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Host Plants and Their Diseases

The information telescoped in this section is taken in large part from the records of the Plant Disease Survey as given in the *Plant Disease Reporter*, *Plant Diseases*, and the *Index of Plant Diseases in the United States*, Agriculture Handbook 165, U.S. Department of Agriculture. I have added recent records as I have run across them in the literature and a few personal observations. Inevitably I have missed some, and there will be many more appearing while this text is in press, so the lists cannot be regarded as complete.

The hosts selected for inclusion here are those trees, shrubs, vines, flowers, as well as vegetables likely to be grown in home gardens. Native plants sometimes grown in wild gardens are here, as well as some forest trees if they are sometimes used as ornamentals. Some plants more often grown for profit are included if they have a place around the home. Cereals, cotton, and other strictly field crops are omitted. Hosts are listed alphabetically by common names except where the scientific names mean less confusion. Often there are several common names, and the Latin name is more likely to be generally recognized.

The diseases are those reported from Maine to Florida, from New York to California, and some from Alaska. Tropical diseases are included only as they affect plants in southern Florida. Diseases peculiar to Puerto Rico, the Canal Zone, and Hawaii are omitted for lack of any personal experience with them, as well as lack of space.

The geographical distribution of diseases can be taken only as a general guide. It is likely that a disease present in New York is also present in

neighboring states but has not been officially reported, or that I have missed seeing the report, or that a long list of states would take too much room. Diseases listed as “general” are prevalent throughout the host range; “wide-spread” means found over a wide area but not prevalent; “occasional” means of infrequent occurrence.

Fungi that are possibly parasitic, and have been recorded as present on leaves or woody plant parts but not as causing a specific disease, have been omitted. Brief comments, following some of the listings, sort out a few of the more important problems, but specific descriptions and control measures are to be found in Chapter 3. In that chapter the diseases are grouped according to the names by which they are commonly known—rot, wilt, blight, blackspot, and so on—and then by the name of the pathogen, the agent causing the disease. In this section on host plants the key word, for example, **rot** or **Blight**, is given first, followed by the name of the pathogen in **boldface**. In the disease section (Chapter 3) the pathogens are likewise listed in boldface, but in alphabetical order under each heading, such as rot or blight, and then the common name of the disease is given.

For instance, your acacia seems to be dying, and you think it may have a root rot; perhaps you can see objects like toadstools at the base. You look up **ACACIA** and check the possibilities until you come to the line: **Rot**, mushroom root. **Armillaria mellea**, occasional; **Clitocybe tabescens**, FL. “Occasional” means that this rot might be found wherever acacias grow. You live in California so you turn to the section head **ROTS** (starting on page 362) and thumb down through the A's until you come to **Armillaria**. Under the name is the classification of the genus, but you can leave that to the pathologist and go on to:

“**Armillaria mellea**; mushroom root rot; of trees and shrubs, also known as *Armillaria* root rot or toadstool disease.” You learn that this disease is especially common in California, and that the honey-colored mushrooms or toadstools are not always present for diagnosis but that black shoestrings are also telltale characters. You conclude that this is your fungus, and you read on to see what can be done to the soil to prevent a recurrence of the problem. But before you do anything too drastic, you should discuss the whole situation with someone at the University of California, for you could be mistaken.

It cannot be expected that a gardener can make accurate diagnosis of disease from reading this book any more than reading a medical book can turn a layperson into a doctor. It takes years of experience to recognize diseases on sight, from macroscopic symptoms, and it takes some technical training to recognize diseases by studying the fungus under the microscope and perhaps growing it in culture. For airtight identification of a bacterium or fungus with a new disease the organism must be repeatedly isolated in culture; the disease must be produced in healthy plants by inoculating them with a pure culture of the organism; and then the fungus, or bacterium, must be reisolated from the artificially infected plant.

In some cases the small number of known diseases for a plant together with

their distinctive type and geographical distribution makes layperson identification relatively reliable. In other cases, specific identification, other than to know that it is a leaf spot, is unnecessary. And in still other cases, specimens should be sent to your state experiment station for diagnosis. It is my hope that the overburdened extension pathologist, receiving some unusual specimen, will find this list of host plants and their diseases of value in speeding up identifications.

Following is a list of the headings under which the diseases are described in Chapter 3. The numbers given with the rusts refer to spore stages (see under Rusts).

Anthracnose—dead spots with definite margins, often with pinkish slimy spore masses, on leaves, stems, or fruit.

Bacterial diseases—all types of diseases, galls, blights, rots, leaf spots, caused by bacteria.

Black knot—black, knotty enlargement of woody tissue.

Blackleg—darkening at the base of a plant.

Black mildew—superficial dark growth caused by parasitic fungi.

Blackspot—a dark leaf spot on rose.

Blights—general killing of leaves, flowers, stems.

Blotch diseases—irregular necrotic areas on leaves or fruit.

Broomrapes—leafless herbs parasitic on roots.

Cankers and dieback—localized lesions on stems or trunks, sometimes accompanied by dying back from the top.

Club root—distorted swollen roots.

Damping-off—sudden wilting of seedlings or rotting of seeds in soil.

Dodder—parasitic seed plant with orange tendrils.

Downy mildews—with internal mycelium but fruiting structures protruding to form white, gray, or violet patches.

Fairy rings—mushrooms growing in circles.

Fruit spots—blemishes on fruit.

Galls—noticeable enlargements of leaves, stems, or roots.

Leaf blister, leaf curl diseases—leaf deformities.

Leaf scorch—discoloration as if by intense heat.

Leaf spots—delimited dead areas in leaves.

Lichens—occasional on trees or shrubs.

Mistletoe—semiparasitic seed plant, forming leafy tufts in trees.

Molds—conspicuous fungus growth on leaves, seeds, or grafts.

Needle casts—conspicuous shedding of evergreen foliage.

Nematodes—causing decline diseases.

Nonparasitic diseases—due to environmental conditions rather than specific organisms.

Powdery mildews—superficial white felty or powdery growth on leaves and flowers.

Rots—soft or hard decay or disintegration of plant tissues.

Rusts—with reddish or rust-colored spore masses.

Scab—raised or crustlike lesions on leaves or fruit.

Scurf—flaky or scaly lesions.

Slime molds—found in lawns.

Smuts—with sooty black spore masses.

Snowmold—light patches in turf, especially early spring.

Sooty mold—superficial black mycelium growing in insect exudate.

Spot anthracnose—light spots with raised darker borders or scabby lesion caused by *Elsinoë* species.

Virus diseases—mosaics, ring spots, yellows, wilt caused by viruses.

White rusts—white blisters in leaves.

Wilts—systemic diseases, with wilting, death of leaves, and branches.

Witchweed—weed parasitic on roots.

ABELIA

Leaf spot. *Cercospora abeliae*, IL.

Nematode, root knot. *Meloidogyne arenaria*; *M. hapla*; *M. incognita*.

Nonparasitic. **Chlorosis**, due to soil alkalinity, TX.

Powdery mildew. *Oidium* sp., TX.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, TX; *Pythium* sp.

ABUTILON

(Flowering Maple, Indian Mallow, Velvet Leaf)

Blight, foliage. *Colletotrichum coccodes*, VT.

Leaf spot. *Alternaria* sp., TX, IL, IN, NJ, NY; *Cercospora avicennae*, KS, MO, VA; *Cladosporium herbarum*, NY, KS; *Colletotrichum malvarum*, IA; *Phyllosticta althaeina*, TX.

Nematode, root knot. *Meloidogyne* sp., AL, FL; *M. incognita*, IN; *M. hapla*.

Rot, root. *Phymatotrichum omnivorum*, TX; *Armillaria mellea*, CA.

Rot, stem. *Macrophomina phaseoli*, IL.

Rust. *Puccinia heterospora* (III), FL to AZ.

Virus. **Abutilon Infectious Variegation**; **Mosaic**, universal.

Wilt. *Verticillium albo-atrum*, NJ; *V. dahlia*, WI.

The leaf spots and rot occur on Indian mallow and velvet leaf. Variegation in flowering maple is a true mosaic disease, although fostered as a desirable ornamental quality.

ACACIA

Canker, twig and branch. *Nectria ditissima*, CA, SC.

Leaf spot. *Physalospora fusca*, FL; *Cercospora* sp., GA; *Phyllachora texana*, TX.

Leaf spot, algal. *Cephaleuros virescens*, FL.
Mistletoe. *Phoradendron californicum*, CA, TX; *P. serotinum (flavescens)*, TX.
Nematode, root knot. *Meloidogyne* sp.
Nonparasitic. **Chlorosis**, due to excess lime, CA. **Gummosis**, due to deficient or irregular moisture, CA.
Powdery mildew. *Erysiphe polygoni*, CA.
Rot, heartwood. *Ganoderma applanatum*, CA.
Rot, mushroom root. *Armillaria mellea*, occasional; *Clitocybe tabescens*, FL.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rot, sapwood. *Schizophyllum commune*, CA.
Rust. *Ravenelia australis*, TX; *R. gooddingii*, AZ; *R. hieronymi*, witches' broom, TX; *R. igualica*, TX; *R. roemerianae*, TX; *R. siliquae*, NM, TX; *R. subtortuosae*, witches' broom, TX; *R. thornberiana*, witches' broom, AZ, TX; *R. versatilis*, AZ, CA, NM, TX.

ACALYPHA (Copper Leaf)

Downy mildew. *Plasmopara acalyphae*, WI.
Gall, leaf. *Synchytrium aureum*, WI.
Leaf spot. *Cercospora acalyphae*, NY to AL, OK, TX, WI; *Phyllosticta* sp., NJ; *Ramularia acalyphae*, TX.
Nematode, root knot. *Meloidogyne* sp., MD, GA; *M. incognita*, IN.
Nematode, lesion. *Pratylenchus* sp., FL.
Powdery mildew. *Erysiphe cichoracearum*, WI.
Rot, mushroom root. *Clitocybe tabescens*, FL.
Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, IL.

ACANTHOPANAX (Five-Leaf Aralia)

Leaf spot. *Alternaria* sp., MO.
Rot, root. *Phymatotrichum omnivorum*, TX.

ACHIMENES

Virus. **Tobacco Mosaic**, CA, CT, FL, OH, WA, DC.

ACTINOMERIS (Yellow Ironweed)

Leaf spot. *Cercospora anomala*, IA; *Gloeosporium* sp., WV.
Powdery mildew. *Erysiphe cichoracearum*, PA to VA and KS.

Rust. *Puccinia verbesinae* (0, I, II, III), MD, ME, TN.

Virus. Tobacco Ring Spot, VA.

ADOXA
(Musk Root)

Gall, leaf. *Synchytrium anomalum*, IA.

Leaf spot. *Phyllosticta adoxae*, CO.

Rust. *Puccinia adoxae* (III), CO, UT, WY; *P. argentata* (0, I), IA, MN, WI. II, III on impatiens.

AESEHYNANTHUS

Virus. Tobacco Mosaic, CA, CT, FL, OH, WA, DC.

AFRICAN DAISY
(*Arctotis*)

Leaf spot, blotch. *Cercospora* sp., FL.

Nematode, root knot. *Meloidogyne* sp., FL.

Rot, crown and stem. *Whetzelinia sclerotiorum*, CA.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, root, crown and stem. *Phytophthora cryptogea*, CA.

AFRICAN VIOLET
(*Saintpaulia*)

Bacterial leaf blight. *Pseudomonas* sp., OR.

Blight, gray mold. *Botrytis cinerea*, cosmopolitan.

Nematode, leaf. *Aphelenchoides ritzema-bosi*; lesion, *Pratylenchus* sp., MD, NJ, OH.

Nematode, root knot. *Meloidogyne arenaria*, general.

Nematode, spiral. *Rotylenchus brachyurus*, MD.

Nonparasitic. Ring Spot, due to wetting foliage with cold water, general.

Petiole Rot, from touching rim of salt-encrusted pot.

Powdery mildew. *Oidium* sp., occasional in greenhouses.

Rot, root. *Rhizoctonia solani*; *Fusarium solani*, MD, NY; *Cylindrocarpon radiculicola*, MD, NY.

Rot, root and crown. *Pythium ultimum*, CA, probably general; *Phytophthora* sp., MD, NC.

Bright yellow ring patterns appear if there is too steep a temperature gradient between leaf and water. Yellowing may be due to excessive bright

sunlight. Nonflowering may be due to improper light. Root-knot nematodes as well as mites cause thickened, blistered leaves.

AGAPANTHUS

(African Lily)

Virus. *Ornithogalum Mosaic*.

AGASTACHE

(Giant Hyssop)

Downy mildew. *Peronospora lophanthi*, IL, IA, WI.

Leaf spot. *Ramularia lophanthi*, CA, MT; *Septoria lophanthi*, IL, MO, OH, WI.

Leaf spot; stem spot. *Ascochyta lophanthi*, IL, IA, WI.

Powdery mildew. *Sphaerotheca macularis* (*S. humuli*), MO, WI, UT, WA.

Rust. *Puccinia hyssopi* (III), NY to IA, MO, WI.

Virus. *Mosaic*. Unidentified, IN.

AGERATUM

Blight, southern. *Sclerotium rolfsii*, NJ, NC, probably widespread.

Powdery mildew. *Erysiphe cichoracearum*, MD.

Rot, root. *Pythium mamillatum*, CA.

Rot, root and stem. *Rhizoctonia solani*, IL, NJ, NM.

Rust. *Puccinia conoclinii* (II, III), GA, MS, NC; 0, I unknown.

Stem rot. *Alternaria zinniae*, IL.

Virus. *Biddens Mottle*, FL.

AGRIMONY

(*Agrimonia*)

Blight, stem. *Phoma herbarum*, TX.

Downy mildew. *Peronospora potentillae*, NY, WI, IA.

Leaf spot. *Cercospora* sp., IL; *Phyllosticta decidua*, NC, WI; *Septoria agrimoniae*, IL, IN, IA, MO, NC, NY, TX, WI; *S. agrimoniae-eupatoriae*, IA.

Powdery mildew. *Sphaerotheca macularis*, MA, NC, NE, WI.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia agrimoniae* (II, III), MO; 0, I unknown.

Rust. *Pucciniastrum agrimoniae* (II, III), general ME to FL, NM, ND; 0, I unknown.

Virus. *Mosaic*. Unidentified, NY.

AILANTHUS

(Tree of Heaven)

- Black mildew. *Dimerosporium robiniae*, DC.
 Blight, twig. *Gibberella baccata* (*Fusarium lateritium*), VA; *Diplodia ailanthi*, TX; *D. natalensis*, TX; *Phoma ailanthi*, TX.
 Canker; dieback. *Nectria cinnabarina*, KS, NJ, SC; *N. coccinea*, occasional; *Physalospora obtusa*, KS, MI, NY.
 Leaf spot. *Cercospora glandulosa*, widespread; *Gloeosporium ailanthi*, WV, LA, TX; *Phyllosticta ailanthi*, VA; *Cristulariella pyramidalis*, FL.
 Rot, butt. *Daedalea unicolor*, occasional.
 Rot, root. *Armillaria mellea*, Northeast; *Phymatotrichum omnivorum*, TX.
 Rot, wound. *Polyporus lacteus*; *P. versicolor*, occasional in living trees; *Schizophyllum commune*.
 Wilt. *Verticillium albo-atrum*, NY, PA, VA.

Ailanthus is well adapted to city smoke and not often troubled by disease except for wilt, which can be serious and has killed many trees in the Philadelphia area.

ALDER

(*Alnus*)

- Blight, gray mold. *Botrytis cinerea*, WA.
 Canker, brown felt. *Septobasidium filiforme*, NC; *S. peckii*, NY.
 Canker; dieback. *Nectria coccinea*, NY, PA; *N. galligena*, NH; *Hymenochaete agglutinans*, MI, NY, PA; *Melanconis alni*, ME to NJ and WI; *Phomopsis alnea*, KY.; *Physalospora obtusa*, SC, VA; *Solenia ochracea*, widespread on bark; *Didymosphaeria oregonensis*, ID, OR, WA.
 Dodder. *Cuscuta compacta*, MD, VA.
 Gall, root. Cause unknown.
 Leaf blister, catkin hypertrophy. *Taphrina robinsoniana*, widespread; *T. japonica*, CA, OR, AK; *T. occidentalis*, CA, OR, ID, MT, WA.
 Leaf spot. *Cercospora alni*, WI; *Cercospora alni*, OR, WA, AK; *Dothidella alni*, black spot; *Gloeosporium tubiformis*; *Cylindrosporium vermiforme*, WI; ?*Ophiodothis alnea*, tar spot, NH, PA; *Phyllosticta alnea*, AK; *Septogloeum variegatum*, CA; *Septoria alni*, NY, WI, CA, OR, WA, AK; *Hyospila californica*, CA.
 Mistletoe. *Phoradendron serotinum* (*flavescens*), AZ, NM; *P. villosum*, CA; *Viscum album*, CA; on *Alnus rubra* (Red Alder).
 Mistletoe, European. *Viscum album*, CA.
 Nematode, root knot. *Meloidogyne* sp.
 Powdery mildew. *Erysiphe aggregata*, ME to NJ, MN, CA, WA; *Phyllactinia corylea*, ME to WI, AL, SC; *Microsphaera alni*, widespread.
 Rot, heart. *Daedalea unicolor*; *Fomes ignarius*; *F. pinicola*; *Ganoderma applanatum*; *Polyporus sulphureus*.

Rot, root. *Armillaria mellea*, CA; *Phymatotrichum omnivorum*, TX.
Rot, wood. *Daedalea confragosa*; *Daldinia occidentalis*; *Fomes scutellatus*;
Lenzites sepiaria; *L. trabea*; *Pholiota adiposa*; *Pleurotus serotinus*; *Polyporus*
adustus; *P. hirsutus*; *P. versicolor*; *Schizophyllum commune*; *Steccherinum*
ochraceum; *Stereum* spp., mostly on dead wood.
Rust. *Melamsoridium alni* (II, III), CA, TX.
Sooty mold. *Scorias spongiosa*, NY to NC and WV.

ALLAMANDA

Nematode, burrowing. *Radopholus similis*, FL.
Nonparasitic. *Chlorosis*, magnesium deficiency in overlimed or acid soil, FL.

ALLIONIA

(Trailing Four-O'Clock)

Downy mildew. *Peronospora oxybaphi*, KS, SD.
Leaf spot. *Ascochyta oxybaphi*, IA, WI; *Cercospora oxybaphi*, IA, KS, WI.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia aristidae*, AZ, NM, TX.
White rust. *Albugo platensis*, AZ, NM, TN, TX.

ALLSPICE

(*Pimenta*)

Rust. *Puccinia psidii*, FL.

ALMOND

(*Prunus amygdalus*)

Anthraxnose; kernel rot. *Gloeosporium amygdalinum*, CA.
Bacterial crown gall. *Agrobacterium tumefaciens*, AL, AZ, CA, NC.
Bacterial leaf spot. *Xanthomonas pruni*, NE.
Bacterial shoot blight; blast. *Pseudomonas syringae*, CA.
Blight, blossom; brown rot. *Monilinia laxa*, CA, OR; *Botrytis cinerea*.
Blight, leaf; shot-hole disease. *Coryneum carpophilum*, CA, ID, OR.
Canker; dieback; crown rot. *Phytophthora cactorum*, CA, *P. citrophthora*,
CA; *Botryosphaeria dothidea* (Dothiorella canker) CA; *Ceratocystis fimbriata*,
CA.
Canker, pruning wound. *Phytophthora syringae*, CA.
Decline, almond. Unknown etiology, CA. "Golden death."
Leaf spot. *Cercospora circumscissa*, CA, OR; *Hendersonia rubi*, CA.

Nematode, lesion. *Pratylenchus vulnus*, CA.
 Nematode, root knot. *Meloidogyne* sp., AZ.
 Nonparasitic. **Bud Failure**, seed transmitted, increased by pruning. **Chlorosis**, iron deficiency. **Little Leaf**, zinc deficiency.
 Powdery mildew. *Podosphaera tridactyla*, CA; *Sphaerotheca pannosa*, CA.
 Rot, green fruit. *Sclerotinia sclerotiorum*, CA.
 Rot, heart. *Polyporus versicolor*, OR.
 Rot, hull. *Rhizopus* spp.
 Rot, root. *Armillaria mellea*, CA, NC; *Phymatotrichum omnivorum*, TX.
 Rot, wound. *Schizophyllum commune*, CA.
 Rust. *Tranzschelia discolor* (II, III); O, I on anemone, CA.
 Scab. *Cladosporium carpophilum*, CA, OR, CT.
 Virus. **Almond Bud Failure**; **Almond Calico**, CA: **Peach Mosaic**; **Peach Ring Spot**; **Peach Rosette**; **Peach Yellow Bud Mosaic**; **Peach Yellows**.
 Wilt. *Verticillium albo-atrum*, CA, IL.

Crown rot and Armillaria rot are often limiting factors in almond production. At least five sprays are necessary to control brown rot, leaf blights, and scab, and often a zinc sulfate spray for little leaf. The California Agricultural Experiment Station Extension Service provides each year a revised "Spray, Dust and Fumigation Program for Almonds."

ALMOND, FLOWERING (*Prunus triloba*)

Bacterial fire blight. *Erwinia amylovora*, IN.
 Bacterial spot. *Xanthomonas pruni*, NJ.
 Blight, blossom and twig. *Botrytis cinerea*, NY; *Monilinia fructicola*, CT, KS.
 Powdery mildew. *Podosphaera oxycanthae*, IA.
 Rot, mushroom root. *Armillaria mellea*, MS; White Root, *Corticium galactinum*, MD.

ALOE

Rot, root. *Pythium ultimum*, CA.

Immerse nursery plants of *Aloe variegata* in hot water at 115°F for 30 minutes; place in cold water; dry; replant.

ALTERNANTHERA

Leaf spot. *Phyllosticta amaranthi*, NJ.
 Nematode, root knot. *Meloidogyne* sp.

Rot, root. **Rhizoctonia solani**, NJ.

Rot, root; wilt. **Fusarium oxysporum**, NJ.

ALYSSUM

(Goldentuft, Yellowtuft)

Club root. **Plasmodiophora brassicae**, NJ.

Damping-off. **Rhizoctonia solani**, NJ.

AMARANTHUS

(Love-Lies-Bleeding, Princes-Feather, Joseph-Coat)

Bacterial, MLO. **Aster Yellows**, NY, MD.

Damping-off. **Pythium debaryanum**, CT.

Leaf spot. **Cercospora canescens**, MD.

Nematode, root knot. **Meloidogyne** sp., FL, MD.

Rot, root. **Phymatotrichum omnivorum**, TX.

Rot, stem. **Macrophomina phaseolina**, AZ.

Virus. **Beet Curly Top**, CA, TX.; **Alfalfa Mosaic**, WA.

White rust. **Albugo bliti**, MA to FL; TX, NE.

AMARYLLIS

(Includes *Hippeastrum*)

Blight, gray mold; bulb rot. **Botrytis cinerea**, occasional, chiefly in outdoor plantings after chilling.

Blight, southern; bulb rot. **Sclerotium rolfsii**, FL, TX.

Leaf scorch; red blotch. **Stagonospora curtisii**, general.

Leaf spot. **Cercospora amaryllidis**, AL, LA; **Colletotrichum crassipes**; **Fusarium bulbigenum**; **Melanospora fallax**; **Epicoccum purpurascens**, secondary.

Nematode, lesion. **Pratylenchus scribneri**, FL. **Scutellonema brachyurum**, FL.

Rot, bulb. **Rhizopus stolonifer**.

Rot, seedling root. **Pythium debaryanum**, FL, TX; Root, **Armillaria mellea**, CA.

Virus. **Cucumber Mosaic**, FL; unidentified **Mosaic**, CA, FL, OK, WI; **Tomato Spotted Wilt**, CA, TX.

Although amaryllis is subject to red spotting from various physiological causes, mite, and insect injuries, the fungus leaf scorch or red blotch is fairly common, with red spots on leaves, flower stalks, and bulb scales.

AMARYLLIS, WILD

(*Nothoscordum bivalve*; *N. inodorum*)

Virus. **Nothoscordum Mosaic**, LA.

AMELANCHIER (Serviceberry, Juneberry)

- Bacterial fire blight. *Erwinia amylovora*, widespread.
 Black mildew; witches' broom. *Apiosporina collinsii*, widespread.
 Blight, leaf. *Fabraea maculata*, widespread.
 Blight, fruit and leaf. *Monilinia gregaria*, WA, CO, IA.
 Canker. *Nectria cinnabarina*, occasional; *Pezicula pruinosa*, widespread;
 Gloeosporium perennans, OR.
 Canker, blister. *Nummularia discreta*, IA, KS, MA, OH.
 Leaf blister; witches' broom. *Taphrina amelanchieri*, CA.
 Leaf spot. *Coccomyces tumidus*, MO, MT; *Cristulariella pyramidalis*, NC;
 Phyllosticta innumerabilis, IA, NE, ND, MN; *P. paupercula*, KS, MT;
 P. virginiana, NY, PA, WI.
 Powdery mildew. *Erysiphe polygona*, ID, MT; *Phyllactinia corylea*, OR, WA;
 Podosphaera oxyacanthae, occasional.
 Rot, brown; fruit. *Monilinia amelanchieris*, NY; *M. fructicola*, MI, OH.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rot, wood butt. *Daedalea unicolor*, cosmopolitan.
 Rust. *Gymnosporangium biseptatum* (I); III on *Chamaecyparis*, northeast-
 ern and Middle Atlantic states. Horned galls, underside leaves. *G. clavariae-*
forme (I) on leaves, fruits, stems; III on juniper. *G. clavipes* (I) on fruits, stems;
 III on juniper. *G. corniculans* (I); III on juniper. *G. cupressi* (0, I); III on cypress.
G. gracile (0, I); III on juniper. *G. harknessianum* (I) on fruits, CA, OR; III
 on juniper. *G. inconspicuum* (I) on fruits; III on juniper. *G. juvenescens* (I);
 III on juniper, in West (may be *G. nidusavis*). *G. kernianum* (I) on leaves,
 AZ, CO, OR; III on juniper. *G. libocedri* (I) on leaves, CA, OR; III on
 juniper. *G. nelsoni* (I) on leaves, fruits; III on juniper. *G. nidusavis* (I) on
 leaves, fruits, stems; III on juniper, central and eastern states.

AMORPHA (Leadplant, Indigobush)

- Canker, twig. *Cytospora amorphae*.
 Leaf spot. *Cylindrosporium passaloroides*, widespread; *Diplodia amorphae*,
 TX.
 Powdery mildew. *Erysiphe polygona*, IA, MN, WY.
 Rust. *Uropyxis amorphae*, general.

AMPELOPSIS (*A. cordata* and Other Species)

- Canker; dieback. *Nectria cinnabarina*, occasional.
 Downy mildew. *Plasmopara viticola*, NY, WI.
 Leaf spot. *Cercospora truncata*, LA; *C. vitis*, LA, AL; *Guignardia bidwellii*,
 widespread; *Linospora psederiae*, WV; *Phleospora ampelopsidis*, WI.

Nematode, dagger. *Xiphinema index*.
Powdery mildew. *Uncinula necator*, widespread.
Rot, root. *Helicobasidium purpureum*, TX.

AMSONIA

Leaf spot. *Mycosphaerella* sp., GA.
Rust. *Coleosporium apocyanaceum* (II, III) on leaves, FL, GA, SC; 0, I on pine. *Puccinia seymouriana* (0, I), MO; II, III on marsh grass.

ANAPHALIS

(Pearl Everlasting)

Leaf spot. *Septoria margaritaceae*, NY, OR, WI.
Rust. *Uromyces amoenus* (III), CA, ID, MI, MT, OR, WA, WY.

ANCHUSA

(Buglos, Alkanet)

Damping-off. *Rhizoctonia solani*, CT.
Leaf spot. *Stemphyllium* sp., NY.
Rust. *Puccinia recondita* var. *secalis* (0, I), IN, MI: II, III on rye.
Virus. Mosaic, unidentified, IN.

ANDROMEDA

(Bog Rosemary)

See *Lyonia* and *Pieris* for shrubs commonly called *Andromeda*.

Black mildew. *Asterina clavuligera*, GA, NJ.
Gall; red leaf spot. *Exobasidium vaccinii*, ME, NY, WI, AK.
Leaf spot. *Venturia arctostaphyli*, NY.
Leaf spot, tar. *Rhytisma andromedae*, ME to NC, MI, MN, AK.
Powdery mildew. *Microsphaeraalni* var. *vaccinii*, MA, NJ.
Rust. *Chrysomyxa cassandrae* (II, III); 0, I on pine.

ANEMONE

(Cultivated Forms, Japanese)

Bacterial, MLO. Aster Yellows, CA.
Blight, collar rot. *Botrytis cinerea*, NJ, PA.
Blight, southern. *Sclerotium rolfsii*, CA, MD, MA.
Leaf spot. *Gloeosporium* sp., NY; *Phyllosticta anemones*, MD.

Nematode, leaf. *Aphelenchoides fragariae*; *A. ritzema-bosi*, CA.

Nematode, root. *Aphelenchus agricola*, CA.

Rust. *Tranzschelia cohaesa* (0, I, II, III), TX; *T. discolor* (0, I), CA, OR; II, III on *Prunus* spp.

Virus. Mosaic. Unidentified, CA.

ANEMONE

(Native Species)

Downy mildew. *Plasmopara pygmaea*, widespread.

Gall. *Synchytrium anemones*, IA, MA, MI, MN, VT, WI.

Leaf spot. *Cercospora pulsatillae*, CO; *Cercospora filiformis*, WI; *Didymaria didyma*, IA, MI, WI; *Phleospora anemones*, IA; *Phyllosticta anemonicola*, IL, MI, ME, NE, VA, WI; *Ramularia ranunculi*, NY, WI; *Septoria anemones*, IL, IA, MS, MO, TX, VT, WI; *S. cylindrica*, MT, VA; *S. punicea*, MA, MI, MS, NE, KS.

Powdery mildew. *Erysiphe polygoni*, IL, IA, IN, MI, MN, ND, NJ, WI.

Rust. *Puccinia anemones-virginianae* (III), ME to MS to NE, ND; *P. gigantispora* (0, I, III), CO, IL, ID, MT, ND, WI, WY; *P. magnusiana* (0, I), NY to KS, ND; II, III on reed grasses; *P. pulsatillae* (III), CO, IA, ND, SD; *P. recondita* (0, I), NY to TX; II, III on grasses; *P. retecta*, CO, AK; *P. vesiculosa*, AK.

Rust. *Tranzschelia cohaesa* (0, I, II, III), TX; *T. pruni-spinosae* (0, I), KS, IA, NE to TX, AL; II, III on *Prunus* spp.; *T. fusca* (0, III), MA to VA, CA, and Northwest; *T. suffusca* (0, III), CO, IA, MT, ND, SD; *T. tucsonensis* (0, I, II, III), AZ.

Smut, leaf and stem. *Urocystis anemones*, ME to DE, CO, KS, IA, MN, ND, WI, AK; *U. sorosporioides*, AK.

Smut, white. *Entyloma ranunculi*, WI.

ANGELICA

Leaf spot. *Cercospora apii* var. *angelicae*, AK; *C. thaspiae*, AL, TX; *Fusicladium angelicae*, general; *Gloeosporium angelicae*, SC; *Phyllosticta angelicae*, CA, WY; *Piggotia depressa*, MT; *Ramularia angelicae*, CO; *Septoria dearnessii*, WI, NC.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia angelicae* (0, I, II, III), NY, OR, PA, WA; *P. bistortae*, AK; *P. coelopleuri* (0, I, II, III), AK; *P. ellisii*, CA, ID, NV, OR, WA; *P. ligustici*, CO, WA; *P. poromera*, UT.

ANISE

(*Pimpinella anisum*)

Leaf spot. *Cercospora malkoffi*, VA.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, stem. **Sclerotinia sclerotiorum**, CA, TX.

Rust. **Puccinia pimpinellae** (0, I, II, III), CA.

ANISE-TREE

(*Illicium floridanum*)

Black mildew. **Lembosia illiciicola**, AL, MS.

Leaf spot, algal; green scurf. **Cephaleuros virescens**, LA, SC.

Sooty mold. **Capnodium footii**, MS.

ANODA

Nematode, cyst. **Meloidogyne hapla**.

Powdery mildew. **Oidium erysipheoides**, NM.

Rust. **Puccinia** sp., TX.

ANTIDESMA

(Chinese Laurel)

Leaf spot, algal; green scurf. **Cephaleuros virescens**, FL.

ANTHURIUM

Bacterial blight. **Xanthomonas campestris** pv. **dieffenbachiae**, CA.

Nematode, lesion. **Pratylenchus pratensis**, LA.

APHELANDRA

(*Zebra plant*)

Leaf spot. **Myrothecium roridum**, FL.

Nonparasitic. **Physiological**, leaf crinkle, shortened internodes, axillary bud proliferation, TX.

Rot, stem. **Phytophthora parasitica**, FL.

APPLE

(*Malus sylvestris*)

Anthracnose, northwestern; canker; fruit rot. **Neofabraea malicorticis**, prevalent OR, WA, occasional CA, IL, MA, ME, MI, NE, OK.

Bacterial blast, of flowers, shoots. **Pseudomonas syringae**, AR, CA; blister spot of bark and fruit. **P. syringae** pv. **papulans**; rot, **P. melophthora**.

- Bacterial crown gall. *Agrobacterium tumefaciens*, general; hairy root, *A. rhizogenes*, central states, ID, NY.
- Bacterial fire blight. *Erwinia amylovora*, general.
- Blight, limb. *Corticium laetum*, LA, NC; *C. salmonicolor*, FL, LA.
- Blight, southern. *Sclerotium rolfsii*, on seedlings.
- Blight, thread. *Pellicularia koleroga*, WV and IN to Gulf states.
- Blotch, fruit; Leaf spot; twig canker. *Phyllosticta solitaria*, general except New England and the far South.
- Blotch, sooty, of fruit. *Gloeodes pomigena*, eastern and central states.
- Canker, bark; fruit rot. *Myxosporium corticola*, New England to MD, IL, MI, OK, OR, SD.
- Canker, blister. *Nummularia discreta*, east of the Rocky Mountains.
- Canker, crater. Cause unknown, sunken bark, crown rot, decline. WA.
- Canker; dieback. *Botryosphaeria ribis*, East and South; *Cytospora* spp., widespread; *Fusarium* spp., also fruit rot, Pacific Northwest, secondary to drought, winter injury, insect punctures; *Coryneum foliicola*, widespread; *Glutinium macrosporium*, OR; *Leptosphaeria coniothyrium*, East, central states, WI; *Plenodomus fuscomaculans*, CA, MI.
- Canker, European. *Nectria galligena*, East and central states to NC and MS; Pacific Coast.
- Canker; Leaf spot. *Monochaetia mali*, IL, NJ to SC, MO, WV.
- Canker, perennial; bull's-eye fruit rot. *Neofabraea perennans*, ID, MT, OR, WA.
- Canker, sapwood rot. *Hymenochaete agglutinans*, CT; *Hypoxylon* spp.
- Canker, scurf bark. *Clasterosporium* sp.
- Canker, twig. *Coryneum foliicolum*, widespread; *Gibberella baccata*; *Nectria cinnabarina*, northern U.S.
- Decline. *Irpex tulipiferae*, MN; *Coriulus versicolor*, also dieback, MN, WA; *Schizophyllum commune*, MN.
- Fruit spot, black pox; canker; leaf spot. *Helminthosporium papulosum*, IN, MA, MS, NJ, OH, PA, WV, GA.
- Fruit spot, brooks. *Mycosphaerella pomi*, New England to NC, AR, MO, IA.
- Fruit spot, fly speck. *Microthyriella rubi*, general.
- Leaf spot. *Cercospora mali*, Gulf states, VT; *Coniothyrium pyrinum*; *Diaporthe pernisiola*, AR; *Fabraea maculata*, IA; *Illosporium malifoliorum*, PA to NC, IN; *Mycosphaerella sentina*, IL, NJ, PA; *Pestalotia* spp., MD to NC, IN, ID; ghost spot, *Alternaria tenuis*, GA; *Cristulariella pyramidalis*, FL, on *Malus pumila*.
- Mistletoe. *Phoradendron serotinum (flavescens)*, NC, TX; *Viscum album*, CA.
- Nematode, lesion. *Pratylenchus penetrans*; *P. pratensis*.
- Nematode, root knot. *Meloidogyne* spp., MS, TX, UT.
- Nonparasitic
- Bitter Pit, Stippen, Baldwin Spot**, general in storage.
- Black End**. Probably drought injury, AL, OR, WA.
- Black Heart**, of wood. Perhaps freezing injury; widespread.
- Brown Core**, in MacIntosh variety. Excessive nitrogen, low storage temperature.

- Callus Knot.** Wound overgrowth from defective union of stock and scion.
- Chlorosis.** Usually iron deficiency in alkaline western soils.
- Collar Rot.** Winter injury.
- Cork; Rosette.** Boron deficiency, northeastern states to IN, KY, Pacific Coast.
- Internal Bark Necrosis.** Cause unknown, possibly same as measles; general.
- Jonathan Spot.** Associated with dry weather, delayed storage.
- Leaf Scorch.** Magnesium deficiency.
- Measles,** reddish pimples in bark. Widespread; cause unknown, possibly boron deficiency in part. False measles due to manganese toxicity.
- Ozone Injury.** Pitted area in flesh.
- Rosette,** little leaf. Usually zinc deficiency.
- Scald.** Discoloration of fruit skin by volatile respiratory products, general in storage. Controlled by oiled paper wraps.
- Soft Scald and Soggy Breakdown.** Associated with delayed storage and low temperature.
- Stigmonose.** Fruit dimpling, distortion from insect punctures; widespread.
- Sunburn,** of fruit. Heat or light injury.
- Sunscauld,** of bark. Freezing injury of trunk and larger branches on side exposed to sun.
- Water Core.** Deficient or irregular water supply.
- Powdery mildew.** *Podosphaera leucotricha* and *P. oxycanthae*, general.
- Rot,** bitter, of fruit; canker. *Glomerella cingulata*, general, especially in South, rare in West; *G. rubicola*, IL.
- Rot,** black; frog-eye leaf spot; canker. *Physalospora obtusa*, general to the Great Plains; *P. mutila*, CA, MT, OR, WA; *P. rhodina*, KY.
- Rot,** black root. *Xylaria mali*, eastern and central states.
- Rot,** brown. *Monilinia fructicola*, general except for far South; *M. laxa*, OR, WA.
- Rot,** calyx-end. *Alternaria* sp., *Sclerotinia sclerotiorum*, NH, WA.
- Rot,** crown. *Phytophthora cactorum*, MA.
- Rot,** fruit. *Alternaria mali*; *Aspergillus niger*; *Cephalosporium carpogenum*; *Corticium centrifugum*, Pacific Northwest, occasional in East; *Chaetomella* sp., WA; *Cladosporium* spp.; *Endomyces mali*; *Epicoccum granulatum*, WA; *Gloeosporium* spp.; *Gliocladium viride*, IL; *Hormodendron cladosporioides*, WA; *Mucor piriformis*, WA; *Oospora* sp.; *Phialophora malorum*, IN, VA, WA; *Pleospora fructicola*, WA; *P. herbarum*, Pacific states; *Penicillium* spp., cosmopolitan; *Phoma* spp.; *Stemphylium congestum*, WA; *Tricothecium roseum*, general; *Botrytis* spp.; *Colletotrichum fructus*; *Rhizopus nigricans*, cosmopolitan.
- Rot,** fruit (postharvest). *Phomopsis mali*, core rot, CA, NY; *Trichoderma harzianum*, MD.
- Rot,** heartwood. *Fomes fomentarius*; *F. ignarius*; *F. pinicola*; *Ganoderma applanatum*.
- Rot,** mushroom root. *Armillaria mellea*, prevalent on Pacific Coast; *Clitocybe tabescens*, AR, FL, TX, VA.
- Rot,** root. *Phymatotrichum omnivorum*, AZ, AK, NM, TX; *Fusarium oxysporum*, ID; *F. solani*, ID.

- Rot, silverleaf. *Stereum purpureum*, KS, ME, MN, NY, Pacific Northwest.
- Rot, white root. *Corticium galactinum*, DE to VA; AR, IL; *Rosellina necatrix*, CA.
- Rot, wood. *Daedalea confragosa*; *Poria* spp.; *Pleurotus ulmarius*; *Pholiota adiposa*; *Polyporus* spp.; *Stereum* sp.; *Schizophyllum commune*; *Trametes* spp.
- Rust. *Gymnosporangium libocedri*. (0, I), on leaves, fruit; III on incense cedar, CA, OR; *Gymnosporangium nidus-avis* (0, I), on leaves, fruit, stems, IN, MD, MS, NJ; III on red cedar.
- Rust, cedar apple. *Gymnosporangium juniperi-virginianae* (0, I) on leaves, fruit; general east of Great Plains; III on red cedar and Rocky Mountain juniper.
- Rust, hawthorn. *Gymnosporangium globosum* (0, I) on leaves; III on red cedar, ME to AK, KS, NE.
- Rust, quince. *Gymnosporangium clavipes* (0, I), on fruit; III on common juniper and red cedar.
- Scab. *Venturia inaequalis*, general.
- Sooty mold. *Fumago vagans*, occasional.
- Spot anthracnose. *Elsinoë piri*, OR, WA.
- Virus, Apple Mosaic; Tulare Apple Mosaic, CA; Tobacco Mosaic; Dapple Apple, NH; Green Mottle, NY; Stem-pitting; Tomato Ringspot, Decline and Graft Union Necrosis, WA
- Wilt. *Verticillium albo-atrum*.

If this appalling list of diseases should make you think twice before planting apples in the backyard with the expectation of getting cheap and abundant fruit, that is all to the good. There is no easy or cheap road to perfect fruit. The commercial grower may, in a wet season, apply nearly 20 sprays to keep scab under control. The homeowner thinks one or two are enough. State experiment stations offer abbreviated schedules for home gardeners, tailored for the area, and if these are followed carefully, a fairly good crop can be expected. There are also all-purpose mixtures available for fruit trees, which may work reasonably well. Scab is the most important apple disease, and proper timing of early season sprays is most essential. Bitter rot, black rot, sometimes rust need attention. Fire blight control is primarily a question of proper pruning to remove infected wood, with an antibiotic spray during bloom.

APPLE-OF-PERU (*Nicandra*)

- Leaf spot. *Cercospora physaloides*, IN.
- Rot, Root. *Phymatotrichum omnivorum*, TX.
- Virus. Mosaic. Unidentified, ID, IA, KY, WA, WI. Experimentally infected with several viruses.

APRICOT
(*Prunus armeniaca*)

- Bacterial canker; gummosis. *Pseudomonas syringae*, CA, OR.
Bacterial crown gall. *Agrobacterium tumefaciens*, widespread. Japanese apricot (*Prunus mume*) is resistant.
Bacterial fire blight. *Erwinia amylovora*, CO, FL, NE, PA, TX.
Bacterial leaf spot. *Xanthomonas pruni*, IL to TX, NE.
Black knot. *Dibotryon morbosum*, CO, IA, NY.
Blight, blossom, twig; brown rot. *Monilinia laxa*, Pacific Coast states.
Blight, shoot; shot hole; fruit spot. *Coryneum carpophilum*, widespread.
Canker, felt fungus. *Septobasidium pseudopedicellatum*, MS.
Canker, trunk. *Phytophthora cactorum*, CA; *P. citrophthora*, CA.
Canker, trunk and limb gall. *Monochaetia rosenwaldia*, CA.
Canker, twig; dieback. *Cytospora* spp., AZ, NY; *Valsa leucostoma*, MO, TX; Cytosporina dieback, *Eutypa armeniaceae*, CA; *Ceratocytis fimbriata*, CA.
Canker; dieback; coral spot. *Nectria cinnabarina*, IN, WA.
Fruit spot. *Venturia ?cerasi* (See under Scab).
Leaf curl. *Taphrina ?deformans*, SC.
Leaf spot. *Cercospora circumscissa*, TX; *Coccomyces* sp., CA, MA, TX, VT; *Phyllosticta circumscissa*, CA.
Nematode, dagger. *Xiphinema* sp., WV, NY.
Nematode, lesion. *Pratylenchus vulnus*, CA; *P. penetrans*, NY.
Nematode, root knot. *Meloidogyne* sp., AZ, TX.
Nonparasitic
 Arsenical Injury, from accumulation in soil, CA.
 Chlorosis, alkali injury. Mineral deficiency, AZ, CA.
 Exanthema. Copper deficiency, CA.
 Gummosis, sour sap. Adverse soil and moisture conditions, AZ, CA, NJ, WA.
 Internal Browning, fruit cracking. Boron deficiency, WA.
 Little Leaf. Zinc deficiency, CA, OR, WA.
 Mottle Leaf. Manganese deficiency, CA.
Powdery mildew. *Podosphaera oxycanthae*, CA, IA; *Sphaerotheca pannosa*, NY, CA.
Rot, blossom end; fruit spot. *Alternaria* sp., and *A. citri*, CA.
Rot, brown; blossom blight. *Monilinia fructicola*, widespread on ripe fruit.
Rot, green fruit; gummosis. *Botrytis cinerea*, CA.
Rot, green fruit; twig blight. *Sclerotinia sclerotiorum*, CA; *Lambertella pruni*, CA.
Rot, heart. *Schizophyllum commune*, after freezing, TX, WA; *Trametes hispida*, CO.
Rot, mushroom root. *Armillaria mellea*, CA, TX; *Clitocybe tabescens*, FL.
Rot, root. *Phymatotrichum omnivorum*, AZ, OK, TX.
Rot, silver leaf. *Stereum purpureum*, CA.
Rust, *Tranzchelia discolor* and *T. pruni* (II, III), CA, MS, NM, TX.

Scab; freckle; twig canker. *Cladosporium carpophilum*, widespread.
Virus. **Apricot Gummosis**, WA; **Apricot Pucker Leaf**, UT; **Apricot Ring Pox**, CA, CO, WA; **Peach Mosaic**, Southwest; **Peach Phony**, GA; **Peach Ring Spot**, western U.S.; ?**Peach Rosette**; **Peach Yellow Bud Mosaic**, CA; **Peach Yellows**, occasional in East; **Stem Pitting**.
Wilt. *Verticillium albo-atrum*, CA, UT, WA.

Apricots are very susceptible to *Armillaria* root rot and should be on resistant Myrobalan rootstock. Bacterial canker is an epidemic disease in many seasons, with activity starting in late autumn, ceasing in early summer. Sprays are usually needed in California for zinc deficiency, brown rot, green or jacket rot, shot hole. Write to the California Agricultural Experiment Station for a special spray schedule.

AQUATIC PLANTS

(*Caboriaba* sp., *Limnophila* sp., *Replis diandra*, and *Potamogeton* sp.)

Nematode, foliar. *Aphelenchoides fragariae*, FL.

ARABIS

(Rock-Cress)

Blight, gray mold. *Botrytis cinerea*, WA.
Club root. *Plasmodiophora brassicae*.
Damping-off. *Rhizoctonia solani*, NJ.
Downy mildew. *Peronospora parasitica*, AL, CO, IN, MI, TX, WI, AK.
Leaf spot. *Septoria arabidis*, CO, TX.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia thlaspeos* (*P. holboelli*) (0, III), on numerous native but not cultivated species in Rocky Mountains and Pacific states; *P. monoica* (0, I) on native species, WI to CO, NM, CA, WA; II, III on *Koehleria* and *Trisetum*.
White rust; white blister. *Albugo candida*, NY to VA, TX, CO, WA.

ARALIA, HERCULES CLUB

(*Aralia spinosa*)

Canker, dieback. *Botryosphaeria ribis*, GA, VA, WV; *Nectria cinnabarina*, VA, WV.
Leaf spot. *Cercospora atromaculans*, LA, TX; *Phyllosticta araliae*, TX; *P. everhartii*, TX, WV, *Stagonospora* sp., WV.
Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, TX.
Rot, sapwood. *Polyporus tulipiferus*, MD.
Spot anthracnose, scab. *Sphaceloma araliae*, MD, MO.

ARALIA, MING

(*Polyyscias*)

Blight. *Alternaria panax*, FL.

ARALIA, SARSAPARILLA, AMERICAN SPIKENARD

(*Aralia hispida*, *A. nudicaulis*, *A. racemosa*)

Leaf spot. *Alternaria* sp., NY; *Ascochyta marginata*, WI; *Cercospora leptosperma*, IA, MI, NY, WI; *Phyllosticta decidua*, WI; *Ramularia repens*, WI; *Sclerotium deciduum*, WI.

Powdery mildew. *Phyllactinia corylea*, MI, NE.

Rust. *Nyssospora clavellosa* (III), MN, OR, TX, CA, ME to PA.

Wilt. *Verticillium albo-atrum*, NY.

ARALIA, UDO

(*Aralia cordata*)

Blight. *Alternaria* sp., DE, NJ.

Rot, stem. *Sclerotinia sclerotiorum*, MD.

Wilt. *Verticillium albo-atrum*, MD, PA.

ARAUCARIA

(Monkey-Puzzle, Norfolk-Island-Pine)

Bacterial crown gall. *Agrobacterium tumefaciens*, CA.

Blight. *Cryptospora longispora*.

Leaf spot. *Pestalotia funerea*, CA, and *P. micheneri*, PA, probably secondary; *Stictis araucariae*, CA.

ARBORVITAE

(*Thuja*)

Blight, fire. *Cercospora thujina*, on oriental arborvitae, AR, LA, MS, TX, GA.

Blight, gray mold. *Botrytis cinerea*, NJ.

Blight, leaf. *Didymascella thujina*, TX, VT to WI.

Blight, nursery. *Phomopsis juniperovora*, IN, KY, OH, PA, VA; *P. occulta*, secondary.

Blight, snow. *Phacidium infestans*, Northeast.

Blight, twig. *Coryneum berckmanii* on oriental arborvitae, OR, WA.

Blight, twig. *Alternaria* sp.; *Mycosphaerella* sp; *Pestalotia funerea*; *Phytophthora* sp.; *Heterosporium* sp., OR.

Canker, bark patch. *Aleurodiscus amorphus*; *A. nivosus*, other species.

Canker, cypress. *Coryneum cardinale*, CA.

Canker; dieback. *Diplodia* sp., AL, FL.

Damping-off. *Rhizoctonia solani*, NM, NY, TX, VA.

Needle cast. *Lophodermium thujae*, ME, NH, NY, WI.

Rot, mushroom root. *Armillaria mellea*, MI, MS, NY, TX; *Clitocybe tabescens*, FL, LA.

Rot, root. *Phymatotrichum omnivorum*, TX; *Fusarium solani*, TX.

Rot, wood. *Fomes annosus*, MI; *F. roseus*, ME; *Poria vaporaria*, *P. weirii*, Great Lakes states; *Lenzites saepiaria*, MN; *Polyporus* spp.; *Schizophyllum commune*, ME; *Trametes* spp.

Giant arborvitae used for timber has many more wood rots than those listed. Oriental arborvitae in the South often looks as if blighted by fire, with nursery losses higher than in gardens. A copper spray, monthly from June to September, controls this blight. In the Northwest *Coryneum berckmanii* causes discoloration and shedding of branches, while *C. cardinale* is sporadically injurious.

ARCTOTIS

Leaf blotch. *Cercospora* sp., FL.

Nematode, root knot. *Meloidogyne* sp., FL.

Rot, root. *Phymatotrichum omnivorum*, TX.

ARDISIA

Leaf spot, algal. *Cephaleuros virescens*, FL.

ARGYREIA

Nematode, root knot. *Meloidogyne* sp., SC.

Rot, root. *Phymatotrichum omnivorum*, TX.

ARMERIA

(Sea-Pink, Thrift)

Rust. *Uromyces armeriae* (0, I, II, III), CA, OR.

ARNICA

Leaf spot. *Ovularia hughesiana*, MT; *Phyllosticta arnicae*, CO, MT, UT, WY.

Powdery mildew. *Erysiphe cichoracearum*, CO; *Sphaerotheca macularis* (*S. humuli* var. *fuliginea*), CA, WA, WY, AK.

Rust. *Puccinia arnicalis* (II, III) AK, to MT, CO, CA; 0, I unknown; *Uromyces junci* (0, I), CA, CO, MT, OR, SD, WY; II, III on *Juncus* spp.
Smut, white. *Entyloma arnicale*, CO, ID, MT, UT, WA, WY, AK.

ARROW-ARUM

(*Peltandra*)

Leaf spot. *Cercospora callae*, AL, DE, FL, NY; *Colletotrichum* sp., AL; *Gloeosporium paludosum*, DE, IN, MA, NY; *Pestalotia aquatica*, secondary; *Ramularia* sp., MI.

Rust. *Uromyces ari-triphylli* (*U. caladii*) (0, I, II, III), MA to FL, IL, IN, IA.

ARROWHEAD

(*Sagittaria*)

Leaf spot. *Cercospora alismatis*, VT to AL, TX, WI; *Didymaria alismatis*, *Gloeosporium confluens*, IA, MA, TX, WI; *Marssonina* sp., LA.

Smut, leaf. *Burrillia pustulata*, IL, NE, WI; *Doassansia deformans*, MA to NJ, MO, SD, FL, TX; *D. furva*, WI; *D. intermedia*, IA, MN, NH, ND, WI; *D. obscura*, CT, MA; *D. opaca*, MA to DE, IL, WI; *D. sagittariae*, CT to KS, TX, AR, MT, WY.

ARROWROOT

(*Maranta*)

Leaf spot. *Glomerella cingulata*, MD, NJ.

Rust. *Puccinia thaliae* (*P. cannae*) (II, III), FL.

ARTEMISIA

(Wormwood)

Blight, leaf. *Cercospora olivaceae*, ND, NJ, NY; *Systrema artemisiae*, black pustule, PA.

Downy mildew. *Peronospora leptosperma*, IA, MN, ND, SD, WI.

Gall, leaf. *Synchytrium aureum*, WI.

Leaf spot. *Cercospora ferruginae*, NY, WI; *Gloeosporium heterophyllum*, CA.

Nematode, root knot. *Meloidogyne* sp., FL.

Powdery mildew. *Erysiphe cichoracearum*, CA, SD, IA, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia tanacetii* (*P. absinthii*) (0, I, II, III), CA; *P. atrofusca* (0, I) ND; II, III on *Carex* spp.; *P. millefolii* (III), CA.

White rust. *Albugo tragopogonis*, IA, MT, ND, SD, TX, WI.

ARTICHOKE, GLOBE

*(Cynara scolymus)*Blight, gray mold. *Botrytis cinerea*, CA, NY.Blight, southern. *Sclerotium rolfsii*, GA.Leaf spot. *Cercospora obscura*, CA, TX; *Cladosporium* sp., CA, SC; *Ramularia cynarae*, CA, prevalent.Nematode, root knot. *Meloidogyne* sp., CA.Powdery mildew. *Erysiphe cichoracearum*, CA, NJ.Rot, root. *Phytophthora megasperma*, CA; *Phymatotrichum omnivorum*, TX.Rot, root, stem. *Rhizoctonia solani*, MS, TX. *Sclerotinia sclerotiorum*, OR.

Virus. Artichoke Curly Dwarf.

ARTICHOKE, JERUSALEM

*(Helianthus tuberosus)*Bacterial leaf spot. *Pseudomonas syringae* pv. *tagetis*, MNBacterial spot. ?*Pseudomonas helianthi*, IL.Blight, southern. *Sclerotium rolfsii*, FL, LA, MS, SC, TX.Downy mildew. *Plasmopara halstedii*, VT and NJ to KS, SD.Leaf spot. *Cercospora helianthi*, KS; *Septoria helianthi*, IL, IA, WI.Nematode, root knot. *Meloidogyne* spp., CA, FL, MD, NY, SC, TN.Powdery mildew. *Erysiphe cichoracearum*, general.Rot, root. *Phymatotrichum omnivorum*, TX, AZ; *Rhizopus stolonifer*, MS.Rot, stem, wilt. *Sclerotinia sclerotiorum*, MA, MN, WA.Rust. *Coleosporium helianthi* (II, III), AL, IL, NY, NC, SC, OK, PA, TN, VA;*Puccinia helianthi* (0, I, II, III), general; *Uromyces junci*, (0, I), NE, ND.

ARTILLERY PLANT, ALUMINUM PLANT

*(Pilea)*Bacterial leaf spot. *Xanthomonas campestris*, FL.Blight, leaf, stem, bud. *Phytophthora parasitica*, FL.Leaf spot. *Myrothecium roridum*, FL; *Septoria pileae*, IL, IN, IA, MI, MO, NY, WI.Nematode, root knot. *Meloidogyne* sp., FL.Rot. *Rhizoctonia* sp., FL.

ARUNDO

(Giant Reed)

Leaf spot; cane "Anthracnose"; dieback. *Papularia sphaerosperma*, general.*P. odora*, KS; *Phyllosticta tuberosa*, OK.

Leaf spot; stem speckle.. **Selenophoma donacis**, CA.

Rot, root. **Armillaria mellea**, MD

Rust. **Puccinia chloridis** (*P. bartholomaei*) (0, I), OK, TX, KS; II, III, on *Bouteloua* spp.; **Uromyces asclepiadis** (II, III), KS, NM, TX.

Rust, crown. **Puccinia coronata**, CA.

ASH

(*Fraxinus*)

Anthraxnose, leaf scorch. **Gloeosporium aridum**, eastern and central states.

Bacterial decline. **MLO**, IA, IN, IL, NY.

Bacterial hairy root. **Agrobacterium rhizogenes**, IA, NE to OK.

Black mildew. **Dimerosporium pulchrum** (*Sarcinella heterospora*).

Blight, seedling. **Rhizoctonia solani**, OK.

Canker, bark patch. **Aleurodiscus** spp., eastern states; **Felt Fungus**, **Septobasidium** spp., NC to FL.

Canker, branch, trunk. **Dothiorella fraxinicola**, IA, KS, NE; **Sphaeropsis** sp., widespread; **Nectria cinnabarina**; **N. coccinea**, Northeast.

Canker; dieback. **Cytospora annularis**, north central states; **Diplodia infuscans**, Northeast; **Cytophoma pruinosa** and **Fusicoccum** sp., may be secondary, Northeast.

Dodder. **Cuscuta** sp.

Leaf spot. **Cercospora fraxinites**, AL, FL, LA, TX; **Cylindrosporium fraxini** (including reports of *Marssonina fraxini*, *Piggotia fraxini*), widespread; **Mycosphaerella effigurata**, widespread; **M. fraxinicola**; **Actinopelte dryina**; **Cytospora** sp., VA.

Mistletoe. **Phoradendron serotinum (flavescens)**, south central to Pacific states.

Mistletoe. **Viscum album**, CA, on *Fraxinus velutina* (Arizona ash).

Mistletoe. European. **Viscum album** on Arizona ash, CA.

Nematode. **Meloidogyne** spp., AZ, MD, OK.

Nematode, dagger. **Xiphinema americanum**, SD on green ash.

Powdery mildew. **Phyllactinia corylea**, northeastern, central, Pacific Coast states. ?**Uncinula circinata**, IA; **Microsphaera alni**, IL.

Rot, collar. **Helicobasidium purpureum**, TX.

Rot, root. **Phymatotrichum omnivorum**, AZ, TX.

Rot, sapwood. **Lentinus tigrinus**, MS.

Rot, white mottled heart, stem. **Fomes fraxinophilus**, eastern and central states to Great Plains; many other species of *Fomes*.

Rot, wood. **Daldinia concentrica**, cosmopolitan; **Daedalea** spp.; **Ganoderma lucidum**, MS, LA; **Polyporus** spp.; **Poria** spp.; **Schizophyllum commune**, cosmopolitan; **Trametes** spp.

Rust. **Puccinia sparganoides** (0, I), general east of Great Plains; II, III on marsh grass (*Spartina* spp.).

Virus. Ash Ring Spot, NY; **Tobacco Mosaic Virus**, MA, NY; **Tobacco Ring Spot Virus**, NY.
Wilt. Verticillium albo-atrum, CO.

Ash rust is epidemic in New England in many seasons, causing defoliation and sometimes death of trees. Anthracnose and leaf spots may be important in a wet season.

ASH, MORAINE
(*Fraxinus holotriocha*)

Virus. Tobacco Mosaic, NY; **Tobacco Ringspot**, NY.

ASPARAGUS
(*Asparagus officinalis*)

Anthracnose; canker. *Colletotrichum* sp., AL, CT, IL.
Bacterial soft rot. *Erwinia carotovora*, general.
Blight, ashy stem. *Macrophomina phaseoli*, TX.
Blight, branchlet; dieback. *Alternaria* sp., IL, MA, NY, OK, SC; *Stemphylium botryosum*, secondary; *Ascochyta* sp., DE, TX.
Blight, gray mold, shoot. *Botrytis cinerea*, CA, IL, MA, NY, WV.
Canker, stem spot. *Phoma asparagi*.
Damping-off, stem canker. *Rhizoctonia solani*, occasional.
Leaf spot. *Cercospora asparagi*, general; *Pleospora herbarum*; *P. allii* anamorph, *Stemphylium vesicarium*, OK, MI, WA.
Nematode, root knot. *Meloidogyne* sp., SC. Usually resistant.
Rot, crown. *Penicillium martensii*, WA; *Penicillium* sp., blue mold rot.
Rot, mushroom root. *Armillaria mellea*, OR.
Rot, root; stem wilt; decline. *Fusarium oxysporum* f. sp. *asparagi*, SC, CA, WA; *Fusarium* sp.
Rot, stem. *Diplodia asparagi*; *Phytophthora* sp., CA.
Rot, watery soft. *Sclerotinia sclerotiorum*, occasional in South.
Rust. *Puccinia asparagi* (0, I, II, III), general on susceptible varieties.
Rust is the most important asparagus disease, and resistant varieties are sometimes disappointing.
Virus. Asparagus I, NJ.

ASPARAGUS FERN
(*Asparagus plumosus*)

Canker, stem; blight. *Ascochyta asparagina*, FL, TX; *Phoma* sp., FL.
Leaf mold. *Cladosporium* sp., FL, MS, TX.

Nematode, root knot. *Meloidogyne* spp., FL.
Nematode, spiral. *Helicotylenchus nannus*.
Nonparasitic "rust." Cause undetermined, FL.
Rot, root; wilt. *Fusarium* sp., FL, WA.

ASPARAGUS, FLORISTS' SMILAX
(*Asparagus asparagoides*)

Blight, gray mold. *Botrytis cinerea*, AK.
Leaf spot. *Stagonospora smilacis*, WI.
Rot, root; wilt. *Fusarium* sp., NJ.

ASPARAGUS, SPRENGER
(*Asparagus sprengeri*)

Bacterial crown gall; fasciation. *Agrobacterium tumefaciens* (possibly confused with *Clavibacter fascians*).
Nematode, root knot. *Meloidogyne* spp., CA.
Rot, root. *Rhizoctonia solani*, NY.

ASPIDISTRA

Blight, leaf. *Labrella aspidistrae*, IL, LA.
Leaf spot. *Ascochyta aspidistrae*, MN, NJ; *Colletotrichum omnivorum*, CA, MO, NJ, PA, WV.

ASTER, CHINA
(*Callistephus*)

Bacterial, MLO. *Aster Yellows*, general.
Anthracnose. *Colletotrichum* sp., FL.
Blight, bud, stem; gray mold. *Botrytis cinerea*, CA, CT, IL, NJ, NY, PA, WI, AK.
Blight, southern. *Sclerotium rolfsii*, MS, NC.
Canker, stem. *Phomopsis callistephi*, IL, WI.
Dodder, *Cuscuta* spp., widespread.
Downy mildew. *Basidiophora entospora*, FL, TX.
Leaf spot. *Ascochyta asteris*, CA, NY, ND, OH; *Septoria callistephi*, AL, DE, MI, MO, NJ, NY, OH, PA.
Mold, seed. *Pleospora herbarum*, cosmopolitan; *Alternaria* sp.
Nematode, root knot. *Meloidogyne* sp., CT, FL, TX, WA.
Powdery mildew. *Erysiphe cichoracearum*, DE, MN, NE, NC, VT, WA;
E. polygoni, NJ.
Rot, foot. *Phytophthora cryptogea*; *Pythium ultimum*.

- Rot, root, stem; leaf blight. **Rhizoctonia solani**, widespread, chiefly in northeastern and central states; **Phymatotrichum omnivorum**, TX.
- Rust. **Coleosporium asterum** (*C. solidaginis*) (II, III), general except far South; II, III on two- and three-needle pines.
- Virus. **Beet Curly Top**, OR.
- Virus. **Tobacco Rattle** (aster strain of); **Tomato Spotted Wilt**, CA; **Biddens Mottle**, FL.
- Wilt. **Verticillium** sp., CA, CT, IL, MA, NY.
- Wilt, stem rot. **Fusarium oxysporum** f. sp. **callistephi**, general.

Fusarium wilt and aster yellows are the two principal diseases. Choose wilt-resistant varieties or plant in a new location. Rogue plants with yellows immediately; use systemic insecticides to control insect vectors.

ASTER, PERENNIAL

(*Aster* spp.)

- Bacterial crown gall. **Agrobacterium tumefaciens**, CT.
- Black knot. **Gibberidea heliopsisidis**, NY, NE, ND, WI.
- Blight, gray mold. **Botrytis cinerea**, CT, NJ, AK.
- Dodder. *Cuscuta* spp., eastern and central states.
- Downy mildew. **Basidiophora entospora**, IL, IN, MD, MO, NE, WI.
- Gall, leaf. **Synchytrium nigrescens**, WI.
- Leaf spot. **Alternaria** sp., MI, TX, VT; **Ascochyta compositarum**, WI; **Cercospora asterata**, AL, TX; **Cercospora cana**, OR, WI; **Leptothyrium doelligeriae**, NY; **Ovularia asteris**, WY; **O. virgaureae**, CO, MS, WI; **Phyllachora sterigena**, KS, NE; **Ramularia asteris**, IA, MI, NE, TX, WI, WY; **Septoria angularis** and other species; **Phyllosticta astericola**, TX.
- Leaf spot, black, tar. **Placosphaeria haydeni** (?*Discosphaerina pseudimantia*), NY, IA, NJ, ND.
- Nematode, leaf. ?**Aphelenchoides ritzema-bosi**, CT.
- Nematode, root knot. **Meloidogyne** sp.
- Parasitic lichen. **Strigula elegans**, **S. camplanata**, LA, Southern U.S.
- Powdery mildew. **Erysiphe cichoracearum**, general.
- Rot, root. **Phymatotrichum omnivorum**, TX.
- Rot, stem. **Sclerotinia sclerotiorum**, CT.
- Rust. **Coleosporium asterum** (II, III); **Puccinia asteris** (III), general; **P. dioicae** var. **asteris** (0, I); II, III, on sedge; **P. grindeliae** (III), CO, KS, NV, WY; **P. stipae** (0, I), CO, IA, KS, NE, ND, SD; **Uromyces compactus**, AZ, NM, TX; **U. junci** (0, I), NH.
- Smut, white. **Entyloma aster-seriaceanum**, WI; **E. compositarum**, ME, MA, SD, WI.
- Virus. **Mosaic**. Unidentified, CA.
- Virus. **Tomato Spotted Wilt**, CA.
- Wilt. **Verticillium albo-atrum**, CT.

ASTILBE

Powdery mildew. *Erysiphe polygoni*, MA.
Wilt. *Fusarium* sp., WA.

AUCUBA

(Gold-Dust Tree)

Anthracnose; leaf spot. *Gloeosporium* sp. (?*Glomerella cingulata*), NJ, PA, SC, WA. Probably includes reports of *Colletotrichum pollaci*, MS, NJ.
Leaf spot. *Pestalotia aucubae*, secondary; *Phyllosticta aucubae*, CA, MS, SC.
Rot, root. *Phytophthora cinnamomi*, *P. citricola*, NC.
Virus. Tobacco Mosaic, Aucuba strain.
Wilt. *Verticillium albo-atrum*, NJ.

AUTUMN CROCUS

(*Colchicum*)

Blight; leaf spot. *Botrytis eiliptica*, WA.
Smut, leaf. *Urocystis colchici*, DE, NY, OH, PA, WA.
Virus. Tobacco Ring Spot Virus, MD.

AVOCADO

(*Persea americana*)

Anthracnose; leaf and fruit spot; black rot. *Glomerella cingulata*, general.
Bacterial crown gall. *Agrobacterium tumefaciens*, CA.
Bacterial fruit blast. *Pseudomonas syringae*, CA.
Black mildew. *Irene perseae*, FL.
Blight, seedling. *Sclerotium rolfsii*, FL; *Phytophthora palmivora*, FL.
Blotch, fruit spot. *Cercospora perseae*, FL; *C. purpurea*.
Canker, branch; dothiorella fruit rot. *Botryosphaeria ribis* var. *chromogena*, CA.
Leaf spot, *Phyllosticta micropuncta*, AL, FL.
Leaf spot, algal; green scurf. *Cephaleuros virescens*, FL.
Leaf spot; fruit spot; seedling blight. *Pestalotia* spp., general.
Leaf spot, smudgy spot on twigs. *Helminthosporium* sp., CA.
Nematode, burrowing. *Radopholus similis*, FL.
Nematode, dagger. *Xiphinema americanum*.
Nematode, meadow. *Pratylenchus brachyurus*; *P. vulnus*.
Nematode, root knot. *Meloidogyne* sp., resistant to.

Nematode, stubby root. *Trichodorus christiei*.

Nonparasitic

Carapace Spot. Abrasion of young fruits.

Dieback. Copper deficiency.

End Spot. Dessication of young fruits; overmaturity.

Little Leaf; Rosette. Zinc deficiency.

Melanorrhiza. Defective drainage and aeration.

Mottle Leaf. Nutritional deficiency.

Tipburn. Sometimes salt accumulation in poorly drained soil.

Rot, blue mold. *Penicillium expansum*, CA.

Rot, collar; trunk canker. *Phytophthora cactorum* CA; *P. parasitica* FL;

Sclerotinia sclerotiorum, CA.

Rot, fruit. *Diplodia theobromae*, FL; *Phomopsis* sp., FL, TX; *Phytophthora*

citrophthora, CA; *P. citricola*, CA; *Rhizopus nigricans*; *Alternaria* sp.;

Fusarium sp.

Rot, root. *Armillaria mellea*, CA; *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX; *Dematophora* Rot, *Rosellinia necatrix*.

Rot, root; decline. *Phytophthora cinnamomi*, CA; *Pythium* spp., CA.

Rot, seed and root. *Rhizoctonia solani*, CA.

Spot anthracnose; scab. *Sphaceloma perseae*, FL, TX.

Virus. *Avocado Sun-Blotch*, CA.

Wilt. *Verticillium albo-atrum*, CA, FL.

Avocado scab may cause heavy damage in susceptible varieties of West Indian stock. *Cercospora* blotch attacks both leaves and fruit. Decline, root rot, is most serious in wet soils, killing trees if they are waterlogged 6 to 8 days.

AZALEA

(*Rhododendron*)

Anthracnose. *Colletotrichum* sp., LA.

Blight, bud and twig. *Briosis azaleae* (*Pycnostysanus*), MA, NH, NJ, NC.

Blight, cutting. *Cylindrocladium scoparium*, AL, FL, NY, OH; *C. floridanum*.

Blight, flower; seedling. *Botrytis cinerea*, often after frost, cosmopolitan;

Alternaria tenuis; *Cladosporium herbarum*; *Epicoccum purpurascens*.

Blight, petal; flower spot. *Ovulinia azaleae*, MD, VA, NC, SC, GA, FL, AL,

MS, LA, TX, CA, PA; also NY, NJ in greenhouses.

Blight, shoot. *Monilinia azaleae*, GA, MA, NY.

Blight, shoot and stem. *Phytophthora citrophthora*, *P. citricola*, *P. nicotianae*

var. *parasitica*, OH, FL.

Blight, thread. *Pellicularia koleroga*, LA.

Canker, stem. *Gloeosporium* sp., OR. *Phomopsis* sp., SC.

Damping-off, leaf blight. *Rhizoctonia solani*, cosmopolitan.

Dodder. *Cuscuta* sp., FL, SC.

Gall, leaf; shoot hypertrophy. *Exobasidium vaccinii*, general; *E. burtii*, **Yellow Leaf Spot**, ID, OR, WA, NJ; *Synchytrium vaccinii*, NJ.
Leaf scorch; angular leaf spot. *Septoria azaleae*, widespread; severe in CA.
Leaf spot. *Cercospora rhododendri*, MD; *Pestalotia* spp., general but secondary; *Phyllosticta* sp.; *Ramularia angustata*, MS, NY; *Colletotrichum azaleae*, FL; *Septoria solitaria*, CA, OR, TX; Tar Spot, *Melasmia menziesii*, WA; *Corynespora cassicola*, GA, FL.
Nonparasitic. **Chlorosis**, usually iron deficiency, general in alkaline soils, sometimes defective drainage.
Nematode, leaf. *Aphelenchoides fragariae*, FL.
Nematode, root knot. *Meloidogyne incognita acrita*.
Nematode, spiral. *Helicotylenchus nannus*; *Rotylenchus robustus*.
Nematode, stubby root. *Trichodorus christiei*; *T. primitivus*.
Nematode, stunt. *Tylenchorhynchus claytoni*.
Powdery mildew. *Erysiphe polygoni*, CA, NJ; *Microsphaera alni*, GA, NJ, NY, PA, RI, VA.
Rot, root. *Armillaria mellea*, CA, NJ, WA; *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX; *Pythium* spp.
Rot, root, stem; wilt. *Phytophthora cinnamomi*, AL, MD, MO.
Rust. *Pucciniastrum myrtilli* (II, III), ME to FL, TX; 0, I, on hemlock.
Wilt. *Cylindrocarpon radicola*, MA.

Azalea flower spot or petal blight devastates azalea blooms in the South in rainy or foggy weather starting when buds show color. Bud and twig blight has killed some shrubs in Massachusetts. Leaf galls are unsightly but not too serious. Leaf scorch may be prevalent in a rainy season. Powdery mildew is common on deciduous azaleas in late summer.

AZARA

Rot, stem. *Sclerotium rolfsii*, CA.

BABIANA

Virus. *Iris Mosaic*, CA.

BALD CYPRESS

(*Taxodium*)

Blight, twig. *Pestalotia funerea*, TX.

Canker, felt fungus. *Septobasidium* spp., LA.

Rot, brown pocket heart. *Fomes geotropus*, cause of "pecky cypress," FL to LA; *F. extensus*; *Ganoderma applanatum*.

Rot, root. *Phymatotrichum omnivorum*, TX.
 Rot, wood. *Lenzites* spp., *Polyporus* spp., *Poria* spp.

BALM
 (*Melissa*)

Blight, gray mold. *Botrytis cinerea*, AK.
 Leaf spot. *Phyllosticta decidua*, NY.

BALSAM-APPLE, BALSAM-PEAR
 (*Momordica*)

Anthracnose. *Colletotrichum lagenarium*, IN.
 Downy mildew. *Pseudoperonospora cubensis*, IA.
 Leaf spot; blight. *Ramularia momordicae*, TX.
 Nematode, burrowing. *Radopholus similis*, FL.
 Nematode, root knot. *Meloidogyne* sp., FL.
 Powdery mildew. *Erysiphe cichoracearum*, WI.

BALSAM-ROOT
 (*Balsamorhiza*)

Leaf spot. *Septoria* sp., WA.
 Nematode, leaf gall. *Anguina balsamophila*, UT.
 Powdery mildew. *Erysiphe cichoracearum*, WY.
 Rust. *Puccinia balsamorhizae* (0, I, II, III), general.

BAMBOO
 (*Bambusa*, *Phyllostachys*)

Black mildew. *Meliola tenuis*.
 Blight, tip. *Diplodia bambusae*, LA, TX.
 Leaf mold. *Cladosporium gramineum*, OR, SC.
 Leaf spot. *Helminthosporium* sp., FL; *Mycosphaerella* sp., CA; culm spot, *Selenophoma donacis*, CA.
 Nematode, burrowing. *Radopholus similis*, FL.
 Rust. *Puccinia melanocephala* (II, III), FL, GA, MS, TX; *Uredo ignava* (II), GA, FL.
 Rust. *Uromyces costaricensis*, FL. on wild bamboo (*Lasiacis divaricata*).
 Smut. *Ustilago shiraiana*, CA, FL, LA, TX.
 Virus. Sugarcane Mosaic Virus, LA, on *Arundinaria gigantea*.

BANANA, DWARF

(*Musa nana*)

Anthracnose; fruit rot. *Gloeosporium musarum*, FL, TX.
Bacterial leaf blight. *Pseudomonas solanacearum*, FL.
Nematode, burrowing. *Radopholus similis*, FL, LA.
Nematode, lesion. *Pratylenchus musicola*, FL.
Nematode, root knot. *Meloidogyne* spp., FL, TX.
Rot, root. *Clitocybe tabescens*, FL.
Virus. Cucumber Mosaic, FL.
Wilt. *Fusarium oxysporum* f. sp. *cubense*, FL.

BANE BERRY, COHOSH

(*Actaea*)

Leaf spot. *Ascochyta actaeae*, WI; *Ramularia actaeae*, CO, IA, NM, VT, WI.
Rust. *Puccinia recondita* (0, I), NY to VA, IL, WA; II, III, on grasses.
Smut, leaf and stem. *Urocystis carcinodes*, ID, PA, WV, UT.

BAPTISIA

(False Indigo)

Leaf spot. *Cercospora velutina*, KS, IL, WI; *Marssonina baptisiae*, IA;
Septoria baptisiae, SC, TX; *Stagonospora baptisiae*, SC.
Powdery mildew. *Erysiphe polygoni*, prevalent; *Microsphaera alni*, WI.
Rot, root. *Armillaria mellea*, CA; *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia andropogonis*, KS, NE, NC, OK.

BARBERRY

(*Berberis*)

Bacterial leaf spot. *Pseudomonas berberidis*, general.
Blight, gray mold. *Botrytis cinerea*, CA, MO.
Canker; dieback. *Botryosphaeria ribis*, FL.
Damping-off. *Pythium debaryanum*, CA.
Leaf spot. ?*Gloeosporium berberidis*, CT, MA, MN, OH, WI; *Phyllosticta berberidis*, KY.
Nematode, root knot. *Meloidogyne hapla*.
Nematode, spiral. *Rotylenchus buxophilus*.
Powdery mildew. *Erysiphe polygoni*; *Phyllactinia corylea*, MA, VT.
Rot, heart. *Poria punctata*, MD.
Rot, root, *Phymatotrichum omnivorum*, TX.
Rust. *Cumminsella sanguinea* (0, I, II, III), OR; *Puccinia koehleriae* (0, I);
II, III on Koehleria; *P. montanensis* (0, I); II, III, on grasses.

Rust, wheat. *Puccinia graminis* (0, I), general; II, III, on cereals and grasses.
Wilt. *Verticillium albo-atrum*, CT to VA, IL, and MI.

All interstate movement of barberry is under quarantine because of the wheat rust, but resistant cultivars may be shipped under permit. Common barberry is eradicated near wheat fields; Japanese barberry is resistant to rust.

BARREN-STRAWBERRY

(*Waldsteinia*)

Leaf spot. *Ramularia waldsteiniae*, WI; *Septoria waldsteiniae*, MI, NY, VT.
Rust. *Puccinia waldsteiniae*, ID, MI, NY, VT, WI.
Smut. *Urocystis (Whetzella) waldsteiniae*, NY, WI.

BASIL

(*Ocimum*)

Nematode, root knot. *Meloidogyne* sp., FL; *M. incognita acrita*, CA.
Virus. **Bromegrass Mosaic Virus**, general, IA, SD.

BAUHINIA

(Orchid-Tree, Mountain Ebony)

Leaf spot. *Colletotrichum* sp., TX; *Phyllosticta* sp., FL.
Powdery mildew. *Microsphaera diffusa*, MD.

BAYBERRY

(*Myrica carolinensis*)

Leaf spot. *Mycosphaerella myricae*, GA, MS; *Phyllosticta myricae*, NY.
Rust. *Gymnosporangium ellissii* (0, I), MA to NY, VA; III, on *Chamaecyparis*.
Virus. **Bayberry Yellows**, NJ.

BEAN, ADZUKI

(*Phaseolus angularis*)

Bacterial stem rot. *Pseudomonas adzukicola*, MN.

BEAN, ASPARAGUS, YARDLONG

(*Vigna sesquipedalis*)

Bacterial spot. *Pseudomonas syringae*, IN, NY.
Leaf spot. *Mycosphaerella cruenta*, VA.

Leaf spot; pod spot. *Cladosporium vigneae*, IN.

Powdery mildew. *Erysiphe polygoni*, CA.

Virus. **Potato Virus X**, work at the University of Wisconsin on *V. unguiculata* spp. *cylindrica* "Catjang," *V. unguiculata* spp. *sesquipedalis*, *V. unguiculata* spp. *unguiculata*.

BEAN, KIDNEY, LIMA (*Phaseolus vulgaris*, *P. limensis*)

Anthracnose. *Colletotrichum lindemuthianum*, general in East; *C. truncatum*, PA to AL, TX, IA.

Bacterial blight. *Xanthomonas phaseoli*, general in East, rare Pacific Coast.

Bacterial halo blight; grease spot. *Pseudomonas syringae* pv. *phaseolicola*, general in East, rare on Pacific Coast.

Bacterial northern wilt. *Clavibacter flaccumfaciens*, Northeast.

Bacterial soft rot. *Erwinia carotovora*, cosmopolitan in market.

Bacterial southern wilt; brown rot. *Pseudomonas solanacearum*, AL, FL, GA, OK.

Bacterial spot, leaf and pod. *Pseudomonas syringae*, widespread.

Bacterial, stem rot. *Pseudomonas adzukicola*, MN.

Bacterial "stickiness." *Pseudomonas coadunata*, CA; *P. ovata*, VA.

Bacterial "wildfire." *Pseudomonas syringae* pv. *tabaci*, MA, NC.

Blight, ashy stem; charcoal rot. *Macrophomina phaseoli*, MD to GA, TX, CO, CA.

Blight, gray mold. *Botrytis cinerea*, occasional.

Blight, pod. *Diaporthe phaseolorum*, CT to FL, LA, OK, OH on lima bean.

Blight, southern. *Sclerotium rolfsii*, VA to FL, TX, AR, CA.

Damping-off. *Pythium ultimum*; *P. debaryanum*; *Rhizoctonia solani*.

Downy mildew. *Phytophthora phaseoli*, on lima bean, East, central states.

Leaf and pod spot. *Ascochyta boltshauseri*, OR, NC, PA; *A. phaseolorum*, WA.

Leaf spot. *Alternaria* spp.; *Aristastoma oeconomicum*, VA, GA; *Cercospora canescens*, southeastern states to NY; *Epicoccum* sp., secondary on lima bean; *Isariopsis griseola*, Angular Leaf Spot, ME to FL, TX, OK; *I. laxa*, IN, NJ; *Mycosphaerella cruenta*, NJ to FL, AR, TX, WI; *Phyllosticta phaseolina*, NY to FL, IN, TX; *Stemphylium botryosum*; *Stagonospora phaseoli*, TN.

Leaf spot, zonate. *Cristulariella pyramidalis*, WV.

Nematode, awl. *Dolichodorus heterocephalus*.

Nematode, hop cyst. *Heterodera humudi*, OR; *H. glycines*, soybean cyst, IL.

Nematode, root knot. *Meloidogyne arenaria*; *M. hapla*; *M. incognita*; *M. javanica*; root lesion, *Pratylenchus pratensis*.

Nematode, stubby root. *Trichodorus christiei*.

Nematode, stunt. *Tylenchorynchus claytoni*.

Nonparasitic

Baldhead. Mechanical injury to seed growing point.

- Blossom Drop.** High temperature, low humidity.
- Bronze Leaf.** Excessive salt concentration, CO, MT, WY.
- Chlorosis.** Deficiency of copper, FL; magnesium, FL, MA, SC, VA; manganese, FL; zinc, FL, CA. Soil alkalinity, West.
- Ozone Injury.** Air pollution.
- Seed Pitting.** Plant bug injury.
- Variegation.** Genetic leaf abnormality.
- Wind Whip.**
- Pod spot, seed mold. **Cladosporium herbarum**, on lima bean, CA, FL.
- Pod spot, yeast spot. **Nematospora phaseoli**, on lima bean; **Pullularia pullulans**, NY.
- Powdery mildew. **Erysiphe polygoni**, East, South, CA; **Microsphaera diffusa**, GA, MD, IL; **M. euphorbiae**, IL.
- Rot, black root. **Thielaviopsis basicola**, AL, CA, NH, NJ, NY.
- Rot, brown stem. **Cephalosporium gregatum**, IL.
- Rot, root. **Fusarium solani** f. **phaseoli**, general; **Phoma terrestris**, secondary, CA; **Phymatotrichum omnivorum**, AZ, OK; **Pythium aristorum**, WI; **P. cateniatum**, WI; **P. dissotocum**, WI; **Pythium** spp., widespread; **Aphanomyces eutiches**, NY.
- Rot, root and stem; web blight. **Pellicularia filamentosa**, general.
- Rot, soft. **Rhizopus stolonifer** and **Pythium aphanidermatum**, leak, of market beans.
- Rot, stem; wilt. **Sclerotinia sclerotiorum**, general, especially in South and West; **S. minor**; **S. ricini**; **S. intermedia**, in market beans. **Pythium myriotylum**, FL, GA, SC.
- Rust. **Uromyces phaseoli** var. **typica**, II, III, general; 0, I, rare.
- Spot anthracnose; lima bean scab. **Sphaceloma phaseoli**, NC.
- Virus. **Alfalfa Mosaic**, WA.
- Virus. **Bean Common Mosaic**, WA.
- Virus. **Bean Mosaic**, general; **Southern Bean Mosaic**, CA, CO, LA, MD, MI; **Bean Pod Mottle**; **Bean Phyllody**; **Bean Red Node**; CO, ID, WY; **Bean Yellow Mosaic**, ND; **Bean Yellow Stipple**, IL; **Bean Yellow Dot** = **Alfalfa Mosaic**, WA; **Beet Curly Top**, West; **Cucumber Mosaic**; **Tobacco Necrosis**; **Tobacco Ring Spot**.
- Virus. **Bromegrass Mosaic**, general, IA, SD, on broad bean (*Vicia fava* var. *minor*).
- Virus. **Lima Bean Mild Mottle**, GA.
- Virus. **Lettuce Mosaic**, NY.
- Virus. **Potato Virus X**, work at the University of Wisconsin on *P. lathyroides*, *P. lunatus*, *P. aboriginens*, *P. vulgaris* "Pinto"; **Peanut Stunt**, AR.
- Wilt; yellows. **Fusarium oxysporum** f. sp. **phaseoli**, CA, CO, ID, MT; **F. oxysporum** f. sp. **vasinfectum**, FL, AL.

Anthracnose and bacterial blight, often erroneously called "rust," are common and destructive bean diseases best avoided by purchasing healthy

seed grown in disease-free arid sections of California and the Northwest. True rust is prevalent in the Southwest and sometimes in the East on susceptible Kentucky Wonder pole beans. Use resistant varieties; clean and disinfest poles each season.

Downy mildew is common on lima beans in moist summers. Resistant varieties are the best solution to virus problems. Avoid picking or cultivating beans when foliage is wet.

BEAN, MUNG
(*Phaseolus aureus*)

Rot, sprout. *Cylindrocephalum* sp., WA.

BEAN, SCARLET RUNNER
(*Phaseolus coccineus*)

Anthraxnose. *Colletotrichum lindemuthianum*, NY.

Bacterial blight. *Xanthomonas phaseoli*, IN, NJ, TX.

Bacterial halo spot. *Pseudomonas phaseolicola*, NY.

Leaf spot. *Ascochyta boltshauseri*, OR; *Cercospora cruenta*, AL.

Powdery mildew. *Erysiphe polygoni*, CA.

Rot, root. *Fusarium solani* f. *phaseoli*, NY.

Rust. *Uromyces phaseoli* (II, III), AL, MA, NH.

BEAN, TEPARY
(*Phaseolus acutifolius*)

Blight, Southern. *Sclerotium rolfsii*, AL.

Powdery mildew. *Erysiphe polygoni*, CA.

Rot, root. *Fusarium solani*, CA; *Phymatotrichum omnivorum*, TX.

Rust. *Uromyces phaseoli* (II, III), CA, TX.

Virus. beet curly top, CA.

BEAN, URD
(*Vigna*)

Virus. Cowpea Mosaic, NY

BEARBERRY
(*Arctostaphylos uva-ursi*)

Black mildew. *Asterina gaultheriae*, WI; *A. conglobata*, ME.

Gall, leaf; red leaf spot. *Exobasidium vaccinii*, CO, ID, MT, MA, NJ, NY, VT, WI.

Leaf spot. *Cercospora gaultheriae*, WI.

Rust. *Chrysomyxa arctostaphyli* (III), CO, MT, UT, WI, AK; *Puccinia sparsum* (II, III), WI.

BEAUTY-BUSH

(*Kolkwitzia*)

Leaf spot. *Cercospora kolkwitziae*, AL, OK.

BEECH

(*Fagus*)

Broomrape. *Conophilis americana*; *Epifagus virginiana*, beechdrops.

Canker, beech bark disease. *Nectria coccinea* var. *faginata*, associated with woolly beech scale, destructive northern New England and New York;

N. galligena, New England, NY, WV; *Cryptococcus fagesuiga*, VA, OH.

Canker, bleeding. *Phytophthora cactorum*. MA, NY, RI.

Canker, dieback. *Cytospora* spp.; *Strumella coryneoides*, New England; *Phomopsis* sp., MI, NY, PA.

Canker, felt fungus. *Septobasidium* spp.; *S. cookeri*, *S. curtisii*, FL, NC.

Canker, perennial. *Endothia gyrosa*, NY.

Leaf spot. *Cercospora* sp., NY; *Gloeosporium fagi*, CT to WI; *Microstroma* sp., IL, NJ; *Phyllosticta faginea*, MA to WV.

Mistletoe. *Phoradendron serotinum (flavescens)*, occasional VT to IN and southward.

Nonparasitic. **Leaf Scorch**, common in Northeast but cause unknown, associated with high temperature and water deficiency. **Leaf Mottle**, cause unknown, virus suspected, CT, NJ, NY, PA.

Powdery mildew. *Microsphaera alni*, MA to AL, WI; *Phyllactinia corylea*, New England to AL, IL and WI.

Rot, heart, butt, wound. *Fomes* spp.; *Ganoderma applanatum*; *Polyporus* spp.; *Schizophyllum commune*; *Stereum* spp.

Rot, mushroom root. *Armillaria mellea*, CT, NJ, NY, OH.

Rot, sapwood. *Hericium* spp.; *Ustulina deusta*.

Rot, wood. *Daedalea* spp.; *Daldinia* spp.; *Lenzites betulina*, widespread.

Sooty mold. *Scorias spongospora*, MA to AL and MO.

BEET

(*Beta vulgaris*)

Bacterial, symptomless. *Clavibacter sepedonicum*, ND.

Bacterial black streak. *Pseudomonas syringae* pv. *aptata*, CA, OR, UT, WA.

Bacterial crown gall. *Agrobacterium tumefaciens*, occasional.

Blight, southern. *Sclerotium rolfsii*, NC to FL, TX, AZ, CA.

Damping-off. *Pythium* spp.; *Rhizoctonia solani*, general.

Dodder. *Cuscuta* spp., occasional when beets follow legumes.

- Downy mildew. *Peronospora schachtii*, CA, MN, NJ, NY, OR, WA.
 Leaf spot. *Alternaria* sp., general, secondary; *Gloeosporium betae*, MS, MT,
Ramularia beticola, CA, OR, WA; *Septoria betae*, DE, IN, MA, OH.
 Leaf spot; blight. *Cercospora beticola*, general.
 Nematode, leaf and stem. *Ditylenchus dipsaci*, KS.
 Nematode, root knot. *Meloidogyne arenaria*; *M. javanica*; *M. chitwoodi*,
 Pacific NW; *M. hapla*, Pacific NW; Sugar beet, *Heterodera schachtii*;
 clover cyst, *H. trifolii*; gall, *Nacobus batatiformis*.
 Nematode, sheath. *Hemicyclophora obtusa*. Sting, *Belonolaimus gracilus*;
 stubby root, *Trichodorus christiei*; lesion, *Pratylenchus penetrans*.
 Nonparasitic
 Black Heart. Boron deficiency, general; phosphorus deficiency, occasional.
 Bronzing. Potassium deficiency occasional.
 Chlorosis. Alkalinity, iron, manganese deficiency.
 Girdle. Strangling constriction of tap root.
 Tipburn. Black tips, from high nitrogen with low light intensity.
 Powdery mildew. *Erysiphe polygoni*, CA.
 Rot, black heart. *Phoma betae*, general, occasional as leaf spot.
 Rot, black root. *Aphanomyces cochlioides*, general.
 Rot, charcoal. *Macrophomina phaseoli*, CA.
 Rot, crown. *Sclerotinia sclerotiorum*, CT, IL.
 Rot, root. *Phytophthora drechleri*, CA, CO, ID; *Physalospora rhodina*, AL;
Phymatotrichum omnivorum, TX; *Pythium deliense*, TX, AZ.
 Rot, violet root. *Helicobasidium purpureum*, occasional.
 Rot, wound, storage. *Rhizopus* spp., cosmopolitan; *Cylindrocarpon radicola*,
 NY; *Penicillium* spp.; *Fusarium* spp.
 Rust. *Puccinia aristidae* (0, I), CO, KS, NM, UT; II, III, on grasses; *Uromyces*
betae (II, III), AZ, CA, NM, OR.
 Scab. *Streptomyces scabies*, widespread.
 Virus. **Beet Curly Top**; **Beet Latent**; **Beet Mosaic**; **Beet Pseudo-Yellows**; **Beet**
Ring Mottle; **Beet Savoy**; **Beet Yellow Net**; **Beet Yellows**; **Beet Yellow**
Vein; **Cucumber Mosaic**; **Beet Necrotic Yellow Vein**, CA, NE, TX, WA;
Beet Necrotic Yellow Vein (Vector, *Polymyxa beta*), CA, TX, WA.
 White rust. ?*Albugo bliti*, IA, OH.
 Wilt. *Verticillium albo-atrum*, CO.
 Wilt; yellows. *Fusarium conglutinans* (*F. orthoceras*) var. *betae*.

Most of the troubles are more important for commercially grown sugar beets. *Cercospora* leaf spot or blight is common on garden beets although spraying is not often practical. Boron deficiency can be prevented by treating soil with borax.

BEGONIA

- Bacterial crown gall. *Agrobacterium tumefaciens*, CT, MS, TX.
 Bacterial spot. *Xanthomonas begoniae*, general.

- Blight, gray mold. *Botrytis cinerea*, cosmopolitan.
- Leaf spot, anthracnose. *Gloeosporium* sp., FL, LA, MA, MS, TX, NJ; ?*Cercospora* sp., FL, GA, MS, NJ, TX; *Penicillium bacillosporium*, ?secondary; *Phyllosticta* sp., NJ, PA.
- Nematode, leaf. *Aphelenchoides fragariae*, cosmopolitan in greenhouses; lesion, *Pratylenchus* sp.
- Nematode, root knot. *Meloidogyne* spp., cosmopolitan in gardens in the South, greenhouses in the North.
- Nonparasitic. *Oedema*, a water-soaked spotting, frequent in house plants.
- Powdery mildew. *Erysiphe cichoracearum*, CA; *Oidium* sp., FL, NC, CA; *Oidium begoniae*, OH.
- Rot, root. *Armillaria mellea*, CA; *Thielaviopsis basicola*, MA, OH.
- Rot, root and stem. *Pythium* spp., CA, MO; *Rhizoctonia solani*, cosmopolitan; *Sclerotinia sclerotiorum*, CA; *Sclerotium rolfsii*, IL.
- Virus. **Tomato Spotted Wilt**, CA, MO, TX; **Broad Bean Wilt**, MN.
- Wilt. *Verticillium albo-atrum*, CT, NY.

The dry air of the average living room keeps leaf diseases at a minimum. Overwatering may foster root rots and physiological oedema. In greenhouses botrytis blight, bacterial spot, leaf nematode, and pythium rots may become problems. Powdery mildew is serious on tuberous begonias.

BELLS-OF-IRELAND (*Molucella*)

- Rot, crown. *Myrothecium* sp., TX.

BIDENS (*Bur-Marigold*)

- Bacterial, MLO. **Aster Yellows**, CA.
- Powdery mildew. *Sphaerotheca macularis*, general.
- Rust. *Uromyces bidenticola* (0, I, II, III), CA, FL, NM.
- Virus. **Bidens Mottle**, FL.

BIGNONIA (*Crossvine*)

- Black mildew. *Asterina bignoniae*, LA; *Meliola bidentata*, Gulf states; *M. furcata*, FL.
- Leaf spot. *Cercospora capreolata*, AL, MS; *Leptostromella bignoniae*, TN.
- Nematode, root knot. *Meloidogyne* sp.
- Sooty mold. *Capnodium elongatum*, AL, MS.
- Spot anthracnose. *Sphaceloma* sp., LA.

BIRCH

(*Betula*)

- Anthraxnose. *Gloeosporium* sp.; *Glomerella cingulata*, VA, on European white birch.
- Canker, bark patch. *Aleurodiscus oakesii*, VT; *Solenia ochracea*, cosmopolitan.
- Canker, bleeding, *Phytophthora cactorum*, NJ.
- Canker, trunk. *Hymenochaete agglutinans*, MI, PA; *Nectria coccinea*; *N. galligena*; twig canker, *N. cinnabarina*.
- Dieback. *Melanconis stilbostoma*, MA to IN on white birch; other species; *Cylindrosporium orthosporum*.
- Leaf blister. *Taphrina americana*, witches' broom, NH, VT, WI; *T. carnea*, NH, ME; *T. flava*, ME, MA, NH, WI.
- Leaf spot. *Gloeosporium betularum*; *G. betulae-luteae*, NY, PA; *Cylindrosporium betulae*, DE, NY, WI; *Phyllosticta betulina*; *Septoria betulicola*; *S. betulae*.
- Mistletoe. *Phoradendron serotinum (flavescens)*, FL, IN, TX; *Viscum album*, CA, on *Betula verrucosa* (weeping white birch).
- Powdery mildew. *Microsphaera alni*, MA, NH, PA; *Phyllactinia corylea*, widespread.
- Rot, heart. *Fomes* spp.; *Stereum purpureum*; *Polyporus hispidus*.
- Rot, root. *Armillaria mellea*; *Phytophthora cinnamomi*, of seedlings; *Phymatotrichum omnivorum*, TX.
- Rot, sapwood. *Polyporus betulinus*, general on gray and paper birches; *P. gilvus*; *Steccherinum* spp.
- Rot, wood. *Polyporus* spp., *Stereum* spp.; *Daedalea unicolor* and other spp.
- Rot, wound. *Schizophyllum commune*; *Pleurotus serotinus*.
- Rust. *Melampsoridium betulina* (II, III); 0, I, on larch.
- ?Virus. Dieback, vein-clearing, New England.

BIRD-OF-PARADISE

(*Strelitzia*)

- Bacterial leaf spot, blight. *Xanthomonas campestris*, FL.

BISCHOFIA

- Leaf spot, algal. *Cephaleuros virescens*, FL.

BISHOPS-CAP

(*Mitella*)

- Leaf spot. *Cercospora mitellae*, MI; *Phyllosticta mitellae*, NY, WI; *Ramularia mitellae*, IN, IL, MI, NY; *Septoria mitellae*, MI, WI.

Powdery mildew. *Sphaerotheca macularis*, WI.
 Rot, leaf. *Sclerotium deciduum*, WI.
 Rust. *Puccinia heucherae* (III), widespread.

BITTERSWEET (*Celastrus*)

Bacterial crown gall. *Agrobacterium tumefaciens*, CT.
 Canker; dieback. *Glomerella cingulata*, NH, NC.
 Leaf spot. *Ascochyta* sp., CT; *Asteria celastris*, KS, ME, MI; *Cercospora melanochaeta*, IA, KS, NE, ND; *Marssonina* sp., NY; *Phyllosticta celastris*, IL, KS, MA, NY, WV; *Ramularia celastris*, VT to MS, TX, ND.
 Powdery mildew. *Microsphaera alni*, WI; *Phyllactinia corylea*, ME to VA, TX, SD.
 Rot, root. *Phymatotrichum omnivorum*, TX.

BIXA (*Annato-Tree*)

Leaf spot. *Cercospora bixae*; *Phyllosticta bixae*.
 Leaf spot, algal. *Cephaleuros virescens*, FL.

BLACK BEARBERRY (*Arctous*)

Rust. *Pucciniastrum sparsum* (II, III), AK.

BLACKBERRY (*Rubus*)

Bacterial crown gall. *Agrobacterium tumefaciens*, general; cane gall, *A. rubi*, NY, OR, PA, WA, WI; hairy root, *A. rhizogenes*, OR.
 Blight, cane. *Gnomonia rubi*, MD, ME, NY, PA, VT; *Leptosphaeria coniothyrium*, NY to NC, WI, TX, Pacific Northwest.
 Blight, spur. *Didymella applanata*, VA, WI.
 Blight, stamen; dry berry. *Hapalosphaeria deformans*, OR, WA.
 Blight, thread. *Pellicularia koleroga*, LA.
 Blotch, sooty. *Gloeodes pomigena*, MD to NC, IN, TX.
 Canker. *Glomerella cingulata*, MD, VA; *Phomopsis* sp., WA; *Botryosphaeria obtusa*, OH; *B. dothidea*, MD; *Leptosphaeria coniothyrium*, OH; *Gnomonia rubi*, OH;
 Canker, cane spot. *Ascospora ruborum*, WA.
 Downy mildew. *Peronospora rubi*, MD, WI.

Fruit spot; fly speck. *Leptothyrium pomi*, PA to NC, IL.

Leaf spot. *Mycosphaerella confusa*, VA to FL; TX, IL, IN; *M. rubi*, NC, WI;

Pezizella oenotherae, also fruit rot, OH, MD, VA; *Cylindrosporium rubi*,

NC, TX; *Phyllosticta* spp., FL, IL, NH; *Septoria darrowi*; *S. rubi*, general.

Leaf spot, algal. *Cephaleuros virescens*, FL.

Powdery mildew. *Sphaerotheca macularis*, CT to MD, IL, MN, Pacific North-
west; *Phyllactinia corylea*, MI.

Rosette, double blossom. *Cercospora rubi*, NY to FL, TX, CA.

Rot, gray mold. *Botrytis cinerea*, general on fruit, bud, shoot.

Rot, root. *Armillaria mellea*, TX, WA; *Phymatotrichum omnivorum*, TX;

Rhizoctonia solani.

Rot, white root. *Corticium galactinum*, near apple trees, AR, MD, VA.

Rust, orange. *Gymnoconia peckiana* (0, I, III), ME to GA and west to Pacific;

Kunkelia nitens (I), general, more common in South.

Rust, yellow cane. *Kuehneola uredinia* (0, I, II, III), ME to FL, LA, WI.

Spot anthracnose. *Elsinoë veneta*, general.

Virus. **Blackberry Dwarfing**; **Blackberry Mosaic**; **Blackberry Variegation**;

Loganberry Dwarf, OR; **Raspberry Beta-Leaf Curl**; **Red Raspberry Mosaic**,

MA to VA, IA, WI, Pacific Northwest; **Raspberry Streak**, OH, PA, WA.

Wilt. *Verticillium albo-atrum*, CA, MN, NY, WA.

Sanitation is the best approach to home garden blackberry diseases. Plants with crown gall, orange rust, or virus diseases should be removed and burned, replanting with clean stock.

BLACKBERRY-LILY

(*Belamcanda*)

Leaf spot. *Alternaria* sp., KS, VA; *Didymellina macrospora*, CA, KS, IA, NY
OK, VA, VT.

Rust. *Puccinia iridis*, FL.

BLADDER-SENNA

(*Colutea*)

Blight, twig. *Diplodia coluteae*, PA.

Powdery mildew. *Erysiphe polygoni*.

Rot, root. *Ganoderma* sp., OK; *Phytophthora cactorum*, MO.

Rust. *Uromyces colutea* (II, III), KS.

BLEEDING-HEART

(*Dicentra spectabilis*)

Rot, stem. *Sclerotium rolfsii*, NY; *Sclerotinia sclerotiorum*, MN.

Wilt. *Fusarium* sp., NJ.

BLEEDING-HEART VINE

(Clerodendrin)

Virus. Zonate ring spot, FL.

BLEPHILIA

Leaf spot. *Cercoseptoria blephiliae*, WI; *Septoria menthicola*, WI.Rust. *Puccinia menthae* (0, I, II, III), IL, IN, IA, MD, MI, MO, TN, WI.

BLOODROOT

(Sanguinaria)

Blight, gray mold. *Botrytis cinerea*, NY.Leaf spot. *Cercospora sanguinariae*, MD, MO, NY, PA, TX, WI; *Cylindrosporium circinans*, MD, MO, WI; *Gloeosporium sanguinariae*, OH, TX.*Phyllosticta sanguinariae*, MO, TX, WV.

BLUEBERRY

(Vaccinium)

Anthracnose. *Gloeosporium* sp., FL, NJ.Bacterial canker. *Pseudomonas* sp., OR.Bacterial crown gall. *Agrobacterium tumefaciens*, MA, MI, WA.Black mildew. *Meliola nidulans*, AL, GA.Blight, blossom, fruit, twig. *Botrytis cinerea*, ME, MA, NJ, CA, OR, WA;
Diaporthe vaccinii, MA, ME, NJ.Blight, stem. *Botryosphaeria dothidea* (*B. ribis*), NC; *Phomopsis vaccinii*, NC.Canker, blight of stem, MI. *Glomerella cingulata*, *Alternaria* sp., *Sordaria* sp.,
Epicoccum sp., *Tympanis* sp., *Papulospora* sp., *Nectria cinnabarina*, *Coniothyrium* sp.,
Pestalotia sp., *Verticillium* sp., *Godronia cassandrae* f. *vaccinii*,
Phoma sp., *Dendrophoma* sp., *Diaporthe* (*Phomopsis*) *vaccinii*, *Melanospora* sp.,
Pullularia spp., *Coryneum microstictum*, *Sphaeronema* sp., *Fusarium* spp.,
Bispora sp., *Botrytis cinerea*, *Cephalosporium* sp., *Cylindrocarpum* sp.,
Pyrenochaeta sp.Canker, cane. *Physalospora corticis*, AL, FL, MS, NC; *Godronia cassandrae*, ME, MI;
Botryosphaeria corticis, NC, AL, FL, GA, MS; *Coryneum microstictum*, MA, MI.Canker, twig. *Dothidella vacciniicola*, NC; *Fusicoccum putrefaciens*, MA, ME, MI,
Phomopsis vaccinii, MI.Dodder. *Cuscuta* sp., FL.Gall, red leaf. *Exobasidium vaccinii*, general; *Synchytrium vaccinii*, ME, MS.Leaf spot. *Gloeocercospora inconspicua*, GA, NC, MD; *Phyllosticta* sp., GA, AL;
Phyllostictina vaccinii, GA, MD, MI, MC; *Piggotia vaccinii*, WI;

Discohainesia oenotherae, NC, NJ; **Ramularia vaccinii**, FL, MD, MI, NJ, NY; **Septoria albopunctata**; **Alternaria tenuissima**, NC; **Cristulariella pyramudates**, MD.

Leaf spot, double spot. **Dothichiza caroliniana**, NC.

Leaf spot, tar. **Thytisma vaccinii**, widespread.

Nematode. **Helicotylenchus** sp.; **Hemicycliophora similis**; **Tetylenchus joctus**; **Xiphinema americanum**.

Powdery mildew. **Microspphaeria alni** var. **vaccinii**, widespread.

Rot, berry; dieback. **Alternaria** sp., MA, NJ, NC; **Glomerella cingulata**, NJ, NY; **Phomopsis vaccinii**, NC.

Rot, brown; mummy berry. **Monilinia vaccinii-corymbosi**, IN, ME, MA, NJ, MI, NY, NC, PA.

Rot, root. **Phytophthora cinnamomi**, NJ, AR.

Rust, witches' broom. **Pucciniastrum geoppertianum** (III) ME to MN; 0, I, on fir; Leaf, **P. myrtilli** (II,III) ME to PA,WI; 0, I, on spruce.

Virus. **Blueberry Necrotic Ring Spot**; **Blueberry Red Ring Spot**; **Blueberry Stunt**, MI, MA, NJ, NY, NC; **Blueberry Shoestring**, WA.

Virus. **Tobacco Ring Spot**, IL; **Peach Rosette Mosaic**, MI.

BLUE COHOSH

(*Caulophyllum*)

Blight, leaf. **Botrytis streptothrix**, NY, NJ.

Leaf spot. **Cercospora caulophylli**, VT to VA, MO, WI.

BLUE CURLS

(*Trichostema*)

Leaf spot. **Septoria trichostematis**, NY.

BLUE-EYED GRASS

(*Sisyrinchium*)

Blight, leaf. **Kellermania sisyrinchii**, CA, ND, NM.

Nematode, lesion. **Pratylenchus pratensis**.

Rust. **Uromyces houstoniatus** (II, III), ME, WV; 0, I, on *Houstonia* spp.;

U. **Probus** (I, II, III), ID, OR, UT, WA, TX; **Aecidium residuum** (0, I), OK, TX.

BLUE LACE-FLOWER

(*Trachymene*)

Bacterial, MLO. **Western Aster Yellows**, CA.

Nematode, root knot. **Meloidogyne** sp., FL.

Rot, root; stem. *Fusarium* sp., CT, NJ; *Rhizoctonia solani*, NJ.
Wilt. *Phytophthora cactorum*, MA.

BLUESTEM
(*Andropogon*)

Leaf spot. *Ascochyta brachypodii*, PA, NY.

BOEHMERIA

Nematode. *Paratylenchus elachistus*, FL.

BOISDUVALIA

Rust. *Puccinia glabella* (II, III), NV, OR, UT; 0, I unknown; *P. oenotherae* (0, I, II, III), CA, ID, NV, OR, WA; *P. vagans* var. *epilobi-tetragoni* (0, I, II, III), CA, NV, ID, OR, UT.

BOLTONIA

Leaf spot. *Septoria erigerontis* var. *boltoniae*, IA, WI.
Powdery mildew. *Erysiphe cichoracearum*, SD.
Rust. *Puccinia dioicae*, var. *asteris* (II, III), IA, NE, ND, SD; 0, I, on sedge;
Uromyces compactus (0, I, II, III), TX.
Smut, white. *Entyloma compositarum*, WI.

BORAGE
(*Borago*)

Leaf spot. *Ramularia* sp., CA; *Stemphylium* sp.

BOTTLE-BRUSH
(*Callistemon*)

Rot, root. *Armillaria mellea*, CA.

BOUGAINVILLEA
(*Buginvillea*)

Blight, foliage. *Phytophthora parasitica*, FL.
Leaf spot. *Cladosporium arthrinioides*, TX; *Cercospora bougainvilleae*, FL.
Virus. **Mosaic**. Undetermined, FL.

BOUVARDIA

Nematode, leaf. *Aphelenchoides fragariae*.
Nematode, root knot. *Meloidogyne* sp., NY.
Rust. *Puccinia bouvardiae* (0, I, III), AZ.

BOXELDER

(*Acer negundo*)

Anthraxnose. *Gloeosporium apocryptum*, widespread.
Bacterial leaf spot. *Pseudomonas aceris*, CA.
Blight, leaf. *Coryneum negundinis*, MO; on twigs, ME.
Blight, twig. *Coniothryium negundinis*, IL, OK; *Coryneum negundinis*, ME.
Nectria cinnabarina.
Canker, felt fungus. *Septobasidium* spp., NC.
Leaf spot. *Alternaria* sp.; *Ascochyta negundinis*, IL, NC; *Cercospora negundinis*, NE, WI, KS; *Piggotia negundinis*, WI; *Phyllosticta minima*, general; *P. negundinis*, ME to AL, TX, WI; *Septoria aceris*, general; *S. negundinis*; *Cylindrosporium negundinis*; *Cristulariella pyramidalis*.
Leaf spot, tar. *Rhytisma punctatum*, NY, CA; *R. acerinum*, OR, WA.
Powdery mildew. *Phyllactinia corylea*, SD; *Microsphaera alni*, *Uncinula circinata*.
Rot, root. *Phymatotrichum omnivorum*, CA, TX; *Helicobasidium purpureum*, TX.
Wilt. *Verticillium albo-atrum*, occasional.

BOXWOOD

(*Buxus*)

Blight, leaf cast. *Hyponectria buxi*, general; *Verticillium buxi*, cosmopolitan on dead leaves, often associated with *Hyponectria*.
Blight, leaf tip. *Phoma conidiogena*, MD, NJ, NY, OK.
Canker, "Nectria"; leaf blight. *Volutella buxi*, general; considered imperfect stage of *Pseudonectria rouselliana* but unconfirmed connection.
Canker; dieback. *Fusarium buxicola* (*Nectria desmazierii*), AL, MD, PA; *E. lateritium* (see *Gibberella baccata*), secondary, MD, SC, VA.
Leaf spot. *Phyllosticta auerswaldii*, MD, MA, NJ, NY, VA, WA; *Macrophoma candollei*, prominent, general on dead leaves following winter injury or disease.
Nematode, dagger. *Xiphinema americanum*.
Nematode, lesion. *Pratylenchus pratensis*; *P. vulnus*, NC.
Nematode, root knot. *Meloidogyne hapla*; *M. incognita*; *M. incognita acrita*; *M. javanica*; *M. arenaria*, NC.

Nematode, spiral. *Helicotylenchus nannus*; *Rotylenchus buxophilus*.

Nematode, stubby root. *Trichodorus* sp.

Nonparasitic. **Freezing**, ice standing on stems causes bark to slough off and branches to die back for months thereafter. **Sunscald**, Injury in late winter or early spring when covering is removed in bright sun or high wind.

Rot, root. *Armillaria mellea*, NJ; *Fusarium oxysporum* and *F. solani*, MD, perhaps secondary; *Phymatotrichum omnivorum*, TX; *Phytophthora parasitica*, MD, NC; *Pythium* sp., MA; *Rhizoctonia solani*, cosmopolitan after nematode injury.

Rot, heart; trunk. *Ganoderma lucidum*, VA; *Fomes ignianius*, VA; *Poria punctata*, VA.

Rot, root; decline. *Paecilomyces buxi* and some *Fusaria*, VA.

?Virus. **Variegation**, cause unknown, MD, NY, VA.

Salmon-pink pustules appearing on backs of leaves, along twigs, and on main stems are indications of *Volutella buxi*, controlled by thorough cleaning, then spraying. Much of the dieback, bronzing, general unhealth of boxwood is due to nematodes, especially spiral and root lesion or meadow.

BOYSENBERRY

Subject to most blackberry diseases: anthracnose, crown gall, cane gall, cane canker, dieback, leaf spots, mosaic.

BRACHYCOMBE (Swan River Daisy)

Bacterial, MLO. **Western Aster Yellows**, CA.

BRACHYPODIUM (Slender False-Brome)

Anthracnose. *Colletotrichum graminicola*, MD.

Bacterial spot. *Pseudomonas coronafaciens* var. *atropurpurea*, ND.

Rot, root. *Curvularia geniculata* and *Fusarium scirpi*, secondary, ND.

BRICKELLIA (Brickle-Bush)

Dodder, *Cuscuta exaltata*, TX.

Leaf spot. *Cercospora coleosanthi*, CA, CO.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Aecidium arcularium* (0, I), AZ, CO, NM; *Coleosporium aridum* (II), CA; *Puccinia kuhniae*, AZ, FL; *P. subdecora* (0; I, II, III), AZ, CO, NM, UT; *Uredo arida* (II), CA.

BRISTLEGRASS

(*Setaria*)

Blight. *Beniowskia sphaeroidea*, TX, GA.

BROCCOLI

See Cabbage.

BRODIAEA

Rust. *Puccinia carnegiana* (0, I, III), AZ; *P. dichelostemmae* (0, I, III), WA, OR, CA; *P. moreniana* (III), CA; *P. nodosa* (0, I, II, III), CA; *P. pattersoniana*, ID, UT, WA; II, III, on grasses; *P. subangulata* (0, I, III), WA; *Uromyces brodiaeae* (0, I, III), CA, OR, WA.

BROMEGRASS, SMOOTH

(*Bromus*)

Bacterial. Halo Blight. *Pseudomonas syringae* pv. *coronafaciens*, AK.
Rust. *Puccinia recondita*, PA.

BROMELIA

Leaf spot. *Gloeosporium* sp., FL, MD; *Helminthosporium rostratum*, FL.

BROOM

(*Cytisus*)

Canker. *Diaporthe* spp., NJ, NY; *Dothidea tetraspora*, CA; *Gloeosporium* sp., NJ; *Nectria coccinea*, OR; *Pestalotia polychaeta*, CA; *Phomopsis* sp., MA, NJ; *Physalospora obtusa*, AL. Many are secondary.
Nematode, lesion. *Pratylenchus pratensis*.
Rot, root. ?*Thielaviopsis basicola*, WI.

BROOM, SPANISH

(*Spartium*)

Canker. *Diplodia sarothamni*, CA; *Pestalotia polychaeta*, CA; *Phomopsis sarothamni*, CA. All possibly secondary infections.

BROUSSONETIA

(Paper-Mulberry)

Canker; dieback. *Nectria cinnabarina*, AL, NY; *Fusarium solani*, OH.

Mistletoe. *Phoradendron serotinum (flavescens)*, TX.

Nematode, root knot. *Meloidogyne* sp., MD.

Rot, root. *Phymatotrichum omnivorum*, TX; *Armillaria mellea*, CA.

BROWALLIA

(*Streptosolen jamesonii*)

Bacterial canker, vascular. *Clavibacter michiganense*, WY.

Nematode, root knot. *Meloidogyne* sp.

Virus. Tomato spotted wilt, CA.

Wilt. *Fusarium* sp., DE.

BRUNFELSIA

Bacterial canker, vascular. *Clavibacter michiganense*, WY.

BRUSSELS SPROUTS

See Cabbage.

BRYONOPSIS

Bacterial spot. *Pseudomonas lachrymans*, WI.

Downy mildew. *Pseudoperonospora cubensis*, MA, OH.

BUCKEYE

See Horse-Chestnut.

BUCKLEYA

Rust. *Cronartium comandrae* (II, III), TN; 0, I, on pine.

BUCKTHORN

(*Rhamnus*)

Leaf spot. *Cercospora aeruginosa*, MO, NE, SC; *C. bacilligera*; *C. rhamni*, LA, NJ, NE, TX, WI; *Cylindrosporium rhamni*, ID; *Marssonina rhamni*, WA; *Phaeosphaerella rhamni*, CA; *Phyllosticta rhamnigena*; *Septoria blasdalei*, CA, OR, ID, TX.

Powdery mildew. *Microsphaera alni*, WI.

Rot, heart. *Daedalea unicolor*, WA; *Fomes igniarius*, ID.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia coronata* (0, I), widespread; II, III, on grasses, cereals, widespread; *P. mesneriana* (III), CA.

Sooty mold. *Capnodium* sp., CA.

BUCKWHEAT-TREE

(*Cliftonia*)

Black mildew. *Morenoella cliftoniae*, MS.

Leaf spot. *Coccomyces* sp.; *Pestalotia cliftoniae*, MS.

BUDDLEIA

(Butterfly-Bush)

Canker, stem. *Phomopsis buddleiae*, AZ.

Nematode, root knot. *Meloidogyne* spp., AL, MS, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Scab. *Cladosporium heugelinianum*, VA, DE.

BUFFALOBERRY

(*Shepherdia*)

Damping-off. *Pythium ultimum*, NE; *Rhizoctonia solani*, NE.

Leaf spot. *Septoria shepherdiae*, UT, WI, ID, MT, AK; *Cylindrosporium* sp., Great Plains.

Powdery mildew. *Phyllactinia corylea*, UT; *Sphaerotheca macularis* (*S. humilis*); CO, MT, TX, WY, AK.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, white heart. *Fomes fraxinophilus*, CO, MT, NM, SD, WY.

Rust. *Puccinia caricis-shepherdiae* (0, I), Rocky Mts., MI, NY, OR, WA, AK;
II, III on *Carex*; *P. coronata* (0, I), SD to NM, WA, AK.

BUFFALOGRASS

(*Buchloe*)

Smut. *Tilletia buchloëana*, KS, NE, OK, TX.

BUGLEWEED

(*Ajuga*)

Blight, southern; crown rot. *Sclerotium rolfsii*, CA, CT, KS, NJ, NY. Serious
in warm, muggy weather.

Nematode, southern root knot. *Meloidogyne incognita*, GA.

BUMELIA

Leaf spot. *Cercospora lanuginosa*, TX; *Phyllosticta bumeliifolia*, AL, TX;
P. curtisii, FL, MO; *Septoria bumeliae*, MS.

Rot, root. *Helicobasidium purpureum*, TX; *Phymatotrichum omnivorum*, TX.

BUNCHFLOWER

(*Melanthium*)

Leaf spot. *Septoria allardii*, VA.

Rust. *Puccinia atropuncta* (II, III), NC, TN, VA.

BUNDLEFLOWER

(*Desmanthus*)

Leaf spot. *Cercospora desmanthi*, KS, LA, MO, NM, SD, TN.

Powdery mildew. *Erysiphe polygona*, IL, MS.

Rust. *Ravenelia texensis* (II, III), TX.

BURNET

(*Sanguisorba*)

Leaf spot. *Graphium sessile*, NY; *Ovularia bulbiger*, IL, AK.

Powdery mildew. *Podosphaera oxycanthae*, IA; *Sphaerotheca macularis*,
MA, NY, PA, AK.

Rust. *Xenodochus carbonarius* (I, III), AK; *X. minor*, AK.

BUTTERFLY-FLOWER

(*Schizanthus*)

Bacterial, MLO. *Aster Yellows*, NJ.

Anthracnose. *Colletotrichum schizanthi*, NY.

Bacterial canker, vascular. *Clavibacter michiganense*, WY.

Damping-off; root rot. *Pythium ultimum*, MO; *Rhizoctonia solani*, NY.

Nematode, root knot. *Meloidogyne* sp.

Rot, stem. *Sclerotinia sclerotiorum*, MS, MO.

Virus. **Tomato Spotted Wilt**, TX.

BUTTERFLY-PEA

(*Centrosema*)

Leaf spot. *Cercospora clitoriae*, AL; *Colletotrichum* sp., on pods.

BUTTERFLY PEA

(*Clitoria*)

Leaf spot. *Cercospora clitoriae*, AL, FL; *C. cruenta*, FL.

Rot, root. *Phymatotrichum omnivorum*, TX.

BUTTERFLY WEED

(*Asclepias*)

Blight, stem. *Phoma asclepiadea*, UT.

Leaf spot. *Cercospora asclepiadorae*, AL, TX; *C. clavata*, general; *C. ventur-ioides*, WA; *Phyllosticta tuberosa*, IL, NJ.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia bartholomaei* (0, I), ND, SD; II, III, on *Spartina*; *Uromyces asclepiadis* (II III), widespread.

BUTTONBUSH

(*Cephalanthus*)

Blight, leaf. *Cercospora perniciosa*, TX.

Blight, thread. *Pellicularia koleroga*, FL.

Dodder. *Cuscuta compacta*, FL; *C. gronovii*, NY.

Leaf spot. *Ascochyta cephalanthi*, LA; *Coniothyrium cephalanthi*, LA; *Phyllosticta cephalanthi*, TX; *Ramularia cephalanthi*, AL, KS, LA, NY, WI; *Septoria cephalanthi*, KS, WI.

Powdery mildew. *Microsphaera alni*, widespread. *Phyllactinia corylea*, IN.

Rust. *Puccinia seymouriana* (0, I), New England to FL and central states; II, III, on *Spartina*, *Uredo cephalanthi* (II), FL.

CABBAGE

(*Brassica oleracea*, including Broccoli, Brussels Sprouts, Cauliflower, Kale, Kohl-rabi)

Bacterial black rot. *Xanthomonas campestris*, general.

Bacterial leaf spot. *Pseudomonas maculicola*, widespread; *P. cichorii*, FL and in market.

Bacterial, MLO. Western Aster Yellows, CA.

Bacterial soft rot; stump rot; *Erwinia carotovora*, cosmopolitan.

Blackleg; leaf spot. *Phoma lingam*, general east of Rocky Mts., also OR, WA.

Blight, gray mold. *Botrytis cinerea*, FL; Pacific states, frequent.

Blight, southern. *Sclerotium rolfsii*, NC to FL, TX, occasional.

Club root. *Plasmodiophora brassicae*, general.

Damping-off; bottom rot. *Pythium* spp.; *Rhizoctonia solani*, general.

Downy mildew. *Peronospora parasitica*, general.

Leaf spot, gray. *Alternaria brassicae*, general; black spot, head browning, *A. brassicicola*, general; *A. oleraceae*, occasional; *Cercospora brassicola*, CA, DE, FL, IL, OK, MS, NC; *Phyllosticta brassicicola*, CA; *Leptosphaeria maculans*, WI.

Leaf spot; white spot. *Cercospora brassicae*, IN, PA, OR; ring spot, *Mycosphaerella brassicicola*, AL, CA, IL, NY, OR, WA, TX; *Pseudocercospora capsellae*, CA.

Mold, leaf. *Heterosporium variabile*, MT, NY; seed, *Curvularia geniculata*; *Stemphylium botryosum*.

Nematode. *Nacobus batatiformis*.

Nematode, cabbage cyst. *Heterodera cruciferae*. Sugar beet, *H. schachtii*.

Nematode, lesion. *Pratylenchus pratensis*. Sting, *Belonolaimus gracilis*; *B. longicaudatus*; stubby root, *Trichodorus christiei*.

Nematode, root knot. *Meloidogyne arenaria*; *M. javanica*.

Nonparasitic

Brown Heart. Probably boron deficiency.

Chlorosis. Magnesium or manganese deficiency.

Oedema. Excessive water tension, or copper sprays.

Pink Head. Probably genetic.

Tipburn. Potassium deficiency.

Whip-tail. Spindly growth, failure to head, due to acid soil, mineral deficiencies.

Powdery mildew. *Erysiphe polygoni*, AZ, CA, CT, FL, MD, MA, OR.

Rot, cottony; drop. *Sclerotinia sclerotiorum*, AZ, MA, NY, TX.

Rot, firm head. *Sclerotinia sclerotiorum*, CA.

Rot, root. *Macrophomina phaseoli*, CA; on *Brassica campestris*.

Rot, root. *Phymatotrichum*, TX; *Phytophthora megasperma*, CA, OR.

Rot, root; damping-off. *Aphanomyces raphani*, WI. Also *Brassica alboglabra* — Chinese kale; *B. carinata* — Abyssinian mustard; *B. napus* — rape; *B. perviridis* — Spanish mustard; *B. robertiana*; *Eruca sativa* — racuet salad; *Raphanus raphanistrum* — wild radish.

Rot, soft; black mold. *Rhizopus stolonifer*, occasional.

Rot, sprout. *Alternaria tenuis*, *Rhizoctonia solani*, and *Fusarium* sp., on brussels sprouts.

Virus. **Cabbage Ring Necrosis**; **Cauliflower Mosaic**, GA; **Turnip Mosaic**, GA; **Beet Curly Top**; **Tomato Spotted Wilt**.

White rust; blister. *Albugo candida*, CA, ID, KY, NE, NC, OH, TX.

Wilt, yellows. *Fusarium oxysporum* f. sp. *conglutinans*, general.

A general control program starts with choosing varieties resistant to *Fusarium* yellows, purchasing disease-free seed, or having it hot-water treated against blackleg and black rot, growing in soil free from club root and careful cleaning up of all vegetable refuse at the end of the season.

CACTUS

(*Cereus*)

Anthracnose. *Mycosphaerella opuntiae*, TX.

Bacterial soft rot. *Erwinia carotovora*, TX.

Blight, gray mold; rot. *Botrytis cinerea*, occasional when too damp indoors.

Leaf scorch. *Hendersonia opuntiae*, TX.

Leaf spot. Black, *Diplothea (Stevensea) wrightii*, TX; stem, *Septoria cacticola*, TX.

Nematode, cyst. *Heterodera cacti*; *Nacobus batatiformis*.

Nematode, root knot. *Meloidogyne* sp.

Rot, root; stem. *Fusarium oxysporum*, AZ, CA; *Helminthosporium cactivorum*, TX, CA. *Phymatotrichum omnivorum*, TX.

Rot, stem and branch. *Aspergillus alliaceus*, TX; dry rot, *Poria* sp., CA.

CACTUS

(*Leuchtenbergia principis* and *Schlumbergera gaertneri* "Makoyana")

Nematode, cyst. *Heterodera cacti*.

CACTUS, FISHHOOK, PINCUSHION

(*Mammillaria*)

Anthracnose; zonate spot. *Gloeosporium cactorum*; *Mycosphaerella opuntiae*; spine spot, *Phoma mammillariae*, MT.

Nematode, root knot. *Meloidogyne incognita*, Bermuda Botanical Garden;
Meloidogyne sp., TX; cyst, *Heterodera cacti*.
Rot, root. *Phymatotrichum omnivorum*, TX.

CACTUS, GIANT, SAGUARO (*Carnegieia*)

Bacterial blight. *Erwinia carnegiaeana*, AZ.
Bacterial crown gall. *Agrobacterium tumefaciens*, AZ.
Rot, dry. *Poria carnegiaeae*; Heart, *Fomes robustus*.
Rot, seedling. *Fusarium solani*; *F. oxysporum*.

The bacterial blight is spread over the whole giant cactus area in Arizona, with mortality heaviest in magnificent specimens 150 to 200 years old.

CACTUS, PRICKLY PEAR (*Opuntia*)

Anthracnose; zonate spot. *Gloeosporium cactorum*, FL, MS; black rot,
Mycosphaerella opuntiae, AL, FL, LA, NY, SC, TX.
Bacterial rot. *Erwinia aroideae*, FL, MS, OK, TX.
Black mildew. *Lembosia cactorum*, FL.
Leaf scorch. *Hendersonia opuntiae*, AL, NJ, KS, MT, TX.
Leaf spot, black. *Diplotheca wrightii*, FL, TX.
Nematode, root knot. *Meloidogyne* sp.
Nonparasitic. *Oedema*, causing glassiness or scab, from overwatering.
Rot, charcoal. *Macrophomina phaseoli*, TX.
Rot, cladode. *Aspergillus alliaceus*, TX; *Diplodia opuntiae*, MD, PA, KS;
Physalospora obtusa, NY; *P. rhodina*, FL; *Phyllosticta cacti*, NM; *P. concava*,
MO, NJ, OK, TX; *Septoria fici-indicae*, TX.
Rot, root. *Armillaria mellea*, CA.
Rot, stem. *Phytophthora parasitica*, NY; *Pythium debaryanum*, CA.
Virus. ?Mosaic, MD; Chlorotic Ring Spot, AZ, CA, ID, MT, NM, UT, WA,
WY.

CACTUS, STAR, SEA-URCHIN, BARREL (*Echinocactus*)

Anthracnose. *Mycosphaerella opuntiae*, TX.
Leaf scorch; scald. *Hendersonia opuntiae*, TX.
Leaf spot, black. *Diplotheca* sp., TX.
Rot, root. *Phymatotrichum omnivorum*, TX; Stem, *Aspergillus alliaceus*,
TX.

CAESALPINIA

Anthracnose. *Gloeosporium* sp., FL.
Bacterial crown gall. *Agrobacterium tumefaciens*, FL.
Canker; dieback. *Botryosphaeria ribis* var. *chromogena*, FL, TX.
Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.
Rust. *Ravenellia hymphreyana* (II, III), FL.

CALADIUM

Bacterial soft rot. *Erwinia carotovora*, FL.
Blight, southern. *Sclerotium rolfsii*, FL.
Blight; tuber rot. *Botrytis ricini*, FL.
Leaf spot. *Gloeosporium ?thuemeni*, FL.
Nematode, citrus. *Tylenchulus semipenetrans*, FL.
Nematode, lesion. *Pratylenchus* sp., FL.
Nematode, root knot. *Meloidogyne* sp., FL, MS; *M. javanica*.
Rot, tuber. *Fusarium solani*, FL.

CALATHEA

Leaf spot. *Glomerella cincta*, NJ; *Phyllosticta* sp.; *Alternaria alternata*, FL;
Drechslera setariae, FL.
Nematode, burrowing. *Radopholus similis*, FL. Spiral, *Helicotylenchus nannus*.

CALCEOLARIA

(Slipperwort)

Blight, gray mold. *Botrytis cinerea*, AK.
Nematode, leaf. *Aphelenchoides fragariae*.
Nonparasitic. Boron Deficiency, leaf necrosis, CA.
Rot, root. *Pythium mastophorum* and *P. ultimum*, CA.
Rot, stem. *Sclerotinia sclerotiorum*, NY, WA.
Virus. Tomato Spotted Wilt, CA.
Wilt. *Verticillium albo-atrum*, NY, WA.

CALENDULA

(Pot Marigold)

Bacterial, MLO. Aster Yellows, CT, DE, ME, NJ, PA, VA; California Aster Yellows, CA;
Blight, gray mold. *Botrytis cinerea*, MO, NJ, NY, AK.

Blight, southern. *Sclerotium rolfsii*, TX.

Leaf spot. *Alternaria* sp., NY; *Cercospora calendulae*, PA, TX, VA; *Colletotrichum gloeosporioides*, VA.

Nematode, root knot. *Meloidogyne* spp., WV, TX, TN; *M. javanica*.

Powdery mildew. *Erysiphe cichoracearum*, CA, NY; *E. polygoni*, PA.

Rot, root. *Rhizoctonia solani*, IN, NJ, NC, TX; *Pythium ultimum*, CA; *Phymatotrichum omnivorum*, TX.

Rot, stem; wilt. *Sclerotinia sclerotiorum*, CA, FL, LA, MO, OH, TX.

Rust. *Puccinia flaveriae* (III), IL, IN, IA, KS, MO, NE, TX.

Smut, white, *Entyloma calendulae*, CA, NH, OR; *E. compositarum*, WA.

Virus. ?Cucumber Mosaic, Tomato Spotted Wilt, CA, MI, TX; **Biddens Mottle**, FL.

CALIFORNIA BLUEBELL

(*Phacelia*)

Leaf spot. *Cylindrosporium phaceliae*, MT, TX.

Powdery mildew. *Erysiphe cichoracearum*, CA, MT, NM, TX.

Rust. *Puccinia aristidae* (0, I); II, III, on wild grasses; *P. Phaceliae* (III); *P. recondita* (0, I), MT to CO, OR, CA, NM; II, III, on brome grass; *Uredo contraria* (II), CA.

Virus. **Beet Curly Top**, CA.

CALIFORNIA LAUREL

(*Umbellularia*)

Anthracnose. *Kabatiella phorodendri* f. *umbellulariae*, CA; leaf blight, *Colletotrichum gloeosporioides*.

Bacterial leaf spot. *Pseudomonas lauraceum*, CA.

Black mildew. *Asterina anomala*, CA.

Canker; dieback. *Nectria cinnabarina*; *N. coccinea*, CA.

Nematode, pin. *Paratylenchus anceps*. Ring, *Criconemoides xenoplax*, CA; Sheath, *Hemicycliophora brevis*, CA.

Nematode, root knot. *Meloidogyne hapla*, CA.

Rot, wood. *Fomes* spp., *Lenzites betulina*; *Polyporus versicolor*; *Porio ambigua*; *P. ferruginosa*; *Stereum albobadium*; *Schizophyllum commune*.

CALIFORNIA PEPPER-TREE

(*Schinus*)

Dodder. *Cuscuta subinclusa*, CA.

Nematode, root knot. *Meloidogyne* sp., TX.

Rot, heart. *Fomes appplanatus*, CA; *Polyporus dryophilus*, CA; *P. farlowii*, AZ, CA; *P. sulphureus*; *P. versicolor*, CA.

Rot, root. *Armillaria mellea*, CA; *Phymatotrichum omnivorum*, TX.
Rot, wood. *Ganoderma polychromum*, CA; *Stereum hirsutum*; *Trametes hispida*, CA; *Schizophyllum commune*.
Wilt, *Verticillium albo-atrum*, CA.

CALIFORNIA PITCHER-PLANT
(*Darlingtonia*)

Leaf spot. *Mycosphaerella sarraceniae*, CA; *Septoria darlingtoniae*, OR.

CALIFORNIA POPPY
(*Eschscholtzia*)

Bacterial blight. *Xanthomonas papavericola*, TX.
Bacterial, MLO. *Aster Yellows*, NJ, NY; and *California Aster Yellows*, CA.
Blight, gray mold. *Botrytis cinerea*, AK.
Leaf spot, mold. *Heterosporium eschscholtziae*, CA.
Nematode, root knot. *Meloidogyne* sp., FL, TX.
Powdery mildew. *Erysiphe polygoni*, CA.
Rot, collar. *Alternaria* sp., TX.
Smut, leaf. *Entyloma eschscholtziae*, CA.
Wilt. *Verticillium albo-atrum*, CA.

CALIFORNIA-ROSE
(*Convolvulus japonicus*)

Leaf spot. *Phyllosticta batatas*, SC; *Septogloeum convolvuli*, CA, WI; *Septoria calystegiae*, CA; *S. convolvuli*, WI; *S. flagellaris*, NY.
Rust. *Coleosporium ipomoeae* (II, III), LA, MA, O, I on pine; *Puccinia convolvuli* (0, I, II, III), CA, OR.

CALLA, COMMON, GOLDEN, PINK
(*Zantedeschia*)

Bacterial soft rot. *Erwinia aroidea*, general; *E. carotovora*.
Blight, gray mold. *Botrytis cinerea*, NJ, AK.
Blight, southern. *Sclerotium rolfsii*, CA, FL, OR.
Leaf spot. *Alternaria* sp., secondary; *Cercospora richardiaecola*, AL, MS; *Coniothecium richardiae*, CA, FL, MA, NJ, NY, OR; *Gloeosporium callae*, WA.
Nematode, root knot. *Meloidogyne* sp., CA, FL.
Nonparasitic. **Chalk rot**, cause uncertain but may be immaturity of rhizomes, CA, OR

Rot, rhizome, *Phytophthora cryptogaea* var. *richardiae*, CA, FL, IL, MA, NJ, NY, OH, OR, PA, WA; *P. erythroseptica*, CA; *Phoma* sp., CA, OR.

Rot, root. *Armillaria mellea*, CA; *Rhizoctonia solani*, CA.

Virus. **Tomato Spotted Wilt**, CA, IL, IN, MD, NY, OR, TX, WA.

Root and rhizome rots are controlled by treating rhizomes before planting and growing in pots rather than benches. Specimens showing spotted wilt must be destroyed before thrips spread the virus.

CALLA, WILD

(*Calla palustris*)

Leaf spot. *Cercospora callae*, MA, NY, WI; *Marssonina callae*, NY.

CALLIANDRA

(False Mesquite)

Rot, root. *Clitocybe tabescens*, FL.

Rust. *Ravenelia reticulatae* (II, III), AZ.

CALLICARPA

(Beauty-Berry; French-Mulberry)

Black mildew. *Meliola cookeana*, FL, LA.

Leaf spot. *Cercospora callicarpae*, SC to TX.

Nematode, burrowing. *Radopholus similis*, FL.

CALYCANTHUS

(Sweetshrub, Carolina Allspice)

Bacterial crown gall. *Agrobacterium tumefaciens*, MS, NY.

Canker. *Botryosphaeria calycanthi*, NC, VA.

Powdery mildew. *Phyllactinia corylea*, CA.

CAMASS

(*Camassia*)

Blight, gray mold. *Botrytis cinerea*, OR.

Leaf spot. *Septoria chlorogali*, OR.

Rot, root. *Phymatotrichum omnivorum*, TX.

Smut, leaf. *Urocystis colchici*, OR, IN.

CAMELLIA

- Bacterial crown gall. *Agrobacterium tumefaciens*, WA.
 Black mildew. *Meliola camelliae*.
 Blight, flower. *Sclerotinia camelliae*, CA, GA, LA, MS, NC, SC, VA, TX; *S. sclerotiorum*, NC; *Pestalotia* sp., *Penicillium* sp., AL.
 Blight, gray mold; bud and flower. *Botrytis cinerea*, general after frost.
 Blight, petal. *Pestalotia* sp., AL.
 Canker; dieback. *Glomerella cingulata*, widespread; *Botryosphaeria ribis*, MS; *Phomopsis* sp., FL.
 Canker, felt fungus. *Septobasidium castaneum*; *S. conidiophorum*; *S. pseudopedicellatum*, SC.
 Dodder. *Cuscuta* sp.
 Gall, leaf. *Exobasidium camelliae*, and var. *gracilis* on *Camellia sasanqua*, FL, LA, MS, TX; *E. monosporum*, AL.
 Leaf spot. *Cercospora* sp., GA; *C. theae*, LA; *Hendersonia subalbicans*, GA; *Pestalotia quepini*, also twig blight, widespread; *Phyllosticta camelliae* and *P. camelliaeicola*, Southeast; *Sporonema camelliae*.
 Leaf spot, algal. *Cephaleuros virescens*, Gulf states.
 Nematode, burrowing. *Radopholus similis*, FL.
 Nematode, lesion. *Pratylenchus coffeae*.
 Nematode, ring. *Criconemoides komabaensis*, FL; *Hemicriconemoides gaddi*, LA, GA.
 Nematode, root knot. *Meloidogyne incognita-acrita*.
 Nematode, spiral. *Helicotylenchus nannus*.
 Nonparasitic. **Bud Drop**, **Dieback**, malnutrition, freezing, desiccation, widespread. **Oedema**, corky excrescences, from disturbed water relations. **Sunscaud**, light circular spots, often with secondary fungi.
 Rot, root. *Phytophthora cinnamomi*, major problem, AL, CA; *Clitocybe tabescens*, FL, LA.
 Spot anthracnose, scab. *Elsinoë leucospila*, FL, GA, LA.
 Virus. **Camellia Yellow Mottle Leaf** (color-breaking strains).

Flower blight is a devastating disease that has spread with plants in cans or pots. Order camellias bare-rooted, with all flower buds showing color picked off. Dieback is the subject of much controversy among camellia fans. Drastic surgery and a copper spray early in the season to prevent infection through bud scars seems to be helpful. Chelated iron may mask color-breaking virus symptoms.

CAMOMILE
(*Anthemis*)

- Bacterial, MLO. **California Aster Yellows**, CA.
 Damping-off. *Rhizoctonia solani*, WA.

Nematode, root knot. *Meloidogyne* sp., MD, FL.
 Rot, root. *Phymatotrichum omnivorum*, TX.

CAMPANULA (Bellflower, Canterbury Bells)

Bacterial, MLO. *Aster Yellows*, PA.
 Blight, gray mold. *Botrytis cinerea*, AK.
 Blight, southern. *Sclerotium rolfsii*, IL, NJ.
 Leaf spot. *Ascochyta bohémica*, WI; *Cercoseptoria minuta*, WI; *Phyllosticta alliarifoliae*, NJ, NY; *Ramularia macrospora*, AK; *Septoria campanulae*, IL, IA, KS, MO, WI.
 Nematode, leaf. *Aphelenchoides* sp.
 Nematode, root knot. *Meloidogyne* sp.
 Powdery mildew. *Erysiphe cichoracearum*, PA.
 Rot, root. *Fusarium* sp., NY, NJ; *Rhizoctonia solani*, IL, CT, TX.
 Rot, stem. *Sclerotinia sclerotiorum*, MD, WA.
 Rust. *Coleosporium campanulae* (II, III), widespread; 0, I, on pine; *Aecidium campanulastrum* (0, I), IA, MN; *Puccinia campanulae* (III), CA, MT, NY, OR, WA.
 Virus. *Tomato Spotted Wilt*, CA.
 Wilt. *Verticillium albo-atrum*.

CAMPHOR-TREE (*Cinnamomum*)

Anthraxnose. *Glomerella cingulata*, Gulf states.
 Black mildew. *Lembosia camphorae*, FL.
 Canker; dieback. *Diplodia camphorae*, *D. natalensis*, *D. tubericola*, widespread; *Gloeosporium camphorae* and *G. ochraceum*, also leaf spot, Gulf states.
 Leaf spot, algal. *Cephaleuros virescens*, FL to LA.
 Mistletoe. *Phoradendron serotinum (flavescens)*, FL.
 Nematode, lesion. *Pratylenchus pratensis*, FL.
 Nonparasitic. *Chlorosis*, manganese deficiency, FL.
 Powdery mildew. *Microsphaera alni* var. *cinnamomi*, LA.
 Rot, root. *Armillaria mellea*, FL; *Phymatotrichum omnivorum*, TX; *Clitocybe tabescens*, FL.
 Spot anthracnose. *Elsinoë cinnamomi*, MS, SC.

CANDLESTICK SHRUB (*Cassia*)

Leaf spot. *Tubakia dryina*, LA.

CANDYTUFT

(*Iberis*)

- Blight, gray mold. *Botrytis cinerea*, AK.
Club root. *Plasmodiophora brassicae*, MS, NJ.
Dodder. *Cuscuta indecora*, TX.
Downy mildew. *Peronospora parasitica*, CA.
Nematode, root knot. *Meloidogyne* sp., AL.
Powdery mildew. *Erysiphe polygoni*, CA.
Rot, root. *Phoma lingam*, CA; *Pythium oligandrum*, ME.
Virus. **Lettuce Mosaic**, NY
White Rust. *Albugo candida*, CA.

CANNA

- Blight, southern. *Sclerotium rolfsii*, TX.
Leaf spot. *Alternaria* sp., MI, SC, TX.
Nematode, burrowing. *Radopholus similis*.
Rot, rhizome. *Fusarium* sp., MN, MO, PA.
Rust. *Puccinia cannae* (II, III), FL, OH, TX.
Virus. **Cucumber Mosaic**, RI; **Mosaic**; unidentified, DE, MD, MI, NY.

CANTALOUPE

See Melon.

CAPE-COWSLIP

(*Lachenalia*)

- Virus. **Ornithogalum Mosaic**, AL.

CAPE-HONEYSUCKLE

(*Tecomaria*)

- Anthracnose. *Colletotrichum gloeosporioides*, TX.
Rot, root. *Armillaria mellea*, CA; *Clitocybe tabescens*, FL.

CAPE-MARIGOLD

(*Dimorphoteca*)

- Bacterial, MLO. **Aster Yellows**, NJ, NY.
Blight, gray mold. *Botrytis cinerea*, CT, AK.

Downy mildew. *Plasmopara halstedii*, IA.
 Nematode, root knot. *Meloidogyne* sp., FL.
 Rot, charcoal. *Macrophomina phaseoli*, CA.
 Rot, root. *Pythium ultimum*, CA; *Rhizoctonia solani*, IL.
 Rust. *Puccinia flaveriae* (III), IL, IN, NJ, NE.
 Virus. **Curly Top Virus (Beet)** on *Dimorphotheca pluvialis* var. *fingens* and
D. sinuata.
 Wilt. *Fusarium* sp., FL.

CAPEWEED, CAPE DANDELION
(Arctotheca calendula)

Blight; Rot, root, crown and stolon. *Sclerotium rolfsii*, CA.

CAPER
(Capparis)

Black mildew. *Asterina lepidigenoides*, FL; *A. radians*, FL.

CARAWAY
(Carum)

Bacterial, MLO. **California Aster Yellows**, WA.
 Dodder. *Cuscuta* sp., WA.
 Nematode, root knot. *Meloidogyne* sp.
 Rot, stem. *Sclerotinia sclerotiorum*, WA.

CARDOON
(Cynara cardunculus)

Leaf spot. *Cercospora obscura*, CA, TX; *Ramularia cynarae*, CA.
 Powdery mildew. *Erysiphe cichoracearum*, CA.

CARISSA

Canker; dieback. *Physalospora obtusa* and *P. rhodina*, FL.
 Leaf spot. *Colletotrichum gloeosporioides*, FL; *Macrophoma* sp., CA; *Septoria*
 sp., CA.
 Nematode, root knot. *Meloidogyne* sp., FL, CA.
 Rot, root. *Phymatotrichum omnivorum*, TX.

CARISSA
(Natal-Plum)

Cankers; gall. *Sphaeropsis tumefaciens*, FL.

CARNATION
(*Dianthus caryophyllus*)

Anthracnose. *Colletotrichum* sp., NJ, NY, TX.

Bacterial crown gall. *Agrobacterium tumefaciens*, MD.

Bacterial fasciation; witches' broom. *Clavibacter fascians*, CA, OH.

Bacterial, MLO. Aster Yellows.

Bacterial pimple. *Xanthomonas oryzae*.

Bacterial spot. *Pseudomonas woodsii*, MS to GA, IN, MI, ND, OK, OR, WA.

Bacterial wilt. *Pseudomonas caryophylli*, IL, IN, IA, MA, MO, WA.

Blight, branch and collar rot. *Alternaria dianthi*, general.

Blight, gray mold. *Botrytis cinerea*, cosmopolitan in high humidity.

Blight, petal. *Stemphylium floridanum*, FL.

Blight, southern. *Sclerotium rolfsii*, FL, MS, TX.

Blight, web. *Pellicularia koleroga*, NC.

Blotch, greasy. *Zygophiala jamaicensis*, CA, PA.

Downy mildew. *Peronospora dianthicola*, CA.

Leaf spot, mold; fairy ring. *Heterosporium echinulatum* occasional in greenhouses, CA, TX; *Cladosporium herbarum*, secondary, general.

Leaf spot. *Septoria dianthae*, VT to SC, TX, MI, CA.

Nematode, cyst. *Heterodera trifolii*.

Nematode, lance. *Hoplolaimus coronatus*.

Nematode, pin. *Paratylenchus dianthus*.

Nematode, ring. *Criconemoides curvatum*.

Nematode, root knot. *Meloidogyne arenaria*; *M. hapla*; *M. incognita-acrita*; *M. javanica*.

Nonparasitic. Yellow Spotting, potassium deficiency, NJ, NY.

Petal spot. *Bipolaris (Helminthosporium) setariae*, FL.

Powdery mildew. *Oidium* sp., FL, NC.

Rot, bud. *Fusarium tricinctum* f. *poae*, MA to VA, KS, NE, WA.

Rot, root. *Phymatotrichum omnivorum*, TX; *Pythium* sp., IL; *Rhizoctonia solani*, general; *Armillaria mellea*, CA.

Rot, stem. *Armillaria mellea*, CA; *Fusarium roseum* f. *ceralis*, general.

Rust. *Uromyces dianthi* (II, III), general.

Smut. Anther. *Ustilago violaceae*, MA.

Virus. Carnation Latent; Carnation Mosaic; Carnation Mottle; Carnation Ring Spot; Carnation Streak; Carnation Yellows; Carnation Etch-Ring; Beet Curly Top, CA, TX; Carnation Necrotic Fleck, CA.

Wilt. *Fusarium oxysporum* f. sp. *dianthi*; *Verticillium albo-atrum* (*dahliae*), NJ; *Phialophora* (*Verticillium*) *cinerescens*, NY.

A rigid sanitation program is necessary for healthy carnations, taking cuttings high on the plant, breaking instead of cutting, planting in sterile medium, controlling aphids and other insect vectors of virus diseases and controlling mites that spread bud rot. The mother block system controls wilts; heat cures viruses.

CAROB, ST. JOHNS BREAD (*Ceratonia*)

Canker. *Botryosphaeria ribis*, CA.

Nematode, root knot. *Meloidogyne* spp.

Rot, root. *Phymatotrichum omnivorum*, TX; *Phytophthora cactorum*, CA.

Wilt. *Verticillium albo-atrum*, CA.

CAROLINA JESSAMINE (*Gelsemium*)

Black mildew; black spot. *Asterina somatophora*, FL.

Leaf spot. *Phyllosticta gelsemii*, NJ.

Rot, root. *Phymatotrichum omnivorum*, TX.

Sooty mold. *Capnodium grandisporum*, MS, TX.

CAROLINA MOONSEED (*Cocculus*)

Leaf spot. *Cercospora cocculicola*, OK; *C. menispermi*, MS, TX.

Nematode, burrowing. *Radopholus similis*, FL.

Rot, root. *Phymatotrichum omnivorum*, TX.

CARROT (*Daucus carota* var. *sativa*)

Bacterial blight. *Xanthomonas carotae*, CA, ID, IA, WI.

Bacterial core rot. *Erwinia chrysanthemi* and/or *E. carotovora* var. *carotovora*, IL.

Bacterial, MLO. Aster Yellows, widespread and it is the California strain, CA, OR, WA, ID.

Bacterial soft rot. *Erwinia carotovora*, general.

Blight, early; leaf spot. *Cercospora carotae*, general.
Blight, late. *Alternaria dauci*, general.
Blight, southern. *Sclerotium rolfsii*, GA to FL, TX, CA.
Canker, root; storage rot. *Rhizoctonia* spp., MI, NY, OR, WA.
Damping-off. *Pythium* sp., ID; *Rhizoctonia solani*, general.
Dodder. *Cuscuta* sp., ID, MS, NM, NY, TX, WV.
Leaf spot. *Ramularia* sp., KS; *Alternaria tenuis*, secondary, also seed mold.
Nematode. *Nacobus batatiformis*.
Nematode, cyst. *Heterodera carotae*.
Nematode, root knot. *Meloidogyne arenaria*; *M. incognita*; *M. javanica*.
Nonparasitic. **Black Heart**, cause unknown, WI. **Chlorosis**, magnesium deficiency in acid soil. **Root Girdle**, cause unknown.
Powdery mildew. *Erysiphe polygoni*, CA; *E. heraclei*, NC.
Rot, black. *Alternaria radicina*, ID, MA, NY, PA, WA.
Rot, black mold. *Rhizopus* spp.; blue mold, *Penicillium* sp.; gray mold, *Botrytis cinerea*; pink mold, *Trichothecium roseum*, IN.
Rot, dry. *Fusarium* spp., ID, NY, associated with scab.
Rot, root. *Helicobasidium purpureum*, OR, WA; *Phymatotrichum omnivorum*, AZ, LA, TX; *Phytophthora megasperma*, CA.
Rot, storage. *Centrospora acerina*, NY; *Aspergillus niger*; *Pellicularia filamentosa*; *Typhula* sp.
Rot, watery soft. *Sclerotinia sclerotiorum*, general; *S. intermedia*, *S. minor*.
Rust. *Uromyces scirpi* (0, I), OR; II, III, on *Scirpus*.
Scab. *Streptomyces scabies*, CA, MI, PA, WA.
Virus. **Alfalfa Mosaic**, CA, WA; **Clover Yellow Vein**, WA.
Virus. **Beet Curly Top**, OR, UT; **Carrot Motley Dwarf**; **Celery Mosaic**.

Carrots in home gardens require a deeply dug friable soil even more than treatment for diseases. Root-knot nematodes are rather common.

CARROT, WILD

(*Daucus carota*)

Virus. **Alfalfa Mosaic**, WA; **Clover Yellow Vein**, WA.

CASHEW

(*Anacardium*)

Blight, seedling. *Sclerotium rolfsii*, FL.

CASSABANA, CURUBA

(*Sicana*)

Anthraxnose. *Colletotrichum lagenarium*, FL.

CASSIA

(Senna)

Blight, seedling. *Alternaria cassiae*, MS.
Dieback. *Diplodia natalensis*, TX.
Leaf spot. *Cercospora nigricans*, MS; *Septoria cassiicola*; *Tubakia dryina*, LA.
Nematode, root knot. *Meloidogyne* sp., CA, TX.
Powdery mildew. *Microsphaera alni*, MD; *Erysiphe polygona*.
Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.
Wilt. *Fusarium oxysporum* f. sp. *cassiae*, NC, SC, FL, GA.

CASSIOPE

Leaf gall. *Exobasidium vaccinii*, WA.

CASTOR-BEAN

(*Ricinus communis*)

Bacterial crown gall. *Agrobacterium tumefaciens*.
Bacterial leaf spot. *Xanthomonas ricinicola*, MD, OK, TX.
Bacterial wilt. *Pseudomonas solanacearum*, AL, GA, FL, MI.
Blight, inflorescence; gray mold. *Botryotinia ricini*, GA to FL, TX.
Blight, southern. *Sclerotium rolfsii*.
Damping-off. *Rhizoctonia solani*, FL, KS.
Gall. *Synchytrium* sp., TX.
Leaf spot. *Alternaria* sp., FL, LA, TX; *Cercospora canescens*, AL, KS, MT;
White Spot, *C. ricinella*; *Corynespora cassicola*.
Nematode, burrowing. *Radopholus similis*, FL.
Nematode, root knot. *Meloidogyne* sp., OK.
Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.
Rot, stem. *Sclerotinia sclerotiorum*, FL; *Phytophthora parasitica*, FL.

CASUARINA

(Australian-Pine)

Nematode, root knot. *Meloidogyne* sp., FL.
Rot. *Armillaria mellea*, CA; *Clitocybe tabescens*, FL.

Casuarina is particularly susceptible to *Clitocybe* root rot but *C. cunninghamiana* is more resistant than other species.

CATALINA CHERRY

(*Prunus lyonii*)

Leaf spot; shot hole. *Coryneum beierincki*.

CATALPA

Anthracnose. *Gloeosporium catalpae*, MD, MA, NJ, NY, PA.

Blight, southern. *Sclerotium rolfsii*, on seedlings.

Damping-off. *Rhizoctonia solani*, NE; *Pythium ultimum* (somewhat resistant).

Leaf spot. *Alternaria catalpae*, widespread; *Cercospora catalpae*, MA to FL, TX and IA; *Phyllosticta catalpae*, general.

Nematode, root knot. *Meloidogyne* sp., southern states to OH.

Nonparasitic. Chlorosis, soil alkalinity. Leaf Scorch, heat, drought.

Powdery mildew. *Microsphaera alni* var. *vaccinii*, MA to AL, TX, IL, NE;

Phyllactinia corylea, IL, IN, KY, OH, MA, SC, VA.

Rot, root. *Armillaria mellea*, WA; *Helicobasidium purpureum*, OH;

Phymatotrichum omnivorum, TX; *Thielaviopsis basicola*, of seedlings.

Rot, wood. *Collybia velutipes*, IN; *Polyporus* spp.; *Schizophyllum commune*; *Stereum* spp.; *Trametes sepium*.

Sooty mold. *Capnodium axiliatum*, LA, SC.

Spot anthracnose. *Sphaceloma* sp.

Wilt. *Verticillium albo-atrum*, IL, IN, KS, NJ, NY, MA, OH, VA.

Leaf spots may cause some defoliation in a wet season, but many years the expense of spraying may be unjustified on a limited budget. *Verticillium* wilt kills street trees.

CATHA

(Arabian-Tea)

Blight, leaf tip. *Colletotrichum gloeosporioides*, FL.

CATNIP

(*Nepeta*)

Bacterial leaf spot. *Pseudomonas tabaci*, WI.

Blight, gray mold. *Botrytis cinerea*, AK.

Blight, southern. *Sclerotium rolfsii*, TX.

Leaf spot. *Ascochyta nepetae*, WI; *Cercospora nepetae*, IL, TX; *Phyllosticta decidua*, IL, NY, OH, WI; *Septoria alabamensis*, AL; *S. nepetae*, WI.

Rot, root. *Rhizoctonia solani*, TX.

Virus. Cucumber Mosaic, IN, IA, KS, MI, WI.

Wilt. *Fusarium* sp., GA.

CATS-CLAW

(*Doxantha*)

Rot, root. *Phymatotrichum omnivorum*, TX.

CAT TAIL

(*Typha*)

Leaf spot. *Stagonospora typhoidearum*, TX, WI; *Phyllosticta typhina*, NE, NY, OR, TX, WI; *Scolecotrichum typhae*, CO.

Mold, leaf. *Cladosporium* spp., general.

Rot, culm. *Ophiobolus* sp., AR.

Rot, leaf. *Phythiogeton autossytum*, OH; *Pythium helicoides*, OH.

CEANOTHUS

Bacterial crown gall. *Agrobacterium tumefaciens*, WA.

Leaf spot. *Cercospora ceanothi*, KS, WI; *Septoria ceanothi*, ID; *Cylindrosporium ceanothi*, Pacific Coast; *Phyllosticta ceanothi*, MS.

Powdery mildew. *Microsphaera alni*, widespread.

Rot, root. *Armillaria mellea*, CA.

Rot, sapwood. *Schizophyllum commune*, CA.

Rust. *Puccinia tripsaci* (0, I), KS, NE, WI; II, III, on grasses.

Wilt. *Verticillium albo-atrum*, CA.

CEDAR

(*Cedrus* spp; Atlas Cedar, Deodar, Cedar of Lebanon)

Canker; dieback. *Diplodia pinea*, AL.

Rot, heart. *Fomes pini*, occasional.

Rot, root, *Armillaria mellea*, MS; *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum* TX; *Phytophthora cinnamomi*, CA.

CELANDINE

(*Chelidonium*)

Leaf spot. *Septoria chelidonii*, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

CELERY, CELERIAC

(*Apium graveolens*)

Bacterial leaf spot. *Pseudomonas jaggeri* pv. *apii*, CT, DE, FL, IN, MI, MN, ND, NY, OH; leaf blight, *P. cichorii*, FL.

Bacterial, MLO. **California Aster Yellows**, CA, ID, UT, WA.

Bacterial soft rot. *Erwinia carotovora*, cosmopolitan.

Blight, early. *Cercospora apii*, general.

- Blight, late. **Septoria apiicola** (includes *S. apii* large leaf spot, and *S. apiigraveolentis*), general.
- Damping-off. **Pythium** spp.; **Rhizoctonia solani**; **Aphanomyces euteiches**, cosmopolitan.
- Leaf spot. **Phyllosticta apii**, DE, NJ; **Stemphylium** sp. and **Alternaria** sp., secondary.
- Nematode, awl. **Dolichodorus heterocephalus**, red root, FL.
- Nematode, pin. **Paratylenchus hamatus**, New England, CA; **P. projectus**, NJ.
- Nematode, root knot. **Meloidogyne incognita-acrita**.
- Nematode, sheath. **Hemicycliophora parvana**, FL.
- Nematode, stem. **Ditylenchus dipsaci**, CA.
- Nematode, sting. **Belonolaimus gracilus**, FL; **B. longicaudatus**.
- Nematode, stubby root. **Trichodorus christiei**.
- Nonparasitic
- Black Heart.** Wide fluctuations of soil moisture, general.
 - Brown stem.** Overaged plants.
 - Cracked stem.** Boron deficiency.
 - Hollow stem.** Pithiness. Sometimes chilling; sometimes genetic.
- Rot, gray mold. **Botrytis cinerea**, cosmopolitan.
- Rot, pink; watery soft. **Sclerotinia sclerotiorum**, general; **S. intermedia**; **S. minor**.
- Rot, root; scab on celeriac. **Phoma apiicola**, CA, MI, NY, OH, WI.
- Rot, stem; brown spot. **Cephalosporium apii**, CA.
- Rot, storage. **Centrospora acerina**, NY; **Typhula variabilis**, NY; **Tricothecium roseum**, pink mold, NY.
- Slime mold. **Physarum** spp., CA.
- Virus. **Celery Calico**, CA, FL, NY, OH; **Celery Mosaic**, CA, WA, AL, FL; **Cucumber Mosaic**, **Beet Curly Top**, OR; **Celery Yellow Spot**, CA; **Tomato Spotted Wilt**; **Lettuce Mosaic**, NY; **Broad Bean Wilt**, NY.
- Wilt. **Verticillium albo-atrum**, CA.
- Wilt, yellows. **Fusarium oxysporum** f. sp. **apii**, TX CA, MI, NY, TX, general.

In many areas soil treatment for nematodes increases yield. Yellow-resistant varieties are on the market. Seed should be treated for leaf blights unless more than 2 years old. In Florida, development of apothecia of *Sclerotinia* is inhibited by flooding fields. Western growers fight mosaic by celery-free periods and by controlling insect vectors.

CELTUCE

(*Lactuca serriota* var. *sativa*)

- Downy mildew. **Bremia lactucae**, ND, PA, WA.
- Leaf spot. **Septoria lactucae**.
- Rot, watery soft; drop. **Sclerotinia sclerotiorum**, MA.

Celtuce is a kind of lettuce and subject to some of the same diseases.

CENTAUREA

(Bachelors-Button, Basketflower; Cornflower;
Dusty-miller)

- Bacterial, MLO. *Aster Yellows*, widespread; **California Aster Yellows**, CA.
Blight, southern. *Sclerotium rolfsii*, CT, MD, NJ, TX.
Dodder. *Cuscuta* sp.
Downy mildew. *Bremia lactucae*, CA; *Plasmopara halstedii*, IA, TX.
Nematode, root knot. *Meloidogyne* sp., CA, FL, OH.
Powdery mildew. *Erysiphe cichoracearum*, CA, CT.
Rot, root. *Phymatotrichum omnivorum*, TX; *Pythium* sp.; *Rhizoctonia solani*, IN, IL, NJ, NY, TX.
Rot, stem. *Sclerotinia sclerotiorum*, CA, IN, MS, MO, TX; *Phytophthora cactorum*, NY.
Rust. *Puccinia cyani* (0, I, III), MA to NC, IN, CA, OR, WA; *P. irrequiseta* (II, III), TX; 0, I, unknown.
White rust. *Albugo tragopogonis*, TX.
Wilt. *Verticillium albo-atrum*, NY.
Wilt, stem rot. *Fusarium oxysporum* f. sp. *callistephi*, MI.

CENTIPEDE GRASS

(*Eremochloa*)

- Anthracnose. *Colletotrichum graminicola*, FL.
Leaf mold. *Curvularia* sp., LA; *Stachybotrys* sp., MD.

CENTURY PLANT

(*Agave*)

- Anthracnose. *Glomerella cingulata* (*Colletotrichum agaves*) occasional.
Blight, gray mold. *Botrytis cinerea*, after chilling.
Leaf scorch; blight. *Stagonospora gigantea*, TX, NM.
Leaf spot. *Coniothryium concentricum*, *C. agaves*, common.
Leaf spot, black patch. *Dothidella parryi*, CA.

CEPHALOTAXUS

(Japanese Plum-Yew)

- Blight, nursery. *Phomopsis juniperovora*, NY.

CESTRUM

- Bacterial canker, vascular. *Clavibacter michiganense*, WY.

CHAEROPHYLLUM

Broomrape. *Orobanche ramosa*, TX.

CHAMAECYPARIS

(Atlantic White-Cedar; Port Orford White-Cedar;
Alaska Yellow-Cedar; Hinoki Cypress;
Sawara Cypress-Retinospora)

Bacterial crown gall. *Agrobacterium tumefaciens*, CA.

Blight, nursery. *Phomopsis juniperovora*, widespread.

Blight, tip. *Pestalotia funerea*, MI, NJ, TX; *Didymascella chamaecyparissi*, NY.

Canker, bark patch. *Aleurodiscus nivosus*, NJ.

Nematode. *Sphaeronema*, AK; *Crossonema*, AK.

Nonparasitic. Scorch, sun, freezing, drought, mites.

Rot, collar and root. *Phytophthora lateralis*, OR, WA, serious; *P. cinnamomi*.

Rot, heart. *Fomes pini*, occasional; *F. pinicola*, AK; *F. subroseus*, NJ, NC.

Rot, root. *Armillaria mellea*, VA; *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX; *Pythium ultimum*, CA; *Phytophthora lateralis*, CA.

Rot, wood. *Lenzites saepiaria*, VA; *Poria* spp.; *Polyporus* spp.; *Steccherinum balloui*, NJ; *Trametes isabellina*, CA; *Fomes annosus*.

Rust, gall. *Gymnosporangium bisseptatum* (III), ME, NH to NJ, AL; 0, I, on serviceberry; *G. nootkatense* (III), OR, WA, AK; 0, I, on crabapple, pear, mountain-ash; *G. fraternum* (III), ME, MA, NJ; 0, I, on chokeberry.

Rust, witches' broom. *Gymnosporangium ellisii* (III), ME to FL and AL; 0, I, on sweet fern, bayberry, wax-myrtle.

CHAMAEDAPHNE

(Cassandra, Leatherleaf)

Gall, leaf. *Exobasidium vaccinii*, widespread; *Synchytrium vaccinii*, NJ.

Leaf spot. *Ascochyta cassandrae*, NY to WI; *Venturia arctostaphyli*, NH, NY.

Rust. *Chrysomyxa ledi* var. *cassandrae* (II, III), ME to PA and MN; AK; 0, I, on pine.

CHAYOTE

(*Sechium*)

Anthraxnose. *Colletotrichum lagenarium*, FL, TX.

Blight, southern. *Sclerotium rolfsii*, TX.

Leaf spot. *Cercospora sechii*, FL, TX.

Nematode, root knot. *Meloidogyne* sp.; *M. incognita-acrita*.

Nematode, stubby root. *Trichodorus* sp.
 Rot, fruit. *Glomerella cingulata*, LA.

CHECKER MALLOW (*Sidalcea*)

Leaf spot. *Ramularia sidalceae*, CO, CA, WY.
 Rust. *Endophyllum tuberculatum* (III), CO, WY; *Puccinia interveniens* (0, I), CA, CO, MT, ID, OR, WA, WY; II, III, on *Stipa*; *P. schedonnardi* (0, I), CO; *P. sherardiana* (0, III), CA, CO, NV, AZ, OR, WA.

CHENOPODIUM

Damping-off. *Sclerotium rolfsii*, CA.
 Virus. Commonly used as test plant (bioassay) for viruses.

CHERIMOYA, CUSTARD-APPLE (*Annona*)

Anthracnose, fruit rot. *Glomerella cingulata*, FL.
 Blight, stem. *Diplodia natalensis*, TX.
 Rot, root. *Armillaria mellea*, CA; *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.
 Rust. *Phakopsora cherimoliae* (II, III), FL, TX.

CHERRY (*Prunus* spp.)

Bacterial black spot; canker; gummosis. *Xanthomonas pruni*, NY to MI, GA and TX.
 Bacterial canker. *Pseudomonas syringae*, MA to MI; Pacific states and *P. morsprunorum*.
 Bacterial crown gall. *Agrobacterium tumefaciens*, CA, TX, WA.
 Bacterial fire blight. *Erwinia amylovora*, OR, WA.
 Bacterial, MLO. Peach X-Disease; Peach Yellow Leaf Roll (Peach Western X-Disease), Northwest.
 Black knot. *Dibotryon morbosum*, eastern states.
 Blight, blossom, brown rot. *Monilinia laxa*, general, Pacific states, NY, MI, WI.
 Blight, seedling, twig. *Monilinia rhododendri*, VT to GA, AR, IA; *M. fructicola*, shoot and leaf, GA.
 Blight, shoot; shot hole. *Coryneum carpophilum* (*C. beijerinckii*), CA, ID, OR, WA.

- Canker, felt fungus. *Septobasidium retiforme*, GA.
- Canker, trunk and collar. *Phytophthora cactorum*, *P. citrophthora*, CA.
- Canker, twig. *Phomopsis padina*; *Cytospora leucostoma*, NY, PA; *Valsa leucostoma*, widespread; *Nectria* sp., NY.
- Leaf blister. *Taphrina farlowii*, VT to FL, TX; *Taphrina cerasi*, ME to NJ, MN.
- Leaf spot. *Cercospora circumscissa* (*Mycosphaerella cerasella*), NJ, PA, VA to FL, TX; *Alternaria citri* var. *cerasi*, CA; *Phyllosticta pruni-avium*, OR; *Cercospora graphioides* and *Phyllosticta serotina* on wild blackcherry only; *Coccomyces lutescens*, VA.
- Leaf spot; blight; shot hole. *Coccomyces hiemalis*, general.
- Mistletoe. *Phoradendron serotinum* (*flavescens*).
- Nematode, lesion. *Pratylenchus* sp.; *P. vulnus*, CA.
- Nematode, root knot. *Meloidogyne* sp; *M. incognita-acrita*; *M. javanica*.
- Nonparasitic. **Brown Bark Spot**, possibly caused by arsenical poisoning of soil, ID, MT, WA. **Chlorosis**, alkali injury, CA, TX. **Little Leaf**, zinc deficiency, CA, OR, WA.
- Powdery mildew. *Podosphaera oxycanthae*, general.
- Rot, brown. *Monilinia fructicola*, general.
- Rot, fruit. *Alternaria* sp.; *Botrytis cinerea*; *Cladosporium herbarum*, CA to WA and ID; *Lambertella* sp., OR; *Microstroma tonellianum*, MA; *Penicillium expansum*; *Rhizopus stolonifer*, occasional in market; *Pullularia* sp., Northwest.
- Rot, heart; wood. *Fomes fomentarius*, Northeast; *Polyporus* spp.; *Poria ambigua*, CA.
- Rot, root. *Armillaria mellea*, NM, OK, OR; *Phymatotrichum omnivorum*, TX; *Xylaria* spp., VA; *Poria ambigua*, CA.
- Rot, silver leaf. *Stereum purpureum*, NY, MT.
- Rust. *Tranzschelia discolor* (II, III), GA, MA, NC, NE, NY, OK, TX; 0, I, on anemone.
- Scab. *Fusicladium cerasi*, NY to IA and WI.
- Virus. **Cherry Rough Fruit**, UT on sweet cherry (*Prunus avium*).
- Virus. **Cherry Albino**; **Cherry Bark-Splitting**; **Cherry Black Canker**; **Cherry Buckskin**; **Cherry Bud Abortion**; **Cherry Chlorosis**; **Cherry Freckle Fruit Disease**; **Cherry Green Ring Mottle**; **Cherry Gummosis**; **Cherry Little Cherry**; **Cherry Midleaf Necrosis**; **Cherry Mora**; **Cherry Mottle Leaf**; **Cherry Necrotic Rusty Mottle**; **Cherry Pink Fruit**; **Cherry Pinto Leaf**; **Cherry Rasp Leaf**; **Cherry Ring Spot**; **Cherry Rugose Mosaic**; **Cherry Rusty Mottle**; **Cherry Twisted Leaf**; **Cherry Vein Clearing**; **Cherry Yellows**; **Prune Dwarf**; **Tomato Ring Spot**; **Stem Pitting**.

CHERRY, FLOWERING, ORIENTAL

(*Prunus serrulata*)

- Bacterial fire blight. *Erwinia amylovora*, GA, OH.
- Bacterial leaf spot. *Xanthomonas pruni*, NJ.

Canker; dieback. *Botryosphaeria ribis*, GA.

Decline. Cause, unknown; complex of insect, poor soil, viral infection and air pollutants suspected, VA.

Leaf blister; witches' broom. *Taphrina cerasi*, MD, NJ.

Leaf spot. *Coccomyces hiemalis*, MA, NJ.

Scab. *Cladosporium carpophilum*, MS.

Virus. Cherry Vein Clearing; Cherry (flowering) Rough Bark; Cherry Little Cherry.

CHERRY, JAPANESE FLOWERING

(*Prunus subhirtella*)

Leaf spot. *Cristulariella pyramidalis*, FL.

CHERRY-LAUREL

(*Prunus laurocerasus*)

Bacterial spot. *Xanthomonas pruni*, GA, MS, NJ, SC.

Blight, blossom; brown rot. *Monilinia fructicola*, CA; *M. laxa*, CA; *Alternaria* sp., TX.

Leaf spot. *Cercospora circumscissa*, CA; *C. cladosporioides*, LA, TX; *Coccomyces lutescens*, MS; *Phyllachora beaumontii*, AL; *Phyllosticta laurocerasi*, CA, FL, NJ; *Septoria ravenelii*, SC.

Mistletoe. *Phoradendron serotinum (flavescens)*, FL.

Rot, root. *Armillaria mellea*, CA; *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

Wilt. *Verticillium albo-atrum*, CA.

CHESTNUT

(*Castanea*)

Blight, canker. *Endothia parasitica*, general, with American chestnut practically exterminated by it.

Blight, twig. *Cytospora* sp.; *Phomopsis* sp.; *Diplodia longispora*.

Canker, bark patch. *Aleurodiscus aceris*.

Canker; dieback. *Cryptodiaporthe castanea*; *Strumella coryneoidea*.

Leaf spot. *Actinopelta dryina*; *Cylindrosporium castaneae*; *Marssonina ochroleuca*, general; *Monochaetia desmazierii*; *M. kansensis*; *Phyllosticta castanea*; *Exosporium fawcettii*; *Scolecosprium fagi*.

Mistletoe. *Phoradendron villosum*, CA.

Powdery mildew. *Microsphaera alni*; *Phyllactinia corylea*.

Rot, root. *Armillaria mellea*; *Phytophthora cinnamomi*; *Phymatotrichum omnivorum*.

Rot, wood. *Fomes* spp.; *Polyporus* spp.; *Poria* spp.; *Stereum* spp.

Japanese and Chinese chestnuts are resistant to chestnut blight. Plant breeders are trying to develop hybrids between Asiatic and native species that will be resistant to *Endothia*.

CHICKORY

See Endive.

CHICK-PEA, GARBANZO

(*Cicer*)

Bacterial blight. *Pseudomonas andropogonis*, ME.

Blight. *Ascochyta radiei*, ID, WA.

Nematode, root knot. *Meloidogyne* spp.

Rot, root. *Fusarium solani* f. *pisi*; *Thielaviopsis basicola*, ID, WA.

Rot, root; damping-off. *Pythium ultimum*, CA; *Rhizoctonia solani*, CA.

Rust. *Uromyces ciceris-arietini*, GA.

Virus. Mosaic, unidentified, CA; *Chickpea filiform*, WA.

Wilt. *Fusarium lateritium* f. *cicerii*; *Verticillium albo-atrum*.

CHICKWEED

(*Stellaria*)

Virus. **Tomato Ringspot**, PA.

CHINABERRY

(*Melia*)

Black mildew. *Meliola* sp.

Blackleg. *Phoma lingam*, WA.

Blight, limb; twig. *Pellicularia koleroga*, FL; *Eutypella stellulata*, OK, TX;

Fusarium lateritium, TX.

Canker. *Nectria coccinea*, MS, SC.

Downy mildew. *Peronospora parasitica*, general.

Leaf spot. *Cercospora leucosticta*, Gulf states; *C. meliae*; *C. subsessilis*;

Phyllosticta azedarachis, AL; *P. meliae*, LA, TX.

Mistletoe. *Phoradendron serotinum* (*flavescens*), TX.

Nematode, root knot. *Meloidogyne* sp.

Powdery mildew. *Phyllactinia corylea*, MS.

Rot, root. *Helicobasidium purpureum*, TX; *Phymatotrichum omnivorum*, AZ, TX.
 Rot, wood. *Fomes meliae*, AL; *Polyporus versicolor*, GA.

CHINESE CABBAGE

(*Brassica pekinensis*, *B. chinensis*)

Anthracnose. *Colletotrichum higginsianum*, FL.
 Bacterial black rot. *Xanthomonas campestris*, IN, MD, TX.
 Bacterial leaf spot. *Pseudomonas maculicola*, VA.
 Bacterial, MLO. Aster Yellows.
 Blight, southern. *Sclerotium rolfsii*, TX.
 Club root. *Plasmodiophora brassicae*, CT, MA, NJ, OH, PA.
 Leaf spot, black, *Alternaria oleracea*, CA, CT, FL, MA, NH, TX; gray, *A. brassicae*, CA, CT, FL, IN, MD; *Cercospora brassicola*, FL, GA, NH, NJ; *Cercospora brassicae*, white spot, widespread.
 Leaf spot; white spot. *Pseudocercospora capsellae*, CA.
 Nematode, root knot. *Meloidogyne* sp.
 Powdery mildew. *Erysiphe polygoni*, AZ, MA; *Peronospora parasitica*.
 Rot, root; damping-off. *Aphanomyces raphani*, WI.
 Rot, watery soft. *Sclerotinia sclerotiorum*, AZ, MA, NY, TX.
 Virus. Turnip Mosaic; Cauliflower Mosaic.
 White rust. *Albugo candida*, AL.

CHINESE EVERGREEN

(*Aglaonema*)

Anthracnose. *Colletotrichum* sp., *Gloeosporium* sp., WA.
 Bacterial leaf spot. *Erwinia aroideae*; *Xanthomonas dieffenbachiae*, FL.
 Glebal masses. *Sphaerobolus stellatus* (*Gasteromycetous fungus*), TX, FL.
 Leaf spot. *Myrothecium roridum*, FL.
 Nematode, lesion. *Pratylenchus coffeae*, FL.
 Nematode, root knot. *Meloidogyne javanica*.
 Rot, root; leaf. *Pythium splendens*, FL.

The root rot is serious, with all roots rotted, plants stunted, dying. Destroy infected plants. Take tip cuttings well above ground.

CHINESE LANTERN

(*Physalis alkekengi*)

Leaf spot. *Alternaria solani*; *Phyllosticta* sp., OK; *P. physaleos*, CT.
 Smut, white. *Entyloma australe*, CT, NY.

Virus. Cucumber Mosaic; Tobacco Mosaic; Potato Mottle.
Wilt. *Verticillium albo-atrum*, NY.

CHINESE TALLOWTREE

(*Sapium*)

Leaf spot. *Cercospora stillingiae*, LA; *Phyllosticta stillingiae*, LA.
Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

CHINESE WAXGOURD

(*Beincasa*)

Anthracnose. *Colletotrichum lagenarium*, IN.
Downy mildew. *Pseudoperonospora cubensis*, MA, OH.
Nematode, root knot. *Meloidogyne* sp.

CHINQUAPIN

(*Castanopsis*)

Blight, chestnut; canker. *Endothia parasitica*, general.
Canker, brown felt. *Septobasidium pseudopedicellatum*.
Leaf blister. *Taphrina castanopsidis*, CA.
Leaf spot. *Dothidella castanopsidis*, CA, OR; ?*Mycosphaerella* sp., CA, OR.
Powdery mildew. *Microsphaera alni*, NC.
Rot, heart; sapwood; wood. *Fomes igniarius*, OR; *Ganoderma oregonensis*;
Peniophora sanguinea; *Polyporus hirsutus*; *P. versicolor*.
Rot, root. *Armillaria mellea*, OR.
Wilt, oak. *Ceratocystis fagacearum*.

CHIOGENES

(Creeping Snowberry)

Rust. *Chrysomyxa chiogenis* (II, III), MI, NH, NY, WI; 0, I unknown.

CHIONODOXA

(Glory-of-the-Snow)

Nematode, bulb. *Ditylenchus dipsaci*.

CHIRITA

Virus. Tobacco Mosaic, CA, CT, DC, FL, OH, WA.

CHIVES

*(Allium schoenoprasum)*Downy mildew. *Peronospora destructor*, CA.Rust. *Puccinia porri* (II, III), CT, NY, WA.Smut. *Urocystis cepulae*, MA.

CHLOROGALUM

*(Soap-Plant)*Leaf spot. *Heterosporium gracile*, CA.Rust. *Uromyces aureus* (0, I, III), CA.

CHOKEBERRY

*(Aronia)*Bacterial fire blight. *Erwinia amylovora*, MI, TX, WV.Dodder. *Cuscuta compacta*, FL.Leaf spot. *Ascochyta pirina*, WI; *Cercospora mali*, AL, TX; *C. piri*, MI, WI, NH; *Mycosphaerella arbutifolia*, NY; *Phyllosticta arbutifolia*, NJ.Rot, brown. *Monilinia fructicola*, WI.Rot, root. *Phymatotrichum omnivorum*, TX.Rust. *Gymnosporangium clavariaeforme* (0, I), MA; III on juniper; *G. clavipes* (0, I), CT, ME, MA, TX; *G. davisii* (0, I), ME, MI, NH, WI; *G. fraternum* (0, I), DE, MA, ME, NJ, PA; III on chamaecyparis.

CHOKECHERRY

*(Prunus virginiana)*Bacterial leaf spot. *Xanthomonas pruni*, IL, NY, MT, WY.

Bacterial, MLO. Peach X-Disease, NH to VA, IL, WI.

Black knot. *Dibotryon morbosum*, general.Blight, fruit and shoot. *Monilinia demissa*, ID, WA; ?*M. padi* (*Sclerotinia angustior*), VT to KS, ND.Canker; dieback. *Cytospora chrysosperma*, MT.Leaf blister; fruit, shoot hypertrophy. *Taphrina confusa*, widespread.Leaf spot. *Cylindrosporium nuttalli*, OR; *Gloeosporium prunicola*, NY; *Lophodermina prunicola*, tar spot, CO; *Mycosphaerella cerasella*, KS; *Phyllosticta circumscissa*; *P. virginiana*, leaf blotch, NY to KS and MT; *Septoria pruni*, MI.Leaf spot; shot hole. *Cercospora circumscissa*, New England, IA, WI; ND to KS, and MT; *Cercospora lutescens*, general.Nematode, root knot. *Meloidogyne* sp.

Powdery mildew. *Podosphaera oxyacanthae*, widespread; *Phyllactinia corylea*, WA.

Rot, brown heart. *Fomes fulvus*, ND, SD.

Rust. *Tranzschelia pruni-spinosae* (II, III), CT to IL, WI.

Virus. Western X-Disease, OR, ID, UT, WA; Tatter Leaf (?Peach Ring Spot).

Chokecherries should be eliminated near peach orchards to control the peach X-disease.

CHRISTMAS CACTUS

(*Zygocactus truncatus*)

Rot, basal stem. *Fusarium oxysporum*, MA.

Rot, root. *Phytophthora parasitica*, FL.

CHRISTMAS ROSE

(*Helleborus niger*)

Blight, flower spot. *Botrytis cinerea*, NJ; *Gloeosporium* sp., NJ.

Leaf spot, black. *Coniothyrium hellebori*, MD, NY, OR.

Rot, stem. *Sclerotium delphinii* (*S. rolfsii*), NY.

CHRYSANTHEMUM

(*Dendranthema grandiflora*)

Bacterial, MLO. Phloem Necrosis. MLO, widespread; Aster Yellows.

Bacterial blight; wilt. *Erwinia chrysanthemi*, serious in greenhouses; *E. carotovora*, OK; *Pseudomonas cichorii*, FL.

Bacterial crown gall. *Agrobacterium tumefaciens*, CT, NJ, TX, FL.

Bacterial fasciation. *Clavibacter fascians*, NJ, MI, NY, OH.

Blight, gray mold. *Botrytis cinerea*, cosmopolitan.

Blight, petal. *Itersonilia perplexans*, MN, FL.

Blight, ray. *Ascochyta chrysanthemi* (*Mycosphaerella ligulicola*), MD to FL, MS, OH, CA; Ray Speck, *Stemphylium floridanum*, FL; *Alternaria* spp.

Blight, southern. *Sclerotium rolfsii*, FL, VA.

Blight, leaf; blotch. *Septoria leucanthemi*, widespread.

Dodder. *Cuscuta* sp., MI, NJ, NY, WA, WV; *C. arvensis* and *C. indecora*, TX.

Leaf spot. *Alternaria* sp., OK, TX; *Cercospora chrysanthemi*, AL, LA, MD, PA, TX; *Cylindrosporium chrysanthemi*, MA to AL and KS; *Phyllosticta chrysanthemi*, FL, MA, MS, VA.

Leaf spot. *Septoria chrysanthemella* (*S. chrysanthemi*) and *S. obesa*, general.

Nematode, leaf. *Aphelenchoides ritzema-bosi*, widespread.

Nematode, lesion. *Pratylenchus pratensis*, NJ, TX.

Nematode, root knot. *Meloidogyne* spp.

Nonparasitic. **Crackneck**, in greenhouses, probably overwatering and insufficient ventilation. **Air Pollution Injury**. **Yellow Strapleaf**, amino acid imbalance.

Petal spot. **Bipolaris** (*Helminthosporium*) **setaniae**, FL.

Powdery mildew. *Erysiphe cichoracearum*, general.

Rot, charcoal stem. **Macrophomina phaseoli**, OK.

Rot, flower. **Fusarium tricinctum** f. **poae**, NJ, LA.

Rot, root. **Fusarium** sp.; **Rhizoctonia solani**, general; **Pythium** sp.

Rot, root. **Phymatotrichum omnivorum**, AZ, TX.

Rot, stem. **Fusarium solani**.

Rot, stem; drop. **Sclerotinia sclerotiorum**, AZ, LA, MI, VA.

Rust. **Puccinia taneceti** (II), general.

Rust, white. **Puccinia horiana** (III, IV), NJ, PA.

Viroid. **Chrysanthemum Stunt**, serious; **Chrysanthemum Chlorotic Mottle**, NY, FL, widespread.

Virus. **Chrysanthemum Flower Distortion**; **Chrysanthemum Mosaic**; **Chrysanthemum Ring Spot**; **Chrysanthemum Rosette**; **Tomato Aspermy**; **Tomato Spotted Wilt**.

Wilt. **Fusarium oxysporum** f. sp. **callistephi**; **F. oxysporum** f. sp. **tracheiphilum**, SC.

Wilt. **Fusarium oxysporum** f. sp. **chrysanthemi**, SC, FL, widespread.

Wilt. **Verticillium albo-atrum**.

When garden chrysanthemums have foliage browning and dying progressively up the stem, the cause can be leaf nematodes, Septoria leaf spots, or Verticillium wilt. To reduce spread of nematodes home gardeners should take tip cuttings rather than crown divisions. Commercial growers should procure stock free from stunt and other virus diseases.

CHRYSOPSIS

(Golden Aster)

Leaf spot. **Cercospora macroguttata**, AL, MS; **Ramularia chrysopsidis**, NY.

Powdery mildew. *Erysiphe cichoracearum*, MT, WY.

Rust. **Coleosporium asterum** (II, III), CO, FL, NE; 0, I, on pine; **Puccinia grindeliae** (III), CA, CO, OK, UT, WY; **P. stipae** (0, I), AZ, CO, FL, MT, NE, WY; II, III, on grasses.

CIMICIFUGA

(Bugbane, Black Cohosh)

Leaf spot. **Ascochyta actaeae**, CT, NY; **Ectostroma afflatum**, VA.

Nematode, root knot. **Meloidogyne** spp., NJ.

CINCHONA

Leaf spot. *Cercospora cinchonae*, LA.
Nematode, root knot. *Meloidogyne* sp.

CINERARIA (*Senecio*)

Bacterial, MLO. *Aster Yellows*, NY.
Blight. *Botrytis cinerea*, IN, MO, NJ, PA, AK.
Damping-off. *Rhizoctonia solani*, IL, NY.
Downy mildew. *Plasmopara halstedii*, NY.
Nematode, root knot. *Meloidogyne* sp.
Powdery mildew. *Erysiphe cichoracearum*, MA.
Rot, root. *Pythium* sp., MD; *P. ultimum*; *Thielaviopsis basicola*, MA.
Rot, stem. *Fusarium* sp., PA; *Phytophthora* sp., NJ; *Sclerotinia sclerotiorum*, WA.
Virus. *Cineraria Mosaic*, WA; *Tomato Spotted Wilt*; *Chrysanthemum Stunt* (viroid).
Wilt. *Verticillium albo-atrum*, NJ, NY, WA.

CINNAMON-TREE (*Cinnamomum zeylandicum*)

Anthraxnose. *Glomerella cingulata*, FL.
Leaf spot, algal. *Cephaleuros virescens*, FL.

CIRSIUM (Plumed Thistle)

Leaf spot. *Alternaria chrysanthemi*, MT; *Cercospora* spp.; *Phyllosticta cirsii*; *Septoria cirsii*, WI.
Powdery mildew. *Erysiphe cichoracearum*, general; *Sphaerotheca macularis*.
Rot, root. *Rhizoctonia solani*, IL; *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia cirsii* (0, I, II, III), PA to NC, TX, CA, OR; *Uromyces junci* (0, I), MT, NE, ND.
White rust. *Albugo tragopogonis*, NY to IA, TX, WY.
Smut, Inflorescence. CO, UT.

CISSUS

Leaf spot. *Cercospora viticola*, LA; *C. arboreae*, TX; *Phyllosticta cissicola*, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Aecidium mexicanum* (0, I), OK.
 Smut. *Mycosyrinx cissi*, FL.

CITRUS FRUITS

(Grapefruit, Lemon, Lime, Orange)

Anthracnose, lime; withertip. *Gloeosporium limeticolum*, on lime only, CA.
 Anthracnose; withertip, fruit spot. *Glomerella cingulata*, general.
 Bacterial blast; blight; black pit. *Pseudomonas syringae*, CA; after cold rains.
 Bacterial canker. *Xanthomonas campestris* pv. *citri*, FL.
 Bacterial crown gall. *Agrobacterium tumefaciens*, AZ, CA.
 Bacterial, MLO. **Citrus Stubborn Disease**.
 Blight, brown spot; fruit and young shoots. *Alternaria citri*, FL.
 Blight, leaf and stem. *Phytophthora syringae*, CA.
 Blight, seedling; fruit rot. *Sclerotium rolfsii*.
 Blight, thread. *Pellicularia koleroga*, Gulf states.
 Blight, twig. *Gibberella baccata* (*Fusarium lateritium*), CA; *Tryblidiella rufula*, TX.
 Blotch, sooty. *Gloeodes pomigena*, Gulf states.
 Canker, branch knot. *Sphaeropsis tumefaciens*, FL.
 Canker, branch wilt. *Exosporina fawcetti*, CA.
 Canker; dieback. *Aspergillus foetidus*, CA.
 Canker, felt fungus. *Septobasidium* spp., Gulf states.
 Canker, trunk. *Botryodiplodia theobromea*, TX.
 Canker, wound. *Hendersonula toruloidea*, CA.
 Damping-off. *Pythium* spp.; *Rhizoctonia solani*, cosmopolitan.
 Dodder. *Cuscuta americana*, CA, FL; *Cassytha filiformis*, a dodderlike plant, FL.
 Leaf spot. *Cercospora aurantia*, TX, FL; greasy spot, *C. citri-grisea*, FL; tar spot, *C. gigantea*, FL; *Cladosporium oxysporum*, FL; *Mycosphaerella lageniformis*, CA, *Pleospora* sp., CA; *Alternaria citri*, on Rangpur lime; fruit spot, *Septoria citri*, CA, TX; *S. limonium*, CA.
 Leaf spot, algal; red rust. *Cephaleuros virescens*, Gulf states.
 Leaf spot; greasy spot. *Mycosphaerella citri*, FL.
 Mistletoe. *Phoradendron* sp., Gulf states.
 Nematode, burrowing. *Radopholus similis*, FL.
 Nematode, citrus. *Tylenchus semipenetrans*, FL, CA.
 Nematode, lance. *Hoplolaimus coronatus*.
 Nematode, lesion. *Pratylenchus brachyurus*; *P. vulnus*.
 Nematode, ring. *Criconeema civellae*; *Criconemoides citri*, FL.
 Nematode, stubby root. *Trichodorus christiei*.
 Nonparasitic
Blight. Boron deficiency, CA, FL.
Bronzing. Magnesium deficiency, FL.
Cancroid Spot. Genetic abnormality.
Chlorosis. Iron deficiency, AZ, CA, FL; manganese deficiency, FL.

- Exanthema.** Copper deficiency, augmented by excessive nitrogen fertilization and bad drainage, CA, FL.
- Greasy Spot.** Black melanose, cause unknown, CA, TX; chiefly grapefruit.
- Gummosis.** Gum spot; gummosis. Environmental injuries in part.
- Leprosis.** Florida scaly bark; nailhead rust. Cause unknown, FL.
- Mottle Leaf.** Zinc deficiency, AZ, CA, FL.
- Oleocellosis.** Rind-oil spot. Chemical injury from release of oil in rind.
- Rumple.** Rind network on lemon; cause unknown.
- Silver Scurf.** Thrips injury on fruit, widespread; silvering. Rust mite injury; stigmonose. Insect punctures.
- Wilt; Blight;** leaf curl. Irregular water supply, FL.
- Powdery mildew. **Oidium** sp., CA, FL; **O. tingitaninum**.
- Rot, black, of fruit. **Alternaria citri**, widespread.
- Rot, brown; gummosis. **Phytophthora citrophthora**, AZ, CA, FL; **P. parasitica**, "mal di gomma," CA, FL.
- Rot, charcoal. **Macrophomina phaseoli**, AZ, CA.
- Rot, cottony fruit; twig blight. **Sclerotinia sclerotiorum**, CA, FL, TX.
- Rot, Dothiorella; bark canker. **Botryosphaeria ribis**, widespread.
- Rot, Diplodia; collar; twig blight. **Diplodia natalensis**, general.
- Rot, fruit. **Aspergillus** spp.; **Fusarium** spp.; **Mucor** spp.; **Oospora citriaurantii**, sour rot, **Nematospora coryli**, dry rot; **Candida krusei**.
- Rot, fruit. **Gloeosporium foliicolum** (*Glomerella cingulata*), FL.
- Rot, gray mold; twig blight. **Botrytis cinerea**, CA.
- Rot, green mold. **Penicillium digitatum**; blue mold, **P. italicum**; pink mold, **P. roseum**, cosmopolitan; black mold, **Rhizopus stolonifer**; **Trichothecium viride**, occasional.
- Rot, melanose; phomopsis; decorticosis; shell bark. **Diaporthe citri**, general.
- Rot, mushroom root. **Armillaria mellea**, CA; **Clitocybe tabescens**, FL.
- Rot, root. **Fusarium solani**; **Phymatotrichum omnivorum**, TX; **Poria vaporaria**, CA; **Thielaviopsis basicola**.
- Rot, wood. **Daldinia concentrica**, occasional; **Ganoderma lucidum**, FL; **Polyporus** spp.; **Schizophyllum commune**; **Trametes hydnoides**; **T. hispida**.
- Sooty mold, **Capnodium citri**; **C. citricola**. Gulf states.
- Spot anthracnose; citrus scab. **Elsinoë fawcetti**, AL, FL, LA, MS, CA.
- Virus. **Algerian Navel Orange**, FL; **Citrus Ringspot**, CA, FL.
- Virus. **Citrus Exocortis** (viroid); **Citrus Psorosis**, scaly bark; **Citrus Tatter Leaf**; **Citrus Tristeza**, quick decline; **Citrus Vein Enation**; **Citrus Xyloporosis**, cachexia; **Citrus Yellow Vein**.

In the home garden oil sprays for scale help to get rid of sooty mold. A neutral copper spray just before growth starts is recommended in Florida for citrus scab and one just after flowering for melanose. Citrus trees in the burrowing nematode area are being pulled and the soil is treated. Consult the California and Florida Agricultural Experiment Stations for the latest information on specific citrus problems.

CLARKIA

- Anthracnose. *Colletotrichum* sp., PA.
 Bacterial, MLO. Aster Yellows, NY, and California Aster Yellows, CA.
 Blight, gray mold; canker. *Botrytis cinerea*, CA, NY.
 Damping-off. *Pythium debaryanum*, CA; *Rhizoctonia solani*, CT.
 Downy mildew. *Peronospora arthuri*, CA.
 Gall, leaf. *Synchytrium fulgens*, CA.
 Leaf spot. *Alternaria tenuis*, secondary.
 Rot, stem. *Fusarium* sp., CA; *Phytophthora cactorum*, NY.
 Rust. *Puccinia oenotherae* (0, I, II, III), CA, ID, NV, OR, WA; *Pucciniastrum pustulatum* (II, III), NY, AK.
 Wilt. *Verticillium albo-atrum*, CA.

CLAUSENA

(Wampi)

- Leaf spot. *Glomerella cingulata*, MD.
 Nematode, citrus. *Tylenchulus semipenetrans*, FL.
 Spot anthracnose; citrus scab. *Elsinoë fawcetti*, FL.

CLAYTONIA

(Spring Beauty)

- Downy mildew. *Peronospora claytoniae*, CA, IA, MD, WA, TX.
 Gall, leaf. *Physoderma claytoniana*; MI, WI.
 Leaf spot. *Ramularia claytoniae*, CA.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Puccinia marie-wilsoniae* (0, I, III), NH to VA, MO and WI, CO; UT, WA, *P. agnita* (0, III); *Uromyces claytoniae* (0, I, III), NY.

CLEMATIS

(Including Virgins-Bower)

- Bacterial crown gall. *Agrobacterium tumefaciens*, MN, TX.
 Blight, leaf. *Phleospora adusta*, TX.
 Leaf spot. *Ascochyta clematidina*, widespread; *Cercospora rubigo*, CA, WA; *C. squalidula*, widespread; *Cylindrosporium clematidis*, East and South; *Glomerella cingulata*, FL; *Phyllosticta clematidis*, MT, VA; *Ramularia clematidis*, MT; *Septoria clematidis*, WA, WI; *Sphaerella applanata*, MT, TX.
 Nematode, root knot. *Meloidogyne hapla*, ND.

Powdery mildew. *Erysiphe polygoni*, widespread.

Rust. *Puccinia recondita* (0, I), Rocky Mountains and Pacific Coast; II, III, on grasses; *P. pulsatillae* (III), CA; *P. stromatica* (III), AL; *Tranzschelia viornae* (II, III), TX.

Smut. *Urocystis carcinodes*, UT.

CLEOME (Spider-Flower)

Downy mildew. ?*Peronospora parasitica*, LA.

Leaf spot. *Cercospora cleomis*, MI, NJ; *C. conspicua*; *Heterosporium hybridum*, IA, MT.

Nematode, root knot. *Meloidogyne* sp.

Rust. *Puccinia aristidae* (0, I), AZ, CO, IN, MT, NE, NM; II, III, on grasses.

CLERODENDRON (Glorybower)

Canker, stem. *Kutikalakesa pironii*, FL.

Leaf spot. *Septoria phyltaenioides*, SC; *Cercospora apii* f. sp. *clerodendri*, FL.

Nematode, root knot. *Meloidogyne* sp., MD.

Virus. Zonate Ring Spot, FL.

CLETHRA (Sweet Pepperbush, White-Alder)

Gall, red leaf. *Synchytrium vaccinii*, NJ.

Leaf spot. *Phyllosticta clethricola*, MD, NJ, TX.

Rot, root. *Corticium galactinum*.

CLINOPODIUM (Basil-Weed)

Leaf spot. *Phyllosticta decidua*, NY.

Rust. *Puccinia menthae* (0, I, II, III), MA to VA, CO and WI.

CLINTONIA

Gall, leaf; false rust. *Synchytrium aureum*, WI.

Rot, leaf. *Ceratobasidium anceps*, ME, NY, WI.

Rust. *Puccinia mesomajalis* (III), MI, MN, NH, NY, TN, VA, WI, CA, ID, MT, OR, WA.

CLIVIA

Nematode, spiral. *Rotylenchus brachyurus*.

COCOLOBA (Sea-Grape, Dove-Plum)

Black mildew. *Lembosia coccolobae*; *L. philodendri*; *L. portoricense*; *L. tenella*, FL.

Leaf spot. *Pestalotia coccolobae*, FL.

Rust. *Uredo coccolobae*; *U. uviferae* (II), FL.

Rust. *Puccinia canaliculata*, GA.

COCKLEBUR (*Xanthium*)

Nematode, root knot. *Meloidogyne hapla*.

Rot, stem. *Sclerotinia trifoliorum*, MD; *S. sclerotiorum*, MD; *S. minor*, MD.

COCKSCOMB (*Celosia argentia*)

Damping-off. *Rhizoctonia solani*, CT.

Leaf spot. *Cercospora celosiae*, AL, OK; *Phyllosticta* sp., NJ; *Alternaria* sp., NJ.

Nematode, root knot. *Meloidogyne* sp., KS, OH, TX.

Rot, charcoal. *Macrophomina phaseoli*, TX.

Virus. **Beet Curly Top**, CA, TX.

Virus. **Cucumber Mosaic**, NY.

COCOA-PLUM (*Chrysobalanus*)

Leaf spot, *Cercospora chrysobalani*, FL.

Leaf spot, algal. *Cephaleuros virescens*, FL.

COCOYAM
(*Xanthosoma*)

Bacterial leaf spot. *Xanthomonas campestris* pv. *dieffenbachiae*, FL.

CODONANTHE

Virus. **Tobacco Mosaic**, CA, CT, DC, FL, OH, WA.

COFFEE-BERRY
(*Rhamnus californicus*)

Leaf spot. *Phaeosphaerella rhamni*, CA.

Rust. *Puccinia mesneriana* (III), CA.

Sooty mold. *Capnodium* sp., CA.

COLEUS

Damping-off; cutting rot. *Pythium* spp., CA, MD; *Rhizoctonia solani*, FL., IL, NY, TX.

Broomrape. *Orobanche ramosa*, NY.

Leaf spot. *Alternaria* sp., NJ; *Phyllosticta* sp., NJ.

Nematode, leaf. *Aphelenchoides fragariae*, NJ.

Nematode, root knot. *Meloidogyne* spp., AL, CA, CT, MD, MO, NJ, NY, OK.

Nonparasitic. **Crinkle**, genetic leaf deformity.

Rot, gray mold; leaf blight. *Botrytis cinerea*, MO, AK.

Slime mold. *Badhamia panicea*, KS.

Virus. **Coleus Mosaic**.

Wilt. *Verticillium* sp., CT.

COLLARDS

See Cabbage. Subject to downy mildew and *Sclerotinia* rot.

COLLINSIA
(Blue-Lips, Blue-Eyed Mary)

Leaf spot. *Septoria collinsiae*, IL.

Rot, root. *Pythium mammillatum*, CA.

Rust. *Aecidium insulum* (0, I), UT; *Puccinia collinsiae* (0, I, II, III), CA, OR, UT, WA.
 Smut, white. *Entyloma collinsiae*, CA, OR.

COLLINSONIA (Horse-Balm)

Black spot, on stem. *Phyllachora* sp., PA.

COLLOMIA

Powdery mildew. *Sphaerotheca macularis*, CA, CO, ID, MT, ND, WA, WY.
 Nematode, bulb. *Ditylenchus dipsaci*, Pacific Northwest.
 Rust. *Puccinia giliae* (II, III), CA, WA; 0, I, unknown; *P. plumbaria* (0, I, III), NV; *Uromyces acuminatus* var. *polemonii* (0, I), CO, NE, ND; II, III, on marsh grass.

COLTSFOOT (*Tussilago*)

Leaf spot. *Mycosphaerella tussilaginis*, NY; *Septoria farfaricola*, TN.

COLUMBINE (*Aquilegia*)

Blight, gray mold. *Botryris cinerea*; ?*B. streptothrix*.
 Damping-off; root rot. *Rhizoctonia solani*, IL.
 Leaf spot, *Ascochyta aquilegiae*, CT, IL, IA, NJ, NY, PA, TX, WI; *Cercospora aquilegiae*, KS, OR; *Septoria aquilegiae*, CT, IN, MI, NY, OH, VA, VT, WI; *Haplobasidium pavoninum*, AK.
 Nematode, root knot. *Meloidogyne* sp.
 Powdery mildew. *Erysiphe polygoni*, IL, IN, IA, NJ, NY, OH, PA, TX, UT, WY, WI, AK.
 Rot, root. *Phymatotrichum omnivorum*, TX; *Pythium mamillatum*, CA.
 Rot, stem. *Phoma* sp., PA; *Sclerotinia sclerotiorum*, DE, OH, PA, TX; ?*Phyllosticta aquilegicola*, WA.
 Rust. *Puccinia recondita* (0, I), CO, CA, ID, NM, OR, WA; II, III, on grasses.
 Smut, leaf and stem. *Urocystis sorosporioides*, UT.
 Virus. Mosaic, unidentified, IA, KS.

COLUMBO

(*Fraseria*)

Leaf spot. *Asteroma fraseriae*, black mildew, CO, ID; *Cercospora fraseriae*, CO, UT; *Marssonina fraseriae*, ID, WA; *Phyllosticta fraseriae*, CO.
Rust. *Uromyces speciosus* (II, III), CO, NM; 0, I, unknown.

CONFEDERATE-JASMINE

(*Trachelospermum*)

Black mildew; sooty mold. *Dimerosporium pulchrum*, LA.
Leaf spot. *Cercospora repens*, LA.
Rot, root. *Clitocybe tabescens*, FL.

CORAL-BELLS

See *Heuchera*.

CORALBERRY

(*Symphoricarpos orbiculatus*)

Canker; stem gall. *Phomopsis* sp., MD.
Leaf spot. *Cercospora symphoricarpi*, KS, NE, TX.
Powdery mildew. *Microsphaera diffusa*, general.
Rot, berry. *Alternaria* sp., CT.
Rot, root. *Helicobasidium purpureum*, TX; *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia crandalli* (0, I), KS, MO, OK.
Spot anthracnose. *Sphaceloma symporicarpi*.

CORDIA

Powdery mildew. *Erysiphe cichoracearum*, TX.
Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

COREOPSIS

(Tickseed)

Bacterial, MLO. *Aster Yellows*, NJ, NY, and *California Aster Yellows*, CA.
Blight, gray mold. *Botrytis cinerea*, AK.
Blight, southern. *Sclerotium rolfsii*, FL, TX.
Broomrape. *Orobanche ramosa*, TX.
Dodder. *Cuscuta* sp., NJ.

Leaf spot. *Cercospora coreopsidis*, OK; *Phyllosticta coreopsidis*, WI; *Septoria coreopsidis*, IA, WI, TX.
 Nematode, root knot. *Meloidogyne* sp., FL.
 Powdery mildew. *Erysiphe cichoracearum*, NY, MD, MN, WI.
 Rot, root. *Rhizoctonia solani*, NY, MN, TX; *Phymatotrichum omnivorum*, TX.
 Rot, stem. *Sclerotinia sclerotiorum*, OH, WA.
 Rust. *Coleosporium inconspicuum* (II, III), GA, MD, NC, SC, OH, TN, VA, WV; 0, I, on pine.
 Scab. *Cladosporium coreopsidis*.
 Virus. Beet Curly Top, CA.
 Wilt. *Verticillium albo-atrum*, NY.

CORIANDER
 (*Coriandrum*)

Anthraxnose. *Gloeosporium* sp., MD.
 Nematode, root knot. *Meloidogyne* sp., FL.

CORN, SWEET
 (*Zea mays* var. *saccharata*)

Bacterial leaf stripe. *Pseudomonas andropogonis*, FL.
 Bacterial spot. *Pseudomonas syringae*, MA.
 Bacterial stalk rot. *Erwinia dissolvens*, FL, WV.
 Bacterial wilt. *Erwinia stewartii*, general.
 Blight, leaf. *Helminthosporium turcicum*; Middle Atlantic and southern states, occasional in central states; *H. maydis* (*Cochliobolus heterostrophus*), southern leaf blight.
 Blight, seedling; stalk rot; ear rot. *Penicillium oxalicum*.
 Leaf spot. *Cercospora zeae-maydis*, VA; *Physoderma maydis*, brown spot, in South; eyespot, *Kabatiella zeae*.
 Nematode, lesion. *Pratylenchus penetrans*.
 Nematode, root knot. *Meloidogyne chitwoodi*, Pacific Northwest; *M. hapla*, Pacific Northwest.
 Rot, black bundle disease. *Cephalosporium acremonium*, MT.
 Rot, dry ear. *Nigrospora sorghi*, IA.
 Rot, ear, root and stalk; seedling blight. *Diplodia zeae*, ME to VA, TX, SD; *Fusarium* spp.; *F. moniliforme*, cosmopolitan.
 Rot, root. *Gibberella zeae*, chiefly east of Mississippi River; *Pythium* spp., IL, IA, OH, TX; *Helminthosporium pedicellatum*, CA.
 Rust. *Puccinia sorghi* (II, III), general; 0, I, on oxalis; *P. polyspora*, southern.
 Smut. *Ustilago maydis*, general; *Sphacelotheca reiliana*, head smut.

Virus. Corn Leaf Fleck; Corn Mosaic, Corn Stunt, AL, AZ, CA, GA, IN, KY, MO, SC; **Wheat Streak Mosaic**, IN, MI, OH; **Cucumber Mosaic**, celery strain.

Virus. Maize Dwarf Mosaic, AL, AR, AZ, CA, GA, IA, ID, MO, NM, NY, OH, NJ, PA, WA.

Witchweed. Striga asiatica, on roots, NC.

Smut is the most conspicuous corn disease in home gardens. Bacterial wilt is dependent on survival of insect vectors and may be serious after a warm winter unless resistant hybrids are used.

CORNCOCKLE

(*Agrostemma*)

Leaf spot. Gloeosporium sp., IN; **Marssonina delastrei**, IL, IN, MI, MO, MS; **Septoria lychnidis** var. **pusilla**, ND.

Rot, root. Phymatotrichum omnivorum, TX.

Rot, stem. Fusarium sp., IN.

CORN-MARIGOLD

(*Chrysanthemum segetum*)

Bacterial, MLO. California Aster Yellows, CA.

Leaf spot. Septoria chrysanthemi, NY.

CORYDALIS

Downy mildew. Peronospora corydalis, IN, MA, MD, OK, TX.

Leaf spot. Septoria corydalis, TX, WI.

Nematode. Meloidogyne sp., FL.

Rust. Puccinia aristidae (0, I), CO, KS, NE; II, III, on grasses; **P. brandegei** (III) CO, WA.

COSMOS

Bacterial, MLO. Aster Yellows, DE, NJ, NY, and **California Aster Yellows**, CA.

Bacterial wilt. Pseudomonas solanacearum, NC.

Blight, southern. Sclerotium rolfsii, MS.

Canker; stem blight. Diaporthe stewartii, CT to NJ; KS, SD, CA, TX.

Dodder. Cuscuta sp., NY.

Leaf spot. Cercospora sp., TX; **Septoria** sp., CT.

Nematode, root knot. *Meloidogyne* sp.
 Powdery mildew. *Erysiphe cichoracerum*, CA, MD, NC, NE, TX.
 Rot, root. *Phymatotrichum omnivorum*, AZ, TX; *Macrophomina phaseoli*, TX; *Pythium* sp., MD; *Rhizoctonia solani*, CT, MD, TX.
 Virus. Beet Curly Top; Mosaic, unidentified, FL, TX; Tomato Spotted Wilt, TX.
 Wilt. *Fusarium* sp., NJ.

COTONEASTER

Bacterial fire blight. *Erwinia amylovora*, widespread.
 Bacterial hairy root. *Agrobacterium rhizogenes*, central states.
 Canker; twig blight. *Physalospora obtusa*, NY to OH, TX; *Diplodia* sp., TX; *Gibberella baccata*, CA.
 Leaf spot. *Fabraea maculata*, CA, IA; *Phyllosticta cotoneastri*, MD; *P. cydoniae*, MS.
 Powdery mildew. *Podosphaera* sp., CA.
 Rot, root. *Armillaria mellea*, CA; *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, AZ, TX; *Phytophthora* sp.
 Scab. *Venturia* sp., WA.

COURSETIA

Rust. *Phragmopyxis acuminata* (0, III), AZ, CA.

COWANIA

Rust. *Phragmidium andersonii* (I, II, III), ID.

COWPEA (*Vigna sinensis*)

Virus. Brome Mosaic, CA.

Cowpeas are of most interest to gardeners as a green manure crop, and there is little need of repeating here the long list of possible diseases, most of which are given under Bean. Ashy stem blight, charcoal rot, is fairly serious. The root-knot nematode is general, but varieties Iron and Bragham are almost immune. *Fusarium* wilt, general in the South, is largely controlled by using resistant varieties. Leaf spots are numerous, and some may cause defoliation. Rust is widespread on Blackeye and related varieties, but many varieties are resistant.

CRABAPPLE, FLOWERING

(Malus)

- Anthracnose, northwestern. *Neofabraea malicorticis*, OR.
 Bacterial fire blight. *Erwinia amylovora*, widespread.
 Blight, thread. *Pellicularia koleroga*, LA.
 Blotch, sooty. *Gloeodes pomigena*, IN.
 Canker, blister. *Nummularia discreta*, WV.
 Canker, coral spot; twig blight. *Nectria cinnabarina*, AK.
 Canker; dieback. *Valsa leucostoma*, WV; *Physalospora obtusa*, MI.
 Leaf spot. *Cercospora pirina*, IL, WI; *Coniothyrium pirinum*, WI; *Fabraea maculata*, MD, AK; *Illosporium malifoliorum*, WV; *Marssonina coronaria*, IN, IA, WI, MO; *Phyllosticta* sp., IA; *P. solitaria*, KS, OH, TX, IN, IA, WV; *P. zonata*, IA; *Septoria pyri*.
 Mistletoe, European. *Viscum album*, CA.
 Powdery mildew. *Oidium pyrinum*, WI; *Phyllactinia corylea*, WA; *Podosphaera leucotricha*, IL, IA; *P. oxyacanthae*, WA, WI.
 Rot, black, fruit, leaf spot. *Physalospora obtusa*, eastern and central states.
 Rot, heart. *Ganoderma applanatum*.
 Rot, root. *Armillaria mellea*, WA; *Phymatotrichum omnivorum*, TX.
 Rust. *Gymnosporangium clavipes*, NJ, CT; *G. globosum*, AL, IN, KS, NJ, SC, VA; *G. juniperi-virginianae*, cedar-apple rust, general; *G. libocedri*, OR, AK; *G. nelsoni*, AK, WA; *G. nootkatense*, AK.
 Scab. *Venturia inaequalis*, general.
 Scab, twig infections. *Venturia inaequalis*, MA, OH, PA, RI.

Cedar-apple rusts are common and injurious on most native crabapples; Asiatic varieties are usually resistant. Remove red-cedars in the vicinity.

CRANBERRY

(Vaccinium, subgenus Oxycoccus)

- Dieback. *Diaporthe vaccinii*, WI.
 Gall, red leaf. *Synchytrium vaccinii*, NJ.
 Gall; shoot hypertrophy; rose-bloom. *Exobasidium vaccinii*, general.
 Leaf spot. *Discohainesia oenotherae*, also storage rot, MA, NJ, OR, WA, WV; *Mycosphaerella nigromaculans*, black spot, OR, WA; *Phyllosticta putrefaciens*, also berry rot, MA, NJ; *Ramularia multiplex*, MI, NY, WI; *Venturia compacta*, leaf smudge, general; *Cladosporium oxycocci*, leaf mold, NJ, WA.
 Nematode. *Atylenchus decalineatus*.
 Nematode, sheath. *Hemicycliophora similis*.
 Nematode, stubby root. *Trichodorus christiei*.
 Powdery mildew. *Microsphaera alni* var. *vaccinii*, AL, NJ, OH.
 Rot, berry; blotch. *Acanthorynchus vaccinii*, ME to NC and WI, OR, WA;

Ceuthospora lunata, black rot, MA, NJ, OR, WA, WI; **Curvularia inaequalis**, IL, NJ, WI; **Sphaeronema pomorum**, NJ; **Sporonema oxycocci**, ME, MA, NJ, WI, OR, WA, AK.

Rot, berry speckle. Several fungi associated.

Rot, bitter; leaf spot. **Glomerella cingulata** var. **vaccinii**, general.

Rot, early; scald, blast. **Guignardia vaccinii**, general.

Rot, end. **Godronia cassandrae**, general.

Rot, fairy ring; root. **Psilocybe agrariella** var. **vaccinii**, MA, NJ.

Rot, hard; twig blight. **Monilinia oxycocci**, MA, ME, OR, WA, WI.

Rot, storage. **Penicillium** spp., cosmopolitan; **Diaporthe vaccinii**, general;

Botrytis cinerea, gray mold, also blossom blight; **Alternaria** sp.; **Dematium** spp.; **Melanospora destruens**, in market; **Gloeosporium minus**, MD, NJ; **Pestalotia vaccinii**; **Stemphylium ilicis**.

Rot, witches' broom. **Naevia oxycocci**, ME, MI, NH, NY.

Rust. **Pucciniastrum vaccinii** (II, III), OR, UT, WA; 0, I, on hemlock.

Virus. **Cranberry False-Blossom**, ME to NJ and WI, OR, WA.

?Virus. **Cranberry Ring Spot**, WI.

GRAPE-MYRTLE

(*Lagerstroemia*)

Blight, thread. **Rhizoctonia ramicola**, FL.

Leaf spot. **Cercospora lythracearum**, TX; **Cercospora** sp., blotch, FL, TX;

Phyllosticta lagerstroemiae, tip blight, LA, TX.

Nonparasitic. **Chlorosis**. Manganese deficiency.

Powdery mildew. **Erysiphe lagerstroemiae**, general; **Phyllactinia corylea**, AL.

Rot, root. **Clitocybe tabescens**, FL; **Phymatotrichum omnivorum**, TX.

Sooty mold. **Capnodium** spp., in aphid honeydew.

Mildew is serious on crape-myrtle, calling for sprays as the buds break.

CRASSULA

Anthraxnose. **Gloeosporium** sp., NJ.

Leaf spot. **Phomopsis** sp., CT.

Nematode, leaf. **Aphelenchoides** sp.

Rot, root. **Armillaria mellea**, CA; **Pythium** sp., NJ, NY.

CREOSOTE BUSH

(*Larrea*)

?Blight. **Omphalia** sp.

Mistletoe. **Phoradendron californicum**, TX to CA.

CRINUM

Leaf scorch; red blotch. *Stagonospora curtisii*, CA, NY.

Leaf spot. *Cercospora pancratii*, AL, FL, MS.

Virus. Mosaic. Unidentified.

CROCUS

Bacterial scab. *Pseudomonas marginata*, occasional on imported stocks.

Rot. Corm. *Fusarium oxysporum*, NY, PA; *Stromatinia gladioli*, dry rot, widespread; *Penicillium* sp., blue mold.

Virus. ?Iris Mosaic, CA, MD.

CROTALARIA

(*C. retusa*)

Blight, seedling. *Alternaria cassiae*, MS.

Powdery mildew. *Oidium erysiphoides* var. *crotalariae*, LA, MS.

Virus. Potato Virus X, on *C. juncea*.

Wilt; root rot. *Fusarium* sp., GA, TX.

This species is sometimes grown as an ornamental. Crotalaria as a cover crop has more diseases, but *C. spectabilis* is immune to root-knot nematode and thus is particularly useful between susceptible crops.

CROTON

(*Codiaeum*)

Anthraxnose. *Gloeosporium* spp., FL, NJ.

Rot, root. *Phymatotrichum omnivorum*, TX.

This is the croton of florists.

CROTON

(*Croton*)

Dodder. *Cuscuta indecora*, TX.

Gall, leaf. *Kutilakesa pironii*, FL.

Leaf spot. *Cercospora capitati*, TX; *C. crotonicola*, TX, SC; *C. crotonis*, AL, FL, SC; *C. crotonophila*, WI; *C. maritima*, MS; *C. crotonifolia*, SC.

Nematode, lesion. *Pratylenchus* sp., FL.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Bubakia crotonis* (II, III), KY to AL; AZ, CA, FL, NE, TX.

CROWBERRY

(*Empetrum*)

Rust. *Chrysomyxa empetri* (II, III), ME, NH, NY.

CROWN VETCH

(*Coronilla varia*)

Nematode. *Meloidogyne* sp., VA.

Rot, stem. *Sclerotinia trifoliorum*; *Fusarium roseum*.

CRYPTANTHA

Gall, leaf. *Synchytrium myosotidis*, AZ, CA.

Powdery mildew. *Erysiphe cichoracearum*, CA, NV.

Rust. *Puccinia aristidae* (0, I); II, III, on native grasses; *P. cryptanthes*, CA, WA.

CRYPTANTHUS

Anthraxnose. *Gloeosporium* sp., WA.

CRYPTOMERIA

Blight, leaf and twig. ?*Diaporthe eres*; *Phyllosticta cryptomeriae*, VA and general U.S.

Leaf spot. *Pestalotia cryptomeriae*, SC; *P. funerea*, NJ.

CUCUMBER

(*Cucumis sativus*)

Anthraxnose. *Colletotrichum lagenarium*, general.

Bacterial angular leaf spot. *Pseudomonas syringae* pv. *lachrymans*, general.

Bacterial soft rot. *Erwinia aroideae*; *E. carotovorus*.

Bacterial spot. *Xanthomonas cucurbitae*, MA, MI.

Bacterial wilt. *Erwinia tracheiphila*, general.

Blight, blossom; fruit rot. *Choanephora cucurbitarum*, FL, GA, NJ, OK, RI, TX.

Blight, gummy stem; black fruit rot. *Mycosphaerella citrullina*, widespread; *M. melonis*, AZ.

Blight, leaf. *Alternaria cucumerina*, general.

- Blight, southern. *Sclerotium rolfsii*, VA to FL, TX.
 Damping-off. *Rhizoctonia solani*, also stem rot; *Pythium* spp.
 Dodder. *Cuscuta gronovii*, NY.
 Downy mildew. *Pseudoperonospora cubensis*, general.
 Leaf spot. *Cercospora cucurbitae*, AL, DE, IA, NJ, TX, WI; *Ascochyta* sp.,
 OR; *Gloeosporium* sp. IL; *Phyllosticta cucurbitacearum*, DE, OH, TX;
Septoria cucurbitacearum, DE, MA, NH, PA; *Stemphylium cucurbitacearum*,
 OH; ?*Alternaria consortiale*, WA.
 Mold. Seed. *Alternaria tenuis*, cosmopolitan; *Curvularia trifoli*, NJ.
 Nematode, hop cyst. *Heterodera humuli*, OR.
 Nematode, root knot. *Meloidogyne incognita*; *M. incognita-acrita*; *M. javanica*.
 Nonparasitic. Chlorosis, nitrogen, manganese, or potassium deficiency.
 Powdery mildew. *Erysiphe cichoracearum*, general; *Sphaerotheca fuliginea*,
 CA, NC.
 Rot, charcoal. *Macrophomina phaseoli*, IL.
 Rot, fruit. *Fusarium* spp., TX; *Rhizopus stolonifer*, occasional. *Diplodia*
natalensis; *Botrytis cinerea*.
 Rot, root. *Fusarium solani* f. *radicicola*, CT, OR, WA; *Phymatotrichum*
omnivorum, TX.
 Rot, stem; fruit. *Sclerotinia sclerotiorum*, occasional.
 Scab. *Cladosporium cucumerinum*, general.
 Virus. Bromegrass Mosaic Virus, general.
 Virus. Cucumber Mosaic, general; Beet Curly Top, CA, ID, OR, TX, UT, WA;
 Tobacco Ring Spot, MD, PA, VA; Zucchini Yellow Mosaic, CA, FL, NY.
 Wilt. *Fusarium oxysporum* f. sp. *cucumerinum*, FL; *E. oxysporum* f. sp. *cucurbitae*;
Verticillium albo-atrum, CA.

Starting cucumbers under Hotkaps and then treating to control insect vectors helps to reduce bacterial wilt and virus diseases. Choose varieties resistant to mosaic and scab.

CULVERS-ROOT (*Veronicastrum*)

- Leaf spot. *Cercospora leptandrae*, WI; *Phyllosticta decidua*, TX, WI; *Ramularia*
veronicae, TX; *Septoria veronicae*, WI.
 Powdery mildew. *Erysiphe cichoracearum*, IL; *Sphaerotheca macularis*, CT,
 IL, IA, MD, MI, MO, WI.
 Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, TX.
 Rust. *Puccinia veronicarum* (III), IA, TX, WI.

CUNNINGHAMIA

- Leaf spot. Necrotic. *Phomopsis* sp., OR.

CUPHEA

Blight, gray mold. *Botrytis cinerea*, occasional in greenhouses.
 Leaf spot. *Septoria maculifera*, NY, PA, VA, WV.
 Nematode, root knot. *Meloidogyne* sp., MD.
 Powdery mildew. *Erysiphe polygoni*, MD, VA.
 Rot, root. *Rhizoctonia solani*, IL.

 CURRANT
 (*Ribes* spp.)

Anthracnose; fruit spot. *Pseudopeziza ribis*, general.
 Blight, cane. *Bostryosphaeria ribis* var. *chromogena*, general.
 Blight, gray mold; fruit spot. *Botrytis cinerea*, Northeast, OR, WA.
 Blight, thread. *Pellicularia koleroga*, FL.
 Canker, cane knot. *Thyronectria berolinensis*, CT to IN, KS, UT.
 Canker; dieback. *Nectria cinnabarina*, ME to CO, WA; *N. ditissima*, MN, NY; Black pustule, *Phragmodothella ribesia*, Northeast, Pacific Northwest.
 Downy mildew. *Plasmopara viticola*, WI.
 Leaf spot. *Alternaria* sp., MI; *Cylindrosporium ribis*, WI; *Mycosphaerella ribis*, ME to MD, AR, OR, WA.
 Leaf spot, angular. *Cercospora angulata*, NY to VA, KS, MN; *C. ribis*, AL, IN, IA.
 Powdery mildew. *Microsphaera grossulariae*, MT, NE, NH; *Sphaerotheca morsuvae*, CA, CT, MT, NE, OR, WA, AK; *Phyllactinia corylea*, MI.
 Rot, berry. *Glomerella cingulata*, CT, PA.
 Rot, collar. *Fomes ribis*, NY to IN, MN, UT.
 Rot, root. *Armillaria mellea*, CA, OR, WA; *Phymatotrichum omnivorum*, TX; *Hypholoma perplexum*, NY.
 Rust, white pine blister. *Cronartium ribicola* (II, III), ME to VA, IL and MN, OR, WA. *Puccinia caricis* (0, I), CT, IN, MD, NY, II, III on *Carex*.
 Virus. *Currant Mosaic*, NY, MD.
 Wilt. *Verticillium* sp., NY.

Black currant is the most important host of white pine blister rust and should not be grown; red currants should be kept at least 300 feet from pines. Cut out canes with cane blight.

 CURRANT, FLOWERING
 (*Ribes*)

Anthracnose. *Pseudopeziza ribis*, IA, MN, MT, IL.
 Bacterial leaf spot. *Pseudomonas ribicola*.
 Blight; dieback. *Botrytis cinerea*, IN, AK.

Canker; dieback. *Botryosphaeria ribis*, KS; *Phragmodothella ribesia*, NY; *Thyronectria berolinensis*, KS; *Nectria cinnabarina*, AK, KS.
 Leaf spot. *Cercospora angulata*, MN; *C. ribicola*, OR, WA; *Marssonina ribicola*, CO; *Mycosphaerella aurea*, NY to KS and SD, WA; *M. ribis*, NY to KS, MN and UT; *Phyllosticta grossulariae*, IN; *Septoria sanguinea*, WA.
 Rust. *Coleosporium jonesii*, MN; *Cronartium occidentale*, MT to NM, CA, WA; *C. ribicola*, ME to MD, CO, MN, Pacific states; *Melampsora ribesii-purpureae*; II, III on willow; *Puccinia caricina*, NY to IA, CA, OR, AK; *P. micrantha*; *P. parkerae*.

CYCAD, SAGO-PALM

(*Cycas*)

Coralloid roots. *Anabaena cycadearum* and *Nostoc commune*, algae, and bacterium *Azotobacter* are associated with roots but are mostly innocuous.
 Leaf spot. *Ascochyta cycadina*, MO, TX; *Pestalotia cycadis* (?secondary), CT, FL.

A destructive blight of unknown cause (but with *Gloeosporium* and *Phoma bresadolae* often associated with it) causes pale green areas on pinnae of young leaves, which are curled out of the flat plane and dieback. The disease is apparently systemic and increases annually until death. Eradication of blighted plants is the only control suggested.

CYCLAMEN

Bacterial tuber rot. *Erwinia carotovora*, OH, NJ, NY.

Blight; bud and leaf rot; petal spot. *Botrytis cinerea*, cosmopolitan.

Blight, leaf and bud. *Glomerella cingulata*, IN, MA, MO, NJ, OH, PA, TX, VA.

Leaf spot. *Phyllosticta cyclaminicola*, IL, OH, TX; *P. cyclaminis*, VA; *Systoria cyclaminis*, CA.

Leaf spot; stunt; white mold. *Ramularia cyclaminicola* (*Cladosporium cyclaminis*), CA, IL, MN, NJ, NY, OH, PA.

Nematode, leaf. *Aphelenchoides fragariae*.

Nematode, lesion. *Pratylenchus pratensis*, VA.

Nematode, root knot. *Meloidogyne* sp., cosmopolitan.

Rot, root. *Thielaviopsis basicola*, CT.

Wilt. *Fusarium oxysporum* f. sp. *cyclaminis*, CA, NJ; *Fusarium* sp., NJ.

Discard plants with stunt; sterilize soil and pots, and benches where diseased plants have grown. Avoid splashing to reduce botrytis blight and leaf nematodes. Spray for blight and leaf spots with zineb or ferbam.

CYNOGLOSSUM (Hounds-Tongue)

- Blight, southern. *Sclerotium rolfsii*, FL.
 Downy mildew. *Peronospora cynoglossi*, MD, IL, TX.
 Leaf spot. *Cercospora cynoglossi*, IN; *Phyllosticta decidua*, WI; *Ramularia lappulae*, WI, TX.
 Nematode, root knot. *Meloidogyne* sp.
 Powdery mildew. *Erysiphe cichoracearum*, UT, WY, VA.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rot, stem. *Sclerotinia sclerotiorum*, WA.

CYPRESS (*Cupressus*)

- Bacterial crown gall. *Agrobacterium tumefaciens*, AZ, CA, FL.
 Blight, nursery. *Phomopsis juniperovora*, MD, NC, VA.
 Blight, seedling. *Fusarium solani*, TX.
 Blight, twig. *Coryneum asperulum*, AL; *C. berckmanii*, OR; *Cercospora thujina*, AL, GA, LA; *Pestalotia funerea*, CA, TX; *Botryosphaeria* sp., GA, on Arizona cypress.
 Canker; dieback. *Coryneum cardinale*, on Monterey, sometimes Italian cypress; *Cytospora cenisia*, CA, on Italian cypress; *Macrophoma cupressi*, AL, CA, FL, TX; *Monochaetia unicornis*, GA, SC.
 Mistletoe. *Phoradendron* sp., AZ, CA, OR.
 Needle cast. *Lophodermium* sp., NJ.
 Nematode, lesion. *Pratylenchus thornei*.
 Rot, heart. *Fomes pini*, CA.
 Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX; *Phytophthora cinnamomi*, LA.
 Rot, wood. *Stereum taxodii*, cause of "pecky" cypress; *Coniophora puteana*, CA; *Lenzites saepiaria*, cosmopolitan; *Polyporus* spp.; *Poria subacida*; *Steccherhinum ochraceum*.
 Rust. *Gymnosporangium cupressi* (III), on Arizona cypress.

Coryneum canker has killed thousands of Monterey cypress trees in California, and Cytospora canker has been fatal in a narrow belt along the coast.

CYPRESS-VINE (*Quamoclit*)

- Nematode, root knot. *Meloidogyne* sp., AL.
 Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Coleosporium ipomoeae* (II, III), IL, SC, TN.
White rust. *Albugo ipoemeae-panduratae*, NM, MS.

CYRILLA (Leatherwood)

Canker, brown felt. *Septobasidium sinuosum*, FL.
Leaf spot. *Phyllosticta cyrillae*, FL.
Rust. *Aecidium cyrillae*, FL, LA, MS.

DAHLIA

Bacterial crown gall. *Agrobacterium tumefaciens*, CT, IL.
Bacterial, MLO. *Aster Yellows*, MD.
Bacterial rot. *Erwinia carotovora*, MS, WA; *E. cytolitica*, NY.
Bacterial wilt. *Pseudomonas solanacearum*, DE, MI, MS, NJ, NC, OK, TX.
Blight, blossom. *Choanephora americana*, FL; *Stemphylium floridanum*.
Blight, gray mold. *Botrytis cinerea*, cosmopolitan on flower buds.
Blight, southern. *Sclerotium rolfsii*, FL, KS, MS, NJ, NC, TX.
Leaf spot. *Alternaria* sp., VA to AL, MO, and MI, ?secondary; *Cercospora* sp., FL, MS.
Nematode, bulb. *Ditylenchus destructor*, OR.
Nematode, leaf. *Aphelenchoides ritzema-bosi*, CA.
Nematode, root. *Trichodorus pachydermus*, MI.
Nematode, root knot. *Meloidogyne* sp., NC to AL, TX, MO, AZ, CA.
Powdery mildew. *Erysiphe cichoracearum*, general; *E. Polygoni*, CA, DE, GA, IA, MO, NJ, PA, VA; *Uncinula* sp., NC.
Rot, charcoal. *Macrophomina phaseoli*, SC, OK.
Rot, root. *Armillaria mellea*, CA; *Phymatotrichum omnivorum*; TX.
Rot, stem. *Sclerotinia sclerotiorum*, CA, ME, NY.
Rot, stem, root, cutting. *Pythium* spp.; *Rhizoctonia solani*; *Fusarium* ?*roseum*.
Scab. *Streptomyces scabies*, NC.
Smut, leaf. *Entyloma dahliae*, CA, NJ, OR.
Virus. *Dahlia Mosaic*, general; *Tomato Spotted Wilt*, CA, MI, NY, NJ, TX, WI; *Cucumber Mosaic*; *Tobacco Ring Spot*.
Wilt. *Fusarium oxysporum*; *Verticillium albo-atrum* (*V. dahliae*) IL, MI, MO, NJ, OH, TX.

Leafhopper injury, hopperburn, looks like a true disease. Margins of leaves turn brown, and there may be general stunting and yellowing. The spotted wilt virus causes yellow ring spots in dahlia foliage. Heavy, wet soil contributes to bacterial and fungus rots and wilts. Mildew is often prevalent in late summer.

DAISY, OXEYE
(*Chrysanthemum leucanthemum*)

Bacterial, MLO. **Aster Yellows**, NY, KS, NJ.
 Blight, southern. **Sclerotium rolfsii**, TX.
 Leaf spot. **Cylindrosporium chrysanthemi**, OK; **Septoria chrysanthemella**;
 S. leucanthemi, blotch, CT, NY.
 Nematode, root knot. **Meloidogyne** sp.
 Nematode, stem. **Ditylenchus dipsaci**, NY.
 Rot, stem. **Fusarium roseum** and **F. solani**, TX; **Sclerotinia sclerotiorum**, TX.
 Rot, root. **Phymatotrichum omnivorum**, TX.
 Virus. **Potato Yellow Dwarf**, NY.

DALIBARDA
(Dewdrop)

Leaf spot. **Septoria dalibardae**, ME, MI, NH, NY, VT.

DANDELION
(*Taraxacum*)

Virus. **Tomato Ringspot**, PA.

DAPHNE

Blight, twig. **Botrytis** sp., Northeast, Northwest.
 Dieback; wilt. **Fusarium** sp., NJ.
 Leaf spot; leaf drop. **Gloeosporium mezerei**, WA; **Marssonina daphnes**.
 Rot, collar, stem. **Phytophthora cactorum**, NY, CA; **Rhizoctonia solani**, NY.
 Rot, stem; wilt. **Sclerotium rolfsii**, FL.

DATURA

Bacterial canker, vascular. **Clavibacter michiganense**, WY. On *Datura* sp.,
 D. innoxia, *D. metal*, *D. meteloides*, *D. mollis*, *D. stramonium*.
 Blight, southern. **Sclerotium rolfsii**, FL.
 Leaf spot; pod blight. **Alternaria crassa**, FL, WI.
 Nematode, root knot. **Meloidogyne hapla**.
 Rot, root. **Thielaviopsis basicola**, WI.
 Virus. **Bromegrass Mosaic**, general.
 Virus. **Tomato Spotted Wilt**, CA, TX.

DAYLILY
(*Hemerocallis*)

Blight, gray mold. *Botrytis* sp., MD.

Blight, leaf. *Kabatiella* sp., ?secondary, MD.

Leaf spot. *Cercospora hemerocallis*, IL; *Heterosporium gracilis*, NJ, NY, TX;
Leaf streak, *Gloecephalus hemerocalli*, MS, and *Collecephalus hemerocalli*,
MS, PA, LA.

Nematode, root knot. *Meloidogyne incognita*; *M. incognita-acrita*.

Rot, root. *Sclerotium* sp., IN; *Phymatotrichum omnivorum*, TX.

DECUMARIA

Leaf spot. *Cercospora decumariae*, MS.

DELPHINIUM
(Larkspur)

Bacterial black spot, leaf spot. *Pseudomonas syringae* pv. *delphinii*, ME to
VA, TX, MN, rare in Pacific Coast states.

Bacterial collar rot. *Erwinia carotovora*, CA, NY.

Bacterial crown gall. *Agrobacterium tumefaciens*, WA.

Bacterial foot rot; blackleg. *Erwinia carotovora* pv. *atroseptica*, general.

Bacterial, MLO. **California Aster Yellow**s Stunt, "Greens," Pacific Coast and
Rocky Mountains.

Blight, gray mold, bud rot. *Botrytis cinerea*, CT, MA, MN, MS, NY, WV, WI.

Blight, southern; crown rot. *Sclerotium rolfsii* (*S. delphinii*), general.

Canker, stem. *Diaporthe arctii*, MD, NC, NY, OH, PA; *Fusarium* spp.,
widespread; *F. oxysporum* f. sp. *delphinii*, wilt, NY; *Volutella* sp., MD;
Phoma sp., CT, NJ, NY.

Damping-off; root rot. *Pythium* spp. and *Rhizoctonia solani*, cosmopolitan.

Gall, leaf. *Synchytrium aureum*, IA.

Leaf spot. *Ascochyta aquilegiae*, CT; *Cercospora delphinii*, CO, MD; *Ovularia*
delphinii, WY; *Phyllosticta* sp., NY; *P. delphinii*, CO; *Ramularia delphinii*,
CA, CO, UT; *Septoria delphinella*, IL, KS, WI.

Nematode, leaf and stem. *Ditylenchus dipsaci*, OR, WA.

Nematode, lesion. *Pratylenchus pratensis*.

Nematode, root knot. *Meloidogyne* spp., AZ, NJ, NY, VA, WA.

Nonparasitic. **Chlorosis**, low temperature and wet soil. **Variiegation**, non-
infectious, seed-transmitted leaf-color anomalies.

Powdery mildew. *Erysiphe cichoracearum*, MA, MN, NY, WA; *Erysiphe*
polygoni, general but some varieties resistant; *Sphaerotheca macularis*,
CA.

Rot, collar; leaf spot. *Diplodina delphinii*, CA, NY.

Rot, crown. *Sclerotium delphinii*. See Blight, southern.

Rot, root. *Phymatotrichum omnivorum*, TX; *Pythium aphanidermatum*; *P. ultimum*; *P. vexans*.

Rot, stem. *Phytophthora* sp., MN; *Sclerotinia sclerotiorum*, widespread.

Rust. *Puccinia delphinii* (III), CA; *P. recondita* (0, I), NE to NM, CA.

Smut, leaf and stem. *Urocystis sorosporioides*, CA, KY, VA.

Smut, white. *Entyloma winteri*, CA; *E. wyomingense*, WY.

Virus. **Delphinium Ring Spot**, CA; **Celery Calico**, CA, ID, WA; **Beet Curly Top**, CA; **Cucumber Mosaic**; **Tomato Spotted Wilt**, CA.

Wilt. *Verticillium albo-atrum*, NY, WA.

One of the chief delphinium problems is a condition known as "blacks," which looks like a disease and is often confused with bacterial black spot but is caused by cyclamen mites. Plants are stunted and deformed; buds turn black. The bacterial disease causes black tar spots on leaves but no deformity, no stunting of the whole plant. Crown rot or southern blight is often fatal to delphiniums. When yellowing and wilting appear, check the soil around the crown for reddish sclerotia and white mycelium and take immediate sanitary measures. Many foot, collar, and root rots and stem cankers afflict delphinium. Because of these, many gardeners grow hybrid delphinium as biennials, rotating locations, choosing well-drained sites. Virus diseases are more important along the Pacific Coast. Use virus-free planting stock and rogue out infected individuals.

DEMORPHOTHECA

Virus. **Biddens Mottle**, FL.

DESERT BIRD OF PARADISE

(*Caesalpinia*)

Powdery mildew. *Leveillula taurica*, AZ.

DESERT-CANDLE

(*Eremurus*)

Leaf spot. *Myrothecium roridum*, OH.

DESERT-PLUME

(*Stanleya*)

Leaf spot. *Cercospora nasturtii*, KS.

Rust. *Puccinia aristidae*, CO, NV.

DESERT-WILLOW

(*Chilopsis*)

Damping-off. *Pythium ultimum*, NE; *Rhizoctonia solani*, NE, TX.

Leaf spot. *Phyllosticta erysiphoides*.

Rot, root. *Phymatotrichum omnivorum*, TX.

DESMODIUM

(Arrowleaf)

Virus. Peanut Mottle, GA.

DEUTZIA

Leaf spot. *Cercospora deutziae*, DE, IA, TX; *Phyllosticta deutziae*, AL, IA, NJ, TX.

Nematode, root knot. *Meloidogyne* spp.

Rot, root. *Armillaria mellea*, CA.

DEVILS-CLUB

(*Oplonanax*)

Blight, gray mold. *Botrytis cinerea*, AK.

Leaf spot. *Cercospora daemonicola*, OR.

DEVILWOOD

(*Osmanthus americanus*)

Black mildew. *Asterina asterophora*, FL, GA; *A. discoidea*; *A. purpurea*, FL; *Lembosia oleae*, MS; *Meliola amphitricha*, FL to MS.

Leaf spot. *Phyllosticta oleae*, FL, NC.

Mistletoe. *Phoradendron serotinum* (*flavescens*), FL.

DEWBERRY

(*Rubus*)

Bacterial cane gall. *Agrobacterium rubi*, NY, OR.

Bacterial crown gall. *Agrobacterium tumefaciens*, general.

Bacterial hairy root. *Agrobacterium rhizogenes*, OR.

Black mildew. *Irenina sanguinea*, AL, LA.

Blight, cane; dieback. *Leptosphaeria coniothyrium*, general; *L. thomasi*, OR, WA.

- Blight**, spur. *Didymella applanata*, OR, WA.
Blight, stamen; dry berry. *Hapalosphaeria deformans*, OR, WA.
Blotch, sooty. *Gloeodes pomigena*, NC, PA.
Canker; cane spot. *Ascospora ruborum*, AL, CA.
Canker; fruit rot. *Glomerella cingulata*, GA, IL, MD, MS.
Downy mildew. *Peronospora rubi*, FL, MD, WI, WA; *P. potentillae*, CT, IL, LA.
Fruit spot; flyspeck. *Leptothyrium pomi*, NC.
Gall, yellow leaf. *Synchytrium aureum*, WI.
Leaf spot. *Mycosphaerella confusa*, NJ to FL, TX, IL; *Pezizella oenotherae*, MD to NC; *Phyllosticta ruborum*, NY; *P. dispersgens*, IL; *Septoria rubi* (*Mycosphaerella rubi*), general; *S. darrowi*, NY.
Powdery mildew. *Sphaerotheca macularis*, IL, MN, IN, OH, PA, Pacific Northwest.
Rosette; double blossom. *Cercospora rubi*, NC to AL, LA, MS, TX, IL.
Rot, collar. *Rhizoctonia solani*, TX, WA.
Rot, fruit. *Botrytis cinerea*; *Phyllosticta carpogena*, MD, NJ, NY, NC.
Rot, root. *Armillaria mellea*, OR; *Collybia dryophila*, NC; *Corticium galactinum*, MD, VA, TX; *Helicobasidium purpureum*, NC, TX; *Phymatotrichum omnivorum*, TX.
Rust. *Gymnoconia peckiana*, orange (0, I, III), ME to VA, MO, MN, CA; *Kuehneola uredinis*, yellow (0, I, II, III), ME to FL, TX, KS, CA, WA; *Kunkelia nitens*, orange (I), CA, OR, CT to FL, TX, IA; *Mainsia rubi* (II, III), TX.
Spot anthracnose. *Elsinoë veneta*, general.
Virus. **Raspberry Beta Leaf Curl**, MI, OH, TX; **Raspberry Mosaic**, CT, MI, NJ, NY, Pacific Coast; **Loganberry Dwarf**, especially on loganberry, CA, OR, WA.
Wilt. *Verticillium albo-atrum*, CA, OR, WA.

Use virus-free, bacterial-free, planting stock; spray for anthracnose.

DIANTHUS (Garden Pinks)

- Blight**; stem rot. *Alternaria dianthi*, widespread.
Blight, gray mold. *Botrytis cinerea*, AK.
Blight, southern. *Sclerotium rolfsii*, IL, TX.
Leaf spot. *Ascochyta dianthi*, NY, MS; *Heterosporium echinulatum*, CA, NY, OR; *Septoria dianthi*, AL, MI, MS, NC, NJ, NY.
Nematode, root knot. *Meloidogyne* sp., AL, MS, TX.
Rot, bud. *Fusarium poae*, NY.
Rot, root. *Phymatotrichum omnivorum*, TX; *Pythium ultimum*, CA.
Rot, stem. *Rhizoctonia solani*, widespread.
Rust. *Puccinia arenariae*, NY; *Uromyces dianthi* (II, III), NE, MS, NY.
Virus. **Beet Curly Top**, CA; **Carnation latent**, NY.

DICHONDRA

(Lawn-Leaf)

- Blight, southern. *Sclerotium rolfsii*, CA.
Gall, leaf. *Synchytrium edgertonii*, LA.
Nematode, root knot. *Meloidogyne* sp., CA.
Rust. *Puccinia dichondrae* (II, III), LA, MS, NC, TX.
Virus. Cucumber Mosaic, CA.

DIEFFENBACHIA

- Anthracnose. *Glomerella cincta*, NJ; *Gloeosporium* sp., WA; *Colletotrichum* sp., WA.
Bacterial stem and leaf rot. *Erwinia dieffenbachiae*, FL.
Leaf spot. *Cephalosporium dieffenbachiae*, FL, NY; *Leptosphaeria* sp., FL;
Myrothecium roridum, FL.
Rot, root. *Pythium splendens*, FL; *Rhizoctonia* sp., FL.
Rot, stem. *Phytophthora palmivora*, CA, FL.
Rot, stem, leaf, cutting. *Fusarium solani*, FL.

Propagate from disease-free canes.

DIERVILLA

(Bush Honeysuckle)

- Leaf spot. *Cercospora weigeliae* (?*C. diervillae*) ME, TX; *Phyllosticta diervillae*, WI; *Ramularia diervillae*, ME, NH, NY, WI; *Septoria diervillae*, IA, MA, MN, WI.
Nematode, root knot. *Meloidogyne* sp.
Powdery mildew. *Microsphaera alni*, NJ, WA.
Rot, root. *Phymatotrichum omnivorum*, TX.
Virus. Tobacco Ringspot, MD.

DILL

(*Anethum*)

- Bacterial, MLO. Aster Yellows, NY, TX.
Damping-off. *Rhizoctonia solani*, GA.
Dodder. *Cuscuta* sp., GA.
Leaf spot; stem spot. *Cercospora anethi*, ND, OR, TX; *Phoma anethi*, CT, IN, IA.
Rot, root, wilt. *Fusarium* sp., OH; *Phymatotrichum omnivorum*, TX.
Rot, stem. *Sclerotinia sclerotiorum*, TX.

DITTANY, STONEMINT

(*Cunila*)

Leaf spot. *Septoria cunilae*, IL.

Rust. *Puccinia menthae* (0, I, II, III), NY to VA, AR and IL.

DIZYGOTHECA

Leaf spot. *Alternaria panax*, CA.

DODECATHEON

(Shooting-Star)

Leaf spot. *Heterosporium* sp., AK; *Phyllosticta dodecathei*, TX, WI.

Rust. *Puccinia melanconioides* (0, I, III), CA, OR; *P. ortonii* (0, I, II, III), CA, OR, SD, UT, WA, AK; *P. solheimi* (III) WY; *Uromyces acuminatus* var. *steironematis* (0, I), NE, ND; II, III, on marsh grasses.

DOGBANE

(*Apocynum*)

Leaf spot. *Cercospora apocyni*, north central states, TX, VA; *Phyllosticta apocyni*, IA, MS, NJ, NY, OR, PA, WI; *Septoria littorea*, MI, KS, NE, ND, OH; *Stagonospora apocyni*, IL, IN, IA, NY, WI, VA.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia seymouriana* (0, I), IN, IL, KS, NY, NJ, NE, OK, SD; *P. smilacis* (0, I), IL, KS, MD, NC, TN, VA, WI; II, III on smilax.

DOGWOOD, DWARF, BUNCHBERRY

(*Cornus canadensis*)

Leaf spot. *Ceratobasidium anceps*, rot, NH; *Discohainesia oenotherae*, also stem spot, ME, NH; *Phyllosticta* sp., NY; *Ramularia* sp., NY; *Septoria canadensis*, ME, WA, AK; *Glomerularia corni*, ME to WI, OR.

Powdery mildew. *Phyllactinia corylea*, WA.

Rust. *Puccinia porphyrogenita* (III), ME to WA and AK.

DOGWOOD, FLOWERING

(*Cornus florida*)

Anthraxnose. *Colletotrichum gloeosporioides*, TX; *Discula* sp., ID, OR, Pacific NW.

Bacterial crown gall. *Agrobacterium tumefaciens*, MO.

Black mildew. *Dimerosporium pulchrum* and *Meliola nidulans*, Southeast.

- Blight, flower and leaf. *Botrytis cinerea*, NJ, NY, MA, MD, probably general in wet springs.
- Blight, foliar. *Phytophthora parasitica*, FL.
- Blight, thread. *Pellicularia koleroga*, LA.
- Canker, crown; bleeding; collar rot. *Phytophthora cactorum*, MA, MD, NJ, NY, WA.
- Canker; dieback. *Botryosphaeria ribis*, PA; *Cytospora* sp., NJ; *Cryptostictis*, NY; *Sphaeropsis* sp.
- Canker, felt fungus. *Septobasidium* spp., VA to FL, LA.
- Leaf spot. *Cristulariella pyramidalis*, FL; *Phyllosticta cornicola*, PA to VA, TN and KS; *Ascochyta cornicola*, NC, PA; *Cercospora cornicola*, NC to FL; *Septoria cornicola*, NY to GA and IA.
- Mistletoe. *Phoradendron serotinum (flavescens)*, FL.
- Nematode, dagger. *Xiphinema americanum*.
- Nematode, lance. *Hoplolaimus uniformis*, RI.
- Nematode, sting. *Belonolaimus longicaudatus*, FL.
- Nonparasitic. Scorch, water deficiency, frequent in Southeast.
- Powdery mildew. *Microsphaera alni*, MA to NC, IL, WI; *Phyllactinia corylea*, general.
- Rot, root. *Armillaria mellea*, NY; *Clitocybe tabescens*, FL, GA; *Phymatotrichum omnivorum*, TX; *Corticium galactinum*, VA; *Pythium* sp.
- Rot, wood. *Daedalia confragosa*, MD, NC, PA, TN, VA, WV; *Daldinia vernicosa*, MD; *Lenzites betulina*, NC; *Polyporus* spp.; *Poria* spp., MD, PA.
- Spot anthracnose. *Elsinoë corni*, DE, MD, GA, NC, SC, FL, LA, VA.
- Virus. Tobacco Ring Spot, MD. Witches' Broom Disease, NJ.
- Wilt. *Verticillium* sp., MA.

The most serious dogwood disease in the East is crown or bleeding canker, which attacks trees after transplanting or injury. In a wet season spot anthracnose badly disfigures leaves, twigs, berries. In wet weather botrytis blight is conspicuous as flowers fade and petals rot onto leaves.

DOGWOOD, PACIFIC

(*Cornus nuttalli*)

- Canker, bleeding; collar rot. *Phytophthora cactorum*, WA.
- Canker, trunk. *Nectria galligena*, OR, WA.
- Powdery mildew. *Phyllactinia corylea*, general.
- Rot, root. *Armillaria mellea*, WA; heart, *Fomes ignarius*, OR.

DOGWOOD, PAGODA, GRAY, RED OSIER, WESTERN OSIER

(*Cornus* spp.)

Most of the diseases listed for flowering dogwood occur on these shrub dogwoods.

DOLICHOS

(Twinflower, Hyacinth Bean)

- Anthracnose. *Colletotrichum dematium* f. sp. *truncata*, GA.
 Black mildew. *Parodiella perisporoides*, NC.
 Leaf spot. *Cercospora canescens*, FL.
 Nematode, root knot. *Meloidogyne* spp., FL, SC.
 Powdery mildew. *Microsphaera euphorbiae*, IN.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Virus. Mosaic, unidentified, MI.
 Virus. Potato Virus X, Work at Wisconsin on *Dolichos biflorus*, *D. lablab*.

DORONICUM

(Leopards bane)

- Nematode, leaf. *Aphelenchoides* sp.
 Nematode, root knot. *Meloidogyne* sp., CA, MD.
 Powdery mildew. *Erysiphe cichoracearum*, CA.

DOUGLAS-FIR

(*Pseudotsuga*)

- Bacterial gall. *Agrobacterium pseudotsugae*, CA.
 Blight. *Phoma eupyrena*, CA.
 Blight, brown felt. *Herpotrichia nigra*, Rocky Mountains. and Pacific Northwest.
 Blight, gray mold; snow mold. *Botrytis cinerea*, cosmopolitan.
 Blight, needle. *Rosellinia herpotrichioides*, CA.
 Blight, seedling. *Rhizina undulata*, Pacific Northwest; *Fusarium oxysporum*, OR.
 Blight, seedling smother. *Thelephora terrestris*, Pacific Northwest.
 Blight, snow. *Phacidium infestans*, ID.
 Canker, bark. *Brunchorstia* (*Cryptosporium*) *boycei*, WA; *Chondropodium pseudotsugae*, OR; *Aleurodiscus* spp., weakly parasitic.
 Canker, branch. *Dermia pseudotsugae*, CA.
 Canker, branch, trunk. *Dasyscypha pseudotsugae*; *D. ellisiana*, twig, MA, NC, RI; *Phomopsis lokoyae*, Pacific Coast; *Cytospora* sp., twig, CO, NJ, OR; *Phaciopycnis* (*Phomopsis*) *pseudotsugae*; *Phomopsis lokoyae*, CA.
 Canker; dieback. Collar rot; seedling blight. *Diplodia pinea*, CA, KS, NJ, NY.
 Damping-off. *Rhizoctonia solani*, cosmopolitan.
 Mistletoe; witches' broom. *Arceuthobium douglasii*, MT to CO, OR, WA. *Phoradendron serotinum* (*flavescens*), TX.
 Needle cast. *Adelopus gaumanni*, Pacific states, Northeast; *Rhabdocline pseudotsugae*, general; *R. pseudotsugae* subsp. *pseudotsugae*, PA; *R. weirii*, PA; *Rhabdogloeum hydrophyllum*, AZ, NM.
 Needle cast, swiss. *Phaeocryptopus gaumanni*, general, MN (also Lake states).

Needle, flyspeck. *Leptothyrium pseudotsugae*, CO.

Nematode, ring. *Criconemoides crotaloides*; *Meloidodera* sp., OR.

Rot, heart, wood. *Poria weirii*, destructive, OR, WA; *Echinodontium tinctorium*; *Fomes* spp.; *Polyporus* spp.; *Lenzites saepiaria*, widespread; *Stereum* spp.; *Trametes* spp.

Rot, root. *Armillaria mellea*, cosmopolitan; *Sparassis radicata*, Pacific Northwest; *Phytophthora cinnamomi*, OR, WA, Southeast; *Phymatotrichum omnivorum*, TX; *Verticicladiella wagnerii*, CA, MT.

Rot, root. *Armillaria mellea*, PA; *Fusarium solani*, PA; *F. oxysporum*, PA; *F. avenaceum*, PA.

Rot, stem, seedling. *Fusarium roseum* f. *avenaceum*, OR; *F. roseum* f. *sambucinum*, OR.

Rot, white pocket. *Ganoderma oregonense*, MT, OR, WA; *Hydnum coralloides*, Pacific Northwest.

Rust. *Melampsora albertensis* (0, I), MT to CO, UT, WA; II, III, on poplar.

DRABA

(Whitlow-Grass)

Downy mildew. *Peronospora parasitica*, CO, IL, IA, KS, NE, SD, TX, WI.

Rust. *Puccinia aristidae* (0, I), AZ; *P. drabae* (III), AK, UT, WY; *P. holboellii* (0, III), CA, CO, UT; *P. monoica* (0, I), CA, NM.

White rust. *Albugo candida*, KS, WY.

DRACAENA

Anthraxnose. *Colletotrichum* sp., *Gloeosporium* sp., WA.

Bacterial, leaf spot. *Erwinia herbicola*, FL; *E. carotovora* pv. *carotovora*, FL.

Blight, tip. *Physalospora dracaenae*, WV; *P. rhodina*, MD.

Leaf spot; tip blight. *Glomerella cincta* (*Colletotrichum dracaenae*), general; *Phyllosticta dracaenae*, NJ, FL; *P. draconis*; *P. maculicola*; *Gloeosporium polymorphum* and *G. thuemeni*, widespread; *Lophodermium dracaenae*, black spot, CA.

Nematode, lance. *Hoplolaimus bradys*, FL.

Nematode, root knot. *Meloidogyne* sp., FL.

Nematode, sheath. *Hemicycliophora parvana*.

Rot, stem. *Aspergillus niger* var. *floridanus*, FL.

DRAGONHEAD

(*Dracocephalum*)

Downy mildew. *Peronospora* sp., WI, WY.

Blight, southern. *Sclerotium rolfsii*, IL, TX.

Leaf spot. *Phyllosticta dracocephali*, TX; *Septoria dracocephali*, TX, WI.

DURANTA

Blight, seedling. *Sclerotium rolfsii*, FL.
Leaf spot, black. *Phyllachora fusicarpa*, FL.

DUTCHMANS-BREECHES, SQUIRREL-CORN

(*Dicentra*)

Downy mildew. *Peronospora dicentrae*, IN, MD, MI, MO, NY, VA, WI.
Rust. *Cerotelium dicentrae* (0, I), NY to MD, KS and SD; II, III, on wood nettle.

DUTCHMANS-PIPE

(*Aristolochia*)

Blight, gray mold. *Botrytis cinerea*, CT, MD.
Leaf spot. *Cercospora guttulata*, WV, IL; *Gloeosporium* sp., MA; *Ovularia aristolochiae*, WV; *Phyllosticta aristolochiae*, NJ.
Rot, root. *Diplodia radiculicola*, VA.

DYSCHORISTE

Rust. *Aecidium tracyanum* (0, I), FL.

EASTER CACTUS

(*Rhipsalidopsis*)

Rot, stem. *Drechslera cactivora* (*Helminthosporium cactivorum*), FL.

ECHEVERIA

Leaf spot. *Stemphylium bolicki*, FL.
Nematode, root knot. *Meloidogyne* sp., CA.
Rust. *Puccinia echeveriae* (III), CA.

ECHINACEA

(Purple Coneflower)

Leaf spot. *Cercospora rudbeckii*, IA; *Septoria lepachydis*, WI.
Rot, root. *Phymatotrichum omnivorum*, TX.
Virus. **Mosaic**, unidentified, NY.

EGGPLANT
(*Solanum melongena*)

- Anthracnose.** *Colletotrichum* spp.; *Gloeosporium melongenae*, NJ to FL, TX, IA; *Glomerella cingulata*, IA.
- Bacterial canker.** *Clavibacter michiganense*, WY.
- Bacterial soft rot.** *Erwinia carotovora*, NJ.
- Bacterial wildfire.** *Pseudomonas syringae* pv. *tabaci*.
- Bacterial wilt.** *Pseudomonas solanacearum*, general.
- Blight, early.** *Alternaria solani*, occasional, NY to FL, LA, WI.
- Blight, late.** *Phytophthora infestans*, FL, NY.
- Blight, phomopsis; fruit rot.** *Phomopsis vexans*, general.
- Blight, southern.** *Sclerotium rolfsii*, VA to FL, LA, WI.
- Damping-off.** *Pythium debaryanum*, CT, LA, NY; *Rhizoctonia solani*, also stem and fruit rot, general.
- Dodder.** *Cuscuta* spp., KS, NJ, PA, VA.
- Downy mildew.** *Peronospora tabacina*, SC.
- Fruit spot.** *Diplodia natalensis*, FL.
- Leaf spot.** *Ascochyta lycopersici*, DE, IL, IN, NY; *Cercospora melongenae*, CA; *Phyllosticta solani*, LA; *P. hortorum*, NJ, LA; *Septoria lycopersici*, IN, MD, NC, VA; *Stemphylium solani*, FL.
- Nematode, golden.** *Heterodera rostochiensis* (*Globodera rostochiensis*).
- Nematode, lesion.** *Pratylenchus pratensis*, TX.
- Nematode, root knot.** *Meloidogyne hapla*; *M. incognita*; *M. javanica*.
- Nematode, tobacco cyst.** *Heterodera tabacum*, VA.
- Powdery mildew.** *Erysiphe cichoracearum*, NJ, VA.
- Rot, charcoal.** *Macrophomina phaseoli*, NJ.
- Rot, cottony leak.** *Pythium aphanidermatum*, CA, FL, TN.
- Rot, fruit.** *Colletotrichum truncatum*, MS; *Phytophthora parasitica*, FL, IN; *Rhizopus stolonifer*, CA, IN, TX.
- Rot, gray mold.** *Botrytis cinerea*, CA, CT, MA, NJ, VA, WA.
- Rot, root.** *Phymatotrichum omnivorum*, TX.
- Rust.** *Puccinia substriata*, FL, IA, TX, GA, AL.
- Virus.** **Eggplant Mosaic; Cucumber Mosaic; Beet Curly Top**, OR, TX, WA, **Tomato Spotted Wilt.**
- Wilt.** *Fusarium* sp.; *Verticillium albo-atrum*, general.

Phomopsis blight and Verticillium wilt are the two most important eggplant diseases. Choose varieties resistant to blight and for wilt plant a long rotation that does not include tomatoes, potatoes, or raspberries.

ELAEAGNUS
(Russian-Olive, Silverberry)

- Bacterial crown gall.** *Agrobacterium tumefaciens*, GA; hairy root, *A. rhizogenes*, IA.

Blight, southern. *Sclerotium rolfsii*, TX.
 Blight, stem and branch, bark and cambium necrosis. *Botryodiplodia theobromae*, ND, SK, Southern Plains, NE, Great Plain States.
 Blight, thread. *Rhizoctonia ramicola*, FL.
 Blight, tip. *Gloeosporium fructigenum*.
 Canker. *Nectria cinnabarina*, CA; *Fusarium* sp., WY; *Phytophthora cactorum*, AZ, IL; *Fusicoccum elaeagni*, IL; *Tubercularia ulmea*, ND, SD.
 Canker, phomopsis. *Phomopsis elaeagni*, (*Fusicoccum elaeagni*) OH, DE; *P. arnoldia* (syn. *P. elaeagni*), ND, MI, SD.
 Leaf spot. *Cercospora carii*, TX; *C. elaeagni*, FL, MS, OK, TX; *Phyllosticta argyrea*, MD, NC; *Septoria argyrea*, IA, ND, NE, WI; *S. elaeagni*, KS.
 Mistletoe. *Phoradendron serotinum* (*flavescens*), FL.
 Powdery mildew. *Phyllactinia corylea*, OR; *P. elaeagni*, WY.
 Rot, root. *Clitocybe tabescens*, FL.
 Rust. *Puccinia caricis-shepherdiae* (0, I), Northern Plains; II, III, on *Carex*; *P. coronata* (0, I), MT, ND; II, III, on *Calamagrostis*.
 Wilt. *Verticillium* sp., WA.

ELDER

(*Sambucus*)

Blight, thread. *Pellicularia koleroga*, LA; *P. filamentosa*, FL.
 Canker, branch. *Cytospora sambucicola*, IL; *C. chrysosperma*.
 Canker; dieback. *Botryosphaeria ribis*, FL, GA; *Diplodia* spp.; *Nectria cinnabarina*, widespread; *N. coccinea*, MD, MI, WA; *Sphaeropsis sambucina*.
 Gall, leaf. *Synchytrium sambuci*, LA.
 Leaf spot. *Ascochyta sambucina*, AK; *A. wisconsinia*, WI, NY; *Cercospora catenospora*, AL, KS, MS; *C. depazeoides*, general; *Cercospora prolificans*, CA, NM, OR; *Gloeosporium tineum*, MS, TX; *Phyllosticta sambuci*, MO, NY, WI; *Ramularia sambucina*, MO, NY, WI, WA; *Mycosphaerella* sp., NM; *Septoria sambucina*, VT to FL, TX, CA, OR, WA.
 Powdery mildew. *Microsphaeraalni* and *M. grossulariae*, general; *Phyllactinia corylea*, MI; *Sphaerotheca macularis*, MA.
 Rot, heart, wood. *Fomes ignarius*, ID; *Hymenochaete agglutinans*, WY; *Polyporus* spp.
 Rot, root. *Helicobasidium purpureum*, TX; *Phymatotrichum omnivorum*, TX; *Xylaria multiplex*, TX.
 Rust. *Puccinia bolleyana* (0, I), ME to FL, TX, and MN; II, III on *Carex*.
 Spot anthracnose. *Sphaceloma* sp., LA.
 Virus. Tobacco Mosaic.
 Wilt. *Verticillium albo-atrum*, MD.

ELDERBERRY

Virus. Tobacco Ring Spot.

ELEPHANTS-EAR

(*Colocasia*)

Bacterial soft rot. *Erwinia carotovora*, FL; *E. aroideae*, FL, TX.

Blight, southern. *Sclerotium rolfsii*, FL, NY.

Nematode, root knot. *Meloidogyne* sp., FL, TX.

Rot, black, of tuber. *Diplodia* sp., FL, SC, TX; Gray, *Fusarium solani*, FL, TX.

Rot, root. *Pythium debaryanum*, CA.

ELM

(*Ulmus*)

Bacterial, leaf spot. *Pseudomonas syringae*, PA.

Bacterial, MLO. **Phloem Necrosis**, AL, AR, GA, IN, IL, IA, KS, KY, MO, MS, NE, NJ, NY, OH, OK, PA, TN, WV.

Bacterial wetwood. *Erwinia nimipressuralis*, VA, on Siberian elm (*Ulmus pumila*).

Bacterial wetwood; slime flux; *Erwinia nimipressuralis*.

Blight, twig. **Phomopsis oblonga**, VA, on Chinese elm (*Ulmus parvifolia*).

Blight, twig. **Septogloeum parasiticum**, MI; **Phomopsis oblonga**, MA; **Fusarium** spp.

Canker, bleeding. **Phytophthora cactorum**, RI; Pit, **P. inflata**, CT, MA, NY, PA.

Canker, felt fungus. **Septobasidium pseudopedicellatum**, NC.

Canker, stem. **Botryosphaeria ribis**.

Canker, twig. **Sphaeropsis ulmicola**, VA, on Chinese elm (*Ulmus parvifolia*).

Canker, twig dieback. **Apioportha apiospora**, IA; **Coniothyrium** spp., IL, MA, MI; **Cytospora ludibunda**, CT, PA; **Nectria coccinea**, NJ, NY; **N. cinnabarina**, coral spot, widespread; **Phoma** sp., **Phomopsis** sp., Northeast to SC, IL, MN; **Sphaeropsis** sp., CT to MS; **Cytosporina ludibunda**, IL, KS.

Damping-off. **Rhizoctonia solani**, cosmopolitan; **Pythium** sp.

Dieback. **Cephalosporium** sp., VA, on English elm (*Ulmus procera*).

Leaf blister. **Taphrina ulmi**, CT to MS, MO, WI.

Leaf spot. **Cercospora sphaeriaeformis**, LA, TX; **Cylindrosporium tenuisporium**, TX; **Coryneum tumoricola**, NY; **Gloeosporium ulmicola**; **Monochaetia desmazierii**, GA; **Phyllosticta confertissima**, PA; **Mycosphaerella ulmi**, MA to AL; **Septogloeum profusum**, AL; **Coniothyrium ulmi**, WV; **Ceratophorum ulmicola**, KS, NE.

Leaf spot; anthracnose. **Gloeosporium inconspicuum**, MA to VA; OK, MN.

Leaf spot; black spot. **Gnomonia ulmi**, general.

Mistletoe. **Phoradendron serotinum (flavescens)**, IN, TX.; **P. tomentosum**, TX.

Mistletoe, European. **Viscum album**, CA.

Nematode, dagger. **Xiphinema americanum**.

Nematode, root knot. *Meloidogyne* spp.

Nematode, stem. *Ditylenchus gallicus*; leaf, *Aphelenchoides fragariae*.

Powdery mildew. *Microsphaera alni*, IL, IA, MS, OH; *Phyllactinia corylea*, NC to TX, IA; *P. unguolata*, GA; *Uncinula macrospora*, general.

Rot, heart. *Collybia velutipes*, widespread; *Daedalea confragosa*, widespread; *Fomes* spp.; *Ganoderma curtisii*, NY.

Rot, root. *Helicobasidium purpureum*, TX; *Phymatotrichum omnivorum*, TX; *Xylaria* spp.; *Armillaria mellea*, MO; *Clitocybe tabescens*, FL.

Rot, wood. *Daldinia concentrica*, widespread; *Lenzites betulinum*, IN, MA, MD; *Pleurotus ostreatus*, widespread; *Polyporus* spp.; *Schizophyllum commune*, cosmopolitan; *Ustulina vulgaris*, MD.

Wilt. *Dothiorella* (*Cephalosporium*) *ulmi*, general; *Verticillium albo-atrum*, ME to VA, OR, WI, MS.

Wilt; Dutch elm disease. *Ceratocystis ulmi*, general.

The Dutch elm disease and phloem necrosis have taken a heavy toll of elms in many states. A dormant spray for the bark beetles that spread Dutch elm disease is the present recommendation, combined with general sanitation. Chemotherapy is still promising but not yet practical. Some seedling elms are highly resistant but not immune.

EMILIA

(Tasselflower, Floras-Paintbrush)

Rust. *Puccinia emiliae*, FL.

Virus. *Cucumber Mosaic*, in part, FL; *Tomato Spotted Wilt*, CA.

ENCELIA

Nematode, root knot. *Meloidogyne* sp., CA.

Rust. *Puccinia enceliae* (0, I, III), CA.

ENDIVE, ESCAROLE, WITLOOF CHICORY

(*Cichorium*)

Bacterial, apical rot. *Pseudomonas cichorii*, CA.

Bacterial center rot. *Pseudomonas cichorii* and *P. intybus*, AZ, CA, FL, MT, TX, WA.

Bacterial, MLO. *Aster Yellows* and *California Aster Yellows*.

Bacterial soft rot. *Erwinia carotovora*, MA, NY.

Blight, southern. *Sclerotium rolfsii*, FL, TX.

Damping-off; bottom rot. *Rhizoctonia solani*, CT, FL, NY, TX.

Downy mildew. *Bremia lactucae*, FL, PA.

Leaf spot. *Alternaria* sp., CT, FL, NY; *Cercospora cichorii*, TX; *Marssonina panattoniana*, TX; *Ramularia cichorii*, NY.

Nematode, root knot. *Meloidogyne* sp., TN, MA, NJ.

Nematode, sting. *Belonolaimus gracilis*.

Nonparasitic. **Brown Heart**, boron deficiency, in part, NJ, NY. **Tipburn**, high temperature and excessive transpiration.

Powdery mildew. *Erysiphe cichoracearum*, ID, NJ.

Rot, gray mold. *Botrytis cinerea*, CA, FL, NY, PA.

Rot, root. *Pythium debaryanum*, CT, FL, NY, PA; *Phymatotrichum omnivorum*, AZ.

Rot, watery soft. *Sclerotinia sclerotiorum*, AR, AZ, CA, FL, LA, MT, PA, TX.

Rust. *Puccinia hieracii* (0, I, II, III), CA, CT, MA, NY.

Slime mold. *Fuligo septica*, NJ.

Virus. **Mosaic**, unidentified, FL; **Tomato Spotted Wilt**; **Tomato Ringspot**, VT.

ENGELMANNIA (Engelmann Daisy)

Broomrape. *Orobanche ramosa*, TX.

Gall, leaf. *Synchytrium taraxaci*, TX.

ENGLISH DAISY (*Bellis perennis*)

Bacterial, MLO. **Aster Yellows**, NJ, NY.

Blight, gray mold. *Botrytis cinerea*, AK.

Leaf spot. *Cercospora* sp., MN.

Nematode, root knot. *Meloidogyne* sp., FL.

Rot, crown. *Sclerotinia sclerotiorum*, NJ.

Rot, root. *Phymatotrichum omnivorum*, TX; *Pythium mastophorum*, MD.

EPIGAEA (Mayflower, Trailing Arbutus)

Leaf spot. *Cercospora epigaeae*, NY, NC, WI; *Phyllosticta epigaeae*, MA, NY.

Powdery mildew. *Microsphaeraalni* var. *vaccinii*, CT to VA and WI.

EPILOBIUM (Willow-Herb; Fireweed)

Bacterial, MLO. **California Aster Yellows**, CA.

Blight, gray mold. *Botrytis cinerea*, AK.

Blight, southern, *Sclerotium rolfsii*, TX.

Downy mildew. *Plasmopara epilobii*, AK, IL, NY.

Leaf spot. *Cercospora montana*, widespread; *Discosia bubaki*, NY, WI; *Phyllosticta chamaeneri*, OR; *P. wyomingensis*, WY; *Ramularia cercosporoides*, MT, TX, WA, WY, AK; *Septoria epilobii*, CA, DE, IL, VT, WI.

Nematode, root knot. *Meloidogyne* sp.

Powdery mildew. *Sphaerotheca macularis*, widespread; *Erysiphe polygoni*, WA; *Microsphaera* sp., IL.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia epilobii* (III), MI, WY; *P. dioicae* (0, I), CO; *P. gigantea* (III), ID, MT, TX, WA, WY; *P. scandica* (III), UT, WA, WY; *P. oenotherae* (0, I, II, III), CA; *P. pulverulenta* (0, I, II, III), ND to NM, CA; *P. veratri* (0, I), NH, MT to WA; *Pucciniastrum pustulatum* (II, III) widespread; 0, I, on fir.

Smut, leaf. *Doassansia epilobii*, CO, NH.

EPISCIA

Leaf spot. *Myrothecium roridum*, FL.

Virus. Tobacco Mosaic, CA, CT, DC, FL, OH, WA.

ERANTHEMUM

Leaf spot. *Phyllosticta* sp., NJ.

ERIGERON (Fleabane)

Bacterial, MLO. Aster Yellows, KS, MD, MS, NJ, NY, OK.

Blight, gray mold. *Botrytis cinerea*, AK.

Broomrape. *Orobanche ramosa*, TX.

Downy mildew. *Basidiophora entospora*, AL, IL; *Plasmopara halstedii*, MD, IA.

Gall, leaf. *Synchytrium erigerontis*, LA.

Leaf spot. *Cercospora cana*, LA; *Cercospora colubrina*, WA; *Septoria erigerontis*, ME to MD, NE, MI.

Powdery mildew. *Erysiphe cichoracearum*, CO, MI, MT, NM, PA, SD, WY; *Phyllactinia corylea*, WA; *Sphaerotheca macularis*, IN, KY.

Rot, stem. *Sclerotium rolfsii*, IL.

Rust. *Puccinia cyperi* (0, I), MO; II, III, on sedge; *P. dioicae* (0, I), East, South; *P. grindeliae* (III), CO, UT, NV, WY; *P. stipae* (0, I), CO, WY; *Coleosporium asterum* (II, III), CA, AK; 0, I, on pine.

Smut, white. *Entyloma compositarum*, MI, ND, UT, WA, WI, WY.

Virus. Mosaic, unidentified, IN.

Wilt. *Verticillium albo-atrum*, MA.

ERIOPHYLLUM

Nematode. *Meloidogyne* sp., CA.

Rust. *Puccinia eriophyllii* (II, III), WY, OR to CA; *Uromyces junci* (0, I), CA; II, III, on *Juncus*.

ERYNGIUM

Leaf spot. *Cylindrosporium eryngii*, IA, KS, TX, WI; *Septoria eryngicola*, WI.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, stem. *Macrophomina phaseoli*, OK.

Smut, white. *Entyloma eryngii*, IA.

ERYTHRINA

Blight, thread. *Pellicularia koleroga*, FL; *Rhizoctonia ramicola*, FL.

Nematode, root knot. *Meloidogyne* sp.

Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

Wilt. *Verticillium albo-atrum*, CA.

ERYTHRONIUM

(Dogs-Tooth Violet, Adders-Tongue, Trout-Lily)

Blight. *Botrytis* sp., IL, NY, VT, WA; *B. elliptica*, WA; *Ciborinia gracilis*, IL, NE; *C. erythronii*, NY.

Leaf spot; black spot. *Asteroma tenerrimum* var. *erythronii*, ID, MT, WA.

Rust. *Uromyces heterodermus* (0, III), CA, CO, ID, MT, OR, TX, UT, WA, WY.

Smut. *Ustilago heufleri*, DE, MD, MI, MO, NJ, NY, PA; *Urocystis erythronii*, CT, NY.

EUCALYPTUS

(Gum-Tree)

Bacterial crown gall. *Agrobacterium tumefaciens*, CA.

Blight, seedling. *Fusarium oxysporum* f. sp. *aurantiacum*, CA.

Canker. *Diaporthe cubensis*, FL, HI, PR.

Canker; dieback, seed capsule abortion. *Botryosphaeria ribis*, FL.

Canker, felt fungus. *Septobasidium curtisii*, NC.

Leaf spot. *Actinopelte dryina*, LA; *Mycosphaerella molleriana*, CA; *Phyllosticta extensa*, CA.

Nonparasitic. **Chlorosis**, iron deficiency, CA.

Rot, heart; wood. **Ganoderma appplanatum**; **Polyporus** spp.; **Stereum hirsutum**.
Rot, root. **Clitocybe tabescens**, FL; **Armillaria mellea**, CA; **Phymatotrichum omnivorum**, TX.

Many other fungi may be found on leaves, twigs, and branches but are not reported as causing specific diseases.

EUCHARIS (Amazon-Lily)

Blight, gray mold. **Botrytis cinerea**, FL.

Leaf scorch; red blotch. **Stagonospora curtisii**, CA.

EUGENIA

Black mildew. **Asterinella puiggarii**, FL.

Leaf spot. **Pezizella oenotherae**, NY.

Rot, root. **Clitocybe tabescens**, FL.

EUONYMUS (Burning-Bush, Spindle-Tree)

Anthracnose. **Colletotrichum griseum**, NJ, NY, AL and GA to TX and AR;
Gloeosporium frigidum, AR, MS.

Bacterial crown gall. **Agrobacterium tumefaciens**, CT, MS, NJ, MI, SC, TX.

Blight, thread. **Pellicularia koleroga**, LA.

Dieback, canker, basal. **Whetzelinia sclerotiorum** (*Sclerotinia*), RI.

Leaf spot. **Cercospora destructiva**, VA to TX; **C. euonymi**, PA to WI;
Exosporium concentricum, AL, MS, SC, TX, VA; **Phyllosticta euonymi**,
NY to MS and TX; **P. pallens**, AL; **Septoria euonymi**, MS, VA; **S. atropurpurea**,
IL; **Ramularia euonymi**, CA, IA, KS, MO; **Marssonina thomasiana**, OH to
WI, MO; **Myocentrospora** sp., OH.

Nematode, root knot. **Meloidogyne** sp., MD, TX.

Powdery mildew. **Microsphaera alni**, NJ to SD and southward; **Oidium euonymi-japonici**, AL, CA, IA, LA, MS, NJ, SC, TX, WA.

Rot, root. **Phymatotrichum omnivorum**, TX; **Fusarium scirpi**, NJ.

Virus. **Euonymus Mosaic**; Infectious Variegation, MA.

The *Oidium* mildew is prevalent throughout the South and in California. Crown gall is common, with conspicuous knobs along the vines, but seldom fatal.

EUPATORIUM

(Boneset, Blue Mist-flower, White Snakeroot,
Joe-Pye Weed)

Blight, gray mold; canker. *Botrytis cinerea*, NJ.

Downy mildew. *Plasmopara halstedii*, NY to MD, KS, MO, TX, WI, WV.

Leaf spot. *Ascochyta compositarum*, WV, WI; *Cercospora ageratoides*, AL, MS, NJ, TX, WV; *P. eupatorina*, IL, NJ; *Septoria eupatorii*, IL, MS, MD, NJ, TX; *S. eupatoriicola*, IL.

Nematode, root knot. *Meloidogyne* sp., AL, FL; *M. hapla*.

Powdery mildew. *Erysiphe cichoracearum*, general in East to TX and MN.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, stem. *Sclerotium rolfsii*, CT, IL, MD, NJ, TX; *Rhizoctonia solani*, NJ.

Rust. *Puccinia conoclinii* (II, III) MD to AL, TX and IL; *P. eleocharidis* (0, I), widespread in eastern and central states; II, III, on *Eleocharis*; *P. tenuis* (0, I, III), MA to NC, NE and MN; *P. tolimensis* (III), NY.

Smut, white. *Entyloma compositarum*, IL, IA, MS, WV, WI.

Virus. **Yellows**. Apparently distinct from Aster Yellows, central states.

Wilt. *Fusarium* sp., NJ.

EUPHORBIA TRIGONA

Rot, soft. *Rhizopus stolonifera*, CA.

EUSTOMA

(Prairie Gentian, Texas Bluebell)

Blight, stem. *Alternaria* sp., TX; *Sclerophoma eustomonis*, TX.

Leaf spot. *Cercospora eustomae*, CO, NE, TX; *C. nepheloides*, CA, TX; *Phyllosticta* sp., TX.

Virus. **Cucumber Mosaic**, NY.

EVOLVULUS

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia lithospermi* (0, I, II, III), CO, KS, NE, TX.

Virus. **Tobacco Streak**, WI.

EVERLASTING

(*Antennaria*)

Leaf spot. *Phoma antennariae*, CO; *Phyllosticta antennariae*, DE, WI; *Septoria lanaria*, NY.

Rot, stem. *Nectria haematococca*, CA.
White rust. *Albugo tragopogonis*, IL, NE.
Wilt. *Nectria haematococca*, CA.

EXACUM

Blight, stem canker. *Botrytis cinerea*, KS.

FARKLEBERRY, TREE-HUCKLEBERRY (*Vaccinium arboreum*)

Canker, felt fungus. *Septobasidium sinuatum*, FL.
Gall, leaf. *Exobasidium vaccinii*, AL, FL.
Leaf spot. *Cylindrosporium* sp., TX; *Ophiodothella vaccinii*, MD to GA, TX; *Pestalotia vaccinicola*, secondary, FL; *Phyllosticta vaccinii*, AL, FL, MS, TX; *Septoria albopunctata*, FL, SC, TX; Tar Spot, *Rhytisma vaccinii*, FL, OK, TX.
Rot, root. *Phymatotrichum omnivorum*, TX.

FEIJOA

Blight, thread. *Rhizoctonia ramicola*, FL.
Rot, fruit. *Botrytis cinerea*, CA; *Colletotrichum gloeosporioides*, CA; *Penicillium expansum*, CA.
Rot, root. *Phymatotrichum omnivorum*, TX.
Spot anthracnose. *Sphaceloma psidii*, FL.

FENDLERA

Rust. *Gymnosporangium speciosum* (0, I), CO and UT to NM and AZ; II, III, on juniper.

FENNEL (*Foeniculum*)

Bacterial soft rot. *Erwinia carotovora*, IL.
Damping-off; stem pitting. *Rhizoctonia solani*, GA, NJ.
Nematode, root knot. *Meloidogyne* sp., FL.
Rot, stem. *Sclerotinia sclerotiorum*, IL, NJ, TX.

FERN, ADDERS-TONGUE
(*Ophioglossum*)

Blight, leaf. *Curvularia crepini*, OH.

FERN, BIRDS-NEST
(*Asplenium*)

Bacterial leaf spot. *Pseudomonas asplenii*, CA.

Bacterial, leaf spot, blights. *Pseudomonas gladioli*, FL.

Leaf spot. *Cercospora* sp., CA.

Nematode, leaf. *Aphelenchoides fragariae*, CT, NJ, NY, PA, FL.

FERN, BLADDER
(*Cystopteris*)

Leaf blister. *Taphrina cystopteridis*, KS, IN, WI.

Rust. *Hyalospora polypodii* (II, III), general in North and West; *Uredinopsis ceratophora* (II, III), IN, NY, WI; *U. glabra* (II, III), NM.

FERN, BOSTON
(*Nephrolepis*)

Anthracnose; tip blight. *Glomerella nephrolepidis*, NY, OH.

Blight, gray mold. *Botrytis cinerea*, AK.

Damping-off. *Rhizoctonia solani*, FL.

Leaf spot. *Cercospora* sp., IN; *Cylindrocladium pteridis*, FL; *Phyllosticta* sp., NY.

Rust. *Desmella superficialis*, FL.

FERN, BRACKEN
(*Pteridium*)

Leaf spot; tar spot; black mildew. *Phyllachora (Catacauma) flabellum*, GA, MD, NJ, PA, SC, TN, WV, WI; *Cryptomycina pteridis*, also leaf roll, widespread, reported under various conidial names; *Phyllosticta pteridis*, ME, NJ.

Rot; canker. *Rhizoctonia* sp., including *Sclerotium decidium*, OR, WI.

Rust. *Uredinopsis aspera* (II, III), CA; *U. macrosperma* (II, III), AL, CA, FL, GA, ID, MS, MT, NM, OR, WA, WI; *U. virginiana* (II, III), NY to NC and TN, GA to TX.

FERN, BRAKE

(*Pteris*)

Blight, tip. *Phyllosticta pteridis*, MS, NJ.

Damping-off. *Completozia complens*, NY; *Pythium intermedium*, NY; *Trichothecium roseum*, IN.

Nematode, leaf. *Aphelenchoides fragariae*, CT, NJ, NY.

FERN, CHRISTMAS

(*Polystichum*)

Leaf blister. *Taphrina faullinana*, OR; *T. polystichi*, ME to NC and TN.

Leaf spot. *Cylindrocladium pteridis*, FL; Tar Spot, *Trabutiella filicina*, AK.

Nematode, leaf. *Ditylenchus dipsaci*, OR; *Aphelenchoides fragariae*, OR;

Lesion, *Pratylenchus penetrans*, FL.

Rot, root. *Phytophthora cinnamomi*, CA

Rust. *Milesia polystichi* (II, III), ID, MT, OR, WA; *M. vogesiaca* (II, III), OR.

FERN, CLIFF-BRAKE

(*Pellaea*)

Rust. *Hyalopsora cheilanthis* (II, III), CA, TX.

FERN, HOLLY

(*Cyrtomium*)

Blight, gray mold. *Botrytis cinerea*, AK.

Damping-off. *Completozia complens*, NY.

FERN, LADY, SILVERY SPLEENWORT

(*Athyrium*)

Blight, gray mold. *Botrytis cinerea*, AK.

Leaf spot. *Septoria asplenii*, MI.

Rust. *Uredinopsis copelandii* (II, III), CA; *U. longimucronata* (II, III), ME to PA and WI; 0, I, on balsam fir; *U. longimucronata* f. *cyclosora*, CA, ID, MT, OR, WA, AK; 0, I, on alpine fir; *U. longimucronata* f. *acrostichoides* (II, III), NH, NY, WI.

FERN, LEATHERLEAF

(*Rumohra*)

Rot, postharvest. *Rhizoctonia* sp., FL; *Cylindrocladium pteridis*, FL; *C. heptaseptatum*, FL.

FERN, MAIDENHAIR

(*Adiantum*)

Leaf spot. *Mycosphaerella* sp., FL.

?Rot. *Sclerotium decidium* (?*Rhizoctonia* sp.), WI.

FERN, OSMUNDA

(*Osmunda*; Cinnamon, Interrupted, and Royal Ferns)

Leaf blister. *Taphrinia higginsii*, GA.

Leaf spot. *Gloeosporium osmundae*, MI.

Rust. *Uredinopsis osmundae* (II, III), northeastern and Great Lakes states, and to FL, and AL; 0, I, on balsam fir.

Smut, inflorescence. *Mykosyrinx osmundae*, NY, MI, WI.

FERN, OSTRICH

(*Pteretis*)

Leaf blister. *Taphrinia hiratsukae*, WI.

Rot; stem necrosis. *Ceratobasidium anceps* (*Rhizoctonia*?), WI.

Rust. *Uredinopsis struthiopteridis* (II, III), NY, VT, WI; 0, I, on balsam fir.

FERN, POLYPODY

(*Polypodium*)

Leaf spot. *Alternaria polypodii*, ?secondary, NY; *Cercospora phyllitidis*, FL; *Phyllosticta* sp., VA.

Nematode, leaf. *Aphelenchoides fragariae*.

Rust. *Milesia laeviuscula* (II, III), CA, and *M. glycyrrhiza*, OR, WA, AK; *M. polypodophila* (II, III), CT, ME, MA, NH, NY, PA, TN, VT.

FERN, ROCK

(*Woodsia*)

Rust. *Hyalopsora polypodii* (II, III), MI, ID; 0, I unknown.

FERN, ROCK-BRAKE

(*Cryptogramma*)

Rust. *Hyalopsora cheilanthis* (II, III), IA, MI, MT, WI; *Milesia darkeri* (II, III), CA, OR.

FERN, SENSITIVE

*(Onoclea)*Dodder. *Cuscuta gronovii*, NY.Leaf blister. *Taphrinia filicina*, NY; *T. hiratsukae*, NY, PA.Rust. *Uredinopsis mirabilis* (II, III), ME to VA, NE and MN; 0, I, on balsam fir.

FERN, TREE

*(Cibotium)*Leaf spot. *Pestalotia cibotii*, NJ.

FERN, WALKING

*(Camptosorus)*Leaf spot. *Cercospora camptosori*, WI.

FERN-WOOD-SHIELD

*(Dryopteris)*Leaf blister, gall. *Taphrina californica*, CA, OR; *T. filicina*, NY, PA; *T. fusca*, NJ, VT, WV; *T. gracilis*, NY; *T. lutescens*, ME, MN, NY, WI.Leaf spot. *Cylindrocladium pteridis*, FL; tar spot, *Cryptomycina pteridis*, FL; *Herpobasidium filicinum*, white mold.Nematode, leaf. *Aphelenchoides fragariae*.Rust. *Hyalopsora aspidiotus* (II, III), ME to NC, WI and WA; 0, I, on balsam fir; *Milesia dilatata* (II, III), OR; *M. fructuosa* (II, III), ME, MA, NH, NY, VT; *M. marginalis* (II, III), MA, NH, VT; *Uredinopsis atkinsonii* (II, III), ME to MS, NE, ND; *U. phegopteris* (II, III), ME, NH, WI; 0, I, on balsam fir.

FERN, WOODWARDIA, CHAIN

*(Woodwardia)*Rust. *Uredinopsis arthurii* (II, III), VT to AL, IN and MI, and var. *maculata*, ME to AL; 0, I unknown.

FEVERFEW

*(Chrysanthemum parthenium)*Powdery mildew. *Erysiphe cichoracearum*, NY.Rot, root and stem. *Rhizoctonia solani*, WA.

FIG
(*Ficus carica*)

- Anthracnose; fruit rot. *Colletotrichum gloeosporioides* (*Glomerella cingulata*), NC to TX.
- Bacterial crown gall. *Agrobacterium tumefaciens*, TX, CA, FL.
- Blight, limb. ?*Corticium salmonicolor*, Gulf states.
- Blight, southern. *Sclerotium rolfsii*, FL.
- Blight, thread. *Pellicularia koleroga*, FL, LA, MS; *Web, P. microsclerotia*, FL to LA, TX.
- Blight, twig. *Gibberella baccata*, CA.
- Blotch, leaf. *Cercospora fici*, NC to FL and TX.
- Canker; dieback. *Botryosphaeria ribis*; *Diplodia sycina*, NC, OR; *Macrophoma fici*, also fruit dry rot, LA, NC, TX; *Nectria cinnabarina*, TX; *Megalonectria pseudotrichia*, LA, TX; *Physalospora rhodina*, AL, FL, TX; *Sclerotinia sclerotiorum*, CA, TX.
- Canker, felt fungus. *Septobasidium* spp., MS.
- Canker, phomopsis. *Phomopsis cinerescens*, CA.
- Leaf spot. *Colletotrichum elastica*, FL; *Corynespora cassiicola*, FL; *Ascochyta caricae*, CA; *Alternaria* sp., SC; *Cephalosporium acremonium*, LA; *Eutypa* sp., TX; *Mycosphaerella bolleana*, NC to TX; *Ormathodium fici*, LA.
- Nematode, dagger. *Xiphinema index*, CA.
- Nematode, fig cyst. *Heterodera fici*, CA.
- Nematode, lesion. *Pratylenchus vulnus*, *P. musicola* and *P. pratensis*, CA.
- Nematode, pin. *Paratylenchus hamatus*, CA.
- Nematode, root knot. *Meloidogyne* spp., southern states to CA.
- Nonparasitic. *Chlorosis*, manganese deficiency, FL. **Little Leaf**, zinc deficiency, CA. **Sunburn**, low temperature injury to trunk and branches, CA.
- Rot, fruit. *Alternaria tenuis*, in market; *Aspergillus niger*, black mold; *Botrytis cinerea*; *Choanephora cucurbitarum*, TX; *Cladosporium herbarum*, market; *Diplodia natalensis*, TX; *Fusarium moniliforme*, CA; *Oospora* sp., sour rot, TX; *Rhizopus nigricans*, CA, Gulf states; *Trichothecium roseum*, Gulf states.
- Rot, root. *Armillaria mellea*, CA; *Dematophora necatrix*, NC; *Phymatotrichum omnivorum*, TX; *Rhizoctonia* sp., TX.
- Rust. *Cerotelium (Physopella) fici* (II, III), NC to FL and TX, AR.
- Sooty mold. *Capnodium* sp., TX; *Fumago vagans*, Gulf states.
- Virus. **Fig Mosaic**, CA, GA, TX, VA?.
- Wilt, branch. *Hendersonula toruloides*, CA.

FIG, FLORIDA STRANGLER
(*Ficus aurea*)

- Anthracnose. *Colletotrichum gloeosporioides*, FL.
- Bacterial crown gall. *Agrobacterium tumefaciens*, FL.

Leaf spot. *Ophiodothella fici*, FL; *Phlyctaena ficuum*, FL; *Phyllosticta physopellae*; *P. roberti*, FL.

Nematode, root knot. *Meloidogyne* spp.

Rot, fruit. *Fusarium moniliforme*, CA.

Rust. *Cerotelium fici* (II, III), FL.

FIGWORT

(*Scrophularia*)

Downy mildew. *Peronospora sordida*, CA, IL, NY, VA to KS.

Leaf spot. *Cylindrosporium scrophulariae*, IL, OK, PA; *Mycosphaerella* sp., KS; *Septoria scrophulariae*, CA, OR, WA, NY to MS and CO.

FILAREE, RED-STEM

(*Erodium cicutarium*)

Nematode, lesion. *Pratylenchus minyus*, CA.

Virus. Filaree Red Leaf, CA.

FILBERT

See Hazelnut.

FIR

(*Abies*)

Black mildew. *Dimerosporium abietis*, ID, OR, WA; *Adelopus nudus*, ME, NY, NC, WI.

Blight. *Phoma eupyrena*, CA.

Blight, brown felt. *Herpotrichia nigra*, on high western firs.

Blight, needle. *Acanthostigma parasiticum*; *Rehmiellopsis balsameae*, Northeast; *Cenangium ferruginosum*, MI, PA; *Rhabdogloeum abietinum*, NC; *Macrophoma parca*, CO, OR, ID, MT, WA; *Phoma eupyrena*, CA.

Blight, needle. *Furcaspora pinicola*, CA.

Blight, seedling smother. *Thelephora terrestris*.

Blight, snow. *Phacidium infestans*, Northeast; *P. balsameae*; *P. abietinellum*.

Canker. *Aleurodiscus amorphus*, general; *Cytospora pinastri*, ME, WI; *C. cylindroides* and *C. abietis*, OR, WA; *Cephalosporium* sp., MN, WI; *Cryptosporium macrospermum*, New England; *Dasyscypha resinaria*, MN; *Phomopsis boycei*, ID, MT; *P. fokoyae*, CA.; *P. montanensis*; *Ophionectria scolecospora*, widespread; *Scleroderris abieticola*, OR; *Sphaeropsis abietis*, MI; *Valsa (Cytospora) kunzei*; *Thyronectria balsamea*, CO.

- Dieback, twig. *Sydowia polyspora*, CA.
- Mistletoe. *Arceuthobium campylopodium*, widespread in West; *A. douglasii*, NM, OR, WA; *Phoradendron pauciflorum*, AZ, CA.
- Needle cast; blight. *Bifusella abietis*, ID, MT, WA; *B. faullii*, ME, MI, NH; *Hypoderma robustum*, CA, ID, OR, WA; *Hypodermella abietis-concoloris*, widespread on western firs; *H. mirabilis*, MI; *H. nervata*, ME, NH, VT; *H. punctata*, OR, ID; *Lophodermium piceae*, tar spot, widespread, weakly parasitic; *L. autumnale*, MI, CA, OR, ID, UT, WY; *L. consciatum*; *L. decorum*; *L. uncinatum*; *L. lacerum*, NH, NY, PA, VT.
- Needle cast; blight. *Tirula nervisequa conspicuosus*, CA.
- Nematode. *Nacobdodera chitwoodi*, OR.
- Rot, heart. *Stereum sanguinolentum*, widespread; *Polyporus sulphureus*, general.
- Rot, hypocotyl. *Fusarium oxysporum*, CA.
- Rot, root. *Armillaria mellea*, New England, NY; *Fusarium solani*, PA; *F. oxysporum*, PA; *F. avenaceum*, PA; *Phytophthora cinnamomi*, NC; *P. citricola*, NC.
- Rot, root. *Phytophthora drechsleri*, NC.
- Rot, root. *Poria weirii*, OR.
- Rot, root. *Verticicladiella wagnerii*, Pacific Coast.
- Rot, wood. *Coniophora puteana*, New England, NY; *C. corrugis*, AZ, CO, WY; *Fomes annosus*, CO; *Echinodontium tinctorium*; *Hydnum abietis*; *H. balsameum*; *Polyporus* spp.; *Poria* spp.
- Rust, fir-broom. *Melampsorella caryophyllacearum*.
- Rust, fir-fern. *Milesia fructuosa* (0, I), on new needles, ME, NH, NY; II, III, on *Dryopteris*; *M. marginalis*, MA, NH, NY; *M. polypodophila* (0, I), ME, NY, NH, on old needles; II, III, on *Polypodium*, *Hyalopsora aspidiotus* (0, I), on 2-year needles; II, III, on *Dryopteris*; *Uredinopsis mirabilis* (0, I), general; II, III, on sensitive fern; *U. osmundae* (0, I), widespread; II, III, on *Osmunda*; *U. struthiopteridis*, MI, ID, OR, WA; II, III, on ostrich-fern; *U. phegopteris* (0, I); II, III, on *Dryopteris*.
- Rust, fir-fireweed. *Pucciniastrum pustulatum*, widespread; II, III, on *Epilobium*.
- Rust, fir-huckleberry. *Pucciniastrum goeppertianum*, widespread on western firs, and ME, PA, WI; II, III, on *Vaccinium*.
- Rust, fir-willow. *Melampsora abieti-capraearum*, widespread; II, III, on willow.
- Rust, needle. *Caecoma faulliana*, OR; *Peridermium ornamentale*, ID, MT, OR, WA; *P. rugosum*, CA, OR, WA.
- Rust, witches' broom. *Melampsorella cerastii*, general; II, III, on chickweed.

Despite this long list of possibilities the gardener should not have much trouble with ornamental firs. *Rehmiellopsis* tip blight yellows needles of new growth and causes twig dieback of native balsam firs in the Northeast but can be controlled with copper sprays, which will also aid in preventing needle-cast diseases. Avoid bark and branch injuries that induce cankers. Rust is taken

care of, if necessary, by eliminating the proper alternate host, but only a specialist can identify the many different rust species.

FIRETHORN

See *Pyracantha*.

FITTONIA

Blight, leaf. *Rhizoctonia* sp., OH.

Leaf spot. *Myrotherium roridum*, FL.

FLAX, FLOWERING

(*Linum*)

Damping-off. *Rhizoctonia solani*, IL.

Nematode, root knot. *Meloidogyne* sp., CA.

Rot, stem. *Sclerotinia sclerotiorum*, CA.

FOAM-FLOWER

(*Tiarella*)

Powdery mildew. *Sphaerotheca macularis*, AK.

Rust. *Puccinia heucherae* (III), CT to NC and TN, CO, MI, WI, CA, ID, MT, OR, WA, AK.

FORESTIERA

(*Swamp-Privet*)

Mistletoe. *Phoradendron serotinum* (*flavescens*), TX.

Powdery mildew. *Microsphaera alni*, IL, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Coleosporium minutum* (II, III), FL, TX; 0, I, on pine; *Puccinia peridermiospora* (0, I), FL, TX; II, III, on marsh grass.

FORGET-ME-NOT

(*Myosotis*)

Bacterial, MLO. California Aster Yellows, CA.

Blight, gray mold. *Botrytis cinerea*, cosmopolitan.

Downy mildew. *Peronospora myosotidis*, IL, MI, MS, WI.

Leaf spot. *Stemphylium* sp., NY.

Rot, crown. *Sclerotinia sclerotiorum*, IL, WA.

Rust. *Puccinia eatoniae* var. *myosotidis* (0, I), IL, IN, MS, MO, NC, WI;
II, III, on *Sphenopholis*; *P. mertensiae* (III), CO.

?Virus. *Chlorosis*, GA. Perhaps eastern strain of Aster Yellows.

FORSYTHIA

(Goldenbells)

Anthraxnose. *Gloeosporium* sp., OK.

Bacterial grown gall. *Agrobacterium tumefaciens*, MS, NJ, TX.

Blight, cane. *Botryosphaeria ribis*.

Blight, southern. *Sclerotium rolfsii*, GA.

Blight, twig. *Sclerotinia sclerotiorum*, NC.

Canker, stem gall. *Phomopsis* sp., KY.

Leaf spot. *Alternaria* sp., IA; *Phyllosticta discincola*, MD.

Nematode, lesion. *Pratylenchus vulnus*.

Nematode, root knot. *Meloidogyne* sp., TX; *M. hapla*; *M. incognita-acrita*.

Rot, root. *Phymatotrichum omnivorum*, TX.

Virus. *Tobacco Ring Spot*, MD.

FOUQUIERIA

(Ocotillo, Candlewood)

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Aecidium cannonii* (0, I), AZ.

FOUR-O'CLOCK

(*Mirabilis*)

Leaf spot. *Cercospora mirabilis*, TX.

Nematode, root knot. *Meloidogyne* sp., FL.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Aecidium mirabilis* (0, I), AZ, NM; *Puccinia aristidae* (0, I), AZ.

Virus. *Beet Curly Top*, CA.

White rust. *Albugo platensis*, TX.

FOXGLOVE

(*Digitalis*)

Anthraxnose. *Colletotrichum fuscum*, CT, MA, OR, PA, WI.

Blight, leaf; inflorescence. *Alternaria* sp., MD.

Leaf spot. *Cladosporium* sp., NJ; *Phyllosticta digitalis*, NY, TX, AK; *Ramularia variabilis*, OR.

Nematode, leaf and stem. *Ditylenchus dipsaci*, CT.
 Nematode, root knot. *Meloidogyne* spp., CA, MD.
 Rot, root and stem. *Rhizoctonia solani*, NJ; *Fusarium* sp., CA, NH.
 Rot, stem wilt. *Sclerotinia sclerotiorum*, NY; *Sclerotium rolfsii*, IN, NJ, TX.
 Virus. **Tobacco Mosaic**, WI.
 Wilt. *Fusarium* sp., CA, NH; *Verticillium albo-atrum*, NY.

FREESIA

Bacterial scab. *Pseudomonas marginata*, occasional in imported stock.
 Leaf spot. *Heterosporium iridis*, CT.
 Nematode, root knot. *Meloidogyne* sp., CA.
 Rot, corm wilt. *Fusarium* spp., including *F. oxysporum*; *F. solani*, CA, FL, TX.
 Rot, dry. *Stromatinia gladioli*, NJ, NY.
 Rot, blue mold. *Penicillium* ?*gladioli*.
 Rust. Cause unknown, not true rust.
 Virus. ?*Iris Mosaic*, CA; **Bean Yellow Mosaic**.

Fusarium corm rot causes wilting and death. Corms should be inspected before planting, and all those showing pinkish lesions should be discarded.

FREMONTIA (Flannel Bush)

Leaf spot. *Ascochyta fremontiae*, CA.
 Rot; stem girdle. *Phytophthora cactorum*, CA.
 Rot, crown, root. *Phytophthora nicotianae* var. *nicotianae*, CA.
 Wilt. *Verticillium albo-atrum*, CA.

FRINGE-TREE (*Chionanthus*)

Leaf spot. *Cercospora chionanthi*, NJ to NC and WV; *Phyllosticta chionanthi*, NJ, WV; *Septoria chionanthi* and *S. eleospora*, SC and TX.
 Powdery mildew. *Phyllactinia corylea*, MD.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rot, wood. *Daedalea confragosa*, MD.

FRITILLARIA

Leaf spot. *Phyllosticta fritillariae*, CA.
 Rust. *Uromyces miurae* (III), WA, AK.
 Virus. **Mosaic**. Undetermined, NY.

FROELICHIA

Leaf spot. *Cercospora crassoides*, OK, TX, WI.
Nematode, root knot. *Meloidogyne* sp., FL.
Rot, root. *Phymatotrichum omnivorum*, TX.
White rust. *Albugo froelichiae*, NE, TX.

FROSTWORT (*Crocanthemum*)

Leaf spot. *Cylindrosporium eminens*, WI.

FUCHSIA

Blight, gray mold. *Botrytis cinerea*, WV, AK.
Dieback. *Phomopsis* sp., VA.
Leaf spot. *Septoria* sp., OK.
Nematode, root knot. *Meloidogyne* sp.
Rot, mushroom root. *Armillaria mellea*, CA.
Rot, root. *Pythium rostratum*; *P. ultimum*, CA; *Phytophthora parasitica*, OR; *Thielaviopsis* sp., OR.
Rust. *Pucciniastrum epilobii*, NC, OR; *Uredo fuchsiae* (II), OH.
Virus. **Tomato Spotted Wilt**, CA.
Wilt. *Verticillium albo-atrum*, CA.

Verticillium wilt is common in garden plantings of fuchsia in California.

GAILLARDIA

Bacterial, MLO. **Aster Yellows**, NJ, NY, PA, and **California Aster Yellows**, CA.
Leaf spot. *Septoria gaillardiae*, IA, OK, TX.
Nematode. *Nacobus batiformis*, NE.
Powdery mildew. *Erysiphe cichoracearum*, MT, OK, TX; *Sphaerotheca macularis*, MT, WA, WY.
Rot, root. *Phymatotrichum omnivorum*, TX; *Pythium ultimum*, CA.
Rust. *Coleosporium asterum* (II, III), CA; 0, I, on pine; *Puccinia gaillardiae* (0,I), CA, II, III unknown.
Smut, white. *Entyloma polysporum*, KS, MN, NE.
Virus. **Tomato Spotted Wilt**, CA; **Biddens Mottle**, FL.

GALAX

Leaf spot. *Clypeolella leemingii*, black spot, MD to GA and MS; *Discohainesia oenotherae*, NC; *Phyllosticta galactis*, NC, VA, WV.

GALIMUM (Bedstraw)

Dodder. *Cuscuta cuspidata*, TX.

Downy mildew. *Peronospora calotheca*, IA, ND, WI.

Leaf spot. *Cercospora galii*, AK, AL, IA, NH, NY, OR; *Pseudopeziza repanda*, CA, CT, GA, IL, IA, ND, NY, OR, WI; *Melasmia galii*, IA; *Septoria cruciatae*, IN, MI, NJ, NY, WI, WV.

Powdery mildew. *Erysiphe cichoracearum*, CA, MT, OR, PA, WA; *E. polygoni*, KS.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia difformis* (0, I, III), OH to KS, MT, Pacific Coast; *P. punctata* (0, I, II, III); CT, NC, MS, ND to CA, WA; *P. punctata* var. *troglodytes* (0, I), CT to MO and SD, WA; *P. rubefaciens* (III), IA and WI to CA, WA, AK; *Pucciniastrum galii*, NY and PA to CO, CA and OR; *Uromyces galiicalifornici* (II, III), CA.

GALTONIA (Summer-Hyacinth)

Virus. *Ornithogalum Mosaic*, OR.

GARDENIA (Cape-Jasmine)

Bacterial leaf spot. *Xanthomonas maculifolium-gardeniae*, CA.

Blight; bud rot. *Botrytis cinerea*, in greenhouses; outdoors in CA.

Canker, stem gall. *Phomopsis (Diaporthe) gardeniae*, CA, widespread in greenhouses, outdoors in CA, FL.

Leaf spot. *Myrothecium roridum*, PA; *Pestalotia langloisii*, FL, AL; *Phyllosticta* sp., MS, NJ, TX; *Rhizoctonia* sp., NJ; *Mycosphaerella gardeniae*, GA.

Leaf spot, algal. *Cephaleuros virescens*, Gulf states.

Nematode, burrowing. *Radopholus similis*, FL.

Nematode, reniform. *Rotylenchulus reniformis*.

Nematode, root knot. *Meloidogyne hapla*; *M. incognita*; *M. incognita-acrita*; *M. javanica*; general; *M. arenaria*, NC.

Nematode, spiral. *Helicotylenchus nannus*.

Nonparasitic. Bud Drop, excessive soil moisture; temperature fluctuation.

Chlorosis, soil too alkaline or soil temperature too low. **Dieback**, yellow vein-banding, defoliation from root smothering by overwatering.

Powdery mildew. *Erysiphe polygoni*, TX.

Rot, root. *Phymatotrichum omnivorum*, TX

Sooty mold. *Capnodium* spp., Gulf states.

In the Deep South gardenia foliage is disfigured with sooty mold growing in whitefly honeydew. Gardenias are difficult house plants, dropping buds

with uneven humidity and temperature. To control phomopsis canker take cuttings near top of plants. Substitute the more resistant Veitchii variety for susceptible Belmont and Hadley. Avoid syringing, which spreads bacterial leaf spot.

GARLIC (*Allium sativum*)

Subject to diseases of Onion, which see. White rot is serious in Louisiana; pink root is a common problem. Clove rot is caused by *Penicillium digitatum*.

GARRYA (Tassel-Tree, Silk-Tassel Bush)

Leaf spot. *Cercospora garryae*, CA, TX; *Phyllosticta garryae*, CA, TX; *Dothichiza garryae*, CA.

Rot, root. *Phymatotrichum omnivorum*, TX.

Sooty mold. *Lembosia lucens*, CA.

GAULTHERIA (Checkerberry, Teaberry; Source of Oil of Wintergreen)

Blotch, sooty. ?*Gloeodes pomigena*, WI.

Fruit spot; black speck. ?*Leptothryium pomi*, WI; *Schizotherium gaultheriae*, ME to VA and WI.

Leaf spot. *Cercospora gaultheriae*, NJ, WI; *Discohainesia oenotherae*, VA; *Mycosphaerella gaultheriae* (*Phyllosticta gaultheriae*), general; *Venturia arctostaphyli*, MD, MA, NJ, NY, VA.

Powdery mildew. *Microsphaeraalni*, MD.

GAURA

Bacterial, MLO. **California Aster Yellows**, CA.

Broomrape. *Orobanche ramosa*, TX.

Downy mildew. *Peronospora arthuri*, KS, NE.

Gall, leaf. *Synchytrium fulgens*, TX.

Leaf spot. *Cercospora gaurae*, NY, OK, TX; *Septoria gaurina*, IL, KS, NE, ND, OK, TX.

Powdery mildew. *Erysiphe polygoni*, CO, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia extensicola* var. *oenotherae* (0, I), CO, NE, TX; II, III, on *Carex* spp.; *Uromyces plumbarius* (0, I, II, III), NY to VA, TX and WI, ND and MT to MS and NM.

GAZANIA

Rot, crown. *Rhizoctonia solani*, CA.

GENISTA
(Wood-waxen)

Dieback. *Diplodia* sp., CA, NJ.

Powdery mildew. *Erysiphe polygoni*, MO.

Rust. *Uromyces genistae-tinctoriae* (II, III), CA.

GENTIAN
(*Gentiana*)

Blight; stem canker. *Botrytis cinerea*, NY.

Leaf spot. *Asteromella andrewsii* (?*Mycosphaerella andrewsii*), DE, IL, IA, ND, NE, NJ, PA, WI, WV; *Cercospora gentianae*, ND, NY, VT; *C. gentianicola*, DE, WI.

Rot, root. *Fusarium solani*, MD.

Rust. *Puccinia gentianae* (0, I, II, III), NY to IN, NE, MN; western states to CA, WA, AK; *P. haleniae*, WY; *Uromyces gentianae* (II, III), CO, IA, NV, NM, WA, WY, NC, VT; *Pucciniastrum alaskanum*, AK.

GERANIUM
(*Pelargonium*)

Bacterial crown gall. *Agrobacterium tumefaciens*, MA, MD, OH.

Bacterial fasciation. *Clavibacter fascians*, MA, OH, IN, OR.

Bacterial leaf spot. *Xanthomonas pelargonii*, MA to VA, MS, OH, CA, WA; *Pseudomonas cichorii*, FL.

Bacterial wilt, southern. *Pseudomonas solanacearum*, NC.

Blight, blossom; gray mold; cutting rot. *Botrytis cinerea*, cosmopolitan.

Leaf spot. *Alternaria* sp., secondary; *Ascochyta* sp., CT, NJ; *Cercospora brunkii*, FL, TX, MD, OH, NH; *Pleosphaerulina* sp., PA.

Mold, leaf. *Botryosporium pulchrum*, occasional in greenhouses.

Nematode, dagger. *Xiphinema americanum*.

Nematode, leaf. *Aphelenchoides* sp., NY.

Nematode, root knot. *Meloidogyne* spp., CT, FL, NJ, OH, OR.

Nonparasitic. *Oedema*, dropsy; intumescence from excessive soil moisture and retarded transpiration. *Crook-Neck*, chimeral mutation.

Petal and leaf spot. *Bipolaris* (*Helminthosporium*) *setariae*, FL.

Rot, blackleg, stem and cutting rot. *Pythium debaryanum*, *P. mammilatum*, *P. splendens*, *P. ultimum*, *P. vexans*, cosmopolitan; *Rhizoctonia solani*, cosmopolitan; *Aspergillus fischeri*, CA; *Fusarium* sp., IN, NY, WA.

Rot, root. *Thielaviopsis basicola*, CT; *Armillaria mellea*, CA.
 Rust, pelargonium. *Puccinia pelargonii-zonalis* (II), CA, NY, FL, PA.
 Virus. **Pelargonium Leaf Curl** (*Geranium Crinkle*), general; **Geranium Mosaic;**
Cucumber Mosaic; Beet Curly Top; Tomato Spotted Wilt, CA, TX; **Tomato**
Ring Spot; Tobacco Ring Spot; Pelargonium Flower Break.
 Wilt. *Verticillium albo-atrum*, CA, NY, OR.

The dry air of the average home makes foliage diseases due to pathogenic organisms unlikely but sometimes a water-logged soil and cloudy weather, with less evaporation, leads to oedema, small swellings in leaves, corky ridges on petioles. Botrytis blight and bacterial leaf spots may be expected in greenhouses unless plants are spaced widely, have proper air circulation, little overhead watering, and all infected plants or parts are speedily removed. Start with clean cuttings from a culture-indexed mother block.

GERANIUM (Cranesbill, Herb-Robert)

Bacterial leaf spot. *Pseudomonas erodii*, FL, IL, IN, OR, TX; *Xanthomonas geranii*, NY.
Blight, leaf spot; stem rot. *Botrytis cinerea*, KS, MO.
Broomrape. *Orobanche ramosa*, TX.
Downy mildew. *Plasmopara geranii*, NJ to FL, KS, TX, MA to IA, MT, UT, WI.
Gall, leaf. *Synchytrium geranii*, LA, OK, TX.
Leaf spot. *Cercospora geranii*, CO, KS, IA, MO, MT, NY, TX, UT, WI;
Cylindrosporium geranii, LA; *Dilophospora geranii*, WI; *Pestolozziella subsessilis*, MS, MO, NJ, WI; *Phyllosticta geranii*, LA, TX; *Ramularia geranii*, CA, LA, WA, WY; *Septoria expansa*, KS, TX; *Stigmatea geranii*, black leaf speck, MD; *Venturia circinans*, mold, AK.
Powdery mildew. *Erysiphe polygoni*, CO, IL, IN, OH, PA, WV, WI, WY;
Sphaerotheca macularis, CA, ID, MN, MT, NE, PA, WA, WI, WY.
Rot, rhizome. *Seaverinia geranii*, NY, OH, WI.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia leveillei* (III), CO, MT, UT, WA, WY; *P. polygoni-amphibii* (0, I), CT to WI, MO, MN, MT, KS, TX; II, III, on Polygonum; *Uromyces geranii* (0, I, II, III), ME, WY, AK.
Virus. **Cucumber Mosaic**, FL.

GERBERA (Transvaal Daisy)

Blight, flower; ray speck. *Alternaria dauci* f. sp. *solani*, FL.
Blight, gray mold. *Botrytis cinerea*, FL, NY.
Leaf spot; stem rot. *Gloeosporium* sp., NY.

Nematode, root knot. *Meloidogyne* sp., AL, CA, MD, NC, NY.
 Powdery mildew. *Erysiphe cichoracearum*, CA, OK.
 Rot, crown. *Sclerotinia sclerotiorum*, MD, NY.
 Rot, root and stem. *Phytophthora cryptogea* and *P. drechsleri*, CA, NJ, NY.
 Virus. ?Tobacco Rattle, FL.

GERMANDER

(*Teucrium*)

Downy mildew. *Peronospora* sp., OK.
 Leaf spot. *Cercospora teucrii*, NY to MS, TX, WI; *Phyllosticta decidua*, TX, WI.
 Nematode, root knot. *Meloidogyne hapla*.
 Powdery mildew. *Erysiphe cichoracearum*, IL, PA, WI.
 Rust. *Puccinia menthae* (0, I, II, III), PA.

GEUM

(*Avens*)

Bacterial, MLO. California Aster Yellows, CA.
 Downy mildew. *Peronospora potentillae*, CA, IL, IN, IA, KS, NE, WI.
 Gall, leaf. *Synchytrium aureum*, WI.
 Leaf spot. *Cercospora gei*, WI; *Cylindrosporium gei*, NH, WI; *Marssonina adunca*, MT, WA; *Phyllosticta* sp., WI, WV; *Ramularia gei*, WI, MO; *Septoria gei*, DE, IL, MI, NY, NE, OH, AK.
 Nematode, root knot. *Meloidogyne* sp., CA.
 Powdery mildew. *Erysiphe polygoni*, AK; *Sphaerotheca macularis*, IN, MD, NE, NY, ND, OH, PA, WA, WI.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Puccinia sieversii*, CO.
 Smut, leaf. *Urocystis (Whetzelia) waldsteinae*, MT, WA.

GILIA

(Skyrocket)

Bacterial, MLO. California Aster Yellows, CA.
 Downy mildew. *Peronospora giliae*, TX.
 Leaf spot. *Ramularia giliae*, OR.
 Nematode, lesion. *Pratylenchus pratensis*, TX.
 Nematode, root knot. *Meloidogyne* sp., CA.
 Nematode, stem. *Ditylenchus dipsaci*.
 Powdery mildew. *Sphaerotheca macularis*, CA, TX, WA.
 Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia aristidae* (0, I), AZ, CO; *P. giliae* (II, III), AZ, CA, CO, NE, OR, WA; 0, I unknown; *P. plumbaria* (0, I, III), CA, CO, NE, UT, WY; *P. yosemitana* (0, III), CA, CO.

GILLENIA

(American Ipecac, Indian Physic)

Rust. *Gymnosporangium exterum* (0, I), IN, KY, MO, NC, TN, VA, III, on red-cedar.

GINGER, WILD

(*Asarum*)

Gall, leaf. *Synchytrium asari*, MN, CA, WI.

Leaf spot. *Ascochyta versicolor*, ID; *Plaglostoma (Laestadia) asarifolia*, SC.

Rot, rhizome. *Sclerotinia sclerotiorum*, NY.

Rust. *Puccinia asarina*, CA, ID, OR, WA.

GINKGO

(Maidenhair-Tree)

Anthracnose. *Glomerella cingulata*, MD, TX.

Leaf spot. *Phyllosticta ginkgo*, PA; *Epicoccum purpurascens*, IL.

Nematode, root knot. *Meloidogyne* sp., MS.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, sapwood. *Polyporus hirsutus*, *P. lacteus*; *P. tulipiferous*; *P. versicolor*; *Fomes connatus*, MD.

Rot, seed. *Xylaria longeana*, PA.

GINSENG

(*Panax*)

Blight. *Alternaria panax*, general; *Botrytis cinerea*, NY to NC and MI, WA.

Damping-off. *Pythium debaryanum*, NY; *Rhizoctonia solani*, AR, IN, MI, NJ, NY, WA.

Leaf spot. *Septoria* sp.; *S. araliae*, WI; *Colletotrichum dematium*, secondary, NY to NC, MO, MN.

Nematode, root knot. *Meloidogyne* sp., CT, MI, NY, OH, PA, WI.

Nonparasitic. **Papery Leaf**, moisture deficiency, sunscald, MI, MO, NJ, NY, PA.

Rot, rhizome. *Sclerotinia sclerotiorum*, white rot, MI, NY, OH, PA, WA, WI; *S. smilacina*, black rot, MI, MN, NY, WI.

Rot, root. *Armillaria mellea*, WA; *Fusarium scirpi*, NY to AL, MO and WI, WA; *Thielaviopsis basicola*, black root, IL, MI, NJ, NY, OH; *Ramularia* spp., MI, NY, OR, WA, WI.
Rot, stem, root; downy mildew. *Phytophthora cactorum*, CT to NC, IA and MI, WA.
Rust. *Puccinia araliae* (III), MA, PA.
Wilt. *Verticillium albo-atrum*, IN, KY, MI, NJ, NY, OH, PA, TN, WI.

GLADIOLUS

Bacterial leaf blight. *Xanthomonas gummisudans*, NY to MO, and ND, WA.
Bacterial, MLO. *Aster Yellows*, MD.
Bacterial scab; neck rot; leaf spot. *Pseudomonas marginata*, general.
Bacterial soft rot. *Erwinia carotovora*, MI.
Blight, leaf; flower spot; corm rot. *Botrytis gladiolorum*, AK, CA, FL, MA, MD, NJ, NY, OR, WA, WI.
Blight, seedling. *Botrytis elliptica*, WA.
Blight, brown spot of leaves, flowers. *Curvularia lunata* (*Cochliobolus lunata*), FL, MD, MI, NC, NY, VA, WI.
Blight, southern. *Sclerotium rolfsii*, FL.
Leaf spot. *Alternaria* spp., cosmopolitan; *Cladosporium herbarum*, cosmopolitan but secondary; *Heterosporium* sp., MD; *Stemphylium* sp., leaf and stem spot, FL, MI, NJ, NY.
Nematode, root knot. *Meloidogyne* spp., NC to FL and TX, CA; *M. hapla*.
Nematode, sheath. *Hemicycliophora oracilis*, OR.
Nonparasitic
Brown Tip. From waterlogged soil.
Ink Spot. On husks and corms. Cause unknown.
Leaf Scorch. Atmospheric fluorides, WA.
"Rust." Spot necrosis on leaves, from sun on water drops.
Topple. Partially controlled by spraying flowers with calcium nitrate.
Rot, corm, basal; yellows; wilt. *Fusarium oxysporum* f. sp. *gladioli*, general.
Rot, dry, of corms; leaf and stalk rot. *Stromatinia gladioli*, general.
Rot, hard; leaf spot. *Septoria gladioli*, general.
Rot, root, collar, leaf base. *Rhizoctonia solani*, NJ, ND, TX.
Rot, storage. *Penicillium gladioli*, general in the North, occasional in the South; *P. funiculosum*, core rot; *Rhizopus arrhizus*, soft, occasional.
Smut. *Urocystis gladiolicola*, CA.
Virus. **Cucumber Mosaic; Yellow Bean Mosaic** (mild mosaic); **White Break**, NY to IL, CA and WA; **Tomato Ring Spot**.

The backyard gardener with a few rows of gladiolus probably sprays for thrips and forgets about diseases, but the serious grower has much to combat. Control starts with choosing varieties resistant to *Fusarium* yellows, treating

corms after digging and before planting to control rots and scab, with removal of husks usually giving a healthier crop, and field spraying for *Botrytis*, *Curvularia*, and *Stemphylium* flower blights and leaf spots. Mild mosaic is spread from beans to gladiolus by aphids; so they should be kept widely separated. Rogue plants with white-break mosaic. An aluminum mulch repels aphid vectors of virus diseases.

GLOBE-AMARANTH

(*Gomphrena*)

Leaf spot. *Cercospora gomphrenae*, GA, OK, TX.

Nematode, root knot. *Meloidogyne* sp., FL.

Virus. **Beet Curly Top**, TX.

White rust. *Albugo bliti*, NM.

GLOBE-MALLOW

(*Sphaeralcea*)

Powdery mildew. *Erysiphe polygoni*, ID.

Rust. *Puccinia interveniens*, ID, WA; *P. schedonnardi*, AZ, NM; *P. sherardiana*, AZ, CA, CO, ID, NE, NM, TX, UT; *P. sphaeralceae* (I, III), CA.

GLOBE-THISTLE

(*Echinops*)

Rot, crown. *Sclerotium rolfsii*, CT.

GLORY-BUSH

(*Tibouchina*)

Rot, mushroom root. *Clitocybe tabescens*, FL.

GLOXINIA

(*Sinningia*)

Bacterial leaf blight. *Pseudomonas* sp., OR.

Bacterial leaf spot. *Pseudomonas alcaligenes*, FL.

Bacterial, MLO. **Aster Yellows**, CA.

Blight, bud rot. *Botrytis cinerea*, CA, MO.

Nonparasitic. **Dieback**, wilt; boron deficiency, CA.

Rot, crown; flower, leaf blight. *Sclerotinia sclerotiorum*, CA.

Rot, leaf. *Cladosporium herbarum*, NJ.

Rot, root and crown. *Phytophthora cryptogaea*, CA; *Pythium ultimum*, CA; *Myrothecium roridum*, FL.
 Virus. **Tomato Spotted Wilt**, CA, MO, TX; **Tobacco Mosaic**, CA, CT, DC, FL, OH, WA.

GNAPHALIUM

(Cudweed)

Bacterial, MLO. **California Aster Yellows**;
 Canker, stem. *Phoma erysiphoides*, TX, WI.
 Downy mildew. *Plasmopara halstedii*, AL, MS.
 Leaf spot. *Cercospora gnaphaliacea*, MS, KS; *Cylindrosporium gnaphalicola*, AL, TX; *Septoria cercosperma*, TX.
 Nematode, root knot. *Meloidogyne* sp.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Puccinia gnaphaliicola* (II, III), AL, LA, NC, SC; 0, I unknown; *P. investita* (0, I, III), AZ, CA, CT, MA, NY, OH, PA, TN, VT, WV, WI.
 Smut, white. *Entyloma compositarum*, AL, MD.
 Virus. **Beet Curly Top**, CA.

GOATS-BEARD

(*Aruncus*)

Leaf spot. *Cercospora* sp., OR; *Ramularia ulmariae*, AK.

GODETIA

Bacterial, MLO. **California Aster Yellows**, CA.
 Blight, gray mold. *Botrytis cinerea*, AK.
 Damping-off. *Rhizoctonia solani*, IL.
 Downy mildew. *Peronospora arthuri*, CA.
 Nematode, root knot. *Meloidogyne* sp.
 Rot, root. *Pythium ultimum*, MO; *Phytophthora cryptogaea*.
 Rust. *Puccinia oenotherae* (0, I, II, III); *P. pulverulenta* (0, I, II, III), CA; *Pucciniastrum epilobii* (II, III), AK; 0, I, on fir.
 Virus. **Tomato Spotted Wilt**, CA.

GOLDEN-CHAIN

(*Laburnum*)

Blight, twig. *Gibberella baccata*, NJ; *Fusarium* sp., MD, OH.
 Leaf spot. *Cercospora laburni*, OK.

GOLDEN-CLUB

(*Orontium*)

Blight, leaf. *Botrytis streptothrix*, NJ.

Leaf spot. *Mycosphaerella* sp., NJ; *Phyllosticta orontii*, NJ, TX; *Ramularia orontii*, NJ; *Volutella diaphana*, NJ.

GOLDEN-EYE

(*Viguiera*)

Powdery mildew. *Erysiphe cichoracearum*, UT.

Rot, root. *Phymatotrichum omnivorum*, TX; *Helicobasidium purpureum*, TX.

Rust. *Puccinia abrupta* (II, III), AZ, TX; *P. turgidipes* (II, III), AZ, CA.

Smut, white. *Entyloma compositarum*, UT.

GOLDEN-GLOW

(*Rudbeckia lacinata*)

Bacterial, MLO. **Aster Yellows; California Aster Yellows.**

Blight, southern. *Sclerotium rolfsii*, FL.

Downy mildew. *Plasmopara halstedii*, IA, NE, NC, ND, WI.

Gall, leaf. *Synchytrium aureum*, IL, WI.

Leaf spot. *Cercospora rudbeckiae*, NY; *Phyllosticta rudbeckiae*, IA, NY, WI; *Ramularia rudbeckiae*, VT to MS, CO and ID; *Septoria rudbeckiae*, KS, NE, WI.

Powdery mildew. *Erysiphe cichoracearum*, general.

Rot, stem. *Sclerotinia sclerotiorum*, CT.

Rust. *Puccinia dioicae* (0, I), MO, SD; *Uromyces perigynius* (0, I), MD to MO and MT; II, III, on *Carex*; *U. rudbeckiae* (III), MD to MS, NM and MT.

Smut, white. *Entyloma compositarum*, IA, MO, OH, WI.

Virus. **Potato Yellow Dwarf; Mosaic**, unidentified.

Powdery mildew is commonly present.

GOLDEN-LARCH

(*Pseudolarix*)

Canker. *Dasyscypha willkommii*, MA.

GOLDENRAIN-TREE

(*Koelreuteria*)

Canker. *Nectria cinnabarina*, CA, CT.

Leaf spot. *Cercospora* sp., FL.

Rot, root. *Phymatotrichum omnivorum*, TX.
 Wilt. *Verticillium* sp., NJ.

GOLDENROD (*Solidago*)

Black knot. *Gibberidia heliopsisidis*, CT, MO, ND, NY.
 Blight, thread. *Pellicularia koleroga*, LA.
 Canker, stem. *Botryosphaeria ribis*, IA.
 Dodder. *Cuscuta* spp., occasional.
 Downy mildew. *Basidiophora entospora*, IL, WI; *Plasmopara halstedii*, IL, WI.
 Gall, leaf. *Rhodochytrium spilanthidis*, LA.
 Leaf spot. *Ascochyta compositarum*, WI; *Asteroma solidaginis*, black scurf; *Cercospora parvamaculans*, WI; *Colletotrichum solitarium*, KS, NE, WI; *Macrophoma sphaeropsisora*; *Phyllosticta solidagnicola*, IL, WI; *Placosphaeria havdeni*, black spot; *Ramularia serotina*, CO, IL, TX, WI, WY; *Septoria* spp.
 Mold, leaf. *Cladosporium astericola*, WI.
 Nematode, lesion. *Pratylenchus pratensis*, FL.
 Powdery mildew. *Erysiphe cichoracearum*, general; *Phyllactinia corylea*, WA; *Sphaerotheca macularis*, IN; ?*Uncinula* sp., NY.
 Rot, root. *Phymatotrichum omnivorum*, TX
 Rust. *Coleosporium delicatulum* (II, III), ME to VA, KS; 0, I, on pine; *C. asterum* (II, III), general; 0, I, on 2- and 3-needle pines; *Puccinia dioicae* (0, I), general; II, III, on *Carex*; *Puccinia virgae-aureae* (III), IL, NH, MA, MI, NY; *P. grindeliae* (III), IL, WI to CA, WA; *P. stipae* (0, I), CO, MT, NE, NM, ND; II, III, on *Stipa*; *Uromyces perigynius* (0, I), ME; II, III, on *Carex*; *U. solidaginis* (III), CO, ID.
 Smut, inflorescence. *Thecaphora cuneata*, KS.
 Spot anthracnose. *Elsinoë solidaginis*, FL, GA, SC.
 Virus. **Mosaic**. Unidentified, NY.

GOLDENSEAL (*Hydrastis*)

Blight, leaf. *Alternaria* sp., MI, NY, OH; *Botrytis* sp., CT to NC, IN, WA, WI.
 Nematode, root knot. *Meloidogyne* spp., MI, OH, WA.
 Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, NC.
 Rot, stem. *Phytophthora cactorum*, NC.
 Virus. **Mosaic**, unidentified, CT.
 Wilt. *Fusarium* sp., IL, NY, OH, WA.

GOLDENTOP

(*Lamarckia*)

Rust. *Puccinia coronata* (II, III), CA; *P. graminis*, CA.

Virus. ?Mosaic, IA.

GOLDTHREAD

(*Coptis*)

Leaf spot. *Mycosphaerella coptis*, ME, NY, VT; *Septoria coptidis*, ID, MI, NY, VT, WI, WA; *Phyllosticta helleboricola* var. *coptidis*, AK; *Vermicularia coptina*, NY.

GOPHER PLANT or CAPER SPURGE

(*Euphorbia*)

Rot, root. *Macrophomina phaseolina*, AZ; *Pythium aphanidermatum*, AZ; *Rhizoctonia solani*, AZ.

GOOSEBERRY

(*Ribes*)

Anthraxnose. *Pseudopeziza ribis*, general.

Blight, cane. *Botryosphaeria ribis*, NJ, VA; *Leptosphaeria coniothyrium*, IN, MO.

Blight, thread. *Pellicularia koleroga*, FL.

Canker; dieback. *Nectria cinnabarina*, coral spot; *Botrytis cinerea*, CT, OR, WA; *Phragmodothella ribesia*, twig knot; *Physalospora obtusa*, NY to VA, KS.

Dodder, *Cuscuta* sp., MN, NY.

Downy mildew. *Plasmopara ribicola*, MT, OR, WI, WV.

Leaf spot. *Marssonina grossulariae*, OH, WI; *Cercospora angulata*, NY to MI and MO; *Mycosphaerella ribis*, MA to VA, KS, MN, OR, AL; *Phyllosticta grossulariae*, WI, CT, NJ, WA; *Ramularia* sp., MI.

Nematode, leaf, bud. *Aphelenchoides ribes*, CA.

Nonparasitic. Leaf Blotch, magnesium deficiency, OR. Leaf Scorch, potassium deficiency.

Powdery mildew. *Sphaerotheca macularis*, MN; *S. mors-uvae*, general; *Microsphaera grossulariae*, CA; *Phyllactinia corylea*, NY.

Rot, root. *Armillaria mellea*, OR, WA; *Dematophora* sp.; *Xylaria hypoxylon*, OR; *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia caricina* var. *grossulariata* (0, I) leaves, fruit, ME to MD, MS, KS, ID, AK, II, III, on *Carex*; *P. Caricina* var. *uniporula*, IA, MD, NY, WI; *Coleosporium jonesii* (II, III), CO, MO, MN, NM, WI, WY; *Cronartium*

occidentale, AZ, CO, UT; **C. ribicola**, white pine blister rust (II, III), European varieties are resistant.
Spot anthracnose, scab. **Sphaceloma ribis**, WA.
Virus. Mosaic. Unidentified, IL, NY.

Powdery mildew caused by *Sphaerotheca mors-uvae* is probably the most important gooseberry disease but is readily controlled by a lime-sulfur spray immediately after bloom, followed by bordeaux mixture spray for leaf spots.

GORDONIA (Franklinia and Loblolly-Bay)

Black mildew, *Meliola cryptocarpa*, FL, LA.
Leaf spot. *Phyllosticta gordoniae*, FL.
Rot, root. *Phymatotrichum omnivorum*, TX.

GOUANIA

Rust. *Puccinia invaginata* (II, III), FL.

GOURD (Lagenaria, Luffa, Trichosanthes)

Anthracnose. *Colletotrichum lagenarium*, CT, IL, IN, IA, MN, MD, NE, PA.
Bacterial, angular leaf spot. *Pseudomonas lachrymans*, WI.
Blight, thread. *Pellicularia koleroga*, FL.
Downy mildew. *Pseudoperonospora cubensis*, CT, FL, MA, NC, OH.
Fruit spot. *Macrophoma trichosanthis*, AL; *Phoma subvelata*, TX; *Stemphylium* sp., NY.
Leaf spot. *Cercospora cucurbitae*, AL, IN.
Nematode, root knot. *Meloidogyne* sp., AL, FL, OH.
Powdery mildew. *Erysiphe cichoracearum*, CT, WI.
Rot, fruit. *Mycosphaerella citrullina* (*Laestadia cucurbitacearum*), PA.
Rot, root. *Phymatotrichum omnivorum*, TX.
Virus. **Cucumber Mosaic**, IN, NY.
Virus. **Tobacco Ring Spot**, TX, on *Luffa acutangula*.

GRAPE (Vitis)

Bacterial crown gall. *Agrobacterium tumefaciens*, widespread.
Bacterial leaf spot. *Xanthomonas* sp., NY.
Bacterial, xylem-limited. **Pierce's Disease**, NC.

- Blight, shoot. *Sclerotinia sclerotiorum*, CA.
- Blotch, leaf. *Briosia amphelophaga*, TX.
- Canker; deadarm; branch necrosis. *Cryptosporella (Phomopsis) viticola*, widespread.
- Dieback. *Eutypa armeniacae*, NY, CA.
- Downy mildew. *Plasmopara viticola*, general, serious in East.
- Fruit spot; fly speck. *Leptothyrium pomi*, PA, WV.
- Leaf spot. *Mycosphaerella personata (Isariopsis clavispora)* widespread; *Septoria ampelina*, NY, TX, VA; *Septosporium heterosporum*, CA.
- Leaf spot, zonate. *Cristulariella pyramidalis*, WV.
- Nematode. *Meloidoderita* sp., NY.
- Nematode, citrus. *Tylenchulus semipenetrans*, CA.
- Nematode, cyst. *Heterodera punctata*, MI.
- Nematode, dagger. *Xiphinema index*.
- Nematode, lesion. *Pratylenchus pratensis*, CA; *P. minyus*, CA; *P. coffeae*, CA; *P. vulnus*, CA.
- Nematode, pin. *Paratylenchus hamatus*.
- Nematode, ring. *Criconemoides xenoplax*, CA.
- Nematode, root knot. *Meloidogyne* spp.
- Nematode, spiral. *Helicotylenchus pseudorobustus*, CA.
- Nematode, stubby root. *Trichodorus christiei*.
- Nonparasitic. **Little Leaf**, zinc deficiency, CA. **Shot Berry**, defective pollination.
- Skin Blanching**, sulfur dioxide injury.
- Powdery mildew. *Uncinula necator*, general.
- Rot, bitter. *Melanconium fuligineum*, widespread, often secondary after black rot.
- Rot, black. *Guignardia bidwellii*, general.
- Rot, charcoal. *Macrophomina phaseoli*, TX.
- Rot, fruit. *Alternaria* sp., CA; *Aspergillus niger*, black mold, CA, OR; *Botrytis cinerea*, gray mold, CA; *Cladosporium* sp., green mold; *Penicillium* spp., blue mold, cosmopolitan; *Glomerella cingulata*, ripe rot; *Pestalotia* sp., *Phoma* spp.
- Rot, root. *Armillaria mellea*, AR, CA, MO, TX, WA; *Phymatotrichum omnivorum*, TX; *Clitocybe tabescens*, SC to TX and OK; *Roesleria hypogaea*, NY to VA, MO, IA; *Rosellina necatrix*, AL, IN, MI, NY, OH.
- Rot, summer bunch. *Diplodia viticola* (?*D. natalensis*).
- Rot, white; dieback. *Coniothyrium diplodiella*, MA to FL and TX.
- Rot, wood. *Schizophyllum commune*, VA; *Stereum* spp.; *Poria* spp.; *Polyporus* spp.
- Rust. *Physopella ampelopsidis (P. vitis)* (II), FL, SC.
- Scorch, leaf. *Pseudopezicula tetraspora*, NY, PA.
- Spot anthracnose; bird's eye rot. *Elsinoë ampelina*, widespread.
- Virus. **Alfalfa Dwarf**; **Grape Fanleaf**; **Grape Leaf Roll** (White Emperor Disease); **Grape Yellow Mosaic**.
- Virus. **Tobacco Ring Spot**, NY; **Tomato Ring Spot**, NY.

Black rot is the most destructive grape disease in most sections of the country, often causing total loss of fruit in home gardens. Pierce's disease has destroyed many vineyards in California; the pathogen is transmitted by grafting and by leafhoppers.

GRAPEFRUIT

See Citrus Diseases.

GRAPE-HYACINTH

(*Muscari*)

Rot, dry. *Sclerotium* sp., MO, WA.

Smut, flower. *Ustilago vaillantii*, MA, WA.

GRASSES, LAWN, TURF

Includes *Agrostis alba*, redtop; *A. canina*, *A. palustris*, *A. stolonifera*, *A. tenuis*, bentgrasses; *Cynodon dactylon*, Bermuda grass; Buffalograss; Bromegrass; *Festuca* spp., fescues; *Poa compressa* and *P. pratensis*, Canada and Kentucky bluegrasses; *Stenotaphrum*, St. Augustine grass; *Dactylis glomerata*, orchard-grass.

Anthracnose. *Colletotricum graminicolum*, general.

Bacterial blight. *Pseudomonas syringae* pv. *coronafaciens*, AK.

Bacterial stunting. *Clavibacter xyli* subsp. *cyodontis*, FL.

Bacterial, xylem-limited. *Rickettsialike organism*, MI.

Blight. *Fusarium roseum* f. sp. *cerealis*, MD, NJ, NY, OH, PA; *F. tricinctum* f. sp. *poae*; *Leptosphaeria korrae*, CA, NY, NJ, and *Phialophora graminicola*, CA, NY, NJ. (New identification for *Fusarium* blight).

Blight, cottony. *Pythium aphanidermatum*, general.

Blight, leaf. *Piricularia grisea*, on bent and St. Augustine; *Pellicularia filamentosa* f. sp. *sasakii*; *Drechslera catenaria*, OH; *Rhizoctonia solani*, FL.

Blight, melting out. *Curvularia geniculata*; *C. inaequalis*; *C. lunata*.

Blight, southern. *Sclerotium rolfsii*, FL, NJ.

Blight (zonate leaf spot). *Drechslera gigantea* (*Helminthosporium gigantea*), RI.

Blotch, purple leaf. *Septoria macropoda*; *S. agropyrina*, brown; *S. elymi*, northern U.S.

Damping-off. *Cladochytrium graminis*, on bentgrass.

Dodder. *Cuscuta* sp., MO.

Downy mildew. *Sclerophthora macrospora*, MS, TX, LA, on St. Augustine grass.

Downy mildew. *Sclerospora farlowi*, OK, on Bermuda grass.

- Ergot. *Claviceps purpurea*, NY to KY, TX, ND, MT, OK, OR, WI; *C. microcephala*, MD, MI, OH.
- Fairy ring. *Marasmius oreades*; *Psalliota compestris*; *Lepiota morgani*.
- Leaf spot. *Ascochyta agropyrina*, Northwest; *A. desmazieri*; CA, OR, WA; *A. elymi*; *A. gramineae* on Bermuda grass; *A. hordei*; *A. sorghi*; *A. graminicola*; *A. utahensis*; *Cercospora seminalis*, TX; *C. fuscomaculans*; *C. poagena*; *Cylindrosporium glyceriae*, NY; *Leptosphaeria korrae*, ringspot, WI; *Macrophoma* sp., OR; *Ovularia pulchella*, OR, UT; *Phaeoseptoria* sp., OR; *Placosphaeria graminis*; *Septogloeum oxysporum*, char spot, widespread; *Stagonospora intermixta*.
- Leaf spot, black, tar. *Phyllachora graminis*, widespread; *P. sylvatica*, Northwest.
- Leaf spot, brown stripe. *Scoletotrichum graminis*, widespread, except on ryegrass.
- Leaf spot, copper. *Ramulispora (Gloeocercospora) sorghi*, CA, LA, PA, RI, on bentgrass.
- Leaf spot, frog-eye. *Selenophoma donacis*, northern states; *S. everhartii*; *S. obtusa*.
- Leaf spot, gray leaf speckle. *Septoria triseti*, WA, OR on redtop, bent; *S. calamagrostidis*, OR, WY, AK; *S. loligena*, CA; *S. nodorum*; *S. oudemansii*, northern U.S.; *S. secalis*, white leaf spot; *S. tenella*, northern plains; *S. tritici* var. *lolicola*.
- Leaf spot; melting-out. *Helminthosporium vagans*, on bluegrass; *H. sativum*; *H. giganteum*, zonate eyespot, general; *H. dictyoides*, fescue netblotch; *H. siccans*, brown blight; *H. stenacrum*, leaf mold; *H. triseptatum*, gray leaf mold; *H. cynodontis*, Bermuda grass leaf blotch; *H. erythrospilum*; *H. rostratum*; *H. stenophilum*.
- Leaf spot, red eye-spot. *Mastigosporium rubricosum*, ME, OR, WA, WY.
- Leaf spot, yellow ring. *Trechispora alnicola*, IL.
- Mold. *Cladosporium herbarum*; *Fusarium heterosporium*.
- Nematode, cyst. *Punctodera punctata*, NJ.
- Nematode, dagger. *Xiphinema americanum*.
- Nematode, gall. *Anguina agrostis*.
- Nematode, lance. *Hoplolaimus coronatus*.
- Nematode, lesion. *Pratylenchus brachyurus*; *P. pratensis*; *P. subpenetrans*; *P. thornei*.
- Nematode, pin. *Paratylenchus projectus*.
- Nematode, pseudo root knot. *Hypsoperine graminis*, AL, MD, TN.
- Nematode, ring. *Criconeoides lobatum*; *C. rusticum*, *C. xenoplax*, *C. ornatum*, *C. parvum*, *C. curvatum*, OH; *Criconebella xenoplax*, SC.
- Nematode, root knot. *Meloidogyne* sp.; *M. incognita-acrita*.
- Nematode, spiral. *Helicotylenchus nannus*; *H. dihystra*; *Rotylenchus christiei*, FL.
- Nematode, sting. *Belonolaimus gracilis*; *B. longicaudatus*.
- Nematode, stubby root. *Trichodorus christiei*; *T. obtusa*.

- Nematode, stylet. *Tylenchorhynchus brevideus*; *T. claytoni*; *T. dubius*.
 Nonparasitic. Burn, mowing too close in hot weather. Spring Dead Spot, too much thatch.
- Powdery mildew. *Erysiphe graminis*, general.
- Rot, crown. *Drechslera catenaria*, OH.
- Rot, culm. *Fusarium culmorum*; *Gibberella zeae*.
- Rot; dollar spot; small brown patch. *Sclerotinia homeocarpa*, general.
- Rot, foot. *Ophiobolus graminis*, NY, WA.
- Rot; large brown patch. *Pellicularia filamentosa* (*Rhizoctonia solani*); widespread, more important on bentgrass than on bluegrass.
- Rot; pink patch; red thread. *Corticium fuciforme*, general.
- Rot, root. *Pythium debaryanum*; *P. ultimum*; *Fusarium* spp.; *Olpidium brassicae*; *Pyrenochaeta terristris*, IL.
- Rust. *Puccinia pygmaea*, NY; *Uromyces mysticus* (II, III), OR; *U. dactylidis*, IN, MI, SD, VI.
- Rust, bluegrass. *Puccinia poae-nemoralis*, widespread; *P. recondita*, on bromegrass, PA; *P. striiformis*, stripe rust, OR; *P. cynodontis*, on Bermuda grass; *P. stenotaphri*, on St. Augustine grass; *P. piperi*.
- Rust, crown. *Puccinia coronata* (II, III), cosmopolitan; *P. glumarum*.
- Rust, stem; wheat. *Puccinia graminis*, cosmopolitan.
- Scab. *Fusarium heterosporum*, MO.
- Slime mold. *Mucilago spongiosa*; *Physarum cinereum*; *Fuligo septica*.
- Smut, bluegrass blister. *Entyloma irregulare* and other spp.
- Smut, flag. *Urocystis agropyri*, WI, OH.
- Smut, head; bunt. *Tilletia pallida*, OR, NJ, OH; *T. fusca*; *T. buchloëana*, OK, KS, NE, TX.
- Smut, inflorescence. *Sorosporium syntherismae*, CA.
- Smut, stripe. *Ustilago striiformis*, widespread; *U. cynodontis* on Bermuda grass in South.
- Snowmold, blight. *Fusarium nivale*, AK, MI, MN, OR, WA; *Calonectria graminicola*; *Sclerotinia borealis*, AK; *Sclerotium rhizodes*, white tip, CT, MA, NJ, PA, WI; *Typhula itoana*, MA, MN, NJ, NY, PA; *T. idahoensis*, ID.
- Stem eyespot. *Phleospora idahoensis*, OH.
- Virus. Bromegrass Mosaic. General, IA, IL; Clover Yellow Vein, GA; Maize Dwarf Mosaic; Peanut Mottle, GA; St. Augustine Decline Virus (*Panicum Mosaic*), AR, LA, TX; Sugarcane Mosaic, FL; Barley Yellow Dwarf, MO, IN.

The possibility of any large proportion of these diseases appearing in the average suburban lawn is remote. Snowmold occurs occasionally after a winter when the snow cover has been rather continuous, but the light tan areas disappear by late spring. Large brown patch is fairly general in humid summer weather along with dollar spot, and Helminthosporium leaf spots or melting-out. Merion bluegrass is resistant to the latter but not to bluegrass rust.

GRASS-OF-PARNASSUS

(*Parnassia*)

Powdery mildew. *Erysiphe polygoni*, NY.

Rust. *Puccinia parnassiae* (III), UT; *P. caricina* var. *uliginosa*, (I), AK; II, III, on *Carex*.

GREVILLEA

(Silk-Oak)

Dieback; gum disease. *Diplodia* sp. (?*Physalospora rhodina*), FL.

Leaf spot, algal. *Cephaleuros virescens*, FL.

Nematode, root knot. *Meloidogyne* sp., CA.

Rot, root. *Phymatotrichum omnivorum*, AZ.

GRINDELIA

(Gumweed)

Leaf spot. *Cercospora grindeliae*, CA, TX, WI; *Septoria grindeliae*, CO, KS, TX; *S. grindeliicola*, WI.

Powdery mildew. *Erysiphe cichoracearum*, MN to NM, CA, MT.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Coleosporium asterum* (II, III), CA, CO, WA, WI; 0, I, on pine; *Puccinia dioicae* (0, I), KS, NE, TX; II, III, on *Carex*; *P. grindeliae* (III), NE to TX, CA, MT; *P. stipae* (0, I), CO, KS, NE, ND, SD; II, III, on *Stipa* and other grasses; *Uromyces junci* (0, I); II, III, on *Juncus*.

Smut, inflorescence. *Thecaphora californica*, UT, CA; *T. Cuneata*, CO, KS, NE, NM.

GROUND-CHERRY, HUSK-TOMATO

(*Physalis*)

Bacterial angular leaf spot. *Pseudomonas angulata*, KY.

Bacterial canker. Vascular. *Clavibacter michiganense*, WY. Also *Pseudomonas longifolia*.

Bacterial, wildfire. *Pseudomonas syringae* pv. *tabaci*, PA.

Blight, seedling. *Gloeosporium fructigenum*, NY.

Blight, southern. *Sclerotium rolfsii*, FL.

Leaf spot. *Alternaria solani*; *Cercospora diffusa*, IL, KS, WI; *C. physalicola*, CT to GA, TX; *Leptosphaeria physalidis*, KY; *Phyllosticta* sp., OK; *Septoria* sp., NE; *Stemphylium solani*, FL.

Nematode, leaf and stem. *Ditylenchus dipsaci*, CA.

Nematode, root knot. *Meloidogyne* spp., FL, AL.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Aecidium physalidis*, WI to TX, NM, CO; *Puccinia physalidis*, CO, IA, MN, NE, WI.

Smut, white. *Entyloma australe*, MA to MS, NM and ND.

Virus. **Beet Curly Top**; **Mosaic** (part cucumber, part tobacco mosaic); **Ring Spot** (?Tobacco).

GROUND-CHERRY, PURPLE-FLOWERED

(*Quincula*)

Leaf spot. *Cercospora physalidis*, KS.

Rust. *Puccinia aristidae* (0, I), CO.

GROUND-SMOKE

(*Gayophytum*)

Leaf spot. *Cercospora gayophyti*, CA.

Rust. *Puccinia vagans* (0, I, II, III), ND to NM, CA, WA.

Smut, seed. *Ustilago gayophyti*, CA, NV, OR, UT.

GUAR

(*Cyamopsis*)

Bacterial blight. *Xanthomonas campestris* pv. *cyamopsidis*, AZ.

Powdery mildew. *Leveillula taurica*, AZ.

GUAVA

(*Psidium*)

Anthracnose; leaf and fruit spot; ripe rot. *Glomerella cingulata*, FL.

Blight, thread. *Pellicularia koleroga*, FL.

Leaf spot. *Cercospora psidii*, FL.

Leaf spot, algal; green scurf. *Cephaleuros virescens*, FL.

Nematode, burrowing. *Radopholus similis*, FL.

Nematode, root knot. *Meloidogyne* sp., FL.

Rot, fruit. *Alternaria citri*, CA; *Rhizopus stolonifera*, HI.

Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

Rot, wound. *Polyporus versicolor*, FL.

GUAYULE

(*Parthenium*)

Rot, root. *Pythium aphanidermatum*, AZ.

GYPSOPHILA

(Babys-Breath)

Bacterial fasciation. *Clavibacter fascians*, OH.

Bacterial, MLO. Aster Yellows, NY, and California Aster Yellows, CA.

Bacterial root and stem gall. *Erwinia herbicola* (*Agrobacterium gypsophilae*), NJ.

Blight, gray mold. *Botrytis cinerea*, NJ.

Damping-off. *Pythium debaryanum*, CT; *Rhizoctonia solani*, CT.

Nematode, root knot. *Meloidogyne* sp., FL.

Wilt. *Phytophthora cactorum*, MA.

HACKBERRY, SUGARBERRY

(*Celtis*)

Blight, leaf. *Cylindrosporium defoliatum*, TX.

Blight, thread. *Pellicularia koleroga*, FL.

Canker, felt fungus. *Septobasidium burtii*, TX; *S. sydowii*, TX.

Downy mildew. *Pseudoperonospora celtidis*, MD, GA.

Leaf spot. *Cercospora celtidis*, AL, TX, central states; *Cylindrosporium celtidis*, AL; *Phleospora celtidis*, MA to TX; *Phyllosticta celtidis*, general; *Septogloeum celtidis*, NY.

Mistletoe. *Phoradendron tomentosum* and *P. serotinum* (*flavescens*), south-eastern and Gulf states.

Powdery mildew. *Sphaerotheca phytoptophila*, associated with gall mites causing witches' brooms, widespread, especially in central states; *Uncinula macrospora*, FL, GA; *U. parvula*, widespread; *U. polychaeta*, in South.

Rot, root. *Armillaria mellea*, occasional; *Helicobasidium purpureum*, seedling blight, TX; *Phymatotrichum omnivorum*, TX; *Poria ambigua*, TX.

Rot, wood. *Daedalea* spp.; *Fomes* spp.; *Ganoderma lucidum*; *Polyporus* spp.; *Stereum bicolor*, cosmopolitan.

Virus. Island Chlorosis, IL; Hackberry Leaf Mosaic.

Hackberry witches' brooms, so prominent in a winter landscape, are caused by gall mites in association with powdery mildew. There is no real control, except to cut off unsightly branches. Chinese hackberry and southern hackberry are less susceptible.

HALESIA

(Silver-Bell, Snowdrop-Tree)

Leaf spot. *Cercospora halesiae*, TN.

Rot, wood. *Polyporus halesiae*, GA.

Other fungi are reported on twigs and branches but not as causing specific diseases.

HAMELIA
(Scarlet-Bush)

Rot, root. *Clitocybe tabescens*, FL.

Rust. *Uredo hameliae*, FL.

HARBINGER-OF-SPRING
(*Erigenia*)

Rust. *Puccinia erigeniae* (0, I, III), OH.

HARDENBERGIA

Nematode, root knot. *Meloidogyne* sp.

HARDY ORANGE
(*Poncirus*)

Anthracnose; dieback. *Glomerella cingulata*, Gulf states.

Canker; dieback. *Diaporthe citri*, melanose, Gulf states; *Diplodia natalensis*, gummosis, general.

Rot, root. *Phymatotrichum omnivorum*, TX; *Xylaria polymorpha*, LA.

Spot anthracnose; citrus scab. *Elsinoë fawcettii*, MS.

HARES-TAIL
(*Lagurus*)

Rust. *Puccinia coronata* (II, III), crown; *P. graminis*, stem, WA.

HAWKBIT, FALL DANDELION
(*Leontodon*)

Bacterial, MLO. *Aster Yellows*, ME, NY

Rust. *Puccinia hieracii* (0, I, II, III), ME, NH

HAWKSBEARD
(*Crepis*)

Leaf spot. ?*Cercospora stromatis*, CO; *Phyllosticta eximia*, CO; *Ramularia crepidis*, NM.

Powdery mildew. *Erysiphe cichoracearum*, NE, PA; *Sphaerotheca macularis*, WY.

Rust. *Puccinia crepidis-montanae* (0, I, II, III), CO, ID, MT, OR, UT, WA, WY; *P. hieracii*, ND to CO, WA; II, III, on *Carex*.

HAWKWEED

(*Hieracium*)

Blight, stem. *Phoma hieracii*, TX.

Downy mildew. *Bremia lactucae*, WI.

Leaf spot. *Cercospora hieracii*, AL, NC; *Phyllosticta decidua*, WI; *Septoria cercosperma*, TX; *S. hieracicola*, NY.

Powdery mildew. *Erysiphe cichoracearum*, PA, TX; *Sphaerotheca macularis*, IL.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia dioicae* (0, I), PA to IL, WI, CA, OR, MT; II, III, on *Carex*; *P. fraseri* (III), MT, NE, NY, NH, PA, TN, VA, WV; *P. hieracii* (0, I, II, III), TX, ME to VA, IL, WA, FL, CA, CO; *P. columbiensis*, OR, TX, WA; *Aecidium columbiense* (0, I), CA, ID, OR, WA.

HAWTHORN

(*Crataegus*)

Bacterial fire blight. *Erwinia amylovora*, widespread, especially on English hawthorn.

Blight, leaf. *Fabraea thuemenii* (*F. maculata*, *Entomosporium thuemenii*), East and central states, southward.

Blight, leaf; fruit spot. *Monilinia johnsonii*, NY to MN.

Blight, seedling. *Sclerotium rolfsii*, FL.

Canker, felt fungus. *Septobasidium* spp., Southeast and Gulf states.

Leaf spot. *Cercospora apiifoliae*, TX; *Cercospora mirabilis*, CO, NY, WI; *Coniothyrium pyrinum*, IL; *Cylindrosporium brevispina*, CA to MT, WA; *C. crataegi*, WA; *Gloeosporium crataegi*, WA; *Hendersonia crataegicola*, AL, TX; *Monochaetia crataegi*, FL; *Phyllosticta* spp., widespread; *Septoria crataegi*, MI to ND; *Mycosphaerella* sp., GA.

Mistletoe. *Phoradendron serotinum* (*flavescens*), TX.

Mistletoe. *Viscum album*, CA.

Powdery mildew. *Podosphaera oxyacanthae*, East and central states; *Phyllactinia corylea*, general.

Rot, gray mold, on fruit. *Botrytis cinerea*, AK.

Rot, root. *Armillaria mellea*, OK; *Phymatotrichum omnivorum*, TX. *Xylaria digitata*; *X. hypoxylon*, IN, OH.

Rot, wood. *Daedalea confragosa*, cosmopolitan; *Polyporus versicolor*, cosmopolitan; *Fomes* spp.

Rust. *Gymnosporangium bethelii* (0, I), on fruits; ND to WA, CO, NM; III, on juniper; *G. clavipes*, quince rust (0, I), on leaves, fruits, general, east of Rocky Mountains; *G. exiguum*, on leaves, fruits, TX; II, III, on juniper; *G. floriforme*, on leaves, SC to FL, OK, TX; III, on red-cedar; *G. globosum*, hawthorn rust (0, I), on leaves, ME to ND, FL, TX; II, III, on juniper; *G. hyalinum* (0, I), leaves, Atlantic Coast, NC to FL; III, unknown; *G. libocedri* (0, I), leaves and fruit, Pacific Coast; III on *Libocedrus*; *G. nelsoni* (0, I), on leaves, fruits, WY; III, on juniper; *G. trachysorum* (0, I), on leaves, Atlantic and Gulf coasts; III, on red-cedar; *G. tubulatum* (0, I), on leaves, Rocky Mountains to OR and WA.

Scab. *Venturia inaequalis*, widespread; *V. crataegi*, FL.

Rusts are common on hawthorn and particularly so in the central states, where junipers should be kept at a distance. Leaf blight, beginning in a moist spring, causes spotting and defoliation in August. When branches die back from fire blight, cut them off several inches below the visible blighted portion.

HAZELNUT, FILBERT

(*Corylus*)

Bacterial blight. *Xanthomonas corylina*, OR, WA.

Bacterial crown gall. *Agrobacterium tumefaciens*, WA.

Bacterial spot. *Pseudomonas columnae*, IL.

Blight, eastern filbert. *Anisogramma anomala*, NY, WA, OR.

Canker; twig blight. *Apioporthe anomala*, eastern and central states; *Hymenochaete agglutinans*, ME; *Gleosporium* sp.

Filbert stunt. Undetermined causal agent, OR.

Kernel spot; yeast spot. ?*Nematospora coryli*, OR.

Leaf blister. *Taphrina coryli*, CT, MA, WI.

Leaf spot. *Cercospora corylina*, OK; *Cylindrosporium vermiformis*, WI; *Gleosporium coryli*, ME to NJ, PA, OR, WA; *Phyllosticta coryli*, widespread; *Septogloeum profusum*, IN, MA, MS; *Septoria corylina*, MA to NJ and WI, OR, WA; *Sphaerognomonia carpinia*, GA; *Gnomoniella coryli*, general.

Nonparasitic. **Bitter Pit** and **Brown Stain** of nuts, cause unknown, OR, WA. **Shrivel**, "Blanks," defective pollination, OR, WA.

Powdery mildew. *Phyllactinia corylea*, northeastern and north central states, OR, WA; *Microsphaera alni*, northeastern and north central states.

Rot, root. *Armillaria mellea*, CA, OR, WA; *Phymatotrichum omnivorum*, TX.

Rot, wood. *Poria ferrea*, CA.

Virus. **Apple Mosaic**, OR.

Bacterial blight often kills young trees in Washington and Oregon. Powdery mildew is important in the Northwest.

HEATH

(*Erica*)

Powdery mildew. *Erysiphe polygoni*, CA.

Rot, collar. *Phytophthora cinnamomi*, CA, NY.

Rot, stem. *Ascochyta* sp., NJ.

Rust. *Pucciniastrum ericae* (II), CA.

HEATHER

(*Calluna*)

Nonparasitic. Chlorosis, iron deficiency, corrected by spraying with ferrous sulfate.

Rot, root, collar. *Phytophthora cinnamomi*, CA, OR.

HEBE

Bacterial fasciation. *Clavibacter fasciens*, CA.

Leaf spot. *Septoria exotica*, CA.

Rot, root. *Armillaria mellea*, CA.

Wilt. *Fusarium oxysporum* f. sp. *hebe*, CA.

HEDGE PARSLEY

(*Torilis*)

Gall, leaf. *Protomyces macrosporus*, AR.

HELENIUM

(Sneezeweed)

Bacterial, MLO. Aster Yellows, NY, and California Aster Yellows, CA.

Leaf spot. *Cercospora helenii*, AL, TX; *Septoria helenii*, IA, PA, TX.

Powdery mildew. *Erysiphe cichoracearum*, CO, OR, TX, UT, WA, WI, WY.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia conspicua* (0, I), AZ, CO, NM; II, III, on *Koeleria*, *P. dioicae* (0, I), NE, CO, TX; II, III, on *Carex*.

Smut. *Entyloma compositarum*, TX, WI; *E. polysporum*, MT.

HELIOPSIS

Black knot. *Gibberidea heliopsidis*.

Leaf spot. *Phyllosticta pitcheriana*, NY; *Septoria helianthi*, IN; *S. heliopsidis*, WI.

Powdery mildew. *Erysiphe cichoracearum*, IA, MN, NE, ND, NM, WI; *Leveillula taurica*, IA.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Coleosporium helianthi* (II, III), NC; 0, I, on pine; *Puccinia batesiana* (0, I, III), DE, PA, IA, KS, MD, MN, NE, WI; *P. helianthi* (0, I, II, III), IN, MN, NC, PA, VA.

Virus. Mosaic. Unidentified, IA.

HELIOTROPE

(*Heliotropium*)

Blight, shoot; leaf spot. *Botrytis cinerea*, cosmopolitan; *Stemphylium* sp., NY.

Leaf spot. *Cercospora heliotropii*, NM, OR.

Nematode, root knot. *Meloidogyne* sp., MA, WA.

Rust. *Puccinia aristidae* (0, I), AZ, CA, NV, NM, TX, UT; II, III, on grasses.

Wilt. *Verticillium albo-atrum*, MD.

HEMLOCK

(*Tsuga*)

Blight, needle. *Didymascella tsugae*, MA, NH, WI; *Rosellinia herpotrichioides*, NC.

Blight, snow. *Herpotrichia nigra*, MT to OR and AK.

Blight, twig. *Botrytis cinerea*, ID.

Canker, bleeding. *Phacidiopycnis pseudotsugae* (*Phacidiella coniferarum*) on eastern hemlock.

Canker, branch. *Discocainia treleasi* on western hemlock, WA, AK.

Canker, stem girdle, of saplings. *Hymenochaete agglutinans*, PA.

Canker, twig. *Cytospora* sp., MD, VA; *Dermatea balsamea*, GA, NY, TN, VA.

Damping-off. *Rhizoctonia solani*, cosmopolitan.

Mistletoe, dwarf. *Arceuthobium campylopodium*, ID, AK; *A. cyanocarpum*, OR; *A. tsugense*, AK.

Nonparasitic. Canker, bark split, heavy soil and poor drainage.

Rot, root. *Armillaria mellea*, MA to PA and MI, OR, WA; *Phymatotrichum omnivorum*, TX; *Fusarium solani*, PA; *F. oxysporum*, PA; *F. avenaceum*, PA.

Rot, seedling root. *Cylindrocladium scoparium*, NY; *Rhizinia undulata*, NY.

Rot, wood. *Fomes* spp.; *Ganoderma lucidum*, Northeast; *Polyporus* spp., general.

Rust, needle, cone. *Caeoma dubium* (0, I), ID, MT, OR, WA; *Melampsora abietis-canadensis* (0, I), New England to PA; II, III on poplar; *M. farlowi* (III), New England to NC, WI; *Pucciniastrum hydrangeae* (0, I), IN, MD,

PA, TN; II, III, on hydrangea; **P. myrtilli** (0, I), ME to AL, IN, WI; II, III, on Ericaceae; **Uraecium holwayi** (0, I), AK, MT, OR, WA.

HEMP

(*Cannabis*)

Blight, gray mold. **Botrytis cinerea**, OR, VA.

Blight, southern. **Sclerotium rolfsii**, SC, TX.

Broomrape. **Orobanche ramosa**, CA, IL, KY, WI.

Canker; stem rot. **Gibberella quinqueseptata**; **G. saubinetti**, IN, VA.

Canker; stem wilt. **Botryosphaeria marconii**, MD, VA.

Leaf curl, wilt. **Cercospora cannabina**, MS.

Leaf spot. **Cylindrosporium** spp., MD; **Septoria cannabis**, MD to KY, IA, MN, FL, TX; **Cercospora cannabis**, MS.

Nematode, root knot. **Meloidogyne** sp., TN.

Rot, charcoal. **Macrophomina phaseoli**, IL.

Rot, root. **Phymatotrichum omnivorum**, TX; **Hypomyces cancri**, MD.

Rot, stem; wilt. **Sclerotinia sclerotiorum**, MT.

HENBIT

(*Laminum*)

Virus. **Tomato Ringspot**, PA.

HEPATICA

Downy mildew. **Plasmopara pygmaea**, IA, IL, NY, PA, WI.

Leaf spot. **Discosia artocreas**, secondary, IA; **Septoria hepaticae**, MI, NC.

Rust. **Transschelia pruni-spinosae** (0, I), MA to MD, TN and MN; II, III on wild plum.

Smut, leaf and stem. **Urocystis anemones**, NY to IN, MO, MN, WI.

HERACLEUM

(Cow-Parsnip)

Leaf spot. **Cylindrosporium heraclei**, CA, CO, ID, MT, ND, TX, UT, WA, WY; **Fusicladium angelicae**, WI; **Phyllosticta heraclei**, OR, TX, AK; **Ramularia heraclei**, general.

Rot, root. **Phymatotrichum omnivorum**, TX.

HERCULES-CLUB

(*Aralia spinosa*)

Canker; dieback. *Botryosphaeria ribis*, GA, VA, WV; *Nectria cinnabarina*, VA, WV.

Leaf spot. *Cercospora atromaculans*, LA, TX; *Phyllosticta araliae*, TX; *P. everhartii*, TX, WV; *Stagonospora* sp., WV.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, TX.

Rot, sapwood. *Polyporus tulipiferus*, MD.

Spot anthracnose. *Sphaceloma araliae*, MD, MO.

HERCULES-CLUB

(*Zanthoxylum clava-herculis*)

Leaf spot. *Cercospora zanthoxyli*, FL, GA, TX; *Septoria pachyspora*, TX.

Mistletoe. *Phoradendron serotinum* (*flavescens*), TX.

Rust. *Puccinia andropogonis* var. *zanthoxyli* (0, I) FL, TX: II, III, on *Andropogon*.

HERONSBILL

(*Erodium*)

Bacterial, MLO. California Aster Yellows.

Blight, southern. *Sclerotium rolfsii*, TX.

Downy mildew. *Pseudoperonospora erodii*, MT, TX.

Gall, leaf. *Synchytrium papillatum*, AZ, CA, OR, TX.

Rot, root. *Rhizoctonia solani*, TX.

Virus. Beet Curly Top, CA.

HESPERIS

(Dames-Rocket)

Club root. *Plasmodiophora brassicae*, NJ.

Downy mildew. *Peronospora parasitica*, NY, PA.

Virus. Cucumber Mosaic, OR.

White rust; white blister. *Albugo candida*, NY.

HEUCHERA

(Alum-Root, Coral-Bells)

Leaf spot. *Cercospora heucherae*, IN, OH, PA, VA, WV, IL, IN, IA, WI; *Phyllosticta excavata*, ID, AK; *Ramularia mitellae* var. *heucherae*, WA; *Septoria heucherae*, IN.

Leaf nematode. *Aphelenchoides fragariae*, CA.
Powdery mildew. *Erysiphe cichoracearum*, CA; *Sphaerotheca macularis*, MT, NM; *Phyllactinia corylea*, MT.
Rot, root. *Pythium hypogynum* and *P. ultimum*.
Rust. *Puccinia heucherae* (III), PA to NC and SD; western states, AK.
Smut, leaf and stem. *Urocystis lithophragmae*, UT.

HIBBERTIA (Guinea-Gold-Vine)

Virus. **Cucumber Mosaic**, CA.

HIBISCUS (Arborescent Forms; Rose-of-Sharon, Confederate-Rose, Chinese Hibiscus)

Bacterial crown gall. *Agrobacterium tumefaciens*, MS.
Bacterial leaf spot. *Pseudomonas syringae*, FL, CA; *P. syringae* pv. *hibisei*, FL; *Xanthomonas campestris* pv. *malvacearum*, FL.
Bacterial wilt. *Xanthomonas solanacearum*, FL.
Blight, blossom. *Choanephora infundibulifera*, FL.
Blight, leaf stem. *Phytophthora palmivora*, LA; *P. parasitica*, FL.
Blight, thread. *Pellicularia koleroga*, FL; web, *P. filamentosa*, FL.
Canker; dieback. *Colletotrichum hibisci*, FL, TX.
Leaf spot. *Alternaria tenuis*, IN, NJ, PA; *Cercospora hibisci*, FL, OK, TX; *C. amalayensis*, GA; *Phyllosticta hibiscina*, LA; *Cristulariella pyramidalis*, FL, MD, MS, and GA.
Nematode, leaf. *Aphelenchoides fragariae*, FL.
Nematode, root knot. *Meloidogyne* spp., MS, TX.
Nonparasitic. **Strapleaf**, molybdenum deficiency, FL.
Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.
Rot, stem. *Fusarium* sp., FL; *Phytophthora parasitica*, TX; *P. cactorum*, LA; *P. palmivora*, LA.
Rust. *Kuehneola malvicola* (II, III), Gulf states.
Virus. **Mosaic**, unidentified, FL.

HICKORY (*Carya*)

Anthraxnose; leaf spot. *Gnomonia caryae*, general (see under Leaf Spots).
Bacterial crown gall. *Agrobacterium tumefaciens*, MD, KS, TX.
Blotch, leaf. *Mycosphaerella dendroides*, widespread East and South.
Canker. *Nectria galligena*, eastern states; *Strumella coryneoides*, PA, MD.

- Canker, bark patch. *Aleurodiscus candidus*, MO, OH, PA; *Solenia ochracea*, MA.
- Canker, felt fungus. *Septobasidium* spp., Southeast.
- Canker, heart rot. *Poria spiculosa*, destructive to pignut, shagbark, PA, and South.
- Canker, twig. *Rosellinia caryae*, MI; *Botryosphaeria berengeriana*.
- Gall, trunk, branch. *Phomopsis* sp., eastern states.
- Leaf spot. *Fusarium carpineum*, WI; *Hendersonia davisii*, WI; *Marssonina juglandis* (*Gnomonia leptostyla*), NJ, NC to IA; *Microstroma juglandis*, witches' broom; *Monochaetia desmazierii*, MD to NC, TN; *Mycosphaerella carigena*, WI; *Pestalotia sphaerelloides*, LA; *Phyllosticta caryae*, widespread; *Septoria caryae*, DE, MI; *S. hicoriae*, TX; *Cercospora fusca*.
- Mistletoe. *Phoradendron serotinum* (*flavescens*), IN, TX; *Viscum album*, CA.
- Nematode, root knot. *Meloidogyne* sp.
- Nonparasitic. Rosette, zinc deficiency, southern states.
- Powdery mildew. *Phyllactinia corylea*, MI, WI; *Microsphaeraalni*, cosmopolitan.
- Rot, heart. *Favolus alveolaris*, VA, VT, NY; *Fomes* spp., cosmopolitan.
- Rot, root. *Armillaria mellea*, cosmopolitan; *Clitocybe parasitica*, OK; *Phymatotrichum omnivorum*, AZ, TX; *Helicobasidium purpureum*.
- Rot, wood. *Daedalea* spp.; *Ganoderma curtissii*; *Polyporus* spp.; *Steccherinum septentrionale*; *Schizophyllum commune*; *Stereum hirsutum*; *Trametes rigida*.
- Scab; leaf spot. *Cladosporium effusum*, general.
- Spot anthracnose. *Elsinoë randii*.
- Wilt. *Verticillium* sp., VA.

Of the various leaf spots on hickory, anthracnose caused by *Gnomonia caryae* is the most destructive. There are no recommended control measures for witches' brooms appearing on shagbark hickory except cutting them out.

HELICHRYSUM

Virus. Biddens Mottle, FL.

HIPPEASTRUM

See *Amaryllis*.

HOARHOUND (*Marrubium*)

Gall, leaf. *Synchytrium marrubii*, TX.

Leaf spot. *Cercospora marrubii*, OK, TX.

Nematode, root knot. *Meloidogyne* sp., AL.

HOARY-TICK CLOVER

(*Desmodium*)

Virus. Cowpea Mosaic, IL.

HOLLY

(*Ilex*; *Ilex opaca*, American; *I. equifolium*, English;
I. cornuta, Chinese; *I. crenata*, Japanese).

Bacterial blight. *Clavibacter ilicis*, MA.

Black mildew. *Asterina* (*Englerulaster*) *orbicularis*, DE to FL and TX; *A. ilicis*; *A. pelliculosa*; *Morenoella* (*Lembosia*) *ilicis*, Gulf states.

Blight, flower. *Botrytis cinerea*, NJ.

Blight, leaf and twig. *Phytophthora ilicis*, OR, WA.

Blight, thread. *Pellicularia koleroga*, LA; silky thread, *Rhizoctonia ramicola*;
Web, *Cylindrocladium scoparium*, AL.

Canker; dieback. *Boydia insculpta*, secondary, OR, WA; *Diaporthe eres*,
?secondary; *Diplodia* sp., MD; *Nectria coccinea*; *Phomopsis* sp.; *Physalospora ilicis* on twigs, also leaf spot, NC, NJ, NY, TX, SC, WV, CA, WA;
Gloeosporium sp., AL.

Canker, felt fungus. *Septobasidium* spp., FL, LA, NC.

Dodder. *Cuscuta compacta*, FL; *C. exaltata*, TX.

Leaf spot. *Cercospora ilicis*, NJ and Gulf states; *Gloeosporium aquifolli*,
NJ, TX, WA; *Macrophoma phacediella*, NJ; *Microthyriella cuticulosa*, black
spot; *Phyllosticta concomitans*, LA; *P. terminalis*, MS; *Septoria ilicifolia*,
NJ; ?*Cuticularia ilicis*, OR; *Sclerophoma* sp., OR.

Leaf spot. *Sclerophoma* sp., Kentucky on English Holly (*Ilex aquifolium*).

Leaf spot, tar. *Phacidium curtisii*, MA to FL and TX; *Rhytisma ilicinicolum*,
VA to GA and TN; *R. velatum*, GA, MS, SC.

Leaf spot; twig dieback. *Cylindrocladium vesiculatum*, GA.

Nematode, lance. *Hoplolaimus uniformis*, RI.

Nematode, root knot. *Meloidogyne incognita*; *M. incognita-acrita*; *M. arenaria*, NC; *M. hapla*; *M. javanica*.

Nonparasitic.

Boron Deficiency.

Chlorosis. Mineral deficiency from excess of lime.

Copper Spray Injury.

Leaf Blotch. Purplish blotches associated with soil deficiencies and drought
or winter injury.

Spine Injury.

Powdery mildew. *Microsphaera alni*, AL, FL, IL, NC; *Phyllactinia corylea*,
TN.

Rot, leaf. *Rhizoctonia solani*, of cuttings.

Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX; *Corticium galactinum*, white root, MD.
 Rot, wood. *Daldinia vernicosa*, MD; *Daedalea confragosa*, MD; *Polyporus* spp.; *Stereum* spp., MD; *Ustulina deusta*, MD; *Poria* spp.; *Pleurotus ostreatus*, MD.
 Rust. *Chrysomyxa ilicina* (II, III), TN, NC, WV, 0, I unknown.
 Sooty mold. *Capnodium elongatum*, Gulf states; *Fumago vagans*, OR, WA.
 Spot anthracnose. *Elsinoë ilicis*, PA, on Chinese holly.

None of these diseases is as important to the average gardener as the holly leaf miner. Spraying is necessary for that insect but seldom obligatory for the various leaf spots. The most common leaf discoloration is a purplish blotch due to environment rather than a fungus. Proper growing conditions and correct soil acidity are important. Pick off occasional spotted leaves; prune out blighted branches.

HOLLYHOCK (*Althaea*)

Anthracnose. *Colletotrichum malvarum*, NY to MS, IA, TX.
 Bacterial hairy root. *Agrobacterium rhizogenes*, WI.
 Bacterial wilt. *Pseudomonas solanacearum*, NY, WV.
 Blight, southern. *Sclerotium rolfsii*, AR.
 Blight, web. *Pellicularia filamentosa*, TX.
 Canker. *Nectria cinnabarina*, OK.
 Leaf spot. *Alternaria* spp., secondary; *Ascochyta althaeina*, IN, MD, NJ, NY, PA, WV; *Cercospora althaeina*, eastern and central states to AL, TX, SD; *C. kellermanii*, IN, MN, MO, MD, NJ, OH; *Myrothecium roridum*, MD; *Septoria malvicola*, MI, MN, NY, OH, OK, VT, WI.
 Nematode, lesion. *Pratylenchus pratensis*, TX.
 Nematode, root knot. *Meloidogyne* spp., FL, KS, MS, OK, TX.
 Powdery mildew. *Erysiphe cichoracearum*, CA, MS; *E. polygoni*, IA.
 Rot, crown. *Phytophthora megasperma*, MD, VA; *Sclerotinia sclerotiorum*, MT, NJ.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Puccinia malvacearum* (III), general; *P. heterospora* (III), CA, KS, MS, TX; *P. lobata*, AZ, NM, TX; *P. schedonnardi* (0, I), KS, MS, NE, ND; *P. sherardiana* (0, III), CA; *Endophyllum tuberculatum* (III), CO, KS, NE, OK.
 Virus. Hollyhock Mosaic.

Rust is by far the most destructive disease of hollyhocks, disfiguring foliage in most seasons and some years causing nearly all leaves to shrivel and die. Remove infected leaves and stalks as noticed.

HOLLY OSMANTHUS

(*Osmanthus ilicifolius*)

Leaf spot. *Phyllosticta oleae*, TX.

Nematode, root knot. *Meloidogyne* sp.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rosellinia necatrix*, CA.

Sooty mold. *Capnodium elongatum*, TX; *Fumago salicina*, TX.

Wilt. *Verticillium albo-atrum*, VA.

HOLODISCUS

(Ocean Spray, Rock-Spirea)

Canker, twig; coral spot. *Nectria cinnabarina*, WA.

Leaf spot. *Cylindrosporium ariaefolium*, OR; *Rhopalidium cercosporoidis*, ID, *Septogloeum schizonoti*, WA.

Powdery mildew. *Podosphaera oxyacanthae*, ID, *Phyllactinia corylea*, WA.

Virus. *Holodiscus* Witches' Broom, OR, WA.

HOMALOMENA

Leaf spot. *Glomerella cincta*, NJ.

HONESTY

(*Lunaria*)

Club root. *Plasmodiophora brassicae*, NJ.

Leaf spot. *Alternaria oleracea*, black spot of leaves, pods; *Helminthosporium lunariae*, MA.

Rot, root; Damping-off. *Aphanomyces raphani*, WI.

HONEY LOCUST

(*Gleditsia*)

Bacterial hairy root. *Agrobacterium rhizogenes*, central states.

Canker. *Dothiorella* sp., MS; *Cytospora gleditschiae*, IL; *Physalospora obtusa*.

Canker, felt fungus. *Septobasidium curtisii*, AR, LA.

Canker, stem and branch. *Kaskaskia gleditsiae*, IL; *Tubercularia ulmea*, ND; *Nectria cinnabarina*, MN; *Thyronectria austro-americana*, KS.

Canker; wilt. *Thyronectria austro-americana*, CA, MA; *T. denigrata*, MA to SC, LA and NE, CA.

Leaf spot. *Cercospora condensata*, IL to KS, NE, WI.

Leaf spot, tar. *Linospora gleditsiae*, SC, NC to NE, TX.

Mistletoe. *Phoradendron serotinum (flavescens)*, IN, TX.
 Powdery mildew. *Microsphaera alni*, widespread.
 Rot, crown. *Phytophthora citrophthora*, CA.
 Rot, root. *Phymatotrichum omnivorum*, OK, TX; *Xylaria mali*, VA.
 Rot, wood. *Fomes* spp., widespread; *Daedalea ambigua*; *D. elegans*; *Ganoderma curtisii* and *G. lucidum*; *Polyporus* spp.; *Schizophyllum commune*.
 Rust. *Ravenelia opaca* (III), IL.
 Virus. *Robinia Brooming*, OH, KY.

HONEY PLANT, BITTERBUSH (*Picramnia*)

Spot, tar. *Phyllachora domingensis*, FL.

HONEYSUCKLE (*Lonicera*)

Bacterial crown gall. *Agrobacterium tumefaciens*, CT.
 Bacterial hairy root. *Agrobacterium rhizogenes*, central states.
 Blight, leaf. *Herpobasidium deformans*, CT, IA, NY, WI.
 Blight, gray mold. *Botrytis cinerea*, CT, AK.
 Blight, thread. *Pellicularia koleroga*, LA.
 Blight, twig. *Phoma mariae*, MA, CT, NY.
 Leaf spot. *Cercospora antipus*, MI to MT, TX; *C. varia*, TX; *Guignardia lonicerae*, CA; *Kabatia lonicerae*, CA; *Lasiobotrys affinis*, CA; *L. lonicerae*, Black Spot, OR; *Leptothyrium periclymeni*, widespread; *Marssonina lonicerae*, CA; *Mycosphaerella clymenia*, VA; *Septoria sambucina*, MT, WI; *S. xylostei*, WI.
 Nematode, root knot. *Meloidogyne* sp.
 Powdery mildew. *Microsphaera alni*, general; *Erysiphe polygoni*, CA, WY.
 Rot, collar, wood. *Fomes* spp.
 Rot, root. *Armillaria mellea*, NJ; *Phymatotrichum omnivorum*, TX.
 Rust. *Puccinia festucae* (I), IL, IA.
 Virus. *Mosaic*, MD.

HOP (*Humulus*)

Anthraxnose; leaf spot. *Colletotrichum* sp.; *Glomerella cingulata*, IN, KS, MD, NY, OR, WA, WI.
 Bacterial crown gall. *Agrobacterium tumefaciens*, CA, OK, OR, WA.
 Downy mildew. *Pseudoperonospora humuli*, CA, NY, OR, WA, WI.

Leaf spot. *Cercospora* sp., NE; *Cylindrosporium humuli*, NY to NC, IA, WI; *Phyllosticta decidua*, IA, WI; *P. humuli*, IA, MA, MI; *Mycosphaerella erysiphina*, CA; *Septoria humuli*, NH; *S. lupulina*, KS.
 Nematode, root knot. *Meloidogyne* sp., CA.
 Powdery mildew. *Erysiphe cichoracearum*; *Sphaerotheca macularis*, general.
 Rot, root. *Armillaria mellea*, OR.
 Rust. *Aecidium* sp., WA.
 Sooty mold. *Fumago vagans*, CA, OR, WA.
 Virus. ?Hop Mosaic, NY, OR, WA.
 Wilt. *Verticillium albo-atrum*, ME, OH, OR, WI.

HOP-HORNBEAM, IRONWOOD

(*Ostrya*)

Canker. *Nectria* sp., NY; *Strumella coryneoidea*, MD, PA, WV.
 Canker, bark patch. *Aleurodiscus* spp.; Felt Fungus, *Septobasidium* spp.
 Leaf blister. *Taphrina virginica*, NH to FL, TX and WI.
 Leaf spot. *Cylindrosporium dearnessi*, VA; *Gloeosporium robergei*, PA, WI; *Septoria ostryae*, IA, NY, WI.
 Powdery mildew. *Microsphaera alni*, widespread; *Phyllactinia corylea*, NY to FL, TX, WI; *Uncinula macrospora*, MI, WI.
 Rot, root. *Armillaria mellea*, cosmopolitan; *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.
 Rot, wood. *Daedalea confragosa*, cosmopolitan; *Fomes* spp.; *Pleurotus similis*, NY; *Poria* spp.; *Polyporus* spp.; *Stereum* spp.; *Trametes mollis*, NY, VT.
 Rust. *Melampsoridium carpini* (II, III), NY; 0, I unknown.

HOP-TREE

(*Ptelea*)

Leaf spot. *Cercospora afflata*, IN, MO, TX; *C. pteleae*, TX; *Phleospora pteleae*, TX; *Phyllosticta pteleicola*, IL; *Septoria pteleae*, WI.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Puccinia windsoriae* (0, I), NY to AL, KS; II, III on grasses.

HORNBEAM

(*Carpinus*)

Blight, twig, dieback. *Gibberella baccata*, AL.
 Canker, bark patch. *Aleurodiscus oakesii*, NY.
 Canker, branch, trunk. *Nectria galligena*, CT, NY; *Pezicula carpinea*, MA to GA and OK.
 Canker, felt fungus. *Septobasidium* spp., VA to FL and LA.
 Leaf blister. *Taphrina australis*, AL, CT, KY.

Leaf spot. *Clasterosporium cornigerum*, MD, NY, WI; *Cylindrosporium dearnessi*, MI; *Phyllosticta* sp., OK; *Sphaerognomonium carpinaea*, GA, NY, PA, WV, WI; *Cercoseptoria caryigena*, WI.

Powdery mildew. *Microsphaeraalni*, MA, IN, IA, MI, TX; *Phyllactinia corylea*, AL, IN, OH, TX, WI.

Rot, root. *Armillaria mellea*, FL; *Phymatotrichum omnivorum*, TX.

Rot, wood. *Daedalea confragosa*, NC; *Polyporus* spp., general; *Poria* spp., general; *Steccherinum* sp., CT; *Stereum* spp., general; *Daldinia concentrica*, MD; *Schizophyllum commune*, cosmopolitan.

HORSE-CHESTNUT, BUCKEYE

(*Aesculus*)

Anthracnose; leaf blight. *Glomerella cingulata*, CT, MD, MO, NJ, NY, TX.

Blight, twig. *Botryosphaeria ribis* var. *chromogena*, MD, NY, GA.

Blotch, leaf. *Guignardia aesculi* (*Phyllosticta paviae*), general.

Canker; dieback. *Nectria cinnabarina*, cosmopolitan; *Phytophthora cactorum*, bleeding canker, RI; *Gibberella acuminatum*, CA.

Leaf blister, yellow. *Taphrina aesculi*, CA, TX.

Leaf spot. *Cercospora aesculina* FL, VA; *Macrosporium baccatum*, KS; *Monochaetia desmazieri*, NC; *Micosphaerella maculiformis* var. *hippocastani*, CA; *Septoria glabra*, IN; *S. hippocastani*, PA, VT.

Mistletoe. *Phoradendron serotinum* (*flavescens*), South, central states; *P. villosum*, CA, OR, TX.

Mistletoe. *Viscum album*, CA, on *Aesculus californica* (California Buckeye). Nonparasitic. Scorch, leaf scald, response to drought and heat.

Powdery mildew. *Phyllactinia corylea*, CA, TX; *Uncinula flexuosa*, widespread.

Rot, root. *Armillaria mellea*, cosmopolitan; *Phymatotrichum omnivorum*, TX.

Rot, wood. *Collybia velutipes*, RI; *Ganoderma applanatum*, cosmopolitan; *Polyporus* spp.

Rust. *Aecidium aesculi*, IN, KS, NE, MO.

Wilt. *Verticillium albo-atrum*, PA.

In a wet season leaves are blotched, turn brown, and drop from the *Guignardia* fungus; in a dry season leaves look scorched or blotched, turn brown, and drop from drought and heat. The minute black fruiting bodies of the fungus distinguish the parasitic form from the physiogenic disease.

HORSE-GENTIAN

(*Triosteum*)

Leaf spot. *Cladosporium triostei*, IL, IA, MO, NE, WV, WI; *Cylindrosporium triostei*, IL, OK, KS, WI; *Cercospora triostei*, WI.

Powdery mildew. *Phyllactinia corylea*, MI.
Rust. *Aecidium triostei* (0, I), MO.

HORSE PURSLANE (*Trianthema*)

Leaf spot. *Gibbago trianthemae*, AR.

HORSE-RADISH (*Armoracia*)

Bacterial crown gall. *Agrobacterium tumefaciens*, NJ, NY.
Bacterial leaf spot. *Xanthomonas campestris* pv. *armoraciae*, CT, IL, IA, MD, MO, SD, VA; *X. phaseoli*, IL.
Bacterial, MLO. Root, brittle, disease, virescence. *Spiroplasma citri*, CA, IL, MD.
Bacterial soft rot. *Erwinia carotovora*, in stored roots, CT, NY.
Club root. *Plasmodiophora brassicae*, IL.
Downy mildew. *Peronospora parasitica*, AL, IL, NJ, SD, WI.
Leaf spot. *Alternaria brassicae*, CT to DE, IL, IA; *A. oleracea*, CT to DE, MO, TX, NE, TX; *Cercospora armoraciae*, general; *Phyllosticta decidua*, TX, WA, WI; *P. orbicula*, NY; *Ramularia armoraciae*, general.
Nematode root knot. *Meloidogyne* sp., IL, MS, OK.
Powdery mildew. *Erysiphe polygoni*, CA.
Rot, blue mold. *Penicillium hirsutum*, IL, NJ.
Rot, collar, root. *Pellicularia filamentosa*, IL, MI, NJ, NY, TX, WA.
Rot, root. *Phymatotrichum omnivorum*, TX; *Thielaviopsis basicola*, KS, NJ.
Virus. **Beet Curly Top**, CA, OR, WA, IL, KS, UT; **Turnip Mosaic**, widespread.
White rust. *Albugo candida*, probably general.
Wilt. *Verticillium albo-atrum*, MI, WA.

HOSTA (*Plantain-Lily*)

Leaf spot. *Alternaria* sp., NY; *Phyllosticta* sp., NJ.
Rot, crown. *Botrytis cinerea*, AK, NJ; *Sclerotium rolfsii* (*S. delphinii*), CT, MD, MN, NJ, NY.
Rot, root. *Rhizoctonia solani*, NJ.

HOUSTONIA (*Bluets*)

Downy mildew. *Peronospora calotheca*, IL; *P. seymourii*, AL, AR, IL, IA, MS, TX.
Leaf spot. *Cercospora houstoniae*, DE; *Septoria* sp., TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia lateritia*, TX; *Uromyces houstoniatus* (0, I), MA to MS, MO, IL, WI; II, III, on blue-eyed grass; *U. peckianus* (0, I), AL, MS, TX; II, III, on grasses.

HOYA

Leaf spot. *Myrothecium roridum*, FL.

HUCKLEBERRY

(*Gaylussacia*)

Black mildew. *Dimerosporium ellissi*, NJ, MS.

Dodder. *Cuscuta* sp., PA.

Gall, leaf. *Exobasidium vaccinii*, ME to VA, WI, AL, FL; *Synchytrium vaccinii*, red lead, NJ.

Leaf spot. *Ophiodothella vaccinii*, TX; *Pestalotia vaccinii*, WV; *Phyllosticta* sp., NJ, PA; *Ramularia effusa*, WI; *Rhytisma vaccinii*, tar spot, MA, SC, OK.

Nematode, root knot. *Meloidogyne* sp., OK.

Powdery mildew. *Microsphaeraalni* var. *vaccinii*, widespread.

Rust. *Pucciniastrum myrtilli* (II, III), ME to VA and WI; 0, I, on hemlock.

HUISACHE, SWEET ACACIA

(*Acacia farnesiana*)

Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

Rust. *Ravenelia australis*, TX; *R. hieronymi*, witches' broom, TX; *R. siliquae*, NM, TX.

HYACINTH

(*Hyacinthus*)

Bacterial soft rot. *Erwinia carotovora*, cosmopolitan.

Bacterial yellows. *Xanthomonas hyacinthi*, occasional in imported bulbs.

Blight, gray mold. *Botrytis hyacinthi*, WA; *B. cinerea*, NC, after frost.

Nematode, bulb; ring disease. *Ditylenchus dipsaci*, NJ, Pacific states.

Nonparasitic. **Loose Bud**, **Stem Break**, excessive water intake during early shoot growth.

Rot, black. *Sclerotinia sclerotiorum*, Pacific Northwest; *S. bulborum*, black slime.

Rot, bulb. *Fusarium* sp., CO, MO, NJ, RI, TX, WA; *Penicillium* spp., blue mold, cosmopolitan.

Rot, root. *Phytophthora* sp., NJ.

Virus. *Ornithogalum Mosaic*, CA, MD, NY, OR, TX, WA.

HYDRANGEA

Bacterial, MLO. *Hydrangea virescens*.

Bacterial wilt. *Pseudomonas solanacearum*, NY.

Blight, flower; gray mold. *Botrytis cinerea*, cosmopolitan, especially after frost.

Blight, southern. *Sclerotium rolfsii*, FL.

Leaf spot. *Ascochyta hydrangeae*, AK, NJ; *Cercospora arborescens*, IL, OK; *C. hydrangeae*, MD, VA to FL, AL, TX; *Colletotrichum* sp., MD, NJ; *Phyllosticta hydrangeae*, IN; *Septoria hydrangeae*, CT, MS, OH; *Corynespora cassicola*, FL, GA.

Nematode, leaf. *Aphelenchoides* sp.

Nematode, lesion. *Pratylenchus pratensis*, TX.

Nematode, root knot. *Meloidogyne* spp., MS, OK, TX.

Nematode, stem, bulb. *Ditylenchus dipsaci*.

Nonparasitic. *Chlorosis*, iron deficiency, excess lime.

Powdery mildew. *Erysiphe polygoni*, general.

Rot, root. *Phymatotrichum omnivorum*, TX; *Armillaria mellea*, CA.

Rot, stem. *Rhizoctonia solani*, MD; wound, *Polyporus versicolor*, CT, MD, IA.

Rust. *Pucciniastrum hydrangeae* (II, III), PA to AR, IL; 0, I, on hemlock.

Virus. *Hydrangea Ring Spot*; *Tomato Spotted Wilt*.

HYDROPHYLLUM

(*Waterleaf*)

Downy mildew. *Peronospora hydrophylli*, MD, IL, IA, NY, WA, WI.

Leaf spot. *Ascochyta hydrophylli*, WA; *Gloeosporium hydrophylli*, NH; *Ramularia hydrophylli*, WA; *Septocylindrium hydrophylli*, NY; *Septoria hydrophylli*, NY.

Powdery mildew. *Erysiphe cichoracearum*, occasional; *E. polygoni*, ID, WA; *Sphaerotheca macularis*, OH, ND, SD.

Rot, leaf and stem. *Ceratobasidium anceps*, NY, WI.

Rust. *Puccinia hydrophylli* (III), CA, CO, NY to NE, ND, UT; *P. recondita* (0, I), MT, widespread; II, III, on grasses.

HYMENOPAPPUS

Downy mildew. *Plasmopara halstedii*, OK.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia grindeliae* (0, III), OK.

HYSSOP

(*Hyssopus*)

Nematode, root knot. *Meloidogyne* sp., MI.

ICE PLANT
(*Carpobrotus*)

Rot, root. *Pythium aphanidermatum*, CA; *Phytophthora cryptogea*, CA.
Wilt. *Verticillium dahliae*, CA; *Phomopsis* sp., CA.

IMPATIENS
(Garden Balsam, Sultan)

Bacterial fasciation. *Clavibacter fasciens*, CA.
Bacterial wilt. ?*Pseudomonas solanacearum*, WI.
Damping-off. *Pythium* sp., WA; *Rhizoctonia solani*, FL.
Leaf spot. *Cercospora fukushiana*, KS, FL; *Septoria noli-tangeris*, OH;
Phyllosticta sp., NJ.
Gall, leaf. *Synchytrium impatientis*, LA.
Nematode, lesion. *Pratylenchus penetrans*.
Nematode, root knot. *Meloidogyne* sp.
Rot, mushroom root. *Armillaria mellea*, CA.
Rot, stem. *Sclerotium rolfsii*; *Myrothecium roridum*.
Virus. Cucumber Mosaic; Turnip Mosaic, NY; Tobacco Ringspot, IA,
MN.
Wilt. *Verticillium albo-atrum*, NY.

INCENSE-CEDAR
(*Libocedrus* [= *Calocedrus decurrens*])

Bacterial crown gall. *Agrobacterium tumefaciens*, AZ, CA.
Blight, brown felt. *Herpotrichia nigra*, CA.
Canker, branch. *Coryneum cardinale*, CA.
Mistletoe. *Phoradendron juniperinum*, CA, NV, OR.
Needle cast. *Lophodermium juniperinum*, CA, OR.
Rot, root. *Phymatotrichum omnivorum*, TX; *Armillaria mellea*, OR.
Rot, wood. *Fomes pini* and *F. pinicola*, CA, OR; *Lenzites saepiaria*, general;
Polyporus spp.; *Trametes isabellina*, CA.
Rust. *Gymnosporangium libocedri*, gall, witches' broom (II, III), CA, NV,
OR; 0, I, on apple and other Malaceae.

INDIA-HAWTHORN
(*Raphiolepis*)

Blight, southern. *Sclerotium rolfsii*, FL.
Leaf spot. *Entomosporium maculatum* (*Fabraea maculata*), CA.

INDIAN CUCUMBER-ROOT

(*Medeola*)

Gall, stem hypertrophy. *Medeolaria farlowii*, ME, MA, NJ.

Leaf spot. *Phyllosticta medeolae*, NY.

INDIAN GRASS

(*Sorghastrum*)

Leaf spot. *Ascochyta brachypodii*, NY, PA.

INDIGO

(*Indigofera*)

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Ravenelia laevis*, TX; *Uromyces indigoferae* (II, III), FL, TX.

INDIGO-BUSH, LEAD-PLANT

(*Amorpha*)

Leaf spot. *Cylindrosporium passaloroides*, widespread; *Diplodia amorphae*, TX.

Powdery mildew. *Erysiphe polygoni*, IA, MN, WY.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Urophyxis amorphae* (0, I, II, III), general.

INKBERRY

(*Ilex glabra*)

Black mildew. *Asterina ilicis*, NJ; *Morenoella ilicis*, FL, GA, MS.

Blight, thread. *Pellicularia koleroga*, LA.

Canker, felt fungus. *Septobasidium* spp., FL.

Dodder. *Cuscuta compacta*, FL.

Leaf spot. *Cercospora ilicis*, AL, FL, MS, NJ; *Phacidium curtisii* and *P. sphaerodieum*, tar spot, MA to FL, and TX.

Rot, wood. *Poria versipora*, AR, LA.

INULA

(*Elecampane*)

Leaf spot. *Ramularia* sp., MI.

Powdery mildew. *Erysiphe cichoracearum*, NY, WI, NJ, probably general.

Rust. *Puccinia hieracii*, WI.

Inula is very susceptible to powdery mildew, which coats the foliage white in late summer.

IRESINE (Blood-Leaf)

Leaf spot. *Septoria iresines*, OK.

Nematode, root knot. *Meloidogyne* sp., MD, FL.

Rot, root. *Helicobasidium purpureum*, TX; *Rhizoctonia solani*, IL.

Smut, inflorescence. *Thecaphora iresine*, IN.

IRIS (Bulbous; English, Spanish, Dutch)

Blight, blossom. *Botrytis cinerea*; *Glomerella cingulata*, MD.

Blight, leaf; ink disease of bulbs. *Mystrosporium adustum*, NC, OR, VA.

Blight, southern; white bulb rot. *Sclerotium rolfsii*, CA, CT, FL, MD, NC, SC, OR, TX.

Leaf spot, blight. *Didymellina macrospora*, CA, NC, TX, WA.

Nematode, bulb. *Ditylenchus dipsaci* (*D. iridis*), FL, NY, NC, SC, OR, VA, WA.

Nematode, root knot. *Meloidogyne* sp., NC.

Nematode, root plate. *Aphelenchoides parietinus*, MI, NY, NC, TX, WA.

Nonparasitic. *Blindness*, complex physiological causes.

Rot, basal. *Fusarium oxysporum*, AZ, CA, NC, NY, OR, TX, VA, WA.

Rot, black. *Sclerotinia bulborum*, bulb rot, Northwest; *Rhizoctonia tuliparum*, occasional; Blue Mold, *Penicillium* spp., general.

Rot, root, neck. *Rhizoctonia solani*, NJ, Pacific Northwest.

Rust. *Puccinia iridis* (II, III), IN, CA, LA, NC.

Virus. *Iris Mosaic*, general.

IRIS (Rhizomatous; German, Siberian, Native Species)

Bacterial soft rot. *Erwinia carotovora*, general.

Blight, blossom. *Botrytis cinerea*, MA.

Blight, southern; crown rot. *Sclerotium rolfsii* (*S. delphinii*), general.

Leaf spot. *Alternaria iridicola*, IL, WI, MT, TX, WA; *Didymellina macrospora* (*Heterosporium iridis*); *Ascochyta iridis* MD, NY; *Cladosporium herbarum*, secondary; *Kabatiella microsticta*, secondary; *Phyllosticta iridis*, FL, MI, NY, OH, TX, WI; *Stictopatella iridis*, IL.

Nematode, root knot. *Meloidogyne incognita-acrita*.

Nonparasitic. *Scorch*, cause unknown, sometimes associated with nematodes.

Rot, gray mold; crown. *Botryotinia convoluta* MN, NJ, NY, WI.

Rot, root; damping-off. *Rhizoctonia solani*, occasional.

Rust. *Puccinia iridis* (II, III), widespread on native species; most garden varieties are resistant. *P. sessilis* (0, I), ME to NE and MN; II, III on *Phalarus*.

The most common disease of bearded iris in home gardens is bacterial soft rot following iris borer. Crown rot or southern blight gets started when iris is too crowded. Didymellina leaf spot or blight may be conspicuous in a wet summer. The physiological (?) disease, scorch, is causing concern, particularly in central states.

IRONWEED

(*Vernonia*)

Black mildew. *Stigmella vernoniae*, MO.

Downy mildew. *Plasmopara halstedii*, KS, MO.

Leaf spot. *Cercospora noveboracensis*, MO; *Ascochyta treleasei*, WI; *Mycosphaerella* sp.; *Septoria* sp., MO; *C. oculata*, WV to AL, TX, NE, WI.

Powdery mildew. *Erysiphe cichoracearum*, general; *Sphaerotheca macularis*, MO.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Coleosporium vernoniae* (I, III), general; 0, I, on pine; *Puccinia vernoniae* (0, I, II, III), widespread.

ITCHGRASS

(*Rottobellia*)

Blight. *Curvularia cymbopogonis*, LA.

IVESIA

Rust. *Phragmidium horkeliae* (III), UT; *P. ivesia*, CA; *P. jonesii*, NV, OR, UT.

IVY, BOSTON

(*Parthenocissus tricuspidata*)

Canker; dieback. *Cladosporium herbarum*, IN, NJ, OH, PA.

Downy mildew. *Plasmopara viticola*, NJ, TX.

Leaf spot. *Cercospora amelopsidis*, MS; *C. pustulata*, TX; *Guignardia bidwellii* f. *parthenocissi* widespread; *Phleospora ampelopsidis*, IA; *Sphaeropsis hedericola*, NJ.

Nematode, dagger. *Xiphinema index*, CA.

Powdery mildew. *Uncinula necator*, TX.

Rot, root. **Phymatotrichum omnivorum**, TX.

Rot, stem. **Pellicularia filamentosa**, CT.

The Guignardia leaf spot is common and disfiguring.

IVY, ENGLISH

(*Hedera helix*)

Anthracnose. **Amerosporium** (*Colletotrichum*) **trichellum**, MA to SC, TX and OK, OR, WA.

Bacterial spot. **Xanthomonas hederae**, GA, IL, MD, NJ, NY, VA, WA.

Dodder. **Cuscuta** sp., AZ, NJ.

Leaf spot. **Glomerella cingulata**, CT, MD, NY, TX; **Phyllosticta concentrica**, MA to AL, TX and NE, CA, WA; **Ramularia hedericola**, TX; **Sphaeropsis hedericola**, NY, WV; **Macrophoma** sp., TX.

Mold, leaf. **Cladosporium brunneolum**, CA.

Nonparasitic. **Winter Injury**, sunburn, freezing.

Powdery mildew. **Erysiphe cichoracearum**, OK.

Rot, root. **Phytophthora palmivora**, CA.

Rot, root. **Rhizoctonia solani**, CT; **Phymatotrichum omnivorum**, TX.

Sooty mold. Common under trees, on insect exudate.

Spot anthracnose; ivy scab. **Sphaceloma hederae**, CA, NC, VA.

Leaf spots are not often important in the garden but browning of foliage from winter injury is conspicuous in early spring. English ivy, used as a ground cover, is often black, with sooty mold growing in honeydew dropped from aphids in trees overhead. Dodder sometimes gets a strangle hold and is difficult to eradicate.

IXIA

Rot, corm. **Fusarium oxysporum** f.sp. **gladioli**; **Sclerotium** sp.

Virus. ?**Iris Mosaic**, OR, WA.

IXORA

Nematode, burrowing. **Radopholus similis**, FL.

Nematode, root knot. **Meloidogyne** sp., FL.

Rot, root. **Clitocybe tabescens**, FL.

JACARANDA

Rot, root. **Armillaria mellea**, CA; **Clitocybe tabescens**, FL; **Phymatotrichum omnivorum**, TX.

JACK-BEAN, SWORD BEAN
(*Canavalia*)

Leaf spot. *Cercospora ternateae*, AL.

Nematode, root knot. *Meloidogyne* spp., FL. Usually resistant to.

Pod spot. *Vermicularia capsici*, FL; *V. polytricha*, AL.

Virus. **Potato Virus X**, WI.

JACK-IN-THE-PULPIT
(*Arisaema*)

Blight, leaf and stalk. *Streptotinia arisaemae* (*Botrytis streptothrix*), IL, IA, MD, NY, PA, WI.

Leaf spot. *Cladosporium* sp., mold, VA; *Volutella* sp., IN.

Rust. *Uromyces caladii* (0, I, II, III), NY to FL and TX; Pacific Northwest.

JACOBINIA

Nematode, burrowing. *Radopholus similis*, FL.

JACQUEMONTIA

Leaf spot. *Cercospora alabamensis*, MS.

Nematode, reniform. *Rotylenchulus reniformis*, GA.

Nematode, root knot. *Meloidogyne* sp., AL; *Rotylenchulus reniformis*, LA; *Meloidogyne incognita*, LA.

Rot, root. *Streptomyces ipomoea*, LA; *Ceratocystis fimbriata*, LA; *Fusarium oxysporum* f. sp. *batatas*, LA; *Plenodomus destruens*, LA; *Monilochaetes infuscans*, LA.

Rust. *Coleosporium ipomoeae* (II, III), LA.

White rust. *Albugo ipomoeae-panduratae*, AL.

JACQUINIA

Black spot. *Asterella paupercula*, FL.

JAMESIA
(Cliffbrush)

Blight. *Ovularia edwiniae*, CO.

JASMINE
(*Jasminum*)

- Bacterial crown gall. *Agrobacterium tumefaciens*, MD.
 Blight, blossom. *Choanephora infundibulifera*, FL.
 Blight, southern. *Sclerotium rolfsii*, FL.
 Canker, stem gall. *Phomopsis* sp., FL; *Phoma* sp., TX.
 Leaf spot. *Colletotrichum gloeosporioides*, FL, TX.
 Leaf spot, algal; green scurf. *Cephaleuros virescens*, FL.
 Nematode, root knot. *Meloidogyne* sp., FL.
 Rot, root. *Clitocybe tabescens*, FL; *Corticium galactinum*, MD.
 Spot anthracnose. *Elsinoë jasminae*, FL.
 Virus. **Tobacco Ring Spot**, MD.
 Virus. Variegation; infectious chlorosis.

JATROPHA

- Black mildew. *Meliola jatrophae*.
 Leaf spot. *Colletotrichum gloeosporioides*, FL.
 Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.
 Rust. *Phakopsora jatrophicola* (II, III), TX.

JERUSALEM-CHERRY

(*Solanum pseudocapsici*; also *Solanum capsicastrum*,
 false Jerusalem- cherry; *S. dulcamara*, Bittersweet;
S. integrifolium, Scarlet Eggplant)

- Bacterial canker. *Clavibacter michiganense*, WY. Also on *S. dulcamara*
 (Bittersweet).
 Bacterial crown gall. *Agrobacterium tumefaciens*, CT.
 Blight, late. *Phytophthora infestans*, MD, NY.
 Dodder. *Cuscuta gronovii*, NY.
 Leaf spot. *Alternaria solani*; *Mycosphaerella solani*, OH; *Ascochyta lycopersici*, NY, OH; *Cercospora dulcamerae*, MI, NY, WI; *Phyllosticta pseudocapsici*, LA; *Stemphylium solani*, FL.
 Nematode, root knot. *Meloidogyne* spp., CA, OR, MD.
 Nematode, tobacco cyst. *Heterodera tabacum*, VA.
 Parasitic lichen. *Strigula elegans* and *S. Camplanata*, southern U.S., LA.
 Virus. **Beet Curly Top** on false Jerusalem-cherry (*S. capsicastrum*)
 Virus. ?**Tobacco Mosaic**, IA, VA; **Tomato Spotted Wilt**, tip blight, OR.
 Wilt. *Verticillium albo-atrum*, NY.

JETBEAD
(*Rhodotypos*)

Anthracnose. *Gloeosporium* sp., IL.
Blight, twig; coral spot. *Nectria cinnabarina*, MA.
Leaf spot. *Ascochyta rhodotypi*, IL.

JOBS-TEARS
(*Coix lachryma-jobi*)

Smut, head. *Ustilago coicis*. Intercepted on imported seed.
Virus. **Chlorotic Streak**.

JUJUBE
(*Zizyphus*)

Leaf spot. *Cercospora jujubae*, FL.
Rust. *Phakopsora zizyphi-vulgaris*, FL.

JUNIPER, RED-CEDAR
(*Juniperus*)

Bacterial crown gall. *Agrobacterium tumefaciens*, MS, FL.
Black mildew. *Apiosporium pinophilum*, OR; *Dimerium juniperi*, CA;
Asterina cupressina.
Blight, brown felt. *Herpotrichia nigra*, northern Rockies to Pacific Northwest.
Blight, leaf. *Chloroscypha juniperina*, IA; *Pestalotia funerea*, secondary;
Cercospora sequoiae var. *juniperi*, CT, IA, KY, MO, NE, OK, WI; *Exo-*
sporium glomerulosum, NC, SC; *Stigmina juniperina*.
Blight, nursery, *Phomopsis juniperovora*, MA to FL, KS, MN.
Blight, tip dieback. *Sclerophoma pythiophila*, WI.
Blight, twig. *Phomopsis juniperovora*, VA.
Canker. *Coryneum cardinale*, CA; *Caliciopsis nigra*, gall, NY.
Canker, bark patch. *Aleurodiscus nivosus*, AL, OR, TX.
Mistletoe. *Phoradendron densum* and *P. juniperinum*, widespread.
Needle cast; leaf spot. *Lophodermium juniperinum*, widespread, secondary;
Cylindrocarpon sp., OR; *Kriegeria* sp., OR.
Nematode, lesion. *Pratylenchus vulnus*, NC.
Parasite, "false foxglove." *Aureolaria grandiflora* var. *serrata*, TX.
Rot, heart. *Fomes juniperinus*, PA to KY, TN; *F. earlei*, Southwest; *R. subroseus*,
general; *F. texanus*, AZ, NM, TX.

Rot, root. *Armillariella mellea*, CA.

Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, OK, TX;

Phytophthora cactorum; *P. citrophthora*, CA.

Rot, root. *Fomes annosus*, VA.

Rot, root and crown. *Phytophthora cinnamomi*, CA; *P. cryptogea*, CA.

Rot, wood. *Lenzites saepiararia*, occasional; *Coniophora corrugis*, Pacific Northwest; *Daedalea juniperina*, SC to AR.

Rust. *Gymnosporangium bermudianum* (III), gall on stems, Gulf states;

G. betheli (III), on stems, ND to OK, NM, WA; 0, I, on hawthorn; *G.*

clavariiforme (III), gall on stems, ME to AL west to MT; 0, I on *Amelanchier*,

chokeberry, quince, pear; *G. clavipes* (III), quince rust, on stems, ME to IL,

MT; 0, I, on *Amelanchier*, hawthorn, quince, apple; *G. corniculans* (III),

gall on stems, ME, MI, NY, WI; 0, I, on *Amelanchier*; *G. cornutum* (III),

gall on stems, leaves, CO, ME, MI; 0, I, on mountain-ash; *G. davissii* (III),

leaf gall, ME, WI; 0, I, on chokeberry; *G. effusum* (III), gall on stems, NY to

SC; 0, I, on chokeberry; *G. exiguum* (III), on leaves, OK, TX; 0, I, on

hawthorn; *G. exterum* (III), gall on stems, KY; 0, I, *Gillenia*; *G. flori-*

forme (III) gall, on leaves, stems, SC to FL, OK, TX; 0, I, on hawthorn;

G. globosum, hawthorn rust (III); 0, I, on hawthorn, apple, pear, mountain-

ash; *G. harknessianum* (III), on western juniper; 0, I, on *Amelanchier*;

G. inconspicuum (III), CA, CO, UT; 0, I, on *Amelanchier*; *G. gracile*,

witches' broom (III), 0, I, on sand pear.

Rust. *Gymnosporangium clavipes*, galls on stems, VA; *G. globosum*, gall on

stems, VA; *G. exterum*, gall on stems, VA.

Rust. *Gymnosporangium juvenescens* (III), gall on stems, witches' brooms,

MN, NE, WI; 0, I, on *Amelanchier*; *G. japonicum* (III), CT, MA, NJ, WA;

0, I, on *Photinia*; *G. kernianum*, witches' broom, ID, OR to AZ, NM; 0, I,

on *Amelanchier*, pear; *G. multiporum* (III), CO to NM, CA; 0, I unknown;

G. nelsoni (III), gall on stems, MT, SD; 0, I, on hawthorn, crabapple,

mountain-ash, quince, *Amelanchier*; *G. nidus-avis* (III), gall on stems;

witches' brooms, East and South; 0, I, on *Amelanchier*, apple, hawthorn,

mountain-ash, quince; *G. speciosum* (III), on stems, AZ, CO, NV, NM; 0, I,

on *Fendlera*, *Philadelphus*; *G. trachysorum* (III), on stems, FL, LA, MS,

SC; *G. tremelloides* (III) gall on stems, CO to Pacific Northwest; 0, I, on

mountain-ash; *G. tubulatum* (III), gall on stems, SD to OR, WA; 0, I, on

hawthorn; *G. vauqueliniae* (III), on one-seed juniper; 0, I, on *Vauquelinia*,

causing witches' brooms.

Rust, cedar-apple. *Gymnosporangium juniperi-virginianae* (III), gall on

leaves of red-cedar, prostrate and Rocky Mountain junipers, general; 0, I,

on apple, crabapple.

Of this lengthy list of juniper rusts the three common apple rusts are most important in the garden, not so much for the damage to this host as for the harm to the deciduous fruit or ornamental. These three are the cedar-apple

rust caused by *Gymnosporangium juniperi-virginianae*, the hawthorn rust caused by *G. globosum*, and the quince rust caused by *G. clavipes*. The latter is perennial in juniper and may produce spores each spring for as long as 20 years. Varieties of *Juniperus chinensis* and *J. communis* and some other forms are resistant to cedar-apple and cedar-hawthorn rusts. If you have only a few red-cedars, it is quite feasible to cut out galls in late winter, before spores are produced.

KAGENECKIA

Scab. *Spilocaea botryae*, CA.

KALANCHOË

Bacterial crown gall. *Agrobacterium tumefaciens*.

Bacterial wilt and soft rot. *Erwinia carotovora* pv. *carotovora*, FL.

Blight, flower. *Stemphylium bolicki*, FL; *S. floridanum* f. sp. *kalanchoe*, also leaf spot, FL.

Leaf spot. *Cercospora* sp., MS.

Rot, crown, stem; wilt. *Phytophthora* ?*cactorum*, NJ, NY; *Diplodia natalensis*, AL.

Virus. Mosaic, FL.

KENTUCKY COFFEE-TREE

(*Gymnocladus*)

Leaf spot. *Cercospora gymnocladi*, north central states; *Marssonina* sp., Northeast; *Phyllosticta gymnocladi*, IL.

Rot, root. *Phymatotrichum omnivorum*, OK, TX.

Rot, wood. *Polyporus pulchellus*, IN, MI.

KERRIA

Blight, twig. *Phomopsis japonica*, OH, NJ, TX.

Canker, coral spot. *Nectria cinnabarina*, OR, WA, NJ.

Leaf spot; leaf and twig blight. *Coccomyces kerriae*, widespread, eastern states to IA and TX; *Septoria* sp., MD, NJ.

Rot, root. *Phymatotrichum omnivorum*, TX.

KIDNEY VETCH, LADYS-FINGERS

(*Anthyllis*)

Blight, leaf and stem. *Fusarium* sp., NC.

Leaf spot. *Phyllosticta* sp., NC.

KIWI

(*Actinidia*)

Bacterial canker. *Pseudomonas syringae*, CA.

Rot, root and wilt. *Cylindrocladium crotalaria*, SC.

KNIPHOFIA

(Tritoma, Torch-Lily, Poker-Plant)

Leaf spot. *Alternaria* sp., AL.

Nematode, root knot. *Meloidogyne* sp., CA.

KNOTROOT BRISTLEGRASS

(*Setaria geniculata*)

Blight. *Beniowskia sphaeroidea*, GA.

KOCHIA

(Summer-Cypress)

Damping-off; root rot. *Pythium debaryanum*, SD; *Rhizoctonia solani*, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia aristidae* (0, I), CO, NE, TX.

Virus. Beet Curly Top, CA.

KOHLERIA

Virus. Tobacco Mosaic, CA, CT, DC, FL, OH, WA.

KRIGIA

(Dwarf Dandelion)

Downy mildew. *Bremia lactucae*, MS, MO, OK, WI.

Leaf spot. *Mycosphaerella krigiae*, IL, WI; *Septoria krigiae*, KY, NY, WI.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia dioicae* (0, I), IA, WI, IL; II, III, on *Carex*; *P. hieracii* (0, I, II, III), NC; *P. maculosa* (III), IL, MI, MS, MO, PA, TN.

KUDZU

(*Pueraria*)

Bacterial blight. *Pseudomonas phaseolicola*, CT to FL, LA, IN; *P. syringae*, NY.

Blight, web. *Pellicularia filamentosa*, GA, MS.

Damping-off. *Rhizoctonia solani*.

Leaf spot. *Alternaria* sp., secondary; *Mycosphaerella pueraricola*, MS, AL, GA.

Nematode, root knot. *Meloidogyne* spp., general.

Rot, charcoal. *Macrophomina phaseoli*, GA; Stem, *Fusarium* sp., LA.

Rot, root. *Phymatotrichum omnivorum*, TX.

KUHNIA

(False-Boneset)

Leaf spot. *Pleospora compositarum*, NM, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia kuhniae* (0, I, II, III), IN to AL, NE, ND, FL, TX, MT.

KUMQUAT

(*Fortunella*)

Dodder. *Cuscuta campestris*, FL.

Leaf spot. *Cephaleuros virescens*, algal spot, Gulf states; *Phyllosticta citricola*, MS.

Nematode, citrus. *Tylenchulus semi-penetrans*, FL.

Rot, black. *Alternaria citri*; stem-end, *Diaporthe citri*, CA.

LANTANA

Black mildew. *Meliola cookeana*, FL.

Leaf spot. *Alternaria* sp., TX.

Nematode, leaf. *Aphelenchoides fragariae*, NJ.

Nematode, root knot. *Meloidogyne* spp., widespread.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia lantanae* (III), FL.

Wilt. *Fusarium* sp., NJ.

LAPPULA (Hackelia)

Downy mildew. *Peronospora echinospermi*, IA, TX; *P. myosotidis*, MT.

Leaf spot. *Cercospora cynoglossi*, WI; *Ovularia asperifolii* var. *lappulae*, WI; *Phyllosticta decidua*, WI, TX.

Powdery mildew. *Erysiphe cichoracearum*, IA, MI, MN, MO, OH, WI, TX; *Microsphaera* sp., IL.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia mertensiae* (III), TX, UT.

Smut, leaf. *Entyloma serotinum*, UT.

LARCH (*Larix*)

Blight, needle. *Hypodermella laricis*, Great Lakes, Pacific Northwest. *Meria laricis*, ID.

Blight, seedling. *Thelephora caryophyllea*, ID, MT, girdle, smother; *Rhizina undulata*, ID; *Meria laricis*, WA.

Canker. *Aleurodiscus amorphus*, bark patch, Northwest; *A. spinulosus*; *A. werii*; *Lachuellula willkommii*, European larch canker, MA, eradicated, ME; *Valsa kunzei* var. *kunzei*.

Canker. *Phomopsis pseudotsugae* (*Phacidiella coniferarum*) on western larch, Northwest.

Damping-off. *Rhizoctonia solani*, cosmopolitan.

Mistletoe, dwarf. *Arceuthobium campylopodum*, MT to OR, WA; *A. pusillum*, Northeast, MN.

Needle cast. *Lophodermium* sp., WA; *L. laricinum*, MT to OR; *L. laricis*, ID; *Cladosporium* sp., ME; *Mycosphaerella laricina*, IA, VT, WI.

Rot, heart. *Fomes* spp., widespread.

Rot, root. *Armillaria mellea*, cosmopolitan; *Phymatotrichum omnivorum*, TX.

Rot, sapwood. *Lenzites saepiaria*.

Rot, seedling. *Botrytis ?douglasii*, gray mold, Northwest; *Cylindrocladium scoparium*, NJ; *Phytophthora cinnamomi*, MD; *Sparassis radicata*, MT to OR, WA.

Rot, wood. *Polyporus* spp.; *Poria* spp.; *Stereum* spp., widespread.

Rust. *Melampsora paradoxa* (0, I), northern U.S. including AK; II, III, on willow; *M. medusae* (0, I), New England to MI and IN; II, III, on poplar; *Melampsoridium betulinum* (0, I), CT, WI; II, III, on birch.

LARKSPUR

See Delphinium. Crown rot, southern blight, is prevalent on annual larkspur.

LAUREL

See California-Laurel, Cherry-Laurel, Mountain-Laurel.

LAUREL, SWEET BAY (*Laurus*)

Blight, thread. *Pellicularia koleroga*, SC.

LAURESTINUS (*Viburnum tinus*)

Downy mildew. *Plasmopara viburni*, GA.
Leaf spot. *Hendersonia tini*, LA; *Leptosphaeria tini*, LA.
Leaf spot, algal. *Cephaleuros virescens*, FL, LA.
Nematode, root knot. *Meloidogyne* sp., CA.
Wilt. *Verticillium albo-atrum*, OR.

LAVATERA (Treemallow)

Anthracnose, leaf spot. *Colletotrichum malvarum*, CA, TX.
Damping-off. *Rhizoctonia solani*, IL.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia malvacearum* (III), CA.
Virus. *Abutilon Infectious Variegation*.

LAVENDER (*Lavandula*)

Leaf spot. *Septoria lavandulae*, OH, OK.
Nematode, root knot. *Meloidogyne* sp.
Rot, root. *Armillaria mellea*, TX.

LAWNS

See Grasses.

LAYIA (Tidy-Tips)

Powdery mildew. *Erysiphe cichoracearum*, CA.
Virus. *Tomato Spotted Wilt*, CA.

LEADTREE

(*Leucaena*)

Rot, root. *Ganoderma sulcatum*, TX.

Rust. *Ravenelia leucaenae* (II, III), TX.

LEATHERWOOD

(*Dirca*)

Rust. *Puccinia dioicae* (I), ME to MN, MO, AL; II, III on *Carex*.

LEBBEK

(*Albizzia lebbek*)

Leaf spot, algal. *Cephaleuros virescens*, FL.

Rust. *Sphaerophragmium acaciae*, FL.

LEDUM

(Labrador-Tea)

Gall, leaf. *Exobasidium vaccinii*, OR, WA, AK; *Synchytrium vaccinii*, red spot, ME.

Leaf spot. *Ascochyta ledi*, WI; *Cryptostictis arbuti*, CA, OR; *Rhytisma ?andromedae*, tar spot, ID.

Powdery mildew. *Microsphaera alni*, WA.

Rust. *Chrysomyxa ledi* (II, III), CA, CT, ID, MT, NV, MI, NH, NY, WI, WY;

C. ledicola (II, III), ME, NH, NY, WA, WI, AK; 0, I, on spruce.

Spot anthracnose. *Elsinoë ledi*, CA, OR, WA, ME, MI, MN, NY, PA, WI.

LEEK

See Shallot.

LEMON

See Citrus Fruits.

LEMON GRASS, CITRONELLA GRASS

(*Cymbopogon*)

Leaf spot, eye-spot. *Helminthosporium sacchari*, FL.

Tangle-top. *Myriogenospora paspali*, FL.

LENTIL

(*Lens*)

Rot, root. *Thielaviopsis basicola*, ID, WA.

LEPTOSPERMUM

Rot, root. *Armillaria mellea*, CA.

LETTUCE

(*Lactuca*)

- Anthracnose. *Marssonina panattoniana*, NY to FL, TX, MI, CA, OR, WA.
Bacterial marginal leaf blight. *Pseudomonas fluorescens* pv. *marginalis*, KS, MO, NJ, NY; *P. cichorii*, NY.
Bacterial, MLO. **Aster Yellows** (white heart, Rio Grande disease) and **California Aster Yellows**, widespread.
Bacterial rot. *Pseudomonas viridilivida*, LA, VA, WA, DE, NH, NY, MI.
Bacterial soft rot. *Erwinia carotovora*, cosmopolitan in market.
Bacterial wilt. *Xanthomonas vitians*, NJ, NM, NY, PA, SC, VA.
Blight, southern. *Sclerotium rolfsii*, CA, FL, NC, SC, TX, VA.
Damping-off; stump wilt; stunt. *Pythium* spp., cosmopolitan.
Downy mildew. *Bremia lactucae*, general.
Leaf spot. *Alternaria* sp., secondary; *Cercospora longissima*, FL, IL, IN, TX, VA, WI; *Septoria lactucae*, occasional in East and central states, to FL, CO, MN.
Mold, leaf; seed. *Pleospora herbarum*, FL, KY, NY.
Nematode. *Nacobus batatiformis*.
Nematode, lesion. *Pratylenchus* sp.
Nematode, root knot. *Meloidogyne hapla*.
Nematode, sting. *Belonolaimus gracilis*.
Nonparasitic. **Brown Blight**, cause unknown, AZ, CA. **Tipburn**, high temperature and excessive transpiration.
Powdery mildew. *Erysiphe cichoracearum*, CA, MI.
Rot, bottom; damping-off. *Rhizoctonia solani*, general.
Rot, gray mold. *Botrytis cinerea*, chiefly in greenhouses, sometimes outdoors.
Rot, root. *Fusarium* sp., KY, OH; *Phymatotrichum omnivorum*, AZ, TX.
Rot, watery soft; drop. *Sclerotinia sclerotiorum*, widespread; *S. minor*, in transit and market.
Rust. *Puccinia dioicae* (0, I), IN, MN, ND, WI; II, III on *Carex*; *P. hieracii* (II), CA.
Slime mold. *Physarum cinereum*, occasional under glass.
Virus. **Cucumber Mosaic**, NY; **Sonchus Yellow Net**, FL; **Tobacco Rattle**, CA; **Lettuce Mosaic**, general; **Radish Yellows**; **Lettuce Big Vein**, associated

with *Olpidium brassicae* in roots, FL; **Tomato Spotted Wilt**, CA, TX;
Tobacco Necrosis.

White rust. *Albugo* sp., TX.

Wilt, leaf blight. *Pythium tracheiphilum*, WI.

Nonparasitic tipburn is the most general of lettuce diseases, prevalent at high temperatures when soil is deficient in moisture. Some hot-weather varieties are rather resistant. Spacing plants well apart in a well-drained soil will reduce bottom rot and drop. Eliminate wild weed hosts and spray for leafhopper vectors to reduce aster yellows.

LEUCOJUM

(Snowflake)

Leaf scorch; red blotch. *Stagonospora curtisii*, CA.

Nematode, meadow. *Pratylenchus* sp.

Rot; scale speck, of bulbs. *Botrytis* sp., CA.

LEUCOTHOË

Black mildew. *Asterina diplodioides*, AL.

Blight, leaf spot. *Cylindrocladium vesiculatum*, GA.

Canker, felt fungus. *Septobasidium pseudopedicellatum*, FL.

Gall, leaf. *Exobasidium vaccinii*, MA, MS, NC.

Leaf spot. *Cercospora leucothoës*, NJ, NY; *Cryptostictis* sp.; *Guignardia leucothoës*, MD, NC, SC, RI, TN, VA; *Mycosphaerella leucothoës*, NJ; *Phyllosticta terminalis*, NY to FL; *Ramularia andromedae*, NJ; *Rhytisma decolorans*, tar spot, CT, FL, TN, VA. *Pestalotia leucothoës*, NJ.

Powdery mildew. *Microsphaera penicillata*, GA.

Spot anthracnose. *Elsinoë ledi*, FL.

LEWISIA

(Bitterroot)

Rust. *Uromyces unitus* (I, III), CA, MT, WA.

LIATRIS

(Gayfeather)

Dodder. *Cuscuta glomerata*, OK.

Leaf spot. *Phyllosticta liatridis*, WI; *Septoria liatridis*, MN, ND, TX, WI.

Nematode, root knot. *Meloidogyne* sp.

Powdery mildew. *Erysiphe cichoracearum*, OK.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, stem. *Sclerotinia sclerotiorum*, NY.

Rust. *Coleosporium laciniariae* (II, III), NJ to FL, AR, TX; 0, I, on pines;

Puccinia liatridis (0, I), KS, IN, ND, NE, MT, WI to CO; II, III, on grasses.

Wilt. *Verticillium albo-atrum*, NJ.

LIGUSTRUM

See Privet.

LILAC

(*Syringa*)

Anthracnose, shoot blight. *Gloeosporium syringae*, CT, MA.

Bacterial crown gall. *Agrobacterium tumefaciens*, CT.

Bacterial blight; twig canker. *Pseudomonas syringae*, northeastern states to AL, IL, Pacific Coast.

Bacterial; MLO. *witches' broom*, IL.

Blight, blossom, shoot. *Phytophthora cactorum*, IA, MD, MA, MN, NJ; *P. syringae*, MD, NY; *Sclerotinia sclerotiorum*, WA.

Blight, cutting. *Cylindrocladium scoparium* and *C. floridanum*, FL, OH.

Blight, gray mold. *Botrytis cinerea*. Pacific Northwest, Northeast.

Blight, thread. *Pellicularia koleroga*, FL, MS, NC.

Blotch, leaf. *Heterosporium syringae*, NJ; *Cladosporium herbarum*, ?secondary, cosmopolitan.

Canker; dieback. *Physalospora obtusa*, MA to VA, OH.

Canker; stem girdle. *Hymenochaete agglutinans*, CT.

Leaf spot. *Cercospora lilacis*, widespread; *Macrophoma halstedii*, CT, NJ, NY; *Phyllosticta* sp., MA; *Pleospora herbarum*, secondary, MD.

Nematode, citrus. *Tylenchulus semipenetrans*.

Nonparasitic. **Blight**, graft incompatibility of lilac scion on privet stock.

Powdery mildew. *Microsphaera alni*, general.

Rot, root. *Phymatotrichum omnivorum*, TX; *Armillaria mellea*, CA, MS; *Thielaviopsis basicola*, CT.

Rot, wood. *Polyporus gilvus*, MD; *Stereum purpureum*, OK.

Virus. **Lilac Ring Spot**, MI, MN; **Lilac Witches' Broom**, MD.

Powdery mildew is the most general and conspicuous disease of lilacs, but it comes too late in the season to damage the bushes materially. It can be controlled with repeated application of sulfur or Karathane, where the time and expense are justified. In wet seasons bacterial and *Phytophthora*

blights may be important, but dieback is more often due to borers than to diseases.

LILY (*Lilium*)

- Bacterial soft rot. *Erwinia carotovora*, GA, MA, NJ, WV.
 Blight, botrytis; leaf spot. *Botrytis elliptica*, general; *B. cinerea*, general; *B. liliorum*, CA.
 Blight, bud. *Sporotrichum* sp., ?secondary, VA.
 Blight, southern; bulb rot. *Sclerotium rolfsii*, cosmopolitan.
 Canker, stem. *Rhizoctonia solani*, CA.
 Damping-off. *Pythium debaryanum*; *Rhizoctonia solani*, cosmopolitan.
 Leaf spot. *Cercospora* sp., FL; *Cercospora lili*, CT, NY; *Ramularia* sp., WA; *Heterosporium* sp., MD.
 Mold, leaf and bulb. *Cladosporium* sp., cosmopolitan.
 Nematode, leaf; bunchy top; dieback. *Aphelenchoides fragariae*, CA, OR, WA and in greenhouses.
 Nematode, lesion. *Pratylenchus pratensis*, *P. penetrans*, Northwest; *P. vulnus*, OR.
 Nematode, root knot. *Meloidogyne* spp., FL.
 Nonparasitic
 Bud Blast. Insufficient light; also causes drop of lower leaves.
 Chlorosis. Iron deficiency. Sometimes result of systemic insecticide.
 Limber Neck. Physiological.
 Scorch, of Easter lilies. Acid soil, low fertility, ?excessive phosphorus.
 Rot, basal. *Fusarium oxysporum* f. sp. *lili*, general.
 Rot, black scale. *Colletotrichum lili*, LA, MS; brown scale, *Colletotrichum* sp., OR, WA; scale tip, *Cylindrocarpon radicola*, secondary.
 Rot, bulb. *Penicillium* spp., blue mold; *Rhizopus* sp., soft rot, cosmopolitan.
 Rot, charcoal. *Macrophomina phaseoli*, CA.
 Rot, root. *Pythium* spp.; *Rhizoctonia solani*, widespread.
 Rot, stem, foot. *Phytophthora cactorum*, MD, MN, NJ, NC, NY, OH, WA, WI; *P. parasitica*, Top Rot, IN, MD, NJ, NY; *Rhizoctonia tuliparum*, WA; *Sclerotinia sclerotiorum*, CT, FL, TX, WA.
 Rust. *Puccinia sporoboli* (0, I), NE, ND; II, III, on *Sporobolus*; *Uromyces holwayi* (0, I, II, III), ME to NJ, NE, MI, MN, CA, ID, OR, WA.
 Virus. **Curl-Stripe Disease**, OR.
 Virus. **Lily Fleck**; **Lily Latent Mosaic**; **Lily Ring Spot**; **Lily Rosette**; **Lily Symptomless**; **Cucumber Mosaic**; **Tulip Breaking Mosaic**; **Streak**, on Easter lily, virus from wild cucumber.

Garden lilies are particularly subject to botrytis blight and mosaic. Madonna lilies are most susceptible, with leaves often completely blackened in wet

weather. Copper sprays are perhaps most effective. The only sure way to be free from mosaic and other virus diseases is to grow lilies from seed in an isolated portion of the garden.

LILY-OF-THE-VALLEY

(*Convallaria*)

Blight, gray mold; rhizome rot. *Botrytis paeoniae*, IL, ME, PA.

Blight, southern. *Sclerotium rolfsii*, ME.

Leaf blotch. *Ascochyta majalis* (*Mycosphaerella convallaris*), PA.

Leaf spot. *Gloeosporium convallariae*, NY; *Kabatiella microsticta*, ?secondary, MD; *Phyllosticta* sp., NJ, NY.

Nematode, meadow. *Pratylenchus pratensis*, associated with forcing failures.

Nematode, root knot. *Meloidogyne* sp., occasional.

LINARIA

(Blue Toadflax; Butter and Eggs)

Anthraxnose. *Colletotrichum vermicularioides*, MA, NJ, NY, TX, WI.

Bacterial, MLO. *Aster Yellows*, CA.

Blight, gray mold. *Botrytis cinerea*, AK.

Blight, southern. *Sclerotium rolfsii*, TX.

Downy mildew. *Peronospora linariae*, FL, MA, OK, WI.

Leaf spot. *Alternaria* sp., MI; *Septoria linariae*, WI.

Nematode, root knot. *Meloidogyne* spp.

Nematode, stem and leaf. *Ditylenchus dipsaci*, NY.

Powdery mildew. *Erysiphe cichoracearum*, CA.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, IL; *Thielaviopsis basicola*, CT.

Rot, stem. *Sclerotinia sclerotiorum*, AZ.

Rust. *Puccinia antirrhini* (II, III), CA; *Aecidium* sp., WI.

Smut, white. *Entyloma linariae*, CT, NJ, PA.

LINDEN, BASSWOOD

(*Tilia*)

Anthraxnose; leaf spot. *Gnomonia tiliae* (*Gloeosporium tiliae*), CT to VA, IA, MN.

Blight, leaf. *Cercospora microsora*, general.

Canker, bark. *Aleurodiscus acerinus*; *A. griseo-canus*, PA, IA, MO.

Canker; dieback. *Botryosphaeria* sp., MD; *Nectria* spp., NY, PA, VA; *Strumella* sp., NJ.

- Canker, felt fungus. *Septobasidium fumigatum*, FL.
 Leaf spot. *Phlyctaena tiliae*, NY; *Phyllosticta praetervisa*, WI; *Sphaeropsis* sp., OK.
 Mistletoe. *Phoradendron serotinum* (*flavescens*), South.
 Powdery mildew. *Microsphaera alni*, MN; *Phyllactinia corylea*, MN; *Uncinula clintonii*, general.
 Rot, heart. *Daedalea confragosa*, VT; *Fomes* spp.; *Steccherinum septentrionale*, AL, MI; *Pholiota adiposa*, MA, PA, TN.
 Rot, root. *Phymatotrichum omnivorum*, TX; *Ustulina vulgaris*, NY.
 Rot, sapwood. *Collybia velutipes*, occasional; *Pleurotus ostreatus*, cosmopolitan.
 Rot, wood. *Daldinia concentrica*, MN, NY; *Lenzites betulina*, NY, VT; *Schizophyllum commune*, MN; *Polyporus* spp.; *Stereum* spp.; *Trametes mollis*, VT.
 Sooty mold. *Fumago vagans*.
 Spot anthracnose. *Elsinoë tiliae*, VA.
 Wilt. *Verticillium albo-atrum*, IL.

Anthracnose and *Cercospora* leaf blight are common diseases.

LINNAEA (Twin-Flower)

- Black mildew. *Halbaniella linnaeae*, NY.
 Leaf spot. *Phyllachora wittrockii*, tar spot, MI, MT, NM, NY; *Venturia dickei*, ID, MI, MT, NM, NY, OR, WA, WI. *Septoria breviscula*, NY.

LIONS-EAR (*Leonotis*)

- Leaf spot. *Cercospora leonotidis*, LA; *Septoria breviscula*, NY.
 Rust. *Puccinia leonotidis* (0, I, II, III), FL.

LIPPIA (Fog-Fruit, Lemon-Verbena)

- Bacterial crown gall. *Agrobacterium tumefaciens*, AZ.
 Black mildew. *Meliola lippiae*, FL, AZ.
 Blight, southern. *Sclerotium rolfsii*, AZ, CA.
 Leaf spot. *Cercospora lippiae*, widespread; *Cylindrosporium lippiae*, TX.
 Nematode, root knot. *Meloidogyne* sp., AZ.
 Spot anthracnose. *Sphaceloma lippiae*, IN, FL.

LIPSTICK VINE
(*Aeschynanthus*)

Leaf spot. *Corynespora casiicola*, FL; *Myrothecium roridum*, FL.

LITHOCARPUS
(Tanbark Oak)

Blight, leaf. *Pestalotia castagnei*, CA.
Leaf spot. *Ceuthocarpum conflictum*, CA.
Powdery mildew. *Erysiphe trina*, CA.
Rot, wood. *Poria* spp.; *Stereum hirsutum*.
Rust. *Cronartium quercuum* (II, III), CA; 0, I, on pine.

LITHOPHRAGMA
(Woodland-Star)

Rust. *Puccinia heucherae* (III), CA, UT, WA.
Smut, leaf and stem. *Urocystis lithophragmae*, UT.

LITHOSPERMUM
(Gromwell, Puccoon)

Leaf spot. *Septoria lithospermi*, WI.
Powdery mildew. *Erysiphe cichoracearum*, PA, TX.
Rust. *Aecidium hesleri*, TN; *Puccinia recondita* (0, I), NE, ND, SD, TX.

LITSEA
(Pond-Spice)

Leaf spot. *Cercospora olivacea*, GA.

LOBELIA
(Cardinal-Flower, Blue Lobelia)

Blight, gray mold. *Botrytis cinerea*.
Damping-off. *Pythium debaryanum*, MA, NY.
Leaf spot. *Cercospora lobeliae*, AL, KS, IL, IN, MD, TX; *C. effusa*, IA, TX;
Phyllosticta bridgesii, IN; *Septoria lobeliae*, ME to VA, TX, WI.
Nematode, root knot. *Meloidogyne* spp., NE, NY, FL, MD.
Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, NY, OH.

Rot, stem. *Sclerotium rolfsii*, NJ.
 Rust. *Puccinia lobeliae* (III), AR, MI, WI, NY to NC, TX, WA.
 Smut, leaf. *Entyloma lobeliae*, ME to PA, MO, WI.
 Virus. **Beet Curly Top**, TX; **Tomato Spotted Wilt**, TX.

LOCUST (*Robinia*)

Bacterial, MLO. **Witches-Broom**, VA.
 Blight, seedling; leaf. *Alternaria* sp., NC to AL, MO; *Fusicladium robiniae*, MD to AL, MO, WI.
 Canker. *Nectria cinnabarina*, VA.
 Canker; twig blight. *Aglaospora anomala*, ME to GA; *Fusarium sarcochroum*, IA; *Diaporthe oncostoma*, NY to GA, IL.
 Damping-off. *Rhizoctonia solani*, ME to AL, NE, TX; *Pythium* spp., NE, TX.
 Dodder. *Cuscuta* sp.; *C. arvensis*, widespread.
 Leaf spot. *Cladosporium epiphyllum*, TN, VA, WV; *Cylindrosporium solitarium*, TX; *Gloeosporium revolutum*, NJ; *Phleospora robiniae*, NY to OH; *Phyllosticta robiniae*, LA.
 Mistletoe. *Phoradendron serotinum* (*flavescens*), NC, AZ, NM, TX; *Viscum album*, CA.
 Nematode, lesion. *Pratylenchus* sp., OR.
 Nematode, root knot. *Meloidogyne* spp., OK, TX.
 Nonparasitic. **Chlorosis**, iron deficiency, NE, TX. **Little Leaf**, zinc deficiency, CA.
 Powdery mildew. *Erysiphe polygoni*, CA; *Microsphaera diffusa*, IL, NC; *Phyllactinia corylea*, NM.
 Rot, heart. *Fomes* spp.; *Polyporus* spp.
 Rot, heart. *Fomes rimosus*, VA.
 Rot, root. *Armillaria mellea*; *Phymatotrichum omnivorum*, OK, NM; *Pythium myriotylum*, NC; *Fusarium* sp., AL, GA.
 Rot, seedling stem. *Phytophthora cinnamomi*, MD; *Rhizoctonia bataticola*, AL, NC; *Sclerotium bataticola*, TX.
 Rot, wood. *Daedalea unicolor*, WI; *Poria* spp.
 Virus. **Locust Witches' Broom**, Robinia Brooming Disease, PA to GA and AR, OH.
 Wilt, seedling. *Phytophthora parasitica*, AL, NC, VA; *Verticillium albo-atrum*, IL.

LOGANBERRY

See Blackberry.

LOMATIUM
(Biscuit-Root)

Downy mildew. *Plasmopara nivea*, MT.

Leaf spot. ?*Phyllachora* sp., WA.

Rust. *Puccinia asperior* (0, I, III), CA, OR, WA; *P. jonesii* (0, I, III), KS, NE, UT, WA; *P. ligustici*, ID, WA.

LOOSESTRIFE, FRINGED
(*Steironema*)

Leaf spot. *Cylindrosporium steironematis*, NY; *Mycosphaerella* sp., NY; *Phyllosticta lysimachiae*, NY; *Ramularia lysimachiae*, NC, WI; *Septoria conspicua*, ME to MS, CO and WI.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia dayi*, NY to WV, IL, MI, MT, WI; *P. distichlidis* (0, I), CO, ND; II, III, on marsh grass; *Uromyces acuminatus* (0, I), CT to CO, SD, ND.

LOOSESTRIFE, MONEYWORT
(*Lysimachia*)

Blight, leaf and stem necrosis. *Ceratobasidium anceps*, WI.

Gall, leaf. *Synchytrium aureum*, WI.

Leaf spot. *Cercospora lysimachiae*, NJ; *Cladosporium lysimachiae*, MA; *Ramularia lysimachiae*, WI; *Septoria conspicua*, IA, NY, VT.

Nematode, root knot. *Meloidogyne* sp., TX.

Nematode, stem. *Ditylenchus dipsaci*.

Rot, crown stem. *Sclerotium rolfsii*, KS; *Phymatotrichum omnivorum*, TX.

Rust. *Coleosporium campanulae* (II, III), TN; 0, I, on red pine; *Puccinia limosae* (0, I), MA to NC and MI, WI, NE.

LOQUAT
(*Eriobotrya*)

Anthracnose; flower blight; withertip. *Colletotrichum gloeosporioides*, CA, FL, TX.

Bacterial fire blight. *Erwinia amylovora*, Gulf states, AZ, CA.

Blight, leaf; blotch. *Fabraea maculata*, FL.

Leaf spot. *Phyllosticta eriobotryae*, FL; *Pestalotia* sp., secondary; *Septoria eriobotryae*, FL.

Leaf spot, algal. *Cephaleuros virescens*, FL.

Nematode, burrowing. *Radopholus similis*, FL.

Rot, collar, crown. *Phytophthora cactorum*, CA.

Rot, root. *Armillaria mellea*, CA; *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

Scab. *Fusicladium eriobotryae*, on leaves, stems, fruit, Gulf states; *Spilocaea eriobotryae* (*Fusicladium photinicola*).

LOTUS (*Nelumbo*)

Blight. *Dothiorella nelumbonis*, on flower parts, DE, MD.

Leaf spot. *Alternaria nelumbii*, MD, NJ, NY, OK, PA, TX; *Cercospora nelumbonis*, IN, TX.

LUCUMA (Canistel, Egg-Fruit)

Anthraxnose; fruit spot. *Colletotrichum gloeosporioides*, FL.

Canker. *Physalospora obtusa*, SC.

Rust. *Achrotelium lucumae* (II, III), FL.

LUDWIGIA (False Loosestrife)

Leaf spot. *Cercospora ludwigiae*, AL; *Pezizella oenotherae*, VA; *Phyllosticta ludwigiae*, NY, WI; *Septoria ludwigiae*, MD, MS, PA.

Rust. *Puccinia jussiaeae* (0, I, III), DE to FL, MS, LA, TX, CA, OH, WI.

LUPINE (*Lupinus*)

Anthraxnose. *Colletotrichum trifolii*, NC; *C. fragariae*, NC.

Blight, gray mold. *Botrytis cinerea*, MA, MT, NY.

Blight, leaf. *Hadrotichum globiferum*, CA, OR, CO, WA, WY.

Blight, seedling. *Pleiochaeta setosa*, *Alternaria* sp., *Aspergillus flavus*, *Aspergillus niger*, *Curvularia* sp., *Rhizopus stolonifer*.

Blight, southern. *Sclerotium rolfsii*, probably general.

Blight, stem necrosis. *Ascochyta* sp., WI, CT.

Damping-off. *Rhizoctonia solani*, CT, TX.

Downy mildew. *Peronospora trifoliorum*, WI.

Leaf spot. *Alternaria* sp., MA; *Cercospora longispora*, FL, MO, NY, WI; *C. lupini*, FL, OR, SC; *C. lupinicola*, TX; *Corynespora cassicola*, TX;

Cylindrosporium lupini, CA; *Mycosphaerella pinodes*, WI; *Ovularia lupinicola*, WA; *Phoma lupini*, also stem spot, CO to NM, CA; *Phyllosticta ferax*, CA to WA, WY, SD to CO; *P. lupini*, CA; *Ramularia lupini*, TX; *Septogloeum lupini*, MI, CA; *Septoria lupinicola*, WI; *Stictochlorella lupini*, CA, WA.

Nematode, leaf. *Aphelenchoides ritzema-bosi*.

Nematode, lesion. *Pratylenchus pratensis*, CA.

Nematode, root knot. *Meloidogyne* sp., FL.

Nematode, sting. *Belonolaimus gracilis*, GA; ring, *Criconea* sp., CA.

Powdery mildew. *Microsphaera* sp.; *Erysiphe polygoni*, widespread.

Rot, root. *Armillaria mellea*, CA; *Fusarium* sp., NJ, VA; *Phymatotrichum omnivorum*, TX; *Pythium ultimum*, CA; *Thielaviopsis basicola*, IA, WI.

Rot, stem. *Macrophomina phaseoli*, charcoal rot; *Sclerotinia sclerotiorum*, LA, NY, TX; *Pythium debaryanum*, TX, CA.

Rust. *Puccinia andropogonis* var. *onobrychidis* (0, I), MI, MN, NY, WI; II, III, on *Andropogon*; *Uromyces lupini* (0, I, II, III), CA, OR, WA, NE, MT; *U. occidentalis* (II, III), on native lupine, MT to NM, CA, WA.

Smut. *Thecaphora deformans*, on seed, CO, WY.

Virus. **Bean Yellow Mosaic**, FL; **Bidens Mottle**, FL; **Ring Spot**. Unidentified; **Tomato Spotted Wilt**, TX; **Peanut Mottle**, GA.

These diseases are of lupines grown as ornamentals. Lupines as ground covers and soil preservers have their own troubles. In gardens powdery mildew is prevalent, and leaf spots are not often important.

LYCHEE

Rot, mushroom rot. *Clitocybe tabescens*, sometimes fatal in FL.

LYCHNIS

(Campion)

Blight, shoot and flower. *Botrytis cinerea*, AK.

Blight, southern. *Sclerotium rolfsii*, TX.

Leaf spot. *Alternaria dianthi*, AK; *Leptothyrium lychnidis*, AL; *Phyllosticta lychnidis*, IA, TX; *Septoria lychnidis*, MA.

Mold, leaf. *Heterosporium* sp., AK.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, IL; *Corticium galactinum*, MD.

Rot, stem. *Phytophthora cactorum*, IN.

Rust. *Puccinia arenariae* (III), PA; *Uromyces suksdorfii* (I, II, III), UT; *U. verruculosus*, IN, MI, NY, TX.

Smut, anther. *Ustilago violacea*, MN, WI, WY.

LYCIUM

(Desert-Thorn, Christmasberry)

Leaf spot. *Cercospora lycii*, OK.Rot, root. *Phymatotrichum omnivorum*, TX.Rust. *Aecidium lycii* (0, I), AZ; *Puccinia globosipes* (II, III), UT to NM, CA; 0, I unknown; *P. tumidipes* (II, III), TX to AZ, UT.

LYCORIS

Leaf scorch; red spot. *Stagonospora curtisii*, CA.Nematode, bulb scale rot. *Ditylenchus dipsaci*, NC, VA; *Aphelenchoides fragariae*, FL, GA, ND, SD.Nematode, root. *Hoplolaimus* sp., NC.

LYONIA

(Maleberry, Fetterbush, Staggerbush)

Black mildew. *Asterina lepidigena*, FL; *Lembosia andromedae*, AL; *Morenoella dothideoides*, FL.Blight, leaf. *Ramularia cylindriopsis*, ME.Dodder. *Cuscuta compacta*, FL.Gall, leaf; shoot hypertrophy. *Exobasidium vaccinii*, MA to FL, AL.Leaf spot. *Ceuthocarpon ferrugineum*, FL; *Pestalotia vaccinii*, ?secondary; *Septoria pulchella*, GA.Leaf spot, tar. *Rhytisma andromedae*, widespread; *R. decolorans*, MS.Powdery mildew. *Microsphaera alni* var. *vaccinii*, AL.Rot, wood. *Poria versispora*, ME.Rust. *Pucciniastrum myrtilli* (II, III), DE to AL, AR; 0, I, on hemlock.

LYSILOMA

Rot, white pocket heart. *Fomes extensus*, FL.Rust. *Ravenelia annulata* (II, III), FL; *R. lysilomae*, FL.

LYTHRUM

(Winged, Purple Loosestrife)

Gall, leaf. *Synchytrium lythrii*, LA.Leaf spot. *Cercospora lythri*, WI; *C. lythracearum*, MS; *Pezizella oenotherae*, NY, MI; *Septoria lythrina*, KS, NY, WI.Rot, root. *Rhizoctonia solani*, IL.

MAACKIA

Rot, root. *Phymatotrichum omnivorum*, TX.

MACADAMIA

Canker. *Phytophthora cinnamomi*, CA.

MADRONE

(*Arbutus menziesii*)

Canker. *Hendersonula toruloidea*, WA.

Canker, trunk. *Phytophthora cactorum*, CA, WA.

Gall, leaf; red leaf spot. *Exobasidium vaccinii*, CA, OR, WA, TX.

Leaf spot. *Ascochyta hansenii*, CA; *Cryptostictis arbuti*, CA, OR; *Didymosporium arbuticola*, OR; *Mycosphaerella arbuticola*, CA, OR, WA; *Phyllosticta fimbriata*, OR.

Leaf spot, tar. *Rhytisma arbuti*, CO, OR, TX, WA.

Rot, heart. *Fomes subroseus*, OR.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, wood. *Lenzites saepiarum*, OR, TX; *Polyporus* spp., OR, TX; *Trametes sepium*, CA.

Rust. *Puccinastrum sparsum* (II, III), CA, OR, WA.

Spot anthracnose. *Elsinoë mattirolanum*, CA.

MAGNOLIA

Bacterial leaf spot. *Pseudomonas syringae*, IL; *P. cichorii*, AL.

Black mildew. *Dimerosporium magnoliae*, TX; *Irene araliae*, MS; *Meliola amphitricha*, Gulf states; *M. magnoliae*; *Trichodothis comata*, South.

Blight, seedling. *Rhizoctonia solani*, NJ.

Blight, thread. *Pellicularia solani*, NJ.

Canker, felt fungus. *Septobasidium langoosii*, *S. tenui*, *S. leprieurii*, Gulf states.

Canker; twig blight. *Nectria* sp., WV; *N. magnoliae*, NJ, TN, WV; *Tuberularia* sp., MI.

Leaf spot. *Alternaria tenuis*, TX; *Cladosporium fasciculatum*, GA to TX; *Cercospora magnoliae* (*Mycosphaerella milleri*), NC, SC, FL, NJ, WV; *Cristulariella pyramidalis*; *Colletotrichum* sp., FL, GA, SC; *Coniothyrium* sp., TX; *C. olivaceum*, TX; *Epicoccum nigrum*, TX; *Exophoma magnoliae*, FL, TX; *Glomerella cingulata*, AL, FL, GA, LA, MS, SC, TX; *Hendersonia magnoliae*, VA; *Heterosporium magnoliae*, FL, NC, TX; *Micropeltis alabamensis*, AL; *Phyllosticta cookei*, NY to Gulf states, CA; *P. magnoliae*, large leaf spot, NY to Gulf states, CA; *Septoria magnoliae*, SC to FL and TX.

Leaf spot; algal; green scurf; "red rust." *Cephaleuros virescens*, general.
 Nematode, burrowing. *Radopholus similis*, FL.
 Nematode, citrus. *Tylenchulus semipenetrans*, FL.
 Nematode, lance. *Hoplolaimus uniformis*, RI.
 Nematode, lesion. *Pratylenchus pratensis*.
 Nematode, root knot. *Meloidogyne* sp.
 Nematode, sting. *Belonolaimus longicaudatus*, FL.
 Parasitic lichen. *Strigula elegans* and *S. camplanata*, Southern U.S., LA.
 Rot, flower. *Cibornia (Sclerotinia) gracilipes*, MD.
 Rot, heart. *Fomes fasciatus*; *F. geotropus*.
 Rot, root. *Phymatotrichum omnivorum*, TX; *Clitocybe tabescens*, GA.
 Rot, wood. *Daldinia concentrica*, cosmopolitan; *Polyporus* spp.; *Poria* spp.,
Stereum spp.
 Spot anthracnose. *Elsinoë magnoliae*, FL, GA, LA, MS.
 Wilt. *Verticillium albo-atrum*, IN, CA.

The many leaf spots need not be alarming; they seldom cause premature defoliation. In the Gulf states lichens appear as small round gray spots on leaves, and the parasitic alga *Cephaleuros* often forms a velvety coating with hairlike outgrowths.

MAHOGANY (*Swietenia*)

Blight, twig, stem. *Phomopsis* sp., OR.
 Leaf spot. *Pestalotia swieteniae*, FL; *Phyllachora swieteniae*, FL.

MAHONIA (Oregon-Grape)

Canker; leaf blotch. *Leptosphaeria berberidis*, ID, MD.
 Leaf spot. *Cercospora* sp., LA; ?*Gloeosporium berberidis*, WA; *Phomopsis* sp., ?secondary; *Phyllosticta* spp., CT, AL, WA; *Cylindrocladium* sp., FL, GA.
 Nematode, root knot. *Meloidogyne* sp.
 Nonparasitic. Scald, in eastern states winter injury to foliage is severe.
 Parasitic lichen. *Strigula elegans* and *S. camplanata*, Southern U.S., LA.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Cumminsella mirabilissima* (0, I, II, III), common Western Great Plains to Pacific Coast; *C. texana*, TX; *C. wootoniana* (II, III), AZ, NM; *Puccinia graminis* (0, I), CA, MI, ND; II, III, on cereals and grasses; *P. koeleriae* (0, I), CO, ID, MT, OR; II, III on *Koeleria*; *P. oxalidis* (0, I), NM; II, III on *Oxalis*.

Rust due to *Cumminsella* is usually inconspicuous, but in a wet season there is a general blighted effect. *Mahonia*, like barberry, is under wheat-rust quarantine. *Mahonia repens* is immune.

MAIANthemum

Blight. *Botrytis* sp., NY.

Leaf spot. *Ramularia rubicunda*, MI, NY, OH, PA, WI, CA to AK; *Sphaeropsis cruenta*, AK, WA.

Rust. *Puccinia sessilis* (0, I), MA, MI, MN, NY, PA, WI; II, III, on *Phalaris*;
Uromyces acuminatus var. *magnatus* (0, I), MI, NY, WI; II, III, on marsh grass.

MALACHRA

Leaf spot. *Cercospora malachrae*, TX.

MALACOTHRIX

Gall, leaf. *Synchytrium innominatum*, CA.

Rust. *Puccinia harknessii* (III), CA; *P. hieracii* (0, I, II, III), CA.

MALLOTUS

Leaf spot. *Cercospora malloti*, MS.

MALLOW, GARDEN

(*Malva*)

Bacterial, MLO. California Aster Yellows, CA; Beet Curly Top, CA.

Leaf spot. *Alternaria* sp.

Rot, root. *Macrophomina phaseoli*, CA on *Malva parviflora*.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia heterospora* (III), KS, TX; *P. malvacearum*, CA, CO, OR, WV.

MALVASTRUM

(False-Mallow, Bush-Mallow)

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia interveniens* (0, I), CA; III on *Stipa*; ?*P. malvacearum*; *P. schedonnardi* (0, I), MT, ND to NM; II, III, on wild grasses; *P. sherardiana* (0, III), MT, ND to TX, NM; *P. heterospora* (III), TX.

MALVAVISCUS

Blight, twig. *Sclerotinia sclerotiorum*, TX.

Leaf spot. *Phyllosticta malvavisci*, TX.

Rot, root. *Clitocybe tabescens*, FL; *Helicobasidium purpureum*, TX; *Phymatotrichum omnivorum*, TX.

Rust. *Kuehneola malvicola* (II, III), TX; *Puccinia heterospora* (III), TX.

MANFREDA

(Spice-Lily, Wild Tuberose)

Leaf spot. *Cercospora amaryllidis*, TX; *Phyllosticta hymenocallidis*, TX.

Rust. *Aecidium modestum*, TX.

MANGO

(*Mangifera*)

Anthraxnose; flower and twig blight; fruit rot. *Glomerella cingulata*, cosmopolitan.

Blight, twig. *Phomopsis* sp., FL; *Physalospora* (*Diplodia*) spp.

Canker, brown felt. *Septobasidium pilosum* and *S. pseudopedicellatum*, FL.

Leaf spot. *Phyllosticta mortoni*, FL, TX; *Septoria* sp., FL.

Leaf spot, algal, green scurf. *Cephaleuros virescens*, general.

Nonparasitic. Little Leaf, zinc deficiency, FL. Soft Nose, on Indian varieties.

Powdery mildew. *Oidium mangiferae*, CA, FL.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, stem-end fruit. *Diplodia* sp.

Sooty mold. *Capnodium* spp., general.

Spot anthracnose; mango scab. *Elsinoë mangiferae*, FL.

Wilt. *Verticillium albo-atrum*, FL.

MANGROVE

(*Rhizophora*)

Leaf spot. *Cercospora rhizophorae*, FL.

MANIHOT

(Cassava, Manioc)

Anthraxnose; withertip. *Gloeosporium ?manihotis*, FL, LA, TX.

Dieback. *Physalospora abdita* and *P. rhodina*, FL.

Leaf spot. *Cercospora henningsii*, FL, TX.

Nematode, root knot. *Meloidogyne* sp., AL, FL.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, FL.

MANZANITA
(*Arctostaphylos*)

Black mildew. *Meliola* sp., CA.

Gall, red leaf spot. *Exobasidium vaccinii*, widespread; shoot gall, *E. vaccinii-uliginosi*, CA, OR.

Leaf spot. *Cryptostictis arbuti*, OR; *Phyllosticta amicta*, CA, OR.

Mistletoe. *Phoradendron villosum*, CA, OR.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, wood. *Fomes annosus*, CA; *F. arctostaphyli*, and *F. igniarius*, general; *Poria ferruginosa*.

Rust. *Pucciniastrum sparsum* (II, III), CA, OR.

MAPLE
(*Acer*)

Anthracnose; leaf blight. *Gloeosporium apocryptum*, large blotches, general; *G. acerinum*, small spots; *G. saccharinum*; *G. aceris*.

Bacterial crown gall. *Agrobacterium tumefaciens*, MI, OK, TX, VA.

Bacterial leaf spot. *Pseudomonas aceris*, on Japanese maple, CA; *P. acernea*.

Blight, inflorescence. *Ciborinia acerina*, MA, NY.

Blight, leaf. *Didymosporina aceris*, CT, PA.

Blight, seedling; smother. *Thelephora albido-brunnea*, NC, VA.

Blight, twig. *Macrophoma* sp., AR, NY.

Canker, bark. *Aleurodiscus acerinus*, MA, VT; *Hymenochaete agglutinans*, CT, MT, MI.

Canker, basal, crown. *Phytophthora cinnamomi*, NJ; *P. cambivora*, NJ.

Canker, bleeding. *Phytophthora cactorum*, CT, MA, NJ, NY, RI, VA.

Canker; dieback. *Coniothyrium negundinis*, IL, OK; *Cytospora* spp., MI; *Eutypella parasitica*, MI, MN, NH, NY, VT, WI; *Hypoxyton morsei*, MI, MN; *Fusarium* spp.; *Nectria cinnabarina*, cosmopolitan, often secondary; *N. coccinea*; *N. galligena*, widespread trunk canker; *Phomopsis* sp., OH; *P. acerina*, NY; *Physalospora* spp., ?secondary; *Sphaeropsis albescens*, IL, KS, IA, NY, ND, SD, WI; *Strumella coryneoidea*, MI, PA; *Schizoxylon microsporium*, Lake states; *Steganosporium acerinum*, NJ.

Canker, felt fungus. *Septobasidium* spp., AL, FL, KY, LA, NC, SC, TN, VA.

Damping-off. *Rhizoctonia solani*, cosmopolitan.

Dodder. *Cuscuta gronovii*, on seedlings, NY.

Leaf blister. *Taphrina carveri*, AL, KY, MI, MO; *T. bartholomaei*, UT; *T. darkeri*, OR; *T. dearnessii*, black, GA, MI, MN, NC, NY, OK, PA, VA;

- T. sacchari**, on sugar maple, AR, GA, IN, KS, ME, MI, MO, NH, NY, OH, PA, TN, WV, WI.
- Leaf spot. **Actinopelte dryina**, IL; **Alternaria** sp., ?secondary; **Cercospora negundinis**, KS, NE, WI; **C. saccharini**, MA; **Cercosporella aceris**, WA; **Cristulariella depraedens**, CT, NY; **C. pyramidalis**, FL; **Monochaetia desmazierii**, GA, NC, OK, TN; **Illosporium maculicola**, WA; **Laestadia brunnea**, NC, SC; **Leptothryium acerinum**, OK; **Marssonina truncatula**, OR; **Pezizella oenotherae**, NC, NY, VA; **Phyllosticta minima**, eyespot, general; **P. negundinis**, ME to AL, TX, WI; **Piggotia negundinis**, leaf blotch, WI, WY; **Stilbella acerina**, PA; **Septoria aceris**, general; **Venturia acerina**, NY, PA, VA, WV, WI.
- Leaf spot, tar. **Rhytisma acerinum**, general; **R. punctatum**, speckled, general.
- Mistletoe. **Phoradendron serotinum (flavescens)**, common from NJ to FL, TX and MO.
- Mistletoe. **Viscum album** on big leaf maple (*A. macrophyllum*) and silver maple (*A. saccharinum*), CA.
- Nematode. **Criconemoides** sp.; **Hemicycliophora** sp.; **Pratylenchus thornei**; **Tylenchorhynchus** sp.; **Xiphinema** sp.
- Nematode, root knot. **Meloidogyne** sp., OR; **M. ovalis**, WI.
- Nonparasitic. **Decline**, frequently roadside salt injury. **Frost Crack**, gas injury.
- Leaf Scorch**. Common on street and lawn trees, often associated with high temperature after a moist spring.
- Parasitic lichen. **Strigula elegans** and **S. camplanata**, southern U.S., LA.
- Powdery mildew. **Phyllactinia corylea**, IA, NC, CA, OR, VT, SD; **Uncinula circinata**, ME to AL, TX, MO, MI; **Microsphaera alni**.
- Rot, heart, sapwood, wound. **Collybia velutipes**, CT, MA; **Daedalea** spp., northeastern and north central states, southward; **Daldinia concentrica**, cosmopolitan; **Fomes applanatus**; **F. connatus**; **F. igniarius**; **Ganoderma lucidum**, fatal to some street trees, NY and NJ; **Hericeum erinaceous**, VT to MD, MI, MN; **Lenzites** spp.; **Pholiota adiposa**; **Pleurotus** spp.; **Polyporus** spp.; **Poria** spp.; **Steccherhinum septentrionale**, general; **Stereum** spp.; **Schizophyllum commune**, cosmopolitan; **Ustulina vulgaris**, northeastern and north central states; **Valsa leucosomoides**, on tapped sugar maples.
- Rot, root. **Armillaria mellea**, general; **Clitocybe tabescens**, GA, MO; **Helicobasidium purpureum**, TX; **Phymatotrichum omnivorum**, TX.
- Rot, sapstreak. **Endoconidiophora virescens**; **Ceratocystis coerulescens**.
- Rot, seedling, charcoal. **Macrophomina phaseoli**, IL.
- Virus. **Peach Rosette**; **Tobacco Necrotic Ring Spot**.
- Wilt. **Verticillium albo-atrum**, widespread in cultivated trees, especially Norway maple.

Verticillium wilt is the most destructive maple disease and is particularly prevalent in street trees. The wilting may be confined to a single branch, which can be cut out, or may kill the whole tree. In removing dead trees, get all of the root system and replace with a different kind of tree. Leaf scorch

is common on sugar maple in hot, windy weather; anthracnose may be conspicuous in wet weather.

MARANTA

(*Calathea*)

Leaf spot. *Glomerella cincta*, NJ; *Phyllosticta* sp., NJ; *Drechslera setariae*, FL.
Rust. *Puccinia cannae* (II, III), FL.

MARGUERITE

(*Chrysanthemum frutescens*)

Bacterial crown gall. *Agrobacterium tumefaciens*, IA, MD, NJ, NY, VA.
Bacterial, MLO. Aster Yellows, KS, NJ, NY, and California Aster Yellows, CA.
Nematode, root knot. *Meloidogyne* sp.
Powdery mildew. *Erysiphe cichoracearum*, NJ.
Virus. Beet Curly Top, CA.
Wilt. *Verticillium albo-atrum*, NJ.

MARIGOLD

(*Tagetes*)

Bacterial leaf spot. *Pseudomonas syringae* pv. *tagetis*, NC.
Bacterial, MLO. Aster Yellows, CT, NJ, NY, PA, WI; California Aster Yellows, CA.
Bacterial wilt. *Pseudomonas solanacearum*, FL.
Blight. *Alternaria tagetica*, SC.
Blight, head. *Botrytis cinerea*, CT, NJ, PA, AK; *Helminthosporium* sp., TX.
Blight, southern. *Sclerotium rolfsii*, FL, NJ, VA.
Leaf spot. *Alternaria tagetica*, SC, NJ; *Cercospora* sp., CT, *C. tageticola*, FL; *Septoria tageticola*, FL.
Nematode. *Aphelenchoides tagetae*, MD; *Paratylenchus micoletzkyi*, MD.
Nematode, root knot. *Meloidogyne hapla*, VA.
Nonparasitic. Air pollution, NO₂, SO₃, O₃, NC.
Rot, charcoal. *Macrophomina phaseoli*, OK.
Rot, root. *Pythium ultimum*, CA; *Rhizoctonia solani*, TX.
Rot, stem; wilt. *Sclerotinia sclerotiorum*, NY; *Phytophthora cryptogaea*, NY; *Fusarium* sp., CA, NJ, NY.
Rust. *Coleosporium madiae* (II, III), CA; 0, I, on pine; *Puccinia tageticola* (II, III), TX.
Virus. Cucumber Mosaic, FL.
Wilt. *Fusarium oxysporum* f. sp. *callistephi*, CA; *Verticillium albo-atrum*, NY; *V. dahliae*, AZ.

Marigolds are easy to grow without paying too much attention to disease. Cut fading flower heads off into a paper bag before the gray mold of botrytis blight gets started.

MARIPOSA-LILY, GLOBE-TULIP
(*Calochortus*)

Rust. *Puccinia calochorti* (0, I, III), CA, OR, WA to NE and NM.

MARSH-MARIGOLD
(*Caltha*)

Gall, leaf. *Synchytrium aureum*, WI.

Leaf spot. *Cercospora calthae*, WI; *Cylindrosporium* sp., NY; *Fabraea rouseauana*, CA, WI; *Ramularia calthae*, NY, WI.

Powdery mildew. *Erysiphe polygoni*, MI, OH, WI.

Rust. *Puccinia areolata* (0, I, II, III), CA, CO, WA, AK; *P. calthae* (0, I, II, III), NY, NJ to IA and ND; *P. calthicola* (0, I, II, III), NY to IA and MN; *P. gemella* (III), CA, ID, MT, OR, WA, AK; *P. treleasiana* (III), CO, NV, UT, WA, WY.

MATELEA

Parasitic lichen. *Strigula elegans*; *S. complanata*, Southern U.S., LA.

MATRICARIA
(False Chamomile)

Bacterial, MLO. *California Aster Yellows*, CA.

Nematode, root knot. *Meloidogyne* sp., CA.

Powdery mildew. *Erysiphe cichoracearum*, WA; *Sphaerotheca macularis*, WA.

White rust. *Albugo tragopogonis*, CA, ND, OR.

MATRIMONY-VINE
(*Lycium halimifolium*)

Leaf spot. *Alternaria* sp., IA; *Cercospora lycii*, IA; *Phyllosticta lycii*, OH, NY.

Powdery mildew. *Erysiphe polygoni*, CT, DE, MD, NJ, PA; *Microsphaera diffusa*, OH, PA, UT; *Sphaerotheca pannosa*, ID, WA.

Rust. *Puccinia tumidipes* (II, III), NY to AL, TX, SD; *P. globosipes* (II, III), PA.

MAURANDYA

Leaf spot. *Septoria antirrhinorum*, TX.

MAURITIUS-HEMP

(*Furcraea*)

Nematode, root knot. *Meloidogyne* sp., MD.

MAY-APPLE

(*Podophyllum*)

Blight, gray mold. *Botrytis cinerea*, NJ.

Blight, leaf. *Septotinia podophyllina*, DE, MD, MO, NJ, NY, VA, WV.

Leaf spot. *Cercospora podophylli*, IL; *Glomerella cingulata*, DE; *Pezizella oenotherae*, VA; *Phyllosticta podophylli*, NY to AL, AR and WI; *Vermicularia podophylli*, TX, VA.

Rot, stem. *Rhizoctonia* sp., MO.

Rust. *Puccinia podophylli*, general.

MEADOW-BEAUTY

(*Rhexia*)

Leaf spot. *Cercospora erythrogena*, AL, DE, MS, TN; *Colletotrichum rhexiae*, DE; *Phyllosticta rhexiae*, FL.

MEADOW-RUE

(*Thalictrum*)

Downy mildew. *Phytophthora thalictri*, WI, CT, NY.

Leaf spot. *Ascochyta clematidina* f. *thalictri*, WI; *Cercospora fingens*, WI, IL; *Cercospora filiformis*, WI; *Cylindrosporium thalictri*, IN, KS, WI; *Gloeosporium thalictri*, WI; *Mycosphaerella thalictri*, NJ, NY, VT, WI; *Septoria thalictri*, KS.

Powdery mildew. *Erysiphe polygoni*, MA to PA, IL and ND.

Rust. *Puccinia recondita* (0, I), CO, MI, northeastern and north central states; II, III on grasses; *P. septentrionalis* (0, I), CO, IN, IA, CA; II, III, on *Polygonum*, *Tranzschelia pruni-spinosae* (0, I), CO, IN, IA, KS, NE, ND, SD, OH, PA; II, III on *Prunus*, *T. thalictri* (0, III), eastern and central states to MS, CA, NM, ID.

Smut, leaf and stem. *Urocystis sorosporioides*, AZ, MA, NY, UT.

Smut, white. *Entyloma thalictri*, CT, IL, IN, NY, WI.

MEADOWSWEET

(*Filipendula*)

Leaf spot. *Cylindrosporium* sp.; *Septoria ulmariae*, CT.

Powdery mildew. *Sphaerotheca macularis*, IN, NY, VT.

Rust. *Triphragmium ulmariae* (0, I, II, III), IN.

MEDICAGO

(Black Medic)

Virus. Tomato Ringspot, VT.

MEDLAR

(*Mespilus*)

Bacterial fire blight. *Erwinia amylovora*, NY.

Leaf spot. *Fabraea maculata*, CA.

Rust. *Gymnosporangium clavipes*, NY.

MELILOTUS

Broomrape. *Orobanche ramosa*, TX.

MELON, MUSKMELON, CANTALOUPE, CASSABA

(*Cucumis melo*)

Anthracnose. *Colletotrichum lagenarium*, general in East and South to CO, AZ, ND; *Marssonina melonis*, NY.

Bacterial angular leaf spot. *Pseudomonas lachrymans*, CA, DE, IA, MD, MI, NJ, PA; *P. pseudoalcaligenes* subsp. *citrulli*, GA.

Bacterial rind necrosis. *Erwinia* sp., TX.

Bacterial soft rot. *Erwinia aroideae* and *E. carotovora*.

Bacterial wilt. *Erwinia tracheiphila*, general east of Rocky Mountains; AZ to ID, WA.

Blight, gummy stem; black rot. *Mycosphaerella citrullina* (*M. melonis*), DE, FL, MA, NJ, NY, TX.

Blight, leaf; black mold. *Alternaria cucumerina*, general.

Blight, southern. *Sclerotium rolfsii*, VA and OH to FL and TX.

Blight, stem gumming and stem-end rot. *Diplodia natalensis*, TX.

Damping-off. *Rhizoctonia solani*, CA, GA, NJ; fruit rot, FL, TX; *Pythium debaryanum*, CA, CT, IA, NJ, NY; *Fusarium equiseti*, CA.

Dodder. *Cuscuta arvensis*, MD.

Downy mildew. *Pseudoperonospora cubensis*, general.

Leaf spot. *Cercospora* sp., CO, GA, TX; *Phyllosticta* sp., GA, OH, TX;

Septoria cucurbitacearum, DE, MA, MI, NH, NY, PA, VT, WI.

Nematode, root knot. *Meloidogyne arenaria*, *M. hapla*, NJ to FL, CA.

Nonparasitic. **Leaf Spot**, magnesium deficiency, NY.

Powdery mildew. *Erysiphe cichoracearum*, general.

Rot, charcoal. *Macrophomina phaseoli*, CA, OR, TX.

Rot, fruit. *Fusarium* spp., general in market, also *Alternaria* spp.; *Monilia sitophila*, IN, NY; *Mucor* sp., NY; *Penicillium* spp., blue mold; *Phytophthora* spp.; *Rhizopus stolonifer*, cosmopolitan; *Trichoderma viride*, green mold; *Trichothecium roseum*, pink mold, occasional in market.

Rot, root. *Phymatotrichum omnivorum*, TX; *Pythium periplocum*, CA.

Rot, root; cottony leak. *Pythium aphanidermatum*, AZ, CA, TX.

Rot, stem. *Sclerotinia sclerotiorum*, AR, MA, TX; *Cephalosporium* sp.

Scab. *Cladosporium cucumerinum*, occasional, East and central states.

Virus. **Beet Curly Top**, AZ, CA, ID, OR, TX, WA; **Cucumber Mosaic**, general;

Muskmelon Mosaic, general; **Tobacco Ring Spot**, KS, MD, NC, PA, WI;

Squash Mosaic; **Watermelon Mosaic**; **Zucchini Yellow Mosaic**, CA, FL,

NY.

Wilt. *Fusarium oxysporum* f. sp. *melonis*, general; *Verticillium albo-atrum*, CA, OR.

Melons belong to the cucurbit family and in general have the same diseases as cucumbers. Downy mildew is a problem on the moist East Coast, and powdery mildew may be a limiting factor in the arid Southwest. Although there are varieties resistant to powdery mildew, different physiological races of the fungus keep things complicated. Sulfur dust should not be used except on sulfur-resistant melon varieties. Mosaic is transmitted both by seed and aphids; purchase virus-free seed, eliminate weeds, and keep down insects.

MELOTHRIA

Downy mildew. *Pseudoperonospora cubensis*, GA, OH, TX.

Nematode, root knot. *Meloidogyne* sp., FL.

Powdery mildew. *Erysiphe cichoracearum*, WI.

MENTZELIA

(Blazing Star)

Leaf spot. *Phyllosticta mentzeliae*, KS, TX; *Septoria mentzeliae*, KS, WA, TX.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, NJ.

Rust. *Puccinia aristidae* (0, I), AZ, CO; II, III, on grasses; *Uredo floridana*, FL.

MENZIESIA

Gall, leaf. *Exobasidium vaccinii*, Pacific Northwest, AL, NC, VA, WV.
 Leaf spot, tar. *Melasmia menziesii*, MT, and WY to OR and AK; *Rhytisma* sp.
 Powdery mildew. *Microsphaeraalni* var. *vaccinii*, AK, VA.
 Rust. *Pucciniastrum myrtilli* (II, III), WV; 0, I, on hemlock.

MERTENSIA

(Bluebells, Virginia Cowslip)

Downy mildew. *Peronospora* sp., MT.
 Leaf spot. *Septoria poseyi*, OR.
 Powdery mildew. *Erysiphe cichoracearum*, AL, CO, MT, PA, NM, NV, UT, WY.
 Rot, stem. *Sclerotinia sclerotiorum*, CO.
 Rust. *Puccinia mertensiae* (III), CO, NV, UT, WY; *P. recondita* (0, I), ID, MT, OR; II, III, on grasses.
 Smut, leaf. *Entyloma serotinum*, IN, IA, MD, VA, WY.
 Virus. Cucumber Mosaic, IL, NJ.

MESEMBRYANTHEMUM

(Fig-Marigold)

Nematode, root knot. *Meloidogyne* sp., AL, TX.
 Sooty mold. *Torula herbarum*, CA.

MESQUITE

(*Prosopis*)

Bacterial crown gall. *Agrobacterium tumefaciens*, TX.
 Blight, leaf. *Cercospora prosopidis*; *Scleropycnium aureum*, AZ, TX.
 Leaf spot. *Napicladium prosopodium*, TX; *Phyllosticta juliflora*, also pod spot, OK, TX; *Gloeosporium leguminum*, pod spot, TX.
 Mistletoe. *Phoradendron californicum*; *P. serotinum (flavescens)*, TX to CA, and *P. tomentosum*, TX.
 Powdery mildew. *Leveilulla taurica*; *Uncinula prosopidis*, TX.
 Rot, heart. *Polyporus texanus*, CA, TX; *Fomes everhartii*, AZ, TX; *Schizophyllum commune*, TX.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Ravenelia arizonica* (II, III), TX to CA; *R. holwayi* (0, I, II, III), TX to CA.

MIGNONETTE

(*Reseda*)

Damping-off, root rot. *Rhizoctonia solani*, CT.
 Leaf spot. *Cercospora resedae*, MA to MS, MO, IA.

Nematode, root knot. *Meloidogyne* sp., FL.
Wilt. *Verticillium albo-atrum*, NY.

MILK THISTLE
(*Silybum*)

Virus. **Tobacco Streak**, CA.

MIKANIA
(Climbing Hempweed)

Leaf spot. *Cercospora mikaniae*, MS; *Septoria mikanii*, CT, TX.
Rust. *Puccinia spegazzinii*, AL, FL, MS, NC.

MILKWORT
(*Polygala*)

Anthracnose. *Gloeosporium ramosum*, IN, NJ, WI.
Leaf spot. *Cercospora grisea*, MS, NJ, VA; *Septoria consocia*, IN, MI; *S. polygalae*, NY.
Rust. *Aecidium renatum*, NM; *Puccinia andropogonis* var. *polygalina* (0, I), IA, MI, WI; II, III, on *Andropogon*; *P. pyrolae* (III), CT, ME, MI, NH, NY, WI.

MIMOSA, SILK-TREE
(*Albizzia julibrissin*)

Canker; dieback. *Nectria cinnabarina*, DC, NC, VA.
Nematode, root knot. *Meloidogyne arenaria* and var. *thamesii*; *M. incognita*; *M. javanica*; *M. hapla*.
Nematode, stubby root. *Trichodorus primitivus*.
Rot, heart. *Ganoderma lucidum*; Root, *Armillaria mellea*.
Wilt. *Fusarium oxysporum* f. sp. *perniciosum*, AL, GA, FL, NC, SC, NJ, VA, AR, MS.

The mimosa wilt is one of the most devastating tree disease on record. The fungus is in the soil with no possibility of control by aerial spraying. The incidence of wilting is probably increased by nematodes. Resistant varieties Tryon and Charlotte have been released, but occasional specimens succumb to wilt. The fungus may also be seed-transmitted.

MIMULUS
(Monkey-Flower)

Bacterial, MLO. **California Aster Yellows**, CA.
Blight, gray mold. *Botrytis cinerea*, AK.

Leaf spot. *Cercospora mimuli*, MO; *Ramularia mimuli*, CA, NY, OH, WY; *Septoria mimuli*, PA to MS, MO, NE.
 Nematode, leaf. *Aphelenchoides ritzema-bosi*.
 Powdery mildew. *Erysiphe cichoracearum*, CA, PA, UT.
 Rust. *Puccinia andropogonis* (0, I), MO, WI; II, III on *Andropogon*; *Uredo* sp. (II), WI.

MINT (*Mentha*)

Canker, stem. *Fusarium* sp., MI, WA; *Alternaria* sp., MI; *Phoma menthae*, OR.
 Leaf spot. *Cercospora menthicola*, IL, TX; *Phyllosticta decidua*, occasional, ME to OH, IA, WI; *Ramularia menthicola*, CA, ME, MT, OR; *Septoria menthae* (*S. menthicola*), IN, WI.
 Nematode. *Aphelenchoides parietinus*; *Longidorus sylphus*, OR; *Paratylenchus macrophallus*, OR.
 Nematode, root knot. *Meloidogyne hapla*, OR.
 Powdery mildew. *Erysiphe cichoracearum*, CO, IA, UT, WA; *E. galeopsidis*, IA; *E. polygona*, TX; *Sphaerotheca macularis*, WA.
 Rust. *Puccinia menthae* (0, I, II, III), East and central states to TX and Pacific Coast; *P. angustata* (0, I), CA, SD, WI; II, III, on grasses.
 Spot anthracnose. *Sphaceloma menthae*, IN, MI, MD.
 Virus. Tobacco Ring Spot, IN.
 Wilt. *Verticillium albo-atrum* f. *menthae* (*V. dahliae*), IN, MI, OR.

Rust is serious in mints grown commercially, in greenhouses or in the field. Overwintering spores can be killed by treating rhizomes with hot water. Spot anthracnose is largely controlled by thorough coverage when mint is plowed under in the fall. Mint in the backyard is too prolific for worry about disease.

MISTLETOE (*Phoradendron*)

Black mildew. *Asterina phoradendricola*, FL.
 Blight, brown felt. *Herpotrichia juniperi*, CA.
 Blight, leaf. *Sphaeropsis visci*, SC, TX; *Phyllosticta phorodendri*, CA.
 Blight, twig. *Nectria cinnabarina*, TX.
 Canker. *Cystospora pinicola*, OR, WA; *Hymenochaete agglutinans*, AL.
 Canker, felt fungus. *Septobasidium pseudopedicellatum*, FL.
 Dodder. *Cuscuta exaltata*, TX.
 Leaf spot. *Cercospora struthanthi*, FL; *Exosporium phoradendri*, TX.
 Rust. *Peridermium bethelii*, CO; *Uredo phoradendri*, CA, OR.

If you treasure mistletoe for Christmas greens, you will be sorry it has diseases; but if you consider mistletoe a pest, you probably wish the above list were longer.

MISTLETOE, DWARF

(*Arceuthobium* spp.)

Blight, brown felt. *Herpotrichia juniperi*, CA.

Rust. *Peridermium bethelii*, CO.

MOCK-CUCUMBER

(*Echinocystis*)

Anthracnose. *Colletotrichum lagenarium*, FL.

Downy mildew. *Plasmopara australis*, IA, KS, MN, OH, WI; *Pseudoperonospora cubensis*, OH.

Leaf spot. *Cercospora echinocystis*, NY to FL, NE, WI; also fruit spot;

Septoria spp., widespread; *Alternaria* sp., FL.

Powdery mildew. *Erysiphe cichoracearum*, WI.

Virus. **Beet Curly Top**, CA; **Cucumber Mosaic**, CA, CO, IN, IL, MI, NY, WI.

Wilt. *Fusarium* sp., FL.

MOCK-ORANGE

(*Philadelphus*)

Bacterial blight. *Pseudomonas syringae*, MN.

Blight, flower and shoot. *Botrytis cinerea*, cosmopolitan.

Blotch, sooty, *Sarcinella heterospora*, FL.

Leaf spot. *Ascochyta philadelphi*, NY; *Cercospora angulata*, MO, TX; *Ramularia philadelphi*, TX, WA; *Septoria philadelphi*, ID, MT, IA.

Nematode, root knot. *Meloidogyne* sp.

Powdery mildew. *Phyllactinia corylea*, MT, WA, GA.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Gymnosporangium speciosum* (0, I), CO, NM, UT; III, on juniper.

MOCK-STRAWBERRY

(*Duchesnea*)

Downy mildew. *Peronospora potentillae*, NC.

Gall, leaf. *Synchytrium globosum*, SC.

Leaf spot. *Pezizella oenotherae*, VA.

Rust. *Frommea obtusa duchesneae* (0, I, II, III), NH to FL and KY; *Frommella duchesneae*, IN.

MONARDA

(Horse-Mint, Bee-Balm)

Blight, southern. *Sclerotium rolfsii*, TX.

Gall, leaf. *Synchytrium holwayi*, IA, WI.

Leaf spot. *Cercospora* sp., OK; *Phyllosticta decida*, KS, NE, OK, TX, WI; *P. monardae*, KS; *Ramularia brevipes*, AL, TX.
Rust. *Puccinia angustata* (0, I), NE, WI; *P. menthae* (0, I, II, III), general from ME to MS; TX, ID.
Virus. **Mosaic**. Unidentified, IN.

MONARDELLA

Leaf spot. *Phyllosticta monardellae*, CA.
Rust. *Puccinia menthae* (0, I, II, III), CA, NV, OR, NM, UT.

MONESES (Wood-Nymph)

Rust. *Chrysomyxa pirolata* (II, III). CO, ME, MI, MT, NM, WA, WY, AK; 0, I, on spruce.

MONKSHOOD, ACONITE (*Aconitum*)

Bacterial leaf spot. *Pseudomonas delphinii*, ME, NJ.
Downy mildew. *Plasmopora pygmaea*, AK.
Nematode, root knot. *Meloidogyne* sp., NY, VT.
Powdery mildew. *Erysiphe polygoni*, NY, TX, WV.
Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, CT, NJ.
Rot, stem. *Sclerotinia sclerotiorum*, CO; *Sclerotium rolfsii*, CT, DE, MN, NJ, NY.
Rust. *Puccinia recondita* (0, I), CO, AK; II, III, on grasses; *Uromyces lycoctoni* (0, I, II, III), CA, CO, TX, UT, WY.
Smut, leaf and stem. *Urocystis carcinodes*, UT; *U. sorosporioides*, UT.
Virus. **Mosaic**, Unidentified, NY.
Wilt, *Verticillium albo-atrum*, MA, NJ, NY, OH.

Verticillium wilt is more widespread in monkshood than the official reports indicate. The leaves dry along the stem, flowers are poor, and when the stem is cut across, blackened bundles are readily seen. The clumps do not die immediately but decline over a period of years.

MONKSHOOD VINE (*Ampelopsis aconitifolia*)

Dieback. *Tubercularia nigricans*, NH, TX.
Nematode, dagger. *Xiphinema index*.

MONSTERA

Anthracnose. *Gloeosporium* sp., WA; *Colletotrichum* sp.
Leaf spot. *Macrophoma philodendri*, FL, MI.

MONTIA (Indian Lettuce)

Smut, seed. *Ustilago claytoniae*, WA.

MOONFLOWER (*Calonyction*)

Leaf spot. *Phyllosticta* sp., NJ.
Nematode, leaf. *Aphelenchoides fragariae*, NJ.
Nematode, root knot. *Meloidogyne* sp., NJ, SC.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rust. *Coleosporium ipomoeae* (II, III), AL, NC, SC, TX; 0, I, on pine.
White rust. *Albugo ipomoeae-panduratae*, FL.

MOONSEED (*Menispermum*)

Leaf spot. *Cercospora menispermi*, NY to VA, KS, WI; *Colletotrichum sordidum*, WI; *Phyllosticta menispermicola*, IL; *Septoria abortiva*, IL, KS.
Powdery mildew. *Microsphaera alni*, widespread.
Smut, leaf. *Entyloma menispermi*, PA to VA, KS, ND.

MOREA

Rust. *Puccinia iridis*, FL.

MORINDA (Royoc, Indian-Mulberry)

Leaf spot. *Cercospora morindicola*, FL.
Spot anthracnose. *Sphaceloma morindae*.

MORNING-GLORY (*Ipomoea*)

Blight, blossom, blight. *Choanephora compacta*, GA.
Blight, southern. *Sclerotium rolfsii*, TX.

- Blight, thread. *Pellicularia koleroga*, FL.
 Canker, stem. *Vermicularia ipomoearum*, NY, PA.
 Leaf spot. *Alternaria* sp., VA; *Cercospora alabamensis*, AL, FL, NJ; *Phyllosticta ipomoeae*, FL, KS, MS; *Septoria convolvuli*, KS, FL, PA, TX, WI.
 Nematode. *Rotylenchulus reniformis*, LA.
 Nematode, root knot. *Meloidogyne* sp.; *M. hapla*, AL, OK; *M. incognita*, LA.
 Rot, root. *Phymatotrichum omnivorum*, TX; *Macrophomina phaseolina*, AZ; *Streptomyces ipomoea*, LA; *Ceratocystis fimbriata*, LA; *Fusarium oxysporum* f. sp. *batatas*, LA; *Plenodomus destruens*, LA; *Monilochaetes infuscans*, LA.
 Rust. *Puccinia crassipes* (I, III), FL, GA, LA, SC; *Coleosporium ipomoeae* (II, III), NJ to FL, TX, KS; 0, I on pine; *Uredo laeticolor* (II), FL.
 Virus. ?Cucumber Mosaic, FL.
 White rust. *Albugo ipomoeae-panduratae*, NJ to AZ, NE.
 Wilt. *Fusarium* sp., TX.

MOTHERWORT

(*Leonurus*)

- Black mildew. *Dimerosporium hispidulum*, TX.
 Leaf spot. *Ascochyta leonuri*, LA; *Phyllosticta decidua*, OH, TX, WI; *Septoria lamii*, PA.
 Virus. Mosaic. Unidentified, IN.

MOUNTAIN-ASH

(*Sorbus*)

- Bacterial fire blight. *Erwinia amylovora*, widespread, VA.
 Bacterial crown gall. *Agrobacterium tumefaciens*, CT, NJ.
 Blight, leaf. *Fabraea maculata*, AK, WI, MN, WV.
 Blight, twig. *Nectria cinnabarina*, corla spot, NC, AK; *Phomopsis* sp., MA; *Valsa leucostoma*, OH, WV.
 Canker. *Cytospora* sp., VA.
 Canker, blister. *Nummularia discreta*, IA, MA.
 Canker, branch; fruit rot. *Glomerella cingulata*, IN.
 Canker; dieback. *Cytospora chrysosperma*, MN, MT, NE, NJ, WA; *C. leucostoma*, MT; *C. massariana*, ID; *C. microspora*, MT; *Fusicoccum* sp., IL.
 Canker, trunk; black rot. *Cytospora rubescens*, IA; *Physalospora obtusa*, IN, MI, OH, CT to VA.
 Leaf spot. *Alternaria* sp., IA; *Graphium sorbi*, NY, WI; *Phyllosticta globigera*, ID, WA; *P. sorbi*, IL, ME, IA, MO, OK, TX; *Septoria sorbi*, IA; *S. sitchensis*, ID.
 Mistletoe, European. *Viscum album*, CA.
 Powdery mildew. *Podosphaera oxyacanthae* var. *tridactyla*, WA.

Rot, heart. *Polyporus hirsutus*, MI, WA; *P. versicolor*, WI.

Rot, root. *Armillaria mellea*, NJ; *Phymatotrichum omnivorum*, TX.

Rust. *Gymnosporangium cornutum* (0, I), ME to NJ and WI, MT to CO, WA, AK; III, on juniper; *G. globosum* (0, I), OR; III, on *Libocedrus*; *G. nelsoni* (0, I), MT, WA, WY; III, on juniper; *G. nootkatense* (0, I), OR, WA, AK; III, on *Chamaecyparis*; *G. tremelloides* (0, I), MT to CO, WA, AK.

Scab. *Venturia inaequalis*, IL, MN, NY, WA.

Mountain-ash is quite susceptible to fire blight, but affected branches can usually be pruned out. Rust may appear on foliage in midsummer. If the mountain-ash is more desirable than the junipers nearby, the latter can be eradicated. Fertilizing will help the tree recover from a bout with *Cytospora* canker but may increase susceptibility to fire blight.

MOUNTAIN-HEATHER

(*Phyllodoce*)

Blight, brown felt. *Herpotrichia nigra*, ID.

Gall, leaf. *Exobasidium vaccinii-uliginosi*, OR.

MOUNTAIN-HOLLY

(*Nemopanthus*)

Leaf spot. *Ramularia nemopanthus*, NY.

Leaf spot, tar. *Rhytisma ilicis-canadensis*, ME to WV and MI.

Powdery mildew. *Microsphaera alni*, NY, WI.

Rot, wood. *Poria inermis*, PA.

MOUNTAIN-LAUREL

(*Kalmia*)

Blight, flower. *Ovulinia azaleae*, SC, AL.

Blight, leaf. *Phomopsis kalmiae*, NY to NC.

Canker; felt fungus. *Septobasidium* sp., TX, AL.

Gall, leaf. *Exobasidium vaccinii*, AK; *Synchytrium vaccinii*, red spot, NJ.

Heart, rot, wood rot. *Fomes annosus*, NC.

Leaf spot. *Cercospora kalmiae*, CT to AL and TN; *Mycosphaerella colorata* (*Phyllosticta kalmicola*), CT to AL, IN, MI, TX; *Pestalotia kalmicola*, ?secondary, DE, NJ, PA, TX, WA; *Septoria angustifolia*, MA to AL, OH; *Rhytisma andromedae*, tar spot, VT.

Nonparasitic. *Chlorosis*, usually iron deficiency.

Powdery mildew. *Microsphaera alni* var. *vaccinii*, WI.

Rot, root. *Armillaria mellea*, MD; *Corticium galactinum*, MD; *Phymatotrichum omnivorum*, TX.

Rot, wood. *Polyporus versicolor*, VA; *Stereum rameale*, VA.

Phomopsis leaf blight or blotch and *Mycosphaerella* (*Phyllosticta*) leaf spot are common and rather disfiguring on bushes in shade or under tree drip. In light cases, removal of spotted leaves is sufficient.

MOUNTAIN-MAHOGANY (*Cercocarpus*)

Leaf spot. *Septogloeum cercocarpi*, CA.
Rot, wood. *Stereum hirsutum*, OR.
Spot anthracnose. *Sphaceloma cercocarpi*, CA.

MOUNTAIN-MINT (*Pycnanthemum*)

Gall, leaf. *Synchytrium cellulare*, WI.
Leaf spot. *Cercoseptoria blephiliae*, WI; *Cercospora pycnanthemis*, AL.
Rust. *Puccinia angustata* (0, I), IN; *P. menthae* (0, I, II, III), MA to VA, TX and IA, AL, OK, CA.

MOUNTAIN-SORREL (*Oxyria*)

Rust. *Puccinia oxyriae* (II, III), CA, CO, ID, OR, UT, AK; 0, I unknown.
Smut, floral. *Ustilago vinosa*, CA, CO, WA, WY, AK.

MULBERRY (*Morus*)

Bacterial hairy root. *Agrobacterium rhizogenes*, NE.
Bacterial leaf spot. *Pseudomonas syringae* pv. *mori*, general.
Bacterial scorch. *Xylem limiting bacteria*, Mid-Atlantic and Southern U.S.
Blight, berry; popcorn disease. *Ciboria carunculoides*, NC to FL, TX, VA.
Blight, twig. *Myxosporium diedickei*, TX, WA.
Canker; twig blight. *Cytospora* sp., NJ, TX; *Dothiorella* sp.; *D. mori*, NJ, TX;
Gibberella baccata var. *mori*, widespread; *Nectria* sp., widespread; *N. cinnabarina*, widespread; *Sclerotinia* sp., TX.
Leaf spot. *Cercospora moricola*, PA to FL, NE, TX; *Cercospora mori*, NE, OK, TX; *Exosporium* sp., FL; *Mycosphaerella arachnoidea*, false mildew, GA, NC; *M. mori*, widespread; *Phyllosticta moricola*, KS; *Cytospora* sp., VA.
Nematode, root knot. *Meloidogyne* spp., NJ, NC, OK.
Powdery mildew. *Phyllactinia corylea*, OH; *Uncinula geniculata*, NY to KS, AL.
Rot, heart. *Polyporus farlowii*, AZ, NM; *P. hispidus*, CT; *Ganoderma applanatum*; *Hymenochaete agglutinas*, MD.

Rot, root. *Armillaria mellea*, DE, NC, OK; *Helicobasidium purpureum*, TX; *Phymatotrichum omnivorum*, TX.

Rot, wood. *Schizophyllum commune*, CA; *Stereum cinerescens*, MA.

Rust. *Cerotelium fici* (II), LA.

Bacterial leaf spot damages nursery trees having overhead irrigation; *Mycosphaerella* leaf spot sometimes defoliates older trees.

MULLEIN (*Verbascum*)

Downy mildew. *Peronospora sordida*, NJ.

Leaf spot. *Cercospora verbascicola*, TX; *Phyllosticta verbasicola*, IN, KS, TX; *Ramularia variabilis*, NY to MS, TX, WA; *Septoria verbasicola*, TX, NY to AL, MO, TX.

Nematode, root knot. *Meloidogyne* sp.

Powdery mildew. *Erysiphe cichoracearum*, PA; *Oidium* sp., NJ.

Rot, root, *Phymatotrichum omnivorum*, TX.

Virus. Tomato Ringspot, VT.

MUSHROOM, OYSTER (*Pleurotus ostreatus*)

Dry bubble. *Verticillium fungicola*, PA

MUSK-ROOT (*Adoxa*)

Gall, leaf. *Synchytrium anomalum*, IA.

Leaf spot. *Phyllosticta adoxae*, CO.

Rust. *Puccinia adoxae* (III), CO, UT, WY; *P. argentata* (0, I), IA, MN, WI; II, III, on *Impatiens*.

MUSTARD GREENS (*Brassica juncea*)

Bacterial black rot. *Xanthomonas compestris*, FL, OH.

Bacterial, MLO. Aster Yellows.

Bacterial, yellows. *Spiroplasma citri*, IL.

Club root. *Plasmodiophora brassicae*, CA, CT, OH, TX, WA.

Damping-off. *Rhizoctonia solani*, cosmopolitan.

Downy mildew. *Peronospora parasitica*, CT, FL, IA, TX.

Leaf spot. *Cercospora brassicola*, IN, LA, NJ; *Cercospora brassicae*, CA, VA.

Nematode, root knot. *Meloidogyne* sp., FL, MO, TX; *Heterodera schactii*, UT.
 Powdery mildew. *Erysiphe polygoni*, AZ, CA, FL, TX.
 Rot, crown; drop. *Sclerotinia sclerotiorum*, TX.
 Rot, root; damping-off. *Aphanomyces raphani*, WI.
 Rust. *Puccinia aristidae* (0, I), CO; II, III, on grasses.
 Virus. Cauliflower Mosaic; Turnip Mosaic; Tobacco Stread, CA.
 Wilt. *Fusarium* sp.

MYRTLE

(*Myrtus*)

Leaf spot. *Pestalotia decolorata*, LA.
 Rot, stem. *Sclerotium rolfsii*, FL.

NANDINA

Anthraxnose. *Glomerella cingulata*, TX.
 Leaf spot. *Cercospora nandinae*, AL, SC.
 Nematode, root knot. *Meloidogyne* sp., NC, TX.
 Nonparasitic. Chlorosis, alkaline soil, TX.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Virus. Cucumber Mosaic, MD, GA.

NARCISSUS

(Daffodil, Jonquil)

Bacterial streak; stem rot. Unidentified, WA.
 Blight, leaf; fire. *Sclerotinia (Botrytis) polyblastis*, OR, WA; *Botrytis cinerea*;
Botryotinia polyblastis, WA.
 Leaf scorch. *Stagonospora curtisii*, general, especially in East and South.
 Leaf spot, blight; white mold. *Ramularia vallisumbrosae*, OR, WA.
 Nematode, bulb. *Aphelenchoides fragariae*, FL, GA, NC, SC; *A. subtenuis*,
 Pacific Coast; *Aphelenchus avenae*, ?secondary.
 Nematode, bulb; brown-ring disease; leaf "spikkel." *Ditylenchus dipsaci*, in
 all commercial narcissus areas.
 Nematode, lesion. *Pratylenchus pratensis*, OH, WA.
 Rot, basal. *Fusarium oxysporum* f. sp. *narcissi*, general on hardy varieties.
 Rot, black bulb. ?*Sclerotinia sclerotiorum*; crown; wet scale, *Sclerotium*
rolfsii, CA, FL, NY, VA.
 Rot, large scale speck. *Stromatinia narcissi*, general in northern bulb areas.
 Rot, leaf and stem. *Gloeosporium* sp., LA, NC.
 Rot, neck; smoulder. *Sclerotinia narcissicola*, NJ, NY, OR, VA, WA; probably
 general except on polyanthus varieties.

Rot, root and bulb. *Armillaria mellea*, CA, OR, WA; *Aspergillus* spp., black mold; *Penicillium* spp., blue mold, in wounds; *Trichoderma viride*, green mold in scales, cosmopolitan after sunscald; *Rhizopus stolonifer*, soft rot, cosmopolitan after sunscald; *Cylindrocarpon radicola*, secondary root rot. Rot, small scale speck; neck rot. *Sclerotium* sp., general, especially in southern bulb districts.

Virus. *Narcissus Mosaic*, mild; *Narcissus Flower Streak*; *Narcissus Chocolate Spot*; *Narcissus Yellow Stripe*, gray disease, often called mosaic, general; *White Streak*, general.

Control of narcissus diseases rests with the grower, who should, and usually does, supply the gardener with sound, healthy bulbs. Inspect all bulbs carefully before planting, making sure there are no dark sclerotia on the scales or the chocolate brown of Fusarium rot at the base. The bulb and stem nematode is controlled by treating in hot water.

NASTURTIIUM (*Tropaeolum*)

Bacterial fasciation. *Clavibacter fascians*, CA.

Bacterial leaf spot. *Pseudomonas syringae* pv. *aptata*, ME, MN, MS, NJ, PA, VA.

Bacterial, MLO. *California Aster Yellows*, CA.

Bacterial wilt. *Pseudomonas solanacearum*, FL, MD, NJ, NC, VA.

Blight, gray mold. *Botrytis cinerea*, AK.

Dodder. *Cuscuta* sp., MO, NH.

Leaf spot. *Cercospora tropaeoli*, AL; *Heterosporium tropaeoli*, CA, NY; *Pleospora* sp., MS, NJ, OH.

Nematode, root knot. *Meloidogyne* spp., NJ, TX; *Heterodera schactii*, root gall.

Rust. *Puccinia aristidae* (0, I), UT; II, III, on grasses.

Virus. *Beet Curly Top*, CA, TX; *Tomato Spotted Wilt*, CA, MD, TX.

Compared with the almost inevitable affliction of black aphids, nasturtium diseases are insignificant.

NECTARINE (*Prunus persica* var. *nectarina*)

Bacterial canker. *Pseudomonas syringae*, CA.

Bacterial crown gall. *Agrobacterium tumefaciens*, MO.

Bacterial leaf spot; canker. *Xanthomonas pruni*, OK.

Bacterial, MLO. *Peach X-Disease*.

Canker. *Valsa leucostoma*, DC.

Leaf curl. *Taphrina deformans*, CA, OR, TX, WA.

Leaf spot. *Cristulariella pyramidalis*, FL.

Leaf spot; shot hole. *Coryneum carpophilum*, CA, OR, WA.
Nematode, lesion. *Pratylenchus thornei*, CA.
Nematode, root knot. *Meloidogyne* sp., CA; usually resistant.
Powdery mildew. *Podosphaera oxyacanthae*, ID, WA; *Sphaerotheca pannosa*, NY, ID, WA.
Rot, brown; twig blight. *Monilinia laxa*, CA, WA; *M. fructicola*, CT, NY, TX.
Scab. *Cladosporium carpophilum*, CT, DE, IL, NY, PA, TX.
Virus. Peach Mosaic; Peach Yellows.

NEMATANTHUS

Leaf spot. *Myrothecium roridum*, FL.
Virus. Tobacco Mosaic, CA, CT, DC, FL, OH, WA.

NEMOPHILA (Baby Blue-Eyes)

Powdery mildew. *Erysiphe cichoracearum*, CA, NV, TX, WA.

NEPHTHYTIS

Leaf spot. *Cephalosporium cinnamomeum*, MD, FL.
Nematode, root knot. *Meloidogyne incognita-acrita*.
Rot, root. *Pythium splendens*, FL.

Spraying with maneb should control the leaf spot.

NERINE (Guernsey-Lily)

Leaf scorch; red blotch. *Stagospora curtisii*, CA.
Nematode, lance. *Hoplolaimus coronatus*, NC.

NEW ZEALAND FLAX (*Phormium tenax*)

Rot, root. *Armillaria mellea*, CA.

NEW ZEALAND SPINACH (*Tetragonia*)

Bacterial, MLO. Aster Yellows, NJ, NY.
Leaf spot. *Cercospora ?tetragoniae*, IN, MA; *Helminthosporium* sp., TX.

Nematode, root knot. *Meloidogyne* sp., TX.

Virus. **Beet Curly Top**, CA; **Mosaic**, DE, and **Rosette**, IN, unidentified.

NICOTIANA

(Flowering Tobacco)

Bacterial blackfire. *Pseudomonas tabaci*, WI; *P. angulata*, WI.

Black shank. *Phytophthora parasitica*, var. *nicotianae*, CT.

Downy mildew. *Peronospora tabacina*, CA, TX.

Leaf spot. *Alternaria longipes*, TX; *Rhizoctonia solani*, NC.

Mold, blue. *Peronospora tabacina*, GA.

Nematode, root knot. *Meloidogyne* sp., FL.

Powdery mildew. *Oidium* sp., KY.

Rot, root. *Phymatotrichum omnivorum*, TX.

Stunt. *Glomus macrocarpum*, KY.

Virus. **Beet Curly Top**, TX; **Tomato Spotted Wilt**, TN; **Tobacco Mosaic**;
Tobacco Ring Spot; **Tobacco Vein-Mottling**, NC.

NIGHT-BLOOMING CEREUS

(*Hylocereus*)

Virus. **Cactus Virus X**, CA.

NIGHTSHADE, Silverleaf

(*Solanum elaeagnifolium*)

Weed found in dry, open woods, prairie, waste places, and disturbed soil in Southwestern, U.S.

Nematode, foliar. *Nothanguina phyllobia*, TX.

Virus. **Tomato Spotted Wilt**, CA.

NINEBARK

(*Physocarpus*)

Leaf spot. *Cercospora spiraea*, IN; *Marssonina neilliae*, CA, TX, WI; *M. Ionicerae*, OR; *Phyllosticta opulasteris*, ID; *Ramularia spiraeae*, MI, NY, WI.

Powdery mildew. *Sphaerotheca macularis*, MA to WI.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, wood. *Fomes conchatus*, NY.

NOTHOSCORDUM

(False Garlic)

Anthracnose. *Colletotrichum circinans*, OK.

Rust. *Uromyces hordeinus* (0, I), KS, OK, TX; II, III, on grasses; *U. primaverilis* (0, I, III), IL, MO, TX.

Virus. *Nothoscordum Mosaic*, LA.

NUTSEGE

(*Cyperus rotunders*)

Blight, flower. *Balansia cyperi*, LA.

Nematode, cyst. *Heterodera mothi*, GA.

Nematode, root-knot. *Meloidogyne graminicola*, GA.

Rust. *Puccinia canaliculata*, GA.

NYMPHOIDES

(Floating-Heart)

Rust. *Puccinia scirpi* (0, I); II, III, on *Scirpus*, FL.

Smut, leaf. *Burrillia decipiens*, NJ.

OAK

(*Quercus*)

Anthracnose; leaf and twig blight. *Gnomonia quercina* (*Gloeosporium quercinum*), general.

Bacterial canker. Unidentified, IL.

Bacterial crown gall. *Agrobacterium tumefaciens*, MD, MI.

Bacterial drippy nut. *Erwinia quercina*, CA, on live oak.

Bacterial leaf scorch. *Xylella fastidiosa*, GA.

Bacterial wetwood. *Erwinia nimipressuralis*, Va.

Black mildew. *Morenoella quercina*, SC to FL, GA, TX; *Irenina manca*, MS.

Blight, twig. *Cryptocline cinerescens*, CA; *Diplodia longispora*, NY to NC, IL and WI; *D. quercina*, CA; *Discula quercina*, CA.

Canker, bark. *Aleurodiscus oakesii*, NY to IL, IA, CA; *A. candidus*; *A. acerinus*; *A. griseo-canus*; *Dichaena quercina*, NJ.

Canker, bleeding. *Phytophthora cactorum*, MA, NY, FL.

Canker, branch. *Endothia gyrosa*, VA.

Canker, branch; decline; dieback. *Botryodiplodia gallae*, MI; *Cephalosporium* sp.; *Hyalodendron* sp.

Canker, chestnut. *Endothia parasitica*, SC, VA, MS.

Canker, felt fungus. *Septobasidium* spp., NC to FL to LA.

- Canker, trunk. *Nectria galligena*; *Strumella coryneoides* (*Urnula craterium*).
- Canker, twig. *Cytospora chrysosperma*, NJ, RI; *Endothia parasitica*, occasional; *Dothiorella quercina*, MD, VA; *Fusarium solani*; *Physalospora glandicola*, MD; *P. obtusa*, MN, VA; *P. rhodina*, VA; *Pseudovalsa longipes*; *Pyrenochaete venuta*.
- Decline. *Hypoxylon atropunctatum*, *H. punctulatum*, *H. mediterraneum*, VA.
- Dodder. *Cuscuta* spp., occasional in forest nurseries.
- Leaf blister. *Taphrina caerulescens*, Northeast to north central and Gulf states; also CO, UT, WY, CA, GA.
- Leaf spot. *Actinopelte dryina*, occasional; *Acantharia echinata*, black, on live oak; *Cercospora macrochaeta*, CA; *Cylindrosporium microspilum*, *C. kelloggii*, CA; *Cibornia* (*Sclerotinia*) *candolleana*; *C. hirtella*; *Dothiorella phomiformis*, widespread; *Gloeosporium septorioides*; *Marssonina martini*, general; *Leptothyrium californicum*, on live oak, CA; *Monochaetia desmazierii*, widespread; *Mycosphaerella* sp; *Phyllosticta* spp.; *Septogloeum defolians*, CA; *S. querceum*, WI; *Septoria* spp.; *Venturia orbicula*, NY to VA and OH.
- Mistletoe. *Phoradendron serotinum* (*flavescens*), NC to FL and TX; *P. villosum*, CA.; *P. tomentosum*, TX.
- Mold, leaf. *Cladosporium brevipes*; *C. herbarum*.
- Nematode, dagger. *Xiphinema americanum*, Southeast.
- Nematode, ring. *Criconemoides annulatum*; *C. teres*; *Hemicriconemoides biformis*.
- Nematode, root. *Hoplolaimus coronatus*; *Pratylenchus* sp.; *Meloidogyne* sp.
- Nonparasitic. Chlorosis, iron deficiency, especially in pin oaks.
- Parasitic lichen. *Strigula elegans* and *S. camplanata*, southern U.S., LA.
- Powdery mildew. *Erysiphe trina*, witches' broom, on live oak, CA; *Microsphaera alni*, widespread; *Phyllactinia corylea*, widespread; *Sphaerotheca lanestris*, "brown mildew," serious on coast live oak, AL, CA, MS, NC; *Saccardia quercina*, AZ, GA.
- Rot, heart. *Daedalea quercina*, widespread, other species; *Fistulina hepatica*; *Fomes* spp.; *Hericium erinaceus*; *Polyporus* spp.; *Stereum* spp.
- Rot, heart. *Phlebia chrysocrea*, eastern U.S. (PA to FL) and WI to MS.
- Rot, root. *Armillaria mellea*, widespread; *Clitocybe tabescens*, FL, MO, OK; *C. olearia*, CA; *Corticium galactinum* and other spp.; *Phytophthora cinnamomi*, of seedlings.
- Rot, wood. *Daldinia concentrica*; *D. vernicosa*; *Hypoxylon atropunctatum*; *Lentinus tigrinus*; *Linzites betulina* and other species; *Schizophyllum commune*; *Steccherhinum ochraceum*.
- Rust. *Cronartium quercuum* (*C. cerebrum*) II, III, widespread; 0, I, on pines; *C. fusiforme* (II, III), southern states; *C. strobilinum* (II), AR, FL, IL, IA, KS, MO, MS; 0, I, on long-leaf pines; *C. conigenum* (II, III), AZ; 0, I, on pine cones.

Rust, fusiform. *Cronartium fusiforme*, GA.

Spot anthracnose. *Elsinoë quercus-falcatae*, on southern red oak, GA, NC;
E. quercicola, FL.

Wilt, dieback. *Fusarium oxysporum* or *F. solani*, VA.

Wilt, oak. *Ceratocystis fagacearum* (*Chalara quercina*), AR, IL, IN, IA, KS,
KY, MD, MI, MN, MO, NE, NC, PA, TN, VA, WV, WI, OH, OK, SC,
MO, FL.

Witches' broom. *Articularia quercina* var. *minor*. AZ, NM, UT.

Oak wilt is our most serious disease with red and black oaks often dying during the first season that symptoms appear. Anthracnose is general, most severe on white oak, defoliating in wet seasons. Leaf blister, important in the South, can be prevented by a single dormant spray. Powdery mildew, due to *Sphaerotheca lanestris*, is important in California, where it produces witches' brooms on live oaks. The honey mushroom, *Armillaria mellea*, sometimes called the oak fungus, causes "shoestring" root rot. Strumella canker is frequent in forest trees, sometimes found in ornamentals.

OCOTILLO, COACH-WHIP, CANDLEWOOD (*Fouquieria*)

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Aecidium cannonii* (0, I), AZ.

OENOTHERA (Evening-Primrose)

Blight, gray mold. *Botrytis cinerea*, AK.

Dodder. *Cuscuta arvensis*, OK.

Downy mildew. *Peronospora arthuri*, MA to MS, KS, MT, NE, OK, SD.

Gall, leaf. *Synchytrium fulgens*, AL, KS, LA, MS, NC, OK, TX to CA.

Leaf spot. *Alternaria tenuis*, ?secondary, NJ; *Cercospora oenotherae*, AL, KS,
TX, WV; *C. oenotherae-sinutae*, AL, NC; *Pezizella oenotherae*, GA, MD,
NC, SD, VA; *Pestalotia oenotherae*, OH, OK; *Septoria oenotherae*, ME to
FL, OK and SD, NM, CA, UT.

Powdery mildew. *Erysiphe polygoni*, general.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, TX.

Rust. *Aecidium anograe* (0, I), NE; *Puccinia aristidae* (0, I), AZ, NV; II, III, on
grasses; *P. dioicae* (0, I), ME to AL, CO, ND, TX, CA; II, III, on *Carex*;
P. oenotherae (0, I, II, III), CO, CA to MT, WA; *Uromyces plumbarius*
(0, I, II, III), general.

Virus. Mosaic. Unidentified, PA.

OKRA

(Hibiscus esculentus)

- Anthracnose. *Colletotrichum gloeosporioides*, pod spot, FL, PA; *C. hibisci*, dieback, TX.
- Blight, blossoms. *Choanephora cucurbitarum*, FL, GA, TX.
- Leaf spot. *Ascochyta abelmoschi*, GA, MD, NJ, NY, pod spot; *Alternaria* sp., ?secondary, FL, OH, PA, SC, UT; *Cercospora abelmoschi* (*C. hibisci*), NC to FL, TX; *C. malayensis*, VA to FL, TX, OK; *Corynespora cassicola*; *Phyllosticta hibiscina*, AL, IL, NJ, NC, OK.
- Nematode, root knot. *Meloidogyne incognita* and *M. incognita-acrita*, general.
- Powdery mildew. *Erysiphe cichoracearum*, CT, NJ, NC, PA.
- Rot, charcoal. *Macrophomina phaseoli*, TX.
- Rot, pod. *Botrytis* sp., NY.
- Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, damping-off, AL, FL; *Thielaviopsis basicola*, NJ.
- Rot, stem. *Sclerotinia sclerotiorum*, MA.
- Virus. **Tobacco Ring Spot**, GA, VA.
- Wilt. *Fusarium oxysporum* f. sp. *vasinfectum*, CT to FL, TX, AZ; *Verticillium albo-atrum*, widespread.

OLEANDER

(Nerium)

- Anthracnose; leaf spot. *Gloeosporium* sp., MA, MS, NJ, TX.
- Bacterial knot. *Pseudomonas syringae* pv. *tonelliana*, AZ, CA, CT.
- Blight, stem and leaf. *Pseudomonas syringae*, CA.
- Canker; witches' broom. *Sphaeropsis* sp., FL.
- Dodder. *Cuscuta indecora*, FL.
- Leaf spot. *Alternaria* sp. (*Macrosporium nerii*), CA, AL, FL, GA, MS; *Cercospora neriella*, also pod spot, AL, LA, FL, TX; *Phyllosticta nerii*, FL, LA, MI, TX; *Septoria oleandrina*, CA, FL, LA.
- Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.
- Rot, stem. *Calonectria crotalariae*, CA.
- Sooty mold. *Capnodium elongatum*, AL, FL.
- Spot anthracnose, scab. *Sphaceloma oleandri*, LA.

OLIVE

(Olea)

- Anthracnose. *Gloeosporium olivarum*, CA.
- Bacterial knot. *Pseudomonas syringae* pv. *savastanoi*, CA.
- Black mildew; leaf spot. *Asternia oleina*, FL, GA.
- Dodder. *Cuscuta indecora*, CA.

Leaf spot. *Cycloclonium oleaginum*, peacock spot, CA; *Cercospora ?caldosporioides*, also fruit spot, CA.

Nematode, citrus. *Tylenchulus semipenetrans*.

Nematode, lesion. *Pratylenchus musicola* (*P. coffeae*), CA.

Nematode, root knot. *Meloidogyne* sp., CA.

Nonparasitic

Bitter Pit, dry rot, of fruit. Overnutrition?

Exanthema. Dieback. Deficiency of organic matter.

Fruit Pit. Boron deficiency.

Soft Nose. Blue nose. ?Moisture supply. On variety Sevillano only.

Rot, root. *Armillaria mellea*, CA, TX; *Phymatotrichum omnivorum*, TX;

Polyporus olaea, CA.

Virus. **Sickle Leaf**.

Wilt. *Verticillium albo-atrum*, CA.

ONCOBA

Rot, root. *Phymatotrichum omnivorum*, TX.

ONION

(*Allium cepa*)

Bacterial, MLO. **Aster Yellows** and **California Aster Yellows**, widespread.

Bacterial rot; slippery skin. *Pseudomonas alliicola*, MA, NY, WA; *P. cepacia*, sour skin, scale rot, NY.

Bacterial soft rot. *Erwinia carotovora*, widespread in field, transit, storage.

Bacterial, yellows. *Spiroplasma citri*, CA.

Blight, southern. *Sclerotium rolfsii*, AL, CA, GA, OK, TX.

Blotch, purple, brown. *Alternaria porri*, ME to MS, TX, CO, UT; *A. tennis*, CO; *A. tenuissima*, CO.

Damping-off. *Pythium* spp., ID, MA, NY; *Rhizoctonia solani*, occasional.

Dodder. *Cuscuta* spp., widespread.

Downy mildew. *Peronospora destructor*, general.

Leaf spot. *Heterosporium allii*, CA, CO, WA; *Phyllosticta allii*, IL, NM;

Stemphylium vesicarium, TX.

Nematode, bulb; onion bloat. *Ditylenchus dipsaci*, NY, TX.

Nematode, root knot. *Meloidogyne incognita* and *M. incognita-acrita*.

Nematode, sting. *Belonolaimus gracilis*.

Nematode, stubby root. *Trichodorus christiei*.

Nonparasitic

Blast, of inflorescence. Appears in Connecticut Valley when bright sun follows cloudy weather. Air pollution in NJ.

Chlorosis. Copper deficiency, NY and FL; manganese deficiency, NY and RI.

Scald. High temperature, general in summer.

Stain, alkali spot. Contact with alkaline materials or ammonia fumes in transit.

Powdery mildew. **Oidiopsis taurica**, CA.

Rot, basal. **Fusarium oxysporum** f. sp. **cepae**, other species, widespread.

Rot, black stalk, tip blight; seed mold. **Stemphylium botryosum**, AR, CA, LA, NH, TX, WA.

Rot, charcoal. **Macrophomina phaseoli**, TX, CA, OK.

Rot, dry. **Diplodia natalensis**, TX; **Helminthosporium allii**, also canker.

Rot, neck; gray mold. **Botrytis allii**, LA, NJ, CA, TX; **B. cinerea**; small sclerotial; leaf blight, **B. (Botryotinia, Sclerotinia) squamosa**, occasional.

Rot, pink root. **Pyrenochaeta tenestris**, widespread.

Rot, root. **Thielaviopsis basicola**, TX.

Rot, smudge. **Colletotrichum circinans**, general.

Rot, soft. **Kluyveromyces marxianus**, WA.

Rot, various, of bulbs. **Aspergillus niger**, black mold, general in market; **Penicillium** spp., blue mold; **Rhizopus stolonifer**, soft, after sunscald or freezing; **Sclerotinia sclerotiorum**, watery soft.

Rot, white. **Sclerotium cepivorum**, CA, KY, LA, NJ, NY, OH, OR, PA, TX, VA.

Rust. **Puccinia asparagi** (0, I, II, III), CA, CT, IA, KS, MN; **P. allii** (*P. porri*) (II, III), CA, NE, CT.

Smut. **Urocystis cepulae**, general; **U. colchici**.

Virus. **Onion Yellow Dwarf**.

Smut is the most general onion disease, but it seldom afflicts onions grown from sets, the usual method for a small garden. Growing colored instead of white onions avoids smudge and neck rots to some extent. Sweet Spanish onions are resistant to pink root and yellow dwarf.

ONOSMODIUM

(Marbleseed)

Rot, root. **Phymatotrichum omnivorum**, TX.

Rust. **Puccinia recondita** (0, I), CO, KS, NE, ND.

OPLISMENUS

(Basket-grass)

Leaf spot, tar. **Phyllachora punctum**, FL, LA.

ORANGE

See Citrus Fruits.

ORCHIDS (Imported Species)

- Anthracnose;** leaf and stem spot. *Colletotrichum cinctum* and *C. gloeosporioides* (*Glomerella cincta* and *G. cingulata*), general; *Gloeosporium affine*, FL; *G. cattleyae*, VA.
- Bacterial brown rot.** *Erwinia cypripedii*.
- Bacterial brown spot.** *Pseudomonas cattleyae*, common on *Cattleya*, severe on *Phalaenopsis*.
- Bacterial leaf scorch and pseudobulb rot.** Unidentified.
- Bacterial soft rot.** *Erwinia carotovora*, serious on *Cattleya* and other general.
- Blight, petal.** *Botrytis cinerea* (*Sclerotinia fuckeliana*), spotting common on older flowers; *Glomerella* sp., black spot of *Vanda* orchids.
- Blotch, sooty.** *Gloeodes pomigena*.
- Dodder.** *Cuscuta gronovii*; laurel dodder. *Cassytha filiformis*.
- Leaf spot.** *Cercospora epipactidis*; *C. cypripedii*; *C. peristeriae*; *C. dendrobii*; *C. odontoglossi*; *Chaetodiplodia* sp.; *Phyllostictina pyriformis*; *Physalospora* spp., also stem decay; *Diplodia laeliocattleyae*; *Phyllosticta* spp.; *Selenophoma* spp.; *Septoria selenophomoides*; *Volutella albido-pila*.
- Flyspeck.** *Microthyriella rubi*.
- Nematode, lesion.** *Pratylenchus pratensis*; *P. scribneri*.
- Nonparasitic.** *Cattleya Dry Sepal*, industrial fumes.
- Rot, black; leaf and heart.** *Phytophthora cactorum*; *Pythium ultimum*, serious on *Cattleyas*; *P. splendens*.
- Rot, dry.** *Nectria bulbicola*, ?secondary.
- Rot, root.** *Rhizoctonia solani*; soft, *Fusarium moniliforme*, CA.
- Rot, stem; southern blight.** *Sclerotium rolfsii*.
- Rust.** *Uredo behnickiana* (II), NJ, NY, FL; *U. epidendri* (II) FL; *U. guacae* (II), FL; *U. nigropuncta* (II), FL; *Sphenospora kevorkianii*, FL; *S. mera*, FL; *S. saphena*, FL.
- Snow mold.** *Ptychogaster* sp. Potting fiber mold.
- Sooty mold.** *Capnodium citri*.
- Virus.** *Cymbidium Mosaic*; *Mild Cattleya Color-Break*; *Severe Cattleya Color-Break*; *Cattleya Blossom Brown Necrotic Streak*; *Odontoglossum Ring Spot*; *Oncidium Ring Spot*; *Vanda Ring Spot*.
- Wilt.** *Fusarium oxysporum* f. sp. *cattleyae*, CA, FL, OH; *F. moniliforme*.

When dividing plants use a "hot knife" or disinfest between cuts; keep new orchids isolated; sterilize or fumigate the potting medium and disinfest the bench. Destroy plants seriously affected by rusts.

ORCHIDS (Native Species)

- Leaf spot.** *Cercospora cypripedii*, NY, WI; *Fusicladium aplectri*, DE; *Mycosphaerella cypripedii*, NY; *Phyllosticta aplectri*, DE; *Septoria calypsonis*, MI.

Rust. *Puccinia praegracilis* (*Aecidium graebnerianum*) (I), CA, MT, OR, WA, AK; *P. cypripedii* (II, III), IN, NJ, IA, MI, VA, WI; *Uredo goodyerae* (II, III), CA, CO, NM, OR, WA.

OSAGE-ORANGE

(*Maclura*)

Blight, leaf. *Sporodesmium maclurae*, MO, SC, TX; *Botrytis cinerea*, OR, gray mold on stems.

Damping-off. *Pythium ultimum*, NE; *Rhizoctonia solani*, NE.

Leaf spot. *Cercospora maclurae*, AL; *Ovularia maclurae*, AL, LA, TX; *Phyllosticta maclurae*, MO, NJ.

Mistletoe. *Phorodendron tomentosum*, TX; *P. serotinum* (*flavescens*), TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Cerotelium fici* (II), SC to FL and TX.

Wilt. *Verticillium* sp., CT.

OSIER, BASKET-WILLOW

(*Salix*)

Canker. *Cryptomyces maximus*, blister; *Valsa salicina*, twig, branch, CA, IA.

Rust, leaf. *Melampsora abieti-capraearum*, NY, PA.

OSOBERRY

(*Osmaronia*)

Leaf spot. *Cylindrosporium nuttallii*, CA to OR, WA; *Gloeosporium osmaroniae*, WA.

Powdery mildew. *Phyllactinia corylea*, OR.

OWLS CLOVER

(*Orthocarpus*)

Leaf spot. *Ascochyta garrettiana*, OR, UT.

Rust. *Cronartium coleosporioides* (II, III), CO, ID, UT; 0, I, on pine.

OXALIS

(Wood-Sorrel)

Blight, gray mold. *Botrytis cinerea*, AK.

Leaf spot. *Cercospora oxalidiphila*, WI; *Phyllosticta guttulatae*, VT to NJ, IN, and WI, *Ramularia oxalidis*, NH, NE, NM, OR, PA, TN, VT; *Septoria acetosella*, NY; tar spot, *Phyllachora oxalina*, DE, ME, VT.

Nematode, root knot. *Meloidogyne* spp.

Nematode, stem. *Ditylenchus dipsaci*, NY.

Powdery mildew. *Microsphaera russellii*, ME to WV, KS and MN, WA.

Rot, root. *Thielaviopsis basicola*, CT.

Rust. *Puccinia andropogonis* (0, I), OK, TX, II, III, on *Andropogon*; *P. oxalidis* (II, III), FL, GA, LA, MS, NM, SC, TN, TX, WI; 0, I, on mahonia; *P. sorghi* (0, I), KS, IN, IA, MI, MS, ND, SD, OK, TX; II, III, on corn and *Euchlaena*.

Smut, seed. *Ustilago oxalidis*, CT to MS, TX, OH, WI.

Virus. **Beet Curly Top**, TX; **Tomato Ringspot**, PA.

OXYDENDRON (Sourwood, Sorrel-Tree)

Blight, twig. *Sphaerulina polyspora*, NC.

Leaf spot. *Cercospora oxydendri*, AL, MS, TX, WV; *Mycosphaerella caroliniana*, GA, NC, TX, WV.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, wood. *Poria punctata*, WV.

OYSTER MUSHROOM (*Pleurotus ostreatus*)

Dry bubble. *Verticillium fungicola*, PA.

PACHISTIMA

Leaf spot. *Mycosphaerella pachystimae*, ID.

PACHYSANDRA (Japanese-Spurge)

Blight, leaf; stem canker. *Volutella pachysandrae* (*Pseudonectria pachysandricola*), CT, DE, NJ, NY, PA, VA; *Sphaeropsis* sp., tip blight, secondary.

Leaf spot. *Gloeosporium* sp., VA; *Phyllosticta pachysandrae*, NC, NY, PA, VA; *Septoria pachysandrae*, FL, TN.

Nematode, root knot. *Meloidogyne* sp.

Virus. **Alfalfa Mosaic**, NJ.

Volutella leaf blight is fairly common after injury or when plants are too crowded; pinkish spore pustules appear on stems, large brown areas on leaves.

PACIFIC WAX MYRTLE

(*Myrica californica*)

Leaf spot. *Phyllosticta myricae*, CA.

Rust. *Cronartium comptoniae* (II, III), OR.

PAINTED CUP, INDIAN PAINTBRUSH

(*Castilleja*)

Leaf spot. *Cercospora* sp., AK.

Powdery mildew. *Erysiphe polygoni*, CO, WA; *Sphaerotheca macularis*, CO, WA, WI.

Rust. *Cronartium coleosporioides* (II, III), CA, CO, SD to NM, UT, WY, WA; 0, I, on pine; *Puccinia andropogonis* (0, I), CA, IA MT, NM, WI; II, III, on *Andropogon*; *P. castillejae* (II, III), CA, UT.

PALM

(*Chamaedorea*)

Leaf spot. *Bipolaris setariae*, FL; *Exserohilum* (*Helminthosporium*) *rostratum*, FL; *Phaetrichoconis crotalariae*, FL.

Rot, stem. *Gliocladium vermoeseni*, FL.

PALM ARECA

(*Chrysalidocarpus*)

Leaf spot. *Bipolaris setariae*, FL; *Exserohilum* (*Helminthosporium*) *rostratum*, FL; *Phaetrichoconis crotalariae*, FL.

PALM, COCONUT

(*Cocos*)

Bacterial, MLO. **Lethal Yellowing**, FL.

Blight, thread. *Pellicularia koleroga*, FL.

Leaf scorch; leaf-bitten disease; stem bleeding. *Ceratocystis* (*Endoconidiophora*, *Thielaviopsis*) *paradoxa*, FL.

Leaf spot, gray; leaf break. *Pestalotia palmarum*, secondary, FL.

Rot, bud; leaf drop; wilt. *Phytophthora palmivora*, FL; *Pythium* sp., wilt, FL.

PALM, DATE

(*Phoenix*)

Blight, inflorescence; fruit rot. *Fusarium* spp., AZ.

Canker. *Penicillium vermoeseni*, CA.

- Fruit spot, brown. *Helminthosporium molle*, AZ; *Alternaria citri*, AZ, CA, TX.
- Leaf scorch; black heart; bud rot. *Ceratocystis paradoxa*, AZ, CA.
- Leaf spot. *Exosporium palmivorum*, Gulf states; *Pestalotia* sp., CA, FL; *P. palmarum*, FL; *Alternaria* sp., FL, AZ, CA, TX; *Annelophora phoenicis*, TX.
- Nematode, root knot. *Meloidogyne* spp., AZ, CA.
- Nonparasitic. **Black Nose**, fruit checking from rain and high humidity.
- Chlorosis**, manganese deficiency, FL.
- Rot; decline disease. *Omphalia pigmentata* and *O. tralucida*, CA.
- Rot, fruit. *Aspergillus niger*, calyx-end, CA, WA; *Catenularia fuliginea*, AZ, CA; *Penicillium roseum*, CA, AZ; *Pleospora herbarum*, CA; *Phomopsis phoenicola*, CA; *Alternaria stemphylioides*, CA.
- Rot, leaf-stalk; shoot blight; fruit rot. *Diplodia phoenicum*, AZ, CA.
- Rot, root. *Armillaria mellea*, CA; *Clitocybe tabescens*, FL; *Ceratostomella radicola*, CA.
- Rot, wood. *Poria* spp., AZ, CA.
- Smut, false. *Graphiola phoenicis*, widespread.

PALM, FISHTAIL

(*Caryota*)

- Blight, leaf and stem. *Glomerella cingulata*.
- Leaf spot. *Bipolaris setariae*, FL; *Exserohilum* (*Helminthosporium*) *rostratum*, FL; *Phaetrichoconis crotalariae*, FL.

PALM, QUEEN, PLUMY COCONUT

(*Arecastrum*)

- Canker; gummosis. *Dothiorella gregaria*, CA; *Penicillium vermoeseni*, CA.
- Leaf spot. *Exosporium palmivorum*, FL; *Glomerella cincta*, NJ; *Septoria cocoina*, MO.
- Nonparasitic. **Chlorosis**, manganese deficiency, FL.
- Rot, bud; wilt. *Phytophthora palmivora*, FL; *Pythium* sp., wilt.
- Rot, butt. *Ganoderma sulcatum*, FL.
- Smut, false. *Graphiola phoenicis*, FL.

PALM, *Rhapis*

(*Rhapis*)

- Leaf spot. *Bipolaris setariae*, FL; *Exserohilum* (*Helminthosporium*) *rostratum*, FL; *Phaetrichoconis crotalariae*, FL.

PALM, ROYAL

(*Roystonea*)

Anthracnose; petiole spot. *Colletotrichum gloeosporioides*, FL, TX.

Leaf spot. *Alternaria* sp., FL; *Diplodia* sp., FL; *Epicoccum neglectum*, FL;

Helminthosporium sp., leaf stripe, FL.

Little leaf. Cause unknown, FL.

Nematode, root knot. *Meloidogyne* sp., FL.

Nematode, spiral. *Helicotylenchus nannus*.

Smut, false. *Graphiola phoenicis*, FL.

Wilt. *Phytophthora palmivora*, FL.

PALM, SUGAR

(*Arenga*)

Smut, false. *Graphiola phoenicis*, occasional.

PALM, WASHINGTON

(*Washingtonia*)

Bacterial leaf spot. *Pseudomonas washingtoniae*, AZ.

Leaf spot. *Auerswaldia* sp., CA; *Cercospora* sp., FL; *Colletotrichum* sp., FL; *Cylindrocladium macrosporium*, FL; *Pestalotia palmarum*, FL; *Phoma palmicola*, ?secondary, TX.

Nematode, root knot. *Meloidogyne* spp., AZ, FL.

Rot, bud. *Penicillium vermoeseni*, CA; *Phytophthora palmivora*, AZ, FL.

Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, FL.

Rot, trunk. *Phytophthora* sp., CA.

Smut, false. *Graphiola phoenicis*, FL, TX.

Wilt. *Pythium* sp., FL.

The *Penicillium* bud rot causes serious losses to *Washingtonia filifera* in California; *W. robusta* is resistant.

PALMETTO, CABBAGE PALM

(*Sabal*)

Black mildew. *Asterina sabalicola*, FL, GA; *Meliola* spp., Gulf states.

Canker, felt fungus. *Septobasidium sabalis*, LA; *S. sabal-minor*, FL.

Leaf spot. *Helminthosporium apiculiferum*, LA, MS; *Mycosphaerella serulata*, FL, SC; *Phyllachora (Catacauma) sabal*, Black Spot, FL, GA, TX;

Phyllosticta palmetto, LA, MS; *Myrianginella sabaleos*, Black Speck, FL, GA.

Smut, false. *Graphiola congesta*, AL, FL, SC; *G. phoenicis*, FL, MS; *G. thaxteri*, FL.

PALOVERDE

*(Cercidium)*Mistletoe. *Phoradendron californicum*, TX to CA.Rot, root. *Phymatotrichum omnivorum*, TX.

PAMPAS GRASS

*(Cordaderia)*Leaf spot. *Helminthosporium* sp., GA; *Hendersonia culmiseda*, leaf mold; *Phyllosticta* sp., KY.

PANDANUS

*(Screw Pine)*Leaf spot. *Heterosporium iridis*, IA; *Macrophoma pandani*, CA, FL; *Melanconium pandani*, FL, MD; *Phomopsis* sp., NJ; *Pestalotia palmarum*, ?secondary, FL; *Volutella mellea*, NY.Nematode, burrowing. *Radopholus similis*, FL.

PANSY

*(Viola tricolor)*Anthracnose. *Colletotrichum violae-tricoloris*, ME to FL, IN and MI, WA, PA.Blight, gray mold. *Botrytis cinerea*, AK, LA, NJ, probably general.Blight, southern. *Sclerotium rolfsii*, FL, VA.Damping-off; root rot. *Pythium* spp., CA, CT, MO, NJ; *Rhizoctonia solani*, DE, IL, MN, NY.Downy mildew. *Peronospora violae*, AL, IL, MS, NE.Leaf spot. *Alternaria violae*, NJ, NY, PA; *Cercospora violae*, CT, IN, MI, NY, TX, WI; *Phyllosticta rafinesquii*, AL, IL; *Ramularia agrestis*, OR; *R. lactea*, WA.Nematode, root knot. *Meloidogyne* sp., NY, TX.Powdery mildew. *Sphaerotheca macularis*, IA, KS, WA.Rot; leaf spot. *Centrospora acerina*, CA, GA.Rot, root; wilt. *Aphanomyces cladogamus*, MD; *Fusarium oxysporum*, CT, MI, NE, NJ, NY, OH, TX; *Thielaviopsis basicola*, CT.Rust. *Puccinia ellisiana* (0, I), KS, NE; II, III, on *Andropogon*; *P. violae* (0, I, II, III), CT, FL, KS, NJ, ND, SC; *Uromyces andropogonis* (0, I), CT; II, III, on *Andropogon*.Smut, seed. *Urocystis kmetiana*, AR, MO, TN.Spot anthracnose; pansy scab. *Sphaceloma violae*, KY, MD, NJ.Virus. **Beet Curly Top**, CA, OR, TX; **Mosaic**, unidentified, MD; **Western Cucumber Mosaic** and **Cherry Calico** cause flower break and leaf mottle in CA.

PAPAYA

(*Carica*)

Anthracnose; fruit, stem, and leaf spot. *Glomerella cingulata*, general.
Black mildew. *Asterina caricarum*, FL.
Blight, flower; leaf spot. *Choanephora americana*, FL.
Blight, southern. *Sclerotium rolfsii*, TX.
Damping-off. *Pythium aphanidermatum*, CA, FL; *P. debaryanum*, TX.
Leaf spot. *Asperisporium caricae*, FL; *Mycosphaerella caricae*, target spot, FL; *Phyllosticta caricae-papayae*, target spot, FL.
Powdery mildew. *Erysiphe cichoracearum*, CA; *Oidium caricae*, FL, TX.
Nematode. *Meloidogyne* sp., FL, TX.
Rot, crown, collar. *Calonectria* sp. (*Cylindrocladium*), HI.
Rot, fruit. *Diplodia* sp., TX.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rot, stem. *Fusarium* sp., CA, TX.
Virus. ?Tobacco Ring Spot.

PARKINSONIA

Leaf spot. *Cylindrosporium parkinsoniae*, TX; *Phyllosticta parkinsoniae*, TX.
Mistletoe. *Phoradendron californicum*, CA, TX.
Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, AZ, TX.
Sooty mold. *Capnodium* sp., TX.

PARROTFEATHER

(*Myriophyllum*)

Rot, root and stem. *Pythium carolinianum*, CA.

PARSLEY

(*Petroselinum*)

Bacterial, MLO. *Aster Yellows*, NY, CO; *California Aster Yellows*, CA.
Bacterial soft rot. *Erwinia aroideae*, CA; *E. carotovora*, FL.
Blight, gray mold. *Botrytis cinerea*, AK.
Blight, leaf. *Alternaria dauci*, CT; *Septoria petroselini*, CA, CT, NJ, NY.
Damping-off; root rot. *Pythium* sp., NJ; *Rhizoctonia solani*, NJ, NY.
Dodder. *Cuscuta* sp., TX.
Leaf spot. *Cercospora petroselini*, NJ; *Stemphylium* sp., NJ.
Nematode, bulb. *Ditylenchus dipsaci*, CA.
Nematode, pin. *Paratylenchus projectus*, MD.
Nematode, root knot. *Meloidogyne* spp., FL, GA, KS, TX, VA.

Rot, root. *Phymatotrichum omnivorum*, TX.
 Rot, stem. *Sclerotinia sclerotiorum*, CT, GA, LA, NY, PA, TX, VA.
 Virus. Alfalfa Mosaic, CA; Strawberry Latent Ringspot, CA.
 Virus. Beet Curly Top, CA.

PARSNIP
 (*Pastinaca*)

Bacterial crown gall. *Agrobacterium tumefaciens*, VA.
 Bacterial, MLO. Aster Yellows, IL, ME, NY, PA, SD, TX, WI, and California
 Aster Yellows, CA, WA.
 Bacterial rot. *Pseudomonas pastinacae*, NY; *Erwinia carotovora*, occasional
 in storage.
 Blight, leaf; canker. *Itersonilia perplexans*, GA, MA, NY.
 Downy mildew. *Plasmopara nivea*.
 Leaf spot. *Alternaria* sp., NJ; *Cercospora pastinacae*, MD, NE, NY, TX, WV;
C. pastinacina, CA, IN, MI, NY; *Cylindrosporium pastinacae*, UT, WI;
Ramularia pastinacae, IN, MA, NY, ND, OH; *Septoria pastinacae*, TX;
Cercospora pastinacae, MA; *Phomopsis dichenii*.
 Nematode, root knot. *Meloidogyne* spp., NJ to KS and southward.
 Nonparasitic. Heart Rot, boron deficiency, NY.
 Powdery mildew. *Erysiphe unbelliferarum*.
 Rot, black, crown. *Centrospora acerina*.
 Rot, black mold. *Rhizopus* spp., occasional in storage.
 Rot, gray mold. *Botrytris cinerea*, occasional.
 Rot, root. *Phymatotrichum omnivorum*, AZ, TX; *Rhizoctonia solani*, black
 scurf, NC, TX; *Phytophthora parasitica*, dry rot, PA; *Phoma* sp.
 Rot, watery soft. *Sclerotinia sclerotiorum*, CA, IN, LA, MA.
 Scab. *Streptomyces scabies*, WA.
 Virus. Mosaic, unidentified, OR, UT.

PARTRIDGE-BERRY
 (*Mitchella*)

Black mildew. *Meliola mitchellae*, AL, FL, MS, PA.
 Rot, stem. *Sclerotium rolfsii*, MD.

PASSION FLOWER
 (*Passiflora*)

Blight, southern. *Sclerotium rolfsii*, FL.
 Leaf spot. *Colletotrichum gloeosporioides*, FL, also stem spot; *Cercospora*
biformis, AR, NC; *C. fuscovirens*, ME to MO, TX; *C. regalis*, TX; *C.*
truncatella, SC, TX; *Gloeosporium fructigenum*, LA; *Phyllosticta* sp., NJ.

Nematode, root knot. *Meloidogyne* sp.
Rot, collar. *Sclerotinia* sp., CA.
Rot, root. *Phymatotrichum omnivorum*, TX.
Virus. *Cucumber Mosaic*, CA.

PAULOWNIA (Princess-Tree)

Leaf spot. *Ascochyta paulowniae*, MD; *Phyllosticta paulowniae*, AL, MD, NY, OK.
Powdery mildew. *Phyllactinia corylea*; *Uncinula clintonii*.
Rot, root. *Phymatotrichum omnivorum*, TX; *Armillaria mellea*.
Rot, wood. *Polyporus spraguei*, AL; *P. versicolor*, MD; *P. robiniophilus*.

PAWPAW (*Asimina*)

Blotch, leaf. *Phleospora asiminae*, IL, KS, MO, OH, WV.
Canker; dieback. *Nectria cinnabarina*; *Polyporus amplexans*, FL, GA;
Sphaeropsis asiminae, MD, WV; *Valsa ambiens*, VA, WV.
Leaf spot. *Cercospora asiminae*, widespread; *Phyllosticta asiminae*, wide-
spread; *Mycosphaerella* sp., IN, OH, WV; *Septoria asiminae*, TX.
Parasitic lichen. *Strigula elegans* and *S. camplanata*, Southern U.S., LA.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rot, sapwood. *Poria isabellina*, VA, WV.

PEA (*Pisum*)

Anthracnose, leaf and pod spot. *Colletotrichum pisi*, CT, GA, IA, ME, MS, TX.
Bacterial blight. *Pseudomonas syringae* pv. *pisi*, general, especially East and South.
Bacterial leaf spot. *Pseudomonas syringae*, ID.
Blight, ashy stem, charcoal rot. *Macrophomina phaseoli*, TX.
Blight, foot rot. *Mycosphaerella pinodes*, widespread, usually with *Ascochyta pinodella*.
Blight, leaf and stem. *Choanephora conjuncta*, GA.
Blight, southern. *Sclerotium rolfsii*, FL.
Damping-off; root rot, pod rot. *Pythium* spp. and *Rhizoctonia solani*, general.
Dodder. *Cuscuta* sp., MO.
Downy mildew. *Peronospora viciae* (*P. pisi*), general, especially northern central and Pacific Coast states.

- Leaf spot. *Alternaria* sp., seedling blight, DE, NH; *A. alternata*, blight, WI; *Ascochyta pisi*, general but rare in Northwest; *Cercospora pisi-sativae*, GA; *Fusicladium pisicola*, black leaf, ID, UT; *Pleospora hyalospora*, MS; *Septoria flagellifera*, MN, ND, SD, WI; *S. pisi*, widespread; *Stemphylium polymorphum*, ME.
- Nematode, hop cyst. *Heterodera humuli*, OR.
- Nematode, oat cyst. *Heterodera avenae*, WA.
- Nematode, pea cyst. *Heterodera gottingiana*.
- Nematode, root knot. *Meloidogyne* spp., AZ, CA, FL, NC, SC, TX, UT, WI.
- Nematode, sting. *Belonolaimus gracilis*.
- Nonparasitic. Chlorosis, manganese or zinc deficiency, FL, TX, WA. Intumescence, pod swellings, CA, NJ, WA. Seed Spotting, cause unknown.
- Powdery mildew. *Erysiphe polygoni*, general.
- Rot, black mold. *Rhizopus stolonifer*, cosmopolitan; gray mold, *Botrytis cinerea*, occasional.
- Rot, foot. *Aphanomyces euteiches*, general except in far north.
- Rot, root. *Aphanomyces euteiches*, ID; *Fusarium solani* f. *pisii*, widespread; *Pellicularia filamentosa*, stem canker, general; *Phoma* sp., NJ, WI; *Pyrenochaete terrestris*, IA; *Phymatotrichum omnivorum*, TX; *Phytophthora* sp., CA, CT; *Thielaviopsis basicola*, AR, CA.
- Rot, stem; wilt. *Sclerotinia sclerotiorum*, CA, DE, FL, ID, MT, NJ, PA, TX, VA, WA.
- Rust. *Uromyces favae* (0, I, II, III), CA, ID, ME, MA, MN, NE, ND, WA, WY.
- Scab; black spot; leaf mold. *Cladosporium pisicola*, CA, ME, OR, UT, WA, TX.
- Virus. Pea Enation Mosaic; Pea Mosaic; Pea Mottle; Pea Streak; Wisconsin Pea Streak; Pea Wilt; Clover (red) Vein Mosaic; Tomato Spotted Wilt.
- Virus, seed-borne; Pea Stunt, WI, Turnip Mosaic Virus, MN.
- Wilt. *Fusarium oxysporum* f. sp. *pisii*, NH to SC, IL, MN, NE, CA, CO, ID, MT, OR, WA; and race 2, Near Wilt; *Fusarium oxysporum* f. sp. *medicaginis*, MS.

Resistant varieties are the answer to *Fusarium* wilt and some virus diseases. Using clean seed, preferably grown in the West, is the best way to avoid bacterial blight. A well-drained, fertile soil, 3- to 5-year rotation, cleaning up or plowing under pea refuse immediately after harvest, all help to produce healthy peas. Some organic soil amendments reduce pea wilt.

PEACH

(*Prunus persica*)

- Bacterial crown gall. *Agrobacterium tumefaciens*, general.
- Bacterial hairy root. *Agrobacterium rhizogenes*, general.
- Bacterial leaf spot. *Xanthomonas pruni*, eastern, central, southern States.
- Bacterial, MLO. Peach X-Disease, CT, MA, MI, NY, OH, PA.

- Bacterial shoot blight; canker; gummosis. *Pseudomonas syringae*, CA, OR.
 Blight, blossom; green fruit rot. *Sclerotinia sclerotiorum*, CA.
 Blight, leaf. *Fabraea maculata*, CA, NJ.
 Blight; shot-hole disease; pustular spot. *Coryneum carpophilum*, general.
 Blight, twig. *Coniothyrium* sp., TX; *Cyphella marginata*, OR; *Nectria cinnabarina*, AL.
 Canker, crown. *Phytophthora citrophthora*, CA; *P. cactorum*, stem, AR, CA; *P. syringae*, OR.
 Canker; dieback; gummosis. *Botryosphaeria dothidea*, AL, FL, GA, LA, TX, TN.
 Canker; dieback; gummosis. *Botryosphaeria ribis* var. *chromogena*, FL, GA; *Valsa* (*Cytospora*) *cincta* and *V. leucostoma*, widespread East and central states; *Coniothyrium fuckelii*, WV; *Ceratocystis fimbriata*, CA.
 Canker; peach; constriction disease. *Fusicoccum amygdali*, East and South. Sometimes reported as *Phoma persicae*.
 Damping-off. *Rhizoctonia solani*, AR, CT.
 Leaf curl. *Taphrina deformans*, general.
 Leaf spot. *Phyllosticta circumscissa*, widespread; *P. persicae*, MD, NE, OH; *Mycosphaerella persicae*, frosty mildew, widespread.
 Leaf spot; shot-hole. *Cercospora circumscissa*, general; *C. consobrina*, IL, LA.
 Nematode, dagger. *Xiphinema americanum*.
 Nematode, lesion. *Pratylenchus penetrans*; *P. vulnus*.
 Nematode, ring. *Criconemoides simile*, *C. xenoplax*, NJ.
 Nematode, root knot. *Meloidogyne incognita*, *M. incognita-acrita*; *M. javanica*, on "nematode-resistant" varieties; *M. arenaria*.
 Nematode, sting. *Belonolaimus gracilis*.
 Nonparasitic.
 Catface. Insect blemish on fruit, often from plant bugs.
 Chlorosis. Iron and magnesium deficiency in alkaline soils, Southwest.
 Gummosis. Winter injury, bad drainage.
 Internal Bark Necrosis. ?Manganese toxicity, IL.
 Little Leaf. Zinc deficiency, CA.
 Stem Pitting. Cause unknown, WV.
 Suture Spot. Cause unknown. Decline, PA.
 Powdery mildew. *Podosphaera oxyacanthae*, general; *Sphaerotheca pannosa* var. *persicae*, general.
 Rot, brown. *Monilinia fructicola*, general.
 Rot, brown; blossom and twig blight. *Monilinia laxa*, Pacific states.
 Rot, bud and twig blight. *Fusarium lateritium*, other spp., CA, GA, KS.
 Rot, fruit. *Botryosphaeria obtusa*, AL, GA; *B. dothidea*, AL, GA; *Aspergillus niger*, black mold, cosmopolitan; *Botrytis cinerea*, gray mold, cosmopolitan; *Cephalothecium roseum*, pink mold, widespread; *Choanephora persicaria*, in market; *Diplodia natalensis*, gumming disease; *D. persicae*, GA; *Fusarium* spp., CA, IL, NY, TX; *Gibberella persicaria*, CA; *Glomerella*

- cingulata**, occasional, AL, GA; **Rhizopus nigricans**, cosmopolitan; **Phomopsis** sp., NJ.
- Rot, root. **Armillaria mellea**, cosmopolitan; **Clitocybe monodelpha**, AR, FL, MO, OK; **C. parasitica**, OK; **C. tabescens**, FL, GA; **Ganoderma curtisii**, NC, VA; **Phymatotrichum omnivorum**, AZ, TX; **Cylindrocladium floridanum**, GA.
- Rot, seedling stem. **Sclerotium rolfsii**, South; wilt, **Cylindrocladium floridanum**; **Penicillium** sp.
- Rot, silver leaf. **Stereum purpureum**, occasional.
- Rot, wood. **Fomes** spp.; **Lenzites saepiaria**; **Polyporus hirsutus**, **P. lacteus** and **P. versicolor**, cosmopolitan; **Stereum hirsutum**; **Shizophyllum commune**, wound rot.
- Rust. **Tranzschelia discolor** (II, III), general; 0, I, on anemone, hepatica.
- Scab. **Cladosporium carpophilum**, general.
- Sooty mold; fruit stain. **Fumago vagans**, cosmopolitan.
- Virus. **Peach Asteroid Spot**, OK and TX to southern CA, OR, UT, WA; **Peach Calico**, ID, WA; **Peach Dwarf**; **Peach Golden Net**, CO; **Peach Little Peach**, eastern US, CT to NC to MI, MO; **Peach Mosaic**, OK and TX to CA, CO, UT; **Peach Mottle**, ID; **Peach Necrotic Leaf Spot**, MI; **Peach Phony Disease**, Southeast to MO and TX; **Peach Red Suture**, IN, MD, MI; **Peach Ring Spot**, CA, WA, **Peach Rosette**, SC to FL, TN, MS, MI to AR, OK; **Peach Rosette Mosaic**, MI, NY; **Peach Stubby Twig**; **Peach Wart**, AZ, CA, ID, OR, WA; **Peach Yellow Bud Mosaic**, CA, **Peach Yellow Leaf Roll** (western X-disease, cherry buckskin), CA, CO, ID, OR, UT, WA; **Peach Yellows**; **Mule's Ear Disease** (Drake almond bud failure); **Prunus Ring Spot**; **Cherry Yellows**; **Green Ring Mottle**.
- Virus. **Stem Pitting**.
- Wilt. **Verticillium albo-atrum**, occasional.

Brown rot is the major peach enemy, and spray schedules are built around it, although they start with a dormant spray for leaf curl. Get the latest advice and spray schedule from your county agricultural agent. Peach foliage is sensitive to arsenicals; do not allow a spray prepared for shade trees to touch peaches. The commercial propagator must take many precautions to provide stock free from the numerous viruses.

PEANUT (*Arachis*)

- Bacterial wilt. **Pseudomonas solanacearum**, AL, FL, NC, VA.
- Blight, seedling. **Rhizoctonia** spp., NC to FL, CA, OK, TX.
- Blight, southern; stem and nut rot. **Sclerotium rolfsii**, general.
- Blight, stem. **Diaporthe sojae**, VA, WV.
- Blotch, web. **Phoma arachidicola**, VA.

- Damping-off. Synergistic interaction of *Pythium myriotylum*, *Fusarium solani*, *Meloidogyne arenaria*, FL.
- Leaf spot. *Alternaria* sp., FL, MO, NJ, NM, SC; *Ascochyta* sp., AR; *Phoma* sp., MO, VA; *Phyllosticta* sp., AL, AR, MS; *Pleospora* sp., AR, OK; *Stemphylium* sp., ND; *Leptosphaerulina arachidicola*, GA, TX.
- Leaf spot, brown, halo. *Mycosphaerella arachidicola*, general; *M. berkeleyi* (*Cercospora personata*), general.
- Nematode. *Panagrolaimus subelongatus*, associated with shoot elongation.
- Nematode, leaf. *Aphelenchoides* sp.
- Nematode, lesion. *Pratylenchus brachyurus*, GA, AL, VA, FL, SC.
- Nematode, reniform. *Rotylenchus reniformis*.
- Nematode, ring. *Criconemoides cylindricum*.
- Nematode, root knot. *Meloidogyne arenaria*; *M. hapla*; *M. javanica*, GA.
- Nematode, spiral. *Helicotylenchus nannus*.
- Nematode, sting. *Belonolaimus gracilis*; *B. longicaudatus*.
- Nematode, stubby root. *Trichodorus christiei*.
- Nematode, stunt. *Tylenchorhynchus claytoni*.
- Nonparasitic.
- Blue Stain.** Seedcoat discoloration.
- Chlorosis.** Excess lime; magnesium, manganese, or iron deficiency.
- Necrotic Spot.** May be caused by nutrient deficiency.
- Pops.** Empty pods. May be caused by nutritional deficiency.
- Pouts.** Stunting and chlorotic spotting from thrips.
- Rot, **Black Mold**, of Pods. *Cladosporium herbarum*, cosmopolitan.
- Rot, blue mold, of pods and nuts. *Penicillium* sp., cosmopolitan.
- Rot, charcoal. *Macrophomina phaseoli*, CO, NC, SC, OK, TX.
- Rot, collar. *Diplodia gossypina*.
- Rot, crown. *Aspergillus niger*, GA, NM, TX.
- Rot, *Cylindrocladium* black rot. *Cylindrocladium crotalariae*, VA, NC.
- Rot, gray mold, leaf. *Botrytis cinerea*, CT, MD, MS, TN, VA.
- Rot, peg, pod, root. *Calonectria* (*Cylindrocladium*) *crotalariae*, GA.
- Rot, root. *Curvalaria inaequalis*, SC; *Helminthosporium* sp., OK; *Phymatotrichum omnivorum*, AZ, TX; *Pythium* sp., CA, GA, NC; *Thielaviopsis basicola*, NC.
- Rot, root and pod. *Sclerotinia minor*, *S. sclerotiorum*, NC, VA.
- Rot, seed. *Rhizopus* spp.; *Trichoderma viride*, SC.
- Rot, stem, pod. *Fusarium* spp., also root rot, wilt; *Physalospora rhodina*, FL, GA; *Rhizoctonia solani*.
- Rust. *Puccinia arachidis* (II), occasional, FL, GA, TX, NC, VA.
- Virus. **Peanut Stunt**, VA, NC, AL, GA; **Peanut Mottle**, OK; **Cowpea Chlorotic Mottle**, SD.
- Virus. **Tomato Spotted Wilt**, TX.
- Wilt. *Pythium myriotylum*, VA.
- Wilt. *Verticillium* sp., NM.

PEAR
(*Pyrus*)

- Anthracnose, northwestern. *Neofabraea malicorticis*, OR, WA.
 Bacterial blossom, twig blight; canker. *Pseudomonas syringae*, AR, CA, CT.
 Bacterial crown gall. *Agrobacterium tumefaciens*, general.
 Bacterial fire blight. *Erwinia amylovora*, general.
 Bacterial fruit rot. *Erwinia carotovora*, MA.
 Blight, leaf; black fruit spot. *Fabraea maculata*, general.
 Blight, thread. *Pellicularia koleroga*, NC to FL, TX, WV.
 Blight, twig. *Corticium salmonicola*, FL, LA; *Fusarium* spp., occasional;
Phomopsis ambigua, widespread; *Valsa leucostoma*, WA.
 Blotch, sooty. *Gloeodes pomigena*, eastern states to OK, TX.
 Canker. *Botryosphaeria dothidea*, AL; *Cytospora* spp., OR, VA, WA; *Nectria cinnabarina*, coral spot; dieback; *N. galligena*, trunk canker; *Nummularia discreta*, DE, IA.
 Canker, bark. *Glutinium microsporum*, OR; *Helminthosporium papulosum*, blister canker, black pox; *Myxosporium corticolum*, NY to MI, MS, OR.
 Canker, felt fungus. *Septobasidium* spp., NC to FL and TX.
 Canker, perennial. *Neofabraea perennans*, OR, WA.
 Fruit spot; flyspeck. *Leptothyrium pomi*, eastern states.
 Leaf spot. *Cercospora minima*, FL to TX; *C. pyri*, MI; *Coniothyrium pyrinum*, MA to AL, TX, IA; *Coryneum foliicolum*, IN; *Hendersonia cydoniae*, NY; *Phyllosticta pyrorum*, IL, MS, SC; *Mycosphaerella sentina*, ashy leaf spot, fruit spot, widespread, especially in East.
 Mistletoe. *Phoradendron serotinum (flavescens)*, AZ, TX.
 Mistletoe, European. *Viscum album*, CA.
 Nematode, lesion. *Pratylenchus minyus*; *P. pratensis*, CA.
 Nematode, root knot. *Meloidogyne* sp., CA.
 Nonparasitic
Bitter Pit. Moisture irregularity, Pacific Coast, NY.
Black End; Hard end. Oriental pear rootstocks on shallow, poor soil.
Black Leaf; Brown Bark Spot; Brown Blotch, of Kieffer fruit. Undetermined.
Chlorosis. Mineral deficiency, soil alkalinity, Pacific Coast.
Cork; drought spot; fruit pitting. Boron deficiency, Pacific Coast, TX.
Exanthema. Copper deficiency, CA, FL.
Little Leaf; Rosette. Zinc deficiency, sometimes boron, CA.
Marginal Leaf Blight; Scorch. Potassium or calcium deficiency, ID, WA.
Red Leaf. In Oriental pear, undetermined cause.
Scald. Immaturity; deficient ventilation.
Stigmonose. Insect punctures during growth, widespread.
Target Canker, Measles. Undetermined, GA, NY, VA, CA, WA.
 Powdery mildew. *Podosphaera leucotricha*, CO, OR, WA; *P. oxycanthae*, NJ.
 Rot, bitter; twig, branch canker. *Glomerella cingulata*, widespread but not destructive.

- Rot, black; canker; leaf spot. **Physalospora obtusa**, widespread.
- Rot; blossom and twig blight. **Botrytis cinerea**, widespread.
- Rot, brown. **Monilinia fructicola**, eastern states, TX, WA.
- Rot, brown; blossom blight. **Monilinia laxa**. Pacific states.
- Rot, collar, root. **Phytophthora cactorum**, widespread; **P. citrophthora**, CA.
- Rot, fruit. **Alternaria** sp., black mold; **Aspergillus** sp., cosmopolitan; **Botryosphaeria ribis**, black rot, VA; **Cephalosporium carpogenum**, storage; **Trichothecium roseum**, occasional pink mold; **Cladosporium** sp., occasional; **Coprinus urticicola**, OR; **Gloeosporium** sp., widespread **Neurospora sitophila**, ripe rot, NC; **Penicillium** spp., blue mold, widespread; **Phialophora malorum**, storage; **Phoma exigua**; **P. mali**; **Rhizopus nigricans**, black mold, cosmopolitan; **Pleospora fructicola**; **Sclerotinia sclerotiorum**, CA, WA; **Sporotrichum malorum**, storage rot, OR, WA.
- Rot, heart. **Fomes ignarius**; **F. pinicola**; **Polyporus** spp.
- Rot, root. **Armillaria mellea**, widespread; **Phymatotrichum omnivorum**, TX, OK, AZ; **Xylaria** sp., ID, IN; **Xylaria mali**, VA; **Phytophthora cinnamomi**.
- Rot, silver leaf. **Stereum purpureum**, NY, OR; **S. hirsutum**, trunk rot.
- Rot, trunk. **Schizophyllum commune**, cosmopolitan.
- Rust, **Gymnosporangium clavariiforme** (0, I), leaves and fruit, SC; **G. clavipes** (0, I), chiefly on fruit; **G. fuseum**, CA; **G. globosum** (0, I), on leaves and fruit, eastern states to IA, MN; **G. hyalinum** (0, I), FL; **G. kernianum** (0, I), on leaves and fruit, AZ, CO; **G. nootkatense** (0, I), on Asiatic pear, AK.
- Scab. **Venturia pyrina**, general.
- Spot anthracnose, scab. **Elsinoë pini**, OR, WA.
- Virus. **Apple Chlorotic Leafspot**, **Spy Epinasty Decline**, **Virginia Crab Stem Pitting and Browline**, **Apple Mosaic**, **Flat Limb**, **Pear Vein Yellows/Red Mottle**, **Pear Ring-Pattern Mosaic**, **Pear Latent** on Bradford Pear (*Pyrus calleryana*), MD.
- Virus. **Pear Stony Pit**, Pacific Coast states, NY; **Pear Decline**, CA, OR, WA; **Pear Leaf Curl**, CA.
- Virus? **Pear Bark Measles**, CO.

Fire blight is the limiting factor in pear production, many orchards having been abandoned because of this devastating bacterial disease. Kieffer pears and some Asiatic varieties are resistant and are being used in breeding; some resistant forms are now available. Sprays during blossoming, usually an antibiotic, sometimes combined with weak copper, are used in conjunction with sanitary measures for fire-blight control. Pear decline, a virus disease transmitted by the pear psylla, is serious on the Pacific Coast.

PEA-TREE (*Caragana*)

- Bacterial hairy root. **Agrobacterium rhizogenes**, KY to NE, OK.
- Blight, leaf. **Ascochyta** sp., OH; **Septoria** sp., MN.

Blight, pod. *Botrytis cinerea*, MA.
 Damping-off. *Rhizoctonia solani*, ND.
 Leaf spot. *Phyllosticta gallarum*, AK, WI.
 Rot, root. *Pellicularia filamentosa*, ND; *Phymatotrichum omnivorum*, TX;
Phytophthora cactorum, wilt, of seedlings.

PECAN

(*Carya illinoensis*)

Bacterial crown gall. *Agrobacterium tumefaciens*, widespread.
 Blight, thread. *Pellicularia koleroga*, FL, NC.
 Blotch, leaf. *Mycosphaerella dendroides*, South.
 Canker. *Cytospora* sp., AZ.
 Canker; black bark spot. *Myriangium tuberculans*, GA, MS.
 Canker; dieback. *Botryosphaeria berengeriana*, AZ, SC to FL.
 Canker, stem. *Microcera (Fusarium) coccophila*, LA, TX.
 Leaf spot. *Microstroma juglandis*, GA to TX; *Phyllosticta convexula*, OK;
Septoria caryae, TX; *Pestalotia uvicola*, FL, TX.
 Leaf spot. algal. *Cephaleuros virescens*, FL.
 Leaf spot. brown. *Cercospora fusca*, prevalent through pecan belt.
 Leaf spot; downy spot. *Mycosphaerella caryigena*, GA and FL to TX.
 Leaf spot; liver spot. *Gnomonia caryae* var. *pecanae*, AR, GA, LA, MS,
 TX, AL.
 Leaf spot; vein spot. *Gnomonia nerviseda*, AR, IL, LA, MS, TX.
 Leaf spot; zonate. *Cristulariella pyramidalis*, AL.
 Mistletoe. *Phoradendron serotinum (flavescens)*, widespread Gulf states.
 Nematode. *Paratylenchus* sp.; *Trichodorus* sp.
 Nematode, awl. *Dolichodorus obtusus*.
 Nematode, dagger. *Xiphinema americanum*, Southeast.
 Nematode, root knot. *Meloidogyne* spp.; *M. incognita*.
 Nonparasitic
 Black Pit; kernel spot. Feeding punctures of plant bugs.
 Leaf Scorch. Low fertility and soil moisture capacity.
 Rosette. Zinc deficiency.
 Sand Burn of Seedlings. High temperature.
 Powdery mildew. *Microsphaera alni*, occasional.
 Rot, heart. *Schizophyllum commune*, after drought injury, OK.
 Rot, on nuts. *Aspergillus chevalieri*, storage mold; *Trichothecium roseum*,
 pink mold.
 Rot, root. *Armillaria mellea*, CA; *Helicobasidium purpureum*, TX; *Phymato-*
trichum omnivorum, TX; *Pestalotia uvicola*, FL, TX; *Clitocybe tabescens*,
 GA.
 Scab. *Cladosporium effusum*, general.
 Spot anthracnose; nursery blight. *Elsinoë randii*, southeastern and Gulf states.
 Virus. **Bunch Disease**. Undetermined.

Pecan scab is the limiting factor in nut production in southeastern states, with strains of the fungus sometimes attacking varieties long considered immune; four or five sprays are required for control. In Arizona severe infection from *Phymatotrichum* root rot has come where trees are intercropped with lucerne, which provides a rapid transit medium for the fungus. Getting rid of the lucerne and treating with ammonium sulfate saves some trees. Zinc sulfate, added to the soil or to foliar sprays, controls rosette.

PENNISETUM

Leaf spot. *Helminthosporium giganteum*, MD.

Smut, seed. *Ustilago penniseti*, VA.

Virus. **Maize Chlorotic Dwarf Virus**, OH.

PENSTEMON

(Beard-Tongue)

Black mildew. *Dimerium alpinum*, CA.

Leaf spot. *Cercospora penstemonis*, AL, KS, IN, MT, ND, SD, NE, OK, TX,

WI; *Cercospora nivosa*, CO, ID, OH, WA; *Phyllosticta antirrhini*, IL;

Ramularia penstemonis, CA; *Septoria penstemonis*, CA, IL, ME, MI, MS, MO, NY, OK, TX, WA, WI.

Leaf spot; stem spot. *Ascochyta penstemonis*, CA.

Nematode, root knot. *Meloidogyne* sp.

Nematode, stem. *Ditylenchus dipsaci*, VA.

Powdery mildew. *Erysiphe cichoracearum*, WA.

Rot, crown, stem. *Sclerotium rolfsii*, CT, IL, NJ, MA, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia andropogonis* (0, I), widespread; II, III, on *Andropogon*;

P. confraga (III), AZ; *P. palmeri* (0, I, III), AZ, CA, ID, WA, MT, to NM;

P. penstemonis (III), AZ, CA, OR, UT.

PEONY

(*Paeonia*)

Anthraxnose. *Gloeosporium* sp., KS, IL, MA, MD, NC, NJ, PA, VA.

Bacterial crown gall. *Agrobacterium tumefaciens*, MI, MD.

Blight; early bud rot. *Botrytis paeoniae*, general.

Blight, late; gray mold. *Botrytis cinerea*, also leaf rot, general.

Blight, southern. *Sclerotium rolfsii*, MS, TX.

Blight, tip; crown rot. *Phytophthora cactorum*, CT, IL, IN, KS, NJ, NY, OH.

Blotch, leaf, stem; measles. *Cladosporium paeoniae*, general.

Canker, stem wilt. *Coniothryium* sp., CA on tree peonies.

- Leaf spot. *Alternaria* sp., occasional in northeastern and central states; *Cercospora paeoniae*, IL; *Pezizella oenotherae*, MD, PA; *Phyllosticta* sp., NJ, PA, VA, *Septoria paeoniae*, also stem canker, ME, MI, MN, NJ, NY, OR, RI, WA, WI; *Cryptostictis paeoniae*, IL.
- Nematode, leaf and stem. *Ditylenchus dipsaci*, NJ, WA.
- Nematode, root knot. *Meloidogyne* spp., widespread; *M. hapla*; *M. incognita*.
- Nematode, spiral. *Rotylenchus buxophilus*.
- Nonparasitic. **Bud Blast**, various causes, sometimes potassium deficiency.
- Le Moine Disease**, club root, cause unknown, possibly virus.
- Powdery mildew. *Erysiphe polygoni*, TX.
- Rot, root. *Armillaria mellea*, CA, IA, MI, OR; *Fusarium* sp., CO, IN, MO, NE, NJ, OK; *Phymatotrichum omnivorum*, AZ, TX; *Rhizoctonia solani*, CT, IL, MN, NY, PA, VA; *Thielaviopsis basicola*, CT.
- Rot, stem; wilt. *Sclerotinia sclerotiorum*, IL, MD, MN, NJ, NY, OK, OH.
- Virus. **Peony Ring Spot**, MA to VA, KS and MI, CA, WA.
- Virus. **Witches' Broom, Crown Elongation**. Cause unknown, MD, NY, VA.
- Wilt. *Verticillium albo-atrum*, IL, KS, MD, NY, OH.

Botrytis blight is the best-known peony disease. Young shoots are rotted at base; buds turn black, flowers are blasted. Cutting down all tops at ground level in fall and spraying in spring when reddish shoots first show will reduce blight. Anthracnose, blotch, sometimes leaf spot, may be serious occasionally. In humid summers *Sclerotinia sclerotiorum* frequently kills stalks, filling the pith with very large sclerotia. Sickly plants may have root-knot nematodes. Lack of bloom may be due to too-deep planting, growing in shade, botrytis blight, or nematodes.

PEPEROMIA

- Anthracnose. *Colletotrichum* sp., WA; *Gloeosporium* sp., WA.
- Leaf spot. *Myrothecium roridum*, FL.
- Nematode. *Aphelenchoides ritzema-bosi*; *Pratylenchus* sp.; *Radopholus similis*, FL.
- Rot, cutting; root. *Rhizoctonia* sp.; *Pythium splendens*, CA; *Phytophthora* ?*palmivora*, CA; *P. nicotianae* var. *parasitica*, OH.
- Virus. **Ring Spot**; **Oedema**, pimples in leaves, graft-transmissible, probably due to a virus.

The virus ring spot distorts leaves, which have chlorotic or brown necrotic rings; plants are stunted.

PEPPER (*Capsicum*)

- Anthracnose; fruit. Leaf and stem spot. *Gloeosporium piperatum*, MA to FL, TX, IL; *Glomerella cingulata*, fruit rot, CT to FL, TX, KS, OH.

- Bacterial canker, vascular. *Clavibacter michiganense*, WY, on *C. annuum* var. *cerasiforme*, on *C. frutescens* (Bell Pepper), CA.
- Bacterial fruit and stem spot; seedling blight. *Xanthomonas vesicatoria*, general in South and East.
- Bacterial leaf spot. *Xanthomonas vesicatoria*, NC; *Pseudomonas syringae*; *P. viridiflora*, FL.
- Bacterial soft rot. *Erwinia aroideae*, and *E. carotovora*, pv. *carotovora*, CA, FL, NJ; *Pseudomonas marginalis*, CA, FL, NJ, occasional in market.
- Bacterial wilt. *Pseudomonas solanacearum*, PA to FL.
- Blight; blossom rot. *Choanephora cucurbitarum*, FL, NC.
- Blight; fruit rot. *Phytophthora capsici*, CA, CO, FL, LA, MO, NM, NY, OH, TX, VA; *P. parasitica*, IL, IN.
- Blight, southern. *Sclerotium rolfsii*, NC to FL.
- Damping-off; stem and root rot. *Pythium* spp., cosmopolitan; *Rhizoctonia solani*, cosmopolitan.
- Dodder. *Cuscuta* sp., GA, NJ, VA.
- Downy mildew. *Peronospora tabacina*, GA, NC, SC, TX.
- Fruit spot, black. Nonparasitic, TX.
- Leaf spot. *Ascochyta capsici*, WA, NY to FL; *Cercospora capsici*, frog-eye; stem-end rot; *C. unamunoi*, CA and Gulf states; *Stemphylium solani*, FL; *S. botryosum* f. sp. *capsicum*, NY.
- Mold, leaf. *Cladosporium herbarum*, CA, GA, TX; Seed Mold, *Stemphylium botryosum*, CT, FL.
- Nematode, awl. *Dolichodorus heterocephalus*.
- Nematode, burrowing. *Radopholus similis*.
- Nematode, lesion. *Pratylenchus penetrans*.
- Nematode, root knot. *Meloidogyne arenaria*; *M. incognita*; *M. incognita-acrita*; *M. hapla*.
- Nematode, spiral. *Helicotylenchus erythrinae*.
- Nematode, stylet. *Tylenchorhynchus claytoni*; *T. capitatus*.
- Nematode, tobacco cyst. *Heterodera tabacum*, VA.
- Nonparasitic. **Blossom-End Rot**, deficient water supply, also lack of calcium. **Sunscald**, high temperature, often after defoliation.
- Powdery mildew. *Leveillula taurica*, UT.
- Rot, black; internal mold, early blight. *Alternaria* spp., general after sunscald and blossom-end rot.
- Rot, charcoal. *Macrophomina phaseoli*, CA, GA, KS, NJ, TX.
- Rot, fruit. *Colletotrichum capsici* and *C. nigrum*, general; *Diaporthe phaseolorum*, MS, MO; *Phoma destructiva*, AL, DE, FL, GA, MS, NY; *Penicillium* sp., GA; *Rhizopus stolonifer*, FL, TX, WA; *Sclerotinia sclerotiorum*, also stem rot, CA, CT, FL, MA; *Fusarium* spp.
- Rot, gray mold. *Botrytis cinerea*, occasional in market or field.
- Rot, pod. *Curvularia lunata*, FL; *Nematospora coryli*, yeast spot after plant bug injury.
- Rot, root. *Aphanomyces* sp., NJ, of seedlings; *Phymatotrichum omnivorum*, AZ, TX.

Virus. **Pepper Mottle**, CA; **Pepper Strain of Alfalfa Mosaic**; **Pepper Vein-Banding Mosaic** (?Potato Y virus); **Potato Virus X**; **Cucumber Mosaic**; **Tobacco Mosaic**; **Tobacco Etch**; **Aster Ring Spot**; **Beet Curly Top**; **Tomato Spotted Wilt**, TN.

Virus. **Potato Virus Y** and **Tobacco Ring Spot**, TX.

Wilt. **Fusarium annuum**, AZ, CO, LA, ME, MS, NJ, NM, OK, and TX; **Verticillium albo-atrum**, CA, CO, CT, NY, TX, LA.

To control bacterial spot and anthracnose, rotate crops, avoiding land growing potatoes, tomatoes, or eggplant the previous year, and do not grow next to other solanaceous crops. To avoid sunscald, keep fruits shaded; spray to control leaf spots to prevent defoliation. For virus diseases, obtain healthy seed or use resistant varieties. Do not start plants in greenhouses with petunias or Jerusalem cherries; do not smoke or handle tobacco near plants; control aphid vectors; control weed hosts before the crop is planted.

PEPPER-GRASS, GARDEN CRESS

(*Lepidium*)

Damping-off. **Pythium debaryanum**, TX; **Rhizoctonia solani**, TX.

Downy mildew. **Peronospora lepidii**, IA, SD, TX.

Rot, crown. **Sclerotinia sclerotiorum**, MA.

Rot, root. **Pyrenochaeta terrestris**, pink root, ND and ST; **Phymatotrichum omnivorum**, TX.

Rust. **Puccinia aristidae** (0, I), TX; II, III, on grasses.

Virus. **Bidens Mottle**, FL.

White rust; White Blister. **Albugo candida**, general.

PEPPER VINE, CISSUS

(*Ampelopsis arborea*)

Blight, thread. **Pellicularia koleroga**, LA.

Dodder. **Cuscuta compacta**, FL.

Leaf spot. **Cercospora arborea**, TX; **C. vitis**, LA; **Guignardia bidwellii** f. **parthenocissi**, MS, NJ.

PERSIMMON

(*Diospyros*)

Anthracnose; fruit, twig, blight. **Gloeosporium diospyri**, East and South to KS.

Bacterial crown gall. **Agrobacterium tumefaciens**, CA.

Bacterial, witches' broom. **MLO**, TX.

Blight, thread. **Pellicularia koleroga**, FL, on Japanese persimmon.

Blight, twig. **Phoma diospyri**, FL, SC; **Physalospora obtusa**, Gulf states.

Blotch, leaf. **Mycosphaerella diospyri**, Gulf states.

- Canker; dieback. *Diplodia natalensis*, AL, TX; *Botryosphaeria ribis*, AL, LA, MD.
- Fruit spot; fly speck. *Leptothyrium pomi*, FL; *Macrophoma diospyri*, AL, NJ, TX.
- Leaf spot, algal. *Cephaleuros virescens*, FL.
- Leaf spot; brown. *Cercospora diospyri*, ME, IL, MS, SC, TX, VA; Black, *C. fuliginosa*, AL, FL, GA, IL, MS, TX; *Pestalotia* sp., ?secondary; *Phyllosticta* sp., FL, IN; *Ramularia* sp., FL; *Fusicladium levieri*, CT, FL, MS.
- Mistletoe. *Phoradendron serotinum (flavescens)*, FL, TX.
- Mistletoe. *Viscum album*, CA, on *Diospyros kaki* (Japanese persimmon).
- Nematode, citrus. *Tylenchulus semipenetrans*, CA.
- Nematode, root knot. *Meloidogyne* sp., FL, SC, TX.
- Powdery mildew. *Podosphaera oxyacanthae*, TX.
- Rot, fruit. *Alternaria* sp., occasional on Japanese persimmon; *Botrytis cinerea*, gray mold; *Penicillium expansum*, blue mold, cosmopolitan; *Physalospora* spp., AZ, AL, GA, TX, NY; *Rhizopus stolonifer*, TX.
- Rot, root. *Armillaria mellea*, CA; *Phymatotrichum omnivorum*, TX.
- Rot, wood. *Daedalea ambigua*, LA, MS; *Daldinia concentrica*, LA, VA; *Fomes* spp.; *Hericiium erinaceus*, LA; *Lentinus tigrinus*, LA, MS; *Pleurotus ostreatus*, LA, MS; *Polyporus* spp.; *Schizophyllum commune*, KY, TN.
- Wilt. *Cephalosporium diospyri*, AL, FL, AR, GA, NC, SC, MS, OK, TN, TX; *Verticillium albo-atrum*, TX.

Persimmon wilt started in Tennessee in 1933, and at the end of 5 years, only 5% of the persimmons in that native stand were alive. Oriental persimmons are resistant.

PETALOSTEMON

(Prairie-Clover)

- Rot, root. *Phymatotrichum omnivorum*, TX.
- Rust. *Puccinia andropogonis* (0, I), ND to KS, CO and WY, TX; *Uropyxis petalostemonis* (0, I, II, III), WI to ND, CO and NM.

PETASITES

(Butter-Bur)

- Gall, leaf. *Synchytrium aureum*, WI.
- Leaf spot. *Ramularia variegata*, WI; *Stagonospora petasitidis*, WI.
- Rust. *Puccinia conglomerata*, MI, MN, NY, WI; *P. poarum*, AK.

PETUNIA

- Bacterial fasciation. *Clavibacter fascians*, CA, OH, PA.
- Bacterial, MLO. Aster Yellows.

Bacterial wilt. *Pseudomonas solanacearum*, FL.
 Blight, of old flowers. *Choanephora conjuncta*, GA.
 Blotch, leaf. *Cercospora petuniae*, FL, OK.
 Damping-off. *Rhizoctonia solani*, FL, NJ, NY, NC, OK, PA, TX.
 Dodder. *Cuscuta* spp., MD, NJ, NY, OK, TX, WV.
 Leaf spot. *Ascochyta petuniae*, TX.
 Nematode, root knot. *Meloidogyne* spp., general in South, occasional in greenhouses.
 Nonparasitic. **Air Pollution Injury.**
 Powdery mildew. *Oidium* sp., MN, NY, VA.
 Rot, black stem. *Stemphylium botryosum*, secondary, TX.
 Rot, crown. *Phytophthora nicotianae* var. *parasitica*, FL.
 Rot, crown. *Phytophthora parasitica*, CO.
 Rust. *Puccinia aristidae* (0, I), AZ.
 Virus. **Beet Curly Top**, CA, OR; **Tobacco Etch; Tobacco Mosaic; Cucumber Mosaic**, general; **Tobacco Ring Spot; Tomato Spotted Wilt**, CA; **Potato Rugose Mosaic; Biddens mottle**, FL; **Bromegrass Mosaic**, general.
 Wilt. *Fusarium* sp., WA; *Sclerotinia sclerotiorum*, WA; *Verticillium albo-atrum*, CA.

Dodder is common on petunias, reported in window boxes as well as in garden beds. Plants started in greenhouses may get infected with tobacco mosaic. Smoking around petunias, or a tobacco-stem mulch, may also foster mosaic.

PHILIBERTIA

Powdery mildew. *Phyllactinia corylea*, FL.
 Rust. *Puccinia bartholomaei* (0, I), AZ; *P. obliqua* (III), FL, AZ, CA, NM, TX.

PHILODENDRON

Anthracnose. *Gloeosporium* sp., WA; *Colletotrichum* sp., WA.
 Bacterial leaf rot. *Erwinia chrysanthemi*, FL.
 Blight, southern. *Sclerotium rolfsii*, CA.
 Leaf spot. *Colletotrichum philodendri*, NJ.
 Nematode, burrowing. *Radopholus similis*, FL; Root Knot. *Meloidogyne* sp.
 Nematode, spiral. *Helicotylenchus nannus*; Lesion *Pratylenchus*, sp., FL.
 Nonparasitic. Exudation of sugars, CA.
 Rot, root. *Pythium splendens*, FL.
 Rot, stem. *Phytophthora* spp., FL.
 Sooty mold. *Capnodium* sp.

PHLOX

- Bacterial crown gall. *Agrobacterium tumefaciens*, NJ.
Bacterial fasciation. *Clavibacter fascians*, CA.
Bacterial, MLO. Aster Yellows, NJ, NY, PA, and California Aster Yellows, CA.
Blight, gray mold. *Botrytis cinerea*, AK.
Blight, southern; crown rot. *Sclerotium rolfsii*, CT, FL, IL, MD, NJ, NY, OH, TX, VA.
Blight, stem. *Pyrenochaeta phlogis*, NY.
Canker, stem. *Colletotrichum* sp., FL.
Downy mildew. *Peronospora phlogina*, IA, WI.
Leaf spot. *Ascochyta phlogis* var. *phlogina*, NY, MA, TX; *Cercospora omphakodes*, NY to IA, WI; *Macrophoma cylindrospora*, CA; *Phyllosticta* sp., WA; *Septoria* spp.; *Volutella phlogina*, LA; *Ramularia* sp., WA; *Stemphylium botryosum* (*Pleospora herbarum*), NJ.
Nematode, leaf. *Aphelenchoides fragariae*, MD.
Nematode, leaf and stem. *Ditylenchus dipsaci*, CA, CT, MD, NJ, NY, OH, TX, WA.
Nematode, root knot. *Meloidogyne* spp., KS, MD, MA, NJ, OH, TX, WA.
Nonparasitic. Leaf Drop, "Rust," blight, cause uncertain but includes inability of old stems of some varieties to take up enough water.
Powdery mildew. *Erysiphe cichoracearum*, general; *Sphaerotheca macularis*, KS, NH, NY, OH, WA.
Rot, charcoal. *Macrophomina phaseoli*, IL.
Rot, root. *Thielaviopsis basicola*; *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia douglasii* (0, I, III), NJ, PA, CO, MT, NE, NM, OR, UT, WA, WY; *P. plumaria* (0, I, III), IL, IA, MO, TX, WY to NM, CA and WA; *Uromyces acuminatus* var. *polemonii* (0, I), IL, IA, MN, MS, SD, WI.
Virus. Mosaic, MD, NC, NY.
Wilt. *Verticillium albo-atrum*, NY, MN.

When gardeners talk about "rust" on phlox, they usually mean the physiological blight, for true rusts are uncommon on perennial summer phlox. Powdery mildew is general and especially disfiguring when plants are shaded or crowded with little air circulation. Sulfur dust is still good.

PHOENIX-TREE (*Firmiana simplex*)

- Blight, web. *Rhizoctonia microsclerotia*, FL.
Canker; coral spot. *Nectria cinnabarina*, OK.
Rot, root. *Phymatotrichum omnivorum*, TX.

PHOTINIA

(Christmasberry, Toyon and Oriental Species)

- Anthracnose. *Gloeosporium* sp., MS.
 Bacterial fire blight. *Erwinia amylovora*, CA, NJ.
 Blight, leaf. *Fabraea maculata*, CA, LA.
 Dieback. *Cytospora* sp.
 Leaf spot. *Cercospora* sp., GA; *C. heteromeles*, CA, TX; *C. photiniaeserrulata*; *C. eriobotryae*; *Lophodermium heteromeles*, CA; *Phyllosticta heteromeles*, CA, TX; *Pestalotia* sp., NJ; *Septoria photiniae*, CA, PA.
 Powdery mildew. *Podosphaera leucotricha*, CA; *Sphaerotheca pannosa*, OR.
 Rot, crown. *Phytophthora cactorum*, CA.
 Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.
 Rust. *Gymnosporangium japonicum* (0, I), III on juniper; *G. clavipes*, MA.
 Scab. *Photinia photinicola* (?*Spilocaea eriobotryae*), on leaves, berries, CA.

PHYSOSTEGIA

(False Dragonhead)

- Blight; southern crown rot. *Sclerotium rolfsii*, VA to OK, KS, CT, NJ, NY, WI.
 Downy mildew. *Plasmopara cephalophora*, WI.
 Leaf spot. *Mycosphaerella physostegiae*, GA, VA; *Septoria physostegiae*, IL, WI.
 Rot, stem. *Sclerotinia sclerotiorum*, ME.
 Rust. *Puccinia physostegiae* (III), IN, NH, MT, NY.

PICK-A-BACK

(Tolmiea)

- Powdery mildew. *Sphaerotheca* sp., OR.

PIERIS

(Mountain, Japanese Andromeda)

- Blight, twig. *Cytospora* sp., OR.
 Dieback. *Phytophthora* sp., PA.
 Leaf spot. *Pestalotia* sp., CT, NJ; *Phyllosticta andromedae*, NJ; *P. maxima*, CT and NJ; *Alternaria tenuis*, RI.
 Leaf spot, tar. *Rhytisma andromedae*, FL, GA.
 Rot, root. *Armillaria mellea*, NJ.

PIGEON PEA

(Cajanus)

Bacterial, MLO. Witches' broom, FL.

PINE

(Pinus)

Black mildew. *Lembosia acicola*, CA.Blight, brown felt. *Herpotrichia nigra*, Northwest, on snow-buried foliage at high altitudes; *Neopeckia coulteri*, MT, CA.Blight, brown spot needle. *Systemma* (*Scirrhia*) *acicola*, on hard pines in South, on Red pine, WI.Blight, needle. *Cytospora pinastri*, ME, NJ, PA; *Hendersonula pinicola*, NC, TN, WY; *Pullaria pullulans*, after insect injury; *Dothistroma pini*, NE, OH, IL, IA, OK, MD; *Septoria spadicea*, NH, NY, VT, VA, MN; *Lecanosticta* sp.Blight, needle. *Dothistroma pini*, MN, PA.Blight, needle. *Lophodermella cerina*, LA, MS, AL, FL.Blight, seedling. *Botrytis cinerea*, cosmopolitan; *Cylindrocladium scoparium*, NJ; *Fusarium* spp.; *Rhizina undulata*, MN, ME, CA, northern Rocky Mountains; *Thelephora terrestris*, ME, NJ, OH, PA, KS, northern Rocky Mountains; *Scleroderris lagerbergii*, MI, WI, NY, also canker.Blight, shoot. *Fusarium moniliforme* var. *subglutinans*, FL, GA; *Diplodia gossypina*, GA; *Gremmeniella abienta*, NH, NY.Blight, snow. *Phacidium infestans*, occasional, New England; *P. convexum*, NC.Blight, tip; twig; collar rot. *Diplodia pinea* (*Sphaeropsis ellisii* and *S. Sapinea*), New England to VA, CA, IA, KS, ND, SD, and WI. *Cenangium ferruginosum* (*C. abietis*), "pruning twig blight," widespread, sometimes secondary; *Monochaetia pinicola*.Canker. *Atropellis pinicola*, Northwest; *A. piniphila*, Northwest, NM, AL, TN; *A. tingens*, GA, MA, NH, NC, PA, VA; *A. arizonica*, AZ; *Caliciopsis pinea*, New England to SC, TN; *Dasyscypha ellisiana*, on introduced pines in eastern states; *D. pini*, on five-needle pines, Pacific Northwest, MI; *Nectria* spp., New England to NC, IA; *Rhabdospora mirabilissima*, of seedlings, NY; *Tympanis confusa*, VA.Canker. *Scleroderris lagerbergii* on red pine MI, MN, NY, VT, WI.Canker, bark. *Aleurodiscus amorphus*, widespread; Felt, *Septobasidium* spp.Canker, bleeding. *Sphaeropsis ellisii*, PA.Canker, pitch. *Fusarium lateritium* f. *pini*, FL, VA; *F. moniliforme* var. *subglutinans*, FL, NC.Damping-off. *Rhizoctonia solani* and *Pythium* spp., cosmopolitan.Dieback, tip. *Sirococcus strobilinus*, CA, MI, MN, WI.Mistletoe, dwarf. *Arceuthobium americanum*, Rocky Mountain states; Pacific Northwest; *A. campylopodum*, western dwarf, Rocky Mountain states to

- Pacific Coast, TX; **A. vaginatum**, southern Rocky Mountain states; **A. vaginatum** subsp. **cryptopodum**, CO; **A. cyanocarpum**, CO, OR, WY; **A. occidentale**, CA.
- Needle cast. **Bifusella linearis**, tar spot, widespread; **B. striiformis**, CA; **Elytroderma deformans**, also witches' broom, SD to AZ, CA and WA, GA; **Hypoderma desmazierii**; ME to NC, GA, and WI; **H. hedgecockii**, Southeast; **H. lethale**, gray blight, on hard pines, New England to FL, LA; **H. pedatum**, CA; **H. pini**, CA, NV; **H. saccatum**, tar spot, CO, NM; **Hypodermella arcuata**, CA, OR; **H. ampla**, tar spot, Great Lakes states; **H. cerina**, CA; **H. concolor**, CO to ID, MT, OR; **H. lacrimiformis**, CA, OR; **H. limitata**, CA; **H. medusa**, CA, CO; **H. montana**, CA to ID, OR; **H. montivaga**, CA to MT, OR; **Lophodermium nitens**, New England to GA and MI and Pacific Northwest, on five-needle pines; **L. pinastri**, widespread; **L. ponderosae**, CA.
- Needle cast. **Bifusella saccata**, CA, CO; **Hypodermella** sp., OR and CA; **Lophodermium durilabrum**, OR; **L. seditiosum**, MI.
- Needle droop. Abiotic inability of poor roots to acquire sufficient water, MN, WI, MI.
- Nematode, dagger. **Xiphinema americanum**.
- Nematode, lance. **Hoplolaimus coronatus**.
- Nematode, leaf. **Aphelenchoides fragariae**, FL.
- Nematode, pinewood. **Bursaphelenchus xylophilus**, vectored by pine sawyer beetle, IL, MO; also **B. lignicolus**, MO.
- Nematode, ring. **Criconemoides lobatum**; FL; **C. simile**, FL, NC.
- Nematode, root knot. **Meloidogyne** sp., NM; **M. javanica**, FL; **Meloidodera floridensis**, on slash pine, FL.
- Nematode, sting. **Belonolaimus gracilis**.
- Nonparasitic. **Ozone Injury**, **Sulfur Dioxide Injury**, NJ, IN, WI. **Needle Curl**, high temperature. **Chlorotic Dwarf**.
- Rot, charcoal. **Macrophomina phaseoli**.
- Rot, heart; wood. **Fomes** spp., general; **Fomes annosus**; **Lentinus lepideus**, widespread; **Polyporus** spp., widespread; **Poria** spp., **Lenzites saepiaria**; **Stereum** spp.; **Trametes** spp., widespread.
- Rot, hypocotyl. **Fusarium oxysporum**, CA.
- Rot, root. **Armillaria mellea**, widespread; **Ceratocystis wageneri**, OR, Pacific NW; **Clitocybe tabescens**, FL; **Cylindrocladium scoparium**, seedling blight, NJ, PA, WA; **Fusarium solani**, PA; **F. oxysporum**, PA; **F. avenaceum**, PA.; **Phytophthora cactorum**, seedling blight, Northeast; **Phymatotrichum omnivorum**, TX; **Sparassis radicata**, MT to OR and WA; **Verticicladiella wagnerii**, CA, MT, western states; **V. procera**, FL, MN; **V. penicillata**, ID; **V. abietina**, ID.
- Rot, root. **Fomes annosus**, VA; **Polyporus schweinitzii**, VA; **Phytophthora parasitica** var. **nicotianae**, CA; **Iononutus circinatus**, FL.
- Rot, root; little leaf. **Phytophthora cinnamomi**, NC, TN, VA.
- Rust. **Coleosporium crowellii**, UT, NV, CA.
- Rust, comandra blister. **Cronartium comandrae** (0, I), swellings in twigs, trunks of hard pines; II, III, on bastard toadflax.

- Rust, cone.** *Cronartium conigenum*, hypertrophy of cones, especially in South; II, III, on oak; *C. strobilinum*; II, III, on evergreen oaks.
- Rust, eastern gall.** *Cronartium quercuum*, galls on trunk, branches, witches' brooms on two- and three-needle pines East to Rocky Mountains especially Southeast; II, III, on oak, rarely chestnut.
- Rust, fusiform.** *Cronartium fusiforme*, swellings in trunk, branches, in South; II, III, on evergreen oaks.
- Rust, lodgepole pine blister; western fusiform.** *Cronartium coleosporioides* (*Peridermium harknessii*) (0, I), swellings on twigs, branches; trunk cankers; widespread in West; II, III, on painted cup, birdbeak, owl-clover, wood-betony; *C. stalactiforme* (0, I); II, III, on Indian paintbrush.
- Rust, needle.** *Coleosporium apocyanaceum* (0, I), Southeast; II, III, on *Amsonia*; *C. asterum* (*C. solidaginis*) (0, I), on all two- and three-needle pines in eastern U.S., western from CO to MT, WA; II, III on aster, goldenrod, and other composites; *C. campanulae* (0, I), Northeast to IN, NC; (I, III, on bellflower, loosestrife, Venus-looking-glass; *C. crowellii* (III), on pinon and limber pines, AZ, CO, NM; *C. delicatulum* (0, I), New England to FL and west to Great Plains; II, III, on goldenrod; *C. elephantopodis* (0, I), NJ to FL, TX; II, III, on *Elephantopus*; *C. helianthi* (0, I), NY to GA, OH; II, III, on sunflower; *C. inconspicuum* (0, I), MD to GA, TN, OH; II, III, on coreopsis; *C. ipomoeae* (0, I), NJ to FL, IL, AZ; II, III, on morning-glory; *C. jonesii* (0, I), AZ, CO, NM; II, III, on currant and gooseberry; *C. laciniariae*, NJ to FL; II, III, on *Liatris*; *C. madaiae* (0, I), CA, OR; II, III, on composites; *C. minutum* (0, I), on loblolly and spruce pines, FL; II, III, on *Forestiera*; *C. pinicola*, DE to NC, TN; *C. senecionis*, CO, RI; II, III, on *Senecio*; *C. sonchiarvensis* (0, I), on Scotch pine, CT to NE; II, III, on sowthistle; *C. terebinthinaceae* (0, I), Southeast; II, III, on *Parthenium* and *Silphium*; *C. vernoniae* (0, I), on two- and three-needle pines East and South; II, III, on ironweed.
- Rust, pine-pine gall.** *Endocronartium harknessii*, MN, PA.
- Rust, piñon blister.** *Cronartium occidentale*.
- Rust, stem.** *Cronartium appalachianum* (0, I), NC, TN, VA; II, III, on *Buckleya*; *C. filamentosum*; *Peridermium weirii*.
- Rust, sweet-fern blister.** *Cronartium comptoniae*, swellings on trunk and branches of two- and three-needle pines from northeastern to central and Great Lakes states; II, III, on sweet-fern and sweet gale.
- Rust, western gall.** *Endocronartium harknessii*, VA, also Twig necrosis and witches' broom, MA, ND.
- Rust, white pine blister.** *Cronartium ribicola* (0, I), swellings on trunk and branches of eastern white pine from New England to VA and MN; on western white pine in Pacific Northwest; on sugar pine, CA; on lumber pine, WY; II, III, on gooseberry, currant, CA.
- Sooty mold.** *Fumago vagans*; *Capnodium pini*, widespread; *Scorias spongiosa*.
- Witches' broom.** *Elytroderma deformans*, CA.

White pine blister rust is, of course, our foremost disease of pines, and full details are given under Rusts. Black currants are banned entirely in infected areas, red currants within 300 feet of pines. Of the other possible rusts on various pines, the only one seen in northern gardens is the aster rust (*Coleosporium asterum*), which is slightly disfiguring to the needles but not very damaging to general health. Fusiform rust is serious in the South. Brown needles may be due to one of the needle blights or needle cast fungi and also to winter drying. New shoots of Austrian pine turn brown from *Diplodia* tip blight, which should not be confused with the common discoloration caused by the pine shoot moth.

PINEAPPLE

(*Ananas*)

Nematode, lesion. *Pratylenchus brachyurus*.

Nematode, root knot. *Meloidogyne* sp., FL.

Nonparasitic. Spike, Long leaf, FL.

Rot, leaf base; white leaf spot. *Ceratocystis paradoxa*, FL.

Wilt. Toxic effect of mealybug feeding.

PIPSISSEWA

(*Chimaphila*)

Leaf spot. *Mycosphaerella chimaphilina*, NY, OR, PA, WA; *Septoria chimaphilae*, DE.

Rust. *Pucciniastrum pyrolae* (II, III), NY to NC, TN and WI, CA, MT, OR, WA.

PISTACHIO

(*Pistacia*)

Blight, shoot. *Botrytis cinerea*, CA.

Blight, thread. *Pellicularia koleroga*, FL, TX.

Leaf spot. *Phyllosticta lentisci*, TX; *Septoria pistaciarum*, TX.

Nematode. *Meloidogyne* sp., CA; *Xiphinema index*, CA.

Rot, root. *Phymatotrichum omnivorum*, AZ, CA, TX.

Rot, sapwood. *Pleurotus ostreatus*, CA; *Schizophyllum commune*, CA.

Wilt. *Verticillium albo-atrum*, CA.

PITCHER-PLANT

(*Sarracenia*)

Blight, southern. *Sclerotium rolfsii*, TX.

Leaf spot. *Colletotrichum gloeosporioides*, NJ, TX; *Helminthosporium sar-*

racenia, secondary, MN; **Mycosphaerella sarraceniae**, ME, MI, MN, NY, PA, GA, MS, SC; **Pestalotia aquatica**, secondary, MN, MD.
 Rot, root. **Pythium graminicola**, NC; **Rhizoctonia solani**, TX.

PITHECELLOBIUM (Blackbead, Catsclaw)

Blight, twig. **Phomopsis** sp., FL.
 Leaf spot. **Colletotrichum erythrinae**, TX; **Pestalotia funerea**, TX; **Phyllosticta pithecolobii**, TX.
 Nematode. **Meloidogyne** sp.
 Rust. **Ravenelia gracilis** (0, I, II, III), TX; **R. pithecolobii** (II, III); **R. siderocarpus** (II, III), TX.

PITTOSPORUM

Blight, southern; wilt. **Sclerotium rolfsii**, FL, TX.
 Blight, thread. **Pellicularia koleroga**, LA; **Rhizoctonia ramicola**, FL.
 Leaf spot, angular. **Cercospora pittospori**, FL, LA, SC to TX; **Phyllosticta** sp., AL; **Alternaria tenuissima**, FL.
 Nematode, root knot. **Meloidogyne** sp.
 Rot, foot. **Diplodia** sp., FL.
 Rot, root. **Phymatotrichum omnivorum**, TX.
 Virus. **Mosaic**, undetermined, CA; **Rough Bark**, undetermined, CA; **Variiegation**. Variegated forms may be due to a virus.
 Wilt. **Verticillium albo-atrum**, CA.

PLANE-TREE, SYCAMORE

(*Platanus*; American Sycamore, *P. occidentalis*;
 California Sycamore, *P. racemosa*; London Plane,
P. acerifolia; and Oriental Plane, *P. orientalis*)

Anthracnose; leaf and twig blight. **Gnomonia platani** (*G. veneta*, *Gloeosporium platani*, *G. nervisequum*), general.
 Bacterial scorch. **Xylem-limited Rickettsialike** bacteria, DC, LA, TX.
 Blight, leaf. **Phleospora multimaculans**, IN, TX.
 Blight, twig. Canker. **Massaria platani**, NJ, GA, IN, IA, KS, CA.
 Canker. **Dothiorella** sp., NY; **Botryodiplodia theobromae**, MS; **Hypoxyylon tinctor**, NC, GA, LA.
 Canker stain; London plane blight. **Ceratocystis fimbriata** f. **platani**, DE, MD, NJ, NY, PA, MS, MO, NC, OH, TN, VA, WV.
 Leaf spot. **Cercospora platanicola** (*Mycosphaerella platanifolia*) NC to GA, TX, IA; spermatial stage is **Phyllosticta platani**; *Mycosphaerella stigmina-*

platani, NC; **Septoria platanifolia**, GA, IA, MD, SC, TX, WV; **Stigmella platanii-racemosae**, CA; **Cristutariella pyramidalis**, FL; **Tubakia dryina**, LA. Mistletoe. **Phoradendron serotinum (flavescens)**, OK, TN, TX, AZ, NM. Nonparasitic. **Rosy canker**, illuminating gas in soil, NJ, MD, NY. **Decline**, moisture deficiency, MS. **Powdery mildew**. **Microsphaera alni**, widespread; **Oidium obductum**, PA, VA, WV; **Phyllactinia corylea**, IN. **Rot**, heart, trunk. **Fomes** spp.; **Steccherinum (Hydnum) erinaceus**, sometimes on living trees. **Rot**, root. **Armillaria mellea**, MD, TX, WV; **Phymatotrichum omnivorum**, TX, AZ;; **Phytophthora cinnamomi**, MD; **Clitocybe tabescens**, CA; **C. olearia**. **Rot**, wood. **Daedalea** spp., widespread; **Sterum** spp.; **Polyporus** spp.

The canker stain of London plane and American sycamore flared up in epidemic form around Philadelphia in 1935, killing thousands of street and ornamental trees from Newark to Baltimore before it was learned that the fungus was spread in pruning and in tree paint as well as by certain beetles. Pruning is now restricted to winter months, and a disinfectant is added to the wound dressing. Sycamore anthracnose is serious in wet seasons, particularly when the mean daily temperature for 2 weeks after bud-break is below 55° F

PLANTAIN, Common (*Plantago*)

Virus. **Tomato Ringspot**, PA.

PLATYCODON (Balloon-Flower)

Blight. **Phytophthora ?cactorum**, MN.
Rot, root. **Rhizoctonia solani**, CT, PA; **Phymatotrichum omnivorum**, TX.

PLUM (GARDEN), PRUNE (*Prunus domestica*)

Bacterial crown gall. **Agrobacterium tumefaciens**, widespread.
Bacterial fire blight. **Erwinia amylovora**, occasional, OR, WA.
Bacterial leaf spot; **black spot**. **Xanthomonas pruni**, eastern and southern states to WI, TX.
Bacterial shoot blight; **gummosis**. **Pseudomonas syringae**, CA.
Black knot. **Dibotryon morbosum**, widespread except far West.
Blight, blossom, twig. **Monilinia laxa**, CA, OR, WA; **Botrytis cinerea**.
Blight, thread. **Pellicularia koleroga**, LA.

- Blight, twig. *Diplodia* spp., secondary.
- Blotch, leaf. *Phyllosticta congesta*, GA, TX.
- Canker. *Phytophthora cactorum*, CA, IN; *Ceratocystis fimbriata*, CA; *Valsa* (*Cytospora*) *leucostoma*, dieback, widespread.
- Leaf curl; witches' broom. *Taphrina* spp., occasional; *T. communis*, plum pockets; *T. pruni*, pockets, bladder plums; *T. insititiae*.
- Leaf spot; shot hole. *Cercospora circumscissa*, CA, FL, MA, TX, WA; *Coccomyces prunophorae*, widespread; *Coryneum carpophilum*, CA to ID and WA; *Phyllosticta circumscissa*, IA, WA; *Septoria pruni*, TX.
- Mistletoe. *Phoradendron serotinum* (*flavescens*), TX.
- Mistletoe. *Viscum album*, CA, on *Prunus salicina* ("Santa Rosa" Plum).
- Nematode, lesion. *Pratylenchus pratensis*; *P. vulnus*.
- Nematode, root knot. *Meloidogyne* spp., FL, TX.
- Nonparasitic
- Brown Bark Spot.** ?Arsenical poisoning, MT.
 - Chlorosis.** Alkaline soil, mineral deficiency, CA, FL.
 - Exanthema.** Copper deficiency, CA, FL.
 - Gum Spot,** drought spot. Irregular water supply, NY, Pacific Northwest.
 - Little Leaf.** Zinc deficiency, CA, OR, WA.
 - Marginal Scorch.** Fluorine injury, WA.
 - Myrobalan Asteroid Spot.** Cause unknown, occasional.
 - Myrobalan Mottle.** Genetic abnormality, occasional in seed stocks.
- Powdery mildew. *Podosphaera oxyacanthae* var. *tridactyla*, occasional.
- Rot, brown; blossom blight. *Monilinia fructicola*, general.
- Rot, fruit. *Alternaria* sp., OR; *Botrytis cinerea*, CA, WA; *Cladosporium* sp., ID, OR; *Lambertella pruni*, CA.
- Rot, heart. *Fomes applanatus*, OR; *F. fulvus*, widespread; *Lenzites saepiaria*, Pacific Northwest; *Polyporus hirsutus*; *P. versicolor*, widespread.
- Rot, root. *Armillaria mellea*, widespread; *Phymatotrichum omnivorum*, TX.
- Rot, silver leaf. *Stereum purpureum*, WA.
- Rust. *Tranzschelia discolor* (II, III), widespread, especially in South and Pacific Coast states; 0, I, on anemone; *T. pruni-spinosae* (II, III); 0, I, on anemone, hepatica, thalictrum, buttercup.
- Scab. *Cladosporium carpophilum*, widespread.
- Virus. Plum Line Pattern; Plum White Spot; Prune Diamond Canker; Prune Constricting Mosaic; Prune Dwarf; Cherry Vein Clearing; Little Peach; Peach Mosaic; ?Peach Rosette; Peach Yellows; Ring Spot; Plum Rusty Blotch; Apricot Ring Pox; Stem Pitting.
- Wilt; seedling black heart. *Verticillium albo-atrum*.

Plums are even more subject to brown rot than peaches and take the same spray schedule, including insect control to avoid infection through feeding injuries. Black knot is sometimes conspicuous on twigs, but diseased portions can be pruned out and a dormant lime-sulfur spray applied.

PLUMEGRASS

*(Erianthus)*Anthracnose. *Colletotrichum falcatum*, LA.Ergot. *Claviceps purpurea*, AL, OK.Leaf spot; mold. *Cladosporium erianthi*, SC; *Curvularia* sp., FL; *Helminthosporium* sp., FL; *Phyllachora erianthi*, tar spot, AL, FL, GA, SC.Rust. *Puccinia virgata* (II, III), GA; *P. polysora* (II, III), O, I unknown.

PLUMERIA

*(Frangipani)*Leaf spot. *Cercospora plumeriae*, FL.Mistletoe. *Phoradendron serotinum (flavescens)*, FL.Rot, root. *Phymatotrichum omnivorum*, TX.Rust. *Coleosporium domingense* (II, III), FL.

PODOCARPUS

Nematode, burrowing. *Rodopholus similis*, FL.Rot, root. *Clitocybe tabescens*, FL.

POINCIANA

*(Caesalpinia)*Anthracnose. *Gloeosporium* sp., FL.Bacterial crown gall. *Agrobacterium tumefaciens*, FL.Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.Rust. *Ravenelia humphreyana* (II, III), FL.

POINSETTIA

*(Euphorbia pulcherrima)*Bacterial, bract spot. *Clavibacter cassiicola*, FL.Bacterial canker; leaf spot. *Clavibacter poinsettiae*, MD, NJ, NY, PA.Bacterial, greasy canker. *Pseudomonas viridiflava*, CA.Bacterial leaf spot. *Xanthomonas poinsettiae*col, FL.Bacterial stem rot. *Erwinia carotovora* pv. *chrysanthemi*, OH, CT, MI, PA, WV.Blight, tip; stem canker. *Botrytis cinerea*, MO, TX, WA.Canker, stem. *Fusarium solani*, WI.

Leaf spot. *Cercospora pulcherrima*, TX.

Nematode, root knot. *Meloidogyne* sp., NY; *M. incognita-acrita*.

Nonparasitic. Chlorosis, possibly due to cloudy weather. Stunt, water-logged soil.

Rot, crown and stem. *Phytophthora nicotianae* var. *parasitica*, FL.

Rot, root. *Chalaropsis thielaviopsis*, IL; *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX, AZ; *Rhizoctonia solani*, FL, IL, NJ, TX; *Thielaviopsis basicola*, serious, common.

Rot, stem; wilt. *Fusarium* sp., FL, NJ; *Pythium debaryanum*, OK; *P. perniciosum*, root rot, CA; *P. ultimum*; *Phytophthora* sp., NJ; *Sclerotinia sclerotiorum*, WA.

Rust. *Uromyces euphorbiae* (0, I, II, III), OK, TX.

Spot anthracnose; poinsettia scab. *Sphaceloma poinsettiae*, FL.

Keep soil acid, pH 4.8 to 5, to reduce trouble with *Thielaviopsis*. *Rhizoctonia* is prevalent at high temperatures; *Pythium* at low. Steaming soil is safer than using chemicals.

POISON HEMLOCK

(*Conium*)

Virus. Alfalfa Mosaic, WA; Clover Yellow Vein, WA.

POLEMONIUM

(Jacobs-Ladder, Greek-Valerian)

Leaf spot. *Cercospora omphakodes*, PA; *Septoria polemonii*, MO, WI; *S. polemoniicola*, CT, IN, MO.

Powdery mildew. *Erysiphe cichoracearum*, UT; *Sphaerotheca macularis*, WA.

Rust. *Puccinia gulosa* (III), CA; *P. polemonii* (III), CA, ID, IN; *Uromyces acuminatus* var. *polemonii* (0, I), IL, IN, IA, WI.

Wilt. *Fusarium* sp., NJ; *Verticillium albo-atrum*, NJ.

POMEGRANATE

(*Punica granatum*)

Anthraxnose; fruit spot. *Colletotrichum* sp., FL.

Blight, thread. *Pellicularia koleroga*, FL.

Blotch, leaf; fruit spot. *Mycosphaerella lythracearum*, FL to MS, TX.

Nematode. *Meloidogyne* sp., FL.

Rot, fruit. *Alternaria* sp., CA; *Aspergillus niger*, AZ, CA, TX; *Botrytis cinerea*, gray mold, cosmopolitan; *Nematospora coryli*, dry rot, CA; *Penicillium expansum*, blue mold, cosmopolitan; *Coniella granati*, NC.

Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

Spot anthracnose. *Sphaceloma punicae*, FL, LA, TX.

POND-SPICE

(*Litsea*)

Leaf spot. *Cercospora olivacea*, GA.

POPLAR, ASPEN, COTTONWOOD

(*Populus*)

Bacterial limb gall. *Agrobacterium tumefaciens*, CT, IA, MN, NE, TX.

Bacterial wetwood. *Clavibacter humiferum*.

Blight, shoot. *Venturia populina* (*Didymosphaeria populina*), Northeast to WI; *V. tremulae*; *Colletotrichum gloeosporioides*, PA.

Canker, branch and trunk. *Dothichiza populea*, most serious on Italian varieties, widespread; *Hypoxyylon pruinaum*, Southwest, Northeast, and Great Lakes states, AZ, CA; *Nectria cinnabarina*; *N. galligena*; *Dothiora polyspora*, CO, NM, UT.

Canker; dieback. *Botryosphaeria ribis* var. *chromogena*, widespread, especially in the South; *Cytospora chrysosperma* (*Valsa sordida*); prevalent on ornamental poplars; *Valsa nivea*; *Ceratocystis tremululo-aurea*, Rocky Mountains; *C. fimbriata*, MN, PA; *Fusarium* (*Hypomyces*) *solani*, IA; *Phomopsis macrospora*, MS.

Canker; dieback. *Ceratocystis* sp., Rocky Mountains, MN, PA, on aspen.

Canker, sooty bark. *Cenangium singulare*, Rocky Mountains.

Leaf blister, yellow. *Taphrina aurea*, SC; *T. populina*, New England to Great Lakes states; *T. johansonii*, catkin deformity, widespread; *T. populisalicis*, CA, OR.

Leaf blotch. *Septotinia populiperda*, MD, ME, MA, NY, VT.

Leaf spot. *Marssonina* spp., widespread; *Mycosphaerella* (*Septoria*) *populicola*; *M. populorum* (*Septoria musiva*), also twig canker. *Phyllosticta* spp.; *Cercospora populina*, LA, AL, MO; *C. populicola*, TX; *Stigmina populi*, DE; *Marssonina brunnea*, central U.S.

Leaf spot; ink spot. *Cibornia bifrons* (*Sclerotinia whetzeli*) in Northeast; *C. confundens* (*Sclerotinia bifrons*), CO to WY, OR, WA.

Mistletoe. *Phoradendron serotinum* (*flavescens*), AZ, NM, TX.

Mistletoe, European. *Viscum album*, CA, on *Populus Fremontii* (Fremont Cottonwood) and *P. tremuloides* (Quaking Aspen).

Nematode, dagger. *Xiphinema americanum*, SD, on cottonwood.

Nematode, ring. *Criconemoides crotaloides*.

Nonparasitic. *Chlorosis*, iron deficiency, WY.

Powdery mildew. *Uncinula salicis*, widespread; *Erysiphe cichoracearum*, UT.

Rot, heart. *Daedalea* spp., sometimes on living trees; *Fomes igniarius*, widespread; *F. pini*; *Pholiota adiposa* and *P. destruens*, New England states.

Rot, root. *Armillaria mellea*, occasional; *Phymatotrichum omnivorum*, OK, TX; *Cylindrocladium scoparium*, of seedlings, GA.

Rot, wood. *Collybia velutipes*, sometimes living trees, Rocky Mountain states; *Fomes* spp.; *Polyporus* spp.; *Lenzites saepiaria*, widespread.

Rot, wound. *Schizophyllum commune*, cosmopolitan.

Rust, leaf. *Melampsora bietis-canadensis* (II, III), New England to Great Plains; 0, I, on hemlock; *M. albertensis* (II, III), CA, MT, NM; 0, I, on Douglas-fir; *M. medusae* (II, III), through U.S. except far South; 0, I, on larch; *M. populnea* (III), CO, RI, Pacific Coast; *M. occidentalis* (II, III), MT to CA, WA; 0, I unknown.

Spot anthracnose. *Sphaceloma populi*, OK.

Cytospora canker is rather common on poplars lacking in vigor, but the Rio Grande cottonwood in the West is resistant. Avoid wounding, prune out twigs that have died back, and promote better growing conditions. Dothichiza canker may kill Lombardy poplars. Seriously diseased trees should be destroyed.

POPPY

(*Papaver*)

Anthracnose. *Gloeosporium* sp. (*Glomerella cingulata*), NJ.

Bacterial blight. *Xanthomonas papavericola*, CT, ME, MO, NJ, NY, OH, OR, VA.

Blight, gray mold. *Botrytis cinerea*, MD, WI, AK.

Leaf spot; pod spot. *Cercospora papaveri*, AL, FL, TX; *Septoria* sp., IA.

Nematode, leaf. *Aphelenchoides fragariae*, NJ.

Nematode, root knot. *Meloidogyne* sp.

Powdery mildew. *Erysiphe polygoni*, OR.

Rot, root, stem; damping-off. *Rhizoctonia solani*, KS, ID, IN, ME, NJ, NY.

Smut, leaf. *Entyloma fuscum*, IA, ME, TX.

Virus. Beet Curly Top, TX; Tomato Spotted Wilt, CA.

Wilt. *Verticillium albo-atrum*, NY.

POPPY-MALLOW

(*Callirhoë*)

Broomrape. *Orobanche ramosa*, TX.

Leaf spot. *Cercospora althaeina*, KS, IL, NE, WI; *Vermicularia sparsipila*, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Endophyllum tuberculatum* (III), KS, IN, NE, OK, TX; *Puccinia interveiniens* (0, I), NE TX, NY; II, III, on Stipa; *P. schedonnardi*, CO, KS, NE, OK, TX, UT.

Wilt. *Verticillium albo-atrum*, NY.

PORTULACA

- Blight, stem. *Dichotomophthora indica*, VA.
 Damping-off. *Rhizoctonia solani*, IL; *Helminthosporium (Bipolaris) portulacae*, NC.
 Nematode, root knot. *Meloidogyne* sp., AL.
 Rot, black stem. *Dichotomophthora portulacae*, CA, TX.
 Virus. Beet Curly Top, CA; Tomato Spotted Wilt, NY
 White rust. *Albugo portulacae*, MT to GA, TX and MT.

POTATO

(*Solanum tuberosum*)

- Anthraxnose; black dot disease. *Colletotrichum atramentarium* (*C. coccodes*), probably general after wilt; *Gloeosporium* sp., IN, OH.
 Bacterial blackleg. *Erwinia carotovora* pv. *atroseptica*, general.
 Bacterial canker. Vascular. *Clavibacter michiganense*, WY.
 Also on *Solanum ciliatum*, *S. gilo*, *S. guineense*, *S. khasianum*, *S. nigrum*, *S. atropurpureum*, *S. avioculare*, *S. carolinense*, *S. indicum*, *S. nodiflorum*, *S. quitoense*.
 Bacterial, MLO. Aster Yellows, purple top.
 Bacterial ring rot. *Clavibacter sepedonicum*, general.
 Bacterial soft rot. *Erwinia carotovora* and *E. aroideae*, cosmopolitan in transit and market.
 Bacterial wilt. *Pseudomonas solanacearum*, chiefly in the South.
 Blight, early. *Alternaria solani*, general.
 Blight, late. *Phytophthora infestans*, general, common in Northeast, Middle Atlantic and north central states, occasional elsewhere, FL.
 Blight, southern. *Sclerotium rolfsii*, NC to FL, AZ, OH.
 Blotch, leaf. *Cercospora concors*, GA, IN, MI, NY.
 Dodder. *Cuscuta* sp., DE, NE, NJ, WA.
 Leaf spot. *Ascochyta lycopersici*, OR.
 Nematode, golden. *Heterodera rostochiensis* (*Globodera rostochiensis*), DE, NY.
 Nematode, lesion. *Pratylenchus brachyurus*; *P. scribneri*.
 Nematode, ring. *Criconemoides mutabile*.
 Nematode, root knot. *Meloidogyne* spp., general; *M. arenaria*; *M. chitwoodi*, CO, Pacific Northwest; *M. hapla*, Pacific Northwest.
 Nematode, sting. *Belonolaimus gracilis*; *B. longicaudatus*.
 Nematode, tuber. *Ditylenchus destructor*, ID.
 Nonparasitic
 Black Heart. Oxygen deficiency.
 Blackening after Cooking. Drought, heat, deficient light during tuber growth; potassium deficiency, chilling.

- Blackening before Cooking.** Mechanical injury.
- Checking.** Skin rough, scurf. Partly fertilizer injury, alkalinity.
- Chlorosis.** Tip blight, boron deficiency; Leaf drop, magnesium deficiency.
- Dimple.** Depression at bud end and **Dimple skin**, pits. Cause unknown.
- Elephant Hide.** May be caused by fertilizer burn, on Russet Burbank.
- Fasciation** (tubers and aerial parts). Probably genetic.
- Giant Hill.** Oversized, late-maturing plants. Genetic factors.
- Glassy End.** Starch deficiency; high water content.
- Growth Cracks.** Fluctuating moisture.
- Hollow Heart.** Excessive soil moisture and fertility.
- Hopperburn.** Marginal necrosis from leafhoppers. General.
- Internal Brown Spot.** Various physiological factors.
- Knobbiness**, "second growth." Extreme fluctuations of soil moisture.
- Lenticel Enlargement.** Wet soil or oxygen deficiency.
- Mahogany Browning.** Low temperature, ME.
- Marginal Browning**, bronzing. Potassium deficiency.
- Ozone injury.** Purple-black specks from air pollution.
- Pitting**, spot necrosis of tubers. Oxygen deficiency in storage.
- Pointed Ends.** Irregular growth conditions.
- Psyllid Yellows.** Insect injury, western states.
- Ring Spot.** Zonate, depressed lesions. Cause unknown.
- Scald of tubers.** Overheating, sunburn, frequent in South.
- Spraing.** Internal concentric necrosis. ?Virus.
- Sprout Tubers**; "little potato." Overheating in storage; planting in dry, cold soil.
- Stem-end Browning.** Vascular necrosis. ?Virus.
- Stem Necrosis**; Defoliation. Manganese toxicity in acid soil.
- Tipburn.** Abrupt transition from cool, moist to hot, dry weather, general.
- Powdery mildew.** *Erysiphe cichoracearum*, KY, NJ; *Oidium* sp.; MD, NJ, PA, UT, OH, western U.S.
- Rot, charcoal.** *Macrophomina phaseoli*, CA, GA, IL, OK, TX.
- Rot, gray mold; shoot blight.** *Botrytis cinerea*, CT, ID, ME, OH, AK.
- Rot, pink, watery.** *Phytophthora erythroseptica*, ID, LA, MA, ME, OK, DE, PA; *P. parasitica*, TX; *P. cryptogea*, TX.
- Rot, root.** *Armillaria mellea*, CA, FL, MI, OR, WA, WI, WY; *Phymatotrichum omnivorum*, TX; *Helicobasidium purpureum*, MA, MT, NE, NY, ND, OR, OK, TX, WA.
- Rot, silver scurf.** *Spondylocladium atrovirens*, general but less frequent in the South.
- Rot, stem.** *Sclerotinia* sp., FL, ME, SC; *S. minor*, CA; *S. sclerotiorum*, FL, MA, MT, NY, OR, TX, WA.
- Rot, stem.** *Sclerotinia* sp., FL, ME, SC; *S. minor*, CA; *S. sclerotiorum*, FL, MA, MT, general.
- Rot, tuber.** *Aspergillus niger*; *Fusarium* spp.; *F. solani*, jelly end-rot; *Gliocladium* sp., secondary; *Oospora pustulans*, skin spot; *Penicillium* spp., blue mold; *Phoma tuberosa*; *Phomopsis tuberivora*; *Phytophthora drech-*

sleri; *Rhizopus* spp.; *Trichothecium roseum*, pink mold; *Xylaria apiculata*.
 Rot, watery leak. Chiefly *Pythium debaryanum*, common in West; *Pythium* spp.
 Scab. *Streptomyces scabies*, general; powdery scab, *Spongospora subterranea*, occasional; russet scab, *Streptomyces* sp.
 Virus. **Apical Leaf Roll**, unidentified; **Potato Aucuba Mosaic**; **Potato Calico** strain of **Alfalfa Mosaic**; **Potato Crinkle**; **Mild Mosaic** (virus X plus A); **Green Dwarf**; **Beet Curly Top**; **Potato Leaf Roll**, general; **Potato Leaf Rolling Mosaic**; **Mottle** (potato virus X); **Potato Rugose Mosaic** (potato virus Y), general; **Potato Spindle Tuber** (viroid-type), general; **Potato Vein Banding**; **Potato Witches' Broom**; **Potato Yellow Dwarf**; **Potato Yellow Spot**; **Tobacco Ring Spot**; **Potato Corky Ring Spot** (Tobacco Rattle).
 Wart, potato. *Synchytrium endobioticum*, MD, PA, VA; see under Galls.
 Wilt. *Verticillium albo-atrum*, widespread.
 Wilt; stem-end rot. *Fusarium* spp.; *F. oxysporum*, general but more frequent East and South.

Potato growing is a highly specialized business not well adapted to most small gardens. Use certified seed, resistant varieties where possible. Control insects spreading virus diseases.

POTENTILLA (*Cinquefoil*)

Downy mildew. *Peronospora potentiallae*, IA, NJ, TX.
 Leaf spot. *Fabraea dehnii*, IA, NY, VT; *Marssonina potentiallae*, CA, CO, MA, MI, NM, NY, WI; *Phyllosticta anserinae*, IL; *Ramularia arvensis*, WI.
 Powdery mildew. *Erysiphe polygoni*, CO; *Sphaerotheca macularis*, CO, WI.
 Rust. *Phragmidium andersonii* (I, II, III), general.
 Virus. **Tomato Ringspot**, NY.

POTHOS, IVY-ARUM (*Scindapsus*)

Bacterial blight. *Pseudomonas cichorii*, FL.
 Nematode, burrowing. *Radopholus similis*, FL.
 Nematode, lesion. *Pratylenchus* sp.
 Nematode, root knot. *Meloidogyne arenaria thamesii*; *M. incognita-acrita*.
 Rot, root. *Pythium splendens*, FL; *Rhizoctonia* sp., foot rot, MO.

PRENANTHES (Rattlesnake-Root)

Downy mildew. *Bremia lactucae*, IA, MA, MN.
 Gall, leaf. *Synchytrium aureum*, WI.

Leaf spot. *Cercospora brunnea*, AR, NC, WI; *C. prenantis*, AL, KS, IN; *C. tabacina*, WI; *Laestadia prenantis*, AL; *Septoria nabali*, NY to IA, WI, ME to VA.

Powdery mildew. *Erysiphe cichoracearum*, IL, MD, NC, PA; *Sphaerotheca macularis*, NY to AL, IL, MN, OH, PA.

Rust. *Puccinia atropuncta* (0, I), PA, VA; II, III, on *Amianthium*; *P. dioicae* (0, I), IL, MN, NY, VA, WI; II, III, on *Carex*; *P. insperata* (I, II, III), OR; *P. orbicula* (0, I, II, III), ME to TN and ND.

PRICKLY-ASH

(*Xanthoxylum americanum*)

Canker, stem. *Diplodia natalensis*, TX.

Leaf spot. *Cercospora xanthoxyli*, IN, TX; *Septoria pachyspora*, IA, NE.

Powdery mildew. *Phyllactinia corylea*, widespread.

Rot, white heart. *Fomes igniarius*.

Rust. *Puccinia andropogonis* var. *xanthoxyli* (0, I), KS, IA, MO, NE, TX, WI; II, III, on *Andropogon*.

PRICKLY-POPPY

(*Argemone*)

Downy mildew. *Peronospora arborescens*, TX.

Leaf spot. *Alternaria lancipes*, KS, TX; *Gloeosporium argemonis*, KS, TX; *Septoria argemones*, NE, OK, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Aecidium plenum* (0, I), TX.

PRIMROSE

(*Primula*)

Bacterial leaf spot. *Pseudomonas primulae*, CA.

Bacterial, MLO. California Aster Yellows.

Blight, gray mold. *Botrytis cinerea*, frequent in greenhouses, occasional in gardens.

Leaf spot. *Ascochyta primulae*, WI; *Asteroma garretianum*, black spot, CO, UT; *Cercospora primulae*, WA; *Colletotrichum primulae*, FL; *Mycosphaerella* sp., AZ; *Ramularia primulae*, CA, CT, DE, NY.

Nematode, leaf and stem. *Ditylenchus dipsaci*, MD, PA, CA.

Nematode, root knot. *Meloidogyne* spp., occasional in greenhouses.

Nonparasitic. Chlorosis, excessive soil acidity or iron or magnesium deficiency.

Powdery mildew. *Erysiphe polygoni*, CT, NJ, VA.

Rot, root. *Pythium irregulare*, CA; *Rhizoctonia solani*, FL, IL, TX; *Phymatotrichum omnivorum*, TX.

Rot, stem. *Alternaria* sp., CT; *Sclerotinia sclerotiorum*, MD.
 Rust. *Puccinia aristidae* (0, I), ME; *Uromyces apiosporus*, CA, NV.
 Virus. Primrose Mosaic; Cucumber Mosaic; Tobacco Necrosis; Tomato Spotted Wilt.

PRIVET
 (*Ligustrum*)

Anthracnose; canker; dieback. *Glomerella cingulata*, general, especially on common privet.
 Bacterial crown gall. *Agrobacterium tumefaciens*, occasional
 Blight, leaf. *Ramularia* sp., NJ, WA.
 Blight, thread. *Pellicularia koleroga*, FL.
 Dodder. *Cuscuta* sp., FL.
 Gall. *Phomopsis* sp., MD, TX; *P. ligustri-vulgaris*, blight, PA; *Phoma* sp., TX.
 Leaf spot. *Cercospora adusta*, DE to AL, TX; *C. ligustri*, Gulf states; *Exosporium concentricum*, TX; *Phyllosticta ovalifolii*, MD, MS, TX; *Corynespora cassicola*, FL.
 Leaf spot, algal. *Cephaleuros virescens*, Gulf states.
 Nematode, leaf. *Aphelenchoides fragariae*.
 Nematode, root knot. *Meloidogyne* spp., southern states.
 Nonparasitic. *Chlorosis*, manganese deficiency, FL.
 Parasitic lichen. *Strigula elegans* and *S. camplanata*, Southern U.S., GA.
 Powdery mildew. *Microsphaeria alni*, IN, LA, NJ, OH, on *Ligustrum japonicum* (Wax-leaf Ligustrum).
 Rot. *Rosellinia necatrix*, CA; *Ganoderma applanatus*, collar rot.
 Rot, root. *Armillaria mellea*, AR, CA, MS, TX; *Clitocybe monadelpha*, AR; *C. tabescens*, FL; *Phymatotrichum omnivorum*, AZ, OK, TX.
 Rot, wood. *Stereum hirsutum*, cosmopolitan; *Polyporus versicolor*, cosmopolitan.
 Sooty mold. Common after whiteflies in the South.
 Virus. *Variation*. Graft transmitted. *Chlorotic Spot*, LA.

PRUNELLA
 (Self-Heal, Heal-All)

Blight, southern. *Sclerotium rolfsii*, TX.
 Leaf spot. *Gibberidea abundans*, Tar Spot, ME, WA; *Linospora brunellae*, AK, ID, WA; *Phyllosticta brunellae*, TX; *Ramularia brunellae*, IL, IN, NY, OH, TX, VA, WI; *Septoria brunellae*, general.
 Powdery mildew. *Erysiphe cihoracearum*, PA; *Sphaerotheca macularis*, IL, IN, MD, MS, WA, WI.
 Rot, root. *Pythium palingenes*; *P. polytylum*, VA.
 Virus. *Tomato Ringspot*, VT.

PUMPKIN

See Squash.

PUNCTURE VINE (*Tribulus*)

Virus. **Tomato Spotted Wilt**, General.

PYRACANTHA (Firethorn)

Bacterial fire blight. *Erwinia amylovora*, widespread.

Blight, leaf. *Fabraea maculata*, LA.

Blight, silky thread. *Rhizoctonia ramicola*, FL.

Blight, twig. *Diplodia crataegi*, PA.

Canker, felt fungus. *Septobasidium cokeri* and *S. marianai*, on bark scales.

Canker; dieback. *Botryosphaeria ribis*, LA.

Mistletoe, European. *Viscum-album*, CA.

Rot, root. *Armillaria mellea*, CA; *Phymatotrichum omnivorum*, TX.

Scab. *Fusicladium pyracanthae*, widespread on leaves and fruit.

Wilt. *Fusarium oxysporum*, FL.

Fire blight is the most common disease. It infects all species, but some are relatively resistant. Scab, often disfiguring on berries, can be prevented by spraying at bud-break and 10 and 20 days later.

PYRETHRUM (*Chrysanthemum cinerariifolium*, *C. coccineum*)

Bacterial fasciation. *Clavibacter fascians*, CT, MD.

Bacterial, MLO. **Aster Yellow**s, NY, KS, NJ.

Blight, gray mold. *Botrytis cinerea*, PA.

Damping-off. *Gloeosporium* sp., PA; *Pythium* sp., root rot, CO.

Nematode, root knot. *Meloidogyne* sp.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, NJ.

Rot, stem. *Sclerotinia sclerotiorum*, VA.

PYROLA (Shinleaf)

Blight, gray mold. *Botrytis cinerea*, MD.

Leaf spot. *Mycosphaerella chimaphilae*, MI; *Ovularia pyrolae*, WI; *Ramularia pyrolae*, WI; *Phyllosticta pyrolae*, DE, MT, WI; *Septoria pyrolae*, MI.

Rust. *Chrysomya pirolata* (II, III), general from ME to MN and from MT to CA and AK; 0, I, on spruce; *Pucciniastrum pyrolae* (II, III), general in West.

QUINCE

(*Cydonia*)

Anthraxnose, Northwestern. *Neofabraea malicorticis*, OR, WA.

Bacterial crown gall. *Agrobacterium tumefaciens*, general.

Bacterial fire blight. *Erwinia amylovora*, general.

Bacterial hairy root. *Agrobacterium rhizogenes*, ME to NC; Pacific Coast.

Blight, Dothiorella twig. *Botryosphaeria ribis*, TX.

Blight, leaf; black spot. *Fabraea maculata*, general.

Blight, thread. *Pellicularia koleroga*, NC, Gulf states.

Canker, perennial. *Neofabraea perennans*, OR.

Canker, trunk. *Nectria galligena*, OR; twig, *Valsa leucostoma*.

Fruit spot. *Leptothyrium pomi*, MO; *Mycosphaerella pomi*, New England to OH.

Leaf spot. *Phyllosticta* sp., DE.

Nematode, root knot. *Meloidogyne* sp., TX.

Powdery mildew. *Phyllosticta corylea*, VA; *Podosphaera leucotricha*, CA., WA; *P. oxyacanthae*, NY, WV to IN.

Rot, bitter; canker. *Glomerella cingulata*, eastern and central states southward.

Rot, black; canker; leaf spot. *Physalospora obtusa*, eastern states to AL, TX.

Rot, brown. *Monilinia fructicola*, eastern states, MS, OR, TX; *M. laxa*, also blossom and twig blight, Pacific Coast.

Rot, fruit. *Alternaria mali*, IN; *Botrytis cinerea*, occasional; *Cephalothecium roseum*, pink mold, occasional; *Penicillium expansum*, cosmopolitan; *Phoma cydoniae*, pale rot, IL, MI; *P. mali*, IN.

Rust. *Gymnosporangium clavariiforme* (0, I), leaves, fruit, stems, CT, ME, NH; III, on juniper; *G. clavipes* (0, I), orange rust, quince rust, on fruit, stems; III, on juniper; *G. gracile* (0, I); III, on juniper; *G. libocedri* (0, I), fruit stems, OR; III, on incense-cedar; *G. nelsoni* (0, I), leaves, stems, AZ, CO; III, on juniper; *G. nidus-avis* (0, I), leaves, fruit, stems, CT, NY; III, on juniper.

Scab. *Venturia pirina*, CT.

Spot anthracnose. *Elsinoë piri*, WA.

Quinces are subject to fire blight; infected branches should be cut out with the usual precautions. For leaf blight, spray when blossoms show pink, again when last of the petals are falling, and perhaps twice more at 2-week intervals. Brown rot is not very important on quince. To prevent rust, remove nearby susceptible junipers or spray them in spring as spore horns are developing on galls. See under Rusts.

QUINCE, FLOWERING, JAPANESE, CHINESE
(*Chaenomeles*)

- Bacterial crown gall. *Agrobacterium tumefaciens*, occasional.
Bacterial fire blight. *Erwinia amylovora*, occasional.
Blight, leaf. *Fabraea macula*, AL, CT, NY, NJ.
Canker, felt fungus. *Septobasidium burtii*, MS; *S. mariani*, NC.
Canker; twig blight. *Botryosphaeria ribis*, AL, TX; *Phoma* sp., MD, TX;
Physalospora obtusa, TX, eastern states.
Fruit spot. *Mycosphaerella pomi*, MD, IL, also leaf blotch.
Leaf spot. *Cercospora cydoniae*, AL, GA.
Nematode, root knot. *Meloidogyne* sp.
Rot, brown. *Monilinia fructicola*, leaf blight, MI; *M. laxa*, also blossom
and twig blight, CA.
Rust, quince. *Gymnosporangium clavipes* (0, I), on stems; CT, NJ; III, on
juniper; *G. libocedri* (0, I), on leaves; III, on incense-cedar.

RABBITBRUSH
(*Chrysothamnus*)

- Leaf spot. *Phleospora bigeloviae*, CA.
Powdery mildew. *Erysiphe cichoracearum*, CA, MT, UT, WY; *E. polygoni*
var. *sepulta*, CO, MT, UT, WY.
Rust. *Puccinia dioicae* (0, I), NM and CA; *P. grindeliae* (III), MT to NM,
CA; *P. stipae* (0, I), MT to NM, CA; II, III, on grasses.
Smut, inflorescence. *Thecaphora pilulaeformis*, AZ.

RADISH
(*Raphanus*)

- Bacterial black rot. *Xanthomonas campestris*, IN, IA, MI, NJ, NY, OH,
PA, TX.
Bacterial, MLO. California Aster Yellows, CA;
Bacterial soft rot. *Erwinia carotovora*, cosmopolitan.
Bacterial spot. *Xanthomonas vesicatoria* pv. *raphani*, IN.
Blotch; black pod. *Alternaria raphani*, CA, MI, MN, NJ, OH, PA.
Club root. *Plasmodiophora brassicae*, occasional in North, MA to NJ, MN,
WA.
Damping-off. *Pythium debaryanum*, MA, MN, NJ, WY; *Rhizoctonia solani*,
cosmopolitan.
Downy mildew. *Peronospora parasitica*, northeastern and central states to
MS and TX, CA.
Leaf spot. *Alternaria brassicae*, gray leaf spot; *A. oleracea*, black leaf spot,
CT, NJ; *Cercospora cruciferarum*, AL, IL, MO, TX; *C. atrogrisea*, NJ.

- Nematode, leaf and stem. *Ditylenchus dipsaci*, NY.
 Nematode, root knot. *Meloidogyne arenaria*; *M. javanica*, AL, MS, OR, PA, TX.
 Nonparasitic. Air pollution, NO₂, O₃, SO₂, NC.
 Powdery mildew. *Erysiphe polygoni*, CA, MO, TX.
 Rot, black root. *Aphanomyces raphani*, ME to FL, OK, OR, IA, CA; *Pythium aphanidermatum*, IN, KS, MA, MI, NY, OH, OK, PA, WI, SC.
 Rot, crown, watery soft. *Sclerotinia sclerotiorum*, CA, IN, MN, NJ, TX.
 Rot, pod. *Phoma lingam*, FL, CA.
 Rot, root. *Ascochyta* sp.; *Phymatotrichum omnivorum*, TX.
 Rust. *Puccinia aristidae* (0, I), AZ, CO.
 Scab. *Streptomyces scabies*, IN, MI, NJ, OH, TX, WI.
 Virus. **Radish Mosaic**; **Beet Curly Top**; **Tobacco Streak**, CA.
 White rust. *Albugo candida*, general.
 Wilt; yellows. *Fusarium oxysporum* f. sp. *raphani*; *F. oxysporum* f. sp. *conglutinans*, CA.

Radishes are so easily grown in home gardens that not many gardeners worry about disease control. Seed should, however, be treated for damping-off and root rots.

RAGWEED (*Ambrosia*)

- Bacterial blight. *Pseudomonas syringae* pv. *tagetis*, WI.

RAIN-LILY (*Cooperia*)

- Leaf spot. *Cercospora amaryllidis*, TX.
 Rust. *Puccinia cooperiae* (0, I, II, III), TX.

RANUNCULUS (Buttercup, Crowfoot)

- Blight, gray mold. *Botrytis cinerea*, CA, NY, WI.
 Bacterial, MLO. **California Aster Yellows**.
 Downy mildew. *Peronospora ficariae*, occasional MA to MD, IA, MN; also CA.
 Gall, leaf. *Synchytrium anomalum*, IA; *S. aureum*, IL, CA, WI; *S. cinnamomeum*, WI.
 Leaf spot. *Ascochyta infuscans*, WI; *Cercospora ranunculi*, IA, WI; *Cylindrosporium ficariae*, WA; *Didymaria didyma*, IL, IN, IA, MA, MI, MS, NY, WI; *Fabraea ranunculi*, CA, NE, NY, WI; *Ovularia decipiens*; *Ramularia*

- aequivoca**, IL, IA, OR, WI; **Septocylindrium ranunculi**, IL, NY, WA, WI;
Septoria sp.
 Nematode, leaf and stem. **Ditylenchus dipsaci**, OR.
 Powdery mildew. **Erysiphe polygoni**, frequent in eastern and central states;
Sphaerotheca macularis, CO.
 Rot, leaf. **Ceratobasidium anceps**, WI.
 Rot, root. **Phymatotrichum omnivorum**, TX.
 Rot, stem. **Sclerotinia sclerotiorum**, AZ, CA; **Pythium** sp., CA; **Sclerotium rolfsii**, CA.
 Rust. **Puccinia andina** (III), IL, IN; **P. eatoniae** var. **ranunculi** (0, I), CT to SC, MS, ND, CA, CO; II, III, on *Sphenopholis*; **P. ranunculi** (III), AZ, CO, UT, WA, WY, **P. recondita** (0, I), WI to TX, CA, WA; III, on *Hordeum*: **Uromyces dactylidis** (0, I), CO, TX, MA; **U. jonesii** (0, I, III), CA, CO, MT, WY.
 Smut, leaf. **Doassansia ranunculina**, IN, WI; **Urocystis anemones**, IL, UT, WY.
 Smut, white. **Entyloma microsporium**, IL, IN, IA, KY, VA, WI; **E. ranunculi**.
 Virus. **Beet Curly Top**; **Ranunculus Mottle**; **Ranunculus Mosaic**.

RASPBERRY

(*Rubus*)

- Anthracnose**; dieback; gray bark. **Gloeosporium allantosporum**, OR, WA.
Bacterial blossom blight. **Pseudomonas** sp., OR.
Bacterial crown gall. **Agrobacterium tumefaciens**, general; **A. rubi**, cane gall, NY, PA to IL, and WI, OR.
Bacterial fire blight; flower and twig blight. **Erwinia amylovora**, ME, NH, PA, WA, WI.
Bacterial hairy root. **Agrobacterium rhizogenes**, OR.
Bacterial, witches' broom. **MLO**, OR.
Blight, cane. **Leptosphaeria coniothyrium**, general; **Physoleptora obtusa**, IA, MD, MI, MO, ND; **Sclerotinia** sp., NY.
Blight, spur. **Didymella applanata**, general.
Canker; cane spot. **Ascospora ruborum**, MA, OR, WI.
Canker; dieback. **Glomerella cingulata**, AR, KY, MD, MI, MO, NJ, OH, RI, WV; **G. rubicola**, white bud, IL, NJ; **Botryosphaeria ribis**, FL; **Macrophoma rubi**, IL.
Dodder. **Cuscuta gronovii**, CT, IL, WI.
Downy mildew. **Peronospora rubi**, WA.
Fruit spot, fly speck. **Leptothyrium pomi**, MA, IN, KY.
Leaf spot. **Cylindrosporium rubi** (*Sphaerulina rubi*), also cane spot, common east of Rocky Mountains; **Mycosphaerella confusa** (*Cercospora rubi*), NJ to FL, TX, IL; **M. rubi**, general; **Pezizella oenotherae**, MD, MO, VA; **Septoria darrowi** (perhaps same as *Cylindrosporium rubi*), **Stigmatea rubicola**, black leaf and cane spot, MT, NM, NY, VT, WI.

- Nematode, lesion. *Pratylenchus vulnus*.
 Nematode, sheath. *Hemicycliophora* sp.
 Nonparasitic. *Chlorosis*, iron deficiency in West.
 Powdery mildew. *Phyllactinia corylea*, MI; *Sphaerotheca macularis*, Northeast, Northwest, IL, MN, CA.
 Rosette, double blossom. *Cercospora rubi*, KY, IL, MD, NY, PA.
 Rot, fruit. *Botrytis cinerea*, gray mold, cosmopolitan; *Phyllostictina carpogena*, MD; *Monilinia fructicola*, brown rot, IL; *Alternaria* sp., MA; *Rhizopus nigricans*, black mold, cosmopolitan.
 Rot, root. *Armillaria mellea*, OR, WA; *Rhizoctonia solani*, CO, ID, WA; *Xylaria* sp., WA; *Phytophthora erythroseptica*, Pacific Northwest.
 Rust, late. *Pucciniastrum americanum* (II, III), Northeast to NC, OH, IL, ID; 0, I, on spruce.
 Rust, leaf. *Phragmidium rubi-idaei* (0, I, II, III), northeastern and central states to CO; Pacific Northwest.
 Rust, orange. *Gymnoconia peckiana* (0, I, III), on black raspberry, Northeast to MN, Pacific Northwest; *Kunkelia nitens* (I), IL, IN, MI, OH.
 Rust, yellow. *Kuehneola uredinis* (0, I, II, III), IL, PA, DE to WI.
 Spot anthracnose. *Elsinoë veneta*, general but less common on red than black raspberry.
 Virus. **Raspberry Leaf Curl**; **Red Raspberry Mosaic**; **Black Raspberry Necrosis**; **Raspberry Streak**; **Raspberry Yellow Mosaic**, general; **Tomato Ring Spot**, cause of crumbly fruit, NY; **Tobacco Ring Spot**, NC.
 Wilt. *Verticillium albo-atrum*, MA to NJ, OH, OR, WA.

Virus diseases are important on raspberries and cannot be controlled by spraying. Purchase healthy plants and set, if possible, 500 feet away from old patches. Inspect at least three times the first year, roguing all diseased plants, after first searing them with a blow torch or flame thrower so aphids will not carry the virus to nearby healthy bushes. Plants seldom recover from *Verticillium* wilt and never from orange rust, which is systemic. Crown gall is important on red raspberries; if infected plants are found, raspberries should not be replanted in the same soil for several years.

RATIBIDA (Prairie Coneflower)

- Downy mildew. *Plasmopara halstedii*, IA.
 Leaf spot. *Cercospora ratibida*, KS, WI; *Physalospora lepachydis*, MT; *Ramularia rudbeckiae*, ID; *Septoria infusata*, MI, MO, WI.
 Powdery mildew. *Erysiphe cichoracearum*, ND, TX.
 Rot, violet root. *Helicobasidium purpureum*, TX; *Phymatotrichum omnivorum*, TX.
 Rust. *Uromyces periginus* (0, I), ND, TX; II, III, on *Carex*.
 Smut, white. *Entyloma compositarum*, NE, MI to IN, KS, MN.

RATTAN VINE

(*Berchemia*)

Rust. *Puccinia coronata* (0, I), VA to LA; II, III, on oats and wild grasses.

REDBUD, JUDAS-TREE

(*Cercis*)

Canker; dieback. *Botryosphaeria ribis* var. *chromogena*, DE, MD, NC, NJ, TX, VA.

Dodder. *Cuscuta exaltata*, TX.

Downy mildew. *Plasmopara cercidis*, TN.

Leaf spot. *Cercospora cercidis*, OK; *Cercospora chionea*, IL, IN, KS, NC; *Mycosphaerella cercidicola*, general; *Phyllosticta cercidicola*, IN, WV; *Pestalotia guepini*, IL.

Rot, root. *Phymatotrichum omnivorum*, TX; *Polyporus lucidus*, VA.

Rot, wood. *Polyporus adustus*; *P. versicolor*; *Ganoderma lucidum* (*Polyporus lucidus*).

Wilt. *Verticillium* sp., OH; of seedlings, *Cylindrocladium* sp.

Wilt. *Verticillium albo-atrum*, VA.

RED-BAY, SWAMP-BAY

(*Persea borbonia*)

Black mildew. *Asterina delitescens*, VA to FL, TX; *Irenopsis martiniana*, AL, MS, TX; *Lembosia rugispora*, MS, NC; *Meliola amphitricha*, FL, MS; *Englerula carnea*, FL.

Leaf spot. *Cercospora purpurea*, GA to FL and MS; *Phyllosticta micropuncta*, MD to FL, TX; *Pestalotia* spp., general.

Leaf spot, algal. *Cephaleuros virescens*, Gulf states.

Rot, wood. *Polyporus hirsutus*; *P. mutabilis*.

RHEXIA

(Deergrass, Meadow-Beauty)

Leaf spot. *Cercospora erythrogena*, AL, DE, MS, TN; *Colletotrichum rhexiae*, DE; *Phyllosticta rhexiae*, FL.

RHODESGRASS

(*Chloris gayana*)

Leaf stripe, culm stripe. *Helminthosporium hawaiiense*, FL.

RHODODENDRON

- Bacterial crown gall. *Agrobacterium tumefaciens*, OH.
- Blight, bud, twig. *Briosis azalea*, GA, NC, NJ, NY, PA, TN, VA.
- Blight, cutting. *Cylindrocladium scoparium* and *C. floridanum*, OH, FL.
- Blight; flower spot. *Ovulinia azaleae*, SC, CA.
- Blight, gray. *Pestalotia macrotricha*, general after winter injury.
- Blight, silky thread. *Rhizoctonia ramicola*, FL.
- Blight; twig canker. *Phomopsis* sp., OR, CT, NJ, NY.
- Canker; dieback. *Botryosphaeria ribis*, MD, MA, NJ, NY; *Gloeosporium* sp., MD, NY; *Phytophthora cactorum*, MD, MA, NJ, NY, OH, PA, RI; *Glomerella cingulata*, MD.
- Damping-off. *Alternaria* sp., CT; *Rhizoctonia solani*, CT, NJ, NY.
- Dodder. *Cuscuta groenovii*, NJ.
- Gall. *Exobasidium vaccinii*, leaf and shot, MA to FL, and MS; *E. burtii*, yellow leaf spot, NJ; *E. vaccinii-uliginosae*, witches' broom, NJ.
- Leaf spot. *Cercospora handelii*, FL, NJ, NC, VA; *Coryneum rhododendri*, NC, PA, TN, VA; *Cryptostictis mariae*, KY, NY, TN, VA; *Discosia artocreas*, secondary, MD, NY; *Guignardia rhodora*, CT, MD, MA, NJ, NY, PA, VA; *Gloeosporium ferrugineum*, NC; *Hendersonia concentrica*, NC, TX, WV; *Lophodermium schweinitzii*, NY to NC and TX; *Pestalopeziza rhododendri*, TN, WV; *Mycosphaerella clintoniana*, NJ, NY, NC, OR, WA; *Phyllosticta rhododendri*, NJ; *Physalospora rhododendri*, PA, TN, VA; *Phomopsis rhododendri*, NJ; *Septoria rhododendri*, ME, NC; *S. solitaria*, NJ; ?*Venturia rhododendri*, MD, VA.
- Leaf spot, tar. *Melasmia rhododendri*, AK.
- Nonparasitic. *Chlorosis*, mineral deficiency, usually iron, widespread. *Sunscald*, windburn, severe winter injury in exposed locations. *Walnut Toxicity*, poisoning by root emanation from *Juglans nigra*.
- Powdery mildew. *Microsphaera alni*, MD, NJ, NY.
- Rot, heart; wood rot. *Fomes annosus*, NC.
- Rot, root. *Armillaria mellea*, CA, NJ, NY; *Phymatotrichum omnivorum*, TX.
- Rust. *Chrysomyxa ledi* var. *rhododendri*, CA, WA; *C. roanensis* (II, III), NC, TN; 0, I, on spruce; *C. piperiana* (II, III), CA, OR, WA; *Pucciniastrum vaccinii* (II), CT, NJ, RI.
- Spot anthracnose. *Sphaceloma* sp., WA.
- Wilt. *Phytophthora cinnamomi*, NJ, NY, PA, MD, OH; *P. citricola*, OH.

Most rhododendron leaf spots are not worth worrying about. Some come after winter injury; some are definitely parasitic but not serious. Winter and early spring sun will turn some of the foliage brown. Do not prune out supposedly dead twigs and branches too soon; wait for new growth to start. An accumulation of matted wet leaves around the trunk fosters root and collar rot. Be cautious in the use of aluminum sulfate to acidify soil; sulfur is somewhat safer.

RHOEO

Virus, **Tobacco Mosaic**, MD.

RHUBARB

(*Rheum*)

Anthracnose. *Colletotrichum* sp., IL, MO, PA, WV, WI.

Bacterial crown gall. *Agrobacterium tumefaciens*, IA, MA, NY.

Bacterial soft rot. *Erwinia carotovora*, occasional in market; *E. rhapontici*, crown rot, OK.

Blight, southern. *Sclerotium rolfsii*, FL, MS, TX, VA.

Damping-off; crown rot. *Pythium* spp., CA, MD.

Downy mildew. *Peronospora rumicis*, CA.

Leaf spot. *Ascochyta rhei*, eastern and central states to MS, KS; *Alternaria* sp., CA, MN, NE, NJ, PA; *Cercospora* sp., DE, MD, NE; *C. rhapontici*, IL; *Cladosporium* sp., CA, WA; *Macrophoma straminella*, general; *Ramularia rhei*, CA; *Septoria rhapontici*, IA.

Nematode, root knot. *Meloidogyne* spp., CA, MD, NY, OK.

Nonparasitic. **Crack Stem**, boron deficiency, WA.

Rot, gray mold. *Botrytis cinerea*, serious in greenhouses.

Rot, root. *Armillaria mellea*, CA, TX; *Phymatotrichum omnivorum*, AZ, TX; *Phytophthora cactorum*, crown rot, CA, MO, OK, PA; *P. parasitica*, IL, KS, LA, MD, MO, NY, TX, VA; *Rhizoctonia solani*, CA, CT, IL, MN, MO, NY, OK, TX, WA.

Rust. *Puccinia phragmites* (0, 1), CA, MN, NE; II, III, on *Phragmites*.

Virus. **Rhubarb Chlorotic Ring**; **Turnip Mosaic**; **Beet Curly Top**.

Macrophoma leaf spot is common but seldom calls for control measures beyond removal of old stalks in late fall. Plants with crown rot should be dug and burned.

RIBBON-BUSH

(*Homalocladium*)

Powdery mildew. *Erysiphe polygoni*, NY, PA, WI.

RIBBON-GRASS

(*Phalaris*)

Ergot. *Claviceps purpurea*, NY.

Leaf blotch (spot). *Stagonospora foliicola*, PA.

Leaf spot. *Helminthosporium catenarium*, PA on Reed Canary grass (*P. arundinacea*)

Leaf spot, zonate eye-spot. *Helminthosporium giganteum*, MD.

RICE-PAPER PLANT

*(Tetrapanax)*Nematode, root knot. *Meloidogyne* sp., FL.

ROCK-JASMINE

*(Androsace)*Downy mildew. *Peronospora candida*, KS.Leaf spot. *Mycosphaerella primulae*, NM.Rust. *Puccinia volkartiana* (III), AK.

ROCK-ROSE

*(Cistus)*Rot, root. *Armillaria mellea*.

ROLLINIA

Dieback, fruit rot. *Glomerella cingulata*, FL.

ROMANZOFFIA

Rust. *Puccinia romanzoffiae* (III), OR.

ROSE

*(Rosa)*Bacterial blast. *Pseudomonas syringae*.Bacterial crown gall. *Agrobacterium tumefaciens*, general.Bacterial hairy root. *Agrobacterium rhizogenes*, PA, TX, MD, VA, New England.Blackspot. *Diplocarpon rosae*, general.Blight, blossom. *Botrytis cinerea*, cosmopolitan; gray mold on canes in storage; *Dothiorella* sp., LA, VA.Blight, cane. *Physalospora obtusa*, CT to AL, KS, TX; *Gloeosporium* spp., widespread.Blight, southern. *Sclerotium rolfsii*, FL, KS, TX.Blight, thread. *Pellicularia koleroga*, FL, LA.Canker, brand. *Coniothyrium wernsdorffiae*, MN, NY, PA (also reported from CO, IN, MS, TX, but probably mistaken for *C. fuckelii*).Canker, brown. *Cryptosporella umbrina*, MA to FL, TX, NE, and MI, CA, ID.

- Canker, common, graft. **Leptosphaeria coniothyrium** (*Coniothyrium fuckelii*), general; Graft, **C. rosarum**, CA, IA, MA, MN, NJ, PA, TX.
- Canker, crown. **Cylindrocladium scoparium**, in greenhouses, MA to GA, TX and IL.
- Canker; dieback. **Botryosphaeria ribis** var. **chromogena**, AL, MD, TX, VA; **Cryptosporium minimum**, OR, PA; **Diplodia** spp., probably secondary; **Griphosphaeria corticola** (*Coryneum microstictum*), NH to AL, ND; Pacific Northwest; **Nectria cinnabarina**, coral spot, MA to VA, WA, AK; **Cytospora** sp., KY, PA, VA, WA; **Didymella sepincoloriformis**, MD; **Glomerella cingulata**, MD, NJ, VA; **Macrophoma** sp., TX, VA; **Botryodiplodia theobromae**, MN; **Trichothecium roseum**, MN.
- Dodder. **Cuscuta indecora** and **C. paradoxa**, FL, TX.
- Downy mildew. **Peronospora sparsa**, mostly under glass, ME to FL, IA, CA; reported outdoors in DE.
- Leaf spot. **Alternaria** sp., VA to AL, TX; **A. brassicae** var. **microspora**, TX; **Cercospora puderi**, FL, GA; **Mycosphaerella rosicola** (*Cercospora rosicola*), general; **M. rosigena**, doubtfully distinct from *M. rosicola*, reported from South; **Monochaetia compta**, AK, IA, KS, MD; **Pezizella oenotherae**, also cane spot, NJ to FL, TX, MI; **Phyllosticta rosae**, NY to FL, IN; **P. rosae-setigeriae**, IN; **Septoria rosae**, MS, NJ, SC.
- Mold, black, of grafts. **Chalaropsis thielavioides**, CA, IL, NY, PA on understock from OR and WA.
- Mold, leaf and bud. **Cladosporium** sp. and **C. fuscum**, AK, CA, MD, MN, MS, OK, TX.
- Nematode, dagger. **Xiphinema diversicaudatum**, greenhouses in Northeast; **X. americanum**; **X. krugi**.
- Nematode, leaf. **Aphelenchoides** spp.; lance, **Hoplolaimus** sp.
- Nematode, lesion. **Pratylenchus pratensis**; **P. scribneri**; **P. vulnus**.
- Nematode, ring. **Criconemoides** sp.; Pin, **Paratylenchus** spp.
- Nematode, root knot. **Meloidogyne** sp.; **M. hapla**.
- Nematode, spiral. **Helicotylenchus** spp.; Sheath, **Hemicycliophora** spp.
- Nematode, sting. **Belonolaimus gracilis**; stubby root, **Trichodorus** spp.
- Nematode, stylet. **Tylenchorhynchus** spp.
- Nonparasitic
- Boron Deficiency.** Leaves distorted, greenhouse.
- Chlorosis.** Iron deficiency, upper leaves yellow, with green veins; nitrogen deficiency, lower leaves pale; potassium deficiency, leaves grayish, may drop, stems weak.
- Leaf Scorch.** Marginal, potash deficiency. In greenhouses scorch may be boron and calcium deficiency.
- Mercury Toxicity.** In greenhouses when paint containing mercury used on sash.
- Weed-killer Injury.** Leaves fernlike, twisted when 2,4-D used in vicinity.
- Pedicle Necrosis.** Collapse of flower stem, cause unknown.

Petal spot. *Bipolaris (Helminthosporium) setariae*, FL.

Powdery mildew. *Sphaerotheca pannosa* var. *rosae*, general; *S. macularis*, not readily distinguished from *S. pannosa*; *Phyllactinia corylea*, WA.

Rot, root. *Armillaria mellea*, CA, MS, OR, TX, WA; *Clitocybe tabescens*, FL.; *Fusarium* spp., occasional, especially in the South; *Phymatotrichum omnivorum*, AZ, TX; *Ramularia macrospora*, MD.

Rust. *Phragmidium americanum* (0, I, II, III), on leaves of cultivated and native roses, ME to NC, TX and ND; *P. montivagum* (0, I, II, III), on native species, SD to NM, AZ, WA; *P. mucronatum* (*P. disciflorum*), the common rust of cultivated roses, possibly on native species (0, I), on leaves and stems; II, III, on leaves, eastern states to Rocky Mountains; Pacific Coast; *P. fusiforme* (*P. rosae-acicularis*) (0, I, II, III), on native species, MI to CO, WY, CA; *P. rosae-californicae* (0, I, II, III), on natives, AZ, CA, MT, OR; *P. rosae-pimpinellifoliae* (*P. subcorticium*) (0, I), on stems; II, III, on leaves of brier and sweetbrier groups, northern U.S.; *P. rosicola* (III), CO, MT, NE, on native spp.; *P. speciosum* (0, I), on leaves and stems, III, on stems of cultivated and native roses, general except far South.

Spot anthracnose. *Elsinoë rosarum*, ME to FL, MI, MO, KS, TX; Pacific Coast.

Unknown. Speckle. Chlorotic flecks in leaves, not transmitted by grafting, MD, NJ, NY, PA, TX, VA.

Virus. Rose Mosaic (in part *Prunus* Necrotic Ring Spot and apple mosaic), Pacific Coast and eastern states in greenhouses and in gardens on plants shipped from the West Coast; **Rose Rosette** (?witches' broom), CA, KS, MO; **Rose Streak**, MD, NJ, NY, TX, VA; **Rose Yellow Mosaic**, IL, MD, NY, PA, VA, CA; **Crinkle**. On Manetti understock, sometimes garden roses, Pacific Coast, TX, MD, NY, PA, VA; **Rose Leaf Curl**, CA; **Rose Spring Dwarf**, CA.

Wilt. Verticillium albo-atrum, AR, CA, IL, NJ, NY; probably widespread.

Blackspot, brown canker, powdery mildew, and rust are the big four diseases of garden roses. Blackspot is almost inevitable except in some dry western states, and shows up even there when overhead watering is substituted for the usual irrigation. It can be controlled by regular weekly spraying or dusting.

Powdery mildew, a problem on the Pacific Coast, is increasing in eastern gardens. Brown canker and other cane diseases are best controlled at spring pruning, by cutting out infected canes and cutting other canes just above a bud, not leaving any stub to die back. Cankers are increased by excessive winter protection. Where temperatures permit, as in the Central Atlantic region, eliminate soil mounding and other special winter treatment.

Roses are sensitive to many chemicals; it is important to distinguish spray injury from blackspot and not increase the dosage because you think you are not getting control. Combination sprays or dusts should take care of

most diseases, as well as insects, in one operation. The bacterial crown gall is occasionally present on plants purchased from a nursery. Ask for a replacement; do not contaminate your soil by planting such a bush.

ROSE-ACACIA
(*Robinia hispida*)

Leaf spot. *Alternaria fasciculata*, ND.
Rot, root. *Phymatotrichum omnivorum*, TX.

ROSELLE
(*Hibiscus sabdariffa*)

Anthraxnose, pod spot. *Colletotrichum gloeosporioides*, FL.
Blight, gray mold. *Botrytis cinerea*, MD.
Blight, southern. *Sclerotium rolfsii*, TX.
Leaf spot. *Cercospora hibisci*, TX.
Nematode, root knot. *Meloidogyne* sp., TX.
Powdery mildew. *Microsphaera euphorbiae*, AL, FL.
Rot, fruit, stem. *Fusarium* sp., FL; *Phytophthora parasitica*, TX.
Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, TX.

ROSE-GENTIAN
(*Sabatia*)

Anthraxnose. *Gloeosporium* sp., OK.
Leaf spot. *Cercospora sabbatae*, DE, MS, NC, OK, TX.

ROSE-MALLOW
(*Hibiscus palustris*)

Bacterial crown gall. *Agrobacterium tumefaciens*, MS.
Dieback. *Colletotrichum hibisci*, NJ, NY, TX.
Leaf spot. *Ascochyta abelmoschi*, NY; ?*Cercospora kellermanii*, IN; *Phyllosticta hibiscina*, CT, FL, LA, MD, NJ, NY; *Septoria* sp., NJ.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia schedonnardi* (0, I), CT to AL, NE, TX; II, III, on grasses.

ROSEMARY
(*Rosmarinus*)

Rot, root. *Phymatotrichum omnivorum*, TX.

ROSE-OF-SHARON, SHRUB-ALTHAEA

(*Hibiscus syriacus*)

Leaf spot. *Cercospora malayensis*, GA; *Phyllosticta hibiscina*, OK; *P. syriaca*, NY.

Nematode, root knot. *Meloidogyne* sp., MS, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Kuehneola malvicola* (II, III), Gulf states.

ROUGE-PLANT

(*Rivina*)

Leaf spot. *Cercospora flagellaris*, FL, TX; *Septoria rivinae*, TX.

Rot, root. *Helicobasidium purpureum*, TX; *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia raunkaerii* (0, I, II, III), FL, TX.

RUBBER-PLANT

(*Ficus elastica*)

Anthracnose. *Glomerella cingulata*, general; *Gloeosporium* sp., WA.

Bacterial crown gall. *Agrobacterium tumefaciens*, CA, TX.

Canker; dieback. *Physalospora rhodina*, GA.

Leaf spot. *Alternaria* sp., IN, OH, TX; *Leptostromella elastica*, NY, north-eastern states; *Mycosphaerella bolleana*, GA; *Phyllosticta* sp., MD, NY; *Phyllosticta roberti*, Gulf states, MD, NY; *Stemphylium elasticae*, ?secondary; *Trabutia (Phyllachora) ficuum*, black spot, FL.

Nematode, leaf. *Aphelenchoides besseyi*, FL.

Nematode, root knot. *Meloidogyne* spp.; *M. incognita-acrita*.

Nematode, spiral. *Helicotylenchus nannus*.

RUDBECKIA

(Golden-Glow, Coneflower, Black-Eyed Susan)

Bacterial, MLO. Aster Yellows, NY, and California Aster Yellows, CA.

Blight, southern. *Sclerotium rolfsii*, FL, NJ.

Downy mildew. *Plasmopara halstedii*, IA, NC, ND, NE, NY, WI.

Gall, leaf. *Synchytrium aureum*, IL, WI.

Leaf spot. *Cercospora rudbeckiae*, NY; *C. tabacina*, WI, IL, NY; *Phyllosticta rudbeckiae*, IA, NY, WI; *Ramularia rudbeckiae*, VT to MS, CO, ID, MT, VA, VT, WV; *Septoria rudbeckiae*, DE, KS, NE, WA, WI.

Powdery mildew. *Erysiphe cichoracearum*, general.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, stem. *Sclerotinia sclerotiorum*, CT.

Rust. *Aecidium batesii* (0, I), NE; *Puccinia dioicae* (0, I), MD, SD; *P. rudbeckiae* (III) TX; *Uromyces perigynius* (0, I), MD to MT; II, III, on *Carex*; *U. rudbeckiae* (III), MT, MD to MS, NM, TX.

Smut, white. *Entyloma compositarum*, IA, MO, OH, WI.

Virus. **Potato Yellow Dwarf**, NY; **Mosaic**, unidentified, IL, IN; **Biddens Mottle**, FL.

Wilt. *Verticillium albo-atrum*, NY.

RUE ANEMONE

(*Anemonella*)

Leaf spot. *Cercospora caulophylli*, MO.

Powdery mildew. *Erysiphe polygoni*, IA.

Rust. *Puccinia recondita* (0, I), IN, IA, MO.

Smut, leaf and stem. *Urocystis anemones*, NY.

RUELLIA

Leaf spot. *Cercospora consociata*, AL, IL, MS, MO, IA.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia lateripes* (0, I, II, III), MD to FL, KS, MO, TX; *Uromyces ruelliae* (0, I, II, III), TX.

RUMEX

(Garden Sorrel)

Bacterial, MLO. **California Aster Yellows**, CA.

Gall, leaf. *Synchytrium anomalum*, IA.

Leaf spot. *Cercospora acetosellae*, LA, TX; *Phyllosticta* sp., NY; *Gloeosporium rumicis*, NY, TX; *Septoria pleosporioides*, TX.

Nematode, ring. *Criconemella xenoplax*, SC.

Nematode, root knot. *Meloidogyne* sp., FL.

Rot, root. *Rhizoctonia solani*, TX.

Rust. *Puccinia acetosae* (II, III), ME to FL.

Virus. **Tomato Ringspot**, PA.

RUSSIAN-OLIVE, SILVERBERRY

(*Elaeagnus*)

Canker. *Fusicoccum elaeagni*, IL, MO.

RUTABAGA

See Turnip.

SAFFLOWER

(*Carthamus*)

Anthraxnose; blight. *Gloeosporium carthami*, IN, TX, VA.

Bacterial blight. *Pseudomonas syringae*, CA.

Blight. *Botrytis cinerea*; *Rhizoctonia* sp., NM.

Leaf spot. *Alternaria* spp., IN, AZ, CA, MT, NE, ND; *Septoria carthami*, IN, TX; *Stemphylium* sp., FL.

Powdery mildew. *Erysiphe* ?*cichoracearum*, CA.

Rot, root. *Phytophthora drechsleri*, CA.

Rot, stem; wilt. *Sclerotinia sclerotiorum*, IN, ND, VA.

Rust. *Puccinia carthami* (II, III), CO, MA, MT, NE, ND.

Virus. Cucumber Mosaic, AZ, CA; Turnip Mosaic, CA.

Wilt. *Fusarium oxysporum* f. sp. *carthami*; *Verticillium albo-atrum*.

SAGE

(*Salvia*; includes Blue, Scarlet,
Black Ornamental Forms)

Bacterial, MLO. California Aster Yellows, CA.

Blight, southern. *Sclerotium rolfsii*, IL.

Damping-off. *Pythium debaryanum*, OH; *Rhizoctonia solani*, CT, IL, NJ, OH.

Downy mildew. *Peronospora lamii*, IA; *P. swinglei*, KS.

Leaf spot. *Cercospora salviicola*, OK, TX; *Ramularia salviicola*, OK.

Nematode, leaf. *Aphelenchoides fragariae*, DE, NJ.

Nematode, root knot. *Meloidogyne* spp., AZ, NJ; *M. incognita-acrita*; *M. javanica*.

Powdery mildew. *Erysiphe cichoracearum*, CA.

Rot, charcoal. *Macrophomina phaseoli*, SC.

Rot, root. *Phymatotrichum omnivorum*, TX; Stem, *Sphaeropsis salviae*, MS.

Rust. *Aecidium subsimulans*, AZ; *Puccinia ballotaeflorae* (II, III), TX; 0, I unknown; *P. caulicola* (0, I, II, III), IA to TX, NM; *P. farinacea* (0, I, II, III), AL, AZ, KS, MS, MO, NE, OK, TX; *P. salviicola* (0, I, II, III), FL, TX; *P. vertisepta* (0, I, III), AZ, NM; *P. melliflora* (I, III), CA.

Virus. Tomato Spotted Wilt.

SAGE-BRUSH

(*Artemisia*)

Blight, gray mold. *Botrytis cinerea*, AK.

Blight, stem. *Sclerotium* sp., OR.

Canker, stem gall, black knot. *Syncarpella tumefaciens*, CA, MT, NV.
Dodder. *Cuscuta* sp., TX.
Downy mildew. *Peronospora leptosperma*, CA, IA, KS, ND, WI.
Leaf spot. *Cercospora ferruginea*, WI; *C. olivacea*, NY; *Cylindrosporium artemisiae*, WA, WI; *Heterosporium* sp., AK; *Phyllosticta raii*, MT; *Ramularia artemisiae*, NY, WI; *Septoria artemisiae*, WA.
Nematode, root knot. *Meloidogyne* sp., AL.
Powdery mildew. *Erysiphe cichoracearum*, WI to NM, CA, WA.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia atrofusca*, IA to TX, CA, OR; II, III, on *Carex*; *P. millefolii* (III), ND to TX, CA, WA, AK; *P. tanacetii* (0, I, II, III), WI to TX, CA, WA; 0, I, II, III on *Tanacetum* and II on chrysanthemum; *Uromyces oblongisporus* (III), WY.

ST. ANDREWS CROSS, ST. PETERSWORT
(*Ascyrum*)

Leaf spot. *Cladosporium gloeosporioides*, AL.
Rust. *Uromyces triquetrus* (0, I, II, III), MS, NJ, TX.

ST. AUGUSTINEGRASS
(*Stenotaphrum*)

Virus. *Panicum Mosaic*, AR.

ST. JOHNSWORT
(*Hypericum*)

Black knot. *Gibberidea heliopsisidis*, MD.
Blight, leaf. *Rosellina (Dematophora) necatrix*.
Leaf spot. *Cercospora hyperici*, IL; *Cladosporium gloeosporioides*, AL, NJ, NY, WI.
Nematode, root knot. *Meloidogyne* spp.
Powdery mildew. *Erysiphe cichoracearum*.
Rust. *Melampsora hypericorum* (II), MT; *Uromyces triquetrus* (0, I, II, III), ME to AL, and IA, TX, WI.

SALAL
(*Gaultheria shallon*)

Black mildew. *Meliola* sp.
Leaf spot. *Dasyscypha gaultheriae*, CA, OR, WA; *Mycosphaerella gaultheriae*, Pacific Coast, AK; *Pestalopezia brunneo-pruinosa*, CA, OR, WA; *Phyllosticta gaultheria*, general.

Powdery mildew. *Microsphaera alni*, OR.
 Spot anthracnose. *Elsinoë ledi*, OR, WA.

SALPIGLOSSIS (Painted-Tongue)

Bacterial canker, vascular. *Clavibacter michiganense*, WY.
 Bacterial, MLO. **California Aster Yellows**, CA.
 Nematode, lesion. *Pratylenchus pratensis*, NY.
 Nematode, root knot. *Meloidogyne* sp., NY.
 Wilt. *Fusarium* sp., WA; *Verticillium albo-atrum*, NY.

SALSIFY (*Tragopogon*)

Bacterial, MLO. **California Aster Yellows**, CA; **Aster Yellows**, MD, NY, PA, WI.
 Bacterial soft rot. *Erwinia carotovora*, CT, TX.
 Blight, leaf. *Sporodesmium scorzonerae*, AL, MD, NY, PA, VA, WV.
 Blight, southern. *Sclerotium rolfsii*, TX.
 Leaf spot. *Cercospora tragopogonis*, MT, OK; *Stemphylium botryosum*, NY;
Alternaria tenuis.
 Nematode, leaf and stem. *Ditylenchus dipsaci*, CA.
 Nematode, root knot. *Meloidogyne* sp., NY to AL, TX, WA.
 Powdery mildew. *Erysiphe cichoracearum*, general.
 Rot, root. *Phymatotrichum omnivorum*, TX, AZ; *Rhizoctonia solani*, TX, WA.
 Rot, stem crown. *Sclerotinia intermedia*, IL; *S. sclerotiorum*, IL.
 Virus. **Beet Curly Top**; **Lettuce Mosaic**, NY.
 White rust. *Albugo tragopogonis*, CA.
 Wilt. *Verticillium albo-atrum*, NY.

SALSIFY, BLACK (*Scorzonera*)

Bacterial, MLO. **California Aster Yellows**, CA.
 Nematode, root knot. *Meloidogyne* sp., FL.
 White rust. *Albugo tragopogonis*, CA.

SALT BUSH (*Atriplex*)

Downy mildew. *Peronospora farinosa*, MT, TX.
 Gall, leaf, stem. *Urophlyctis pulposa*, ND, TX.
 Leaf spot. *Cercospora dubia*, widespread; *Stagonospora atriplicis*, NJ, NY,
 PA, KS, NE.

Nematode, root knot. *Meloidogyne* sp., CA; Root Gall, *Heterodera schachtii*, UT.

Rust. *Puccinia aristidae* (0, I); II, III, on grasses; *Uromyces shearianus* (0, I, III).

Virus. Beet Curly Top.

SAINFOIN
(*Onobrychis*)

Damping-off. *Rhizoctonia solani*, TX; *Sclerotium rolfsii*, TX.

Nematode, root knot. *Meloidogyne hapla*, WY.

Rot, stem. *Rhizoctonia solani*, TX; *Sclerotium rolfsii*, TX.

SANCHEZIA

Rot, mushroom root. *Clitocybe tabescens*, FL.

SAND-MYRTLE
(*Leiophyllum*)

Gall, leaf. *Exobasidium vaccinii*, NC, NJ.

SAND-VERBENA
(*Abronia*)

Downy mildew. *Peronospora oxybaphi*, TX.

Leaf spot. *Heterosporium abroniae*, CA, TX.

Rust. *Puccinia aristidae*, AZ, CA, CO, NM; II, III on grasses.

SANDVINE
(*Ampelanus*)

Black mildew. *Meliola bidentata*, NC.

Downy mildew. *Plasmopara gonolobi*, SC.

Leaf spot. *Cercospora gonolobi*, OK; *Septoria* sp., LA.

Rust. *Puccinia obliqua* (III), OK, TX.

SANDWORT
(*Arenaria*)

Leaf spot. *Hendersonia tenella*, TX.

Powdery mildew. *Erysiphe polygoni*, CA.

Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Puccinia arenariae* (III), CA, FL, MT, NY, TX, WI; *P. tardissima*, CO, NM, UT, WY; *Uromyces inaequaltus* (0, I, II, III), CO, UT.
 Smut, anther. *Ustilago violacea*, ME, NH, NY, VT.

SANGUISORBA

(Burnet)

Leaf spot. *Graphium sessile*, NY; *Ovularia bulbifera*, AK, IL.
 Powdery mildew. *Podosphaera oxyacanthae*, IA; *Sphaerotheca macularis*, AK, KS, NY, PA.
 Rust. *Xenodochus carbonarius* (I, III), AK; *X. minor*, AK.

SANSEVIERIA

(Bowstring-Hemp, Snake Plant)

Bacterial soft rot. *Erwinia aroideae* and *E. carotovora*, AZ, FL, NJ, MD.
 Leaf spot. *Fusarium moniliforme*, FL, MO, WA; *Gloeosporium sansevieriae*, FL, WA.
 Nematode, lesion. *Pratylenchus* sp., CA.
 Nematode, root knot. *Meloidogyne* sp.; *M. javanica*.
 Nonparasitic. **Wilt**, overfertilization or toxic salts.
 Rot. *Aspergillus niger*; *Fusarium* sp.

SAPODILLA

(*Achras*)

Gall, limb. *Pestalotia scirrofaciens*, FL, TX.
 Leaf spot. *Phyllosticta* sp., FL; *Septoria* sp., FL.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Scopella (Uredo) sapotae* (II), FL.
 Spot anthracnose. *Elsinoë lepagei*, FL.

SASSAFRAS

Canker, branch, trunk. *Nectria* sp., CT to WV, MS.
 Canker; dieback. *Physalospora obtusa*, NY to GA.
 Leaf spot. *Septoria* sp., NY; *Actinothyrium gloeosporioides (Actinopella dryina)*; *Cristulariella pyramidalis*; *Phyllosticta illinoiensis*, IL, MA; *P. sassafras*, NY to GA, TX, IL.
 Mistletoe. *Phoradendron serotinum (flavescens)*, TX.
 Powdery mildew. *Phyllactinia corylea*, MI.

Rot, heart, trunk. *Daedalea confragosa*, IN, NY; *Fomes igniarius*, OH, VA; *F. ribis*, MO.

Rot, root. *Armillaria mellea*, PA; *Phymatotrichum omnivorum*, TX.

Rot, wood. *Daldinia vernicosa*; *Hymenochaete agglutinans*; *Hypoxylon* spp.; *Polyporus* spp., sometimes on living trees; *Poria ferruginosa*; *Schizophyllum commune*, NY; *Trametes sepium*, IN.

Virus. **Mosaic**, NY; **Yellows**, TX, unidentified.

The undetermined yellows disease causes fasciation of tops, leafroll, and dwarfing of leaves.

SAURURUS

(Swamp-Lily, Water Dragon)

Gall, leaf. *Physoderma* sp., VA.

Leaf spot. *Cercospora saururi*, AL, FL, IL, IN, LA, NY, TX; *Ramularia saururi*, OK.

Nematode, root knot. *Meloidogyne* sp.

SAXIFRAGE

(*Saxifraga*)

Blight, gray mold. *Botrytis cinerea*, AK.

Leaf spot. *Cercospora saxifragae*, WI; *Phyllosticta saxifragarum*, WY; *Septoria albicans*, WI; *Ramularia* sp., AK.

Powdery mildew. *Sphaerotheca macularis*, NY, AK, CO, PA, WY.

Rust. *Melampsora artica* (0, I), CO, AK; II, III, on willow; *Puccinia heucherae* (III), AK, MT to NM, ID, WA, WY, NY to IL, MT; *P. pazschkei* (III), ID, MT, WA; and var. *tricuspidatae*, CO, UT.

SCABIOSA

Bacterial, MLO. **Aster Yellows**, CT, NJ, NY, VA; and **California Aster Yellows**, CA.

Blight, southern. *Sclerotium rolfsii*.

Powdery mildew. *Erysiphe polygoni*.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rot, stem. *Sclerotinia sclerotiorum*, NY.

Virus. **Beet Curly Top**, CA.

SCARBOROUGH-LILY

(*Vallota*)

Leaf scorch; red spot. *Stagonospora curtisii*, LA.

SCHEFFLERA

(*Brassaia actinophylla* = *Schefflera actinophylla*)

Bacterial blight. *Pseudomonas cichorii*, FL.
Leaf spot. *Alternaria panax*, CA, FL.
Nematode, root knot. *Meloidogyne incognita-acrita*.
Rot, stem, leaf, cutting. *Fusarium solani*, FL.
Virus. ?Ghost Ring.

SCHEFFLERA, DWARF

(*Schefflera arboricola*)

Bacterial leaf blight. *Pseudomonas cichorii*, FL.
Leaf spot. *Alternaria* sp. FL.

SCHRANKIA

Rust. *Ravenelia morongiae*, TX.
Stem spot. *Cercospora morongiae*, MS.

SCILLA

(Squill)

Nematode, bulb. *Ditylenchus dipsaci*, VA.
Rot, blue mold. *Penicillium gladioli*, on imported bulbs.
Rot, bulb. *Sclerotium rolfsii*, WA.
Smut, flower. *Ustilago vaillantii*, MA, WA.
Virus. ?*Ornithogallum* Mosaic, NY.

SCINDAPSUS

See Pothos.

SEA-GRAPE, DOVE-PLUM

(*Coccoloba*)

Spot, tar. *Phyllachora simplex*, FL.

SEA-KALE

(*Crambe*)

Leaf spot, black. *Alternaria oleracea*, VA.
Rot, root; damping-off. *Aphanomyces raphani*, WI.

Virus. Beet Western Yellows Virus, CA.

Wilt; yellows. *Fusarium oxysporum* f. sp. *conglutinans*, IN.

SEDUM
(Stonecrop)

Blight, southern. *Sclerotium rolfsii*, KS, NJ, VA.

Leaf spot. *Septoria sedi*, IL, IA, ME, NY; *Pleospora* sp., NY; *Stemphylium bolicki*, FL.

Nematode, root knot. *Meloidogyne* sp.

Rot, stem. *Colletotrichum* sp. (*Vermicularia benficiens*), VA, NY; *Phytophthora* sp., NY; *Rhizoctonia solani*, IL, NJ.

Rust. *Puccinia rydbergii* (III), UT; *P. umbilici* (III), CO, WY.

Wilt. *Fusarium oxysporum* f. sp. *sedi*, CA.

SEMPERVIVUM
(Houseleek)

Rot, leaf and stem. *Phytophthora parasitica*, NY.

Rot, root. *Pythium* sp., IA.

Rust. *Endophyllum sempervivi* (III), MA, NJ, NY.

SENECIO
(Groundsel)

Bacterial, MLO. California Aster Yellows.

Gall, leaf. *Synchytrium aureum*, WI.

Leaf spot. *Cercospora senecionicola*, WI; *C. senecionis*, TX; *Gloeosporium senecionis*, CA; *Phyllosticta garrettii*, OR, UT, WY; *Ramularia filaris*, CO, MT; *R. pruinosa*, CO, WY; *R. senecionis*, CA, CO; *Septoria cacaliae*, AL, IN, TX; *S. senecionis*, CA.

Nematode, leaf. *Aphelenchoides ritzema-bosi*.

Powdery mildew. *Erysiphe cichoracearum*, ID, MN, NE, VA, WA; *Sphaerotheca macularis*, CO, MT, UT, WY.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, IL, NJ.

Rot, stem. *Phytophthora* sp., NJ; *Sclerotinia sclerotiorum*, LA.

Rust. *Coleosporium occidentale* (II, III), CA, CO, ID, MT, OR, WA, WY; 0, I unknown; *C. senecionis* (II, III), CO, RI; *Puccinia angustata* var. *eriophori* (0, I), CT, IA, MN, NH, UT, VT; II, III, on *Eriophorum* and *Scirpus*; *P. expansa*, CA, UT, WA, WY; *P. recedens*, CO, CT to NC, TN, IA, ND to OR, WA, WY; *P. dioicae* (0, I), NE, NM, TX; II, III, on *Carex*; *P. stipae* (0, I), CO, WY, NE; II, III, on *Stipa*; *P. subcircinata* (0, I, III), NE, NV, ND, ID, UT, WA, NM; *Baeodromus californicus* (III), CA.

Smut, white. *Entyloma compositarum*, KS, MD, NE, PA, TX, WI.
 Virus. **Tomato Spotted Wilt.**
 White rust. *Albugo tragopogonis*, CA, CO, IN, MO, MT, NE, UT, WA.
 Wilt. *Fusarium* sp., NJ; *Verticillium albo-atrum*, WA.

SEQUOIA

(Redwood and Giant Sequoia)

Blight, needle. *Chloroscypha chloromela*; *Cercospora sequoiae*, MD, PA;
Mycosphaerella sequoiae; *Pestalotia funerea*, TX.
 Blight, seedling. *Botrytis douglasii*, CA, OH, PA.
 Blight, twig. *Phomopsis juniperovora* (?); *Botrytis cinerea*.
 Burls, galls, on trunk. Cause unknown.
 Canker. *Botryosphaeria dothidea*, VA. [Redwood, Dawn] [U.S. National
 Arboretum, Washington, DC]; *B. dothidea* (= *B. ribis*), CA.
 Canker, bark. *Dermatea livida*.
 Nematode. *Meloidogyne hapla*, *M. incognita*, *M. javanica*, *Pratylenchus*
penetrans, *P. vulnus*, *Xiphinema bakeri*, CA.
 Rot, charcoal. *Macrophomina phaseoli*.
 Rot, root. *Armillaria mellea*; *Phymatotrichum omnivorum*, TX.
 Rot, trunk; heart. *Fomes annosus*; *Ganoderma sequoiae*; *Poria sequoiae*;
P. albipellucida.
 Rot, wood. *Hymenochaete tabacina*; *Lenzites saepiaria*; *Merulius hexa-*
gonoides; *Polyporus* spp.; *Schizophyllum commune*; *Stereum* spp.; *Trametes*
 spp.

SERIOCARPUS

(White-Topped Aster)

Rust. *Coleosporium asterum* (II, III), CT; *Puccinia dioicae* (0, I), NC, IN,
 TN.

SESAME

(*Sesamum*)

Bacterial leaf spot. *Pseudomonas sesami*, KS, TX.
 Bacterial wilt. *Pseudomonas solanacearum*, AZ.
 Blight. *Corynespora cassiicola*, MS, Southeast.
 Leaf spot. *Alternaria sesami*, Southeast; *Cercospora sesami*, FL, GA, SC;
Cylindrocladium sesami, FL, SC; *Helminthosporium sesami*, TX.
 Rot, charcoal. *Macrophomina phaseoli*, CA, TX.
 Wilt. *Verticillium albo-atrum*, NM.

SESUVIUM

Nematode, root knot. *Meloidogyne* sp., AL, FL.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia aristidae* (0, I), TX; II, III, on grasses.
White rust. *Albugo trianthemi*, TX.

SHALLOT

(*Allium ascalonicum*)

Bacterial, MLO. Aster Yellows, LA.
Blight, southern. *Sclerotium rolfsii*, LA.
Blotch, purple. *Alternaria porri*, LA, TX.
Downy mildew. *Peronospora destructor*, LA.
Nematode, root knot. *Meloidogyne* sp., TX.
Rot, neck. Gray mold, *Botrytis allii*, LA; smudge, *Colletotrichum circinans*, IL, LA, WI.
Rot, pink root. *Pyrenochaete terrestris*, CO, LA, TX; *Fusarium solani*, TX.
Rot, white. *Sclerotium cepivorum*, LA, VA.
Smut. *Urocystis cepulae*, MA.
Virus. Mosaic, unidentified.

Pink root and white rot are prevalent in Louisiana. Losses from white rot are heavy if plants are set late; September setting may give a good crop.

SHASTA DAISY

(*Chrysanthemum maximum*)

Bacterial fasciation. *Clavibacter fascians*, CA.
Leaf blotch. *Septoria leucanthemi*, CA, OR.
Leaf spot. *Cercospora chrysanthemi*, OK.
Nematode, root knot. *Meloidogyne* spp., AL, MS, FL.
Rot, root. *Pythium* sp., NJ.
Rot, stem. *Rhizoctonia solani*, MD; *Sclerotinia sclerotiorum*, MT, WA; *Fusarium roseum* and *F. solani*, TX.

SHEPHERD'S PURSE

(*Capsella*)

Bacterial, yellows. *Spiroplasma citri*, IL.

SHORTIA

(Oconee-bells)

Leaf spot. *Peizizella oenotherae*, NC, SC.

SIDA

Blight, southern. *Sclerotium rolfsii*, FL.
 Leaf spot. *Cercospora sidicola*; *Colletotrichum malvarum*, KS, TX, UT;
Phyllosticta spinosa, KS, TX; *Ramularia sidarum*, FL.
 Nematode, root knot. *Meloidogyne* spp., AL, MS, FL.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Puccinia heterospora*, FL to TX, MO, IN; *P. lobata*, AZ, CA, NM,
 TX, UT; *P. schedonnardi*, NM.
 Virus. *Abutilon Mosaic*, FL.

SILENE

(Catchfly, Cushion-Pink, Champion)

Broomrape. *Orobanche ramosa*, TX.
 Damping-off. *Rhizoctonia solani*, IL.
 Downy mildew. *Peronospora silenes*, KS, IL, NE, TX, WI.
 Leaf spot. *Ascochyta silenes*, MT, OK, WI; *Marssonina delastrei*, WI; *Phyllosticta nebulosa*, MT, NY, WI; *Septoria dimera*, NE, WI; *S. silenes*.
 Rust. *Uromyces silenes* (0, I, II, III), PA, CA, IA, KS, MT, WA; *U. suksdorfii*,
 CA, ID, NM, UT, WA; *Puccinia aristidae* (0, I), AZ, TX.
 Smut, flower. *Sorosporium saponariae*, CO, NV, UT; *Ustilago violacea*,
 anther smut, CA, MT, NH, TX, VA, WA, WY.

SILK-TASSEL BUSH

(*Garrya*)

Black mildew. *Lembosia lucens*, CA.
 Leaf spot. *Cercospora garryae*, CA, TX; *Dothichiza garryae*, CA; *Phyllosticta garryae*, CA, TX.
 Rot, root. *Phymatotrichum omnivorum*, TX.

SILPHIUM

(Compass Plant, Indian-Cup)

Downy mildew. *Plasmopara halstedii*, IL, IA, WI to AR, KS, MN.
 Leaf spot. *Ascochyta compositarum*, WI; *Cercospora silphii*, AL, KS, IL,
 TX, WV, WI; *Colletotrichum silphii*, WI; *Septoria alba*, IL, KS.
 Powdery mildew. *Erysiphe cichoracearum*, CT, MD.
 Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, ME.
 Rust. *Puccinia silphii* (III), NC to AL, TX, ND; *Coleosporium terebinthi-*
naceae (II, III), PA to FL, TX, KS; 0, I, on pines; *Uromyces silphii* (0, I),
 OH to MO, KS and WI; II, III, on *Juncus*.
 Smut, white. *Entyloma compositarum*, TX, WI.

SKIMMIA

Virus. **Tobacco Ring Spot**, NY.

SKULLCAP

(*Scutellaria*)

Leaf spot. **Cercospora scutellariae**, IL, MS, MO, TX; **Phyllosticta decidua**, TX, WI; **Septoria scutellariae**, ME to IA, CA, CO, MS, OK.

Powdery mildew. **Erysiphe ?galeopsidis**, MI, NY, IL, IN, IA, KS, OH, WI; **Microsphaera** sp., IL.

Rot, root. **Phymatotrichum omnivorum**, TX; **Rhizoctonia solani**, TX.

Rot, stem. **Botrytis cinerea**, WA.

SKUNK-CABBAGE

(*Symplocarpus*)

Blight, leaf. **Botrytis ?streptothrix**, CT, IL, NJ, NY.

Leaf spot. **Cercospora symplocarpi**, MA to VA, IN, WI; **Septoria spiculosa**, MD, NY, PA, WI.

SLENDERFLOWER THISTLE

(*Carduus*)

Rust. **Puccinia carduorum**, CA.

SMALL FLOWER GALINSOGA

(*Galinsoga parviflora*)

Rot, stem. **Whetzelinia sclerotiorum**, MD.

SMELOWSKIA

Rust. **Puccinia aberrans** (0, III), CO, MT, NE, UT, WA; **P. holboelli**, NV; **P. monoica**, CO, WY.

SMILACINA

(False Solomons Seal)

Leaf spot. **Cercospora idahoensis**, ID; **Cylindrosporium smilacinae**, CO, OR, UT, CA; **?Heterosporium asperatum**, WY; **Phleospora vagnerae**, MT; **Ramularia smilacinae**, MT, WY, WA; **Septoria smilacinae**, general; **Sphaeropsis cruenta**, CA, NM.

Rot, rhizome. *Stromatinia smilacinae*, NY.

Rust. *Puccinia sessilis*, CA, KS, IA, ID, ND, SD, MT, NE, NY, OK, PA, WA; *Uromyces acuminatus* var. *magnatus*, CO, MN, MT, NE, WI, IL, ND, SD; II, III on *Spartina*.

Smut, leaf. *Urocystis colchici*, MT.

SMILAX

(Greenbrier Cat-Brier; for Florists' Smilax,
see Asparagus)

Canker, felt fungus. *Septobasidium pseudopedicellatum*, FL.

Gall. *Synchytrium smilacis*.

Leaf spot. *Ascochyta confusa*, NY, WI; *Cercospora smilacina*, CT to FL, TX; *C. smilacis*, MA to FL, TX, and MN; *Colletotrichum smilacis*, IL; *Cylindrosporium smilacis*, AL; *Dothiorella smilacina*, MA to LA, TX; *Mycosphaerella smilacicola*, GA, SC; *Pestalotia clavata*, NY to AL, LA; *Phyllosticta subeffusa*, KS, IL, WV; *Ramularia subrufa*, IA, MS, NE, WI; *Septogloeum subnudum*, IL, WI; *Septoria smilacis*, WV; *Sphaeropsis cruenta*, IA; *Stagonospora smilacis*, CT to MD, ND, TX.

Nematode, burrowing. *Radopholus similis*, FL.

Powdery mildew. *Phyllactinia corylea*, MI.

Rot, root. *Helicobasidium purpureum*, TX.

Rust. *Puccinia amphigena* (0, I), KS, MI, NE, ND; II, III, on *Calamovilfa*; *P. arundinariae* (0, I), NC, SC; *P. macrospora* (0, I), DE, NJ, NY; II, III, on *Carex*; *P. smilacis* (II, III), MA to FL, TX, and NE; 0, I, on *Apocynum*.

SMITHANTHA

Virus. Tobacco Mosaic, CA, CT, DC, FL, OH, WA.

SMOKE TREE

(*Cotinus*)

Leaf spot. *Cercospora rhoina*, AL; *Pezizella oenotherae*, MD; *Septoria rhoina*, CT, MA, NY, VA; *Gloeosporium* sp., IL.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Pileolaria cotini-coggyriae*, GA, RI.

Wilt. *Verticillium albo-atrum*, CT, IL, NE, NJ, NY.

SMOKE-TREE

(*Dalea*)

Leaf spot. *Cercospora daleae*, KS.

Mistletoe. *Phoradendron californicum*, CA to TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Pileolaria cotini-cogyriae*, AR.

Rust. *Puccinia andropogonis* (0, I), SD to KS; II, III, on *Andropogon*;
P. paroselae (II, III), CA.

SNAPDRAGON

(*Antirrhinum*)

Anthracnose. *Colletotrichum antirrhini*, general in eastern and southern states to CO and TX.

Bacterial crown gall. *Agrobacterium tumefaciens*, NY.

Blight, gray mold. *Botrytis cinerea*, cosmopolitan in greenhouses.

Blight, southern; stem rot. *Sclerotium rolfsii*, CA, FL, MS, NJ, NY, TX.

Canker, stem and crown. *Myrothecium roridum*, IL.

Damping-off; root rot. *Pythium* spp., cosmopolitan; *Rhizoctonia solani*, also collar rot.

Dodder. *Cuscuta* sp., WA.

Downy mildew. *Peronospora antirrhini*, CA, NY, OK, OR, PA.

Leaf spot. *Cercospora antirrhini*, FL, IL.

Leaf spot; stem rot; canker. *Phyllosticta antirrhini*, general in eastern and north central states, also TX and WA.

Nematode, lesion. *Pratylenchus pratensis*.

Nematode, root knot. *Meloidogyne* spp., general in South and in northern greenhouses; *M. javanica*, MD.

Nematode, pin. *Paratylenchus penetrans*, CA.

Nonparasitic. **Fasciation**, probably genetic. **Tip Blight**, cause unknown, MD, OK, VA, CA; injury from peach aphid.

Petal spot. *Bipolaris (Helminthosporium) setariae*, FL.

Powdery mildew. *Oidium* sp., MA, NY, PA.

Rot, charcoal. *Macrophomina phaseoli*, OK.

Rot, root. *Phymatotrichum omnivorum*, TX; *Thielaviopsis basicola*, CT, NJ.

Rot, stem; wilt. *Fusarium* sp., perhaps secondary; CT, FL, GA, OK, TN, WA; *Phytophthora cactorum*, CA, IL, MN, NJ, NY; *P. cryptogea*, CA, OK; *P. parasitica*, GA; *Sclerotinia sclerotiorum*, CA, IN, MI, PA, TX; *S. minor*, CT.

Rust. *Puccinia antirrhini* (II, III), general; 0, I unknown.

Virus. **Cucumber Mosaic**, **Mosaic**, unidentified, KS, NY, OH, PA; **Ring Spot**, unidentified, OK.

Wilt. *Verticillium albo-atrum*, CA, CT, ME, MA, MN, NY, NJ, PA.

Rust is the most generally important disease and can be prevented, to some extent, by purchasing rust-resistant seed, but not all such seed is resistant to all strains of rust.

SNOWBERRY
(*Symphoricarpos*)

Anthracnose; black berry rot; twig canker. *Glomerella cingulata*, widespread, MA to VA, IL and WI.

Bacterial crown gall. *Agrobacterium tumefaciens*, MD.

Bacterial hairy root. *Agrobacterium rhizogenes*, IA.

Leaf spot. *Ascochyta symphoricarpophila*, NY; *Cercospora symphoricarpi*, MT, SD; *Phyllosticta symphoricarpi*, NY, NM, WA; *Lasiobotrys symphoricarpi*, black spot, CO, UT, WY; *Septoria oedospora*, CO; *S. signalensis*, WY; *S. symphoricarpi*, ND to CO, CA and WA.

Powdery mildew. *Microsphaera diffusa*, general; *Podosphaera oxyacanthae*, WA.

Rot, berry. *Alternaria* sp., CO, CT, MA, NY; *Botrytis cinerea*, CT, MA, NY. Rot, collar. *Fomes ribis*, KS, MT.

Rot, root. *Helicobasidium purpureum*, TX.

Rust. *Puccinia crandalli* (0, I), ND, CO, CA, WA, ID, MT, UT, WY; II, III, on grasses; *P. symphoricarpi* (III), MT to CA and AK.

Spot anthracnose; scab. *Sphaceloma symphoricarpi*, ME to VA, AR and WI, CA, CO, OR, WA.

Anthracnose and spot anthracnose, scab, commonly disfigure berries.

SNOWDROP
(*Galanthus*)

Blight, botrytis. *Botrytis galanthina* on imported bulbs.

SNOW-ON-THE-MOUNTAIN
(*Euphorbia marginata*)

Blight, gray mold. *Botrytis cinerea*, NJ.

Leaf spot. *Alternaria* sp., KS, TX; *Cercospora euphorbiicola*, NE; *C. pulcherrimae*, OK; *Phyllosticta* sp., NJ.

Powdery mildew. *Microsphaera euphorbiae*, IN, IA, KS, MO.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia panici* (0, I), MS to TX, CO, and SD; *Uromyces euphorbiae*, IA and SD to TX and CO.

SOAPBERRY, SOUTHERN
(*Sapindus saponaria*)

Blight, thread. *Pellicularia koleroga*, FL.

Leaf spot; dieback. *Glomerella cingulata*, FL; *Phyllosticta sapindii*, FL.

SOAPBERRY, WESTERN

(*Sapindus drummondii*)

Blight, leaf. *Cylindrosporium griseum*, OK, TX.

Leaf spot; dieback. *Glomerella cingulata*, TX; *Mycosphaerella sapindii*, MO.

Mistletoe. *Phoradendron serotinum (flavescens)*, AZ, NM, TX.

Powdery mildew. *Uncinula circinata*, TX.

Rot, root. *Helicobasidium purpureum*, TX.

Virus. Mosaic, TX.

This is one of the few plants reported resistant to Texas root rot.

SOAPWORT

(*Saponaria*)

Leaf spot. *Alternaria saponariae*, also stem spot, CT to MD, IN, MN; *Cylindrosporium officinale*, IN; *Phyllosticta tenerrima*, NJ, TX; *Septoria noctiflorae*, IL.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia aristidae* (0, I), CO.

SOCIETY GARLIC

(*Tulbaghia*)

Nematode, root knot. *Meloidogyne incognita*, FL.

SOLOMONS-SEAL

(*Polygonatum*)

Leaf spot. *Colletotrichum lilieacearum*, ?secondary, cosmopolitan; *Sphaeropsis cruenta*, CT, IN, IA, NY, OH, VA, WI.

Rot, rhizome. *Stromatinia smilacinae*, NY.

Rust. *Puccinia sessilis* (0, I), AL, CT, ID, IA, MN, NY, OH, PA, WI, WY; II, III, on *Phalaris*; *Uromyces acuminatus* var. *marginatus* (0, I), IL, IA, MN, NE, ND, SD; II, III, on *Spartina*.

Smut, leaf. *Urocystis colchici*, IA.

Virus. Mosaic. Unidentified, ME.

SONCHUS

Rot. *Macrophomina phaseolina*, AZ.

SOPHORA

(Pagoda Tree, Silky Sophora, Mescalbean)

- Blight, twig. *Nectria cinnabarina*, CT, NY.
 Canker. *Fusarium lateritium*, NJ.
 Damping-off. *Rhizoctonia solani*, CT.
 Dieback. *Diplodia sophorae*, OH.
 Leaf spot. *Phyllosticta sophorae*, OK, TX.
 Mistletoe. *Phoradendron serotinum (flavescens)*, TX.
 Nematode, root knot. *Meloidogyne* sp., MD.
 Powdery mildew. *Microsphaera alni*, CT.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rust. *Uromyces hyalinus* (0, I, II, III), SD to TX, AZ, WY.
 Virus. Brooming Disease. Unidentified.

SOYBEAN

(Glycine Max)

- Anthraxnose. *Glomerella glycines*, IA, MI, NC to FL, TX and NE; *Colletotrichum truncatum*.
 Bacterial blight. *Pseudomonas syringae* pv. *glycinea*, East and South to TX, MN.
 Bacterial, MLO. Bud proliferation, LA.
 Bacterial leaf crinkle. Unidentified, Midwest.
 Bacterial pustule; pustular spot. *Xanthomonas glycines (phaseoli* var. *sojense)*, general.
 Bacterial, tan spot. *Clavibacter flaccumfaciens*, IA.
 Bacterial wildfire. *Pseudomonas tabaci*, MD to AL, LA, NE.
 Bacterial wilt. *Pseudomonas solanacearum*, NC.
 Blight, aerial. *Rhizoctonia solani*, LA.
 Blight, ashy stem; charcoal rot. *Macrophomina phaseoli*, NJ to SC, TX and NE, OH, WA, WI.
 Blight, gray mold; leaf spot. *Botrytis cinerea*, CT, OH.
 Blight, pod and stem. *Diaporthe sojae*, NY, MI to GA, LA, KS.
 Blight. *Sclerotinia minor*, *S. sclerotiorum*, VA.
 Blight, southern. *Sclerotium rolfsii*, VA to FL, TX, IA.
 Canker, stem. *Diaporthe phaseolorum* vars. *batatatis* and *caulivora*, AR, FL, MD, OH, SC, TX; *Phyllosticta sojaecola*, AR, MD, stem and pod canker.
 Damping-off; root rot. *Pythium* spp., IL, IA, MN, MO, NC, ND; *P. aphanidermatum*.
 Downy mildew. *Peronospora manshurica*, East and South to LA, IA.
 Leaf spot. *Alternaria* sp., widespread, secondary; *Cercospora canescens*, also on pods, stems, AL, IL, MD, MS, NC, TX, WV; *C. kikuchii*, also purple

- stain of seed, IN, MD, NC, VA; **C. sojina**, frog-eye spot, NY and MI to FL, OK and IA; **Coryneospora casiicola** (*Helminthosporium vignicola*), target spot, AL, AR, FL, GA, LA, MS, NC, SC; **Helminthosporium vignae**, zonate leaf spot, NC; **Mycosphaerella cruenta**, GA, MS; **Myrothecium roridum**, secondary, LA; **Phyllosticta glycinea**, IL, MD, MO, NC, VA; **Pleosphaerulina sojaecola**, ME, NJ, NY, WI.
- Leaf spot, brown spot. **Septoria glycines**, AR, DE, IN, IA, MD, NC, WI.
- Nematode, cyst. **Heterodera glycines**, soybean cyst, AR, IA, KS, KY, LA, MI, MN, MO, NC, NE, OH, TN, TX; **H. gottingiana**, pea cyst; **H. trifolii**, clover cyst; **Cactodera estonica**, WI.
- Nematode, dagger. **Longidorus** sp.
- Nematode, lesion. **Pratylenchus safaensis**, GA.
- Nematode, root knot. **Meloidogyne hapla**; **M. javanica**.
- Nematode, spiral. **Helicotylenchus erythrinae**; **H. nannus**.
- Nematode, stem. **Ditylenchus dipsaci**, NY.
- Nematode, sting. **Belonolaimus gracilus**; **B. longicaudatus**.
- Nonparasitic. **Baldhead**, mechanical injury. **Chlorosis**, interveinal, manganese deficiency, AL, NC, TN. **Yellowing**, potassium deficiency, iron deficiency.
- Powdery mildew. **Erysiphe polygoni**, DE, IA, NC, SC; **Microsphaera diffusa**, DE, MN, NC.
- Rot, root. **Phymatotrichum omnivorum**, TX; **Pythium aphanidermatum**, AZ; **P. dissotocum**, AZ.
- Rot, root and stem. **Phytophthora megasperme** f. sp. **glycinea**, DE, Northeast, MN, SD.
- Rot, seed. **Fusarium scirpi**, NE; **F. graminearum**, IL; **Nematospora coryli**, NC, SC, OK, VA; **Aspergillus** spp; **Phomopsis sojiae**, NY.
- Rot, stem. **Cephalosporium gregatum**, brown stem, IL, IN, IA, KY, MO, MN, NC, VA, OH; **Pellicularia filamentosa**, also root rot, canker, general; **Sclerotinia sclerotiorum**, AZ, MD, IA, NY, VA; **Phytophthora megasperma** var. **sojiae**; **Neocosmospora vasinfecta**, AL.
- Rust. **Phakospora pachyrhizi**, MD.
- Virus. **Soybean Mosaic**; **Tobacco Ring Spot**, causing bud blight, midwestern U.S.; **Beet Curly Top**; **Bean Pod Mottle**, NE; **Soybean Yellow Mosaic**, Midwest; **Cowpea Mosaic**, IL; **Tobacco Streak**, OK.
- Wilt. **Fusarium oxysporum** f. sp. **tracheiphilum**, PA to FL, TX, and NE; also CA.

Edible soybeans are well suited to home garden culture and usually produce a good crop without control measures beyond dusting seed with a protectant before planting. Commercial growers find a number of diseases of economic importance: bacterial pustule, the various blights, leaf spots, downy mildew, wildfire, virus diseases. Some areas are now under quarantine for the soybean cyst nematode.

SPANISH MOSS

(*Tillandsia*)

Blight, stem and leaf. *Fusarium solani*. Southeast, U.S.

SPARAXIS

(*Wandflower*)

Virus. ?Iris Mosaic, CA, OR.

SPATHIPHYLLUM

Leaf spot. *Myrothecium roridum*, FL.

SPECULARIA

(Venus Looking-Glass)

Dodder. *Cuscuta* sp., TX.

Gall, leaf. *Synchytrium* sp., TX.

Leaf spot. *Cercospora speculariae*, LA; *Septoria speculariae*, KS, PA to AL, TX, and WI.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Coleosporium campanulae* (II, III), NC, PA.

Smut, seed. *Ustilago speculariae*, OK.

SPHACELE

(Pitcher-Sage)

Rust. *Uredo sphacelicola* (II), CA.

SPICE-BUSH

(*Lindera*)

Canker. *Botryosphaeria ribis* var. *chromogena*, MD.

Leaf spot. *Phyllosticta linderae*, DE, IN, WV; *P. lindericola*, WV.

Mistletoe. *Phoradendron serotinum* (*flavescens*), eastern states.

Rot, root. *Phymatotrichum omnivorum*, TX.

SPIDER-LILY
(*Hymenocallis*)

Leaf blotch; red spot. *Stagonospora curtissi*, CA, TX.

Leaf spot. *Cercospora amaryllidis*, TX; *C. pancratii*, FL, LA, TX; *Gloeosporium hemerocallidis*, TX.

Nematode, spiral. *Rotylenchus blaberus*.

Virus. Mosaic. Unidentified, CA.

SPIDERLING, WINE-FLOWER
(*Boerhaavia*)

Bacterial leaf spot. *Xanthomonas campestris*, TX.

Leaf spot. *Ascochyta boerhaaviae*, TX; *Cercospora boerhaaviae*, TX.

Nematode, root knot. *Meloidogyne* spp.

Rot, root. *Phymatotrichum omnivorum*, TX.

White rust. *Albugo platensis*, AZ, FL, NM, TX.

SPINACH
(*Spinacea*)

Anthracnose. *Colletotrichum spinaciae*, CT, LA, MS, NJ, NY, TX, VA;
C. spinicola (*Gloeosporium spinaciae*).

Bacterial, MLO. **Aster Yellows.**

Bacterial soft rot. *Erwinia carotovora*, general in transit, market.

Damping-off; root rot. *Rhizoctonia solani*, general; *Pythium* spp., pre-emergence seed decay.

Downy mildew. *Peronospora effusa*, general.

Leaf spot. *Cercospora beticola*, CA, GA, IL, IA, MA, NY, TX; *Phyllosticta chenopodii*, DE, NJ, NY, VA; *Stagonospora spinaciae*, SD; *Alternaria spinaciae*, MA.

Mold, leaf. *Cladosporium macrocarpum*, secondary, DE, OK, PA, TX; *Heterosporium variabile*, pinhead "rust," general.

Mold, seed. *Pleospora herbarum* (*Stemphylium botryosum*); *Alternaria* sp., and secondary leaf spot; *Curvularia inaequalis*.

Nematode, clover cyst. *Heterodera trifolii*.

Nematode, root knot. *Meloidogyne* spp.

Nonparasitic. **Yellows**, nutrient deficiency.

Rot, root. *Aphanomyces cladogamus*, NJ, VA; *Phymatotrichum omnivorum*, TX; *Pyrenochaete terrestris*, IA; *Olpidium brassicae*.

Rot, root, crown; wilt. *Fusarium solani*; *E. oxysporum* f. sp. *spinaciae*,

general; *Phytophthora* sp., AZ, IN, NJ, NY; *P. megasperma*, CA, NC; *Sclerotinia sclerotiorum*, GA, NY.
 Rust. *Puccinia aristidae* (0, I), AZ, CA, CO, OR, WA; II, III, on grasses.
 Smut, leaf. *Entyloma ellisii*, NJ, WA.
 Virus. **Cucumber Mosaic** (spinach blight); **Spinach Yellow Dwarf**; **Beet Curly Top**; **Beet Ring Mottle**; **Beet Pseudo-Yellows**; **Tomato Spotted Wilt**; **Lettuce Mosaic**, NY.
 White rust. *Albugo occidentalis*, AR, OK, TX.
 Wilt. *Verticillium* sp., NY.

Downy mildew is the outstanding spinach disease, with all varieties susceptible in some degree because of physiologic races, although Dixie Market, Savoy Supreme, and others are considered resistant. To reduce blight, use virus-tolerant varieties.

SPIRAEA

(Native Hardhack, Meadowsweet)

Blight, seedling; stem girdle. *Thelephora terrestris*, ID.
 Canker. *Cryptodiaporthe macounii*, NY.
 Leaf spot. *Cercospora rubigo*, CA, KS, OR, WI; *Cylindrosporium* spp., NY, ID; *Phleospora salicifoliae*, NY to KS, TX, WA.
 Powdery mildew. *Podosphaera oxyacanthae*, widespread; *Sphaerotheca macularis*, CT, MI, NY, PA.

SPIREA, ORIENTAL FLOWERING

(*Spiraea*)

Bacterial fire blight. *Erwinia amylovora*, MD, NJ, NC, VA.
 Bacterial hairy root. *Agrobacterium rhizogenes*, IA.
 Leaf spot. *Cylindrosporium filipendulae*, IA, OR, WA, WI.
 Nematode, root knot. *Meloidogyne* spp., FL, MS; *M. hapla*.
 Powdery mildew. *Microsphaera alni*, CT; *Podosphaera oxyacanthae*, widespread; *Sphaerotheca macularis*, TX.
 Rot, root. *Phymatotrichum omnivorum*, AZ, TX.

SPONDIAS

(Mombin)

Nematode, root knot. *Meloidogyne* sp., FL.
 Spot anthracnose; mombin scab. *Sphaceloma spondiadis*, FL.

SPRUCE

(Picea)

- Blight, brown felt. *Herpotrichia nigra*, MT, Northern Rocky Mountains, Pacific Northwest; *Neopeckia coulteri*.
- Blight, needle. *Sirula macrospora*, ND.
- Blight, seedling smother. *Thelephora terrestris*, ID, MN, OH; seedling, *Rosellinia herpotrichioides*, WA.
- Blight, shoot. *Sirococcus strobilinus*, KS, NC, WI; *Phomopsis occulta*, WI.
- Blight, snow. *Phacidium infestans*, New England states; *Botrytis cinerea*, NJ; *Lophophacidium hyperboream*, MN.
- Blight, twig. *Ascochyta piniperda*, NC, ME.
- Brooming. *Rhizosphaera kalkhoffii*, Central Rocky Mountains.
- Canker, bark. *Aleurodiscus amorphus*, widespread.
- Canker; twig blight. *Cytospora kunzei* (*Valsa kunzei* var. *piceae*), New England to NJ, IL, and MN.
- Damping-off. *Cylindrocladium scoparium*, NJ, MI; *Phytophthora cinnamomi*, VA, MD, NY; *P. cactorum*, NY, VA; *Pythium ultimum*, widespread; *Rhizoctonia solani*, cosmopolitan; *Aphanomyces euteiches*; *Caloscypha fulgens*, OR, WA.
- Mistletoe; witches' broom. *Arceuthobium campylopodium*, Rocky Mountains, TX, NM; *A. pusillum*, New England, especially ME, NH, to Great Lakes states, MN, WI.
- Needle cast. *Rhizosphaera kalkhoffii*, northeastern U.S., AZ, IN, MI, MN, WI, PA.
- Needle cast; tar spot. *Lophodermium filiforme*, NY, CO, AK; *L. piceae*, New England to Great Lakes states, Pacific Northwest; *Lophodermium septata*, OR; *Rhizosphaera kalkhoffii*, CT, NY, VA; *Bifusella crepidiformis*, MT; *Cladosporium* sp., ME.
- Nematode. *Nacobdodera chitwoodi*, OR.
- Nematode. *Paratylenchus projectus*; *Pratylenchus penetrans*; *Tylenchus marginatus*.
- Nematode, dagger. *Xiphinema americanum*, WI.
- Rot, collar. *Diplodia pinea*, NJ, NY; *Sphaeropsis ellisii*, NJ.
- Rot, heart. *Fomes annosus*, CA to WA; *F. pini*, widespread; *F. pinicola*, widespread; *F. roseus*; *F. subroseus*, widespread; *Polyporus* spp.
- Rot, root. *Armillaria mellea*, AZ, CO, NM, PA, OR, UT, WA; *Phytophthora omnivorum*, TX; *Sparassis radicata*, ID, MT, OR, WA; *Phytophthora cinnamomi*, NC; *Fusarium solani*, PA; *F. oxysporum*, PA; *F. avenaceum*, PA.
- Rust, cone. *Chrysomyxa pirolata* (0, I), AK, ME, MA, MI, NY, NH, PA, VT, CO, MT, OR; II, III, on *Moneses* and *Pyrola*.
- Rust, needle. *Chrysomyxa empetri* (0, I), ME; *C. ledi* (0, I), New England to Great Lakes; II, III, on *Ledum*; *C. ledi* var. *cassandrae* (0, I), New England to Great Lakes; II, III, on *Chamaedaphne*; *C. ledicola* (0, I), northern U.S. from ME to WA, and AK, CO; II, III, on *Ledum*; wild rosemary;

C. piperiana (0, I), CA, OR; II, III, on *Rhododendron californicum*,
C. roanensis (0, I), NC, TN; II, III, on *Rhododendron catawbiense*,
C. weirii, TN, VT, WV; **C. arctostaphyli** (0, I); III, on bearberry.
Rust; witches' broom. **Melampsorella cerastii**, widespread.

Cytospora canker frequently kills lower branches of ornamental spruces.
There is little control except to remove affected portions.

SPURGE CAPER

(*Euphorbia lathyris*)

Rot, root. **Macrophomina phaseolina**, AZ, **Rhizoctonia solani**, AZ; **Phythium aphanidermatum**, AZ.

SPURGE, CYPRESS

(*Euphorbia cyparissias*)

Anthracnose. **Sphaceloma poinsettiae**, FL.

Leaf spot. **Cercospora euphorbiae**, TX.

Rot, root. **Phymatotrichum omnivorum**, TX; **Rhizoctonia** sp.

Rust. **Melampsora euphorbiae** (0, I, II, III), ME to PA, IN, WI.

SPURGE, FLOWERING

(*Euphorbia corollata*)

Leaf spot. **Cercospora euphorbiae**, KS, TX; **C. heterospora**, WI; **Phyllosticta** sp.

Mold, leaf. **Cercosporidium fasciculatum**, IA.

Powdery mildew. **Microsphaera euphorbiae**, MD to GA, IN, WI.

Rot, root. **Phymatotrichum omnivorum**, TX.

Rust. **Puccinia panici** (0, I), OH to AL, TX, MN; II, III, on *Panicum*.

SPURGE, PAINTED

(*Euphorbia heterophylla*)

Rust. **Uromyces euphorbiae** (0, I, II, III), IN to FL, TX, KS.

Smut, stem. **Tilletia euphorbiae**, LA.

SPURGE, SPOTTED

(*Euphorbia maculata*)

Nematode, root knot. **Meloidogyne hapla**.

SQUASH and PUMPKIN

(Cucurbita)

Anthracnose. *Colletotrichum lagenarium*, CT to NJ, TX, KS.

Bacterial, MLO. Aster Yellows.

Bacterial soft rot. *Erwinia carotovora* pv. *carotovora*, cosmopolitan; *E. aroideae*.

Bacterial spot. *Xanthomonas cucurbitae*, CT, GA, IL, IN, MA, MD, MI, WA, WI; *Pseudomonas syringae* pv. *lachrymans*.

Blight, blossom. *Choanephora cucurbitarum*, brown rot of fruit, ME to FL, MI, OK, TX.

Blight, gummy stem; black rot of fruit. *Mycosphaerella citrullina* (*M. melonis*), CT, FL, GA, MA, MI, NJ, NY.

Blight, leaf. *Alternaria cucumerina*, DE, MN, NC, NJ, NY, UT; *Phytophthora capsici*, also stem rot, NC, CA.

Blight, southern. *Sclerotium rolfsii*, AL, FL, GA.

Damping-off. *Pythium debaryanum*, CT, WI.

Downy mildew. *Pseudoperonospora cubensis*, ME to AL, LA, and TX, CA, IA.

Leaf spot. *Ascochyta* sp.; *Cercospora cucurbitae*, DE, NJ, WI, AL; *C. citrullina*, AL; *Gloeosporium* sp., IL; *Phyllosticta cucurbitarum*, IN, NY; *P. orbicularis*, DE, PA, NY; *Septoria cucurbitacearum*, MA, NY, WI; *Stemphylium cucurbitacearum*, IN, OH.

Mold, seed. *Alternaria tenuis*, cosmopolitan; *A. radicina*, occasional; *Curvularia trifolii*, CT.

Nematode, root knot. *Meloidogyne* spp., MD to FL and TX.

Nematode, stubby root. *Trichodorus christiei*.

Nonparasitic. Blossom-end Rot, on summer squash when hot, dry weather follows a cool, rainy spell. Bronzing, marginal necrosis, fruit deformity, potassium deficiency. Chlorosis, nutrient deficiency: manganese, interveinal chlorosis, nitrogen, leaf yellowing, and chlorosis of bud end of fruit.

Powdery mildew. *Erysiphe cichoracearum*, general; *Sphaerotheca fuliginea*, CA, NC.

Rot, blossom-end; root. *Pythium aphanidermatum*, AZ, CA, MD.

Rot, charcoal. *Macrophomina phaseoli*, OR, TX.

Rot, fruit. *Alternaria* sp., MA, NH, NJ, NY, OR, VT, WA; *Diplodia natalensis*, TX; *Coniosporium fairmani*, black mold; *Botrytis cinerea*, gray mold; *Fusarium* spp.; *F. solani* f. *cucurbitae*, also root and stem rot, CA, CT, NY, OR, WA; *Phytophthora cactorum*, AZ; *Pythium ultimum*, CA; *Rhizopus stolonifer*, general in storage after injury; *Sclerotinia sclerotiorum*, ID, MA, ME, NH, NY, WA; *Trichothecium roseum*, pink mold, MA; *Phoma subvelata*, also leaf spot, stem rot, TX.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, TX.

Scab; leaf spot; storage rot. *Cladosporium cucumerinum*, CT, MD, MA, NJ, NY, OR, WA.

Virus. **Bromegrass Mosaic**. General, IA, SD, on squash (*Cucurbita pepa*); **Lettuce Mosaic**, NY; **Squash Mosaic**; **Southern Squash Mosaic**; **Cucumber Mosaic**; **Beet Curly Top**; **Tobacco Ring Spot**; **Prunus Ring Spot**; **Watermelon Mosaic**; **Zucchini Yellow Mosaic**, AR, CA, FL, NY, OH.

Wilt. *Fusarium oxysporum* f. sp. *niveum*, CA, IL, MI, WI; *Verticillium albo-atrum*, OR.

Wilt, anasa. Feeding injury from the squash bug.

In general, diseases and control measures are the same as for cucumbers. Some squash varieties are injured by sulfur dusts. Acorn and butternut squashes are resistant to bacterial wilt.

SQUASH-BUSH

(*Condalia*)

Mistletoe. *Phoradendron californicum*, CA.

SQUAW-APPLE

(*Peraphyllum*)

Leaf spot. *Septoria peraphylli*, UT.

Rust. *Gymnosporangium inconspicuum* (0, I), CO; III, on juniper; *G. nelsoni* (0, I), on leaves, fruit; CO, UT.

STACHYS

(Betony, Hedgenettle, Woundwort)

Gall, leaf. *Synchytrium stachydis*, LA.

Leaf spot. *Cercospora stachydis*, IA, ME; *Cylindrosporium stachydis*, IL; *Ovularia bullata*, CA; *Phyllosticta decidua*, MA, WI; *P. palustris*, OH, IL; *Ramularia stachydis*, OR; *Septoria stachydis*, CA, IL, MS, NY, WI.

Nematode, root knot. *Meloidogyne* sp.

Powdery mildew. *Erysiphe galeopsidis* (*E. cichoracearum*), OH to CO, MT, NY to IN, WI; *Sphaerotheca macularis*, CA.

Rust. *Puccinia pallidissima*, TX.

STAPHYLEA

(Bladdernut)

Blight, twig. *Hypomyces ipomoeae*, MA; *Coryneum microstictum*, MA.

Leaf spot. *Mycosphaerella staphylina*, GA, KS. *Ovularia isarioides*, NY to MO, IA; *Septoria cirrhosa*, MO.

STARFLOWER

(*Trientalis*)

Gall, leaf. *Synchytrium aureum*, PA.

Leaf spot. *Cylindrosporium magnusianum*, CA, MA, MI, NY, WI; *Septoria increscens*, CA, ME, MI, NY, VT, WI.

Rot, leaf. *Ceratobasidium anceps*, WI.

Rust. *Puccinia caricina* var. *limosae* (0, I), NY, WI, AK; II, III, on *Carex*.

Smut, leaf and stem. *Tubercinia trientalis*, OR, WA.

STARGRASS

(*Aletris*)

Leaf spot. *Gloeosporium aletridis*, MS.

Rust. *Puccinia aletridis* (II, III), DE, FL, IL, IN, MA, MS, NC, NJ, RI, SC, TN, WI; 0, I unknown.

STARGRASS, GOLDEN

(*Hypoxis*)

Leaf spot. *Cylindrosporium guttatum*, WI; *Septoria hypoxis*, PA.

Rust. *Uromyces affinis* (I, III), MO, CT, MS; *U. necopinus*, NY

Smut, flower. *Urocystis hypoxis*, CT, MA.

STAR-OF-BETHLEHEM

(*Ornithogalum*)

Blight, southern. *Sclerotium rolfsii*, CA.

Leaf spot. *Didymellina ornithogali*, IL, PA, WA; *Septoria ornithogali*, CT, MA.

Virus. *Ornithogalum* Mosaic, AL, OK, OR.

STATICE, SEA-LAVENDER

(*Limonium*)

Anthracnose; rot, crown. *Colletotrichum gloeosporioides*, FL.

Bacterial, crown and leaf rot. *Pseudomonas caryophylli*, FL.

Bacterial, MLO. *California Aster Yellows*, CA;

Bacterial, MLO. *Yellows and phyllody*, MI.

Blight, flower. *Botrytis cinerea*, FL.

Leaf spot. *Alternaria* sp., CT; *Cercospora* sp., TX; *C. insulana*, FL; *Ascochyta plumbaginicola*, IA; *Fusicladium staticis*, TX; *Phyllosticta* sp., CT; *P. staticis*, NY.

Nematode, root knot. *Meloidogyne* sp.

Rot, crown. *Sclerotium rolfsii*, FL; *Rhizoctonia solani*, FL.

Rust. *Uromyces limonii* (0, I, II, III), ME to MS and TX, NM, CA.

Virus. Turnip Mosaic, CA.

STENANTHIUM

Rust. *Puccinia atropuncta* (II, III), GA; *P. grumosa*, OR.

STENOLOBIUM

(Florida Yellow-Trumpet)

Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

Rust. *Prosopodium appendiculatum* (0, I, II, III), FL, TX.

STEPHANOMERIA

(Wire-Lettuce)

Leaf spot. *Cercospora claviceps*, CA.

Rust. *Puccinia harknessi* (0, I, III), MT to NM, CA, WA.

STEPHANOTIS

Anthraxnose. *Gloeosporium* sp., WA.

Blight, flower. *Botrytis elliptica*, CA.

Virus. Tomato Spotted Wilt, OR.

STERNBERGIA

(Fall-Daffodil)

Leaf scorch; red spot. *Stagonospora curtisii*, CA.

STEVIA

(*Piqueria*)

Bacterial fasciation. *Clavibacter fascians*, MI.

Bacterial, MLO. Aster Yellows, MI, NJ.

Damping-off. *Rhizoctonia solani*, IL.

Nematode, lesion. *Pratylenchus pratensis*, NJ.

Powdery mildew. *Erysiphe cichoracearum*, IL.

Rot, stem. *Sclerotium rolfsii*, NJ.

STILLINGIA
(Queens Delight)

Dodder. *Cuscuta* sp., OK.

Leaf spot. *Cercospora stillingiae*, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Uromyces graminicola* (0, I), OK; II, III, on *Panicum*.

STOCK
(*Matthiola*)

Anthraxnose; leaf and stem spot. *Colletotrichum gloeosporioides*, TX.

Bacterial black rot. *Xanthomonas incanae*, CA, TN.

Blight, gray mold. *Botrytis cinerea*, TX, AK.

Club root. *Plasmodiophora brassicae*, NJ.

Damping-off. *Pythium* spp.; *Rhizoctonia solani*, cosmopolitan.

Downy mildew. *Peronospora parasitica*, IL.

Leaf spot. *Alternaria raphani*, CA; *Myrothecium roridum*, TX.

Nematode. *Nacobus batatiformis*.

Nematode, root knot. *Meloidogyne* sp., TX.

Rot, crown; wilt. *Sclerotinia sclerotiorum*, CA, MI, PA.

Rot, root. *Fusarium avenaceum*, DE, NJ; *Phymatotrichum omnivorum*, TX:
Phytophthora megasperma, CA; *P. cryptogea*, stem rot, CA.

Virus. Turnip Mosaic; ?Cauliflower Mosaic; Beet Curly Top, CA; Tomato Spotted Wilt, TX.

Wilt. *Fusarium oxysporum* f. sp. *mathioli*, AZ, CA; *Verticillium albo-atrum*, NY, CA.

Mosaic causes flower-breaking as well as mottling of foliage. *Verticillium* wilt is prevalent in cut-flower-producing areas of California.

STOKESIA
(Stokes-Aster)

Blight, head. *Botrytis cinerea*, NY.

Leaf spot. *Ascochyta* sp., IA, PA.

Powdery mildew. *Erysiphe cichoracearum*, MD.

Virus. Mosaic. Unidentified, IA; *Biddens* Mottle, FL.

STONE PLANT
(*Lithops*)

Rot. *Fusarium oxysporum*, ID.

STRANVAESIA

Bacterial fire blight. *Erwinia amylovora*, NJ.
Rot, root. *Clitocybe tabescens*, FL.

STRAWBERRY

(Fragaria)

- Anthracnose; crown rot. *Colletotrichum fragariae*, FL, LA; *Gloeosporium* sp., MD.
Anthracnose, fruit. *Colletotrichum gloeosporioides*, FL, OH.
Bacterial angular leaf spot. *Xanthomonas fragariae*, KY, MN, WI, FL.
Bacterial, MLO. Aster Yellows, strawberry green petal; Lethal Disease Decline or Peach Western X Disease. WA, OR.
Bacterial soft rot. *Erwinia carotovora*, MA.
Blight, gray mold. *Botrytis cinerea*, general on fruit.
Blight, leaf. *Dendrophoma obscurans*, angular leaf spot, MA, to FL, and TX, MI, MN, NE, OR.
Blight, southern. *Sclerotium rolfsii*, AL, FL, NC, TX.
Broomrape. *Orobanche* sp., WA.
Downy mildew. *Peronospora fragariae*, IA.
Gall, leaf. *Synchytrium aureum*, on native spp., WI; *S. fragariae*, root gall, CA, WA.
Leaf blotch. *Gnomonia fructicola*, also fruit rot.
Leaf scorch. *Diplocarpon earliana*, general.
Leaf spot. *Cercospora fragariae*, LA; *C. vexans*, NY, CA, WI; *Gloeosporium* sp., IL, MA, PA, MI, NC, UT, associated with black root; *Mycosphaerella fragariae*, common leaf spot, black-seed disease, general; *M. louisianae*, purple leaf spot, LA, MS, NC.
Nematode, dagger. *Xiphinema americanum*; *X. diversicaudatum*; *X. chambersi*.
Nematode, leaf and stem. *Ditylenchus dipsaci*, CA, ID, NC, OR, TX, WA.
Nematode, lesion. *Pratylenchus penetrans*; *P. coffeae*; *P. pratensis*; *P. scribneri*.
Nematode, root knot. *Meloidogyne hapla*.
Nematode, spring dwarf. *Aphelenchoides fragariae*, MA to FL and TX, also AR, CA, MI, TN, WA; Summer Dwarf, Crimp. *A. besseyi*, southeastern and Gulf states, also AR, CA, DE, IL, TX.
Nematode, sting. *Belonolaimus gracilis*.
Nematode, stubby root. *Trichodorus christiei*.
Nonparasitic. Black Root, Brown Root, winter injury, defective drainage, soil toxins, widespread. Chlorosis, iron deficiency. Variegation, June yellows. chlorophyll deficiency, especially in Blakemore, Progressive, and related varieties, general.
Powdery mildew. *Sphaerotheca macularis*, general but rare in South, reported in FL.

- Rot, crown. **Sclerotinia sclerotiorum**, MD to FL, and TX, IL, CA, IA, MN; **Sclerotium rolfsii**, AL, FL, NC, TX.
- Rot, fruit. **Penicillium** spp., secondary; **Pezizella lythri**, also leaf spot, root rot, ME to FL, and OK, IL, IA, MI, OH, OR, WI, AK; **Phytophthora cactorum**, leather rot, AL, AR, IL, KY, LA, MD, MI, MO, OH, TN, VA; **Rhizopus nigricans**, black rot, cosmopolitan; **Rhizoctonia solani**, hard brown rot, widespread; **Sphaeropsis** sp., CA, CO, IL, IA, MN.
- Rot, red stele; brown core root rot. **Phytophthora fragariae**, ME to VA, OK and IA; also CO, MI, WI, Pacific states.
- Rot, root. **Armillaria mellea**, CA, OR, WA; **Cylindrocladium scoparium**, OR, TN; associated with black root; **Leptosphaeria coniothyrium**; **Fusarium** spp.; **Olpidium brassicae**, WA; **Pythium** spp., widespread; **Ramularia** spp., ID, OR, WA; **Idriella lunata**, CA, MD.
- Rot, root, stolon and petiole. **Pestalotia longisetula**, OR, IL.
- Slime mold. **Diachea leucopodia**, CA, IL, KS, LA, MS, MO, TN, TX; **Fuligo septata**, IA, KS, MN, NE, NJ, TX, WA; **Mucilago spongiosa**, KS, MN, MO, NE, OK; **Physarum cinereum**, IL, NE, NJ.
- Sooty mold. **Scoria spongiosa**, ME.
- Virus. **Strawberry Crinkle**, CA, ID, OR, WA, MN, NY; **Strawberry Yellow Edge**, Xanthosis, CA, OR, WA, NC and other states introduced from West Coast; **Strawberry Leaf Roll**, MD, NJ, NY, VT; **Strawberry Mottle**; **Strawberry Multiplier Disease**, WI; **Strawberry Necrotic Shock**, CA; **Strawberry Vein Necrosis**, MN; **Strawberry Vein Banding**; **Strawberry Witches' Broom**, ID, MT, OR, WA, MN, NY; **Tomato Ringspot**, PA.
- Wilt. **Verticillium albo-atrum**, CA, FL, NY, OR, WA; **Colletotrichum acutatus**, AR, CA, FL, MO, MS.

Red Stele is, except in the Deep South, of first importance on strawberries. The roots rot, and above-ground parts are stunted and wilted. Choose resistant varieties, such as Stelemaster, Sparkle, Surecrop, Midway, and Fairland. Purchase plants certified free from nematodes and virus diseases. Mulching helps to prevent fruit rots.

U.S. Department of Agriculture Farmers Bulletin 1891 gives an excellent discussion of "Diseases of Strawberries." The American Phytopathological Society, St. Paul, MN, has published a *Compendium of Strawberry Diseases*.

STRAWBERRY-TREE

(*Arbutus unedo*)

- Bacterial crown gall. **Agrobacterium tumefaciens**, CA.
- Leaf spot. **Septoria unedonis**, OR.
- Spot anthracnose. **Elsinoë mattirolanum**, CA.

STRAWFLOWER

(*Helichrysum*)

Bacterial, MLO. **Aster Yellows**, eastern and central states; **California Aster Yellows**, CA.

Downy mildew. **Plasmopara halstedii**, CA.

Nematode, root knot. **Meloidogyne** sp., FL.

Rot, stem. **Fusarium** sp., FL.

Virus. **Beet Curly Top**, CA, OR, WA; **Biddens Mottle**.

Wilt, **Verticillium albo-atrum**, CA.

STREPTANTHERA

Virus. **Iris Mosaic**, CA, OR.

STREPTOCARPUS

Virus. **Tobacco Mosaic**, CA, CT, DC, FL, OH, WA.

STREPTOPUS

(Twisted-Stalk)

Leaf spot. **Cercospora streptopi**, WA; **Septoria streptopidis**, MT.

Rust. **Puccinia sessilis** (0, I), NY.

Smut, leaf. **Tubercinia clintoniae**, WI.

STYRAX

(Snowbell)

Leaf spot. **Mycosphaerella punctiformis**, GA.

Nematode, root knot. **Meloidogyne** sp., MD.

STYLOSANTHES

Leaf spot, canker. **Colletotrichum dematium** f. sp. **truncata**, FL.

SWEDISH IVY

(*Plectranthus australis*)

Nonparasitic. **Brown Leaf Spot**, Boron deficiency.

SUMAC

(*Rhus*)

Canker, stem; dieback. *Botryosphaeria ribis*, "umbrella disease," NY to GA, NE, and MN; *Cryptodiaporthe aculeans*, ME to AL, OK, and IA; *Nectria cinnabarina*, NY, OK; *N. galligena*, NY, PA, VA; *Physalospora obtusa*, canker, inflorescence blight, NY to AL, KS, MI.

Dodder. *Cuscuta exaltata*, TX.

Leaf blister. *Taphrina purpurascens*, MA to GA, TX and KS.

Leaf spot. *Cercospora rhoina*, general; *Pezizella oenotherae*, NY to GA, WV; *Coniothyrium rhois*, TX; *Harknessia rhoina*, CA; *Phyllosticta rhoiseda*, CA; *Septoria rhoina*, general; *Cylindrosporium* sp., CO, NE.

Mold, leaf. *Cladosporium aromaticum*, IA, NE, NY, WI, WV.

Parasitic lichen. *Strigula elegans* and *S. camplanata*, LA, southern U.S.

Powdery mildew. *Sphaerotheca macularis*, widespread; *Oidium* sp., WI.

Rot, root. *Armillaria mellea*, CA; *Clitocybe tabescens*, FL; *Corticium galactinum*, white root, VA; *Phymatotrichum omnivorum*, TX.

Rot, wood. *Polyporus* spp.; *Poria punctata*, MI; *Schizophyllum commune*, cosmopolitan; *Steccherinum ochraceum*, PA.

Rust. *Pileolaria effusa* (0, III), AZ; *P. patzcuarensis* (0, I, II, III), CO, NM, OK.

Wilt. *Fusarium oxysporum* f. sp. *rhois*, CT, VA; *Verticillium albo-atrum*, IL, IA, MA, MN.

SUNFLOWER

(*Helianthus*)

Bacterial leaf spot. *Pseudomonas syringae* (*helianthi*).

Bacterial, MLO. California Aster Yellows, CA.

Bacterial stem rot. *Erwinia carotovora*, ND.

Bacterial wilt, and apical chlorosis. *Pseudomonas solanacearum*, FL; *P. syringae* pv. *tagetis*, KS, MN, ND, WI; *Erwinia carotovora* pv. *carotovora*, IN.

Black knot, black patch. *Gibberidea heliopsisidis*, GA, IL, MS, MO, NC, VA.

Blight, gray mold; bud rot. *Botrytis cinerea*, CA, OR.

Blight, seedling. *Alternaria helianthi*, MN; *Diaporthe helianthi*, TX.

Blight, southern, *Sclerotium rolfsii*, LA, TX.

Canker, stem. *Diaporthe helianthi*, OH, TX.

Dodder. *Cuscuta* sp., OK, TX, WA.

Downy mildew. *Plasmopara halstedii*, NY to MD, KS and MT, TX.

Gall, basal. *Plasmopora halstedii*, ND, MN.

Leaf spot. *Ascochyta compositarum*, WI; *Cercospora helianthi*, KS, IL, MO, OH, TX, WI; *C. pachypus*, AL, KS, OK, TX; *Colletotrichum helianthi*, WI;

Septoria helianthi, general; *Alternaria zinniae*; *Alternaria helianthi*, MN, OH.

Nematode, leaf gall. *Tylenchus balsamophilus*, WA.

- Nematode, root knot. *Meloidogyne* sp., AL, FL, TX, WV.
 Powdery mildew. *Erysiphe cichoracearum*, general, CA.
 Rot, charcoal. *Macrophomina phaseoli*, MD, CA.
 Rot, head. *Rhizopus oryzae*, CA; *Phoma macdonaldii*, premature ripening, ND.
 Rot, root. *Armillaria mellea*, OR; *Helicobasidium purpureum*, violet root, TX; *Phymatotrichum omnivorum*, TX; *Pythium debaryanum*; *Rhizoctonia solani*, IL, MD, NE, NY, WI.
 Rot, stem. *Phytophthora cryptogea*, CA; *Septosphaeria lindquistii*, black stem, MN, ND.
 Rot, stem. *Sclerotinia sclerotiorum*, widespread.
 Rust. *Coleosporium madia*, CA.
 Rust. *Puccinia helianthi*, (0, I, II, III), general, CA; *P. massalis*, NM, TX; *P. canaliculata*, GA; *Coleosporium helianthi* (II, III), NY to FL, LA and OK; II, III, on pine; *Uromyces junci* (0, I), CA, KS, NE, ND, SD, OK, WY; *U. silphii* (0, I), IL, NY, MO, TN, WI.
 Smut, leaf. *Entyloma polysporum*, MT.
 Virus. **Bromegrass Mosaic**, General, IA, SD; **Mosaic**. Unidentified, IN; **Cucumber Mosaic**, FL, MD; **Biddens Mottle**, FL.
 White rust. *Albugo tragopogonis*, IL, MO, WI.
 Wilt. *Fusarium oxysporum* f. sp. *apii*, SC; *Verticillium albo-atrum*.
 Wilt. *Sclerotinia sclerotiorum* = *Whetzelinia sclerotiorum*, CA.
 Wilt. *Verticillium dahliae*, CA.

SUNROSE

(*Helianthemum*)

- Leaf spot. *Cylindrosporium eminens*, TX, WI; *Septoria chamaecisti*, WA.
 Rot, root. *Phymatotrichum omnivorum*, TX.

SWEET ALYSSUM

(*Lobularia*)

- Bacterial, MLO. **Aster Yellows**, NJ.
 Club root. *Plasmodiophora brassicae*, NJ.
 Damping-off, root rot. *Rhizoctonia solani*, NJ, NY, VA; *Pythium ultimum*, NJ.
 Dodder. *Cuscuta* sp., TX.
 Downy mildew. *Peronospora parasitica*, CA, NJ.
 Nematode, root knot. *Meloidogyne* sp.
 Powdery mildew. *Erysiphe polygona*, CA.
 Rot, crown. *Sclerotinia sclerotiorum*, VA.
 Rot, root. *Phoma lingam*, CA.

SWEET-FERN

(*Comptonia*)

Rust, blister. *Cronartium comptoniae* (II, III), ME to MN, NC, and OH; 0, I, on hard pine.

Rust, leaf. *Gymnosporangium ellisii* (0, I), NJ; II, III, on *Chamaecyparis*.

SWEET-FLAG

(*Acorus*)

Leaf spot. *Cylindrosporium acori*, CT, KS; *Ramularia aromatica*, CT to MD, IN, and WI; *Septocylindrium* sp., NY.

Rust. *Uromyces sparganii* (II, III), ME to VA, MS, IL, and MN; 0, I, unknown.

SWEET GALE

(*Myrica gale*)

Blight, twig. *Diplodia* sp., NJ.

Leaf spot. *Ramularia monilioides*, NY; *Septoria myricata*, NY.

Rust. *Cronartium comptoniae*, ME to NY, WA; 0, I, on pine; *Gymnosporangium ellisii* (0, I), ME.

SWEET GUM

(*Liquidambar*)

Anthraxnose. *Gloeosporium nervisequum*.

Blight; leader dieback. Cause unknown, killing trees in MD, AL, AR, FL, GA, LA, SC, TX.

Blight, thread. *Pellicularia koleroga*, LA.

Canker; dieback. *Botryosphaeria ribis* var. *chromogena*, NY, IL, MD to FL and LA; *B. dothidea*, MS; *Hymenochaete agglutinans*, MD; *Nectria* sp.; *Dothiorella berengeriana*, bleeding necrosis, NJ, NY.

Canker, felt fungus. *Septobasidium alni*; *S. apiculatum*, *S. burtii*, *S. mariana*, *S. pseudopedicellatum*, and *S. sinuosum*, southern states.

Leaf spot. *Cercospora liquidambaris*, MD to FL and TX; *C. tuberculans*, FL, LA, MS, MO; *Discosia artocreas*, OK; *Exosporium liquidambaris*, TX; *Leptothyriella liquidambaris*, red leaf spot, IL, MD, NC; *Septoria liquidambaris*, MA to FL and TX; *Actinopelte dryina*; *Cladosporium* sp., OR.

Mistletoe. *Phoradendron serotinum* (*flavescens*), OH to NC and TX.

Nematode, root knot. *Meloidogyne* sp.

Nonparasitic, Blight, Decline, leader dieback; killing trees in MD, AL, AR, FL, GA, LA, SC, TX. Partly moisture shortage.

Rot, heart. *Polyporus adustus* and *P. gilvus*, widespread.

Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

Rot, root. *Cylindrocladium scoparium*, GA.

Rot, wood. *Daedalea confragosa*, cosmopolitan; *Fomes* spp., *Ganoderma* spp.; *Hericium erinaceus*; *Steccherinum ochraceum*; *S. pulcherrimum*, Gulf states; *Polyporus* spp., *Poria* spp.; *Pleurotus* spp.; *Schizophyllum commune*, cosmopolitan; *Stereum* spp.

SWEETLEAF

(*Symplocos*)

Gall, bud. *Exobasidium symploci*, Gulf states to NC and IN.

Leaf spot. *Septoria stigma*, AL; *S. symploci*, FL, MS, NC, OK, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

SWEET-OLIVE

(*Osmanthus fragrans*)

Black mildew; black spot. *Asterina* sp., MS.

Leaf spot. *Gloeosporium oleae*, MD.

Rot, root. *Armillaria mellea*, CA; *Clitocybe tabescens*, LA.

SWEET PEA and PERENNIAL PEA

(*Lathyrus*)

Anthraxnose; blossom and shoot blight. *Glomerella cingulata*, general except on Pacific Coast.

Bacterial crown gall. *Agrobacterium tumefaciens*, NJ, VA.

Bacterial fasciation. *Clavibacter fascians*, widespread.

Bacterial leaf spot. *Pseudomonas pisi*, IN, WI.

Blight, gray mold. *Botrytis cinerea*, general.

Blight, southern. *Sclerotium rolfsii*, FL, TX.

Damping-off; root and stem rot. *Pythium* spp., CA, CT, MD, MA, NJ, NC, NY; *Rhizoctonia solani*, general.

Dodder. *Cuscuta indecora*, TX.

Downy mildew. *Peronospora trifoliorum*, FL.

Leaf spot. *Alternaria* sp., secondary, MD, MA, NJ, NY, PA, TX; *Colletotrichum pisi*, AL, FL, GA, SC; *Ascochyta* sp., also stem spot, CT, LA, MN, MO, WV, WI; *A. lathyri*, NJ; *Cercospora lathyrina*, GA, OK; *Isariopsis griseola*, CT; *Mycosphaerella pinodes*, also stem spot, MN, WI; *Ovularia* sp., CA; *Phyllosticta orobella*, TX; *Ramularia* sp., NY, MA, NJ, PA, TX, WA; *R. deusta* f. *odorati*, CA; *Curvularia* sp., CA.

Mold, white. *Erostrotheca multififormis* (*Cladosporium album*) CA, MA, NJ, NY, PA, TX, WA, in greenhouses.

Nematode, lesion. *Pratylenchus pratensis*, NJ, NY.

Nematode, root knot. *Meloidogyne* spp., FL, MA, NJ, NY, TX.

Nonparasitic, **Bud Drop**, unbalanced nutrition, low light intensity in greenhouses.

Powdery mildew. *Microsphaera alni*, general, especially in greenhouses;

Erysiphe polygoni, widely reported, sometimes confused with *M. alni*.

Rot, root. *Aphanomyces euteiches*, IN, MI, WI; *Fusarium solani* f. *pisi*, occasional to prevalent under glass and outdoors; *Phymatotrichum omnivorum*, TX, *Phytophthora cactorum*, CT; *Thielaviopsis basicola*, black rot, CT to OH, IL, MS, FL, CO, Pacific Coast.

Rot; stem wilt. *Sclerotinia* ?*sclerotiorum*, MD, PA.

Virus. **Pea Mosaic**; **Tomato Spotted Wilt**; **Sweet Pea Streak**. A complex, components not identified, perhaps in part bacterial.

Wilt. *Verticillium* sp., NY, NJ; *Fusarium oxysporum* f. sp. *vasinfectum*, FL, NY.

Control aphids and thrips spreading mosaic and spotted wilt.

SWEET POTATO

(*Ipomoea batatas*)

Bacterial soft rot. *Erwinia carotovora*, CT, SC.

Blight, leaf. *Phyllosticta batatas*, occasional NJ to FL, TX and KS, usually in the South; *Choanephora cucurbitarum*, FL, leaf mold.

Blight, southern; cottony rot. *Sclerotium rolfsii*, general in South.

Canker, stem. *Fusarium solani*, NC.

Leaf spot. *Alternaria* sp., secondary, occasional to general; *Cercospora* sp., FL, OK; *Septoria bataticola*, occasional NJ to AL, TX and IA.

Leaf spot, blight. *Acremonium crotocinigenum* (= *Cephalosporium cinnamomeum*), CA, FL.

Nematode, lance. *Hoplolaimus coronatus*; Lesion, *Pratylenchus* sp.

Nematode, root knot. *Meloidogyne incognita* and *M. incognita-acrita*.

Nematode, stem, bulb. *Ditylenchus dipsaci*, causing brown ring, NJ.

Nematode, sting. *Belonolaimus gracilis*.

Nematode, stunt. *Tylenchorhynchus claytoni*.

Nonparasitic. **Internal Breakdown**, perhaps from chilling. **Internal Brown Spot**, boron deficiency. **Intumescence**, high water intake and retarded transpiration.

Rot, black. *Ceratocystis fimbriata*, general on roots, stems; *Diplodia theobromae* (*Physalospora rhodina*), Java black rot, general in South.

Rot, charcoal. *Macrophomina phaseoli*, NJ to FL, TX, and KS, CA.

Rot, gray mold. *Botrytis cinerea*, on sprouts, cosmopolitan.

Rot, root. *Diaporthe batatis*, dry rot, stem rot, NJ to FL, TX, MO; *Helicobasidium purpureum*, KS, TX; *Pyrenochaeta terrestris*, pink root, CA; *Phymatotrichum omnivorum*, AZ, NM, OK, TX; *Phytophthora* sp., NJ,

- PA; **Plenodomus destruens**, foot and storage rot, NJ to FL, LA and IA, CA; **Pythium** spp., mottle necrosis, leak, ring rot; **Fusarium solani**, NC.
- Rot, soil; pox. **Streptomyces ipomoea**, general, NJ to FL, TX and IA, also AZ, CA.
- Rot, sprout; stem canker. **Rhizoctonia solani**, occasional, NJ to FL and TX, AZ, CA, OH, WA.
- Rot, storage. **Fusarium** spp., general; **Mucor racemosus**, occasional after chilling; **Penicillium** sp., blue mold, cosmopolitan; **Rhizopus** spp., soft rot, general; **Sclerotinia** sp., NC; **Trichoderma** spp., DE, NJ; **Aspergillus** spp., secondary.
- Rust. **Coleosporium ipomoeae** (II, III), AL, MS; 0, I, on pine.
- Scurf. **Monilochaetes infuscans**, general.
- Slime mold. **Fuligo violacea**, AL, DE, NJ, TX; **Physarum cinereum**; **P. plumbeum**, AL, AR, KY, MS, NC, VA.
- Virus. **Sweetpotato Feathery Mottle** (yellow dwarf); **Sweetpotato Internal Cork**, GA, LA, MD, MS, NC, SC, TN, VA; **Sweetpotato Mosaic** (?tobacco mosaic); **Tobacco Ring Spot**; **Beet Curly Top**; **Sweetpotato Russet Crack**.
- White rust. **Albugo ipomoeae-panduratae**, general.
- Wilt. **Fusarium oxysporium** f. sp. **batatas**, stem rot, general; **Verticillium albo-atrum**, CA.

Select varieties resistant to *Fusarium* stem rot, in general the Spanish group. Heat treatment eliminates some viruses. Hot water (10 minutes at 120° F) controls scurf. Variety Nemagold is resistant to root-knot nematodes.

SWEET-ROOT

(*Osmorhiza*)

- Leaf gall. **Urophlyctis** (*Physoderma*) **pluriannulata**, MT.
- Leaf spot. **Cercospora osmorhizae**, IL, OH, WI; **Fusicladium angelicae**, WA; **Phleospora osmorhizae**, NY, IA, WI; **Ramularia reticulata**, WI, VA; **Septoria aegopodii**, NY, ND, OH, WI.
- Rust. **Puccinia pimpinelli** (0, I, II, III), general.

SWEET VETCH

(*Hedysarum*)

- Black mildew. **Parodiella perisporioides**, NY.
- Leaf spot. **Septogloeum hedysari**, WY.
- Nematode, root knot. **Meloidogyne** sp.
- Rust. **Uromyces hedysari-obscuri** (0, I, II, III), AK, CO, ID, MT, NM, SD, UT, WY.

SWEET WILLIAM
(*Dianthus barbatus*)

Anthracnose. ?*Volutella dianthi*, DE, IN, NY.
Bacterial, MLO. **California Aster Yellows**, CA.
Blight, cutting. *Cylindrocladium scoparium* and *C. floridanum*, FL, OH.
Blight, southern. *Sclerotium rolfsii*, CT, FL, NC.
Leaf spot. *Phyllosticta* sp. (*Ascochyta dianthi*?), WA; *Septoria dianthi*, AL, IA, MI, NY.
Nematode, leaf and stem. *Ditylenchus dipsaci*, OR.
Nematode, root knot. *Meloidogyne* sp., FL, TX.
Rot, root. *Pythium ultimum*, CA; *Phymatotrichum omnivorum*, TX.
Rot, stem. *Rhizoctonia solani*, CT, IL, KS, MA, MS, NJ, NY, PA, TX.
Rust. *Uromyces dianthi* (II, III), IA, TX, NE; *Puccinia arenariae* (III), AL, CT, MA, NY, PA.
Virus. ?**Carnation Mosaic**; **Beet Curly Top**, CA, TX.
Wilt. *Fusarium oxysporum* f. sp. *barbati*, CA, KS; *Fusarium* sp., MA, NJ, SC, VA.

Fusarium wilt is one of the more serious diseases with the new growth yellowing, the leaves pointing downward, and plants stunted. Place new plants in a new location or sterilized soil.

SWISS CHARD
(*Beta vulgaris* var. *cicla*)

Blight, southern. *Sclerotium rolfsii*, LA, SC.
Damping-off, root rot. *Rhizoctonia solani*, NY; *Pythium aphanidermatum*, CA.
Downy mildew. *Peronospora schachtii*, CA.
Leaf spot. *Cercospora beticola*, general; *Ramularia beticola*, WA.
Mold, seed. *Alternaria tenuis*, CA; *Stemphylium botryosum*, CA, WA.
Nematode, root knot. *Meloidogyne* sp., LA.
Nonparasitic. **Heart Rot**, cracked stem, boron deficiency, NY, WA.
Rot, crown. *Sclerotinia* sp., MS.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rust. *Uromyces betae* (II), CA, OR.
Virus. **Beet Curly Top**, AZ, CA, OR; **Beet Mosaic**, AZ, CA, WA; **Yellow Net**, unidentified, CA.

SWITCHGRASS
(*Panicum*)

Blotch, spot. *Helminthosporium sativum* (*Bipolaris sorokinianum*), PA.

SYCAMORE

See Plane.

SYNGONIUM

Anthraxnose. *Gloeosporium* sp., WA; *Colletotrichum* sp., WA.
Bacterial blight. *Xanthomonas campestris*, MD.
Bacterial leaf spot. *Xanthomonas dieffenbachiae*, FL; *X. vitians*, FL.
Leaf spot. *Cephalosporium cinnamomeum*, NY.
Rot; black cane. *Ceratocystis fimbriata*, CA.

SYNTHYRIS

Leaf spot. *Ramularia* sp., OR.
Rust. *Puccinia acrophila* (III), MT to CO, and UT; *P. welfeniae* (III), CA, ID, OR, WA, WY.

TABEBUIA

(Trumpet-Tree)

Rust. *Prosopodium plagiopus* (II, III), FL.

TABERNAEMONTANA

(Crape-Jasmine)

Leaf mold. *Cladosporium* sp., FL.
Leaf spot. *Gloeosporium tabernaemontanae*, FL.
Leaf spot, algal; green scurf. *Cephaleuros virescens*, FL.
Rot, mushroom root. *Clitocybe tabescens*, FL.

TAENIDIA

Leaf spot. *Fusicladium angelicae*, WI; *Septoria pimpinellae*, MN.
Rust. *Puccinia angelicae* (0, I, II, III), IN, MI, MO, NY, WI.

TAHITIAN BRIDAL VEIL

(*Gibasis*)

Virus. Bean Yellow Mosaic, VA.

TAMARIND
(*Tamarindus*)

Nematode, root knot. *Meloidogyne* sp., FL.

TAMARISK, SALT CEDAR
(*Tamarix*)

Bacterial blight. Fatal to some plants in AZ, NM, and TX, where the host has become a noxious weed.

Powdery mildew. *Sphaerotheca macularis*, IN.

Rot, root. *Phymatotrichum omnivorum*, CA, TX.

Rot, wood. *Polyporus sulphureus*, MD.

TANSY
(*Tanacetum*)

Leaf spot. *Ramularia tanacetii*, WI.

Powdery mildew. *Erysiphe cichoracearum*, PA.

Nematode, root knot. *Meloidogyne* sp., FL.

Rust. *Puccinia tanacetii* (0, I, II, III), WY; 0, I, II, III on *Artemisia*; II on chrysanthemum.

TEASEL
(*Dipsacus*)

Blight, southern. *Sclerotium rolfsii*, TX.

Downy mildew. *Peronospora dipsaci*, MO.

Leaf spot. *Cercospora elongata*, MD, NY to MO, WA.

Nematode, leaf and stem. *Ditylenchus dipsaci*, CA, OR.

Powdery mildew. ?*Phyllactinia corylea*, WA.

Rot root. *Phymatotrichum omnivorum*, TX.

Rot stem. *Sclerotinia sclerotiorum*, TX.

Virus. Teasel Mosaic.

TEA
(*Thea sinensis*)

Blight, twig. *Pestalotia guepini*, also leaf spot, SC.

Leaf spot, algal; green scurf. *Cephaleuros virescens*, FL, SC.

Spot anthracnose; scab. *Sphaceloma* sp., LA; *Elsinoë leucospila*, FL.

TELLIMA

Powdery mildew. *Sphaerotheca macularis*, AK.
Rust. *Puccinia heucherae* (III), CA, OR, WA, AK.

TERNSTROEMIA

Spot anthracnose. *Elsinoë leucospila*, FL.

TEXASWEED (*Caperonia*)

Canker, stem. *Amphobotrys recini*, TX.

THALIA

Leaf spot. *Cercospora thaliae*, LA.
Rust. *Puccinia thaliae* (II, III), FL.

THERMOPSIS (Bush-Pea, Golden-Pea)

Leaf spot. *Cercospora thermopsidis*, CO, MT; *Phoma thermopsidicola*, CA;
Ramularia sphaeroides, WA; *Stigmina thermopsidis*, CA.
Powdery mildew. *Erysiphe polygoni*, Rocky Mountains and Pacific North-
west.

THISTLE (*Cirsium*)

Leaf spot. *Cercospora* spp., WA, KS, TX; *Phyllosticta cirsii*, NY, WA, WI;
Stagonospora cirsii, WI; *Septoria cirsii*, VT to IN, TX, and WI; *Alternaria*
chrysanthemi, MT.
Powdery mildew. *Erysiphe cichoracearum*, general; *Phyllactinia corylea*, WA;
Sphaerotheca macularis, MD.
Rot, root. *Rhizoctonia solani*, IL; *Phymatotrichum omnivorum*, TX.
Rust. *Puccinia cirsii* (0, I, II, III), PA to NC, TX, CA, OR; *P. punctiformis*
(0, I, II, III), ME to NJ, OH, CA, WA; *Uromyces junci* (0, I), MO, NE, ND.
Smut, inflorescence. *Thecaphora trailii*, CO, UT.
White rust. *Albugo tragopogonis*, NY to IA, TX, and WY, LA.

THISTLE, BLESSED

(*Cnicus*)

Blight, southern. *Sclerotium rolfsii*, GA.

THOROUGHWAX

(*Bupleurum*)

Nematode, root knot. *Meloidogyne* sp., CA.

THUJOPSIS

(Hiba Arborvitae)

Blight, twig. *Phomopsis occulta*, CA.

THUNBERGIA

(Clockvine)

Bacterial crown gall. *Agrobacterium tumefaciens*, CT, FL.

Bacterial, MLO. *Aster Yellows*, NY.

Nematode, root knot. *Meloidogyne* sp., FL.

Virus. *Broad Bean Wilt*, NY.

THYME

(*Thymus*)

Blight, gray mold. *Botrytis cinerea*, AK.

Rot, root. *Rhizoctonia solani*, MA.

TI

(*Cordyline terminalis*)

Leaf spot. *Phytophthora parasitica*, HI.

TIBOUCHINA

(Glory-Bush)

Rot, mushroom root. *Clitocybe tabescens*, FL.

TIDESTROMINIA

Rot. *Macrophomina phaseolina*, AZ.

TIGRIDIA

(Tiger-Flower)

Bacterial scab. *Pseudomonas marginata*, MD.

Nematode, bulb. *Ditylenchus dipsaci*.

Rot, internal. *Fusarium oxysporum* f. sp. *gladioli*; storage, *Penicillium gladioli*.

Virus. *Tigridia Mosaic*, OR, WA.

TOMATO

(*Lycopersicon*)

Anthracnose. *Glomerella phomoides* (*Colletotrichum coccodes*), chiefly ripe rot of fruit, sometimes on leaves, general, especially in Northeast; *Colletotrichum dematium*, var. *truncata*, MS; *C. graminicola*, MS; *C. trichellum*, MS; *C. glycines*, MS; *C. gossypii*, MS.

Bacterial blight. *Pseudomonas viridiflava*, FL.

Bacterial canker. *Clavibacter michiganense*, birds-eye spot, general, most frequent in North and West.

Bacterial crown gall. *Agrobacterium tumefaciens*; in experiments, *A. rhizogenes*, hairy root.

Bacterial, MLO. *Aster Yellows*; *Tomato Big Bud*, NY.

Bacterial, pith rot. *Pseudomonas corrugata*, CA, FL, LA; also *Stem necrosis*, FL.

Bacterial, seedling blight. *Bacillus polymyxa*, NY.

Bacterial soft rot. *Erwinia aroideae* and *E. carotovora*, cosmopolitan.

Bacterial speck. *Pseudomonas syringae* pv. *tomato*, occasional East and central states, also CA, OK, TX.

Bacterial spot. *Xanthomonas vesicatoria*, on fruit, leaves, sometimes stem cankers, northeastern, central, and southern states.

Bacterial wildfire. *Pseudomonas syringae* pv. *tabaci*, WI.

Bacterial wilt. *Pseudomonas solanacearum*, general, MA to IL and southward.

Blight, blossom. *Sclerotinia* sp., CA, FL, NY, OH.

Blight, early; collar rot; fruit rot. *Alternaria solani*, general.

Blight, late; fruit rot. *Phytophthora infestans*, general in humid regions and seasons, especially East and Southeast.

Blight, southern. *Sclerotium rolfsii*, VA to FL and TX; CA, occasional in North.

Broomrape. *Orobanche ludoviciana*, WY; *O. racemosa*, CA, NY, NJ.

Canker, stem. **Helminthosporium** sp., TX; **Myrothecium roridum**, also fruit rot, OH, TX, VA, WI.

Damping-off. **Rhizoctonia solani**, also collar rot, stem canker, cosmopolitan; **Pythium** spp., cosmopolitan.

Dodder. **Cuscuta** spp., CA, ID, MD, NY, TX.

Downy mildew. **Peronospora tabacina**, GA, NC, SC.

Fruit spot. **Pullularia pullulans**, WV.

Leaf spot. **Ascochyta lycopersici**, DE, FL, NJ, NC, OR, VA, WI; **Septoria lycopersici**, general except Northwest; **Phyllosticta hortorum**, NY; **Cercospora** spp.; **Stemphylium solani**, gray leaf spot, FL, GA, IN, LA, NJ, NC, SC, TN, TX, VA; **S. floridanum**.

Leaf spot, target. **Corynespora cassicola**, FL.

Mold, leaf. **Botryosporium pulchrum**, PA, TX; **Chaetomium bostrychodes**, TX; **Cladosporium fulvum**, general under glass, occasional outdoors.

Nematode, awl. **Dolichodorus heterocephalus**.

Nematode, dagger. **Xiphinema americanum**.

Nematode, golden. **Heterodera rostochiensis** (*Globodera rostochiensis*); tobacco cyst, **H. tabacum**; soybean cyst, **H. glycines**, IA, MN, OH.

Nematode, lance. **Hoplolaimus coronatus**.

Nematode, lesion. **Pratylenchus pratensis**, MD, NJ.

Nematode, reniform. **Rotylenchulus reniformis**.

Nematode, root knot. **Meloidogyne arenaria** var. **thamesii**; **M. hapla**, Pacific NW; **M. incognita**; **M. incognita-acrita**; **M. javanica**; **M. chitwoodi**, Pacific NW.

Nematode, spiral. **Helicotylenchus nannus**.

Nonparasitic

Blossom-end Rot. Unbalanced moisture and calcium deficiency, general.

Blotchy Ripening. Malnutrition, ?potassium deficiency.

Catface. Fruit abnormalities from growth disturbances.

Cloudy Spot. Feeding punctures of plant bugs.

Cuticle Crack. Of green fruit; high soil moisture and air temperature.

Fasciation. ?Genetic abnormality. ?Unbalanced nutrition.

Leafroll. Excessive soil moisture with starch congestion in leaves.

Oedema. Leaf hypertrophy from excessive water absorption and reduced transpiration.

Pockets; Puffing. Fruit defect from factors adversely affecting pollination and growth.

Psyllid Yellows. Toxemia from psyllid feeding. Western states.

Russetting. Mite injury.

Sunscald. Fruit injury in heat on plants defoliated by disease.

Walnut Wilt. Toxemia from root excretions of walnut trees.

Powdery mildew. ?**Erysiphe polygoni**, on seedlings indoors, NC; **Leveillula taurica**, AZ, CA, UT; **Oidiopsis taurica**, CA.

Rot, brown, root. **Pyrenochaeta lycopersici**, MA.

- Rot, buckeye; stem rot. *Phytophthora parasitica*, MA to FL, TX, and IL, AZ, CA; *P. cactorum*, NY, PA, WI; *P. capsici*; *P. cryptogea*; *P. drechsleri*.
- Rot, charcoal. *Macrophomina phaseoli*, CA, TX.
- Rot, fruit. *Alternaria* sp., black mold; *Aspergillus* spp., green and yellow mold; *Alternaria alternata*, NY; *Brachyспорium tomato*, KS, TX; *Cladosporium herbarum*, green mold; *Diaporthe phaseolorum*, MS, TX; *Diplodia theobromae*, AL; *Glomerella cingulata*, FL, LA, ME, MI, NJ, NY; *Isaria clonostachoides*, VA; *Mucor mucedo*, MD; *Nematospora coryli*, cloudy spot, CA, FL, GA; *Nigrospora oryzae*, CA; *Oospora lactis*, sour rot, cosmopolitan; *Phoma destructiva*, black spot, nearly general; *Pleospora lycopersici*, CA; *Rhizopus stolonifer*, cosmopolitan in transit; *Sclerotinia minor*, TX; *Sporotrichum* sp., IN, TX; *Trichothecium roseum*, MD, OH, NC; *Gibberella zeae*; *Phoma* sp.; *Myrothecium* sp.
- Rot, gray mold; ghost spot. *Botrytis cinerea*, occasional on foliage, fruit, stems.
- Rot, nailhead spot. *Alternaria tomato*, on fruit, stems, CT to FL, TX and ND.
- Rot, root. *Aphanomyces cladogamus*; *Colletotrichum atramentarium*, black dot; *Pyrenochaeta terrestris*, secondary, IA, IL, NJ; *Phymatotrichum omnivorum*, AZ, OK, TX; *Plectospora myriandra*, VA; *Thielaviopsis basicola*, TX.
- Rot, root. *Fusarium oxysporum*, FL, NE, NH, OH, (different from wilt); *F. oxysporum* f. sp. *radicis*, crown, FL, NH, OH, PA, TX. Also *F. oxysporum* f. sp. *radicis-lycopersici*, TX.
- Rot, root (and stunting of seedlings). *Pythium myriotylum* and *P. arrhenomones*, FL.
- Rot, root and wilt. *Colletotrichum coccodes*, CA.
- Rot, stem, fruit. *Sclerotinia sclerotiorum*, occasional in greenhouses and in South; *Pythium myriotylum*.
- Scab, powdery. *Spongospora subterranea*, PA.
- Virus. **Tobacco Mosaic**, general, strains causing fernleaf and internal browning of fruit; **Cucumber Mosaic**, also causing shoestring; **Beet Curly Top**, western yellow blight; **Tomato Aspermy**, AZ; **Tomato Ring Mosaic**; **Tomato Ring Spot**; **Tomato Spotted Wilt**, TN; **Tomato Streak** (tobacco mosaic plus potato virus X); **Tomato Yellow Net**; **Tomato Yellow Top**; **Witches' Broom**; **Tobacco Etch**, may cause severe mosaic; **Rugose Mosaic** (due to potato mottle virus and potato virus Y); **Pseudo Curly Top**, FL; **Tobacco streak**, CA; **Tomato Mosaic**, CA.
- Wart. *Synchytrium nobioticum*, PA (see under Galls).
- Wilt. *Fusarium oxysporum* f. sp. *lycopersici*, general; *Verticillium albo-atrum*, occasional in all regions.

Choose tomato varieties resistant to *Fusarium* wilt; purchase seed certified free from virus disease. In setting seedlings discard any showing galls of

root-knot nematodes. Do not smoke while handling, and do not use tobacco stems as a mulch, although other mulches are helpful. Spray for late blight and other foliage diseases. State and federal agencies give warning when late blight is imminent and it is time to start spraying. See *USDA Agricultural Handbook 203* for an excellent discussion of tomato diseases with fine illustrations.

TORENIA

Nematode, root knot. *Meloidogyne* sp., MD.

TORREYA

Leaf spot. *Phomopsis* sp.

Needle spot. *Fusarium lateritium*, FL.

TRADESCANTIA

(Wandering Jew, Spiderwort)

Blight, gray mold. *Botrytis cinerea*, AK.

Leaf spot. *Cladochytrium replicatum*, NY, secondary; *Colletotrichum* sp., TX, NJ; *Cylindrosporium tradescantiae*, IA; *Septoria tradescantiae*, WI to TX and SD.

Nematode, root knot. *Meloidogyne* sp., OR, TX.

Rust. *Uromyces commelinae* (II, III), TX.

TRAUTVETTERIA

(False Bugbane)

Downy mildew. *Peronospora ficariae*, TN.

Leaf spot. *Septoria trautveteriae*, WV.

Rust. *Puccinia pulsatillae*, ID, OR, WA.

Smut, leaf and stem. *Urocystis anemones*, UT.

TREE-POPPY

(*Dendromecon*)

Smut, leaf. *Entyloma eschscholtziae*, CA.

TREE-TOMATO

(*Cyphomandra*)

Bacterial canker. *Clavibacter michiganense*, CA.

Powdery mildew. *Oidium* sp., MD.

TRILLIUM

(Wake-Robin)

Blight, leaf. *Ciborinia trillii*.

Leaf spot. *Colletotrichum peckii*, NY to NC, IL, MN; *Gloeosporium trillii*, CA, OR, WA; *Heterosporium trillii*, WA; *Phyllosticta trillii*, NY, PA, WA, WI; *Septoria trillii*, New England to SC, OK, WI.

Rot, stem. *Sclerotium rolfsii*, NH, PA.

Rust. *Uromyces halstedii* (0, I), IL, NY; II, III, on *Spartina*.

Smut, leaf. *Urocystis trillii*, ID, OR.

TRITONIA

(*Montbretia*)

Blight, leaf. *Alternaria* sp., ?secondary, NH; *Heterosporium* sp., OR, WA.

Blight, southern. *Sclerotium rolfsii*, CA.

Rot, corm. *Fusarium oxysporum* f. sp. *gladioli*, yellows; *Stromatinia gladioli*, in commercial stocks.

Virus. ?Iris Mosaic, CA, OR.

TROLLIUS

(Globeflower)

Leaf spot. *Ascochyta* sp., NY; *Cylindrosporium montenegrinum*, WY; *Phyllosticta trollii*, WY.

Smut, leaf and stem. *Urocystis anemones*, MD, NY.

TRUMPETVINE, TRUMPET-CREEPER

(*Campsis*)

Leaf spot. *Cercospora duplicata*, LA; *Mycosphaerella tecomae* (*Cercospora sordida*), general; *Phyllosticta tecomae*, MS; *Myrothecium roridum*, TX; *Septoria tecomae*, OK, TX, WV.

Mistletoe. *Phoradendron serotinum* (*flavescens*), TX.

Powdery mildew. *Erysiphe cichoracearum*, IL; *Microspheera alni*, MD to AL, TX, and IN.
Rot, root. *Phymatotrichum omnivorum*, TX.

TUBEROSE (*Polianthes*)

Bacterial soft rot. *Erwinia carotovora*, NC.
Blight; leaf and flower spot. *Botrytis elliptica*, CA.
Leaf spot. *Cercospora* sp., TX; *Helminthosporium* sp., also stem spot, TX.
Nematode, root knot. *Meloidogyne* sp., CA, FL, NC, TX, VA.
Rot, root. *Pythium debaryanum*, TX; *Rhizoctonia solani*, NC.

TULIP (*Tulipa*)

Anthracnose. *Gloeosporium thumenii* f. *tulipae*, CA.
Bacterial soft rot. *Erwinia carotovora*, WA.
Blight, botrytis; tulip fire. *Botrytis tulipae*, general except for South and Southwest; *B. cinerea*, sometimes secondary.
Blight, southern; bulb and stem rot. *Sclerotium rolfsii*, CA, CT, NY, OR.
Nematode, bulb. *Ditylenchus dipsaci*, NY.
Nonparasitic. **Chalking**, stone disease, immaturity of bulbs or injury at digging. **Topple**, sugarstem, collapse of flower stem, often from calcium deficiency.
Rot, basal. *Fusarium* sp., OK, WA.
Rot, black. ?*Sclerotinia sclerotiorum*, WA.
Rot, bulb. *Penicillium* spp., blue mold; *Aspergillus* spp., black mold, cosmopolitan; *Rhizopus stolonifer*, mushy rot, cosmopolitan; *Sclerotinia* sp., ME, OH, WA; *S. sativa*, MD, NY; *Pythium ultimum*, secondary.
Rot, gray bulb. *Rhizoctonia tuliparum*, Northeast, Pacific states.
Rot, root, stem, bulb. *Rhizoctonia solani*, MA, NY, WA.
Rot, stem; flower spot. *Phytophthora cactorum*, CA, IA, NJ, PA, SC, WA.
Virus. **Tulip Breaking** (lily latent mosaic and tulip color-adding), general; **Tobacco Necrosis**, WI.

Botrytis blight is extensive with tulips. In a wet spring, leaves are blasted, buds blighted, and open flowers covered with spots, followed by the familiar gray mold. Sanitary measures are all-important, for the sclerotia survive in the soil, ready to blight new, healthy bulbs. Cut off fading flowers into a paper bag. Gradual running out of tulips may be due to virus disease. Breaking of flowers, once considered a desirable ornamental character, is now recognized as a disease that may be harmful in the long run. Unless aphids are controlled, the virus will spread from variegated to solid-color plantings in the garden.

TULIP-TREE, YELLOW POPLAR

(Liriodendron)

Bacterial root lesion. *Pseudomonas* sp., OR.

Blight, seedling. *Rhizoctonia solani*, OH, VA.

Canker. *Dothiorella* sp., PA; *Myxosporium* spp., NY; *Nectria* sp., WV to NC and TN; *Fusarium solani*, SC.

Leaf spot. *Cylindrosporium cercosporioides*, MD, WV; *Gloeosporium liriodendri*, CT to NJ and TX.; *Mycosphaerella liriodendri*, GA, MI; *M. tulipiferae*, Middle Atlantic and Gulf states; *Phyllosticta liriodendrica* (conidial stage of *Mycosphaerella*), widespread; *Ramularia liriodendri*, AL, DE.

Leaf spot, tar, black. *Ectostroma liriodendri*, widespread; *Rhytisma liriodendri*, CA, TX, VA.

Nematode, lesion. *Pratylenchus pratensis*, TX.

Powdery mildew. *Phyllactinia corylea*, NY to AL, MO; *Erysiphe polygoni*, widespread.

Rot, heart. *Collybia velutipes*, WV; *Ganoderma applanatum*, occasional.

Rot, root. *Armillaria mellea*, VA; *Phymatotrichum omnivorum*, TX; *Cylindrocladium liriodendri*, CA.

Rot, sapwood; wood. *Daedalea extensa* and *D. unicolor*, sometimes on standing trees; *Daldinia vernicosa*, cosmopolitan; *Polyporus* spp.; *Schizophyllum commune*, wound rot; also many stain and timber rots.

Rot, seedling collar. *Cylindrocladium scoparium*, NJ, NC, TN.

Sooty mold. *Capnodium elongatum*, cosmopolitan.

The most conspicuous fungus on ornamental tulip-trees is the black sooty mold growing in copious honeydew secreted by tulip-tree aphids and scales. In hot, dry weather leaves sometimes turn yellow and drop prematurely. Leaf spots are seldom serious enough for treatment.

TUNG TREE

(Aleurites)

Anthraxnose. *Glomerella cingulata*, FL.

Blight, southern. *Sclerotium rolfsii*, TX.

Blight, thread. *Pellicularia koleroga*, FL, MS, LA, TX; *Web, P. filamentosa*, LA, MS.

Canker; dieback; nut rot. *Botryosphaeria ribis*, GA, LA; *Physalospora rhodina*, FL, LA, MS, TX.

Canker, felt fungus. *Septobasidium pseudopedicellatum*, LA.

Leaf spot. *Cercospora websteri*, MS; *Gloeosporium aleuriticum*, MS; *Phyllosticta* sp., FL, GA, *Cristulariella pyramidalis*, FL.

Leaf spot, angular. *Mycosphaerella (Cercospora) aleuritidis*, MS.

Nematode, root knot. *Meloidogyne* sp., AL, FL, MS.

Nonparasitic

Bronzing. Zinc deficiency, FL.

Chlorosis. Copper or potassium deficiency, FL.

Frenching. Manganese deficiency, FL.

Wetwood. Alcoholic slime flux. Perhaps bacterial in part.

White Seed. Genetic abnormality.

Rot, root, collar. **Clitocybe tabescens**, serious throughout tung belt; **Cephalosporium** sp., LA, ?secondary; **Phytophthora cinnamomi**, LA.

Rot, root; collar rot. **Cylindrocladium scoparium**, **C. crotalariae**, **C. floridanum**, MS.

Spraying is usually necessary for thread blight and nut rot.

TUPELO, SOUR GUM, BLACK GUM
(*Nyssa*)

Blight, thread, **Pellicularia koleroga**, LA.

Canker. **Nectria galligena**, CT; **Strumella coryneoidea**, northern Appalachians; **Botryosphaeria ribis**, IL; **Fusarium solani**, LA.

Canker, felt fungus. **Septobasidium** spp., NJ to Gulf states.

Leaf spot. **Actinopelta dryina**, AL, IL, OK; **Cercospora nyssae**, TX; **Mycosphaerella nyssaecola**, MA to GA, MI; **Phyllosticta nyssae**, southeastern states to TX.

Mistletoe. **Phoradendron serotinum (flavescens)**, FL, MD, IN, TX.

Rot, heart. **Ganoderma applanatum**; **Fomes connatus**, CT; **Hericeum erinaceus**, NC.

Rot, root. **Phymatotrichum omnivorum**, TX.

Rot, wood. **Daedalea confragosa**; **D. unicolor**, occasional; **Lentinus** spp., cosmopolitan; **Polyporus** spp.; **Stereum** spp.; **Trametes rigida**, Gulf states.

Rust. **Aplopsora nyssae** (II, III), MD to AL, TX.

Wilt, seedling. **Phytophthora cactorum**, MO.

TUPIDANTHUS

Leaf spot. **Alternaria panax**, CA.

TURNIP
(*Brassica rapa*)

Anthraxnose. **Colletotrichum higginsianum**, NY to FL and TX.

Bacterial black rot. **Xanthomonas campestris**, ME to FL, TX, and MN.

Bacterial crown gall. **Agrobacterium tumefaciens**, KS.

Bacterial soft rot. **Erwinia carotovora**, general in field, transit, storage.

- Bacterial spot. *Pseudomonas maculicola*, CT, GA, TX, MA; *Xanthomonas vesicatoria* pv. *raphani*, IN.
- Blackleg. *Phoma lingam*, CT, MA, WA.
- Blight, southern. *Sclerotium rolfsii*, FL, TX.
- Club root. *Plasmodiophora brassicae*, ME to NC, TX and MN, CA, CO, WA.
- Damping-off. *Pythium ultimum*, WI; *Rhizoctonia solani*, also root, stem and storage rot, general.
- Downy mildew. *Peronospora parasitica*, MA to FL, TX, and IL.
- Leaf spot. *Alternaria brassicae*, gray leaf spot, general; *A. oleracea*, black leaf spot, CT, FL, MD, MA, NJ, NC, TX; *Alternaria raphani*, AZ; *Cercospora brassicicola*, AL, FL, GA, MS; *Mycosphaerella brassicola*, ring spot, OR; *Phyllosticta* sp., TX, WV; *Ramularia* sp., AL, FL, WA; *Septomyxa affine*, AL.
- Leaf spot; white spot. *Cercospora brassicae*, MA to FL, TX and IN, OR; *Pseudocercospora capsellae*, CA.
- Mold, seed. *Alternaria tenuis*, cosmopolitan; *Stemphylium botryosum*, occasional; *Curvularia inaequalis*.
- Nematode, root. *Pratylenchus pratensis*, MD.
- Nematode, root knot. *Meloidogyne* spp., AL, AZ, FL, OR, TX.
- Nonparasitic. **Brown Heart**, boron deficiency, CA, MA, MN, VA, WI.
- Powdery mildew. *Erysiphe polygoni*, northeastern states to FL, TX, and CA, WA.
- Rot, root. *Phymatotrichum omnivorum*, TX; *Pythium* sp., NY.
- Rot, watery soft. *Sclerotinia sclerotiorum*, CT, MD, MS, TX, WA.
- Scab. *Streptomyces scabies*, CT, MI, NJ.
- Virus. **Turnip Mosaic**, AL; **Beet Curly Top**, CA; **Radish Mosaic**.
- White rust; white blister. *Albugo candida*, general.
- Wilt; yellows. *Fusarium oxysporum* f. sp. *conglutinans*, IN, MS, TX.

The control of turnip diseases is about the same as for cabbage and other crucifers.

TURPENTINE TREE

(*Syncarpia*)

- Nematode, root knot. *Meloidogyne* sp., FL.

TURTLE-HEAD

(*Chelone*)

- Leaf spot. *Septoria mariae-wilsonii*, ME to PA, OH, and WI.
- Powdery mildew. *Erysiphe cichoracearum*, and *E. polygoni*, widespread.
- Rust. *Puccinia andropogonis* var. *penstemonis* (0, I), CT, MA, NJ, NY, PA, TN; II, III, on *Andropogon*; *P. chelonis* (III), OR, WA.

UDO
(*Aralia cordata*)

Blight. *Alternaria* sp., DE, NJ.
Rot, stem. *Sclerotinia sclerotiorum*, MD.
Wilt. *Verticillium albo-atrum*, ME, PA.

UMBRELLA-PINE
(*Sciadopitys*)

Blight, twig. *Diplodia pinea*, NJ.
Leaf spot. *Phyllosticta* sp., RI; *Cytospora* sp., OR.
Rot, root; damping-off. *Rhizoctonia solani*, CT.
Rot, root; wilt. *Phytophthora cinnamomi*, VA.

UMBRELLAWORT
(*Oxybaphus*)

Downy mildew. *Peronospora oxybaphi*, KS, SD.
Leaf spot. *Ascochyta oxybaphi*, IA, WI; *Cercospora oxybaphi*, IL, NE, OH,
IA, KS, TX.
Rot, root. *Phymatotrichum omnivorum*, TX.
White rust. *Albugo platensis*, AL.

UNICORN-PLANT, PROBOSCIS-FLOWER
(*Proboscidea*)

Blight, southern. *Sclerotium rolfsii*, TX.
Leaf spot. *Cercospora beticola*, KS, IA, TX, WI, OK.
Rot, root. *Phymatotrichum omnivorum*, TX.
Rot, stem. *Sclerotinia sclerotiorum*, MA.
Virus. **Bean Yellow Mosaic Virus**, NY. Also susceptible to **Cucumber Mosaic**,
Tobacco Etch, **Tobacco Mosaic**, **Tobacco Necrosis**, **Tobacco Ring Spot**,
Tomato Ring Spot, **Alfalfa Mosaic**, **Broad Bean Wilt**, **Lettuce Mosaic**,
Pea Seedborne Mosaic, **Potato Virus Y**, **Turnip Mosaic**, **Watermelon Mosaic**.

UVULARIA
(Bellwort, Merry-Bells)

Leaf spot. *Sphaeropsis cruenta*, IL, IA, MO, VA, WI, IN, CT, NY.
Rust. *Puccinia sessilis* (0, I), DE, IA, MN, MO, NE, NY, WI; *Uromyces*
acuminatus var. *magnatus* (0, I), MS, WI.

VALERIAN, GARDEN HELIOTROPE

(*Valeriana*)

Leaf spot. *Ramularia centranthi*, CA; *Septoria valerianae*, WI.

Powdery mildew. *Erysiphe cichoracearum*, CO, UT.

Rot, root. *Rhizoctonia solani*, NY.

Rot, stem. *Sclerotinia rolfsii*, CT, NJ.

Rust. *Puccinia commutata* (0, I, III), NY, OR; *P. dioicae* (0, I), CO, NM, UT;
II, III, on *Carex*; *P. valerianae* (II, III), AK.

VALERIAN, RED, JUPITERS-BEARD

(*Centranthus*)

Leaf spot. *Ramularia centranthi*, CA.

VALERIANELLA

(Corn-Salad)

Gall, leaf. *Synchytrium aureum*, MS.

Leaf spot. *Septoria valerianellae*, MS, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

VANCOUVERIA

Leaf spot. *Phragmodothis berberidis*, CA; *Ramularia vancouveriae*, CA, OR.

VANILLA

Black mildew. *Lembosia rolfsii*, FL.

Leaf spot; pod spot. *Botryosphaeria vanillae*, FL; *Volutella vanillae*, FL.

VANILLA-LEAF

(*Achlys*)

Leaf spot. *Ascochyta achlyicola*, WA; *Stagonospora achlydis*, OR.

VELVET BEAN

(*Stizolobium*)

Bacterial spot. *Pseudomonas syringae*, IN; *P. stizolobii*, NC.

Blight, southern. *Sclerotium rolfsii*, AL, FL, GA.

Leaf spot. *Cercospora stizobii*, AL, FL, GA, NC, SC; *Mycosphaerella cruenta*, GA; *Phyllosticta macunae*, AL.

Nematode, root knot. *Meloidogyne* spp., CA, TX.

Rot, pod spot. *Fusarium* sp., TX.

Rot, root. *Phymatotrichum omnivorum*, AZ, TX; *Phytophthora parasitica*, FL.

VERATRUM

(False-Hellebore)

Leaf spot. *Ascochyta veratrina*, WA; *Cylindrosporium veratrinum*, CA, NY, UT, VA, WA; *Cercospora terminalis*, NY; *Phyllosticta melanoplaca*, CA, CT, ID, UT.

Leaf spot, tar. *Phyllachora melanoplaca*, NY.

Rust. *Puccinia atropuncta* (II, III), MO, NC, OK, TN, VA, WV; 0, I, on composites; *P. veratri*, widespread; 0, I, on *Epilobium*.

VERBENA, GARDEN

(*Verbena hortensis*)

Blight, flower. *Botrytis cinerea*, MA.

Nematode, root knot. *Meloidogyne* sp., MD.

Powdery mildew. *Erysiphe cichoracearum*, general.

Rot, charcoal. *Macrophomina phaseoli*, OK.

Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, NY; *Thielaviopsis basicola*, PA.

VERBENA

(Native Species)

Broomrape. *Orobanche ramosa*, TX.

Dodder. *Cuscuta arvensis*, OK.

Downy mildew. *Plasmopara halstedii*, NM.

Leaf spot. *Ascochna verbena*, WI; *Cercospora verbenicola*, AL, LA, TX; *Phyllosticta texensis*, TX; *Septoria verbena*, VT to MS, TX, and SD.

Powdery mildew. *Erysiphe cichoracearum*, general.

Rot, root. *Phymatotrichum omnivorum*, TX.

Rust. *Puccinia aristidae* (0, I), AZ; II, III, on grasses; *P. vilfae* (0, I), IN to OK, and SD; II, III, on *Sporobolus*.

Virus. Mosaic. Unidentified; **Biddens Mottle**, FL.

VERBESINA (Crownbeard)

- Downy mildew. *Plasmopara halstedii*, NM, TX.
 Leaf spot. *Cercospora fulvella*, TX; *Colletotrichum* sp., also stem spot;
Phyllosticta verbesinae, TX.
 Nematode, root knot. *Meloidogyne* sp., AL.
 Powdery mildew. *Erysiphe cichoracearum*, SC, TX, VA.
 Rot, root. *Helicobasidium purpureum*, TX; *Phymatotrichum omnivorum*,
 TX.
 Rust. *Coleosporium viguierae* (II, III), AZ, FL, NC, TX; 0, I, unknown;
Puccinia abrupta (II, III), CA, TX; *P. cognata* (0, I, II, III), AR, LA, TN,
 TX; *P. verbesinae* (0, I, II, III), MD to AL, LA.

VERONICA (Speedwell)

- Downy mildew. *Peronospora grisea*, CA, GA, KS, IL, IN, MO, NY, TX, WI.
 Gall, leaf. *Synchytrium globosum*, LA; *Sorosphaera veronicae*, CO, MS.
 Leaf spot. *Cercospora tortipes*, WI; *Gloeosporium veronicae*, NY; *Ramularia veronicae*, OK, TX, WI; *Septoria veronicae*, CA, FL, IA, MI, OH, WI.
 Nematode, root knot. *Meloidogyne* spp., FL.
 Powdery mildew. *Sphaerotheca macularis*, CT, IA, OR, WI.
 Rot, root and stem. *Fusarium* sp., NJ; *Rhizoctonia solani*, IL, MD; *Phymatotrichum omnivorum*, TX.
 Rot, stem. *Sclerotium rolfsii*, CT, NJ, OH.
 Rust. *Puccinia albulensis* (III), CO, MT, OR, UT, WA, WY; *P. probabilis* (II, III), NM; *P. rhaetica* (III), WA; *P. veronicarum* (III), IA, WI.
 Smut, leaf. *Entyloma veronicae*, CO, CT, KS, IL, IA, MS, MO, NY, TX, WI;
Urocystis kmetiana, GA.
 Virus. Cucumber Mosaic, AR.

VETCH (*Vicia*)

- Nematode, ring. *Criconemella*, SC.

VIBURNUM

- Bacterial crown gall. *Agrobacterium tumefaciens*, PA, WA.
 Bacterial leaf spot. *Pseudomonas viburni*, IL, IA, NJ.
 Blight, gray mold; shoot. *Botrytis cinerea*, MA, WA.

- Blight, thread. *Pellicularia koleroga*, FL, NC.
 Canker, stem girdle. *Hymenochaete agglutinans*, PA.
 Dodder. *Cuscuta compacta*, FL.
 Downy mildew. *Plasmopara viburni*, general.
 Gall, stem; dieback. *Phomopsis* sp., MD, NJ, NY.
 Leaf spot. *Cercospora opuli*, IA, MS; *C. tineae*, LA; *C. varia*, general; *Helminthosporium beaumontii*, AL, TX; *Hendersonia foliorum* var. *viburni*, FL, TX; *H. tini*, LA; *Leptosphaeria tini*, LA; *Monochaetia desmazieri*, WV; *Phyllosticta lantanoides*, NY; *P. punctata*, FL, IA, WI; *P. tineae*, MD; *Ramularia viburni*, TN, WI.
 Leaf spot. *Cristulariella pyramidalis*, MD.
 Leaf spot, algal. *Cephaleuros virescens*, FL, LA.
 Mold, leaf. *Cladosporium herbarum*, OH, PA.
 Nematode, root knot. *Meloidogyne* spp., CA, MD, MS.
 Powdery mildew. *Microsphaeri alni*, general.
 Rot, root. *Clitocybe tabescens*, FL; *Corticium falactinum*, MD; *Phymatotrichum omnivorum*, TX; *Rosellinia necatrix*, CA.
 Rust. *Aecidium rubromaculans* (0, I), FL; *Coleosporium viburni* (II, III), IL, IA, MD, MI, VA, WI; 0, I unknown; *Puccinia linkii* (III), ID, MI, MT, NH, WA, AK.
 Spot anthracnose. *Sphaceloma viburni*, CA, WA.
 Wilt. *Verticillium albo-atrum*, IL, IN, OR, WA.

Viburnum carlesii is extremely sensitive to sulfur and may be injured even by spray drift from other plants.

VINCA

(Periwinkle, Ground-Myrtle)

- Bacterial, MLO. *Aster Yellows*, KS, TX.
 Bacterial stunt. MLO, AR, OK.
 Blight, gray mold. *Botrytis cinerea*, CT, WA.
 Canker; dieback. *Phomopsis lirella*, CT, MD, NJ, OH, PA, VA; *Phoma* sp., OR.
 Dodder. *Cuscuta indecora*, TX.
 Leaf spot. *Alternaria* sp., PA, TX; *Colletotrichum* sp., FL; *Macrophoma vincae*, also dieback, IL, NY; *Phyllosticta* sp., GA, NJ, CT; *P. minor*, MD, NJ, NY, VA; *P. vincae-majoris*, CA; *Septoria vincae*, NJ, NY; *Volutella vincae*, NY, PA.
 Mold, leaf. *Cladosporium herbarum*, ME, NY, PA.
 Nematode, dagger. *Xiphinema americanum*, WI.
 Nematode, root knot. *Meloidogyne* sp., KS, OH, CA.
 Rot, root and stem. *Rhizoctonia solani*, IL, MD, NJ, PA. *Phytophthora parasitica*, MD.
 Rust. *Puccinia vincae* (0, I, II, III), MA, MI, NY, WA.

Virus. **Cucumber Mosaic**, NJ; **Potato Yellow Dwarf**, CA.

Wilt. **Verticillium albo-atrum**, CA, OR.

VINCETOXICUM

(Milkvine)

Downy mildew. **Plasmopara gonolobii**, MD to FL and TX.

Leaf spot. **Cercospora bellynckii**, TX.

Rot, root. **Phymatotrichum omnivorum**, TX.

Rust. **Puccinia obliqua** (III), FL to KY, OK and AZ; **Uromyces asclepiadis** (II, III), IN, WV.

VIOLET

(*Viola odorata* and Native Species)

Anthraxnose. **Colletotrichum violae-tricoloris**, CT, MA, MS, NJ, NY, OH, PA.

Blight, southern. **Sclerotium rolfsii**, VA to FL and TX, also CA, CT, NY, VT.

Downy mildew. **Bremiella megasperma**, FL, NJ, IL, IA, MN.

Gall, leaf. **Synchytrium aureum**, NY, WI.

Leaf spot. **Alternaria violae**, CT to GA, TX, and WI; **Ascochyta violicola**, AK; **A. violae**, IN, IA, PA, WI; **Centrospora acerina**, CA, AK; **Cercospora granuliformis**, ME to AL, OK, and SD; **C. violae**, MA to FL, TX and ND; **Cryptostictis violae**, IL; **Cylindrosporium violae**, MT; **Heterosporium** sp., AK; **Marssonina violae**, MA to SC, IA, and MN; **Phyllosticta violae**, MA to FL, KS, and MN, CA; **P. nigrescens**, CA; **Ramularia lactea**, CO, MS, MT, AK; **R. agrestis**, NE, OR; **Septoria violae**, northeastern and north central states to FL, LA, and KS, AK; **Ciborinia violae**.

Nematode, lesion. **Pratylenchus pratensis**.

Nematode, root knot. **Meloidogyne** spp., FL to CA, occasional in North.

Powdery mildew. **Sphaerotheca macularis**, CA, CO, ND, OR, WI, WY.

Rot, root. **Fusarium oxysporum** f. sp. **aurantiacum**, FL, MS, OH; **Helicobasidium purpureum**, TX; **Phymatotrichum omnivorum**, TX; **Rhizoctonia solani**, IL, NY, FL, MN, MS; **Thielaviopsis basicola**, CT to MS and OH, also KS, MA.

Rot, wet; gray mold. **Botrytis cinerea**, MD, OH, AK.

Rust. **Puccinia violae** (0, I, II, III), general; **P. effusa** (III), CA; **P. ellisiana** (0, I), northeastern and north central states to AL, NM, and WY; II, III, on *Andropogon*; **P. fergussoni** (III), CO, MT, UT, AK; **Uromyces andropogonis**, (0, I), MS, NC, NJ, PA, TN, WV; II, III, on *Andropogon*.

Sooty mold. **Scorias spongiosa**, ME.

Spot anthracnose; scab. **Sphaceloma violae**, ME to FL and LA, OH, KS, WA.

Smut, leaf and stem. **Urocystis violae**, CA, MN, TX, UT, AK.

Virus. **Beet Curly Top**, TX.

Spot anthracnose is an important violet disease in many gardens with disfiguring scabby lesions on stems and leaves.

VIPERS-BUGLOSS

(*Echium*)

Leaf spot. **Cercospora echii**; **Stemphylium** sp., NY.

Rot, root. **Rosellinia** sp., CA.

VIRGINIA CREEPER

(*Parthenocissus quinquefolia*)

Blight, thread. **Pellicularia koleroga**, FL.

Canker; dieback. **Coniothryium fuckelii**, WV; **Cladosporium** sp., NJ.

Downy mildew. **Plasmopara viticola**, AL, IA, ME, MN, NJ, NY, TX, WI.

Leaf spot. **Cercospora ampelopsidis**, widespread; **C. psedericola**, IL, VA;

Guignardia bidwellii f. **parthenocissi**, general; **Phleospora ampelopsidis**, IL, IA, NE, WI.

Parasitic lichen. **Strigula elegans** and **S. camplanata**, LA, Southern U.S.

Powdery mildew. **Uncinula necator**, general.

Rot, root. **Helicobasidium purpureum**, TX; **Phymatotrichum omnivorum**, TX.

Spot anthracnose. **Elsinoë parthenocissi**, FL, MO, NH, PA.

The *Guignardia* leaf spot is commonly disfiguring in a wet season.

VITEX

(*Chaste-Tree*)

Leaf spot. **Cercospora viticis**, LA, TX.

Rot, root. **Phymatotrichum omnivorum**, TX.

WALLFLOWER

(*Cheiranthus*)

Bacterial, MLO. **California Aster Yellows**, CA.

Blight, gray mold. **Botrytis cinerea**, WA, AK.

Leaf spot. **Heterosporium** sp., OK.

Rot, crown. **Rhizoctonia solani**, NJ.

White blister. **Albugo candida**, MN.

WALLFLOWER, WESTERN

*(Erysimum)*Club root. *Plasmodiophora brassicae*, NJ.Downy mildew. *Peronospora parasitica*, CO, ID, IA.Leaf spot. *Cercospora erysimi*, WI.Powdery mildew. *Erysiphe polygona*, CA.Rot, root. *Rhizoctonia solani*, TX.Rust. *Puccinia aristidae* (0, I), AZ, CO, ND, NE, UT; *P. consimilis* (I, III), MT; *P. holboellii* (0, III), CO.Virus. **Tomato Spotted Wilt**, CA.White rust; white blister. *Albugo candida*, ID, OR, TX.

WALNUT

*(Juglans; includes Butternut, Black, English, and Japanese Walnuts)*Anthracnose; leaf spot. *Gnomonia leptostyla* (*Marssonina juglandis*), general.Bacterial blight. *Xanthomonas juglandis*, NY to GA, TX, and Pacific Coast, especially on English (Persian) walnut.Bacterial canker. *Erwinia nigrifluens*, CA; *E. rubrifaciens*, phloem canker, CA.Bacterial crown gall. *Agrobacterium tumefaciens*, occasional.Blight, leaf. *Cylindrosporium juglandis*, AL and TN to TX, CA.Blight, seedling. *Sclerotium rolfsii*, TX.Canker; branch wilt. *Hendersonula toruloidea*, connected with sunburn.Canker; dieback. *Diplodia juglandis*, widespread; *Dothiorella gregaria*, CA; *Exosporina fawcetti*, wilt, CA; *Melanconis juglandis*, widespread, especially in East; *Nectria* spp., widespread; *N. galligena*; *Cytospora* sp., AZ.Canker; felt fungus. *Septobasidium curtisii*, NC.Canker, stem. *Fusarium solani*, KS.Leaf spot. *Cercospora juglandis*, KS, MA; *Phelospora multimaculans*, TX; *Marssonina californica*, CA; *Ascochyta juglandis*, ring spot; *Grovesinia pyramidalis*, IA, IL, MN, OH, WV; *Mycosphaerella juglandis*, IA, IL, IN, NC.Leaf spot. *Cristulariella pyramidalis*, IL. Also on *Bidens frondosa* (beggarticks), *Campsis radicans* (trumpet vine), *Chenopodium ambrosioides* (Mexican tea), *Commelina diffusa* (dayflower), *Cuphea petiolota* (blue waxweed), *Desmodium canescens* (tick clover), *Eupatorium coelestinum* (mist-flower), *E. rugosum* (white snakeroot), *Ipomoea hederseca* (morning-glory), *I. lacunosa* (morning-glory), *Lobelia inflata* (Indian tobacco), *L. siphilitica* (blue cardinal-flower), *Perilla frutescens* (beefsteak plant), *Phytolacca arnericana* (poke), *Platanus occidentalis* (sycamore), *Poly-*

gonum pennsylvanicum (smart weed), *P. scandens* (false buckwheat), *Rumex crispus* (yellow dock), *Sida spinosa* (prickly mallow), *Solidago canadensis* (goldenrod), *Vitis palmata* (Catbird grape).

Leaf spot; downy spot; white mold. **Microstroma juglandis**, widespread; **M. brachysporum**, general.

Mistletoe. **Phoradendron serotinum (flavescens)**, IN southward, AZ, CA, NM.

Mold, nut. **Alternaria** sp., CA.

Nematode, lesion. **Pratylenchus musicola**, CA; **P. vulnus**.

Nematode, root knot. **Meloidogyne** spp., TX.

Nonparasitic

Black End, of nuts. Probably drought injury, CA, OR.

Black Line, girdle. May be caused by graft incompatibility.

Dieback. Boron deficiency, OR.

Erinose. Leaf galls from blister mites.

Leaf Scorch, Sunscald. NJ, OR, WA.

Little Leaf. Zinc deficiency, CA. Probably also causes Rosette.

Shrivel, Witches' Broom, Yellows. Cause unknown.

Powdery mildew. **Phyllactinia corylea**, IN, OH, OR; **Microsphaera alni**, widespread; **Erysiphe ?polygona**, CA.

Rot, collar. **Phytophthora cactorum**, CA; **P. cinnamomi**, MD to AL, LA.

Rot, heart. **Fomes igniarius** and **F. everhartii**, widespread; **Polyporus sulphureus**, widespread.

Rot, root. **Armularia mellea**, cosmopolitan; **Phymatotrichum omnivorum**, TX; **Cylindrocladium** sp., TN.

Rot, wood. **Fomes conchatus**; **Polyporus** spp.; **Poria** spp.; **Schizophyllum commune**, cosmopolitan; **Daedalea confragosa**; **D. quercina**, widespread.

Scab. **Cladosporium** sp., MD, MN.

Virus. **Brooming Disease**, MD, NY, GA, DC.

Bacterial blight is the most serious disease of walnuts on the Pacific Coast, requiring several sprays. A toxin, juglone, has been considered injurious to many shrubs growing in the vicinity of black walnut roots; the toxin also causes vascular wilt-like symptoms in eggplant and tomato in home gardens.

WATER-CRESS (*Nasturtium officinale*)

Damping-off. **Rhizoctonia solani**, TX.

Leaf spot. **Cercospora nasturtii**, CA, CT, FL, IN, NH, TX, WI.

Rot, root. **Pythium debaryanum**, TX; **Sporgospora subterranea** f. sp. **nasturtii**, FL, PA; **Phytophthora cryptogea**, and stem, FL.

Rust. **Puccinia aristidae**, AZ, CO, TX.

White rust; white blister. **Albugo candida**, MN.

WATER-ELM*(Planera)*

Rot, wood. *Daedalea ambigua*, SC; *Ganoderma lucidum*.

WATER-HOREHOUND*(Lycopus)*

Gall, leaf. *Synchytrium cellulare*, WI.

Leaf spot. *Ascochyta lophanthi*, MA, WI; *Cercospora lycopi*, LA; *Phyllosticta decidua*, IA, OK, WI; *Septoria lycopi*, WI.

Rust. *Puccinia angustata* (0, I), ME to MD, KS, ND; II, III, on grasses.

WATER-HYACINTHS*(Eichhornia)*

Blight. *Aquathanatephorus pendulus* (*Rhizoctonia* stage), LA.

Leaf spot. *Cercospora piaropi*, FL.

Rot, root and crown. *Mycoleptodiscus terrestris*, FL.

WATER-LILY*(Nymphaea)*

Leaf spot. *Alternaria* sp., TX; *Cercospora exotica*, IL; *C. nymphaeacea*, scattered ME to TX, CA; *Helicoceras nymphaerum*, MD, NJ, NY; *Mycosphaerella pontederiae*, VA, MI; *Ovularia nymphaearum*, MD, NY, WA; *Phyllosticta fatiscens*, VT.

Leaf spot. *Dichotomophthoropsis nymphaerum*, MN; *Sclerotium* sp., MN.

Rot, leaf and stem. *Pythium* spp., MA, NY, WI.

Smut, white. *Entyloma nymphaeae*, MA to VA, OK, and WI.

WATER-LILY, YELLOW POND LILY*(Nuphar)*

Leaf spot. *Dichotomophthoropsis nymphaerum*, MN.

Leaf spot. *Mycosphaerella pontederiae*, ME, MI, NY, VA, WI; *Phyllosticta fatiscens*, IA, NJ, NY, WI.

Smut, white. *Entyloma nymphaeae*, CT, IL, MA, WI.

WATERMELON*(Citrullus)*

Anthracoze. *Colletotrichum lagenarium*, general, Pacific Coast; *Marssonina melonis*, NY.

- Bacterial, angular leaf spot. *Pseudomonas pseudoalcaligenes* subsp. *citrulli*, GA.
- Bacterial rind necrosis. *Erwinia* sp., TX.
- Bacterial soft rot. *Erwinia aroideae*, WV; Wilt, *E. tracheiphila*, rare.
- Bacterial spot. *Pseudomonas lachrymans*, MI.
- Blight, gummy stem; fruit spot. *Mycosphaerella citrullina*, also stem-end rot, leaf spot, MA to FL, AZ, and MO.
- Blight, southern. *Sclerotium rolfsii*, also fruit rot, NC to FL, TX.
- Damping-off. *Rhizoctonia solani*, Soil rot, leaf blight; *Pythium* spp., also blossom-end rot, foot rot.
- Downy mildew. *Pseudoperonospora cubensis*, occasional from MA to FL, TX, and WI; also CA.
- Fruit spot; speck. *Cribropeltis citrullina*, IL.
- Leaf spot. *Alternaria cucumerina*, general except Pacific Coast; *Cercospora citrullina*, NJ to FL, TX, and OH; *Corynespora cassicola*.
- Nematode, root knot. *Meloidogyne arenaria*; *M. incognita*; *M. incognita-acrita*; *M. javanica*.
- Nonparasitic. **Blossom-end Rot**, hot dry weather after cool, moist days. **Internal Browning**, drought and nutritional deficiencies.
- Powdery mildew. *Erysiphe cichoracearum*, AZ, CA, FL, GA, NY, NC, TX, VA. May make pimples in young fruit.
- Rot. *Diplodia* spp., stem-end, gray; MD to FL, AZ and KS; *Fusarium scirpi*, occasional in market; *Helminthosporium* sp., TX; *Rhizopus* spp., mushy soft rot.
- Rot, charcoal. *Macrophomina phaseoli*, TX.
- Rot, root. *Phymatotrichum omnivorum*, AZ, TX; *Thielaviopsis basicola*, OR, UT.
- Rot, stem and fruit. *Phytophthora cactorum*, AZ; *P. capsici*, CO; *P. citrophthora*, CA; *Sclerotinia sclerotiorum*, NJ, TX.
- Scab; leaf mold. *Cladosporium cucumerinum*, MD, NE.
- Virus. **Watermelon Mosaic**, NY to FL, TX, and IA, also AZ, CA, MI, WA; **Beet Curly Top**; **Tobacco Ring Spot**; **Watermelon Stunt** (?strain of squash mosaic); **Zucchini Yellow Mosaic**, CA.
- Wilt. *Fusarium oxysporum* f. sp. *niveum*, general; *Verticillium albo-atrum*, CA, NH, OR.

Fusarium wilt is probably the major disease and resistant varieties are available. For anthracnose and leaf spots treat seed before planting, and start spraying or dusting when vines start to run.

WATER-PRIMROSE (*Jussiaea*)

- Leaf spot. *Alternaria* sp. OK; *Cercospora jussiaeae*, AL, OK, TX; *Colletotrichum jussiaeae*, AL, TX; *Septoria jussiaeae*, AL, FL, LA, TX.

Rust. *Aecidium betheli*, CA; *Puccinia jussiaeae* (0, I, III), MS; *Uredo guaunabensis* (II), FL.

WATER SHIELD
(*Brasenia*)

Leaf spot. *Dichotomophthoropsis nymphaerum*, MN.

WATSONIA

Rot, root. *Armillaria mellea*, CA.

Virus. ?*Iris mosaic*, CA.

WAX-MYRTLE, CANDLEBERRY
(*Myrica cerifera*)

Black mildew. *Irene calostroma*, Gulf states; *Irenina manca*, MS; *Meliola manca*, FL.

Blight, seedling. *Rhizoctonia solani*, NJ.

Dodder. *Cuscuta compacta*, FL.

Leaf spot. *Cercospora dispersa*, NJ; *Phyllosticta myricae*, NJ to FL, TX; *Septoria myricae*, NJ.

Nematode, ring. *Hemicriconemoides wessoni*, FL.

Parasitic lichen. *Strigula elegans* and *S. camplanata*, LA, southern US.

Rot, root. *Clitocybe tabescens*, FL; *Phymatotrichum omnivorum*, TX.

Rust. *Gymnosporangium ellisii* (0, I), MA to MD; III, on *Chamaecyparis*.

Sooty mold. *Capnodium grandisporum*, FL.

WEIGELA

Bacterial crown gall. *Agrobacterium tumefaciens*, MD, MS.

Blight, twig. *Phoma weigela*, WA.

Leaf spot. *Cercospora weigela*, MD, MS, NJ; *Ramularia diervillae*, TN.

Nematode, lesion. *Pratylenchus pratensis*.

Nematode, root knot. *Meloidogyne* sp., CA, MD, MS, TX.

Rot, root. *Phymatotrichum omnivorum*, TX.

WHIPPLEA

Downy mildew. *Peronospora whippleae*, CA.

WHORTLEBERRY, BILBERRY

(*Vaccinium* spp.)

Blight, twig; berry rot. *Monilinia ledi*, NY.

Gall, leaf. *Exobasidium vaccinii*, occasional; *E. parvifolii*, stem gall, OR, WA; *E. vaccinii-uliginosi*, shoot gall, rose-bloom, OR.

Leaf spot, tar. *Rhytisma vaccinii*, AK.

Powdery mildew. *Microsphaeraalni* var. *vaccinii*, AK, OR, WA, WY; *Podosphaera oxyacanthae*, AK.

Rust. *Pucciniastrum* sp. (II), OR, WA; *P. goeppertianum* (III), witches' broom, general; 0, I, on fir; *P. vaccinii* (II, III), general; 0, I, on hemlock.

WILD RICE

(*Zizania*)

Anthracnose. *Colletotrichum sublineolum*, MN.

Bacterial leaf spot. *Pseudomonas syringae* pv. *syringae*, MN, Pacific Northwest; *P. syringae* pv. *zizaniae*, Pacific Northwest.

Leaf spot, stem lesion. *Bipolaris sorokiniana*, Pacific Northwest; *Sclerotium oryzae*, Pacific Northwest; *S. hydrophilum*, Pacific Northwest.

Leaf spot, zonate. *Drechslera gigantea*, MN.

Rot, crown, root. *Phytophthora erythroseptica*, CA.

Smut. *Entyloma lineatum*, Pacific Northwest.

Virus. Wheat Streak Mosaic, MN.

WILDRYE

(*Elymus*)

Leaf spot. *Pyrenophora trichostoma*, ND; *Septorium spraguei*, ND.

WILLOW

(*Salix*; includes Weeping Willow, Pussy Willow)

Bacterial crown gall. *Agrobacterium tumefaciens*, CT, NJ, TX, VA.

Bacterial wetwood. *Erwinia nimipressuralis*.

Blight, twig. *Diplodia salicina*.

Blight, willow. Complex of scab and black canker.

Canker, black. *Physalospora miyabeana*, New England, NY, WV.

Canker, twig and branch. *Botryosphaeria ribis*, VA to GA and AR, CA;

Cryptodiaporthe salicina, ME to VA, OK, KS, and SD, CA, WA, AK;

Cryptomyces maximus, bark blister; NM, UT; *Discella carbonacea*, twig

blight, New England; *Dothiora polyspora*, CO; *Dothiorella* sp., AR, ND;

Macrophoma spp., AR, KY, MS, NC, SC, TX; **Phomopsis salicina**, IA, MA, VA; **Physalospora gregaria**, WV; **Valsa** spp., twig canker; **V. sordida** (*Cytospora chrysosperma*), widespread; **V. salicina**, widespread; **V. nivea**, western states.

Dodder. **Cuscuta** spp., IA, NY, WA.

Leaf blister. **Taphrina populi-salicis**, CA.

Leaf spot. **Ascochyta salicis**, CA; **Cercospora salicina**, IL, LA, MD, TX; **Cibornia foliicola**; **C. wisconsinensis**; **Cylindrosporium salicinum**, MA to CO, and WI, MS; **Gloeosporium** spp., also twig blight, CT, DE, MA; **G. salicis**, VT to NJ, MS, and WI, OR; **Marssonina** spp., widespread; **M. kriegeriana**, WI; **M. apicalis**, CA; **Myrioconium comitatum**, WI; **Phyllosticta apicalis**, KS, WI; **Ramularia rosea**, CO, MT, WI; **Septogloeum salicinum**, NY, WI, AK; **S. maculans**, CA, MT; **S. salicis-fendlerianae**, ID; **Septoria** spp.; **S. salicicola**, AK, OR; **S. didyma**, WI.

Leaf spot, tar. **Rhytisma salicinum**, MI.

Mistletoe. **Phoradendron serotinum (flavescens)**, CA, IN, TX, AZ, NM.

Mistletoe, European. **Viscum album**, CA.

Nematode, lesion. **Pratylenchus vulnus**, CA.

Nematode, root knot. **Meloidogyne** sp.

Powdery mildew. **Uncinula salicis**, general; **Phyllactinia corylea**, WA.

Rot, heart. **Daedalea confragosa**, widespread; **Fomes** spp.; **Polyporus farlowii**, TX to CA; **Trametes suaveolens**, New England to MT and AK.

Rot, root. **Armillaria mellea**, CA, WA; **Helicobasidium purpureum**, TX; **Phymatotrichum omnivorum**, TX.

Rot, sapwood; wood. **Daedalea ambigua**; **Ganoderma lucidum**; **Pholiota** spp.; **Pleurotus** spp.; **Polyporus** spp.; **Schizophyllum commune**, cosmopolitan.

Rust. **Melampsora abieri-capraearum** (*M. epitea*) (II, III), general except far North; 0, I, on fir; **M. artica** (II, III), AK, CO, NH; **M. paradoxa** (*M. bigelowii*) (II, III), ME to NC, IA, NM, and AK; 0, I, on larch; **M. ribesii-purpurea** (II, III), MT to CO, CA, and AK; 0, I, on *Ribes*.

Scab, gray; blight. **Fusicladium saliciperdatum** (*Venturia chlorospora*), New England to NJ, PA, NC.

Sooty mold. **Capnodium** sp.

Spot anthracnose; scab. **Sphaceloma murrayae**, CA, OR, WA, WI.

Willow scab, followed by black canker, forms a very destructive blight, killing many trees in New England.

WINGED BEAN (*Psophocarpus*)

Virus. **Cucumber Mosaic**, FL; **Clover Yellow Vein**, MD.

WINTERBERRY

(*Ilex verticillata*)

Leaf spot. *Phyalospora ilicis*, NY.

Leaf spot, tar. *Rhytisma concavum*, WI; *R. prini*, ME to MS, IL, and WI.

Powdery mildew. *Microsphaera alni*, WI.

WINTER CRESS

(*Barbarea*)

Bacterial black rot. *Xanthomonas barbareae*, NY.

Bacterial, yellows. *Spiroplasma citri*, IL.

Dodder. *Cuscuta gronovii*, NY.

Downy mildew. *Peronospora parasitica*, TX.

Leaf spot. *Cercospora barbarea*, WI; *Ramularia barbareae*, MA to NJ, OH, and WI, TX; *Alternaria* sp., PA.

Rot, stem. *Sclerotium rolfsii*, TX.

Virus. Beet Curly Top; Potato Yellow Dwarf.

White rust. *Albugo candida*, CA, TX.

WINTERGREEN, CHECKERBERRY

(*Gaultheria procumbens*)

Blotch, sooty. ?*Gloeodes pomigena*, WI.

Fruit spot, black speck. ?*Leptothyrium pomi*, WI.

Leaf spot. *Cercospora gaultheriae*, NY, WI; *Pezizella oenotherae*, VA; *Discosia maculicola*, secondary; *Mycosphaerella gaultheriae*, ME to MD and WV; *Phyllosticta gaultheriae*, general; *Schizothyrium gaultheriae*, ME to VA and WI; *Venturia arctostaphyli*, MD, MA, NJ, NY, VA.

Powdery mildew. *Microsphaera alni*, WI.

WINTERGREEN, WAXFLOWER

See Pipsissewa.

WISTERIA

(*Wistaria*)

Bacterial crown gall. *Agrobacterium tumefaciens*, CT, MD, TX.

Canker, stem. *Nectria cinnabarina*, CT.

Leaf spot. *Phyllosticta wistariae*, MA, MO, NJ, TX; *Septoria wisteriae*, TX.

Nematode, root knot. *Meloidogyne* spp.

Powdery mildew. *Erysiphe* ?*cichoracearum*, TX.

Rot, heart. *Pleurotus* sp., WV.

Rot, root. *Phymatotrichum omnivorum*, TX.

?Virus. *Wisteria Vein Mosaic*, MS, NY, TX. *Tobacco Mosaic*, RI.

WITCH-HAZEL

(*Hamamelis*)

Bacterial crown gall. *Agrobacterium tumefaciens*, MD.

Leaf spot. *Discosia artocreas*, OK; *Gonatobotryum maculicola*, NH to WV, FL and WI; *Graphium hamamelidis*, NY to IN and TN; *Monochaetia desmazierii*, VA to GA and TN; *Mycosphaerella* sp., WV; *Phyllosticta hamamelidis*, CT to MS, TN, and WI; *Ramularia hamamelidis*, NY to WV, OK, and WI.

Powdery mildew. *Phyllactinia corylea*, MI, WI; *Podosphaera biuncinata*, New England to IL and southward.

Rot, wood. *Fomes scutellatus*, widespread; *Polyporus* spp.

WOLFBERRY

(*Symphoricarpos occidentalis*)

Black knot. *Dibotryon symphoricarpi*, twig canker, ND.

Leaf spot. *Cercospora symphoricarpi*, MT, ND, WA; *Septoria symphoricarpi*, IA, MT, ND, WA.

Powdery mildew. *Microsphaera diffusa*, general.

Rot, collar. *Fomes ribis*, KS, ND.

Rust. *Puccinia crandallii* (0, I), CO, MT, ND, WY; II, III on grasses; *P. symphoricarpi*, MT.

WOOD-BETONY, LOUSEWORT

(*Pedicularis*)

Gall, leaf. *Synchytrium aureum*, WI.

Leaf spot. *Ramularia obducens*, CA; *Septoria cylindrospora*, WI.

Powdery mildew. *Sphaerotheca macularis*, CA, CO, MD, MI, MN, WY, WI.

Rust. *Cronartium coleosporioides* (II, III), CA, ID, MT, NM, WA; *Puccinia clintonii* (III), CO, ID, ME, MI, NM, NY, OR, WA, WI, WY; *P. rufescens* (I, III), CO, CA, NV.

WOODRUSH

(*Luzula*)

Rust. *Puccinia obscura* (II, III), ME to KS, WI, ID, OR, WA.

Smut, inflorescence. *Cintractia luzulae*, IN.

WYETHIA

Leaf spot. *Didymaria conferta*, OR, UT; *Marssonina wyethiae*, CA, WA;
Septoria wyethiae, CA, UT.
Nematode, leaf gall. *Tylenchus balsamophilus*, UT.
Rust. *Puccinia balsamorrhizae* (0, I, II, III), AZ, CA, CO, UT.

XANTHOSMA

Rot, root. *Armillaria mellea*, CA; *Fusarium solani*, powdery gray rot, FL.

XEROPHYLLUM

(Turkeybeard)

Rust. *Puccinia atropuncta* (II, III), MS.

YAM, CINNAMON-VINE

(*Dioscorea*)

Leaf spot. *Cercospora dioscoreae*, MD, IL, IA, MI, PA, WI; *Colletotrichum dioscoreae*, IL; *Phyllosticta dioscoreae*, SC, VA, WV; *Ramularia dioscoreae*, WI.
Nematode, root knot. *Meloidogyne* sp., NC.
Rot, root. *Phymatotrichum omnivorum*, TX.

YARROW

(*Achillea*)

Bacterial crown gall. *Agrobacterium tumefaciens*, IN.
Dodder. *Cuscuta* sp., NH.
Powdery mildew. *Erysiphe cichoracearum*, MO, MT, PA, SD, VT, WI, AK.
Nematode, root knot. *Meloidogyne* sp., OR.
Rot, root. *Phymatotrichum omnivorum*, TX; *Rhizoctonia solani*, general.
Rust. *Puccinia millefolii* (III), CA, CO, ID, MT, NM, OR, UT, WA, WY.

YAUPON

(*Ilex vomitoria*)

Leaf spot; tar spot. *Rhytisma ilicincola*, VA.
Rot, root. *Phymatotrichum omnivorum*, TX.
Sooty mold. *Capnodium* spp., Gulf states.

YELLOW-ROOT

(*Xanthorhiza*)

Leaf spot. *Phyllosticta xanthorhizae*, WV, NC.

YELLOWWOOD

(*Cladastris*)

Powdery mildew. *Phyllactinia corylea*, OK.

Rot, wood. *Polyporus spraguei*, MD.

Virus. **Bean Yellow Mosaic**, NY.

Wilt. *Verticillium albo-atrum*, IL.

YERBA BUENA

(*Micromeria*)

Rust. *Puccinia menthae* (0, I, II, III), CA, ID, OR, WA.

YERBA SANTA

(*Eriodictyon*)

Blotch, sooty. *Coniothecium eriodictyonis*, CA.

YEW

(*Taxus*)

Blight, needle. *Herpotrichia nigra*, ID; *Sphaerulina taxi*, CA, ID, OR, WA; *S. taxicola*, also twig blight, NY, PA; *Alternaria* sp., CT, NY, RI; *Phyllosticta taxi*, VA; *Macrophoma taxi*; *Mycosphaerella taxi*; *Neopeckia coulteri*.

Blight, seedling. *Phytophthora cinnamomi*, IN, MD, VA, Pacific Northwest.

Blight twig. *Phyllostictina hysterella* (*Physalospora gregaria*); *Pestuloria* sp., PA; *P. funerea*, MA; *Sphaeropsis* sp., NJ; *Botryosphaeria ribes*.

Damping-off. *Rhizoctonia solani*, CT.

Rot heart. *Fomes hartigii* OR; *F. roseus*, ID.

Rot, root. *Armillaria mellea*, ID.

Rot, wood. *Polyporus schweinitzii*, ID.

YUCCA

(Adams-Needle, Joshua-Tree, Spanish Bayonet)

Blight, flower. *Cercospora floricola* (?*C. concentrica*), TX.

Blight, leaf. *Kellermannia anomala*, ?secondary, general.

Leaf spot, *Cercospora concentrica*, CT, GA, IA, NJ, OK, TX; *Coniothyrium concentricum*, general; *Cylindrosporium angustifolium*, KS, MS, OK, TX;

Diplodia circinans, TX; **Epicoccum asternium**, TX; **Gloeosporium yuccogenum**, MO, TX; **Neottiospora yuccifolia**, GA, WA; **Pestalozziella yuccae**, secondary, TX; **Phyllosticta** sp., TX; **Stagonospora gigantea**, CA; **Leptosphaeria obtusipora**.

Mold, leaf. **Torula maculans**, AZ, CA, SC, TX; **Alternaria tenuis**, leaf rot.

Nematode. **Meloidogyne** sp., OR.

Rot, stem. **Sclerotium rolfsii**, MD.

Rust. **Puccinia amphigena** (0, I), NE.

Many other fungi are found on dead leaves and stems.

ZAMIA (Coontie)

Algae. **Anabaena cycadeae**, in coralloid roots, FL.

Nematode. **Meloidogyne** sp., FL.

ZAUSCHNERIA (Fire-Chalice, California Fuchsia)

Rust. **Puccinia oenotherae** (0, I, II, III), CA, UT.

ZEBRA PLANT (*Aphelandra*)

Nonparasitic. Leaf crinkle; shortened internodes; axillary bud proliferation, TX.

Rot, stems. **Phytophthora parasitica**, FL.

ZEPHYRANTHES (Atamasco-Lily; Zephyr-Lily)

Leaf scorch; red spot. **Stagonospora curtisii**, CA.

Leaf spot. **Colletotrichum lilieacearum**, NC.

Rot, dry; scale speck. **Sclerotium** sp., OR.

Rust. **Puccinia cooperiae** (0, I, II, III), FL, AL, NC, TX.

ZIGADENUS

Rust. **Puccinia atropuncta** (II, III), IA, MO, ND, TX, WI; 0, I, on composites;

P. grumosa (0, I, II, III), CO, MT, WY; **Uromyces zygadeni** (0, I, II, III), CA, CO, IA, KS, MT, NV, TX, UT, WA, WY.

Smut, leaf. **Urocystis flowersii**, UT.

ZINNIA

Bacterial; leaf spot, flower spot. *Xanthomonas campestris* pv. *zinniae*, LA.
 Bacterial, MLO. **Aster Yellows**, MI, PA, and **California Aster Yellows**, CA.
 Bacterial wilt. *Pseudomonas solanacearum*, FL.
 Blight. *Alternaria zinniae*, CO, CT, NJ, NY, PA, SC.
 Blight, head; stem canker. *Botrytis cinerea*, CA, CT, NJ, OR, PA.
 Blight, southern. *Sclerotium rolfsii*, FL, NJ.
 Damping-off; root rot. *Rhizoctonia solani*, CA, NJ, TX.
 Leaf spot. *Cercospora zinniae*, SC to FL and TX, CO, IN, PA.
 Leaf spot, bacterial. *Xanthomonas nigromaculans* f. sp. *zinniae*, OH, NC.
 Nematode, leaf. *Aphelenchoides ritzema-bosi*, DE, MA, NJ.
 Nematode, lesion. *Pratylenchus nannus*, MD; *P. penetrans*, NJ.
 Nematode, root knot. *Meloidogyne* sp., NJ, PA, TX.
 Powdery mildew. *Erysiphe cichoracearum*, general.
 Rot, blossom. *Choanephora* sp., FL.
 Rot, charcoal. *Macrophomina phaseoli*, TX.
 Rot, root. *Phymatotrichum omnivorum*, TX.
 Rot, stem; wilt. *Fusarium* sp., CO, IA, MO, NY; *Phytophthora cryptogea*, NJ; *Sclerotinia sclerotiorum*, CA, CO, MA, MT, OR, PA, WA.
 Virus. **Cucumber Mosaic**; **Beet Curly Top**; **Tobacco Etch**, FL; **Tomato Spotted Wilt**; **Biddens Mottle**, FL.

Powdery mildew in late summer is the most common zinnia disease.

ZIZIA

(Meadow Parsnip)

Gall, leaf. *Urophlyctis* (*Physoderma*) *pluriannulata*, IA, WI.
 Leaf spot. *Ascochyta thaspiae*, WI; *Cercospora ziziae*, PA, WI; *Cylindrosporium ziziae*, ND, WA, WI; *Septoria ziziae*, ND.
 Powdery mildew. *Erysiphe polygoni*, PA, WV.
 Rust. *Puccinia ziziae* (III), WA.

ZOYSIA

(Japanese Lawn Grass)

Nematode, pseudo root knot. *Hypsoperine graminis*, MD.
 Rot, root and crown. *Rhizoctonia solani*, MD; *Helminthosporium tetramera*; *Curvularia* spp.; *Fusarium* spp.
 Rust. *Puccinia zoysiae*, AL, AR, FL, GA, LA, MD, MO, MS, TX.