New or noteworthy plant diseases in coastal British Columbia 1975 to 1977

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During the summer months of **1975** to **1977** inclusive, over **2000** specimens were examined at the B.C. Ministry of Agriculture Plant Clinic at Surrey, B.C. This paper lists and illustrates a number of new or noteworthy diseases encountered on a wide range of host plants.

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Au cours des étés **1975** a **1977** inclusivement, au-dela de 2 000 specimens vegetaux ont ete examines au Plant Clinic de Surrey (Colombie-Britannique) tenue sous l'égide du ministere provincial de l'Agriculture. Le present rapport enumere et illustre une serie de maladies nouvelles ou importantes decelees chez une grande variété de plantes hôtes.

The British Columbia Ministry of Agriculture provides a plant diagnostic service for the general public at Surrey, Kelowna, and Victoria, B.C. The Surrey Plant Clinic receives the largest number of submissions and is now staffed year round. The senior author operated the Surrey Plant Clinic during the months of May, June, July and August in each of the 3 years 1975 to 1977. During those 3 summers approximately 2000 specimens were received and examined. This paper records some of the previously unrecorded or more unusual diseases found during diagnosis and also illustrates in 24 photographs some of the more striking symptoms observed.

A number of specimens submitted to the Biosystematics Research Institute have been retained in the National Mycological Herbarium. These are identified with DAOM (Department of Agriculture, Ottawa, Mycology) accession numbers in the text.

DISEASES

Agropyron *repens* (L.) Beauv. - couchgrass
***Phyllachora graminis* (Pers. ex. Fr.) Fckl., tar spot. Vancouver, B.C. DAOM 162792. Fig. 1.**
This pathogen has been reported numerous times on couchgrass and other ***Agropyron*** spp. across Canada. There is a previous collection from British Columbia in the National Mycological Herbarium from the year 1962 by R.J. Bandoni 2691 (DAOM 91111).

Cornus canadensis L. - dwarf cornel
***Puccinia porphyrogenita* Curt., rust. Surrey, B.C. DAOM 164610, 162732. Fig. 2.**
Stage III has been reported numerous times on this host in Canada (1). It is recorded here for purposes of symptom illustration.

Cornus *nuttalli* Audub. - flowering dogwood
***Septoria cornicola* Desm, leaf spot. Surrey, B.C. DAOM 162791. Fig. 3.**
This disease was seen only once out of numerous cultivated dogwood specimens submitted. The pathogen is reported on other ***Cornus*** spp. throughout Canada but this is the first published report for British Columbia (1). In DAOM there are 3 additional B.C. collections on ***C. pubescens:*** 5953 Cowichan Lake Wm. Newton 23 July 1939; 118596 W. Saanich W. Jones 19 Aug. 1948 SBC 1144; 39891 N. Saanich W. Jones 17 Aug. 1949; and one on ***Cornus*** sp.: 155668 Sidney, Vancouver Island, Macoun 6, 11 Sept. 1916.

***Cucumis sativus* L. - cucumber**
Mycosphaerella *citrullina* (C.O. Sm.) Gross (*M. melonis* (Pass.) Chiu and Walker), gummy stem blight. Burnaby, B.C., Surrey, B.C.
Serious losses due to fruit rot in greenhouse cucumbers led to the identification of this disease in several commercial greenhouses in the Lower Fraser Valley in 1975. Leaf and stem infections were also extensive. The use of maneb brought the disease under control. There is one additional B.C. collection of ***Mycosphaerella citrulina*** in DAOM on ***Cucurbita pepo*** vegetable marrow (greenhouse), 118313 Saanichton I.M. 12 Dec. 1941.

***Cytisus scoparius* (L.) Lk. - Scotch broom**
***Alternaria* alternata (Fr.) Keissler, foliage blight. Langley, B.C. Fig. 4.**
In the spring of 1977, about 10% of the plants in an unheated polyethylene propagation house containing 9000, 1-gallon size, plants were destroyed by a foliar blight. The gross symptoms resembled a typical ***Botrytis*** disease but examination of numerous plants revealed only ***Alternaria*** spp. and ***Stemphylium*** spp. The disease was brought under control by improving ventilation and applying chlorothalonil.

There are no known published reports of ***Alternaria*** or ***Stemphylium*** on ***Cytisus*** in North America (1, 2).

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***Daucus carota* L. - carrot**
***Thielaviopsis basicola* (Berkeley & Broome) Ferraris, black root rot. Surrey, B.C. Fig. 5.**
The early harvested carrots from 4 separate farms in the Cloverdale area encountered problems when superficial blackening developed in the market place after carrots had been washed and packaged in perforated polyethylene bags. Examination showed that the discoloration was due to extensive fruiting of the fungus. The problem did not persist into the late crop which is harvested under cooler conditions. This is the first known natural infection of carrot by this fungus in British Columbia.

***Fraxinus velutina* Torr. var. *glabra* Rehd. - Modesto ash**
***Discula quercina* (West.) Arx. (*Gloeosporium aridum* Ell. & Holw.), anthracnose. Vancouver, B.C. DAOM 162789. Fig. 6.**
This disease appears to be well established in all Vancouver city street plantings of Modesto Ash. The extent of early summer leaf infection and shedding is proportional to the rainfall received in April, May and June. This is a new report for British Columbia.

***Ilex aquifoluim* L. - English holly**
***Phyfophthora ilicis* Buddenhagen & Young, leaf and twig blight. Delta, B.C.; Duncan, B.C. Fig. 7, 8.**
Phytophthora is a perennial problem in many holly plantations. It causes leaf, twig, and fruit infections and may cause post-harvest defoliation. Control involves pruning of lower branches, fungicide applications to the trees and post-harvest dips of 30 ppm copper ion (D.L. Coyier, personal communication).

***Juniperus* spp. - junipers**
***Gymnosporangium fuscum* DC (G. sabinae Dicks ex. Wint.), pear trellis rust. Fig. 9, 10.**
An intensive pear trellis rust survey and eradication program has seen over 1000 infected junipers removed in the Fraser Valley since 1975. Figure 9 illustrates the contrast between the appearance of dry telia on juniper and the same telia 15 minutes after being wetted. Figure 10 illustrates rarely observed pear fruit infections.

***Lycopersicum esculentum* Mill. - tomato**
***Stemphylium botryosum* Wallr. and *Alternaria* spp., leafspot. Fig. 11.**
An extensive greenhouse tomato leafspot problem in the Fraser Valley in the early summer of 1976 led to a survey which showed the disease to be present in 19 of 32 houses. Only S. *botryosum* was isolated from some houses while others yielded A. *alternata* or A. *solani.* It appeared that the fungi were only weakly pathogenic. Factors which appeared to predispose leaves to infection were high humidity, temperatures of 25–27°C, phosphorus deficiency, and approaching senescence.

***Mahonia aquifolium* (Pursh.) Nutt. - mahonia**
***Cumminsiella mirabilissima* (Pk.) Nannf. *(C. sanquinea)* Arth., rust. DAOM 164613-617; 162731. Fig. 13, 14, 15.**
Rust is very common in *Mahonia* in British Columbia. Both C. *mirabilissima* and *Puccinia koeleriae* Arth. have been identified in the past. A survey of nurseries was carried out in 1977 to determine the distribution and identity of the rust now present in the Fraser Valley. Of 38 nurseries carrying the shrubs, 33 had infected stock. In all cases C. *mirabilissima* was the fungus present. No evidence of *Puccinia* spp. was found.

***Malus pumila* Mill. - apple and *Pyrus communis* L. - pear**
***Nectria galligena* Bres., European canker DAOM 164806. Fig. 17, 18.**
European canker has long been known in British Columbia. Previous B.C. collections on *Malus* in DAOM are: 118307 Vancouver W. Jones June 1935 SBC 174; 118306 Alberni W. Jones 27 Feb. 1939 SBC 408. Positive diagnoses were carried out on 20 apple branch specimens and 5 pear branch specimens from various parts of the Fraser Valley. This is presently the most serious canker disease on these hosts in the coastal area.

***Oemleria (Osmaronia) cerasiformis* (Torr. & A. Gray ex Hook & Arn.) Landon. - Osoberry, Indian plum**
***Cylindrosporium nuttallii* (Harkn.) Dearn., leafspot Surrey, B.C. DAOM 165273. Fig. 19, 20.**
This disease appears to be very common on this host where it is grown on the Pacific coast of North America (1, 2). It is included here as the symptoms are unique and it is doubtful that photographs have been published previously. Additional records on *O. cerasiformis* from B.C. in DAOM are: Vancouver Island. J. Macoun 933 18 July, 1916; 3960 Sannichton, B.C. W. Newton. 22 September 1936; 25166 Duncan, V.I. M.K. Nobles. 4 June 1949; 129576 Ivy Green Park N. of Ladysmith. M.C. Melburn P. 3056 August 1969.

***Paeonia lactiflora* Pall. - peony**
Peony ringspot virus. Fig. 21.
Peony ringspot is frequently encountered in the Fraser Valley as it is elsewhere in Canada (1). The virus has yet to be characterized beyond the fact that it is a spherical partical (R. Stace-Smith, personal communication)

***Pinus sylvestris* L. - Scots pine**
***Lophodermium pinastri* (Schrad. ex Fr.) Chev., needle cast. Fig. 21, 22.**
L. pinastri on *P. sylvestris* from B.C. is represented by DAOM 138809 Straiton D.J. Ormrod, 17 March 1972. As noted in a previous paper, *Lophodermium* needle cast is now a major disease of Scots pine in nursery and Christmas tree plantations in the Fraser Valley (3). Protectant sprays using maneb or benomyl have been effective in controlling the disease.

***Polygonum scabrum* Moench. - green smartweed**
Septoria polygonorum on *Polygonum persicaria* L. in B.C. is represented in DAOM by: 118619 Aldergrove W. Jones 4 Aug. 1942 SBC 700; 118618 Agassiz W. Jones 2 July 1942 SBC 663; and on *Polygonum* sp. by: 118619 Surrey W. Jones 8 Aug. 1933. *Ustilago reticulata* Liro (*U. utriculosa* (Nees) Ung.), Smut Burnaby, B.C.; Richmond, B.C. DAOM 162733. *Ustilago reticulata* is not represented in DAOM by a B.C. collection but is recorded from most other provinces.

***Raphiolepis indica* (L) Lindl. - Indian hawthorn**
***Diplocarpon maculatum* (Atk.) Jorst *(Entomosporium mespili* (DC. ex Duby) Sacc.). Burnaby, B.C. DAOM 162790.**
Indian hawthorn is not a common outdoor shrub in British Columbia, being hardy only in the most sheltered

locations. The host genus is not listed in Canada (1) and the pathogen is not listed on this host in the U.S.A. (2). There are numerous collections of the pathogen on other hosts in DAOM.

***Rheum rhaponticum* L. - rhubarb**
Virus. Fig. 23.

Turnip mosaic virus is fairly common in commercial rhubarb plantings in the Fraser Valley. It causes stunting and various leaf mosaic symptoms. Infected plants must be rogued but fortunately the virus appears to spread slowly (4). At least one other virus is also present in plants which may or may not be infected with turnip mosaic: virus. It is believed that this additional virus may be responsible for the definite ring spot symptoms which are frequently seen (R. Stace-Smith, personal communication).

***Thuja plicata* Donn. - western red cedar**
***Didymascella thujina* (Durand) Maire, keithia blight. Fig. 24.**

Keithia blight is the most serious disease of ornamental cultivars of *T. plicata* in coastal nurseries. Damage is frequently so severe as to render thousands of shrubs unsaleable each year. Control measures include a spray program and increasing plant spacing in nurseries. There are numerous collections of this fungus on native *Thuja plicata* from B.C. in DAOM.

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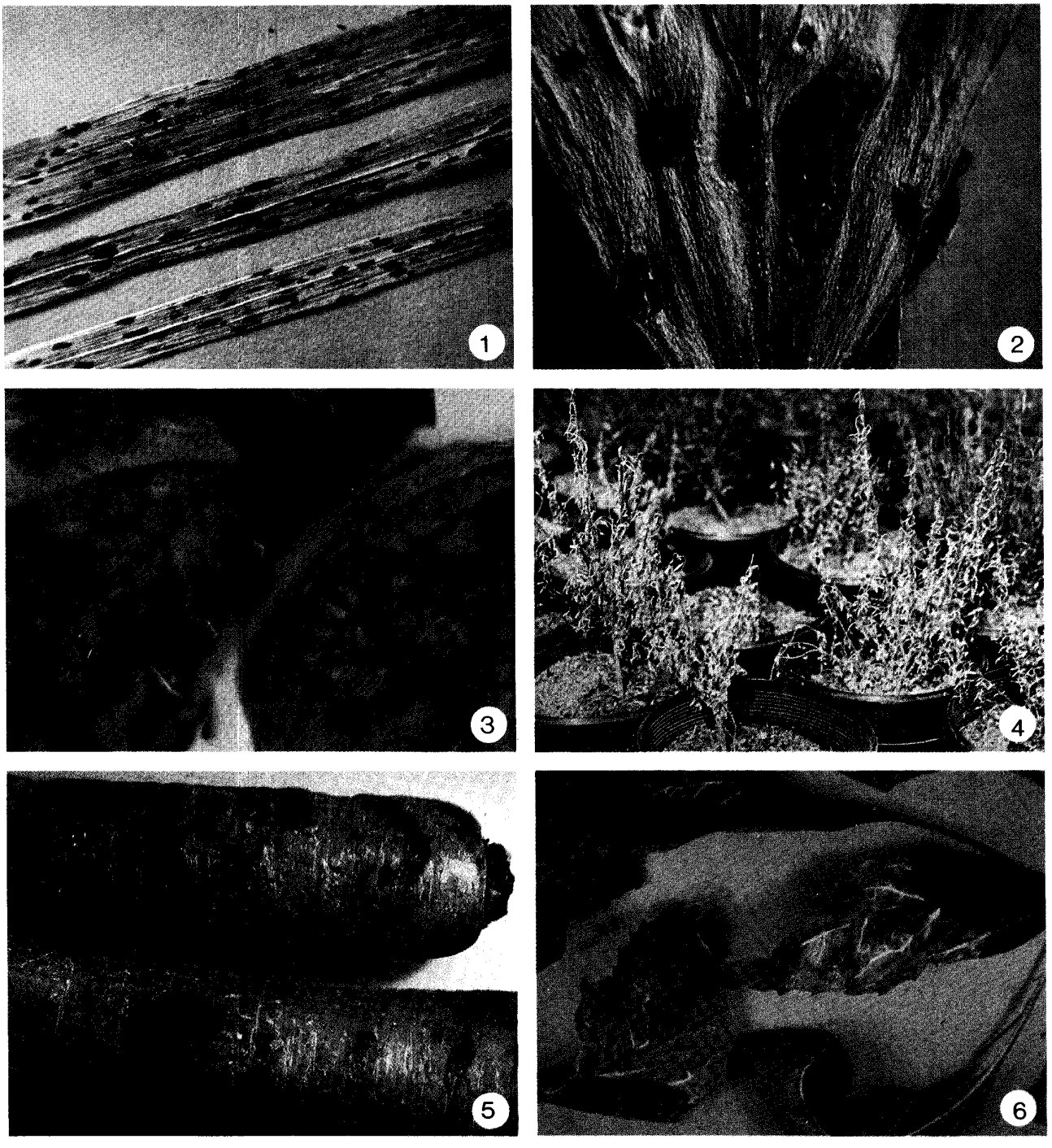
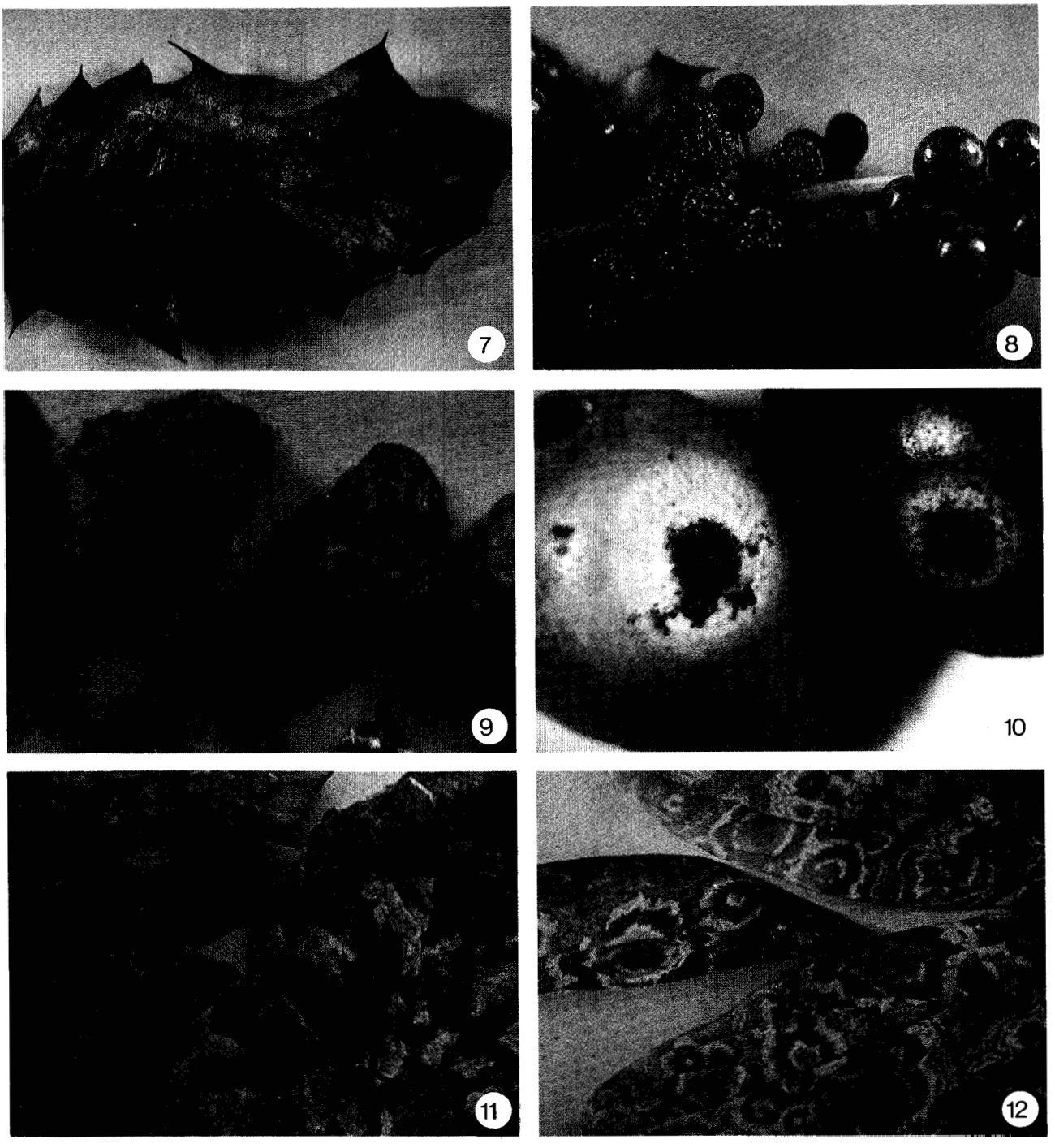
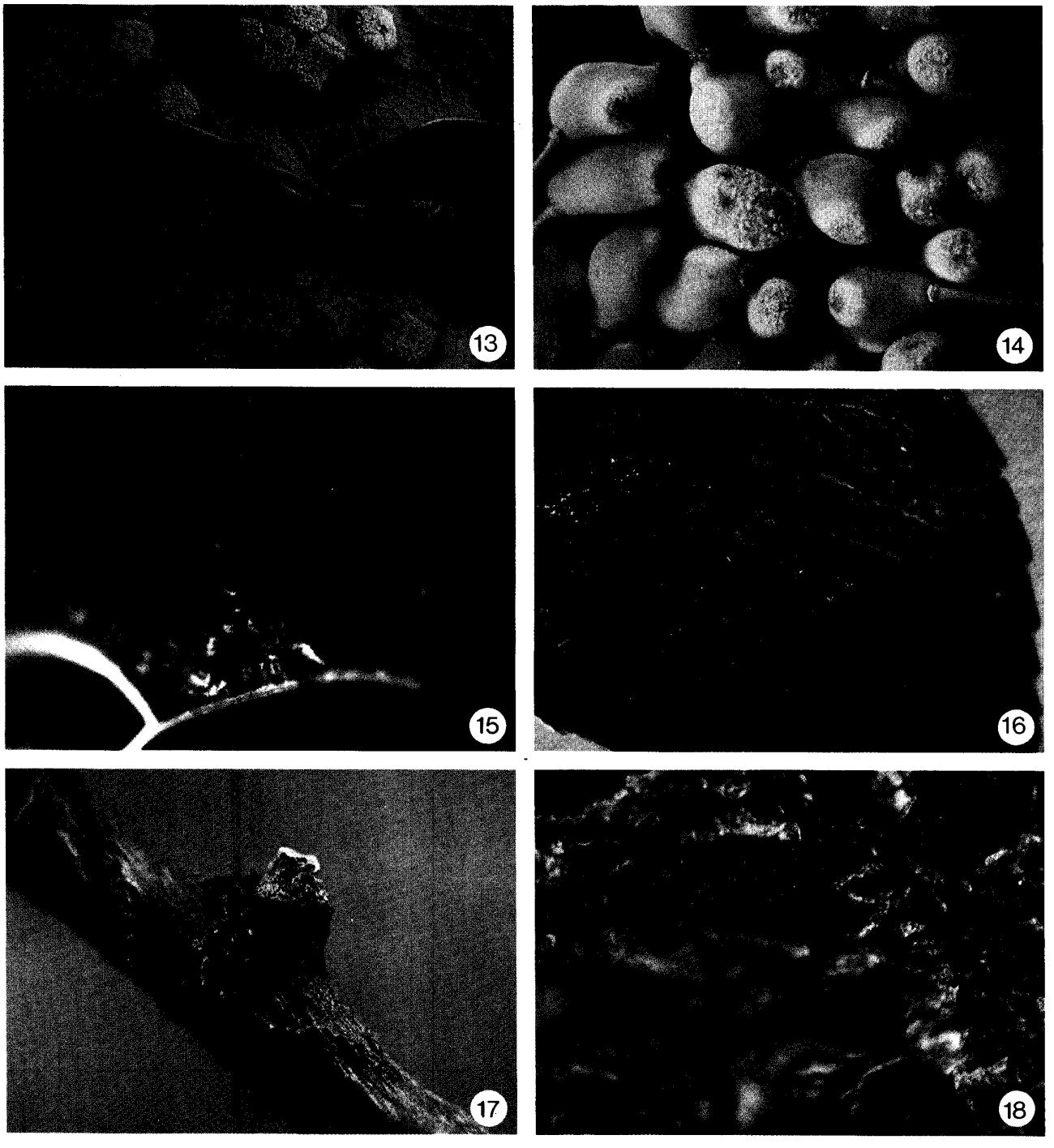


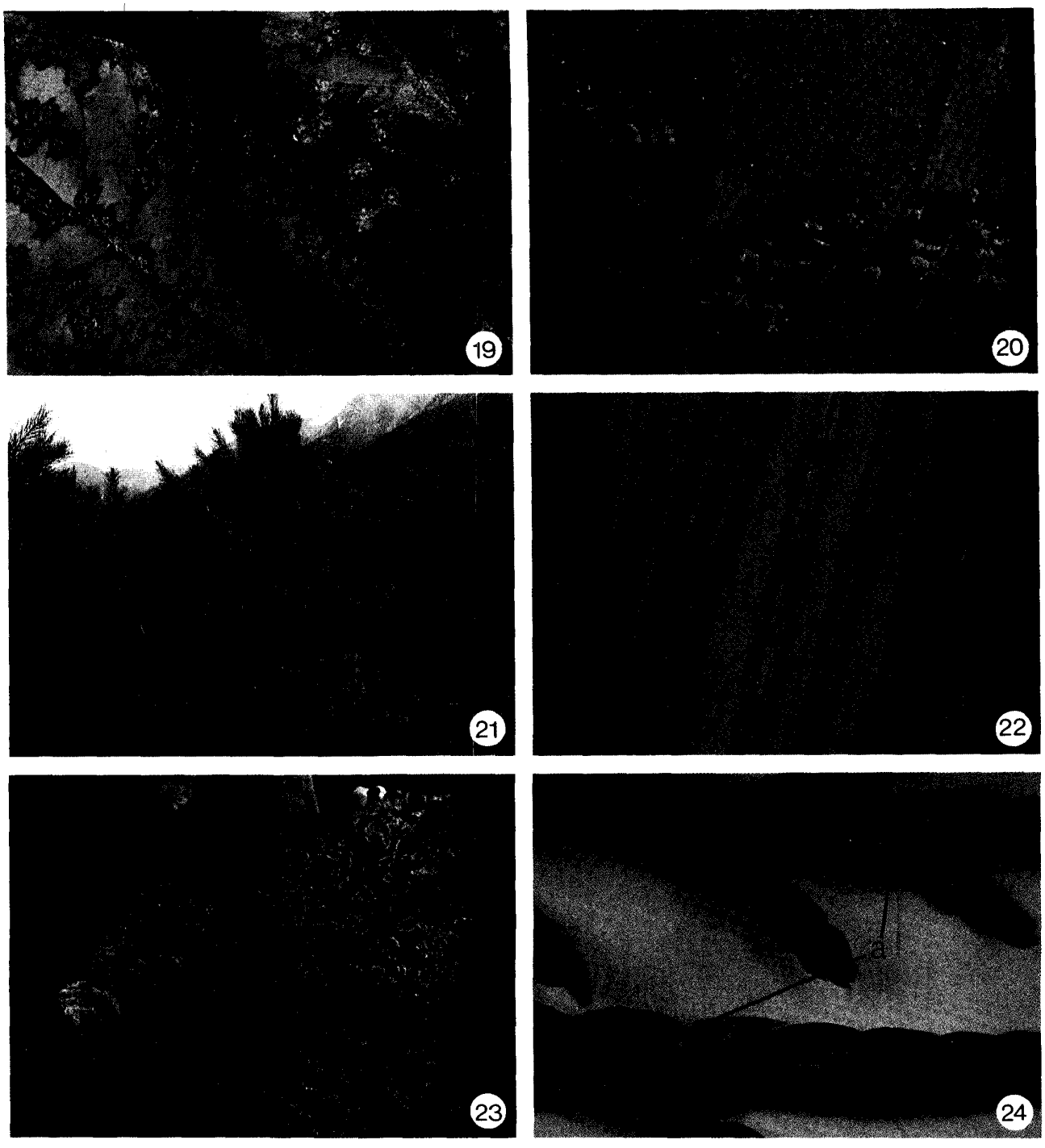
Fig. **1.** *Phyllachora graminis* on *Agropyron repens* showing hard, black fungus stroma. Fig. 2. *Puccinia porphyrogenita* on *Cornus canadensis* showing sori containing telia. Fig. 3. *Septoria cornicola* on *Cornus nuttalli.* Fig. 4. *Alternaria* blight of *Cytisus scoparius.* Fig. 5. Fruiting of *Thielaviopsis basicola* on surface of carrot roots. Fig. 6. Leaves of *Fraxinus velutina* var *glabra* infected with *Discula quercina.*
"Gloeosporium **spp.** Conners 1967 Ed.



Figs. 7 and 8. Leaf and fruit cluster infections of *Ilex aquifolium* by *Phytophthora ilicis.* Fig. 9. Comparison of dry *Gymnosporangium fuscum* telia from *Juniperus* sp. (bottom) with telia wetted for 15 minutes (top). Fig. 10. Pycnia of *gymnosporangium fuscum* on pear fruit. Fig. **11.** *Stemphylium botryosum* leaf spot on leaves of *Lycopersicum esculentum.* Fig. **12.** Ringspot virus symptoms in leaves of *Paeonia lactiflora.*



Figs. **13** and 14. Aecia of *Cumminsiella mirabilissima* on leaves and fruits of *Mahonia aquifolium.* Fig. 15. Telia of C. *mirabilissima* on M. *aquifolium.* Fig. **16.** *Diplocarpon maculatum* leafspot on *Raphiolepsis* indica. Fig. **17.** First year canker of *Nectria galligena* on pear twig. Fig; 18. Perithecia of N. *galligena* in **6** year old apple branch canker.



Figs. 19 and 20. *Cylindrosporium nuttallii* leafspot on *Oemleria cerasiformis* showing masses of extruded conidia. Fig. **21.** Typical symptoms of *Lophodermium pinastri* on *Pinus sylvestris* showing genetic variability in susceptibility of seedling trees. Fig. 22. Infected, over-wintered needles of P. *sylvestris* showing pycnidia (a), apothecia (b) and transverse black bars (c) which are diagnostic. Fig. 23. Leaf of *Rheum rhaponticum* showing virus symptoms. Fig. 24. *Didymascella thujina* on *Thuja plicata* var *atrovirens* showing brown cushion-like apothecia (a).