Thelephoraceae of New Zealand—Parts XII and XIII
Part XII—The Genera *Thelephora* and *Tomentella*

By G. H. CUNNINGHAM

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Abstract

Thelephora griseo-zonata Cke. and *T. terrestris* Ehrh. ex Fr. are the only representatives of *Thelephora* yet collected in New Zealand. Both are found in *Pinus* plantations, growing upon needles, twigs and soil, or occasionally in nurseries of pine seedlings.

Four species of *Tomentella* are recorded, namely *T. castanea* (B. & G.) Donk, *T fusca* (Pers.) Schroet., *T punicea* (A & Sw.) Schroet., and one previously undescribed. The named three species were described from Europe, *T. fusca* extends to North America, and *T. punicea* to North Africa. Though numerous species have been described from the Northern Hemisphere, both genera are sparsely represented in Australia and New Zealand.

INTRODUCTION

UNDER the Thelephoreae of this series are placed three genera—*Thelephora, Tomentella* and*Coniophora* They possess in common hyphae with walls coloured brown, in part at least, spores with coloured walls and a hymenium usually composed of basidia and paraphyses alone. Ancillary organs are found in a few species of *Tomentella* and *Coniophora. Thelephora* and *Tomentella* are closely related in their microstructure, the latter differing only in that species are resupinate. *Coniophora* is separated by its smooth, coloured, prominently apiculate spores, absence of clamp connexions and resupinate fructifications.

As defined herein *Thelephora* contains species with both stereoid and clavarioid types of fructification. Patouillard (1887, 1900) and later Bourdot & Galzin (1928) placed certain species under the "Clavaries" and others under *Phylacteria* of the "Phylacteries", an arrangement which is unacceptable since it changes the generic concept. Stereoid fructifications are encrusting or erect, and exhibit many forms to which names have been given, though few differ in microfeatures. Pilei may be flabelliform or applanate, arise from a common base (*T. terrestris*), or may become erect and merge at their margins to become rosetted (*T. griseo-zonata*) or infundibuliform (*T. caryophylla*). Sometimes they are encrusting, forming a mycelial sheath around round upright twigs, or living seedling pines, the upper portion becoming applanate or flabelliform, sometimes divided into narrow lobes. Clavarioid species, which have not been found in New Zealand, superficially resemble members of the Clavariaceae, but are placed under *Thelephora* because of their brown hyphae and characteristic coloured, echinulate spores. Many species have been described, but most appear to be variants of two or three basic species, as for example the Australian *T. archeri* Berk., *T. congesta* Berk. and *Stereum simulans* Berk. & Br., which are all forms of *T. archeri*. Commonly the fructification consists of a mycelial bulbous base from which arise one or more simple stems bearing numerous flattened or rounded branches, sometimes further branched near the apices.

In all species examined the hyphal system is monomitic, consisting of generative hyphae alone. Hyphal walls are usually coloured some shade of brown, and clamp connexions are present.

Basidia and paraphyses alone form the hymenium, ancillary organs being absent Basidia are of the usual clavate type, and bear 2–4 spores on slender sterigmata. Paraphyses are similar in shape to the basidia, though narrower and usually shorter.

Together they form a close palisade of somewhat irregular arrangement which gives to the hymenial surface its frequent finely tuberculate appearance.

Spores are among the most characteristic features of *Thelephora*. Walls are coloured some shade of brown, never hyaline, and bear conspicuous spines which may be aculeate, echinulate, or verruculose. The outline of the spore wall may be sinuate, the common condition as in *T. terrestris*, or regular as in *Tomentella ferruginea*. Sinuate spores owe their appearance to the presence of several irregular dome-shaped lobes which may be sometimes so marked as to give spores an angular appearance. The condition is clearly seen in developing spores, since spines do not appear until spores have attained nearly their full size.

Most species grow upon the ground, on humus lying upon the forest floor, or on mosses and liverworts covering the ground, rarely and fortuitously upon decayed wood. Both species present in New Zealand grow upon humus under trees in *Pinus* plantations, though one collection was taken from a tree nursery where fructifications had so encrusted the stems of seedling pines as to cause their death.

15. **Thelephora** Ehrhart, ex Fries, Systema Mycologicum, *1*, 428, 1821.
(*Thelephora* Ehrh., Crypt. Exsicc., No. 178, 1785.)
Phylacteria Pers., Myc. Eur., *1*, 111, 1822.

Hymenophore pileate, annual or biennial. Pilei stereoid or clavarioid, when stereoid usually flabelliform and arising from a simple base, or mycelium encrusting humus or twigs, applanate, urniform or rosetted; when clavarioid composed of one or several stems arising from a common base, bearing several laciniate branches; hymenial surface commonly decurrent, amphigenous in some clavarioid species, usually pruinose, or finely tuberculate. Context some shade of brown, composed of hyphae loosely arranged, mainly parallel, or in parallel strands with woven hyphae between. Hyphal system monomitic; generative hyphae with walls coloured light brown, or darker, branched, septate, with prominent clamp connexions. Hymenial surface composed of a palisade of basidia and paraphyses. Basidia clavate or subclavate, 2–4-spored Spores subglobose, oval, or elliptical, often sinuate, coloured, verruculose, echinulate, or aculeate

TYPE SPECIES: *Thelephora terrestris* Ehrh ex Fr

DISTRIBUTION: World-wide.

Fries and most other early workers employed the generic name for practically all members of the Thelephoraceae. Gradually species were removed to other genera until to-day the genus is limited to species with characters defined above. Patouillard (1887, 153) and later Bourdot & Galzin (1928, 463) revived Persoon's name *Phylacteria* for many species of *Thelephora*, and placed it under the family "Phylacteries" because of the finely tuberculate sometimes ribbed hymenial surface. Clavarioid species Patouillard placed under the Clavariaceae.

1. **Thelephora terrestris** Ehrhart, ex Fries, Systema Mycologicum, *1*, 431, 1821. Text-fig. 1.
(*Thelephora terrestris* Ehrh., Crypt. Exsicc., No 178, 1785)
T. laciniata Pers. (Syst. Meth. Fung., 567, 1801) ex Fr., Syst Myc., *1*, 431, 1821
Phylacteria terrestris (Ehrh) Pat., Essai Tax., 119, 1900
Thelephora crustosa Lloyd, Myc. Notes, No. 69, 1196, 1923

Hymenophore annual, membranous, humicolous, sometimes encrusting living or dead plants, forming pilei of diverse shapes and sizes. Pilei applanate, flabelliform, sometimes merged to form erect rosettes, 1–10 cm tall and broad. Surface ferruginous to umber, covered with strigose tufts which are concolorous or darker and sometimes imbricated; hymenial surface ferruginous to umber, radiately striate, even, or finely tuberculate, often vinaceous, margins crenate, sometimes freely lobed or toothed, bluntly rounded or tenuous, concolorous Context 1–5 mm thick, ferruginous; intermediate layer of mainly woven hyphae, basal layer forming the greater part of the fructification, of woven hyphae interspersed with parallel strands of closely compacted hyphae; generative hyphae 4–6μ diameter, walls 0.2–0.5μ thick, pallid yellow-brown, naked, freely branched often at a wide angle, septate, clamp connexions conspicuous Hymenial layer to 90μ deep, a close palisade of tinted basidia and paraphyses. Basidia subclavate, 32–45 x 8–10μ, 2–4-spored, sterigmata arcuate, to 8μ long Paraphyses subclavate, shorter and narrower than the basidia. Spores subglobose or irregularly oval, irregularly sinuate, 8–10μ or 8–11 x 7–9μ, walls pallid ferruginous, finely sparsely verruculose, 0.5μ thick.

TYPE LOCALITY: Europe.

DISTRIBUTION: World-wide

HABITAT: Encrusting humus under pines and pine seedlings

Auckland: Whakarewarewa, State Forest Nursery, 1,200ft, September, 1928, W. Morrison; Avondale, October, 1932, J. E. Attwood; Rangitoto Island, June, 1947, J. M. Dingley; Kawau Island, June, 1948, H Clark, Mt. Maunganui, December, 1952, M. Hodgkins; Tokoroa, May, 1954, K. M. Harrow.

Hawke's Bay: Napier, August, 1922, R. E. Bishop.

Wellington: Ngaio, 1909, A H. Cockayne; Weraroa, August, 1919, E. H. Atkinson; Tangimoana, October, 1937, W. D. Reid-E. E. Chamberlain; Tinakori Hills, August, 1946, Mrs. G. B. Cone.

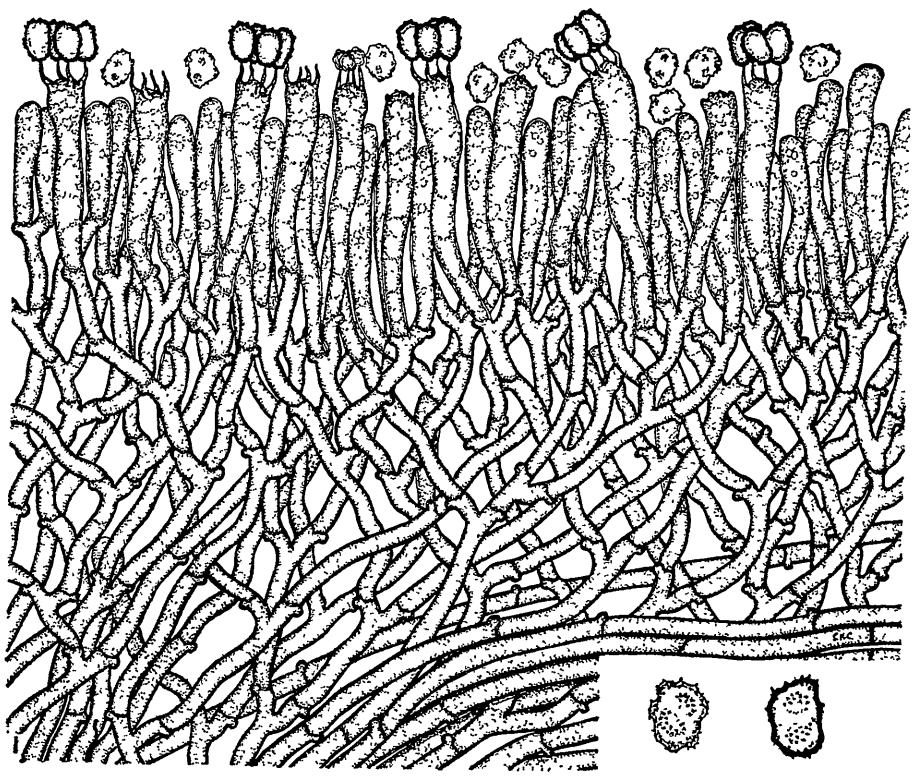
Nelson: Appleby Research Orchard, February, 1949, D. W. McKenzie.

Canterbury: Ashburton, August, 1925, D. W. McKenzie.

Westland: Totara Flats, State Forest Nursery, April, 1955, J. M. Dingley.

Although only a few collections have been listed, the species is common throughout New Zealand, and may be found in any plantation of *Pinus radiata*. It has evidently been introduced to the Dominion with seeds or plants, since it is not found in any other habitat. There is no evidence showing that the fungus forms a mycorrhiza with pines; nor is the species parasitic, though known occasionally to kill seedlings by growing around the stems and smothering them.

In macrofeatures the species varies so appreciably that it is difficult to give a concise description of fructifications. Commonly the plant grows over pine needles, humus and soil under pines. From the mycelium the pilei arise. Commonly flabelliform, they may merge and form erect rosettes, or sometimes campanulate pilei. *T. crustosa* was based on a form with small flabelliform pilei. Fructifications may remain entire, or more commonly become torn into few or many lobes, *T. laciniata*



TEXT-FIG. 1.—*Thelephora terrestris* Ehrh. ex Fr. Transverse section through upper part of the context and hymenium. × 500. Spores × 1,000. *Original*

being a name applied to the latter condition. Colour may range from ferruginous to dark umber, or umber with a vinaceous tinge; the pileus surface may be coated with coarse strigose tufts, slender downpressed bundles of hairs, or remain almost smooth. The hymenial surface may be smooth, or as often finely tuberculate and radially striate Most conditions may be found in one collection, showing that these are merely variable growth conditions.

Spores are subglobose or more often oval, with 3–5 rounded lobes, giving them a sinuate appearance. Walls are clothed with scanty, short, broad-based verruculae, which may be hyaline or tinted brown like the spore wall.

2. **Thelephora griseo-zonata** Cooke, Grevillea, *19,* 104, 1891.

Hymenophore commonly rosetted, formed from several erect flabelliform pilei fused at margins, attached by a central base; margins entire, or torn, but not lobed. Exterior surfaces of pilei scabrid, exhibiting several concentric, ferruginous, chestnut-brown or umber colour bands sometimes demarked by raised strigose tufts on the periphery of the bands. Hymenial surface umber, finely tuberculate. Microfeatures as in *T. terrestris*.

TYPE LOCALITY: South Carolina, U.S.A.

DISTRIBUTION: North America, New Zealand.

HABITAT: On ground in pine plantations.

Canterbury: Balmoral State Forest, December, 1932, G. H. C.

Specimens of the collection listed were collected in a plantation of *Pinus ponderosa* and match the type in Kew herbarium, ex "Aiken, S. Carolina, H. W. Ravenel". The species is merely a form of *T. terrestris,* identical in microfeatures, differing in shape and surface features of pilei. The most marked feature is that dorsal surfaces of the pilei are concentrically zoned with bands of grey and brown, a second that margins of pilei are fused to form upright infundibuliform rosettes.

EXCLUDED SPECIES

1. *Thelephora americana* Lloyd, Letter *59,* 4, 1915, nomen nudum. The type, ex "W. E. Barker, New Zealand" was based on a specimen of *T. terrestris.*

2. *Thelephora crustosa* Lloyd, Myc. Notes, No. *69,* 1196, 1923. Ex "James Mitchell, Christchurch, N.Z.", the type was described from a form of the variable *T. terrestris,* as Lloyd's figure (f.2432) shows.

3. *Thelephora pedicellata* Schw. In Kew herbarium there are several collections from New Zealand and Australia filed under this cover. The species was also recorded by Colenso (1885, 269) Collections from New Zealand are of a species of *Septobasidium;* Australian collections are also members of that genus, but of a different species.

4. *Thelephora vaga* Berk., Fl. N.Z., *2,* 182, 1855. The type, ex "Sinclair, N.Z." is no longer in existence, so that the species cannot be identified. Its habitat, dead wood, shows that the species could not have been a *Thelephora*; and, together with the fragmentary description, suggests it may have been named from a specimen of *Coniophora betulae.* Massee (1906, 25) gave a brief description of the species, based on a specimen from Ashburton sent to Kew in 1897 by W. W. Smith. Examination of this showed it to be a specimen of *T. terrestris.*

5. *Thelephora viridis* Berk., Fl. Tas., 2, 258, 1860. On the type sheet in Kew herbarium is placed a collection ex "N.Z., Colenso", which is portion of the type of *Coniophora viridis* (Berk.) Sacc. *Thelephora viridis* is a *Tomentella, T. viridis* (Berk.) G H. Cunn., a later synonym being *Hypochnus chlorinus* Mass. Types of both the species and its synonym were collected in Tasmania to which region the species appears to be confined.

16. **Tomentella** (Persoon) Patouillard, Les Hymenomycetes d'Europe, 154, 1887.
(*Corticium* § *Tomentella* Pers., Obs. Myc., 2, 18, 1799.)
(*Hypochnus* Fr., Obs. Myc., *2,* 278, 1818.)
Tomentellina Hoehn. & Litsch., Sitz. K. Akad. Wiss , Wien, *115,* 1604, 1906.

Hymenophore resupinate, annual, sometimes biennial, effused on dead bark, wood, humus, or soil, sometimes on rocks; surface even, or finely granulose, usually coloured. Context composed of a basal layer of usually repent hyphae and an intermediate layer of woven mainly upright hyphae; hyphal system monomitic, generative hyphae usually coloured, less frequently hyaline, branched, septate, naked or coated with mucilaginous granules or calcium crystals, with or without clamp connexions. Hymenial layer composed of a palisade of basidia and paraphyses sometimes associated with septocystidia and modified paraphysate hyphae. Basidia subclavate or clavate, bearing 2–4 spores on short sterigmata. Septocystidia projecting, cylindrical with rounded apices, septate, coloured Paraphysate hyphae cylindrical or fusiform, sometimes with inflated apices, projecting. Spores globose, subglobose, obovate or oval, walls usually coloured brown or tinted, often sinuate, bearing aculeae or verrucae which may be tinted or hyaline.

TYPE SPECIES: *Tomentella ferruginea* (Pers.) Pat.

DISTRIBUTION: Europe, North and South America, Africa, Australia, New Zealand.

Tomentella contains about a dozen basic species which can be delimited by measurable features. Numerous others have been described, many from single specimens, chiefly upon slight differences in colour or growth form. Reasons why *Hypochnus* may not be used as the generic name have been discussed by Rogers (1939, 297).

The genus contains resupinate species with a microstructure similar to that of *Thelephora.* The hymenophore may be adnate, or readily detached from the substratum. Commonly some shade of brown (ochraceous, ferruginous, olivaceous or sepia), it is brick-red or reddish-brown in *T. punicea,* blue or green in *T. cyanea* and bluish-grey in *T. caesia.* The surface is most frequently even, sometimes delicately porose-punctate when examined under a lens, granulose in a few species. Coloured granules are embedded within the hyphae, basidia and paraphyses of three species. They dissolve in and discolour solutions of KOH and stain deep blue in lactic acid aniline blue mounts.

Hyphae are usually coloured some shade of brown. Frequently hyphae of the basal layer are brown, whereas those of the intermediate layer may be hyaline or tinted slightly. All species examined possess a monomitic hyphal system, generative hyphae being freely branched, septate and are with or without clamp connexions.

Some species possess septocystidia and paraphysate hyphae. Septocystidia, present in *T. bombycina* (Karst.) G. H. Cunn., are cylindrical, emergent for about half their length, septate, and with walls coloured brown. *Tomentellina* Hoehn. & Litsch. was erected to contain species with septocystidia. Paraphysate hyphae, termed "cystidioles" by Bourdot and Galzin (1928, 489) were used by these authors to delimit the section "Cystidiolatae". They are cylindrical or fusiform hyphae with acuminate or inflated apices, which arise in the base of the hymenial layer and project to about half their length. Occasional clavate organs develop from intermediate hyphae of the context in several species (Text-figs. 2, 4, 5). As they resemble paraphyses in form and contents they also are regarded as paraphysate hyphae, rather than as cystidia, gloeocystidia or vesicles.

Cordons are conspicuous features of several species, notably *T. epiphylla* (Schw.) G. H. Cunn. (= *T. granulosa* (Peck) B. & G) and *T. rubiginosa* (Bres.) Maire. They arise in the basal layer, as filaments composed of 5–15 hyphae lying parallel and firmly compacted together.

Spores are similar to those of *Thelephora.* All possess coloured walls, though in some species walls are merely tinted. Colour is best seen when sections are mounted in lactic acid solution without an added stain. Spores with both sinuate and regular walls are present in different species, the former being the more common condition. In the four species described below spore walls are sinuate; whereas in the Tasmanian *T viridis* (Berk) G. H Cunn. they are regular

Most species grow upon decayed bark or wood; a few on humus or soil, and two or three on rocks.

KEY TO SPECIES

Hymenial surface brick-red or reddish-brown; context hyphae and spores tinted only, or hyphae hyaline and containing many reddish mucilaginous granules . . . . . 1. *T. punicea* (A & Sw.) Schroet.

Hymenial surface ferruginous, umber or sepia.

Hymenial surface strongly granulose; intermediate layer with hyaline hyphae, basal hyphae tinted brown; spores 6–9 x 6–8μ . . . . . 2. *T. scobinella* G. H. Cunn.

Hymenial surface even or porose-punctate under a lens.

Surface umber, chocolate, often vinaceous; context hyphae coloured; spores 9–12 x 8–10μ . . . . . 3. *T. fusca* (Pers.) Schroet.

Surface tan or chestnut brown; context hyphae hyaline or with basal hyphae tinted brown; spores 7–9 x 6–8μ . . . . . 4. *T. castanea* (B. & G.) Donk

1. **Tomentella punicea** (Albertini & Schweinitz) Schroeter, Kryptogamen-Flora Schlesiens, *3*, 419, 1897. Text-fig. 2.

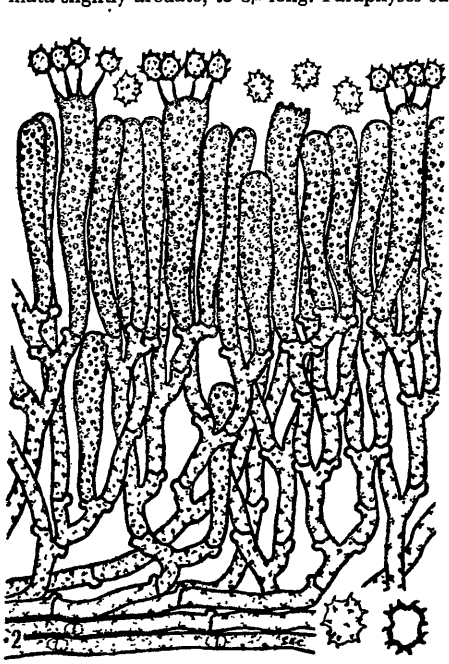
Thelephora punicea Alb. & Schw. (Consp. Fung., 278, 1805) ex Fries, Elench., *1*, 199, 1828.

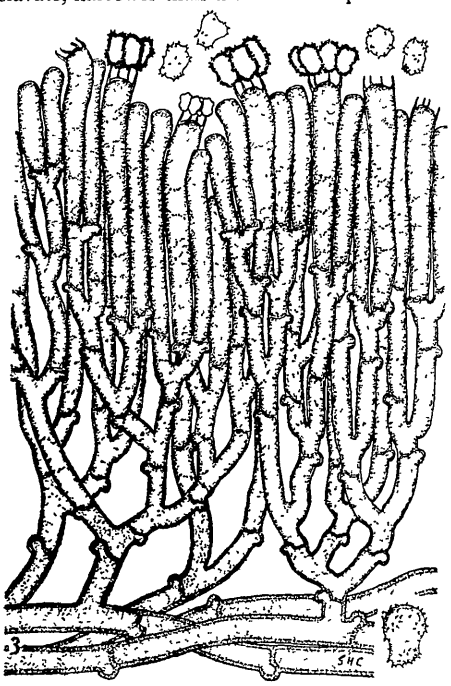
Corticium (*Hypochnus*) *puniceum* (A. & Sw.) Fr., Hymen. Eur., 661, 1874

Hypochnus puniceus (A. & Sw.) Sacc., Syll. Fung., *6*, 661, 1888.

Thelephora (*Tomentella*) *lateritia* Pat., Jour. de Bot., *8*, 221, 1894.

Hymenophore annual, membranous, adnate, effused forming small irregular areas 0.5–2 cm across; surface delicately porose-punctate under a lens, pruinose, not creviced, brick-red, drying pinkish-buff or reddish-brown; margin thinning out, arachnoid, adnate, concolorous or pallid. Context reddish-brown, 100–220μ thick, intermediate layer of mainly upright hyaline hyphae, basal layer of a few repent hyphae tinted brown; generative hyphae 3–5μ diameter, walls 0.2μ thick, branched, freely septate, with prominent clamp connexions. Hymenial layer to 65μ deep, a close palisade of basidia and paraphyses. Basidia clavate, 40–56 x 8–11μ, 2–4-spored; sterigmata slightly arcuate, to 8μ long. Paraphyses subclavate, narrower than the basidia. Spores sub-





TEXT-FIG. 2.—*Tomentella punicea* (A. & Sw.) Schroet. Transverse section. Note granules in tissues. × 500. Spores × 1,000. *Original.*

TEXT-FIG. 3.—*Tomentella scobinella* G. H. Cunn. Transverse section showing thick-walled basal hyphae and thin-walled hyphae of the intermediate layer. × 500. Spore × 1,000. *Original.*

globose, broadly oval, or ovate, 7–10 x 6–8μ (including spines), sinuate, coarsely aculeate, delicately tinted brown, spines to 2μ long.

TYPE LOCALITY: Europe

DISTRIBUTION: Europe, Great Britain, North Africa, New Zealand.

HABITAT: Effused on decayed decorticated wood.

Podocarpus hallii Kirk

Taranaki: Mt. Egmont, 2,700ft, February, 1952, G. H. C.

Consisting of several small elliptical colonies coloured brick-red or reddish-brown, this scanty collection agrees with authentic specimens of *T. punicea* examined in Kew herbarium. Pigment granules are soluble in solutions of KOH, stain blue in lactic acid aniline blue solutions, and in sections are seen to be crowded in hyphae. basidia, paraphyses and spores. Walls of the spores are lightly tinted brown, sinuate and coarsely aculeate.

Good diagnostic features are afforded by surface colour, hyaline hyphae of the intermediate layer, tinted hyphae of the basal layer, and presence of embedded pigment granules in all tissues.

2 **Tomentella scobinella** sp. nov Text-fig. 3

* Hymenophorum annum, membranaceum, effusum; superficies hymenii cinnamomea, fusca vel olivacea, granulosa. Medium stratum libere ramosarum, hyalinarum hypharum 3–4μ diam, infimum aliquot repentium hypharum 4–6μ diam., castaneis parietibus 1μ crassis, septatis, nodulosis. Basidia subclavata, 30–50 x 6–8μ, 2–4 sporis in gracilibus sterigmatis 6μ longis. Sporae subglobosae vel ovales, sinuosae, 6–9 x 6–8μ, parietibus ferrugineis, inaequaliter et breviter verruculosis.

Hymenophore annual, tufted-membranous, loosely attached, effused forming linear or irregular areas 1–3 cm across; hymenial surface ranging from cinnamon to fuscus, or dingy olivaceous, strongly granular; margin thinning out, fibrillose, concolorous, loosely attached Context fuscus, 120–200μ thick, intermediate layer of loosely arranged mainly upright hyphae, hyaline or tinted brown, basal layer scanty, composed of a few repent hyphae with sparse septa and walls coloured chestnut-brown; generative hyphae 3–4μ diameter in hyphae of the intermediate layer, walls 0.2μ thick, basal hyphae 5–6μ diameter, walls to 1μ thick, septate, freely branched, with large clamp connexions. Hymenial layer to 60μ deep, a close palisade of hyaline basidia and paraphyses. Basidia subclavate, 30–50 x 6–8μ, 2–4-spored; sterigmata slightly arcuate, to 6μ long. Paraphyses subclavate, or as often subfusiform, shorter and narrower than the basidia. Spores subglobose, or oval, sinuate, 6–9 x 6–8μ, walls tinted brown, irregularly aculeate, 0.5μ thick, spines to 0.5μ long.

DISTRIBUTION: New Zealand.

HABITAT: Effused on decorticated decayed wood

Nothofagus fusca (Hook. f.) Oerst.

Westland: Staircase Creek, Reefton, 2,000ft, November, 1952, S. D. Baker, ***type collection,*** P.D.D. herbarium, No. 15892.

The species belongs to the section "Dimorphae" of Bourdot & Galzin (1928, 503), containing plants with repent, thick-walled, sparsely septate, coloured basal hyphae and hyaline (or tinted only) thin-walled mainly upright hyphae of the intermediate layer. It resembles *T. epiphylla* in the granulose surface, but differs in that cordons are absent, spores are smaller and context hyphae are much lighter in colour. Basidia, though long, are narrower than those of other species placed in the section "Dimorphae".

3. **Tomentella fusca** (Persoon) Schroeter, Kryptogamen-Flora Schlesiens, *3*, 419, 1897. Text-fig. 4.

(*Hypochnus fuscus* (Pers.) Fr., Obs. Myc., *2*, 280, 1818.)

Thelephora fusca (Pers.) Fr., Syst. Myc., *1*, 451, 1821.

Corticium fuscum Pers. (Obs. Myc., *1*, 38, 1796) ex Fr., Hym. Eur., 651, 1874.

Hymenophore annual, sometimes biennial, membranous, loosely attached, effused forming irregularly orbicular or elliptical areas to 10 x 7 cm; hymenial surface ferruginous, dark umber or chocolate brown, often with a vinaceous tinge, even, slightly punctate under a lens, not

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* The Latin description was kindly supplied by Miss Beryl Hooton, Librarian of the Plant Diseases Division.

creviced; margin thinning out, concolorous, arachnoid, loosely attached. Context ferruginous, 400–650μ thick, intermediate layer well developed, composed of mainly upright hyphae, basal layer of mainly parallel hyphae; generative hyphae 4–6μ diameter, walls 0.25μ thick, clear brown, branched at a wide angle, freely septate save in the basal hyphae where septa are widely spaced, with prominent clamp connexions. Hymenial layer to 80μ deep, a close palisade of basidia and paraphyses. Basidia subclavate, 40–56 x 8–10μ, 2–4-spored; sterigmata arcuate, to 10μ long. Paraphyses subclavate, shorter and narrower than the basidia. Spores globose, subglobose, obovate, or oval, sinuate, 9–12 x 8–10μ (a few to 14 x 10μ), apiculate, walls sparsely coarsely aculeate, ferruginous, 0.25–0.5μ thick, spines to 1.5μ long.

TYPE LOCALITY: Europe.

DISTRIBUTION: Europe, North America, New Zealand.

HABITAT: Effused on dead bark and decorticated wood.

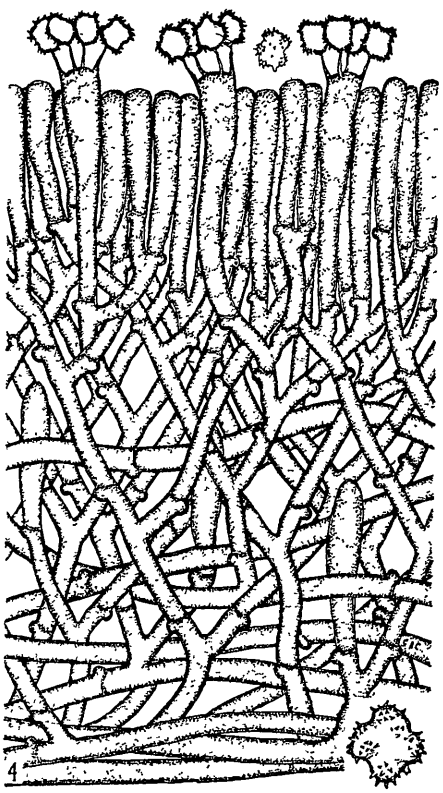
Nothofagus fusca (Hook. f.) Oerst.

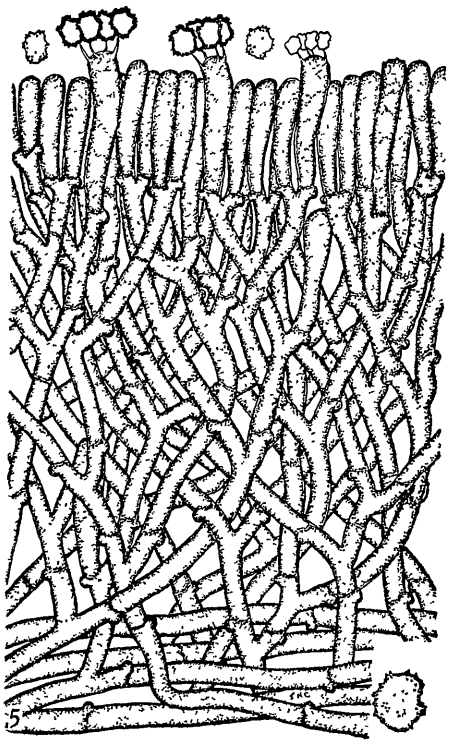
Westland: Staircase Creek, Reefton, 2,000ft, November, 1952, S. D. Baker

Nothofagus menziesii (Hook. f.) Oerst.

Otago: Alton Valley, Tuatapere, 400ft, February, 1954, J. M. Dingley.

Spores are slightly larger than in authentic European specimens examined in Kew herbarium, but in other features our collections agree. Specific features are the dark colour of the hymenial surface which is often chocolate and exhibits a vinaceous tinge, loose attachment of fructifications, absence of cordons, and coarsely aculeate, sinuate spores of a colour similar to the context hyphae. Spores bear a prominent apiculus, though this is sometimes obscured by the coarse aculeae covering their walls.





TEXT-FIG. 4.—*Tomentella fusca* (Pers.) Schroet. Transverse section. Note scattered paraphyses in the context. × 500. Spore × 1,000. *Original.*

TEXT-FIG. 5.—*Tomentella castanea* (B & G.) Donk. Transverse section, × 500 Spore × 1,000 *Original.*

4. **Tomentella castanea** (Bourdot & Galzin), Donk, Mededeelingen van het Botanisch Museum en Herbarium van de Rijks Universiteit te Utrecht, No. 9, 31, 1933. Text-fig. 5.

Hypochnus umbrinus Quel., Fl. Myc Fr., 2, 1888, non Fr. 1849.

Tomentella fusca subspecies *castanea* Bourd. & Galz., Bull. Soc. Myc. Fr., *40,* 148, 1924

Hymenophore annual, membranous, adnate, effused forming small irregular orbicular or linear areas 1–5 cm across; surface tan or chestnut-brown, sometimes with a vinaceous tinge, finely punctate under a lens, especially towards the centre; margin fibrillose, thinning out, concolorous, adnate. Context pallid tan, 100–400μ thick, intermediate layer of mainly upright hyaline hyphae, basal layer a narrow zone of mainly parallel hyphae tinted brown; generative hyphae 4–6μ diameter, walls 0.2μ thick, branched, freely septate, with large clamp connexions. Hymenial layer to 60μ deep, a close palisade of basidia and paraphyses. Basidia subclavate, 30–45 x 6–8μ, 2–4-spored; sterigmata slightly arcuate, to 6μ long. Paraphyses about half the length of the basidia. Spores subglobose, or oval, sinuate, 7–9 x 6–8μ, walls sparsely and finely verruculose, tinted umber, to 0.25μ thick, spines to 0.75μ long.

TYPE LOCALITY: France.

DISTRIBUTION: Europe, New Zealand.

HABITAT: Adnate on bark of dead branches.

Cupressus lawsoniana Murr.

Westland: Rimu State Forest Plantation, November, 1954, J. M. Dingley.

Pinus radiata Don

Auckland: Domain, November, 1930, M. Hodgkins

Separated from *T. fusca* by the lighter colour, adherent colonies, hyaline hyphae of the intermediate layer and smaller spores. Collections agree with a specimen from Europe seen in Kew herbarium, named by Bourdot *T. fusca* subsp. *castanea* I have followed Donk in considering the plant sufficiently distinct to be regarded as a species, rather than a subspecies of *T. fusca* as it was treated by Bourdot & Galzin.

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Part XIII—The Genus *Coniophora*

Abstract

SPECIES of *Coniophora* are separated from *Tomentella* by their smooth, dark coloured, apiculate spores. Six species have so far been collected in New Zealand, two being hitherto undescribed *C. arida* (Fr) Karst., *C. betulae* (Schum.) Karst. and *C. olivacea* (Fr.) Karst. are European species which extend to North America. *C. betulae* has also been found in Australia and *C. olivacea* in South Africa. *C. viridis* (Berk.) Sacc is endemic.

INTRODUCTION

Coniophora is a small genus containing about a dozen species, characterized by the resupinate brown fructifications and apiculate spores, walls of which are smooth and coloured some shade of brown. Two New Zealand species enlarge the concept of *Coniophora* in that they possess ancillary organs of a type not hitherto recorded in the genus.

Fructifications are coloured some shade of brown, usually darker towards the centre, effused and somewhat indefinite in size and shape, and seldom creviced. Commonly adnate and membranous, in *C. olivacea* fructifications are readily detached and brittle. Margins may be contrasted by their different colour and texture, or concolorous and little different from the body of the plant. Surfaces may be even, papillate, tuberculate or, in *C. olivacea,* finely velutinate.

Context tissues are usually composed of woven hyphae freely branched and intertwined, not or seldom differentiated into definite intermediate and basal layers, save in *C. dimitica.* In the latter the basal layer is formed from densely compacted generative hyphae. Hyphae may be hyaline, as in *C. arida* and *C. viridis,* or coloured some shade of brown as in *C. dimitica, C. minor* and *C. olivacea.* In *C. betulae* hyphae of the upper part of the context are hyaline, basal hyphae being lightly tinted brown Most hyphae are naked, those of *C. betulae* are coated with coarse calcium crystals, and in *C. olivacea* some are covered with scattered masses of gelatinous granules.

All species examined, save *C. dimitica,* possess a monomitic hyphal system, tissues being composed of generative hyphae alone. In *C. dimitica* the system is dimitic, with well-defined skeletal and generative hyphae. Hyphae are freely branched and septate, with walls either thin and delicate, or thickened appreciably, as in *C. dimitica, C. minor* and *C. olivacea.* Walls of skeletal hyphae of *C. dimitica* are so thickened in the basal tissues that the lumen is almost capillary (Text-fig. 11). Cells between septa are sometimes inflated (*C. betulae, C. minor, C. olivacea* and *C. viridis*) a condition which may be scanty or abundant in different sections from the same specimen. Clamp connexions are absent from septa of hyphae of all species examined in Kew herbarium and from New Zealand species. In *C. betulae* and *C. olivacea* hyphae of the lower portion of the context are often aggregated into cordons, which may be scanty or abundant, but are always present. Each cordon is composed of 7–30 hyphae firmly aggregated and partly cemented by their walls (Text-fig. 9).

Basidia of most species project above the hymenial surface for about half their length. Usually subclavate, in *C. minor* basidia are cylindrical, and in *C. arida* some are cucurbitiform. They bear two or four spores on short often arcuate sterigmata.

Three of the species described are noteworthy for their ancillary organs. Large septocystidia are present in *C. olivacea* (Text-fig. 9). They arise in the base of the subhymenium and project for as much as 110μ above the surface. Freely septate, cylindrical, with coloured walls coated with mucilage granules compacted into large irregular warts, they are conspicuous bodies which may be seen with a hand lens and give to the hymenial surface a velutinate appearance. A few also develop in tissues of the context, then lying at an angle among the hyphae (Text-fig. 9). They were used by Karsten as a generic character for *Coniophorella.*

Gloeocystidia are abundant in the hymenium of *C. viridis.* They arise in the base of the subhymenium, project for about half their length in actively growing specimens, but soon collapse. They also develop among the context hyphae (Text-fig. 6) Most are cylindrical, a few have apices strangulated; septa are absent, and walls are thin, naked and hyaline. In appearance, contents and staining reactions they exhibit all features of gloeocystidia and are so regarded although such organs have not been recorded hitherto for species of the genus.

Ends of skeletal hyphae of *C. dimitica* project above the basidia to form the surface of the hymenial layer. Commonly cylindrical, with somewhat thickened brown walls, and occasionally branched near their apices, they resemble closely similar bodies developed in fructifications of species of *Duportella.* Because of their origin and appearance they have been termed pseudosetae (Text-fig. 11), organs which hitherto have not been recorded for members of *Coniophora.* Occasional paraphysate hyphae project above the hymenial surface in *C. olivacea* and *C. viridis* (Text-fig. 6)

Spores characterize the genus. Walls are somewhat thickened, smooth, often appear as if laminated, and are deeply coloured some shade of brown. Contents stain deeply with aniline blue. Each is provided with a brief pedicel, vestige of the sterigma by which it was attached to the basidium. Spores vary appreciably in shape and size, in most species examined. Commonly elliptical, elliptical with one side flattened, oval, or obovate, in *C. viridis* they are in addition often subglobose, and in *C. dimitica* may be broadly fusiform. In thickness spore walls of different species range from 0·5μ to 1μ. Spores of greatest diameter are found in *C viridis,* smallest in *C minor.*

All species grow upon bark or wood of dead branches and trunks of shrubs and trees, some additionally on worked timber. *C. arida* and *C. puteana* and probably, too, *C. betulae*, produce a destructive decay of building timbers.

17. **Coniophora** De Candolle ex Persoon, Mycologia Europea, *1*, 153, 1822.
(*Coniophora* DC., Fl. Fr., *6*, 34, 1815.)
Coniophorella Karst., Finl. Basidsv., 438, 1889.

Hymenophore resupinate, effused, annual or biennial. Hymenial surface plane, tuberculate, or velutinate, usually dark coloured and pulverulent with spores. Context with a monomitic or dimitic hyphal system; skeletal hyphae with thickened brown walls, naked, branched and septate; generative hyphae hyaline or coloured brown, branched, septate, without clamp connexions, naked or coated with calcium crystals or mucilage granules, sometimes inflated between septa, in a few species arranged in cordons. Hymenial layer composed of a palisade of basidia and paraphyses with in addition, in some species, septocystidia, pseudosetae, gloeocystidia or paraphysate hyphae. Septocystidia cylindrical, projecting, septate, with thickened walls coloured brown and coated exteriorly with mucilaginous warts. Pseudosetae modified terminal ends of skeletal hyphae, projecting, cylindrical, septate, brown, naked, sometimes branched near their apices Gloeocystidia projecting, cylindrical, hyaline, naked, aseptate. Basidia subclavate, cylindrical, or cucurbitiform, usually projecting, bearing 2–4 spores on short arcuate sterigmata. Spores elliptical, obovate, oval, fusiform or subglobose, apiculate, walls coloured brown, smooth.

TYPE SPECIES: *Coniophora puteana* (Schum. ex Fr.) Karst.

DISTRIBUTION: Europe, Asia, North America, South Africa, Australia, New Zealand.

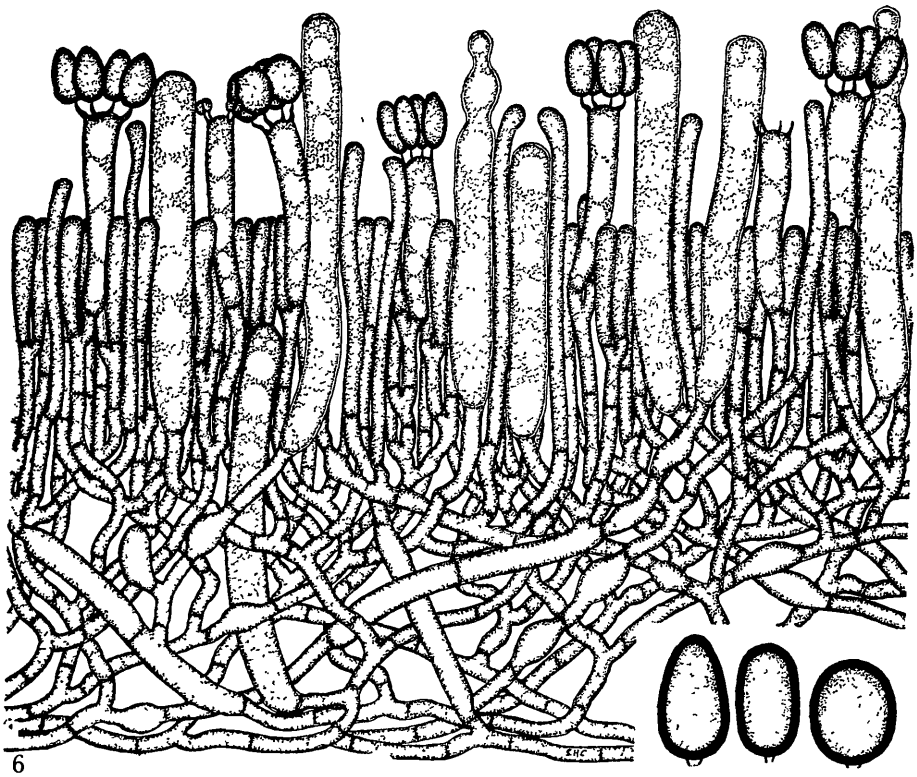
KEY TO SPECIES

Context hyphae hyaline, or tinted in the basal tissues of *C. betulae;* hyphal system monomitic.
- Gloeocystidia aseptate, projecting, hyaline, cylindrical; spores 12–18 x 8–11μ — 1. *C. viridis* (Berk.) Sacc.
- Gloeocystidia absent
  - Context hyphae hyaline, naked, 2–4μ diameter; spores elliptical, or elliptic-obovate, 8–12 x 6–7μ — 2. *C arida* (Fr.) Karst
  - Context hyphae of the basal tissues tinted, elsewhere hyaline, coated with calcium crystals, 4–6μ diameter; spores elliptical, oval, obovate, or pip-shaped, 10–13 x 6–7μ — 3. *C betulae* (Schum) Karst.

Context hyphae coloured deeply; hyphal system monomitic in *C. minor* and *C olivacea,* dimitic in *C. dimitica.*
- Septocystidia present, projecting; spores obovate, elliptical, or pip-shaped, 10–13 x 5–7μ — 4 *C olivacea* (Fr.) Karst.
- Septocystidia absent
  - Pseudosetae present, spores obovate, oval, or fusiform, 9–13 x 6–7.5μ — 6. *C. dimitica* G. H. Cunn.
  - Pseudosetae absent, spores obovate, elliptical, or subglobose, 7–9 x 5–6 5μ — 5. *C. minor* G. H. Cunn.

1 **Coniophora viridis** (Berkeley) Saccardo, Sylloge Fungorum, *8*, 649, 1888. Text-fig. 6.
Corticium viride Berk., Fl. N.Z., *2*, 184, 1855.
Corticium (*Coniophora*) *viride* (Berk.) Cke., Grev., *8*, 89, 1880

Hymenophore annual, membranous, adnate, effused forming numerous elliptical colonies 2–18 x 2–3 cm; hymenial surface at first ochre, then chestnut, finally olivaceous towards the centre, even, minutely velutinate, tardily areolately creviced; margin thinning out, arachnoid-fibrillose, cream or pallid ochre, adnate, forming a broad border 2–10 mm wide Context cream to ochre, 200–750μ thick, of woven hyphae not differentiated into intermediate and basal layers; hyphal system monomitic; generative hyphae 2.5–4μ diameter, walls 0.5μ thick, hyaline, freely branched and septate, sometimes inflated between septa, without clamp connexions. Hymenial layer to 95μ deep, a close palisade of basidia, paraphyses, gloeocystidia and paraphysate hyphae. Basidia subclavate, projecting, 35–50 x 8–10μ, 4-spored; sterigmata arcuate, to 6μ long. Paraphyses subclavate, about half the length and diameter of the basidia, sometimes cylindrical and acuminate. Gloeocystidia arising in the base of the hymenium, when projecting to 40μ, and at different levels in the context, cylindrical, often strangulated near the apices, 70–95 x 8–12μ, walls hyaline, naked, 0.25μ thick. Spores subglobose, oval, elliptical, or obovate, 12–18 x 8–11μ, with rounded apices and apiculate bases, walls smooth, fuscus, 0.75–1μ thick.



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TEXT-FIG. 6.—*Coniophora viridis* (Berk.) Sacc. Transverse section through the context showing gloeocystidia, paraphysate hyphae and inflated hyphae. × 500. Spores × 1,000. *Original.*

TYPE LOCALITY: North Island, New Zealand.

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark of dead branches and trunks.

Cupressus macrocarpa Hartn.

Auckland: Cornwallis, 50ft, September, 1953, J. D Atkinson.

Dacrydium cupressinum Sol.

Auckland: Pureora, G. B. Rawlings.

Specific features are the hyaline generative hyphae, conspicuous hyaline gloeocystidia, large spores, effused adnate colonies with pallid broad margins and the central area becoming olivaceous and creviced. Spores may range in shape from subglobose to obovate, reach a length of 18μ, and walls may become thickened to 1μ. Gloeocystidia are abundant, naked, project for about half their length, aseptate, thin walled and possess contents which stain deeply with aniline blue. They exhibit all features of similar organs present in certain species of *Corticium* and *Peniophora*, so are regarded as gloeocystidia and not cystidia. Occasional hyphae are inflated between septa, a condition also present in *C. betulae, C. minor* and *C. olivacea*. Paraphysate hyphae occur in the hymenial layer of actively developing specimens and, as plants age, collapse and tend to disappear.

Although Massee (1906, 30) stated that there was no specimen of *Corticium viride* in Kew herbarium, the type, ex "North Island, N.Z., Colenso" is present nevertheless, filed under the cover of *Coniophora viridis*. Portion of the same collection has been placed under the cover of *Thelephora viridis* (= *Tomentella viridis* (Berk.) G. H. Cunn.). Massee (1889, 130) stated that spores were 25–30 x 17–20μ, an error later compiled by Cooke in his "Handbook of Australian Fungi" (1892, 195).

2. **Coniophora arida** (Fries) Karsten, Bidrag till kannedom af Finlands Natur och Folk, *37*, 161, 1882. Text-fig. 7.

Thelephora arida Fr., Elench., 197, 1828.

Corticium aridum Fr., Hym. Eur., 659, 1874.

Coniophora cookei Mass., Jour. Linn. Soc., *25*, 136, 1889.

Hymenophore annual, membranous, arid, adnate, effused forming irregularly elliptical areas to 7 x 3 cm; hymenial surface ochraceous, becoming pallid olivaceous towards the centre, even, not creviced, margins thinning out, adnate, fibrillose, concolorous or tan. Context 150–300μ thick, tan, composed of woven hyphae not arranged into definite intermediate and basal layers; hyphal system monomitic, generative hyphae 2–4μ diameter, walls 0.2μ thick, hyaline, naked, branched, not inflated between septa, without clamp connexions. Hymenial layer to 50μ thick, a scanty palisade of basidia and paraphyses. Basidia subclavate, sometimes cucurbitiform, 35–45 x 7–9μ, 2–4-spored; sterigmata slightly arcuate, to 8μ long. Paraphyses clavate, about half the length and slightly narrower than the basidia. Spores elliptical, or obovate, sometimes flattened on one side, apiculate, sometimes obliquely so, 8–12 x 6–7μ, walls coloured chestnut brown, smooth, 0.5μ thick.

TYPE LOCALITY: Europe.

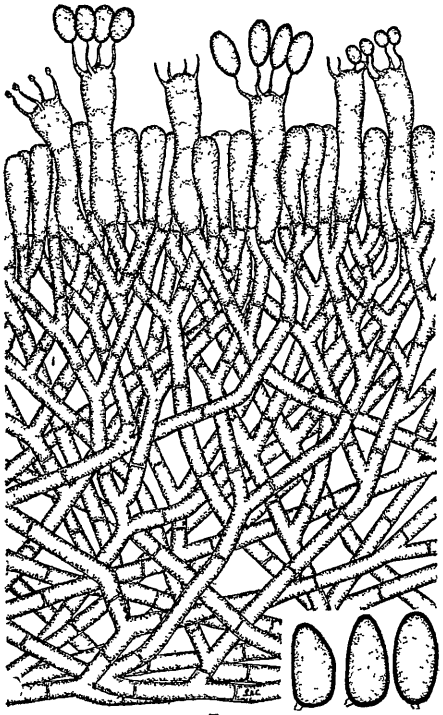
DISTRIBUTION: Europe, Great Britain, North America, New Zealand.

HABITAT: Effused on dead bark or decorticated wood.

Podocarpus dacrydioides A. Rich.

Auckland: Hillcrest, Northcote, May, 1949, E. E Chamberlain.

Our collection agrees with typical forms of *C. arida* examined in Kew herbarium. The species differs from the related *C. betulae* in surface features and especially in the hyaline, naked, slender hyphae of the context which are not inflated between



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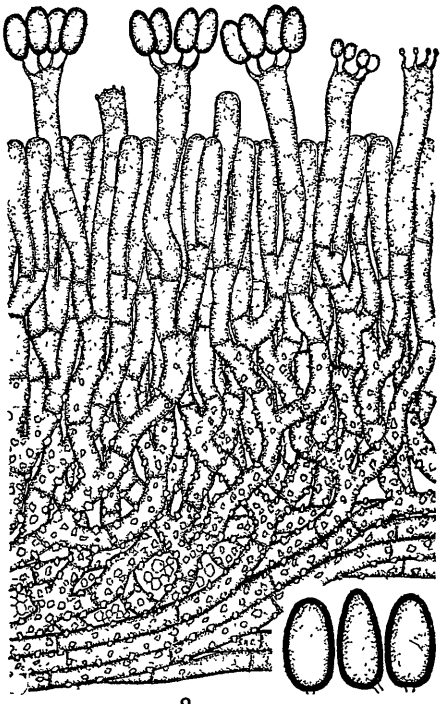

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TEXT-FIG. 7.—*Coniophora arida* (Fr.) Karst. Transverse section through the context. × 500. Spores × 1,000. *Original*

TEXT-FIG. 8.—*Coniophora betulae* (Schum.) Karst. Transverse section through the context showing hyphae coated with calcium crystals and portion of a cordon. × 500. Spores × 1,000. *Original.*

septa, absence of cordons, narrower spores with thinner walls and more clavate basidia. *C. arida* is said to produce an active decay of worked timber.

3. **Coniophora betulae** (Schumacher) Karsten, Hedwigia, *35*, 174, 1896. Text-fig. 8.

(*Thelephora betulae* Schum., Enum. Pl. Saell., *2*, 396, 1803.)
Thelephora luteo-cincta Berk., Jour. Linn. Soc., *13*, 168, 1873.
Corticium suffocatum Peck, N Y. State Mus., Rept., *30*, 48, 1878.
Corticium (*Coniophora*) *luteo-cinctum* (Berk.) Cke., Grev., *8*, 89, 1880.
Coniophora luteo-cincta (Berk.) Sacc., Syll. Fung., *6*, 648, 1888.
C. suffocata (Peck) Mass., Jour. Linn. Soc., *25*, 138, 1889.
Corticium kalmiae Peck, N.Y. State Mus., Rept. *46*, 109, 1893.
Coniophora kalmiae (Peck) Burt, Ann. Missouri Bot. Gard., *4*, 246, 1917.
Hypochnus flavo-brunneus Dearn. & Bisby, Fungi Manitoba, 90, 1929.

Hymenophore annual, membranous, at first adnate, tending to become detached in flakes, effused forming irregularly linear colonies 6–10 x 2–5 cm; hymenial surface ochraceous, soon olivaceous or pallid umber, even, finely, sparsely and tardily creviced towards the centre; margin thinning out, cream or tan, forming a broad fibrillose base around the darker fertile portion, adnate. Context 350–500μ thick, ferruginous, of compact hyphae not differentiated into intermediate and basal layers, finally tending to collapse and form a pseudoparenchyma; hyphal system monomitic; generative hyphae 4–6μ diameter, sometimes inflated to 12μ, often arranged in cordons, walls 0.5μ thick, hyaline or more usually tinted brown towards the base and coated with coarse calcium crystals, branched, septate, without clamp connexions. Hymenial layer to 65μ deep, a loose palisade of basidia and paraphyses. Basidia projecting for about half their length, subcylindrical, 35–60 x 6–7μ, 2–4-spored; sterigmata arcuate, to 6μ long. Paraphyses subclavate, about half the length and slightly narrower than the basidia. Spores elliptical, oval, obovate or pip-shaped, sometimes flattened on one side, apiculate, occasionally obliquely so, 10–13 x 6–9μ, walls ferruginous, smooth, 0.75μ thick.

TYPE LOCALITY: Europe.

DISTRIBUTION: Europe, Great Britain, North America, Australia, New Zealand.

Habitat: Effused on dead bark, decorticated wood and worked timber.

Cupressus macrocarpa Hartn.
Auckland: Tauranga, May, 1950, J. D. Atkinson.

Dacrydium cupressinum Sol.
Auckland: Waikaretu, 400ft, October, 1946, E E. Chamberlain; Campbell's Bay, 200ft, May, 1953, E. E. Chamberlain; Te Puke, 50ft, May, 1954, J D. Atkinson.

Eucalyptus sp.
Canterbury: West Eyreton, May, 1951, H. C. Smith.

Knightia excelsa R.Br.
Auckland: Rangitoto Island, July, 1950, J. M. Dingley

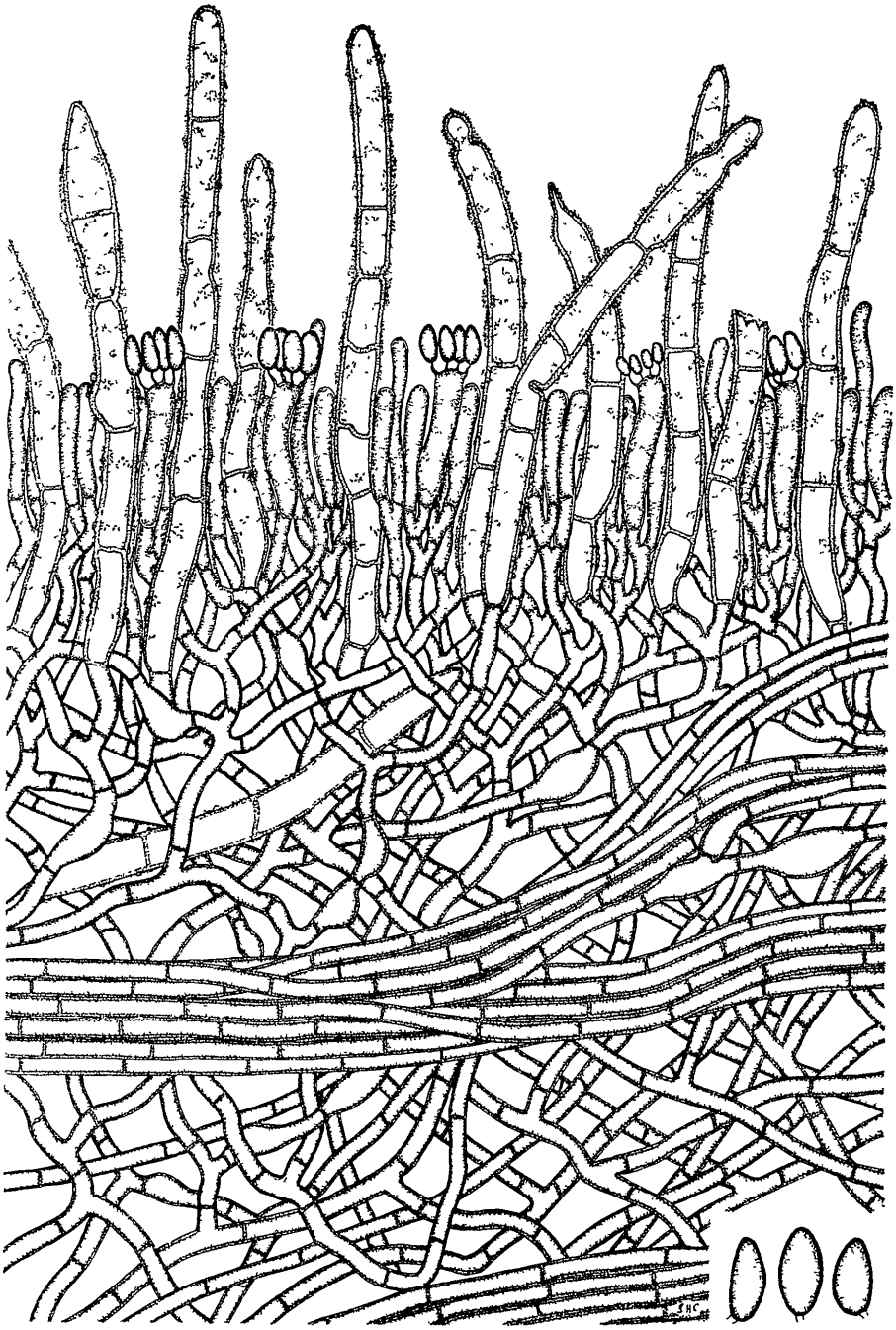
Pinus radiata Don
Auckland: Oratia, July, 1948, April, 1953, D. W. McKenzie

Surface features of both *C. betulae* and *C. arida* are so similar that they cannot be separated by macrofeatures. Microfeatures are quite distinct, however; for in *C. betulae* context hyphae are of greater diameter, often inflated between septa, frequently compacted into cordons near the base, coated exteriorly—especially towards the base—with coarse crystals of calcium oxalate, and usually tinted light brown Basidia are subcylindrical and narrower than those of *C. arida,* and spores are more irregular in shape, slightly larger and possess thicker walls. Like *C. arida* the species appears to produce a destructive rot of worked timber.

I examined the type of *Thelephora luteo-cincta* in Kew herbarium ex "Wangaretta, Victoria" and found it to be based on a fragmentary specimen of *C. betulae.*

4. **Coniphora olivacea** (Fries ex Persoon) Karsten, Bidrag till kannedom af Finlands Natur och Folk, *37*, 162, 1882. Text-fig. 9.

(*Hypochnus olivaceus* Fr., Obs. Myc., 2, 282, 1818.)
Thelephora olivacea (Fr.) Pers., Myc. Eur., *1*, 143, 1822.
T. umbrina Fr., Elench., 199, 1828, non Pers., 1801.
Corticium brunneolum Berk. & Curt., Grev., *2*, 4, 1873
C. leucothrix Berk. & Curt., Grev., 2, 4, 1873.
Hymenochaete ellisii Berk. & Cke., Grev., *4*, 162, 1876.



TEXT-FIG 9.—*Coniophora olivacea* (Fr ex Pers.) Karst. Transverse section through the context showing septocystidia coated with warts of mucilage, occasional paraphysate hyphae, inflated hyphae of the context, and cordons. × 500. Spores × 1,000. *Original.*

Coniophora atro-cinerea Karst., Medd. Soc. Faun. Fl. Fenn., *6*, 12, 1881.
C. fumosa Karst., Medd. Soc. Faun. Fl. Fenn., *6*, 13, 1881.
C. umbrina (Fr.) Karst., Bidr. kann. Finl. Nat. Folk, *37*, 160, 1882.
C. furva Karst., Bidr. kann. Finl. Nat. Folk, *37*, 244, 1882.
C. brunneola (B. & C.) Sacc., Syll. Fung., *6*, 648, 1888.
C. ellisii (B. & C.) Sacc., Syll. Fung., *6*, 648, 1888.
Coniophorella atro-cinerea Karst., Bidr. kann. Finl. Nat. Folk, *48*, 438, 1889.
C. olivacea (Fr.) Karst., Bidr. kann. Finl. Nat. Folk, *48*, 438, 1889.
Coniophora fulvo-olivacea Mass., Jour. Linn. Soc., *25*, 134, 1889.
C. karstenii Mass., Jour. Linn. Soc., *25*, 134, 1889.
C. sibirica Burt, Ann. Missouri Bot. Gard., *18*, 485, 1931.

Hymenophore annual, sometimes reviving a second season, loosely attached, effused forming linear areas to 10 x 2 cm; hymenial surface ferruginous, becoming umber, sepia, or olivaceous, velutinate, even, not creviced, margin thinning out, adnate, strongly fibrillose, pallid tan Context to 500μ thick, ferruginous, of woven hyphae not differentiated into intermediate and basal layers; hyphal system monomitic; generative hyphae 4–6μ diameter, walls 0 5μ thick, chestnut brown, branched, septate, inflated to 12μ in occasional cells, coated with sparse gelatinous warts, clamp connexions absent. Cordons numerous, scattered in the base and context, formed from 7–30 partly cemented hyphae. Hymenial layer to 120μ deep, a dense palisade of basidia, paraphyses, septocystidia and paraphysate hyphae. Basidia subclavate, 30–45 x 6–8μ, scarcely projecting, 2–4-spored; sterigmata arcuate, to 6μ long. Paraphyses subclavate, about two-thirds the length of the basidia. Paraphysate hyphae 4–6μ diameter, hyaline, slender, septate, projecting to 40μ. Septocystidia arising in the base of the hymenial layer and projecting to 110μ, also scattered in the context, cylindrical, septate, 90–180 x 10–16μ, walls chestnut-brown, 1–3μ thick, coated with granules of mucilage arranged in irregular warts. Spores obovate, elliptical, pip-shaped, or naviculate, often flattened on one side, apex rounded or slightly acuminate, base apiculate, 10–13 x 5–7μ, walls ferruginous or chestnut-brown, smooth, 0.5μ thick.

TYPE LOCALITY: Europe.

DISTRIBUTION: Europe, Great Britain, North America, South Africa, New Zealand.

HABITAT: Effused on bark of decayed branches and trunks.

Nothofagus fusca (Hook. f.) Oerst.

Westland: Staircase Creek, Reefton, 2,000ft, December, 1952, S. D. Baker.

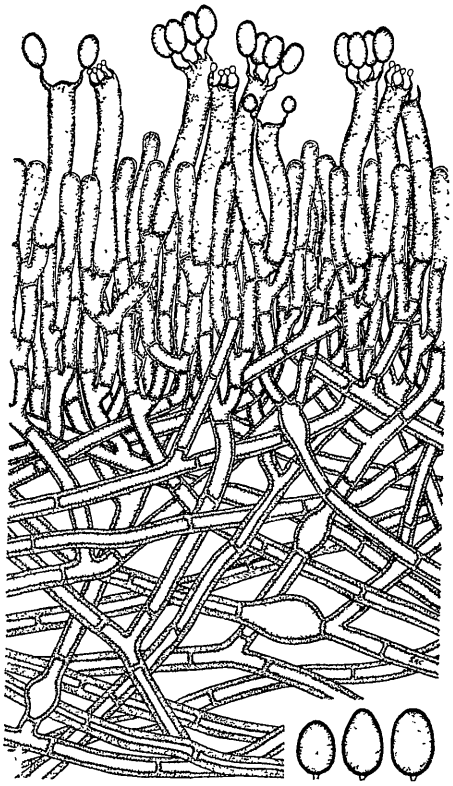
Readily recognized by the presence of large septocystidia which may project for as much as 110μ above the hymenial surface, and give to it a velutinate appearance. Hyphae of the context are brown, often inflated between septa, and near the base often compacted into cordons. Spores vary appreciably in shape and size. Although Bourdot & Galzin (1928, 362) recorded the presence of rare clamp connexions, they were not seen in any of the specimens examined in Kew herbarium. As the synonymy shows, taken for the most part from Rogers & Jackson (1943, 273) the species bears many names, erected mainly on slight differences in size and shape of the septocystidia, or colour variants of the hymenial surface. *Coniophorella* was erected by Karsten because of the presence of septocystidia. If this genus is to be regarded as valid, then *C. viridis* and *C. dimitica* should also be segregated under different genera, since they possess distinctive types of ancillary organs. Such treatment appears to be unnecessary in this small genus.

5. **Coniophora minor** sp. nov. Text-fig. 10.

* Hymenophorum annuum, membranaceum, adnatum, effusum; superficies hymenii alutacea vel ochracea, tenuiter pruinosa, aequa, fibrilloso, adnato, alutacea margine. Contextus alutaceus. Hypharum systema monomiticum; hyphae generatoriae hyalinis, tenuibus parietibus, enodulosae. Basidia cylindricalia, eminentia, 30–55 x 6–7μ Sporae obovatae, ellipticae vel aliquot subglobosae, apiculatae, 7–9 x 5–6 5μ, olivaceis parietibus, 0.5μ crassis.

Hymenophore annual, membranous, adnate, effused forming small linear areas to 6 x 2 cm; hymenial surface tan or ochraceous, delicately pruinose, even, not creviced; margin thinning out, fibrillose, adnate, tan. Context to 500μ thick, tan, of woven hyphae not organised into intermediate and basal layers; hyphal system monomitic; generative hyphae 3–5μ diameter, walls 1–1.5μ thick, clear fuscus, branched, sparsely septate, often inflated between septa, without

* Latin descriptions were kindly prepared by Miss Beryl Hooton, Librarian of the Plant Diseases Division.



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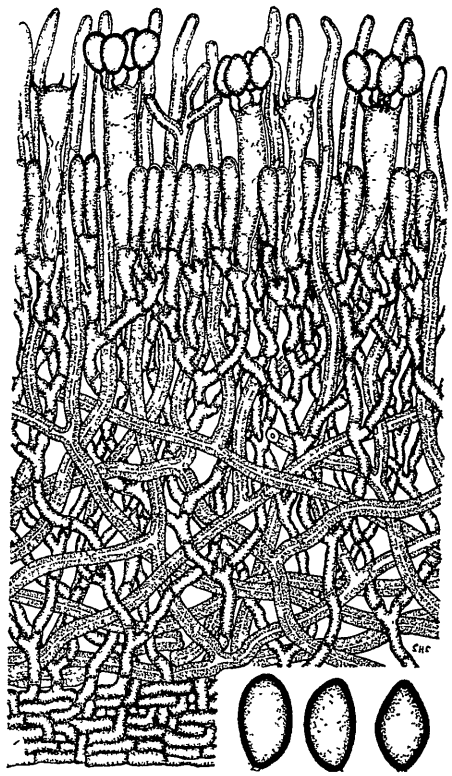

11

TEXT-FIG. 10.—*Coniophora minor* G. H. Cunn. Transverse section through the context showing cylindrical basidia, some bearing two spores, and inflated cells of context hyphae. × 500. Spores × 1,000. *Original.*

TEXT-FIG. 11 —*Coniophora dimitica* G. H. Cunn. Transverse section through the context showing generative and skeletal hyphae with terminal ends of the latter forming pseudosetae, one of which is branched. × 500. Spores × 1,000. *Original.*

clamp connexions Hymenial layer to 65μ deep, a close palisade of basidia and paraphyses. Basidia cylindrical, 30–55 x 6–7μ, 2–4-spored; sterigmata arcuate, slender, to 8μ long. Paraphyses subclavate, about half the length and diameter of the basidia. Spores obovate, elliptical, a few subglobose, with apices rounded and bases apiculate, 7–9 x 5–6 5μ, walls olivaceous, smooth, 0.5μ thick

DISTRIBUTION: New Zealand.

HABITAT: Effused on decorticated wood.

Vitex lucens Kirk

Auckland: Oratia, 600ft, May, 1953, J. M. Dingley, *type collection,* P.D D. herbarium, No. 12549.

Specific features are the monomitic hyphal system with sepia or fuscous coloured thick-walled hyphae, small spores and rather slender, projecting, cylindrical basidia Spores are the smallest of the species described.

6 **Coniophora dimitica** sp. nov Text-fig. 11.

Hymenophorum annuum, membranaceum, adnatum, effusum, superficies hymenii olivacea deinde fusca vel sepiacea, tenuiter pubescens, aequa, fibrilloso, adnato, concoloro margine. Contextus olivaceus vel fuscus; hypharum systema dimiticum; hyphae skeletales crassis, castaneis vel fuscis parietibus, raris calcii crystalli; hyphae generatoriae hyalinis, tenuibus parietibus, enodulosae. Basidia subclavata vel cucurbitiformis, 35–58 x 8–10μ Pseudosetae ex extremis

skeletalibus hyphis finctae, 4–6μ diam., castaneis parietibus nudis vel raris crystallis. Sporae obovatae, ovales vel late fusiformes, apiculatae, 9–13 x 6–7.5μ, fuscis parietibus, 0.75μ crassis.

Hymenophore annual, membranous, adnate, effused forming linear areas to 17 x 2 cm; hymenial surface at first olivaceous, becoming fuscus or sepia, delicately pubescent, even, not creviced; margin thinning out, fibrillose, adnate, concolorous. Context olivaceous or fuscus, 100–160μ thick, intermediate layer of irregularly arranged mainly skeletal hyphae, basal layer narrow, of densely compacted generative hyphae; hyphal system dimitic; skeletal hyphae 4–6μ diameter, walls 1–2μ thick in the subhymenial hyphae, lumen almost capillary in the basal hyphae, chestnut-brown to fuscus, septate, sparsely branched and coated with occasional calcium crystals; generative hyphae to 4μ diameter, walls 0.2μ thick, hyaline, septate, freely branched, naked, without clamp connexions. Hymenial layer a scanty palisade of basidia and paraphyses interrupted by projecting pseudosetae. Basidia projecting, subclavate, some cucurbitiform, often geniculated, soon collapsed, 35–58 x 8–10μ, 4-spored; sterigmata erect, to 6μ long. Paraphyses subclavate, about half the length and diameter of the basidia. Pseudosetae formed from projecting ends of skeletal hyphae, forming the surface of the hymenium and embedding the basidia, 4–6μ diameter, walls 1–2μ thick, septate, chestnut-brown, naked or bearing occasional crystals Spores obovate, with rounded apices and apiculate bases, ovate, oval, or broadly fusiform with bluntly pointed ends, apiculate, 9–13 x 6–7.5μ, walls smooth, fuscus, 0.75μ thick.

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark of dead branches

Leptospermum ericoides A. Rich.

Auckland: Kauri Park, Birkdale, January, 1956, S D Brook.

Leptospermum scoparium Forst.

Auckland: Rangitoto Island, June, 1947, J. M. Dingley, *type collection*, P. D. D. herbarium, No. 5541.

A well defined species which may be recognized by the following features. Colonies are effused, closely adnate, olivaceous or sepia, almost black when old, with concolorous margins. The hyphal system is dimitic, the only species seen with such a feature. Skeletal hyphae are deeply coloured, thick-walled, and apices of the upper hyphae project through the hymenial layer to form the hymenial surface, embedding basidia and paraphyses. Generative hyphae are thin-walled, hyaline, and at the base become compacted to form the basal layer which in old specimens appears almost pseudoparenchymatous. Basidia are irregular in shape and soon collapse. The species links *Coniophora* with *Duportella*; for it possesses typical spores of the former, and pseudosetae of the latter

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G. H. CUNNINGHAM, C.B E., D.Sc., Ph.D., F.R.S.,
Plant Diseases Division,
Department of Scientific and Industrial Research,
Auckland, N.Z.