## DISEASES OF TREES AND SHRUBS

ABIES - Fir

Timber Rot. Organisms found causing decay of A. balsamea were: Fomes pinicola, Dore Lake, Sask.; Lenzites saepiaria, Dore Lake, Sask., Whiteshell Forest Reserve, Man.; Polyporus abietinus, Dore Lake, Sask., Whiteshell Forest Reserve, Man.; Stereum sanguinolentum, common at Dore Lake, Sask. (C.G. Riley). Reported from A. lasiocarpa were: Poria Weirii, Prince George district, B.C. (P.J. Salisbury); Lenzites saepiaris and Stereum sanguinolentum, Brule, Alta. (C.G. Riley).

ACER - Maple

Timber Rot (Daedalea unicolor) was observed at Fort Garry, Man. (C.G. Riley).

Tar Spot (Rhytisma spp.). R. acerinum was severe on a tree of A. ginnala at Edmonton, Alta. (J.D. Gilpatrick). It was prevalent on A. saccharinum at Rawdon, Que. (J.E. Jacques), and was very heavy on A. saccharum in Queens Co., P.E.I. (R.R. Hurst). R. punctatum was common on A. macrophyllum at Point Grey, B.C., but caused no damage (H.N.W. Toms).

AESCULUS - Horsechestnut

Leaf Blight (Guignardia Aesculi). Trees in communities in the Annapolis Valley, N.S., were severely blighted and disfigured. One tree that received two summer applications of Fermate was much less injured than others (D. Creelman).

ALNUS - Alder

Wood Rot (Daedalea unicolor) was found at Hudson Bay Junction, Sask. (C.G. Riley).

Catkin Deformation (Taphrina Robinsoniana) was found at St. Alphonse de Joliette, Que. (A. Payette, D.B.O. Savile).

AMELANCHIER

Black Leaf Curl (Apiosporina Collinsii) was observed at Whiteshell For. Res., Man. (C.G. Riley).

Rust (Gymnosporangium spp.). G. sp. was prevalent on leaves and fruits of wild Amelanchier in the Okanagan Valley, B.C. (G.E. Woolliams). G. clavipes was seen on A. sp. at Berens River and Whiteshell For. Res., Man. (C.G. Riley); it was heavy on fruit of A. canadensis near Arnprior, Ont. (D.B.O. Savile).

BETULA - Birch

Timber Rot. The following organisms were identified from B. papyrifera in the prairie provinces: Daedalea unicolor, Riding Mt. Nat. Park, Man.; Fomes fomentarius, Hudson Bay Junction and Dore Lake, Sask., Spruce Woods For. Res. and Riding Mt. Nat. Park, Man.; Fomes igniarius, Hudson Bay Junction and Dore Lake, Sask., Whiteshell For. Res., Man.; Polyporus adustus, Riding Mt. Nat. Park, Man.; P. betulinus, Dore Lake, Sask., Riding Mt. Nat. Park and Whiteshell For. Res., Man.; P. cuticularis, Hudson Bay Junction and Dore Lake, Sask., Whiteshell For. Res., Man.; P. pubescens, Buffalo Narrows, Sask.; Stereum fasciatum, Buffalo Narrows, Sask.; S. hirsutum, Slave Lake, Alta.; Trogia crispa, Slave Lake, Alta. (C.G. Riley).

Twig Blight (Melanconium sp.) was abundant in a birch tree at Guelph, Ont. (J.D. MacLachlan).

Die-Back (cause unknown). All birch trees, except the planted cut-leaves forms, appear to be dead or dying near Charlottetown, P.E.I. (R.R. Hurst). See L.S. Hawboldt and A.J. Skolko, Investigation of yellow birch die-back in Nova Scotia in 1947. Jl. For. 46:659-671. 1948.

CARAGANA

Seedling Blight (?Fusarium sp.) was severe in several blocks at the Forest Nursery Station, Sutherland, Sask.; Fusarium spp. and other fungi were isolated (H.W.M.).

CRATAEGUS - Hawthorn

Scald (Entomosporium Thuemenii) was moderately heavy on Crataegus sp. at Kentville, N.S. (D. Creelman).

FAGUS - Beech

Canker (Cytosporina sp.). C. sp. fruited freely in cankers on ornamental beech used for a hedge at Oakville, Ont. Several of the trees were dying. The fungus is thought to have followed winter injury (J.D. MacLachlan). Dodge and Rickett (Diseases and Pests of Ornamental Plants) refer to C. sp. as the cause of a canker of beech. Since it is a wound parasite it might be serious in a hedge where pruning wounds are necessarily abundant. Grove (British Stem and Leaf Fungi) includes Fagus as a host for C. Acharii, C. flavovirens and C. milliaria, which are the imperfect stages of Eutypa Acharii, E. flavovirens and Valsa milliaria respectively.

FRAXINUS - Ash

Rust (Puccinia sparganioides) was very heavy and malformed 5% of the twigs of F. americana at Hortonville, N.S. (K.A. Harrison).

ILEX - Holly

Tar Spot (Rhytisma sp.) was seen on a few leaves of a tree in a garden at North Saanich, B.C., in Dec. 1947. Material brought indoors matured in Feb. 1948 (W. Jones).

JUNIPERUS

Rust (Gymnosporangium spp.). G. Nelsoni was seen on a few trees of J. scopulorum in the Cariboo district, B.C. The aecial stage was found on Amelanchier florida in the same area (J.M. Macalister, W. Jones).

LABURNUM

Canker (Fusarium lateritium sensu Snyder & Hansen). Cankers on L. Watereri (L. anagyroides x alpinum), received from a nursery at Kingsville, Ont., in Dec. 1948, yielded this fungus. See also Hibiscus (I.L. Conners, W.L. Gordon).

PICEA - Spruce

Rust (Chrysomyxa spp.). C. ledicola severely attacked P. glauca in large areas east of L. Winnipeg, Man., imparting a conspicuous rusty colour to the forest as seen from the air. At Berens River leaf infection was practically 100%, resulting in severe defoliation in August. There was

evidence of a similar defoliation in 1945 (C.G. Riley). Specimens collected by J.M. Gillett at Churchill indicate that C. ledicola was abundant on P. glauca, Ledum groenlandicum and L. palustre var. decumbens (D.B.O. Savile). C. Ledi was observed on P. mariana at Berens River (C.G. Riley). Cone rust (C. Pyrolae) was prevalent in parts of western Alta. on P. glauca and P. mariana (P.J. Salisbury).

Witches' Broom (Peridermium colorandense) was seen on P. glauca at Riding Mt. Nat. Park, Man. (C.G. Riley).

Timber Rot. The following organisms were found causing decay of P. Englemanni in Alta.: Fomes Pini and Lenzites saepiaria at Coleman; Phlebia mellea, Trametes heteromorpha and T. serialis at Brule (C.G. Riley). R.A. Waldie (Interim report on decay losses in spruce in the Upper Fraser region, B.C. Nov. 1948. Mimeographed) discusses the fungi concerned in decay of spruce in that region; no distinction is made between host species, but the principal species is P. glauca and P. Engelmanni occurs to a small extent. Infections of root and butt comprised 83.5% of the total, those of the trunk 12.4%, and those of the sapwood 4.1%. The principal rots of root and butt were caused by: Polyporus circinatus, Corticium galactinum, Polyporus balsamous, Stereum sanguinolentum, Odontia bicolor, and Coniophora puteana, in descending order of importance. Stereum sanguinolentum was the principal cause of trunk decay. Thirteen other identified and a number of unidentified organisms were involved (D.B.O.S.). The following organisms were identified from P. glauca in the prairie provinces: Coniophora puteana, Hudson Bay Junction, Sask., Riding Mt. Nat. Park, Man.; Fomes Pini, Dore Lake, Porcupine Provincial Forest, Sask.; F. piniicola, Dore Lake, Hudson Bay Junction, Sask., Riding Mt. Nat. Park, Whitesholl For. Res., Man.; F. subroseus, Riding Mt. Nat. Park, Man.; Lenzites saepiaria, Athabaska, Alta., Dore Lake, Porcupine Prov. Forest, Hudson Bay Junction, Sask., Riding Mt. Nat. Park, Duck Mt. For. Res., Spruce Woods For. Res., Whiteshell For. Res., Berens River, Man.; Polyporus abietinus, Slake Lake, Alta., Dore Lake, Hudson Bay Junction, Porcupine Prov. Forest, Sask., Riding Mt. Nat. Park, Duck Mt. For. Res., Whitesholl For. Res., Man.; P. adustus, Riding Mt. Nat. Park, Man.; P. alboluteus, Brule, Alta.; P. anceps, Hudson Bay Junction, Porcupine Prov. Forest, Sask.; P. circinatus, P. circinatus var. dualis, P. immitus and P. volvatus, Riding Mt. Nat. Park, Man.; Stereum sanguinolentum, Dore Lake, Sask., Riding Mt. Nat. Park, Man. (C.G. Riley). The following organisms were identified from P. mariana: Fomes subroseus, Sassaginigak Lake, Man.; Polyporus sulphureus, Rocky Mountain House, Alta.; Poria subacida, Sassaginigak Lake, Man. (C.G. Riley). Poria vaporaria was found on Picea sitchensis in the Queen Charlotte Islands, B.C. (P.J. Salisbury).

PINUS - Pine

Witches' Broom (Arcuthobium americanum) was observed in abundance on P. Banksiana in Alta. and Sask., and in Man. east to Cowan. It is desirable to know whether this mistletoe is extending its range eastward. Observers in eastern Manitoba are asked to send details of its occurrence to the Dominion Laboratory of Forest Pathology, University of Saskatchewan, Saskatoon, Sask., and to send pressed specimens to the Division of Botany and Plant Pathology at Ottawa for deposition in the herbarium. Mistletoe was also seen on P. contorta var. latifolia at Kananaskis Forest Experiment

Station, Alta., and was reported from many localities in the foothills and subalpine forest belts (C.G. Riley). Previously reported in the Survey only from Sask., but there are specimens in the phanerogamic herbarium from B.C., Alta., Sask. and Man.

Rust (Cronartium spp.). C. coleosporioides caused slight damage to P. Banksiana at Ste. Anne de la Pocatiere, Que. The distal part of the branch was sometimes killed (A. Payette). See R. Pomerleau (Mycol. 34: 120-122. 1942) for discussion of the status of this rust in Que. and the occurrence of the telia on Melampyrum lineare and Rhinanthus borealis (D.B.O.S.). C. ?Quercuum was found on P. Banksiana at Cartier, Ont., 40 mi. N.W. of Sudbury and just within the limits of Quercus macrocarpa (A.W. McCallum).

Timber Rot. Trametes americana was found on P. Banksiana at Whiteshell and Duck Mt. Forest Reserves, Man. Poria purpurea was seen at Shilo Nursery, Man., and Stereum sanguinolentum at Brule, Alta., on P. contorta var. latifolia. Thelephora terrestris was found on the base of a living tree of P. sylvestris and on the adjacent ground at Spruce Woods For. Res., Man. (C.G. Riley).

Needle Cast (Hypodermella montana). Needle cast of P. contorta caused considerable yellowing and defoliation along the Alaska Highway in northern B.C. A single specimen received agreed most closely with H. montana (P.J. Salisbury, D.B.O. Savile).

Pole Blight (cause unknown), a disease that causes considerable mortality of P. monticola 40 to 100 years old in parts of northern Idaho and Montana, was reported, for the first time in Canada, at New Denver in southeastern B.C. (P.J. Salisbury). See C.A. Wellner, Journ. of Forestry 46(4):294-295. Apr. 1948.

Damping Off (Pythium de Baryanum) caused 50% loss of P. Banksiana and P. Pinaster seedlings near Charlottetown, P.E.I., in July (R.R. Hurst).

POPULUS - Poplar

Canker (Dothichiza populea) was heavy and caused severe damage to specimens of P. nigra var. italica brought in from McGregor Lake, Que., in late June, by Mr. R. Chamberland of the Dept. of Lands and Forests, who stated that all 12 of a row of 40-ft. trees were heavily cankered from top to bottom and that their death appeared to be unavoidable. The disease was first noticed by the owner in 1945. The fungus w s immature in the most recent cankers, but was fruiting on some that appeared to have originated in 1947. Previously reported from Ont., N.B. and N.S. (Ruth Macrae, D.B.O. Savile).

Leaf Blight (Fusicladium radiosum) caused considerable damage to wild and ornamental poplars throughout Kings Co., N.S. The wet season apparently greatly favoured infection, which ranged from 20 to 100% (D. Creelman). At the Kentville Experimental Station leaf blight was seen, on 11 June, to be concentrated around and below twigs killed by the fungus in 1947, indicating overwintering on the attached twigs (K.A. Harrison).

Branch Gall (Macrophoma tumefaciens) occurred sporadically on P. trichocarpa in the Quesnel district, B.C. (P.J. Salisbury). Reported in the Survey from Alta. and in the herbarium from Kenora, Ont.

Anthracnose (Marssonina Castagnei) was so severe as a result of the wet season that leaves of P. tremuloides near L. Okanagan at Summerland, B.C., began to fall early in August. The trees were almost bare by the end

of August, whereas leaf fall does not ordinarily occur until late October (G.E. Woolliams). It caused heavy defoliation of Carolina poplars (P. canadensis) near the Welland Canal, Lincoln Co., Ont., in late August (G.C. Chamberlain).

Rust (Melampsora medusae) was observed on P. tacamahaca at Spruce Woods For. Res., Man.; and on P. tremuloides at Turtle Mt. and Whiteshell For. Reserves, Man. (C.G. Riley).

Leaf Spot (Septoria Populi) was abundant, but apparently not very injurious, on P. trichocarpa at Summerland, B.C. (G.E. Woolliams).

Yellow Leaf Blister (Taphrina aurea) was abundant but not serious on specimens of P. nigra var. italica from McGregor Lake, Que. Reported in Survey from B.C. and P.E.I. and in Herbarium from eastern Que. (D.B.O. Savile).

Timber Rot. The following organisms were identified from P. tacamahaca in the prairie provinces: Coniophora byssoidea and Eichleriella spinulosa, Rocky Mountain House, Alta.; Polyporus adustus, Swan River, Man.; Poria ambigua, Rocky Mountain House, Alta. (C.G. Riley). Fungi identified from P. tremuloides were: Corticium polygonium and C. udicola, Whiteshell For. Res., Man.; Fomes fomentarius, Dore Lake, Sask., Riding Mt. Nat. Park, Man.; F. igniarius, Brule, Slave Lake, Alta., Buffalo Narrows, Dore Lake, Hudson Bay Junction, Sask., Riding Mt. Nat. Park, Turtle Mt., Duck Mt. and Whiteshell For. Reserves, Man.; F. pinicola, Hudson Bay Junction, Sask., Berens River, Man.; Gloecystidium leucoxanthum, Whiteshell For. Res., Man.; Hypoxylon pruinatum, Riding Mt. Nat. Park, Turtle Mt. and Whiteshell For. Res., Man.; Lenzites saepiaria, Rocky Mountain House, Alta.; Merulius tremellosus, Hudson Bay Junction, Sask.; Phlebia strigoso-zonata, Benalto, Alta., Candle Lake, Sask., Turtle Mt. and Whiteshell For. Reserves, Man.; Pholiota adiposa, Riding Mt. Nat. Park, Man.; Polyporus adustus, Brule, Alta. Candle Lake, Sask., Riding Mt. Nat. Park, Swan River, Whiteshell For. Res., Man.; P. dichrous, Hudson Bay Junction, Sask.; P. hirsutus, Rocky Mountain House, Alta.; Hudson Bay Junction, Sask.; P. pargamenus, Dore Lake, Hudson Bay Junction, Sask., Riding Mt. Nat. Park, Man.; P. pubescescens, Swan River, Man.; P. velutinus, Swan River, Whiteshell For. Res., Man.; P. versicolor, Hudson Bay Junction, Sask., Whiteshell For. Res., Man.; Schizophyllum commune, Turtle Mt. For. Res., Man., Stereum fuscum, Riding Mt. Nat. Park, Whiteshell For. Res., Man.; S. rufum, Royal Park, Alta., Whiteshell For. Res. Man. (C.G. Riley). In the Quesnel area, B.C., decay of P. tremuloides by Fomes igniarius was serious in some stands. Other organisms attacking this species in the area were: Coniophora olivacea, Corticium polygonium, C. sulphureum, Oxydontia alboviride and Phlebia strigoso-zonata. The following were found in living trees of P. trichocarpa in the Quesnel area: Fomes igniarius, Ganoderma applanatum, Pholiota destruens, Pleurotus subareolatus, Pleurotus ulmarius, Polyporus delectans and Stereum purpureum (P.J. Salisbury).

PRUNUS

Black Knot (Dibotryon morbosum) was seen on P. pennsylvanica at Dore Lake, Sask., and Whiteshell For. Res., Man. (C.G. Riley).

Blossom and Twig Blight (Sclerotinia laxa) was severe on bushes of P. japonica at the Station, Saanichton, B.C. (W. Jones).

Leaf Curl (Taphrina confusa) was moderately heavy on P. virginiana at Ste. Anne de la Pocatiere and Notre Dame du Portage, Que., but was checked in June by dry weather (A. Payette).

PSEUDOTSUGA TAXIFOLIA - Douglas Fir

Rust (Melampsora albertensis) caused slight damage in the interior of B.C. (P.J. Salisbury).

Needle Blight (Rhabdocline Pseudotsugae) was apparently responsible for most of the considerable needle cast seen in the B.C. Interior (P.J. Salisbury).

PYRACANTHA - Firethorn

Scab (Fusicladium Pyracanthae) caused considerable damage to P. sp. in gardens at Salt Spring Island, B.C. (W. Jones). It was common on the foliage and fruit of P. coccinea at the University, Point Grey (H.N.W. Toms).

QUERCUS - Oak

Timber Rot (Polyporus pubescens) was observed on Q. macrocarpa at Spruce Woods For. Res., Man. (C.G. Riley).

RHAMNUS - Buckthorn

Rust (Puccinia coronata). Aecia on R. cathartica were reported near Kemptville, Ont., on 15 May, and a light infection was noted in the Arboretum, Ottawa, on 26 May (R.J. Baylis). Infection was moderately heavy on a bush of R. cathartica at Ste. Anne de la Pocatiere, Que. (A. Payette). A light infection occurred on bushes of R. cathartica at the Experimental Station, Fredericton, N.B., and a hedge and scattered bushes of R. Frangula bore moderate to heavy infections of P. c. var. Agrostis (J.L. Howatt).

SALIX - Willow

Scab (Fusicladium saliciperdum). Specimens of Salix sp. from Markham, near Toronto, Ont., showed the pathogen fruiting freely on all twigs and some leaves. This is the first report for Ontario and Markham is about 350 miles from the nearest reported centre in Que. (J.E. Bier, I.L. Conners).

Anthracnose (Marssonina Kriegeriana) severely damaged a weeping willow (S. babylonica) at Oyster River, B.C. (W. Jones), and caused heavy defoliation of several trees of the same species at Burnaby (I.C. MacSwan, H.N.W. Toms).

Rust (Melampsora sp.) severely infected wild Salix at Summerland, B.C., and caused premature defoliation (G.E. Woolliams). M. Bigelowii was observed on Salix spp. at Dore Lake, Sask., and Turtle Mt. and Spruce Woods For. Reserves, Man. (C.G. Riley).

Tar Spot (Rhytisma salicinum) was seen on Salix sp. at Spruce Woods For. Res., Man. (C.G. Riley).

Leaf Blight (Septogloeum salicinum (Pk.) Sacc.) caused considerable damage to willow shrubs at North Saanich, B.C., and generally throughout the district; the shrubs appeared in August as though burnt. In the herbarium from Que., but not previously reported in the Survey. The various Septogloeum spp. on willow are doubtfully distinct, the variation between species often being nearly equalled in a single collection; but they do not appear to overlap the several Marssonina spp., which, in turn, are doubtfully distinct from M. Kriegeriana (W. Jones, D.B.O. Savile).

SORBUS - Mountain Ash

Black Rot Canker (Physalospora obtusa (Sphaeropsis Malorum) caused twig and branch die-back on a few trees in a nursery at London, Ont. (G.C. Chamberlain). Not reported in the Survey on this host, but we have one specimen from Preston, Ont., on S. americana.

THUJA - Arbor-vitae

Die-Back. Specimens of dying branches of T. occidentalis were received from the Provincial Forest Station, St. Williams, Ont., on which Pestalotia funerea Desm. (det. J.W. Groves) was fruiting. It is possible that the fungus followed winter injury (J.D. MacLachlan).

TILIA - Basswood

Leaf Spot (Cercospora microsora). Infection was 90% on T. cordata at Canard, N.S., and caused 10% premature defoliation (J.F. Hockey).

ULMUS - Elm

Dutch Elm Disease (Ceratostomella Ulmi). During 1948 work on this project continued on about the same scale as in the preceding year. In Que. considerable intensification of the disease occurred in the eastern part of the infected area south of the St. Lawrence River. Infected trees were found for the first time in 7 additional counties, mostly south of the St. Lawrence, this making a total of 30 counties in which the disease occurred. There was some extension of the infected area southward, diseased trees being found approximately within 25 miles of the Maine border, within 16 miles of the New Hampshire border and within 20 miles of the Vermont and New York borders. A total of 3648 collections from suspected trees was made in Que. and of these 2581 proved to be positive. The policy of removing diseased trees in the outer sections of the general area of infection was continued.

The most important development during the year was the discovery of a single infected tree with typical symptoms in Ottawa close to the Parliament Buildings. In addition, positive cultures were obtained from 13 other trees, which were dead or dying, in six counties in eastern Ont. These trees occurred sporadically and there is no apparent explanation either for the scattered distribution or for the fact that most of the trees were far removed from the nearest known source of infection in Que. Several of these trees were within 16 to 18 miles of the New York border and one found in Cornwall was on the immediate shore of the St. Lawrence. There is ample evidence to indicate that in no instance was the death or poor condition of these trees caused by Dutch elm disease. It seems evident that the causal fungus of the disease has only recently reached Ont. and that it is existing as a saprophyte in dead wood or bark. This is important from the point of view of control. There is no doubt that the 14 trees that yielded positive cultures in 1948 would, had control measures not been adopted, have acted as centres of infection for adjacent healthy trees and that in time the disease would have become widely distributed in eastern Ont. However, all these trees were promptly removed and either sprayed with DDT or burned. It will require the work of another field season at least to clarify the situation in Ontario in regard to Dutch elm disease.

In Ont. 348 collections were made and 14 of these proved to be positive. In New Brunswick 4 collections were made, none of which were positive.

As in previous years work on Dutch elm disease was carried on co-operatively by the Dominion Department of Agriculture (Divisions of Plant Protection, Botany and Plant Pathology, and Entomology), the Quebec Department of Lands and Forests, and the Ontario Department of Agriculture (A.W. McCallum).

Wood Rot (Corticium vellereum) was observed at Lac du Bonnet, Man., on U. pumila (C.G. Riley).

Black Spot (Gnomonia ulmea). Affected leaves of U. americana were sent in from Beloeil Station, Que. It was also seen on U. pumila at the Botanical Garden, Montreal (J.E. Jacques). Infection was 25% on several trees at Kentville, N.S. (J.F. Hockey).

Leaf Spot (Mycosphaerella (Phleospora) Ulmi) caused 25% defoliation of U. americana at Annapolis Royal, N.S. (J.F. Hockey). Previously reported from southern Ont. and western Que.

Coral Spot (Tubercularia ulmea) was seen on U. pumila at Lac du Bonnet, Man. (C.G. Riley). A hedge of U. pumila was attacked at Calumet, Argenteuil Co., Que., and it was prevalent on the same host at the Botanical Garden, Montreal (J.E. Jacques). Three plants in a four and a half year old hedge of U. pumila were visibly infected in July at St. Lambert (A.W. McCallum).