

R. Kenneth Horst

# Field Manual of Diseases on Garden and Greenhouse Flowers

 Springer

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Plant Pathology and Plant Microbe Biology  
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ISBN 978-94-007-6048-6                      ISBN 978-94-007-6049-3 (eBook)  
DOI 10.1007/978-94-007-6049-3  
Springer Dordrecht Heidelberg New York London

Library of Congress Control Number: 2013935122

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# Preface

The information in this manual is taken in large part from the records of the Plant Disease Survey as given in the *Plant Disease Reporter*, *Plant Disease*, and from the *Index of Plant Diseases in the United States*, *Agriculture Handbook 165*, U.S. Department of Agriculture. There are a great many records that bring in new reports every day, and any such list is out of date by the time it is published, and is sure to be far from complete. This check list is offered as a helpful guide, a foundation on which to build. It is by no means the last word.

Hosts are listed alphabetically by common names except where the scientific names mean less confusion. The diseases are those mostly reported from North, Central, and South America.



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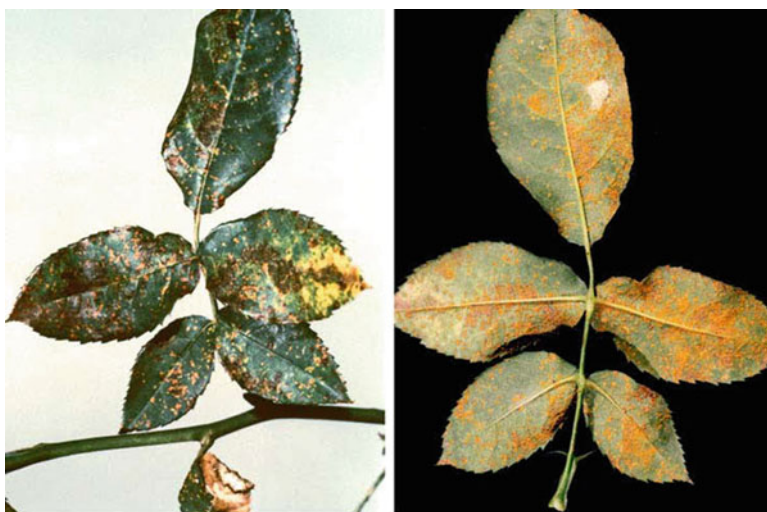
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# Part I

# Illustrations



**Plate 1** Tulip Break on Tulip caused by Lily Latent Mosaic Virus



**Plate 2** Rust on Rose caused by *Phragmidium mucronatum*



**Plate 3** Stunt on Chrysanthemum caused by Chrysanthemum Stunt Viroid. Var. Dark Pink Orchard Queen



**Plate 4** Green Flowers on Chrysanthemum caused by Aster Yellows Phytoplasma



**Plate 5** Mosaic on Rose caused by Prunus Necrotic Ringspot Virus



**Plate 6** Foliar Symptoms on Chrysanthemum (Variety Bonnie Jean) caused by (clockwise from upper left) Chrysanthemum Chlorotic Mottle Viroid, Healthy Leaf, Potato Spindle Tuber Viroid, Chrysanthemum Stunt Viroid, and Potato Spindle Tuber Viroid (Mild Strain)



**Plate 7** Bacterial Leaf Rot on Philodendron caused by *Erwinia chrysanthemi*



**Plate 8** Crown Gall on Chrysanthemum caused by *Agrobacterium tumefaciens*



**Plate 9** Powdery Mildew on Rose caused by *Podosphaera pannosa*

**Plate 10** Powdery Mildew on Begonia caused by *Erysiphe cichoracearum*



**Plate 11** Copper Injury on Rose caused by sprays containing Copper. Blackspot on Rose caused by *Diplocarpon rosae*



**Plate 12** Foliar Nematode on Chrysanthemum caused by *Aphelenchoides ritzemabosi*



**Plate 13** Foliar Nematode on Chrysanthemum caused by *Aphelenchoides ritzemabosi*





**Plate 14** Leaf Spot on Dracaena caused by *Physalospora dracaenae*

**Plate 15** Blossom Blight on Rose caused by *Botrytis cinerea*





**Plate 16** Flower and Leaf Blight on Geranium caused by *Botrytis cinerea*. Downy Mildew on Rose by *Peronospora sparsa*



**Plate 17** Downy Mildew on Rose by *Peronospora sparsa*

**Plate 18** Crown Gall on Rose

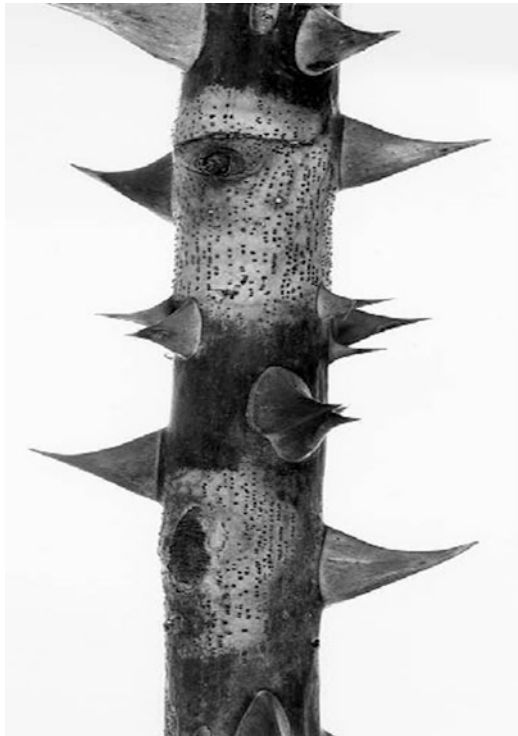


**Plate 19** Bacterial Black Spot on Chrysanthemum



**Plate 20** Botrytis Blight on Tulip

**Plate 21** Brown Canker on Rose



**Plate 22** *Discostroma* Canker  
on Rose



**Plate 23** Dodder on  
Oleander



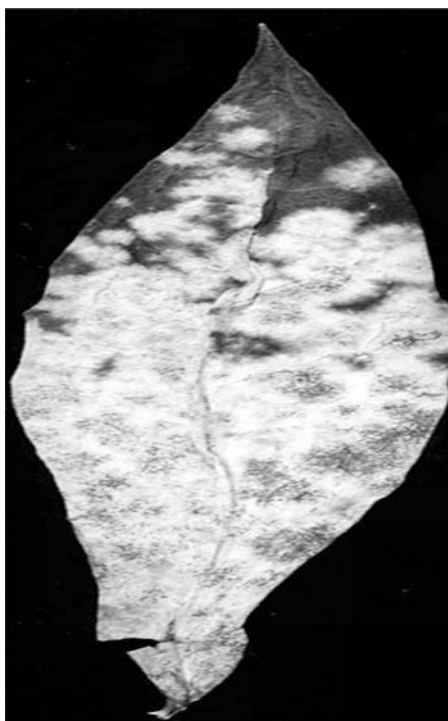
**Plate 24** Foliar Nematode on  
Lily

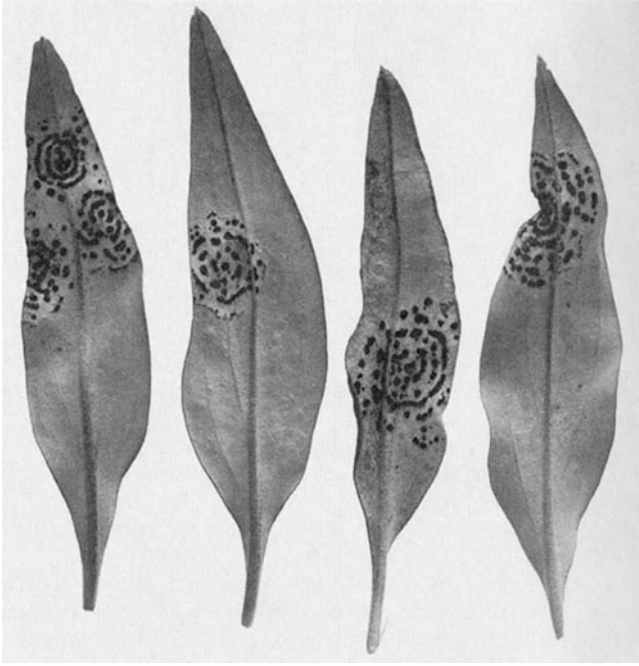


**Plate 25** Iris Leaf Spot



**Plate 26** *Erysiphe cichoracearum* on Phlox





**Plate 27** Rust on Snapdragon



## Part II

# Disease Control and Management

Control of a plant disease means reduction in the amount of damage caused. Our present annual toll from disease is nearly four billion dollars. Perfect control is rare, but profitable control, when the increased yield more than covers the cost of chemicals and labor, is quite possible. Commercial growers now average a return of four dollars for each dollar so invested. Keeping home plantings ornamental yields a large return in satisfaction and increased property value.

The five fundamental principles of control are exclusion, eradication, protection, resistance, and therapy.

1. *Exclusion* means preventing the entrance and establishment of pathogens in uninfested gardens, states, or countries. For home gardeners it means using certified seed or plants, sorting bulbs before planting, discarding any that are doubtful, possibly treating seeds or tubers or corms before they are planted, and, most especially, refusing obviously diseased specimens from nurseryman or dealer. For states and countries, exclusion means quarantines, prohibition by law. Sometimes restricted entry of nursery stock is allowed, the plants to be grown in isolation and inspected for 1 or 2 years before distribution is permitted.
2. *Eradication* means the elimination of a pathogen once it has become established on a plant or in a garden. It can be accomplished by *removal* of diseased specimens, or parts, as in roguing to control virus diseases or cutting off cankered tree limbs; by *cultivating* to keep down weed hosts and deep ploughing or spading to bury diseased plant debris; by *rotation* of susceptible with nonsusceptible crops to starve out the pathogen; and by *disinfection*, usually by chemicals, sometimes by heat treatment. Spraying or dusting foliage with sulfur after mildew mycelium is present is eradication, and so is treating the soil with chloropicrin to kill nematodes and fungi.
3. *Protection* is the interposition of some protective barrier between the susceptible part of the suscept or host and the pathogen. In most instances this is a protective spray or dust applied to the plant in advance of the arrival of the fungus spore; sometimes it means killing insects or other inoculating agents; sometimes it means the erection of a windbreak or other mechanical barrier.

4. *Resistance* is control by the development of resistant varieties. Resistant varieties are as old as time. Nature has always eliminated the unfit, but since about 1890 man has been speeding up the process by deliberately breeding, selecting, and propagating plants resistant to the more important diseases. Resistant ornamental plants have lagged behind food plants, but we do have wilt-resistant asters, rust-resistant snapdragons, wilt-resistant mimosas. Here is the ideal way for home gardeners to control their plant diseases –in the winter when the seed order and the nursery list is made out – so easy, and so safe!
5. *Therapy* is control by inoculating or treating the plant with something that will inactivate the pathogen. Chemotherapy is the use of chemicals to inactivate the pathogen, whereas heat is sometimes used to inactivate or inhibit virus development in infected plant tissues so that newly developing tissue may be obtained which is free of the pathogen.

A **fungicide** is a substance that destroys or inhibits the growth of fungi. It may be an **eradicator**, applied to a plant, plant part, or the environment as a curative treatment to destroy fungi established within a given area or plant; or preferably it may be a **protectant**, applied to protect a plant or plant part from infection by killing, or inhibiting the development of, fungal spores or mycelium that may arrive at the infection court. A **bactericide** is a substance that destroys or inhibits bacteria and nematicide for nematodes. Among the more recent bactericides are antibiotics, products of other living organisms. They also have value against certain fungi. There are few **virocides**, which are toxic or poisonous to viruses.

A **pesticide** is any chemical that is used to kill pests, especially insects and rodents.

An **insecticide** is an agent used to kill insects.

A **disinfectant** is an agent that frees a plant or plant part from infection by destroying the pathogen established within it. A disinfectant kills or inactivates organisms present on the surface of the plant or plant part or in the immediate environment. Chemicals for seed treatment can be either eradicants or protectants, but most of them are disinfectants, in that they kill organisms on the surface of the seed rather than those within. In common usage, however, they are called disinfectants.

A **nematicide** is, of course, a chemical that kills nematodes in the soil or in the plant. Most nematicides are **fumigants**, chemical toxicants that act in volatile form.

The search for new fungicides goes on, with hundreds of synthetic organic compounds being screened each year. This screening is often a cooperative venture between manufacturers, state experiment stations, and the U.S. Department of Agriculture. After safety precautions for the operator and the environment, and the effectiveness of a compound for certain diseases have been determined, the chief question is whether the material is **phytotoxic**, that is, injurious to plants, at concentrations required for control. Phytotoxicity is an elusive factor, not to be pinned down in a few tests. It varies not only with the kind of plant but with the particular variety, the amount of moisture in the soil when the spray is applied, the temperature, whether or not the application is followed by rain or high humidity, the section of the country,

and the compatibility of the chemical with spreaders or wetting agents, as well as with other fungicides or insecticides. Coordinated tests with new materials in many different states are extremely valuable. Some compounds give rather uniform results over the country; others vary widely with climatic conditions.

Consumers are well protected against fraud, but they must be willing to read the fine print on labels if they are to choose intelligently from the bewildering array of proprietary compounds on dealers' shelves. Consumers must also read the fine print and follow directions exactly if their homegrown vegetables are to be as safe for consumption as those from commercial growers who have to comply with the law in the matter of residues.

Even if you follow exactly the directions for dosage given on the label, you may have some plant injury under your particular combination of soil, weather, and kinds of plants. Keep a notebook. Put down the date you sprayed, the dosage used, the approximate temperature and humidity, whether it was cloudy or sunny, in a period of drought or prolonged wet weather. Go around later and check for burning; for leaf spotting and defoliation from the spray or from failure to control the disease; for leaf curling or stunting; for too much unsightly residue. Note which varieties can take the spray and which cannot. Exclusive reliance must be placed on directions and information supplied by the manufacturer or by agricultural specialists, agents, or advisors. **Be sure to read the label.**

## **Part III**

# Host Plants and Their Diseases

## Headings Under Which Diseases Are Described

**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. and flowers.

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.

SNOW MOLD – 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. The numbers given with the rusts refer to spore stages.

# A

## ACANTHUS

BACTERIAL, Proliferation. **Rhodococcus fascians**, OR.

LEAF SPOT. **Cercospora beticola**, CA.

## ACHIMENES

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

AEGOPODIUM (Bishop's Weed)

VIRUS. **Tomato Spotted Wilt**, PA.

AFRICAN DAISY (Arctotis) (*Gerbera jamesonii*)

LEAF SPOT, Blotch. **Cercospora** sp., FL.

NECROSIS, Leaf, Crown. **Sclerotinia sclerotiorum**, AZ.

NEMATODE, Root Knot. **Meloidogyne** sp., FL.

ROT, Crown and Stem. **Whetzelinia sclerotiorum**, CA; **Sclerotinia sclerotiorum**, LA.

ROT, Root. **Phymatotrichum omnivorum**, TX.

ROT, Root, Crown, and Stem. **Phytophthora cryptogea**, CA.

VIRUS. **Tomato Spotted Wilt. Impatiens Serotype**, GA.

WHITE RUST. **Albugo tragopogonis**, NC.

AFRICAN VIOLET (*Saintpaulia*)

BACTERIAL Leaf Blight. **Pseudomonas** sp., OR.

BLIGHT, Gray Mold. **Botrytis cinerea**, cosmopolitan.

NEMATODE, Leaf. **Aphelenchoides ritzemabosi**; Lesion, **Pratylenchus** sp., MD, NJ, OH.

NEMATODE, Root Knot. **Meloidogyne arenaria**, general.

NEMATODE, Spiral. **Scutellonema 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 radicola**, 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. Non-flowering may be due to improper light. Root-knot nematodes as well as mites causes thickened, blistered leaves.

AGAPANTHUS (African-Lily)

BACTERIAL Leaf Streak (water-soaked). **Xanthomonas axonopodis**, FL.

VIRUS. **Ornithogalum Mosaic**.

AGERATUM

BLIGHT, Southern. **Sclerotium rolfsii**, NJ, NC, probably widespread.

POWDERY MILDEW. **Golovinomyces cichoracearum**, MD.

ROT, Root. **Pythium mamillatum**, CA.

ROT, Root and Stem. **Rhizoctonia solani**, IL, NJ, NM.

ROT, Stem. **Alternaria zinniae**, IL.

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

VIRUS. **Bidens Mottle**, FL; **Tomato Spotted Wilt-lettuce serotype**, GA.

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.

ALOE

ROT, Root. **Pythium ultimum**, CA.

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

ALSTROEMERIA

VIRUS. **Alstroemeria Mosaic**; **Alstroemeria**, NY.

ALTERNANTHERA

LEAF SPOT, **Phyllosticta amaranthi**, NJ.

NEMATODE, Root Knot. **Meloidogyne** sp.

ROT, Root. **Rhizoctonia solani**, NJ.

ROT, Root; Wilt. **Fusarium oxysporum**, NJ.

VIRUS. **Alternanthera Mosaic**, FL.

ALYSSUM (Goldentuft, Yellowtuft)

CLUB ROOT. **Plasmodiophora brassicae**, NJ.

DAMPING-OFF. **Rhizoctonia solani**, NJ.

AMARANTHUS (Love-Lies-Bleeding, Princes-Feather, Joseph-Coat, Spiny Amaranth)

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

CANKER, Stem. **Diaporthe phaseolorum** var. **caulivora**, LA.

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, NE, SC, TX.

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 brachyurus**, 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; **Hippeastrum Mosaic**.

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.

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.

ANCHUSA (Buglos, Alkanet)

DAMPING-OFF. **Rhizoctonia solani**, CT.

LEAF SPOT. **Stemphylium** sp., NY.

RUST. **Puccinia recondita** var. **secalis** (0, I), IN, MI: II, III on rye.

VIRUS. **Mosaic**, unidentified, IN.

ANEMONE (Cultivated forms, Japanese)

BACTERIA, 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. ritzemabosi**, 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; **Tobacco Rattle**, MN.

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.

ANTHURIUM

BACTERIAL Blight. **Xanthomonas campestris** pv. **dieffenbachiae**, CA, HI;  
**Ralstonia (Pseudomonas) solanacearum**, FL.  
 BLACK NOSE (on flower spadix). **Colletotrichum gloeosporioides**.  
 NEMATODE, Lesion. **Pratylenchus pratensis**, LA.

ARABIDOPSIS

BACTERIAL Leaf Spot. **Xanthomonas campestris** pv. **campestris**, MI.  
 ROT, Root. **Sclerotinia minor**, NC.

ARABIS (Rock-Cress)

BLIGHT, Gray Mold. **Botrytis cinerea**, WA.  
 CLUB ROOT. **Plasmodiophora brassicae**.  
 DAMPING-OFF. **Rhizoctonia solani**, NJ.  
 DOWNY MILDEW. **Peronospora parasitica**, AL, AK, CO, IN, MI, TX, WI.  
 LEAF SPOT. **Septoria arabis**, 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, CA, NM, WA; II, III on *Koehleria* and *Trisetum*.  
 VIRUS. **Arabis Mosaic**.  
 WHITE RUST; White Blister. **Albugo candida**, NY to VA, CO, TX, WA.

ARCTOTIS

LEAF BLOTCH. **Cercospora** sp., FL.  
 NEMATODE, Root Knot. **Meloidogyne** sp., FL.  
 ROT, Root. **Phymatotrichum omnivorum**, TX.

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.

ARROWROOT (*Maranta*)LEAF SPOT. **Glomerella cingulata**, MD, NJ.RUST. **Puccinia thaliae** (*P. cannae*) (II, III), FL.ARTICHOKE, JERUSALEM (*Helianthus tuberosus*)BACTERIAL Leaf Spot. **Pseudomonas syringae** pv. **tagetis**, MN.BACTERIAL Spot. **Pseudomonas helianthi**, IL.BLIGHT, Southern. **Sclerotium rolfsii**, CA, 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. **Golovinomyces cichoracearum**, general.ROT, Root. **Phymatotrichum omnivorum**, AZ, TX; **Rhizopus stolonifer**, MS.ROT, Stem; Wilt. **Sclerotinia sclerotiorum**, MA, MN, WA.RUST. **Coleosporium helianthi** (II, III), AL, IL, NY, NC, OK, PA, SC, TN, VA;**Puccinia helianthi** (0, I, II, III), general; **Uromyces junci**, (0, I), NE, ND.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.ASPARAGUS TREE FERN (*Asparagus virgatus*)BACTERIAL, Water Soaked Lesions. **Xanthomonas translucens** pv. **undulosa**, MI.BACTERIAL Lesion. **Xanthomonas campestris**, FL.

## ASPIDISTRA

BLIGHT, Leaf. **Labrella aspidistrae**, IL, LA.LEAF SPOT. **Ascochyta aspidistrae**, MN, NJ; **Colletotrichum omnivorum**, CA, MO, NJ, PA, WV.ASTER, CHINA (*Callistephus*)ANTHRACNOSE. **Colletotrichum** sp., FL.BACTERIAL, MLO. **Aster Yellows**, general.BLIGHT, Bud, Stem; Gray Mold. **Botrytis cinerea**, AK, CA, CT, IL, NJ, NY, PA, WI.BLIGHT, Petal. **Itersonilia perplexans**, FL.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. **Golovinomyces cichoracearum**, DE, MN, NE, NC, TN, VT, WA; **Erysiphe polygoni**, NJ.

ROT, Foot. **Phytophthora cryptogea**; **Pythium ultimum**.

ROT, Root and Stem; Leaf Blight. **Rhizoctonia solani**, widespread, chiefly in north-eastern 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; **Tobacco Rattle** (aster strain of); **Tomato Spotted Wilt**, CA; **Bidens 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**, NE, NY, ND, WI.

BLIGHT, Gray Mold. **Botrytis cinerea**, AK, CT, NJ.

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*), IA, NJ, NY, ND.

NEMATODE, Leaf. **Aphelenchoides ritzemabosi**, CT.

NEMATODE, Root Knot. **Meloidogyne** sp.

PARASITIC LICHEN. **Strigula elegans**, **S. complanata**, LA, Southern U.S.

POWDERY MILDEW. **Golovinomyces 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. **Aster Chlorotic Stunt**; **Mosaic**. Unidentified, CA; **Tomato Spotted Wilt**, CA.

WILT. **Verticillium albo-atrum**, CT.

## ASTILBE

POWDERY MILDEW. **Erysiphe polygoni**, MA.  
 ROT, Petiole. **Sclerotium rolfsii** var. **delphinii**, IA.  
 VIRUS. **Tobacco Ringspot**, MN.  
 WILT. **Fusarium** sp., WA.

## AUBRIETTA

VIRUS. **Tomato Spotted Wilt**, PA.

AUTUMN CROCUS (*Colchicum*)

BLIGHT; Leaf Spot. **Botrytis elliptica**, WA.  
 SMUT, Leaf. **Urocystis colchici**, DE, NY, OH, PA, WA.  
 VIRUS. **Tobacco Ring Spot Virus**, MD.

AZALEA (*Rhododendron*)

ANTHRACNOSE. **Colletotrichum** sp., LA.  
 BLIGHT, Bud and Twig. **Briosia 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, Foliar. **Phytophthora foliarum**, TN.  
 BLIGHT, Petal; Flower Spot. **Ovulinia azaleae**, AL, CA, FL, GA, LA, MD, MS,  
 NC, PA, SC, TX, VA; also NY, NJ in greenhouses.  
 BLIGHT, Shoot. **Monilinia azaleae**, GA, MA, NY.  
 BLIGHT, Shoot and Stem. *Phytophthora citrophthora*, *P. citricola*, *P. nicotianae* var.  
*parasitica*, FL, OH.  
 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, NJ, OR, WA; **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 cassiicola**, GA, FL.  
 NEMATODE, Leaf. **Aphelenchoides fragariae**, FL.  
 NEMATODE, Root Knot. **Meloidogyne incognita**.  
 NEMATODE, Spiral. **Helicotylenchus nannus**; **Rotylenchus robustus**.  
 NEMATODE, Stubby Root. **Paratrichodorus christiei**; **Trichodorus primitivus**.  
 NEMATODE, Stunt. **Tylenchorhynchus claytoni**.  
 NONPARASITIC. **Chlorosis**. Usually iron deficiency, general in alkaline soils, sometimes defective drainage.  
 POWDERY MILDEW. **Erysiphe azaleae**, LA; **Erysiphe polygoni**, CA, NJ; **Microsphaeraalni**, GA, NJ, NY, PA, RI, VA.

ROT, Root. **Armillaria mellea**, CA, NJ, WA; **Clitocybe tabescens**, FL;  
**Phymatotrichum omnivorum**, TX; **Pythium** spp.; **Phytophthora lateralis**, NC.  
ROT, Root and Stem; Wilt. **Phytophthora cinnamomi**, AL, MD, MO.  
RUST. **Pucciniastrum myrtilli** (II, III), ME to FL, TX; 0, I on hemlock.  
VIRUS. **Tomato Spotted Wilt**, PA.  
WILT. **Cylindrocarpon radicicola**, 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.

# B

## BABIANA

VIRUS. **Iris Mosaic**, CA.

## BAPTISIA (Fale Indigo)

LEAF SPOT. **Cercospora velutina**, IL, KS, 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.

RUST, Soybean. **Phakopsora pachyrhizi**, southern U.S.

## BARRENWORT (*Epimedium*)

VIRUS. **Tobacco Rattle**, MA, MI, MN.

## BEAN, ASPARAGUS, YARDLONG (*Vigna sesquipedalis*)

BACTERIAL Spot. **Pseudomonas syringae**, IN, NY.

LEAF SPOT. **Mycosphaerella cruenta**, VA.

LEAF SPOT; Pod Spot. **Cladosporium vignae**, 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, SCARLET RUNNER (*Phaseolus coccineus*)

ANTHRACNOSE. **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. sp. **phaseoli**, NY.

RUST. *Uromyces phaseoli* (II, III), AL, MA, NH; *Phakopsora pachyrhizi*, FL.



## 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, NJ, TX; **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. **Golovinomyces cichoracearum**, CA; **Oidium** sp., CA, FL, NC; **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. **Impatiens Necrotic Spot**, NC; **Tomato Spotted Wilt**, CA, MO, OK, TX; **Broad Bean Wilt**, MN.

WILT. **Verticillium albo-atrum**, CT, NY; **Fusarium foetens**, CT, Ontario Canada.

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.

BIRD-OF-PARADISE (*Strelitzia*)

BACTERIAL Leaf Spot; Blight. **Xanthomonas campestris**, FL.

BACTERIAL Leaf Stripe. **Acidovorax avenae** subsp. **avenae**, FL.

BLIGHT. **Cylindrocladium clavatum**, FL.

BLACKBERRY-LILY (*Belamcanda*)

LEAF SPOT. **Alternaria** sp., KS, VA; **Didymellina macrospora**, CA, IA, KS, NY OK, VT, VA.

RUST. **Puccinia iridis**, FL.

VIRUS. **Tomato Spotted Wilt**, FL.

BLANKET FLOWER (*Gaillardia grandiflora*)

POWDERY MILDEW. **Leveillula taurica**, WA.

BLUE LACE-FLOWER (*Trachymene*)

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

NEMATODE, Root Knot. **Meloidogyne** sp., FL.

ROT, Root and Stem. **Fusarium** sp., CT, NJ; **Rhizoctonia solani**, NJ.

WILT. **Phytophthora cactorum**, MA.

## BOLTONIA

LEAF SPOT. **Septoria erigerontis** var. **boltoniae**, IA, WI.

POWDERY MILDEW. **Golovinomyces 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.

ROT, Soft. **Sclerotinia sclerotiorum**, ND.

BRACHYCOME (Swan River Daisy)

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

VIRUS. **Tomato Spotted Wilt**, PA.

BRODIAEA

RUST. **Puccinia carnegiana** (0, I, III), AZ; **P. dichelostemmae** (0, I, III), CA, OR,

WA; **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.

BROMELIA

LEAF SPOT. **Gloeosporium** sp., FL, MD; **Helminthosporium rostratum**, FL.

BROWALLIA (*Streptosolen jamesonii*)

BACTERIAL Canker; Vascular. **Clavibacter michiganense**, WY.

NEMATODE, Root Knot. **Meloidogyne** sp.

VIRUS. **Tomato Spotted Wilt**, CA, OK.

WILT. **Fusarium** sp., DE.

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.

ROT, Crown and Root. **Phoma** sp. GA.

VIRUS. **Cucumber Mosaic**, OH; **Tobacco Streak**, OH.

BUTTERFLY FLOWER (*Schizanthus*)

ANTHRACNOSE. **Colletotrichum schizanthi**, NY.

BACTERIAL, MLO. **Aster Yellows**, NJ.

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.

# C

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. **Diplotheca** (*Stevensea*) **wrightii**, TX; Stem, **Septoria cacticola**, TX.

NEMATODE, Cyst. **Heterodera cacti**; **Nacobbis batatiformis**.

NEMATODE, Root Knot. **Meloidogyne** sp.

ROT, Dry. **Poria** sp., CA.

ROT, Stem and Branch. **Aspergillus alliaceus**, TX.

ROT, Root and Stem. **Fusarium oxysporum**, AZ, CA; **Helminthosporium cactorum**, CA, TX; **Phymatotrichum omnivorum**, TX.

CACTUS (*Leuchtenbergia principis* and *Schlumbergera gaertneri* “*Makoyana*”)

NEMATODE, Cyst. **Heterodera cacti**.

VIRUS. **Tomato Spotted Wilt**, PA.

CACTUS, FISHHOOK, PINCUSHION (*Mammillaria*)

ANTHRACNOSE; Zonate Spot. **Gloeosporium cactorum**; **Mycosphaerella opuntiae**; Spine Spot, **Phoma mammillariae**, MT.

NEMATODE, Root Knot. **Meloidogyne incognita**, Bermuda Bot. Gard; **Meloidogyne** sp., TX; Cyst, **Heterodera cacti**.

ROT, Root. **Phymatotrichum omnivorum**, TX.

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, KS, MT, NJ, TX.

LEAF SPOT, Black. **Diplothea 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, KS, PA;

**Phylospora 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;

**Opuntia Sammons**, AZ; **Tomato Spotted Wilt**, PA.

#### CALADIUM

BACTERIAL Soft Rot. **Erwinia carotovora**, FL.

BLIGHT, Southern. **Sclerotium rolfsii**, FL.

BLIGHT; Tuber Rot. **Botrytis ricini**, FL.

LEAF SPOT. **Gloeosporium thumenii**, 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**, AK, MO, NJ, NY.

BLIGHT, Southern. **Sclerotium rolfsii**, TX.

LEAF SPOT. **Alternaria** sp., NY; **Cercospora calendulae**, PA, TX, VA;

**Colletotrichum gloeosporioides**, VA.

NEMATODE, Root Knot. **Meloidogyne** spp., TN, TX, WV; **M. javanica**.

POWDERY MILDEW. **Golovinomyces cichoracearum**, CA, NY; **Erysiphe 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; **Bidens Mottle**, FL.

CALIBRACHOA (*Calibrachoa* sp.)

VIRUS. **Calibrachoa Mottle**, CA; **Tobacco Mild Green Mosaic**, MS.

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, 0, I on pine; **Puccinia convolvuli** (0, I, II, I, II), CA, OR.

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

BACTERIAL Soft Rot. **Erwinia aroideae**, general; **E. carotovora**.

BLIGHT, Gray Mold. **Botrytis cinerea**, AK, NJ.

BLIGHT, Southern. **Sclerotium rolfsii**, CA, FL, OR.

LEAF SPOT. **Alternaria** sp., secondary; **Cercospora richardiae**, AL, MS; **Coniothecium richardiae**, CA, FL, MA, NJ, NY, OR; **Gloeosporium callae**, WA.

NEMATODE, Root Knot. **Meloidogyne** sp., CA, FL.

NONPARASITIC. **Chalk rot**. Immaturity of rhizomes, CA, OR.

POWDERY MILDEW. **Leveillula taurica**, CA.

ROT, Rhizome. **Phytophthora cryptogea** 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. **Dasheen Mosaic; Tomato Spotted Wilt**, CA, IL, IN, MD, NY, OR, TX, WA; **Calla Chlorotic Spot**, U.S.

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.

CAMASS (*Camassia*)

BLIGHT, Gray Mold. **Botrytis cinerea**, OR.

LEAF SPOT. **Septoria chlorogali**, OR.

ROT, Root. **Phymatotrichum omnivorum**, TX.  
SMUT, Leaf. **Urocystis colchici**, IN, OR.

CAMOMILE (*Anthemis*)

BACTERIAL, MLO. **California Aster Yellows**, CA.  
DAMPING-OFF. **Rhizoctonia solani**, WA.  
NEMATODE, Root Knot. **Meloidogyne** sp., FL, MD.  
ROT, Root. **Phymatotrichum omnivorum**, TX.

CAMPANULA (Bellflower, Canterbury)

BACTERIAL, MLO. **Aster Yellows**, PA.  
BACTERIAL, Proliferation. **Rhodococcus fascians**, OR.  
BLIGHT, Gray Mold. **Botrytis cinerea**, AK.  
BLIGHT, Southern. **Sclerotium rolfsii**, IL, NJ.  
LEAF SPOT. **Ascochyta bohemica**, WI; **Cercoseptoria minuta**, WI; **Phyllosticta alliariifoliae**, NJ, NY; **Ramularia macrospora**, AK; **Septoria campanulae**, IL, IA, KS, MO, WI.  
NEMATODE, Leaf. **Aphelenchoides** sp.  
NEMATODE, Root Knot. **Meloidogyne** sp.  
POWDERY MILDEW. **Golovinomyces cichoracearum**, PA.  
ROT, Root. **Fusarium** sp., NY, NJ; **Rhizoctonia solani**, CT, IL, TX.  
ROT, Stem. **Sclerotinia sclerotiorum**, MD, WA.  
RUST. **Coleosporium campanulae** (II, III), widespread; 0, I on pine; **Aecidium campanulastris** (0, I), IA, MN; **Puccinia campanulae** (III), CA, MT, NY, OR, WA.  
VIRUS. **Tomato Spotted Wilt**, CA.  
WILT. **Verticillium albo-atrum**.

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; **P. thaliae**, LA.  
VIRUS. **Cucumber Mosaic**, OH, RI; **Mosaic**; unidentified, DE, MD, MI, NY;  
**Canna Yellow Mottle**, WA, Pacific Northwest; **Hosta Virus X**, **Tobacco Rattle**

**Virus; Helleborus Net Necrosis; Nemesia Ring Necrosis, Diascia Yellow Mottle**, Pacific Northwest.

CAPE-COWSLIP (*Lachenalia*)

VIRUS. **Ornithogalum Mosaic**, AL.

CARNATION (*Dianthus caryophyllus*)

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

BACTERIAL Blight. **Pseudomonas woodsii**, HI.

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. **Zygothia 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. **Cladosporium echinulatum**, HI; **Septoria dianthae**, VT to SC, CA, MI, TX.

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; **O. dianthi**, CA.

ROT, Bud. **Fusarium tricinctum** f. sp. **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 cerealis**, 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; **Carnation Italian Ring Spot; Carnation Vein Mottle; Carnation Yellow Fleck and Necrotic Fleck**, OR.

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.

CASSABANA, CURUBA (*Sicana*)

ANTHRACNOSE. **Colletotrichum lagenarium**, FL.

CATNIP (*Nepeta*)

BACTERIAL Leaf Spot. **Pseudomonas tabaci**, WI; **Xanthomonas campestris**, CA.

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.

CENTURY PLANT (*Agave*)

ANTHRACNOSE. **Glomerella cingulata** (*Colletotrichum agaves*) occasional.

BLIGHT, Gray Mold. **Botrytis cinerea**, after chilling.

LEAF SCORCH; Blight. **Stagonospora gigantea**, NM, TX.

LEAF SPOT. **Coniothyrium concentricum**, **C. agaves**, common.

LEAF SPOT, Black Patch. **Dothidella parryi**, CA.

LEAF SPOT, Black Rot. **Thielaviopsis paradoxa**, Mexico.

LEAF SPOT, Red Leaf Ring, **Pantoea ananatis**, Mexico.

CHECKER MALLOW (*Sidalcea*)

LEAF SPOT. **Ramularia sidalceae**, CA, CO, WY.

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

CHICKWEED (*Stellaria* and *Cerastium*)

ROT. **Sclerotinia minor**, NC; **Sclerotium rolfsii** (stem), NC.

RUST, Broom. **Melampsorella caryophyllacearum**, NY.

VIRUS. **Tomato Ringspot**, PA; **Tomato Spotted Wilt**, GA.

CHINESE EVERGREEN (*Aglaonema*)

ANTHRACNOSE. **Colletotrichum** sp., **Gloeosporium** sp., WA.

BACTERIAL Leaf Spot. **Erwinia aroideae**; **Xanthomonas dieffenbachiae**, FL.

GLEBAL MASSES. **Sphaerobolus stellatus** (**Gasteromycetous fungus**), FL, TX.

LEAF SPOT. **Myrothecium roridum**, FL; **Burkholderia gladioli**, Argentina.

NEMATODE, Lesion. **Pratylenchus coffeae**, FL.

NEMATODE, Root Knot. **Meloidogyne javanica**.



ROT, Collar; Foliar Blight. **Fusarium subglutinans**, HI.

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.

CHIONODOXA (Glory-of-the-Snow)

NEMATODE, Bulb. **Ditylenchus dipsaci**.

CHIVES (*Allium schoenoprasum*)

BLIGHT, Leaf. **Botrytis byssoidea**, CA.

DOWNY MILDEW. **Peronospora destructor**, CA.

RUST. **Puccinia porri** (II, III), CT, NY, WA.

SMUT. **Urocystis cepulae**, MA.

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, FL, NJ, TX.

BACTERIAL Fasciation. **Clavibacter fascians**, MI, NJ, NY, OH.

BLIGHT, Blossom. **Phytophthora nicotianae**, AL.

BLIGHT, Gray Mold. **Botrytis cinerea**, cosmopolitan.

BLIGHT, Leaf; Blotch. **Septoria leucanthemi**, widespread.

BLIGHT, Petal. **Itersonilia perplexans**, FL, MN.

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

BLIGHT, Southern. **Sclerotium rolfsii**, FL, VA.

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

NEMATODE, Leaf. **Aphelenchoides ritzemabosi**, 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*) **setariae**, FL.

POWDERY MILDEW. **Golovinomyces cichoracearum**, general.

ROT, Charcoal Stem. **Macrophomina phaseoli**, OK.

ROT, Flower. **Fusarium tricinctum** f. sp. **poae**, LA, NJ.

ROT, Root. **Fusarium** sp.; **Rhizoctonia solani**, general; **Pythium** sp.; **Phymatotrichum omnivorum**, AZ, TX.

ROT, Stem. **Fusarium solani**.

ROT, Stem; Drop. **Sclerotinia sclerotiorum**, AZ, LA, MI, VA.

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

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

VIRUS. **Chrysanthemum Flower Distortion**; **Chrysanthemum Mosaic**; **Chrysanthemum**

**Ring Spot**; **Chrysanthemum Rosette**; **Impatiens Necrotic Spot**, GA, NC; **Tomato Aspermy**; **Tomato Spotted Wilt**.

WHITE RUST. **Puccinia horiana** (III, IV), CA, FL, NJ, OR, PA.

WILT. **Fusarium oxysporum** f. sp. **callistephi**; **F. oxysporum** f. sp. **tracheiphilum**, SC; **F. oxysporum** f. sp. **chrysanthemi**, FL, SC, widespread; **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.

CIMICIFUGA (Bugbane, Black Cohosh)

LEAF SPOT. **Ascochyta actaeae**, CT, NY; **Ectostroma afflatum**, VA.

NEMATODE, Root Knot. **Meloidogyne** spp., NJ.

CINERARIA (*Senecio*)

BACTERIAL, MLO. **Aster Yellows**, NY.

BLIGHT. **Botrytis cinerea**, AK, IN, MO, NJ, PA.

DAMPING-OFF. **Rhizoctonia solani**, IL, NY.

DOWNY MILDEW. **Plasmopara halstedii**, NY.

NEMATODE, Root Knot. **Meloidogyne** sp.

POWDERY MILDEW. **Golovinomyces cichoracearum**, MA.

ROT, Root. **Pythium** sp., MD; **P. ultimum**; **Thielaviopsis basicola**, MA.

ROT, Stem. **Fusarium** sp., PA; **Phytophthora** sp., NJ; **Sclerotinia sclerotiorum**, WA.

RUST. **Puccinia lagenophorae**, NY.

VIRUS. **Cineraria Mosaic**, WA; **Tomato Spotted Wilt; Chrysanthemum Stunt** (viroid); **Impatiens Necrotic Spot**, NC.

WILT. **Verticillium albo-atrum**, NJ, NY, WA; **V. dahliae**, CA.

#### 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; **Puccini astrum pustulatum** (II, III), AK, NY.

WILT. **Verticillium albo-atrum**, CA.

#### 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.

POWDERY MILDEW. **Leveillula taurica**, North America.

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

#### CLIVIA

NEMATODE, Spiral. **Rotylenchus brachyurus**.

#### 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; **Cucumber Mosaic**, NY.

#### COCOYAM (*Xanthosoma*)

BACTERIAL Leaf Spot. **Xanthomonas campestris** pv. **dieffenbachiae**, FL.

#### COLEUS

BROOMRAPE. **Orobanche ramosa**, NY.

DAMPING-OFF; Cutting Rot. **Pythium** spp., CA, MD; **Rhizoctonia solani**, FL, IL, NY, TX.

DOWNY MILDEW. **Peronospora lamii**, LA, 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**, AK, MO.

SLIME MOLD. **Badhamia panicea**, KS.

VIRUS. **Coleus Mosaic**; **Coleus Vein Necrosis**, **Tobacco Etch Virus**, MN, MO.

WILT. **Verticillium** sp., CT.

COLLINSIA (Blue-Lips, Blue-Eyed Mary)

LEAF SPOT. **Septoria collinsiae**, IL.

ROT, Root. **Pythium mamillatum**, CA.

RUST. **Aecidium insulm** (0, I), UT; **Puccinia collinsiae** (0, I, II, III), CA, OR, UT, WA.

SMUT, White. **Entyloma collinsiae**, CA, OR.

COLLOMIA

NEMATODE, Bulb. **Ditylenchus dipsaci**, Pacific Northwest.

POWDERY MILDEW. **Sphaerotheca macularis**, CA, CO, ID, MT, ND, WA, WY.

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.

COLUMBINE (*Aquilegia*)

BLIGHT, Gray Mold. **Botrytis 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, VT, VA, WI; **Haplobasidium pavoninum**, AK.

NEMATODE, Root Knot. **Meloidogyne** sp.

POWDERY MILDEW. **Erysiphe polygoni**, AK, IL, IN, IA, NJ, NY, OH, PA, TX, UT, WI, WY.

ROT, Root. **Phymatotrichum omnivorum**, TX; **Pythium mamillatum**, CA; **Phytophthora dreschleri**, NC.

ROT, Stem. **Phoma** sp., PA; **Sclerotinia sclerotiorum**, DE, OH, PA, TX; **Phyllosticta aquilegicola**, WA.

RUST. **Puccinia recondita** (0, I), CA, CO, ID, NM, OR, WA; II, III on grasses.

SMUT, Leaf and Stem. **Urocystis sorosporioides**, UT.

VIRUS. **Cucumber Mosaic**, OH; **Mosaic**, unidentified, IA, KS.

CONFEDERATE-JASMINE (*Trachelospermum*)

BLACK MILDEW; Sooty Mold. **Dimerosporium pulchrum**, LA.

LEAF SPOT. **Cercospora repens**, LA.

ROT, Root. **Clitocybe tabescens**, FL.

CORAL-BELLS

See Heuchera.

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.  
 CANKER, Basal. **Fusarium oxysporum**, CT, NY.  
 DODDER. **Cuscuta** sp., NJ.  
 LEAF SPOT. **Cercospora coreopsidis**, OK; **Phyllosticta coreopsidis**, WI; **Septoria coreopsidis**, IA, WI, TX.  
 NECROSIS, Foliar. **Fusarium oxysporum**, CT, NY.  
 NEMATODE, Root Knot. **Meloidogyne** sp., FL.  
 POWDERY MILDEW. **Golovinomyces cichoracearum**, MD, MN, NY, WI.  
 ROT, Root. **Rhizoctonia solani**, MN, NY, TX; **Phymatotrichum omnivorum**, TX; **Fusarium oxysporum**, CT, NY.  
 ROT, Stem. **Sclerotinia sclerotiorum**, OH, WA.  
 RUST. **Coleosporium inconspicuum** (II, III), GA, MD, NC, OH, SC, TN, VA, WV; 0, I on pine.  
 SCAB. **Cladosporium coreopsidis**.  
 VIRUS. **Beet Curly Top**, CA; **Lettuce Mosaic**, WA.  
 WILT. **Verticillium albo-atrum**, NY.
- CORIANDER (*Coriandrum*)  
 ANTHRACNOSE. **Gloesporium** sp., MD.  
 BACTERIAL Leaf Spot. **Pseudomonas syringae**, CA, FL; **Xanthomonas campestris** pv. **carotae**, OR.  
 NEMATODE, Root Knot. **Meloidogyne** sp., FL.  
 VIRUS. **Coriander Feathery Red Vein**, CA; **Apium Virus Y**, **Potyvirus**, CA.  
 WILT. **Fusarium oxysporum** f. sp. **coriandrii**, CA.
- CORN-MARIGOLD (*Chrysanthemum segetum*)  
 BACTERIAL, MLO. **California Aster Yellows**, CA.  
 LEAF SPOT. **Septoria chrysanthemi**, NY.
- 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, CA, KS, SD, TX.  
 DODDER. **Cuscuta** sp., NY.  
 LEAF SPOT. **Cercospora** sp., TX; **Septoria** sp., CT.  
 MOLD, Gray. **Botrytis cinerea**, Brazil.  
 NEMATODE, Root Knot. **Meloidogyne** sp.  
 POWDERY MILDEW. **Golovinomyces cichoracearum**, CA, MD, NE, NC, 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; **Verticillium dahlia**, CA.

CREeping ZINNIA (*Sanvitalia procumbens*)

VIRUS. **Sunflower Mosaic**, TX.

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, wide-spread; **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 so particularly useful between susceptible crops.

CROTON (*Codiaeum*)

ANTHRACNOSE. **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*, SC, TX; *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.

CROWN VETCH (*Coronilla varia*)

NEMATODE. **Meloidogyne** sp., VA.

ROT, Stem. **Sclerotinia trifoliorum**; **Fusarium roseum**.

CRYPTANTHA

GALL, Leaf. **Synchytrium myosotidis**, AZ, CA.

POWDERY MILDEW. **Golovinomyces cichoracearum**, CA, NV.

RUST. **Puccinia aristidae** (0, I); II, III on native grasses; **P. cryptanthes**, CA, WA.

## CRYPTANTHUS

ANTHRACNOSE. **Gloeosporium** sp., WA.

## 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.

WILT, Root Rot. **Sclerotinia sclerotiorum** MN, ND.

CYCAD, SAGO-PALM (*Cycas*)

CORALLOID ROOTS. **Anabaena cycdearum** 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.

VIRUS. **Tobacco Ringspot**, 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

ANTHRACNOSE. **Colletotrichum fragariae**, NC.

BACTERIAL Tuber Rot. **Erwinia carotovora**, NJ, NY, OH.

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; **Colletotrichum gloeosporioides**, FL; **C. fragariae**, FL; also lesions on flowers and stems.

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.

VIRUS. **Impatiens Necrotic Spot**, NC.

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**, IL, MD, TX.

LEAF SPOT. **Cercospora cynoglossi**, IN; **Phyllosticta decidua**, WI; **Ramularia lappulae**, WI, TX.

NEMATODE, Root Knot. **Meloidogyne** sp.

POWDERY MILDEW. **Golovinomyces cichoracearum**, UT, VA, WY.

ROT, Root. **Phymatotrichum omnivorum**, TX.

ROT, Stem. **Sclerotinia sclerotiorum**, WA, British Columbia, Canada.



# D

## 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, MI, secondary; *Cercospora* sp., FL, MS.  
NEMATODE, Bulb. *Ditylenchus destructor*, OR.  
NEMATODE, Leaf. *Aphelenchoides ritzemabosi*, CA.  
NEMATODE, Root. *Paratrichodorus pachydermus*, MI.  
NEMATODE, Root Knot. *Meloidogyne* sp., NC to AL, AZ, CA, MO, TX.  
POWDERY MILDEW. *Golovinomyces cichoracearum*, general; *Ersiphe polygoni*, CA, DE, GA, IA, MO, NJ, PA, VA; *Uncinula* sp., NC.  
ROT, Charcoal. *Macrophomina phaseoli*, OK, SC.  
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, NJ, NY, NC, OK, 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.

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**,  
LA, MS, PA.

NEMATODE, Root Knot. **Meloidogyne incognita**.

ROT, Root. **Sclerotium** sp., IN; **Phymatotrichum omnivorum**, TX; **Armillaria gallsia**, SC.

RUST. **Puccinia hemerocallidis**, FL, GA, HI, Costa Rica.

## DELPHINIUM (Larkspur)

BACTERIAL Black Spot, Leaf Spot. **Pseudomonas syringae** pv. **delphinii**, ME to  
VA, MN, TX, 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 Yellows Stunt**, "Greens", Pacific Coast and  
Rocky Mts.

BLIGHT, Gray Mold, Bud Rot. **Botrytis cinerea**, CT, MA, MN, MS, NY, WV, WI.

BLIGHT, Southern; Crown Rot. **Sclerotium rolfisii** (*S. delphinii*), general.

CANKER, Stem. **Diaporthe arctii**, MD, NY, NC, 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.

DOWNEY MILDEW. **Peronospora ficariae**, CA.

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.

**Variation**. Noninfectious, seed transmitted leaf-color anomalies.

POWDERY MILDEW. **Golovinomyces 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; **Delphinium Vein-Clearing**, AK.

**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. Bidens Mottle**, FL.

DESERT-CANDLE (*Eremurus*)

LEAF SPOT. **Myrothecium roridum**, OH.

DESERT-PLUME (*Stanleya*)

LEAF SPOT. **Cercospora nasturtii**, KS.

RUST. **Puccinia aristidae**, CO, NV.

DESERT-ROSE (*Adenium obesum*)

LEAF SPOT. **Aristastoma** sp., FL.

**VIRUS. Tomato Spotted Wilt**, FL; **Cucumber Mosaic**, FL.

#### DIANTHUS (Garden Pinks)

BLIGHT; Stem Rot. **Alternaria dianthi**, widespread.

BLIGHT, Gray Mold. **Botrytis cinerea**, AK.

BLIGHT, Southern. **Sclerotium rolfsii**, IL, TX.

LEAF, Blight. **Rhizoctonia solani**, LA.

LEAF SPOT. **Ascochyta dianthi**, NY, MS; **Heterosporium echinulatum**, CA, NY,

OR; **Septoria dianthi**, AL, MI, MS, NJ, NY, NC.

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), MS, NE, NY.

**VIRUS. Beet Curly Top**, CA; **Carnation latent**, NY.

#### 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; **Burkholderia gladioli**, Argentina.

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.

DITTANY, STONEMINT (*Cunila*)

LEAF SPOT. **Septoria cunilae**, IL.

RUST. **Puccinia menthae** (0, I, II, III), NY to VA, AR, IL.

DIZYGOTHECA

LEAF SPOT. **Alternaria panax**, CA.

DOGBANE (*Apocynum*)

LEAF SPOT. **Cercospora apocyni**, north central states, TX, VA; **Phyllosticta apocyni**, IA, MS, NJ, NY, OR, PA, WI; **Septoria littorea**, KS, MI, NE, ND, OH; **tagonospora apocyni**, IL, IN, IA, NY, WI, VA.

ROT, Root. **Phymatotrichum omnivorum**, TX.

RUST. **Puccinia seymouriana** (0, I), IL, IN, KS, NE, NJ, NY, OK, SD; **P. smilacis** (0, I), IL, KS, MD, NC, TN, VA, WI; II, III on smilax.

DORONICUM (Leopards-bane)

NEMATODE, Leaf. **Aphelenchoides** sp.

NEMATODE, Root Knot. **Meloidogyne** sp., CA, MD.

POWDERY MILDEW. **Golovinomyces cichoracearum**, CA.

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

ANTHRACNOSE. **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**, FL, NJ; **P. draconis**; **P. maculicola**; **Gloeosporium polymorphum** and **G. thumenii**, 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.

VIRUS. **Tomato Spotted Wilt**, PA.

DUTCHMANS-PIPE (*Aristolochia*)

BLIGHT, Gray Mold. **Botrytis cinerea**, CT, MD.

LEAF SPOT. **Cercospora guttulata**, IL, WV; **Gloeosporium** sp., MA; **Ovularia aristolochiae**, WV; **Phyllosticta aristolochiae**, NJ.

ROT, Root. **Diplodia radicola**, VA.

# E

EASTER CACTUS (*Rhipsalidopsis*)

ROT, Stem. **Drechslera cactivora** (*Helminthosporium cactivorum*), FL.

ECHEVERIA

LEAF SPOT. **Stemphylium bolickii**, FL.

NEMATODE, Root Knot. **Meloidogyne** sp., CA.

RUST. **Puccinia echeveriae** (III), CA.

ECHINACEA (Purple Coneflower)

BACTERIAL, phytoplasma. **Aster Yellows**, WI.

BLIGHT, Wilt. **Fusarium oxysporum**, SD.

LEAF SPOT. **Cercospora rudbeckii**, IA; **Septoria lepachydis**, WI.

PHYLLODY, Phytoplasma, MD.

POWDERY MILDEW. **Golovinomyces cichoracearum**, Canada.

ROT, Root. **Phymatotrichum omnivorum**, TX.

ROT, Stem. **Sclerotinia sclerotiorum**.

VIRUS. **Mosaic**, unidentified, NY.

WILT. **Verticillium dahliae**, OR.

ELEPHANTS-EAR (*Colocasia*)

BACTERIAL Soft Rot. **Erwinia carotovora**, FL; **E. aroideae**, FL, TX.

BLIGHT, Southern. **Sclerotium rolfsii**, FL, NY.

LEAF SPOT. **Cladosporium colocasiae**, LA.

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.

VIRUS. **Dasheen Mosaic**, HI.

EMILIA (Tasselflower, Floras-Paintbrush)

RUST. **Puccinia emiliae**, FL.

VIRUS. **Cucumber Mosaic**, in part, FL; **Tomato Spotted Wilt**, CA; **Impatiens Necrotic Spot**, GA.

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.RUST. **Puccinia lagenophorae**, CA.VIRUS. **Tomato Spotted Wilt**, PA.

## EPISCIA

LEAF SPOT. **Myrothecium roridum**, FL.VIRUS. **Tobacco Mosaic**, CA, CT, DC, FL, OH, WA.

## 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**, IA, MD.GALL, Leaf. **Synchytrium erigerontis**, LA.LEAF SPOT. **Cercospora cana**, LA; **Cercospora colubrina**, WA; **Septoria erigerontis**, ME to MD, MI, NE.POWDERY MILDEW. **Golovinomyces 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, NV, UT, 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.

## ERYNGIUM (Rattlesnake Master)

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.VIRUS. **Cucumber Mosaic**, OH.

## EUCHARIS (Amazon-Lily)

BLIGHT, Gray Mold. **Botrytis cinerea**, FL.LEAF SCORCH; Red Blotch. **Stagonospora curtisii**, CA.VIRUS. **Tomato Spotted Wilt**, PA.

## EUPATORIUM (Boneset, Blue Mist-flower, Dogfennel, White Snakeroot, Joe-Pye Weed)

BLIGHT, Gray Mold; Canker. **Botrytis cinerea**, NJ.DOWNY MILDEW. **Plasmopara halstedii**, NY to MD, KS, MO, TX, WV, WI.

LEAF SPOT. **Ascochyta compositarum**, WV, WI; **Cercospora ageratoides**, AL, MS, NJ, TX, WV; **Phyllosticta decidua**; **P. eupatorina**, IL, NJ; **Septoria eupatorii**, IL, MD, MS, NJ, TX; **S. eupatoriicola**, IL.

NEMATODE, Root Knot. **Meloidogyne** sp., AL, FL; **M. hapla**.

POWDERY MILDEW. **Golovinomyces cichoracearum**, general in East to TX, 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, IL, TX; **P. eleocharidis** (0, I), widespread in eastern and central states; II, III on *Eleocharis*; **P. tenuis** (0, I, III), MA to NC, MN, NE; **P. tolimensis** (III), NY.

SMUT, White. **Entyloma compositarum**, IL, IA, MS, WV, WI.

VIRUS. **Tobacco Ringspot**, MS; **Yellows**. Apparently distinct from Aster Yellows, central states; **Tomato Spotted Wilt**, GA.

WILT. **Fusarium** sp., NJ.

#### EUPHORBIA TRIGONA

ROT, Soft. **Rhizopus stolonifer**, CA.

EUSTOMA (Prairie Gentian, Texas Bluebell)

BLIGHT, Stem. **Alternaria** sp., TX; **Sclerophoma eustomonis**, TX; **Phomopsis** sp., FL.

LEAF SPOT. **Cercospora eustomae**, CO, NE, TX; **C. nepheloides**, CA, TX; **Phyllosticta** sp., TX.

ROT, Crown. **Fusarium avenaceum**, CA; **Sclerotinia rolfsii**, FL.

VIRUS. **Cucumber Mosaic**, NY; **Impatiens Necrotic Spot**, FL; **Tomato Spotted Wilt**, PA; **Tomato Spotted Wilt – Impatiens Serotype**, FL, GA.

#### 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.

#### EVOLVULUS

ROT, Root. **Phymatotrichum omnivorum**, TX.

RUST. **Puccinia lithospermi** (0, I, II, III), CO, KS, NE, TX.

VIRUS. **Tobacco Streak**, WI.

#### EXACUM

BLIGHT, Stem Canker. **Botrytis cinerea**, KS.

VIRUS. **Impatiens Necrotic Spot**, NC.

WILT. **Fusarium oxysporum** f. sp. **exaii**, CT.



# F

## FENNEL (*Foeniculum*)

BACTERIAL Leaf Spot. ***Pseudomonas syringae***, CA.

BACTERIAL Soft Rot. ***Erwinia carotovora***, IL.

BLIGHT, Stem, Foliage. ***Cercosporidium punctum***, CA.

DAMPING-OFF; Stem Pitting. ***Rhizoctonia solani***, GA, NJ.

NEMATODE, Root Knot. ***Meloidogyne*** sp., FL.

ROT, Stem. ***Sclerotinia sclerotiorum***, IL, NJ, TX; ***Sclerotinia minor***, CA.

## 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, FL, NJ, NY, PA.

VIRUS. **Tomato Spotted Wilt**, PA.

## FERN, BLADDER (*Cystopteris*)

LEAF BLISTER. ***Taphrina cystopteridis***, IN, KS, WI.

RUST. ***Hyalopsora 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 deciduum**, 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 faulliana**, OR; **T. polystichi**, ME to NC, TN.  
 LEAF SPOT. **Cylindrocladium pteridis**, FL; Tar Spot, **Trabutiella filicina**, AK.  
 NEMATODE, Leaf. **Ditylenchus dipsaci**, OR; **Aphelenchoides fragariae**, OR, SC; 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. **Hyalospora cheilanthis** (II, III), CA, TX.

FERN, HOLLY (*Cyrtomium*)

BLIGHT, Gray Mold. **Botrytis cinerea**, AK.  
 Damping-Off. **Completozia complens** NY.  
 VIRUS. **Yellows, Mosaic, Necrosis Ringspots, Holly Fern Mottle Virus**, LA, MS.

FERN, JAPANESE CLIMBING (*Lygodium japonicum*) Also – OLD WORLD CLIMBING (*Lygodium microphyllum*)

BLIGHT. **Colletotrichum gloeosporioides**, FL.  
 LEAF SPOT. **Biopolairs sacchari**, FL.  
 RUST. **Puccinia lygodii** (on Old World Climbing Fern), FL.

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, WI; 0, I on balsam fir; **U. longimucronata** f. sp. **cyclosora**, AK, CA, ID, MT, OR, WA; 0, I on alpine fir; **U. longimucronata** f. sp. **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; **Phytophthora ramorum**, CA.

ROT. **Sclerotium deciduum** (*Rhizoctonia* sp.), WI.

VIRUS. **Cucumovirus**, OH.

FERN, OSMUNDA (*Osmunda*; Cinnamon, Interrupted, and Royal Ferns)

LEAF BLISTER. **Taphrinia higginsii**, GA.

LEAF SPOT. **Gloeosporium osmundae**, MI.

NEMATODE, Foliar. **Aphelenchoides fragariae**, SC.

RUST. **Uredinopsis osmundae** (II, III), northeastern and Great Lakes states, and to FL, and AL; 0, I on balsam fir.

SMUT, Inflorescence. **Mycosyrinx osmundae**, MI, NY, 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**, AK, OR, WA; **M. polypodophila** (II, III), CT, ME, MA, NH, NY, PA, TN, VT.

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, MN; 0, I on balsam fir.

FERN, TREE (*Cibotium*)

LEAF SPOT. **Pestalotia cibotii**, NJ.

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, WA, WI; 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. phegopteridis** (II, III), ME, NH, WI; 0, I on balsam fir.

FERN, ROCK (*Woodsia*)

RUST. **Hyaloporsora polypodii** (II, III), ID, MI; 0, I unknown.

FERN, WOODWARDIA, CHAIN (*Woodwardia*)

RUST. **Uredinopsis arthurii** (II, III), VT to AL, IN, MI, and var. **maculata**, ME to AL; 0, I unknown.

FEVERFEW (*Chrysanthemum parthenium*)

POWDERY MILDEW. **Golovinomyces cichoracearum**, NY.

ROT, Root and Stem. **Rhizoctonia solani**, WA.

## FITTONIA

BLIGHT, Leaf. **Rhizoctonia** sp., OH.

LEAF SPOT. **Myrothecium roridum**, FL.

FLAX, FLOWERING (*Linum*)

DAMPING-OFF. **Rhizoctonia solani**, IL.

NEMATODE, Root Knot. **Meloidogyne** sp., CA.

ROT, Stem. **Sclerotinia sclerotiorum**, CA.

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.

POWDERY MILDEW. **Golovinomyces cynoglossi** (*Erysiphe cynoglossi*), WA.

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.

FOUR-O'CLOCK (*Mirabilis*)

BACTERIAL, Blight. **Xanthomonas campestris** pv. **campestris**, CA.

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; **Mirabilis Mosaic**, IL.

WHITE RUST. **Albugo platensis**, TX.

FOXGLOVE (*Digitalis*)

ANTHRACNOSE. **Colletotrichum fuscum**, CT, MA, OR, PA, WI.

BLIGHT, Leaf; Inflorescence. **Alternaria** sp., MD.

DOWNY MILDEW. **Peronospora digitalidis**, CA.

LEAF SPOT. **Cladosporium** sp., NJ; **Phyllosticta digitalis**, AK, NY, TX; **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; **Tomato Spotted Wilt**, PA; **Tomato Spotted Wilt-Impatiens Serotype**, FL, GA.

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**; **Freesia Sneak**, VA.

*Fusarium* corm rot causes wilting and death. Corms should be inspected before planting, and all those showing pinkish lesions should be discarded.

#### FREEWAY DAISY (*Osteospermum*)

VIRUS. Lettuce Mosaic, CA.

#### FRITILLARIA

LEAF SPOT. **Phyllosticta fritillariae**, CA.

RUST. **Uromyces miurae** (III), AK, WA.

VIRUS. **Mosaic**. Undetermined, NY.

# G

## GAILLARDIA (Blanket Flower)

BACTERIAL, MLO. **Aster Yellows**, NJ, NY, PA, and **California Aster Yellows**, CA.

LEAF SPOT. **Septoria gaillardiae**, IA, OK, TX.

NEMATODE. **Nacobus batatiformis**, NE.

POWDERY MILDEW. **Golovinomyces cichoracearum**, MT, OK, TX; **Sphaerotheca macularis**, MT, WA, WY; **Leveillula taurica**, WA.

ROT, Crown and Stem. **Sclerotinia sclerotiorum**, CA.

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, VA.

VIRUS. **Tomato Spotted Wilt**, CA; **Bidens Mottle**, FL.

## 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**, AL, FL; **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. 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 veinbanding, 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.

#### 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, WI, ND and MT to MS, NM.

#### GAZANIA

ROT, Crown. **Rhizoctonia solani**, CA; **Sclerotinia sclerotiorum**, LA.  
 VIRUS. **Lettuce Mosaic**, CA; **Tomato Spotted Wilt-Lettuce Serotype**, GA.

#### GAZANIA (Treasure Flower)

ROT, Crown. **Sclerotinia sclerotiorum**, LA.

#### GENTIAN (*Gentiana*)

BLIGHT, Stem Canker. **Botrytis cinerea**, NY.  
 LEAF SPOT. **Asteromella andrewsii** (*Mycosphaerella andrewsii*), DE, IL, IA, NE, NJ, D, PA, WV, WI; **Cercospora gentianae**, NY, ND, 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 AK, CA, WA; **P. haleniae**, WY; **Uromyces gentianae** (II, III), CO, IA, NV, NM, NC, VT, WA, WY; **Pucciniastrum alaskanum**, AK.

#### GERANIUM (*Pelargonium*)

BACTERIAL Crown Gall. **Agrobacterium tumefaciens**, MD, MA, OH.  
 BACTERIAL Fasciation. **Clavibacter fascians**, IN, MA, OH, OR.  
 BACTERIAL Leaf Spot. **Xanthomonas pelargonii**, MA to VA, CA, MS, OH, WA; **Pseudomonas cichorii**, FL.  
 BACTERIAL Wilt, Southern. **Pseudomonas solanacearum**, NC; **Ralstonia solanacearum**, Race 3, Biovar 2, CT, DE, PA.  
 BLIGHT, Blossom; Gray Mold; Cutting Rot. **Botrytis cinerea**, cosmopolitan.

LEAF SPOT. *Alternaria* sp., secondary; *Ascochyta* sp., CT, NJ; *Cercospora brunkii*, FL, MD, OH, NH, TX; *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.** Chimera mutation.

PETAL AND LEAF SPOT. *Bipolaris (Helminthosporium) setariae*, FL.

ROT, Blackleg, Stem and Cutting Rot. *Pythium debaryanum*, *P. mamillatum*, *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; *Pythium aphanidermatum*, PA; *P. dissotocum*, PA; *P. ultimum*, PA; *P. heterothallicum*, PA; *P. irregulare*, PA; *P. myriotylum*, PA.

RUST, Pelargonium. *Puccinia pelargonii-zonalis* (II), CA, FL, NY, PA.

VIRUS. **Pelargonium Leaf Curl** (Geranium Crinkle), general; **Geranium Mosaic**; **Cucumber Mosaic**; **Beet Curly Top**; **Tomato Spotted Wilt**, CA, OK, TX; **Tomato Ring Spot**; **Tobacco Ring Spot**; **Pelargonium Flower Break**; **Pelargonium Line Pattern**.

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 speedily removed. Start with clean cuttings from a culture-indexed mother block.

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, NY, NC.

POWDERY MILDEW. *Golovinomyces cichoracearum*, CA, OK.

ROT, Crown. *Sclerotinia sclerotiorum*, MD, NY.

ROT, Root and Stem. *Phytophthora cryptogea* and *P. drechsleri*, CA, NJ, NY; *Pythium irregulare*, CA.

VIRUS. **Tobacco Rattle**, FL; **Tomato Spotted Wilt-Impatiens Serotype**, FL.

WILT, Fusarium. *Fusarium chrysanthemi*, *F. oxysporum* f. sp. *trachapheillum*, FL.

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., WV, WI; **Ramularia gei**, MO, WI; **Septoria gei**, AK, DE, IL, MI, NE, NY, OH.

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*) **waldsteiniae**, 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; **Gymnosporangium exterum** (0, I), IN, KY, MO, NC, TN, VA, III on red-cedar.

GLADIOLUS

BACTERIAL Leaf Blight. **Xanthomonas gummisudans**, NY to MO, ND, WA.

BACTERIAL, MLO. **Aster Yellows**, MD.

BACTERIAL Scab; Neck Rot; Leaf Spot. **Pseudomonas marginata**, general.

BACTERIAL Soft Rot. **Erwinia carotovora**, MI.

BLIGHT, Brown Spot of leaves, flowers. **Curvularia lunata** (*Cochliobolus lunata*), FL, MD, MI, NY, NC, VA, WI.

BLIGHT, Leaf; Flower Spot; Corm Rot. **Botrytis gladiolorum**, AK, CA, FL, MA, MD, NJ, NY, OR, WA, WI.

BLIGHT, Seedling. **Botrytis elliptica**, WA.

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, TX; **M. hapla**.

NEMATODE, Sheath. **Hemicycliophora oracilis**, OR.

NONPARASITIC **Leaf Scorch**. Atmospheric fluorides, WA.

**Brown Tip**. From waterlogged soil.

**Ink Spot**. On husks and corms. Cause unknown.

“**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.  
 RUST, **Uromyces transversalis**, Mexico (Michoacan), CA, FL.  
 SMUT. **Urocystis gladiolicola**, CA.  
 VIRUS. **Cucumber Mosaic**; **Yellow Bean Mosaic** (mild mosaic); **White Break**, NY  
 to IL, CA, 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; **Tomato Spotted Wilt-Impatiens Serotype**, FL, GA.  
 WHITE RUST. **Albugo bliti**, NM.

#### 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 cryptogea**, CA; **P. tropicalis**, NC; **Pythium ultimum**, CA; **Myrothecium roridum**, FL.  
 VIRUS. **Tomato Spotted Wilt**, CA, MO, NC, TX; **Tobacco Mosaic**, CA, CT, DC,  
 FL, OH, WA; **Impatiens Necrotic Spot**, NC.

#### 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. **Phythium ultimum**, MO; **Phytophthora cryptogea**.  
 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-GLOW (*Rudbeckia lacinata*)

BACTERIAL, MLO. **Aster Yellows**; **California Aster Yellows**.  
 BLIGHT, Southern. **Sclerotium rolfii**, 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. **Golovinomyces cichoracearum**, general.  
 ROT, Stem. **Sclerotinia sclerotiorum**, CT.  
 RUST. **Puccinia dioicae** (0, I), MO, SD; **Uromyces perigynius** (0, I), MD to MO,  
 MT; II, III on *Carex*; **U. rudbeckiae** (III), MD to MS, NM, MT.  
 SMUT, White. **Entyloma compositarum**, IA, MO, OH, WI.  
 VIRUS. **Potato Yellow Dwarf**; **Mosaic**, unidentified. Powdery mildew is commonly  
 present.

GOLDENROD (*Solidago*)

BLACK KNOT. **Gibberidea heliopsisidis**, CT, MO, NY, ND.  
 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 spilanthisidis**, LA.  
 LEAF SPOT. **Ascochyta compositarum**, WI; **Asteroma solidaginis**, black scurf;  
**Cercospora parvimaculans**, WI; **Colletotrichum solitarium**, KS, NE, WI;  
**Macrophoma sphaeropsispora**; **Phyllosticta solidagni-cola**, IL, WI; **Placosphaeria haydeni**, black spot; **Ramularia serotina**, CO, IL, TX, WI, WY;  
**Septoria** spp.  
 MOLD, Leaf. **Cladosporium astericola**, WI.  
 NEMATODE, Lesion. **Pratylenchus pratensis**, FL.  
 POWDERY MILDEW. **Golovinomyces 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; **Tomato Spotted Wilt**, PA.

GRAPE-HYACINTH (*Muscari*)

ROT, Dry. **Sclerotium** sp., MO, WA.

SMUT, Flower. **Ustilago vaillantii**, MA, WA.

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.

NECROSIS, Vascular. **Verticillium dahliae**, NM.

NEMATODE, Leaf and Stem. **Ditylenchus dipsaci**, CA.

NEMATODE, Root Knot. **Meloidogyne** spp., AL, FL.

POWDERY MILDEW. **Sphaerotheca fusca**, CA.

ROT, Root. **Phymatotrichum omnivorum**, TX.

RUST. **Aecidium physalidis**, WI to TX, CO, NM; **Puccinia physalidis**, CO, IA, MN, NE, WI.

SMUT, White. **Entyloma australe**, MA to MS, NM, ND.

VIRUS. **Beet Curly Top**; **Mosaic** (part cucumber, part tobacco mosaic); **Ring Spot** (Tobacco); **Physalis Mosaic**, IL; **Potato Leafroll**, Pacific Northwest; **Tomato Spotted Wilt**, GA; **Yellowing Stunting Disorder**, CA.

## GYPSOPHILA (Baby's-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.

ROOT ROT. **Phytophthora dreschleri**, NC.

WILT. **Phytophthora cactorum**, MA.

# H

## HELICHRYSUM

See Strawflower.

## 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.

## 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 NEMATODE. **Aphelenchoides fragariae**, CA.

LEAF SPOT. **Cercospora heucherae**, IL, IN, IA, OH, PA, VA, WV, WI; **Phyllosticta excavata**, AK, ID; **Ramularia mitellae** var. **heucherae**, WA; **Septoria heucherae**, IN.

POWDERY MILDEW. **Golovinomyces cichoracearum**, CA; **Sphaerotheca macularis**, MT, NM; **Phyllactinia corylea**, MT.

ROT, Root. **Phytophthora cinnamomi**, NC; **Pythium hypogynum** and **P. ultimum**.

RUST. **Puccinia heucherae** (III), PA to NC, AK, SD, western states.

SMUT, Leaf and Stem. **Urocystis lithophragmae**, UT.

VIRUS. **Tobacco Rattle**, MA, MI, MN.

## HIBISCUS (Arborescent Forms) (Rose-of-Sharon, Confederate-Rose, Chinese Hibiscus, Kenaf)

BACTERIAL Crown Gall. **Agrobacterium tumefaciens**, MS.

BACTERIAL Leaf Spot. **Pseudomonas syringae**, CA, FL; **P. syringae** pv. **hibisci**, 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, GA, MD, MS; **C. moricola**, LA.  
 NEMATODE, Leaf. **Aphelenchoides fragariae**, FL.  
 NEMATODE, Root Knot. **Meloidogyne** spp., MS, TX.  
 NONPARASITIC. **Strapleaf**. Molybdenum deficiency, FL.  
 POWDERY MILDEW. **Leveillula taurica**, TX.  
 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.  
 STUNTING. **Hoplolaimus magnistylus**, MS.  
 VIRUS. **Mosaic**, unidentified, FL; **Hibiscus Chlorotic Ringspot**; **Tomato Spotted Wilt**, TX; **Potato Leaf Roll**, Pacific Northwest; **Hibiscus Latent Fort Pierce**, NM.

#### HIPPEASTRUM

See Amaryllis.

#### HOARHOUND (*Marrubium*)

GALL, Leaf. **Synchytrium marrubii**, TX.  
 LEAF SPOT. **Cercospora marrubii**, OK, TX.  
 NEMATODE, Root Knot. **Meloidogyne** sp., AL.

#### 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**, East and central states to AL, SD, TX; **C. kellermanii**, IN, MD, MN, MO, 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. **Golovinomyces cichoracearum**, CA, MS; **Erysiphe polygoni**, IA.  
 ROT, Crown. **Phytophthora megasperma**, MD, VA; **Sclerotinia sclerotium**, 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.

HOSTA (*Plantain-Lily*)

BACTERIAL, Proliferation. **Rhodococcus fascians**, OR.

LEAF SPOT. **Alternaria** sp., NY; **Phyllosticta** sp., NJ.

NEMATODE, LEAF LESION. **Aphelenchoides fragariae**, IL, NY, SC.

ROT, Crown. **Botrytis cinerea**, AK, NJ; **Sclerotium rolfsii** (*S. delphinii*), CT, MD, MN, NJ, NY.

ROT, Root. **Rhizoctonia solani**, NJ; **Fusarium solani**, **F. oxysporum**, **F. proliferatum** (Root and Crown), SC.

VIRUS. **Hosta Virus X**, IL, IN, IA, MN, HI, Pacific Northwest; **Tobravirus**, **Leaf Necrosis**, IL, MI, MN; **Tomato Spotted Wilt**, FL; **Impatiens Necrotic Spot**, NY; **Arabis Mosaic**, MI, MN, NE; **Tobacco Rattle**, **Canna Yellow Mottle**, **Helloborus Black Death Disease**, **Nemerica Necrosis**, **Diascia Yellow Mottle**, Pacific Northwest.

HYACINTH (*Hyacinthus*)

BACTERIAL Soft Rot. **Erwinia carotovora**, cosmopolitan.

BACTERIAL Yellow. **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; **Hyacinth Mosaic**, OR.

# I

IMPATIENS (Garden Balsam, Sultan)

BACTERIAL BLIGHT LEAF. **Pseudomonas syringae**, CA.

BACTERIAL FASCINATION. **Clavibacter fascians**, CA.

BACTERIAL WILT. **Pseudomonas solanacearum**, WI.

DAMPING-OFF. **Pythium** sp., WA; **Rhizoctonia solani**, FL.

DOWNY MILDEW. **Bremiella sphaerosperma**, IN, MN, MS, MT, WI, Manitoba, Quebec, Canada; **Plasmopara obducens**, CA, IL, MA, NY.

GALL, Leaf. **Synchytrium impatiensis**, LA.

LEAF SPOT. **Cercospora fukushiana**, FL, KS; **Septoria noli-tangeris**, OH; **Phyllosticta** sp., NJ.

NEMATODE, Lesion. **Pratylenchus penetrans**.

NEMATODE, Root Knot. **Meloidogyne** sp.

ROT, Crown. **Pythium ultimum** and **Rhizoctonia solani**.

ROT, Mushroom Root. **Armillaria mellea**, CA.

ROT, Stem. **Sclerotium rolfsii**; **Myrothecium roridum**.

VIRUS. **Cucumber Mosaic**, SC; **Impatiens Latent**, MN; **Impatiens Necrotic Spot**, NC; **Tomato Spotted Wilt**, FL, GA, NC, OK; **Turnip Mosaic**, NY; **Tobacco Ringspot**, IA, MN.

WILT. **Verticillium albo-atrum**, NY; **Verticillium dahliae**, OH.

IRESINE (Blood-Leaf)

LEAF SPOT. **Septoria iresines**, OK.

NEMATODE, Root Knot. **Meloidogyne** sp., FL, MD.

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, OR, SC, TX.



- LEAF SPOT, Blight. **Didymellina macrospora**, CA, NC, TX, WA.
- NEMATODE, Bulb. **Ditylenchus dipsaci** (*D. iridis*), FL, NY, NC, OR, SC, 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, NY, NC, 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), CA, IN, LA, NC.
- VIRUS. **Iris Mosaic**, general; **Iris Severe Mosaic**.
- 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, MT, TX, WA WI; **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**.
- 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, MN; II, III on *Phalarus*.
- VIRUS. **Iris Severe Mosaic**; **Iris Fulva Mosaic**, MA.
- 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.
- IXIA
- ROT, Corm. **Fusarium oxysporum** f. sp. **gladioli**; **Sclerotium** sp.
- VIRUS. **Iris Mosaic**, OR, WA.

# J

JERUSALEM-CHERRY (*Solanum pseudocapsicum*) (Also *Solanum capsicastrum*, False Jerusalem-cherry; *S. dulcamara*, Bittersweet; *S. integrifolium*, Scarlet Eggplant; *S. nigrum*, Black nightshade)

BACTERIAL Canker. **Clavibacter michiganense**, WY. Also on *S. dulcamara* (Bittersweet).

BACTERIAL Crown Gall. **Agrobacterium tumefaciens**, CT.

BLIGHT, Late. **Phytophthora infestans**, MD, NY.

CANKER, STEM. **Diaporthe phaseolorum** var. **caulivora**, LA.

DODDER. **Cuscuta groenovii**, 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, MD, OR.

NEMATODE, Tobacco Cyst. **Heterodera tabacum**, VA.

PARASITIC Lichen. **Strigula elegans** and **S. complanata**, southern U.S., LA.

VIRUS. **Beet Curly Top** on False Jerusalem-cherry (*S. capsicastrum*); **Tobacco Mosaic**, IA, VA; **Tomato Spotted Wilt**, tip blight, OR.

WILT. **Verticillium albo-atrum**, NY.

# K

## KALANCHOE

BACTERIAL Crown Gall. **Agrobacterium tumefaciens**.

BACTERIAL Wilt and Soft Rot. **Erwinia carotovora** pv. **carotovora**, FL.

BLIGHT, Flower. **Stemphylium bolickii**, 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; **Kalanchoe Latent**; **Kalanchoe Top-Spotting**.

## KIDNEY VETCH, LADY'S FINGERS (*Anthyllis*)

BLIGHT, Leaf and Stem. **Fusarium** sp., NC.

LEAF SPOT. **Phyllosticta** sp., NC.

## KRIGIA (Dwarf Dandelion)

DOWNY MILDEW. **Bremia lactucae**, MS, MO, OKWI.

LEAF SPOT. *Mycosphaerella krigiae*, IL, WI; *Septoria krigiae*, KY, NY, WI.

ROT, Root. **Phymatotrichum omnivorum**, TX.

RUST. **Puccinia dioicae** (0, I), IL, IA, WI; II, III on *Carex*; **P. hieracii** (0, I, II, III), NC;

**P. maculosa** (III), IL, MI, MS, MO, PA, TN.

# L

## LARKSPUR

See Delphinium.

Crown Rot, Southern Blight, is prevalent on annual larkspur.

## 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**.

## LESPEDEZA

LEAF and STEM DISEASE. **Cercospora zebrina** (clover isolate), NC.

## LEUCOJUM (Snowflake)

LEAF SCORCH, Red Blotch. **Stagonospora curtisii**, CA.

NEMATODE, Meadow. **Pratylenchus** sp.

ROT; Scale Speck, of Bulbs. **Botrytis** sp., CA.

## LILY (*Lilium*)

BACTERIAL Soft Rot. **Erwinia carotovora**, GA, MA, NJ, WV.

BLIGHT, Botrytis; Leaf Spot. **Botrytis elliptica**, general; **B. cinerea**, general;

**B. liliorum**, CA; **Botryotinia sphaerosperma**, 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 lillii**, 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, **Scorch**, of Easter lilies. Acid soil, low fertility, excessive phosphorus.

**Bud Blast**. Insufficient light; also causes drop of lower leaves.

**Chlorosis**. Iron deficiency. Sometimes result of systemic insecticide.

**Limber Neck**. Physiological.

PHYTOPLASMA. Mexico.

ROT, Basal. **Fusarium oxysporum** f. sp. **lilii**, general.

ROT, Black Scale. **Colletotrichum lilii**, LA, MS; Brown Scale, **Colletotrichum** sp., OR, WA; Scale-tip, **Cylindrocarpon radicicola**, secondary.

ROT, Bulb. **Penicillium** spp., blue mold; **Rhizopus** sp., soft rot, cosmopolitan.

ROT, Charcoal. **Macrophomina phaseoli**, CA.

ROT, Root. **Pythium** spp.; **Rhizoctonia solani**, wide spread.

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, CA, ID, MI, MN, NE, OR, WA.

VIRUS. **Lily Fleck**; **Lily Latent Mosaic**; **Lily Mottle**; **Lily X**, CA; **Lily Ring Spot**; **Lily Rosette**; **Lily Symptomless**, MD, Argentina; **Cucumber Mosaic**; **Tulip Breaking Mosaic**; **Streak**, on Easter lily, virus from wild cucumber; **Curl-Stripe Disease**, OR.

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; **Phytophthora citricola** (also foliar blight), CA.

NEMATODE, Meadow. **Pratylenchus pratensis**, associated with forcing failures.

NEMATODE, Root Knot. **Meloidogyne** sp., occasional.

LIONS-EAR (*Leonotis*)

LEAF SPOT. **Cercospora leonotidis**, LA; **Septoria breviscula**, NY.

RUST. **Puccinia leonotidis** (0, I, II, III), FL.

LOBELIA (Cardinal-Flower, Blue Lobelia)

BACTERIAL BLIGHT. **Pseudomonas cichorii**, WA.

BLIGHT, Gray Mold. **Botrytis cinerea**.

DAMPING-OFF. **Pythium debaryanum**, MA, NY.

LEAF SPOT. **Cercospora lobeliae**, AL, IL, IN, KS, MD, TX; **C. effusa**, IA, TX; **Phyllosticta bridgesii**, IN; **Septoria lobeliae**, ME to VA, TX, WI.

NEMATODE, Root Knot. **Meloidogyne** spp., FL, MD, NE, NY.  
 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.

LUPINE (*Lupinus*)

ANTHRACNOSE. **Colletotrichum trifolii**, NC; **C. fragariae**, NC.  
 BACTERIAL Drippy Pod. **Brenneria quercina** pv. **lupinicola**, WA, Pacific northwest.  
 BLIGHT, Gray Mold. **Botrytis cinerea**, MA, MT, NY.  
 BLIGHT, Leaf. **Hadrotrichum globiferum**, CA, CO, OR, 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., CT, WI; **Alternaria alternata** (Bluebonnet),  
 TX.  
 BROWN SPOT. **Pleiochaeta setosa**, Nova Scotia, Canada.  
 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 cassiicola**, TX;  
**Cylindrosporium lupini**, CA; **Mycosphaerella pinodes**, WI; **Ovularia lupini-**  
**cola**, 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**, CA, MI; **Septoria lupinicola**, WI; **Stictochlorella lupini**, CA, WA.  
 LESION, STEM. **Phoma** sp.  
 NEMATODE, Leaf. **Aphelenchoides ritzemabosi**.  
 NEMATODE, Lesion. **Pratylenchus pratensis**, CA.  
 NEMATODE, Root Knot. **Meloidogyne** sp., FL.  
 NEMATODE, Sting. **Belonolaimus gracilis**, GA; ring, **Criconema** sp., CA.  
 POWDERY MILDEW. **Microsphaera** sp.; **Erysiphe polygoni**, widespread; **Ovulariopsis**  
 sp. (Bluebonnets), NM.  
 ROT, Root. **Armillaria mellea**, CA; **Fusarium** sp., NJ, VA; **Phymatotrichum**  
**omnivorum**, TX; **Pythium ultimum**, CA; **Thielaviopsis basicola**, IA, WI.  
 ROT, Root, Crown, Stem. **Pythium paroecandrum**, NM.  
 ROT, Stem. **Macrophomina phaseoli**, charcoal rot; **Sclerotinia sclerotiorum**, LA,  
 NY, TX; **Pythium debaryanum**, TX, CA; **Rhizoctonia solani**, Alberta, Canada.  
 RUST. **Puccinia andropogonis** var. **onobrychidis** (0, I), MI, MN, NY, WI; II, III on  
*Andropogon*; **Uromyces lupini** (0, I, II, III), CA, MT, NE, OR, WA; **U. occident-**  
**alis** (II, III), on native lupine, MT to NM, CA, WA.  
 SMUT. **Thecaphora deformans**, on seed, CO, WY.  
 VIRUS. **Bean Yellow Mosaic**, FL, WA; **Bidens Mottle**, FL; **Ring Spot**. Unidentified;  
**Tomato Spotted Wilt**, TX; **Peanut Mottle**, GA; (Stunt/Vein Clearing)  
**Tombusvirus**, AK.  
 WILT. **Sclerotinia minor**, TX.

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.

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.

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.

# M

## MARANTA (*Calathea*)

LEAF SPOT. **Glomerella cincta**, NJ; **Phyllosticta** sp., NJ; **Drechslera setariae**, FL.  
RUST. **Puccinia cannae** (II, III), FL.  
VIRUS, Mosaic. **Sugarcane Mosaic**, FL.

## MARGUERITE (*Argyranthemum frutescens*)

BACTERIAL Crown Gall. **Agrobacterium tumefaciens**, IA, MD, NJ, NY, VA.  
BACTERIAL, MLO. **Aster Yellows**, KS, NJ, NY, and **California Aster Yellows**, CA.  
DOWNY MILDEW. **Peronospora radii**, CA.  
NEMATODE, Root Knot. **Meloidogyne** sp.  
POWDERY MILDEW. **Golovinomyces 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**, AK, CT, NJ, PA; **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.  $\text{NO}_2$ ,  $\text{SO}_3$ ,  $\text{O}_3$ , NC.  
ROT, Charcoal. **Macrophomina phaseoli**, OK.  
ROT, Root. **Pythium ultimum**, CA; **Rhizoctonia solani**, TX.  
ROT, Stem; Wilt. **Sclerotinia sclerotiorum**, NY; **Phytophthora cryptogea**, NY;  
**Fusarium** sp., CA, NJ, NY.  
RUST. **Coleosporium madaiae** (II, III), CA; 0, I on pine; **Puccinia tageticola** (II, III), TX.



VIRUS. **Cucumber Mosaic**, FL.

WILT. **Fusarium oxysporum** f. sp. **callistephi**, CA; **Verticillium alboatrum**, 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, NM.

MEADOWSWEET (*Filipendula*)

LEAF SPOT. **Cylindrosporium** sp.; **Septoria ulmariae**, CT.

POWDERY MILDEW. **Sphaerotheca macularis**, IN, NY, VT.

RUST. **Triphragmium ulmariae** (0, I, II, III), IN.

MELAMPODIUM (*Melampodium divaricatum*)

POWDERY MILDEW. **Oidium** sp., LA.

VIRUS. **Tomato Spotted Wilt**, LA.

MIGNONETTE (*Reseda*)

DAMPING-OFF, Root Rot. **Rhizoctonia solani**, CT.

LEAF SPOT. **Cercospora resedae**, MA to MS, IA, MO.

NEMATODE, Root Knot. **Meloidogyne** sp., FL.

WILT. **Verticillium albo-atrum**, NY.

MONARDA (Horse-Mint, Bee-Balm)

BLIGHT, Southern. **Sclerotium rolfsii**, TX.

GALL, Leaf. **Synchytrium holwayi**, IA, WI.

LEAF SPOT. **Cercospora** sp., OK; **Phyllosticta decidua**, KS, NE, OK, TX, WI;  
**P. monardae**, KS; **Ramularia brevipes**, AL, TX.

POWDERY MILDEW. **Golovinomyces cichoracearum**, general.

RUST. **Puccinia angustata** (0, I), NE, WI; **P. menthae** (0, I, II, III), general from  
ME to MS. ID, TX, **P. monardae**.

VIRUS. **Mosaic**. Unidentified, IN; **Tomato Spotted Wilt**, PA.

MONSTERA

ANTHRACNOSE. **Gloeosporium** sp., WA; **Colletotrichum** sp.

LEAF SPOT. **Macrophoma philodendri**, FL, MI.

MORNING-GLORY (*Ipomoea*)

BLIGHT. **Phytophthora ipomoeae**, Mexico (Metepac).

BLIGHT, Blossom, Blight. **Choanephora compacta**, GA.

BLIGHT, Southern. **Sclerotium rolfsii**, TX.

BLIGHT, Thread. **Pellicularia koleroga**, FL.

CANKER, Stem. **Vermicularia ipomoearum**, NY, PA; **Diaporthe phaseolorum** var.  
**cauliflora**, LA.

CHLOROTIC LEAF DISTORTION. **Fusarium lateritium**, NC.

LEAF SPOT. **Alternaria** sp., VA; **Cercospora alabamensis**, AL, FL, NJ; **Phyllosticta ipomoeae**, FL, KS, MS; **Septoria convolvuli**, FL, KS, PA, TX, WI.

NEMATODE, Root Knot. **Meloidogyne** sp.; **M. hapla**, AL, OK; **M. incognita**, LA.

NEMATODE. **Rotylenchulus reniformis**, LA.

ROT, Root. **Erwinia carotovora** subsp. **carotovora**, LA; **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, KS, TX; 0, I on pine; **Uredo laeticolor** (II), FL.

VIRUS. **Cucumber Mosaic**, FL; Sweet Potato; **Tomato Spotted Wilt – Impatiens Serotype** and **Lettuce Serotype**, FL; **Sweetpotato Feathery Mottle**.

WHITE RUST. **Albugo ipomoeae-panduratae**, NJ to AZ, NE.

WILT. **Fusarium** sp., TX.

MOSS ROSE (*Portulaca grandiflora*)

VIRUS. **Alternanthera Mosaic**, FL, MD, PA.

# N

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 radicum**, 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.

NASTURTIUM (*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 schachtii**, 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.

NEMOPHILA (Baby Blue-Eyes)

POWDERY MILDEW. **Golovinomyces cichoracearum**, CA, NV, TX, WA.

NEPHTHYTIS

LEAF SPOT. **Cephalosporium cinnamomeum**, FL, MD.

NEMATODE, Root Knot. **Meloidogyne incognita**.

ROT, Root. **Pythium splendens**, FL.

VIRUS. **Tomato Spotted Wilt**, PA.

Spraying with maneb should control the leaf spot.

NERINE (Guernsey-Lily)

LEAF SCORCH; Red Blotch. **Stagonospora curtisii**, CA.

NEMATODE, Lance. **Hoplolaimus coronatus**, NC.

NEW ZEALAND FLAX (*Phormium tenax*)

ROT, Root. **Armillaria mellea**, CA.

NICOTIANA (Flowering Tobacco)

BACTERIAL Blackfire. **Pseudomonas tabaci**, WI; **P. angulata**, WI.

BLACK SHANK. **Phytophthora parasitica** var. **nicotianae**, CT.

BLIGHT. **Phytophthora infestans**, NY.

DAMPING-OFF, STEM LESIONS. **Rhizoctonia solani**, GA.

DOWNY MILDEW. **Peronospora tabacina**, CA, TX.

LEAF SPOT. **Alternaria longipes**, TX; **Rhizoctonia solani**, NC, New England;

**Alternaria alternata**, CT, MA; **Thanatephorus cucumeris**, New England.

MOLD, Blue. **Peronospora tabacina**, GA.

NEMATODE, Root Knot. **Meloidogyne** sp., FL.

NEMATODE STUNT. **Globodera tabacum solanacearum**, VA, (also CT and Quebec, Canada on **Nicotiana tabacum**).

POWDERY MILDEW. **Oidium** sp., KY.

ROT, Root. **Phymatotrichum omnivorum**, TX; **Pythium myriotylum**, SC; in hydroponic; **Phytophthora nicotianae**, NC.

STEM NECROSIS. **Phytophthora nicotianae**, NC.

STUNT. **Glomus macrocarpum**, KY.

STUNT, Wilt. **Pythium dissotocum**, Brazil.

VIRUS. **Beet Curly Top**, TX; **Tomato Spotted Wilt**, CA, TN, TX, Mexico, Impatiens and Lettuce serotypes, GA; **Tobacco Mosaic**, GA; **Tobacco Ring Spot**; **Tobacco Vein- Mottling**, NC; **Cucumber Mosaic**, FL; **Tobacco Mild Green Mosaic**, **Tobacco Vein- Banding Mosaic**, TN; **Tobacco Yellow Net**, CA; **Potato Leafroll**, Pacific Northwest, **Potato Virus A**, WA; **Blueberry Scorch**, British Columbia; **Rhynchosia Golden Mosaic**, Mexico; **Potato Virus Y**, GA; Southern Ontario, Canada.

WILT. **Pythium aphanidermatum**, NC.

NIGHT-BLOOMING CEREUS (*Hylocereus*)

VIRUS. **Cactus Virus X**, CA.

# O

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; **Peizella oenotherae**, GA, MD, NC, SD, VA; **Pestalotia oenotherae**, OH, OK; **Septoria oenotherae**, ME to FL, CA, NM, OK, SD, UT.

POWDERY MILDEW. **Erysiphe polygoni**, general.

ROT, Root. **Phymatotrichum omnivorum**, TX; **Rhizoctonia solani**, TX; **Sclerotinia minor**, NC.

RUST. **Aecidium anograe** (0, I), NE; **Puccinia aristidae** (0, I), AZ, NV; II, III on grasses; **P. dioicae** (0, I), ME to AL, CA, CO, ND, TX; 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.

OLEANDER (*Nerium*)

ANTHRACNOSE, Leaf Spot. **Gloeosporium** sp., MA, MS, NJ, TX.

BACTERIAL Knot. **Pseudomonas syringae** pv. **tonelliana**, AZ, CA, CT.

BACTERIAL, Leaf Scorch. **Xylella fastidiosa**, FL.

BLIGHT, Stem and Leaf. **Pseudomonas syringae**, CA.

CANKER; Witches' Broom. **Sphaeropsis** sp., FL.

DODDER. **Cuscuta indecora**, FL.

LEAF SPOT. **Alternaria** sp. (*Macrosporium nerii*), AL, CA, FL, GA, MS; **Cercospora neriella**, also pod spot, AL, FL, LA, 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.

ORCHIDS (*Dendrobium*)

BLIGHT, Flower and Leaf; Rot, Root. **Fusarium proliferatum**, **F. solani**, **F. oxysporum**, **F. subglutinans**, HI.

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**; **Burkholderia gladioli**.

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, **E. chrysanthemi**, FL; **Burkholderia gladioli** (also leaf spot), HI; **Dickeya chrysanthemi**, FL.

BACTERIAL Water Soaked Leaves. **Dickey chrysanthemi**, **Erwinia chrysanthemi**, FL.

BLIGHT, Petal. **Botrytis cinerea** (*Sclerotinia fuckeliana*), spotting common on older flowers; **Glomerella** sp., black spot of *Vanda* orchids.

BLIGHT, Southern. **Sclerotium rolfsii**, FL.

BLOTCH, Sooty. **Gloeodes pomigena**.

DODDER. **Cuscuta gronovii**; Laurel-Dodder. **Cassytha filiformis**.

FLYSPECK. **Microthyriella rubi**.

LEAF ROT. **Sclerotinia rolfsii**, FL.

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**.

NEMATODE, Lesion. **Pratylenchus pratensis**; **P. scribneri**.

NONPARASITIC. **Cattleya Dry Sepal**. Industrial fumes.

ROT, Black; Leaf and Heart. **Phytophthora cactorum**, **P. phaseoli**, FL; **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), FL, NJ, NY; 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**, CA, HI; **Orchid Fleck**; **Mild Cattleya Color-Break**; **Severe Cattleya Color-Break**; **Cattleya Blossom Brown Necrotic Streak**; **Odontoglossum Ring Spot**, HI; **Oncidium Ring Spot**; **Tomato Spotted Wilt**,

HI; **Vanda Ring Spot**; **Spiranthes Mosaic**, MD; **Odontoglossum Ringspot**, China, Japan, Taiwan; **Impatiens Necrotic Spot Virus**, FL.  
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.

OREGANO, SWEET MARJORAM (*Origanum*)

RUST. **Puccinia menthae**, CA, FL.



# P

## PANSY (*Viola tricolor*)

ANTHRACNOSE. **Colletotrichum violae-tricoloris**, ME to FL, IN, MI, PA, WA.

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; Crown. **Myrothecium roridum**, AL.

ROT; Leaf Spot. **Centrospora acerina**, CA, GA.

ROT, Root; Wilt. **Aphanomyces cladogamus**, MD; **Fusarium oxysporum**, CT, MI, NE, NJ, NY, OH, TX; **Thielaviopsis basicola** (*Chalara elegans*), 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; **Tomato Spotted Wilt – Lettuce Serotype**, GA.

## PASSION FLOWER (*Passiflora*)

ANTHRACNOSE, Postharvest. **Colletotrichum boninense**, **C. capsici** and **Glomerella** sp., FL.

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; **Alternaria passiflorae**, FL, brown spot.

NEMATODE, Root Knot. **Meloidogyne** sp.

PHYTOPLASMA. Costa Rica.

ROT, Collar. **Sclerotinia** sp., CA.

ROT, Root. **Phymatotrichum omnivorum**, TX.

VIRUS. **Cucumber Mosaic**, CA; **Passiflora Latent**, FL.

VIRUS, Chlorosis. **Bean Common Mosaic**, FL.

WILT, Fusarium. **Fusarium oxysporum** f. sp. **passiflora**, CA.

PENSTEMON (Beard-Tongue)

BLACK MILDEW. **Dimerium alpinum**, CA.

LEAF SPOT. **Cercospora penstemonis**, AL, IN, KS, MT, NE, ND, OK, SD, 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. **Golovinomyces cichoracearum**, WA.

ROT, Crown, Stem. **Sclerotium rolfsii**, CT, IL, MA, NJ, TX.

ROT, Root. **Phymatotrichum omnivorum**, TX.

ROT, Root, Crown. **Phytophthora citrophthora**, CA.

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.

VIRUS. **Cucumber Mosaic**, OR; **Turnip Vein-Clearing**, MN.

PEONY (*Paeonia*)

ANTHRACNOSE. **Gloeosporium** sp., IL, KS, MD, MA, NJ, NC, PA, VA.

BACTERIAL Crown Gall. **Agrobacterium tumefaciens**, MD, MI.

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.

BLIGHT, Twig. **Pestalotiopsis paeoniicola**, CT.

BLOTCH, Leaf, Stem; Measles. **Cladosporium paeoniae**, general.

CANKER, Stem Wilt. **Coniothyrium** 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, OH, OK.

VIRUS. **Peony Ring Spot**, MA to VA, CA, KS, MI, WA; **Tobacco Rattle**, AK; **Witches' Broom**, **Crown Elongation**. Cause unknown, MD, NY, VA; **Hosta Virus X**, **Tobacco Rattle Virus**; **Helleborus Net Necrosis**; **Nemesia Ring Necrosis**, **Diascia Yellow Mottle**, Pacific Northwest.

WILT. **Verticillium albo-atrum**, IL, KS, MD, NY, OH.

Botrytis blight is doubtless 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 ritzemabosi**; **Pratylenchus** sp.; **Radopholus similis**, FL.

ROT, Cutting; Root. **Rhizoctonia** sp.; **Pythium splendens**, CA; **Phytophthora palmivora**, CA; **P. nicotianae** var. **parasitica**, OH.

VIRUS. **Cucumber Mosaic**, SC; **Ring Spot**; **Oedema**, pimples in leaves, graft-transmissible, probably due to a virus; **Tobravirus**, IL, MI, MN.

The virus ring spot distorts leaves, which have chlorotic or brown necrotic rings; plants are stunted.

#### PETUNIA

BACTERIAL Fasciation. **Clavibacter fascians**, CA, OH, PA.

BACTERIAL, MLO. **Aster Yellows**.

BACTERIAL Wilt. **Pseudomonas solanacearum**, FL.

BLIGHT, of old flowers. **Choanephora conjuncta**, GA; **C. cucurbitarum** (whole plant), LA; **Phytophthora infestans**, CA, MD, NY; **Sclerotinia sclerotiorum**, LA.

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.

NONPARASITIC. **Air Pollution Injury**.

NEMATODE, Root Knot. **Meloidogyne** spp., general in South, occasional in greenhouses.

POWDERY MILDEW. **Oidium** sp., MN, NJ, NY, VA, Austria, Hungary.

ROT, Black Stem. **Stemphylium botryosum**, secondary, TX.

ROT, Crown. **Phytophthora nicotianae** var. **parasitica**, FL; **P. parasitica**, CO.

RUST. **Puccinia aristidae** (0, I), AZ.

VIROID. **Tomato Chlorotic Dwarf**, USA.

VIRUS. **Beet Curly Top**, CA, OR; **Tobacco Etch**; **Tobacco Mosaic**; **Cucumber Mosaic**, general; **Tobacco Ring Spot**; **Tomato Spotted Wilt**, CA; **Impatiens Serotype**, GA, FL; **Petunia Vein-Clearing**, MN; **Potato Rugose Mosaic**; **Bidens Mottle**, FL; **Bromegrass Mosaic**, General; **Calibrachoa Mottle**, CA, FL.

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.

#### 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**, MA, NY, 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. **Golovinomyces cichoracearum**, general; **Sphaero theca macularis**, KS, NH, NY, OH, WA.

ROT, Charcoal. **Macrophomina phaseoli**, IL.

ROT, Root. **Thielaviopsis basicola**; **Phymatotrichum omnivorum**, TX.

RUST. **Puccinia douglasii** (0, I, III), CO, MT, NE, NJ, NM, OR, PA, UT, WA, WY; **P. plumbaria** (0, I, III), IL, IA, MO, TX, WY to NM, CA, WA; **Uromyces acuminatus** var. **polemonii** (0, I), IL, IA, MN, MS, SD, WI.

VIRUS. **Angelonia Flower**; **Mosaic**, MD, NY, NC; **Tomato Spotted Wilt-Impatiens Serotype**, GA, FL; **Tobravirus**, IL, MI, MN.

WILT. **Verticillium albo-atrum**, MN, NY.

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.

PHYSOSTEGIA (False Dragonhead)

BLIGHT; Southern Crown Rot. **Sclerotium rolfsii**, VA to OK, CT, KS, 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, MT, NH, NY.

VIRUS. **Tomato Spotted Wilt**, PA.

PLATYCODON (Balloon-Flower)

BLIGHT. **Phytophthora cactorum**, MN.

ROT, Root. **Rhizoctonia solani**, CT, PA; **Phymatotrichum omnivorum**, TX.

POINSETTIA (*Euphorbia pulcherrima*)

BACTERIAL Bract Spot. **Clavibacter cassiicola**, FL.

BACTERIAL Canker; Leaf Spot. **Clavibacter poinsettiae**, MD, NJ, NY, PA; **Pseudomonas viridiflava**, CA, FL.

BACTERIAL, Greasy Canker. **Pseudomonas viridiflava**, CA, FL.

BACTERIAL Leaf Spot. **Xanthomonas poinsetriacola**, FL.

BACTERIAL Stem Rot. **Erwinia carotovora** pv. **chrysanthemi**, CT, MI, OH, PA, WV.

BLIGHT, Tip; Stem Canker. **Botrytis cinerea**, MO, TX, WA.

CANKER, Stem. **Fusarium solani**, WI.

LEAF SPOT. **Cercospora pulcherrimae**, TX; **Corynespora cassiicola**, LA.

NEMATODE, Root Knot. **Meloidogyne** sp., NY; **M. incognita**.

NONPARASITIC. **Chlorosis**. Possibly due to cloudy weather.

**Stunt**. Waterlogged soil.

POWDERY MILDEW. **Oidium** sp., CA.

ROT, Crown and Stem. **Phytophthora nicotianae** var. **parasitica**, FL.

ROT, Root. **Chalaropsis thielaviopsis**, IL; **Clitocybe tabescens**, FL; **Phymatotrichum omnivorum**, AZ, TX; **Rhizoctonia solani**, FL, IL, NJ, TX; **Thielaviopsis basicola**, serious, common; **Pythium aphanidermatum**, PA; **P. irregulare**, PA; **P. ultimum**, PA.

ROT, Stem; Wilt. **Fusarium** sp., FL, NJ; **Pythium debaryanum**, OK; **P. perniciosum**, root rot, CA; **P. ultimum**; **Phytophthora** sp., NJ; **Sclerotinia sclerotiorum**, WA; **Amphobotrys ricini**, basal, LA.

RUST. **Uromyces euphorbiae** (0, I, II, III), OK, TX.

SPOT ANTHRACNOSE; Poinsettia Scab. **Sphaceloma poinsettiae**, FL.

VIRUS. **Poinsettia Mosaic**, WI.

Keep soil acid, pH 4.8–5, to reduce trouble with *Thielaviopsis*. *Rhizoctonia* is prevalent at high temperatures, *Pythium* at low. Steaming soil is safer than using chemicals.

POLEMONIUM (Jacobs-Ladder, Greek-Valerian)

LEAF SPOT. **Cercospora omphakodes**, PA; **Septoria polemonii**, MO, WI; **S. polemoniicola**, CT, IN, MO.

POWDERY MILDEW. **Golovinomyces 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.

VIRUS. **Tomato Spotted Wilt**, PA.

WILT. **Fusarium** sp., NJ; **Verticillium albo-atrum**, NJ.

POPPY (*Papaver*)

ANTHRACNOSE. **Gloeosporium** sp. (*Glomerella cingulata*), NJ.

BLIGHT, Bacterial. **Xanthomonas papavericola**, CT, ME, MO, NJ, NY, OH, OR, VA.

BLIGHT, Gray Mold. **Botrytis cinerea**, AK, MD, WI.

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; **Leveillula taurica**, CA.

ROT, Root, Stem; Damping-Off. **Rhizoctonia solani**, ID, IN, KS, 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**, IL, KS, NE, WI; **Vermicularia spar-sipila**, TX.

ROT, Root. **Phymatotrichum omnivorum**, TX.

RUST. **Endophyllum tuberculatum** (III), IN, KS, NE, OK, TX; **Puccinia interveniens** (0 I), NE, NY, TX; 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, MT, TX.

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**, CA, MD, PA.  
 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; **Phymato-**  
**trichum 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**; **Impatiens Necrotic Spot**, NC.

PULMONARIA

ROT, Petiole. **Sclerotium rolfsii** var. **delphinii**, IA.

PYRETHRUM (*Chrysanthemum cinerariifolium*, *C. coccineum*)

BACTERIAL Fasciation. **Clavibacter fascians**, CT, MD.  
 BACTERIAL, MLO. **Aster Yellows**, KS, NJ, NY.  
 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.

# R

RAIN-LILY (*Cooperia*)

LEAF SPOT. ***Cercospora amaryllidis***, TX.

RUST. ***Puccinia cooperiae*** (0, I, II, III), TX.

RANUNCULUS (Buttercup, Crowfoot)

BACTERIAL, MLO. **California Aster Yellows**.

BACTERIAL NECROTIC LESION, LEAF, STEM. ***Xanthomonas campestris***, CA.

BLIGHT, Gray Mold. ***Botrytis cinerea***, CA, NY, WI.

DOWNY MILDEW. ***Peronospora ficariae***, occasional MA to MD, IA, MN; also CA.

GALL, Leaf. ***Synchytrium anomalum***, IA; ***S. aureum***, CA. IL, 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; ***R. didyma***, CA; ***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, CA, CO, MS, ND; 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, MA, TX; ***U. jonesii*** (0, I, III), CA, CO, MT, WY.

SMUT, Leaf. ***Doassansia ranunculina***, IN, WI; ***Urocystis anemones***, IL, UT, WY.

SMUT, White. ***Entyloma microsporum***, IL, IN, IA, KY, VA, WI; ***E. ranunculi***.



**VIRUS. Beet Curly Top; Ranunculus Mottle; Ranunculus Mosaic; Impatiens Necrotic Spot, NC; Tomato Spotted Wilt, PA.**

**RHODODENDRON**

**BACTERIAL Crown Gall. Agrobacterium tumefaciens, OH.**

**BACTERIAL Leaf Spot. Pseudomonas cichorii, GA.**

**BLIGHT. Phytophthora ramorum, CA, NC, OR, WA; P. tropicalis, VA.**

**BLIGHT, Bud, Twig. Briosia azalea, GA, NJ, NY, NC, PA, TN, VA.**

**BLIGHT, Cutting. Cydrocladium scoparium and C. floridanum, FL, OH.**

**BLIGHT, Flower Spot. Ovinia azaleae, CA, SC.**

**BLIGHT, Gray. Pestalotia macrotricha, general after winter injury.**

**BLIGHT, Necrotic Shoots and Leaves. Phytophthora irrigate and P. hydropathica, MD, PA, VA, WV.**

**BLIGHT, Silky Thread. Rhizoctonia ramicola, FL.**

**BLIGHT, Twig. Phomopsis sp., CT, NJ, NY, OR; Phytophthora hedraiantra, PA.**

**CANKER; DIEBACK. Botryosphaeria ribis, MD, MA, NJ, NY; Gloeosporium sp., MD, NY; Phytophthora cactorum, MD, MA, NJ, NY, OH, PA, RI; P. hedraiantra (also leaf lesions), MN; Glomerella cingulata, MD; Phytophthora cambivora, NC.**

**DAMPING-OFF. Alternaria sp., CT; Rhizoctonia solani, CT, NJ, NY.**

**DODDER. Cuscuta gronovii, NJ.**

**GALL. Exobasidium vaccinii, leaf and shot, MA to FL, 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 rhodoraе, CT, MD, MA, NJ, NY, PA, VA; Gloeosporium ferrugineum, NC; Hendersonia concentrica, NC, TX, WV; Lophodermium schweinitzii, NY to NC, TX; Pestalopezia 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; Phytophthora inflata, OH; P. insolita, OH.**

**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; Erysiphe azalea and E. vaccinii, Pacific Northwest.**

**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. roahnensis (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.**

**VIRUS. Rhododendron Necrotic Ringspot, OR.**

WILT. **Phytophthora cambivora**, NC; **P. cinnamomi**, MD, NJ, NY, PA, OH, VA; **P. citricola**, OH, VA; **P. cactorum**, VA; **P. citrophthora**, VA; **P. nicotianae**, VA; **P. tropicalis**, VA; **P. hibernalis**.

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.

#### ROHDEA

VIRUS. **Tomato Spotted Wilt**, PA.

#### ROMANZOFFIA

RUST. **Puccinia romanzoffiae** (III), OR.

#### ROSE (*Rosa*)

BACTERIAL Blast. **Pseudomonas syringae**.

BACTERIAL Crown Gall. **Agrobacterium tumefaciens**, general.

BACTERIAL Hairy Root. **Agrobacterium rhizogenes**, MD, PA, TX, VA, New England.

BLACKSPOT. **Diplocarpon rosae**, general; **Marssonina rosae**, MS.

BLIGHT, Blossom. **Botrytis cinerea**, cosmopolitan; gray mold on canes in storage;

**Dothiorella** sp., LA, VA.

BLIGHT, Cane. **Phylospora 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, CA, ID, MI, NE, TX.

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, IL, TX.

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, AK, WA; **Cytospora**

sp., KY, PA, VA, WA; **Didymella sepincoliformis**, 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, CA, IA; 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, MI, TX; **Phyllosticta rosae**, NY to FL, IN; **P. rosae-setigerae**, 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.

**Pedicle Necrosis**. Collapse of flower stem, cause unknown.

**Weed-killer Injury**. Leaves fernlike, twisted when 2,4-D used in vicinity.

PETAL SPOT. **Bipolaris** (*Helminthosporium*) **setariae**, FL.

POWDERY MILDEW. **Podosphaera pannosa**, general; **S. macularis**, not readily distinguished from *pannosa*; **Phyllactinia corylea**, WA.

ROT, Dry. **Fusarium oxysporum**, Brazil.

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, ND, TX; **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 Mts.; Pacific Coast; **P. fusiforme** (*P. rosae-acicularis*) (0, I, II, III), on native species, MI to CO, CA, WY; **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, KS, MI, MO, 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, MD, MO, OR; **Rose Streak**, MD, NJ, NY, TX, VA; **Rose Yellow Mosaic**, CA, IL, MD, NY, PA, VA; **Crinkle**. On Manetti understock, sometimes garden roses, Pacific Coast, MD, NY, PA, TX, VA; **Rose Leaf Curl**, CA; **Rose Spring Dwarf**, CA.

WILT. **Verticillium albo-atrum**, AR, CA, IL, NJ, NY; probably wide spread.

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.

#### 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, Northeastern 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**.  
 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, NE, NY, NC, ND, VA, WI.  
 GALL, Leaf. **Synchytrium aureum**, IL, WI.

LEAF SPOT. **Cercospora rudbeckiae**, NY; **C. tabacina**, IL, NY, WI; **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. **Golovinomyces 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; **Bidens Mottle**, FL; **Tomato Spotted Wilt**, TX.

VIRUS, Phyllody. **Flower Distortion**, MN.

WILT. **Verticillium albo-atrum**, NY.

# S

## SAFFLOWER (*Carthamus*)

ANTHRACNOSE; Blight. **Gloeosporium carthami**, IN, TX, VA.

BACTERIAL Blight. **Pseudomonas syringae**, CA.

BLIGHT. **Botrytis cinerea**; **Rhizoctonia** sp., NM.

LEAF SPOT. **Alternaria** spp., AZ, CA, IN, MT, NE, ND; **Septoria carthami**, IN, TX; **Stemphylium** sp., FL; **Cercospora beticola**, MT.; **Ramularia carthami**, **Ramularia cercosphaelloides**, Sonora, Mexico.

POWDERY MILDEW. **Golovinomyces 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, Clary, Sauceleaf, 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, LA; **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. javanica**.

POWDERY MILDEW. **Golovinomyces cichoracearum**, CA.

ROT, Charcoal. **Macrophomina phaseoli**, SC.

ROT, Root. **Fusarium oxysporum**, NC; **Phytophthora dreschleri**; **P. parasitica**, NC; **Phymatotrichum omnivorum**, TX; Stem, **Sphaeropsis salviae**, MS.

ROT, Root and Crown. **Phytophthora cryptogea**, CA.

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.

STEM SPOT, Lesion; Wilt. **Sclerotinia sclerotiorum**, ND.

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. **Golovinomyces 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, AK, CA, WA; **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.

SAINFOIN (*Onobrychis*)

DAMPING-OFF. **Rhizoctonia solani**, TX; **Sclerotium rolfsii**, TX.

NEMATODE, Root Knot. **Meloidogyne hapla**, WY.

ROT, Stem. **Rhizoctonia solani**, TX; **Sclerotium rolfsii**, TX.

ST. ANDREWS CROSS, ST. PETERSWORT (*Ascyrum*)

LEAF SPOT. **Cladosporium gloeosporioides**, AL.

RUST. **Uromyces triquetrus** (0, I, II, III), MS, NJ, TX.

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, BLACK (*Scorzonera*)

BACTERIAL, MLO. **California Aster Yellows**, CA.

NEMATODE, Root Knot. **Meloidogyne** sp., FL.

WHITE RUST. **Albugo tragopogonis**, CA.

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; **U. acuminatus**, CN.

SMUT, Anther. **Ustilago violacea**, ME, NH, NY, VT.

SANSEVIERIA (Bowstring-Hemp, Snake Plant)

BACTERIAL Soft Rot. **Erwinia aroideae** and **E. carotovora**, AZ, FL, MD, NJ.

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.

SCABIOSA

BACTERIAL, MLO. **Aster Yellows**, CT, NJ, NY, VA; and **California Aster Yellows**, CA.

BLIGHT, Southern. **Sclerotium rolfsii**.

POWDERY MILDEW. **Erysiphe polygoni**; **E. knautiae**, NY, WA.

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.

SCILLA (Squill)

LEAF SPOT. **Embellisia hyacinthi**, CA.

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. **Ornithogalum Mosaic**, NY.

SCINDAPSUS

See Pothos.

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 bolickii**, FL.

NEMATODE, Root Knot. **Meloidogyne** sp.

POWDERY MILDEW. **Erysiphe sedi**, NY.

ROT, Stem. **Colletotrichum** sp. (*Vermicularia benficiens*), NY, VA; **Phytophthora** sp., NY; **Rhizoctonia solani**, IL, NJ.

RUST. **Puccinia rydbergii** (III), UT; **P. umbilici** (III), CO, WY.

VIRUS. **Tomato Spotted Wilt**, PA.



VIRUS, Foliar Ringspot. **Tobacco Rattle Virus**, MN.  
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 ritzemabosi**.

POWDERY MILDEW. **Golovinomyces 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. lagenophorae**, CA; **P. recedens**, CO, CT to NC, IA, TN, ND to OR, WA, WY; **P. dioicae** (0, I), NE, NM, TX; II, III on *Carex*; **P. stipae** (0, I), CO, NE, WY; II, III on *Stipa*; **P. subcircinata** (0, I, III), ID, NE, NV, NM, ND, UT, WA; **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.

SILPHIUM (Compass Plant, Indian-Cup)

BACTERIAL Leaf Spot. **Pseudomonas syringae** pv. **tagetis**, WI.

DOWNY MILDEW. **Plasmopara halstedii**, IL, IA, WI to AR, KS, MN.

LEAF SPOT. **Ascochyta compositarum**, WI; **Cercospora silphii**, AL, IL, KS, TX, WV, WI; **Colletotrichum silphii**, WI; **Septoria alba**, IL, KS.

POWDERY MILDEW. **Golovinomyces cichoracearum**, CT, MD.

ROT, Root. **Phymatotrichum omnivorum**, TX; **Rhizoctonia solani**, ME.

RUST. **Puccinia silphii** (III), NC to AL, TX, ND; **Coleosporium terebinthinaceae** (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.

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, Pin. **Paratylenchus penetrans**, CA.
- NEMATODE, Root Knot. **Meloidogyne** spp., general in South and in northern greenhouses; **M. javanica**, MD.
- NONPARASITIC. **Fasciation**. Probably genetic.
- Tip Blight**. Cause unknown CA, MD, OK, VA; 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; **Impatiens Necrotic Spot**, NC.
- 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.
- 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, SD; **Uromyces euphorbiae**, IA, SD to TX, CO.
- 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 liliacearum**, 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. **magnatus** (0, I), IL, IA, MN, NE, ND, SD; II, III on *Spartina*.

SMUT, Leaf. **Urocystis colchici**, IA.

VIRUS. **Mosaic**. Unidentified, ME.

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, WI.

ROT, Root. **Phymatotrichum omnivorum**, TX.

RUST. **Coleosporium campanulae** (II, III), NC, PA.

SMUT, Seed. **Ustilago speculariae**, OK.

SPIDER-LILY (*Hymenocallis*)

LEAF BLOTCH; Red Spot. **Stagonospora curtisii**, CA, TX.

LEAF SPOT. **Cercospora amaryllidis**, TX; **C. pancratii**, FL, LA, TX; **Gloeosporium hemerocallidis**, TX.

NEMATODE, Spiral. **Rotylenchus blaberus**.

VIRUS. **Mosaic**. Unidentified, CA.

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, MN, TX; II, III on *Panicum*.

SPURGE, PAINTED (*Euphorbia heterophylla*)

CANKER, Stem. **Diaporthe phaseolarum** var. **caulivora**, LA; pathogen of soybean stem canker.

RUST. **Uromyces euphorbiae** (0, I, II, III), IN to FL, KS, TX.

SMUT, Stem. **Tilletia euphorbiae**, LA.

VIRUS. **Euphorbia Mosaic**, FL.

STARBUR, BRISTLY (*Acanthospermum*)

VIRUS. **Tomato Spotted Wilt**, GA.

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; **Yellows and Phyllody**, MI.BACTERIAL SPOT. **Pseudomonas andropogonis**, KS.BLIGHT, Flower. **Botrytis cinerea**, FL.DOWNY MILDEW. **Peronospora statices**, CA.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 CA, NM, TX.VIRUS. **Turnip Mosaic**, CA.

## STEPHANOTIS

ANTHRACNOSE. **Gloeosporium** sp., WA.BLIGHT, Flower. **Botrytis elliptica**, CA.VIRUS. **Tomato Spotted Wilt**, OR.

## STERNBERGIA (Fall-Daffodil)

LEAF SCORCH; Red Spot. **Stagonospora curtisii**, CA.STOCK (*Matthiola*)ANTHRACNOSE; Leaf and Stem Spot. **Colletotrichum gloeosporioides**, TX.BACTERIAL Black Rot. **Xanthomonas incanae**, CA, TN.BLIGHT, Gray Mold. **Botrytis cinerea**, AK, TX.CLUB ROOT. **Plasmodiophora brassicae**, NJ.DAMPING-OFF. **Pythium** spp.; **Rhizoctonia solani**, cosmopolitan.DOWNY MILDEW. **Peronospora parasitica**, CA, IL.LEAF SPOT. **Alternaria raphani**, CA; **Myrothecium roridum**, TX.NEMATODE. **Nacobus batatifformis**.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 alboatrum**, CA, NY.

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. **Golovinomyces cichoracearum**, MD.VIRUS. **Mosaic**. Unidentified, IA; **Bidens Mottle**, FL.STRAWFLOWER (*Helichrysum*)BACTERIAL, MLO. **Aster Yellows**, eastern and central states; **California Aster Yellows**, CA.DOWNY MILDEW. **Plasmopara halstedii**, CA; **Bremia lactucae**, CA.NEMATODE, Root Knot. **Meloidogyne** sp., FL.ROT, Stem. **Fusarium** sp., FL.VIRUS. **Beet Curly Top**, CA, OR, WA; **Bidens Mottle**, FL; **Tomato Spotted Wilt**, PA.WILT. **Verticillium albo-atrum**, CA.

## STREPTOCARPUS

VIRUS. **Tobacco Mosaic**, CA, CT, DC, FL, OH, WA; **Tomato Spotted Wilt**, PA.SUNFLOWER (*Helianthus*)ANTHRACNOSE. **Colletotrichum acutatum**, CA.BACTERIAL Leaf Spot. **Pseudomonas syringae** pv. **helianthi**; **P. syringae** pv. **tagetis**, WI.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, Petal. **Itersonilia perplexans**, FL.BLIGHT, Seedling. **Alternaria helianthi**, MN; **Diaporthe helianthi**, TX.BLIGHT, Southern, **Sclerotium rolfsii**, LA, TX.CANKER, Stem. **Diaporthe helianthi**, OH, TX; **Phomopsis helianthi**, IL.DODDER. **Cuscuta** sp., OK, TX, WA.DOWNY MILDEW. **Plasmopara halstedii**, NY to MD, KS, MT, TX.GALL, Basal. **Plasmopara halstedii**, MN, ND.LEAF SPOT. **Ascochyta compositarum**, WI; **Cercospora helianthi**, IL, KS, 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. **Golovinomyces cichoracearum**, general, CA.ROT, Charcoal. **Macrophomina phaseolina**, CA, IL, MD, MN, ND, SD.ROT, Head. **Rhizopus oryzae**, CA, NM; **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; **Sclerotinia sclerotiorum**, widespread.

RUST. **Puccinia helianthi**, (0, I, II, III), general, CA, IL, MN, NE, ND; **P. massalis**, NM, TX; **P. canaliculata**, GA, KS; **P. xanthii**, ND; **Coleosporium helianthi** (II, III), NY to FL, LA and OK; II, III on pine; **C. madaiae**, CA; **Uromyces junci** (0, I), CA, KS, NE, ND, OK, SD, WY; **U. silphii** (0, I), IL, MO, NY, TN, WI.

SMUT, Leaf. **Entyloma polysporum** CA, MT.

VIRUS. **Bromegrass Mosaic** General, IA, SD; **Sunflower Mosaic**, IN, TX; **Cucumber Mosaic**, FL, MD; **Bidens Mottle**, FL.

WHITE RUST. **Albugo tragopogonis**, CO, IL, KS, MO, WI.

WILT. **Fusarium oxysporum** f. sp. **apii**, SC; **F. sporotrichioides**, MN; **Verticillium albo-atrum**; **V. dahliae**, CA; **Sclerotinia sclerotiorum** = **Whetzelinia sclerotiorum**, CA.

SWEDISH IVY (*Plectranthus australis*)

NONPARASITIC. **Brown Leaf Spot**. Boron deficiency.

VIRUS. **Alfalfa Mosaic**, NY; **Tomato Spotted Wilt**, PA; and **TSW-Impatiens Serotype**, GA, FL.

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 polygoni**, CA.

ROT, Crown. **Sclerotinia sclerotiorum**, VA.

ROT, Root. **Phoma lingam**, CA.

SWEET PEA and PERENNIAL PEA (*Lathyrus*)

ANTHRACNOSE; 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, NY, NC; **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. sp. **odorati**, CA; **Curvularia** sp., CA.

MOLD, White. **Erothrotheca multiformis** (*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. **Microspheera alni**, general, especially in greenhouses; **Erysiphe polygoni**, widely reported, sometimes confused with *M. alni*.

ROT, Root. **Aphanomyces euteiches**, IN, MI, WI; **Fusarium solani** f. sp. **pisi**, occasional to prevalent under glass and outdoors; **Phymatotrichum omnivorum**, TX, **Phytophthora cactorum**, CT; **Thielaviopsis basicola**, black rot, CT to OH, CO, FL, IL, MS; 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 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, NE, TX; **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.

SYNGONIUM

ANTHRACNOSE. **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.

# T

## TANSY (*Tanacetum*)

LEAF SPOT. **Ramularia tanacetii**, WI.

NEMATODE, Root Knot. **Meloidogyne** sp., FL.

POWDERY MILDEW. **Golovinomyces cichoracearum**, PA.

RUST. **Puccinia tanacetii** (0, I, II, III), WY; 0, I, II, III on **Artemisia**; II on chrysanthemum.

## 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 sphaerpioides**, WA; **Stigmina thermopsidis**, CA.

POWDERY MILDEW. **Erysiphe polygoni**, Rocky Mts., and Pacific Northwest.

VIRUS. **Bean Yellow Mosaic** in false lupine (*Thermopsis caroliniana*), MN.

## THISTLE, IVORY AND MILK (*Silybum*)

RUST. **Puccinia punctiformis**, MD.

SMUT, Biological Control. **Microbotryum silybum**, MD.

## THYME (*Thymus*)

BLIGHT, Gray Mold. **Botrytis cinerea**, AK.

LEAF SPOT. **Corynespora cassiicola**, FL.

ROT, Root. **Rhizoctonia solani**, MA.

## TI (*Cordyline terminalis*)

LEAF SPOT. **Phytophthora parasitica**, HI.

## TIBOUCHINA (Glory-Bush)

ROT, Mushroom Root. **Clitocybe tabescens**, FL.

## 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.

TORENIA

NEMATODE, Root Knot. **Meloidogyne** sp., MD.

POWDERY MILDEW. **Oidium** sp., LA.

TRADESCANTIA (Wandering Jew, Spiderwort)

BLIGHT, Gray Mold. **Botrytis cinerea**, AK.

LEAF SPOT. **Cladochytrium replicatum**, NY, secondary; **Colletotrichum** sp., NJ, TX;

**Cylindrosporium tradescantiae**, IA; **Septoria tradescantiae**, WI to TX, SD.

NEMATODE, Root Knot. **Meloidogyne** sp., OR, TX.

RUST. **Uromyces commelinae** (II, III), TX.

VIRUS. **Tomato Spotted Wilt**, PA; **Tradescantia zebrina**, MN.

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. **Golovinomyces cichoracearum**, IL; **Microsphaera alni**, MD to AL, IN, TX.

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 thuemennii** f. sp. **tulipi**, 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.

#### TURTLE-HEAD (*Chelone*)

LEAF SPOT. **Septoria mariae-wilsonii**, ME to PA, OH, WI.

POWDERY MILDEW. **Golovinomyces cichoracearum**, and **Erysiphe polygoni**, widespread.

RUST. **Puccinia andropogonis** var. **penstemonis** (0, I), CT, MA, NJ, NY, PA, TN; II, III on *Andropogon*; **P. chelonis** (III), OR, WA.

VIRUS. **Tomato Spotted Wilt**, PA.

# U

UNICORN-PLANT, PROBOSCIS-FLOWER (*Proboscidea*)

BLIGHT, Southern. **Sclerotium rolfsii**, TX.

LEAF SPOT. **Cercospora beticola**, IA, KS, OK, TX, WI.

NECROSIS, Vascular. **Verticillium dahliae**, NM.

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**.

# V

VALERIAN, GARDEN HELIOTROPE (*Valeriana*)

LEAF SPOT. **Ramularia centranthi**, CA; **Septoria valerianae**, WI.

POWDERY MILDEW. **Golovinomyces 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.

VENUS FLYTRAP (*Dionaea muscipula*)

ROT, Root. **Phytophthora cinnamomi**, NC.

VERBENA, GARDEN (*Verbena hortensis*)

BLIGHT, Flower. **Botrytis cinerea**, MA.

NEMATODE, Root Knot. **Meloidogyne** sp., MD.

POWDERY MILDEW. **Golovinomyces cichoracearum**, general.

ROT, Charcoal. **Macrophomina phaseoli**, OK.

ROT, Root. **Phymatotrichum omnivorum**, TX; **Rhizoctonia solani**, NY; **Thielaviopsis basicola**, PA.

VIRUS. **Broad Bean Wilt**, FL; **Nemesia Ring Necrosis Tymovirus**, CA; **Angelonia Flower Break Carmovirus**; **Verbena Virus Y**, **Potatao Virus Y**, **Potyvirus**, AR, OR.

VERBENA (*Nemesia diascia*)

NEMESIA RING NECROSIS. **Tymovirus**, CA; **Angelonia Flower Break Carmovirus**.

VERONICA (Speedwell)

BACTERIAL, Proliferation. **Rhodococcus fascians**, OR.

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, IL, IA, KS, MS, MO, NY, TX, WI; **Urocystis kmetiana**, GA.

VIRUS. **Cucumber Mosaic**, AR; **Tomato Spotted Wilt**, PA.

VINCA (*Periwinkle*, *Ground-Myrtle*)

BACTERIAL, MLO. **Aster Yellows**, KS, TX.

BACTERIAL Stunt. **MLO**, AR, OK.

BLIGHT, Foliar. **Phytophthora tropicalis**, VA.

BLIGHT, Gray Mold. **Botrytis cinerea**, CT, WA.

BLIGHT, TWIG. **Colletotrichum dematium**, FL.

CANKER; DIEBACK. **Phomopsis lirella**, CT, MD, NJ, OH, PA, VA; **Phoma** sp., OR.

DODDER. **Cuscuta indecora**, TX.

FLOWER, Spot and Blight. **Choanephora cucurbitarum**, LA.

LEAF SPOT. **Alternaria** sp., PA, TX; **Colletotrichum** sp., FL; **Macrophoma vincae**, also dieback, IL, NY; **Phyllosticta** sp., CT, GA, NJ; **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., CA, KS, OH.

ROT, Root. **Phytophthora cactorum**, NC; **P. lateralis**, NC.

ROT, Root, Black. **Thielaviopsis basicola**, FL.

ROT, Root and Stem. **Rhizoctonia solani**, IL, MD, NJ, PA. **Phytophthora parasitica**, MD.

RUST. **Puccinia vincae** (0, I, II, III), MA, MI, NY, WA.

SPOT, Target. **Corynespora cassiicola**, FL.

VIRUS. **Cucumber Mosaic**, NJ; **Potato Yellow Dwarf**, CA; **Tomato Spotted Wilt- Impatiens Serotype**, FL, GA.

WILT. **Verticillium albo-atrum**, CA, OR.

VIOLET (*Viola odorata* and *Native Species*)

ANTHRACNOSE. **Colletotrichum violae-tricoloris**, CT, MA, MS, NJ, NY, OH, PA.

BLIGHT, Southern. **Sclerotium rolfsii**, VA to FL, CA, CT, NY, TX, VT.

DOWNY MILDEW. **Bremiella megasperma**, FL, IL, IA, MN, NJ.

GALL, Leaf. **Synchytrium aureum**, NY, WI.

LEAF SPOT. **Alternaria violae**, CT to GA, TX, WI; **Ascochyta violicola**, AK; **A. violae**, IN, IA, PA, WI; **Centrospora acerina**, AK, CA; **Cercospora granuliformis**, ME to AL, OK, SD; **C. violae**, MA to FL, ND, TX; **Cryptostictis violae**, IL;

**Cylindrosporium violae**, MT; **Heterosporium** sp., AK; **Marssonina violae**, MA to SC, IA, MN; **Phyllosticta violae**, MA to FL, CA, KS, MN; **P. nigrescens**, CA; **Ramularia lactea**, AK, CO, MS, MT; **R. agrestis**, NE, OR; **Septoria violae**, northeastern and North central states to AK, FL, KS, LA; **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**, FL, IL, MN, MS, NY; **Thielaviopsis basicola**, CT to MS, KS, MA, OH.

ROT, Wet; Gray Mold. **Botrytis cinerea**, AK, MD, OH.

RUST. **Puccinia violae** (0, I, II, III), general; **P. effusa** (III), CA; **P. ellisiana** (0, I), northeastern and North central states to AL, NM, WY; II, III on *Andropogon*; **P. fergussoni** (III), AK, CO, MT, UT; **Uromyces andropogonis**, (0, I), MS, NJ, NC, PA, TN, WV; II, III on *Andropogon*.

SOOTY MOLD. **Scorias spongiosa**, ME.

SPOT ANTHRACNOSE; Scab. **Sphaceloma violae**, ME to FL, KS, LA, OH, WA.

SMUT, Leaf and Stem. **Urocystis violae**, AK, CA, MN, TX, UT.

VIRUS. **Beet Curly Top**, TX.

Spot anthracnose is an important violet disease in many gardens with disfiguring scabby lesions on stems and leaves.

VIRGINIA CREEPER (*Parthenocissus quinquefolia*)

BLIGHT, Thread. **Pellicularia koleroga**, FL.

CANKER; DIEBACK. **Coniothyrium 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. sp. **parthenocissi**, general; **Phloeospora ampelopsidis**, IL, IA, NE, WI.

PARASITIC LICHEN. **Strigula elegans** and **S. complanata**, LA, southern US.

POWDERY MILDEW. **Uncinula necator**, general; CAES.

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.

# W

WAHLENBERGIA (*Southern Rockbell*)

VIRUS. **Tomato Spotted Wilt**, GA.

WALLFLOWER (*Cheiranthus*)

BACTERIAL, MLO. **California Aster Yellows**, CA.

BLIGHT, Gray Mold. **Botrytis cinerea**, AK, WA.

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 polygoni**, 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.

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.

VIRUS. **Western Aster Yellows Phytoplasma**, HI.

VIRUS, Mosaic and Stunting. **Turnip Virus**, Brazil.

WHITE RUST; White Blister. **Albugo candida**, MN.

WISTERIA (*Wistaria*)

BACTERIAL Crown Gall. **Agrobacterium tumefaciens**, CT, MD, TX.

CANKER, Stem. **Nectria cinnabarina**, CT.

LEAF SPOT. **Phyllosticta wistariae**, MA, MO, NJ, TX; **Septoria wistariae**, TX.

NEMATODE, Root Knot. **Meloidogyne** spp.

POWDERY MILDEW. **Golovinomyces cichoracearum**, TX.

ROT, Heart. **Pleurotus** sp., WV.

ROT, Root. **Phymatotrichum omnivorum**, TX.

VIRUS. **Wisteria Vein Mosaic**, MS, NY, TX; **Tobacco Mosaic**, RI.



# Y

YARROW (*Achillea*)

BACTERIAL Crown Gall. **Agrobacterium tumefaciens**, IN.

DODDER. **Cuscuta** sp., NH.

NEMATODE, Root Knot. **Meloidogyne** sp., OR.

POWDERY MILDEW. **Golovinomyces cichoracearum**, AK, MO, MT, PA, SD, VT, WI.

ROT, Root. **Phymatotrichum omnivorum**, TX; **Rhizoctonia solani**, general.

RUST. **Puccinia millefolii** (III), CA, CO, ID, MT, NM, OR, UT, WA, WY.

# Z

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, STEM. **Phytophthora parasitica**, FL.

ZEPHYRANTHES (Atamasco-Lily, Zephyr-Lily)

LEAF SCORCH; Red Spot. **Stagonospora curtisii**, CA.

LEAF SPOT. **Colletotrichum liliacearum**, NC.

ROT, Dry; Scale Speck. **Sclerotium** sp., OR.

RUST. **Puccinia cooperiae** (0, I, II, III), AL, FL, NC, TX.

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, Flower. **Alternaria alternata**, TX.

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, CO, IN, PA, TX.

LEAF SPOT, Bacterial. **Xanthomonas nigromaculans** f. sp. **zinniae**, NC, OH.

NEMATODE, Leaf. **Aphelenchoides ritzemabosi**, DE, MA, NJ.

NEMATODE, Lesion. **Pratylenchus nannus**, MD; **P. penetrans**, NJ.

NEMATODE, Root Knot. **Meloidogyne** sp., NJ, PA, TX.

POWDERY MILDEW. **Golovinomyces 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**; **Bidens Mottle**, FL; **Potato Leafroll**, Pacific Northwest; **Sunflower Mosaic**, TX.

Powdery mildew in late summer is the most common zinnia disease.

## **Part IV**

# List of Land-Grant Institutions and Agricultural Experiment Stations in the United States

For help in diagnosing and controlling plant diseases contact your County Ag Commissioners (CA) or county extension agent, your state Diagnostic Lab, your state Department of Agriculture or your Cooperative Extension Specialist.

Alabama: Auburn University, Auburn, AL 36849. <http://www.aces.edu/dept/plantdiagnosticlab/>

Alabama Cooperative Extension Service <http://www.aces.edu/plantlabbbham/>

Alaska: University of Alaska and Alaska Department of Agriculture <http://www.dnr.state.ak.us/ag/index.htm>

Arizona: University of Arizona, Tucson, AZ 85721. <http://ag.arizona.edu/PLP/plpext/>

Arkansas: University of Arkansas, Fayetteville, AR 72701. <http://www.aragriculture.org/pestmanagement/diseases/clinic/default.asp>

California: Department of Food and Agriculture, Plant Pest Diagnostic Center. (sgaimari@cdfa.ca.gov)

Colorado: Colorado State University, Fort Collins, CO 80523. <http://www.coopext.colostate.edu/jeffco/hort/clinic.htm>

Connecticut: University of Connecticut, Storrs, CT 06269. <http://pronewengland.org>

Delaware: University of Delaware, Newark, DE 19716. <http://ag.udel.edu/extension/pdc/index.htm>

District of Columbia: See Rutgers. <http://www.rcs.rutgers.eon/services/>

Florida: University of Florida, Gainesville, FL 32611. <http://plantpath.ifas.ufl.edu/>

Georgia: University of Georgia, Athens, GA 30602. <http://www.plant.uga.edu/Extension/Clinics/PDC.htm>

Hawaii: University of Hawaii, Honolulu, HI 96822. <http://www2.ctahr.hawaii.edu/adsc/>

Idaho: University of Idaho, Extension Service, Parma, ID 83660. <http://www.uidaho.edu/ag/plantdisease/>

Illinois: University of Illinois, Urbana, IL 61802. <http://plantclinic.cropsci.uiuc.edu/>

- Indiana: Purdue University, West Lafayette, IN 47907. <http://www.ppd1.purdue.edu>
- Iowa: Iowa State University, Ames, IA 50011. <http://www.isuplantdiseaseclinic.org>
- Kansas: Kansas State University, Manhattan, KS 66506. <http://www.plantpath.k-state.edu/DesktopDefault.aspx?tabid=49>
- Kentucky: University of Kentucky, Lexington, KY 40546. [http://www.ca.uky.edu/agcollee/plantpathology/extension/pdd\\_lab.html](http://www.ca.uky.edu/agcollee/plantpathology/extension/pdd_lab.html)
- Louisiana: Louisiana State University, Baton Rouge, LA 70803. [http://www.lsuagcenter.com/en/our\\_offices/departments/PlantPathology\\_Crops\\_Physiology/Plant\\_Disease\\_Clinic/](http://www.lsuagcenter.com/en/our_offices/departments/PlantPathology_Crops_Physiology/Plant_Disease_Clinic/)
- Maine: University of Maine, Orono, ME 04473. <http://pmo.umext.main.edu>
- Maryland: University of Maryland, College Park, MD 20742. <http://www.plantclinic.umd.edu/>
- Massachusetts: University of Massachusetts, Amherst, MA 01003. (umassextension.org)
- Michigan: Michigan State University, East Lansing, MI 48824. <http://www.pestid.msu.edu/>
- Minnesota: University of Minnesota, St. Paul, MN 55108. <http://www.extension.umn.edu/distribution/cropsystems/DC3170.html>
- Mississippi: Mississippi Cooperative Extension Service, Mississippi State University, MS 39762. <http://www.extensionplantclinics.msstate.edu/>
- Missouri: University of Missouri, Columbia, MO 65211. <http://soilplantlab.missouri.edu/>
- Montana: Montana State University, Bozeman, MT 59717. <http://scarab.msu.montana.edu/ipm/>
- Nebraska: University of Nebraska, Lincoln, NE 68583. <http://plantpath.unl.edu/ppathdiagnostic.htm>
- Nevada: University of Nevada, or Nevada Department of Agriculture. <http://www.nevada.gov/>
- New Hampshire: University of New Hampshire, Durham, NH 03824. <http://ceinfo.unh.edu/Agric/AGPDTS/PlantH.htm>
- New Jersey: Rutgers, The State University, Milltown, NJ 08850. <http://www.rce.rutgers.edu/services/>
- New Mexico: New Mexico State University, Las Cruces, NM 88003. <http://plantclinic.nmsu.edu>
- New York: Cornell University, Ithaca, NY 14853. <http://plantclinic.cornell.edu>
- North Carolina: North Carolina State University, Raleigh, NC 27695. <http://www.ncsu.edu/pdic>
- North Dakota: North Dakota State University, Fargo, ND 58105. <http://www.ag.ndsu.nodak.edu/diaglab/>
- Ohio: Ohio State University, Columbus, OH 43210. <http://ppdc.osu.edu>
- Oklahoma: Oklahoma State University, Stillwater, OK 74078. <http://entopl.okstate.edu/Pddl/>

- Oregon: Oregon State University, Corvallis, OR 97331. [http://web.science.oregonstate.edu/bpp/Plant\\_Clinic/index.htm](http://web.science.oregonstate.edu/bpp/Plant_Clinic/index.htm)
- Pennsylvania: The Pennsylvania State University, University Park, PA 16802. <http://www.ppath.cas.psu.edu/extension.html>
- Puerto Rico: Department of Agriculture, San Juan, PR. <http://www.agricultura.gobierno.pr>
- Rhode Island: University of Rhode Island, Kingston, RI 02881. <http://www.uri.edu/ce/ceec/plantclinic.html>
- South Carolina: Clemson University, Clemson, SC 29634. <http://www.clemson.edu/agsrvlb>
- South Dakota: South Dakota State University, Brookings, SD 57007. <http://plantsci.sdstate.edu/planthealth/subpage.cfm?ID=12>
- Tennessee: University of Tennessee, Nashville, TN 37211. <http://soilplantandpest.utk.edu/>
- Texas: Texas A & M University, College Station, TX 77845. <http://plantdiseaselab.tamu.edu/>
- Utah: Utah State University, Logan, UT 84322. <http://utahpests.usu.edu>
- Vermont: University of Vermont, Burlington, VT 05405. <http://pss.uvm.edu/pd/pdc/>
- Virgin Islands: Virgin Islands Extension Service, Kingshill, St. Croix, VI 00850. <http://rps.uvi.edu/CES/index.html>
- Virginia: Virginia Polytechnic Institute, Blacksburg, VA 24061. <http://www.ppws.vt.edu/~clinic/>
- Washington: WSU Research and Extension Center, Puyallup, WA 98371. <http://www.puyallup.wsu.edu/plantclinic/index.html>
- West Virginia: West Virginia University Extension Service, Morgantown, WV 26506. <http://www.mastergardener2008.com/>
- Wisconsin: University of Wisconsin, Madison, WI 53706. <http://pddc.wisc.edu/>, <http://www.entomology.wisc.edu/entodiag.html>
- Wyoming: University of Wyoming Cooperative Extension Service, Laramie, WY 82071. <http://ces.uwyo.edu/>
- Ontario: Pest Diagnostic Clinic, University of Guelph, Ontario, Canada, N1H 8J7. <http://www.labservices.uoguelph.ca/units/pdc/>

# Glossary

- Acervulus*, pl. *Acervuli* A “little heap,” an erumpent, cushionlike mass of hyphae bearing conidiophores and conidia, sometimes with setae; characteristic of the Melanconiales.
- Acicular* Needlelike.
- Aeciospore* Rust spore formed in an aecium.
- Aecium*, pl. *Aecia* A cluster-cup, or cuplike fruiting sorus in the rusts.
- Aerobic* Living or active only in the presence of oxygen.
- Amoeboid* Not having a cell wall and changing in form like an amoeba.
- Allantoid* Sausage-shaped.
- Alternate Host* One or other of the two unlike hosts of a heteroecious rust.
- Anamorph* State of life-cycle in which asexual spores, or none, are produced.
- Annulus* A ring; ringlike partial veil around stipe in the mushrooms.
- Antheridium*, pl. *Antheridia* Male sex organ in the fungi.
- Anthraxnose* A disease with limited necrotic lesions, caused by a fungus producing nonsexual spores in acervuli.
- Antibiotic* Damaging to life; especially a substance produced by one microorganism to destroy others.
- Apothecium*, pl. *Apothecia* The cup-or saucer-like ascus-bearing fruiting body; in the Discomycete section of the Ascomycetes.
- Appressorium* A swelling on a fungus germ tube for attachment to host in early stage of infection; found especially in anthracnose fungi and rusts.
- Ascocarp*, or *Ascoma* Any structure producing asci, as an apothecium, perithecium.
- Ascomycetes* One of the three main groups of the fungi, bearing sexual spores in asci.
- Ascospore* Produced in ascus by free cell formation.
- Ascus*, pl. *Asci* Saclike, usually clavate cell containing ascospores, typically eight.
- Aseptate* Without cross-walls.
- Asexual* Vegetative, having no sex organs or sex spores; the imperfect stage of a fungus.
- Autoecious* Completing life cycle on one host; term used in rusts.



- Bacteria* Microscopic one-celled organisms increasing by fission.
- Bactericide* Substance causing death of bacteria.
- Basidiomycetes* Class 3 in the Fungi, characterized by septate mycelium, sometimes with clamp-connections, and sexual spores on basidia.
- Basidiospore* Spore produced on a basidium.
- Basidium*, pl. *Basidia* Club-shaped structure, which, after fusion of two nuclei, produces four basidiospores.
- Binucleate* Having two nuclei.
- Blight* A disease with sudden, severe leaf damage and often with general killing of flowers and stems.
- Blotch* A blot or spot, usually superficial.
- Breaking*, of a virus Loss of flower color in a variegated pattern, especially in tulips.
- Canker* A lesion on a stem; a plant disease with sharply limited necrosis of the cortical tissue.
- Carrier* Infected plant showing no marked symptoms but source of infection for other plants.
- Catenulate* In chains, or in an end-to-end series.
- Cerebroid* With brainlike convolutions or folds.
- Chemotherapy* Treatment of internal disease by chemical agents that have a toxic effect on the microorganism without injuring the plant.
- Chlamydospore* Thick-walled, asexual resting spore formed by the rounding up of any mycelial cell; also used for smut spores.
- Chlorosis* Yellowing of normally green tissue due to partial failure of chlorophyll to develop; often due to unavailability of iron.
- Cilium*, pl. *Cilia* Hairlike swimming organ on bacteria or zoospores.
- Cirrus*, pl. *Cirri* A tendril or horn of forced-out spores.
- Clamp-connections* Outgrowths of hyphae which form bridges around septa, thus connecting two cells; in Basidiomycetes.
- Clavate* Club-shaped.
- Cleistothecium*, pl. *Cleistothecia* A perithecium without a special opening; in powdery mildews.
- Coalesce* Growing together into one body or spot.
- Coenocytic* Multinucleate; mycelia having no cell walls.
- Columella* Sterile central axis in a mature fruiting body.
- Concentric* One circle within another with a common center.
- Conidiophore* Simple or branched hyphae on which conidia are produced.
- Conidium*, pl. *Conidia* Any asexual spore except sporangiospore or chlamydospore.
- Conk* Term used in forestry for sporophores of Polyporaceae on trees.
- Control* Prevention of, or reduction of loss from, plant disease.
- Coremium*, pl. *Coremia* Synnema, a cluster of erect hyphae bearing conidia.
- Coriaceous* Like leather in texture.
- Culturing* Artificial propagation of organisms on nutrient media or living plants.
- Cystidium*, pl. *Cystidia* Sterile, often swollen cell projecting from hymenium in Basidiomycetes.

- Damping-off* Seed decay in soil, or seedling blight.
- Decumbent* Resting on substratum with ends turned up.
- Decurrent* Running down the stipe or stem.
- Diagnosis* Identification of nature and cause of a disease.
- Dieback* Progressive death of branches or shoots beginning at tips.
- Defoliate* To strip or become stripped of leaves.
- Dichotomous* Branching, frequently successive, into two more or less equal arms.
- Dimidiate* Having one half smaller than the other; of a perithecium, having outer wall covering only top half.
- Discomycetes* The cup fungi, a subclass of Ascomycetes; with apothecia.
- Disease* A condition in which use or structure of any part of the living organism is not normal.
- Disinfection* Freeing a diseased plant, organ, or tissue from infection.
- Disinfestation* Killing or inactivating disease organisms before they can cause infection; on surface of seed or plant part, or in soil.
- Dissemination* Transport of inoculum from a diseased to a healthy plant.
- Disjuncter* Cell or projection connecting spores of a chain.
- Duster* Apparatus for applying fungicides in dry form.
- Echinulate* Having small, pointed spines; used of spores.
- Endoconidium*, pl. *Endoconidia* Conidium formed within a hypha.
- Enphytotic* A plant disease causing constant damage from year to year.
- Epiphytotic* Sudden and destructive development of a plant disease over an extensive area, an epidemic.
- Eradicant Fungicide* One that destroys a fungus at its source.
- Eradication* Control of disease by eliminating the pathogen after it is already established.
- Erumpent* Breaking through surface of substratum.
- Excentric* Off center.
- Exclusion* Control of disease by preventing its introduction into disease-free areas.
- Exudate* Liquid discharge from diseased tissues.
- Fasciation* Joining side by side; a plant disease with flattened and sometimes curved shoots.
- Fascicle* A small bundle or cluster.
- Filiform* Threadlike.
- Fimbriate* Fringed, or toothed.
- Flag* A branch with dead leaves on an otherwise green tree.
- Flagellum*, pl. *Flagella* Whiplike organ on a motile cell; cilium.
- Fruiting Body* Fungus structure containing or bearing spores; mushroom, pycnidium, perithecium, apothecium, etc.
- Fumigant* A volatile disinfectant, destroying organisms by vapor.
- Fungicide* Chemical or physical agent that kills or inhibits fungi.
- Fungi Imperfecti* Fungi that have not been connected with the perfect or sexual stage; most are imperfect states of Ascomycetes.
- Fungistatic* An agent preventing development of fungi without killing them.

*Fungus*, pl. *Fungi* An organism with no chlorophyll, reproducing by sexual or asexual spores, usually with mycelium with well-marked nuclei.

*Fusiform* Spindle-like, narrowing toward the ends.

*Fusoid* Somewhat fusiform.

*Gall* Outgrowth or swelling, often more or less spherical, of unorganized plant cells as result of attack by bacteria, fungi, or other organisms.

*Gametangium* Gamete mother cell.

*Gamete* A sex cell, especially one formed in a gametangium.

*Germ Tube* Hypha produced by a germinated fungus spore.

*Gill* Lamella or hymenium-covered plate on underside of cap of a mushroom.

*Girdle* A canker that surrounds stem, completely cutting off water supply and thus causing death; girdling roots also cause death.

*Glabrous* Smooth.

*Gleba* Sporulating tissue in an angiocarpous fruit body.

*Globose* Almost spherical.

*Gram-negative*, *Gram-positive* Not being stained, and being stained, by the Gram stain used in classifying bacteria.

*Haustorium*, pl. *Haustoria* Special hyphal branch extended into living cell for purpose of absorbing food.

*Heteroecious* Undergoing different parasitic stages on two unlike hosts, as in the rusts.

*Heterothallic* Of a fungus, sexes separate in different mycelia.

*Holocarpic* Having all the thallus used for a fruiting body.

*Homothallic* Both sexes present in same mycelium.

*Host* Any plant attacked by a parasite.

*Hyaline* Colorless, or nearly transparent.

*Hymenium* Spore-bearing layer of a fungus fruiting body.

*Hyperplastic* Term applied to a disease producing an abnormally large number of cells.

*Hypha*, pl. *Hyphae* Single thread of a fungus mycelium.

*Hypoplastic* Term applied to a disease with subnormal cell production.

*Hyphopodium*, pl. *Hyphopodia* More or less lobed appendage to a hypha.

*Hysterothecium* Oblong or linear perithecium, sometimes considered an apothecium, opening by a cleft.

*Immune* Exempt from disease; having qualities that do not permit infection.

*Immunization* Process of increasing the resistance of a living organism.

*Imperfect Fungus* One lacking any sexual reproductive state.

*Imperfect State* State of life-cycle in which asexual spores, or none, are produced. See Anamorph.

*Incubation Period* Time between inoculation and development of symptoms that can be seen.

*Indehiscent* Of fruit bodies, not opening, or with no special method.

*Infection* Process of beginning or producing disease.

*Infection Court* Place where an infection may take place, as leaf, fruit, petal, etc.

*Injury* Result of transient operation of an adverse factor, as an insect bite, or action of a chemical.

*Innate* Bedded in, immersed.

*Inoculation* Placing of inoculum in infection court.

*Inoculum* Pathogen or its part, as spores, fragments of mycelium, etc., that can infect plants.

*Inoperculate* Not opening by a lid.

*Intercellular* Between cells.

*Intracellular* Within cells.

*Intumescence* Knoblike or pustulelike outgrowth of elongated cells on leaves, stems, etc., caused by environmental disturbances.

*Lamella* Gill.

*Lesion* Localized spot of diseased tissue.

*Locule* A cavity, especially one in a stroma.

*Macroconidia* Large conidia.

*Macroscopic* Large enough to be seen with the naked eye.

*Medulla* Loose layer of hyphae inside a thallus; body of a sclerotium.

*Microconidia* Very small spores, now considered spermatia of a fungus also having larger conidia.

*Micron* 1/1,000 mm, unit used for measuring spores.

*Microscopic* Too small to be seen except with the aid of a microscope; true of most of the fungus structures shown in line drawings in this book.

*Mildew* Plant disease in which the pathogen is a growth on the surface.

*Molds* Fungi with conspicuous mycelium or spore masses, often saprophytes.

*Monoecious* Male and female reproductive organs in same individual; in rusts, all stages of life cycle on single species of plant.

*Multinucleate* Several nuclei in same cell.

*Mummy* Dried, shriveled fruit, result of disease.

*Muriform* Having cross and longitudinal septa.

*Mushroom* An agaric fruit body.

*Mycelium*, pl. *Mycelia* Mass of fungus hyphae.

*Mycelia Sterilia* Fungi Imperfecti where spores, except for chlamydo spores, are not present.

*Mycoplasmalike Organism (MLO)* A wallless prokaryotic plant pathogen which has a single-unit membrane. See Phytoplasma.

*Mycorrhiza*, pl. *Mycorrhizae* Symbiotic, nonpathogenic association of fungi and roots.

*Necrosis* Death of plant cells, usually resulting in tissue turning dark.

*Necrotic* As an adjective, killing.

*Nematicide* Chemical or physical agent killing nematodes.

*Nematodes* Nemas, roundworms, eelworms, cause of some plant diseases.

*Obligate Parasite* A parasite that can develop only in living tissues, with no saprophytic stage.

*Obovate* Inversely ovate, narrowest at base.

- Obtuse* Rounded or blunted, greater than a right angle.
- Oogonium*, pl. *Oogonia* Female sex organ in the Oomycetes.
- Oomycetes* Subclass of the Phycomycetes, gametangia of unequal size.
- Oospore* Resting spore formed in a fertilized oogonium.
- Operculate* With a cover or lid, as in some asci.
- Ostiole* Porelike mouth or openings in papilla or neck of a perithecium or pycnidium.
- Papilla*, pl. *Papillae* Small, nipplelike projection.
- Paraphysis*, pl. *Paraphyses* A sterile hyphal element in the hymenium, especially in the Ascomycetes, usually clavate or filiform.
- Paraphysoids* Threads of hyphal tissue between asci, like delicate paraphyses but without free ends.
- Parasite* An organism that lives on or in a second organism, usually causing disease in the latter.
- Pathogen* Any organism or factor causing disease.
- Pathogenic* Capable of causing disease.
- Pedicel* Small stalk.
- Perfect State* Stage of life-cycle in which spores are formed after nuclear fission.  
See Teleomorph.
- Peridium* Wall or limiting membrane of a sporangium or other fruit body, or of a rust sorus.
- Perithecium* Subglobose or flasklike ascocarp of the Pyrenomycetes.
- Phialide* A cell that develops one or more open ends from which a basipetal succession of conidia develops without an increase in length of the phialide itself.
- Physiogenic Disease* Caused by unfavorable environmental factors.
- Physiologic Races* Pathogens of same variety and species structurally the same but differing in physiological behavior, especially in ability to parasitize a given host.
- Phytopathology* Plant pathology, science of plant disease.
- Phytoplasma* A MLO that is pathogenic to plants.
- Pileus* Hymenium-supporting part of a fruit body of a higher fungus; the cap of a mushroom.
- Primary Infection* First infection by a pathogen after going through a resting or dormant period.
- Prokaryotic* Organisms which lack a true nucleus; includes bacteria and mycoplasma-like organisms.
- Promycelium* Basidium of rusts and smuts.
- Pulvinate* Cushionlike in form.
- Pycnidium*, pl. *Pycnidia* Flasklike fruiting body containing conidia.
- Pycnium* Spermogonium in the rusts, the 0 stage, resembling a pycnidium.
- Resistance* Ability of a host plant to suppress or retard activity of a pathogen.
- Resting Spore* A spore, often thick-walled, that can remain alive in a dormant condition for some time, later germinating and capable of initiating infection.
- Resupinate* Flat on the substratum with hymenium on outer side.
- Rhizoid* Rootlike structure.

- Rhizomorph* A cordlike strand of fungus hyphae.
- Ring Spot* Disease symptoms characterized by yellowish or necrotic rings with green tissue inside the ring, as in virus diseases.
- Roguing* Removal of undesired individual plants.
- Rosette* Disease symptom with stems shortened to produce a bunchy growth habit.
- Russet* Brownish roughened areas on skins of fruit, from abnormal production of cork caused by disease, insect, or spray injury.
- Rust* A fungus, one of the Uredinales, causing a disease also known as rust.
- Saprophyte* An organism that feeds on lifeless organic matter.
- Scab* Crustlike disease lesion; or a disease in which scabs are prominent symptoms.
- Sclerotium*, pl. *Sclerotia* Resting mass of fungus tissue, often more or less spherical, normally having no spores in or on it.
- Scorch* Burning of tissue, from infection or weather conditions.
- Scutellum* Plate or shieldlike cover, as in Microthyriales.
- Septate* Having cross-walls, septa.
- Sessile* Having no stem.
- Seta*, pl. *Setae* A stiff hair, or bristle, generally dark-colored.
- Shot Hole* A disease symptom in which small round fragments drop out of leaves, making them look as if riddled by shot.
- Sign* Any indication of disease other than reaction of the host plant – pores, mycelium, exudate, or fruiting bodies of the pathogen.
- Slurry* Thick suspension of chemical; used for seed treatment.
- Smut* A fungus of the Ustilaginales, characterized by sooty spore masses; the name also used for the disease caused by the smut.
- Sooty Mold* Dark fungus growing in insect honeydew.
- Sorus*, pl. *Sori* Fungus spore mass, especially of rusts and smuts; occasionally, a group of fruiting bodies.
- Species* One sort of plant or animal; abbreviated as “sp.” singular, and “spp.” plural. A genus name followed by sp. means that the particular species is undetermined. Spp. following a genus name means that several species are grouped together without being named individually.
- Spermogonium* Walled structure in which spermatia are produced, a pycnium.
- Spermatium*, pl. *Spermatia* A sex cell (+ or –), a pycniospore.
- Sporangiole* Small sporangium without a columella and with a small number of spores.
- Sporangiophore* Hypha bearing a sporangium.
- Sporangium* Organ producing nonsexual spores in a more or less spherical wall.
- Spore* A single-to many-celled reproductive body, in the fungi and lower plants, which can develop a new plant.
- Sporidium*, pl. *Sporidia* Basidiospore of rusts and smuts.
- Sporodochium*, pl. *Sporodochia* Cluster of conidiophores interwoven on a stroma or mass of hyphae.
- Sporophore* Spore-producing or supporting structure – fruit body; used especially in the Basidiomycetes.

- Sporulate* To produce spores.
- Sprayer* Apparatus for applying chemicals in liquid form.
- Sterigma*, pl. *Sterigmata* Projection for supporting a spore.
- Stipe*. A stalk. *Stipitate* Stalked.
- Strain* An organism or group of organisms differing in origin or minor aspects from other organisms of same species or variety.
- Stroma*, pl. *Stromata* Mass of fungus hyphae often including host tissue containing or bearing spores.
- Subiculum*, *Subicle* Netlike woolly or crustlike growth of mycelium under fruit bodies.
- Substrate* The substance or object on which a saprophytic organism lives and from which it gets nourishment.
- Suscept* A living organism attacked by, or susceptible to, a given disease or pathogen; in many cases a more precise term than host but less familiar.
- Susceptible* Unresistant, permitting the attack of a pathogen.
- Swarmspore* Zoospore.
- Synnema*, pl. *Synnemata* Groups of hyphae sometimes joined together, generally upright and producing spores; coremium.
- Systemic* Term applied to disease in which single infection leads to general spread of the pathogen throughout the plant body; or to a chemical that acts through the vascular system.
- Teleomorph* State of life-cycle in which spores are formed after nuclear fission.
- Teliospore* Winter or resting form of rust spore, from which basidium is produced.
- Telium* Sorus producing teliospores.
- Thallophyte* One of the simpler plants, belonging to the algae, bacteria, fungi, slime molds, or lichens.
- Thallus* Vegetative body of a thallophyte.
- Tolerant* Capable of sustaining disease without serious injury or crop loss.
- Toxin* Poison formed by an organism.
- Tylosi*, pl. *Tyloses* Cell outgrowth into cavity of xylem vessel, plugging it.
- Urediospore* Summer spore of rusts; one-celled, verrucose.
- Uredium* Sorus producing urediospores.
- Valsoid* Having groups of perithecia with beaks pointing inward, or even parallel with surface, as in valsa.
- Vector* An agent, insect, man, etc., transmitting disease.
- Vein-banding* Symptom of virus disease in which regions along veins are darker green than the tissue between veins.
- Verrucose* With small rounded processes or warts.
- Viroid* The smallest known viruslike infectious agent having no protein coat and only a small amount of nucleic acid.
- Virulent* Highly pathogenic; with strong capacity for causing disease.
- Viruliferous* Virus-carrying; term applied particularly to virus-laden insects.

*Virus* An obligate parasite capable of multiplying in certain hosts, ultramicroscopic, recognizable by the effects produced in infected hosts. Has nucleic acid with protein coat.

*Wilt* Loss of freshness or drooping of plants due to inadequate water supply or excessive transpiration; a vascular disease interfering with utilization of water.

*Witches' Broom* Disease symptom with abnormal brushlike development of many weak shoots.

*Yellows* Term applied to disease in which yellowing or chlorosis is a principal symptom.

*Zoospore* A swimming spore, swarmspore, capable of independent movement.

*Zygomycetes* Subclass of the Phycomycetes, characterized by gametes of equal size.

*Zygospore* Resting spore formed from the union of similar gametes.