

PYRENOMYCETES OF BRITISH COLUMBIA

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
in the Department
of
Biology and Botany

We accept this thesis as conforming to the
standard required from candidates for the
degree of MASTER OF ARTS.

Members of the Department of
Biology and Botany

THE UNIVERSITY OF BRITISH COLUMBIA

September, 1952

ABSTRACT

The two hundred and sixty three species of Pyrenomycetes listed from British Columbia are distributed in ninety five genera as follows: Perisporiales, thirty one species in fifteen genera; Dothideales, six species in five genera; Hypocreales, eighteen species in ten genera; Sphaeriales, two hundred and eight species in sixty five genera. Forty one collections are briefly described as unidentified species of their respective genera; more adequate specimens of these are needed before satisfactory determination can be made. One species, Gnomonia potentillae, and one form, Sphaerulina Alni A.Lorr.Smith forma minor, are described as new.

ACKNOWLEDGEMENTS

This study was made possible by a Bursary and two Summer Research Grants from the National Research Council, to whom I am deeply grateful.

I wish to thank Dr. F. Dickson for suggesting this study and for his help in the numerous difficulties encountered. Dr. T.M.C. Taylor and Miss Mary Harrington are responsible for assistance in the identification of host plants and Mr. John Bancroft in the preparation of plates. I am indebted to Dr. J.W. Groves who kindly lent me material of British Columbia Pyrenomycetes from the Mycological Herbarium at Ottawa, and to the officers in charge of the Plant Pathology Laboratories at Saanichton, Summerland, and Vancouver, and of the Forest Pathology Laboratory at Victoria.

To the interested friends who brought or sent in specimens to be added to the collection I am also grateful.

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PYRENOMYCETES OF BRITISH COLUMBIA

INTRODUCTION

General Introduction

When the collection and identification of Pyrenomycetes of British Columbia was first suggested as a mycological study, the idea was to make a general survey and then to concentrate on one particular family. This plan was followed in part, but several families proved to have numerous representatives in the province. Three families, the Erysiphaceae, Mycosphaerellaceae, and Podosporaceae, are treated in detail as they occur. Representatives of the remaining families, although not as numerous, are keyed out and listed in the same way. This survey is in no way suggested as being complete, rather it is a preliminary study upon which further intensive work may be based.

Historical Survey

There has been no previous intensive collecting of Pyrenomycetes in the province. Certain collections made by John Macoun were determined by Dearness (1916, 1917), and earlier by Ellis and Everhart (1887, 1891, 1892, 1898). References to those specimens described or mentioned have been included in this list. The Dominion Laboratories of Plant Pathology at Summerland, Saanichton and Vancouver, the Dominion Laboratory of Forest Pathology at Victoria, and the Provincial Plant Pathologists have contributed records of plant and forest pathogens. These records, published in the Canadian Plant Disease Surveys from 1920 to the present, have been studies; the prevalence of those fungi in the province is reported as obtained from the surveys. Any other references found in the literature are also included, in order to make this list as complete as possible.

NATURAL FEATURESGeographical Regions

British Columbia extends from the 49th parallel to the 60th parallel of latitude and from the crest of the Rocky Mountains west to the Pacific Ocean. The eastern boundary of the province follows the axis of the Rockies to the 54th parallel and follows longitude 120° from there to the 60th parallel of latitude. Between 55° and 60° latitude on the west, the Panhandle of Alaska cuts off the province from the ocean. It is roughly 760 by 470 miles, and covers an area of 355,855 square miles.

British Columbia is predominately mountainous. The Rocky Mountains on the east form the northern end of the Cordilleran belt, consisting of the upturned edges of the strata underlying the Great Plains on the east, chiefly alluvial and carboniferous limestone. They range in height from an average of 8000 to 10,000 feet; some peaks reach 13,500 feet in the south of the province. The Rocky Mountain trench extends throughout the length of the province, with variation in width from 2 to 15 miles. The Columbia mountains extend from the United States to the Fraser River, latitude $53^{\circ} 45'$, with an average width of 80 miles, to form the western rim of the trench. The Columbia system includes the Purcell and Selkirk trenches in the south and the Cariboo Range, the Peace and Stikine Mountains in the north.

The central region of the plateaux and mountains, 200 miles wide, is a much dissected and eroded tableland, with soil composed of disintegrated lava and glacial drift. The topography is characteristically of two types:

deep-cut U-shaped valleys 1000 to 2000 feet above sea level, occupying one-third of the area, and rolling upland plateaux, 3500 to 5000 feet in elevation.

The Coast Range, 6000 to 7000 feet high and about 100 miles wide, forms a barrier between the Interior Plateau and the ocean. These mountains are composed of massive crystalline rocks of an ancient period. West of the Mainland lies the partially submerged Island Range, which forms an archipelago of islands, including Queen Charlotte and Vancouver Islands. The deeply submerged Coastal Trench lies between this range and the Mainland, forming the system of fiords and straits characterizing the British Columbia coast.

The climate of British Columbia is chiefly influenced by the Japan Current, the eleven degrees of latitude through which the province extends, and the extremes of altitude from sea level to the highest mountain peak at 13,500 feet. Warm moisture-laden air currents sweep inland over the Japan Current, are chilled in ascent of the western slope of the mountain ranges and there deposit their moisture. This produces alternating wet and dry belts, and moderates extremes of temperature.

The Lower Coast Belt is characterized by mild, even temperatures, and precipitation of 60 to 70 inches, of which one-third occurs during the summer months. The North Coast Belt averages about 5° lower in mean temperature and has a precipitation of 110 inches, with a part of the winter precipitation as snow. The Interior Plateau or Dry Belt shows greater variation in temperature, with means from 14° in January to 67° in July, and a limited precipitation of 11 to 13 inches. The second Wet Belt has

relatively the same temperature range as the Dry Belt, but greater precipitation, from 27 to 60 inches. The Second or Columbia Dry Belt, forming the western rim of the Rocky Mountain trench, has a slightly lower mean winter temperature but a mean summer temperature similar to that of the Second Wet Belt; precipitation varies from 13 to 17 inches. The Great Northern Belt is subject to greater extremes in temperature; precipitation varies from 16 to 20 inches, of which nearly half falls during the growing season.

Phanerogamic Flora

- The coastal region of British Columbia is covered in great part by coniferous forests. The types of the forests may be characterized briefly as:
1. Douglas fir-cedar type, prevalent at lower altitudes to 3000 feet, on Vancouver Island and the Mainland, consisting of Pseudotsuga taxifolia, Thuja plicata, Tsuga heterophylla, Abies amabilis, Pinus monticola, and Picea sitchensis.
 2. Giant cedar-hemlock type, at a higher altitude and north of the coastal type, to 4000 feet, consisting of Thuja plicata, Tsuga heterophylla, Abies amabilis, Picea sitchensis, Chamaecyparis nootkatensis, and Pinus monticola.
 3. Western hemlock-Sitka spruce type, on the Queen Charlotte Islands and North Coast, consisting of Tsuga heterophylla, Picea sitchensis, Thuja plicata, Chamaecyparis nootkatensis, and Abies amabilis.
 4. Hemlock-white fir type, at higher altitudes and on more exposed sites, chiefly Tsuga heterophylla and Abies amabilis, with some Picea sitchensis, Thuja plicata, and Pinus contorta.
 5. Sub-alpine type, above the hemlock-white fir type and below timber line, consisting of Tsuga Mertensiana, Abies lasiocarpa, Pinus

contorta, Picea sitchensis and Tsuga heterophylla. The underbrush consists mainly of Gaultheria shallon, Olopanax horrida (Echinopanax horridum), Rubus spectabilis; ferns include Polystichum, Adiantum, Dryopteris, Polypodium, and Pteridium spp. Deciduous trees in the coastal region include Acer macrophyllum, A. circinatum, Rhamnus Purshiana, Arbutus Menziesii, Alnus oregona, Quercus Garryana, Populus trichocarpa, Salix spp., Betula spp., Prunus spp.

The semi-desert or drybelt regions of British Columbia are characterized by the scarcity or absence of trees and predominance of grasses, sagebrush, golden rod, balsam root, and other xerophytic plants. There are three main drybelt regions: the Columbia-Kootenay area, the Okanagan-Similkameen area and the Fraser area, including the Thompson Valley. Within these regions grow the natural grasslands of British Columbia. Spring plants are numerous and varied, short-seasoned in the brief time after the snow melts and before the soil becomes dry. They include Fritillaria pudica, Calochortus macrocarpus, Phacelia leucophylla, Balsamorhiza sagittata, Clematis ligusticifolia, and Lewisia rediviva. The semi-desert flora includes Artemisia tridentata, Opuntia polyacantha, Bigelovia dracunculoides, Asclepias speciosa, Mentzelia laevicaulis, Lupinus spp., Astragalus spp. Shrubs and trees include Amelanchier florida, Acer glabrum, Rhus glabra, Corylus californica, Betula glandulosa, B. fontinalis, Salix spp., Populus tremuloides, Prunus demissa.

The grasslands are distinguished as:

1. Open grasslands, (a) where sagebrush predominates, species of Agropyron, Koeleria, Festuca, Stipa, Aristida and Poa, all tufted perennial deep-rooted forms; (b) where grasses predominate, as well as the above-mentioned, Bromus, Elymus and Calemagrostis, with creeping rootstocks;

with these grow Lupinus, Astragalus, Ceranium, Plantago, and Juncus spp.

2. Wooded grasslands, (a) Douglas fir-grassland areas: grasses are much as in the open grassy regions, with fewer bunch grasses, and with the addition of Melica, Festuca, and Lathyrus; (b) Jackpine-grassland areas: mainly Calamagrostis, Koeleria, and Stipa; (c) cottonwood-grassland, differing very little, but with the addition of numerous legumes.

Dry belt and mountain forests are divided into four types:

1. Yellow pine, from 2000-3000 feet on slopes of benches; Pinus ponderosa is found in almost pure stands, mixed with Pseudotsuga taxifolia near its upper limit; Juniperus scopulorum, Ceanothus velutinus, C. sanguineus, Penstemon scoulerii are numerous; with and above Douglas fir at the higher levels are found Pinus contorta and Picea Engelmanni.

2. Mixed forest, in the Kootenay district, where Larix occidentalis is found with Douglas fir between the yellow pine and the spruce-lodgepole pine types.

3. Montane forest from 3000 to 6000 feet, in whose open park-like slopes herbaceous plants are abundant: Erythronium, Arnica, Lilium, Sedum, Erigeron, Lappula, Delphinium, Polemonium, Penstemon, Brodiaea, Castilleja, Aquilegia, Heracleum, Zygadenus, Claytonia, Spiraea, and numerous others.

4. Subalpine forest and meadow; timberline forest and mountain meadows consist of stunted Pinus contorta, P. albicaulis, Abies lasiocarpa, with grass species of Agrostis, Phleum, Danthonia, Trisetum, Koeleria, Festuca, and numerous herbaceous plants including Valeriana, Castilleja, Senecio, Lupinus.

The forests in the second wet belt resemble those on the coast, with the same transition in types. The range of trees passes from almost pure

Thuja plicata on the river-bottoms to a mixture of Thuja plicata and Tsuga heterophylla, finally changing into Tsuga heterophylla-Picea Engelmanni-Thuja plicata type or the subalpine (Picea Engelmanni-Pinus contorta) type from 4000 to 6000 feet.

The northern sub-arctic or spruce-pine type is a continuation of the great forest area that sweeps across Canada, lying between the tundra and the plains or pine-hardwood forests. It consists of Pinus contorta, Picea canadensis, and P. mariana, changing to P. Engelmanni farther south.

Alpine regions are found on most British Columbia mountains above 5500 feet. Subalpine association of ericaceous shrubs, such as Rhododendron, Phyllodoce, Cassiope, Cladothamnus, and Vaccinium, as well as Spiraea, Caltha, and Trollius, extend from 4000 to 6000 feet. Small lakes are abundant, with their flora of Kalmia, Gentiana, Parnassia, Menyanthes. The last trees are Abies lasiocarpa, Pinus albicaulis, and Tsuga Mertensiana, with Larix Lyallii in a few localities. The arctic-alpine zone is characterized by Silene acaulis, Artemisia norvegica var. pacifica, Phacelia sericea, Phlox Douglasii, Empetrum nigrum, Loiseleuria procumbens, Gentiana calycosa, Anemone occidentalis, Saxifraga Tolmiei. Rock slides are clothed by Sedum divergens, Juniperus siberica, Lupinus arcticus, and Polemonium confertum. Gravelly creek banks and sand bars are covered with Mimulus Lewisii, M. alpinus, Petasites frigidus, Epilobium latifolium, Lupinus spp., Castilleja spp., Valeriana sitchensis, Pedicularis bracteosa, Aquilegia formosa, Vernonia Wormskjoldii, Veratrum viride, and numerous sedges and rushes abound on alpine slopes.

AREAS OF SPECIAL COLLECTING

The size of the province renders impossible any comprehensive survey at present; rather representative areas were covered as thoroughly as possible. Certain localities have been fairly intensively studied, either because of their convenience or because a few days were spent in the area. These areas include the campus of the University of British Columbia, the environs of Vancouver, the vicinity of Duncan and Saanichton on Vancouver Island, the open parklands of the interior of British Columbia between Penticton and Salmon Arm, and an alpine area in the Ashnola district, in the southern part of the province. These localities will be described in somewhat more detail than the generalized regions of the province.

The campus of the University of British Columbia is situated on Point Grey, a point of land to the west of Vancouver cut off by English Bay on the north and the Gulf of Georgia on the west. The campus is planted with a number of native and introduced trees, shrubs, and herbaceous plants, many of which were examined in the search for fungi. Further collections of fungi were made in woods and gardens in the city. A trip to Mount Seymour, altitude 4758 feet, in the district of New Westminster, yielded other representatives which approached the alpine type of fungi. Beaches near Vancouver gave a few fungi on casual examination.

The areas on Vancouver Island, Duncan and Saanichton, are drier and hotter in the summer than Vancouver. Duncan is situated in a valley on the Cowichan River, forty miles north of Victoria. It is largely a cleared area, with small farms and some second growth of trees. Numerous collections were made of dead herbaceous stems in the spring. The Dominion Experimental Farm near Saanichton on the Saanich Peninsula provided an area for collection amidst

small fruit and market gardens. The observations of Mr. W. Jones and Dr. W. Newton in this locality have resulted in a Check List of plant parasites, of which those remarks pertinent to this study have been included.

The drybelt region of the province, with its typical flora, provided other fungi, especially among the Erysiphaceae, which are general in those areas. Collections were made from the dry clay benches to the west of the city of Penticton, where Artemisia, Opuntia, and bunchgrasses were dominant. The parklike area north of Vernon up to Salmon Arm, with Pinus ponderosa the prominent feature of the landscape, provided other specimens. Around Lumby and the Shuswap Falls, the somewhat wetter locality gave another type of flora and different fungi.

The area known locally as the Cathedral Lakes in the Ashnola district, south of Keremeos, was the most fruitful in numbers of Pyrenomycetes collected. This locality varies in altitude from 6500 feet to 8300 feet. Several small alpine lakes are situated between the ridges, which at the time of exploring, early in August, were clothed with brilliant alpine flowers. Moisture was abundant on the north and east sides of the ridges, where the snow still remained in sheltered patches. To the south and west of these ridges, vegetation was in a more advanced condition and often dried out. Collections of dead stems and leaves of the herbaceous plants yielded many fungi, typically alpine and arctic in distribution. Most common were species of Mycosphaerella, Pleospora, and Leptosphaeria.

A glance at the map of British Columbia shows that the localities mentioned are scattered through the southwestern part. The greater part of the province is represented by only a few scattered collections.

GENERAL OUTLINE OF PYRENOMYCETES

Delimitation of the Group

The Pyrenomycetes comprise a large group of Ascomycetes in which the asci are borne in a closed fruiting body, the perithecium, which opens by a round or elongated ostiole or lacks an ostiole and then ruptures irregularly. Mycelium is septate, hyaline or dark colored. Perithecia are globose, conical, hemispherical or flattened. The perithecium may be superficial, with or without hyphal strands at the base; may be partially immersed or completely immersed in the substratum and then sometimes partially or completely erumpent at maturity; or it may be imbedded in a stroma composed of mycelium or a mixture of mycelial and host tissues. In one order perithecia are lacking; the asci arise in locules in the stroma which lack a definitely differentiated wall. Paraphyses or pseudoparaphyses, interthecial threads, are usually present between the asci, although in certain genera or families they may be lacking. Periphyses, hairs lining the upper wall and ostiole of the perithecium, are often present. The asci arise from the base or sides of the perithecium, and may be globose, ovate, clavate or cylindrical, stalked or sessile, thin- or thick-walled, usually eight-spored, or with more or less spores. Spores are of various shapes, colors, and septation. The imperfect stages of many of these fungi have been connected with the ascigerous stage; they belong to numerous form genera of the Fungi Imperfecti.

Keys to Orders and Families

For the purpose of this paper the following key to the orders and families of Pyrenomycetes is given.

Perithecia either globose and without ostiole or hemispherical and opening by an ostiole.....PERISPORIALES

Perithecia more or less globose, without ostiole and opening irregularly, wall entire.

Aerial mycelium white, perithecia (cleistothecia) with appendages.....1. Erysiphaceae

Aerial mycelium lacking or dark-colored, perithecia without appendages.....2. Perisporiaceae

Perithecia flat or hemispherical, opening by a round pore at the apex, wall often lacking below.....3. Microthyriaceae

Perithecia globose or ellipsoid, with differentiated ostiole.

Perithecia delicate, light colored or colorless, occasionally brownish, never black and hard.....HYPOCREALES

Perithecia superficial; stroma present or absent...4. Nectriaceae

Perithecia partially to entirely immersed in a stroma or stromatic base.....5. Hypocreaceae

Perithecia either lacking or firm and dark colored.

Fruiting body without perithecia, formed in a stroma as ascigerous locules.....DOTHIDEALES

Here considered as one family.....6. Dothideaceae

Perithecia with definitely differentiated, membranaceous, leathery or carbonaceous walls, with or without stroma.....

.....SPHAERIALES

Perithecia wholly or partly superficial.

Subiculum lacking or arachnoid.

Perithecial walls membranaceous.

Perithecia hairy, especially

above, asci evanescent.....7. Chaetomiaceae

Perithecia naked or setose, asci

discharging spores forcibly...8. Sordariaceae

Perithecial walls coriaceous or carbonaceous.

Mouths of perithecia papillate.

Perithecia setose or hairy.....

.....9. Trichosphaeriaceae

Perithecia naked.....10. Melanommataceae

Perithecia with long, often hairlike

beaks.....11. Ceratostomataceae

Stroma present or perithecia more or less deeply

sunken in substratum at bases.

Stroma present; at maturity perithecia either

free or remaining partially immersed in it.

Stroma not limited, perithecia mostly

free at maturity, globose to conical,

ostiolate.....12. Cucurbitariaceae

Stroma sharply defined; perithecia (asco-

carps) elongated into slender cylindrical

columns as lobes from the stroma; true

ostiole lacking.....13. Coryneliaceae

Stroma lacking; bases of perithecia only

persistently immersed.

Mouths of perithecia circular.....

.....14. Amphisphaeriaceae

Mouths of perithecia compressed, slit-

like.....15. Lophiostomataceae

Perithecia immersed in substratum or stroma, with
osticles or necks only projecting, or at maturity
becoming nearly superficial.

Perithecia immersed in substratum; stroma lacking
or poorly developed.

Mouths of perithecia mostly papillate or plane;
periphyses lacking.

Perithecia membranaceous to coriaceous.

Asci fasciculate, without paraphyses....

.....16. Mycosphaerellaceae

Asci not usually fasciculate, para-
physes or interthecial threads present..

.....17. Pleosporaceae

Perithecia coriaceous to carbonaceous; spores
large, mostly with gelatinous coating.....

.....18. Massariaceae

Perithecia usually beaked; periphyses present.

Perithecia without clypeus...19. Gnomoniaceae

Perithecia covered with a shield-like crust
(clypeus).....20. Clypeosphaeriaceae

Perithecia typically immersed in stroma.

Stroma composed of mixed host and fungus elements.

Conidia borne in cavities in the

stroma.....21. Valsaceae

Conidia borne superficially on surface

of stroma.....22. Melanconidaceae

Stroma composed wholly of fungus elements.

Ascospores small, cylindrical, usually
allantoid, hyaline to yellow-brown.

(Stroma present only in the conidial
stage in Calosphaeria).....23. Diatrypaceae

Ascospores various but not as above.

Conidia typically borne in hollow
chambers in stroma; ascospores one-
to many-celled, hyaline or brown.....
.....24. Melogrammataceae

Conidia borne in superficial layer on
surface of young stroma; ascospores
one- (rarely two-) celled, blackish
brown.....25. Xylariaceae

Classification and Nomenclature

In general the classification of fungi in this list follows that of Winter in Rabenhorst's Kryptogamen-Flora. Keys to families are taken from Lindau's Pyrenomycetinae in Engler and Prantl's Naturlichen Pflanzenfamilien, with some slight changes. The exceptions to Winter's classification are due to more recent monographic treatment of certain groups. The Erysiphaceae are treated according to Salmon's monograph (1900) of the

family. Seaver's monograph (1909, 1910, 1911) of the Hypocreales is followed; where the names used differ from the generally accepted names, both are included.

Members of the Dothideales and Perisporiales (with the exception of the Erysiphaceae) have been little collected so that differences of opinion concerning their classification are not particularly important. The Coryneliaceae, with one species represented in this province, are retained in the Sphaeriales following Lindau's treatment of the group; that position is not correct according to the recent studies of Fitzpatrick (1942).

As far as possible to avoid confusion due to synonymy, where more than one name is in use, all are included. The generally accepted name is employed as the legitimate one. No new combinations of names have been made, so that in the genus Mycosphaerella, both that generic name and Sphaerella are listed; the same is true for Guignardia and Laeostadia, Pleospora and Pyrenophora.

Determinations in nearly every case were made from descriptive literature. Only a few species were available for comparison, so that the majority represent the writer's idea of the species entirely. Further study will probably result in alteration of some of these determinations.

MATERIALS AND METHODSSources of Collections

Specimens listed in this paper were taken from several sources. A few references from literature have been included; where specimens have not been examined, the fact is noted. The collections of the Dominion Laboratories of Plant Pathology at Saanichton and Summerland have been studied. These collections constitute the majority of the parasitic Pyrenomycetes, chiefly among the Erysiphaceae. The herbarium of the Dominion Laboratory of Forest Pathology at Victoria has yielded parasitic and saprophytic fungi on both coniferous and deciduous trees. Wherever sufficient material was available, duplicates of these collections were placed in the Mycological Herbarium at the University of British Columbia.

Collections have been made by the writer in localities previously described. Specimens from these areas are deposited in the University Mycological Herbarium. In addition many specimens have been examined from the Phenogamic Herbarium at the University, with the kind permission of Dr. T.M.C. Taylor. From these specimens dead stalks and leaves were removed and examined. Those bearing Pyrenomycetes are now in the University Mycological Herbarium.

From the Mycological Herbarium at Ottawa Dr. J.W. Greves contributed collections of British Columbia Pyrenomycetes. Although not numerous, these collections are valuable in that they include collections made by John Macoun, with certain type and rare specimens.

The collection numbers listed are preceded by a letter denoting the Herbarium in which they are to be found. The following abbreviations have been used.

H - Mycological Herbarium of the Department of Biology and Botany, University of British Columbia, Vancouver, B.C.

O - Mycological Herbarium, Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Ontario.

OM - From the Mycological Herbarium at Ottawa, but collected by John Macoun and either bearing his collection numbers, or unnumbered.

S - Herbarium of the Dominion Laboratory of Plant Pathology, Summerland, B.C.

U - Forest Pathology Herbarium, University of British Columbia, Vancouver, B.C.

V - Herbarium of the Dominion Laboratory of Forest Pathology, Victoria, B.C.

Examination of Specimens

All collections were examined with the aid of a low-power microscope. In the case of stromatic forms freehand sections were cut and examined, while single perithecia were removed bodily and flattened between slide and cover glass. Camera lucida drawings were made of asci and spores, as well as any other diagnostic feature, for each species. Measurements were taken of perithecia or locules, of asci and spores. The sizes are given as the range of a number of measurements. Each species was described when first seen, and in further collections notes were made of any variation from the previous collection or from the published description.

LIST OF SPECIES

The Pyrenomycetes found in British Columbia are listed in the families delimited on page 10. A brief characterization of each family is given. Genera and species are listed in alphabetical order. In families where more than one genera are noted, a key is given to the genera. Again, genera with several species have been keyed out, in an effort to make this study of practical use in the herbarium. Species mentioned in the literature as collected in this province are included under their genus. Those species collected only in the imperfect stage are also listed under the name of the perfect stage and the stage of the collection is noted.

PERISPORIALES

Perithecia either lacking an ostiole and opening irregularly, or with a conical or plane ostiole; membranaceous, coriaceous or carbonaceous, usually without stroma, but often seated on strongly developed, permanent mycelium, always superficial; asci variously shaped, mostly aparaphysate; spores variously shaped and colored.

1. Erysiphaceae

Perithecia globose, membranaceous, without ostiole, brown or black, with variously shaped appendages; mycelium superficial, white or light brown, sending haustoria into the epidermal cells of the host; conidia preceding the perithecia, abstracted from conidiophores basipetally; asci one or several, oblong, ovate or globose, two- to eight-spored; spores oblong or oval or elliptical, hyaline, granular; paraphyses lacking; parasitic on living plants.

Perithecia containing a single ascus.

Perithecial appendages mycelial, filiform.....Sphaerotheca

Perithecial appendages several times dichotomously branched
near the tips.....Podosphaera

Perithecia containing more than one ascus.

Perithecial appendages simple, not branched, or if branched,
once only and not ornate.

Appendages uncinate at apex, simple or branched.....Uncinula

Appendages not uncinate.

Appendages similar to mycelium, simple or irregularly
branched.....Erysiphe

Appendages equatorial, rigid, with a bulbous base.....
.....Phyllactinia

Perithecial appendages branched at apex in a definite manner,
often ornate.....Microsphaera

Erysiphe Hedw.f.

Perithecia globose, or globose-depressed; asci several, two- to eight-spored; appendages floccose, simple or irregularly branched, sometimes obsolete, usually more or less similar to the mycelium and interwoven with it.

Perithecia large, 135-280 μ diameter; spores not developed on living
plants.....E. graminis

Perithecia smaller, up to 175, rarely 230 μ diameter; spores developed
on living plants.

Asci 2-spored (rarely 3-spored).....E. cichoracearum

Asci 3- to 8-spored.

On female catkins of alder; asci numerous, 20-42.....E. aggregata

On numerous hosts, but not alder catkins; asci few,

2-8, or rarely up to 22.....E. polygoni

E. aggregata (Pk.) Farl. (Plate I, fig.1). Perithecia amphigenous, 130-230 μ diameter; appendages numerous; asci numerous, 20-42, 80-115 x 30-40 μ ; spores 8, rarely 7, rounded, 16-20 x 10-15 μ . On catkins of Alnus sp., N.Saanich, leg. W.Jones (H-302).

E. eichoracearum DC. (Plate I, fig. 2) Perithecia amphigenous, 80-140 μ diameter; appendages variable, brown or hyaline; asci 4-25, narrowly to broadly ovate, more or less stalked, 58-90 x 30-50 μ ; spores 2, 20-28 x 12-20 μ . On Aster MacCallas Rydb., Enderby, leg. G.E.Woolliams (S-30); A. novae-angliae L. (CPDS 1934); Aster sp., Summerland, leg. G.E.Woolliams, (H-1671, H-1569); Callistephus sp. (CPDS 1933, 1937); Chrysanthemum sp. (CPDS 1930); Cucumis spp. (CPDS 1937, 1940, 1943, 1945); Delphinium sp. (CPDS 1926, 1937); Lactuca scariola L., Penticton, leg. G.E.Woolliams (H-1593), Summerland, leg. G.E.Woolliams (H-1603); Oenothera sp. (CPDS 1925); Penstemon sp. (CPDS 1934); Phlox sp., Agassiz, leg. T.G.Atkinson (H-1879), Powell River, leg. W.Jones (H-791), Sumas, leg. W.Jones (H-789), Summerland, leg. M.F. Welch (H-1599), Vancouver, leg. B.Lawson (H-83, H-1485); Plantago major L., Agassiz, leg. W.Jones (H-790), Kelowna, leg. G.E.Woolliams (H-1571), Shawnigan Lake, leg. W.Jones (H-303); Rudbeckia laciniata L., (CPDS 1934, 1940); Solanum nigrum L., Kelowna, leg. G.E.Woolliams (H-1575), Summerland, leg. G.E.Woolliams (H-1602); Solidago sp., Vancouver, leg. F.Dickson (H-952); Zinnia elegans (CPDS 1936).

E. graminis DC. (Plate I, fig.3) Perithecia usually epiphyllous, large, 135-280 μ diameter, more or less immersed in the lanuginose persistent mycelium; asci numerous, 9-30, cylindrical to ovate-oblong, stalked, 70-108 x 25-40 μ ; spores 8 (rarely 4), 20-23 x 10-13 μ . On Agropyron repens (L.) Beauv., N.Saanich, leg. W.Jones (H-792), Agassiz, (CPDS 1949); Avena sativa L. (CPDS 1930, 1939); Dactylis glomerata L., N.Saanich, leg. W.Jones (H-305, CPDS 1934, 1935, 1939); Hordeum vulgare L., Sidney, leg. W.Jones (H-304, CPDS 1934, 1937, 1939, 1940); Hordeum sp., Cloverdale, leg. I.C.MacSwan (H-28); Poa sp., Langley, leg. W.Jones (H-306); Secale cereale L., Hatzic, leg. W.Jones (H-793, CPDS 1939); Triticum aestivum L., Vancouver, leg. I.C.MacSwan (H-1486, CPDS 1928, 1930, 1933, 1935, 1937, 1939, 1940).

E. polygoni DC. (E. communis Grev.) (Plate I, fig.4) Perithecia amphigenous, 65-180 μ diameter, appendages variable; asci 2-8 (rarely up to 22), ovate to subglobose, stalked or sessile, 46-72 x 30-45 μ ; spores 3-8, 19-25 x 9-14 μ . On Aquilegia formosa Fisch., Brentwood, leg. W.Jones (H-308), Summerland, leg. D.L.McIntosh (H-956), leg. M.F.Welch (H-1591), Invermere, leg. H.R.McLarty (S-152); Brassica oleracea L. var. acephala DC., Sidney, leg. W.Jones (H-307); Comandra pallida DC., Lillooet, leg. B.Lawson (H-966); Delphinium sp., Summerland, leg. G.E.Woolliams (H-1648, S-73); Lathyrus ochroleucus Hook., Tranquille, leg. V.C.Brink (H-1543); Lotus denticulatus (Drew) Greene (Hosackia denticulata Drew) (CPDS 1931); Lupinus polyphyllus Lindl., Sidney, leg. W.Jones (H-309); L. perennis L., Summerland, leg. G.E.Woolliams (S-1), Lupinus sp., Crawford Bar, leg. G.E.Woolliams and J.W. Eastham (H-1679); Matthiola sp. (CPDS 1938); Pisum sativum L., Duncan (H-1886),

Lillooet, leg. B.Lawson and G.E.Woolliams (H-1693), Rocky Point, Vancouver Island, leg. W.Jones (H-325), Invermere, leg. H.R.McLarty (S-151); Pisum sp., Dewdney, leg. W.Jones (H-794), U.B.C., leg. F.Dickson (H-173); Polygonum aviculare L., Kelowna, leg. G.E.Woolliams (H-1573), Summerland, leg. M.F. Welch (H-1600); P. erectum L., Salmon Arm (H-1893); P. ramosissimum Michx., Kamloops, leg. A.F.Szczawinski (H-1890); P. Persicaria L. (CPDS 1925); Polygonum sp., Notch Hill, leg. B.Lawson (H-1705); Trifolium hybridum L., Stone Creek, leg. G.E.Woolliams (S-363); T. pratense L., Agassiz, leg. W.Jones (H-310), U.B.C., leg. R.Stace-Smith (H-1373).

Erysiphe sp. Not seen, reported in CPDS on Antirrhinum sp., Artemisia sp., Rhus sp. (Rhubarb).

Microsphaera Lev.

Perithecia globose to globose-depressed; asci several, two- to eight-spored; appendages several times dichotomously branched at the apex.

Tips of some or all of the ultimate branches of the appendages recurved.

Appendages long, flaccid; apex irregularly branched.....
.....M. alni var. vaccinii

Appendages shorter, not flaccid; apical branching closer and regular.....M. alni

Tips not recurved.

Branching of the appendages lax, irregular, forming a narrow fork.....M. diffusa

Branching closer and regular, apex widely spreading.....
.....M. alni var. loniceræ

M. alni (Wallr.) Salm. (Plate I, fig.5) Perithecia amphigenous, 66-135 μ diameter; appendages hyaline or amber-colored, apex 3-6 times dichotomously branched, tips of ultimate branchlets recurved; asci 3-8, ovate to ovate globose, 42-70 x 32-50 μ , short stalked; spores 4-8, 18-23 x 10-12 μ . On Quercus Garryana Dougl., U.B.C., leg. F.Dickson (H-1799).

M. alni (Wallr.) Salm. var. lonicerae (DC.) Salm. (Plate I, fig.6) Differing from M. alni in the more loosely branched apex, with the tips of the ultimate branches straight. Salmon (1900, 145) states that this variety is confined to Europe; however the straight appendages of the collection would place it here rather than in M. alni. On Lonicera sp., N.Saanich, leg. W.Jones (H-768).

M. alni (Wallr.) Salm. var. vaccinii (Schw.) Salm. (Plate I, fig.7) Appendages long flaccid, apex more irregularly branched than in M. alni. On Chiogenes hispidula (L.) Torr. & Gr., Agassiz, leg. H.H.Ross (H-1449).

M. diffusa Cke. & Pk. (Plate I, fig.8) Perithecia amphigenous, 55-126 μ diameter; appendages variable in number and length, apex 3- to 5-times dichotomously branched, tips not recurved; asci 4-9, 48-60 x 28-30 μ , ovate-oblong, short stalked; spores 3-6, 18-22 x 9-11 μ . On Symporicarpus albus (L.) Blake, very common; Carlin, leg. G.E.Woolliams (H-1719), Fraser Valley, leg. W.Jones (H-530), Kelowna, leg. G.E.Woolliams (H-1572), Notch Hill, leg. B.Lawson (H-965), Summerland, leg. M.F.Welch (H-1598, H-964), U.B.C., leg. B.Lawson (H-963).

Phyllactinia Lev.

Perithecia large, globose-depressed to lenticular; true appendages

equatorial, rigid, acicular, with a bulbous base; apex of peritheciun with a mass of densely crowded branched outgrowths from the epidermal cells; asci many, two- or rarely three-spored.

P. corylea (Pers.) Karst. (Plate I, fig.9) Perithecia usually hypophyllous, 140-350 μ diameter; asci 5-45, subcylindrical to ovate-oblong, 60-105 x 25-45 μ , more or less stalked; spores 2, rarely 3, 30-42 x 16-25 μ . On Alnus oregonia Nutt., Prairie Valley, Summerland, leg. G.E.Woolliams (S-7, CPDS 1933); A. sitchensis Sarg., Summerland (CPDS 1932); Amelanchier alnifolia Nutt., Oyama, leg. G.E.Woolliams (H-1718); Cornus Nuttallii Aud., Vancouver, leg. J.E. Bier (U-13), N.Saanich, leg. W.Jones (H-761), leg. I.Mounce (V-2171), Cowichan Lake, leg. R.E.Foster (V-569, V-2092); C. pubescens Nutt., Sidney, leg. W.Jones (H-350), Summerland, leg. G.E.Woolliams (S-128); C. stolonifera Michx., Summerland, leg. G.E.Woolliams (S-3, CPDS 1932); Corylus sp., Cloverdale, leg. R.E.Fitzpatrick (H-961); Crataegus sp., Carlin, leg. G.E.Woolliams (H-1717), Metchosin (CPDS 1928); Holodiscus discolor (Pursh.) Maxim. (Spiraea discolor Pursh.), N.Saanich, leg. W.Jones (H-351, CPDS 1933).

Podosphaera Kunze

Perithecia globose or globose-depressed; appendages brown or hyaline, dichotomously branched at apex; ascus solitary, subglobose; spores 8. Basal and apical appendages both present, apical usually unbranched and blunt.....P. leuotricha
 Basal appendages absent; others more or less spreading and equatorially inserted; ultimate branches knob-shaped.....P. oxyacanthae

P. leucotricha (Ell. & Ev.) Salm. (Plate I, fig.10) Perithecia densely gregarious, 75-96 μ diameter, subglobose; apical appendages 3-11, dark brown to pale at tips, apex undivided and blunt; basal appendages sometimes nearly obsolete, sometimes well developed, short, simple or branched; ascus oblong to subglobose, 55-70 x 44-50 μ ; spores 22-26 x 12-14 μ , crowded. On Pyrus Malus L., Naramata, leg. H.R.McLarty (H-1681), Summerland, leg. D.L.McIntosh (H-1546), Vancouver, leg. I.C.MacSwan (H-27).

P. oxyacanthae (DC.) de Bary (Plate I, fig.11) Perithecia amphigenous, 64-90 μ diameter; appendages spreading, 4-30, dark brown, apex 2-4 times dichotomously branched, ultimate branchlets rounded, knob-shaped; ascus broadly obovate to subglobose, 58-90 x 45-75 μ ; spores 8 (rarely 6), 18-30 x 10-17 μ . On Prunus avium L., Penticton (H-1475); P. demissa (Nutt.) D.Dietr., Oliver, leg. R.E.Fitzpatrick, and J.B.Lott (H-1576); Carlin, leg. G.E.Woolliams (H-1716); P. emarginata (Dougl.) Walp., N.Saanich, leg. W.Jones (H-342); Prunus sp., cultivated cherry, common, Lillooet, leg. B.Lawson (H-957), Trepanier, leg. R.E.Fitzpatrick (H-1592), Naramata, leg. W.R.Foster (H-1636), Lytton, leg. D.L.McIntosh and G.E.Woolliams (H-1704), Penticton, leg. A.C.Carter (H-1884). On apricot (CPDS 1940), pear (CPDS 1938).

Sphaerotheca Lev.

Perithecia subglobose; appendages floccose, brown or hyaline, simple or vaguely branched, frequently obsolete; ascus solitary, eight-spored. Mycelium persistent, thick, pannose, forming dense patches composed of special hyphae, in which the perithecia are more or less immersed.

Persistent mycelium usually satiny and shining, white, sometimes becoming grey or pale brown.....S. pannosa
 Persistent mycelium dark brown.....S. mors-uvae
 Mycelium without these characters.

Cells of outer wall of perithecium 10-20 μ wide, averaging

15 μS. humuli

Cells 20-30 (rarely 40) μ wide, averaging 25 μ

.....S. humuli var. fuliginea

S. humuli (DC.) Burr. (Plate I, fig.12) Perithecia amphigogenous, 58-120 μ diameter, cells averaging 15 μ wide; appendages variable, few or numerous, usually long, dark brown; ascus broadly elliptical to subglobose, rarely short stalked, 45-90 x 50-72 μ ; spores 8, 20-25 (rarely 30) x 12-18 μ . On Fragaria sp. (CPDS 1938); Geranium viscosissimum Fisch. & Mey., Bridesville, leg. F.R.Bewell (S-194); Gilia linearis Gray, Quesnel, leg. W.Taylor (H-1883); Heuchera glabra Willd., Smithers, leg. J.W.Eastham (H-1880); Potentilla palustris Scop., Summerland, leg. T.M.C.Taylor (H-1800); Rhus glabra L., Penticton, leg. G.E.Woolliams (H-1594), East Kelowna, leg. H.R.McLarty (S-58), Summerland, leg. M.F.Welch (S-242); Rubus macropetalus Dougl., N.Saanich (H-863); R. parviflorus Nutt., U.B.C., leg. I.C.MacSwan (H-1487); R. spectabilis Pursh., Mill Bay, leg. W.Jones (H-865), Ladner, leg. W.Jones (H-276), U.B.C., leg. I.C.MacSwan (H-1489), Agassiz, leg. H.H.Ross (H-1448); Rubus sp., raspberry, Gordon Head, leg. W.Jones (H-864); Shepherdia canadensis Nutt. (CPDS 1933); Viola Tricolor L., Elk Lake (EPDS 1948); Viola sp. (CPDS 1937, 1944).

S. humuli (DC.) Burr. var. fuliginea (Schlecht.) Salm. (Plate I, fig.13)
 Perithecia usually smaller, 50-100 μ diameter, cells larger, averaging
 25 μ wide; spores 20-25 x 12-15 μ . On Agoseris aurantiaca (Hook.) Greene,
 Bridge Lake, Cariboo, leg. J.W.Eastham (H-1882); A. glauca (Nutt.) Greene,
 Canal Flats, leg. J.W.Eastham (H-1881); Bidens cernua L., Surrey, leg.
 W.Jones (H-275, H-277); Castilleja lutescens (Greenm.) Rydb., Summerland,
 leg. T.C.Brayshaw (H-1878), Castilleja sp., Lumby (H-1891); Coreopsis
grandiflora (CPDS 1940); Coreopsis sp., Summerland, leg. M.F.Welch (H-1649);
Lactuca scariola L., (CPDS 1925, given as S. Castagniei Lev.); L. spicata
 (Lam.) Hitchc., South Canoe, leg. G.E.Woolliams (S-24); Rubus sp., raspberry
 (CPDS 1925); Taraxacum officinale Weber, Summerland, leg. G.E.Woolliams
 (H-1590), Duncan (H-1887); Taraxacum sp., Summerland, leg. B.Lawson (H-82,
 H-960, H-958), Saanich, leg. W.Jones (H-866), Lytton, leg. B.Lawson (H-959).

S. mors-uvae (Schw.) Berk. & Curt. Perithecia amphigenous, subglobose,
 76-110 μ diameter, mycelium persistent, dark brown; appendages few, pale
 brown, short; ascus elliptic-oblong to subglobose, 70-92 (-110) x 50-62 μ ;
 spores 20-25 x 12-15 μ . On Ribes nigrum L., Summerland, leg. B.Lawson
 (H-953); R. sativum, Abbotsford, leg. B.Lawson (H-1520); Ribes sp., Salmon
 Arm, leg. T.Lott (H-274), Vancouver (H-1894).

S. pannosa (Wallr.) Lev. Mycelium persistent, white to pale brown; peri-
 thecia immersed in the mycelium, globose to pyriform, 85-120 μ diameter,
 appendages few, short, pale brown; ascus broadly oblong to globose, 88-115
 x 60-75 μ ; spores 8, 20-27 x 12-15 μ . On Prunus sp., peach, Summerland
 (H-1895); reported in CPDS on rose and nectarine.

Uncinula Lev.

Perithecia globose to depressed; appendages simple or once or twice dichotomously forked, uncinate at apex, hyaline, rarely dark brown; asci several, two - to eight-spored.

Appendages colored for half their length or more.....*U. necator*

Appendages colorless.

Appendages all or nearly all branched.....*U. aceris*

Appendages all simple.

Asci 4- to 6-spored.....*U. salicis*

Asci 7- to 8-spored.....*U. circinata*

* *U. aceris* (DC.) Sacc. (Plate I, fig.14, Plate VI, fig.26) Amphigenous, mycelium evanescent or persistent; perithecia hemispherical or globose-depressed, 120-225 μ diameter; appendages numerous, hyaline, thick-walled, mostly bifid, uncinate; asci 4-12, subpyriform or oblong, with or without short stalk, 70-95 x 45-55 μ ; spores usually 8, 22-26 x 13-15 μ . This species is given by Salmon (1900:92) as confined to Europe and Asia. The first authentic record on this continent appears in CPDS (1929:97), on Acer, N.Saanich. The appendages are bifid and exactly as in Tulasne's illustrations (1931, Vol.I, Pl.II, fig.2-3). On Acer Macrophyllum Pursh., Duncan (H-1888), N.Saanich, leg. W.Jones (H-827), U.B.C., leg. I.C.MacSwan (H-1488), leg. M.E.Barr (H-1885).

U. circinatum Cke. & Pk. Hypophyllous, mycelium evanescent, or persistent in spots; perithecia rounded-lenticular, (125-) 160-225 μ diameter; appendages very numerous, apex simply uncinate; asci 9-26, narrowly ovate or cylindrical, 68-86 x 29-40 μ ; spores 8, sometimes 7, 18-22 x 10-14 μ . On Acer sp.,

Victoria (CPDS 1928), not seen.

U. necator (Schw.) Burr. (Plate I, fig.15) Amphigenous, mycelium usually subpersistent; perithecia globose-depressed, 70-128 μ diameter; appendages very variable in number and length, 7-32 (-40), light or dark ember-brown in the lower half; asci 4-6 (-9), broadly ovate or ovate-oblong to sub-globose, 50-60 x 30-40 μ ; spores 4-7, 18-25 x 10-12 μ . On *Parthenocissus* sp., Summerland, leg. M.F.Welch (H-1597); *Vitis* sp., Summerland, leg. B.Lawson (H-955).

U. salicis (DC.) Wint. (Plate I, fig.16) Amphigenous, mycelium evanescent or persistent; perithecia globose-depressed or lenticular, 90-175 μ diameter; appendages usually numerous, 100-150, hyaline, apex simply uncinate; asci 8-14, rarely 4-6, elliptic-oblong or broadly ovate, stalked, 55-80 x 30-40 μ ; spores 4-6, 20-26 x 10-15 μ . On *Myrica Gale* L., Cowichan Lake, leg. R.E. Foster, det. H.S.Jackson (H-1889, V-325); this host has not been previously recorded, however perithecia and appendages agree well, asci are broad-ovate, 69-78 x 54-60 μ , spores are longer, 22-29 x 15 μ . On *Populus tremuloides* Michx., Summerland (CPDS 1940); *P. trichocarpa* T.& G., Summerland (CPDS 1940); *Salix* spp., Summerland, leg. G.E.Woolliams (H-1568, H-1673, S-2, S-9), Tranquille, leg. V.C.Brink (H-1892), Cultis Lake, leg. H.H.Ross (H-1450), Stanley Park, Vancouver, leg. B.Lawson (H-84), South Canoe, leg. G.E.Woolliams (S-19), between Vernon and Armstrong, leg. G.E.Woolliams (S-42).

2. Perisporiaceae

Perithecia more or less globose, black, membranaceous, without ostiole, opening irregularly at apex; aerial mycelium lacking or dark-colored, appendages none; asci fasciculate, ovate to clavate; spores variously shaped

and colored; paraphyses lacking or present.

Spores one-celled, brown.....Petriella

Spores two-celled.

Spores hyaline.....Dimerosporium

Spores brown.

Bases of perithecia stalked and immersed in the substrate.....

.....Phaeocryptopus

Bases of perithecia not stalked, superficial or immersed

in dark aerial mycelium.....Dimerium

Dimerium Sacc.& Syd.

Perithecia globose, membranaceous, on well developed brown mycelium; asci globose to ovate, eight-spored; spores two-celled, brown.

D. alpinum W.B.Cooke (1949:609) (Plate I, fig.17). Perithecia black, membranaceous, in a dense mycelial mat, 100-250 μ diameter, hyphae of subiculum black, thick-walled, septate; asci obclavate, 36-58 x 8.5-15 μ ; spores brown, two-celled, constricted at the septum, lower cell slightly smaller, uniseriate to biseriate, 11.5-15 x 4.5-6 μ . Forming black crusts on leaves of Penstemon fruticosus (Pursh.) Greene, Cathedral Lakes (H-1981).

Dimerosporium Fckl.

As Dimerium, but spores hyaline.

Spores large, 27-30 x 6-10 μD. Abietis

Spores smaller, 13-24 x 3.5-7 μD. Tsugae

D. Abietis Dear. (Plate I, fig.18) Perithecia on branching brown mycelium, hypophylloous, densely clustered, dark-brown, 100-180 μ diam.; hyphal appendages numerous, brown, obtuse, sometimes septate, 30-80 x 4-5 μ ; ascii sessile, ovate, (33-) 40-60 x (15-) 21-28 μ ; spores conglobate in the ascus, hyaline, one-septate, 27-30 x 9-10 μ . On Abies lasiocarpa (Hook.) Nutt., Cinema (H-1982, V-5492); immature, with spores smaller than in description.

D. Tsugas Dear. (Plate I, fig.19, Plate VI, fig.27) Perithecia hypophylloous, gregarious on thin branching anastomosing subiculum, dark-brown, globose, 75-135 μ diameter; ascii variable in shape, obclavate to cylindrical, 36-66 (-76) x 12-25 μ ; spores biseriate to conglobate, hyaline, one-septate, sometimes nucleate in one or both cells, upper cell usually larger, 13-24 x 3.5-7 μ . On leaves of Tsuga heterophylla (Raf.) Sarg., Arrowhead, leg. W.G.Ziller (H-1984, V-6476), Cowichan Lake, leg. J.E.Bier, det. I.L.Conners (O-14363, V-346), leg. W.G.Ziller, det. D.B.O.Savile (O-25161, V-4604), leg. D.C.Buckland (U-540, U-551), Port Clements, Queen Charlotte Island, leg. R.E.Foster, det. I.L.Conners (O-14362, H-1983, V-348), Revelstoke, leg. W.G. Ziller, det. D.B.O.Savile (V-5731, O-25172), Terrace, leg. W.G.Ziller, det. D.B.O.Savile (O-25190, V-5984).

Petriella Curzi

Perithecia superficial, on brown hyphae, brown to black, globose to conical or beaked; ascii ovate, evanescent, eight-spored; spores yellow-brown, one-celled, ellipsoid or ovate.

P. asymmetrica Curzi (Plate I, fig.20) Perithecia globose to conical or beaked, superficial, on intertwined brown hyphal strands, brown-black,

150-240 μ diameter, beak up to 90 μ long; asci ovate, with a slender evanescent stalk, early evanescent, 21-27 x 18 μ , 8-spored; spores yellow-brown, one-celled, with numerous refractive globules, ellipsoid or ovate, flattened on one side, somewhat with hyaline apiculum at one end, 7.5-12 x 4.5-6 μ . Isolated from seeds of Beta vulgaris L., Armstrong, by J.W.Groves, det. E.W.Mason (0-14924); from seeds of Cucumis melo L., Armstrong, det. J.W.Groves (0-14922); from seeds of Raphanus sativus L., Grand Forks, det. J.W.Groves (0-14923).

Phaeocryptopus Naumoff

Perithecia globose to depressed, base stalked and immersed in the substrate, parenchymatous; ostiole irregular; mycelium effused, superficial, brown; asci cylindric, eight-spored, paraphysate; spores one-septate, fuliginous.

P. gaumannii (Rohde) Petrank (Adelopus Gaumannii Rohde) (Plate I, fig. 21)
 Perithecia superficial, hypophylloous, black, membranaceous, globose, 50-75 μ diameter; asci ovate-oblong, sessile, 18-27 x 8-15 μ , ?paraphysate; spores crowded, greenish-hyaline, (immature), one-septate, not constricted, guttulate, 8.5-13.5 x 3-4.5 μ . On leaves of Pseudotsuga taxifolia (Lam.) Britt., Cowichan Lake, leg. R.A.Waldie (V-561, V-2013, V-2014), Cultus Lake, leg. W.G.Ziller (H-1980, V-6468), Green Timbers, leg. J.E.Bier (H-1979, V-2012, V-2011), Hope, leg. W.D.Touzeau (0-7264), Kersaley, leg. G.E.Woolliams (H-1604), Pemberton, leg. W.D.Touzeau (0-7262), Saanichton, leg. I.Mounce (0-7263, 0-7265), Stanley Park, Vancouver, leg. R.E.Foster (V-2015), Vancouver Island and Fraser Valley (CPDS 1941).

3. Microthyriaceae

Perithecia flattened, or hemispherical, wall often lacking below, opening by a round pore at the apex, brown to black, membranaceous, often of radiating mycelium; aerial mycelium dark-colored or lacking; asci globose, ovate or clavate, fasciculate, usually eight-spored; spores variously shaped and colored; paraphyses lacking or present.

Spores one-celled.....Asterula

Spores two-celled.

Spores hyaline to greenish or yellowish.

Aerial mycelium present.....Asterella

Aerial mycelium lacking.

Spores unequally two-celled, yellowish.....Stigmatea

Spores equally two-celled, hyaline.....Microthyrium

Spores brown.....Asterina

Asterella Sacc.

Perithecia globose, depressed or lenticular, membranaceous; ostiole circular; seated on spots of black radiating subsuperficial mycelium; asci mostly eight-spored, globose or ellipsoid; spores two-celled, hyaline to subhyaline; paraphyses lacking.

Spores large, 9-12 x 3-4 μA. Gaultheriae

Spores smaller, 7.5-9 x 2-3 μA. Hellebori

A. Gaultheriae (Curtis) Sacc. (Plate I, fig. 22) Perithecia brown to black, flattened, slightly raised in the centre, hypophyllous, 170-300 μ diameter; mycelium brown, radiating around the base of the perithecium; asci ovate,

$21-25 \times 13-16.5 \mu$ (elongating at maturity), a paraphysate; spores hyaline, 2-celled, obovate, upper cell broader, $9-12 \times 3-4 \mu$. On leaves of Gaultheria Shallon Pursh., Crofton (H-1985).

* A. ?Hellebori Rehm (Plate I, fig. 23) Perithecia small, globose, black, membranaceous, $90-105 \mu$ diameter; surrounded at the base with septate, branched, brown hyphae; asci clavate, sessile, (18-) $36-45 \times 4.5-7.5 \mu$; a paraphysate; spores clavate, 2-celled, biseriate, hyaline, $7.5-9 \times 2-3 \mu$. On Astragalus Macounii Rydb., Cathedral Lakes (H-2007); no Asterella has been described on Astragalus, but this collection fits the above species.

Asterina Lev.

As Asterella, but spores brown.

A. rubicola Ell. & Ev. (Plate I, fig. 24) Perithecia epiphyllous, solitary or grouped, on yellow-brown indefinite spots, depressed-hemispherical, ostiole plane, $75-150 \mu$ diameter; asci oblong, sessile, $35-54 \times 12-16.5 \mu$; spores biseriate, ovate-ellipsoid, yellowish-brown, one-septate, upper cell broader, $12-16.5 \times 6-8 \mu$. On leaves of Rubus sp., Summerland, leg. G.E. Woolliams, det. I.L. Conners (O-3366, S-11, CPDS 1933).

Asterula Sacc.

As Asterella, but spores one-celled, hyaline.

Two collections key to this genus; in neither case was a description found to fit, but the scarcity of material prevents description as new species.

Asterula sp. On Phleum alpinum L., Cathedral Lakes (H-2009): Perithecia black, shiny, flattened, membranaceous, of radiating mycelium, surrounded

at base by hyaline hyphae, ostiole umbilicate, 85-150 μ diameter; asci cylindric-oblong, sessile, eight-spored, a paraphysate, 30-38 x 6-7.5 μ , spores hyaline, one-celled, narrow ellipsoid, oblique in the ascus, 7-9 x 1.5-3 μ .

On Potentilla diversifolia Lehm., Atlin District, leg. W.A. Setchell (H-1998): Perithecia superficial, black, shining, flattened, membranaceous, 90-150 μ diameter; asci sessile, oblong, a paraphysate, 36-45 x 15-18 μ , eight-spored; spores one-celled, greenish-hyaline, biseriate, ovate ellipsoid, granular, 12-15 x 6-7.5 μ . The perithecia are similar in appearance to those of Microthyrium arcticum Oudem., but asci are much broader and spores one-celled.

Microthyrium Desm.

Perithecia superficial, without aerial mycelium, shield-shaped, perforated at the centre, membranaceous, brown to black; asci cylindrical to obovate; spores oblong to fusoid, one-septate, hyaline; paraphyses mostly lacking.

Spores large, 15-25 μ long.....M. Juniperi

Spores smaller, not over 12 μ long.

Perithecia black and shiny, gregarious.....M. arcticum

Perithecia brown, dull, scattered.....M. microscopicum

M. arcticum Oudem. (Plate I, fig. 25) Perithecia superficial, gregarious on leaves, minute, 60-120 μ diameter, of radiating mycelium, membranaceous, black and shiny, ostiole a pore in the centre; asci a paraphysate, clavate, 33-45 (-50) x 7-9 (-12) μ ; spores biseriate, hyaline, one-septate, 9-10 (-12) x 1.5-3 (-4.5) μ . On Potentilla flabellifolia Hook., Cathedral Lakes (H-1999); Sibbaldia procumbens L., Garibaldi, leg. W. Cottle (H-2008).

M. Juniperi (Desm.) Sacc. (Plate I, fig.26, Plate VI, fig.28) Perithecia epiphyllous, superficial, dimidiate-lenticular, membranaceous, brown-black, ostiole minute in raised centre, $160-300 \mu$ diameter; asci broadly cylindrical, abruptly narrowed to a short stalk, eight-spored, (60-) 70-75 (-90) $\times 20-24 \mu$; spores hyaline to greenish, biseriate, one-septate, slightly constricted at the septum, upper cell broader, $15-25 \times 6-10.5 \mu$. On living leaves of Juniperus scopulorum Sarg., Soda Creek, leg. J.Bancroft (H-1976), Fort Steele, near Cranbrook, leg. A.K.Parker (H-1978); J. ?sibirica Burgsd., Soda Creek, leg. J. Bancroft (H-1977).

M. ?microscopicum Desm. Perithecia flattened, brown, $50-150 \mu$ diameter; of radiating mycelium; asci ovate-oblong, sessile, eight-spored (18-) 21-30 $\times 7-10$ (-12) μ , paraphysate; spores biseriate or irregular, elongate-ovate, hyaline, with one septum slightly nearer the lower end, $7.5-10 \times 2-3.5 \mu$. Two collections on Pteridophytes are doubtfully placed here; no other species fits as well, but this species is noted only on leaves of deciduous trees. On Dryopteris sp. (H-2010) and Polystichum munitum (Kaulf.) Presl. (H-2011), Stanley Park, Vancouver.

Stigmatae Fries

Perithecia smooth, superficial, membranaceous, ostiole minute; asci oblong, subsessile, eight-spored, paraphysate; spores ovoid-ellipsoid, unequally uniseptate, yellowish-hyaline.

S. Robertiani Fr. (Plate I, fig. 27) Perithecia scattered or grouped loosely, superficial, smooth and shining, $65-140 \mu$ diameter; asci oblong, sessile, broader below, $33-45 \times 10-14 \mu$; paraphyses scanty; spores

subbiseriate, uniseptate, upper cell broader, greenish, 12-14 x 4-6 μ .

On living leaves of Geranium pusillum Burm. f., Cultis Lake, leg.

H.H.Ross (H-1975).

HYPocreales

Perithecia globose, ovate, conical, cylindrical, fusoid, or flask-shaped, free or seated on or immersed in a fleshy stroma; bright-colored, white, yellow, red, brown, violet, ostiolate; wall membranaceous or fleshy; asci cylindrical, clavate or subovoid, four- to eight- (sixteen-) spored; paraphyses present; spores simple or compound, hyaline or colored, globose to filiform.

4. Nectriaceae

Perithecia free or seated on a stroma and cespitose; stroma often obscured at maturity by perithecia, but presence indicated by cespitose perithecia.

Stroma absent, perithecia free, scattered or gregarious.

Perithecia clavate, spores filiform, hyaline.....Acrospermum

Perithecia globose, conical or ovate, spores ovate, fusoid or elliptical.

Spores one-celled, ovate, yellow to brown.

Perithecia beaked.....Melanospora

Perithecia without beak.....Erostrotheca

Spores two-celled, hyaline, fusoid or elliptical.

Perithecia subepidermal, becoming erumpent-super-

ficial.....Nectriella

Perithecia superficial.....Nectria

Stroma present, perithecia cespitose on the stroma; spores two-celled,

hyaline.....Creonectria

Acrospermum Tode ex Fr.

Perithecia superficial, single or in small groups, fleshy-cartilaginous to coriaceous, horny when dry; creamy-white when young, at maturity honey-yellow to brown or brownish-black; elongate-clavate to subcylindric, sessile; asci long-cylindrical; paraphyses threadlike, longer than asci; spores filiform, nearly as long as the ascus.

A. compressum Tode. Perithecia brown to black, clavate, up to 3 mm. in length; asci cylindrical, $200-400 \times 4-7 \mu$, paraphysate; spores filiform, nearly as long as the ascus, hyaline. This fungus is retained in the Nectriaceae in Accordance with Bisby (1938: 45) and Wehmeyer (1950: 31); its status is probably close to the Coryneliaceae (Brandriff, 1936). On Draba Paysonii Macbr. var. Treleasii (Schulz.) Hitchc., Tenquille Lake, Pemberton, leg. W.Taylor (H-1817).

Erostrotheca Martin & Charles (1928)

Perithecia superficial, gregarious or scattered, globose-conical, beakless, glabrous, diaphanous; stroma absent; asci arising basally, evanescent, eight-spored; spores ellipsoid, yellow to olivaceous.

E. multiformis Martin & Charles. Perithecia gregarious or scattered, at first Capucine yellow changing to mahogany red with age; asci clavate, $20-25 \times 12-16 \mu$, a paraphysate, short stalked; spores irregularly biseriate,

elliptical, flattened on one side, dark citrine, olive-yellow in mass. Only the imperfect stage (Cladosporium album Dowson) noted; on Lathyrus sp. (CPDS 1952).

Creonectria Seaver (Nectria Fries in part)

Perithecia globose or subglobose, on or with bases immersed in a fleshy stroma, ostiole often depressed with age; asci cylindrical or clavate, eight-spored; spores uni- or biseriate or crowded, elliptical to fusoid, straight or curved, 1-septate, hyaline; paraphyses present or lacking.

Perithecia dull brick-red becoming brown or black with age, stroma tubercular, prominent.....C. purpurea
Perithecia scarlet or blood-red, becoming reddish-purple with age.

Spores elliptical with ends obtuse.

Perithecia collapsing with age, becoming truncate...C. pithoides

Perithecia entire, ostiole very prominent.....C. memmoidea

Spores fusoid with ends acute or subacute.

Spores narrow-fusoid, on deciduous trees.....C. coccinea

Spores broad-fusoid, on coniferous wood.....C. Cucurbitula

C. coccinea (Pers.) Seaver (Plate I, fig.28) Stroma yellowish, springing from the crevices of bark in irregular patches; perithecia cespitose in dense irregular clusters, or occasionally scattered, ovate with a prominent ostiole, bright red, smooth or minutely roughened, about 300μ diameter; asci cylindrical or clavate, eight-spored, $80-90 \times 8-10 \mu$; spores uniseriate, fusoid, $11-16 \times 3-6.8 \mu$. On bark of Acer macrophyllum Pursh., Cowichan Lake, leg. W.G.Ziller (O-26108, H-1825, V-3415), East Sooke, leg. W.G.Ziller

(0-26098, H-1824, V-3063); A. circinatum Pursh., Haney, leg. W.H.Ziller
 (0-23348, V-4503).

C. Cucurbitula (Sacc.) Seaver (Nectria Cucurbitula Sacc.) (Plate I, fig.29)

Perithecia in erumpent and irregular clusters, cespitose, bright red, later becoming reddish-purple, ovate with a prominent, obtuse ostiole, entire or rarely collapsing; asci cylindrical or clavate, $75-120 \times 6-8 (-13) \mu$; spores at first crowded and partially biseriate, finally uniseriate, oblique, broad-fusoid, one-septate, not constricted, hyaline, $14-22.5 \times 4.5-7 \mu$.

On bark of Abies grandis Lindl., Cowichan Lake, leg. I.Mounce and J.Curtis, det. I.L.Conners (0-1912, CPDS 1933).

C. mammoidea (Phil. & Plow.) Seaver (Nectria mammoidea Phil.& Plow.)

Perithecia cespitose or scattered, surrounding a brownish stroma, large, about 500μ diameter, ovate, ostiole large, obtuse, bright red with ostiole often darker, shining, entire; asci cylindrical or slightly clavate, $100 \times 7-8 \mu$, spores uniseriate or partially biseriate above, oblique, subfuscoid, one-septate, usually slightly unequal-sided, $18-20 \times 6-7 \mu$. Not seen, mentioned in North American Pyrenomycetes (Ellis & Everhart, 1892: 106), on bark of maple, B.C., Macoun.

C. pithoides (Ell.& Ev.) Seaver (Nectria pithoides Ell.& Ev.) (Plate I, fig.30, Plate VI, fig.29) Stroma erumpent, yellowish; perithecia seated on the stroma in dense clusters, bright red, collapsing to become truncate, resembling the head of a barrel with the ostiole appearing as a light translucent dot in the centre, $200-250 \mu$ diameter; asci cylindrical, $70-80 \times 5 \mu$; spores elliptical, one-septate, with an oil-drop in each cell, hyaline, $6-10 \times 3-4 \mu$. On bark of dead alder, Agassiz, leg. J.Macoun (OM-122, COTYPE),

described by Ellis and Everhart (1890: 247); Elk Lake, Vancouver Island, leg. J.Macoun (OM unnumbered, April 18, 1915), confirmed by J.Dearness.

C. purpurea (L.) Seaver (Nectria cinnabarina Fries) (Plate I, fig.31)

Stroma erumpent, tubercular, pinkish becoming darker with age; perithecia nearly globose, ostiole rather prominent, slightly collapsing, at first bright cinnabar-red, becoming darker with age to brown and occasionally black; roughened with coarse granules, $375-400 \mu$ diameter; asci clavate, $50-105 \times 7-12 (-15) \mu$; spores mostly biseriate, elliptical, elongated, one-septate, hyaline, slightly curved, $12-20 \times 4.5-7.5 \mu$; paraphyses delicate. On bark of various trees and shrubs: Acer macrophyllum Pursh., U.B.C. (H-1828, U-370), Victoria, leg. P.J.Salisbury (U-55); Alnus oregona Nutt., U.B.C., leg. H.Pepin (H-1815); Chaenomeles lagenaria Koidz., Japanese quince, North Vancouver, leg. S.Brown-John (H-1822); Choisya ternata HBK, Victoria (CPDS 1934); Ficus sp., U.B.C. (H-1827); Pyrus Malus L., Salmon Arm, leg. F.Dickson (H-216), South Canoe, leg. G.E.Woolliams (S-86); Rubus sp., raspberry, Saanichton, leg. J.Macoun (OM unnumbered, Aug.1, 1916); Spiraea Menziesii Hook., Sidney, leg. J.Macoun (OM-372, 373).

Creonectria sp. (Plate I, fig.32) On bark of trees, Hastings, April 12, 1889, leg. J.Macoun (OM-25); on the packet is written Nectria Macouniana E. & E. n.sp. but according to J.Dearness the name was never published.

The fungus most closely resembles Creonectria mammoidea (Phil. & Plow.) Seaver. Perithecia grouped on a yellow stroma, bright red, granular, $256-446 \mu$ diameter; collapsing pezizoid with age, ostiole prominent, smooth, darker red; asci cylindrical, $78-105 \times 9-12 \mu$; spores uniseriate, elliptical, uniseptate and slightly constricted at the septum, flattened on one side, $13-16.5 \times 6-7.5 \mu$.

Melanospora Corda

Perithecia superficial, without stroma, globose-pyriform, with a long neck, tipped with hairs and perithecia often hairy; asci broad-clavate, four- to eight-spored, evanescent; spores simple, brown.

Spores elliptical, flattened on one side, often curved.....M. papillata

Spores broad-elliptical, not flattened.....M. Townei

M. papillata Hotson (Plate I, fig. 33) Perithecia brown, fleshy, globose, papillate, 350-450 μ diameter; asci clavate, evanescent, 60-75 x 24-36 μ ; spores hyaline at first, becoming deep brown except for a hyaline tip or apiculum at each end, one-celled, ellipsoid, flattened and slightly curved on one side, 21-33 x 10-16.5 μ . Isolated from seeds of Phaseolus coccineus L., scarlet runner bean, Vancouver (0-14909); Vicia faba L., broad bean, New Westminster (0-18353); both isolated and determined by J.W.Groves.

M. Townei Griffiths (Plate I, fig. 34, Plate VI, fig. 30) Perithecia straw-colored, centre darkened by spore mass, globose, 200-330 μ diameter; neck elongate, 145 x 55 μ , bristled at the apex; asci early evanescent, ovate, eight-spored; spores at first hyaline, becoming dark brown, broad-ellipsoid to ovate, apiculate at each end, with a large guttule, 19.5-24 x 15-18.25 μ . On pressed specimens of Amaranthus sp., Windermere, leg. G.E.Woolliams (H-1826).

Nectria Fries

Perithecia superficial, free, scattered to crowded, globose, ovate-conical, ostiole papilliform, obtuse, or obscure; color whitish to reddish-purple; asci cylindrical or clavate, eight-spored; spores hyaline, one-

septate, ellipsoid, fusoid or fusiform.

Perithecia not collapsing, ostiole papillate.....N. galligena

Perithecia collapsing at maturity, ostiole obtuse.

Spores narrow-fusoid; on wood.....N. sanguinea

Spores broad-fusoid; on sphaeriaceous fungi.....N. episphaeria

N. episphaeria (Tode) Fr. (Plate I, fig.35) Perithecia gregarious or scattered, superficial, subovoid, bilaterally collapsing when dry, smooth, blood-red, perithecial wall composed of rather coarse cells, 150-250 μ diameter; asci cylindrical, 60-75 x 5-7 (-9) μ ; spores obliquely uniseriate, broad-fusoid, 9-12 x 4-6 μ , one-septate, hyaline. On Diaporthe columbiensis Ell. & Ev., Hastings, leg. J. Macoun (OM-32); Diatrype Macounii Ell. & Ev., Royal Oak, Vancouver Island, leg. J. Macoun (OM unnumbered, Sept. 29, 1914, April 8, 1915); Eutypella stellulata (Fr.) Sacc., U.B.C. (H-1829); Hypoxyton sp., and Melanconis thelebola (Fr.) Sacc., Cowichan Lake, leg. W.G. Ziller (0-26101, H-1820, V-3466, V-3557).

N. galligena Bres. (Plate I, fig.36) Perithecia dull red when dry, scattered, globose-conical, 500 x 370 μ ; asci clavate, stalked, 66-96 x 7.5-8 μ ; spores hyaline, one-septate, ellipsoid, uniseriate or partially biseriate, 15-18 x 4-5 μ . On apple and pear, Vancouver and Alberni (H-399, H-26, CPDS 1926, 1931, 1935, 1939, 1946).

N. sanguinea Fr. (Plate I, fig.37) Perithecia gregarious or scattered, superficial, ovoid, mostly entire, often collapsing when prematurely dried, smooth, blood-red, shining, about 200-275 x 250-300 μ ; ostiole obtuse but prominent; asci cylindrical, 60-75 x 6-7 μ ; spores obliquely arranged in the

ascus, uniseriate below, partially biserrate above, narrow fuscoid or sub-elliptical, one-septate, slightly constricted at the septum, granular, 10-12 (-15) x 4-5 (-6) μ . On old birch, Hastings, leg. J. Macoun (QM-34).

Nectriella Fckl.

Perithecia subepidermal, becoming erumpent, globose or subglobose; asci eight-spored, cylindrical or clavate, paraphysate; spores hyaline, one-septate.

Nectriella sp. (Plate I, fig. 38). The following three collections are somewhat immature, therefore cannot be placed in a species definitely.

On Arnica latifolia Bong., Cathedral Lakes (H-1972): Perithecia salmon pink, 210-240 μ diameter; asci clavate, paraphysate, 45-50 x 9-14 μ , filled with granular material, immature.

On Lupinus latifolius Agh. var. subalpinus (Piper and Robins.) C.P.Sm., Cathedral Lakes (H-2051): Perithecia pink to brownish, 200-270 μ diameter; asci 54-60 x 9-12 μ , clavate, paraphysate, filled with granular material, immature.

On Phlox diffusa Benth., Garibaldi, leg. W. Cottle (H-1816): Perithecia pink, 180 μ diameter or larger; asci clavate, paraphysate, 54-66 x 13-15 μ ; spores one-septate when mature, 13-18 x 6-9 μ , obliquely biserrate, ellipsoid, ends rounded.

5. Hypocreaceae

Stromata conspicuous, on the substratum or arising from a sclerotium, effused without definite margin, patellate, substipitate or erect; perithecia partially to entirely immersed in the stroma; asci cylindrical or clavate, eight- to sixteen-spored; spores subglobose to filiform, simple or compound,

hyaline or colored.

Stroma seated directly on the substratum, usually patellate or effused,
rarely clavate and erect.

Spores fusiform; usually on fleshy fungi.....Hypomyces

Spores filiform; on stems of grasses.....Epichloe (Typhodium)

Stroma springing from a sclerotium, usually erect and clavate,
rarely depressed.

Sclerotia formed in the bodies of insects or fruiting organs
of fungi.....Cordyceps

Sclerotia formed in the ovaries of plants.....Claviceps (Spermoedia)

Claviceps Tul. (Spermoedia Fries)

Sclerotia formed in the inflorescence of various grasses and sedges;
stromata developed from sclerotium, consisting of sterile stem and fertile
head, head subglobose, grayish, reddish-brown, or yellowish; perithecia
flask-shaped, immersed in the stroma with necks protruding; asci cylindrical,
eight-spored; spores filiform, simple, hyaline.

Sclerotia formed in ovaries of Carex spp., not over 15 mm. long...C. Grohii

Sclerotia formed in ovaries of wild and cultivated grasses, 1-2 cm.

long.....C. purpurea

C. Grohii Groves (Plate I, fig.39) Sclerotia blackish-violet, usually
curved, 5-15 x 1-3 mm.; stalk reddish brown, slender, twisted, .25-.5 x 4-15
mm., head globose, pinkish, ostioles darker red, .8-2.0 mm. diameter; peri-
thecia 150-300 x 100-150 μ ; asci cylindrical, short stalked, (100-) 125-
160 (-175) x 5-6 μ ; spores filiform, (75-) 90-125 x 1-1.5 μ . In ovaries of

Carex stellulata Good., Milner, leg. H.Groh (0-12072, TYPE), (Groves 1943: 608); Carex aff. festivella Mackenzie, Aldergrove, leg. H.Groh, det. J.W.Groves (0-12073).

C. purpurea Tul. (Spermoedia Clavus (DC.) Fr.) (Plate I, fig.40) Sclerotia hard, purplish-black, 1-2 cm. long; stromata 20-30 from a single sclerotium; stem slender, flexuous or spirally twisted, dark-brown; head subglobose, 1-2 mm. diam., reddish-brown; perithecia entirely immersed or slightly protruding, flask-shaped, 150-175 x 200-250 μ ; asci very long, cylindrical, 100-125 (-170) x 4-4.5 μ ; spores filiform. This species has been collected on many genera of grasses; it is a complex of biological races requiring cross-inoculation studies. In ovaries of Agropyron cristatum (L.) Gaertn., Agassiz, leg. W.Jones (H-269); Avena sativa L., (CPDS 1930); Bromus inermis Leyss. (CPDS 1930); Calamagrostis canadensis (Michx.) Beauv. (CPDS 1933); Elymus arenarius L., Kamloops, leg. V.Krajina (H-1530); E. canadensis L., Prairie Valley, Summerland, leg. G.E.Woolliams (S-13); E. condensatus Presl., Tranquille, leg. V.C.Brink (H-1551); E. glaucus Buckl., N.Saanich, leg. W.Jones (H-682); E. Macounii Vasey, Nicola Valley, leg. V.C.Brink (H-1559); Elymus sp., U.B.C., leg. D.Elvidge (H-978); Festuca elatior L., Fraser Valley, leg. W.Jones (H-270); Hordeum vulgare L., Saanich, leg. W.Jones (H-258, CPDS 1925, 1934, 1936); Lolium perenne L., Ladner, leg. W.Jones (H-259, CPDS 1934, 1945); Phleum pratense L., (CPDS 1930); Secale cereale L., Summerland, leg. G.E.Woolliams (S-231); Triticum aestivum L., (CPDS 1930).

Cordyceps (Fr.) Link

Stromata springing from the sclerotium within bodies of insects or in other fungi, simple or branched, clavate; perithecia more or less immersed;

asci cylindrical, eight-spored; spores filiform, many-septate and breaking into segments in the ascus or simple and entire.

C. myrmecophila Ces. On ants, Vancouver, leg. J. Davidson, not seen (Mains 1947).

Epichloe (Fr.) Tul. (Typhodium Link)

Stroma effused, subfleshy, pale becoming bright orange, forming rings or sheaths about the stems of grasses; perithecia immersed or with ostioles protruding; asci cylindrical, eight-spored; spores filiform, many-septate.

E. typhina (Pers.) Tul. (Typhodium typhinum (Pers.) Seaver) Stroma effused, subfleshy, at first pale, becoming bright orange, perithecia thickly scattered, partially to entirely immersed, soft, membranaceous, orange, ostiole prominent; asci cylindrical, very long, eight-spored; spores nearly as long as the ascus, in a close fascicle, about 2μ diameter, many-septate. On Holcus lanatus L., U.B.C., leg. H. Toms (H-1823). Mature stromata have never been collected; although the immature stage has been noted and watched through the year, perithecia were not formed.

Hypomyces (Fr.) Tul.

Stroma of effused, cottony subiculum, parasitic on fleshy fungi; perithecia numerous, usually thickly scattered and immersed in the subiculum; asci cylindrical, eight-spored; spores fusoid or fusiform, usually with an apiculus at each end, one-septate, hyaline, smooth or rough.

Stroma entirely covering and transforming the hymenium of Lactariae; perithecia immersed.....H. Lactifluorum
 Stroma forming interrupted patches on fungi of various kinds; perithecia subsuperficial.....H. aurantius

H. aurantius (Pers.) Tul. (Plate I, fig.41, Plate VI, fig.31) Subiculum effused, at first whitish, becoming orange or rust-colored; perithecia thickly gregarious or crowded, orange, subconical, with the ostioles strongly protruding; asci cylindrical, spores slightly overlapping, 126-160 x 4-7 μ ; spores fusiform, usually a little curved, one-septate, with a short apiculus at each end, becoming strongly verrucose at maturity, 22-27 x 4-6 μ . On Fomes pinicola (Fr.) Cke. on Tsuga heterophylla (Raf.) Sarg., Hope, leg. W.G.Ziller (H-1818, V-6014); Polyporus resinosus Fr., on Tsuga heterophylla (Raf.) Sarg., Wigwam, Revelstoke, leg. W.G.Ziller, (H-1819, V-6556); Polyporus sp., on Tsuga heterophylla (Raf.) Sarg., Martha Creek, Revelstoke, leg. W.G.Ziller (H-1821, V-6568, V-6581).

H. Lactifluorum (Schw.) Tul. (Plate I, fig.42) Subiculum thin, effused, covering the hymenium and stem of the host and entirely obliterating the gills, bright orange, changing to bright purple as the host decays; perithecia thickly scattered, immersed or with necks slightly protruding, a little darker than the subiculum; asci very long, cylindrical; spores uniseriate, ends overlapping, fusiform with an apiculus at each end, slightly curved or unequal-sided, one-septate, hyaline, strongly roughened at maturity, 35-45 x 6-8 μ , oozing from the perithecia and forming a white powder over the surface of the stroma. On Lactaria sp., Savary Island, leg. M.Herchmel (H-975), Hatzig, leg. W.Jones (0-3994).

DOTHIDEALES

Stroma always present, brown or black throughout or white within; perithecia lacking, asci in locules in the stroma which lack a definite

wall; stroma elongated, round, or several stromata coalescing to form an irregular mass; true paraphyses lacking, rather pseudoparaphyses filling the locule with asci growing up into them; asci clavate or cylindrical, stalked; spores variously shaped and colored.

6. Dothideaceae

Characters those of the order.

Spores unicellular.....Phyllachora

Spores two- to several-celled.

Spores uniseptate, hyaline to yellowish.

Stromata large and prominent, erumpent from branches of trees.....Dibotryon

Stromata smaller and thin, on leaves and stems of herbaceous plants.

On leaves of Trifolium spp.; a paraphysate, spores with yellowish tint.....Cymadothea

On Monocotyledons; paraphysate, spores hyaline..Endothella

Spores muriform, brown.....Cucurbitothis

Cucurbitothis Petrk

Stromata crust-like, variously shaped; perithecia seated in the stroma, globose, broad papillate, black; asci cylindrical, stalked, eight-spored; spores uniseriate, oblong, muriform, yellow-brown.

C. pithyophila (Fr.) Petrk (Plate II, fig.1) Perithecia carbonaceous, on a black stroma; asci cylindrical, 120-135 x 9-11 μ ; spores olive-brown,

3-5-septate with 1-2 vertical septa, 17.2-20.6 x 6-8 μ . On Pinus monticola Dougl., Nakusp, leg. R.W.Davidson (H-1835, V-6749); Shawnigan Lake, leg. R.E.Foster, et al., (H-1833, V-5750, O-26771); Victoria Watershed, leg. A.K.Parker (H-1834, V-6728).

Cymadothea Wolf

Stroma innate, erumpent, dothideoid, brown; perithecia imbedded in the stroma, irregularly dehiscent, spherical to ampulliform; asci clavate, aparaphysate, eight-spored; spores two-celled, subhyaline to honey-yellow. C. Trifolii (Pers.) Wolf (Wolf 1935: 71) Perfect stage not collected; Polythrincium Trifolii stage causing sooty blotch of clover. On Trifolium hybridum L., T. pratense L., and T. repens L., Vancouver Island and Fraser Valley, not seen (H-1586, H-370, H-354, H-218, H-353, H-371; CPDS 1930, 1935, 1936, 1937, 1939, 1940.).

Dibotryon Theiss. & Syd. (Plowrightia Sacc.)

Stroma convex-pulvinate, confluent, black coriaceous; asci elongated, eight-spored; spores ovoid to oblong, two-celled, hyaline to light green.

D. morbosum (Schw.) Theiss. & Syd. (Plowrightia morbosa (Schw.) Sacc.) (Plate II, fig.2, Plate VI, fig.32) Perithecia partially erumpent from the black stroma; asci clavate, 75-100 x 13-15 μ ; spores ovate-oblong, uniseptate, lower cell much smaller than upper, 15-18 (-24) x 7.5 μ . On Prunus armeniaca L. var. Anda, Agassiz, leg. R.E.Fitzpatrick (O-19794); Prunus demissa (Nutt.) Walp., Australian, Cariboo, leg. W.Jones (H-667), Vernon (H-1837), Keremeos leg. R.P.Murray (S-280, CPDS 1939); Prunus sp., Cowichan Bay (H-1534), Spence's Bridge (U-426), Clinton (U-357); on wild and cultivated plum and cherry (CPDS 1926, 1933, 1937, 1943, 1944, 1945, 1946, 1947). (Stace-Smith 1950).

Endothella Theiss. & Syd.

Parasitic, stromata simple or compound, ostiole present; asci cylindrical to broadly ellipsoid, paraphysate; spores hyaline, two-celled.

E. Tracyi (Ell. & Ev.) Theiss. & Syd. Immature, no asci present. On Distichlis stricta (Torr.) Rydb., Oliver, det. I.L. Conners (O-15234).

Phyllachora Nitsch.

Parasitic, simple or compound, perithecia with clypeus conspicuous in one or both leaf surfaces; ostiole present; paraphyses filiform; asci cylindrical to broadly ellipsoid; spores one-celled, hyaline. (Orton, 1944)

Spores medium sized, 9-13 μ long; clypei elliptical to linear in outline.....P. graminis

Spores large, 12-20 μ long; clypei circular to oval in outline.....P. silvatica

P. graminis (Pers.) Fckl. (Plate II, fig.3) Stromata numerous; asci cylindrical, 90-95 x 9 μ ; spores unicellular, hyaline, 9-13 x 4.5-7.5 μ . On Dactylis glomerata L., Harrison Lake (H-1836); Elymus condensatus Pres., U.B.C. (H-1832); ?Poa sp., Lulu Island, leg. B.Lawson (H-1831), Kamloops, leg. J.Macoun (OM-154).

P. silvatica Sacc. & Spieg. (Plate II, fig.4) Stromata oval, with few perithecia; asci broadly cylindrical, 90-105 x 12-15 μ ; spores 12-16.5 x 7.5-9 μ . On Festuca rubra L., Sidney, leg. W.Jones (H-760).

Dothideaceae indet. (Plate II, fig.5) According to Theissen & Sydow's classification (Saccardo 1926: 535, 551) this specimen falls into the

genus Phragmodothella, except that paraphyses are lacking in that genus; it does not fit either of the two species given there. Stromata elongate, black; perithecial locules 120-200 μ diameter, walls light brown; paraphyses numerous; asci cylindrical, 60-78 x 7.5-9 μ ; spores 1-7 in an ascus, uniseriate, three-septate, hyaline or greenish, with a large guttule in each cell, 15-18 x 7-8 μ . On decorticated wood, Cathedral Lakes (H-1838).

SPHAERIALES

Perithecia (generally) with distinct, rounded, sometimes elongated ostioles, membranaceous to carbonaceous, not fleshy-fragile, brown to black; stroma, if present, dark outside, mostly white within, perithecial walls distinct; asci variously shaped, stalked or sessile, with or without paraphyses; spores of various shapes and colors.

7. Chaetomiaceas

Perithecia superficial, free or seated on superficial mycelium, colored or black; ostiole rounded, plane, sometimes lacking, clothed with characteristically straight, branched, or spirally wound hairs; asci clavate or cylindrical, stalked, eight-spored, evanescent; spores one-celled, mostly broad-ellipsoid and short apiculate (lemon-shaped), dark colored, smooth; paraphyses none.

Chaetomium Kunze

Characters those of the family.

- Hairs light yellow-green, terminal ones of straight and spiral mixed.....C. cochlioides
 Hairs brown, terminal ones in a tight spiral.....C. spirale

C. cochlioides Palliser (Chivers 1915: 204) (Plate II, fig.6) Brilliant yellow-green; lateral hairs numerous, roughened; terminal hairs straight and tapering or loosely spirally twisted; asci club-shaped, eight-spored, $88 \times 11 \mu$, p.sp. 32μ ; spores olive-brown, lemon-shaped, apiculate at both ends, $8-10 \times 6-8 \mu$, compressed, with edge $4.5-6 \mu$. On cardboard and paper towelling in moist chamber, collected Duncan (H-1904).

C. ?spirale Zopf (Plate II, fig.7, Plate VI, fig.33). Perithecia ovate, dark brown to black, $150-300 \mu$ diameter, seated on dark olive-yellow to brown rhizoids; lateral hairs nearly straight, dark olive-brown; terminal hairs rich olive-brown, roughened, spirally coiled; asci clavate, p.sp. $34-43 \mu$ long, spores lemon-shaped, ovate or spherical, olive-brown, $6-12 \times 5.5-9 \mu$, edgewise $5.5-7 \mu$ broad. What comes most nearly to this species was found on decaying plant remains of Oxyria digyna (L.) Campptdera, Cathedral Lakes (H-1905).

8. Sorderiaceae

Perithecia either superficial, free or more or less deeply sunken in the substrate, with or without a stroma, membranaceous or fragile, dark colored; ostiole distinct, round, without a tuft of hair; asci cylindrical, stalked, 8- to many-spored; spores one- to several-celled, often with membranaceous sheath and appendages, brown; paraphyses present. Spores one-celled, with or without hyaline sheath or appendages.

Perithecia beneath a black crusty stroma.....Hypocopra

Perithecia lacking stroma, immersed or superficial.

Perithecia with stout, spiny neck; spores oblong-elliptic, pale brown.....Acanthorhynchus

Perithecia globose or conical, without spines; spores dark brown, ellipsoid.....Sordaria

Spores at first long cylindrical, hyaline, guttulate, appendaged, at maturity with upper part swollen, dark brown, lower part as hyaline primary appendage.....Bombardia

Acanthorhynchus Shear

Perithecia submembranaceous, scattered, buried, beaked; beak spiny, ostiolate; asci eight-spored, paraphysate; spores one-celled, brownish-yellow.

A. vaccinii Shear (1907) (Plate II, fig.8, Plate VI, fig.34) Perithecia amphigenous, scattered, subglobose, to flask-shaped, submembranaceous, 120-200 μ diameter; neck stout, ostiolate, 1/3 to 1/2 the length of the perithecium, with black, nonseptate spines, 50-70 x 8-9 μ at base; asci subellipsoid, subsessile, eight-spored, 120-155 x 24-44 μ ; paraphyses septate, exceeding the asci; spores oblong-elliptic, one-celled, pale brownish-yellow, 24-32 x 12-18 μ . On leaves of Vaccinium Oxyccocos L., Lulu Island, leg. A.Szczawinski (H-1926).

Bombardia Fries

Perithecia superficial, clustered, coriaceous; asci perforate at apex, with refractive globule in the upper end; spores when young long cylindrical, hyaline, bent, guttulate, with tapered appendage at each end; at maturity, upper end of spore swollen, dark brown, cut off by a septum, lower part remaining as hyaline primary appendage, secondary appendages frequently broken off.

B. ambigua (Sacc.) Wint. var. carbonaria Rehm. (Plate II, fig. 9) Perithecia grouped, coriaceous, covered with short brown hairs, with longer hyphae at base, oblong, $800 \times 500 \mu$; asci cylindrical, long stalked, p.sp. $160-210 \times 15-19 \mu$, eight-spored; paraphyses long, branched; spores at first cylindrical, bent, with many guttules, hyaline, appendage at both ends, at maturity spore brown, ellipsoid, $18-21 \times 9-10.5 \mu$, primary appendage cylindrical, curved, $38-44 \times 5 \mu$, secondary appendages long and slender. On wood covered with sand, U.B.C. (H-1923).

Hypocopra Fries

Perithecia situated below a black crusty stroma with projecting, usually papilliform beaks, completely surrounded by a dense feltwork of white mycelium by which they are firmly attached to the substratum; asci containing an apical structure which stains, eight-spored, cylindrical or clavate; paraphyses filiform to tubular; spores ellipsoid, dark colored, surrounded by a prominent gelatinous envelope and containing a lateral germ slit.

H. gigaspora (Ell. & Ev.) Griffiths (Coprolepa gigaspora Ell. & Ev.) Perithecia very large, scattered or aggregated in small clusters, sunken, with the short papilliform black smooth beak erumpent through the smooth black convex shield-shaped stroma, about $.75 \times 1$ mm., membranaceous to coriaceous, colorless to brown and densely covered with a fine white mycelium which becomes gradually differentiated above into a true stroma; asci eight-spored, cylindrical, broadly rounded above and abruptly contracted below into a short triangular base, $55-52 \times 375-480 \mu$; apical structure very prominent and staining bright blue with iodine; paraphyses tubular to filiform, tapering upward, septate, coarsely guttulate, longer than the asci;

spores obliquely uniserial, ellipsoid to oval and broadly rounded at the ends, $24-28 \times 52-61 \mu$; ranging from hyaline when young through yellow to dark brown and opaque, tipped below with a short blunt hyaline apiculum; germ slit lateral, rather indistinct, extending nearly the entire length of the spore, surrounded by a hyaline gelatinous zone. On cow dung, Rocky Mountains, British Columbia, June, 1897, Macoun, No. 684. (Ellis and Everhart 1898: 501; Griffiths 1901: 93).

Sordaria Ces. & de Not.

Perithecia scattered or aggregated, superficial or sunken, membranaceous or coriaceous, dark and opaque; asci apically perforated; spores one-celled, usually dark brown and surrounded by a gelatinous hyaline covering.

Asci eight-spored; perithecia bare or covered with brown flexuous hyphae.

Spores without apiculum or appendages; surrounded by a gelatinous sheath.....S. fimicola

Spores with minute appendage or second cell at base, lacking gelatinous sheath.....S. hypocoproides

Asci 128-spored; perithecia covered with straight, septate brown hairs.....
.....S. setosa

S. fimicola (Rob.) Ces. & de Not. (Plate II, fig. 10) Perithecia bare, neck conical; asci eight-spored, cylindrical, $140-160 \times 16-19 \mu$, aplanospore; spores obliquely uniserial, $16-23 \times 11-13 \mu$, surrounded by hyaline gelatinous sheath, germ pore circular, basal. Isolated from seeds of Cucurbita maxima Duch., squash, by J.W. Groves, Grand Forks (0-14958); from seeds of Daucus carota L., by J.W. Groves, Okanagan Mission (0-14282); on horse dung in moist chamber, U.B.C. (H-1924).

S. hypocoprooides Speg. (Plate II, fig.11) Perithecia scattered or in small clusters, nearly superficial, pyriform, $450-700 \times 320-370 \mu$, nearly bare or with brown flexuous hyphae to the base of the papillate neck, coriaceous, dark brown to black; asci eight-spored, cylindrical, $230-260 \times 20-25 \mu$; stipe 50μ long; paraphyses filiform, septate; spores obliquely uniserial, ellipsoid, $25-36 \times 13-20 \mu$, broadly rounded above, slightly truncate below, with a papilliform hyaline basal cell, $5-6 \times 6-9 \mu$, without any hyaline, gelatinous sheath or appendages. Isolated from seeds of Raphanus sativus L., det. R.F.Cain, Grand Forks (0-13539).

S. setosa Winter (Plate II, fig.12) Perithecia superficial, pyriform, $600-800 \times 400-500 \mu$, membranaceous, greenish-brown, neck papillate, $200-250 \mu$ long; covered with straight, septate, brown, hyaline-tipped hairs, $100-150 \times 3-5 \mu$; asci 128-spored, fusiform-clavate, $300-360 \times 65-85 \mu$, stalk short; paraphyses longer than asci; spores in several series, ellipsoid, $19-24 \times 11-26 \mu$, broadly rounded at the ends, hyaline to dark brown; primary appendage $11 \times 3 \mu$, slightly clavate, long slender secondary appendages at each end; germ pore apical, circular. Isolated from seed of Beta vulgaris L., mangold, det. R.F.Cain (0-15185).

9. Trichosphaeriaceae

Perithecia superficial, mostly coriaceous to carbonaceous, clothed with bristles or hairs, often surrounded by filamentous hyphae bearing conidia or seated on a subiculum; stroma lacking; asci cylindrical or clavate, eight-spored; paraphyses usually present; spores one to several-celled, hyaline or dark colored.

Spores one-celled, hyaline.....Trichosphaeria

Spores more than one-celled.

Spores two-celled, hyaline to greenish-brown.

Perithecia seated on black, septate mycelium which covers
the entire lower surface of the leaf.....Apiosporina

Perithecia superficial on leaf, thickly covered with spines.....
.....Coleroa

Spores (two-) mostly several-celled, pale to dark brown.

Perithecia coriaceous to subcarbonaceous; paraphysate.....
.....Herpotrichia

Perithecia membranaceous to subcoriaceous; a paraphysate.....
.....Herpotrichiella

Apiosporina Hohnel

Perithecia black, globose, crowded on a thick black subiculum covering
lower leaf surface; asci eight-spored, paraphysate; spores hyaline- to
greenish, two-celled.

A. Collinsii (Schw.) Höhn. (Plate II, fig.13) Mycelium brown-black, septate,
crustaceous, covering the entire lower leaf surface; perithecia black,
globose, crowded, 150-160 μ diam.; asci cylindrical-clavate, eight-spored,
45-60 (-68) x 10-12 μ ; spores hyaline to greenish, unequally two-celled,
ovoid, 12-15 x 4-7 μ . On leaves of Amelanchier alnifolia Nutt., Wire Cache,
leg. D.C.Buckland (U-606, U-659); A. florida Lindl., Fort St. James, leg.
G.E.Woolliams (O-7822), Macalister, leg. J.M.Macalister (H-671), N.Saanich,
leg. W.Jones (H-358, Prince George, leg. W.E.Ziller (O-25180, V-5969),
Amelanchier sp., Cache Creek, leg. M.J.Short (V-4846), Pemberton, leg. N.S.
Wright (H-1930), Quesnel, leg. N.S.Wright (H-1513), Vernon, leg. V.Krajina
(H-1528).

Coleroa (Fr.) Rab.

Perithecia superficial, membranaceous, spiny; asci not thickened at apex, oblong, mostly curved, paraphysate; spores two-celled, greenish to yellow-brown.

Asci 65-75 (-120) x 15-21 μ ; spores 15-21 x 6-7.5 μC. Oxyriæ

Asci 40-54 x 9-12 μ ; spores 9-13 x 4-6 μC. Chaetomium

C. Chaetomium (Kunze) Rab. (Plate II, fig.14) Perithecia superficial, in small clusters, globose, membranaceous, covered with stiff bristles; asci oblong, sessile, eight-spored, 40-54 x 9-12 μ ; paraphyses indistinct; spores biseriate, oblong, two-celled, lower cell smaller, greenish brown, 9-13 x 4-6 μ . On leaves of Rubus parviflorus Nutt., U.B.C. (H-1922).

C. Oxyriæ Rostr. (Plate II, fig.15, Plate VI, fig.35) Perithecia globose, superficial, 200 μ diameter, coriaceous-membranaceous, covered with dark sharp-pointed bristles; asci obclavate, with a short foot, 66-75 (-120) x 15-21 μ ; paraphyses branched; spores greenish-grey, two-celled, lower cell smaller, 15-21 x 6-7.5 μ . On dead leaves of Oxyria digyna (L.) Campyderis, Cathedral Lakes (H-1905).

Herpotrichia Fckl.

Perithecia superficial, spherical or depressed, coriaceous to subcarbonaceous, hairy or glabrous; asci clavate, paraphysate; spores fusiform or oblong, one- to several-septate, brown.

H. nigra Hartig (Plate II, fig.16) Perithecia spherical, 250-450 μ diameter, semi-immersed in a dark brown, felt-like subiculum; asci clavate, (105-) 128-155 (-180) x (10-) 14-18 μ ; paraphyses filiform; spores irregularly biseriate,

ellipsoid-oblong, at first one- to three-septate and hyaline, later three-septate, olivaceous-brown, more or less constricted at septa, 21-33 x (6-) 8.5-9 (-10) μ . On living leaves of Abies amabilis (Dougl.) Forbes, Terrace, leg. W.G.Ziller (H-1914, V-6498); A. grandis Lindl., Shawnigan Lake, leg. J.Roff (H-65), Jordan River, leg. D.C.Buckland (H-1913, V-2952); A. lasiocarpa (Hook.) Nutt., Mt. Revelstoke, leg. D.C.Buckland (0-19289, U-398), leg. G.P.Thomas (H-1912, V-5675); Picea sitchensis (Bong.) Carr., Queen Charlotte Islands, leg. R.E.Foster (V-1821); Tsuga heterophylla (Raf.) Sarg., Mt. McPherson, leg. D.C.Buckland (U-635).

Herpotrichiella Petrak

Perithecia superficial, subcoriaceous, globose, covered on all sides by spines or setae, which are brownish-black, septate, acuminate; ascii oblong-clavate, eight-spored, a paraphysate; spores subbiseriate, ovate-oblong, brown, three-septate.

Herpotrichiella sp. (Plate II, fig.17) Perithecia black, membranaceous, superficial, on twigs, covered with brown, septate, anastomosing hyphae which form a subiculum, globose with a minute ostiole, about 210 μ diameter; ascii oblong-ovate, sessile or short-stalked, eight-spored, a paraphysate, 60-75 x 30-36 μ ; spores dull brown, three-septate, slightly constricted at the septa, curved, guttulate, 30-33 x 9-12 μ . On Abies amabilis Lindl., Cowichan Lake, leg. R.E.Foster (H-2337, V-2491). This collection is exceedingly puzzling: it is similar to Melicla in subiculum, but the perithecium is ostiolate; the perithecium, except for subiculum, and ascus shape would place it in Mycosphaerellaceae; the spores are similar to some of Leptosphaeria. It most nearly fits into the genus Herpotrichiella, where it is placed for the present, but the only species described under

that genus does not fit this collection.

Trichosphaeria Fckl.

Perithecia small, superficial, membranaceous or sometimes of firmer, subcarbonaceous texture, spherical or ovate, hairy or bristly; asci oblong or cylindrical, eight-spored, paraphysate; spores oblong, ovate or cylindrical, continuous, hyaline.

T. breviseta Dear. (Plate II, fig. 18) Perithecia black, crowded, appearing to the naked eye as a continuous stratum, three but not quite four to the lineal mm., globose-conic; bristles 15-20 μ , usually limited to the basal half of the perithecium; asci linear, 50-75 μ , shorter than the abundant paraphyses; spores uniseriate, nucleate at each end, hyaline, 6-7 x 3-3.5 μ . On rotten coniferous wood, Victoria, April, 1915, John Macoun (Dearness 1916: 99). A collection on bark of Betula papyrifera Marsh, Silver Creek (H-2331) appears to be this species. Perithecia 160-200 μ diameter, ostiole papillate, gregarious with basal spines forming a thin subiculum; asci cylindrical, 60 x 4-5-6 μ ; spores uniseriate, hyaline to greenish, 7-8 x 1.5-3 μ , two- to three-guttulate, unicellular.

10. Melanommaeae

Perithecia globose to conical, superficial, carbonaceous or woody, occasionally coriaceous, smooth walled or short spiny, asci cylindrical or clavate, eight-spored; paraphyses usually present; spores one- to several-celled, hyaline or dark.

Spores one-celled, dark brown.

Perithecia covered with short spiny hairs.....Coniochaeta

Perithecia smooth.....Rosellinia

Spores two- to several-celled, hyaline or brown.

Perithecia rough-tubercular; spores two-celled, hyaline.....Bertia

Perithecia smooth; spores two- to several-celled, brown.....Melanomma

Bertia de Not.

Perithecia superficial or nearly so, irregular in shape, coriaceous-carbonaceous, surface tubercular or coarsely wrinkled, glabrous, black; asci clavate, four- to eight-spored; spores elongate, subcylindrical, uniseptate, hyaline; paraphyses present.

B. moriformis (Tode) de Not. (Plate II, fig.19, Plate VI, fig.36) Perithecia crowded, superficial, ovate-globose, surface coarsely tubercular-roughened, 500-800 μ diameter; asci elongate-clavate, stalked, 130-165 x 14-16 μ , eight-spored; spores crowded, hyaline, fusoid-cylindrical, curved, with two guttules, uniseptate, 25-40 (-52) x 6-7 μ . On bark of Alnus sp., Vancouver Island, leg. J.Macoun (OM unnumbered, Feb.10, 1915).

Coniochaeta Sacc.

Perithecia superficial, covered on the upper part with spiny hairs; asci cylindrical, eight- to many-spored; spores uniseriate, dark, one-celled, slightly discoid, germ slit elongated.

C. leucoplaca (Berk. & Rav.) Cain (Plate II, fig.20) Perithecia superficial, minute, covered with straight, dark brown, pointed hairs 30 x 4 μ ; asci eight-spored, perforate at the apex; paraphyses filiform; spores obliquely uniseriate, discoid, 7-9 x 6-8 x 5-6 μ , with an elongated germ slit in the narrow face, surrounded by a narrow gelatinous sheath. On cardboard in moist chamber, collected Duncan (H-1931); on horse dung, U.B.C. (H-1925).

Melanomma Fckl.

Perithecia gregarious or scattered, superficial or erumpent, carbonaceous, black, glabrous, spherical or ovate; asci cylindrical or clavate, eight-spored; spores oblong or fusoid, two- to several-celled, brown.

Spores small, $10-12 \times 3-5 \mu$, crowded biseriate.....M. parasiticum

Spores larger, 15μ long and over.

Second cell of spore somewhat enlarged, spores $18-28 \times 6-10 \mu$

.....M. cinereum

Second cell not noticeably enlarged, spores $15-18 \times 4-6 \mu$

.....M. pulvis-pyrius

M. cinereum (Karst.) Sacc. (Plate II, fig. 21) Perithecia gregarious, attached to inner bark and erumpent through epidermis, becoming free, spherical, black, $200-400 \mu$ diameter; ostiole papillate or umbilicate; asci cylindrical-clavate, $120-150 \times 10-12 \mu$; paraphyses filiform; spores uniseriate or partly biseriate, oblong, obtuse, 3- (5-) septate, second cell enlarged, constricted at the septa, greenish-hyaline, then yellow, $18-28 \times 6-10 \mu$. On Salix babylonica L., North Vancouver, leg. S.Brown-John (H-1927).

M. parasiticum Ell. & Ev. (Plate II, fig. 22) Perithecia scattered or gregarious, superficial, ovate-hemispherical, $110-165 \mu$ diameter, rough, black; ostiole papillate; asci oblong-cylindrical, $40-60 \times 8-12 \mu$, sessile, aplanospore; spores crowded-biseriate, gray-brown, oblong-fusoid, three-septate, slightly constricted at the septa, $10-12 \times 3-5 \mu$. On stromata of Diatrype sp., on rotten wood, Comox, leg. J.Macoun (OM unnumbered, May 3, 1887).

M. pulvis-pyrius (Pers.) Fckl. (Plate II, fig.23) Perithecia crowded, sometimes scattered, superficial, spherical or ovate, wrinkled or roughened, black, carbonaceous, 400μ diameter; ostiole papillate; asci cylindrical to subclavate, stalked, eight-spored, $80-125 \times 6-9 \mu$; paraphyses filiform; spores uniseriate, oblong, straight or curved, three-septate, constricted at the septa, brownish, $(10-) 15-18 \times 4-6 \mu$. Common on dead wood; on Alnus oregonia Nutt., Cowichan Lake, leg. W.G.Ziller, det. R.Horner (O-26114, V-3460, H-1919); Corylus californica (A.DC.) Rose, Goldstream Park, leg. W.G.Ziller (O-26094, V-3507, H-1920); on Vaccinium corymbosum L., Lulu Island, leg. R.Stace-Smith (O-26185, H-1917); on dead wood, Duncan (H-1906), U.B.C. (H-1918), Cathedral Lakes (H-1916).

Rosellinia Ces. & de Not.

Perithecia superficial, occasionally with bases sunk in the substrate, coriaceous or carbonaceous; spherical or ovate, black, bare, ostiole distinct; asci cylindrical, eight-spored; paraphyses filiform; spores ellipsoid, oblong or fusiform, one-celled, brown or black.

On scales of pine cones; spores $8-12 \times 6-7 \mu$R. obliquata var. Americana
On dead wood.

Spores $8.8-15 \times 6-7.5 \mu$, without appendages.....R. ovalis

Spores $18-23 \times 6-7 \mu$, with a short ($6-8 \mu$) hyaline appendage at each end.....R. thelena var. pinea

R. obliquata (Somm.) Sacc. var. Americana Ell. & Ev. (Plate II, fig.24)
Perithecia gregarious, $200-400 \mu$ diameter, depressed-globose, ostiole acutely papillate; asci cylindrical, $(90-) 120-130 \times 6-7 \mu$; spores uniseriate, ellipsoid, brown, one-celled, $8-12 \times 5-7.5 \mu$; paraphyses filiform. On scales

of dead cones of Pinus ponderosa Dougl., Vernon (H-1907). This collection has spores approaching the size of the species ($10-12 \times 7 \mu$, Winter 1887: 229), but the perithecia are not obliquely attached.

R. ovalis (Ell.) Sacc. (Plate II, fig. 25) Perithecia superficial, globose, carbonaceous, $200-300 \mu$ diameter; asci long cylindrical, $90-125 \times 7-9 (-10) \mu$; paraphyses broad band-like; spores uniseriate, oblong-ellipsoid, somewhat flattened, with a longitudinal germ slit, $8.8-15 \times 6-7.5 \times 5-6 \mu$, dark brown. On dead branches of Artemisia tridentata Nutt., Princeton (H-1909).

R. thelena (Fr.) Rab. var. pinea Sacc. Perithecia scattered or gregarious or sometimes crowded, spherical, with a strongly papilliform ostiole, smooth, thin and brittle, brownish-black, about 1 mm. diam., seated on a superficial, loosely adhering, densely interwoven but thin, brownish-purple subiculum; asci cylindrical, stipitate, eight-spored, $90-130 \times 8-9 \mu$ (p.sp.), with conglutinated paraphyses; spores uniseriate, oblong, sub-inequilateral, brown, $18-23 \times 6-7 \mu$, with a short ($6-8 \mu$), hyaline, spine-shaped appendage at each end. Sent from British Columbia by Dr. Macoun. (Ellis and Everhart 1892: 166). Not seen.

II. Ceratostomataceae

Similar to Melanommaeae. Perithecia more coriaceous than carbonaceous, with more or less elongated beaks, often very long and hairlike; asci ovate, clavate, or cylindrical, often evanescent before spores mature; spores variously shaped and colored.

Ceratostomella Sacc.

Perithecia superficial, free or slightly sunk in the substrate, globose,

beak long and hairlike; asci ovate, eight-spored, early evanescent; spores oblong, blunt or pointed, one-celled, hyaline.

Ceratostomella sp. (Plate II, fig. 26) On *Pinus monticola* Dougl., Silverton, leg. A.K.Parker (H-1915). This collection comes nearest to C. sphacrosperma (Fckl.) Sacc., but does not agree completely with that species. Perithecia black, carbonaceous, superficial, globose, 240-340 μ diameter; beak obtuse at apex, 320-540 x 65-70 μ ; asci not seen; spores hyaline, clustered together, when emitted forming a drop at tip of estiole, globose to ovate, 1.5-3 μ .

12. Cucurbitariaceae

Perithecia gregarious, formed under the surface of the substrate, later erumpent and free on a crusty or cushion-like stroma, coriaceous or carbonaceous, firm; asci clavate or cylindrical, eight- to many-spored; paraphyses present; spores one- to several-celled, hyaline or dark.

Spores one-celled, hyaline.....Acanthonitschkea
Spores two-celled, hyaline to brown.....Otthia

Acanthonitschkea Speg.

Perithecia superficial or a brownish-black subculum of spiny, iridescent hyphae; perithecia turbinate, ostiolate, collapsing to cupulate, scattered or densely gregarious, brownish to black, armed with spines, coriaceous to carbonaceous; asci clavate, long-stalked, evanescent, eight-spored, aplanospore; spores biseriate to crowded, hyaline, one-celled, inequilateral to ellantoid.

A. coloradensis Cash & Davidson (1940: 728) (Plate II, fig. 27) Perithecia

clustered, carbonaceous, subglobose, to turbinate, collapsing, black, dull or shining, setose, 200-300 μ diameter; setae numerous, dark-brown, rigid, short and thick, 15-40 (-55) μ long, 7-10 μ thick at base; asci cylindrical, 70-75 x 4-5 μ ; spores hyaline, one-celled, 2-guttulate to pseudoseptate, broad-ellipsoid, obliquely uniseriate, 6-8 x 3-4 μ . On bark of Abies lasiocarpa (Hook.) Nutt., Cathedral Lakes (H-1911).

Otthia Nitschke

Perithecia clustered, at first under the substrate and later becoming erumpent, globose or ovate, black, thick, coriaceous, smooth; asci cylindrical, stalked, paraphysate; spores ellipsoid, uniseptate, hyaline (subgenus Otthiella) to brown.

Otthia sp. (Plate II, fig. 28) Perithecia cespitose, erumpent in groups through bark, black, coriaceous, globose, 250-450 μ diameter, short papillate, collapsing to become cupulate; asci broadly cylindrical, abruptly tapered to a short stalk, thickened at the apex, four- to eight-spored, 90-150 x 15-21 μ ; paraphyses numerous, branched; spores biseriate, hyaline to olive green and finally light brown, uniseptate, constricted at the septum, granular, 21-36 x 9-14 μ . On branches of Populus tremuloides Michx., Noisy Creek, Ashnola District (H-1860); Populus sp., Soda Creek, leg. J.Bancroft (H-2336); Sambucus sp., Soda Creek, leg. J.Bancroft (H-2335). These three collections are very similar, although that on Populus sp. shows slightly smaller asci and spores. They do not appear to fit any of the described species.

13. Coryneliaceae

Mycelium endophytic, mostly parasitic; stromata erumpent, sharply demarcated, black, coriaceous to carbonaceous; lobes of the stroma elongating vertically into spermogonia or ascocarps; ascocarps greatly elongated into slender cylindrical columns; ascigerous locule varying from basal to apical; apex rounded and undifferentiated, or definitely and variously lobed, without true ostiole, opening by a transverse or several radiating clefts, or perforated and funnel-form; asci ovate to clavate, thin-walled, evanescent, stalks long and delicate, eight-spored; paraphyses lacking; spores crowded, inordinate, unicellular, smooth or echinulate, brown to hyaline.

Caliciopsis Peck

Stromata scattered to crowded; lobes becoming spermogonia and later ascocarps; swollen ascigerous locule from terminal to basal; asci ovoid to ellipsoid, with a delicate stalk; spores ellipsoid to globose or subfusiform, smooth, yellowish to blackish-brown.

C. Pseudotsugas Fitzp. (Plate II, fig. 29, Plate VI, fig. 37) Ascigerous locule subapical, asci $14 \times 7 \mu$, spores ellipsoid, $4 \times 2 \mu$. On Pseudotsuga taxifolia (Lam.) Britt. Type collected at Daisy Lake, not seen (Fitzpatrick 1942: 496); from Lake Cowichan, leg. R.E. Foster (U-119, V-237, V-235), Nakusp leg. D.C. Buckland (U-22), Pemberton, leg. S.C. Frost (V-4541), Sayward, leg. W.A. Porter (H-1830, O-21367, V-2789).

14. Amphisphaeriaceae

Perithecia without stroma, at first sunken in the substrate, at maturity more or less erumpent, but always with the bases partially immersed, carbonaceous, smooth, occasionally hairy; ostiole papillate; asci clavate to

cylindrical; paraphyses present; spores two- to several-celled, hyaline to dark colored.

Spores several-celled, hyaline to brown.....Trematosphaeria

Spores muriform, brown.....Strickeria

Strickeria Korber (Teichospora Fckl.)

Perithecia scattered to gregarious, at first buried, later nearly superficial, spherical or ovoid, coriaceous or carbonaceous, frequently collapsing; ostiole papillate or inconspicuous; asci cylindrical or clavate-cylindrical, eight-spored, paraphysate; spores ellipsoid, muriform, brown.

Spores obliquely uniserial, 22-30 (-33) μ long.

Spores with one longitudinal septum, end cells the same color as the rest of the spore.....S. obducens

Spores with one to two longitudinal septa, end cells lighter in color.....S. Typhina

Spores crowded biseriate, 30-36 x 10 μS. Amelanchieris

S. Amelanchieris Earle (Plate II, fig.30) Perithecia scattered or gregarious, black, smooth, collapsing, 300-500 μ diameter; asci clavate-cylindrical, 100-120 x 16-22 (-30) μ , eight-spored; paraphyses filiform; spores crowded-biseriate, ovoid-oblong, long hyaline, finally brown, curved, 5-7-septate, with a partial vertical septum, somewhat flattened, (21-) 30-36 x 10-12 x 7 μ . On weathered wood of Amelanchier sp., Penticton (H-1928). Asci in this collection are considerably broader, otherwise as in the species.

S. obducens (Fr.) Wint. (Plate II, fig.31) Perithecia thickly scattered, superficial, bases immersed, globose, papillate, collapsing, 300-500 μ diameter; asci long cylindrical, 130-150 (-185) x 15-22 μ ; paraphyses filiform; spores obliquely uniseriate, fusoid-ellipsoid, brown, 5-7-septate, constricted at the central septum, one vertical septum in all but end cells, 22-30 (-33) x 9-12 (-14) μ . On Acer sp., U.B.C. (H-1929); Alnus oregona Nutt., leg. S.Brown-John, U.B.C. (H-1910); A. sitchensis Sarg., leg. D.C.Buckland (U-666); Artemisia tridentata Nutt., Princeton (H-1909).

Strickeria (Cucurbitaria) Typhina Ell. & Ev. (Plate II, fig.32) This species is, according to Welch (1926: 73), a Strickeria (Teichospora). Perithecia subglobose, thick-walled, immersed when very young and becoming erumpent before maturity, basal portion remaining sunken; bases of perithecia appear to have been formed above empty pycnidial cavities which are shrunken and flattened by the growth of the perithecia; asci cylindrical-clavate, short-stalked, paraphysate, 120-150 x 15 (-18) μ ; spores uniseriate, oblong-ellipsoid, 5-6-7-septate and muriform with one or two longitudinal septa, slightly constricted at the central septum, yellow-brown, end cells subhyaline, 22-30 x 12-15 μ . On Rhus glabra L., U.B.C. (H-1955). This collection agrees with Ellis and Everhart's description, which is here emended to include mention of the superficial nature of the perithecia above the stromatic-appearing remains of pycnidial walls. If examination of the type material shows the same condition, as Welch states, this species should be transferred to Strickeria as S. Typhina (Ell. & Ev.), since none of the other species of Strickeria show that character as well as the light color of the end cells of the spores.

Trematosphaeria Fckl.

Perithecia carbonaceous, superficial or subsuperficial, conical or globose; asci eight-spored, paraphysate; spores oblong or fusoid, three- to several-septate, hyaline or brown.

* T. ?fissa (Fckl.) Wint. (Plate II, fig.33) Perithecia scattered or grouped, mostly with basal half immersed, later erumpent, 350-450 μ wide, globose, papillate, black, somewhat rough; asci cylindrical or clavate, stalked, eight-spored, 70-110 x 7-9 μ ; spores uniseriate, long-ellipsoid, brown, four-celled, scarcely constricted, 12-16 x 4-5.5 μ . On Acer sp., U.B.C. (H-1929); this collection comes nearest to this species, but spores are longer, 15-21 x 6-7.5 μ , and wood around the perithecia is stained purple, however it does not have purple ostioles as in T. phaea (Rehm) Wint.

15. Lophiostomataceas

Perithecia single, occasionally grouped, without stroma, but sometimes on a blackened substrate, at first more or less deeply immersed in the substrate and often at maturity with only the ostiole erumpent, usually however erumpent and almost completely superficial; black, carbonaceous, smooth or somewhat hairy; ostiole compressed, more or less drawn together and opening by a longitudinal slit; asci cylindrical or clavate, eight-spored; paraphyses present; spores long, pointed or rounded, with or without appendages, one- to several-celled or muriform or filiform, hyaline or dark-colored.

Spores several-celled, hyaline.....Lophiotrema

Spores several-celled, brown.....Lophiostoma

Lophiostoma Fries

Perithecia typical, of varying sizes; asci cylindrical-clavate, stalked; spores ellipsoid to fusiform, with three or more cross-walls, dark colored, ends rounded or with appendages at one or both ends.

Perithecia small, 250-300 μ diameter; asci 90-105 μ in length...L. caulinum

Perithecia larger, 600-1000 μ diameter; asci 105-150 μ in length.....
.....L. appendiculatum

L. appendiculatum Fckl. (Plate II, fig.34) Perithecia innate, then erumpent, 600-1000 μ diameter; ostiole compressed; asci clavate, 105-150 x 12-17 μ , paraphysate, stalked; spores biseriate above, uniseriate below, ellipsoid, straight or curved, (3-) 5-7-septate, constricted at the septa, with cap-like appendages at both ends which soon disappear, yellow-brown, 24-35 x 7-9 μ . On Artemisia tridentata Nutt., dead weathered branches, Princeton (H-1909). Appendages are not visible on any mature spores but can be faintly seen on the immature ones.

L. caulinum (Fr.) de Not. (Plate II, fig.35, Plate VI, fig. 38) Perithecia often covered by the epidermis, later erumpent, globose, ostiole compressed, black, 250-300 μ diameter; asci clavate, eight-spored, 90-105 x 10-14 μ ; spores biseriate, oblong-fusiform, without appendages, 4-8-celled, constricted at the cross-walls, yellow-brown, 20-30 x 5-8 μ ; paraphyses filiform. On Phlox speciosa Pursh., Penticton, leg. J.W.Eastham (H-1902).

Lophiotrema Sacc.

Perithecia typical; spores oblong or fusiform, three- to several-celled, blunt or with small appendages at both ends, hyaline, often becoming brown with age.

Spores 12-14 x 3-3.5 μ ; ostiole varying from compressed to conical or imperfectly three-cleft.....L. aequivocum
 Spores 20-26 (-35) x 5-8 μ ; ostiole cylindrical or compressed....L. nucula

L. aequivocum Ell. & Ev. (Plate II, fig. 36) Perithecia gregarious, erumpent, black, about 330 μ diameter; ostiole subconical, slightly compressed; asci subcylindrical, 80 (-108) x 5 (-10) μ ; paraphyses filiform; spores yellowish-hyaline, uniseriate, three-septate, 12-14 (-20) x 3-3.5 (-6) μ . The species was described from a collection made by John Macoun "on de-corticated wood of some deciduous tree, British Columbia, May, 1887" (Ellis and Everhart 1887: 118). The specimen examined, on dead wood, Comox, Vancouver Island, May 3, 1887, leg. J. Macoun (OM-34), is presumably cotype material. Spores are larger than in description, 15-22.5 x 4.5-6 μ , and many show hyaline appendages at both ends.

L. ?nucula (Fr.) Sacc. (Plate II, fig. 37) Perithecia innate-superficial, ovoid, at first with a short, cylindrical or compressed ostiole, 300-500 μ diameter; asci cylindrical-clavate, 90-125 x 10-12 μ ; spores biseriate, oblong, three-septate, constricted at the middle septum, greenish-hyaline, 20-26 (-35) x 5-8 μ . Two collections are placed doubtfully as this species; in both the ostiole is very short and the opening often irregular. On dead branches of ?Chamaecyparis nootkatensis (Lam.) Spach. (H-1903) and Tsuga sp. (H-1901), Mount Seymour.

16. Mycosphaerellaceae

Perithecia mostly formed under the epidermis, remaining covered or becoming erumpent by disintegration of the covering layer, usually with only the papillate or conical ostiole protruding, globose, mostly very small,

membranaceous or leathery, fragile; asci fasciculate, ovate, cylindrical, or clavate, eight- to many-spored; paraphyses lacking; spores various, one- to many-celled or muriform, hyaline or dark colored.

Spores one-celled, hyaline.

Perithecia seated on a subiculum of branched hyphae.....Ascospora

Such a subiculum lacking.....Guignardia

Spores more than one-celled, hyaline or dark.

Spores two-celled.

Spores hyaline.

Asci eight-spored.....Mycosphaerella

Asci many (16-24) spored.....Rehmieellopsis

Spores brown.....Phaeosphaerella

Spores more than two-celled.

Spores with transverse walls only.....Sphaerulina

Spores muriform.

Spores hyaline.

Perithecia in a light brown stroma, which forms spots or lesions.....Pseudoplea

Perithecia not in such a stroma.....Pleosphaerulina

Spores brown.....Leptosphaerulina

Ascospora Fries

Perithecia sunken in superficial layers of the substrate, seated on a growth of branched, thick brown hyphae, globose, black, smooth; asci ovate to obclavate, fasciculate, eight-spored, small; spores one-celled, hyaline, ellipsoid; paraphyses lacking.

Spores large, 15-16 μ long.....A. graminis

Spores smaller, 10-13 μ long.....A. Ruborum

A. graminis N.Lind (Plate III, fig.1) Perithecia superficial, applanate, on effused, branched mycelium, 80-100 μ diameter; asci fasciculate, sessile, ovoid-oblong, eight-spored, 24-42 x 12-17 μ ; spores ellipsoid, hyaline, granular, inequilateral, 15-16 (-22) x 4-4.5 (-7.5) μ . On Poa paucispicula Scribn. & Merr., Summit between Francois and Ootsa Lakes, leg. J.W.Eastham (H-2006); P. secunda Presl., Ootsa Lake, leg. J.W.Eastham (H-2005).

A. Ruborum (Oud.) Zeller Perithecia at first subcuticular, then erumpent, carbonaceous, arising from a ramifying cushion of dark mycelium, 100-200 μ diameter; ostiole small, circular to lenticular; asci cylindrical, larger below, eight-spored, 40-55 x 9-12 μ ; spores ellipsoid, obtuse at both ends, hyaline, 10-13 x 4-5 μ . On Rubus sp., raspberry, not seen (CPDS 1939).

Guignardia Viala & Ravaz (Laestadia Awd.)

Perithecia immersed, globose or somewhat flattened, black, membranaceous, smooth, ostiole plane or short papillate to conical, sometimes lacking; asci clavate to elongate, eight-spored, aplanospore; spores ellipsoid or fusiform, hyaline, one-celled.

Asci large, (48-) 60-80 x 9-13 μ .

Spores granular, 12-17 x 4.5-5 μG. Bidwellii

Spores smooth, 13.5-16.5 x 6.5-7 μG. Vaccinii

Asci smaller, 30-45 (-54) x 9-15 μ .

On Gramineae.....L. graminicola

On other plants.

On Potentilla.....G. Potentillae

On other plants.....L. circumtegens

G. Bidwellii (Ell.) Viala & Ravaz. Perithecia minute, globose, immersed, finally suberumpent; asci clavate-cylindrical, obtuse, $60-70 \times 10-13 \mu$, a paraphysate; spores ellipsoid to oblong, one-celled, hyaline, granular, $12-17 \times 4.5-5 \mu$. On Vitis sp., grape, not seen (CPDS 1933, 1946).

Laestadia ?circumtegens Rostr. (Plate III, fig.2) Perithecia gregarious, lenticular, $60-135 \mu$ diameter; asci cylindrical-clavate, curved, a paraphysate, sessile, $30-45 (-54) \times 9-12 (-15) \mu$; spores one-celled, fusoid-oblong, guttulate, hyaline, $(7.5-) 10-15 \times 3-5 \mu$. Several collections appear to belong to this species: on Campanula ?Media L., Duncan (H-1996); Dianthus sp., U.B.C. (H-1997); Erigeron linearis (Hook.) Piper, Tranquille, leg. T.M.C.Taylor (H-1990); Iris germanica L., Duncan (H-1993); Lupinus sp., U.B.C. (H-1995); Oenothera biennis L., U.B.C. (H-1992), Duncan (H-1994).

Laestadia graminicola Rostr. (Plate III, fig.3) Perithecia minute, abundant, gregarious, arranged in parallel lines under the epidermis, globose, $60-105 \mu$ diameter; asci fasciculate, oblong-clavate, a paraphysate, sessile, $30-45 (-54) \times (10-) 12-14 \mu$; spores fusoid-oblong, hyaline to greenish, one-celled, $12-15 (-17) \times 4-5 \mu$. On Agrostis hiemalis (Walt.) B.S.P. var. geminata (Trin.) Hitchc., Vanderhoof, leg. J.W.Eastham (H-1991); Puccinellia Nuttalliana (Schult.) Hitchc., Doyle, leg. J.W.Eastham (H-2004).

G. Potentillae (Rostr.) Lindau (Plate III, fig.4) Perithecia black, membranaceous, erumpent, globose-lenticular, 150μ diameter; asci cylindrical-clavate, curved, $30-45 (-54) \times 8-12 (-15) \mu$; spores hyaline to greenish, one-celled, biseriate, fusoid-oblong, $9-12 (-15) \times 3-5 (-6) \mu$.

On Potentilla diversifolia Lehm., Kennco Mining Camp, leg. G.A.Noel (H-2003).

G. ?Vaccinii Shear (Plate III, fig.5) Perithecia mostly hypophylloous, globose, 165-210 μ diameter, immersed, short ostiole erumpent; asci clavate-cylindrical, short stalked, a paraphysate (48-) 60-80 x 9-13 (-18) μ ; spores hyaline, one-celled, elliptical to subrhomboid, somewhat inequilateral, 13-16.5 x 4-7 μ . A collection on Arctostaphylos columbiana Piper, Duncan (H-2000), fits this species.

Leptosphaerulina McAlpine

Perithecia immersed, globose to flattened; asci a paraphysate, eight-spored; spores oblong, several-septate and muriform, brown.

Leptosphaerulina sp. (Plate III, fig.6) Perithecia black, crowded and bursting through the epidermis in small groups, or single, membranaceous, globose, 120-210 μ diameter; asci fasciculate, clavate, attenuated to the base, thickened at the apex, eight-spored, 52-60 x 18-24 μ ; paraphyses lacking; spores yellow-brown, oblong-ellipsoid, ends rounded, 3-4-septate, constricted at the central septum, upper half broader, narrowed below, one longitudinal septum through most of the cells, irregular in the ascus, 18-21 x 9-10 μ . On Sequoia sempervirens Endl., U.B.C. (H-2533). This collection fits the genus well, but does not belong to any of the species described in it.

Mycosphaerella Johans. (Sphaerella Ces. & de Not., non Sommerf.)

Perithecia immersed, remaining covered or becoming erumpent, ostiole plane or papillate, membranaceous to coriaceous, globose to conical, small; asci eight-spored, fasciculate, cylindrical, clavate, oblong, ovate, or

obovate; spores hyaline or greenish, ellipsoid, two-celled; paraphyses lacking.

On Pteridophytes.....M. indistincta

On Spermatophytes.

On Monocotyledons.

Spores small, 9-10.5 μ long.....M. graminicola

Spores larger.

Spores narrow, 2.5-4 μ wide.

Perithecia 120-160 μ diameter; asci oblong.....

.....M. caricicola

Perithecia less than 100 μ diameter; asci ovate to
obclavate.

On Typha.....M. Typhae

On other plants.

Asci 22-30 x 10-15 μ .

Spores 15-18 x 2.5-3 μM. perixigua

Spores 8-12 (-15) x 3-4 μM. Wichuriana

Asci 30-40 x 10-15 μM. pusilla

Spores over 4 μ wide.

Perithecia in long rows in the leaf.....M. lineolata

Perithecia scattered or gregarious, not in definite

rows.....M. Tassiana

On Dicotyledons.

On leaves of trees and shrubs.

Spores over 20 μ long.

Spores broad, 6-7.5 μ wide.....M. Auerswaldii

Spores narrower, not over 5μ wide.

Spores $26-35 \mu$ long.....M. Grossulariae

Spores (17-) $20-25 (-28) \mu$ long.....M. rubi

Spores less than 20μ long.

Perithecia clustered on conspicuous spots on the
evergreen leaves.....M. arbuticola

Perithecia scattered or gregarious but not on con-
spicuous spots.

Spores $13-18 \mu$ long.

On Rosa.....M. rosicola

On Populus.....M. populifolia

Spores shorter, $6-10 (-13.5) \mu$ long.

On Populus.....M. orbicularis

On other leaves.

On Prunus.....M. cinerascens

On other leaves.....M. punctiformis

Not on leaves of trees and shrubs.

On living leaves, on spots.

Spores small, $7-8 \times 2-2.5 \mu$M. Chimaphilae

Spores larger, $12-20 \times 4-5 \mu$.

On Pachystima.....M. Pachystimae

On Rumex.....M. stromatoidea

On dead leaves or stalks.

Asci oblong-cylindrical, not over 12μ wide.

Spores $7-8 \mu$ long.

Asci $27-30 \times 6-7.5 \mu$M. earliana

Asci $34-42 \times 7.5 \mu$M. microspila

Spores mostly over 11 μ long.

Asci 9-12 μ wide.

Asci 36-45 x 9-11 μM. confinis

Asci 58-62 x 12 μM. pinodes

Asci 7-9 μ wide.

Spores 4-7 μ wide.....M. vagans

Spores up to 3.5 μ wide.

On Fragaria and Potentilla..M. Fragariae

On other plants.....

.....M. punctiformis var. Clematidis

Asci ovate, obovate or obclavate.

Spores large, 25-40 μ long.

On Ranunculus.....M. Ranunculi

On other plants.....M. dolichospora

Spores smaller, not over 30 μ long.

Spores not longer than 14 μ .

Perithecia seated on thin brown radiating

mycelium.....M. Minor

Perithecia not seated on mycelium.

On Umbelliferae.....M. sagadioides

On other plants.....M. melaena

Spores mostly longer than 14 μ .

On Polygonaceae.....M. Polygonorum

On other plants.

On Cruciferae.....M. brassicicola

On other plants.

On Sibbaldia, perithecia less than

75 μ diameter.....M. innumerella

On other plants, perithecia
mostly more than 75μ diameter.

Spores broad, $7-9 \mu$ wide; on

Erigeron and Artemisia.....

.....M. eriophila

Spores generally narrower,

$3.5-8.5 \mu$ wide; on many

plants.....M. Tassiana

M. arbuticola (Pk.) House (Plate III, fig.7) Perithecia on greyish spots with a red border, epiphyllous, black, small, $100-135 \mu$ diameter; asci oblong, fasciculate, $52-60 \times 9-11 \mu$; spores crowded biseriate, hyaline, uniseptate, $12-15 \times 3 \mu$. On Arbutus Menziesii Pursh., Saanich, leg. W. Jones (H-771, H-2101, CPDS 1931, 1934, 1937).

M. ?Auerswaldii (Fleischh.) Migula (Plate III, fig.8) Perithecia hypophyllous, immersed, gregarious, globose-conical, black, $100-200 \mu$ diameter; asci obclavate, very short stalked, $45-75 \times 10-23 \mu$; spores irregularly biseriate, ellipsoid, narrowed towards the lower end, uniseptate, hyaline to greenish, with two or three oil-drops in each cell, $22-30 \times 4-7.5 \mu$. On Cornus Nuttallii Aud., Duncan (H-2286). This collection has broader asci and spores than the species description but otherwise fits well.

M. brassicicola (Duby) Lindau (Plate III, fig.9) Perithecia numerous on spots on the leaves, amphigenous, globose to lens-shaped, $60-90 \mu$ diameter, brown-black, ostiole short papillate, erumpent; asci broad-fusoid, narrowed towards each end, $36-51 \times 10-15 \mu$; spores bi- to triseriate,

oblong, uniseptate, slightly curved, scarcely constricted, 15-21 x 3-4.5 μ , greenish. On Brassica oleracea L. var. botrytis L., Saanichton, leg. W.Jones (H-775); var. capitata L., Dewdney, leg. W.Jones (H-773, CPDS 1943, 1945); var. gummifera Zenker, Sidney, leg. W.Jones (H-774); var. italica Planchk., N.Saanich, leg. W.Jones (H-772).

M. caricicola (Fckl.) Lindau (Plate III, fig.10) Perithecia immersed-erumpent, globose, 100-160 μ diameter, black, ostiole short, punctiform; asci oblong, sessile, 39-51 x 9-12 μ ; spores crowded biseriate, hyaline to greenish, uniseptate, oblong, straight or curved, 10-15 x 3-5 μ . On Carex pyrenaica Wahl., Mt.Brent, Penticton, leg. J.W.Eastham (H-2056); Juncus Drummondii Meyer, Mt.Apex, Penticton, leg. J.W.Eastham (H-1989).

Sphaerella Chimaphilae Ell. & Ev. (Plate III, fig.11) Perithecia on spots on living leaves, spots dark with a lighter centre, amphigenuous, erumpent, globose, 75-110 μ diameter, black, membranaceous; asci oblivate-oblong, sessile, 30-45 x 6-10 μ ; spores crowded biseriate, oblong-fusoid, uniseptate, not constricted, 7-14 (-15) x 2-3 μ . On Chimaphila umbellata (L.) Nutt., Armstrong, leg. E.Wilson (H-2127).

M. cinerascens (Fckl.) Migula (Plate III, fig.12) Perithecia amphigenuous, gregarious in small clusters or scattered, grey-black, globose-conical, erumpent, 90-105 μ diameter; asci oblong, nearly sessile, fasciculate, 30-45 x 6-9 μ ; spores long ovate, uniseptate, biseriate, partially uni-seriate above, hyaline to greenish, 6-10 x 2-3 μ . On Prunus emarginata (Dougl.) Walp. var. mollis (Dougl.) Brewer, U.B.C. (H-2287).

M. coerulea (Ell. & Ev.) Tracy & Earle (Plate III, fig.13) Perithecia

sparingly to thickly scattered, immersed, erumpent by a minute ostiole, black, globose to somewhat flattened, 100-150 μ diameter; asci oblong, fasciculate, 35-51 x 7-14 μ ; spores biseriate, fusoid-ellipsoid, uniseptate, hyaline, slightly constricted at the septum, 12.5-18 x 3-3.5 μ .

On Aquilegia brevistyla, Chilko River, leg. W.A. Newcombe (H-2263), A. formosa Fisch., Tenquille Lake, Pemberton, leg. W. Taylor (H-2261), Revelstoke, leg. J. Buckland (H-2262).

M. confinis (Karst.) J.Lind (Plate III, fig.14) Perithecia black, membranaceous, amphigenous, immersed, then erumpent, scattered or gregarious, globose, papillate, black, 90-120 μ diameter; asci oblong, subsessile, fasciculate, 36-52 x 9-13 μ ; spores crowded biseriate, greenish-hyaline, elongated, uniseptate, not constricted at the septum, 14-19 x 3-5 μ . On Draba alpina L., Moose Mt., Pelly Creek, leg. G.V. Copley (H-2138).

M. dolichospora (Sacc. & Fautre) Wehm. (Plate III, fig.15) Perithecia gregarious, globose-conical, papillate, 60-200 μ diameter, erumpent; asci stout clavate, apical wall thickened, 45-70 x 10-18 (-23) μ ; spores fasciculate in the ascus, fusoid-cylindrical, straight or curved, uniseptate, hyaline, slightly constricted at the septum, (22-) 25-40 x 2.5-5 μ . On Arenaria obtusiloba (Rydb.) Fern., Cathedral Lakes (H-2067).

Sphaerella earliana Wint. (Plate III, fig.16) Perithecia amphigenous, crowded, globose to conical, black, 45-75 μ diameter, erumpent; asci fasciculate, oblong, short stalked, 26-30 x 6-7.5 μ ; spores crowded, clavate, uniseptate, not constricted at the septum, hyaline, 7-8 x 1.5-3 μ . On Fragaria chiloensis (L.) Duch., Glacier Point, Jordan River, leg. J.W. Eastham (H-2126).

M. eriophila (Niesal) Dear. (Plate III, fig.17) Perithecia scattered, erumpent, globose, papillate, $90-210 \mu$ diameter; coriaceous; asci ob-clavate, straight or curved, short stalked or sessile, $45-96 \times 24-33 (-45) \mu$; spores greenish, uniseptate, biserrate-crowded, narrowing to the lower end, guttulate, oblong-cuneate, $20-36 \times 7-9 \mu$. On Artemisia longepedunculata Rydb., Mt. Baldy, Chua Chua, leg. V.C.Brink (H-2306); Erigeron sp., Cathedral Lakes (H-2274, H-2270).

M. Fragariae (Tul.) Lindau (Plate III, fig.18) Perithecia amphigenous, mostly hypophyllous, gregarious, immersed, becoming erumpent, globose-depressed, $35-120 \mu$ diameter; asci oblong, fasciculate, nearly sessile, $33-50 \times 5-9 \mu$; spores crowded biserrate, fusoid, uniseptate, straight or curved, hyaline to greenish, $9-15 \times 2-3.5 \mu$. On Fragaria chiloensis (L.) Duch., (CPDS 1926, 1933, 1934, 1937, 1939, 1940); Potentilla palustris (L.) Scop., Stanley Park, Vancouver (H-1974).

M. graminicola (Fckl.) Schroet. (Plate III, fig.19) Perithecia epiphyllous, gregarious, immersed-erumpent, black, globose, small, $80-100 \mu$ diameter, ostiole papillate; asci oblong or ovate-oblong, sessile, $22-27 \times 9-12 \mu$; spores oblong, uniseptate, hyaline to greenish, crowded, $9-10.5 \times 2-3 \mu$. On Distichlis spicata (L.) Greene, Lac la Hache, leg. G.A.Hardy (H-2187); var. stricta (Gray) Beetle, Flying U Ranch, Cariboo, leg. J.W.Eastham (H-2186).

M. Grossulariae (Fr.) Lindau Perithecia hypophyllous, innate, gregarious, globose, minutely perforated, black, 155μ diameter; asci short stalked, or subsessile, clavate, $55-66 \times 8-12 \mu$; spores triseriate, fusoid-elongate, slightly curved, uniseptate, not constricted, hyaline, $26-35 \times 3-4 \mu$. On

Ribes spp., currant and gooseberry, not seen (CPDS 1926).

M. indistincta (Pk.) Lindau (Plate III, fig. 20) Perithecia innate, becoming erumpent, scattered or subgregarious, epiphyllous, globose, black, 50-70 μ diameter; asci clavate, short stalked, fasciculate, 48-58 x 9-12 μ ; spores crowded, hyaline to greenish, fuscoid-elongate, straight or curved, obscurely septate, guttulate, 33-38 x 6 μ . On Pteridium aquilinum (L.) Kuhn., Saanichton (H-2996), Mount Seymour (H-2094).

Sphaerella innumerella Karst. (Plate III, fig. 21) Perithecia hypophyllous, gregarious, erumpent, globose, papillate, membranaceous, black, 45-100 μ diameter; asci clavate-cylindrical, very short stalked, 42-60 x 8-12 μ ; spores imperfectly biseriate, usually six in an ascus, oblong, uniseptate, not constricted, hyaline to greenish, 13-24 x 3-5 μ . On Sibbaldia procumbens L., Cathedral Lakes (H-2144).

M. lineolata (Rob. & Desm.) Schroet. (Plate III, fig. 22) Perithecia amphigenous, immersed, seriate in rows, globose, somewhat erumpent, black, 54-70 μ diameter; asci obovate or oblong-clavate, sessile, 30-50 x 12-16.5 μ ; spores crowded biseriate, greenish-hyaline, oblong, curved, uniseptate, 15-18 x 3-5 μ . On Carex limosa L., Tetana River, leg. Mrs. Fletcher (H-2204).

Sphaerella melaena (Fr.) Sacc. (Plate III, fig. 23) Perithecia black, densely crowded, ostiole plane, globose, 45-80 μ diameter; asci obovate, sessile, 18-27 x 10-15 μ ; spores crowded, obovate-oblong, uniseptate below the middle, not constricted, hyaline to greenish or yellow, 7-13.5 x 3-4.5 μ . On Rubus parviflorus Nutt., U.B.C. (H-1973); Rumex Acetosella L., Lumby, (H-2311); Spiraea lucida Dougl., Vernon (H-2309, Keraley, leg. G.E.Woolliams (H-1607)).

Sphaerella microspila (B. & Br.) Cke. (Plate III, fig. 24) Perithecia scattered, globose, black, fragile, erumpent, $80-90 \mu$ diameter; asci oblong, fasciculate, sessile, $34-42 \times 7.5 \mu$; spores oblong-ellipsoid, uniseptate, hyaline, $7.5-11 \times 3 \mu$. On Epilobium angustifolium L., U.B.C. (H-2093).

M. minor (Karst) Lindau (Plate III, fig. 25) Perithecia innate, joined by subradiate, creeping brown mycelium, black, membranaceous, ostiole plane, $30-70 \mu$ diameter; asci obovate, sessile, fasciculate, $18-25 \times 12-14 \mu$; spores conglobate, ovoid-oblong, uniseptate, slightly constricted, hyaline to greenish, $8-12 \times 3-4 \mu$. On Epilobium angustifolium L., Vernon (H-2164).

M. orbicularis (Pk.) House (Plate III, fig. 26) Perithecia innate, black, membranaceous, amphigenous, globose, $100-120 \mu$ diameter; asci oblong, sessile, fasciculate, $36-54 \times 7.5-9 \mu$; spores oblong, uniseptate, greenish, flattened on one side or slightly curved, biseriate, guttulate, $10-13.5 \times 2-3 \mu$. On Populus tremuloides Michx., Saanichton (H-2012).

M. Pachystimae Dear. (Plate III, fig. 27) Perithecia on pale grey or whitish spots, epiphyllous, black, innate, globose, $125-200 \times 85-100 \mu$; some with radiating mycelium and a few stiff bristles near the apex; asci oblong, short stalked, (37-) $45-78 \times 8-12 \mu$; spores crowded biseriate, hyaline to greenish, uniseptate, somewhat constricted, often with two oil-drops in each cell, $10-20 \times 3-5 \mu$. On living leaves of Pachystima myrsinites Raf., Hope (H-2115); this collection has smaller asci and spores than the species and may be a small form.

M. perexigua (Karst.) Johans. (Plate III, fig. 28) Perithecia black, membranaceous, slightly erumpent, hypophyllous, small, globose, $60-75 \mu$ diameter; asci obovate, unequal sided, sessile, fasciculate, $22-30 \times 10-15 \mu$; spores greenish, fasciculate in the ascus, uniseptate, not constricted, fusoid-oblong, $15-18 \times 2.5-3 \mu$. On Carex diandra Schrank., Vanderhoof, leg. J.W.Eastham (H-2089).

M. pinodes (B. & Blox.) R.E.Stone. Perithecia depressed, numerous, $100-140 \mu$ diameter; asci oblong-cylindrical, $58-62 \times 12 \mu$; spores biseriate, oblong, uniseptate, hyaline, $14-16 \times 5 \mu$. On Pisum sativum L., Not seen (CPDS 1925).

M. Polygonorum (Crie) J.Lind (Plate III, fig. 29) Perithecia epiphyllous, on spots surrounded by a prominent, dark red border, black, membranaceous, globose-conical, $120-150 \mu$ diameter, erumpent, papillate; asci obclavate-oblong, sessile, fasciculate, $30-36 \times 15-17 \mu$; spores greenish, ellipsoid, ends obtuse, uniseptate, not constricted, crowded, $12-18 \times 4.5-6 \mu$. On Eriogonum heracleoides Nutt., Ashnola Trail (H-2143).

M. populifolia (Cke.) House (Plate III, fig. 30) Perithecia mostly hypophyllous, innate-prominent, punctiform, globose, black, gregarious, membranaceous, $120-200 \mu$ diameter; asci cylindrical-clavate, fasciculate, sessile or short stalked, $42-75 \times 7.5-15 \mu$; spores sublanceolate, uniseptate, hyaline to greenish, not constricted, straight or slightly curved, $15-18 (-27) \times 3-4.5 \mu$. On Populus deltoides Marsh., leg. and det. J.E.Bier (H-2142, V-881); P. trichocarpa T.& G., Vernon (H-2283).

M. punctiformis (Pers.) Schroet. (Plate III, fig.31) Perithecia innate-punctiform, smooth, subshining, black, prominent, perforated above, 60-120 μ diameter; asci oblong, subsessile, attenuated below, 27-45 x 6.5-9 μ ; spores biseriate or obliquely uniseriate, obovate-oblong, uniseptate, constricted at the septum, hyaline to greenish, upper cell broader, 6-12 x 2-4 μ . On Acer macrophyllum Pursh., U.B.C. (H-1958, H-1954), Silver Creek (H-1946); Alnus oregona Nutt., U.B.C. (H-1959).

M. punctiformis (Pers.) Schroet. var. Clematidis Jaap (Plate III, fig.32) Perithecia globose, 100-125 μ diameter, thickly scattered, ostiole stout papillate; asci clavate, fasciculate, 25-43 x 7-10 μ ; spores biseriate, fusoid-ellipsoid, one end sometimes more rounded, uniseptate, hyaline, scarcely constricted, 8-16 x 2-3.5 μ . On Arabis hirsuta (L.) Scop., var. glabrata, Crawford Bay, leg. H.Murray (H-2320); Arenaria capillaris, var. nardifolia, Fish Lake, leg. J.R.Anderson (H-2302); Cirsium lanceolatum (L.) Scop., Vancouver Island, leg. J.Macoun (OM-926); Cirsium sp., Saanichton (H-1969, H-2316); Erigeron sp., Saanichton (H-2315); Heuchera glabra Willd., Hudson Bay Mt., Smithers, leg. J.W.Eastham (H-1880); Senecio pauperculus Michx., Golden, leg. J.W.Eastham (H-2299).

Sphaerella pusilla Awd. (Plate III, fig.33) Perithecia epiphyllous, immersed, globose, 60-75 μ diameter, ostiole plane; asci ovate-oblong, sessile, fasciculate, 30-40 x 10-15 μ ; spores crowded, oblong-fusoid, greenish-hyaline, uniseptate, slightly constricted at the septum, with three or four oil-drops, (16 \times)22-24 x 3-4 μ . On Carex flava L., Shawnigan Lake, leg. W.M. Canby (H-2308).

M. Ranunculi (Karst.) J.Lind (Plate III, fig.34) Perithecia black, coriaceous-membranaceous, single or grouped, erumpent, conical-globose, short papillate, 180-200 μ diameter; asci obclavate, very short stalked, inequilateral, fasciculate, 84-99 x 21-24 μ ; spores greenish, elongate-fusoid, uniseptate, scarcely constricted at the septum, biseriate, crowded below, 27-33 x 6-7.5 μ . On Ranunculus Eschscholtzii Schlecht, Garibaldi, leg. J.Davidson (H-2293).

M. rosicola (Pass.) Davis. Perithecia amphigenous, erumpent, black, single, 65-105 μ diameter; asci sessile, clavate, walls slightly thickened toward the apex, 36-57 x 9-11 μ ; spores biseriate or subbiseriate, unequally two-celled with the smaller cell toward the apex of the ascus, not constricted, slightly curved on one side, flattened on the other, rounded on the ends, olivaceous, 13-17 x 4-5.3 μ . On Rosa centifolia L. var. muscosa Ser., Patricia Bay, not seen (CPDS 1942).

M. rubi Roark. Perithecia mainly hypophyllous, usually gregarious, erumpent, globose, 60-80 μ diameter, ostiole short papillate, black; asci subclavate to cylindrical, very short stalked, 42-45 x 8-10 μ ; ascospores hyaline, slender fusiform, uniseptate, straight or slightly curved, very slightly constricted, (17-) 20-25 (-28) x 3.5-4.25 μ , usually irregularly biseriate. The conidial stage, Septoria Rubi West. is of common occurrence, but the perithecial stage has not been collected. On Rubus spp., Blackberry, boysenberry, raspberry, youngberry (CPDS 1931, 1932, 1933, 1934, 1937, 1940, 1948).

M. sagedioides (Wint.) Lindau (Plate III, fig.35) Perithecia in groups,

immersed, then erumpent, globose, membranaceous, black, 65-110 μ diameter; ascii oblong-obclavate, sessile, 30-35 x 9-14 μ ; spores crowded, hyaline to greenish, oblong-clavate, often unequal sided, both ends blunt, uniseptate, lower cell narrower, with four oil-drops, 10-14 x 3.5-4.5 μ .

On Cicuta Douglasii L., Saanichton (H-2318).

M. stromatoidea Dear. (Plate III, fig. 36) Perithecia grouped on numerous, scattered, small, circular, dark-bordered spots which are surrounded by a diffuse red band; innate, crowded at the middle of the spot, subglobose, epiphyllous, 85-180 μ diameter; ascii aparaphysate, fasciculate, oblong-clavate, often curved, with a short foot, 45-70 x 12-15 μ ; spores biseriate, hyaline to yellowish, uniseptate, scarcely constricted, upper cell wider and larger, suboblong, 12-18 (-20) x 5-7 (-9) μ . Most of the collections noted here show ascii and spores somewhat larger than in Dearness' description, but otherwise fit well. On living leaves of Rumex obtusifolius L., Lake of the Woods, Hope (H-2108), Cowichan Bay (H-2147); R. occidentalis Wats., Agassiz, leg. H.H.Ross (H-2103); Rumex sp., Abbotsford, leg. B.Lawson (H-2102), Langlie Prairie, leg. B.Lawson (H-2100).

M. Tassiana (de Not.) Johans. (M. pachyasca (Rostr.) Vesterg.) (Plate III, figs. 37, 38, Plate VI, fig. 39). Perithecia small, 70-150 (-200) μ diameter, globose, becoming pyriform, ostiole conical, stout, widely scattered, densely crowded or confluent, immersed becoming erumpent; ascii aparaphysate, broadly saccate below, constricted into a narrower cylindrical tip with a much thickened wall, often stretching at maturity to become clavate or cylindrical, 27-97 x 12-27 (-30) μ ; fasciculate; spores narrow-fusoid becoming broader clavate or wedge-shaped, uniseptate, slightly or not constricted.

upper cell broader and rounded, lower cell narrower and tapered, hyaline to greenish, often with two guttules in each cell, 14-28.5 (-30) x 3.5-8.5 (-9) μ . This is a collective species with many synonyms, reported on many hosts under many binomials. It is the most wide-spread species in British Columbia, found on stems from nearly every collection, and very common on arctic-alpine collections. Following the usage of Lind (1929) and Wehmeyer (1946) this name is used to include all collections showing the typical ascus shape and within the size ranges given above. On Achillea borealis Bong., Cathedral Lakes (H-2277); A. Millefolium L., Lake of the Woods, Hope (H-2284); Agoseris gracilens (Gray) Greene, Cathedral Lakes (H-2159); Agropyron latiglume (Scribn. & Sm.) Rydb., Wall Lake, leg. T.M.C.Taylor (H-2193); A. spicatum (Pursh.) Rydb., Fairmont Hot Springs, leg. J.W.Eastham (H-2060); Agrostis hiemalis (Welt.) B.S.P., Goldstream Lake, leg. I.McT.Cowan (H-2139); A. stolonifera L., Cathedral Lakes (H-2151, H-2160); Allium Cepa L., Duncan (H-2256), A. cernuum Roth., Grand Forks, leg. G.E.Woolliams and J.W.Eastham (H-1664), Chilcotin, leg. E.W.Tisdale (H-2248); A. Schoenoprasum L. var. sibiricum (L.) Hartm., Kinbasket, Big Bend Highway, leg. J.W.Eastham (H-2247), Nakusp, leg. J.W.Eastham (H-2246); Anaphalis margaritacea (L.) B.& H., Mt. Caven, Flagstone, leg. F.B.Peterson (H-2303); Andropogon scoparius Michx., Fairmont Hot Springs, leg. J.W.Eastham (H-2267); Anemone Drummondii Wats., Cathedral Lakes (H-2158); A. globosa Nutt., between Redstone and Chelquoit Lake, leg. J.W.Eastham (H-2128); A. multifida affinis hudsoniana, Bennett, leg. B.Boivin (H-2129); Antennaria media Greene, Cathedral Lakes (H-2290); A. rosea Greene, St.Mary's Lake, Kimberley, leg. J.W.Eastham (H-2014); Aplopappus Brandegei Gray, Cathedral Lakes (H-1937); Aquilegia brevistyla Chilko River, leg. W.A.Newcombe (H-2263); A. formosa Fisch., Duncan (H-2182);

Arabis canescens Nutt., Summerland, leg. G.E.Woolliams (H-1683); A. Drummondii Gray, Mt. Apex, Penticton, leg. J.W.Eastham (H-2055); A. hirsuta (L.) Scop. var. glabrata, Crawford Bay, leg. H.Murray (H-2320), A. Lyallii S.Wats., Cathedral Lakes (H-2154); Arctagrostis latifolia (R.Br.) Griseb., Telegraph Creek District, leg. W.H.Mathews (H-2021); Arenaria capillaris Poir., Mt. Apex, Penticton, leg. J.W.Eastham (H-2301); A. capillaris Poir. var. var. nardifolia, Fish Lake, leg. J.R.Anderson (H-2302); A. formosa Fisch., St.Mary's Prairie, leg. J.W.Eastham (H-2023); A. verna L. var. propinqua Fern., Mt. Cheam, leg. J.K.Henry (H-2217); Arnica latifolia Bong., Cathedral Lakes (H-1972); Artamisia vulgaris L.var. discolor (Dougl.) Peck, Cathedral Lakes (H-2152); Aster conspicuus Lindl., Salmon Arm (H-2289); Astragalus campestris, Armstrong, leg. E.Wilson (H-2285); A. glareosus Dougl., Kaleden, leg. E.Milley (H-2249); A. Macounii Rydb., Cathedral Lakes (H-2007); Balsamorrhiza sp., Vernon (H-2168); Brassica sp., Duncan (H-2257); Bromus porteri (Coul.) Nash, McDonald's Landing, Francois Lake, leg. J.W.Eastham (H-2191); Calamagrostis canadensis (Michx.) Beauv., Ootsa Lake, leg. J.W.Eastham (H-2061); C. inexpansa Gray, Columbia Valley north of Kimberley, leg. J.W. Eastham (H-2192); C. neglecta (Ehrh.) Gaertn., Ootsa Lake, leg. J.W.Eastham (H-2042); C. purpurascens R.Br., Chasm, Clinton, leg. J.W.Eastham (H-2087); C. rubescens Buckl., Cariboo Highway, leg. J.W.Eastham (H-2086), C. Suksdorffii (Link) Trin., Beaver Lake, leg. A.H.Hutchinson (H-2190); Campanula ?Media L., Duncan (H-1996); Campanula sp., Duncan (H-2330); Carex albonigra Mack., Garibaldi, leg. J.W.Eastham (H-2122); C. angarae Steud., Mt. Apex, Penticton, leg. J.W.Eastham (H-2121); C. atrata L., Mt. McLean, leg. R.Glendinning (H-2120); C. atratiformis Brit., Garibaldi, leg. J.Davidson (H-2054); C. aurea Nutt., McDonald's Landing, Francois Lake, leg. J.W.Eastham (H-2119);

C. flava L., Yoho National Park, leg. W.C.McCalla (H-2307); C. phaeocephala
Piper, Sage Pass, leg. T.M.C.Taylor (H-2196); C.prae.gracilis Boott.,
 Wheeler Mt., Kamloops, leg. E.W.Tisdale (H-2197); C. pyrenaica Wahl.,
 Mt. Brent, Penticton, leg. J.W.Eastham (H-2056); Castilleja miniata Dougl.,
 Cathedral Lakes (H-2163); Castilleja sp., Shuswap Falls, Lumby (H-2165);
Centaurea Jacea, U.B.C. (H-2176); Cheiranthus sp., Duncan (H-2178, H-2104);
Chrysanthemum sp., cultivated, Duncan (H-2173); Cichorium Intybus L.,
 Salmon Arm (H-2259); Cirsium arvense (L.) Scop., Princeton (H-2110, H-2111);
C. Hookerianum Nutt., Cathedral Lakes (H-2150); Crepis atribarba Heller,
 Cranbrook, leg. J.W.Eastham (H-2206); Cucurbita maxima Duch., Duncan (H-2175);
Danthonia californica Boland var. americana (Scrib.) Hitchc., Cowichan Lake,
 leg. J.W.Eastham (H-2189); Delphinium sp., Duncan (H-2105); Deschampsia
atropurpurea (Wahl.) Scheele, Garibaldi, leg. J.W.Eastham (H-2040); D.
elongata (Hook.) Munro ex Benth., Wall Lake, leg. T.M.C.Taylor (H-2188);
Draba alpina L., Garibaldi, leg. J.Davidson (H-2294); D. incerta Pays.,
 Coquihalla, leg. F.Perry (H-2137); D. Paysonii Macbr., Cathedral Lakes
 (H-2157); D. praealta Greene, Mt. Waddington, leg. W.Taylor (H-2266);
D. stenoloba Ledeb., Mt. Brent, Penticton, leg. J.W.Eastham (H-2019);
Elymus innovatus Beal., Vanderhoof, leg. J.W.Eastham (H-2038); Kechika
 River, leg. N.C.Stewart (H-2039); Erigeron linearis (Hook.) Piper,
 Tranquille, leg. T.M.C.Taylor (H-1990); E. pumilus subsp. intermedius,
 Tobacco Plains, leg. J.W.Eastham (H-2213); E. speciosus DC.yar. typicus
 Cronqu., Vernon (H-2064); Erigeron sp., Vernon (H-2288); Festuca attaica
 Trin., Telegraph Creek District, leg. W.H.Mathews (H-2002); F. ovina L.,
 Mt. Pope, Fort St. James, leg. J.W.Eastham (H-2185); F. ovina L. var.
brachyphylla (Schult.) Piper, McBride, leg. J.W.Eastham (H-2296); F.

pacifica Piper, Cowichan Lake, leg. J.W.Eastham (H-2184); F. rubra L.,
 Hudson Bay Mt., Smithers, leg. J.W.Eastham (H-2183); Gaillardia aristata
 Pursh., Vernon (H-2312), Gray Creek, Kootenay Lakes, leg. J.W.Eastham
 (H-2214); Geranium erianthum DC., Mile 27 on Yukon-White Pass Railway,
 leg. J.M.Gillett and D.A.Mitchell (H-2194); Hieracium aurantiacum L.,
 U.B.C. (H-2282); H. gracile Hook., Cathedral Lakes (H-2145); Hierochloe
alpina (Swartz.) Roem., McBride, leg. J.W.Eastham (H-2240); Heborealis Roem.
 & Schult., Atlin Lake, leg. E.S.Wilkinson (H-2239); H. odorata (L.) Beauv.,
 Coal Creek, Fernie, leg. J.W.Eastham (H-2238); Hydrangea sp., Duncan (H-2180);
Iris germanica L., Duncan (H-1993); Juncus Drummondii Meyer, Mt. Apex,
 Penticton, leg. J.W.Eastham (H-1989); Koeleria cristata (L.) Pers., Mc-
 Donald's Landing, Francois Lake, leg. J.W.Eastham (H-2237); Mt. Pope,
 Fort St. James, leg. J.W.Eastham (H-2236); Mt. Brent, Penticton, leg.
 J.W.Eastham (H-2082), Cariboo Road, leg. E.Wilson (H-2085); Lathyrus odoratus
 L., Duncan (H-2181); Linum Lewisii Pursh., Windermere, leg. J.W.Eastham
 (H-2219); Lomatium ambiguum (Nutt.) C.& R., Cathedral Lakes (H-2280);
Lupinus latifolius var. subalpinus (Piper and Robins.) C.P.Sm., Cathedral
 Lakes, (H-2051); L. Lyallii Gray, Cathedral Lakes (H-2272); L. sericeus
 Pursh., Vernon (H-2107); Lupinus sp., Vancouver Island, leg. J.Macoun
 (OM-916), Cathedral Lakes (H-2162), U.B.C. (H-1995); Luzula Piperi (Cov.)
 M.E.Jones, Garibaldi, leg. J.W.Eastham (H-1987); L. spicata (L.) DC.,
 Dunn Peak, Chua Chua, leg. E.W.Tisdale (H-2124); Lychnis Coronaria Desr.,
 U.B.C. (H-2179); Lycopersicum esculentum Mill., Duncan (H-2172); Monarda
mollis L., Vernon (H-2167); Oenothera biennis L., U.B.C. (H-1992), Duncan
 (H-1994); Oryzopsis asperifolia Michx., Fairmont Hot Springs, leg. J.W.
 Eastham (H-2235); O. hymenoides (R.& S.) Ricker, Penticton, leg. J.W.

Eastham (H-2234); O. pungens (Torr.) Hitchc., McDonald's Landing,
 Francois Lake, leg. J.W.Eastham (H-2227); Panicum occidentale Scrib.,
 Gray Creek, Kootenay Lake, leg. J.W.Eastham (H-2065); Pedicularis bracteosa
 Benth., Cathedral Lakes (H-2036); P. padoensis Pennel, Mt. McLean, leg.
 S.J. Yamanaka (H-2200); Penstemon ovatus Dougl., Cathedral Lakes (H-2153);
Phacelia leucophylla Torr., Vernon (H-1940); Phleum alpinum L., Anahin Lake,
 Chilcotin, leg. C.F.Cornwall (H-2049, H-2156); Cathedral Lakes (H-2009);
Garibaldi, leg. J.W.Eastham (H-2232); Phlox diffusa Benth., Mt. Copley,
 leg. D.Elvidge (H-2133); P. Douglasii Hook., Forbidden Plateau, Vancouver
 Island, leg. J.Bostock (H-2131); Poa alpina L., Hudson Bay Mt., Smithers,
 leg. J.W.Eastham (H-2231), Wall Lake, leg. T.M.C.Taylor (H-2230); P. arctica
 R.Br., McBride, leg. J.W.Eastham (H-2229); P. compressa L., Flying U Ranch,
 Cariboo, leg. J.W.Eastham (H-2084); P. confinis Vasey, Saanich Spit, leg.
 J.W.Eastham (H-2228); P. glauca Vahl, Mount Rowe, leg. T.M.C.Taylor (H-2079);
P. interior Rydb., McDonald's Landing, Francois Lake, leg. J.W.Eastham (H-2035);
P. lettermanni Vasey, Mount Rowe, leg. T.M.C.Taylor (H-2233); P. nervosa
 (Hook.) Vasey, Ootsa Lake, leg. J.W.Eastham (H-2048); Hudson Bay Mt.,
 Smithers, leg. J.W.Eastham (H-2226); P. paucispicula Scribn. & Murr., summit
 between Francois and Ootsa Lakes, leg. J.W.Eastham (H-2006); P. pratensis L.,
 Kootenay Crossing, leg. I.McT.Cowan (H-2225); Kamloops, leg. E.W.Tisdale
 (H-2224); P. secunda Presl., Old Forestry Lookout, Ootsa Lake, leg. J.W.
 Eastham (H-2005); P. stenantha Trin., Lake Garibaldi, leg. J.W.Eastham
 (H-2077); Polemonium californicum Eastw., Mt. Brent, Penticton, leg. J.W.
 Eastham (H-2134); P. pulcherrimum Hook., Tobacco Plains, leg. J.W.Eastham
 (H-2328), Penticton-Merritt Highway, leg. J.W.Eastham (H-2327), Skwa-ach Mt.,
 leg. J.Davidson (H-2326); Potentilla diversifolia Lehm., Kennco Mining Camp,
 leg. G.A.Noel (H-2003), Mount Monarch, Atlin District, leg. W.A.Statchell

(H-1998); P. flabellifolia Hook., Cathedral Lakes (H-1999); P. Nuttallii Lehmann, Marysville, leg. J.W.Eastham (H-2125); P. palustris (L.) Scop., Nelson, leg. G.E.Woolliams and J.W.Eastham (H-1666); Puccinellia Nuttalliana (Schult.) Hitchc., Doyle, south of Wasa, leg. J.W.Eastham (H-2004); Rumex Acetosella L., U.B.C. (H-2098); Sanicula crassicaulis Poepp., Vancouver Island, leg. J.Macoun (OM unnumbered, July 17, 1916); Schizachne purpurascens (Torr.) Swallen, Prince George, leg. J.W.Eastham (H-2223); Sedum stenopetalum Pursh., Cathedral Lakes (H-2155); Senecio integrerrimus Nutt., Cathedral Lakes (H-2146); Silene Douglasii Hook., Grand Forks, leg. G.L. Landon (H-2218); Sisyrinchium angustifolium Miller, east of Fernie, leg. J.W.Eastham (H-2252), McGillivray, Crowsnest Pass, leg. J.W.Eastham (H-2251), Canal Flats, leg. J.W.Eastham (H-2250); Sitanion hystrix (Nutt.) J.G.Smith, Redstone, leg. J.W.Eastham (H-2161); Solidago multiradiata Ait., Bennett, leg. D.A.Mitchell (H-2203); Sphenopholis obtusata (Michx.) Scrib., Fairmont, leg. W.W.Eastham (H-2045); Spiraea lucida Dougl., summit Rossland Highway, leg. G.E.Woolliams and J.W.Eastham (H-2325); Stellaria longipes Goldie, Cathedral Lakes (H-2313); Stenanthium occidentale Gray, Mt. Stephen, Field, leg. J.M.Fogg (H-2323); Stipa columbiana Macoun, McDonald's Landing, Francois Lake, leg. J.W.Eastham (H-2221); S. comata Trin. & Rupr., Dewdrop Flat, leg. V.C.Brink (H-2026); S. Richardsoni Link, McDonald's Land, Francois Lake, leg. J.W.Eastham (H-2220); Symporicarpus albus (L.) Blake, Salmon Arm (H-2109); Tanacetum vulgare L., U.B.C. (H-2171); Tofieldia glutinosa (Mt.) Pers., Canal Flats, leg. H.Murray (H-2097), Garibaldi, leg. W.Cottle (H-2195), Field, leg. J.W.Eastham (H-2243), Coldstream Creek, Windermere, leg. J.W.Eastham (H-2244); Trisetum spicatum (L.) Richt., Hudson Bay Mt., Smithers, leg. J.W.Eastham (H-2076); Zea Mays L., Duncan (H-2174); Zygadenus elegans (Pursh.) Rydb.,

Fairmont Hot Springs, leg. T.M.C.Taylor (H-2241), Wall Lake, leg. T.M.C. Taylor (H-2242); Liliaceae indet., Duncan (H-2295); herbaceous stalks, Penticton (H-2281), Duncan (H-2255); Gramineae indet., Kamloops, leg. J.Macoun (OM-154), Duncan (H-2044); dead wood, Allison Pass (H-2116).

M. Typhae (Lasch.) Lindau (Plate III, fig.39) Perithecia amphigenous, black, membranaceous, globose, 45-80 μ diameter; asci fasciculate, sessile, obclavate, 36-40 x 10-15 μ ; spores greenish, uniseptate, four guttulate, narrow-ellipsoid, upper cell slightly wider, 11-15 x 3-4.5 μ . On Typha latifolia L., Stanley Park, Vancouver (H-2062).

Sphaerella vagans Ell. & Ev. (Plate III, fig.40) Perithecia scattered, erumpent, becoming superficial, globose, black, membranaceous (50-) 250-300 μ diameter; asci fasciculate, oblong-obclavate, sessile, 30-60 x 7-9 μ ; spores biseriate, ovate-oblong, uniseptate, slightly constricted at the septum, hyaline to greenish, 12-16 x 4-7 μ . On leaves of Valeriana sitchensis Bong., Cathedral Lakes (H-2275).

M.Wichuriana (Schroet.) Johans. (Plate III, fig.41) Perithecia gregarious, innate, globose, 50-65 μ diameter, membranaceous; asci ovoid, sessile, fasciculate, 22-26 x 14-16 μ ; spores conglobate, fusoid, uniseptate, not constricted, hyaline, 11-13 x 3-3.5 μ . On Carex flava L., Yoho National Park, leg. W.C.McCalla (H-2307); C. praengracilis Boott., Flying U Ranch, Cariboo, leg. J.W.Eastham (H-2298); Carex sp., Soda Creek, leg. J.Bancroft, (H-2166); Festuca idahoensis Elmer, Elko, leg. J.W.Eastham (H-2297); Luzula Wahlenbergii Rup., McBride, leg. J.W.Eastham (H-2123); Oryzopsis pungens (Torr.) Hitchc., McDonald's Landing, Francois Lake, leg. J.W.Eastham (H-2227); Poa ampla Merr., Junction Elk and Kootenay Rivers, leg. J.W.

Eastham (H-2080); P. interior Rydb., McDonald's Landing, Francois Lake,
leg. J.W. Eastham (H-2035).

Mycosphaerella sp. The five collections noted below have not been determined satisfactorily to species. Short descriptions are given for each.

On Salix saximontana Rydb., Cathedral Lakes (H-2268); (Plate III, fig. 42): Perithecia minute, black, membranaceous, erumpent, hyphophyllous, globose, 60 μ diameter; asci sessile, fasciculate, obovate, 22 x 36 μ ; spores greenish, uniseptate, not constricted, lower cell narrower, granular, 15-17 x 6-7.5 μ .

On Sambucus sp., Soda Creek, leg. J.Bancroft (H-2335) (Plate III, fig. 43): Perithecia black, membranaceous, erumpent, globose-conical, 60-75 μ diameter; some brown mycelium connecting perithecia; asci sessile, fasciculate, ovate-oblong, 33-39 x 15-18 μ ; spores hyaline, granular, uniseptate, crowded in the ascus, 12-13.5 x 4.5 μ .

On Sanicula crassicaulis Poepp., Vancouver Island, leg. J.Macoun (OM unnumbered, July 17, 1916) (Plate III, fig. 44): Perithecia brown to black, membranaceous, globose, ostiole short papillate, erumpent, 60-100 μ diameter; asci sessile, obclavate, fasciculate, 33-45 x 10.5-12 μ ; spores greenish-hyaline, uniseptate, guttulate, upper cell broader, 12-15 x 3 μ .

On Silene Douglasii Hook., Cathedral Lakes (H-2329) (Plate III, fig. 45): Perithecia black, shining, erumpent, coriaceous, papillate, globose, 230-260 μ diameter; asci sessile, fasciculate, clavate, narrowed to both ends, 75-120 x 30-38 μ ; spores greenish, uniseptate, slightly constricted at the septum, upper cell broader, 28-36 x 9-11 μ .

On cone scales of Thuja plicata D.Don., Duncan (H-2278) (Plate III, fig. 46): Perithecia black, membranaceous, erumpent, globose, ostiole plane, 130-260 μ

diameter; some with a fascicle of conidiophores at the apex, bearing brown apiculate, verrucose conidia; asci fasciculate, obclavate, short stalked, $60-75 \times 15-18 \mu$; spores hyaline, straight or curved, uniseptate, not constricted, guttulate, $15-23 \times 6-7.5 \mu$.

Phaeosphaerella Karst.

As Mycosphaerella, but spores brown.

P. maculosa (Sacc.) Karst. (Plate III, fig.47) Perithecia amphigenous, imbedded in leaf tissues, later erumpent, globose, black, ostiole minute, $60-200 \mu$ diameter; asci sessile, elongate, inflated at the base, aparaphysate, eight- (often two- to six-) spored, $60-95 \times 11-18 \mu$; spores uniseriate above, biseriate below, broadly ovate-oblong, uniseptate, slightly constricted at the septum, first hyaline, becoming dull brown, $14-24 \mu$ long, upper cell $9-10 \mu$ broad, lower cell $7-8 \mu$ broad. On leaves of Populus tremuloides Michx., Saanichton (H-2012).

Pleosphaerulina Pass.

Perithecia immersed, globose to flattened; asci aparaphysate, eight-spored; spores oblong, several-septate, one or more of the cells divided by a longitudinal septum, hyaline.

P. constricta (Starb.) Sacc. (Plate III, fig.48) Perithecia scattered to gregarious, under the epidermis and raising it in bumps, globose; asci sessile, aparaphysate, oblong, clavate, $50-60 \times 13.5-15 \mu$; spores oblong, greenish-hyaline, 3-5-septate, constricted at the middle septum, upper part shorter and broader, longitudinal septum in central cells, (18-) $20-30 \times 6-9 \mu$. On stems of Rosa sp., Sidney, leg. J. Macoun (OM unnumbered, April, 1915).

Pseudoplea v. Höhn.

Perithecia immersed, apices prominent, ostiole distinct, parenchymatous; asci ovoid, eight-spored; spores elongated, hyaline, muriform.

P. Trifolii (Rostr.) Petrák (Sphaerulina Trifolii Rostr., Pleosphaerulina Briosiana Pollicci) (Plate III, fig. 49) Perithecia on small circular spots, epiphyllous, brown, membranaceous, globose, 90-120 μ diameter; asci broadly ovate, sessile, aplanospore, 50-75 x 27-42 μ , eight-spored; spores hyaline, oblong, 3-septate, constricted at the middle septum, granular, with one or more cells containing a longitudinal septum, 24-33 x 12-15 μ . On leaves of Medicago sativa L., U.B.C., leg. W.Jones (H-2025).

Rehmieellopsis Bubák & Kabat

Stromata lacking; perithecia subepidermal, immersed, globose-conical, ostiole erumpent, coriaceous, brown-black; asci 10-24-spored, fusoid to clavate, short stalked, aplanospore; spores ellipsoid to oblong, uniseptate, ends rounded, hyaline.

R. abietis (E.Rostr.) O.Rostr. Perithecia amphigenous, subepidermal becoming erumpent, single, globose, papillate, 150-200 μ diameter; asci clavate to cylindrical, short-stalked, thick-walled, fasciculate, aplanospore, many-spored (16-24), 50-90 x 20-22 μ ; spores ellipsoid, irregular, hyaline, 11-21 x 4-6.7 μ , one-septate, not constricted, granular. On living leaves of Abies lasiocarpa (Hook.) Nutt., in British Columbia, not seen (Waterman 1945: 327; CPDS 1945).

Sphaerulina Sacc.

Perithecia immersed, latter somewhat erumpent, small, globose, or lenticular, black, membranaceous, ostiole plane or short papillate; asci

fasciculate, eight-spored, a paraphysate; spores elongate, rounded or pointed, with several cross walls, hyaline.

Spores large, 45-54 x 14-18 μS. Gentianae

Spores smaller, 18-22.5 x 7-9 μS. Alni fm. minor

S. Alni A.Lorr.Smith forma minor fm.nov. (Plate III, fig.50) Perithecia immersed, black, coriaceous, depressed-globose, 600-700 x 450-500 μ , ostiole erumpent, curved, 300-350 x 100-150 μ ; asci broad-ellipsoid, narrowed at the base to a delicate slender stalk and at the apex rounded-truncate, thin-walled, thickened at the apex, at maturity distorted around the spores, 48-66 x 18-24 μ ; spores hyaline, three-septate, not constricted at the septa, irregularly biseriate, ellipsoid to ovate, straight or slightly curved, multiguttulate, 18-22.5 x 7-9 μ . Differing from the species in the smaller spores. On petioles of Alnus oregona Nutt., Stanley Park, Vancouver (H-1953).

S. Alni A.Lorr.Smith forma minor fm. nov.

A typo differt sporis paullo brevioribus, nempe 18-22.5 x 7-9 μ , nec 22-30 x 8 μ .

Specimen typicum in University of British Columbia herbario conservatum, in petiolis Alni oregonis Nutt., prope locum dictum "Stanley Park, Vancouver" in British Columbia, legit M.E.Barr (H-1953), March 29, 1952.

S. Gentianae Wehm. (1946: 166) (Plate III, fig. 51, Plate VI, fig.40).

Perithecia formed beneath the epidermis, erumpent, superficial, globose to conical, 400-500 μ diameter, ostiole short papillate, wall thick, collapsing irregularly with age; asci cylindric-clavate, walls thick, 150-270 x 32-39 (~54) μ ; spores hyaline, irregularly biseriate, ellipsoid, 3-septate, slightly constricted at the septa, granular, guttulate, contained in an

evanescent gelatinous envelope, 45-54 x 14-18 μ . On Gentiana calycosa Griseb., Wall Lake, 6000', leg. T.M.C.Taylor (H-1933). This collection shows a few paraphyses; it could well be a Massarina.

17. Pleosporaceae

Perithecia separate, immersed, later more or less free, always with the short papillate or conical ostiole erumpent; membranaceous-coriaceous, smooth or tomentose or bristly; asci clavate or cylindrical, eight- to many-spored; paraphyses or interthecial tissues present; spores various, one- to many-celled, muriform or filiform, hyaline to dark-colored.

Spores one-celled, hyaline.

Asci cylindrical.....Phomatospora

Asci clavate.....Physalospora

Spores more than one-celled, hyaline or dark colored.

Spores two-celled.

Perithecia spiny or hairy.

Spores hyaline.....Venturia

Spores brown.....Protoventuria

Perithecia smooth.

Spores hyaline.

Spores divided into two very unequal cells.....

.....Apiosporella

Spores divided into two nearly equal cells.

Paraphyses present.....Didymella

Paraphyses absent.....Didymellina

Spores brown.....Didymosphaeria

Spores more than two-celled.

Spores with transverse walls only.

Spores filiform.....Ophiobolus

Spores not filiform.

Spores hyaline.....Metaspheeria

Spores brown.....Leptosphaeria

Spores muriform.

Asci eight-spored (sometimes less).....Pleospora

Asci sixteen-spored.....Capronia

Apiosporella v. Hohn.

Perithecia immersed, then erumpent, globose; membranaceous, dark brown to black, ostiole short; asci eight-spored, clavate-cylindrical; paraphyses present; spores elongate, clavate-pyriform, smaller below, uniseptate, hyaline. (Differs from Apiospora in lacking stroma).

A. alpina Wehm. (1946: 148) (Plate III, fig. 52) Perithecia thickly scattered, erumpent-superficial, shiny black, flattened-spherical, 250-350 x 200-250 μ ; walls thick; asci cylindrical-clavate, wall thickened at apex, 75-120 x 10-13 μ ; paraphyses slender, longer than asci; spores biserrate, ellipsoid to inequilateral, narrowed toward lower end, septum irregularly placed near this end, hyaline, 16-23 x 5-7 μ , guttulate. On Pedicularis bracteosa Benth., Cathedral Lakes (H-2036). Wehmeyer in his description states that no paraphyses nor paraphysis-like structures were seen; in this collection they are distinctly evident.

Capronia Sacc.

Perithecia erumpent, almost superficial, globose, ostiole papillate,

beset with stiff, straight, dark bristles; asci sixteen-spored, elongate, short stalked; spores fusiform or oblong, muriform, hyaline to brown; paraphyses lacking.

*C. pleiospora (Mout.) Sacc. (Plate III, fig.53, Plate VI, fig.41) Perithecia globose, setose, coriaceous-carbonaceous, 180 μ diameter; asci obovate, sessile, sixteen-spored, aplanospore, 45-70 x 15-21 μ ; spores yellow- to grey-brown, three-septate, one or more longitudinal septa, ellipsoid, crowded in the ascus, 11-15 x 5-7 μ . On bark of Prunus demissa (Nutt.) D.Dietr., Stanley Park, Vancouver (H-1956).

Didymella Sacc.

Perithecia immersed, ostiole erumpent, globose, membranaceous, black, smooth; asci cylindrical to clavate, eight-spored; spores ellipsoid or ovate, two-celled, hyaline; paraphyses present.

Spores small, 6-8 μ long.....D. Rauii

Spores larger, over 12 μ long.

Spores uniseriate in the ascus, 9-11 μ broad.....D. fenestrans

Spores biseriate, not over 8 μ broad.

Spores with ends acute.....D. Delphinii

Spores with ends blunt and rounded.

On Trifolium.....D. Trifolii

On Rubus.....D. appplanata

D. appplanata (Niessl.) Sacc. (Plate III, fig.54) Perithecia gregarious, submembranaceous, obscurely papillate, subglobose or depressed, immersed, becoming superficial when the epidermis falls away, black; asci cylindrical

to clavate, subsessile, paraphysate, (45-) 60-75 x 10-15 μ ; spores biseriate, obovate to oblong, uniseptate, hyaline, constricted at the septum, upper cell broader, 12-18 (-21) x 4.5-6 (-7.5) μ . On stems of Rubus parviflorus Nutt., U.B.C. (H-1973); Rubus spp., raspberry, Duncan (H-2022), (CPDS 1936, 1937), loganberry (CPDS 1931, 1932, 1934).

D. Delphinii Earle (Plate III, fig.55) Perithecia abundantly scattered, immersed, later partially exposed, black, short papillate, subglobose, 250-300 μ diameter; asci clavate, short stalked, paraphysate, 80-90 (-105) x 12-15 μ ; spores biseriate, hyaline, subellipsoid, unequally uniseptate, ends, subacute, 18-25 x 6.5-8 μ . On Arnica latifolia Bong., Cathedral Lakes (H-1972).

D. fenestrans (Duby) Wint. (Plate IV, fig.1) Perithecia scattered or gregarious, immersed, later erumpent, globose, becoming flattened-concave in age, membranaceous-coriaceous, black, ostiole cylindrical or conical, about 400 μ diameter; asci cylindrical, short stalked, 105-150 x 10-15 μ ; paraphyses indistinct; spores hyaline, oblong-ellipsoid, unequal-sided, ends rounded, uniseptate, slightly constricted at the septum, 18-30 x 9-12 μ . On stalks of Epilobium angustifolium L., U.B.C. (H-1947), Mount Seymour (H-2018).

D. Rauii (Ell. & Ev.) Sacc. (Plate IV, fig.2) Perithecia scattered or two or three together, covered by the loosened cuticle which is pierced by the papillate ostioles, globose-depressed, 300-350 μ diameter; asci clavate, short-stalked, 35-45 x 4.5-7 μ ; no paraphyses seen; spores biseriate, yellowish-hyaline, oblong-fusiform, uniseptate, constricted at the septum, slightly curved, 6-8 x 1.5-2 μ . On stems of Rosa sp., Sidney,

leg. J. Macoun (OM unnumbered, April 1915). Wehmeyer (1933: 265) says this species should be placed in Gnomonia or Gnomonina.

D. Trifolii (Fckl.) Sacc. (Plate IV, fig. 3) Perithecia gregarious, immersed, depressed-globose, ostiole papillate, erumpent, black, coriaceous, 200 μ diameter; asci cylindric-clavate, narrowed at the base, paraphysate, (60-) 80-100 x 10-12 μ ; spores biseriate, becoming uniseriate, oblong, uniseptate, constricted at the septum, hyaline, upper cell broader, 15-20 x 5-7 μ . On stems of Trifolium sp., Sidney, leg. J. Macoun (OM-370).

Diaporthe exiguestroma Dear., (Dearness 1917: 348), type collected on dead stems of Rosa sp., Vancouver Island, July 1916, John Macoun, 923, is, according to Wehmeyer (1933: 252), a Didymella. No specimens were seen.

Didymellina v. Hohn.

As Didymella, but destitute of paraphyses.

D. macrospora Klebahn. Perithecia black, carbonaceous, immersed, beak erumpent, irregularly globose, 175-305 x 120-321 μ , wall pseudoparenchymatous; asci few to many, fasciculate, ovate, fusiform, or clavate, short stalked or sessile, eight-spored, aplanospore, 68-115 x 37-53 μ ; spores oval to ellipsoid, two-celled, slightly constricted at the septum, upper cell somewhat larger, hyaline, 35-57 x 10-16 μ . On Iris sp., not seen (CPDS 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937).

Didymosphaeria Fckl.

As Didymella, but spores brown.

Spores large, not constricted at the septum, 16.5-21 μ long...D. oregonensis
Spores smaller, constricted at the septum, 9-12 μ long.....D. Borgii

*D. ?Borgii Carnena-Gatto & Sacc. (Plate IV, fig.5) Perithecia gregarious, erumpent through epidermis, globose, short papillate, 300-500 μ diameter, black; asci cylindrical, short stalked, four- to eight-spored (68-) 75-84 x 7-8 μ , paraphysate; spores oblique, light-brown, one-septate, constricted at the septum, 9-12 x 6 μ . On stems of Rosa sp., Saanichton (H-2024); this collection fits the species description except for the occasional four-spored condition of the asci and the constriction at the septum of the spores.

D. oregonensis Goodding. (Plate IV, fig.4) Perithecia black, membranaceous, globose, raising the epidermis of the branch, 400 μ diameter; asci clavate-cylindrical, very short stalked or sessile, eight-spored, paraphysate, 75-105 x 10.5-13.5 μ ; spores greyish-brown, biseriate or irregular, ellipsoid, uniseptate, granular, guttulate, upper cell slightly broader, 16.5-21 x 6 μ . On Alnus oregona Nutt., Knight Inlet, leg. I.Schiedel, det. D.C. Buckland (U-324); Sayward, leg. and det. D.C.Buckland (U-413, U-665); A. sitchensis Sarg., Clearwater, leg. and det. D.C.Buckland (U-666).

Leptosphaeria Ces. & de Not.

Perithecia immersed in the substrate, becoming erumpent, globose to conical, coriaceous-membranaceous, brown or black, ostiole papillate or conical; asci clavate or cylindrical, becoming elongated at maturity, eight-spored; spores ellipsoid to fusiform, transversely divided into three to many cells, yellow to dark brown; paraphyses present (occasionally lacking).

Spores three- to four-septate.

On Monocotyledons.

Spores elongate, 45-60 μ long.....L. petkovicensis

Spores shorter.

Spores 9-11 μ wide.....L. epicarecta

Spores up to 9 μ wide.

On Typha.....L. Typhae

On other plants.

On Carex.

Spores 6-9 μ wide.....L. Lolii

Spores 3-5.5 μ wide.....L. Apogon

On other plants.

Spores 17-27 μ long.....L. culmorum

Spores 15-18 μ long.....L. eustoma

On Dicotyledons.

Spores elongate, (30-) 36-42 μ long.....L. Silenes-acaulis

Spores shorter.

Spores 12-14 μ wide.....L. Andromedae

Spores narrower.

Spores over 20 μ long.

Spores 4-septate.....L. Californica

Spores 3-septate.....L. pratensis

Spores not over 20 μ long.

Asci 90-115 μ long.....L. coniothyrium

Asci up to 80 μ long.

Spores 15-20 x 3-4.5 μL. dumetorum

Spores 12-16 x 5 μL. Gaultheriae

Spores more than four-septate.

Spores five-septate.

Third cell of spore enlarged, on Monocotyledons.....L. culmicola

Second cell of spore enlarged, on Dicotyledons.....L. tenera

Spores six or more septate.

On Monocotyledons.

On Carex.....L. conosbrina

On other plants.

On Typha.....L. typhicola

On Gramineae.....L. culmifraga

On Dicotyledons.....L. agnita

L. agnita (Desm.) Ces. & de Not. (Plate IV, fig.6) Perithecia widely scattered, erumpent, globose or slightly depressed, 200-300 μ diameter, walls thick; asci short clavate, becoming elongate, base claw-like, 70-115 (-150) x 9-15 μ ; spores fasciculate, fusoid-cylindrical, pale yellow-brown, 6-septate, constricted at the third septum which is nearly central, third cell enlarged, tapering towards both ends, with droplets on each side of the septa, somewhat curved, (28-) 35-45 (-48) x 3.5-6 μ . On Erigeron speciesus DC. var. macranthus (Nutt.) Cronq., Vernon (H-2064); Lupinus latifolius Agh. var. subalpinus (Piper & Robins.) C.P.Sm., Cathedral Lakes (H-2051).

L. Andromedae (Awd.) Sacc. (L. hyperborea (Fckl.) Berl. & Vogl.) (Plate IV, fig.7) Perithecia epiphyllous, black, innate, ovoid, 160 x 130 μ , ostiole erumpent; asci broadly clavate, sessile, 75-136 x 24-30 μ ; spores biseriate-crowded, oblong, ends rounded, 3-septate, constricted at the central septum, hyaline finally becoming brown, 27-34 x 12-14 μ . On Cassiope sp., Garibaldi, leg. V.C.Brink (H-2050). This is very near to Massaria.

*L. ?Apogon Sacc. & Speg. (Plate IV, fig.8) Perithecia sparse, globose, immersed, papillate, 150μ diameter, membranaceous; asci oblong, subsessile, paraphysate, $45-60 \times 9-12 \mu$; spores biseriate, oblong-subfusoid, 3-septate, slightly constricted at the central septum, olivaceous, $22-27 \times 3-5.5 \mu$. On Carex diandra Schrank., Vanderhoef, leg. J.W.Eastham (H-2089); C. Hoodii Boott., Smithers, leg. J.W.Eastham (H-2090). This species fits the collections cited; the host differs.

L. Californica (Cke. & Hark.) Sacc. (Plate IV, fig.9) Perithecia gregarious, immersed, black, finally partially erumpent, globose-conical, $250-300 \mu$ diameter; asci clavate, stalked, $105-120 \times 12-15 \mu$; paraphysate; spores biseriate, sublanceolate, second cell swollen, 4-septate and slightly constricted at the septa, pale brown, $21-30 \times 2.5-8 \mu$. On branches of Cytisus sp., Duncan (H-2037).

L. Camelliae Cooke & Mass. Perithecia sparse, punctiform, on epiphyllous brown spots, papillate ostiole erumpent; asci subclavate, usually 4-spored, short stalked; spores biseriate, fusoid, curved, 3-septate, constricted, greenish, $25-27 \times 5-6 \mu$. On Camellia sp., Saanichton, not seen (CPDS 1932).

L. coniothyrium (Fckl.) Sacc. Perithecia single or gregarious, erumpent, depressed-globose, papillate; asci cylindrical, stalked, paraphysate, $90-115 \times 7.5-9 \mu$; spores mostly uniseriate, oblong, typically 3-septate, somewhat constricted, fuscous, $14.5-16 \times 4-5 \mu$. On Rubus sp., raspberry, not seen (CPDS 1928, 1931, 1932, 1933, 1934, 1936, 1937, 1938, 1939, 1940); Loganberry (CPDS 1931); blackberry (CPDS 1931).

L. consobrina Karst. (Plate IV, fig.10) Perithecia sparse to gregarious, immersed, spherical, ostiole papillate, erumpent, black; asci sessile, elongate-clavate, paraphysate, $72-120 \times 10-22 \mu$; spores biseriate above, uniserial below, slightly curved, attenuated at the ends, 7-8-septate, constricted at the septa, greyish-brown, (27-) $36-50 \times 4-8 \mu$. On Carex senea Fern., McBride, leg. J.W.Eastham (H-2053); C. brunneascens (Pers.) Poir., Vanderhoof, leg. J.W.Eastham (H-2043).

L. culmicola (Fr.) Awd. (L. microscopica Karst.) (Plate IV, fig.11) Perithecia scattered or subgregarious, immersed, ostiole papillate and erumpent, globose, $200-270 \mu$ diameter; asci clavate, short-stalked, paraphysate, $70-84 (-105) \times 7.5-9 \mu$; spores fusoid, subinequilateral, slightly curved, 5-septate, third cell enlarged, honey-yellow, $19-24 (-30) \times 3.5-5 \mu$. On Phalaris arundinacea L., Ladner, leg. J.W.Eastham (H-2032).

L. culmifraga (Fr.) Ces. & De Not. (Plate IV, fig.12) Perithecia scattered or seriate, immersed, later erumpent, subcompressed, ostiole short-conical, black, $300-400 \times 200-250 \mu$; asci clavate, paraphysate, $72-114 \times 10-16 \mu$; spores bi- to triseriate above, fusoid-elongate, mostly curved, 7-9-septate, third cell somewhat swollen, slightly constricted at the septa, yellow to dull brown, (24-) $32-46 \times (3-) 5-7 \mu$. On Agropyron spicatum (Pursh.) Rydb., Fairmont Hot Springs, leg. J.W.Eastham (H-2060); Agrostis alba L., Nelson, leg. J.W.Eastham (H-2059); A. Rossae Vasey, Garibaldi, leg. J.W.Eastham (H-2058); A. scabra Willd., Revelstoke, leg. J.W.Eastham (H-2057); Calemagrostis canadensis (Michx.) Beauv., Ootsa Lake, leg. J.W.Eastham (H-2061); Elymus Macounii Vasey, Anahin Lake, Chilcoten, leg. C.F.Cornwall (H-2053); Panicum occidentale Scrib., Gray Creek,

Kootenay Lakes, leg. J.W.Eastham (H-2065); Poa alpina L., Barkerville, leg. J.W.Eastham (H-2081); P. compressa L., Cariboo, leg. J.W.Eastham (H-2084); P. nemoralis L., Spuzzum, leg. J.W.Eastham (H-2047); P. nervosa (Hook.) Vasey, leg. J.W.Eastham (H-2048); P. palustris L., St.Mary's Lake, Kimberley, leg. J.W.Eastham (H-2046); P. stenantha Trin., Garibaldi, leg. J.W.Eastham (H-2077).

L. culmorum Awd. (Plate IV, fig.13) Perithecia scattered, immersed in the substrate, ostiole projecting, black, glabrous, up to 150 μ diameter; asci elongate-clavate, very short stalked or sessile, paraphysate, (45-) 60-90 (-100) x (12) 15-22 μ ; spores bi- to triseriate, oblong-fusoid, subinequilateral or slightly curved, 3-septate, second cell enlarged, honey-yellow to dull brown, (15-) 17-27 (-30) x 5-9 μ . On Calamagrostis neglecta (Ehrk.) Gaertn., Ootsa Lake, leg. J.W.Eastham (H-2042); C. purpurascens R.Br., Clinton, leg. J.W.Eastham (H-2087); C. rubescens Buckl., Cariboo Highway, leg. J.W.Eastham (H-2086); Calemovilfa latifolia (Hook.) Scribn., Kettle Valley, leg. H.K.DeBeck (H-2088); Dactylis glomerata L., Harrison Lake (H-2031); Danthonia intermedia Vasey, Garibaldi, leg. J.W. Eastham (H-2041); Deschampsia atropurpurea (Wahl.) Scheele, Garibaldi, leg. J.W.Eastham (H-2040); Elymus innovatus Beal, Vanderhoof, leg. J.W. Eastham (H-2038), Kechika River, leg. N.C.Stewart (H-2039); E. Macounii Vasey, Anahim Lake, Chilcotin, leg. C.F.Cornwall (H-2053); Koeleria cristata (L.) Pers., Cariboo Road, leg. E.Wilson (H-2085), Mt. Brent, Penticton, leg. J.W.Eastham (H-2082); Panicum thermale Boland, Fairmont Hot Springs, leg. J.W.Eastham (H-2083); Poa ampla Merr., Elk and Kootenay Rivers, leg. J.W.Eastham (H-2080); P. compressa L., Cariboo, leg. J.W.Eastham (H-2084); P. glauca Vahl, Mount Rowe, leg. T.M.C.Taylor (H-2079); P. gracillima Vasey,

Garibaldi, leg. J.W.Eastham (H-2075); *P. secunda* Presl., Ootsa Lake, leg. J.W.Eastham (H-2005); *Trisetum spicatum* (L.) Richt., Smithers, leg. J.W.Eastham (H-2076).

L. dumetorum Niessl. (Plate IV, fig.14) Perithecia scattered, immersed, subglobose, collapsing, papillate, membranaceous-coriaceous, black, 200-300 μ diameter; asci clavate-oblong, short stalked, paraphysate, 60-84 x 6-9 μ ; spores biseriate, fusoid-oblong, straight or slightly curved, subacute, 3-septate, constricted at the septa, second cell slightly swollen, olive-yellow, 15-20 x 3-4.5 μ . On *Lonicera involucratum* Banks., Harrison Lake (H-1971).

L. epicarecta (Cke.) Sacc. (Plate IV, fig.15) Perithecia scattered, black, globose, 165-210 μ diameter; asci clavate, paraphysate, 66-90 (-114) x 20-23 μ ; spores biseriate, ellipsoid, 3-septate, second cell enlarged, (21-) 27-30 x 9-11 μ . On *Carex atratiformis* Britt., Garibaldi, leg. J. Davidson (H-2054).

L. eustoma (Fr.) Sacc. Sensu Berl. (Plate IV, fig.16) Perithecia scattered or clustered, small, 90-150 (-200) μ diameter, immersed, later erumpent, globose then depressed; asci broad- to narrow-clavate, wall thickened, base claw-like, 45-70 x 8-12 μ ; spores biseriate, fusoid-ellipsoid, inequilateral to curved, deep yellow-brown, 3-septate, not much constricted at the septa, 16-20 (-23) x 3.5-5.3 μ . On *Phleum alpinum* L., Anahin Lake, Chilcoten, leg. C.F.Cornwall (H-2049).

L. Gaultheriae Dear. Perithecia scattered, black, erumpent, ovoid-conic to globose, 115-255 μ diameter; ostiole short, black, conic, shining; asci broad-linear, paraphysate, 75-80 x 6.5-7 μ ; spores pale brown, uniseriate,

overlapping, 3-septate, larger in the upper half, 12-16 x 5 μ . On dead stems of Gaultheria Shallon Pursh., Vancouver Island, August 1916, John Macoun 980, not seen (Dearness 1917: 349).

L. ?Lolii Syd. (Plate IV, fig.17) Perithecia sparse, black, immersed, finally erumpent, globose, 180-210 μ diameter; asci elongate-clavate, short-stalked, straight to curved, paraphysate, 72-102 (-120) x 13-18 μ ; spores biseriate, 3-septate, slightly constricted at the septa, yellow-brown, second cell enlarged, slightly curved, 24-32 x 6-9 μ . On Carex sitchensis Prescott, Topley Landing, Babine Lake, leg. J.W.Eastham (H-2091). This collection, although on a different host, fits the species well.

* L. petkovicensis Bubak & Ranojevic (Plate IV, fig.18) Perithecia globose, papillate, black, immersed, 100-150 μ diameter; asci elongate, short-stalked, paraphysate, 65-96 x 12-20 μ ; spores fusoid, straight or curved, attenuated at the ends, 3-septate, not constricted, pale brown, 38-50 (-60) x 4-5 μ . On Carex diandra Schrank., Vanderhoof, leg. J.W.Eastham (H-2089); C. pyrenaica Wahl., Mt. Brent, Penticton, leg. J.W.Eastham (H-2056); Juncus Drummondii Meyer, Mt. Apex, Penticton, leg. J.W.Eastham (H-1989); J. Parryi Engelm., Paradise Mine, Windermere, leg. G.A.Hardy (H-2034).

L. pratensis Sacc. & Br. Perithecia immersed, globose, small, depressed, 250-330 μ diameter, ostiole obtuse, erumpent; asci cylindrical-clavate, short-stalked, paraphysate, 68-112 x 8-12 μ ; spores biseriate, fusiform, ends obtuse, first hyaline, later yellowish, 3-septate, slightly constricted at the septa, straight or curved, 28-32 x 5-6 μ . On Melilotus sp., not seen (CPDS 1938).

L. Silenes-acaulis de Not. (Plate IV, fig.19) Perithecia epiphyllous, globose, ostiole erumpent, black, 90-150 μ diameter; asci oblong-clavate, sessile, paraphysate, (45-) 60-75 x (12-) 15-17 μ ; spores conglomerated, fusoid, slightly curved, 3-septate, not constricted, yellow-brown, 30-42 x 4.5-7 μ . On Silene acaulis L., Cathedral Lakes (H-2052).

L. tenera Ellis. (Plate IV, fig.20) Perithecia somewhat depressed-globose, 200-350 μ diameter, immersed, later erumpent, ostiole papillate, membranaceous; asci clavate, wall somewhat thickened, base claw-like, 75-95 x 6-7 μ ; spores bi- to triseriate, fusoid-cylindrical, straight or slightly curved, pale yellow, 5-septate, second cell enlarged, 18-23 x 2.5-3.5 μ . On Arabis Drummondii Gray, Mt. Apex, Penticton, leg. J.W.Eastham (H-2055); Draba stenoloba Ledeb., Mt. Brent, Penticton, Leg. J.W.Eastham (H-2019).

L. Typhae Karst. (Plate IV, fig.21) Perithecia sparse, amphigenous, innate, ostiole papillate, globose, 90-105 μ diameter, black; asci fusoid-elongate, subsessile, paraphysate, 50-70 x 9-12 μ ; spores biseriate, fusoid-elongate, curved, ends obtuse, 3- (4-) septate, second cell enlarged, yellowish, 15-21 x 4.5-6 μ . On Typha latifolia L., Stanley Park, Vancouver (H-2062).

L. typhicola Karst. (Plate IV, fig.22) Perithecia erumpent, globose, 200-350 μ diameter, short papillate, black; asci clavate, stalked, paraphysate, 90-124 x 12 μ ; spores biseriate, 9-septate, slightly constricted at the septa, light brown, middle cell enlarged, 33-50 x (4.5-) 6-10 μ . On Typha latifolia L., Stanley Park, Vancouver (H-2062).

The following collections cannot be identified to species. Due to the scarcity of material they are described here briefly as Leptosphaeria sp. only.

On Arenaria obtusiloba (Rydb.) Fern., Cathedral Lakes (H-2067) (Plate IV, fig. 23): Perithecia nearly superficial, brownish, coriaceous, covered with matted brown septate mycelium, globose, papillate, 400 μ diameter; asci clavate, stalked, paraphysate, 175-240 x 21-24 μ ; spores biserrate or crowded above, uniseriate below, rich brown, at first 4-, later 7-8-septate, constricted at the septa, third cell slightly enlarged, curved, ends obtuse, 45-54 x 10-12 μ .

On Arnica latifolia Bong., Cathedral Lakes (H-1972) (Plate IV, fig. 24): Perithecia black, coriaceous, covered with short spiny dark brown hairs, erumpent, globose-conical, 400 μ diameter; asci clavate, short-stalked, with scanty paraphyses, 180-250 x 30-36 μ ; spores cylindrical, ends rounded, 4-5-septate, second cell enlarged, slightly constricted at the septa, biseriate, yellowish- to grey-brown, (55-) 60-69 x 15-18 μ .

On Festuca attaica Trin., Telegraph Creek District, leg. W.H. Matthews (H-2002), and Sitanion hystrix (Nutt.) J.G. Smith, Paradise Mine, Windermere, leg. G.A. Hardy (H-2074) (Plate IV, fig. 25): Perithecia black, membranaceous, immersed, becoming erumpent, globose-depressed, 150-330 μ diameter, with or without basal tomentum; asci broad clavate, short-stalked, paraphysate, (105-) 120-150 (-210) x 27-33 μ ; spores biseriate, yellow- or olive-brown, mostly 3-, occasionally 4-6-septate, second cell enlarged, constricted at the septa, straight or curved, (33-) 39-54 (-60) x (11-) 12-18 (-20) μ .

On Ledum glandulosum Nutt., (H-2068) and Salix pennata Ball, (H-2069), Cathedral Lakes (Plate IV, fig. 26): Perithecia black, membranaceous-coriaceous, erumpent, globose-conical, 80-150 μ diameter, asci oblong-clavate, short stalked or sessile, a paraphysate, 36-66 x 15-21 μ ; spores

crowded, brown, 3-septate, deeply constricted at the central septum, each half ovate, $15-18 \times 4.5-8 \mu$.

On Ledum groenlandicum Oedr., Burnaby Lake, leg. V.C.Brink (H-2070) (Plate IV, fig. 27): Perithecia black, membranaceous, globose, erumpent, slightly tomentose, $90-105 \mu$ diameter, epiphyllous on grey spots on leaf and on branch; asci obclavate, sessile or short-stalked, paraphysate, $45-60 \times 9-15 \mu$; spores overlapping biseriate, yellow-brown, 3-septate, second cell enlarged, straight or slightly curved, $15-18 (-21) \times 4.5-6 \mu$.

On Oxytropis alpicola (Rydb.) Jones, Sage Pass, 7500', leg. T.M.C.Taylor (H-2066) (Plate IV, fig. 28): Perithecia black, membranaceous, tomentose, erumpent, globose, papillate, $600-670 \mu$ diameter; asci cylindrical-clavate, paraphysate, stalked, $150-180 \times 13-15 \mu$; spores light brown, bi- to tri-seriate, (9-) 11-12-septate, middle septum constricted, cell above the constriction enlarged, guttulate near each septum, $59-69 \times 6-7.5 \mu$.

On Poa rupicola Nash, Sage Pass, 7500', leg. T.M.C.Taylor (H-2078) (Plate IV, fig. 29): Perithecia black, membranaceous, immersed, globose, $120-150 \mu$ diameter; asci broad clavate, short stalked, paraphysate, $75-90 \times 21-25 \mu$; spores crowded biseriate, yellowish to reddish brown, 5-septate, third cell enlarged, constricted at the septa, ellipsoid-flattened, straight or curved, $24-36 \times 8-9 \mu$.

On Gramineae (ribbon grass), Duncan (H-2044): Perithecia black, membranaceous, visible under the epidermis, depressed-globose, $195-270 \mu$ diameter; asci cylindrical-clavate, short-stalked, paraphysate, $90-120 \times 9 \mu$; spores irregularly biseriate, hyaline, later olive-brown, 5-6-septate, middle cell enlarged, each cell containing a guttule, $24-30 \times 3-4 \mu$.

Metasphaeria Sacc.

Perithecia globose, immersed, covered at first by the epidermis, membranaceous-coriaceous, dark colored, with short, papillate or conical ostiole; asci cylindrical to clavate, eight-spored; spores ellipsoid, elongated, three- to many-celled, hyaline; paraphyses present.

Spores uniseriate, ends rounded.....M. Macounii

Spores subbiseriate, ends pointed.

Perithecia large, 270-330 μ diameter.....M. Poae

Perithecia smaller, 100-130 μ diameter.....M. zobeliana

M. Macounii Dear. (Plate IV, fig.30) Perithecia black, globose-conical, bases flattened, beneath wood with ostioles visible, through whitened areas of the stem, 300-750 μ diameter; asci cylindrical, paraphysate, 135-170 (-210) x 7-9 μ ; spores uniseriate, hyaline (becoming brown in one collection), rounded at the ends, 3-septate, 16-22 x 6-7 μ . On dead decorticated stems of Rosa sp., Vancouver Island, June, 1915, John Macoun, not seen (Dearness 1916: 100). A collection on Rosa sp., Saanichton (H-2024) fits this description perfectly except that the spores become brown with the end cells a lighter color. If this collection is identical with the species, as it appears, it should be transferred to Leptosphaeria.

M. Poae (Niessl.) Sacc. (Plate IV, fig.31) Perithecia black, membranaceous-coriaceous, crowned with short setae, globose-depressed, 270-330 μ diameter; asci clavate, curved, paraphysate, 70-90 (-105) x 9-15 μ ; spores subellipsoid, straight to slightly curved, indistinctly 3-septate, second cell enlarged, guttulate, hyaline, biseriate, 22-30 x 4.5-6 μ . On Poa interior Rydb., McDonald's Landing, Francois Lake, leg. J.W.Eastham (H-2035).

*M. ?zobeliana Staritz. (Plate IV, fig.32) Perithecia immersed, ostiole erumpent, small, 100-130 μ diameter, coriaceous-membranaceous; asci clavate, short-stalked, paraphysate, 54-60 x 7.5-17 μ ; spores irregularly biseriate, hyaline, 4-celled, constricted at the septa, straight to slightly curved, 18-27 x 4-6 μ . On Delphinium Brownii Rydb., Sinkut Lake, Vanderhoof, leg. J.W.Eastham (H-2033).

Ophiobolus Riess.

Perithecia scattered or gregarious, subglobose, membranaceous-coriaceous, brown or black, immersed or suberumpent; ostiole papillate or elongated; asci cylindrical, paraphysate; spores filiform, guttulate or septate, hyaline or yellowish.

Spores separating into many parts at maturity.....O. rufid

Spores not separating.

Spores 55-110 μ long.

On twigs; spores 55-70 μ long.....O. minor

On herbaceous stems or stems of Gramineae; spores 60-110 μ long.

On Gramineae; asci 90-115 x 10-13 μO. cariceti

On herbaceous stems; asci 120-150 x 8-10 μO. acuminatus

Spores over 115 μ long.

Perithecia on purplish stains on dead stalks; spores 140-165 μ

long.....O. porphyrogenus

Perithecia on living leaves; spores 115-135 μ long...O. Rostrupii

O. acuminatus (Sow.) Duby (Plate IV, fig.33, Plate VI, fig.42) Perithecia scattered, immersed, finally erumpent, ostiole conical to short-cylindrical, mycelial hyphae around the base, 300-400 μ diameter; asci cylindrical-clavate,

eight-spored, short-stalked, paraphysate, 120-150 (-180) x 8-14 μ ; spores filiform, multinucleate, then multiseptate, usually with one joint near the middle swollen, yellowish, 75-150 x 2-4 μ . On stalks of Cirsium lanceolatum (L.) Scop., Vancouver Island, leg. J.Macoun, det. J.Dearnness (OM-926); Cirsium sp., Saanichton (H-1969).

O. cariceti (Berk. & Br.) Sacc. (O. graminis Sacc.) Perithecia membranaceous-carbonaceous, smooth, immersed, 330-500 μ diameter; ostioles beaked, erumpent, curved, obliquely attached; asci elongate-clavate, short-stalked, or sessile, eight-spored, paraphysate, 90-115 \times 10-13 μ ; spores fascicled to subbiseriate, hyaline, filiform, curved, multiguttulate, finally 5-7-septate, 60-90 x 3 μ . Parasitic on wheat, barley, rye, and various wild grasses, causing the take-all disease. On Triticum aestivum L., Duncan, leg. W.Jones (immature) (H-612, CPDS 1930, 1935, 1936, 1939, 1940); on Avena sativa L. (CPDS 1939).

O.minor Bubak (Plate IV, fig.34) Perithecia globose to depressed, immersed with the short beak visible, later erumpent, black, membranaceous, 200-300 μ diameter; asci cylindrical, broader near base, short stalked, paraphysate, 54-90 x 7-12 μ ; spores filiform, more or less curved, often bent almost at right angles when free from the ascus, with several guttules and septa, hyaline, 45-70 x 1-2.5 μ . On dead twigs of Lonicera involucratum Banks, Harrison Lake (H-1971).

O. porphyrogenus (Tode) Sacc. (Plate IV, fig.35) Perithecia scattered or gregarious, mostly on purplish stains, immersed, later erumpent, globose-conical, black, glabrous or covered with short hyphae, 300-400 μ diameter; ostiole conical to cylindrical; asci cylindrical, very short stalked,

eight-spored, paraphysate, 140-165 x 4.5-8 μ ; spores filiform, parallel, multinucleate, later multiseptate, yellowish, 130-160 x 1-2 μ . On dead herbaceous stems, Duncan (H-1970).

O. Rostrupii Ferdinand & Winge (Plate IV, fig.36) Perithecia amphigenous, immersed, black erumpent, flattened-globose, 300-400 μ diameter, membranaceous, black; asci cylindrical, sessile, eight-spored, paraphysate, 125-165 x 14-16 μ ; spores filiform, hyaline, parallel, multiguttulate, then 6-7-septate, constricted at third and fourth septa, 115-135 x 1-4 μ . On leaves of Prunella vulgaris L., Patricia Bay, leg. W.Jones (H-436, O-15328, V-2161), North Saanich, leg. B.Lawson (H-63, H-613), Parksville, leg. W. Jones (O-19994).

O. rufid (Riess.) Rehm (Plate IV, fig.37) Perithecia forming small groups, immersed, conic-papillate ostiole erumpent, black, membranaceous, 320-640 μ diameter; asci cylindrical-clavate, short stalked, eight-spored, paraphysate, 135-210 x 9-10.5 μ ; spores lying parallel, filiform, with many septa, separating at these into short cylindrical, blunt-ended sections, 5-7 x 3-3.5 μ , hyaline to brownish. On stems of Phacelia leptosepala Rydb., Sage Pass, 7500', leg. T.M.C.Taylor (H-1968). Asci are longer in this collection than noted by Winter (140-150 μ).

Phomatospora Sacc.

Without stroma, perithecia immersed, occasionally erumpent, ostiole short, conical, globose, black, membranaceous; asci cylindrical, eight-spored; spores one-celled, hyaline, small, uniseriate, ellipsoid; with or without paraphyses.

Spores large, 9-15 μ long.....P. argyrostigma

Spores smaller, 7-9 μ long.....P. therophila

P. argyrostigma (Berk.) Sacc. (Plate IV, fig.38) Perithecia widely scattered, small, depressed-globose, immersed; asci cylindrical to clavate, (45-) 60-75 x 9-10 (-18) μ , sessile, eight-spored; spores boat-shaped, hyaline, biguttulate, granular, 9-15 x 3-5 μ , occasionally one or two large spores in an ascus, 28-33 x 6-7.5 μ . On dead leaves of Yucca sp., U.B.C. (H-1952); no measurements of asci or spores is given in any description, so that this determination is questionable.

P. therophila (Desm.) Sacc. (Plate IV, fig.39) Perithecia black, barely erumpent, membranaceous, globose, 200 (-300) μ diameter; asci cylindrical, 44-75 (-90) x 4.5-7 μ , eight-spored; paraphyses numerous, taper-pointed; spores obliquely uniseriate, hyaline, fusoid-ellipsoid, one-celled, 7-9 x 2.5-4 μ . On Juncus Drummondii Meyer, Mt. Apex, Penticton, leg. J.W.Eastham (H-1989).

Physalospora Niessl.

Perithecia immersed, globose, with the conical ostiole erumpent, black, smooth, membranaceous, to coriaceous; asci clavate, eight-spored; spores oblong, blunt-ended, one-celled, hyaline or light colored; paraphyses present.

P. Miyabeana Fukushi (Plate IV, fig.40) Perithecia black, membranaceous, single or gregarious, immersed, ostioles erumpent through blackened epidermis, globose, 200 μ diameter; asci clavate, short stalked, 58.5-75 x 10-12 μ ; spores greenish hyaline, one-celled, irregularly biseriate, ellipsoid, guttulate, 14-17 x 4.5-6 μ . Causing black canker or blight of willow;

on Salix ?babylonica L., Abbotsford, det. I.L.Conners (O-6463, O-6465); Salix sp., Abbotsford (O-6709, V-229), Vancouver (V-2211, V-2212), Chilliwack (V-233), Fraser Valley (O-7184, CPDS 1940).

Physalospora sp. Here are placed two collections which have not been identified satisfactorily.

On Aplopappus lyallii Gray, Garibaldi, leg. J.Davidson (H-2001) (Plate IV, fig. 41): Perithecia black, membranaceous, amphigenous, globose, about 150 μ diameter; ostiole plane; asci clavate, short stalked, paraphysate, 52-60 x 10-12 μ ; spores yellowish, one-celled, biseriate, ovate-oblong, 12-15 x 4.5-6 μ .

On Festuca attaica Trin., Telegraph Creek District, leg. W.H.Matthews (H-2002) (Plate IV, fig.42): Perithecia black membranaceous, immersed, globose, 150 μ diameter; asci obclavate, sessile, paraphysate, 36-57 x 9-14 μ ; spores greenish, biguttulate, ellipsoid, one-celled, 12-14 x 6 μ .

P. obtusa (Schw.) Cke. is recorded on apple (CPDS 1939, 1947, 1948) from North Saanich, Terrace, and Pemberton Meadows. According to Stevens (1933: 536-548) this fungus is not found in the Pacific Northwest. No collections have been seen.

Pleospora Rab. (Including Pyrenophora Fr., Clathrospora Rab., and Catharinia Sacc.)

Perithecia immersed at first, often becoming erumpent, globose to conical or depressed, black, membranaceous to coriaceous, smooth or with basal tomentum or apical setae or both, ostiole short papillate; asci cylindrical-clavate, wall thin or thick, usually thickened at the apex, eight-spored (occasionally less than eight); spores oblong, ellipsoid, fusoid,

or flattened, muriformly septate, hyaline to yellow to dark brown; paraphyses or interthecial tissues present.

In accordance with Wehmeyer (1946, 1948, 1951), the collections noted here are all grouped under the genus Pleospora; separation into four genera is difficult when a number of collections show variation from, for instance, distinctly setose to tomentose or glabrous perithecia in one species.

Perithecia typically depressed-globose, with a basal tomentum or none; spores flattened, longitudinal septa not extending into the end walls.....
.....Clathrospora

Spores three-septate.

Spores large, 35-42 μ long.....P. macrospora

Spores smaller, up to 36 μ long.

Spores (27-) 30-36 μ long.....P. diplospora

Spores 21-33 μ long.....P. permunda

Spores more than three-septate.

Spores four- to six-septate.

Spores 9-11 μ wide on the broad side, five-septate;
on Cirsium.....P. baccata

Spores 10 μ or wider; four- to six-septate.

Spores four- to five-(to six) septate, (18-) 23-
33 x 8-14 μP. pentamera

Spores five-septate, 27-35 x 13-16 μP. planispora

Spores more than six-septate, large, with numerous longitudinal
septa.....P. Elynæs

Perithecia variable, globose, conical, or depressed, with or without basal tomentum and setae; spores not flattened.....Pleospora and Pyrenophora

Spores three-septate.....P. trichostoma

Spores more than three-septate.

Spores four- to seven-septate.

Spores always five-septate.

Longitudinal septum through all cells.....P. infectoria

Longitudinal septum never through end cells.....

.....P. vulgaris

Spores four- to seven-septate.

Spores four- to six-septate, upper half globose, one- to two-septate, lower half longer and narrower, two- to three-septate; perithecia very small, conical, glabrous.....P. oligasca

Spores not as above, five- to seven-septate; perithecia larger, mostly tomentose or setose.

Perithecia small with apical crown of short setae and no basal tomentum...P. ambigua var. Crandallii

Perithecia larger, globose to depressed, basal tomentum present, often setae also.

Spores fusoid-oblong, usually five-septate.....P. angustata

Spores oblong-ellipsoid, ends obtuse, five- to seven-septate.....P. Compositarum

Spores seven-septate or more.

Spores mostly seven-septate.

Perithecia glabrous or tomentose at base.

On Gramineae and Cyperaceae.

Spores fusoid-oblong.....P. arctica

Spores ellipsoid-oblong, ends obtuse.....

.....P. discors

On other plants.

Perithecia small, spores broad, 14-25 μ wide.

.....P. Balsamorrhizae

Perithecia larger, spores narrower.

Spores yellow-brown, nearly straight,

uni- to biseriate.....P. herbarum

Spores darker brown, inequilateral,

mostly biseriate.....

.....P. herbarum var. occidentalis

Perithecia tomentose or setose or both.

Perithecia flattened-globose, tomentose and setose;

spores 20-30 x 9-12 μP. helvetica

Perithecia globose to pyriform, more definitely

setose; spores larger, 24.5-37 x 10.5-18 μ

.....P. Tragacanthae

Spores mostly more than seven-septate.

Perithecia definitely setose, usually globose to

conical.....P. comata

Perithecia tomentose, with occasional setas, globose

to depressed.

Spores 30-46 x 13-19 μ , (sevent) eight- to nine-

septate.....P. coloradensis

Spores larger, 33-70 μ long, eight- to fourteen-septate.

Spores 33-58 (-62) x 13-25 μ , eight- to ten-septate.....P. njegensis

Spores 43-81 x 16-30 μ , twelve- to fourteen-septate at maturity.....P. asymmetrica

P. ambigua (Berl. & Bres.) Wehm. var. Crandallii (Ell. & Ev.) Wehm. (Plate IV, fig. 43) Perithecia 100-200 μ diameter, globose to pyriform, usually on leaves, petioles or small stems, with an apical crown of short, stout, erect pointed setae and usually no basal tomentum; asci clavate, with a thickened wall and a claw-like base, (60-) 75-105 x 17-23 (-27) μ ; spores biseriate or becoming uniseriate, oblong-ellipsoid, red-brown, 5-7-septate, straight or slightly inequilateral, slightly asymmetric, tapered below, with a single longitudinal septum, ends broadly rounded, 19.5-26.5 x (8.5) 9-12.5 μ . On leaves of Arenaria obtusiloba (Rydb.) Fern., Cathedral Lakes (H-2067).

P. angustata Wehm. (Plate IV, fig. 44) Perithecia 150-300 μ diameter, globose or depressed, immersed, then erumpent, tomentose and setose; asci clavate to cylindrical-clavate, walls somewhat thickened, base claw-like, 75-115 x 11-23 μ ; spores overlapping uniseriate to biseriate, fusoid- to clavate-ellipsoid, 5-7-septate, yellow- to reddish-brown, straight or slightly inequilateral, one longitudinal septum, (16-) 19-26 x 7-9 (-10) μ . On Artemisia vulgaris L. var. discolor (Dougl.) Peck, Cathedral Lakes (H-2152); Gaillardia aristata Pursh., Gray Creek, Kootenay Lakes, leg. J.W.Eastham (H-2214).

P. arctica Karst. (Plate IV, fig. 45) Perithecia immersed, slightly erumpent,

globose, black, very short tomentose, 200-300 μ diameter; asci clavate, short-stalked, 135-200 x 24-50 μ ; spores biseriate, fusoid-oblong, slightly inequilateral, 7-septate, constricted at the central septum, yellowish-brown, 36-50 x 13-18 μ . On Poa gracillima Vasey, Garibaldi, leg. J.W. Eastham (H-2075); Trisetum spicatum (L.) Richt., Garibaldi, leg. J.W. Eastham (H-2322).

P. asymmetrica Wehm. (Plate IV, fig.46) Perithecia 250-500 μ diameter, globose to depressed, erumpent as papillate ostioles, smooth or tomentose at the base, in a few cases setose; asci clavate, becoming elongate, apical wall thickened, base claw-like, 170-250 (-350) x (20-) 40-60 μ ; spores biseriate, cylindrical-ellipsoid, yellow-brown to dark brown, 8-9-septate, soon becoming 12-14-septate, constricted at central primary septum, straight, strongly asymmetric, broader and shorter above, ends broadly rounded or abruptly tapered, 2-4 longitudinal septa, 43-81 x 16-30 μ . On Achillea lanulosa Nutt., Cathedral Lakes (H-2277); Antennaria media Greene, Cathedral Lakes (H-2290); Aplopappus Brandegei Gray, Cathedral Lakes (H-1937); Artemisia longepedunculata Rydb., Mt. Baldy, Chua Chua, leg. V.C. Brink (H-2306); Astragalus glareosus Dougl., Kaleden, leg. E.Milley (H-2249); Draba stenoloba Ledeb., Mt. Brent, Penticton, leg. J.W.Eastham (H-2019); Erigeron sp., Cathedral Lakes (H-2270); Lupinus latifolius Agh. var. subalpinus (Piper & Robins.) C.P.Sm. Cathedral Lakes (H-2162); Ranunculus Eschscholtzii Schlecht, Tenquille Lake, Pemberton, leg. W.Taylor (H-2291), Kokanee, leg. J.W.Eastham (H-2292), Garibaldi, leg. J.Davidson (H-2293); Viola adunca Smith, Sooke, leg. J.W.Eastham (H-2202).

P. (Clathrospora) baccata Ell. (Plate IV, fig.47) Perithecia scattered, depressed-globose, papillate, immersed at first, becoming superficial,

tomentose at base, 300-500 μ diameter; asci clavate, short stalked, 75-120 x 15-24 μ ; spores partially biseriate, oblong-ovate, 5-septate, 1-2 longitudinal septa, 20-30 x 10-14 x 9 μ . On Cirsium arvense (L.) Scop., Princeton (H-2111, H-2110); C. lanceolatum (L.) Scop., Vancouver Island, leg. J.Macoun (OM-926).

P. Balsamorrhizae Tracy & Earle (Plate IV, fig.48) Perithecia small, 100-250 μ diameter, globose, finally somewhat flattened, ostiole minute papillate, tomentose; asci broad clavate, thick-walled, with a claw-like base, 115-175 x 35-65 μ ; spores bi- to triseriate, oblong-ellipsoid, straight, ends blunt, broad, constricted at the central septum, 7- (8-) septate, yellow-brown at first, becoming black brown to opaque, 33-63 x 14-25 μ . On Erigeron filifolius (Hook.) Nutt., Anarchist Mt., Osoyoos, leg. J.W.Eastham (H-2300); Solidago decumbens Greene, Sinkut Mt., Vanderhoof, leg. J.W.Eastham (H-2276).

P. coloradensis Ell. & Ev. (Plate IV, fig.49) Perithecia 200-400 μ diameter, scattered, depressed-globose, tomentose; asci broad clavate, apical wall thickened, base claw-like, 90-140 x 20-42 μ ; spores biseriate, oblong-ellipsoid, (7-) 8-9-septate, dark yellow-brown to dark red-brown, mostly asymmetric, broader and shorter above, narrower and longer below, constricted at central septum, ends broadly rounded, lower end of spore commonly with irregular oblique septation, 30-44 (-46) x 14-19 μ . On Anemone multifida Poir. affinis Hudsoniana, Bennett, leg. B.Boivin (H-2129); Astragalus campestris, Armstrong, leg. E.Wilson (H-2285); Phacelia leucophylla Torr., Vernon (H-1940).

P. comata Niessl. (P. ciliata Ell.) (Plate IV, fig. 50, Plate VI, fig. 43) Perithecia 100-350 μ diameter, scattered, globose to conical, immersed at first, often erumpent-superficial, with a crown of brown, pointed setae at the apex; asci broad-clavate, thick walled, base claw-like, 90-200 x 26-35 μ ; spores biseriate, oblong-ellipsoid, dark yellow-brown to dark red-brown, 7-8-9-septate, straight or slightly curved, mostly asymmetric, narrower and more tapered below, ends broadly rounded, constricted at the middle and sometimes at the other septa, 28-50 x 13-18 μ . On Anemone globosa Nutt., between Redstone and Chelquoit Lakes, leg. J.W.Eastham (H-2128); A. multifida Poir. affinis hudsoniana, Bennett, leg. B.Boivin (H-2129); Aplopappus lyallii Gray, Garibaldi, leg. J.Davidson (H-2001); Arabis canescens Nutt., Summerland, leg. G.E.Woolliams (H-1683); Artemisia borealis Pall., Sinkut Mt., Vanderhoof, leg. J.W.Eastham (H-2304); Castilleja miniata Dougl., Cathedral Lakes (H-2163); Chrysopsis villosa (Pursh.) Nutt. var. hispida (Nutt.) Gray, Fairmont Hot Springs, leg. J.W. Eastham (H-2117); Erigeron linearis (Hook.) Piper, Tranquille, leg. T.M.C. Taylor (H-1990); E. longophyllus Hook., Windermere, leg. J.W.Eastham (H-2212); Erigeron spp., Cathedral Lakes (H-2274); Oxytropis alpicola (Rydb.) Jones, Sage Pass, leg. T.M.C.Taylor (H-2066); Phacelia sericea Gray, Garibaldi, leg. W.Cottle, (H-2254, H-2253, H-2198); Phlox diffusa Benth., Garibaldi, leg. W.Cottle (H-1816), Mt. Copley, leg. D.Elvidge (H-2133); P. Douglasii Hook., The Lions, leg. F.Perry (H-2130); P. rigida Benth., Elko, leg. J.W.Eastham (H-2305); P. speciosa Pursh., Penticton, leg. J.W.Eastham (H-2132); Polemonium coeruleum L. subsp. occidentale (Greene) Davids., Mile 107, Alaska Highway, leg. M.Y.Williams (H-2135); P. pulcherrimum Hook., Kimberley, leg. J.W.Eastham (H-2328); P. viscosum Nutt., Garibaldi,

leg. W.Taylor (H-2136); Potentilla dissecta Nutt., Garibaldi, leg. J. Davidson (H-2071); P. diversifolia Lehm., Kennco Mining Camp, leg. G.A.Noel (H-2003); Garibaldi, leg. J.Davidson (H-2071a); Silene Douglasii Hook., Cathedral Lakes (H-2148); Stenanthium occidentale Gray, Mt. Stephen, Field, leg. J.M.Fogg (H-2323).

P. Compositarum Earle (Plate IV, fig.51) Perithecia scattered, globose to depressed, ostiole minute papillate, tomentose at base and sometimes with a few apical spines, 100-350 x 100-250 μ ; asci stout clavate, thick walled, with a claw-like base, 65-135 x 14-23 μ ; spores biseriate, oblong-ellipsoid, ends rounded, obtuse, 5-7-septate, with usually one longitudinal septum in each cell, including the end cells, 19.5-28 x 8-12.5 μ , dark brown. On Aquilegia formosa Fisch., Tenquille Lake, Pemberton, leg. W.Taylor (H-2261); Draba Paysonii Macbr. var. Treleasii (Schulz) Hitchc., Rainbow Mt., Bella Coola, leg. F.Perry (H-2265); Erigeron corymbosus Nutt., Kamloops, leg. E. W.Tisdale (H-2211); E. filifolius (Hook.) Nutt., Anarchist Mt., Osoyoos, leg. J.W.Eastham (H-2300); E. pumilus subsp. intermedius, Tobacco Plains, leg. J.W.Eastham (H-2213); E. speciosus DC. var. macranthus (Nutt.) Cronq. Vernon (H-2064); Iris germanica L., Duncan (H-1993); Senecio pauperulus Michx., Golden, leg. J.W.Eastham (H-2299); Stenanthium occidentale Gray, Mt. Stephen, Field, leg. J.M.Fogg (H-2323).

P. (Clathrospora) diplospora Ell. & Ev. (Plate IV, fig.52) Perithecia scattered, depressed-spherical, 250-600 μ diameter, with a radiating basal tomentum; asci clavate, thick walled, with a claw-like base, 125-175 x 26-40 μ ; spores biseriate, ovoid, rhomboid-ellipsoid, clathrate-flattened, 3-septate, central cells with a longitudinal septum, end cells without,

cylindrical to fusoid in edge view, 30-43 x 16-24 x 12.5-15 μ . On Phlox longifolia Nutt., Penticton (H-2112).

P. discors (Mont.) Ces. & de Not. (Plate V, fig.1) Perithecia sparse, globose, 100-120 μ diameter, tomentose at base, immersed; asci broad-clavate, short stalked, curved, 120-140 x 27-32 μ ; spores biseriate, oblong-ovoid, lower half narrower, straight to inequilateral, 7-septate, 1-4-longitudinally septate, yellow-brown, constricted at the central septum, 27-35 (-45) x 12-16 μ . On Carex hoodii Boott., Fort Fraser, leg. J.W. Eastham (H-2118); Luzula campestris (L.) DC., Mt. Seymour (H-2106); Poa ampla Merr., Elk and Kootenay Rivers, leg. J.W. Eastham (H-2080); P. confinis Vasey, Saanich Spit, leg. J.W. Eastham (H-2228); Gramineae indet., Mt. Seymour (H-2095).

P. (Clathrospora) Elynæ (Rab.) Ces. & de Not. (Plate V, fig.2) Perithecia immersed, depressed, globose, ostiole minute papillate, 260 μ diameter; asci broad-clavate, abruptly short stalked, 108-150 x 35-51 μ ; spores bi- to triseriate, oblong to broad ellipsoid, dark brown, 7-8-septate, 3-5-longitudinally septate, 45-60 x 18-27 μ . On Carex atratiformis Brit., Garibaldi, leg. J. Davidson (H-2054); Luzula spicata (L.) DC., Dunn Peak, Chua Chua, leg. E.W. Tisdale (H-2124).

P. helvetica Niessl (P. chrysospora Niessl) (Plate V, fig.3) Perithecia 150-400 μ diameter, scattered, globose to depressed, immersed at first, later slightly erumpent, tomentose below, setose above; asci clavate to broad-clavate, wall somewhat thickened, base claw-like, 80-140 x 17-24 (-28) μ ; spores biseriate, oblong-ellipsoid, yellow-brown to dark red-brown, 5- to mostly 7-septate, straight or slightly curved, often assymmetric with a

narrower tapered lower portion, broadly rounded at the ends, more or less constricted at the septa, with 2-3 longitudinal septa, $20-30 \times 9-12.5$ (-14)

p. On Agropyron trachicaulum var. unilaterale (Cassidy) Malte, Fairmont Hot Springs, leg. J.W.Eastham (H-2140); Anaphalis margaritacea (L.) D. & H., Mt. Caven, Flagstone, leg. F.B.Peterson (H-2303); Draba alpina L., Geribaldi, leg. J.Davidson (H-2294); D. Paysonii Macbr., Cathedral Lakes (H-2157); Poa alpina L., Hudson Bay Mt., Smithers, leg. J.W.Eastham (H-2231); P. glauca Vahl., Mount Rowe, leg. T.M.C.Taylor (H-2079).

P. herbarum (Pers.) Rab. (Plate V, fig. 4) Perithecia scattered, depressed-globose, ostiole papillate, $250-400 \times 150-300$ μ , somewhat collapsed with age, immersed; asci clavate, thick walled, with a claw-like base, $90-165$ (-215) $\times 24-28$ (-40) μ ; spores 7-septate, with 1-2 longitudinal septa, partially uniseriate, yellow-brown, ovoid-oblong, rounded at the ends, constricted at the central septum and slightly at the others, $28-45 \times 14-18$ μ . On Allium Cepa L., Duncan (H-2256), Agassiz (CPDS 1944); Aquilegia formosa Fisch., Duncan (H-2182); Armeria maritima Willd., U.B.C. (H-2169); Brassica spp., Duncan (H-2257); Campanula sp., Duncan (H-2099, H-1996, H-2330); Centaurea Jacea, U.B.C. (H-2176); Cichorium Intybus L., Salmon Arm (H-2259); Cirsium sp., Saanichton (H-1969); Digitalis sp., U.B.C. (H-2258); Erigeron sp., Saanichton (H-2315); Hieracium eurantiacum L., U.B.C. (H-2282); Iris germanica L., Duncan, (H-1993); Lathyrus odoratus L., Vancouver Island, leg. J.Macoun (OM unnumbered, March 11, 1915), Duncan (H-2181); Lupinus sp., U.B.C. (H-1995), Vancouver Island, leg. J.Macoun (OM-916); Lychnis Coronaria Desr., Duncan (H-2179); Oenothera biennis L., U.B.C. (H-1992), Duncan (H-1994); Oenothera sp., U.B.C. (H-2113); Pisum sativum L., Duncan (H-2177), Cobble Hill (CPDS 1948); Primula spp., U.B.C. (H-2170); Rumex sp., Saanichton (H-2114);

Sanicula crassicaulis Poepp., Vancouver Island, leg. J. Macoun (OM unnumbered, July 17, 1916, OM-586); Tanacetum vulgare L., U.B.C. (H-2171); Trifolium sp., Sidney, leg. J. Macoun (OM-370); Liliaceae indet., Duncan (H-2295); herbaceous stems, Duncan (H-2255), North Vancouver (H-2092).

P. herbarum (Pers.) Rab. var. occidentalis Wehm. (Plate V, fig. 5) Differing from the species in the darker, red-brown spores which are more inequilateral, more consistently biseriate in shorter asci; asci 80-145 x 20-28 (-35) μ ; spores 26-35 x 11-16 μ . On Achillea Millefolium L., Mt. Caven, Flagstone, leg. F.B.Peterson (H-2279); Antennaria snaphalooides var. genuina Boivin, Elko, leg. J.W.Eastham (H-2017); A. dimorpha T. & G., Summerland, leg. G.E. Woolliams (H-1682); A. umbrinella Rydb., Merritt, leg. T.M.C.Taylor (H-2016); Aster sp., Salmon Arm (H-2289); Hieraceum Albertinum Farr., Mt. Caven, Flagstone leg. F.B.Peterson (H-2199); Penstemon tolmiei Hook., Mt. Brent, Penticton, leg. J.W.Eastham (H-2201); Tofieldia coccinea Rich., Fort Nelson, Alcan Highway, leg. M.Y.Williams (H-2245).

P. infectoria Fckl. (Plate V, fig. 6) Perithecia seriate along culms, rarely solitary, erumpent, spherical, black, around 350 μ diameter; asci clavate to cylindrical-clavate, short stalked, 84-138 x 12-17 μ ; spores uniseriate, occasionally subbiseriate, ellipsoid to ovoid-oblong, 5-septate, with one longitudinal septum, constricted at the central septum, golden brown becoming darker, 18-26 x 7-12 μ . On Gramineae indet., Saanichton (H-2317).

P. (Olathrospora) macrospora Schroet. (Plate V, fig. 7) Perithecia gregarious, globose-depressed, 250-300 μ diameter, black, erumpent, thick walled, slightly tomentose; asci broad clavate, attenuated to a short stalk, 135-170 x 24-37 (-45) μ ; spores irregular, ellipsoid, 3-septate, with a longitudinal septum through the middle cells, flattened, yellow-brown, 35-45 x 13-31 x 9-12 μ .

On Arctagrostis latifolia (R.Br.) Griseb., Telegraph Creek District, leg.

W.H.Matthews (H-2021); Elymus innovatus Beal., Kechika River north of

Sifton Pass, leg. N.C.Stewart (H-2039).

P. njegusensis Bub. (Plate V, fig.8) Perithecia (150-) 200-400 μ diameter, globose or depressed, glabrous, tomentose or even setose; walls rather thick; asci broad-clavate, thick-walled, with a claw-like base, 105-220 x 30-55 μ ; spores biseriate, oblong-ellipsoid, dark yellow-brown to very dark red-brown, 8-10-septate, mostly straight, rarely inequilateral, mostly asymmetric with a broader, shorter upper and a longer, narrower lower portion, constricted at the central septum and sometimes at the other septa, ends broadly rounded, longitudinal septa one to three, 33-58 (-62) x 13-25 μ . On Erigeron com-
positus Pursh., var. glaabratus Macoun, Bennett, leg. J.M.Gillett (H-2210), Okanagan Landing, leg. E.Wilson (H-2209).

P. oligasca Bub. (Plate V, fig.9, Plate VI, fig.44) Perithecia thickly scattered, minute, 70-150 μ diameter, conical-globose, with a comparatively large, conical, often curved, beak-like ostiole, soon erumpent superficial; asci few, at first broad saccate, almost globose, with a thickened apical wall and a claw-like base, becoming broad clavate, 45-70 x 30-60 μ ; spores bi- to triseriate, oblong-ellipsoid, brown, 4- to 6-septate, constricted at the second or third septum, upper half short, stout, globose, and 1- to 2-septate, lower half longer, narrower, oblong, and 2- to 3-septate, with one, or rarely two longitudinal septa in all but the end cells, (18-) 25-36 μ long, 9-14 μ wide in the upper, and 8-11 μ wide in the lower half. Many of the collections listed here are immature, and are determined as this species on the basis of perithecial size and shape and ascus shape. On Antennaria anaphaloides Rydb. var. genuina Boivin, Elko, leg. J.W.Eastham (H-2017);

A. dimorpha T. & G., Summerland, leg. G.E.Woolliams (H-1682); A. Howellii Greene, Williams Lake, Cariboo, leg. E.W.Tisdale (H-2015); A. microphylla Rydb., Big Creek, leg. C.Bertrand (H-2013); A. rosea Greene, St. Mary's Lake, Kimberley, leg. J.W.Eastham (H-2014); A. umbrinella Rydb., Merritt, leg. T.M.C.Taylor (H-2016); Dryas octopetala L., Cathedral Lakes (H-2027), Mt. Baldy, Chua Chua, leg. E.W.Tisdale (H-2020); Eriogonum subalpinum Greene, Cathedral Lakes (H-2028); E. umbellatum Torr. var. majus Benth., Mt. Apex, Penticton, leg. J.W.Eastham (H-2030); Geum triflorum Pursh., Chelquoit Lake, Chilcotin, leg. J.W.Eastham (H-2029); Potentilla dissecta Nutt., Garibaldi, leg. J.Davidson (H-2071); P. diversifolia Lehm., Kennco Mining Camp, leg. G.A.Noel (H-2003); P. emarginata Pursh., Garibaldi, leg. J.W.Eastham (H-2073); Senecio canus Hook., Cathedral Lakes (H-2072).

P. (Clathrospora) pentamera Karst. (Plate V, fig.10) Perithecia immersed, later erumpent, subglobose to depressed, ostiole conical and depressed, glabrous or tomentose at the base, 150-250 μ diameter; asci clavate, short-stalked, 65-150 x 24-30 μ ; spores biseriate, ovoid-ellipsoid to rhomboid, flattened, 4-5-(6-) septate, longitudinal septum in the middle cells, 15-34 x 11-15 x 7-10 μ . On Agropyron latiglume (Scribn. & Sm.) Rydb., Sage Pass, leg. T.M.C.Taylor (H-2319), Garibaldi, leg. J.W.Eastham (H-2141); Agrostis Rossae Vasey, Garibaldi, leg. J.W.Eastham (H-2058); Andropogon scoparius Michx., Fairmont Hot Springs, leg. J.W.Eastham (H-2267); Calamagrostis purpurascens R.Br., Chasm, Clinton, leg. J.W.Eastham (H-2087); Carex aperta Boott., Mirror Lake, Kaslo, leg. J.W.Eastham (H-2260); Oryzopsis hymenoides (R.& S.) Ricker, Penticton, leg. J.W.Eastham (H-2234); Poa compressa L., Flying U Ranch, Cariboo, leg. J.W.Eastham (H-2084); P. interior Rydb., McDonald's Landing, Francois Lake, leg. J.W.Eastham

(H-2035); *Stipa comata* Trin. & Rupr., Crenbrook, leg. J.W.Eastham (H-2222); Gramineae indet., Kamloops, leg. J.Macoun (OM-154).

P. (*Clathrospora*) *permunda* (Cke.) Sacc. (Plate V, fig.11) Perithecia thickly scattered, immersed, finally superficial, flattened-spherical, ostiole minute, 200-400 μ diameter, collapsing pezizoid, saucer-shaped with age, surrounded by a radiating brown tomentum; asci broadly clavate, with a thickened wall and claw-like base, 75-115 (-150) x 19-30 μ ; spores biseriate, broadly rhomboid-fusoid to clavate-ellipsoid in face view, 3-septate, end cross walls often at an oblique "Y" angle to the single central septum which does not extend into the end cells, 21-33 x 10-12.5 (-15) x 7-10 μ . On *Astragalus campestris*, Armstrong, leg. E.Wilson (H-2285); *Phlox longifolia* Nutt., Mt. Munson, Penticton, leg. J.W.Eastham (H-2264); P. *rigida* Benth., Elko, leg. J.W.Eastham (H-2305); *Stipa comata* Trin. & Rupr., Dewdrop Flat, leg. V.C.Brink, det. F.Dickson (H-2026).

P. (*Clathrospora*) *planispora* Ell. (Plate V, fig.12) Perithecia scattered, depressed-globose, slightly tomentose at the base, about 300 μ diameter; asci clavate, thick walled, with a claw-like base, 78-100 (-120) x 22-26 μ ; spores biseriate, broadly rhomboid- to fusoid-ellipsoid in face view, flattened, 5-septate, not constricted at the septa, with a single longitudinal septum through the central cells, 27-35 x 13-16 x 9-11 μ . On *Arabis hirsuta* (L.) Scop. var. *glabrata*, Crawford Bay, leg. H.Murray (H-2320); *A. Holboellii* Hornem., Lansdown, Okanagan, leg. E.Wilson (H-2321).

P. *Tragacanthae* Rab. (Plate V, fig.13) Perithecia 100-400 μ diameter, globose, slightly flattened, or conic-globose to pyriform with a conical ostiole, immersed, later erumpent, setose about the ostiole; asci clavate

to stout-clavate, thick walled, base claw-like, $95-140 \times (15-) 24-35 \mu$; spores biseriate, oblong to clavate-ellipsoid, yellow-brown to dark red-brown or almost opaque, 7-septate, usually straight, or inequilateral, or the lower portion curved, mostly asymmetric with the upper portion broader and shorter, broadly rounded at the ends, constricted at the middle and slightly so or not constricted at the other septa, with two or more longitudinal septa, $(24-) 26-37 \times 11-16 (-18) \mu$. On Anemone Drummondii Wats., Cathedral Lakes (H-2158); Antennaria microphylla Rydb., Big Creek, leg. C.Bertrand (H-2013); Arenaria capillaris Poir. var. nardifolia, Fish Lake, leg. J.R.Anderson (H-2302); A. formosa Fisch., St. Mary's Prairie, Cranbrook, leg. J.W.Eastham (H-2023); A. obtusiloba (Rydb.) Fern., Mt. Brent, Penticton, leg. J.W.Eastham (H-2215); A. verna var. propinqua Fern., Mt. Cheam, leg. J.K.Henry (H-2217), Mt. Copley, leg. D.Elvidge (H-2216); Draba praeculta Greene, leg. W.Taylor, Mt. Waddington (H-2266); Erigeron acris L. var. asteroides (Andrz.) DC., Fairmont Hot Springs, leg. J.W. Eastham (H-2205); E. aureus var. typicus Cronq., Mt. Brent, Penticton, leg. J.W.Eastham (H-2207); E. compositus Pursh., Cathedral Lakes (H-2273); E. compositus Pursh., var. glabratum Macoun, Garibaldi, leg. J.Davidson (H-2208); Linum Lewisii Pursh., Windermere, leg. J.W.Eastham (H-2219); Lupinus Lyallii Gray, Cathedral Lakes (H-2272); Oxytropis Cusickii Greenm., Cathedral Lakes (H-2271); Pedicularis bracteosa Benth., Cathedral Lakes (H-2036); Phacelia sericea Gray, Cathedral Lakes (H-2149).

P. trichostoma (Fr.) Ces. & de Not. Perithecia 300-500 (-750) x 200-350 μ , sclerotioïd, usually rather thickly scattered, somewhat flattened-spherical, strongly erumpent, often becoming superficial, ostiole indefinite or flattened-papillate, with a few or many setae; asci stout clavate, with a much thickened

wall, base claw-like, 160-210 x 35-50 μ ; spores biseriate, oblong-ellipsoid, 3-septate, light olive-brown, ends broadly rounded, constricted at all septa, often with a vertical septum in one or two cells, 44-60 x 18-25 μ .

On Hordeum vulgare L., not seen (CPDS 1935, as Pyrenophora teres).

P. vulgaris Niessl (Plate V, fig.14) Perithecia globose or depressed, tomentose at base, 100-350 x 100-250 μ ; asci stout clavate, wall thickened, base claw-like, 70-120 x 14-19 μ ; spores biseriate, oblong-to fusoid-ellipsoid, ends usually acute but sometimes obtuse, often inequilateral or slightly curved, 3- then 5-septate, constricted at the central septum, with a vertical septum in the central cells, dark brown, 17.5-26 x 7-10 μ . On Balsamorrhiza sp., Vernon (H-2162); Erigeron sp., Vernon (H-2288); Phacelia leucophylla Torr., Vernon (H-1941); Liliaceae indet., Duncan (H-2295); dead herbaceous stalks, Penticton (H-2281).

The following collections have not been satisfactorily identified to species; descriptions are given as Pleospora spp.

P. (Catharinia) sp. On Ledum groenlandicum Oedr., Burnaby Lake, leg. V.C. Brink (H-2070) (Plate V, fig.15): Perithecia erumpent through greyish spots, globose, 200 μ diameter, black, membranaceous; asci clavate to ovate, apex thickened, 32-54 x 18-24 μ ; spores hyaline, 3-4- (5-) septate, one longitudinal septum through most cells, constricted at the septa, 15-21 x 6-7.5 μ .

P. (Clathrospora) sp. On Carex praegracilis Boott., Flying U Ranch, Cariboo, leg. J.W. Eastham (H-2298) (Plate V, fig.16): Perithecia black, immersed, visible as black dots through the epidermis, globose, slightly tomentose, 210-240 μ diameter, membranaceous; asci clavate, thick-walled, with a claw-like base, 126-180 x 36-45 μ ; spores dark brown, 5-septate, constricted at

the septa, ellipsoid-oblong, with one longitudinal septum through middle cells, $30-45 \times 12-18 \mu$.

On Poa rupicola Nash, Sage Pass, leg. T.M.C.Taylor (H-2078) (Plate V, fig. 17): Perithecia black, membranaceous, globose, about 180μ diameter; asci clavate, short-stalked, about $135 \times 27 \mu$; spores 8-septate, with 1-2 longitudinal septa, through most cells, reddish to dark brown, flattened, $30-37.5 \times 12-15 \times 9-12 \mu$.

P. sp. On Agrostis humilis Vasey, Garibaldi, leg. J.Davidson (H-2310) (Plate V, fig.18): Perithecia black, membranaceous, immersed, globose, $180-250 \mu$ diameter; asci broad clavate, short stalked, $120-126 \times 48-54 \mu$; spores very light brown, biseriate, 6-8-septate, with two longitudinal septa, ellipsoid-oblong, upper portion somewhat broader and much shorter than lower, $33-50 \times 13-21 \mu$.

On Gaillardia aristata Pursh., Vernon (H-2312) (Plate V, fig.19): Perithecia immersed, globose, collapsing, short papillate, black, membranaceous, with radiating brown hyphae at base; asci clavate, short stalked, $90-105 \times 13-15 \mu$; spores light to dark brown, fusoid, flattened on one side, 3-7-septate, constricted at the central septum, with one longitudinal septum through middle cells, $27-30 \times 6-7.5 \mu$.

On Oxytropis alpicola (Rydb.) Jones, Sage Pass, leg. T.M.C.Taylor (H-2066) (Plate V, fig.20): Perithecia black, partially erumpent, membranaceous, globose-depressed, $300-400 \mu$ diameter; asci clavate, stalked, $135-180 \times 24-30 \mu$; spores reddish-brown, partially biseriate, 6-7-septate, some with 10 septa, 1-2 longitudinal septa, none in end cells, fusoid-inequilateral, $30-36 \times 12-15 \mu$.

On Syringa vulgaris L., Duncan (H-2314) (Plate V, fig.21): Perithecia black, coriaceous, globose, collapsing, papillate ostiole erumpent through

epidermis, 330-430 x 230-300 μ ; asci clavate, 105 x 21 μ ; spores biseriate, yellow-brown, 3-septate with 1-3 longitudinal septa in the central cells, constricted at the septa, 21-27 x 10-14 μ .

P. (Pyrenophora) sp. On Agropyron trachycaulum (Link) Malte, Tenquille Lake, Pemberton, leg. W.Taylor (H-2269) and on Trisetum spicatum (L.) Richt., Garibaldi, leg. J.W.Eastham (H-2322) (Plate V, fig.22): Perithecia black, coriaceous, with a greenish tinge, setose about the ostiole, tomentose at base, erumpent, globose, 150-350 μ diameter; asci clavate, short stalked, thick walled, 114-200 x 27-33 μ ; spores reddish or yellow-brown, flattened, 7-11-septate, biseriate, becoming uniseriate, 1-3 longitudinal septa, 33-52 x 15-16.5 x 12-13 μ .

Protoventuria Berl. & Sacc.

Perithecia superficial, large, carbonaceous, fragile, globose-depressed, setose, ostiole round, wide; asci oblong to ellipsoid, abruptly narrowed at the base to a short stalk, eight-spored; paraphyses lacking or obsolete; spores uniseptate, constricted, cells subequal, fuliginous.

P. vancouverensis Dear. Perithecia scattered, carbonaceous, globose to conical, bristly, 120-150 μ diameter; bristles rigid, acuminate, pungent, 30-55 x 4-6 μ at base; asci fusoid-cylindrical, straight or curved, 45-55 x 14 μ ; paraphyses few, longer than asci; spores fuliginous, 2-3-seriate, uniseptate, 2-4-nucleate, upper cell wider, 14-15 x 4.5-5 μ . On bark of dead Acer sp., Vancouver Island, August, 1916, John Macoun, 1003, not seen (Dearness 1917: 348).

Protoventuria sp. (Plate V, fig.23) Perithecia at first immersed, soon becoming superficial, black, carbonaceous, globose-depressed, about 270 μ

diameter, covered with numerous long dark brown septate hyphae, not spiny, of varying lengths; asci oblong, slightly broader near the base, with a claw-like foot, thickened at the apex, curved, $75-90 \times 13-15 \mu$; paraphyses filiform, short and indistinct; spores light brown, uniseptate, upper cell broader and shorter, lower cell narrower; ellipsoid, constricted at the septum, uniseriate above, biseriate below, $18-24 \times 7-8 \mu$. On branches of Lonicera involucratum Banks, Cathedral Lakes (H-2332).

Venturia Ces. & de Not.

Perithecia superficial or erumpent, bristly, membranaceous, ostiolate; asci sessile or short stalked, eight-spored; paraphyses present or lacking; spores oblong or ovoid-ellipsoid, uni- or biseriate, hyaline to yellowish-brown, two-celled.

Perithecia immersed, usually remaining so.

Perithecia epiphyllous, grouped around brownish-green spots.....
.....V. Rumicis

Perithecia mostly hypophyllous, grouped or scattered.

Spores small, $11-15 \times 4-8 \mu$, upper cell with a blunt point; on Pyrus Malus.....V. inaequalis
Spores larger, $14-20 \times 5-8 \mu$; both ends broadly rounded;
on other species of Pyrus.....V. pyrina

Perithecia superficial, or with bases immersed.

Asci small, $35-50 \times 7-10.5 \mu$.

On Linnaea.....V. Dickiei
On Ledum.....V. Cassandras

Asci larger, over 50μ long.

Perithelia on spots on dead stalks of Gentiana sp....V. atriseda

Perithecia scattered on leaves.

Spores greenish-hyaline, 12-14 x 3-5 μV. myrtilli

Spores yellow-brown, (10-) 14-17 x 4-7 μV. chlorospora

V. atriseda Rehm (Plate V, fig.24) Perithecia thickly grouped, first immersed, later bases almost free, black, membranaceous, 96-120 μ ; bristles mostly around the ostiole; asci oblong, (37-) 50-60 x 9-12 μ ; paraphysate; spores biseriate, two-celled, greenish, lower cell shorter and narrower than the upper, (12-) 15-18 x 4-6 μ . On stalks of Gentiana calycosa Griseb., Wall Lake, leg. T.M.C.Taylor (H-1933).

V. ?Cassandras Pk. (Plate V, fig.25) Perithecia brown-black, membranaceous, bases immersed on greyish spots on leaves and branches, globose, 45-100 μ diameter, bristles dark brown, few; 45-60 x 4.5-6 μ ; asci oblong to ob-clavate, sessile, bent, paraphysate, 30-48 x 7.5-10 μ ; spores hyaline to yellow, uniseptate, very slightly constricted at the septum, upper cell a little broader, granular, biseriate, 9-12 x 3 μ . On Ledum groenlandicum Oedr., Burnaby Lake, leg. V.C.Brink, (H-2070). No species of Venturia is reported on Ledum; this species comes most closely to this collection.

V. chlorospora (Ces.) Karst. (Plate V, fig.26) Perithecia hypophyllous, subglobose, 50-120 μ diameter, bases immersed or superficial, bristles 40-50 x 4 μ ; asci cylindrical-clavate, a paraphysate, (37-) 45-70 x 9-14 μ ; spores uniseriate above, biseriate below, two-celled, lower cell tapering, yellow-brown, (10-) 14-17 x 4-7 μ . On leaves of Salix sp., U.B.C. (H-1967).

V. Dickiei (B. & Br.) de Not. (Plate V, fig.27) Perithecia crowded in groups, superficial on a filamentous subiculum, epiphyllous, subglobose, 75-90 μ diameter; bristles around the apex, 40-80 μ long; asci sessile,

cylindrical-clavate, paraphysate, $35-50 \times 7-10.5 \mu$; spores biseriate, two-celled, olive-green, $10-14 \times 3-4.5 \mu$. On leaves of Linnaea borealis L. var. americana (Forbes) Rehder, Canoe, leg. G.E.Woolliams (H-1587).

V. inaequalis (Cke.) Aderh. Perithecia immersed, grouped, usually hypophyllous, globose, $90-160 \mu$ diameter, with or without bristles; asci oblong, $40-70 \times 9-12 \mu$; spores yellow-green, unequally two-celled, upper cell shorter and broader with a blunt point, lower elongated, end rounded, uniseriate above, biseriate below, $11-15 \times 4-8 \mu$. On Pyrus Malus L., common throughout the apple-growing region of the province; the conidial stage, Fusicladium dendriticum (Wallr.) Fckl., causing leaf and fruit scab during the summer. (S-14, S-49; CPDS 1926, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940).

V. myrtilli Cke. (Plate V, fig.28) Perithecia amphigenous, scattered or gregarious, superficial, small, 90μ diameter, bristles long or short, sometimes once branched; asci oblong, $30-50 \times 9-14 \mu$; spores biseriate, ovoid-oblong, two-celled, not constricted, greenish-hyaline, $12-14 \times 3-5 \mu$. On Cassiope Stellariana DC., BeaveryMtn., Hope, leg. F.Perry (H-1936).

V. pyrina Aderh. (Plate V, fig.29) Perithecia mostly hypophyllous, grouped or scattered, immersed, globose, $120-210 \mu$ diameter, glabrous or with a few bristles around the ostiole; asci oblong, $40-70 \times 9-12 \mu$; spores uniseriate above, biseriate or crowded below, yellow-brown, two-celled, upper cell larger and broader, ends rounded, $12-20 \times 5-8 \mu$. Common on Pyrus communis L., throughout the province; U.B.C. (H-1932), Sidney, leg. W.Jones (H-471). The conidial stage, Fusicladium pyrinum (Lib.) Fckl., forms brown leaf and fruit spots during the summer. (CPDS 1926, 1930, 1931, 1935, 1936, 1937,

1938, 1939, 1940).

V. Rumicis (Desm.) Wint. (Plate V, fig.30) Perithecia in small groups around a brownish, green, or purple spot, epiphyllous, immersed, globose, 100-130 μ diameter, ostiole ringed by divergent, deep brown bristles; ascii oblong or clavate, short stalked, 45-60 x 12-14 μ ; spores biseriate, ovate-oblong, ends rounded, two-celled, yellowish-brown, 12-15 x 4-7.5 μ . On leaves of Rumex Acetosella L., Mt. Seymour (H-1934); Bennett, leg. D.A. Mitchell (H-1935).

Venturia sp. The following four collections could not be determined to species nor could they be related to any described species. Perithecia are variable; ascii large, 60-90 x (7-) 12-23 μ ; spores (12-)15-23 x 4.5-9 μ .

On Aplopappus Brandegei Gray, Cathedral Lakes (H-1937) (Plate V, fig.31): Perithecia large, conical, 200-250 μ diameter, with short, black bristles above and long, brown, septate mycelium below; ascii elongated, 60-90 (-120) x 12-15 μ ; paraphysate; spores greyish-brown, two-celled, upper cell smaller, cylindrical, ends rounded, biseriate, finally uniseriate, 18-23 x 7-8 μ .

On Astragalus Macounii Rydb., Cathedral Lakes (H-1938) (Plate V, fig.32): Perithecia globose, 130-200 μ diameter, bristled above, mycelial threads at base; ascii cylindrical, sessile, 60-75 x 7-8 μ ; spores ellipsoid, yellowish, two-celled, upper cell larger, (12-) 15-18 x 4.5-7 μ .

On Penstemon ellipticus Coulter & Fisher, Mount Rowe, leg. T.M.C. Taylor (H-1939) (Plate V, fig.33): Perithecia globose, 150-200 μ diameter, ostiole plane, covered with short spines, 45-60 x 3 μ with a bulbous base; ascii obclavate, short stalked, paraphysate, 60-90 x 15-23 μ ; spores hyaline

to light brown, two-celled, upper cell broader, uniseriate above, crowded or biseriate below, $15-21 \times 6-7.5 \mu$.

On Phacelia leucophylla Torr., Vernon (H-1940) (Plate V, fig.34): Perithecia globose, 130μ diameter, covered with stiff, brown bristles, $84 \times 4-5 \mu$, ends obtuse; asci oblong-clavate, short stalked, paraphysate, $60-64 \times 16-17 \mu$; spores grey-brown, biseriate, two-celled, constricted at septum, $15-23 \times 7-9 \mu$; spore wall much darker than interior of spore.

18. Massariaceae

Perithecia without stroma, immersed and remaining covered, with only the small ostiole breaking through the covering layer of plant tissues; carbonaceous or coriaceous, thick; asci clavate or cylindrical, eight-spored; spores mostly surrounded by a gelatinous envelope, one- to several-celled or muriform, hyaline or brown; paraphyses present.

Spores several-celled, hyaline.....Massarina

Spores several-celled, brown.....Massaria

Massaria de Not.

Perithecia under the epidermis and remaining covered, globose, with only the short, blunt ostiole erumpent, black, coriaceous; asci clavate, large, eight-spored; spores ellipsoid, fusiform, or cylindrical, several-celled, hyaline, with a gelatinous covering; paraphyses present.

M.macrotheca (Rostr.) J.Lind (Plate V, fig.35) Perithecia globose-depressed, under the epidermis, large, $200-270 \mu$ diameter, black, coriaceous; asci cylindrical to obclavate, short stalked, thick-walled, $130-180 \times 20-39 (-51) \mu$;

paraphyses indistinct; spores irregular-triseriate, at first hyaline, one-septate, with four cubical guttules, at maturity three-septate, light brown, cylindrical, obtusely rounded at the ends, with a narrow gelatinous envelope, $36-42 \times 12-15 \mu$. On Carex sp., Cathedral Lakes (H-1963).

Massarina Sacc.

As Massaria, but spores remaining hyaline.

M. Dryadis Rostr. (Plate V, fig.36) Perithecia scattered, epiphyllous, globose-depressed, black, small; asci broad-cylindrical, $90-135 \times 32-38$ (-45) μ ; paraphysate, five- to eight-spored; spores biseriate, three-septate, hyaline, granular, oblong, constricted at the septa, surrounded by a broad gelatinous envelope, $33-42 \times 15-20 \mu$. On Dryas Drummondii Rich., Field, leg. J.M.Fogg (H-1966). No measurements of spores were given in any descriptions seen.

? Massarina sp. (Plate V, fig.37) Perithecia black, membranaceous-coriaceous, superficial, globose-flattened, papillate, $300-350 \mu$ diameter, covered with numerous long brown hairs, massed and tangled; asci clavate, short stalked, eight-spored, thickened at the apex, $110-135 \times 15-17 \mu$; paraphyses numerous; spores hyaline to greenish, granular, long two-celled, becoming four-celled, fusoid, surrounded by a gelatinous coating, $30-39 \times 7.5-10 \mu$. On Pedicularia paddoensis Pennel, Sage Pass, 7500', leg. T.M.C. Taylor (H-2335). This collection has the hairy depressed perithecium of a Herpotrichia; the spores in their two-celled stage are quite similar to those of Didymella. It is placed in Massarina because of the broad gelatinous envelope surrounding the spores, and the great similarity between it and M. eburnea (Tul.) Sacc., the differences between the two being the hairy perithecia and herbaceous habit of this species.

19. Gnomoniaceae

Without stroma but in some cases with a clypeus; perithecia immersed, free under the epidermis, with the long, beak-like ostiole emergent; membranaceous or coriaceous; asci usually thickened at the apex, with a refractive ring, cylindrical, clavate, or fuscoid; spores hyaline, one- to several-celled, with or without appendages; paraphyses mostly lacking.

Spores one-celled.

Perithecia glabrous.....Gnomoniella

Perithecia pilose.....Glomerella

Spores two-celled.....Gnomonia

Glomerella Schrenk & Spauld.

Perithecia cespitose, membranaceous, black-brown, beaked, lighter at the apex, pilose, seated on or partially immersed in a stroma; asci sessile, aplanospore, clavate; spores eight, hyaline, oblong, continuous, slightly curved, ellipsoid, subbiseriate.

G. cingulata (Ston.) Schrenk & Spauld. Perithecia cespitose, surrounded by subiculum of loose hyphae, black-brown, membranaceous, $250-320 \mu$ long, 150μ wide, ostiole as a short constricted beak, conspicuous brown mycelium around the ostiole; asci aplanospore, clavate, sessile, $64 \times 14 \mu$, eight-spored; spores subbiseriate, hyaline, elliptical, slightly curved, usually with one guttule in the centre, $20-28 \times 5-7 \mu$. On Pyrus Malus L., not seen (CPDS 1931).

Gnomonia Ces. & de Not.

Stroma lacking, perithecia immersed with the elongated ostiole erumpent,

globose to globose-depressed, membranaceous to coriaceous, black; asci ellipsoid to fusoid, thickened at the apex, with a refractive ring, eight-spored; aparaphysate; spores elongated, hyaline, two-celled.

Asci large, 54-105 x 12-18 μ .

Spores 24-33 μ long.

On stems, spores 7-10 μ wide.....G. depressula

On leaves, spores 4.5-6 μ wide.....G. Caryae

Spores 21-24 μ long.....G. potentillae

Asci smaller, less than 50 μ long.

Ostiole elongated, usually longer than the diameter of the perithecium.

Asci 45-50 x 7-8 μG. veneta

Asci 30-40 (-45) x 6-9 μG. setacea

Ostiole shorter, broader, length not reaching the diameter of the perithecium.....G. Vepris

G. Caryae Fr. A.Wolf (Plate V, fig.38) Perithecia immersed, more or less gregarious, depressed-globose, 200-300 μ wide, hypophyllous, ostiole broad-cylindrical, long, 300-400 x 35 μ , curved; asci eight-spored, obovate, 54-75 x 12-18 μ ; spores hyaline, 4-guttulate, equally two-celled, 24-33 x 4.5-6 μ . On leaves of Alnus oregonia Nutt., U.B.C. (H-1959).

G. depressula Karst. (Plate V, fig.39) Perithecia scattered or gregarious, immersed, globose-collapsing, black, 450-530 μ diameter, ostioles erumpent, conoid, straight, broad, mostly shorter than perithecia; asci sessile, fusoid, eight-spored, 84-110 x 15-18 μ ; spores obliquely biseriate, fusoid-oblong, slightly curved, 2-4-guttulate, two-celled, slightly constricted at

the septum, hyaline, 24-32 x 7-10 μ . On dead stems of Rubus parviflorus Nutt., U.B.C. (H-1973).

G. potentillae sp.nov. (Plate V, fig.41, Plate VI, fig.45) Perithecia immersed, black, coriaceous-membranaceous, globose, 330-400 μ diameter, ostiole erumpent, straight or curved, 200 x 60 μ ; ascii sessile or with a short, delicate stalk, thickened and with a refractive ring at the apex, fusoid-clavate, eight-spored, 60-70 x 13-15 μ ; spores hyaline, equally two-celled, not constricted at the septum, biseriate or crowded-oblique, four-guttulate, fusoid, inequilateral to slightly curved, 21-24 x 6-7 μ . Type: Herbarium of the University of British Columbia, on petioles of Potentilla palustris (L.) Scop., Stanley Park, Vancouver, B.C., March 29, 1952, leg. M.E.Barr (H-1974).

G. potentillae sp.nov.

Peritheciis immersis, atris, coriaceis vel membranaceis, globulosis, laxe gregariis, 330-400 μ ; cum rostro elongato, recto vel curvulo, 200 x 60 μ ; ascis octosporis, sessilibus, refractivo annulo praebitis et membrana incrassata, fusoideis vel clavatis, 60-70 x 13-15 μ ; sporis hyalinis, fusoideis, inequilaterilibus vel paulum curvatis, medio septatis, ad septum haud constrictis, 4-guttulatis, biseriatis to oblique gregariis, 21-24 x 6-7 μ ; apophysatis.

Specimen typicum in University of British Columbia herbario conservatum, in petiolis Potentilla palustris (L.) Scop., prope locum dictum "Stanley Park, Vancouver" in British Columbia, legit M.E. Barr (H-1974), March 29, 1952.

G. setacea (Pers.) Ces.& de Not. (Plate V, fig.40) Perithecia mostly

hypophyllous, scattered, immersed, globose, black, 200-400 μ diameter, ostiole long, slender, often curved, up to twice as long as the diameter of the perithecium; asci oblong-clavate, or fusoid, contracted into a short stalk, four- to eight-spored, (15-) 24-40 (-45) x 6-9 μ ; spores fasciculate-crowded, fusoid or cylindrical, with or without a bristle-like appendage at each end, straight or slightly curved, two-celled, not constricted at the septum, hyaline, 12-16 x 1.5-2 μ . On leaves of Acer macrophyllum Pursh., Silver Creek, (H-1946), U.B.C. (H-1954, H-1958); Alnus oregona Nutt., Stanley Park (H-1953), U.B.C. (H-1959).

G. veneta (Sacc. & Speg.) Klebahn Perithecia globose, gregarious, innate-erumpent, collapsing, 200-300 μ diameter, black, ostiole elongated, straight or curved, as long as or exceeding the diameter of the perithecium; asci fusoid-clavate, apices rounded, 45-50 x 7-8 μ , eight-spored; spores elongate-fusoid to subclavate, unequally two-celled, lower cell longer than the upper, hyaline, minutely multiguttulate, appendages at the ends, 15 x 3.5-4 μ . On leaves of Platanus occidentalis L., Victoria, leg. P.J.Salisbury (N-2356), imperfect stage; Platanus sp., Sidney, leg. W.Jones (H-797, CPDS 1934).

*G. Vepris Mout. (Plate V, fig.42) Perithecia immersed, globose, 200-250 μ diameter, ostiole not exceeding the diameter of the perithecium in length, erumpent; asci oblong-clavate, eight-spored, 27-35 x 7-9 μ ; spores two-celled, not constricted, cells with minute guttules, at first appendaged, 6-12 x 1.5-2.5 μ . On leaves of Rubus parviflorus Nutt., U.B.C. (H-1922).

Gnomoniella Sacc.

Perithecia membranaceous-coriaceous, subglobose, immersed-erumpent; ostiole beaked, central or lateral; asci cylindrical-clavate, eight-spored,

aparaphysate, with refractive ring at the apex; spores continuous, hyaline, ovoid to oblong, rarely short filiform. Subgenus Mamiana: perithecia grouped under a black pseudostroma; spores ovoid.

G. Coryli (Batsch ex Fr.) Sacc. (Memiania Coryli Ces. & de Not.) (Plate V, fig. 43) Perithecia hypophyllous, separate, arranged in a circle, immersed in leaf tissues, covered on both sides by the blackened and inflated epidermis, depressed-globose, about 300μ diameter, ostiole stout, cylindrical, about equal in length to the diameter of the perithecium, erumpent through a minute white disk; asci clavate, short-stalked, $36-40 \times 7 \mu$, eight-spored; spores biseriate, obovoid, one-celled, subhyaline, granular, $7 \times 3 \mu$. Few of the collections seen showed mature asci; in many the perithecia were filled with globose hyaline cells. On Corylus californica (A.DC.) Rose, Revelstoke, leg. S.Brown-John (H-1949), Boat Encampment, Big Bend Highway, leg. J.W.Eastham, det. I.L.Conners (O-7519); C. rostrata Ait., Aleza Lake, leg. J.W.Eastham (H-1951), Vancouver, collected and determined by H.T.Gussow (O unnumbered, Aug.17, 1956); Corylus sp., Hope, leg. M.J.Short, det. D.B.O.Savile (H-1950, V-5722), Kersley, leg. G.E.Woollams (H-1669).

20. Clypeosphaeriaceae

Perithecia immersed, without a true stroma, but with a pseudostroma which forms a sharply delimited, thin, black clypeus of fungus hyphae and epidermal cells, usually only on the upper surface; ostiole short conical or papillate to long beak-like; breaking through the shield; perithecia mostly carbonaceous-coriaceous; paraphyses usually lacking; asci cylindrical

or clavate, eight-spored; spores one- to several-celled, muriform or filiform, hyaline or colored.

Linospora Fckl.

Perithecia single or several covered by the flat, black pseudostroma, coriaceous, with a more or less elongated, beak-like ostiole; asci cylindrical, delicate, eight-spored; spores filiform, hyaline or light yellow.

L. ?insularis Johans. (Plate V, fig.44) Perithecia few to numerous, innate in the leaf, depressed-globose to oblong, 330-450 μ diameter, beak lateral, 200-370 μ long; pseudostroma distinct; asci cylindrical, sharply attenuated to the base, eight-spored, 135-200 x 7-9 μ ; spores lying parallel, filiform, one-septate, 100-120 x 3 μ . On leaf of Salix sp., U.B.C. (H-1967). This collection has larger asci (250-300 x 7.5-10 μ) and septate spores (225-x 1.5 μ) than any recorded. It most nearly fits L. insularis in size and in the lateral position of the curved beak, and may be a large variety of this species.

Linospora sp. Pseudostroma scattered along veins of leaf, irregular-rectangular, epiphyllous, at first only the margin blackened, later the entire clypeus; perithecia immature. On Populus balsamifera L., Saanichton, leg. W.Jones, det. J.E.Bier (H-1965, V-2068).

21. Valsaceae

Stromata developed, black, formed in and more or less altering the substrate, finally erumpent with irregular border or often distinguished only by a black marginal line or sharply delimited, conical, papillate, or

hemispherical; perithecia immersed in the stroma or occasionally seated in the substrate, or with only the ostiole embedded in the hemispherical stroma, formed under the surface of the substrate and generally remaining covered, often circinately arranged, black, coriaceous; asci cylindrical or clavate, long stalked; paraphyses present or lacking; spores one- to several celled, or muriform, hyaline or colored.

Spores one-celled, hyaline to brownish.

Ostioles distinctly sulcate, dark marginal zone present.....Eutypella

Ostioles not distinctly sulcate.

Ectostroma distinct, conical; marginal zone lacking.....Valsa

No ectostroma formed; dark marginal zone usually present.....

.....Cryptosphaeria

Spores more than one-celled, hyaline to brown.

Spores two-celled, hyaline.

Spores unequally two-celled.....Apioporthe

Spores equally two-celled.

Blackened zones present in the substrate.....Diaporthe

Blackened zones lacking.....Cryptodiaporthe

Spores muriform, yellowish, becoming dark brown.....Fenestella

Apioporthe Hohn. (Emend. Wehmeyer, 1933: 219).

Perithecia immersed in the substrate, usually clustered; entostromatic development scanty or variously developed; ectostromata also various; tissues above the perithecia sometimes blackened, but no definite marginal zones within the substrate; asci clavate, with a refractive ring in the apex, stalks evanescent; spores hyaline, unequally two-celled, fusoid to pyriform, commonly tapered toward one end, which contains the smaller cell.

A. vepris (De Lacr.) Wehm. (Plate V, fig. 45) Usually forming longitudinally elongate pustulate ruptures of the periderm with small central blackened disks containing the scarcely erumpent ostioles; no blackened zones within the substrate; perithecia 160-300 x 160-200 μ , usually in definite clusters; stromatic development variable; asci clavate, 30-40 x 6-8 μ ; spores obliquely biseriate, ellipsoid, narrowed toward one end, often somewhat curved, unequally two-celled, often constricted at the septum, 6-9 (-10) x 2-2.5 μ , and often with a short, bristle-like, hyaline appendage at each end. On stems of Rubus macropetalus Dougl., Cowichan Bay (H-1960).

Cryptodiaporthe Petrak (Emend. Wehmeyer, 1933: 189)

Perithecia immersed in the bark, more or less irregularly scattered or in definite clusters, but usually with convergent ostiolar necks which are erumpent through the periderm or through variously formed ectostromata; ectostromata scanty or as conic to pulvinate erumpent disks; entostromata very scanty or as a rich development of hyphae about the perithecia; no blackened marginal zones within the substrate; asci clavate, base tapering, evanescent, refractive ring in the apex; spores hyaline, two-celled, ellipsoid to fusoid, straight or curved and often appendaged.

Spores not over 11 μ in length.....C. Macounii

Spores over 11 μ in length.....C. salicina

C. Macounii (Dear.) Wehm. On the surface as minute papillate pustules, 0.1-0.2 mm. in diameter, through which the minute ostioles are barely erumpent and visible only with a lens; no blackening of the substrate; perithecia small, spherical to flattened, with rather thick walls of heavily blackened parenchyma, 150-250 x 120-160 μ , clustered in groups of 1-6 on the surface

of the bark just beneath the periderm; asci narrow-clavate, 30-35 x 4-5 μ ; spores biseriate, oblong-ellipsoid, 2-celled, hyaline, not constricted at the septum, 8-10 x 1.5-2 μ . On Spiraea Menziesii Hook., Vancouver Island, May, 1915, J.Macoun. Not seen. This species was described by Dearness (1916: 100) as Diaporthe Macounii and transferred to Cryptodiaporthe by Wehmeyer (1933: 191).

C. salicina (Surr.) Wehm. (Plate V, fig.46) Visible on the surface as numerous, minute, conic, pustules consisting of 1-8 ostioles, usually separately erumpent; perithecia spherical or flattened, 300-480 x 280-400 μ , walls membranaceous, 18-27 μ thick, within bark cortex; ectostromata formed on surface and obliterated by the erumpent ostioles; no blackened zones; asci clavate, 45-70 x 9-15 μ ; spores biseriate, ellipsoid to inequilateral, blunt at the ends, 2-celled, hyaline, not constricted at the septum, 15-20 x (3.5) 4.5-7.5 μ . On twigs of Salix sp., Sidney, leg. J.Macoun (OM-243), determined as Diaporthe salicella by J.Dearness, but similar to Ellis and Everhart, N.A.F. 2745; on Salix sp., Fraser Valley, leg. G.E.W.Clarke (O-7184).

Cryptosphaeria Nitschke (non Grev.)

Stroma effused or wanting, not limited by circumscribing line; perithecia immersed in bark, scattered; ostioles erumpent; asci eight-spored, without paraphyses; spores allantoid, hyaline.

C. populina (Pers.) Sacc. (Plate V, fig.47) Stromata effused, raised as a broad, flat blister, dark marginal zone present; perithecia scattered, immersed, large; ostioles erumpent, obscurely sulcate; asci narrow-clavate,

p.sp. 30-45 x 5-8 μ , narrowed above and tapering below into a long stalk; spores biseriate, allantoid, yellowish, (7-) 8-12 x 1.5-2 μ . On Populus sp., Summerland, leg, G.E.Woolliams, det. I.L.Conners (0-7862).

Diaporthe Nit. (Emend. Wehmeyer, 1933: 14).

Perithecia formed in the substrate, erumpent, scattered singly or clustered, marginal zone present; asci clavate to clavate-cylindrical, with a refractive ring at the apex; paraphyses broad, band-like, evanescent; spores fusoid-ellipsoid to cylindrical, straight, inequilateral, or curved, 2-celled, hyaline, sometimes appendaged, biseriate to uniserial.

On herbaceous stems.

Entostromata sharply margined by a blackened line or ridge visible on the surface.....D. pardolata

Entostromata not strongly margined as above.....D. Arctii

On woody stems; dorsal blackening usually concealed by the periderm.

Spores not over 4 μ in diameter.....D. eres

Spores over 6.5 μ in diameter.....D. columbiensis

D. Arctii (Lasch.) Nit. (Plate V, fig.48) Entostromata normally widely effuse and indefinitely outlined; appearing on the surface as blackened widely effuse or confluent areas or as numerous conic or spine-like ostioles erumpent singly or in loose groups; dorsal blackened zones usually developed on the bark surface; ostioles conic, cylindric, or spine-like; ventral zone present or absent; perithecia spherical or somewhat flattened, 280-480 x 160-320 μ , scattered or crowded; asci clavate, with a refractive ring in

the apex, (40-) 47-60 x 7-10 μ ; spores biseriate, fusoid-ellipsoid, straight or more or less inequilateral or curved, two-celled (often tardily septate), hyaline, constricted at the septum when mature, (11-) 12-15 (-17) x 2.5-4 μ . On stalks of Arnica latifolia Bong., Cathedral Lakes (H-1972).

D. columbiensis Ell. & Ev. (Plate V, fig.49) Barely visible on the surface as short, stout ostioles, erumpent singly or in small loose groups through slightly pustulate, ruptures of the periderm or appearing as small slightly blackened patches, 1-5 mm. in diameter, bounded by marginal lines; entostromata strongly differentiated and pustulate-effused; dorsal blackened zones dipping through the bark into the wood; perithecia large, 480-650 x 480-560 μ , scattered singly or in small groups; asci clavate-cylindrical, with a refractive ring in the apex, 100-122 x 11-19 μ ; spores irregularly biseriate to uniserial, oblong-ellipsoid, blunt, two-celled, hyaline, constricted at the septum, 16-20 (-22) x 7-9 μ . Original host given as unknown (Ellis and Everhart, 1890: 233); cotype (OM-32), Hastings, coll. J. Macoun, April 11, 1889 is labelled "on dead aspen". Reported by Dearness (1916: 100) on Nuttallia cerasiformis T. & G., Victoria, April, 1915.

D. eres Nit. (Plate VI, fig.1) Appearing on the surface as small pustulate ruptures or angular perforations of the periderm, often exposing the blackened surface of the bark or ectostromata; ostioles short-cylindric to somewhat elongated, erumpent singly or in small loose clusters; on decorticated twigs as widely effuse, blackened areas with numerous erumpent ostioles; entostromata mostly evenly effuse, surface of bark usually blackened; ventral zones always present at the extreme margins of the fruiting areas,

usually more or less complete beneath; numerous small conic or pulvinate ectostromata formed on the surface of the bark; perithecia spherical or flattened, $240-800 \times 160-500 \mu$, scattered singly, irregularly crowded, or grouped, separately or collectively erumpent; asci clavate, with a refractive ring in the apex, $40-60 \times 5-8 \mu$; spores biseriate, hyaline, long-narrow-fusoid, or often inequilateral, one-celled when young and immature, becoming broader, two-celled, fusoid, constricted at the septum, $9.5-15 \times 2.5-4 \mu$ at maturity. On Acer sp., Duncan (H-1957), spores $15 \times 3-4 \mu$; Populus ?trichocarpa T.& G., Surrey, leg. T.G. Atkinson (H-1858), spores $17 \times (1.5-) 3 \mu$; Salix babylonica L., North Vancouver, leg. S. Brown-John, det. L.E. Wehmeyer (H-1927), spores $13-15 \times 2.5-4 \mu$. These three hosts have not been previously reported in North America.

D. pardolata (Mont.) Eckl. (Plate VI, fig. 2) Appearing on the surface as sharply outlined entostromatic areas with a marginal blackened line or ridge where the ventral zone abuts upon the surface; entostromatic areas limited in extent (1-7 mm.), confluent, or more widely effuse, margin even or, more usually, irregularly lobed; surface of substratum blackened heavily, only slightly, or not at all; perithecia spherical or somewhat flattened, $160-480 \times 120-300 \mu$, scattered singly or occasionally in small groups of 2-3; ostioles short-cylindric to conic, slightly erumpent; ventral zone definite in wood; asci clavate, $40-55 \times 6-8 \mu$; spores biseriate, fusoid-ellipsoid, two-celled, hyaline, slightly constricted at the septum, straight or sometimes inequilateral, or somewhat curved, $9-15 \times 2.5-4 \mu$. On Epilobium angustifolium L., U.B.C. (H-1947); spores $11-12 \times 2.5-3.5 \mu$.

Eutypella Nit.

Stroma effuse or isolated; perithecia clustered and collectively erumpent; ectostroma limited in development, usually in isolated patches; entostroma often well developed and pustulate, surrounded by a dark marginal zone; ostioles sulcate; asci eight-spored; spores biseriate, allantoid, one-celled, yellowish to brownish-hyaline.

E. stellulata (Fr.) Sacc. (Plate VI, fig.3) Stromata obtusely conical or subspherical, rarely subeffused, 1-2 mm. across; perithecia few or numerous in a stroma, subspherical or angular from mutual pressure, small, necks converging; ostioles short and small or elongated, rough sulcate-cleft, 3-5-sided, connate; asci cylindrical-clavate, p.sp. 40-50 x 5-6 μ ; spores crowded or subbiseriate, allantoid, yellowish, 7-12 x 1.5-2 μ . On dead bark of Alnus oregona Nutt., U.B.C. (H-1829); on dead bark of Alnus sp., leg. J.Macoun, det. J.Dearness, Vancouver Island (OM unnumbered, 1912); Sidney (OM unnumbered, Sept. 13, 1913, OM-36); Betula occidentalis Hook., Quesnel, leg. M.K.Nobles (H-2324); Populus sp., Sidney, leg. J.Macoun (OM-38).

Fenestella Tul.

Stromata and perithecia as in Valsa; asci cylindrical, four- to eight-spored; spores uniseriate, oblong or elliptical, muriform, yellow-brown.

F. princeps Tul. (Plate VI, fig.4) Stromata orbicular or elliptical at base, lenticular, sunk in the parenchyma of the bark, with the epidermis slightly pustulate-elevated over it, consisting of brown, floccose matter;

perithecia 3-14 in a stroma, crowded and mostly angular from pressure, collapsing when dry, black, about 500 μ diameter, with short-cylindrical, perforated ostioles, united in a roundish or lanceolate, erumpent disk; asci cylindrical, short-stipitate, 150-260 x 18-27 μ ; with numerous paraphyses; spores uniseriate, oblong-ellipsoid, constricted in the middle, closely multiseptate and muriform, golden-yellow, becoming brown, with a hyaline, papillate cell at each end, 25-42 (-70) x 12-21 μ . On bark of Prunus demissa (Nutt.) D.Dietr., Stanley Park, Vancouver (H-1956); on dead bark, Victoria, leg. J.Macoun, det. J.Dearness (OM-17), Comox (OM-68).

Valsa Fries

Stromata isolated; perithecia clustered in the unaltered bark tissues beneath a distinct conical ectostroma; no marginal zone present; asci eight-spored; spores allantoid, one-celled, hyaline.

On coniferous hosts; asci small, (18-) 25-30 μ long.....V. Pini

On deciduous hosts; asci larger, over 30 μ in length.

Ectostromatic disk white.

Spores small, 7-9 μ long.....V. nivea

Spores longer, 9 μ and over.

Perithecial necks short, blunt; asci with truncate apices.....V. sp.

Perithecial necks longer, the length of the perithecium; asci with apices narrowed and rounded.

Spores 9-12 (-15)x 2-3 μ ; stroma whitish within.....

.....V. leucostoma

Spores 13.5-24 x 3-5 μ ; stroma brown within.....V. embiens

Ectostromatic disk brown.....V. ceratophora

V. ambiens (Pers.) Fr. (Plate VI, fig.5) Stromata numerous, 1.5-3 mm. broad, pustulate-prominent; perithecia 4-20, circinate, necks long, slender, ostioles erumpent around the small, whitish disk; asci p.sp. 40-55 x 12-15 μ ; spores irregular, allantoid, hyaline, obtuse, 14-24 x 3.5 μ . On bark of Pyrus Malus L., Sidney, leg. J.Macoun, det. J. Dearness (OM-202). Dearness considers this an atypical form, with its narrower asci (7.5-10 μ wide) and smaller spores (13.5-16.5 x 3 μ).

V. ceratophora Tul. (Plate VI, fig.6) Stromata scattered, depressed-hemispherical to conical, erumpent; perithecia 5-20 in a stroma, crowded, necks long, ostioles erumpent around the brown disk; asci narrow-clavate, (24-) 32-40 x 4-7 μ ; spores biseriate, allantoid, slightly curved, hyaline, 6-9 (-10) x 1.5-2 μ . On Betula sp., Hastings, leg. J.Macoun (OM-342); Rubus sp., Vancouver Island, leg. J.Macoun, det. J.Dearness (OM-19).

V. leucostoma (Pers.) Fr. (Plate VI, fig.7) Stromata scattered, whitish inside; disk erumpent through transverse cracks in the bark, white, dotted with black ostioles; necks long; asci fuscoid-clavate, 35-45 (-57) x 7-9 μ ; nearly sessile; spores biseriate, allantoid, hyaline, 9-12 (-15) x 1.5-3 μ . On Pyrus Malus L., Sidney, leg. J.Macoun, det. J.Dearness (OM-37); on dead wood, Comox, leg. J.Macoun (OM-73); Prunus persica (L.) Stokes, Sandwick, leg. W.R.Foster, det. W.Jones (H-466); on nectarine (CPDS 1945).

V. nivea (Hoff.) Fr. Stromata scutellate, white inside, disk erumpent, white, truncate; perithecia circinate or irregular, 4-10 in a stroma, small; asci clavate, 35-45 x 5-6 μ , four- or eight-spored; spores allantoid, hyaline, 7-9 x 1.25-1.5 μ . Conidial stage (Cytospora nivea Sacc.) in centre of stroma, spores allantoid, hyaline, 5-7 x 1 μ . On Populus sp., Cariboo, leg.

J.Bancroft (H-1948); perithecia in this collection immature.

V. Pini (Alb. & Schw.) Fr. (Plate VI, fig.8) Stromata scattered or subgregarious, hemispherical, 1-2.5 mm. diameter, covered by the elevated epidermis which is ruptured by the closely packed, short ostioles, forming a flat black disk; perithecia small, numerous, 20-30 in a stroma, closely packed; asci narrow-clavate, sessile, 18-30 x 4.5-6 μ ; spores allantoid, hyaline, irregular, 6-9 x 1-1.5 μ . On Pseudotsuga taxifolia (Lam.) Britt., Cowichan Lake, leg. I.Mounce, det. I.L.Conners (0-6098).

V. sp. (Plate VI, fig.9) Stromata scattered, rounded; perithecia circinate, with short necks and ostioles erumpent through a whitish disk; asci sessile, fusoid with a truncate apex, 30-36 x 7-9 μ ; spores allantoid, hyaline, curved or straight, 10.5-21 x 1.5-2 μ . On dead stumps of Betula occidentalis Hook., Summerland, leg. G.E.Woolliams (0-3612, 0-3625).

V. sp. On peach, Vancouver Island, not seen (CPDS 1947).

22. Melanconidaceae

Stromata round, sharply delimited, conical or cushion-shaped, sunken; perithecia remaining covered, with only the ostiolar layer erumpent, coriaceous; asci cylindrical or clavate, eight-spored; paraphyses present; spores one- to several-celled, hyaline or colored.

Melanconis Tul.

Pustulate-erumpent through the periderm by a white, grey or yellow-green ectostroma; perithecia circinate in bark, in some cases surrounded

by entostromatic mycelium; blackened zones occasionally present; asci clavate, wall thickened at apex; paraphyses broad-bandlike, evanescent; spores bi- to uniseriate, two-celled, hyaline or brown, fusoid, ellipsoid or cylindrical, with or without appendages.

Appendages elongate, as long as or longer than the spores; spores $8-13 \mu$ in diameter.....M. thelebola
 Appendages shorter, spinelike or caplike, often evanescent; spores $4-8 \mu$ in diameter.....M. alni

M. alni Tul. (Plate VI, fig.10) On the surface as raised circular flat-conical pustules 1.5-2.5 mm. diameter, with central white to yellowish disk, surrounded by the punctate ostioles; perithecia spherical to flattened, $350-450 \times 300-400 \mu$, circinate in the unaltered bark cortex; asci fusoid-cylindrical, sessile, $60-80 \times 8-13.5 \mu$; spores irregularly biseriate, fusoid-ellipsoid, two-celled, hyaline, granular, $13-22 \times 3.5-7 \mu$; terminal appendages short-cylindric to tapered, $3-7 \times 2-4 \mu$, evanescent. On Alnus sitchensis (Regel.) Sarg., Daisy Lake, leg. J.S.Boyce, det. J.Dearness (B-767).

M. thelebola (Fr.) Sacc. (Plate VI, fig.11) On the surface as scattered conic pustules 1-2.5 mm. diameter; with central white disk containing 2-12 short stout or conic black ostioles, ectostroma yellowish white, slight or well developed; perithecia $500-800 \mu$ diameter, more or less circinate with convergent necks in a swollen area of the bark, with or without a blackened zone; asci clavate, $120-195 \times 15-21 \mu$; spores irregularly biseriate, ellipsoid, cylindrical, straight or curved, slightly or not constricted at the septum, two-celled, hyaline, $24-35 \times 30-42 \mu$ long, $8-10 \mu$ wide;

appendages long, hyaline, bristle-like when fresh, evanescent in old material; in age spores tend to become brown and two- to three-septate. On Alnus oregonia Nutt., Cowichan Lake, leg. W.G.Ziller (O-26101), U.B.C., leg. C.J.Anastaciou (H-1921). This species is common on the University campus, Haney, and Goldstream Park on Vancouver Island; cankers are formed on branches and main stem of young alders (Anastaciou 1952).

23. Diatrypaceae

Stromata effused or discoid, of fungus mycelium, lying beneath the epidermis, later erumpent, the conidial and perithecial stromata separate or, in Calosphaeria, the perithecial stroma lacking; perithecia sunken in the stroma or seated on the bark (in Calosphaeria), with ostioles erumpent; asci generally thickened at the apex, four- or eight- or many-spored; paraphyses present or lacking; spores mostly one-celled, small, allantoid, hyaline to yellowish or light brown.

Perithecia lying free or seated on the inner bark, stroma lacking.....

.....Calosphaeria

Perithecia immersed in an erumpent-superficial, effused or discoid stroma.

Asci eight-spored.....Diatrype

Asci many-spored.....Diatrypella

Calosphaeria Tul.

Stroma lacking; perithecia free or seated on the inner bark, scattered or in circinate groups; ostioles more or less elongated; asci clavate, fas-

fasciculate, sessile or stalked; mostly eight-spored; paraphyses longer than asci, stout, evanescent; spores small, allantoid, hyaline, one-celled.

C. princeps Tul. (Plate VI, fig.12) Perithecia on the inner bark in orbicular or elliptical groups, crowded, globose, smooth, shining; necks long, decumbent, cylindrical, erumpent; asci clavate, long-stalked, eight-spored, p.sp. $18-26 \times 4-6 \mu$; paraphyses long; spores allantoid, hyaline, $5-6 (69) \times 1.5 \mu$. On Amelanchier sp., Spence's Bridge, leg. W.G.Ziller (H-1945).

Diatrype Fr. (Emend. Wehmeyer, 1926)

Stroma effused or isolated; ectostroma strongly developed and deciduous; entostroma forming a widely erumpent disk, dark marginal zone present; ostioles sulcate; asci eight-spored; spores biseriate, allantoid, one-celled, yellow-hyaline.

Stroma widely effused, continuous or interrupted.....D. stigma

Stroma flattened-pulvinate, discoid.

Asci p.sp. $40-55 \times 4-6 \mu$D. bullata

Asci smaller, p.sp. not over 30μ long.

Stroma grey; spores $4-6 \times .75-1.5 \mu$D. Macounii

Stroma dark brown; spores $6-8 \times 1.5-2 \mu$D. disciformis

D. bullata (Hoffm.) Fr. (Plate VI, fig.13) Stromata gregarious, flattened-pulvinate to shield-shaped, 2-5 mm., erumpent, surface dark brown, interior whitish; perithecia numerous, monostichous, immersed, ovate, small, ostioles punctiform, perforated, slightly prominent; asci narrow-clavate, long-stalked, p.sp. $40-55 \times 4-6 \mu$; spores subbiseriate, allantoid, yellowish-hyaline, $5-8 (-10) \times 1.5-2 \mu$. On ?Salix sp., Saanichton, leg. I.Mounce, det.

I.L.Conners (O-14361).

D. disciformis (Hoffm.) Fr. (Plate VI, fig.14) Stromata scattered or gregarious, flattened-pulvinate, round, 2-3 mm. diameter, discoid, erumpent, dark brown, whitish within; perithecia 20-30 or more, ovate, about 750 x 500 μ ; necks short, ostioles obtusely conical, smooth or 3-5-cleft; asci clavate, long stalked, p.sp. 22-30 x 4-5 μ ; spores allantoid, yellowish, 6-8 x 1.5-2 μ . On bark of Alnus sp., Hastings, leg. J. Macoun (OM-35b).

D. Macounii Ell. & Ev. (Plate VI, fig.15) Stromata discoid, grey, 3-4-mm., suborbicular or subelliptical, erumpent; perithecia numerous, 30-50, monostichous; ovate-globose, 200-350 μ diameter; neck short, ostiole small, black, radiate-cleft in depressions of the stroma; asci p.sp. 20-30 x 3-4.5 μ ; spores allantoid, yellowish, 4-6 x .75-1.5 μ . Described by Ellis and Everhart (1890: 224) on "(Acer rubrum)?, Agassiz, May, 1889. Macoun, No.127." The cotype is labelled "on alder bark" (OM-127). On Populus trichocarpa T. & G., White Rock (H-1944); Populus sp., Royal Oak, leg. J. Macoun, det. J. Dearness (OM unnumbered, Sept. 29, 1914), Elk Lake (OM unnumbered, April 18, 1915), Vancouver Island (OM unnumbered, April 8, 1915).

D. stigma (Hoffm.) de Not. (Plate VI, fig.16) Stromata widely effused, continuous or interrupted, finally erumpent, brownish or dusty-white becoming nearly black, whitish inside; perithecia monostichous, ovate, small, with short necks and punctiform, discoid, depressed-hemispherical or conical, entire or sulcate ostioles; asci clavate-oblong, long stalked, p.sp. 30-50 x 4-8 μ ; spores allantoid, yellowish to brownish, 4.5-7.5 x

1-2 μ . On Betula fontinalis Sarg., Salmon Arm, leg. G.E.Woolliams (H-1941).

Diatrypella Ces. & de Not. (Emend. Wehmeyer, 1926)

Stroma effuse or isolated; ectostroma absent or strongly developed, but not deciduous; entostroma well developed, often pustulate but usually not widely erumpent, bounded by a dark marginal zone; perithecia usually clustered, rarely separated, erumpent; ostioles usually sulcate; asci long stalked, poly-sporous; spores allantoid, one-celled, yellow-hyaline.

Stromata with an enlarged base; asci p.sp. 100-120 x 10-12 μ ...D. Tocciaeana

Stromata without enlarged base; green within; asci p.sp. 50-60 x 6-7 μ

.....D. betulina

D. betulina Pk. (Plate VI, fig.17) Stromata transversely erumpent, prominent, elliptical, black outside, green within, 1.5-2.5 mm.; perithecia ellipsoid, black; ostioles stellate; asci polysporous, stalked, clavate-fuscid, p.sp. 45-65 x 6-7 μ , paraphysate; spores crowded, allantoid, yellowish, 4-7 x 1 μ . On Betula fontinalis Sarg., MacLeese Lake, leg. J.Bancroft (H-1942); B. occidentalis Hook., Quesnel, leg. W.G.Ziller (H-1943, V-5285).

D. Tocciaeana de Not. Stromata scattered or gregarious, small, pustuliform or hemispherical, with a broad base, disk black, piercing the epidermis; perithecia 3-8 in a stroma, large, globose, with a short, thick neck, ostioles converging, faintly sulcate; asci narrow-oblong-clavate, long stalked, polysporous, p.sp. 80-120 x 10-15 μ ; paraphyses long, filiform; spores crowded, allantoid, yellow-brown, 5-7.5 x 1 μ . On bark of Alnus sp., Sidney, leg. J.Macoun, det. J.Dearness (OM-30).

24. Melogrammataceae

Stromata mostly round, sharply delimited, conical or cushion-shaped, seldom effused or discoid, mostly hemispherical, formed under the periderm and then erumpent and more or less free; perithecia sunken in the stroma; asci cylindrical, clavate, or fusiform, four- to eight-spored; paraphyses present or lacking; spores one- to several-celled or muriform, hyaline or colored.

Endothia Fries

Stromata sharply delimited, conical or cushion-shaped, at first covered, then erumpent, leathery, yellow; perithecia sunken, black, with long necks; asci elongated cylindrical, partly clavate, eight-spored; spores fusoid or ellipsoid, two-celled, hyaline; paraphyses lacking.

E. parasitica (Murr. A. & A. Only the conidial stage seen. On bark of Castanea sativa Sarg., Agassiz (0-370, 0-2992) (CPDS 1941; Faull and Graham 1914).

25. Xylariaceae

Stromata superficial, free, sometimes partially sunken in the substrate, variously shaped, crust-like, hemispherical, conical, clavate, truncate, or expanded disk-like at the apex, in some species branched, sometimes fibrous in the sterile part, always of fungus hyphae, often with sterile basal stalk; usually black, woody, or carbonaceous, occasionally thick-fleshy when young; perithecia peripheral, concentrically arranged, sunken, occasionally prominent, usually monostichous; ostiole usually short conical, slightly prominent;

coriaceous or carbonaceous, black; asci cylindrical or cylindrical-clavate, eight-spored; paraphyses filiform or lacking; spores mostly one-celled, ellipsoid or fusoid, often inequilateral, brown or black.

Stroma effused, pulvinate to globose, sessile or stalked.

Internal zonation prominent.....Daldinia

Internal zonation not conspicuous.....Hypoxylon

Stroma stalked, clavate to cylindrical, simple or branched.....Xylaria

Daldinia Ces. & de Not.

Stromata pulvinate to globose, stalked or sessile, dark inside, conspicuously zonate; asci cylindrical, eight-spored, stalked; spores ovoid or oblong, dark-colored.

D. concentrica (Bolt.) Ces. & de Not. (Plate VI, fig.18) Stromata black, carbonaceous, subspherical to hemispherical; perithecia monostichous, obovoid-oblong, angular from pressure, ostioles slightly prominent, punctiform; asci long stalked, $80-100 \times 8-10 \mu$ (p.sp.); spores dark brown, uniseriate, $12-15 \times 7-9 \mu$. On logs, Slocan City, leg. J.Macoun (OM unnumbered, Aug.21, 1900); Betula fontinalis Sarg., Summerland, leg. G.E.Woolliams, sterile (H-1578). According to Child (1932), D. concentrica is not found in western North America; however the specimens mentioned here do not show any bronze color in the stromata but are black; spores are slightly larger than in D. occidentale.

D. occidentale Child. Mentioned by Child (1932) from Bendigo, Victoria, June 1918, E.J.Summers (L-10806); on Betula occidentalis Hook., Betula sp., Cheetzi (CPDS 1933). Not seen.

Hypoxylon Fries

Stromata effused to globose, dark inside, not stalked, not conspicuously zonate, of woody-corky consistency; perithecia peripheral, globose, ovate or oblong, coriaceous to membranaceous, sunken in the stroma, but generally with the upper part more or less projecting, with a papilliform or umbilicate ostiole; asci cylindrical, eight-spored; spores uniseriate, elliptical or fusoid, inequilateral or curved, one-celled, brown.

Stromata hollow when mature, encrusted over perithecia; spores large, over 30μ long.....H. ustulatum
Stromata not hollow; spores smaller, 25μ in length or less.

Stromata with a purplish color.

Stromata pulvinate, irregularly circular.....H. fuscum

Stromata effused in a flat layer on the wood.....H. vogesiacum

Stromata without purplish color.

Stromata raised, irregular.

At first red-brown; spores $9-12 \times 4-7 \mu$H. multiforme

Black throughout; spores $18-25 \times 8-13 \mu$H. aspera

Stromata flat, effused, greyish black.....
.....H. serpens var. macrosporum

H. aspera Mass. (Plate VI, fig.19) Stromata black, large, prominently hemispherical to irregular, much roughened; perithecia in a peripheral layer, large, ovoid; asci not seen; spores ovate-ellipsoid, one end frequently truncate, brown, $18-25.5 \times 8-13 \mu$. On Tsuga heterophylla (Raf.) Sarg., Turnour Island, leg. D.C.Buckland (H-1908); identified by Dr. J.H.Miller, in litt. June 12, 1952. Dr. Miller considers this an unusual host.

H. fuscum (Pers.) Fr. (Plate VI, fig.20) Stromata purplish, small, prominently erumpent through bark, irregularly globose, blackened by the raised upper part of the perithecia; perithecia shining black, not papillate, globose; asci cylindrical, long stalked, 120-135 x 7-9 μ , p.sp.; spores brown, ellipsoid, with two guttules, 12-16 (-18) x 6-8 μ . On Alnus oregona Nutt., Cowichan Lake, leg. V.J.Nordin (H-1855, V-2916); North Vancouver (H-1857), Sicamous, leg. J.Macoun (OM-167), Sidney, leg. J.Macoun (OM-35, OM-60), U.B.C., leg. S.Brown-John (H-1854); Betula sp., Hastings, leg. J.Macoun (OM-56); Corylus sp., Mt. Douglas Park, leg. W.G.Ziller (V-3566). One collection on Populus tremuloides Michx., Ashnola District (H-1860), fits this species, although Miller (1928: 317) says that H. fuscum is found only on Alnus, Betula, and Corylus spp.

H. multiforme Fr. (Plate VI, fig.21) Stromata large, black, irregular, reddish brown when young, roughened by the prominent perithecia, ostioles black; spores 9-12 x 3-7 μ . First recorded from British Columbia by Ellis and Everhart (1892: 634), on Alnus sp., Macoun. On Alnus oregona Nutt., U.B.C., leg. W.A.Porter (U-127), Sooke, leg. W.G.Ziller (H-1856, V-3562); Alnus sp., Cowichan Lake, leg. R.E.Foster (V-397); Betula sp., Hastings, leg. J.Macoun and labelled by him H. commutatum Nitschke var. Holwayanum Sacc. & Ell. (OM-23); Cinema, leg. M.K.Nobles, (H-1852, V-5196); Sicamous, leg. J.Macoun (OM-164); Populus trichocarpa T.& G., Surrey, leg. T.G.Atkinson (H-1858); Populus sp., Sidney, leg. J.Macoun (OM-322, OM unnumbered, Sept.9, 1913); on bark, Comox, leg. J.Macoun (OM-15, OM-27), Hastings, leg. J.Macoun (OM-51, sterile), Cedar Hill, leg. J.Macoun (OM-63).

H. serpens Pers. ex Fr. var. Macrosporum Miller (Plate VI, fig.22) Stroma flat, effused, greyish black; spores 12-18 x 6-9 μ . On dead wood, Comox, Vancouver Island, leg. J.Macoun (OM-29).

H. ustulatum (Bull.) Fr. (Ustulina vulgaris Tul.) (Plate VI, fig.23) Stromata black, extensive, crust-like over the perithecia; perithecia punctiform, large, broadly ovate; spores black-brown, (27-) 30-39 x 6-9.7 μ . Common around stumps, especially of maple. On Acer macrophyllum Pursh., Mt. Douglas Park, leg. P.J.Salisbury (H-1850, V-2648, O-19944), Royston, leg. W.Touzeau (H-1848, V-2162, O-6487), U.B.C., leg. J.W.Groves (O-23323), (H-1847); Alnus sp., Goldstream Park, leg. L.Arnall (O-4387); on burned log, Goldstream Park, leg. M.K.Nobles (H-1849, V-4662).

H. vogesiaccum Pers. ex Sacc. Stromata effused, flattened, purplish-red; perithecia black, crowded; ostioles punctiform, forming black dots on the surface of the stroma; asci cylindrical, long stalked, p.sp. 105-120 x 7-9 μ ; spores brown, flattened on one side, guttulate, 14-20 x 6-8 μ . On Alnus sp., Cowichan Lake, leg. R.E.Foster (H-1851, V-406).

Species not seen or uncertain:

H. atropurpureum Fr. Cited by Ellis and Everhart (1892: 647) on bark, Macoun. His collection (OM-28) on rotten wood, Comox, examined here has asci 90-105 x 6-7 μ , larger than in the description, spores 9-13.5 x 4.5-6 μ . It is very close to H. multiforme Fr. Miller (1933: 324) created H. cinereo-lilacinum usuing Ellis's specimens of H. atropurpureum as type; he considers Ellis's determinations as misunderstanding of the original species.

H. concurrens B. & C.? On dead wood, sterile, Hastings, leg. J. Macoun (OM-36). J. Dearness says of this collection: "Mr. Ellis mentions only two records of H. concurrens - Carolina and California. This was probably referred to him, in which case if he had thought it H. concurrens he would likely have recorded it."

H. crustaceum Nitschke. No specimens seen. Listed by Ellis and Everhart (1892: 652) on decorticated wood, British Columbia (Macoun).

H. perforatum (Schw.) Sacc. On poplar, Saanichton, leg. J. Macoun (OM-unnumbered, March 24, 1915). Ascii are longer (108-120 x 10-12 μ), than in description. If this determination is correct, the species is identical with H. rubiginosum Fr. (Miller 1928: 315).

H. ?pruinatum (Klotsche) Cke. On Populus tremuloides Michx., causing canker, no perithecia seen. Collected and tentatively determined by D.C. Buckland, Green Lake, 70 Mile House (U-74).

Xylaria Hill. ex Grev.

Stromata erect or ascending, cylindrical, clavate, filiform, often compressed, simple or branched, black outside, mostly white within; perithecia immersed in stroma, more or less prominent, globose or ovate, ostiole papilliform; ascii cylindrical, eight-spored; spores ellipsoid or fusoid, continuous, black or brown, mostly inequilateral.

X. Hypoxylon (L.) Grev. (Plate VI, fig. 25, fig. 46) Stipe villose, sterile, fertile portion clavate or flattened, branched or simple, apex sterile; ascii cylindrical, long stalked, 75-93 x 6-7.5 μ , p.sp; spores 12-15 x 4.5-7.5 μ , narrow ellipsoid, inequilateral. On Alnus oregona Nutt., Lake Cowichan, leg. G.P. Thomas (U-307), North Vancouver, leg. S.Brown-John (H-1853),

U.B.C., leg. W.A.Porter (U-129); on rotten wood, U.B.C. (H-1859); three collections from Sidney collected by J.Macoun, conidial stage only (OM-19, OM-20, OM-46).

Xylaria sp. No asci or spores seen. Dearness would leave it under X. arbuscula or X. apiculata. On rotten wood, Cedar Hill, leg. J.Macoun (OM-67).

HOST INDEX

The hosts or substrates of the fungi listed have been determined as accurately as possible. Names given in the host index are in accordance with Bailey's Manual of Cultivated Plants (1949), Peck's Flora of Oregon (1941), or Abrams' Flora of the Pacific States (1940, 1944, 1951), with the exception of certain genera which have been recently monographed. Hosts are arranged alphabetically. Fungus names are followed by the number of the page on which they appear.

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Leptosphaeria culmorum, 111

Mycosphaerella Tassiana, 89

Pleospora (Clathrospora) pentamera, 135

Calemagrostis rubescens Buckl.

Leptosphaeria culmorum, 111

Mycosphaerella Tassiana, 89

Calamagrostis Suksdorffii (Link.) Trin.

Mycosphaerella Tassiana, 89

Calamovilfa latifolia (Hook.) Scribn.

Leptosphaeria culmorum, 111

Callistephus sp.

Erysiphe cichoracearum, 19

Camellia sp.

Leptosphaeria Camelliae, 109

Campanula ?Media L.

Laestadia?circumtegens, 175

Mycosphaerella Tassiana, 89

Campanula sp.

Mycosphaerella Tassiana, 89

Pleospora herbarum, 132

Carex aenea Fern.

Leptosphaeria consobrina, 110

Carex albonigra Mack.

Mycosphaerella Tassiana, 89

Carex angarae Steud.

Mycosphaerella Tassiana, 89

Carex aperta Boott.

Pleospora (Clathrospora) pentamera, 135

Carex atrata L.

Mycosphaerella Tassiana, 89

Carex atratiformis Britt.

Leptosphaeria epicarecta, 112

Mycosphaerella Tassiana, 89

Pleospora (Clathrospora) Elynae, 131

Carex aurea Nutt.

Mycosphaerella Tassiana, 89

Carex brunnescens (Pers.) Poir.

Leptosphaeria consobrina, 110

Carex diandra Schrank.

Leptosphaeria ?Apogon, 109

Leptosphaeria petkovicensis, 113

Mycosphaerella pere exigua, 86

Carex festivella Mack. (aff.)

Claviceps Grohii, 44

Carex flava, L.

Mycosphaerella (Sphaerella) pusilla, 87

Mycosphaerella Tassiana, 89

Mycosphaerella Wichuriana, 98

Carex Hoodii Boott.

Leptosphaeria ?Apogon, 109

Pleospora discors, 131

Carex limosa L.

Mycosphaerella lineolata, 84

Carex phaeocephala Piper

Mycosphaerella Tassiana, 89

Carex praegracilis Boott.

Mycosphaerella Tassiana, 89

Mycosphaerella Wichuriana, 96

Pleospora (Clathrospora) sp., 138

Carex pyrenaica Wahl.

Leptosphaeria petkovicensis, 113

Mycosphaerella caricicola, 81

Mycosphaerella Tassiana, 89

Carex sitchensis Prescott

Leptosphaeria ?Lolii, 113

Carex stellulata Good.

Claviceps Grohii, 44

Carex spp.

Massaria macrotheca, 145

Mycosphaerella Wichuriana, 96

Cassiope Stellariana DC.

Venturia myrtilli, 143

Cassiope sp.

Leptosphaeria Andromedae, 108

Castanea sativa Sarg.

Endothia parasitica, 168

Castilleja lutescens (Greenm.) Rydb.

Spheerotheca humuli var. fuliginea, 26

Castilleja miniata Dougl.

Mycosphaerella Tassiana, 89

Pleospora comata, 129

Castilleja spp.

Mycosphaerella Tassiana, 89

Sphaerotheca humuli var. fuliginea, 26

Centaurea Jacea

Mycosphaerella Tassiana, 89

Pleospora herbarum, 132

Chaenomeles lagenaria Koidz. (Japanese quince)

Creonectria purpurea, 40

Chamaecyparis nootkatensis (Lamb.) Spach.

Lophiotrema ?nucula, 72

Cheiranthus spp.

Mycosphaerella Tassiana, 89

Chimaphila umbellata (L.) Nutt.

Mycosphaerella (Sphaerella) Chimaphilae, 81

Chiogenes hispidula (L.) Torr. & Gr.

Microsphaera alni var. vaccinii, 22

Choisya ternata HBK.

Creonectria purpurea, 40

Chrysanthemum spp.

Erysiphe cichoracearum, 19

Mycosphaerella Tassiana, 89

Chrysopsis villosa (Pursh.) Nutt. var. hispida (Nutt.) Gray

Pleospora comata, 129

Cichorium Intybus L.

Mycosphaerella Tassiana, 89

Pleospora herbarum, 132

Cirsium arvense (L.) Scop.

Mycosphaerella Tassiana, 89

Pleospora (Clathrospora) baccata, 127

Cirsium Hookerianum Nutt.

Mycosphaerella Tassiana, 89

Cirsium lanceolatum (L.) Scop.

Mycosphaerella punctiformis var. Clematidis, 87

Ophiobolus acuminatus, 118

Pleospora (Clathrospora) baccata, 127

Cirsium spp.

Mycosphaerella punctiformis var. Clematidis, 87

Ophiobolus acuminatus, 118

Pleospora herbarum, 132

Comandra pallida DC.

Erysiphe polygoni, 20

Coreopsis grandiflora

Sphaerotheca humuli var. fuliginea, 26

Coreopsis sp.

Sphaerotheca humuli var. fuliginea, 26

Cornus Nuttallii Aud.

Mycosphaerella ?Auerswaldii, 80

Phyllactinia corylea, 23

Cornus pubescens Nutt.

Phyllactinia corylea, 23

Cornus stolonifera Michx.

Phyllactinia corylea, 23

Corylus Californica (A.DC.) Rose

Gnomoniella Coryli, 151

Melanomma pulvis-pyrius, 63

Corylus rostrata Ait.

Gnomoniella Coryli, 151

Corylus spp.

Gnomoniella Coryli, 151

Hypoxylon fuscum, 171

Phyllactinia corylea, 23

Crataegus sp.

Phyllactinia corylea, 23

Crepis atribarba Heller

Mycosphaerella Tassiana, 89

Cucumis melo L.

Petriella asymmetrica, 30

Cucumis spp.

Erysiphe cichoracearum, 19

Cucurbita maxima Duch.

Mycosphaerella Tassiana, 89

Sordaria fimicola, 55

Cytisus sp.

Leptosphaeria Californica, 109

Dactylis glomerata L.

Erysiphe graminis, 20

Leptosphaeria culmorum, 111

Phyllachora graminis, 50

Danthonia californica Boland var. americana (Scribn.) Hitchc.

Mycosphaerella Tassiana, 89

Danthonia intermedia Vasey

Leptosphaeria culmorum, lll

Daucus carota L.

Sordaria fimicola, 55

Delphinium Brownii Rydb.

Metasphaeria ?zobeliana, ll8

Delphinium sp.

Erysiphe cichoracearum, 19

Erysiphe polygoni, 20

Mycosphaerella Tassiana, 89

Deschampsia atropurpurea (Wahl.) Scheele

Leptosphaeria culmorum, lll

Mycosphaerella Tassiana, 89

Deschampsia elongata (Hook.) Munro ex Benth.

Mycosphaerella Tassiana, 89

Dianthus sp.

Laestadia ?circumtegens, 75

Daporthe columbiensis Ell. & Ev.

Nectria episphaeria, 42

Diatrype Macounii Ell. & Ev.

Nectria episphaeria, 42.

Diatrype sp.

Melanomma parasiticum, 62

Digitalis sp.

Pleospora herbarum, 132

Distichlis spicata (L.) Greene

Mycosphaerella graminicola, 83

Distichlis spicata (L.) Greene var. stricta (Gray) Beetle

Mycosphaerella graminicola, 83

Draba alpina L.

Mycosphaerella confinis, 82

Mycosphaerella Tassiana, 89

Pleospora helvetica, 131

Draba incerta Pays.

Mycosphaerella Tassiana, 89

Draba Paysonii Macbr.

Mycosphaerella Tassiana, 89

Pleospora helvetica, 131

Draba Paysonii Macbr. var. Treleasii (Schulz) Hitchc.

Acrospermum compressum, 37

Pleospora Compositarum, 130

Draba praealta Greene

Mycosphaerella Tassiana, 89

Pleospora Tragacanthae, 136

Draba stenoloba Ledeb.

Leptosphaeria tenera, 114

Mycosphaerella Tassiana, 89

Pleospora asymmetrica, 127

Dryas Drummondii Rich.

Massarina Dryadis, 146

Dryas octopetala L.

Pleospora oligasca, 134

Dryopteris sp.

Microthyrium ?microscopicum, D35

Elymus arenarius L.

Claviceps purpurea, 45

Elymus canadensis L.

Claviceps purpurea, 45

Elymus condensatus Presl.

Claviceps purpurea, 45

Phyllachora graminis, 50

Elymus glaucus Buckl.

Claviceps purpurea, 45

Elymus innovatus Beal

Leptosphaeria culmorum, 111

Mycosphaerella Tassiana, 89

Pleospora macrospora, 133

Elymus Macounii Vasey

Claviceps purpurea, 45

Leptosphaeria culmifraga, 110

Leptosphaeria culmorum, 1111

Elymus sp.

Claviceps purpurea, 45

Epilobium angustifolium L.

Diaporthe pardolata, 158

Didymella fenestrans, 104

Mycosphaerella (Sphaerella) microspila, 85

Mycosphaerella minor, 85

Erigeron acris L. var. asteroides (Andrz.) DC.

Pleospora Tragacanthae, 136

Erigeron aurea var. typicus Cronq.

Pleospora Tragacanthae, 136

Erigeron compositus Pursh.

Pleospora Tragacanthae, 136

Erigeron compositus Pursh. var. glabratus Macoun

Pleospora njegusensis, 134

Pleospora Tragacanthae, 136

Erigeron corymbosus Nutt.

Pleospora Compositarum, 130

Erigeron filifolius (Hook.) Nutt.

Pleospora Balsamorrhizae, 128

Pleospora Compositarum, 130

Erigeron linearis (Hook.) Piper

Laestadia circumtegens, 75

Mycosphaerella Tassiana, 89

Pleospora comata, 129

Erigeron lonchophyllus Hook.

Pleospora comata, 129

Erigeron pumilus subsp. intermedius

Mycosphaerella Tassiana, 89

Pleospora Compositarum, 130

Erigeron speciosus DC. var. macranthus (Nutt.) Cronq.

Leptosphaeria agnita, 108

Pleospora Compositarum, 130

Erigeron speciosus DC. var. typicus Cronq.

Mycosphaerella Tassiana, 89

Erigeron spp.

Mycosphaerella eriophila, 83

Mycosphaerella punctifommis var. Clematidis, 87

Mycosphaerella Tassiana, 89

Pleospora asymmetrica, 127

Pleospora comata, 129

Pleospora herbarum, 132

Pleospora vulgaris, 138

Eriogonum heracleoides Nutt.

Mycosphaerella Polygonorum, 86

Eriogonum subalpinum Greene

Pleospora oligasca, 134

Eriogonum umbellatum Torr.

Pleospora oligasca, 134

Eutypella stellulata (Fr.) Sacc.

Nectria episphaeria, 42

Festuca attaica Trin.

Leptosphaeria sp., 115

Mycosphaerella Tassiana, 89

Physalospora sp., 122

Festuca elatior L.

Claviceps purpurea, 45

Festuca idahoensis Elmer

Mycosphaerella Wichuriana, 96

Festuca ovina L.

Mycosphaerella Tassiana, 89

Festuca ovina L. var. brachyphylla (Schult.) Piper

Mycosphaerella Tassiana, 89

Festuca pacifica Piper

Mycosphaerella Tassiana, 89

Festuca rubra L.

Mycosphaerella Tassiana, 89

Phyllachora silvatica, 50

Ficus sp.

Creonectria purpurea, 40

Fomes pinicola, (Fr.) Cke.

Hypomyces aurantius, 47

Fragaria chiloensis (L.) Duch.

Mycosphaerella (Sphaerella) earliana, 82

Mycosphaerella Fragariae, 83

Fragaria sp.

Sphaerothecá humuli, 25

Gaillardia aristata Pursh.

Mycosphaerella Tassiana, 89

Pleospora angustata, 126

Pleospora sp., 139

Gaultheria Shallon Pursh.

Asterella Gaultheriae, 32

Leptosphaeria Gaultheriae, 112

Gentiana calycosa Griseb.

Sphaerulina Gentianae, 100

Venturia atriseda, 142

Geranium erianthum DC.

Mycosphaerella Tassiana, 89

Geranium pusillum Burm.f.

Stigmatea Robertiani, 35

Geranium viscosissimum Fisch. & Mey.

Sphaerotheca humuli, 25

Geum triflorum Pursh.

Pleospora oligosca, 134

Gilia linearis Gray

Sphaerotheca humuli, 25

Heuchera glabra Willd.

Mycosphaerella punctiformis var. Clematidis, 87

Sphaerotheca humuli, 25

Hieraceum Albertinum Farr

Pleospora herbarum var. occidentalis, 133

Hieracium aurantiacum L.

Mycosphaerella Tassiana, 89

Pleospora herbarum, 132

Hieracium gracile Hook.

Mycosphaerella Tassiana, 89

Hierocholoe alpina (Swartz.) Roem.

Mycosphaerella Tassiana, 89

Hierocholoe borealis Roem. & Schult.

Mycosphaerella Tassiana, 89

Hierocholoe odorata (L.) Beauv.

Mycosphaerella Tassiana, 89

Holcus lanatus L.

Epichloe typhina, 46

Holodiscus discolor (Pursh.) Maxim.

Phyllactinia corylea, 23

Hordeum vulgare L.

Claviceps purpurea, 45

Erysiphe graminis, 20

Hordeum sp.

Erysiphe graminis, 20

Hydrangea sp.

Mycosphaerella Tassiana, 89

Hypoxyton sp.

Nectria episphaeria, 42

Iris germanica L.

Laestadia ?circumtegens, 75

Mycosphaerella Tassiana, 89

Iris germanica cont.

Pleospora Compositarum, 130

Pleospora herbarum, 132

Iris sp.

Didymellina macrospora, 105

Juncus Drummondii Meyer

Leptosphaeria petkovicensis, 113

Mycosphaerella caricicola, 81

Mycosphaerella Tassiana, 89

Phomatospora therophila, 121

Juncus Parryi Engelm.

Leptosphaeria petkovicensis, 113

Juniperus scopulorum Sarg.

Microthyrium Juniperi, 35

Juniperus sibirica Burgsd.

Microthyrium Juniperi, 35

Koeleria cristata (L.) Pers.

Leptosphaeria culmorum, 111

Mycosphaerella Tassiana, 89

Lactaria sp.

Hypomyces Lactifluorum, 47

Lactuca scariola L.

Erysiphe cichoracearum, 19

Sphaerotheca humuli var. fuliginea, 26

Lactuca spicata (Lam.) Hitchc.

Sphaerotheca humuli var. fuliginea, 26

Lathyrus ochroleucus Hook.

Erysiphe polygoni, 20

Lathyrus odoratus L.

Mycosphaerella Tassiana, 89

Pleospora herbarum, 132

Lathyrus sp.

Erostrotheca multiformis, 37

Ledum glandulosum Nutt.

Leptosphaeria sp., 115

Ledum groenlandicum Oedr.

Leptosphaeria sp., 116

Pleospora (Catharinia) sp., 138

Venturia ?Cassandrae, 142

Linnaea borealis L. var. americana (Forbes) Rehder

Venturia Dickiei, 142

Linum Lewisii Pursh.

Mycosphaerella Tassiana, 89

Pleospora Tragacanthae, 136

Lolium perenne L.

Claviceps purpurea, 45

Lomatium ambiguum (Nutt. C.& R.)

Mycosphaerella Tassiana, 89

Lonicera involucratum Banks

Leptosphaeria dumetorum, 112

Ophiobolus minor, 119

Protoventuria sp., 140

Lonicera sp.

Microsphaera alni var. *loniceræ*, 22

Lotus denticulatus (Drew) Greene (Hosackia denticulata Drew)

Erysiphe polygoni, D20

Lupinus latifolius Agh. var. subalpinus (Piper & Robins.) C.P.Sm.

Leptosphaeria agnita, 108

Mycosphaerella Tassiana, 89

Nectriella sp., 43

Pleospora asymmetrica, 127

Lupinus Lyallii Gray

Mycosphaerella Tassiana, 89

Pleospora Tragacantheæ, 136

Lupinus polyphyllus Lindl.

Erysiphe polygoni, 20

Lupinus perennis L.

Erysiphe polygoni, 20

Lupinus sericeus Pursh.

Mycosphaerella Tassiana, 89

Lupinus spp.

Erysiphe polygoni, 20

Laestadia ?circumtegens, 75

Mycosphaerella Tassiana, 89

Pleospora herbarum, 132

Luzula campestris (L.) DC.

Pleospora discors, 131

Luzula Piperi (Cov.) M.E.Jones

Mycosphaerella Tassiana, 89

Luzula spicata (L.) DC.

Mycosphaerella Tassiana, 89

Pleospora (Clathrospora) Elynae, 131

Luzula Wahlenbergii Rup.

Mycosphaerella Wichuriana, 96

Lychnis Coronaria Desr.

Mycosphaerella Tassiana, 89

Pleospora herbarum, 132

Lycopersicum esculentum Mill.

Mycosphaerella Tassiana, 89

Matthiola sp.

Erysiphe polygoni, 20

Medicago sativa L.

Pseudoplea Trifolii, 99

Melanconis thelebola (Fr.) Sacc.

Nectria episphaeria, 42

Melilotus sp.

Leptosphaeria pratensis, 113

Monarda mollis L.

Mycosphaerella Tassiana, 89

Myrica Gale L.

Uncinula salicis, 28

Nuttallia cerasiformis T. & G.

Diaporthe columbiensis, 157

Oenothera biennis L.

Laestadia ? circumtegens, 75

Mycosphaerella Tassiana, 89

Pleospora herbarum, 132

Oenothera spp.

Erysiphe cichoracearum, 19

Pleospora herbarum, 132

Oryzopsis asperifolia Michx.

Mycosphaerella Tassiana, 89

Oryzopsis hymenoides (R. & S.) Ricker

Mycosphaerella Tassiana, 89

Pleospora (Clathrospora) pentamera, 135

Oryzopsis pungens (Torr.) Hitchc.

Mycosphaerella Tassiana, 89

Mycosphaerella Wichuriana, 96

Oxyria digyna (L.) Camptdera

Chaetomium ?spirale, 52

Coleroa Oxyriæ, 58

Oxytropis alpicola (Rydb.) Jones

Leptosphaeria sp., 116

Pleospora comata, 129

Pleospora sp., 139

Oxytropis Gusickii Greenm.

Pleospora Tragacanthæ, 136

Pachystima myrsinites Raf.

Mycosphaerella Pachystimæ, 85

Panicum occidentale Scrib.

Leptosphaeria culmifraga, 110

Mycosphaerella Tassiana, 89

Panicum thermale Boland

Leptosphaeria culmorum, 111

Parthenocissus sp.

Uncinula necator, 28

Pedicularis bracteosa Benth.

Apiosporella alpina, 102

Mycosphaerella Tassiana, 89

Pleospora Tragacanthae, 136

Pedicularis podoensis Pennel

?*Massarinia* sp., 146

Mycosphaerella Tassiana, 89

Penstemon ellipticus Coult. & Fisher

Venturia sp., 144

Penstemon fruticosus (Pursh.) Greene

Dimerium alpinum, 29

Penstemon ovatus Dougl.

Mycosphaerella Tassiana, 89

Penstemon tolmiei Hook.

Pleospora herbarum var. *occidentalis*, 133

Penstemon sp.

Erysiphe cichoracearum, 19

Phacelia leptosepala Rydb.

Ophiobolus rufid, 120

Phacelia leucophylla Torr.

Mycosphaerella Tassiana, 89

Pleospora coloradensis, 128

Pleospora vulgaris, 138

Venturia sp., 145

Rhacelia sericea Gray

Pleospora comata, 129

Pleospora Tragacantheae, 136

Phalaris arundinacea L.

Leptosphaeria culmicola, 110

Phaseolus coccineus L. (Scarlet runner bean)

Melanospora papillata, 41

Phleum alpinum L.

Asterula sp., 33

Leptosphaeria eustoma, 112

Mycosphaerella Tassiana, 89

Phleum pratense L.

Claviceps purpurea, 45

Phlox diffusa Benth.

Mycosphaerella Tassiana, 89

Nectriella sp., 43

Pleospora comata, 129

Phlox Douglasii Hook.

Mycosphaerella Tassiana, 89

Pleospora comata, 129

Phlox longifolia Nutt.

Pleospora (Clathrospora) diplospora, 130

Pleospora (Clathrospora) permunda, 136

Phlox rigida Benth.

Pleospora comata, 129

Pleospora (Clathrospora) permunda, 136

Phlox speciosa Pursh.

Lophiostoma caulum, 71

Phlox speciosa cont.

Pleospora comata, 129

Phlox sp.

Erysiphe cichoracearum, 19

Picea sitchensis (Bong.) Carr.

Herpotrichia nigra, 58

Pinus monticola Dougl.

Ceratostomella sp., 65

Cucurbitothis pithyphila, 48

Pinus ponderosa Dougl.

Rosellinia obliquata var. Americana, 63

Pisum sativum L.

Erysiphe polygoni, 20

Mycosphaerella pinodes, 86

Pleospora herbarum, 132

Pisum sp.

Erysiphe polygoni, 20

Plantago major L.

Erysiphe cichoracearum, 19

Platanus occidentalis L.

Gnomonia veneta, 150

Platanus sp.

Gnomonia veneta, 150

Poa alpina L.

Leptosphaeria culmifraga, 110

Mycosphaerella Tassiana, 89

Pleospora helvetica, 136

Poa ampla Merr.

Leptosphaeria culmorum, 111

Mycosphaerella Wichuriana, 96

Pleospora discors, 131

Poa arctica R.Br.

Mycosphaerella Tassiana, 89

Poa compressa L.

Leptosphaeria culmifraga, 110

Leptosphaeria culmorum, 111

Mycosphaerella Tassiana, 89

Pleospora (Clathrospora) pentamera, 135

Poa confinis Vasey

Mycosphaerella Tassiana, 89

Pleospora discors, 131

Poa glauca Vahl.

Leptosphaeria culmorum, 111

Mycosphaerella Tassiana, 89

Pleospora helvetica, 131

Poa gracillima Vasey

Leptosphaeria culmorum, 111

Pleospora arctica, 126

Poa interior Rydb.

Metasphaeria Poae, 117

Mycosphaerella Tassiana, 89

Mycosphaerella Wichuriana, 96

Pleospora (Clathrospora) pentamera, 135

Poa lettermanni Vasey

Mycosphaerella Tassiana, 89

Poa nemoralis L.

Leptosphaeria culmifraga, 110

Poa nervosa (Hook.) Vasey

Leptosphaeria culmifraga, 110

Mycosphaerella Tassiana, 89

Poa palustris L.

Leptosphaeria culmifraga, 110

Poa paucispicula Scrib. & Merr.

Ascospora graminis, 74

Mycosphaerella Tassiana, 89

Poa pratensis L.

Mycosphaerella Tassiana, 89

Poa rupicola Nash

Leptosphaeria sp., 116

Pleospora (Clathrospora) sp., 139

Poa secunda Presl.

Ascospora graminis, 74

Leptosphaeria culmorum, 111

Mycosphaerella Tassiana, 89

Poa stenantha Trin.

Leptosphaeria culmifraga, 110

Mycosphaerella Tassiana, 89

Poa spp.

Erysiphe graminis, 20

Phyllachora graminis, 50

Polemonium californicum Eastw.

Mycosphaerella Tassiana, 89

Polemonium coeruleum L. subsp. occidentale (Greene) Davids.

Pleospora comata, 129

Polemonium pulcherrimum Hook.

Mycosphaerella Tassiana, 89

Pleospora comata, 129

Polemonium viscosum Nutt.

Pleospora comata, 129

Polygonum aviculare L.

Erysiphe polygoni, 20

Polygonum erectum L.

Erysiphe polygoni, 20

Polygonum ramosissimum Michx.

Erysiphe polygoni, 20

Polygonum Persicaria L.

Erysiphe polygoni, 20

Polygonum sp.

Erysiphe polygoni, 20

Polyporus resinosus, Fr.

Hypomyces aurantius, 47

Polyporus sp.

Hypomyces aurantius, 47

Polystichum munitum (Kaulf.) Presl.

?Microthyrium microscopicum, 35

Populus balsamifera L.

Linospora sp., 152

Populus deltoides Marsh.

Mycosphaerella populifolia, 86

Populus tremuloides Michx.

Hypoxylon fuscum, 171

?Hypoxylon pruinatum, 173

Mycosphaerella orbicularis, 85

Otthia sp., 66

Phaeosphaerella maculosa, 98

Uncinula salicis, 28

Populus trichocarpa T. & G.

Diaporthe eres, 157

Diatrype Macounii, 166

Hypoxylon multiforme, 171

Mycosphaerella populifolia, 86

Uncinula salicis, 28

Populus spp.

Cryptosphaeria populina, 155

Diaporthe columbiensis, 157

Diatrype Macounii, 166

Eutypella stellulata, 159

Hypoxylon multiforme, 171

?Hypoxylon perforatum, 173

Otthia sp., 66

Valsa nivea, 161

Potentilla dissecta Nutt.

Pleospora comata, 129

Pleospora oligasca, 134

Potentilla diversifolia Lehm.

Asterula sp., 34

Guignardia Potentillae, 75

Mycosphaerella Tassiana, 89

Pleospora comata, 129

Pleospora oligasca, 134

Potentilla emarginata Pursh.

Pleospora oligasca, 134

Potentilla flabellifolia Hook.

Microthyrium arcticum, 34

Mycosphaerella Tassiana, 89

Potentilla Nuttallii Lehm.

Mycosphaerella Tassiana, 89

Potentilla palustris Scop.

Gnomonia potentillae, 149

Mycosphaerella Fragariae, 83

Mycosphaerella Tassiana, 89

Sphaerotheca humuli, 25

Primula sp.

Pleospora herbarum, 132

Prunella vulgaris L.

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SUMMARY

The foregoing list shows a total of 263 species in 95 genera. Those species which have not been determined and which are awaiting complete identification comprise 41. In the table given below the number of genera, species, and indeterminate species are tabulated by family and order.

TABLE I

Family	Genera	Species	Indet. species
PERISPORIALES:			
Erysiphaceae	6	19	-
Perisporiaceae	4	5	-
Microthyriaceae	5	7	2
HYPOCREALES:			
Nectriaceae	6	12	2
Hypocreaceae	4	6	-
DOTHIDEALES:			
Dothideaceae	6	6	1
SPHAERIALES:			
Chaetomiaceae	1	22	-
Sordariaceae	4	6	-
Trichosphaeriaceae	5	5	1
Melanommaeae	4	8	-
Ceratostomataceae	1	-	1

TABLE I cont.

Family	Genera	Species	Indet. species
SPHAERIALES cont.			
Cucurbitariaceae	2	1	1
Coryneliaceae	1	1	-
Amphisphaeriaceae	2	4	-
Lophiostomataceae	2	4	-
Mycosphaerellaceae	9	51	6
Pleosporaceae	13	77	23
Massariaceae	2	2	1
Gnomoniaceae	3	8	-
Clypeosphaeriaceae	1	1	1
Valsaceae	7	15	1
Melanconidaceae	1	2	-
Diatrypaceae	3	7	-
Melogrammataceae	1	1	-
Xylariaceae	3	13	1
TOTAL	95	263	41

Comparison of this list of Pyrenomyctes with those of Manitoba and Saskatchewan (Bisby, et al. 1938) and those of the Maritime Provinces (Wehmeyer, 1950) is also given. The number of species reported for the three regions, and the number of species common to each of the other two regions and to British Columbia are given for the four orders of

Pyrenomycetes. All varieties are counted as species in each case.

TABLE II

Order	British Columbia species	Manitoba species common		Maritimes species common	
PERISPORIALES	31	18	14	28	19
HYPOCREALES	18	32	8	42	9
DOTHIDEALES	6	9	2	10	3
SPHAERIALES	208	276	39	166	46
TOTAL	263	335	63	246	77

The larger number of species from Manitoba is probably the result of more intensive study for a longer period. Of the three families best represented in British Columbia, comparison with those of Manitoba and the Maritimes shows the following:

TABLE III

Family	British Columbia species	Manitoba species common		Maritimes species common	
Erysiphaceae	19	16	13	23	18
Mycosphaerellaceae	51	9	4	18	9
Pleosporaceae	77	56	12	35	12

The larger number of British Columbia species in two of these families indicates that further study in all groups would show a similarly large number of species in the other families. Further study would also provide more fungi common to this province and the other two regions.

The similarity between European and Western North American fungi has been noted previously by collectors in the west. As Kauffman (1925: 116) says: "...many species, if one is at all familiar with northern European plants, are found to be old Friesian species....". A number of species in this list have not previously been noted from North America. These species are marked in the list by an asterisk.

As has been previously stated, this list is far from complete. The size of the province prevented collecting throughout the larger part of it. Even in the areas more intensively studied, many more species will doubtless be found.

REFERENCES

1. Abrams, Leroy. Illustrated Flora of the Pacific States. Stanford University, University Press. Vol.I, 1940, Vol.II, 1944, Vol.III, 1951.
2. Ainsworth, G.C. and Bisby, G.R. A Dictionary of the fungi. Kew, Imperial Mycological Institute, 1945, 2d ed.
3. Anastasiou, C.J. The biology of Melanconis thelebola (Fr.) Sacc. and its associated borer on Alnus oregona Nutt. Thesis in the Department of Botany, Univ. British Columbia, unpublished, 1952.
4. Bailey, L.H. Manual of Cultivated Plants. New York, Macmillan, 1949.
5. Bisby, G.R., et al. The fungi of Manitoba and Saskatchewan. Ottawa, National Research Council, 1938.
6. Brandriff, Helen. The development of the ascocarp of Acrospermum compressum. Mycol. 28: 228-235. 1936.
7. Cain, R.F. Studies of coprophilous Sphaeriales in Ontario. Univ. Toronto Studies, Biol.Ser.No.38. 1934.
8. Cash, Edith K. and Davidson, Ross W. Some new species of Ascomycetes on coniferous hosts. Mycol. 32: 728-735. 1940.
9. Child, Marion. The genus Daldinia. Ann. Mo.Bot.Gard. 19: 429-496. 1932.
10. Chivers, A.H. A monograph of the genera Chaetomium and Ascotricha. Torrey Bot. Club Mem. 14 (3): 155-240. 1915.
11. Clements, Frederic E. and Shear, Cornelius L. The genera of fungi. New York, H.W.Wilson Company, 1931
12. Conners, I.L. Annual report of the Canadian Plant Disease Survey. (9th and 11th to 21st reports.) Can.Dept.Agr., Ottawa, 1929, 1931-1941.
13. _____ and Eardley, E.A. Annual report of the Canadian Plant Disease Survey (10th report). Can.Dept.Agr., Ottawa, 1930.

14. Conners, I.L. and Savile, D.B.O. Annual report of the Canadian Plant Disease Survey (22nd to 29th reports). Can.Dept. Agr., Ottawa, 1942-1949.
15. Cooke, Wm.Bridge. Western fungi - I. Mycol. 41: 601-622. 1949.
16. Davidson, John, et.al. British Columbia. In Naturalist's Guide to the Americas. Baltimore, Williams & Wilkins Company. pp. 150-168. 1926.
17. Dearness, John. New or noteworthy species of fungi. Mycol. 8: 98-107. 1916.
18. _____ New or noteworthy North American fungi. Mycol. 9: 345-364. 1917.
19. Drayton, F.L. A summary of the prevalence of plant diseases in the Dominion of Canada 1920-1924. Can.Dept.Agr. Bull. 71. n.s. Ottawa, 1926.
20. Ellis, J.B. and Everhart, B.M. New species of fungi from various localities. Journ.Mycol. 3: 116-118, 1887.
21. _____ New North American fungi. Proc. Acad.Nat.Sci.Phila. 1890: 219-249. 1891.
22. _____ The North American Pyrenomyctetes. Newfield, N.J. 1892.
23. _____ New species of fungi from various localities. Bull. Torr. Bot.Club 25: 501-514. 1898.
24. Faull, J.H. and Graham, G.H. Bark disease of the chestnut in British Columbia. Forestry Quarterley 12: 201-203. 1914.
25. Fitzpatrick, Harry Morton. Revisionary studies in the Coryneliaceae. II. The genus Caliciopsis. Mycol. 34: 489-514. 1942.

26. Griffiths, David. Contributions to a better knowledge of the Pyrenomyctes. - I: A study of miscellaneous species. Bull. Torr. Bot. club. 26: 432-444. 1899.
27. G. The North American Sordariaceae. Torrey Bot. Club Mem. 11: 1-34. 1901.
28. Groves, J. Walton. A new species of Claviceps on Carex. Mycol. 35: 604-609. 1943.
29. Kauffman, C.H. The fungus flora of Mt. Hood, with some new species. Mich. Acad. Sci. (Papers) 5: 115-148. 1925.
30. Lind, J. Micromycetes from north-western Greenland found on plants collected during the Jubilee Expedition, 1920-23. Meddel. om Groenl. 69: 161-179. 1926.
31. The Micromycetes of Svalbard. Skrifter om Svalbard og Ishavet. 13. 1928.
32. Lindau, G. Pyrenomycetinae. In Engler and Prantl's Die naturlichen Pflanzenfamilien. Leipzig, Wilhelm Engelmann, 1897. pp. 321-491.
33. Mains, E.B. New and interesting species of Cordyceps. Mycol. 39: 535-545. 1947.
34. Martin, G. Hamilton and Charles, Ver K. Preliminary studies of the life history of Erostrotheca multiformis, the perfect stage of Cladosporium album Dowson. Phytopath. 18: 839-846. 1928.
35. McCurry, J.B. Report on the prevalence of plant diseases in the Dominion of Canada for the years 1927 and 1928. Can. Dept. Agr. Ottawa, 1928.
36. and Hicks, A.J. Fifth annual report on the prevalence of plant diseases in the Dominion of Canada. Can. Dept. Agr. Ottawa, 1925.

37. Migula, W. Kryptogamen-Flora. In Dr. Thome's Flora von Deutschland, Österreich und der Schweiz. Gera, Friedrich von Zetschitz. Vol.III, Part 3, Divisions 1 and 2. 1913.
38. Miller, Julian H. Biologic studies in the Sphaeriales - II. Mycol. 20: 305-339. 1928.
39. _____ Some new species of Hypoxyylon. Mycol. 25: 321-329. 1933.
40. _____ Georgia Pyrenomycetes. II. Mycol. 33: 74-81. 1941.
41. _____ Letter to the writer, June 12, 1952.
42. Orton, C.R. Graminiculous species of Phyllachora in North America. Mycol. 36: 18-54. 1944.
43. Peck, Morton Eaton. A manual of the higher plants of Oregon. Portland, Oregon, Metropolitan Press. 1941.
44. Saccardo, P.A. Sylloge Fungorum. I. Pyrenomyceti. 1882. Pata VII. II. Pyrenomyceti. 1883. Pata VII. Additamenta ad I - IV. 1886. Pata VII. IX. Supplementum Universale I. 1891. Pata VII. XI. Supplementum Universale III. 1895. Pata VII. XIV. Supplementum Universale IV. 1899. Pata VII. XVI. Supplementum Universale V. 1902. Pata VII. XVII. Supplementum Universale. VI. 1905. Pata VII. XXII. Supplementum Universale IX. 1913. Pata VII. XXIV. Supplementum Universale. X. Sectio I. 1926. Abellini. Sectio II. 1928. Abellini.
45. Salmon Ernest S. A monograph of the Erysiphaceae. Torrey. Bot. Club Mem. 9: 1-292. 1900.
46. Seaver, Fred J. Hypocreales. North Am. Flora, 3(1): 1-56. 1910.
47. Seymour, Arthur Bliss. Host index of the fungi of North America. Cambridge, Harvard University Press. 1929.
48. Shear, Cornelius Lott. New species of fungi. Bull. Torrey Bot. Club 34: 305-317. 1907.

49. Stace-Smith, Richard. A study of the black knot disease of plums.
Thesis in the Department of Agriculture, Univ. British Columbia,
unpublished. 1950.
50. Stevens, Neil E. Two apple black rot fungi in the United States. Mycol.
25: 536-548. 1933.
51. Waterman, Alma M. Tip blight of species of *Abies* caused by a new species
of Rehmieollopsis. Journ. Agr.Res. 70: 315-338. 1945.
52. Welch, Donald Stuart. A monographic study of the genus Cucurbitaria
in North America. Mycol. 18: 51-86. 1926.
53. Wehmeyer, Lewis E. A biologic and phylogenetic study of the stromatic
Sphaeriales. Am. Journ. Bot. 13: 575-645. 1926.
54. _____ The genus Diaporthe Nitschke and its segregates.
Univ. Mich. Studies. Scien. Series. 9: 1-349. 1933.
55. _____ Studies on some fungi from Northwestern Wyoming.
I. Pyrenomycetes. Mycol. 38: 144-170. 1946. III. Pleospora and
Leptosphaeria. Lloydia (9: 203-240. 1946.
56. _____ Studies in the genus Pleospora. I. Mycol. 41: 565-
593. 1949. III. Mycol. 43: 34-53. 1951. IV. Mycol. 43: 570-
589. 1951.
57. _____ The fungi of New Brunswick, Nova Scotia and Prince
Edward Island. Ottawa, National Research Council. 1950.
58. _____ Letter to the writer, May 19, 1952.
59. Winter, Georg. Ascomyceten: Gymnoasceen und Pyrenomyceten In Die
Pilze. Rabenh. Krypt.-Flora Deutsch. Oesterr. Schweiz. 1(2):
1-928. Leipzig, Eduard Kummer. 1887.
60. Wolf, Frederick A. Morphology of Polythrincium, causing sooty blotch
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<i>Erostrotheca</i> Martin & Charles	37
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<i>Erysiphe</i> Hedw.f.	18
<i>aggregata</i> (Pk.) Fark.	19
<i>cichoracearum</i> DC.	19
<i>graminis</i> DC.	20
<i>polygoni</i> DC.	20
<i>Eutypella</i> Nitschke	159
<i>stellulata</i> (Fr.) Sacc.	159
<i>Fenestella</i> Tul.	159
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<i>cingulata</i> (Ston.) Schrenk & Spauld.	147
<i>Gnomonia</i> Ces. & de Not.	147
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<i>depressula</i> Karst.	148
<i>potentillae</i> sp.nov.	149
<i>setacea</i> (Pers.) Ces. & de Not.	149
<i>veneta</i> (Sacc. & Speg.) Klebahn	150
<i>Vepris</i> Mout.	150
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Hypoxylon Fr.	170
aspera Mass.	170
atropurpureum Fr.	172
Cinereo-lilacinum Miller	172
concurrens B. & C.	173
Crustaceum Nit.	173
fuscum (Pers.) Fr.	171
multiforme Fr.	171
perforatum (Schw.) Sacc.	173
rubiginosum Fr.	173
?pruinatum (Klotsche) Cke.	173
serpens Pers. ex Fr. var. macrosporum Mill.	172
ustulatum (Bull.) Fr.	172
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Camelliae Cooke & Mass.	109
coniothyrium (Fckl.) Sacc.	109
consobrina Karst.	110
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culmifraga (Fr.) Ces. & de Not.	110
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dumetorum Niessl	112
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eustoma (Fr.) Sacc.	112
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?Lolii Syd.	113
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pratensis Sacc. & Br.	113
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tenera Ellis	114
Typhae Karst.	114
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<i>caulium</i> (Fr.) de Not.	71
<i>Lophiotrema</i> Sacc.	71
<i>aequivocum</i> Ell. & Ev.	72
<i>?nucula</i> (Fr.) Sacc.	72
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<i>alni</i> var. <i>vaccinii</i> (Schw.) Salm.	22
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<i>brassicicola</i> (Duby) Lindau	80
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<i>Chimaphilae</i> Ell. & Ev.	81
<i>cinerascens</i> (Eckl.) Migula	81
<i>coerulea</i> (Ell. & Ev.) Tracy & Earle	81
<i>confinis</i> (Karst.) Lind	82
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Pachystimae Dear.	85
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Ranunculi (Karst.) Lind	88
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rubi Roark	88
sagedioides (Wint.) Lindau	88
stromatoidea Dear.	89
Tassiana (de Not.) Johans.	89
Typhae (Lasch.) Lindau	96
vagans Ell. & Ev.	96
Wichuriana (Schroet.) Johans.	96
sp.	97

Nectria Fr.	41
episphaeria (Tode) Fr.	42
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sanguinea Fr.	42
Nectriella Fckl.	43
sp.	43
Ophiobolus Riess.	118
acuminatus (Sow.) Duby	118
cariceti (Berk. & Br.) Sacc.	119
minor Bubak	119
porphyrogonus (Tode) Sacc.	119
Rostrupii Ferdin. & Winge	120
rudis (Riess.) Rehm	120
Otthia Nitschke	66
sp.	66
Petriella Curzi	30
asymmetrica Curzi	30
Phaeocryptopus Naumoff	31
gaumannii (Rohde) Petrak	31
Phaeosphaerella Karst.	98
maculosa (Sacc.) Karst.	98
Phomatospora Sacc.	120
?argyrostigma (Berk.) Sacc.	121
therophila (Desm.) Sacc.	121
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silvatica Sacc. & Speg.	50

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<i>corylea</i> (Pers.) Karst.	23
<i>Physalospora</i> Niessl	121
<i>Miyabeana</i> Fukush.	121
sp.	122
<i>obtusa</i> (Schw.) Cke.	122
<i>Pleosphaerulina</i> Pass.	98
<i>constricta</i> (Starb.) Sacc.	98
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<i>Crandallii</i> (Ell. & Ev.) Wehm.	126
<i>angustata</i> Wehm.	126
<i>arctica</i> Karst.	126
<i>asymmetrica</i> Wehm.	127
<i>Baccata</i> Ell.	127
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<i>Elynae</i> (Rab.) Ces. & de Not.	131
<i>helvetica</i> Niessl	131
<i>herbarum</i> (Pers.) Rab.	132
<i>herbarum</i> var. <i>occidentalis</i> Wehm.	133
<i>infectoria</i> Fckl.	133
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<i>oligasca</i> Bub.	134
<i>pentamera</i> Karst.	135
<i>permunda</i> (Cke.) Sacc.	136
<i>planispora</i> Ell.	136
<i>Tragacanthae</i> Rab.	136
<i>trichostoma</i> (Fr.) Ces. & de Not.	137
<i>vulgaris</i> Niessl.	138
sp.	138-140

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<i>Podosphaera</i> Kunze	23
<i>leucotricha</i> (Ell. & Ev.) Salm.	24
<i>oxyacanthae</i> (DC.) de Bary	24
<i>Protoventuria</i> Berl. & Sacc.	140
<i>vancouverensis</i> Dear.	140
sp.	140

<i>Pseudoplea</i> Hohn.	99
<i>Trifolii</i> (Rostr.) Petrank	99

Pyrenophora, see Pleospora

<i>Rehmiellopsis</i> Bubak & Kabat	99
<i>abietis</i> (E.Rostr.) O.Rostr.	99
<i>Rosellinia</i> Ces. & de Not.	63
<i>obliquata</i> (Somm.) Sacc. var. <i>Americana</i> E. & E.	63
<i>ovalis</i> (Ell.) Sacc.	64
<i>thelena</i> (Fr.) Rab. var. <i>pinea</i> Sacc.	64

Sordaria Ces. & de Not.	55
fimicola (Rob.) Ces. & de Not.	55
hypocoproides Speg.	56
setosa Wint.	56
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Sphaerella, see Mycosphaerella	
Sphaerotheca Lev.	24
humuli (DC.) Burr.	25
humuli var. fuliginea (Schlecht.) Salm.	26
mors-uvae (Schw.) Berk. & Curt.	26
pannosa (Wallr.) Lev.	26
Sphaerulina Sacc.	99
Alni A.Lorr.Smith forma minor fm. nov.	100
Gentianae Wehm.	100
Stigmata Fr.	35
Robertiani Fr.	35
Strickeria Korber	68
Amelanchieris Earle	68
obducens (Fr.) Wint.	69
Typhina Ell. & Ev.	69
Teichospora, see Strickeria	
Trematosphaeria Fckl.	70
?fissa (Fckl.) Wint.	70
Trichosphaeria Fckl.	60
breviseta Dear.	60
Typhodium, see Epichloe	

<i>Uncinula</i> Lev.	27
<i>aceris</i> (DC.) Sacc.	27
<i>circinatum</i> Cke. & Pk.	27
<i>necator</i> (Schw.) Burr.	28
<i>salicis</i> (DC.) Wint.	28
<i>Ustulina</i> , see <i>Hypoxyylon</i>	
<i>Valsa</i> Fr.	160
<i>amhiens</i> (Pers.) Fr.	161
<i>ceratophora</i> Tul.	161
<i>leucostoma</i> (Pers.) Fr.	161
<i>nivea</i> (Hoffm.) Fr.	161
<i>Pini</i> (Alb. & Schw.) Fr.	162
sp.	162
<i>Venturia</i> Ces. & de Not.	141
<i>atriseda</i> Rehm	142
?Cassandrae Pk.	142
<i>chlorospora</i> (Ces.) Karst.	142
<i>Dickiei</i> (B. & Br.) de Not.	142
<i>inaequalis</i> (Cke.) Aderh.	143
<i>myrtilli</i> Cke.	143
<i>Pyrina</i> Aderh.	143
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sp.	144
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sp.	174

PLATES AND EXPLANATION

PLATE I

Representative asci or spores of each species were drawn by camera lucida, to scale, as indicated, in order to illustrate the descriptions.

- Fig.1. Ascus of Erysiphe aggregata (Pk.) Farl. Fig.2. Ascus of E. cichoracearum DC. Fig.3. Immature ascus of E. graminis DC.
Fig.4. Ascus of E. polygoni DC. Fig.5. Appendage and ascus of Microsphaera alni (Wallr.) Salm. Fig.6. Appendage and ascus of M. alni var. lonicerae (DC.) Salm. Fig.7. Appendage and ascus of M. alni var. vaccinii (Schw.) Salm. Fig.8. Ascus of M. diffusa Cke. & Pk. Fig.9. Ascus of Phyllactinia corylea (Pers.) Karst. Fig.10. Ascus of Podosphaera leucotricha (Ell. & Ev.) Salm. Fig.11. Ascus of P. oxyacanthae (DC.) de Bary. Fig.12. Ascus of Sphaerotheca humuli (DC.) Burr. Fig.13. Ascus of S. humuli var. fuliginea (Schlecht.) Salm. Fig.14. Appendage and ascus of Uncinula Aceris (DC.) Sacc. Fig.15. Ascus of U. necator (Schw.) Burr. Fig.16. Ascus of U. salicis (DC.) Wint.
Fig.17. Ascus and spore of Dimerium alpinum W.B.Cooke. Fig.18. Ascus and spore of Dimerosporium Abietis Dear. Fig.19. Ascus and spore of D. Tsugae Dear. Fig.20. Ascus and spores of Petriella asymmetrica Gurzi. Fig.21. Ascus and spore of Phaecocryptopus gaumannii (Rohde) Petrak. Fig.22. Ascus and spore of Asterella Gaultheriae (Curt.) Sacc. Fig.23. Spores of A. ?Hellebori Rehm. Fig.24. Ascus and spores of Asterina rubicola Ell. & Ev. Fig.25. Ascus and spores of Microthyrium

PLATE I cont.

arcticum Andem. Fig.26. Ascus and spore of M. Juniperi (Desm.)
Sacc. Fig.27, Ascus and spores of Stigmatea Robertiani Fr.
Fig.28. Spores of Creonectria coccinea (Pers.) Seav. Fig.29.
Spores of C. cucurbitula (Sacc.) Seav. Fig.30. Ascus of
C. pithoides (Ell. & Ev.) Seav. Fig.31. Ascus of C. purpurea
(L.) Seav. Fig.32. Ascus and spore of Creonectria sp. Fig.33.
Ascus and spores of Melanospora papillata Hotson. Fig.34. Spore
of M. Townei Griffiths. Fig.35. Ascus of Nectria episphaeria
(Tode) Fr. Fig.36. Spores of N. galligena Bres. Fig.37. Ascus
of N. sanguinea Fr. Fig.38. Ascus and spores of Nectriella sp.
Fig.39. Ascus of Claviceps Grohii Groves. Fig.40. Spores of
C. purpurea Tul. Fig.41. Ascus and spore of Hypomyces aurantius
(Pers.) Tul. Fig.42. Spore of H. Lactifluorum (Schw.) Tul.

PLATE I

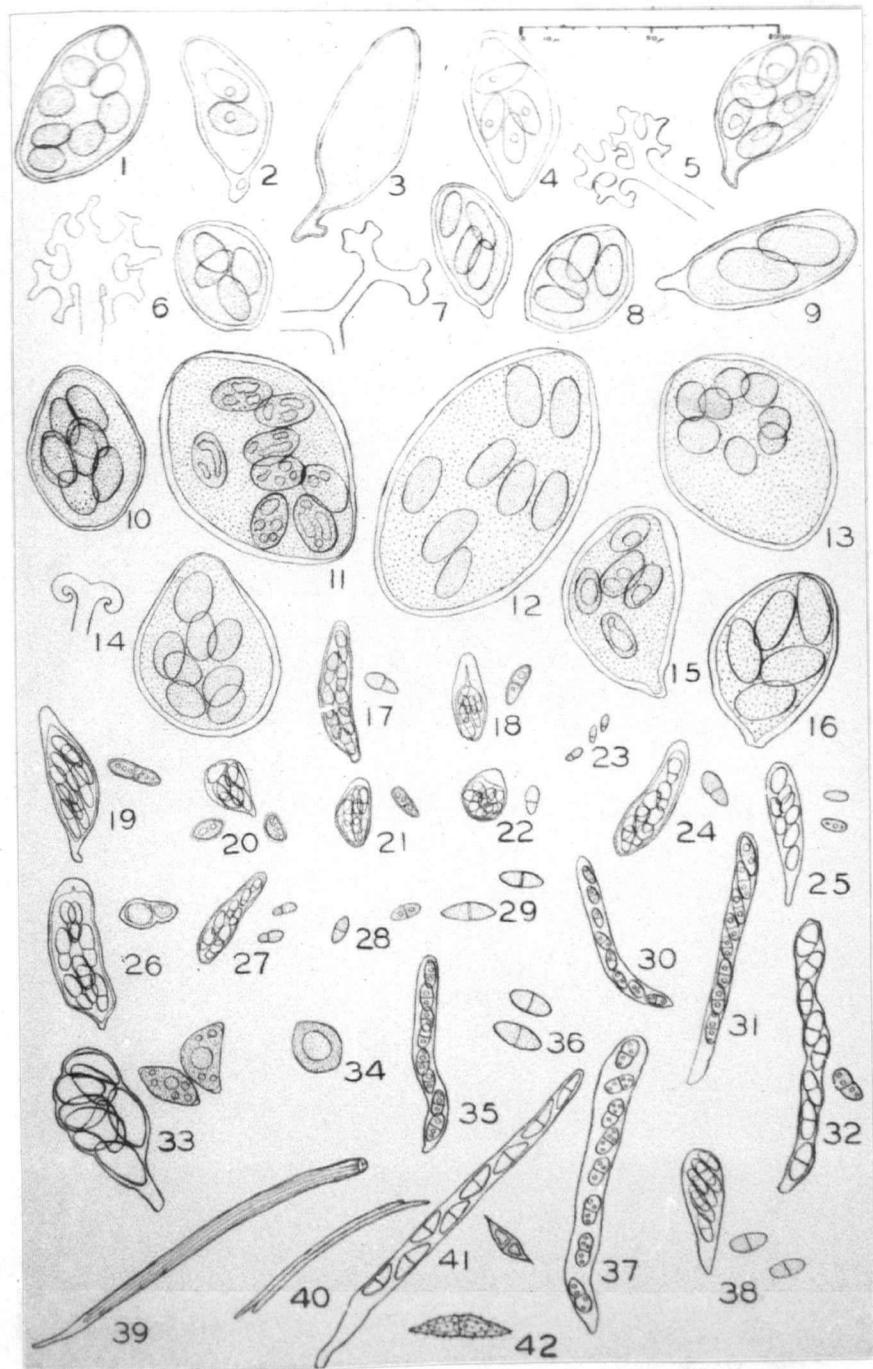


PLATE II

Fig.1. Ascus and spores of Cucurbitothis pithyophila (Fr.) Petrak.
Fig.2. Ascus and spore of Dibotryon morbosum (Schw.) Theiss. & Syd.
Fig.3. Ascus and spores of Phyllachora graminis (Pers.) Fckl.
Fig.4. Ascus and spore of P. silvatica Sacc. & Speg. Fig.5. Ascus and spores of Dothideaceae indet. Fig.6. Spores of Chaetomium cochlioides Pall. Fig.7. Spores of C. ?spirale Zopf. Fig.8. Ascus of Acanthorhynchus vaccinii Shear. Fig.9. Immature and mature spores of Bombardia ambigua var. carbonaria Rehm. Fig.10. Ascus of Sordaria fimicola (Rob.) Ces. & de Not. Fig.11. Spores of S. hypocoprooides Speg. Fig.12. Spores of S. setosa Wint. Fig.13. Ascus and spore of Apiosporina Collinsii (Schw.) Hohn. Fig.14. Ascus and spores of Coleroa Chaetomium (Kunze) Rab. Fig.15. Ascus and spore of C. Oxyriiae Rosts. Fig.16. Ascus and spore of Herpotrichia nigra Hartig. Fig.17. Ascus and spores of Herpotrichiella sp. Fig.18. Ascus of Trichosphaeria ?brevisetata Dear. Fig.19. Ascus and spore of Bertia moriformis (Tode) de Not. Fig.20. Ascus of Coniochaeta leucoplaca (Berk. & Rav.) Cain. Fig.21. Spores of Melanomma cinereum (Karst.) Sacc. Fig.22. Ascus and spore of M. parasiticum Ell. & Ev. Fig.23. Ascus and spore of M. pulvis-pyrius (Pers.) Fckl. Fig.24. Ascus and spores of Rosellinia obliquata (Somm.) Sacc. var. Americana Ell. & Ev. Fig.25. Ascus and spore of R. ovalis (Ell.) Sacc. Fig.26. Spores of Ceratostomella sp. Fig.27. Ascus of Acanthonitschkea coloradensis Cash

PLATE II cont.

& Davidson. Fig. 28. Ascus and spore of Otthia sp. Fig.29.
Ascus and spores of Caliciopsis pseudotsugae Fitzp. Fig.30.
Spores of Strickeria Amelanchieris Earle. Fig.31. Ascus of
S. obducens (Fr.) Wint. Fig.32. Spore of S. Typhina (Ell.& Ev.)
Fig.33. Spores of Trematosphaeria ?fissa (Fckl.) Wint. Fig.34.
Ascus and spore of Lophiostoma appendiculatum Fckl. Fig. 35.
Spores of L. caulinum (Fr.) de Not. Fig.36. Ascus and spore of
Lophiotrema aequivocum Ell. & Ev. Fig.37. Ascus and spore of
L. ?nucula (Fr.) Sacc.

PLATE II

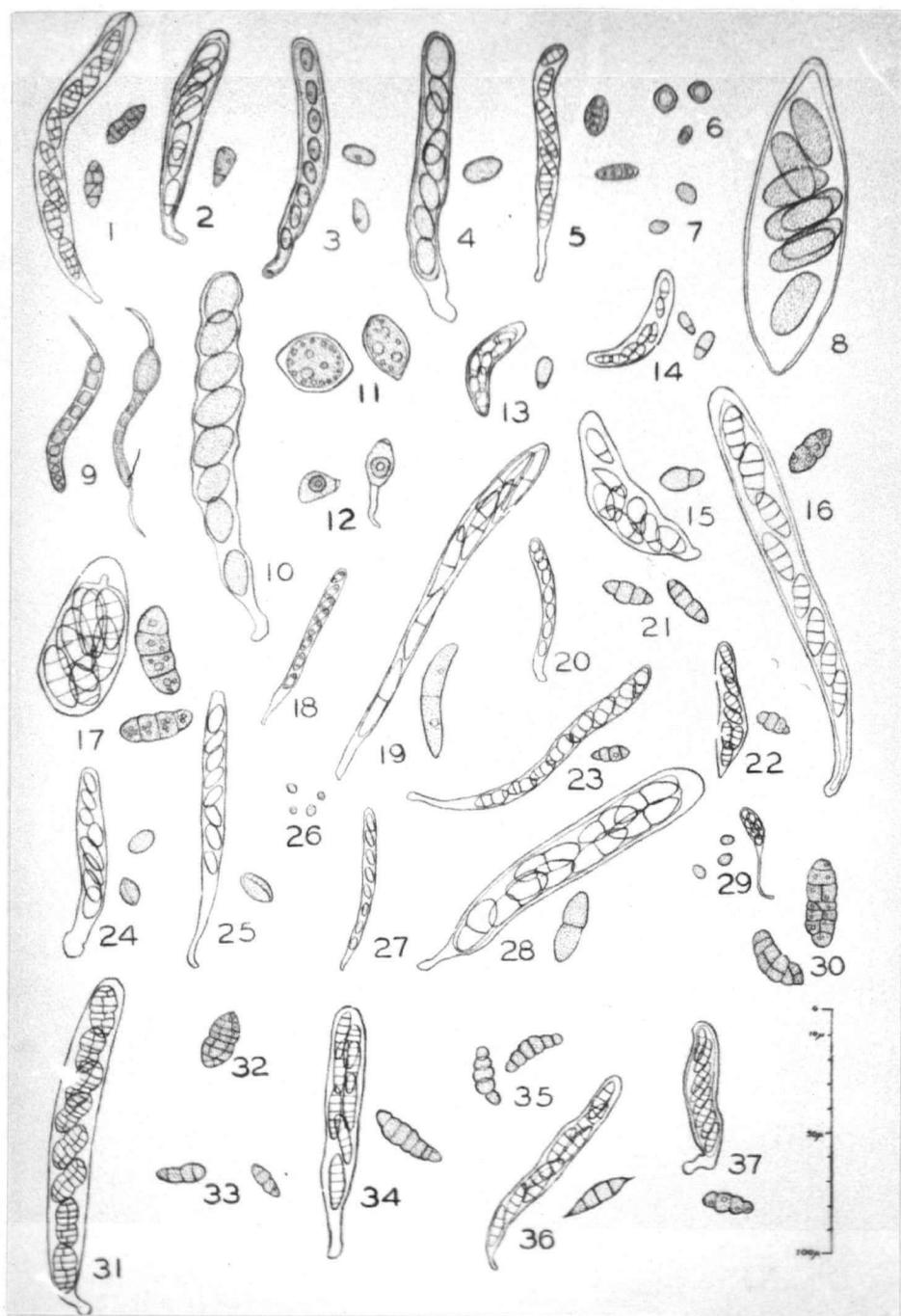


PLATE III

Fig.1. Ascus and spore of Ascospora graminis J.Lind. Fig.2. Ascus and spores of ?Laestadia circumtegens Rostr. Fig.3. Ascus and spore of L. graminicola Rostr. Fig.4. Ascus and spores of Guignardia Potentillae (Rostr.) Lindau. Fig.5. Ascus and spore of G. ?Vaccinii Shear. Fig.6. Ascus and spores of Leptosphaerulina sp. Fig.7. Ascus of Mycosphaerella arbuticola (Pk.) House. Fig.8. Ascus and spore of M. ?Auerswaldii (Fleischh.) Mig. Fig.9. Ascus and spore of M. brassicicola (Duby) Lindau. Fig.10. Ascus and spore of M. caricicola (Fckl.) Lindau. Fig.11. Ascus and spore of M. Chimaphilae Ell.& Ev. Fig.12. Ascus and spores of M. cinerascens (Fckl.) Mig. Fig.13. Ascus and spore of M. coerulea (Ell.& Ev.) Tracy & Earle. Fig.14. Ascus and spore of M. confinis (Karst.) Lindau. Fig.15. Ascus and spore of M. dolichospora (Sacc. & Fautre) Wehm. Fig.16. Ascus and spores of M. earliana Wint. Fig.17. Ascus and spore of M. eriophila (Niessl) Dear. Fig.18. Ascus and spores of M. Fragariae (Tul.) Lindau. Fig.19. Ascus and spore of M. graminicola (Fckl.) Schroet. Fig.20. Ascus and spore of M. indistincta (Pk.) Lindau. Fig.21. Ascus and spores of M. innumerella Karst. Fig.22. Ascus and spore of M. lineolata (Rob. & Desm.) Schroet. Fig.23. Ascus and spores of M. melaena (Fr.) Sacc. Fig.24. Ascus and spores of M. microspila (B.& Br.) Cke. Fig.25. Ascus and spores of M. minor (Karst.) Lindau. Fig.26. Ascus and spores of M. orbicularis (Pk.) House. Fig.27. Ascus

PLATE III cont.

and spores of M. Pachystimeae Dear. Fig.28. Ascus and spore of M. peregrina (Karst.) Johans. Fig.29. Ascus and spore of M. Polygonorum (Crie) Lind. Fig.30. Ascus and spore of M. populifolia (Cke.) House. Fig.31. Ascus and spore of M. punctiformis (Pers.) Schroet. Fig.32. Ascus and spores of M. punctiformis var. Clematidis Jaap. Fig.33. Ascus and spores of M. pusilla Awd. Fig. 34. Ascus and spores of M. Ranunculi (Karst) Lind. Fig.35. Ascus and spores of M. sagedicoides (Wint.) Lindau. Fig.36. Ascus and spore of M. stromatoidea Dear. Fig.37. Ascus and spore of M. Tassiana (de Not.) Johans., sea level. Fig.38. Ascus and spore of M. Tassiana (de Not.) Johans., high altitude. Fig.39. Ascus and spores of M. Typhae (Lasch.) Lindau. Fig.40. Ascus and spores of M. vagans Ell.& Ev. Fig.41. Ascus of M. Wichuriana (Schroet.) Johans. Fig.42. Ascus and spore of M. sp. on Salix. Fig.43. Ascus and spore of M. sp. on Sambucus. Fig.44. Ascus and spore of M. sp. on Sanicula. Fig.45. Ascus of M. sp. on Silene. Fig.46. Ascus and spore of M. sp. on Thuja. Fig.47. Ascus and spore of Phaeosphaerella maculosa (Sacc.) Karst. Fig.48. Ascus and spores of Pleosphaerulina constricta (Starb.) Sacc. Fig.49. Ascus and spore of Pseudoplea Trifolii (Rostr.) Petrak. Fig.50. Ascus and spore of Sphaerulina Alni A.Lorr.Smith fm. minor, fm.nov. Fig.51. Spore of S. Gentianae Wehm. Fig.52. Ascus and spores of Apiosporella alpina Wehm. Fig.53. Ascus and spores of Capronia pleiospora (Mout.) Sacc. Fig.54. Ascus and spore of Didymella applanata (Niessl) Sacc. Fig.55. Ascus and spores of D. Delphinii Earle.

PLATE III

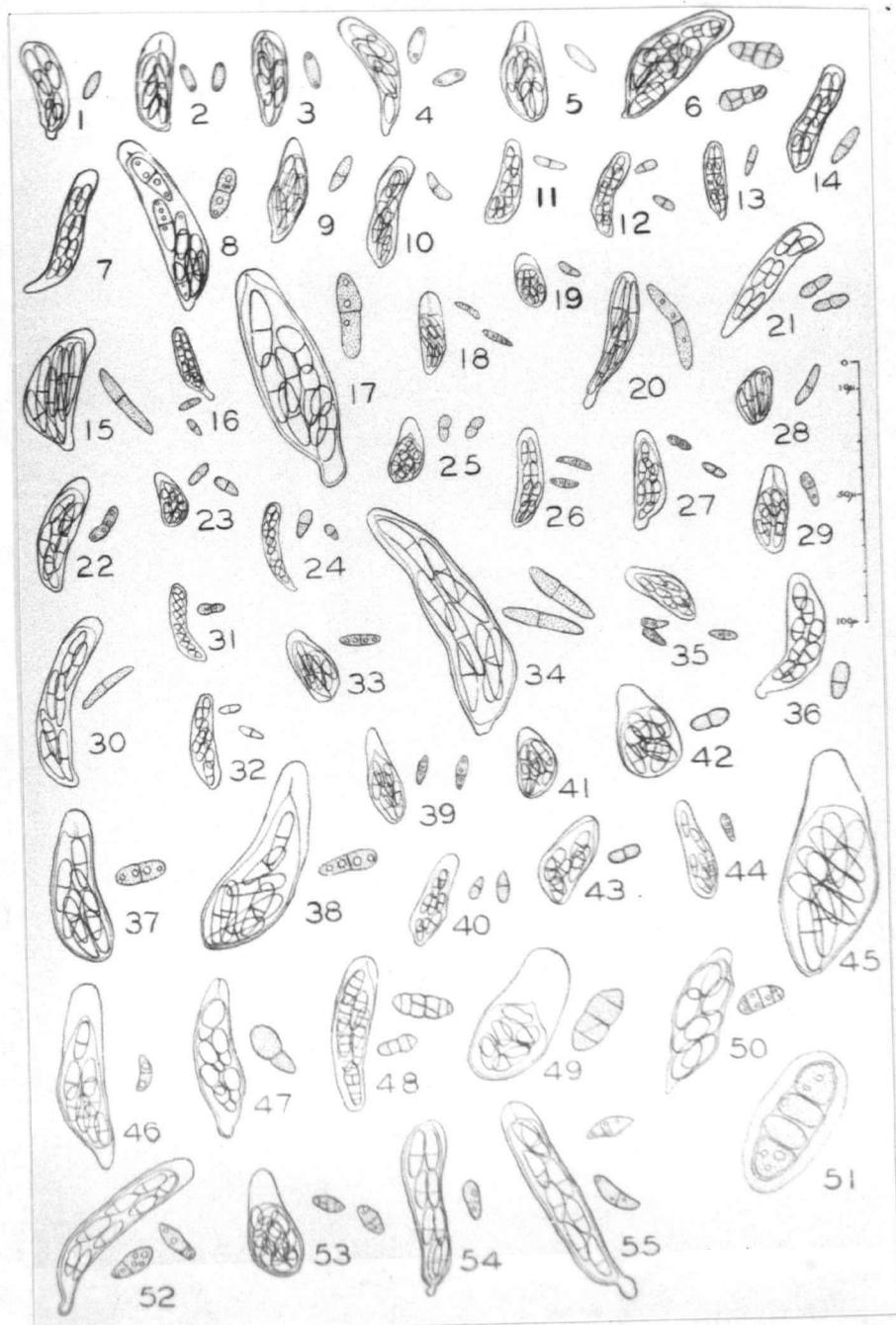


PLATE IV

Fig.1. Ascus and spore of Didymella fenestrans (Duby) Wint. Fig. 2. Ascus and spores of D. Rauii (Ell. & Ev.) Sacc. Fig.3. Ascus and spores of D. Trifolii (Fckl.) Sacc. Fig.4. Ascus and spore of Didymosphaeria oregonensis Goodding. Fig.5. Ascus and spores of D. ?Borgii Carnana-Gatto & Sacc. Fig.6. Ascus and spore of Leptosphaeria agnita (Desm.) Ces.& de Not. Fig.7. Ascus and spore of L. Andromedae (Awd.) Sacc. Fig.8. Spores of L. ?Apogon Sacc. & Speg. Fig.9. Spores of L. Californica (Cke.& Hark.) Sacc. Fig.10. Spore of L. consobrina Karst. Fig.11. Spores of L. culmicola (Fr.) Awd. Fig.12. Spore of L. culmifraga (Fr.) Ces. & de Not. Fig.13. Spore of L. culmorum Awd. Fig.14. Ascus and spore of L. dumetorum Niessl. Fig. 15. Spores of L. epicarecta (Ckd.) Sacc. Fig.16. Spores of L. eustoma (Fr.) Sacc. Fig.17. Spore of L. ?Lolii Syd. Fig.18. Spore of L. petkovicensis Bub. & Ran. Fig.19. Spores of L. Silenes-acaulis de Not. Fig.20. Spores of L. tenera Ell. Fig. 21. Spores of L. Typhae (Auersw.) Karst. Fig.22. Spores of L. typhicola Karst. Fig.23. Spore of L. sp. on Arenaria. Fig.24. Spore of L. sp. on Arnica. Fig. 25. Ascus of L.sp. on Festuca. Fig.26. Spores of L.sp. on Ledum and Salix. Fig.27. Spores of L.sp. on Ledum. Fig.28. Spore of L.sp. on Oxytropis. Fig.29. Spores of L.sp. on Poa. Fig.30. Spores of Metaspheeria Macounii Dear. Fig.31. Ascus and spores of M. Poae (Niessl.) Sacc. Fig. 32. Spores of M. ?zobeliana Staritz. Fig.33. Ascus of Ophiobolus acuminatus (Sow.) Duby. Fig.34. Ascus and spore of O. Minor Bub.

PLATE IV cont.

Fig.35. Ascus of O. porphyrogenus (Tode) Sacc. Fig. 36. Ascus of O. Rostrupii Fer.& Winge. Fig. 37. Spore fragments of O. rufis (Riess.) Rehm. Fig.38. Spores of Phomatospora ?argyrostigma (B.) Sacc. Fig. 39. Ascus and spore of P. therophila (Desm.) Sacc. Fig.40. Ascus and spore of Physalospora Miyabeana Fukushi. Fig. 41. Ascus of P. sp. on Aplopappus. Fig.42. Ascus of P. sp. on Festuca. Fig.43. Ascus and spore of Pleospora ambigua (Berl. & Bres.) Wehm. var. Crandallii (Ell.& Ev.) Wehm. Fig.44. Ascus and spore of P. angustata Wehm. Fig.45. Spores of P. arctica Karst. Fig.46. Spore of P. asymmetrica Wahm. Fig.47. Spores of P. baccata Ell. Fig.48. Spore of P. Balsamorrhizae Tracy & Earle. Fig.49. Spore of P. coloradensis Ell. & Ev. Fig.50. Spore of P. comata Niessl. Fig.51. Spore of P. Compositarum Earle. Fig.52. Spores of P. diplospora Ell. & Ev.

PLATE IV

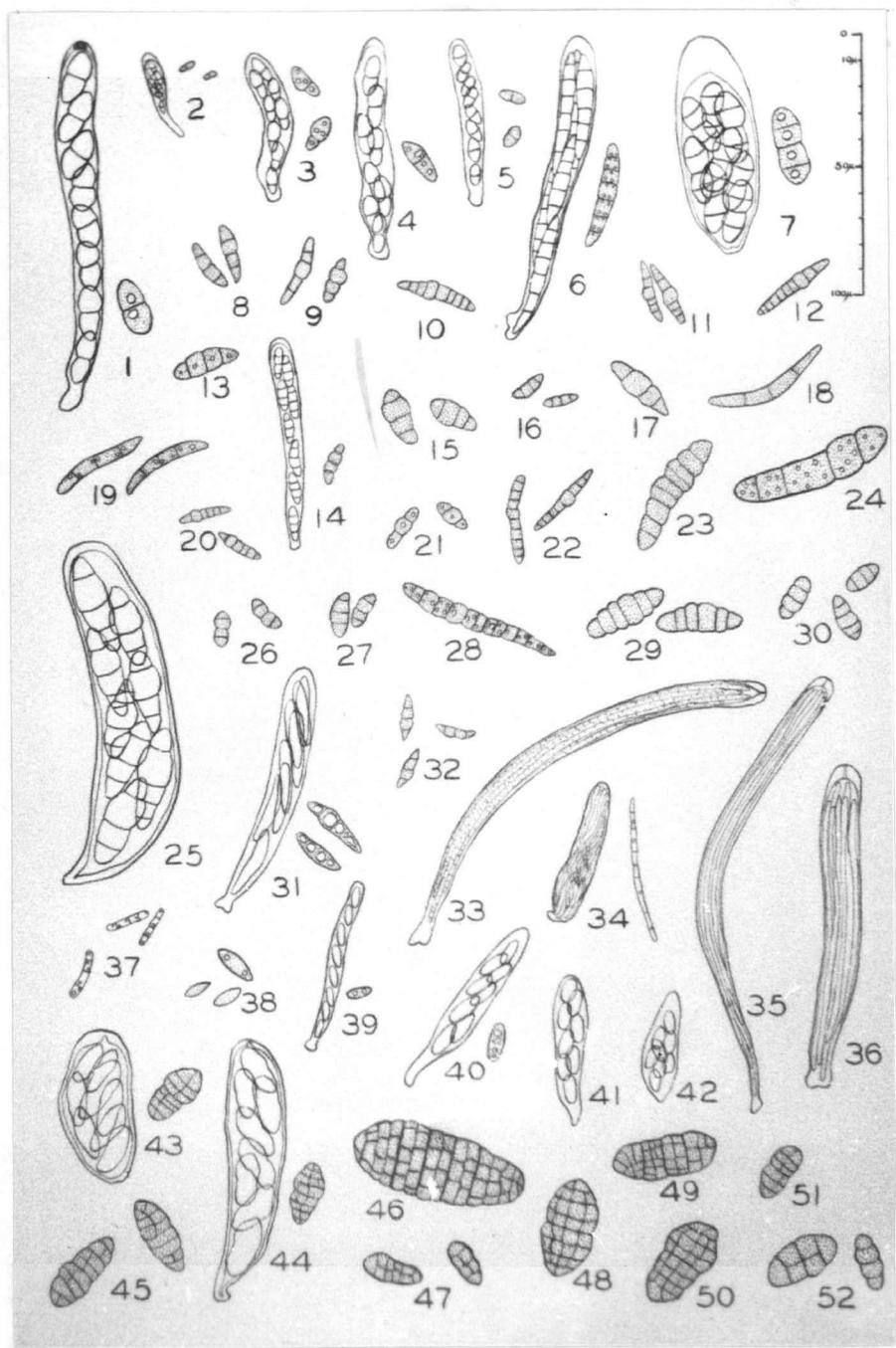


PLATE V

Fig.1. Ascus and spore of Pleospora discors (Dur. & Mont.) Ces. & de Not. Fig.2. Spore of P. Elynæ (Rab.) Ces. & de Not. Fig.3. Spore of P. helvetica Niessl. Fig.4. Spore of P. herbarum (Pers.) Rab. Fig.5. Spores of P. herbarum var. occidentalis Wehm. Fig.6. Spore of P. infectoria Fckl. Fig.7. Spore of P. macrospora Schroet. Fig.8. Spore of P. njegusensis Bub. Fig.9. Ascus and spore of P. oligasca Bub. Fig.10. Spores of P. pentamera Ell. Fig.11. Spores of P. permunda (Cke.) Sacc. Fig.12. Spore of P. planispora Ell. Fig.13. Spores of P. Tragacanthæ Rab. Fig.14. Spores of P. vulgaris Niessl. 15. Spores of P. (Catharinia) sp. Fig.16. Spores of P. sp. on Carex. Fig.17. Spores of P. sp. on Poa. Fig.18. Spore of P. sp. on Agrostis. Fig.19. Spores of P. sp. on Gaillardia. Fig.20. Spores of P. sp. on Oxytropis. Fig.21. Spores of P. sp. on Syringa. Fig.22. Spores of P. sp. on Agropyron and Trisetum. Fig.23. Ascus and spore of Protoventuria sp. Fig.24. Ascus and spore of Venturia atriseda Rehm. Fig.25. Ascus and spore of V. ?Cassandrae Pk. Fig.26. Ascus and spore of V. chlorospora (Ces.) Aderh. Fig.27. Ascus and spore of V. Dickiei (B. & Br.) Ces. & de Not. Fig.28. Ascus and spores of V. myrtilli Cke. Fig.29. Ascus and spore of V. pyrina Aderh. Fig.30. Ascus and spore of V. Ruminicis (Desm.) Wint. Fig.31. Ascus and spore of V. sp. on Aplopappus. Fig.32. Ascus and spore of V. sp. on Astragalus. Fig.33. Ascus and spore of V. sp. on Fenstemon. Fig.34. Ascus and spore of V. sp. on Phacelia. Fig.35. Ascus and spore

PLATE V cont.

of Massaria macrotheca (Rostr.) Lind. Fig. 36. Spore of Massarina
Dryadis Rostr. Fig.37. Ascus and spores of Massarina sp. Fig.38.
Ascus and spore of Gnomonia Caryae Fr.A.Wolf. Fig.39. Ascus and
spore of G. depressula Karst. Fig.40. Ascus and spores of G.
setacea (Pers.) Ces. & de Not. Fig.41. Ascus and spores of G.
potentillae sp.nov. Fig.42. Ascus and spore of G. Vepris Mout.
Fig.43. Ascus and spore of Gnomoniella Coryli (Batsch.) Sacc.
Fig.44. Spore of Linospora ?insularis Johans. Fig.45. Ascus
and spores of Apioporthe vepris (DeLacr.) Wehm. Fig.46. Ascus
and spores of Cryptodiaporthe salicina (Curr.) Wehm. Fig.47.
Ascus and spores of Cryptosphaeria populina (Pers.) Sacc. Fig.
48. Ascus and spores of Diaporthe Arctii (Lasch.) Nit. Fig.49.
Spores of D. columbiensis Ell. & Ev.

PLATE V



PLATE VI

Fig.1. Ascus and spores of Diaporthe eres Nit. Fig.2. Ascus and spores of D. pardolata (Mont.) Fckl. Fig.3. Ascus and spores of Eutypella stellulata (Fr.) Sacc. Fig.4. Spore of Fenestella princeps Tul. Fig.5. Ascus and spores of Valsa ambiens (Pers.) Fr. Fig.6. Ascus and spores of V. ceratophora Tul. Fig.7. Ascus and spores of V. leucostoma (Pers.) Fr. Fig.8. Ascus and spores of V. Pini (Alb. & Schw.) Fr. Fig.9. Ascus and spores of V.sp. Fig.10. Ascus and spore of Melanconis alni Tul. Fig.11. Ascus and spore of M. thelebola (Fr.) Sacc. Fig.12. Ascus and spores of Calosphaeria princeps Tul. Fig.13. Spores of Diatrype bullata (Hoff.) Fr. Fig.14. Ascus and spores of D. disciformis (Hoff.) Fr. Fig.15. Ascus and spores of D. Macounii Ell. & Ev. Fig.16. Ascus and spores of D. stigma (Hoff.) de Not. Fig.17. Ascus and spores of Diatrypella betulina Pk. Fig.18. Spores of Daldinia concentrica (Bolt.) Ces. & de Not. Fig.19. Spores of Hypoxyylon aspera Mass. Fig.20. Ascus and spores of H. fuscum (Pers.) Fr. Fig.21. Spores of H. multiforme Fr. Fig.22. Spores of H. serpens Pers. ex Fr. var. macrosporum Miller. Fig.23. Spores of H. u stulatum (Bull.) Fr. Fig.24. Spores of H. vogesiacum Pers. ex Sacc. Fig.25. Ascus and spores of Xylaria Hypoxylon (L.) Grev.

PLATE VI cont.

Figures 26 to 46 inclusive are diagrammatic sketches of perithecia, to scale as indicated.

Fig.26. Perithecium of Uncinula Aceris (DC.) Sacc. Fig.27. Perithecium of Dimerosporium Tsugae Dear. Fig.28. Perithecium of Microthyrium Juniperi (Desm.) Sacc. Fig.29. Perithecium of Creonectria pithoides (Ell. & Ev.) Seav. Fig.30. Perithecium of Melanospora Townei Griffiths. Fig.31. Perithecium, partially immersed in stroma, of Hypomyces aurantius (Pers.) Tul. Fig.32. Perithecium, erumpent from stroma, of Dibotryon morbosum (Schw.) Theiss. & Syd. Fig.33. Perithecium, with spirally wound appendages, of Chaetomium ?spirale Zopf. Fig.34. Immersed perithecium of Acanthorhynchus vaccinii Shear. Fig.35. Setose perithecium of Coleroa Oxyriæ Rostr. Fig.36. Tuberculate perithecium of Bertia moriformis (Tode) de Not. Fig.37. Ascocarp of Caliciopsis Pseudotsugae Fitzp. Fig.38. Perithecium, with compressed ostiole, of Lophiostoma caulum (Fr.) de Not. Fig.39. Erumpent perithecium of Mycosphaerella Tassiana (de Not.) Johans. Fig.40. Perithecium of Sphaerulina Gentianæ Wehm. Fig.41. Perithecium of Capronia pleiospora (Mout.) Sacc. Fig.42. Immersed perithecium of Ophiobolus acuminatus (Sow.) Duby. Fig.43. Setose perithecium of Pleospora comata Niessl. Fig.44. Perithecium of Pleospora oligasca Bub. Fig. 45. Beaked perithecium of Gnomonia potentillæ sp.nov. Fig. 46. Perithecium, immersed in stroma, of Xylaria Hypoxylon (L.) Grev.

PLATE VI

