The Hypocreales of New Zealand

IV: The Genera Calonectria, Gibberella, and Thyronectria

By Joan M. Dingley,

Plant Diseases Division, Department of Scientific and Industrial Research

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Perithecia of Calonectria de Not. and Thyronectria Sacc. are similar to those of Nectria, differing only in that in the former genera spores are multicellular; in Calonectria spores are divided by transverse septa only, while in Thyronectria longitudinal as well as transverse septa are present. In Gibberella Sacc. perithecia and spores are similar to those of Calonectria, but cells of the perithecial wall are dark coloured, usually violaceous or fuscous-black.

Seaver (1909) divided Calonectria and placed species with perithecia caespitose on a stroma in a new genus Scaleonectria together with some species which are usually included in Ophionectria. In this paper under Calonectria are described all species with multi-septate spores divided only by transverse septa and with inoperculate asci. Species with operculate asci are described under Ophionectria of the Clavicipitaceae. When revising Thyronectria, Seeler (1942) included all muriate spore forms and treated the genus as originally defined by Saccardo (1883).

Two species of Calonectria, five of Gibberella and one species of Thyronectria are described from New Zealand. They are saprophytes on dead organic material, but Gibberella macrolopha is found in association with cankers on branches of living Coprosma, while G. zeae causus scab or ear blight of wheat and barley. Gibberella macrolopha and Calonectria novae-zealandiae are endemic.


Stroma when present erumpent, pseudoparenchymatous. Perithecia scattered or caespitose, globose, or oval, light or brightly coloured, usually red, ostiole papillated; perithecial wall pseudoparenchymatous. Ascii cylindrical or clavate, inoperculate 6–8 spored; pseudoparaphyses evanescent, paraphyses absent. Spores elliptical or fusiform, divided by two or more transverse septa into three or more cells, hyaline or lightly coloured.

Type Species: Calonectria daldiniana de Notaris.

Distribution: Cosmopolitan.

<table>
<thead>
<tr>
<th>Key to Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spores 28–50 × 3.5–6μ</td>
</tr>
<tr>
<td>Spores 18–24 × 6–8μ</td>
</tr>
</tbody>
</table>

Transactions of the Royal Society of New Zealand 403
1. Calonectria ochraceo-pallida (Berk. & Br.) Sacc., Attii Soc. Veneti trent. Sc. Nat., Vol. 4, p. 101–141, 1875. Plate 82, Fig. 2a, b and c

Stroma absent, perithecia scattered or gregarious, globose or oval, 0.3–0.4 mm. diameter, ochraceous, sometimes buff or cream, smooth; ostiole minute, not very distinct, umbilicate when dry; perithecial wall pseudoparenchymatous, 30μ thick, cells 2–5μ diameter, thin walled, hyaline or lightly coloured yellow. Asci elliptical, clavate, 80–106 x 9–16μ, thin walled, 6–8 spored, obliquely uniseriate or arranged in a more or less parallel bundle; pseudoparaphyses diffuse. Spores fusiform or cylindrical, usually falcate, ends obtuse, 3–6 septate 23–50 x 4.5–6μ, hyaline, smooth.

Type Locality: Rockingham Forest, England.

Distribution: Europe, New Zealand.

Habitat: On dead stems or branches.


In external appearance this species is typical of Nectria; the perithecia are light coloured, cream in the New Zealand collection; the ostioles are indistinct except in dried specimens, where the perithecia become collapsed and appear umbilicate. Spores are typically eight-celled, although some four or six-celled spores are sometimes present; they are filiform and curved, whereas spores in the following species are elliptical or broadly elliptical.

2. Calonectria novae-zealandiae n.sp.* Plate 82, Fig. 1a, b and c

Stroma planum erumpens 2–3 mm. diam. Perithecia caespitosa superficialia globosa 0.4–0.5 mm., vinoso cocinea immaturitate, ostiolo umbilicate, pariete perithecii pseudoparenchymato, cellulis 10–14μ diam., partetibus densatis et tinetis. Asci clavati vel elliptici 70–120 x 12–20μ 8 sporis biseriatis, pseudoparaphysibus filamentosis. Sporae ellipticae vel late ellipticae, 2–3 septatae 18–22 x 6–8μ hyalinae, levis.

Stroma erumpent. flat, 2–3 mm. diameter, pseudoparenchymatous, pigmented. Perithecia caespitose, superficial, globose 0.4–0.5 mm. diameter, vinaceous, crimson when immature, ostiole small, umbilicate, darker coloured; perithecial wall pseudoparenchymatous, 50–100μ thick, cells cubicoid, 10–14μ diameter, walls thickened, pigmented. Asci clavate, elliptical, 70–120 x 12–20μ, thin-walled, eight-spored, biseriate, occasionally uniseriate; pseudoparaphyses filamentous, branched, forming network within the perithecia. Spores elliptical, or broadly elliptical, sometimes allantoid, 2–3 septate, constricted at septa, 18–22 x 6–8μ, thick walled, hyaline, smooth.

* The author wishes to thank Miss B. Hooton for the Latin translation of the description of this species.
Type Locality: Hooker moraine, Canterbury.
Distribution: New Zealand.


The species is distinct. Perithecia are caespitose on a poorly developed erumpent stroma. In dried specimens they are brightly pigmented with the ostiole umbilicate and dark coloured.

Examination of type material of Calonectria polythalma (Berk.) Sacc.† proved it to be the same as Thyronectria pseudotrichia (Schw. ex Berk. & Curt.) Seeler. The Stilbium conidial stage was present in Berkeley’s collection and a few spores were divided by longitudinal as well as transverse septa. Specimens described as Scoleconectria polythalma (Berk.) Seaver from North America belong to a different species. Material recorded by MacBride (1926) as Calonectria polythalma is also of Thyronectria pseudotrichia.

5. Gibberella Saccardo, Michelia, Vol. 1, p. 43, 1877


Stroma when present, erumpent, pseudoparenchymatous. Perithecium superficial, scattered or caespitose; globose, fuscous or black, ostiole distinct, usually papillated, perithecial wall pseudoparenchymatous, cell walls pigmented blue-black. Ascii elavate or cylindrical, usually eight-spored, pseudoparaphyses evanescent, paraphyses absent. Ascospores elliptical, oval, sometimes fusiform with 2 or more transverse septa, hyaline, sometimes lightly pigmented.

Type Species: Gibberella pulicaris (Fr.) Sacc.
Distribution: Cosmopolitan.

KEY TO SPECIES.

Stroma pulvinate and erumpent
Spores 18-24 x 5-7µ
Spores 24-33 x 8-11µ
Stroma effuse or absent

Perithecium wrinkled or hairy
Spores 17-35 x 4-7µ
Spores 16-25 x 3-4.5µ

Perithecium tuberculate
Spores 23-32 x 5-8.5µ


(Sphaeria pulicaris Fr. in Kunze & Schm., Mycol. Hfte, Heft 2, p. 37, 1823.)

Stroma pulvinate, 0.5-7.5 x 0.5-1 mm., pseudoparenchymatous; perithecium caespitose, globose or pyriform, 0.15 x 0.2 mm. diameter, fuscous or black, rugose, especially when dry, ostiole distinct, smooth and papillated, perithecial wall pseudoparenchymatous up to 40 µ thick, cells cuboid or rectangular, 12-16 µ diameter, walls pigmented,

† The author wishes to thank the Director, Royal Botanic Gardens, Kew, England, for forwarding on loan type material of this species.
not thickened. Asci clavate or elliptical, 80–105 x 8–12 μ, 4–8 spored. usually biseriate, pseudoparaphyses evanescent. Spores 1–4 septate, elliptical or cylindrical, sometimes allantoid, 18–26 x 6–8 μ, constricted at septa, hyaline or lightly pigmented, smooth. Conidial stage: stroma fleshy, light coloured, salmon or ochraceous, sometimes associated with a floccose mycelial mat, conidia 1–5 septate, commonly 3, fusiform, usually falcate, abruptly bent at apex, ends pointed, 20–30 x 3 5–5 μ, hyaline = Fusarium sambucinum Fel

Type Locality: Sweden.

Distribution: Europe, North and South America, Algeria, South Africa, New Zealand.

Habitat: On bark of dead twigs, stalks or branches.


Coprosma sp. Westland: Weheka, Dec. 1946, J. M. D.


This species was first recorded from New Zealand by J. M. Berkeley in Hooker’s Flora Novae-Zealandiae in 1853. The smaller spores and erumpent stroma separate it from G. baccata.

2. Gibberella macrolopha (Sydow) n. comb. Plate 83, Fig. 1, 2, 3a and b.


Stroma erumpent, usually pulvinate, 5–10 mm. or more long, pseudoparenchymatous, cells dark coloured. Perithecia caespitose. globose sometimes oval, 0 2–0 3 mm. diameter, black, or fuscous black. smooth, often collapsing when dry; perithecial wall pseudoparenchymatous, 50 μ thick, cells 8–12 μ diameter, walls pigmented, fuscous-black or blue-black, thickened. Asci clavate, cylindrical, 84–120 x 16–20 μ, thin-walled, 4–8 spored, usually biseriate, pseudoparaphyses-branched, evanescent. Spores 1–3 septate, oval or broadly elliptical, sometimes curved, 24–33 x 8–11 μ, smooth, hyaline or light brown Conidial stage: stroma 0 5–1 mm diameter, pulvinate, salmon pink. transverse, conidiophores verticillate, conidia borne in clusters cylindrical, ends sharply curved, 1–5 septate, 32–80 x 5–8 μ, microconidia 2–4 x 1 5–2 μ, hyaline = Fusarium sp.

Type Locality: York Bay, Wellington.

Distribution: New Zealand.

Habitat: On cankers on living branches of Coprosma spp.


DINGLEY—The Hypocreales of New Zealand. IV


Sydow 1924 included this species in the genus Botryosphaeria and states "Wenn ich den vorliegenden Pilz als Botryosphaeria bezeichne, so nehme ich hier diese Gattung im Sinne von Weese (S. Ber. Deutsch. Bot Ges. XXXVII, 1919, p. 83ff.) wozu Gibberella Sacc. als Synonym gestellt werden muss." He described a conidial stage with spindle shaped one-celled hyaline spores 8–11 μ x 2–3 μ, and suggested that this Imperfect stage belongs under Tuberculariaceae.

Perithecia occur on erumpent pseudoparenchymatousstromata among abnormal corky tissue of stem cankers (Plate 83, fig. 2) on living Coprosma.


Stroma effuse usually erumpent pseudoparenchymatous 2–5 mm. diameter. Perithecia caespitose oval or globose 0.15–0.3 x 0.15–0.2 mm. violaceous black, rugulose, collapsing when dry, often appearing as if tuberculate, ostiole papillated; perithecial wall pseudoparenchymatous 30–60 μ thick, cells 10–15 μ diameter, thickened, pigmented blue-black. Asei clavate, thin-walled, 60–90 x 9–14 μ, 8, occasionally 4 spored, usually biseriate; pseudoparaphyses evanescent. Spores 2–3 septate, elliptical, sometimes falcate, 17–35 x 4–7 μ (usually 20–25 x 5–6 μ), smooth, hyaline, or lightly pigmented yellow. Conidia borne on a fleshy, pulvinate, often effuse stroma, orange or pale pink, translucent, darkening to black as perithecia are formed, conidia 3–5 septate, usually 3, cylindrical, falcate, ends pointed, often abruptly curved at apex, base usually pedicillated. 20–34 x 3–6 μ = Fusarium lateritium Nees (syn. F. lateritium Nees var. fruitigenum (Fr.) Wr.).

Type Locality: Germany.

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

Habitat: On bark of roots and stems.


Cytisus proliferus L. Wellington: City, Sept. 1919, E. B. Levy; June 1946 (unknown collector); Khandallah, July 1940 (unknown collector).


This species appears to be variable, since spore size varies within a collection.ollenwerber separated the variety G. baccata var. eunymyi on stromatic characters but later (1943) reduced it as a synonym. The conidial stage Fusarium lateritium is more common than the perithecial stage. The species often occurs as a wound parasite gaining entrance to the host plant through tissue damaged by frost, by insects or by some mechanical injury. It is separated from G. pulicaris by the larger spores, rugulose never tuberculate perithecia and an effuse rarely pulvinate stroma.


Stroma absent. Perithecia caespitose, globose or oval, 0.1–0.2 x 0.2–0.3 mm., tuberculate, violet black, ostiole not papillated, collapsing when dry, perithecial wall 20–30 μ thick, pseudoparenchymatous, cells globose or cuboid, 10–15 μ diam., collapsing when dry, giving perithecia a roughened appearance. Ascii thin-walled, ellipsoidal or clavate, ends truncate, 8 spored, obliquely uniseriate; pseudoparaphyses diffusent. Spores elliptical, fusiform, allantoid, 2–3 septate, 16–25 x 3–4.5 μ, hyaline, or lightly pigmented, smooth. Conidia present on a byssoid mass, compacted, elongate, fusiform 1, 3 or 5 septate, curved, tapering at both ends, pedicellate, 22–44 x 3.5–4 μ (usually 3 septate, 30–44 x 3.5–4 μ) = Fusarium graminearum Schwabe.

Type Locality: Carolina, North America.
Distribution: North America, Europe, South Africa, Australia, New Zealand.

Habitat: On stems and seed heads of Gramineae.


Throughout the literature this species has been misidentified as G. saubinetii (Mont.) Sacc. which Petch (1936) showed to be a much confused species. His examination of collections determined by previous workers as G. saubinetii showed some to be G. cyanogenae (Desm.) Sacc., others on Gramineae appeared to be identical with collections of Sphaeria zeae Schw. in Herb. Kew. Shear and Stevens (1935) examined Schweinitz’s specimens of Sphaeria zeae and
showed that S. zeae did not always refer to the same species. Schweinitz’s first collections proved to be identical with G. saubinetii but later collections were Diplodia zeae (Schw.) Lev.

Wheat scab was recorded in New Zealand by Cunningham (1922) as being caused by G. saubinetii (Mont.) Sacc. Blair and Morrison (1949) stated that Fusarium graminearum was the fungus responsible for “ear blight” as well as foot-rot of wheat, but that the perithecial stage Gibberella zeae was rarely observed. The collection from Manawatu (1950) shows mature perithecia. Unlike those of G. baccata and G. pulicaris perithecia are semi-immersed in the byssoid hyphae, no stroma is present and perithecia have a greyish appearance due to threads of hyphae. Perithecia appear in clusters on the awns of wheat ears among mycelium which have borne the conidia.


Gibbera saubinetii Mont., Syll. Crypt., p. 252, 1856.

Stroma inconspicuous but erumpent, 0.2-2.0-3.0 mm. diameter. Perithecia scattered or caespitose, globose or oval, tuberculate, ostiole inconspicuous, not papillated, collapsing when dry, violaceous black; perithecial wall pseudoparenchymatous, 20μ thick, outer cells cuboid, 10-20μ diameter, thickened and pigmented blue black, inner cells smaller, rectangular 10-12 x 4-5μ, hyaline, evanescent in dried material. Asci elliptical or clavate, 80-100 x 10-15μ, thin-walled, 6-8 spored, usually obliquely uniseriate, pseudoparaphyses evanescent. Spores elliptical, sometimes cymbiform, or falcate, 2-3 septate (occasionally 4), 20-36 x 5-8μ (mostly 25-30 x 5-7μ), hyaline or lightly pigmented brown, smooth.

Type Locality: Caen, France.
Distribution: Europe, South America, New Zealand.
Habitat: On dead stems or bark of trees.

Solanum auriculatum Ait. Auckland: Mt. Albert, Sept. 1950, J. M. D.

As stated above this species, together with G. zeae, have been confused and both recorded as G. saubinetii. Petch (1936) stated that he examined type material of Desmaziere’s and Montagne’s species and found them to be identical, the type material of G. saubinetii appeared to be immature G. cyanogenæ.

The species can be separated from G. pulicaris and G. baccata by its larger spores and tuberculate perithecia. In both collections germinating spores were present within the perithecia, so that care had to be exercised in selecting spores for measurement.


Stroma usually present, erumpent and pulvinate, pseudoparenchymatous. Perithecia scattered, gregarious, or caespitose, superficial or semi-immersed in a stroma, globose, fleshy, bright or lightly coloured, never carbonaceous, ostiole, distinct, usually papillated; perithecial wall pseudoparenchymatous, cell walls pigmented and thickened. Asci clavate or cylindrical, 8 spored, pseudoparaphyses filamentous, branched, paraphyses absent. Spores multisepitate, muriate or lightly pigmented brown.

Type Species: Thyronectria patavina Sacc.

Distribution: World-wide.

Thyronectria pseudotrichia (Schweinitz ex Berk. & Curt.) Seeler, J. of Arnold Arboretum, Vol 21, p 438, 1940.


Stroma erumpent, usually pulvinate, pseudoparenchymatous, pigmented brown, 5–25 mm. diameter Perithecia gregarious or caespitose, globose, 0 4–0 5 mm. diameter, scarlet, dark red, sometimes vinaceous brown, smooth, verrucose or scaly, ostiole papillated, darker coloured than perithecia. perithecial wall pseudoparenchymatous 40–70μ thick, cells obloid, up to 20μ diameter, walls pigmented, thickened, pigmented globules present among cells, especially near sub-hymenial layer. Asci elliptical or clavate, 80–120 x 8–20μ, 8 spored, spores biseriate sometimes obliquely uniseriate; pseudoparaphyses forms network within perithecia. Spores muriate (occasionally transverse septa only are present), 20–42 x 6–12μ, hyaline or lightly coloured brown, smooth. Conidia produced on a stalked stroma 1–2 mm long; head 0 5–1 5 mm. diameter, black or dark brown; conidia 3–6 x 2–3.5μ, hyaline or light brown = Stibella cinnabarina (Mont.) Wollenweber (syn. Stilbum cinnabarinum Mont.).

Type Locality: Surinam, South America.

Distribution: North and South America, West Indies, Africa, Ceylon, East Indies. Australia. New Zealand

Habitat: On bark of dead branches.


Fig. 1—Calonectria novae-zelandiae. a, Section through stroma. b, Ascii. c, Spores.
Fig. 2—Calonectria ochraceo-pallida. a, Section through perithecia. b, Ascii. c, Spores.
Fig. 1—Gibberella macrolopha. Section through perithecia.

Fig. 2—Canker on Coprosma robusta with perithecia of Gibberella macrolopha.

Fig. 3—G. macrolopha. a, Asci. b, Spores.

Fig. 4—G. pulvaris. a, Ascus. b, Spores.

Fig. 5—G. zea. a, Ascus. b, Spores.

Fig. 6—G. bacca. a, Ascus. b, Spores.
Brachyglossis repanda Forst. Wellington: Khandallah Reserve, Dec. 1948, J. M. D.


Rhopalostylis sapida (Sol.) Wendl. & Drude. Auckland: Waitakere Ra., Swanson, Dec. 1945, J. M. D.


Examination of type material of Calonecita polythalama (Berk.) Sacc. and Megalonecita nigrescens (Kalchbr. & Cke.) Sacc. proved to be the same species as Thyronectria pseudotrichia (Berk.) Seeler but material determined by Seaver 1909 as Scoleonecita polythalama (Berk.) Seaver appears to be a different species. The collection recorded from New Zealand by MacBride (1926) as Calonecita polythalama is identical with T. pseudotrichia.

Perithecia and spores vary in size and shape within a single collection. Sometimes most spores within a perithecia are transversely septate with an occasional spore with longitudinal septa, while in others all spores are muraliform and regular in size and shape. The typical Stibium conidial stroma is present in most collections. This species is the commonest member of the family in the Auckland province. Seeler (1940) when discussing T. pseudotrichia stated that “this species is to the tropics and sub-tropics what Nectria cinnabarina is to our latitudes—a worldwide form showing little discrimination as to host and varying as much in its appearance.”

Literature Cited.

Blair, I. D., and Morrison, L., 1949. Wheat Diseases and Insect Pests. Informa-


