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MICROFUNGI COLLECTED IN 1969 IN THE CANADIAN ROCKY MOUNTAINS AND THE ADJACENT TRENCH

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AND THE ADJACENT TRENCH

by

J. Gremmen* and J.A. Parmelee**

ABSTRACT

In 1969 101 species of microfungi were collected on 84 hosts in the Rocky Mountains and the adjacent Trench. These fungi are reported alphabetically, within major fungal groups and alphabetically under hosts. New records for Canada are illustrated.

INTRODUCTION

In late August and September 1969, the first author visited the Kanaskis Forest Experimental Station of the Canada Department of Environment (then Fisheries and Forestry). In this setting, situated in the foothills of the Rocky Mountains, Alberta, various tree diseases were studied, particularly the *Atropellis* canker of lodgepole pine, dwarf mistletoe (*Arceuthobium americanum*) and the western gall rusts of pine (*Endocronartium coleosporiooides* and *Cronartium comandrae*.)

In May, July and August, the second author carried out inoculation studies of *Gymnosporangium* species in the greenhouses of the Station. The object of this study was to compare the period of aecial development for species collected in Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. The results of these observations have been reported elsewhere (Parmelee, 1971). In addition, general collecting of parasitic fungi in the southern Canadian Rockies was carried out from Kananaskis.

In the following combined listing of fungi, the specimens collected independently are given the numbers of Gremmen (G), Parmelee (P) and a few other collectors whose names are not abbreviated. Specimens are deposited in the Herbarium of Forest Research Station, Wageningen, Netherlands, and in the National Mycological Herbarium (DAOM), Canada Department of Agriculture, Ottawa; also, duplicates are in the Mycological Herbarium of the Northern Forest Research Center (CFB) Edmonton, Alberta.

The classification in the listing follows that in the Dictionary of the Fungi, 6th ed. (Ainsworth 1971). Collection sites are omitted and a simplified general area is given: Banff National Park (Banff), Jasper National Park (Jasper), Kootenay National Park (Koot.), Kananaskis Forest Experimental Station (Kan.), Rocky Mountains Trench in British Columbia

from Wardner north to Golden (T). An asterisk (*) preceding a fungus or host name indicates a fungus or host record not previously known in Canada from collections deposited in DAOM, CFB, and not recorded by Conners (1967), Lowe (1969) or McArthur (1966). In the list of rusts, the standard symbols 0 I II III are used for pycnia, aecia, uredinia and telia respectively. General remarks are inserted where appropriate.

While at Kananaskis, both authors received kindly aid and advice and general liaison from Dr. Y. Hiratsuka and Dr. J.H. Hopkins. Mr. M. de Kam Forest Research Station, Wageningen, prepared the illustrations and his aid is sincerely acknowledged.

FUNGI IMPERFECTI

SPHAEROPSIDALES

Kabatia lonicerae (Mark.) Hoehn, var. involutratae Conners on Lonicera involucrata (Richards.) Banks P 4348 (Kan.)

Placosphaeria punctiformis (Fuckel) Sacc. on Galium boreale L. P 4396 (Jasper), P 4434 (Kan.). This fungus is listed as the conidial state of Leptotrichila verrucosa (Helotiales) by Schuepp (1959).

Placosphaeria sp. on Hedysarum alpinum L. G 2568 (Kan.) (Fig. 1). Primordia of an ascigerous fungus were associated but it was not identifiable.

Von Arx and Mueller (1954) record the perfect state to be Diachora onobrychidis (DC.) J. Müller.

Septoria aceris (Lib.) Berk. & Br. on Acer glabrum Torr. P 4338 (Koot.)
*Septoria heraclei (Lib.) Desm. on Heracleum sp. G 2632 (Banff).

*Septoria seribriankowii Sacc. on Astragalus missouriensis Nutt. P 4298
(Kan.). This and the above fungi all caused leaf spots, and all were
generally of rare occurrence.

MELANCONIALES

Cylindrosporium filipendulae Thuem. on Spiraea lucida Dougl. P 4339 (Koot.).
Sphaceloma sp. on Arctostaphylos uva-ursi (L.) Spreng. P 4393 (Jasper).

MONILIALES

Bostrichonema polygoni (Ung.) Schroet. on Polygonum viviparum L. P 4352
(Kan.).

Clomopsis corni (Peck) Henderson on Cornus canadensis L. G. 2615 (Kan.)
(= Glomerularia corni Pk).

Ramularia montana Speg. on Epilobium angustifolium L. P 4280 (Kan.).

Ramularia saximontanensis Solh. on Clematis sp. G 2689 (Kan.)

*Stigmina glomerulosa (Sacc.) Hughes on Juniperus communis L. P 4232 (Koot.).

PHYCOMYCETES

Synchytrium aureum Schroet. on *Parnassia fimbriata Koenig P 4373 (Kan.).

ASCOMYCETES

Apiosporina collinsii (Schw.) Hoehn. on Amelanchier alnifolia Nutt.
P 4433 (Kan.).

Atropellis piniphila (Weir) Loman & Cash on Pinus contorta Dougl. var.
latifolia Engelm. G 2561 (Kan.).

?Diachora onobrychidis (DC.) J. Müller on Hedysarum alpinum L. G 2568
(Kan.); stat. conid. Placosphaeria sp.

*Diplocarpon sp. on Sibbaldia procumbens L. G 2609 (Banff), stat.

conid. Marssonina sp.

Drepanopeziza populorum (Desm.) Hoehn. on Populus balsamifera L. G 2610,
2611 (Kan.); stat. conid. Marssonina populi (Lib.) Magn.

Encoeliopsis ledi (Alb. & Schw. ex Fr.) Groves on Ledum groenlandicum Oeder
G 2569 (Koot.). Reported from Ontario and Quebec by Groves (1969).

Elytroderma deformans (Weir) Darker on Pinus contorta Dougl. G 2560 (Kan.).

*Eupropolella arctostaphylli Müller, Hütter & Schuepp. on Arctostaphylos
uva-ursi (L.) Spreng. G 2598 (Kan.), (Fig. 2).

*Eutryblidiella sabina (de Not.) Hoehn. on Juniperus sp. G 2572 (Kan.),
(Fig. 3).

Godronia uberiformis Groves on Ribes sp. G 2565, 2581, 2600 (Kan.), (Fig. 4);
stat. conid. Topospora uberiformis (Fr.) Fr. is also present.

Isothea rhytismoides (Bab. ex Berk.) Fr. on Dryas drummondii Richards.
P 4374 (Banff).

Lachnellula arida (Phill.) Dennis on Abies sp. G 2599 (Kan.).

Lasiobotrys lonicerae (Fr.) Kze. on Lonicera dioica L. var. glaucescens
(Rydb.) Butters P 4341 (Koot.)

Metacoleroa dickisci (Berk. & Br.) Petrak on Linnaea borealis L. G 262

Mycosphaerella fragariae (Tul.) Lindau on Fragaria sp. G 2621 (Kan.)
stat. conid. Ramularia tulasnei Sacc.

Othia spiraeae (Fuckel) Fuckel on Ribes sp. G 2595 (Kan.), (Fig. 5)

*Polystigma astragali (Lasch.) Hoehn. on Astragalus sp. G 2597 (Bar
(Fig. 6).

Phylleutypa wittrockii (Erikss.) Petrak on Linnaea borealis L. G 2596
(Koot.).

Propolis leonis (Tul.) Rehm on *Pinus contorta Dougl. G 2559 (Kan.),
(Fig. 7).

Rhytisma arbuti Phill. on *Menziesia ferruginea Smith ssp. gabella (a. Gray)
Calder & Taylor G 2594 (Koot.).

Rhytisma salicinum (Pers.) Fr. on Salix sp. G 2631 (Banff).

Sphaerotheca fuliginea (Schlecht. ex. Fr.) Poll. on Pedicularis bracteosa
Benth. P 4349 (Kan.).

Tympinis alnea (Pers.) Fr. on Alnus sp. G 2563 (Kan.).

Uncinula adunca (Wallr. ex Schlecht.) Lev. on Populus balsamifera L.
G 2633 (Kan.).

Valsa sp. on Cornus sp. G 2636 (Kan.).

Valsa sp. on Shepherdia sp. G 2635 (Kan.). The host is probably S. canadensis
(L.) Nutt. which occurs on slopes and thin woods throughout Alberta where
as the other possible species, S. argentea Nutt., inhabits coulees and
river valleys in southern Alberta. Valsa ambiens (Pers.) Fr. (DAOM 26638)
is an record in the National herbarium on S. canadensis from the Ottawa
district.

BASIDIOMYCETES

UREDINALES

Chrysomyxa arctostaphyli Diet. O I, on Picea glauca (Moench) Voss. P 4345
(Banff); causing conspicuous witches brooms.

Chrysomyxa ledi de Bary II III, on Ledum groenlandicum Oeder G 2605 (Banff),
2606 (Koot.).

Chrysomyxa ledicola (Peck.) Lagerh. O I, on Picea glauca (Moench) Voss
G 2602 (Banff), 2604, (Kan.) P 4383 (Kan.) II III, on Ledum groenlandicum
Oeder G 2603, P 4295, 4382 (Kan.)

Chrysomyxa pirolata (Koern.) Wint. III, on Pyrola asarifolia Michx. P 4259
(Jasper) and II, on P. minor L. P 4344 (Kan.).

Coleosporium asterum (Diet.) Syd. II III on Aster sp. G 2601 (kan.), P 4295
(Kan.).

Cronartium coleosporioides Arth. II III, on Castilleja miniata Doug. G 2607
(Banff').

Cronartium comandrae Peck. II III, on Comandra umbellata (L.) Nutt. ssp.
pallida (A. DC.) Piehl G 2608 (Kan.), P 4430 (T).

Cumminsiella mirabilissima (Peck.) Nannf. II, on Berberis repens Lindl.
P 4202 (T).

Gymnosporangium bethelii Kern. O I, on Crataegus douglasii Lindl. P 4402
(T); III, on Juniperus scopulorum Sarg. P 4223, 4427 (T). These
collections represent good field association of alternate hosts permitting
heavy rust on both hosts.

Gymnosporangium clavariiforme (Pers.) DC. O I, on Amelanchier not collected;
III, on Juniperus communis L. P 4231, 4234 (Koot.), 4236 (Banff). In
all collections rust was rare. Just outside the reference area, near
Yahk in southern B.C., this species was common and heavy on juniper and
the alternate juneberry.

Gymnosporangium clavipes (Cke. & Pk.) O I, on Amelanchier alnifolia Nutt.
P 4323, 4401 (T); on Crataegus douglasii Lindl. P 4402 (T); III on

Juniperus communis L. P 4225 (T). Note, P 4402 is a mixed collection exhibiting also G. bethelii. Good host association was evident for the last three specimens.

Gymnosporangium cornutum Arth. ex Kern. O I, on Sorbus sitchensis Roemer P 4397 (Jasper); III, on Juniperus communis L. P 4230 (Koot.), P 4254 (Jasper). The mountain ash and the juniper from Jasper were adjacent; infection of the former was heavy but not mature when collected on 4 August 1959. The rust on the juniper was taken in bulk for greenhouse studies and from it mature aecia were obtained on mountain ash transplants from Miette and on nursery-grown mountain ash.

Gymnosporangium gaeumanii Zogg ssp. albertense Parmelee II (III), on Juniperus communis L. P 4258, 4263 (Jasper), P 4375 (Banff.) First reported in Canada by Parmelee (1969).

Gymnosporangium nelsonii Arth. O I, on Amelanchier alnifolia Nutt. P 4392, 4398 (Jasper), P 4396 (Koot.), P 4391, 4431 (Kan.), P 4400, 4426 (T); III, on Juniperus horizontalis Moench. P 4217 (T), P 4239 (Banff), P 4255, 4256 (Jasper); on J. scopulorum Sarg. P 4203, 4219, 4221, 4224 (T), P 4228 (Koot.), P 4237 (Banff). Inoculation studies in 1969 showed there to be no difference in aecial characters or maturing period between gall-forming rusts on J. horizontalis from Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. On this evidence, the second author (Parmelee) (1971) now considers G. corniculans Kern synonymous with G. nelsonii.

Gymnosporangium nidus-avis Thaxt. O I, on Amelanchier alnifolia Nutt. P 4331 (T), P 4469 (Kan.); III, on Juniperus horizontalis Moench P 4218 (T), P 4238 (Banff), P 4257 (Jasper); on J. scopulorum Sarg. P 4240, 4226,

(''), P 4229 (Koot.). Telia (4218, 4220) from both telial hosts were inoculated successfully in 1969 and the resulting aecia showed no difference in morphological characters or the period required to reach maturity (Parmelee 1971).

Gymnosporangium tremelloides Hartig O I, on Sorbus sp. was not collected in the Canadian Rocky Mountains in 1969, it is however on record in DAOM from Stanley Peak in Kootenay Nat. Park; III, on Juniperus communis L. P 4233 (Koot.).

Hyalopsora polypodii (Pers.) Magn. II, on Cystopteris fragilis (L.) Bernh. Scotter 11996 (Banff).

Melampsora albertensis Arth. II, on Populus tremuloides Michx. G 2619 (Banff).

Melampsora lini (Ehrenb.) Lev. II, on Linum lewisii Pursh P 4429 (T), G 2618 (Kan.).

Melampsorella caryophyllacearum Schroet. O, on Abies lasiocarpa (Hook.) Nutt, P 4389 (Kan.) forming conspicuous witches' brooms, common at 7000 ft. alt.; II III, on Cerastium arvense L., Mulligan 3416 (Banff) moderate infection at 6500 ft. altitude.

Phragmidium americanum (Peck) Dict. (II) III, on Rosa sp. G 2622 (Kan.).

Phragmidium andersoni Shear 11 III, on Potentilla fruticosa L. G 2623 (Banff), P 4340 (Koot.).

Phragmidium mucronatum (Pers.) Schroet. II III, on Rosa sp. P 4333 (T).

Phragmidium rosae-californicae Diet. II III, on Rosa acicularis Lindl. P 4403 (T).

*Puccinia aberrans Peck III, on Smelowskia calycina (Steph.) May, P 4285 (Kan.). Telia are systemic and the dark telia are readily separated from systemic but orange aecia of P. monoica (q.v.).

Puccinia asteris Duby III on Aster foliaceous Lindl. Mulligan 3482 (Kan. at 6900 ft.); on A. laevis L. P 4450 (Banff.); on Aster sp. G 2624 (Kan.).

Puccinia balsamorhizae Peck. II III, on Balsamorhiza sagittata (Pursh) Nutt. P 4325 (T).

Puccinia bistortae (Str.) DC. II III, on Polygonum viviparum L. P 4387 (Kan.); common in subalpine meadows.

Puccinia clintonii Peck var. bracteosii Savile on Pedicularis bracteosa Benth. P 4303, 4379 (Kan.).

Puccinia columbiensis Ell. & Ev. III, on Agoseris glauca (pursh) Raf. P 4271, 4369 (Kan.). Telia are large, conspicuous and pulvinate.

Puccinia coronata Cda. O I, on Shepherdia canadensis (L.) Nutt. G 2681, P 4270, 4376 (Kan.) II III, on Bromus pumpellianus Scribn. P 4436 (Kan.); Elymus innovatus Beal P 4435 (Kan.).

Puccinia crandallii Pam. & Gall. O I, on Symporicarpus occidentalis Hook. P 4305 (Kan.); Festuca, a known alternate host grass, was associated but was not rusted.

Puccinia dioicae Magn. O I, on Aster sp. P 4302 (Kan.); alternates to species of Carex.

Puccinia granulispora Ell. & Gall. O I II III, on Allium cernuum Roth P 4326, 4330 (T). 4384. 4395. 4468 (Kan.).

Puccinia heucherae (Schw.) Diet. var. saxifragae (Schlecht.) Savile III, on Heuchera cylindrica Dougl. P 4279 (kan.).

Puccinia heucherae (Schw.) Diet. var. austroberingiana Savile III, on Mitella pentandra Hook. P 4372 (Kan.). Savile (1954) distinguishes varieties of this rust on teliospore wall striations...delicate and just visible in this variety and noticeable, straight and somewhat serrate in var. saxifragae.

Puccinia hieracii (Roch.) Mart. II III, on Agoseris glauca (Pursh.) Raf.

P 4368 (Kan.). Telia are small, not nearly as conspicuous as in P. columbiensis and + pulverulent.

Puccinia holboellii (Horn.) Rostr. III, systemic on Arabis sp. P 4283 (Kan.)

At this alpine site, other cruciferae were rusted; vide P. aberrans and P. monoica. European authors treat P. holboellii as a synonym of P. thlaspeos Schub., but it has consistently larger spores than that species (Savile and Marmolee 1964).

Puccinia laschii Lagerh var. laschii (=P. cirsii Lasch.) II III, on Cirsium Hookerianum Nutt. P 4350 (Kan.); moderate infection at 7000 ft.

Puccinia monoica Arth. O I, systemic on *Smelowskia calycina (Steph.) Mey.

P 4284 (Kan.). The known alternate hosts are grasses of the tribes Avenae and Agrostideae (Arthur 1934). Adjacent plants of Smelowskia were infected with P. aberrans (q.v.).

Puccinia parkerae Diet. & House III, on Ribes lacustre (Pers.) Poir. P. 4381 (Kan.).

Puccinia rubefaciens Rob ex Desm. III, on Galium boreale L. P 4351, 4377 (Kan.), 4396 (Jasper).

Puccinia stipae Arth. O I, Erigeron filiformis P 4215, 4428 (b), (T); II III, on Stipa commata Trin. & Rupr. P 4216, 4335, 4428 (a) (T). The hosts were contiguous on open slopes above Lake Windemere, B.C. and both were heavily rusted - an excellent example of host association and rust alternation.

Puccinia violae (Schum.) D. (O I) III, on Viola sp. P. 4337 (Koot.)

Pucciniastrum americanum (Farl.) Arth. II III, on Rubus sp. G 2626 (Banff).

Pucciniastrum epilobii Otth. (sensu Hylander, Jørstad & Nannf.) II III, on Epilobium sp. G 2682 (Kan.). Savile (1962) distinguishes P. pustulatum (Pers.) Diet. on small but consistent morphological characters and its restriction to Epilobium spp. of section Lysimachion and to Clarkia. P. epilobii occurs only on Epilobium angustifolium L. and E. latifolium L. of host section Chamaenerion.

Pucciniastrum goeppertianum (Kuhn) Kleb. O I, on Abies lasiocarpa (Hook.) Nutt. G 2628 (Koot.), 2630 (Koot.); III only on Vaccinium spp. G 2629 (Koot.), G 2683 (Koot.).

Pucciniastrum pyrolae Diet. ex Arth O I, unknown; II (?III), on Pyrola sp. G 2625 (Koot.).

Uromyces hedysari-obscuri (DC.) Car & Picc. O I III, on Hedysarum alpinum L. P 4394 (Jasper); on H. ? mackenzii Richards. P 4342 (Koot.); on H. sulphurescens Rydb. P 4272, 4282, 4467 (Kan.) and 4343 (Koot.); on Hedysarum sp. G 2634 (Kan.).

Uromyces heterodermus Syd. O III, on Erythronium grandiflorum Pursh. P 4281 (Kan.), Mulligan 3432 (Banff). Both collections are from alpine meadows over 7000 ft. altitude.

Uromyces lapponicus Lagerh. III, on Astragalus ? pectinatus (Hook.) Dougl. P 4291 (Kan.); on *A. tenellus Pursh P 4290 (Kan.).

USTILAGINALES

Anthracoidea elynae (Syd.) Kukk. on Kobresia bellardii (All.) Degl. (=K. myosuroides (Vill.) Fiori & Paol.) P 4386 (Kan.). This smut was fairly common in inflorescences of plants scattered on alpine meadows.

Anthracoidea paniceae Kukk. on Carex vaginata Tausch P 4300, 4347 (Kan.)

Anthracoidea scirpoideae Kukk. on Carex scirpoidea Michx. P 4301 (Kan.)

Entyloma arnicale Ell. & Ev. on Arnica alpina (L.) Olin P 4371 (Kan.) on

Arnica sp. G 2564 (Kan.). The embedded leaf sori lend a leaf-spot appearance to the infected plants.

Schizoneilla pusilla (Cke. & PK.) Ciff. (=S. melanogramma s.l. non (DC) Schroet.) on Carex scirpoidea Michx. P 4299 (Kan.).

Ustilago bistortarum (DC.) Koern. on Polygonum viviparum L. P 4388 (Kan.).

Inflorescences were systemically smutted while leaves were moderately rusted (vide Puccinia bistortae).

Ustilago vinosa (Berk.) Tul. on Oxyria digyna (L.) Hill P 4370 (Kan.).

EXOBASIDIALES

Exobasidium vaccinii Wor. var. arctostaphyli (Harkn.) Savile on Arctostaphylos uva-ursi (L.) Spreng. G 2613 Banff, P 4297, 4378, 4391 (Kan.).

Exobasidium vaccinii Wor. var. vaccinii on Cassiope tetragona (L.) D. Don ssp. saximontana (Small) Porsild G 2612 (Banff); Ledum groenlandicum Oeder G 2614 (Koot.).

HOST INDEX

Abies lasiocarpa

Melampsorella caryophilacearum

Pucciniastrum goeppertianum

Abies sp.

Lachnellula arida

Acer glabrum

Septoria aceris

Agoseris glauca

Puccinia columbiensis

Puccinia hieracii

Allium cernuum

Puccinia granulispore

Alnus sp.

Tympinis alnea

Amelanchier alnifolia

Apiosporina collinsii

Gymnosporangium clavipes

Gymnosporangium nelsonii

Gymnosporangium nidus-avis

Arabis sp.

Puccinia holboellii

Arctostaphylos uva-ursi

Eupropolella arctostaphylii

Exobasidium vaccinii var. *arctostaphyli*

Sphaceloma sp.

Arnica alpina

Entyloma arnicale

Arnica sp.

Entyloma arnicale

Aster foliaceous

Puccinia asteris

Aster sp.

Coleosporium asterum

Puccinia dioicae

Astragalus missouriensis

Septoria scribriankowii

Astragalus pectinatus

Uromyces lapponicus

Astragalus tenellus

Uromyces lapponicus

Astragalus sp.

Polystigma astragali

Balsamorrhiza sagittata

Puccinia balsamorrhizae

Berberis repens

Cumminsiella mirabilissima

Bromus pumpellianus

Puccinia coronata

Carex scirpoidea

Anthracoidea scirpoidea

Schizonella pusilla

Carex vaginata

Anthracoidea paniceae

Carex sp.

Puccinia dioicae

Cassiope tetragona ssp. *saximontana*

Exobasidium vaccinii var. *vaccinii*

Castilleja miniata

Cronartium coleosporioides

Cerastium arvense

Melampsorella caryophyllacearum

Cirsium hookerianum

Puccinia laschii var. *laschii*

(=*P. cirsii*)

Clematis sp.

Ramularia saximontanensis

Comandra umbellata ssp. *pallida*

Cronartium comandrae

Cornus canadensis

Glomopsis corni

(=*Glomerularia c.*)

Crataegus douglasii

Gymnosporangium bethelii

Gymnosporangium clavipes

Cystopteris fragilis

Hyalopsora polypodii

Dryas drummondii

Isothea rhytismaoides

Elymus innovatus

Puccinia coronata

Epilobium angustifolium

Ramularia montana

Epilobium sp.

Pucciniastrum epilobii

Erigeron filiformis

Puccinia stipae

Erythronium grandiflorum

Uromyces heterodermus

Festuca sp.

Puccinia crandalii

Fragaria sp.

Mycosphaerella fragariae

Galium boreale

Leptotrichila verrucosa

Placosphaeria punctiformis

Puccinia rubefaciens

Hedysarum alpinum

Diachora onobrychidis

Placosphaeria sp.

Uromyces hedsari-obscuri

Hedysarum mackenzii

Uromyces hedsari-obscuri

Heracleum sp.

Septoria heraclei

Heuchera cylindrica

Puccinia heucherae var. *saxifragae*

Juniperus communis var. *depressa*

Gymnosporangium clavariiforme

Gymnosporangium clavipes

Gymnosporangium cornutum

Gymnosporangium gaeumanii ssp. *albertense*

Gymnosporangium tremelloides

Stigmina glomerulosa

Juniperus horizontalis

Gymnosporangium nelsonii

Gymnosporangium nidus-avis

Juniperus scopulorum

Gymnosporangium bethelii

Gymnosporangium nelsonii

Gymnosporangium nidus-avis

Juniperus sp.

Eutryblidiella sabina

Kobresia bellardii

Anthracoides elynae

Ledum groenlandicum

Chrysomyxa ledi

Chrysomyxa ledicola

Encoeliopsis ledi

Exobasidium vaccinii var. *vaccinii*

Linnaea borealis

Metacoleroa dickiei

Phylleutypa wittrochii

Linum lewisii

Melampsora lini

Lonicera dioica var. *glaucescens*

Lasiobotrys lonicerae

Lonicera involucrata

Kabatia lonicerae var. *involucratae*

Mahonia see *Berberis*

Menziesia ferruginea ssp. *glabella*

Rhytisma arbuti

Mitella pentandra

Puccinia heucherae var. *austroberingiana*

Oxyria digyna

Ustilago vinosa

Parnassia fimbriata

Synchytrium aureum

Pedicularis bracteosa

Puccinia clintonii var. *bracteosae*

Sphaerotheca fuliginea

Picea glauca

Chrysomyxa arctostaphyli

Chrysomyxa ledicola

Pinus contorta var. *latifolia*

Atropellis piniphila

Elytroderma deformans

Propolis leonis

Polygonum viviparum

Bostrichonema polygoni

Puccinia bistortae

Ustilago bistortarum

Populus balsamifera

Drepanopexixa populorum

Marssonina populi

Uncinula adunca

Pyrola asarifolia

Chrysomyxa pirolata

Pyrola minor

Chrysomyxa pirolata

Pyrola sp.

Pucciniastrum pyrolae

Rosa acicularis

Phragmidium rosae-californicae

Rosa sp.

Phragmidium americanum

Phragmidium mucronatum

Ribes lacustre

Puccinia parkerae

Ribes sp.

Godronia uberiformis

Otthia spiraeae

Rubus sp.

Pucciniastrum americanum

Salix

Rhytidia salicinum

Shepherdia canadensis

Puccinia coronata

Valsa sp.

Sibbaldia procumbens

Diplocarpon sp.

Smelowskia calycina

Puccinia aberrans

Puccinia monoica

Sorbus sitchensis

Gymnosporangium cornutum

Gymnosporangium tremelloides

Spiraea lucida

Cylindrosporium filipendulae

Stipa commata

Puccinia stipae

Symporicarpos occidentalis

Puccinia crandallii

Vaccinium spp.

Pucciniastrum goeppertianum

Viola sp.

Puccinia violae

Figs. 1 - 7 Various fungi showing fructifications, paraphyses,
asci and ascospores and/or conidia.

Fig. 1 Placosphaeria sp. (G 2568)

Fig. 2 Eupropolella arctostaphylii (G 2598)

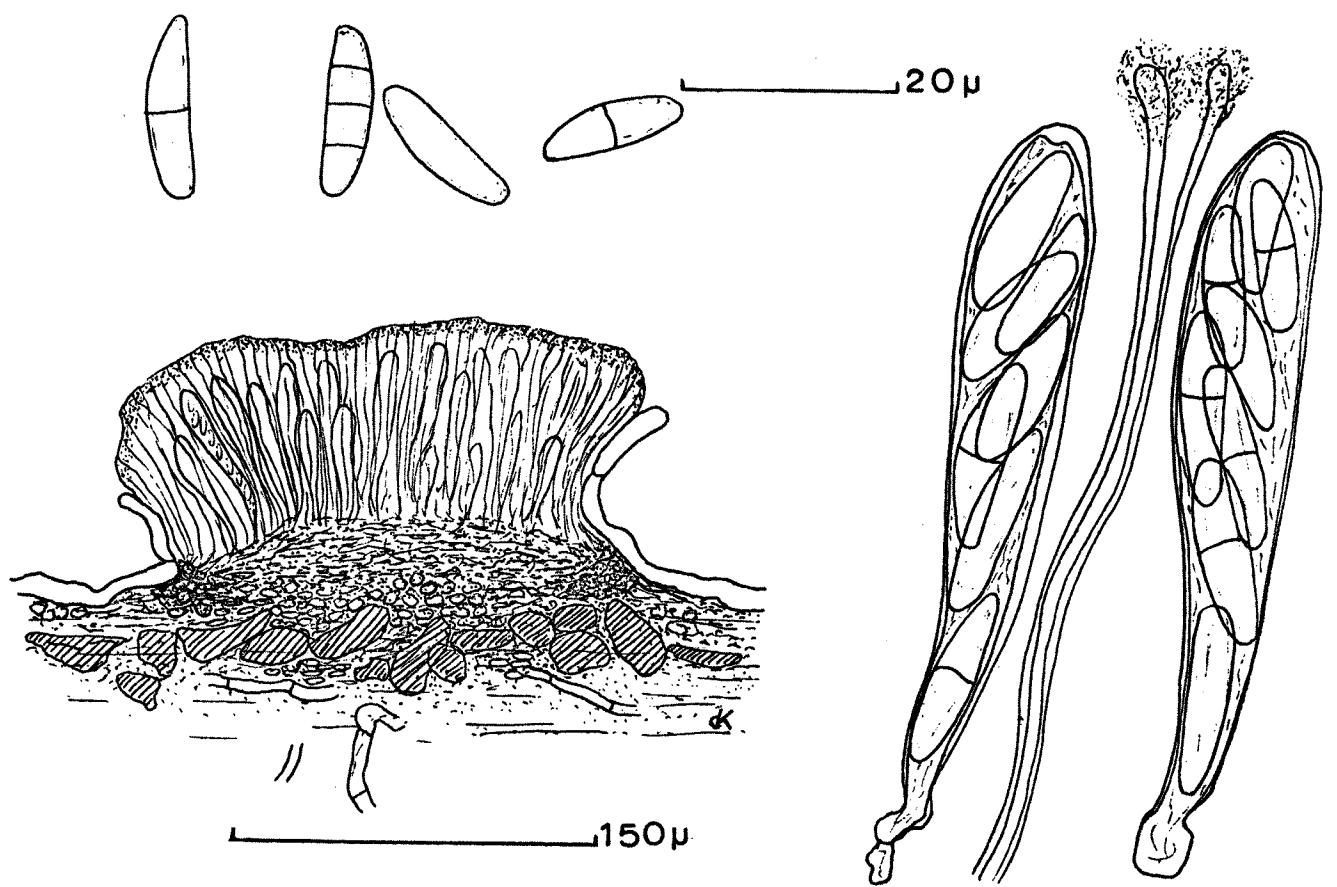
Fig. 3 Eutryblidella sabina (G 2572)

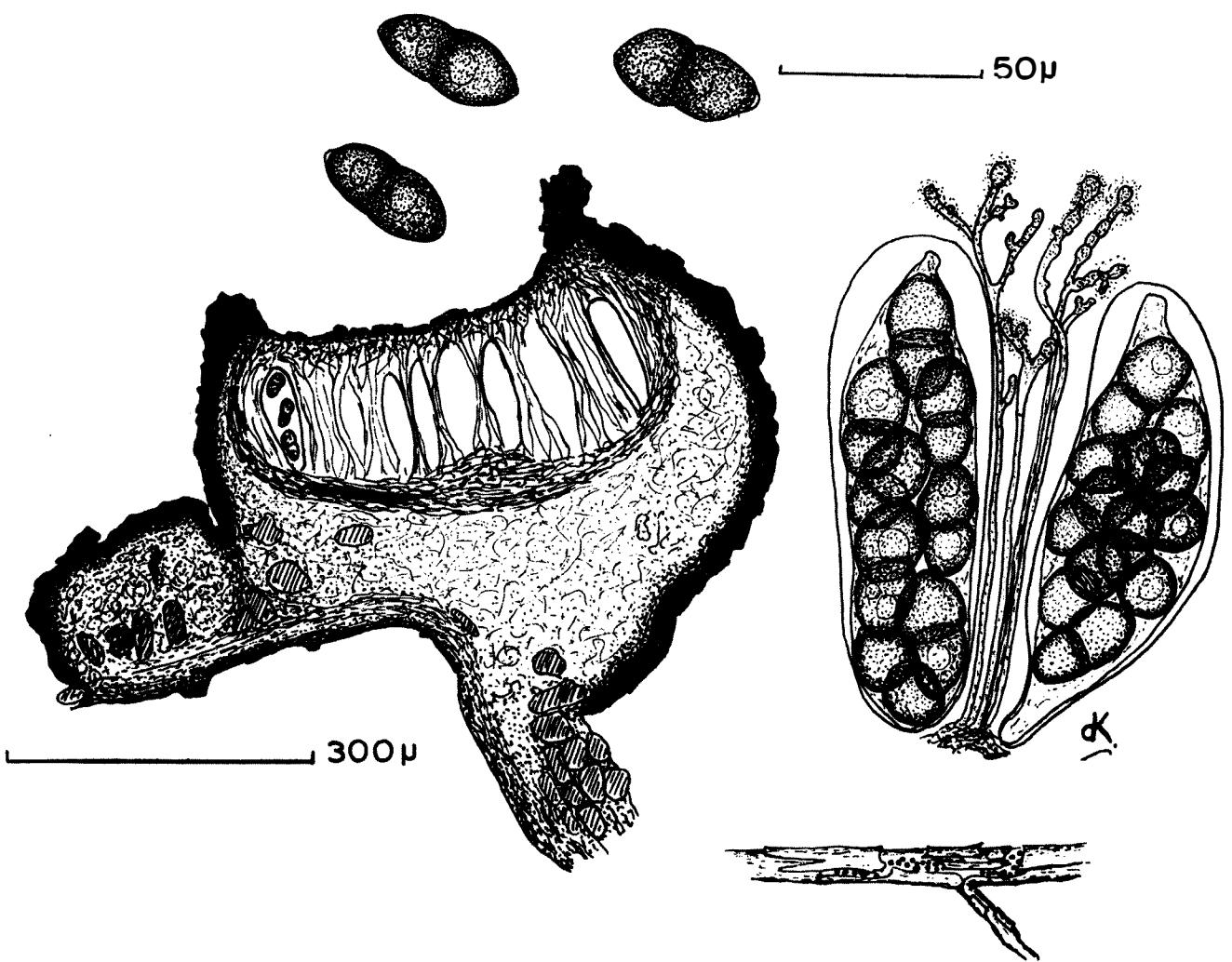
Fig. 4 Codronia uberiformis (G 2581)

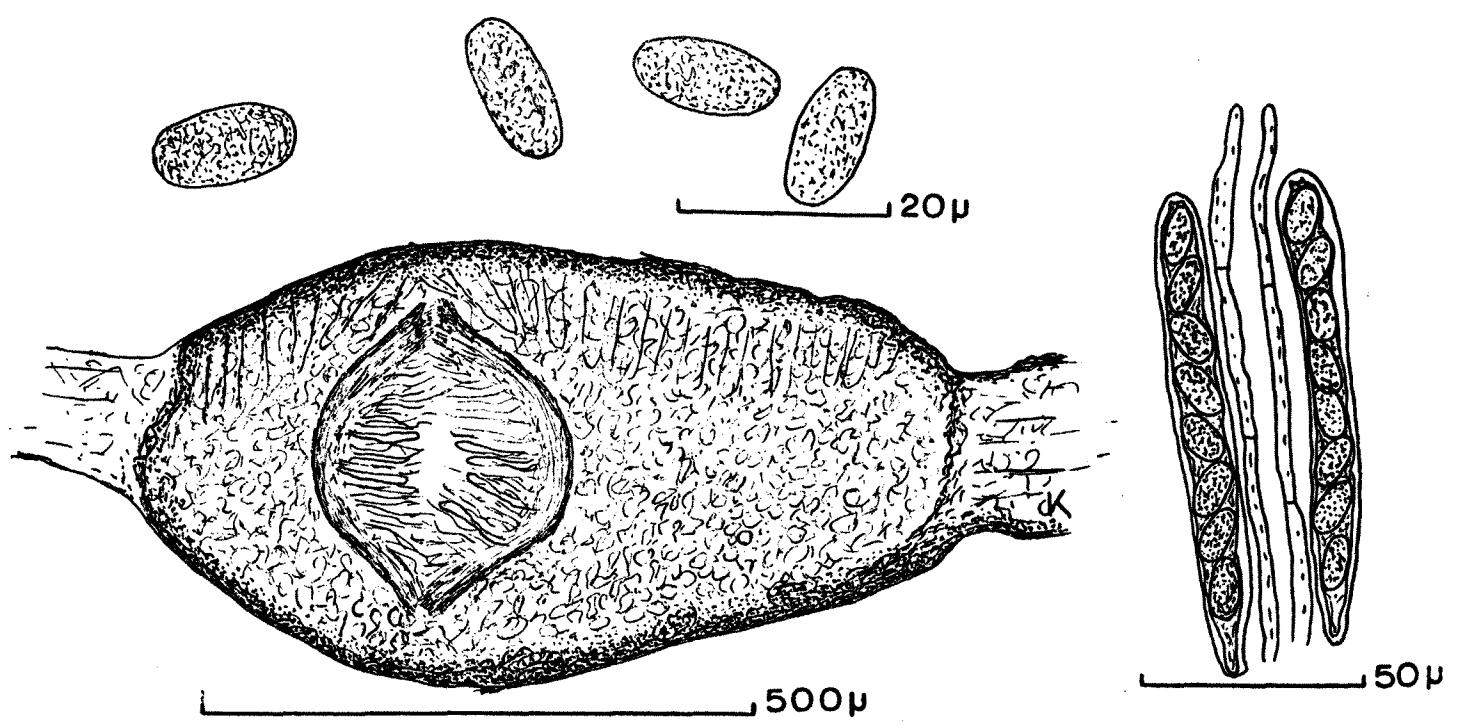
Fig. 5 Otthia spiraeae (G 2595)

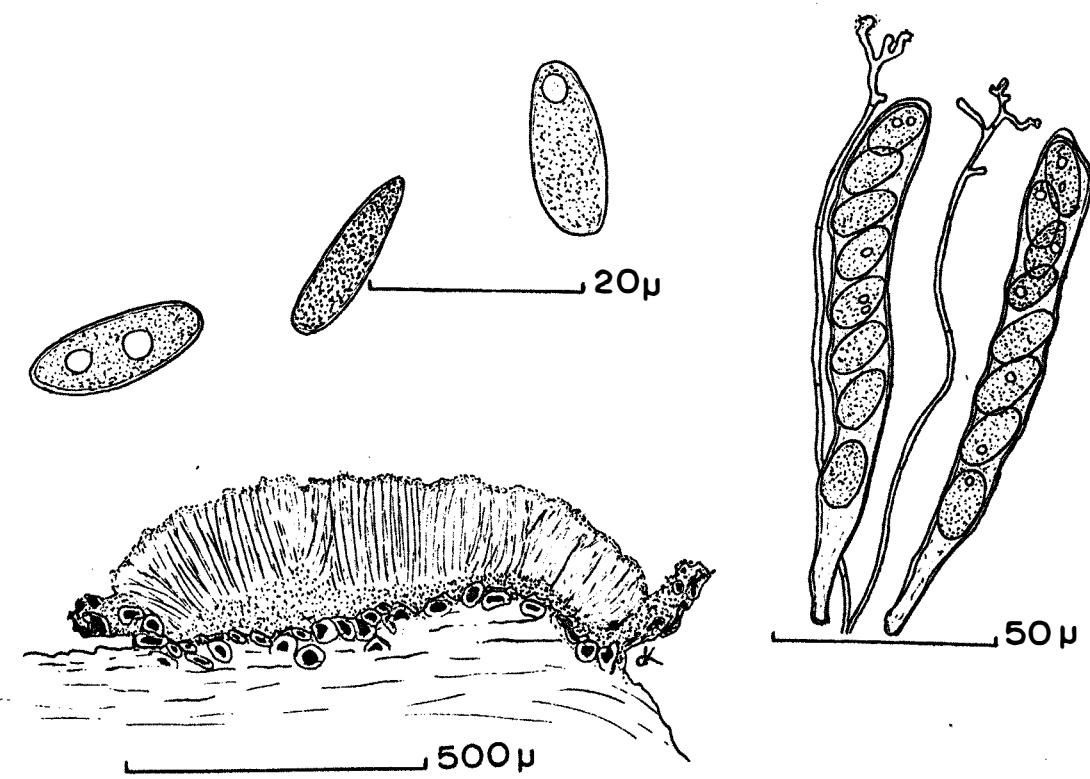
Fig. 6 Polystigma astragali (G 2597)

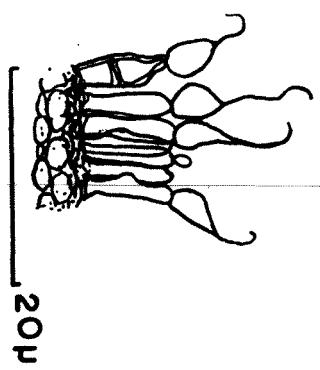
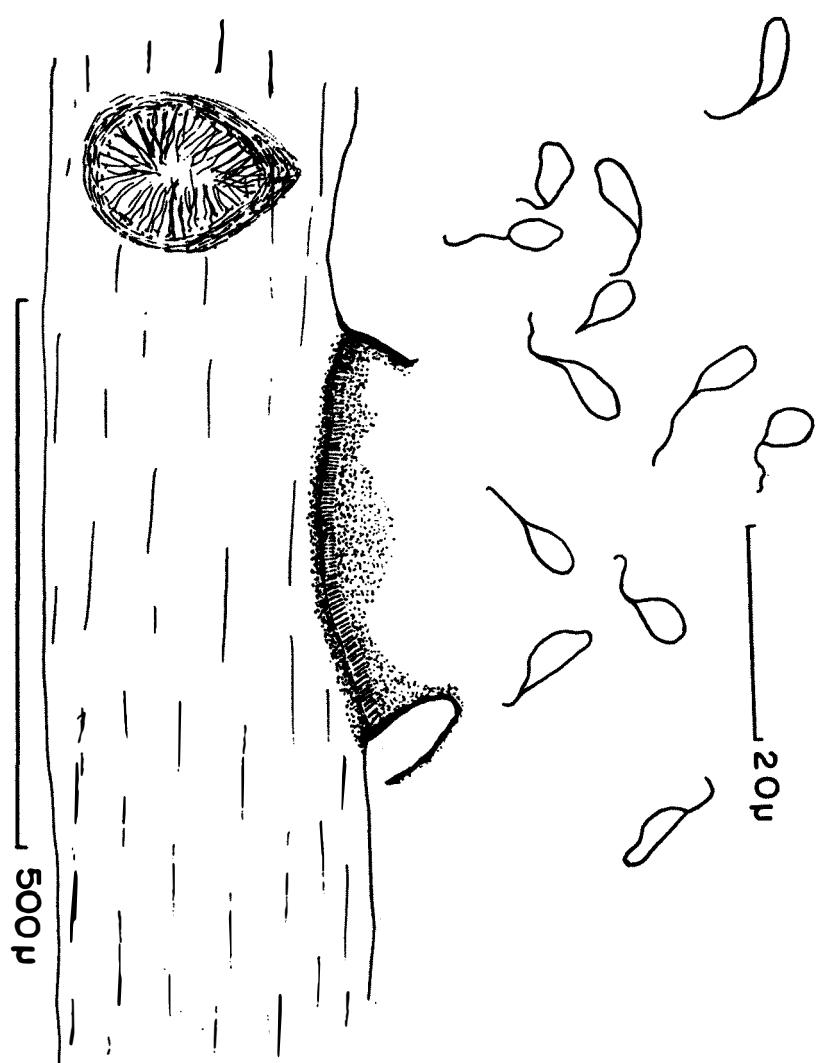
Fig. 7 Propolis leonis (G 2559)

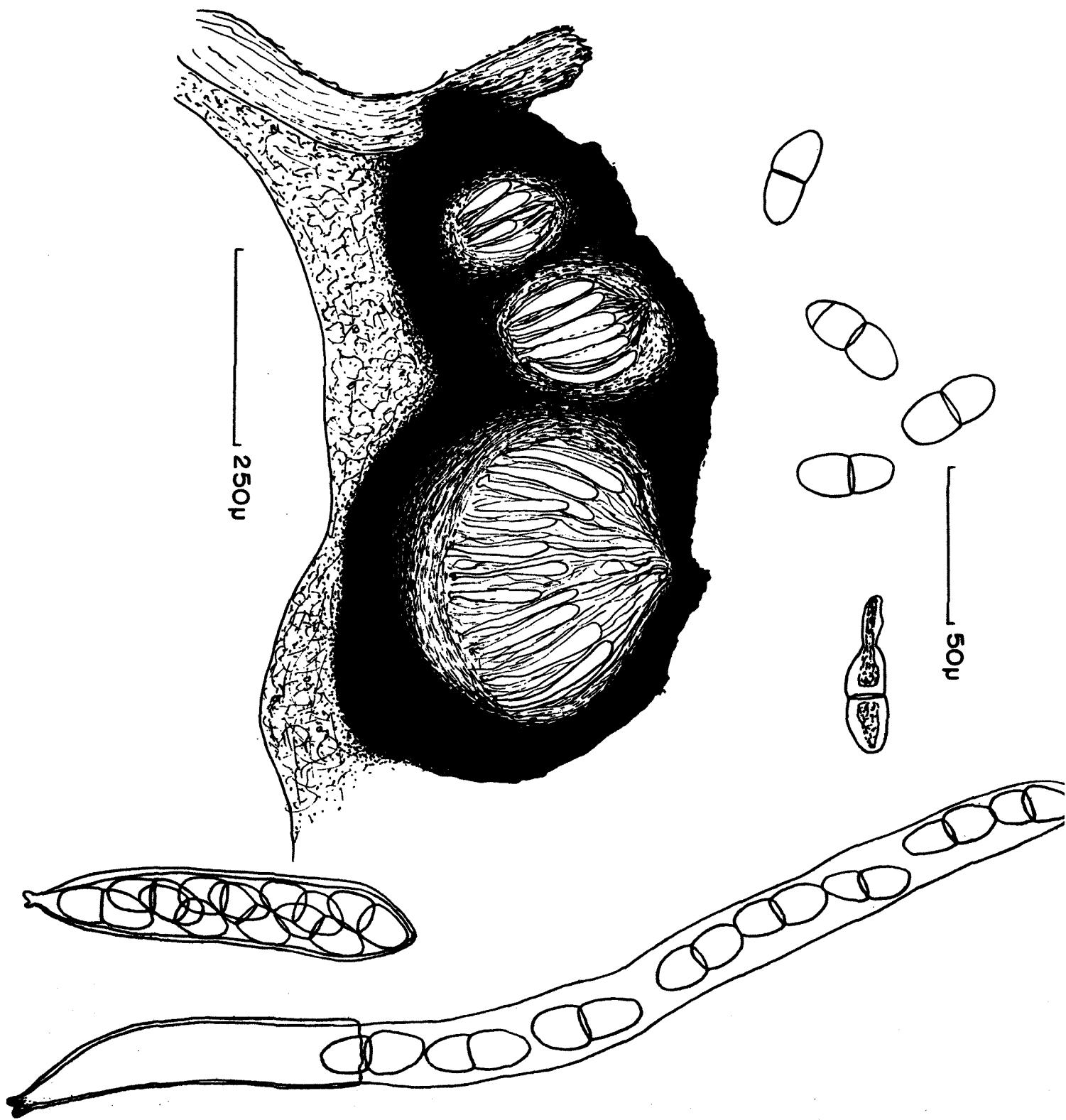


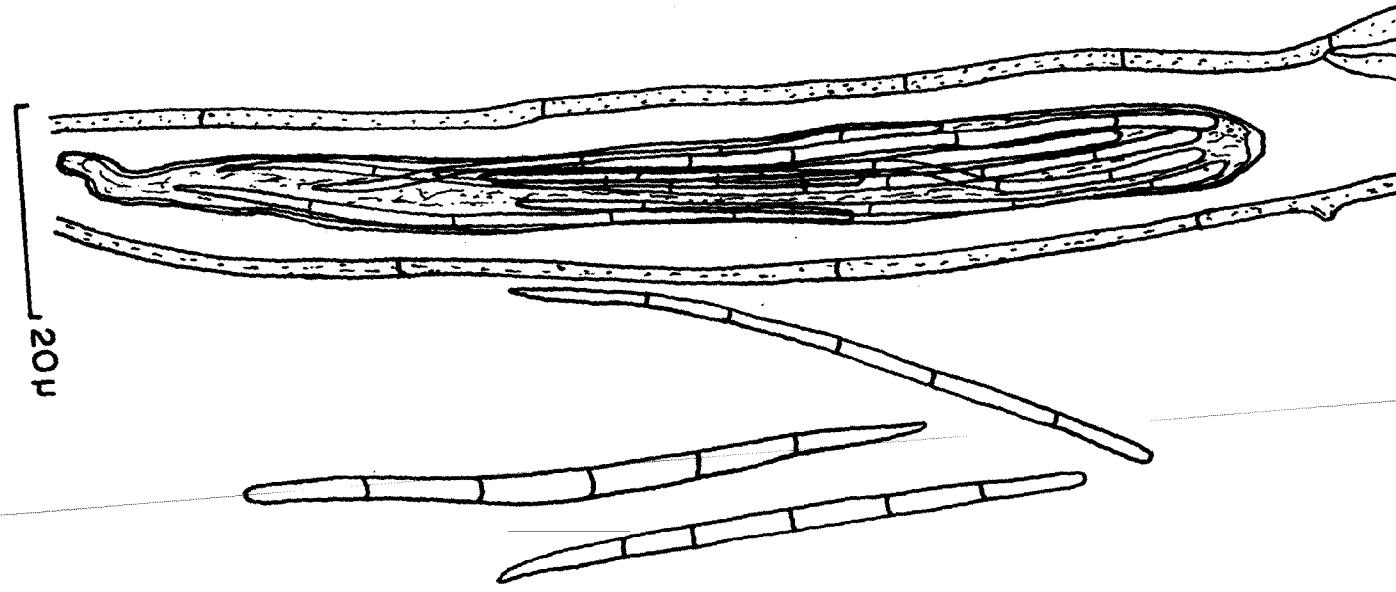
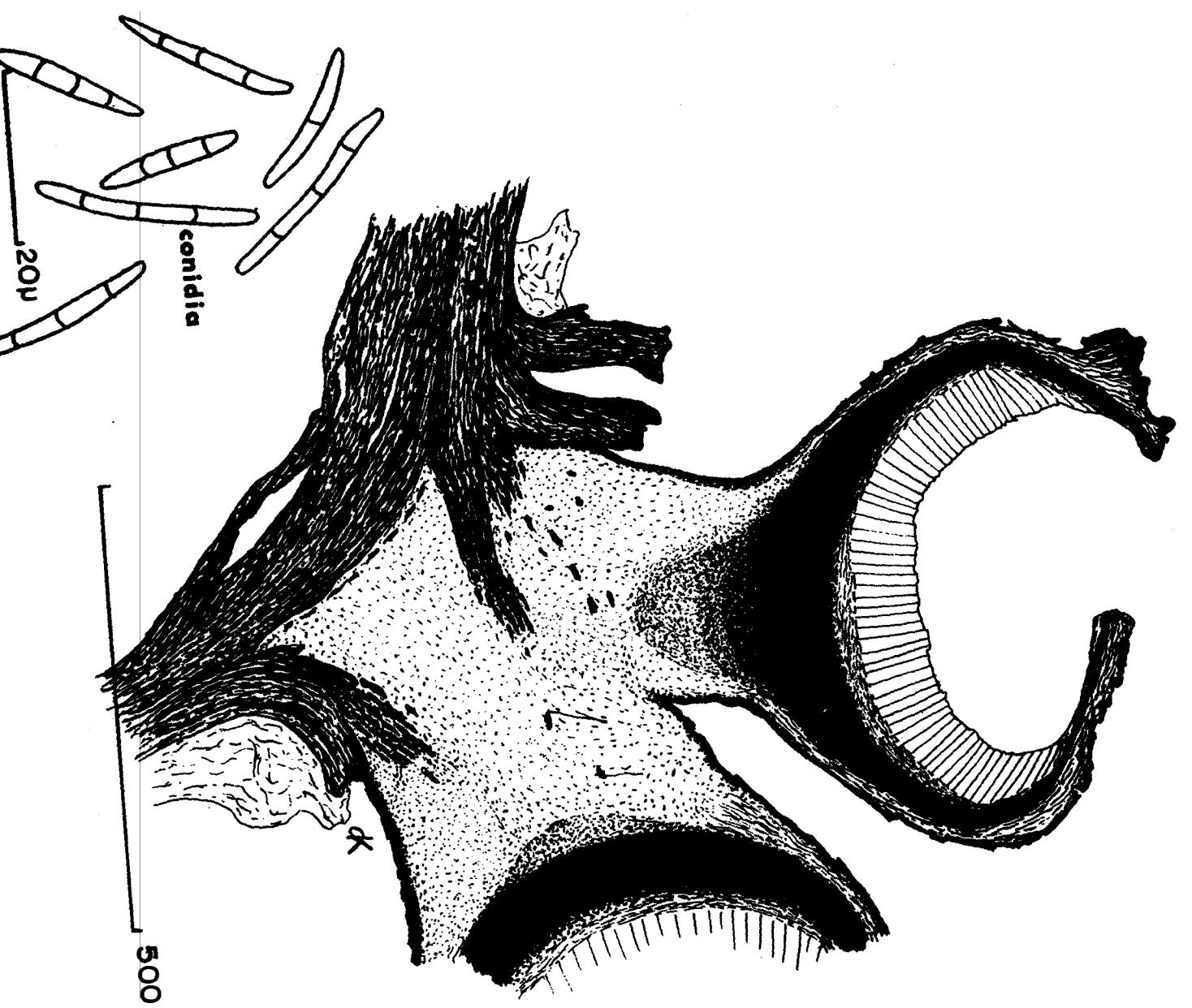












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