

Contents

Introduction	1
Most Common Fungal Diseases of Russian Forests	2
Diseases of Fruits and Seeds	2
Birch Seed Mummification	2
Fruit Deformation	2
Fruit Spots	4
Molds	6
Seed and Fruit Rots	9
Diseases of Needles and Leaves	11
Needle Diseases	11
Lophodermium Needle Casts	11
Snow Blight	15
Meria Needle Blight	16
Brown Felt Blight	18
Rhizosphaera Needle Casts	18
Needle Rusts of Pine	20
Leaf Diseases	22
Powdery Mildews	22
Leaf Spots	23
Leaf Rusts	35
Diseases Of Roots, Stems, And Branches	36
Diseases in Tree Nurseries and Young Forests	36
Damping - off	36
Diseases of Forest Stands	38
Wilts	38
Verticillium Wilt	38
Dutch Elm Disease	39
Oak Wilt	41
Dieback and Canker Diseases	42
Cenangium Dieback of Pine	42
Nectria Canker and Dieback	44
Cytospora Canker	45
Dothichiza Canker of Poplar	46
Clithris Canker and Dieback of Oaks	48
Nummularia Canker	48
Black Naemospora Canker	49
Thyrostroma Canker and Dieback	50
Ascocalyx Scleroderris Shoot Canker	52
European Larch Canker	53
Lachnellula Canker of Siberian Pine Understory	54
Stem Rust of Pine	55
Broom Rust of Fir	56
Perennial Nectria Canker	58
Black Hypoxylon Canker	60
Cytophoma Canker of Ash	60
Wood-Decaying Diseases	62
Annosum Root and Butt Rot	62
Armillaria Root Rot	65
Butt and Trunk Rot of Conifers	67
Trunk and Limb Rot of Hardwoods	75

Fungal Diseases that Occur Only in Russian Forests	89
Diseases of Fruits and Seeds	89
Thecopsora Rust of Spruce Cones	89
Acorn Mummification Deformity	89
Diseases of Needles and Leaves	91
Needle Diseases	91
Hypodermella Needle Cast of Pine Hosts	91
Chrysomyxa Rust of Spruce	91
Leaf Diseases	93
Powdery Mildew of Siberian Pea Tree	93
Other Powdery Mildews	94
Orange Leaf Spot of Padus	95
Red Spot of Ussurian Plum	96
Foliage Anthracnoses, Spots, and Blights	96
Leaf Rusts	108
Taphrina Diseases: Leaf Blisters, Leaf and Shoot Deformation	110
Diseases of Roots, Stems, and Branches	111
Diseases in Tree Nurseries and Young Forests	111
"Infectious Damping" of Coniferous Seedlings	111
Sclerophoma Disease of Pine Shoots	112
Pine Shoot Rust	113
Chrysomyxa Rust of Spruce Shoots and Needles	114
Diseases of Forest Stands	116
Dieback and Canker Diseases	116
Black Cytospora Canker of Poplar	116
Biatorella Canker	117
Pitch Blister Rust Canker	119
Endoxylina Canker of Ash	120
Cankers and Diebacks	122
Wood-Decaying Diseases	128
Ganoderma Butt Rot of Beech	129
Vuillemania Decay	129
Trunk and Limb Rots	130
Acknowledgment	133
Appendix A	
Pathogens That Affect Trees and Shrubs in Russia	134
Appendix B	
Host Trees, Shrubs, and Herbs Listed in this Report	137

Distribution

European part of Russia, Urals, Far East

Pathogen

Tyromyces erubescens (Fr.) Bond. et Sing.

Host

Fir (*Abies*), spruce (*Picea*), and pine (*Pinus*) species

Diagnosis

Basidiocarps form on the stumps and dead trees. They are cushion-like, single or in clusters, 2-7 x 4-12 x 1-4 cm. The fresh basidiocarp surface is white or pink-violet, soft, felt-like, later turning brown and bristly. The margin is sharp and tucked in. The interior tissue is fleshy and watery. After drying, it becomes brittle, fibrous, and turns the same color as the surface. Tubes are 6-7 mm long and darker than the trama. Pores initially are circular, but later become angular, oblong to labyrinth-like, 0.2-0.4 mm in diameter. The hymenophore is white-pink but turns pink-violet with age. Spores are cylindrical, curved, colorless, often with 2 oil drops, 4-4.5 x 1-1.5 μ . Decay is brown, prismatic, and develops in sapwood and heartwood.

Distribution

European part of Russia, Urals, Siberia

**Acknowledgment**

This report was prepared under Cooperative Agreement 23-953 of 1 July 1994, between the Federal Forest Service of Russia and the Northeastern Research Station of the USDA Forest Service. Robert Lewis was Director of the Northeastern Station when this project was initiated. Robert Bridges, Max McFadden (retired), and Philip M. Wargo, Northeastern Station, and Daniel Kucera (retired), Northeastern Area, State and Private Forestry, provided important assistance during the initial preparation of this publication.

Significant input was provided by Prof. Ekaterina G. Mozolevskaya (Moscow State Forest University), Prof. Ateo M. Zhukov (All-Russian Institute of Forestry Chemistry), Dr. Tamara V. Galas'eva (Moscow State Forest University), Dr. Vasilii K. Tuzov (Russian Forest Protection Center), Gennady P. Alekseytsev (Department of Reforming of Agro-Industrial Complex, Government of the Russian Federation), Dr. Galina B. Kolganikhina (Moscow State Forest University) who gave comments on the text, and provided slides of various diseases.

The manuscript was translated into English by Elena G. Kulikova and Victor K. Teplyakov. Philip Wargo edited the English text.

Word processing in Russia was performed by Alexey N. Bobrinskiy, Nina S. Emelina, Galina G. Fedotova, Tatana E. Gendel', Lyubov' F. Komarovskaya, and Tatyana I. Tuzova. Laura Cricco, Northeastern Station, Hamden, CT, prepared the edited versions of the manuscript.

Appendix A

Pathogens That Affect Trees and Shrubs in Russia

(Pathogen species that occur only in Russia are in bold italic)

- Alternaria tenuis* Nees.
Armillaria mellea (Vahl.:Fr.) Kummer
Ascocalyx abietina (Lagerb.) Schlapfer.
***Ascochyta borjomi* Bond.**
***Ascochyta crataegi* Fckl.**
***Ascochyta elaeagni* Sacc.**
***Ascochyta piricola* Sacc.**
***Ascochyta populina* Sacc.**
***Ascochyta ribesia* Sacc. et Fautr.**
***Ascochyta sarmentica* Sacc.**
Aspergillus niger Link.
Asteroma padi Grew.
Asteroma tiliae Rud.
***Biatorrella difformis* (Fries.) Rehm.**
***Biatoridina pinastri* Golov. et Stzedr.**
Botrytis cinerea Pers.
Brunchorstia pinea (Karst.) Hohnk.
***Camarosporium rubicolum* Sacc.**
Cenangium abietis (Pers.) Rehm.
Ceratocystis ulmi (Buism.) Mor.
Ceratocystis roboris Georg. et Teod.
Ceratocystis valachicum Georg. et Teod.
Cercospora acerina Hart.
Cercospora coryli Mont.
Cercospora fraxini Sacc.
Cercospora microsora Sacc.
***Cercospora padi* Bub. et Serebr.**
Cercospora salicina Ell. et Ev.
Ceuthospora abietina Delacr.
***Chrysomyxa abietis* (Wallr.) Unger.**
Chrysomyxa ledi (Alb. et Schw.) de Bary
***Chrysomyxa woroninii* Tranz.**
Cladosporium herbarum Link.
Clithris quercina (Pers.) Rehm.
***Coleosporium pini-pumila* Azb.**
***Coniothecium phyllophilum* Desm.**
Colletotrichella periclymeni (Desm.) v. Hoehn.
Colpoma quercinum (Pers.) Wallr.
***Coniothyrium unisitivum* Sacc.**
***Coniothyrium salicicola* Rossi.**
Coryneum foliicola Fckl.
***Cronartium flaccidum* Wint.**
Cronartium ribicola Dittr.
Crumenula abietina Lagerb.
***Cucurbitaria rhamni* (Nees.) Fckl.**
***Cylindrosporium avellanum* (B. et Br.) Jbr. et Ach.**
Cylindrosporium platanoides (Allesch.) Died.***Cylindrosporium propinquum* (Bub. et Vleug.) Vassil.**
***Cylindrosporium pseudoplatani* (Rob. et Desm.) Died.**
Cylindrosporium ulmi (Fr.) Vassil.
Cytophoma pulchella (Sacc.) Guthn.
Cytospora chrysosperma (Pers.) Fr.
***Cytospora foetida* Vl. et Fr.**
Cytospora intermedia Sacc.
Cytospora quercella Sacc.
***Cytospora tumida* Lib.**
Daedalea quercina (L.) Fr.
Dasyscyphus willkommii (Hart.) Rehm
Diatrype stigma (Hoffm.) Wint.
***Didymosporium profusum* Fr.**
***Diplodia amphisphaerioides* Pass.**
***Diplodia ascochytulula* Sacc.**
***Diplodia juniperi* Westend.**
***Diplodia obtulusum* Grove**
***Diplodia rhamni* Gaap.**
***Diplodina tatarica* Allesch.**
Discula betulina West. Arx
Discula umbrinella (Berk. & Broome) Sutton
Dothichiza populea Sacc. et Briard.
Dothichiza ferruginosa Sacc.
Dothidella betulina (Fr.) Sacc.
Dothidella ulmi (Duv.) Wint.
***Dothiorella robiniae* Prill. et Delacr.**
***Endoxylina stellulata* Rom.**
Fomes fomentarius (L.: Fr.) Gill.
Fomitopsis annosa (Fr.) Karst.
Fomitopsis officinalis (Will.) Bond. et Sing.
Fomitopsis pinicola (Sw. et Fr.) Karst.
Fusicoccum obtusulum Grove
Fusarium sp.
Ganoderma applanatum (Pers.) Pat.
***Ganoderma pfeifferi* Bres.**
***Gloeosporium acericola* Allesch.**
***Gloeosporium aucuparia* Henn.**
Gloeosporium betulinum West.
***Gloeosporium capreae* Allesch.**
Gloeosporium coryli (Desm.) Sacc.
Gloeosporium fagi West.
***Gloeosporium perexiguum* Sacc.**
Gloeosporium quercinum West.
Gloeosporium tiliae Oudem.
Gloeosporium tremulae (Lib.) Pass.
Gnominia quercina Kleb.
Graphium ulmi Schwarz.
-

Continued

Appendix A continued.

- Gremmeniella abietina* (Lagerb.) Moretel
Hendersonia acicola Munch. et Tub.
Hendersonia piricola Sacc.
Hendersonia pseudoacaciae Ell. et Barth.
Hericium cirrhatum (Fr.) Nikol.
Herpotrichia juniperi (Duby) Petr.
Heterobasidion annosum (Fr.) Bref.
Heterosporium fraxini Ferd. et Winge.
Hypodermella sulcigena Tub.
Hypoxylon pruinaum (Kl.) Cke.
(*Hypoxylon mammatum* (Wahlenberg) J.H. Miller)
Inonotus dryadeus (Pers.: Fr.) Murrill
Inonotus dryophilus (Berk.) Murr.
Inonotus obliquus (Pers.: Fr.) Pil.
Inonotus polymorphus (Rostk.) Bond. et Sing.
Lachnellula angustispora Raitv.
Lachnellula flavovirens (Bres.) Dennis
Lachnellula fuckelii (Bres. in Rehm.) Dharne.
Lachnellula kamtschatica Raitv.
Lachnellula minuscula Raitv.
Lachnellula pini (Brunch.) Dennis
Lachnellula pseudofarinaceae (Cronan.) Dennis
Lachnellula willkommii (Hart.) Dennis
Laetiporus sulphureus (Bull.) Bond. et Sing.
Leucostoma diatrype Fr.
Libertella fraxini Ogan.
Lophodermium juniperinum (Fr.) De Not.
Lophodermium macrosporum (Hart.) Rehm.
Lophodermium nervisequium (D.C.) Rehm.
Lophodermium pinastri Chev.
Lophodermium seditiosum Mint., Stal. et Mill.
Marssonina juglandis (Lib.) P. Magn.
Marssonina populi Kleb.
Melampsora allii-populina Kleb.
Melampsora larici-caprearum Kleb.
Melampsora larici-populina Kleb.
Melampsora larici-tremulae Kleb.
Melampsora pinitorqua Rostr.
Melampsorella cerastii Wint.
Melampsorella symphiti (DC) Bub.
Melampsorium betulae Arth.
Melanconium czerniaiewi Poteb.
Melanconium desmazierii (Berk. et Br.) Sacc.
Melasmia acerina Lev.
Melasmia punctata Sacc.
Melasmia salicina Lev.
Meria laricis Vuill.
Microdiplodiaascochyntula (Sacc.) Allesch.
Microsphaera alphitoides Griff. et Maubl.
Microsphaera berberidis Lev.
Microsphaera betulae Magn.
Microsphaera divaricata Lev.
Microsphaera grossulariae (Wallr.) Lev.
Microsphaera lonicera Wint.
Microsphaera palczewskii Jacz.
Microsphaera penicillata (Wallr.) Lev.
Microsphaera syringae (Schwein.) Magnus
Microsphaera vanbruntiana Gerard.
Microsphaera viburni (Duby) Blum.
Monilia linhartiana Sacc.
Mucor species
Mycosphaerella latebrosa (Ckl.) Schroet.
Mycosphaerella pseudoplatani Zer.
Mycosphaerella oxyacanthae Jaap
Mycelia sterilia
Naemospora croceola Sacc.
Nectria cinnabarina (Tode.) Fr.
Nectria coccinea (Pers.: Fr.) Fr.
Nectria ditissima Tul.
Nectria galligena Bres.
Nitschkia cupularis (Pers.) Winter
Nummularia bulliardii Tul.
Nummularia succenturiata (Tode) Nitschke
Onnia triqueter (Lentz.:Fr.) Imaz.
Ophiostoma ulmi (Buism.) Nannf.
Ovularia necans Pass.
Oxyporus populinus (Schum. ex Fr.) Donk.
Penicillium expansum (Link.) Thom.
Penicillium italicum Pers.
Peridermium pini (Willd.) Lev. et Kleb.
Pestalotia breviseta Sacc.
Pestalotia malorum Elenk. et Ohl.
Phacidium infestans Karst.
Phaeolus schweinitzii (Fr.) Pat.
Phellinus baumii Pil.
Phellinus chrysoloma (Fr.) Donk.
Phellinus hartigii (Allesch. et Schnabl.) Pat.
Phellinus igniarius (L.:Fr.) Quel.
Phellinus microsporus (Pil.) Parm.
Phellinus pini (Thore:Fr.) A. Ames
Phellinus pini (Thore:Fr.) Pil. var. *abietis* (P. Karst.) Pil.
Phellinus robustus (P. Karst.) Bourd. et Galz.
Phellinus tremulae (Bond.) Bond. et Borisov.
Phleospora oxyacanthae (Kze. et Schum.) Wallr.
Pholiota adiposa (Fr.: Fr.) Kumm.
Phoma aceris-negundinis Arcang.
Phoma betulae Jacz.
Phoma fuckelii Sacc.
Phoma samarorum Desm.
Phomopsis quercella (Sacc.) Died.
Phyllactinia suffulta (Rabh.) Sacc.
Phyllosticta aceris Sacc.

Continued

Appendix A continued.

-
- Phyllosticta associata* Bub.**
***Phyllosticta aucupariae* Thum.**
***Phyllosticta bellunensis* Mart.**
***Phyllosticta borschowii* Thum.**
***Phyllosticta corylaria* Sacc.**
Phyllosticta coryli West.
Phyllosticta fraxini Ell. et Mart.
***Phyllosticta globulosa* Thum.**
***Phyllosticta lacerans* Pass.**
***Phyllosticta michailowskoensis* Elenk.**
***Phyllosticta monogyna* Allesch.**
Phyllosticta populina Sacc.
***Phyllosticta populi-nigrae* Allesch.**
***Phyllosticta quercina* Thum.**
***Phyllosticta tambowiensis* Bub. et Serebr.**
***Phyllosticta ulmaria* Pass.**
***Phyllosticta ulmi* H.C. Greene**
Piggotia astroidea Berk. et Br.
Piptoporus betulinus (Bull.: Fr.) Karst.
***Piptoporus quercinus* (Schrad. ex Fr.) Pil.**
Podosphaera oxyacanthae de Bary
Pollaccia radiosa (Lib.) Bald. et Cif.
***Polyporus laccatus* Kalchbr.**
Polyporus squamosus (Huds.: Fr.) Fr.
Polystictus circinatus (Fr.) P. Karst. var. triqueter Bres.
***Polystigma ochraceum* (Wahl.) Sacc.**
***Polystigma ussuriensis* (Natal. et Jacz.) A. Proz.**
***Polystigmia rubra* (Desm.) Sacc.**
***Pseudoulsa berkeleyi* Sacc.**
***Puccinia coronifera* Kleb.**
***Pucciniastrum coryli* Kom.**
Pythium spp.
***Ramularia sorbi* Karak.**
***Ramularia tiliae* Lobik.**
***Rhabdospora passerinii* Sacc.**
Rhizoctonia species
Rhizopus nigricans Ehr.
Rhizosphaera kalkhoffii Bubak.
Rhizosphaera pini (Corda) Maubl.
Rhytisma acerinum (Pers.) Fr.
Rhytisma punctatum (Pers.) Fr.
Rhytisma salicinum (Pers.) Fr.
***Rhytisma symmetricum* Joh. Mull.**
***Rhytisma xylostei* Naum.**
Schizophyllum commune Fr.
Scleroderris lagerbergii Gremm.
***Sclerophoma pithya* v. Hohn.**
Sclerotinia betulae Woron.
***Sclerotinia graminearum* Elen.**
***Septogloeum hartigianum* Sacc.**
***Septomyxa negundinis* Allesch.**
-
- Septoria acerella* Sacc.**
***Septoria acerina* Sacc.**
Septoria betulae Pass. non (Lib.) West.
***Septoria candida* (Fckl.) Sacc.**
***Septoria crataegicola* Bond. et Tranz.**
***Septoria ebuli* Desm. et Rob.**
***Septoria frangulae* Guep.**
***Septoria pallens* Sacc.**
Septoria populi Desm.
Septoria quercicola (Desm.) Sacc.
***Septoria tiliae* Westend.**
***Septoria tremulae* Pass.**
Septoria xylostei Sacc. et Wint.
Sphaerotheca pannosa (Wallr.) Lev.
***Spongipellis litschaueri* Lohw.**
Stereum hirsutum (Willd: Fr.) S.F. Gray
Stigmia compacta (Sacc.) M.B. Ellis
***Stilbospora angustata* Pers.**
***Stromatinia pseudotuberosa* Rehm.**
Taphrina alni-incanae (Kuhn.) Sad.
Taphrina aurea (Pers.) Fr.
***Taphrina autumnalis* Palm.**
***Taphrina betulae* Johans.**
***Taphrina betulina* Rostr.**
***Taphrina crataegi* Sad.**
Taphrina johansonii Sad.
Taphrina polyspora Johans.
Taphrina pruni Tul.
Taphrina rhizophora Johans.
***Taphrina turgida* Sad.**
Taphrina ulmi Johans.
Thamnidium elegans Link.
***Thecospora aleolata* (Fr.) Magn.**
***Thecospora padi* (Kze. et Schm.) Kleb.**
Thyrostroma compactum (Sacc.) Hohn.
Trichocladia caraganae Magn.
Trichocladia euonymi Neger.
Trichothecium roseum Link.
Tubercularia vulgaris Tode: Fr.
***Typhula graminearum* Tul.**
***Tyromyces erubescens* (Fr.) Bond. et Sing.**
Uncinula aceris Sacc.
***Uncinula clandestina* Schroet.**
Uncinula fraxini Miyake
Uncinula salicis Wint.
Valsa sordida Nits.
***Valsaria stellulata* Rom.**
Venturia tremulae Aderh.
Verticillium albo-atrum Rke. et Berth.
Verticillium dahliae Kleb.
***Vuillemenia comedens* Maire**
-

Appendix B

Host Trees, Shrubs, and Herbs Listed in this Report

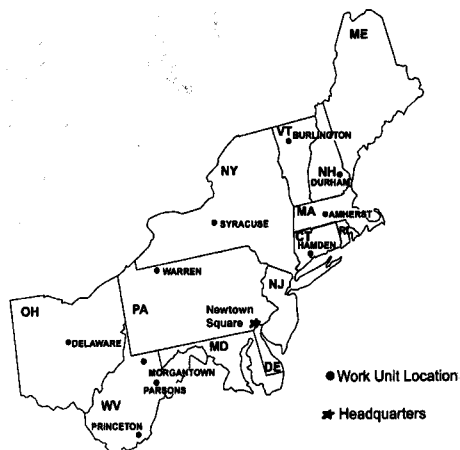
<i>Abies alba</i>	<i>Impatiens</i>	<i>Populus pyramidalis</i>
<i>Abies balsamea</i>	<i>Inula</i>	<i>Populus tremula</i>
<i>Abies concolor</i>	<i>Juglans regia</i>	<i>Prunus ussuriensis</i>
<i>Abies nordmanniana</i>	<i>Juniperus communis</i>	<i>Pyrus</i>
<i>Abies sachalinensis</i>	<i>Juniperus sibirica</i>	<i>Quercus palustris</i>
<i>Abies sibirica</i>	<i>Juniperus virginiana</i>	<i>Quercus petraea</i>
<i>Acer campestre</i>	<i>Larix dahurica</i>	<i>Quercus robur</i>
<i>Acer ginnala</i>	<i>Larix decidua</i>	<i>Quercus suber</i>
<i>Acer negundo</i>	<i>Larix kurilensis</i>	<i>Rhamnus cathartica</i>
<i>Acer platanoides</i>	<i>Larix sibirica</i>	<i>Ribes aureum</i>
<i>Acer pseudoplatanus</i>	<i>Larix sukaczewii</i>	<i>Robinia pseudoacacia</i>
<i>Acer tataricum</i>	<i>Ledum palustre</i>	<i>Rosa cania</i>
<i>Aesculus hippocastanum</i>	<i>Lonicera chrysantha</i>	<i>Rosa cinnamomea</i>
<i>Allium</i>	<i>Lonicera maakii</i>	<i>Salix acutifolia</i>
<i>Alnus glutinosa</i>	<i>Lonicera tatarica</i>	<i>Salix alba</i>
<i>Alnus hirsuta</i>	<i>Lonicera xylosteum</i>	<i>Salix caprea</i>
<i>Alnus incana</i>	<i>Malus domestica</i>	<i>Salix purpurea</i>
<i>Amygdalus</i>	<i>Morus alba</i>	<i>Sambucus nigra</i>
<i>Argostis tenuis</i>	<i>Padus avium</i>	<i>Sambucus racemosa</i>
<i>Arum elongatum</i>	<i>Padus asiatica</i>	<i>Senecio jacobaea</i>
<i>Berberis vulgaris</i>	<i>Pedicularis palustris</i>	<i>Senecio nemorensis</i>
<i>Betula pendula</i>	<i>Picea abies</i>	<i>Sonchus arvensis</i>
<i>Betula pubescens</i>	<i>Picea excelsa</i>	<i>Sorbus aucuparia</i>
<i>Caragana arborescens</i>	<i>Picea fennica</i>	<i>Stellaria</i>
<i>Carpinus betulus</i>	<i>Picea obovata</i>	<i>Syringa amurensis</i>
<i>Caryophyllaceae</i>	<i>Picea orientalis</i>	<i>Syringa vulgaris</i>
<i>Castanea sativa</i>	<i>Picea pungens</i>	<i>Thuja</i>
<i>Cerastium</i>	<i>Pinus banksiana</i>	<i>Tilia cordata</i>
<i>Cornus mas</i>	<i>Pinus cembra</i>	<i>Tilia platyphylla</i>
<i>Corylus avellana</i>	<i>Pinus koraiensis</i>	<i>Tilia tomentosa</i>
<i>Crataegus</i>	<i>Pinus montana</i>	<i>Tussilago farfaga</i>
<i>Cynanchum vincetoxicum</i>	<i>Pinus nigra</i>	<i>Ulmus androssowii</i>
<i>Elaeagnus angustifolia</i>	<i>Pinus pumila</i>	<i>Ulmus carpiniifolia</i>
<i>Elaeagnus argentea</i>	<i>Pinus sibirica</i>	<i>Ulmus glabra</i>
<i>Euonymus</i>	<i>Pinus silvestris</i>	<i>Ulmus japonica</i>
<i>Fagus orientalis</i>	<i>Pinus strobus</i>	<i>Ulmus laciniata</i>
<i>Fagus sylvatica</i>	<i>Populus alba</i>	<i>Ulmus laevis</i>
<i>Frangula alnus</i>	<i>Populus bolleana</i>	<i>Ulmus pumila</i>
<i>Fraxinus excelsior</i>	<i>Populus canadensis</i>	<i>Verbena</i>
<i>Fraxinus viridis</i>	<i>Populus canescens</i>	<i>Viburnum opulus</i>
<i>Grossularia reclinata</i>	<i>Populus nigra</i>	

Kuz'michev, Evgeny P.; Sokolova, Ella S.; Kulikova, Elena G. 2001. **Common fungal diseases of Russian forests**. Gen. Tech. Rep. NE-279. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 137 p.

Describes common fungal diseases of Russian forests, including diagnostic signs and symptoms, pathogen biology, damage caused by the disease, and methods of control. The fungal diseases are divided into two groups: those that are the most common in Russian forests and those that are found only in Russia. Within each group, diseases are subdivided by plant organ attacked, i.e., fruit, seeds, leaves, needles, roots, stems, and branches.

Keywords: hosts, pathogens, diagnostics, symptoms, pathogen biology, control





Headquarters of the Northeastern Research Station is in Newtown Square, Pennsylvania. Field laboratories are maintained at:

Amherst, Massachusetts, in cooperation with the University of Massachusetts

Burlington, Vermont, in cooperation with the University of Vermont

Delaware, Ohio

Durham, New Hampshire, in cooperation with the University of New Hampshire

Hamden, Connecticut, in cooperation with Yale University

Morgantown, West Virginia, in cooperation with West Virginia University

Parsons, West Virginia

Princeton, West Virginia

Syracuse, New York, in cooperation with the State University of New York, College of Environmental Sciences and Forestry at Syracuse University

Warren, Pennsylvania

The U. S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at (202)720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue SW, Washington, DC 20250-9410, or call (202)720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

"Caring for the Land and Serving People Through Research"