

**PRELIMINARY STUDIES IN THE  
GENUS ENTOLOMA IN TASMANIA – I**GENEVIEVE M. GATES<sup>1</sup> & MACHIEL NOORDELOOS<sup>2</sup>

This paper describes 33 new species of *Entoloma* from wet and dry forests in Tasmania, Australia, based on 8 years of intensive collecting, description and study of the *Entoloma* mycota. As such it is a precursor to a monographic treatment of the Entolomataceae of Tasmania, to be published in the next few years.

Tasmania is the island state of Australia, lying between 40° and 43° 40' south of the equator, and separated from the mainland of Australia by Bass Strait. The island, with an area of 68,200 km<sup>2</sup>, is approximately the same size as Sri Lanka and a little smaller than Ireland. Its climate can be described as modified marine Mediterranean. The interesting, varied vegetation of the diverse habitats is a result of its geology, precipitation and the effects of the surrounding oceans on this mountainous island. This vegetation has been described as austral montane, temperate rainforest and sclerophyll forest (wet and dry).

The cool temperate rainforests dominated by *Nothofagus cunninghamii* and the wet eucalypt forests dominated by *Eucalyptus* spp. (for a detailed description see Jackson, 1999) support a rich mycota, the majority of species of which appear to be undescribed and unnamed.

In Tasmania numerous species of *Entoloma* and related genera can be found, of which many are new to science. A previous paper on the family Entolomataceae in Tasmania was confined to the genus *Rhodocybe* (Baroni & Gates, 2006). The present paper deals with the first lot of new taxa of *Entoloma* s.l. to be described from Tasmania. They have been arranged according to their resemblance to some large groups within the genus: Entolomatoid, with a *Tricholoma*-like habit and a glabrous or velutinous pileus; Nolaneoid, with a *Mycena*-like habit and glabrous pileus; Leptonioid, with a *Collybia*-like habit, often depressed, distinctly squamulose pileus; and Omphalinoid, with a depressed pileus and decurrent lamellae.

The current infrageneric taxonomy of *Entoloma* (Romagnesi & Gilles, 1979; Noordeloos, 1992, 2005; Largent, 1994) is primarily based on European, North American, and African species. These classifications, which sometimes differ considerably, are based mainly on morphological, and to a lesser extent, chemical characteristics. Although a number of taxa have been described from the Southern Hemisphere in the works by Berkeley (1859), Cleland (1934, 1935), Stevenson (1962), Horak (1973, 1976, 1977, 1980, 1982) and Grgurinovic (1997), no attempt has been made so far to place them into an infrageneric context.

- 1) School of Plant Science, University of Tasmania, Private Bag 55, Hobart, Tasmania 7001, Australia.
- 2) Nationaal Herbarium Nederland, Universiteit Leiden branch, P.O. Box 9514, 2300 RA, Leiden, The Netherlands.

During our study of the Tasmanian *Entoloma* mycota several new taxa have been encountered that do not fit into the current classification. However, we refrain from describing new infrageneric taxa, because current ongoing phylogenetic studies, using molecular markers, may well throw new light on the existing classification and the value of certain morphological characters on which they are based.

#### MATERIALS AND METHODS

Approximately 700 trips were undertaken during the period 1998–2006, predominantly in the south, south-east and south-west of the island with some sojourns to the north-east and north-west, mostly in the altitude range 0–750 m. The southern regions of Tasmania contain many wet forests rich in fungi within reasonable driving distance of Hobart.

Fresh collections were photographed and described with colour notations according to Kornerup & Wanscher (1978) or Munsell Soil Colour Chart (1975). Mounts for microscopic analysis were made from fresh and dried material and examined in water, 10% NH<sub>4</sub>OH, 3% KOH, or ammoniacal Congo Red. All measurements were made in 10% NH<sub>4</sub>OH or 3% KOH. For basidiospore measurements, the hilar appendix was excluded. The spore quotient Q, refers to the length divided by the width of an individual spore. Drawings of basidiospores, cystidia and other microscopic structures were made with the aid of a drawing tube attached to a light microscope. Holotype specimens are deposited in the Tasmanian Herbarium (HO); isotypes are deposited at the National Herbarium of the Netherlands, Leiden (L). Collections cited are deposited at HO or L as designated.

### DESCRIPTIONS OF THE SPECIES

#### I. ENTOLOMATOID TAXA

Representatives of subg. *Entoloma* are poorly represented in the temperate Southern Hemisphere, and mainly restricted to species in the group of *Entoloma bloxamii* (Berk. & Broome) Sacc. of sect. *Entoloma* with blue or violaceous coloured basidiocarps. This species group shows a remarkable variation in morphology, particularly with regard to the structure of the pileipellis. This is reflected in the number of new taxa proposed here.

##### 1. *Entoloma cretaceum* G. Gates & Noordel., *spec. nov.* — Fig. 1, Plate 1

Habitus tricholomatoideus sed parvus. Pileus 15–45 mm latus cretaceus glaber. Stipes 15–40 × 2–10 mm hyalinus flavitinctus.

Sporae 6.0–8.5 × 6.0–8.0 μm isodiametrales. Cystidia desunt. Pileipellis ixocutis hyphis epigmentatis 2–7 μm latis. Fibulae adsunt.

Holotypus: Australia, Tasmania, Bruny Island, Mt Mangana, 43° 22' S, 147° 17' E, 26.V.2001, G. Gates E1181 & D. Ratkowsky (HO 543528; isotypus in L).

Etymology — Cretaceus = chalky, chalky white, referring to the colour of the basidiocarp.

Main characters — Chalky white cap, hyaline stipe and isodiametric spores.

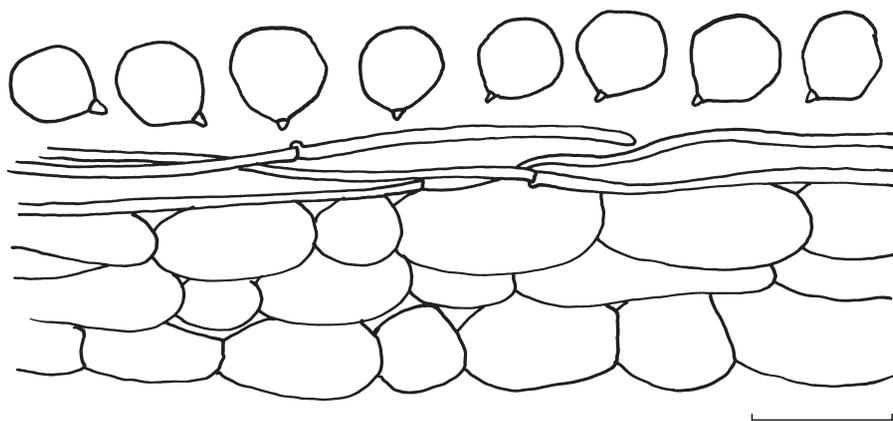


Fig. 1. *Entoloma cretaceum*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

Pileus 15–45 mm broad, conical to conico-convex, expanding with age to convex with low umbo, with deflexed margin, pure white when fresh, developing ochraceous tinges or spots, slightly viscid when moist, not translucently striate, not hygrophanous, glabrous. Lamellae adnate to adnexed, sometimes emarginate, narrowly ventricose, to 5 mm deep, white in youth, becoming pink with spore maturation, with slightly irregular edge, thickish, close or crowded, with 3 tiers of lamellulae. Stipe 15–40  $\times$  2–10 mm, cylindric, tapering at base, hyaline with a yellow-ochre flush at base, dry, innately fibrillose, glabrous. Odour like cucumber becoming farinaceous. Taste like cucumber becoming farinaceous.

Spores 6.0–8.5  $\times$  6.0–8.0  $\mu\text{m}$ , on average 7.0–7.6  $\times$  6.6–7.2  $\mu\text{m}$ ,  $Q = 1.0\text{--}1.1(-1.2)$ , isodiametric, many-angled, rather thin-walled. Basidia 17–35  $\times$  7–12  $\mu\text{m}$ , 4-spored, clavate, clamped. Lamella edge fertile. Cystidia absent. Pileipellis an ixocutis of narrow, cylindric hyphae 2–7  $\mu\text{m}$  in diameter, in a thin layer overlaying a subpellis composed of inflated elements 22–70  $\times$  5–19  $\mu\text{m}$ , gradually passing into a pileitrama of inflated elements 30–120  $\times$  5–30  $\mu\text{m}$ . Pigment not present. Stipitipellis a compact cutis of narrow hyphae 2–9  $\mu\text{m}$  in diameter. Caulocystidia absent, except for a few subcylindric loose terminal elements of surface hyphae. Clamp-connections abundant in all tissues.

Habitat & distribution — Widespread but infrequently encountered, in Tasmanian wet forests.

*Collections examined.* AUSTRALIA: Tasmania, Bruny Island, Mt Mangana, 43° 22' S, 147° 17' E, 26.V.2001, G. Gates E1181 & D. Ratkowsky (holotype HO; isotype L); Wielangta, 42° 42' S, 147° 51' E, 13.IV.2004, M.E. Noordeloos 2004015a (L).

*Entoloma cretaceum* is a relatively small member of sect. *Entoloma*, reminiscent of the European *E. prunuloides* (Fr.) Quél., but differs mainly in the rather chalky white pileus and hyaline stipe.

2. **Entoloma albomagnum** G. Gates & Noordel., *spec. nov.* — Fig. 2, Plate 2

Habitus robustus. Pileus usque ad 100 mm latus albus glaber. Stipes 95 × 26 mm albus.

Sporae 6.0–8.5 × 6.0–8.0 μm isodiametricae paulisper angulatae. Pileipellis ixocutis hyphis parvis 6 μm latis haud pigmentatis. Fibulae abundantes.

Holotypus: Australia, Tasmania, Scottsdale, Forester Road, 41° 06' S, 147° 37' E, 9.VI.2004, G. Gates E2030 & D. Ratkowsky (HO 543532; isotypus in L).

**Etymology** — Albus = white, magnus = big, referring to the robust, white basidiocarp.

**Main characters** — Large, white, tricholomatoid species with strong, soapy smell, and small, isodiametric spores.

Pileus up to 100 mm broad, plano-convex with a low, broad umbo and undulating entire margin, pure white with faint yellow tinge at centre with age, not distinctly hygrophanous, not translucently striate, glabrous, somewhat lubricous when moist. Lamellae adnate to emarginate, segmentiform, to 9 mm deep, pale pink with entire, concolorous edge, very thin, crowded, with 2 tiers of lamellulae. Stipe 95 × 26 mm at apex, 14 mm at base, tapering towards base, stuffed, white, silky fibrillose with scattered loose fibrils, pruinose at base. Context white. Odour soapy at time of collecting, then like cucumber. Taste like cucumber.

Spores 6.0–8.5 × 6.0–8.0 μm, on average 7.0–7.6 × 6.5–7.2 μm, Q = 1.0–1.2, isodiametric with 6 or 7 rather weak angles, relatively thin-walled. Basidia 4-spored, clamped. Lamella edge fertile. Cystidia absent. Pileipellis an ixocutis of narrow, cylindrical hyphae c. 6 μm in diameter. Pigment not observed. Hymenophoral and pileitrama regular, made up of relatively short, barrel-shaped elements 20–65(–90) × 4–15 μm. Clamp-connections present in all tissues.

**Habitat & distribution** — Known only from one location in a dry sclerophyll forest in Tasmania's northeast.

*Collection examined.* AUSTRALIA: Tasmania, Scottsdale, Forester Rd, 41° 06' S, 147° 37' E, 9.VI.2004, G. Gates E2030 & D. Ratkowsky (holotype HO; isotype L).

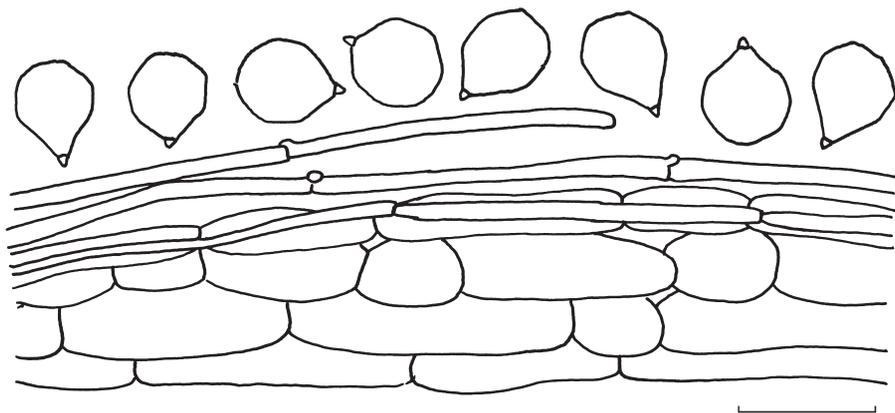


Fig. 2. *Entoloma albomagnum*. Spores and pileipellis. Bar = 10 μm (spores), 30 μm (pileipellis).

*Entoloma albomagnum* resembles *E. cretaceum* in the white colour of the basidiocarps, but differs in the very large size, not hyaline, more or less fibrillose stipe, and the soapy odour. The small, isodiametric spores indicate that this species fits well in sect. *Entoloma*, close to *E. prunuloides*. Similar white, tricholomatoid species in the literature differ in having larger, more conspicuously angular spores, which place them in sect. *Sinuata* (Noordeloos, 2005).

### 3. *Entoloma manganaensis* G. Gates & Noordel., *spec. nov.* — Fig. 3, Plate 3

Habitus tricholomatoideus. Pileus 90 mm fuliginosus glaber. Lamellae distantes crassae luteae. Stipes 40 × 25 mm coeruleo-griseus.

Sporae 6.0–8.5 × 5.5–7.5  $\mu\text{m}$  isodiametrales. Cystidia desunt. Pileipellis cutis hyphis 3.5–7.5  $\mu\text{m}$  latis epigmentatis. Fibulae abundantes.

Holotypus: Australia, Tasmania, Bruny Island, Mt Mangana, 43° 22' S, 147° 17' E, 8.IV.1999, G. Gates E369 & D. Ratkowsky (HO 543529; isotypus in L).

Etymology — Referring to Mt Mangana, the type locality.

Main characters — A relatively large species with a brown, glabrous, lubricous pileus, thickish, bright yellow lamellae, a blue-grey stipe, and isodiametric spores.

Pileus 90 mm broad, plano-convex with entire, uplifted and undulating margin, red-brown (K. & W. 5F6), more or less uniformly coloured, not translucently striate, not truly hygrophanous, glabrous, smooth, slightly lubricous. Lamellae sinuate-emarginate, ventricose, to 15 mm deep, cadmium yellow (4A5), with concolorous and entire edge, thickish, moderately crowded, with 2 tiers of lamellulae. Stipe 40 × 25 mm, stout, equal, cylindrical, innately fibrillose, glabrous, blue grey (20E4) with slight yellow tinge near base. Odour none. Taste mild, but not distinctive.

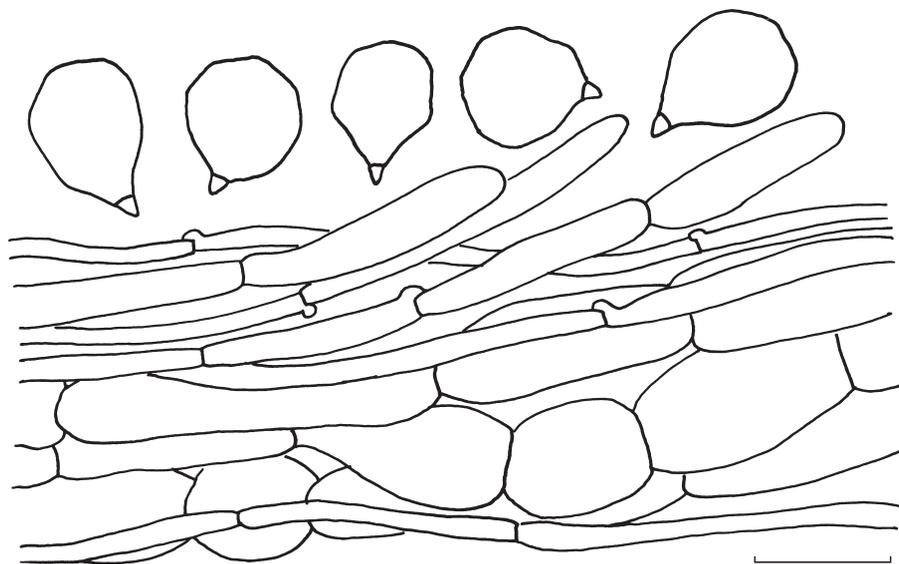


Fig. 3. *Entoloma manganaensis*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

Spores  $6.0\text{--}8.5 \times 5.5\text{--}7.5 \mu\text{m}$ , on average  $7.3 \times 6.9 \mu\text{m}$ ,  $Q = 1.0\text{--}1.15$ , angles weak, 5-7- or many-angled, reminiscent of the spores of *Rhodocybe*. Basidia  $20\text{--}35 \times 6\text{--}8 \mu\text{m}$ , 4-spored, clamped. Lamella edge fertile. Cystidia absent. Pileipellis an ixocutis of narrow, cylindrical to inflated hyphae  $22\text{--}55(-70) \times 3.5\text{--}7.5 \mu\text{m}$ ; subpellis made up of cylindrical to inflated hyphae to  $30 \mu\text{m}$  in diameter. Pigment pale brown, intracellular in pileipellis. Hymenophoral and pileitrama consisting of short, cylindrical to inflated hyphae,  $17\text{--}45 \times 3\text{--}7 \mu\text{m}$ . Stipitipellis a cutis of narrow, cylindrical to  $3 \mu\text{m}$  in diameter hyphae with slate blue intracellular pigment. Clamp-connections abundant.

Habitat & distribution — In wet sclerophyll forest litter, on a small mountain on an island in the D'Entrecasteaux Channel.

*Collection examined.* AUSTRALIA: Tasmania, Bruny Island, Mt Mangana,  $43^\circ 22' \text{S}$ ,  $147^\circ 17' \text{E}$ , 8.IV.1999, G. Gates E369 & D. Ratkowsky (holotype HO; isotype L).

This species fits well into sect. *Entoloma* close to *E. nitidum* Quél., *E. bloxamii* (Berk.) Sacc. and *E. prunuloides* on account of the small, isodiametric, weakly angled spores, pileipellis in the form of an ixocutis, and abundant clamp-connections. Several species from South East Asia are similar, viz. *E. assimulatum* Corner & E. Horak from Malaysia, and *E. chalybs* E. Horak from Papua New Guinea. However, the thick, deep yellow lamellae are distinctive for the present species. *Entoloma cerinum* E. Horak, described from New Zealand, also has yellow lamellae when young, turning pink with age. The lamellae in that species are thin and crowded, however. The European *E. sinuatum* (Bull.: Fr.) P. Kumm. has less brightly coloured, normally thick lamellae and larger, differently shaped spores.

#### 4. *Entoloma indigoticoumbrinum* G. Gates & Noordel., *spec. nov.* — Fig. 4, Plate 4

Pileus  $30\text{--}80 \text{ mm}$  latus conico-convexus expansus leviter umbonatus brunneus indogoticus tinctus toto tomentosulus demum rimosus vel rugulosus. Stipes  $30\text{--}70 \times 5\text{--}7 \text{ mm}$  (apex)  $\times 12 \text{ mm}$  (basis) coeruleo-fibrillosus.

Sporae  $6.0\text{--}7.5(-8.0) \times 5.5\text{--}7.5 \mu\text{m}$  paulisper 5-7-angulatae. Cystidia desunt. Pileipellis trichoderma vel hymenoderma elementis terminalis clavatis  $10\text{--}30 \times 20 \mu\text{m}$ . Pigmentis intracellulosis. Fibulae adsunt.

Holotypus: Australia, Tasmania, Growling Swallet,  $42^\circ 41' \text{S}$ ,  $146^\circ 30' \text{E}$ , 22.IV.2004, M.E. Noordeloos 2004063 (HO 543559; isotypus in L).

*Etymology* — Indigoticus = indigo-blue, umbrinum = umber-brown, referring to the colour of the pileus.

*Main characters* — Habit tricholomatoid, pileus and stipe with dark indigo-blue tinges, often mixed with dark brown, pileal surface finely tomentose or velutinous, cracking with age.

Pileus  $30\text{--}80 \text{ mm}$  broad, conico-convex to convex, expanding to plano-convex with low, broad umbo, with deflexed margin, uniformly dark brown with indigo-blue tinges particularly when fresh and in older specimens often very distinct near margin (K. & W. 7F1-2, 11F2-3, 19F2-3), entirely finely velutinous-tomentose, when old sometimes cracked or faintly radially wrinkled, not hygrophanous, not translucently striate. Lamellae adnate-emarginate, narrowly ventricose, flesh-coloured pink, often tinged blue especially near the margin of the pileus, then grey-pink, with irregular, concolorous edge, moderately crowded,  $L = 28\text{--}42$ ,  $l = 3\text{--}7$ . Stipe  $30\text{--}70 \times 5\text{--}7 \text{ mm}$  (apex)  $\times 12 \text{ mm}$

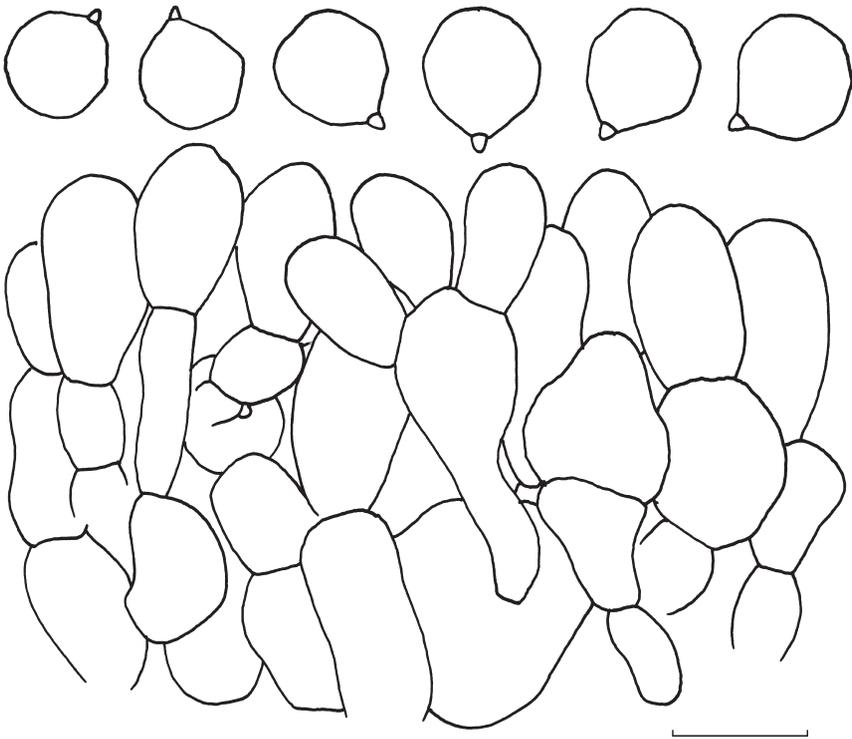


Fig. 4. *Entoloma indigoticoumbrinum*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

(at base), cylindric, distinctly broadened at base to subbulbous, sometimes flexuous, covered with grey-blue, brown, or dark blue to purplish blue fibrils, in colour different from pileus (19E2-4, 17-18E3) on a paler background, shining, base glabrous and pallid, often tinged yellow. Context concolorous in cortex, grey-blue in context of pileus and most of the stipe, pale yellow at stipe base. Odour none or like raw beans. Taste none or like raw beans.

Spores 6.0–7.5(–8.0)  $\times$  5.5–7.5  $\mu\text{m}$ , on average 6.5–7.5  $\times$  6.1–6.7  $\mu\text{m}$ ,  $Q = 1.0$ –1.2, (sub)isodiametric, with 5–7 weak angles and relatively thick walls. Basidia 20–34  $\times$  8–15  $\mu\text{m}$ , (broadly) clavate to sphaeropedunculate, clamped. Lamella edge fertile. Cystidia absent. Pileipellis a trichoderm with transitions to a hymeniderm of short, clavate terminal elements, 10–30  $\times$  20  $\mu\text{m}$ . Pigment brown, intracellular. Pileitrama and hymenophoral trama made up of relatively short elements, 40–120  $\times$  7–20  $\mu\text{m}$ . Clamp-connections abundant in all tissues.

Habitat & distribution — Widespread and abundant in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Growling Swallet, 42° 41' S, 146° 30' E, 22.IV.2004, M.E. Noordeloos 2004063 (holotype HO; isotype L); idem, M.E. Noordeloos 2004064 (CTAB157); Kermadie Falls, 43° 12' S, 146° 52' E, Upper Track, G. Gates E1135 & D. Ratkowsky; Wielangta, 42° 42' S, 147° 51' E, 13.IV.2004, M.E. Noordeloos 2004013; idem, 20.III.1999, G. Gates E267 & D. Ratkowsky.

*Entoloma indigoticoumbrinum* is a fairly common species in Tasmania, with a rather striking pileus colour, which is a mixture of brown and dark indigo blue, and a dry velutinous-tomentose pileal surface, which tends to become cracked or wrinkled with age. The general aspect is reminiscent of species of the complex of *E. bloxamii*, with which it also shares some microscopic characters, such as the small, isodiametric spores and abundant clamp-connections. The pileipellis structure, however, is strikingly different and would place this species in sect. *Calliderma* of subg. *Inocephalus*. Interestingly, the species comes out in the same clade as *E. bloxamii* and *E. prunuloides* in the preliminary phylogenetic analysis based on molecular markers (Co, unpublished results). Several similar species have been described in the literature: *Entoloma praestans* Corner & E. Horak differs in the smaller, quadrate spores and *E. burkillii* Massee has a different pileipellis of narrow, cylindrical hyphae and larger spores. *Entoloma coeruleoviride* Corner & E. Horak has narrower spores and pileipellis hyphae, and a fimbriate lamella edge with abundant cheilocystidia.

##### 5. *Entoloma kermantii* G. Gates & Noordel., *spec. nov.* — Fig. 5, Plate 5

Pileus 20–70 mm latus stipiteque purpureo-ianthinus innato-fibrillosus. Stipes 46–105 × 9–10 mm. Sapore amaro.

Sporae 6.0–8.5 × (5.5–)6.0–7.0 μm paulisper angulatae tenuitunicatae. Pileipellis cutis pigmento intracellularem spadiceum. Fibulae adsunt.

Holotypus: Australia, Tasmania, Kermantid Falls, 43° 12' S, 146° 52' E, Lower Track, 16.III.1999, G. Gates E227 & D. Ratkowsky (HO 543530; isotypus in L).

Etymology — Referring to the type locality.

Main characters — A relatively stout species with violet-blue pileus and stipe, bitter taste.

Pileus 20–70 mm broad, hemispheric at first, becoming more convex with age, sometimes weakly umbonate, with straight, entire margin becoming undulated, colour ranging from greyish ruby (K. & W. 12D3) with brownish centre to brown with violet hues at margin or purple (plum-coloured) (15E8), much deeper coloured in youth, or very faded grey-pink in the largest basidiocarps, irregularly hygrophanous, innately radially fibrillose, dry. Lamellae adnexed, ventricose, to 13 mm deep, whitish in youth becoming flesh-coloured pink with concolorous edge, sometimes with violet or grey-violet hues, moderately thick, moderately crowded with 2 tiers of lamellulae. Stipe 46–105 × 9–10 mm, cylindrical, gradually broadening towards base (12 mm in diameter), firm, blue, violet to purple-red (18E8, 15C8, 17A8), whitish at base or in lower part, dry, innately fibrillose throughout. Odour faint cucumber when freshly dissected. Taste cucumber and bitter.

Spores 6.0–8.5 × (5.5–)6.0–7.0 μm, on average 7.1 × 6.4 μm, Q = 1.0–1.2, 5–8-angled in side-view with rather weak angles. Basidia 38–51 × 4–8 μm, 4-spored, relatively slender clavate, clamped. Lamella edge fertile. Cystidia absent. Hymenophoral trama consisting of short elements. Pileipellis a differentiated cutis, cylindrical to narrowly clavate terminal elements, 25–55(–70) × 4–7.5(–9) μm; subpellis of short elements, gradually passing into pileitrama of short elements. Pigment very pale brownish, intracellular in pileipellis. Stipitipellis a cutis with some ascending loose terminal hyphal elements, 4.0–15 μm in diameter with pale greyish-violaceous intracellular pigment. Caulocystidia absent. Clamp-connections present.

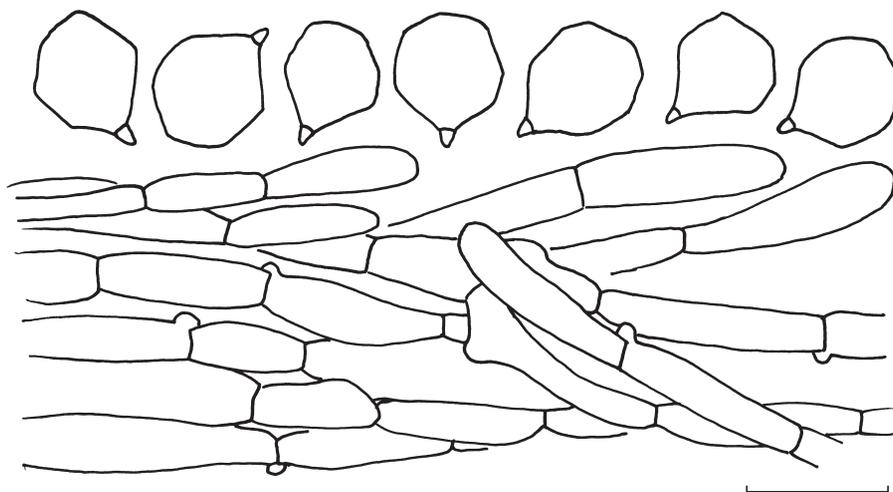


Fig. 5. *Entoloma kermantii*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

**Habitat & distribution** — Known only from two localities in wet sclerophyll forest in southern Tasmania.

*Collection examined.* AUSTRALIA: Tasmania, Kermantidie Falls, 43° 12' S, 146° 52' E, Lower Track, 16.III.1999, G. Gates E227 & D. Ratkowsky (holotype HO; isotype L).

The rather small, many-angled spores are distinctive for the *E. nitidum* group, but in *E. kermantii* the spores are more pronouncedly angled than in *E. nitidum* and *E. indigoticoumbrinum*. The stout basidiocarps are reminiscent of *E. bloxamii*, which usually lacks distinct purple-violaceous tinges. *Entoloma kermantii* also has some similarity to *E. assimulatum* Corner & E. Horak, described from tropical rainforest in Singapore, Sabah and Peninsular Malaysia, but that species differs in the absence of clamp-connections and a more pronouncedly farinaceous odour.

## 6. *Entoloma coeruleomagnum* G. Gates & Noordel., *spec. nov.* — Fig. 6, Plate 6

Pileus ad 100 mm latus convexus obscure coeruleus tomentosus versus marginem sulcatus. Lamellae albide violaceo-tinctae. Stipes 60 × 8–10 mm innate coeruleo-fibrillosus.

Sporae 9.0–11.0 × 8.5–10.0  $\mu\text{m}$  paulisper 5–6-angulatae. Acies lamellarum fertilis. Pileipellis hymenoderma elementis elongates pigmento intracellulari. Fibulae adsunt.

Holotypus: Australia, Tasmania, Duckhole Lake Track, 43° 22' S, 146° 53' E, 16.IV.2005, G. Gates E2109 & D. Ratkowsky (HO 543531; isotypus in L).

**Etymology** — Coeruleus = sky-blue, magnus = big, referring to the big, blue basidiocarp.

**Main characters** — Robust basidiocarp, intensely bluish black with velvety cap, pileipellis a palisadoderm, spores small, definitely angled.

Pileus 100 mm broad, irregularly convex, with deflexed margin, very dark blackish blue with purple sheen, not hygrophanous, not translucently striate, entirely finely subtomentose, dry, radially sulcate at margin. Lamellae adnate, ventricose, to 18 mm

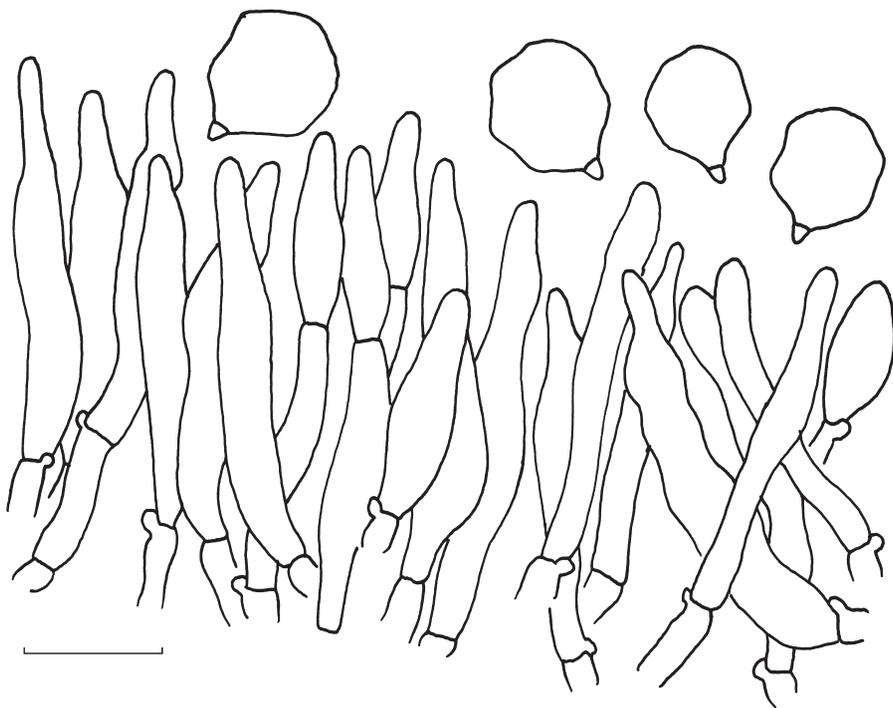


Fig. 6. *Entoloma coeruleomagnum*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

deep, pink-tinged dark violet, with irregular, concolorous edge, crowded, moderately thick. Stipe 60  $\times$  8–10 mm, cylindrical, dark blue with violet tinges, concolorous with pileus, innately fibrous, glabrous, yellowing at base. Odour and taste not distinctive.

Spores 9.0–11.0  $\times$  8.5–10.0  $\mu\text{m}$ ,  $Q = 1.1\text{--}1.25$ ,  $Q_{\text{av}} = 1.15$ , isodiametric, 5- or 6-angled with rather distinct angles. Basidia 20–40  $\times$  7.0–11  $\mu\text{m}$ , 4-spored, clamped. Lamella edge fertile. Cheilocystidia absent. Hymenophoral trama regular, made up of medium-sized, cylindrical to slightly inflated elements, 50–120  $\times$  5–20  $\mu\text{m}$ . Pileipellis a palisadoderm of erect hyphae with cystidioid terminal elements. Pigment intracellular, brown in terminal elements of pileipellis, purple-blue, and appearing parietal in lower parts of pileipellis. Pileitrama regular, similar to hymenophoral trama. Stipitipellis with numerous cylindrical-flexuous caulocystidia, to 9  $\mu\text{m}$  in diameter. Clamp-connections frequently observed in pileipellis, stipitipellis and hymenium.

Habitat & distribution — In rainforest, rare. Known only from the type locality.

*Collection examined.* AUSTRALIA: Tasmania, Duckhole Lake Track, 43° 22' S, 146° 53' E, 16.IV.2005, G. Gates E2109 & D. Ratkowski (holotype HO; isotype L).

At first sight, the description of *E. angulatum* (Cleland) Grgur. might well fit the current species. However, this poorly known species has a simple cutis-like pileipellis (Grgurinovic, 1997). There are a few similar species known from Australasia (Horak, 1980). *Entoloma praestans* Corner & E. Horak has much smaller, subquadrangle spores,

*E. burkillii* Masee differs in having much narrower terminal elements in the pileipellis, and *E. coeruleoviride* Corner & E. Horak differs in the green tinges in the pileus, and a sterile lamella edge. *Entoloma jennyae* Noordel. & Cate from Ireland is very similar, but has a more sky-blue pileus and whitish stipe.

## II. NOLANEOID TAXA

### 7. *Entoloma coeruleogracilis* G. Gates & Noordel., *spec. nov.* — Fig. 7, Plate 7

Habitus mycenoideus. Pileus 8–22 mm latus profunde coeruleus innate fibrilloso-virgatus. Stipes 30–60 × 1–3 mm concolorus vel profunde indigotius innate fibrillosus.

Sporae 6.0–8.0 × 5.5–7.5 μm isodiametrales paulisper multiangulatae tenuitenucatae. Pileipellis cutis hyphis tenuis 3.0–9.0 μm latis constituis pigmento intracellulari. Fibulae numerosae.

Holotypus: Australia, Tasmania, Timbs Track, 42° 44' S, 146° 25' E, 8.V.2003, G. Gates E1777 & D. Ratkowsky (HO 543550; isotypus in L).

Etymology — Coeruleus = sky-blue, gracilis = slender, referring to the slender, mycenoid, blue basidiocarp.

Main characters — Habit mycenoid, pileus and stipe deep blue with violet hues.

Pileus 8–22 mm broad, conico-convex with or without small umbo, with straight, entire margin, dark blue (K. & W. 19E5-19F5), with hint of dark violet at margin or a greyish violet (18E5) in young specimens, not hygrophanous, sometimes faintly translucent striate at margin, dry, innately radially fibrillose. Lamellae adnexed, ventricose, to 5 mm deep, flesh-coloured pink when young, then buff-pink, with entire, concolorous edge, thin, moderately crowded. Stipe 30–60 × 1–3 mm, cylindric, broadened at base to 2–3 mm, slender, brittle, indigo-blue or deep violet, cream to pale yellow at base, longitudinally innately fibrillose, mostly glabrous with a sheen, but with some sparse superficial violet fibrils, dry, stuffed with dark blue-violet inner part, yellowish at base, fistulose with age, with some white basal tomentum. Odour not distinctive. Taste like green grass.

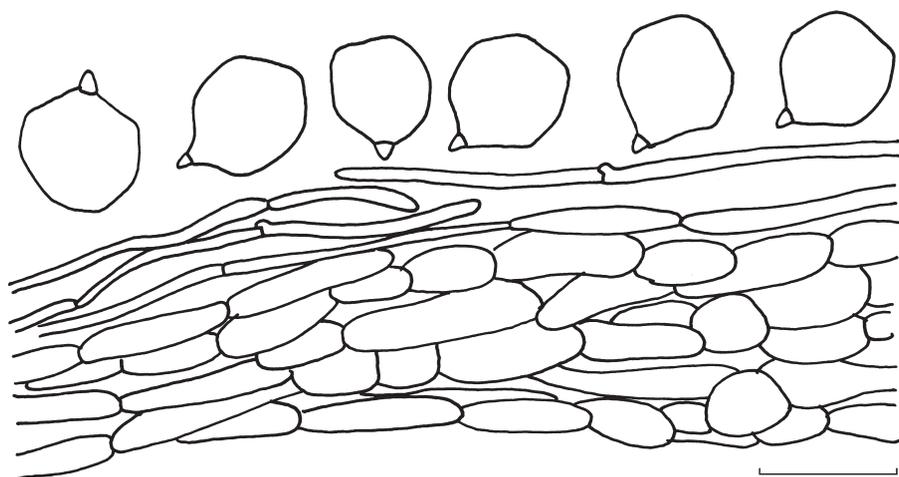


Fig. 7. *Entoloma coeruleogracilis*. Spores and pileipellis. Bar = 10 μm (spores), 30 μm (pileipellis).

Spores  $6.0\text{--}8.0 \times 5.5\text{--}7.5 \mu\text{m}$ , on average  $6.5\text{--}7.3 \times 5.8\text{--}6.8 \mu\text{m}$ ,  $Q = 1.0\text{--}1.25$ , 6–9-angled in side-view, very thin-walled ('*Rhodocybe*-type'). Basidia  $25\text{--}35 \times 7\text{--}9 \mu\text{m}$ , 4-spored, clamped. Lamella edge fertile. Cystidia absent. Hymenophoral trama regular, made up of short, inflated elements. Pileipellis a thin cutis of cylindrical hyphae,  $3.0\text{--}9.0 \mu\text{m}$  in diameter; subpellis of inflated elements,  $16\text{--}45 \times 7\text{--}22 \mu\text{m}$ . Pigment blue, intracellular in supra- and subpellis. Clamp-connections present in all tissues.

Habitat & distribution — Widespread but infrequently observed in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Cape Pillar Track,  $43^\circ 09' \text{S}$ ,  $147^\circ 56' \text{E}$ , 29.V.1999, G. Gates E550 & D. Ratkowsky; Clarks Cliffs,  $43^\circ 06' \text{S}$ ,  $147^\circ 47' \text{E}$ , 5.VI.2001, G. Gates E1220 & D. Ratkowsky; Timbs Track,  $42^\circ 44' \text{S}$ ,  $146^\circ 25' \text{E}$ , 8.V.2003, G. Gates E1777 & D. Ratkowsky (holotype HO; isotype L).

*Entoloma coeruleogracilis* is a relative of *E. bloxamii* and *E. nitidum* with its bluish basidiocarps, but differs in its small, mycenoid basidiocarps and relatively small spores. *Entoloma alcedicolor*, described from Europe (Noordeloos, 2005) is similar, but differs in having a distinctly fibrillose-squamulose pileus with a trichodermal layer of rather wide hyphae. The North American species *E. trachyosporum* Largent has very similar spores and habit, but differs in colour of the basidiocarp.

#### 8. *Entoloma contrastans* G. Gates & Noordel., *spec. nov.* — Fig. 8, Plate 8

Habitus mycenoides. Pileus 8–20 mm latus pallide brunneus vel albidulus centro obscurior haud vel leviter hygrophanus versus marginem translucidus striatus glabrus. Stipes 30–50 × 2 mm intense violaceus vel coeruleus, politus.

Sporae  $6.0\text{--}8.0 \times 5.5\text{--}7.5 \mu\text{m}$  isodiametrales paulisper multiangulatae tenuitenucatae. Pileipellis cutis hyphis tenuis  $3\text{--}9 \mu\text{m}$  latis constituis pigmento intracellulari. Fibulae numerosae.

Holotypus: Australia, Tasmania, Creepy Crawly,  $42^\circ 50' \text{S}$ ,  $146^\circ 22' \text{E}$ , 6.V.2003, G. Gates E1774 & D. Ratkowsky (HO 543538; isotypus in L).

Etymology — *Contrastans* refers to the strong contrast in colour between pileus and stipe.

Main characters — Basidiocarps mycenoid, thin-fleshed, pileus pallid brown, often appearing almost white, but then often with darker centre, without blue or violaceous tinges, glabrous, stipe deep violaceous or blue, contrasting with the pale pileus, polished, spores small, isodiametric.

Pileus 8–20 mm broad, conical, then expanding to plano-convex with acute centre, with straight margin, very pale beige-brown, often appearing almost white in the field, then often with somewhat darker brown centre, dry, not or only slightly hygrophanous, slightly translucently striate in marginal zone, glabrous. Lamellae adnexed, ventricose, to 3 mm deep, pink with concolorous, entire edge, thin, close, with 2 tiers of lamellulae. Stipe 30–50 × 2 mm, cylindrical, flexuous, deep violaceous or blue, strongly contrasting with colour of pileus (K. & W. 16-18A4), shining, polished, lower part paler with appressed fibrils, with yellowish tinges at base. Context thin. Odour and taste mild.

Spores  $6.0\text{--}8.0 \times 5.5\text{--}7.5 \mu\text{m}$ ,  $Q = 1.0\text{--}1.2$ ,  $Q_{av} = 1.05$ , isodiametric with 5 to many weak angles, thin-walled. Basidia  $14\text{--}20 \times 4\text{--}10 \mu\text{m}$ , 4-spored, clamped. Lamella edge fertile. Cystidia absent. Hymenophoral trama regular, made up of short, cylindrical elements,  $40\text{--}90 \times 8\text{--}20 \mu\text{m}$ . Pileipellis a thin (ixo)cutis of cylindrical hyphae,  $3\text{--}9 \mu\text{m}$

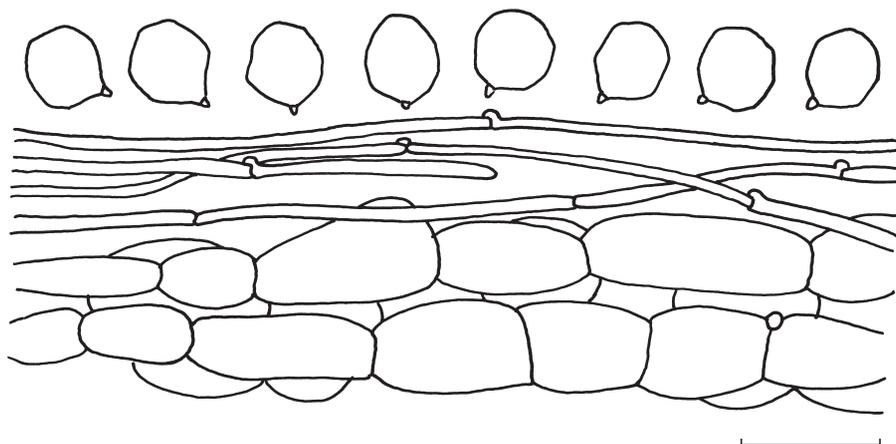


Fig. 8. *Entoloma contrastans*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

in diameter; subpellis well-developed, made up of inflated elements, 20–50(–90)  $\times$  6.0–20  $\mu\text{m}$ . Pigment pale brown, intracellular in pileipellis. Clamp-connections frequent.

**Habitat & distribution** — Uncommon, in wet forests and rainforest.

**Collections examined.** AUSTRALIA: Tasmania, Creepy Crawly, 42° 50' S, 146° 22' E, 6.V.2003, G. Gates E1774 & D. Ratkowsky (holotype HO; isotype L); idem, 23.V.2002, G. Gates E1528 & D. Ratkowsky; Radfords Track, Mt Wellington, 42° 55' S, 147° 15' E, 18 July 2000, G. Gates E987 & D. Ratkowsky.

*Entoloma contrastans* is another new species in the group of *E. nitidum*. The small, mycenoid habit is similar to that of *E. coeruleo-gracilis*, from which it differs in its pallid beige-brown, translucently striate, glabrous pileus and deep violet, polished stipe.

### 9. *Entoloma chrysopus* G. Gates & Noordel., *spec. nov.* — Fig. 9, Plate 9

Pileus 20–35 mm latus conicus vel campanulatus saepe cum papilla ornatus hygrophanus translucido-striatus porphyreobrunneus innate radialiter fibrillosus vel leviter pruinoso-micaceus. Stipes 40–80  $\times$  2–5 mm aureus leviter innate fibrillosus plus minusve politus. Odore aromaticus.

Sporae 9.5–14  $\times$  6.5–9.0  $\mu\text{m}$  5–7-angulatae interdum complexae pseudocruciformae. Acies lamellarum fertiles. Pileipellis cutis differentiatu e hyphis cylindraceis 4–10  $\mu\text{m}$  latis constituit pigmentis leviter incrustantibus vel granuloso-intracellulosus. Fibulae desunt.

Holotypus: Australia, Tasmania, Lady Barron Falls, 42° 41' S, 146° 42' E, 1.IV.1999, G. Gates E335 & D. Ratkowsky (HO 543552; isotypus in L).

**Etymology** — Chrysos = yellow, pus = stipe, referring to the yellow stipe.

**Main characters** — Habit mycenoid, often with pronounced conical umbo, pileus purple-brown, stipe golden yellow, subpolished, clamp-connections absent, bubblegum odour and taste.

Pileus 20–35 mm broad, conical to campanulate, expanding to conico-convex with pronounced small umbo, with deflexed then straight margin, brown with vinaceous hue or purple-brown with a slight lilac-pink tinge when fresh, particularly near margin

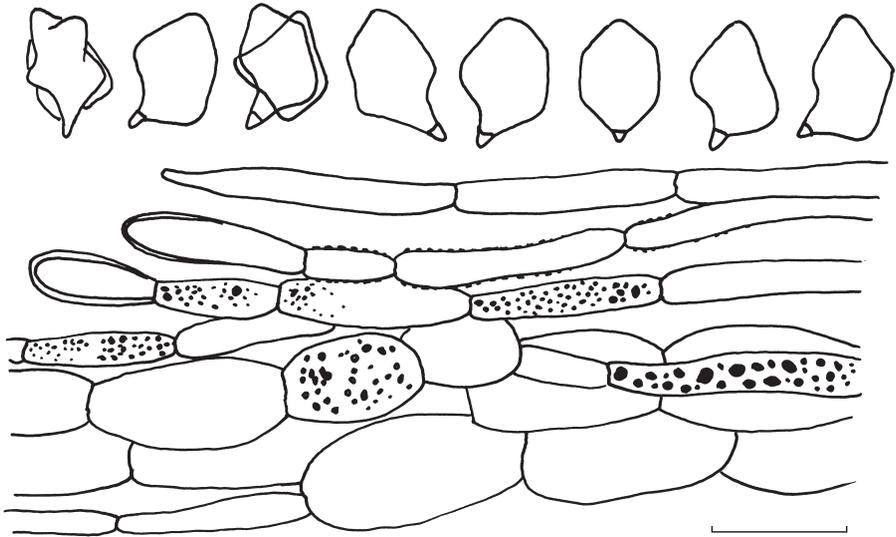


Fig. 9. *Entoloma chrysopus*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

(Mu. 2.5 YR 4-3/2, 5 YR 2.5-3/2), translucently striate at margin when moist, hygrophanous, becoming pallescent along radial streaks when drying, rather pronouncedly innately radially fibrillose or sometimes slightly pruinose-micaceous overall. Lamellae narrowly adnexed, deeply emarginate, ventricose, to 6 mm deep, brown to red-brown with pink hue (7.5 YR 6-4/4, 5 YR 4/3), sometimes transversely veined, slightly paler towards irregular, concolorous edge, moderately crowded, L = 35–50, l = 2–5. Stipe 40–80  $\times$  2–5 mm, cylindric, gradually broadened towards base, white pruina overall in youth, disappearing with age or bruising, then golden yellow (10 YR 6-8/6, 8/4, 7/6, 2.5 Y 8/6-8), very slightly fibrillose, almost polished, dry, brittle, with white basal tomentum. Context thin, concolorous with surface. Odour strongly of bubblegum. Taste of bubblegum.

Spores 9.5–14  $\times$  6.5–9.0  $\mu\text{m}$ , Q = (1.0–)1.2–1.7, rather pronouncedly 5–7-angled in side-view, sometimes complex and somewhat distorted to cruciform. Basidia 18–32  $\times$  6–11  $\mu\text{m}$ , 4-spored, clampless. Lamella edge sterile. Cheilocystidia not observed. Pileipellis is a differentiated cutis of septate, cylindric, 4–10  $\mu\text{m}$  in diameter, hyphae with clavate terminal elements, with parietal and rarely also finely encrusting pigment as well as intracellular pigment in the form of agglutinated dark brown granules and diffuse; terminal elements often with a slightly thickened, refringent apex. Pileitrama regular, made up of cylindric to inflated elements, to 220  $\times$  5–19  $\mu\text{m}$ . Stipeipellis a cutis of narrow, cylindric hyphae, 3–9  $\mu\text{m}$  in diameter. Clamp-connections absent.

Habitat & distribution — Widespread and common throughout Tasmania in all types of wet forest.

*Collections examined.* AUSTRALIA: Tasmania, Duckhole Lake Track, 43° 22' S, 146° 53' E, 20.IV.2004, M.E. Noordeloos (CTAB134, CTAB137); Growling Swallet, 42° 41' S, 146° 30' E, 6.IV.2000, G. Gates E817 & D. Ratkovsky; idem, 22.IV.2004, M.E. Noordeloos 2004066; Hellyer

Gorge, 41° 16' S, 145° 37' E, 26.IV.2002, *G. Gates E1490* & D. Ratkowsky; Lady Barron Falls, 42° 41' S, 146° 42' E, 1.IV.1999, *G. Gates E335* & D. Ratkowsky (holotype HO; isotype L); idem, 17.IV.2004, *M.E. Noordeloos 2004041*; Mt Field, 42° 41' S, 146° 42' E, 9.V.1999, *G. Gates E482* & D. Ratkowsky.

*Entoloma chrysopus* is a very interesting Nolaneoid species, which shares the clampless hyphae and structure and pigmentation of the pileipellis with the species in sect. *Fernandae*. The spores are, however, definitely larger than in any of the known species in the section. *Entoloma xanthocaulon* Arnolds & Noordel. from Europe has a similarly coloured stipe (Noordeloos, 1992) but a more greyish brown pileus and much smaller and differently shaped spores. *Entoloma translucidum* E. Horak and *E. perzonatum* E. Horak resemble *E. chrysopus* in their pigmentation in the pileipellis and their clampless hyphae, but differ in colour, the often squamulose centre of pileus, and fibrillose-twisted stipe surface. Encrusting pigments are absent. Furthermore they lack the distinctive odour of *E. chrysopus*. See also *E. maldea* below.

#### 10. *Entoloma maldea* G. Gates & Noordel., *spec. nov.* — Fig. 10, Plate 10

Pileus 20–50 mm conicus vel campanulatus saepe cum papilla ornatus hygrophanus translucido-striatus brunneus vel griseobrunneus innate radialiter fibrillosus vel leviter pruinoso-micaceus. Stipes 30–100 × 2–10 mm pallide griseobrunneus valde fibrilloso-striatus. Odore plus minusve farinaceus. Sapore farinaceus.

Sporae 7.0–9.0(–10.0) × 6.0–8.0 μm 5–7-angulatae. Cystidia nulla. Pileipellis cutis differentiatu e hyphis cylindraceis 4–15 μm latis constituis pigmentis leviter incrustantibus vel granuloso-intracel- lulosus, subpellis a elementis inflata constituis. Fibulae desunt.

Holotypus: Australia, Tasmania, Chauncy Vale, 42° 37' S, 147° 16' E, 29.IX.2005, *G. Gates E2197* & D. Ratkowsky (HO 543537; isotypus in L).

Etymology — *Maldea* = aboriginal for different.

Main characters — Pileus moderately dark brown, silky fibrillose, stipe much paler, greyish brown, silky fibrillose. Pigment of three types: intracellular diffuse, granular, and finely encrusting.

Pileus 20–50 mm broad, campanulate or conico-convex with large umbo, expanding to plano-convex with umbo, with straight margin, when moist moderately dark brown with darker greyish brown centre, not or slightly translucently striate in marginal zone, hygrophanous, pallescent to moderately dark or pale reddish brown, innately radially fibrillose to lustrous, at centre sometimes slightly villose to very minutely squamulose, micaceous, particularly when dry. Lamellae narrowly adnate, almost free, ventricose, to 8 mm deep, white then brownish pink with irregular, concolorous edge, thin, close to crowded with 2 tiers of lamellulae. Stipe 30–100 × 2–10 mm, cylindric, often distinctly broadened towards base, pale greyish brown, entirely densely lustrous-silky fibrillose-striate, sometimes twisted, base whitely tomentose. Odour not distinct to farinaceous. Taste farinaceous.

Spores 7.0–9.0(–10.0) × 6.0–8.0 μm, Q = 1.2–1.6, Qav = 1.3–1.4, regularly to irregularly 5–7-angled in side-view. Basidia 18–30 × 7–11 μm, 4-spored, clampless. Lamella edge fertile. Cystidia absent. Pileipellis a cutis with transition to a trichoderm, made up of cylindric hyphae, terminal elements sometimes slightly inflated-fusiform, to 15 μm in diameter; subpellis well-differentiated, made up of inflated elements, 20–70 ×

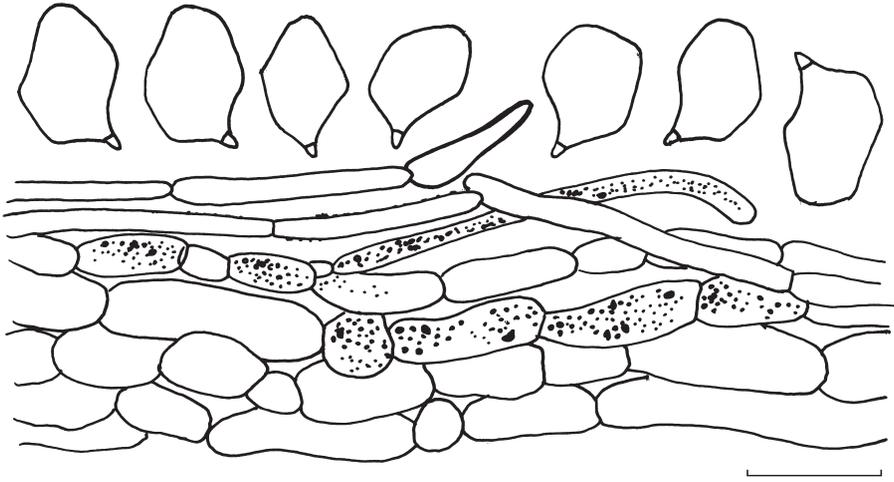


Fig. 10. *Entoloma maldea*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

4–20  $\mu\text{m}$ . Pigment brown, diffusely intracellular and also, particularly in the narrower hyphae of subpellis and upper trama, consisting of rather large, clustered golden brown granules. Pileitrama regular, made up of cylindrical to fusiform elements, up to 20  $\mu\text{m}$  in diameter. Stipitipellis a cutis of narrow, cylindrical hyphae, up to 12  $\mu\text{m}$  in diameter. Clamp-connections absent.

Habitat & distribution — Widespread but uncommon, in dry and wet sclerophyll forest.

*Collections examined.* AUSTRALIA: Tasmania, Chauncy Vale, 42° 37' S, 147° 16' E, 15.IX.2005, *G. Gates E2192* & D. Ratkowsky; idem, 29.IX.2005, *G. Gates E2197* & D. Ratkowsky (holotype HO; isotype L); idem, 6.X.2005, *G. Gates E2202* & D. Ratkowsky; Kingston, 43° 00' S, 147° 18' E, 12.VI.2001, coll. J.A. Cooke, *G. Gates E1243*; idem, 15.VII.2002, coll. J.A. Cooke, *G. Gates E1693*; idem, 21.XI.2002, coll. J.A. Cooke, *G. Gates E1341*; idem, 25.V.2003, coll. J.A. Cooke, *G. Gates E1826*; Scottsdale, Cuckoo Falls Track, 41° 15' S, 147° 37' E, 28.IV.2006, *M.E. Noordeloos 2006033a* & *b*.

The distinct features of *E. maldea* are the rather firm basidiocarps with broadly umbonate, very dark brown pileus with contrastingly paler stipe. Microscopically it is easily identified by the curious pigment pattern of the pileipellis with hyphae full of dark reddish brown pigment granules, and the brown diffusely intracellular pigment of the differentiated subpellis. This peculiar character is shared with *E. chrysopus*, from which it differs in colour, smell, and in having much smaller spores. Both species apparently belong to the complex of *E. translucidum* E. Horak and *E. perzonatum* E. Horak, characterized by a nolaneoid habit, trichodermal aspect of the pileipellis with a distinct subpellis of inflated elements, and clampless hyphae. The New Zealand species lack encrusting pigment, however, and are described as having a squamulose centre to the pileus. It would be interesting to compare these Southern Hemisphere species at molecular level with species of the sect. *Fernandae*, a group of closely related species distributed in the Northern Hemisphere with a similar pigment pattern.

11. **Entoloma obscureotenax** G. Gates & Noordel., *spec. nov.* — Fig. 11, Plate 11

Pileus 20–40 mm latus obscure brunneus umbonatus hygrophanus pauce translucido-striatus glaber vel innate fibrillosus centro leviter rugulosus. Stipes 25–70 × 1–3 mm obscure brunneus politus. Caro tenax. Odore saporeque forte acidulus.

Sporae 10–13 × 8.0–10 μm 5–8-angulatae. Acies lamellarum heterogenea. Cheilocystidia 18–50 × 6–16 μm, late clavata. Pileipellis cutis elementis cylindraceis 2–7 μm latis pigmentis incrustatis constitutis. Fibulae presentes.

Holotypus: Australia, Tasmania, Marriotts Falls, 42° 43' S, 146° 39' E, 29.V.2003, *G. Gates E1834* & D. Ratkowsky (HO 543553; isotypus in L).

Etymology — *Obscureus* = dark, *tenax* = tough, horny, referring to the dark coloured basidiocarp with horny consistency.

Main characters — Basidiocarps mycenoid with a rather tough, cartilaginous context, entirely very dark brown, spores heterodiametric, cheilocystidia present, pigment encrusting, clamp-connections present.

Pileus 20–40 mm broad, conico-convex to plano-convex with small pointed umbo, with straight, finally uplifted margin, very dark red-brown to almost black (Mu. 10 YR 2/2-3, 3/2-3; 7.5 YR 3/2-4, 4/4), sometimes with olivaceous tinges, distinctly or indistinctly translucently striate for half the radius, hygrophanous from the centre out in radial streaks, finally strikingly golden yellow, dry, waxy, cracking, glabrous. Lamellae very narrowly adnate with or without decurrent tooth, ventricose, to 8 mm deep, very dark yellow-brown to red-brown (7.5 YR 3/4-2; 2.5/2), slightly paler towards edge with slightly pruinose, differently coloured, hyaline-brown edge, thickish with some intervenosing, close to subdistant, L = 26–30, l = 3–5, 2 tiers of lamellulae. Stipe

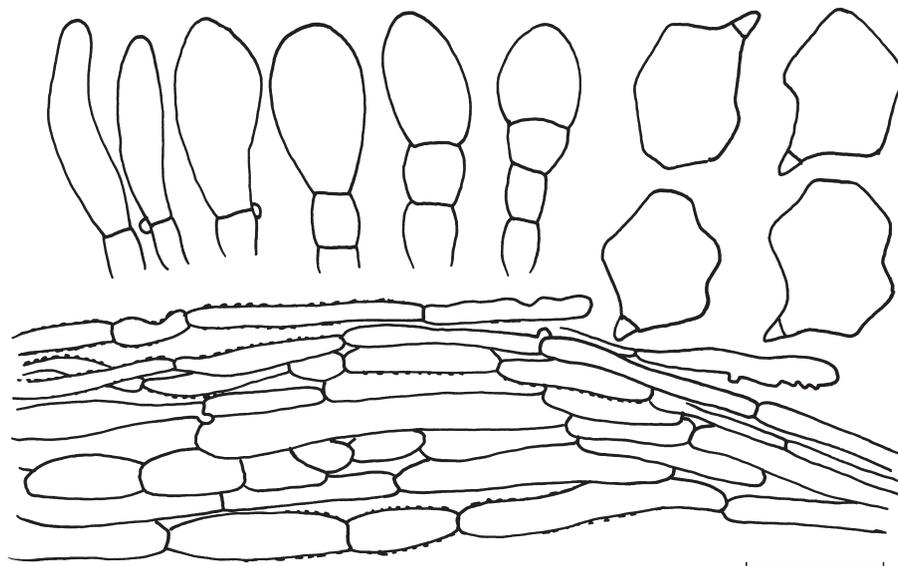


Fig. 11. *Entoloma obscureotenax*. Spores, cheilocystidia, and pileipellis. Bar = 10 μm (spores), 30 μm (cheilocystidia and pileipellis).

25–70 × 1–3 mm, cylindric, slightly broadened towards base, slender, dry, brittle, very dark red-brown, stuffed brown inner, glabrous, dull, whitish basal tomentum. Odour spermiatic. Taste sweetish, saliva producing.

Spores 10–13 × 8.0–10 μm, on average 10.5–11 × 8.7–9.2 μm, Q = 1.15–1.4, Q<sub>av</sub> = 1.2–1.25, heterodiametric, with 5–8 pronounced angles. Basidia 22–35 × 7–11 μm, 4-spored, clamped. Lamella edge sterile (in part) with dense clusters of broadly clavate cheilocystidia, 18–50 × 6–16 μm, often in chains and with refringent, often slightly thickened walls. Hymenophoral trama regular, made up of long, fusiform elements, to 220 × 7–19 μm. Pileipellis a cutis of narrow, cylindric hyphae, 2–7 μm in diameter, gradually passing into pileitrama, which is similar to hymenophoral trama. Pigment brown, parietal and encrusting in pileipellis and pileitrama. Clamp-connections present.

Habitat & distribution — Widespread in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Marriotts Falls, 42° 43' S, 146° 39' E, 13.V.2000, G. Gates E910 & D. Ratkowsky; idem, 29.V.2003, G. Gates E1834 & D. Ratkowsky (holotype HO; isotype L); Mt Field, Lady Barron Falls Walk, 42° 41' S, 146° 42' E, 1.IV.1999, G. Gates E336 & D. Ratkowsky; idem, 13.XI.1999, G. Gates E748 & D. Ratkowsky; idem, 17.IV.2004, M.E. Noordeloos 2004028.

*Entoloma obscureotenax* is well characterized by its overall dark brown-black colour of the basidiocarp, the striking hygrophanous yellowing of the pileus, and the presence of cheilocystidia. *Entoloma kerocarpus* Hauskn. & Noordel. from Europe is similar, but lacks the yellow tinges in the centre of the pileus, and has differently shaped spores and cystidia.

## 12. *Entoloma fumosopruinosum* G. Gates & Noordel., *spec. nov.* — Fig. 12, Plate 12

Pileus 15–45 mm latus obtuse conicus vel concavo-convexus expansus umbonatus hygrophanus translucido-striatus fumosus minute aerifero-pruinosis. Stipes 20–70 × 2–4 mm fumosus innate fibrillosus vel subpilosus. Odore saporeque nulis.

Sporae 10–13(–13.5) × 7.0–10 μm 6–7 vel pluriangulatae-subgibbosae. Acies lamellarum heterogeneae. Cheilocystidia 20–49(–65) × 4–12 μm versiformes lageniformia vel tibiiformia. Pileipellis cutis elementis cylindraceutis vel clavatis ad 14 μm latis pigmentis intracellulosis constitutis. Fibulae presentes.

Holotypus: Australia, Tasmania, Wielangta, 42° 42' S, 147° 51' E, 6.VI.2000, G. Gates E959 & D. Ratkowsky (HO 543551; isotypus in L).

*Etymology* — Fumosus = smoke, pruinosum = hoary, referring to the smoke grey, hoary aspect of the pileal surface.

*Main characters* — Pileus and stipe grey-brown, pileal surface not entirely smooth, but distinctly frosty to fluffy at centre, very hygrophanous; spores variably shaped, cheilocystidia present.

Pileus 15–45 mm broad, truncately conical to convex, expanding to plano-convex with low umbo or with slightly depressed centre, with involute then deflexed margin, slightly to distinctly translucently striate when moist, grey to grey-brown (Mu. 10 YR 3/5-4/4; 10 YR 5/4-6/4; K&W 4-5 E 4-2), slightly paler towards margin, hygrophanous, strongly pallescent on drying, entirely densely minutely fibrillose-frosted, becoming more pronounced when dried, centre sometimes finely fluffy-tomentose. Lamellae adnate-emarginate with decurrent tooth, segmentiform to subventricose, to 6 mm deep,

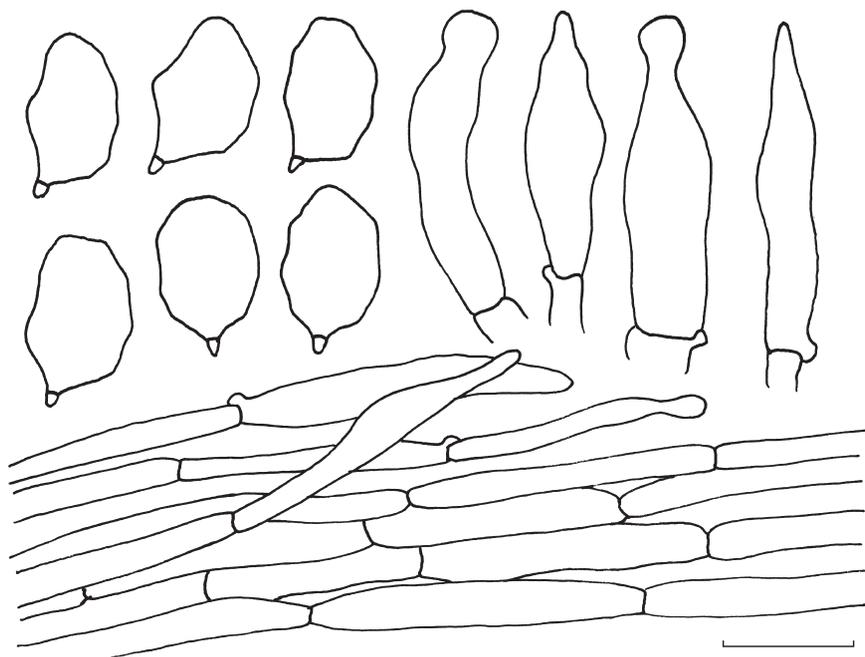


Fig. 12. *Entoloma fumosoprinosum*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

grey with pink tinge (7.5 YR 6/4), with irregular, concolorous or slightly paler edge, sometimes veined on sides, fairly distant, L = 28–36, l = 3–5. Stipe 20–70  $\times$  2–4 mm, cylindric, or sometimes laterally flattened and longitudinally grooved, broadened toward base, grey, concolorous with pileus or much paler grey-brown (10 YR 5/4–6/4 to 5/3), innately fibrillose, substrate or almost polished, dry, brittle, slender. Odour like cucumber or farinaceous. Taste like cucumber or farinaceous.

Spores 10–13(–13.5)  $\times$  7.0–10  $\mu\text{m}$ , on average 11.5–12  $\times$  8.3–9.0  $\mu\text{m}$ , Q = 1.2–1.5, many-angled (6 or 7) in side-view with rather blunt angles, thin-walled. Basidia 20–32  $\times$  7–10  $\mu\text{m}$ , 4-spored, clamped. Lamella edge heterogeneous. Cheilocystidia 20–49(–65)  $\times$  4–12  $\mu\text{m}$ , variably shaped, lageniform to tibiiform with round, attenuate or capitate apex, sometimes capitate-mucronate, thin-walled, colourless, scattered amongst basidia, but strongly protruding from hymenium. Pileipellis a rather strongly differentiated cutis of cylindric hyphae to 14  $\mu\text{m}$  in diameter with abundant free terminal elements, which may be cylindric or cystidiform, with intracellular pigment, and resembling the cheilocystidia. Pileitrama regular, made up of long, fusiform elements, 120–230  $\times$  5–20  $\mu\text{m}$ . Clamp-connections present.

Habitat & distribution — Widespread in wet sclerophyll forests and rainforests.

*Collections examined.* AUSTRALIA: Tasmania, Growling Swallet, 42° 41' S, 146° 30' E, 22.IV.2004, M.E. Noordeloos 2004069; Macgregors Peak, 42° 59' S, 147° 57' E, 11.IV.2004, M.E. Noordeloos 2004072a; Marriotts Falls, 42° 43' S, 146° 39' E, 2.VI.2001, G. Gates E1207 & D. Ratkowsky; Scottsdale, Forester Road, 41° 06' S, 147° 37' E, 29.IV.2006, M.E. Noordeloos 2006039; Wielangta, 42° 42' S, 147° 51' E, 6.VI.2000, G. Gates E959 & D. Ratkowsky (holotype HO; isotype L).

The taxonomic position of *E. fumosopruinosum* is somewhat unclear because of the combination of characters: rather strongly nodulose-angular, fairly large spores, versiform cheilocystidia and the complex structure of the pileipellis with pileocystidia that are similar to the cheilocystidia. It could therefore be placed in subg. *Inocephalus*.

13. *Entoloma brevispermus* G. Gates & Noordel., *spec. nov.* — Fig. 13, Plate 13

Pileus 15–35 mm latus conicus demum campanulatus umbonatus hygrophanus translucido-striatus fulvus expallens glaber in sicco leviter fibrillosus. Stipes 40–85 × 2.5–9 mm cylindraceus flavobrunneus politus sub lente leviter fibrillosus. Odore saporeque nullus leviter rancidus sapor farinaceus.

Sporae 6.5–9.0 × 5.5–8.5 μm irregulariter 5–6-angulatae interdum subcruciformibus. Basidia tetrasporigera efibulata. Acies lamellarum fertiles. Pileipellis cutis hyphis cylindraceis 4–11 μm latis pigmento incrustantibus formata. Fibulae absentes.

Holotypus: Australia, Tasmania, Skemps Fern Gully, 41° 18' S, 147° 22' E, 16.IV.2001, *G. Gates E1095* & *D. Ratkowsky* (HO 543555; isotypus in L).

Etymology — *Brevis* = short, *spermus* = spores, referring to the short spores.

Main characters — Pileus yellow-brown, strongly striate, very hygrophanous, lamellae whitish to pale yellow-pink, stipe subpolished to densely silvery striate.

Pileus 15–35 mm broad, conical to conico-campanulate, usually with pronounced sharp umbo, rarely more or less blunt, conico-convex or convex, with straight margin, with undulating marginal zone, distinctly translucently striate when moist, moderately dark reddish brown (K. & W. 5D4), slightly paler at margin, slightly darker on umbo, glabrous, slightly lubricous at centre when moist, radially fibrillose-lustrous when dry, hygrophanous, becoming a pale buff. Lamellae adnexed, ventricose, to 6 mm deep, flesh coloured then pink, with concolorous edge, thin, moderately crowded. Stipe 40–85 × 2.5–9 mm, cylindric, slightly broadened towards base, dry, glabrous, twisted longitudinally striate, brittle, fistulose with age, horn brown with a white pruina overall which disappears with age or upon bruising.

Spores 6.5–9.0 × 5.5–8.5 μm, on average 7.5 × 6.8 μm, Q = 1.0–1.2, very irregularly shaped, subcuboid or cruciform, 5- or 6-angled, with large, blunt angles, often

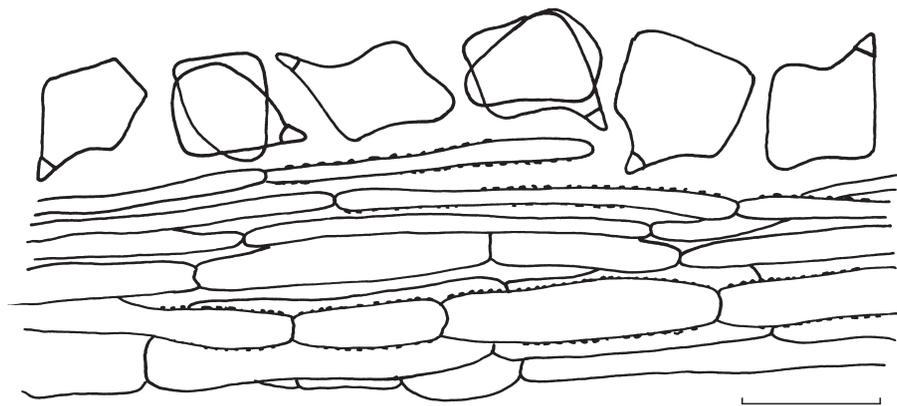


Fig. 13. *Entoloma brevispermus*. Spores and pileipellis. Bar = 10 μm (spores), 30 μm (pileipellis).

twisted along the central axis. Basidia  $24\text{--}40 \times 7\text{--}11 \mu\text{m}$ , 4-spored, clampless. Lamella edge fertile. Cystidia absent. Hymenophoral trama regular, made up of long, fusiform elements, to  $200 \times 35 \mu\text{m}$ . Pileipellis a cutis of cylindric hyphae  $4\text{--}11 \mu\text{m}$  in diameter, gradually passing into pileitrama. Pileitrama composed of fusiform elements, similar to hymenophoral trama. Pigment encrusting in pileipellis and upper pileitrama. Clamp-connections absent.

Habitat & distribution — Widespread in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Marriotts Falls,  $42^\circ 43' \text{ S}$ ,  $146^\circ 39' \text{ E}$ , 29.V.2003, *G. Gates E1835* & D. Ratkowsky; Mt Field,  $42^\circ 41' \text{ S}$ ,  $146^\circ 42' \text{ E}$ , 17.IV.2004, *M.E. Noordeloos 2004089* (CTAB108); Mt Wellington, Pillinger Drive,  $42^\circ 55' \text{ S}$ ,  $147^\circ 15' \text{ E}$ , 4.III.1999, *G. Gates E162* & D. Ratkowsky; Skemps Fern Gully,  $41^\circ 18' \text{ S}$ ,  $147^\circ 22' \text{ E}$ , 16.IV.2001, *G. Gates E1095* & D. Ratkowsky (holotype HO; isotype L); Wielangta,  $42^\circ 42' \text{ S}$ ,  $147^\circ 51' \text{ E}$ , 29.III.2001, *G. Gates E1047* & D. Ratkowsky.

This remarkable *Nolanea* has very small and rather irregularly shaped spores, which are similar to those of *E. conferendum* (Britzelm.) Noordel., but smaller and less pronouncedly cruciform. No similar taxa could be found in the literature.

#### 14. *Entoloma fibrosopileatum* G. Gates & Noordel., *spec. nov.* — Fig. 14, Plate 14

Habitus mycenoideus. Pileus  $30\text{--}45 \text{ mm}$  latus fusce brunneus translucido-striatus fibroso-minute squamulosus. Stipes  $55\text{--}70 \times 3\text{--}4 \text{ mm}$  argenteostriatus.

Spores  $(9.5\text{--})10\text{--}14 \times 7.0\text{--}9.5(\text{--}10) \mu\text{m}$  irregulariter  $5\text{--}6$ -angulatae, heterodiametrales, interdum cruciformae. Cystidia desunt. Pileipellis trichoderma elementis ad  $20 \mu\text{m}$  latis. Pigmentum intracellulare. Fibulae adsunt

Holotypus: Australia, Tasmania, Duckhole Lake Track,  $43^\circ 22' \text{ S}$ ,  $146^\circ 53' \text{ E}$ , 20.IV.2004, *M.E. Noordeloos 2004056* (HO 543558; isotypus in L).

Etymology — Fibrosus = fibrous, referring to the fibrous pileus.

Main characters — Rather stout *Nolanea* with radially fibrillose to subsquamulose pileus and rather large, complex spores.

Pileus  $30\text{--}45 \text{ mm}$  broad, conical at first, expanding to plano-convex with small umbo, with deflexed then straight margin, when moist deeply translucently striate up to  $2/3$  of the radius, dark reddish brown, slightly paler towards margin (K. & W. 7-8 F 6-5; 7 DE 5-4), very hygrophanous, becoming pallescent buff in radial streaks, rather strongly fibrillose, very minutely and darkly squamulose at centre. Lamellae adnate, deeply emarginate or adnexed to almost free, ventricose, to  $8 \text{ mm}$  deep, greyish pink with irregular, concolorous edge, rather crowded,  $L = 50\text{--}60$ ,  $l = 3\text{--}5$ . Stipe  $55\text{--}70 \times 3\text{--}4 \text{ mm}$ , cylindric, gradually broadened towards base, brittle, dry, pale brown (5D5), fluffy-scurfy with white fibrils at apex, longitudinally silvery striate, with white basal tomentum. Context thin, concolorous with surface. Odour rather indistinct, sweetish. Taste mild.

Spores  $(9.5\text{--})10\text{--}14 \times 7.0\text{--}9.5(\text{--}10) \mu\text{m}$ , on average  $11.0\text{--}12.5 \times 7.1\text{--}8.2 \mu\text{m}$ ,  $Q = 1.2\text{--}1.8$ , very pronouncedly angular, 5- or 6-angled, sometimes twisted and transient to the cruciform type. Basidia 4-spored, clamped. Lamella edge fertile. Cystidia absent. Hymenophoral trama regular, made up of short to medium-sized cylindric elements,  $60\text{--}200 \times 6\text{--}20 \mu\text{m}$ . Pileipellis a cutis of rather wide, inflated hyphae with trichodermal

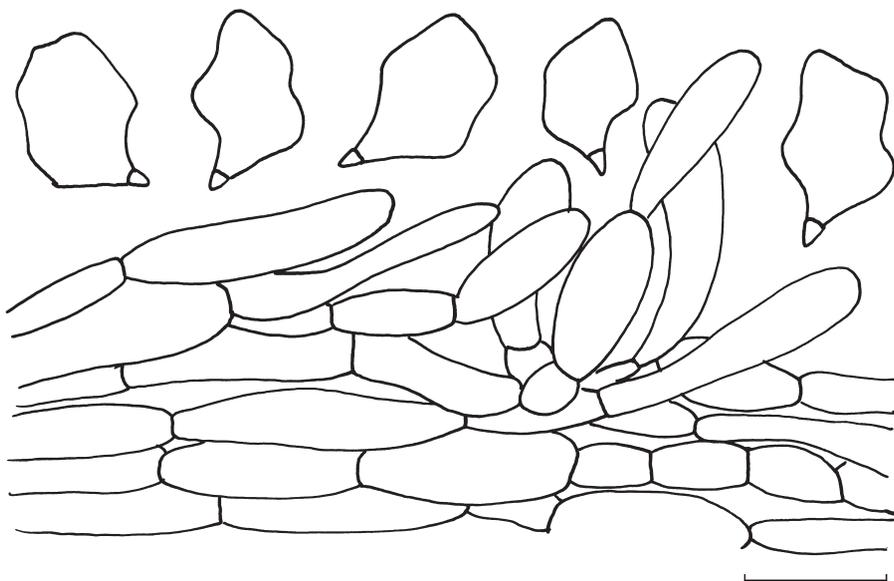


Fig. 14. *Entoloma fibrosopileatum*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

tufts of clavate, ascending elements, 40–120  $\times$  10–20  $\mu\text{m}$  with very abundant brown pigment. Pileitrama regular, similar to hymenophoral trama. Clamp-connections rare, but present.

Habitat & distribution — Widespread in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Duckhole Lake Track, 43° 22' S, 146° 53' E, 20.IV.2004, M.E. Noordeloos 2004056 (holotype HO; isotype L); Growling Swallet, 42° 41' S, 146° 30' E, 22.IV.2004, M.E. Noordeloos 2004072.

*Entoloma fibrosopileatum* is a remarkable nolaneoid species, which is transient to *Inocephalus* because of the rather strongly fibrillose, at centre often also minutely squamulose, pileus. In some aspects it is similar to *E. conferendum*, but *E. fibrosopileatum* differs in its pileipellis structure, which is more distinctly trichodermal in places, and the shape of the spores, which are irregularly 5- or 6-angled with pronounced angles, sometimes reminiscent of the cruciform type of *E. conferendum*.

15. ***Entoloma fuligineopallescens*** G. Gates & Noordel., *spec. nov.* — Fig. 15,  
Plate 15

Habitus mycenoideus. Pileus 13–23 mm latus valde hygrophanus griseobrunneus translucido-striatus toto expallens sericeo-fibrillosus interdum paulisper zonatus. Stipes 20–35  $\times$  1–3 mm brunneus vel flavo-brunneus politus.

Sporae parvae 6.0–7.0(–7.5)  $\times$  5.0–7.0  $\mu\text{m}$  isodiametrales tenuiparietales. Cystidia desunt. Pileipellis cutis hyphis cylindraceis vel inflatis 4.0–9.0  $\mu\text{m}$  latis pigmento valde incrustantibus formata fibulae presentes.

Holotypus: Australia, Tasmania, Growling Swallet, 42° 41' S, 146° 30' E, 7.VIII.2001, G. Gates E1272 & D. Ratkowsky (HO 543536; isotypus in L).

Etymology — Fuliginus = brown, pallescens = pallescent, referring to the strongly pallescent basidiocarp.

Main characters — A small very dark brown *Nolanea* with a strongly hygrophanous, sericeous pileus, polished stipe and extremely small, isodiametric spores.

Pileus 13–23 mm broad, convex with slightly elevated or slightly depressed centre, when moist translucently striate up to half the radius, dark greyish brown to sepia, strongly hygrophanous, strongly pallescent, becoming pale greyish brown upon drying, often appearing more or less concentrically zoned, glabrous, with aeriferous fibrillose surface when dry. Lamellae sinuate, ventricose, to 3.5 mm deep, brown to brown-red, paler towards entire edge. Stipe 20–35 × 1–3 mm, cylindric, slender, brittle, brown (5E4) to yellow-brown, glabrous, polished, base with white, mycelial tomentum. Context thin, concolorous with surface. Odour and taste strongly spermiac.

Spores 6.0–7.0(–7.5) × 5.0–7.0 μm, Q = 1.0–1.15, isodiametric, with 6–8 weak angles in side-view, very thin-walled. Basidia 20–30 × 4.0–9.0 μm, 4-spored, clamped. Lamella edge fertile. Hymenophoral trama regular, made up of rather long, fusiform-inflated elements, often greater than 120 × 5.0–20 μm, interspersed with narrow cylindric hyphae 2.0–6.0 μm in diameter with brown, encrusted pigment. Pileipellis a cutis of narrow, cylindric hyphae, 4.0–9.0 μm wide; subpellis of rather short, inflated hyphae, 20–60 × 5.0–12 μm. Pileitrama regular, made up of long, inflated elements. Pigment abundant, brown, parietal-encrusting in pileipellis and upper pileitrama. Clamp-connections abundant in hymenium and also seen frequently in trama.

Habitat & distribution — Widespread in wet sclerophyll forests and rainforest.

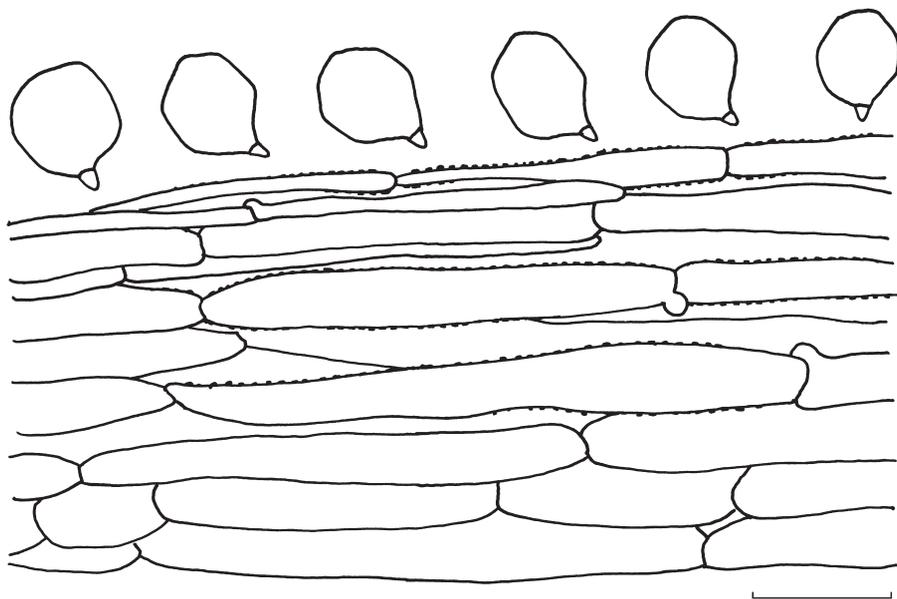


Fig. 15. *Entoloma fuligineopallescens*. Spores and pileipellis. Bar = 10 μm (spores), 30 μm (pileipellis).

*Collections examined.* AUSTRALIA: Tasmania, Arm River, 41° 42' S, 146° 12' E, 22.IX.2001, *G. Gates E1282*; Growling Swallet, 42° 41' S, 146° 30' E, 7.VIII.2001, *G. Gates E1272* & D. Ratkowsky (holotype HO; isotype L); Russell Falls, Mt Field National Park, 42° 41' S, 146° 42' E, 8.X.2002, *G. Gates E1641* & D. Ratkowsky; Silver Falls, Mt Wellington, 42° 55' S, 147° 15' E, 2.X.2001, *G. Gates E1240* & D. Ratkowsky.

*Entoloma fuligineopallescens* is distinctive because of the very small, isodiametric spores. It is a typical *Nolanea*, and may well key out in the group of *E. sericeum* and related species, also considering the shape of the pileus, which may be slightly depressed at centre, and the sinuate lamellae. These characters indicate that it is not related to the groups of *E. undatum* (Fr. ex Gillet) Moser. *Entoloma elaboratum* E. Horak from Argentina is similar, but has a pronouncedly papillate pileus and lacks clamp-connections.

### 16. *Entoloma stellatum* G. Gates & Noordel., *spec. nov.* — Fig. 16, Plate 16

Habitus mycenoideus. Pileus 10–25 mm latus campanulatus vel conicus demum convexus valde hygrophanus brunneus translucido-striatus toto expallens sericeo-fibrillosus. Stipes 30–50 × 1–3 mm pallide flavo-brunneus politus.

Sporae parvae 8.0–11 × 7.0–10 μm irregulariter cruciformibus. Cystidia lageniformia. Pileipellis cutis hyphis cylindratis vel inflatis 2–5 μm latis pigmento intracellulosa formata. Fibulae presentes.

Holotypus: Australia, Tasmania, Duckhole Lake Track, 43° 22' S, 146° 53' E, 6.VI.2002, *G. Gates E1558* & D. Ratkowsky (HO 543535; isotypus in L).

Etymology — Stella = star, referring to the star-shaped spores.

Main characters — A small mycenoid species with brown hygrophanous pileus, yellow-brown polished stipe, cruciform spores very irregularly shaped, and large cheilocystidia.

Pileus 10–25 mm broad, campanulate or conico-convex, expanding to convex or applanate, usually with acute to minutely umbonate centre, rarely truncate with slight central depression, with straight margin, when moist translucently striate up to half the radius, brown, brown-ochre (K. & W. 5C4-5), hygrophanous, pallescent on drying to silky ochraceous buff, glabrous, fibrillose-shiny when dry. Lamellae adnate with decurrent tooth, ascending, segmentiform to ventricose, to 6 mm deep, pink, becoming ochraceous pink with age, with entire, concolorous edge, moderately thick, moderately distant, with 2 tiers of lamellulae. Stipe 30–50 × 1–3 mm, cylindric, often broadened to subbulbous at base, brittle, pallid at apex, downwards yellow-brown, ochre or brown, glabrous, polished, base with white mycelial tomentum. Odour faintly spermatic. Taste slightly bitter.

Spores 8.0–11 × 7.0–10 μm, Q = 1.0–1.2, very irregularly cruciform. Basidia 20–38 × 9–11 μm, 4-spored, clamped. Lamella edge heterogeneous. Cheilocystidia scattered among basidia, 30–90 × 6–15 × 2–4 μm, lageniform, sometimes slender, sometimes with very broad basal part, with tapering neck, often ending up in a slightly broadened, spatula-like apex, sometimes with moniliform neck ending bluntly, thin-walled. Hymenophoral trama regular, made up of inflated elements, 90–120 × 9–20 μm. Pileipellis a cutis of cylindric hyphae 2–5 μm in diameter, overlaying a subpellis of rather short, inflated elements, 30–70 × 8–18 μm. Pileitrarma regular, made up of inflated elements. Pigment rather diffusely intracellular, brown. Clamp-connections rare, seen at base of basidia and in pileipellis.

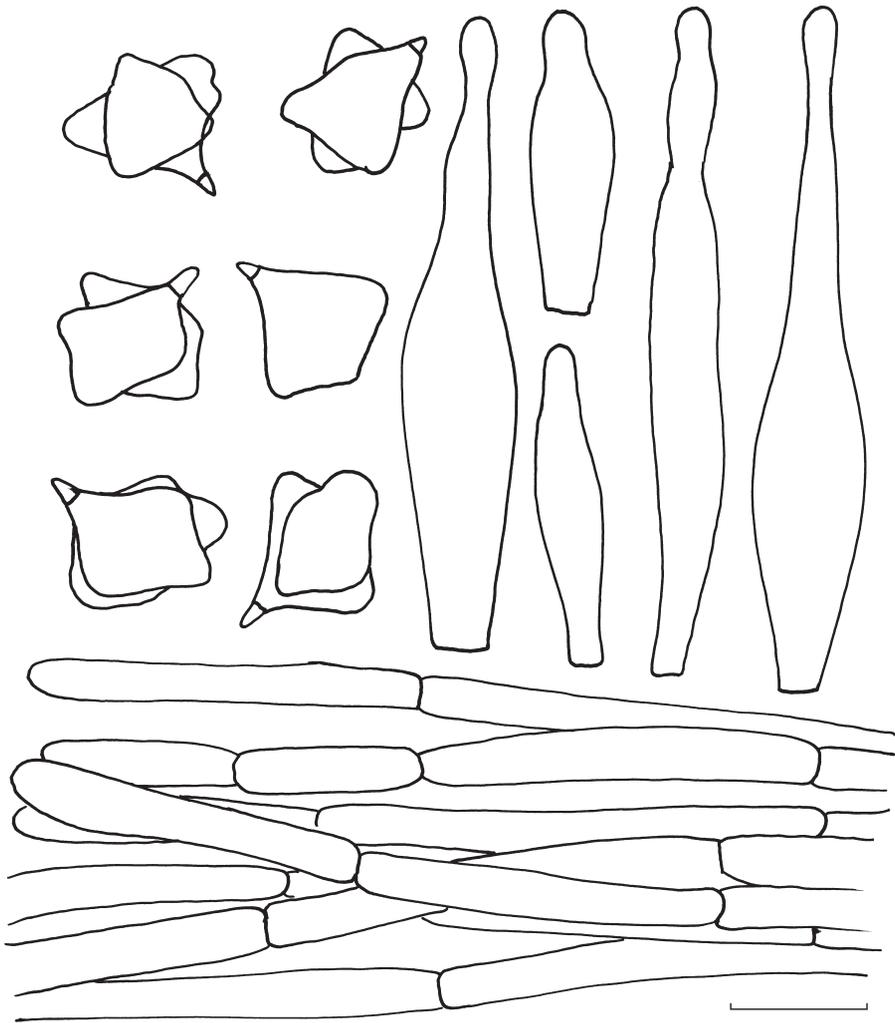


Fig. 16. *Entoloma stellatum*. Spores, cheilocystidia, and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (cheilocystidia and pileipellis).

**Habitat & distribution** — Widespread but relatively uncommon, in wet sclerophyll forests and rainforests.

**Collections examined.** AUSTRALIA: Tasmania, Creepy Crawly, 42° 50' S, 146° 22' E, 23.V.2002, *G. Gates E1529* & D. Ratkowsky; Dora Falls, 42° 58' S, 146° 55' E, 16.XII. 2004, *G. Gates E2068* & D. Ratkowsky; Duckhole Lake Track, 43° 22' S, 146° 53' E, 6.VI.2002, *G. Gates E1558* & D. Ratkowsky (holotype HO; isotype L); Echo Point to Cynthia Bay, Lake St. Clair NP, 42° 04' S, 146° 09' E, 26.III.2005, *G. Gates E2103* & D. Ratkowsky; Mt Cripps Karst Area, 41° 36' S, 145° 46' E, 24.III.2005, *G. Gates E2101* & D. Ratkowsky; Timbs Track, 42° 44' S, 146° 25' E, 8.V.2003, *G. Gates E1784* & D. Ratkowsky; Warra LTER, 43° 06' S, 146° 41' E, 27.IV.2004, *G. Gates E1978* & D. Ratkowsky; idem, 24.V.2005, *G. Gates E2172* & D. Ratkowsky.

*Entoloma stellatum* is widespread in Tasmania, but could not be named with the current literature (Horak, 1976, 1977). It resembles *E. conferendum* (Britzelm.) Noordel. on account of the rather smooth pileus and cruciform spores, but that species lacks cheilocystidia.

17. ***Entoloma lepiotoides*** G. Gates & Noordel., *spec. nov.* — Fig. 17, Plate 17

Habitus lepiotoideus. Pileus 8–25 mm latus toto rufobrunneus tomentosus demum squamulosus. Stipes 10–40 × 1–4 mm pallidus plus minusve politus.

Spores parvae 7.0–9.0 × 7.0–8.5 μm (sub)isodiametrales. Cystidia nulla. Pileipellis trichoderma elementis fusioideis 40–120 × 15–25 μm pigmento intracellulosa formata. Fibulae presentes.

Holotypus: Australia, Tasmania, Mt Field NP, 42° 41' S, 146° 42' E, 31.V.2003, G. Gates E1847 & D. Ratkowsky (HO 543534; isotypus in L).

Etymology — Resembling a *Lepiota* species.

Main characters — Basidiocarps small and soft, reminiscent of a brown *Lepiota* species, spores small, clamp-connections present.

Pileus 8–25 mm broad, conical to conico-convex with or without small umbo, expanding to plano-convex with small umbo, with deflexed then straight margin, uniformly very dark reddish brown, burnt umber or chocolate brown, not hygrophanous, not translucently striate, densely woolly-tomentose all over, often becoming cracked and more or less concentrically scaly at margin, showing the slightly paler background, centre often remaining non-squamulose, dull. Lamellae adnate with small decurrent tooth or emarginate, segmentiform to ventricose, to 6 mm deep, pale grey, almost

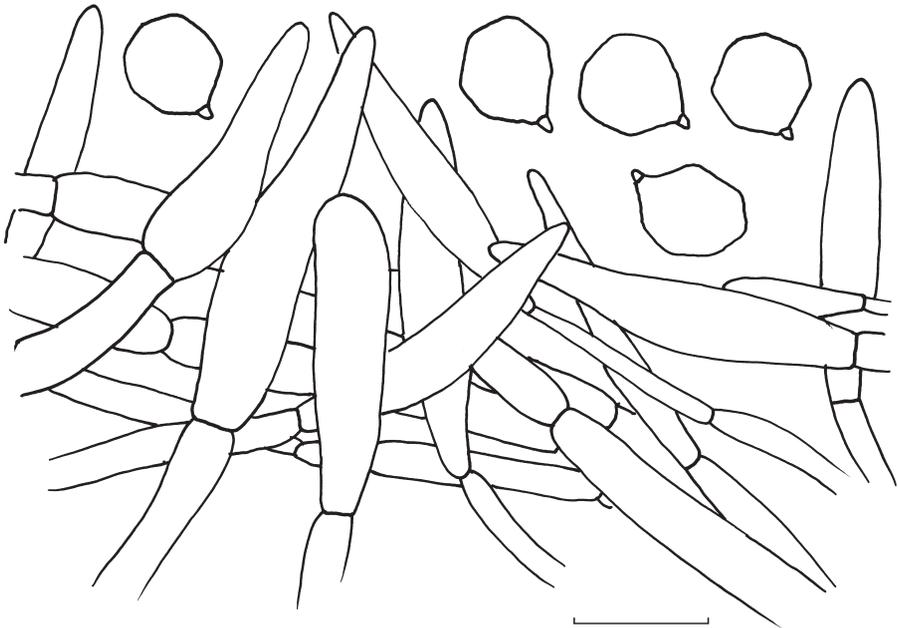


Fig. 17. *Entoloma lepiotoides*. Spores and pileipellis. Bar = 10 μm (spores), 30 μm (pileipellis).

white at first then pallid brown, with faint pink tinge and always consistently very pale, with eroded, concolorous edge, moderately thin, moderately crowded, with 2 tiers of lamellulae. Stipe 10–40 × 1–4 mm, cylindrical, curved or straight, pale grey-brown to whitish grey, contrastingly paler than pileus, glabrous or innately fibrillose, not truly polished, with white basal tomentum. Odour and taste indistinct.

Spores 7.0–9.0 × 7.0–8.5 μm, Q = 1.0–1.3, Q<sub>av</sub> = 1.2, iso- to subsodiametric, 5–7-angled in side-view. Basidia 18–32 × 7–9 μm, 4-spored, clamped. Lamella edge fertile. Cystidia absent. Hymenophoral trama regular, made up of cylindrical to inflated elements, 40–160 × 5–20 μm. Pileipellis a true trichoderm, made up of triangular bundles of fusiform to lageniform elements, 40–120 × 15–25 μm. Subpellis made up of rather short elements, 20–60 × 12–40 μm, gradually passing into pileitrama, made up of cylindrical to inflated elements, 70–200 × 12–36 μm. Pigment abundant, brown, intracellular in pileipellis. Brilliant granules present but not abundant. Clamp-connections present in hymenium and in pileipellis.

Habitat & distribution — Widespread, in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Donnellys Rd, 43° 07' S, 146° 54' E, 23.V.2000, *G. Gates E932* & D. Ratkowsky; Forester Road, Scottsdale, 41° 06' S, 147° 37' E, 29.IV.2006, *M.E. Noordeloos 2006035*; Kermadie Falls, Lower Track, 43° 12' S, 146° 52' E, 5.I.2002, *G. Gates E1386* & D. Ratkowsky; idem, 5.IV.2001, *G. Gates E1079* & D. Ratkowsky; Mt Field NP, 42° 41' S, 146° 42' E, 31.V.2003, *G. Gates E1847* & D. Ratkowsky (holotype HO; isotype L); Wielangta, 42° 42' S, 147° 51' E, 23.II.1999, *G. Gates E130* & D. Ratkowsky; idem, 3.IV.2003, *G. Gates E1674* & D. Ratkowsky.

*Entoloma lepiotoides* is a soft, delicate species with a brown, woolly then distinctly regularly squamulose pileus, resembling a *Lepiota* species. The small spores, lack of cheilocystidia, and presence of clamp-connections are distinctive. Only a few species in the literature are similar. *Entoloma pervelutinum* E. Horak from Papua New Guinea has a very dark brown, concentrically squamulose pileus, and more or less similar spores and pileipellis, but clearly differs in the dark stipe with lilac or porphyry tinges, and the presence of clavate cheilocystidia. *Entoloma vulsum* E. Horak from New Zealand is rather similar in general aspect of the basidiocarp and the small spores, differing by having a fibrillose stipe and abundant, large cheilocystidia.

### 18. *Entoloma sepiaceovelutinum* G. Gates & Noordel., *spec. nov.* — Fig. 18, Plate 18

Habitus mycenoideus vel collybioideus. Pileus 12–32 mm latus expansus haud hygrophanus haud vel paulisper translucido-striatus toto intense sepiaceus tomentosus demum squamulosus. Stipes 12–43 × 2–3 mm pallid griseobrunneus politus. Odore spermaticis.

Sporae 10–14(–15) × 7.0–9.0(–10) μm heterodiametrales 6–8-angulatae. Basidia 4-sporigera fibulata. Cheilocystidia sparsa lageniformia. Pileipellis trichoderma elementis cylindraceus vel clavatis 60–160 × 7–22 μm pigmento intracellulosa formata. Fibulae presentes raras.

Holotypus: Australia, Tasmania, Lady Barron Falls, 42° 41' S, 146° 42' E, 7.XII.2004, *G. Gates E2065* & D. Ratkowsky (HO 543533; isotypus in L).

Etymology — *Sepia* = dark brown, *velutinus* = velvety, referring to the sepia-coloured, velvety pileus.

Main characters — Habit mycenoid to collybioid, pileus very dark sepia brown, entirely velutinous, lamellae broadly adnate with decurrent tooth, stipe pallid, polished, cheilocystidia very prominent, lageniform, spores large, heterodiametric.

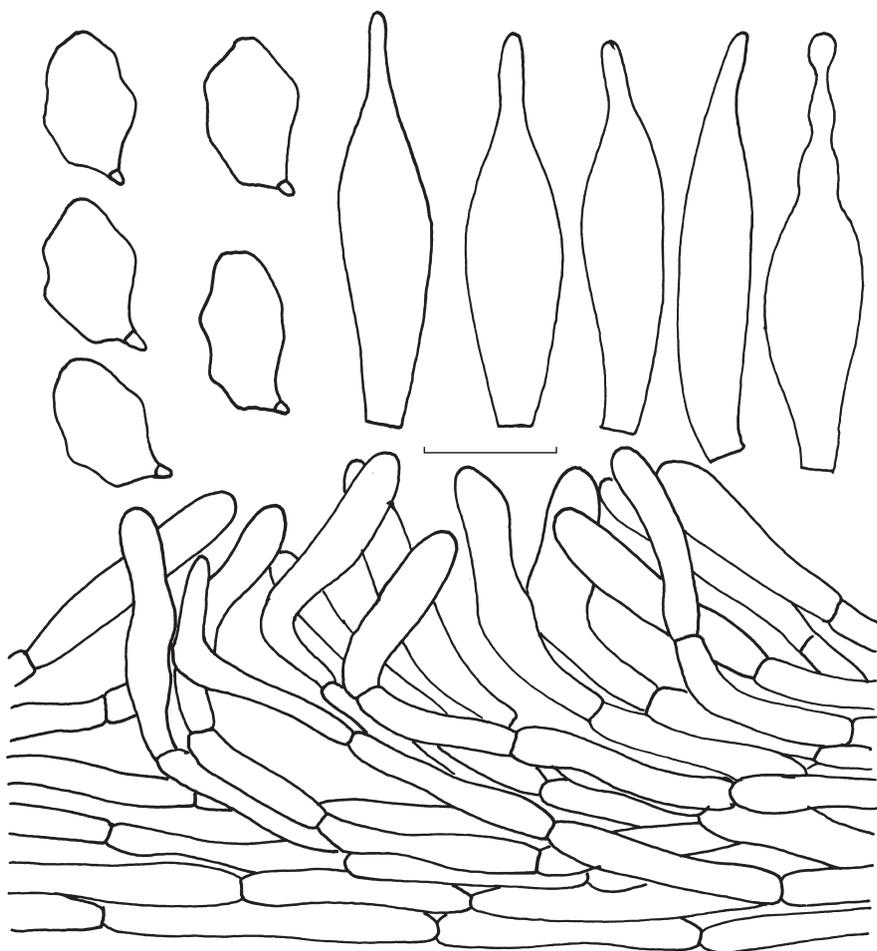


Fig. 18. *Entoloma sepiaceovelutinum*. Spores, cheilocystidia, and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (cheilocystidia and pileipellis).

Pileus 12–32 mm broad, expanded plano-convex, almost flat with deflexed to straight margin, entirely very dark sepia-brown, dry, not hygrophanous, not or indistinctly translucently striate, velutinous or breaking up in small pointed squamules at centre and imbricate scales towards margin. Lamellae broadly adnate with small decurrent tooth, segmentiform to ventricose, to 6 mm deep, pale pinkish brown with concolorous edge, with 2 tiers of lamellulae. Stipe 12–43  $\times$  2–3 mm, cylindric, straight, pale grey-brown (K. & W. 5D3), glabrous, polished, with white basal tomentum. Odour spermatic. Taste slightly saliva inducing.

Spores 10–14(–15)  $\times$  7.0–9.0(–10)  $\mu\text{m}$ , heterodiametric with 6–8, pronounced, rounded angles. Basidia 24–40  $\times$  9–14  $\mu\text{m}$ , 4-spored, clamped. Lamella edge heterogeneous. Cheilocystidia scattered, long, protruding from hymenium, lageniform with gradually tapering neck or with moniliform neck and slightly widened, blunt apex.

Hymenophoral trama regular, made up of cylindric to inflated elements, 50–190 × 6–23  $\mu\text{m}$ . Pileipellis a cutis with transition to a trichoderm, particularly at centre, made up of long, cylindric to clavate terminal elements, 30–70 × 6–20  $\mu\text{m}$ . Pileitrama regular, made up of cylindric to slightly inflated elements, 60–160 × 7–22  $\mu\text{m}$ . Pigment brown, intracellular in pileipellis. Brilliant granules absent. Clamp-connections very rare, only seen in hymenium at base of basidia.

Habitat & distribution — Rare, in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Growing Swallet, 42° 41' S, 146° 30' E, 12.III.2005, G. Gates E2091 & D. Ratkowsky; Lady Barron Falls, 42° 41' S, 146° 42' E, 7.XII. 2004, G. Gates E2065 & D. Ratkowsky (holotype HO; isotype L).

*Entoloma sepiaceovelutinus* superficially resembles *E. lepiotoides*, but differs strikingly by the much larger spores and presence of large cheilocystidia. It seems to fit in subg. *Trichopilus* on account of the type of covering of the pileus, and the presence of large cheilocystidia. *Entoloma corneum* E. Horak from New Zealand is much smaller, with a translucently striate pileus, less distinctly angled spores, and clampless basidia.

### III. LEPTONIOID TAXA

#### 19. *Entoloma austroprunicolor* G. Gates & Noordel., *spec. nov.* — Fig. 19, Plate 19

Pileus 10–50 mm latus convexus demum expansus interdum umbonatus obscure coeruleo-violaceus interdum roseo-tinctus fibrilloso-velutinus demum minute squamulosus. Stipes 30–75 × 2–6 mm initio albus demum pallide griseo tinctus glabrus pseudopolitus vel leviter fibrillosus.

Sporae 10–13(–16) × 6.5–9.0(–10)  $\mu\text{m}$ . Acies lamellarum sterilis. Cheilocystidia 20–30 × 5–9  $\mu\text{m}$  cylindracea vel clavata. Pileipellis trichoderma elementis usque ad 20  $\mu\text{m}$  latis pigmentis intracellularis. Fibulae absentes.

Holotypus: Australia, Tasmania, Kermadie Falls Lower Track, 43° 12' S, 146° 52' E, 5.I.2002, G. Gates E1389 & D. Ratkowsky (HO 543543; isotypus in L).

Etymology — Austro = southern, prunicolor = plum-coloured.

Main characters — Pileus reddish purple, fibrillose-velutinous then minutely squamulose all over, strongly contrasting with the pallid, almost white, glabrous or innately fibrillose stipe, spores large, cheilocystidia present, clamp-connections absent.

Pileus 10–50 mm broad, hemispheric to convex, expanding with age, often with slight umbo, margin deflexed, dark blue to purple-blue at first (K. & W. 21E4), then with reddish purple tinges, purplish grey or pinkish purple-grey (13E3), not hygrophorous, not translucently striate, entirely fibrillose-velutinous at first, breaking up in small radially arranged fibrillose squamules. Lamellae adnate, segmentiform, to 6 mm deep, white then pale pink with entire, concolorous edge, moderately thick, rather crowded. Stipe 30–75 × 2–6 mm, cylindric with slight broadening at base, dry, brittle, fistulose with age, white or pale grey-violet, glabrous, innately fibrillose. Context purple in cortex of pileus, white in stipe and inner parts of pileus. Odour not distinctive. Taste usually none but sometimes slightly radish or peppery.

Spores 10–13(–16) × 6.5–9.0(–10)  $\mu\text{m}$ , Q = 1.3–1.8, Q<sub>av</sub> = 1.50, heterodiametric, 6–8-angled in side-view with pronounced angles. Basidia 33–40 × 9–14  $\mu\text{m}$ , 4-spored, clampless. Lamella edge heterogeneous. Cheilocystidia 20–30 × 5–9  $\mu\text{m}$ , irregularly cylindric, narrowly clavate or lageniform, rather thin-walled and inconspicuous.

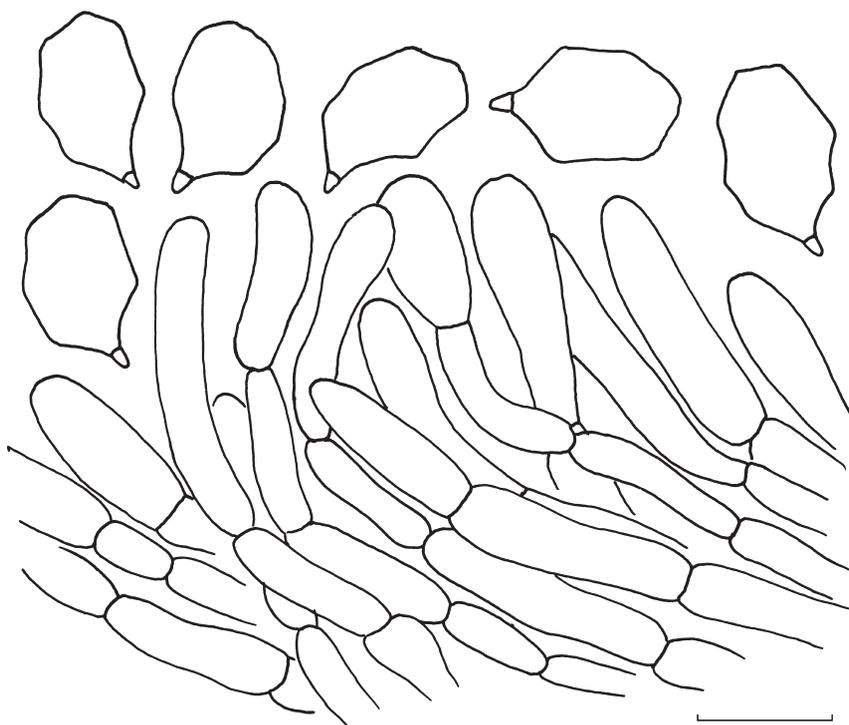


Fig. 19. *Entoloma austroprunicolor*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

Pileipellis a cutis with transitions to a trichoderm, made up of cylindric to inflated hyphae to 20  $\mu\text{m}$  in diameter, with clavate terminal elements of 40–125  $\times$  11–25  $\mu\text{m}$ . Pileitrama regular, consisting of rather narrow cylindric hyphae 4.5–9  $\mu\text{m}$  in diameter with very abundant brilliant granules. Pigment purple brown, diffusely intracellular and in the form of agglutinated granules. Stipitipellis a cutis of loosely arranged, cylindric hyphae, 2.0–7.0  $\mu\text{m}$  in diameter. Caulocystidia absent. Clamp-connections absent.

Habitat & distribution — Widespread and common in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Arve River Streamside Reserve, 43° 08' S, 146° 46' E, 22.XII.2001, *G. Gates E1375* & D. Ratkowsky; Kermadie Falls Lower Track, 43° 12' S, 146° 52' E, 5.I.2002, *G. Gates E1389* & D. Ratkowsky (holotype HO; isotype L); Mt Wellington, Myrtle Gully, 42° 54' S, 147° 15' E, 11.II.1999, *G. Gates E118* & D. Ratkowsky.

*Entoloma austroprunicolor* represents a species of subg. *Leptonia*, sect. *Cyanula*, because of the general stature of the basidiocarp, clampless hyphae, and abundant brilliant granules. It has some similarity with *Entoloma queletii* (Boud.) Noordel., which has a differently coloured pinkish vinaceous pileus tending to ochre when old, and a white, fibrillose stipe. Also the spore size fits, but the European species has well differentiated cheilocystidia on a sterile lamella edge. In Largent (1994) it fits sect. *Albidicaules*, but none of the North American species matches ours. In Horak (1980) it keys out near *E. puroides* E. Horak, which, however, has completely different characters.

20. **Entoloma austroroseum** G. Gates & Noordel., *spec. nov.* — Fig. 20, Plate 20

Pileus 10–26 mm latus convexus demum expansus leviter umbilicatus margine inflexus haud vel paulisper translucido-striatus intense roseus centro obscurior glaber vel centro minute squamulosus. Stipes 11–20 × 1.5–3 mm pileo concolorus glabrus politus.

Sporae 7.5–10 × 6.0–8.0 μm 5–7-angulatae heterodiametricae. Acies lamellarum fertiles. Cheilocystidia absentes. Pileipellis cutis vel trichoderma elementis latis pigmentis intracellulosis. Fibulae absentes.

Holotypus: Australia, Tasmania, Myrtle Forest, 42° 52' S, 147° 09' E, 19.IV.2001, G. Gates E1101 & D. Ratkowsky (HO 543542; isotypus in L).

Etymology — Austro = southern, roseum = pink.

Main characters — Habit collybioid, delicate pink colour, spores to 10 μm long.

Pileus 10–26 mm broad, shallowly convex (to 3 mm high) to plano-convex with slight umbilicus, margin straight and entire, not hygrophanous, faintly translucently striate, deep pink (K. & W. 11B5) with darker centre (11B7), entirely finely squamulose. Lamellae adnate with small decurrent tooth, ventricose, to 3 mm deep, whitish or pale pink, sometimes with a pink edge, moderately thin, moderately crowded. Stipe 11–20 × 1.5–3 mm, cylindric, pale pink, dry, polished, with white basal tomentum. Odour spermatic. Taste sweetish.

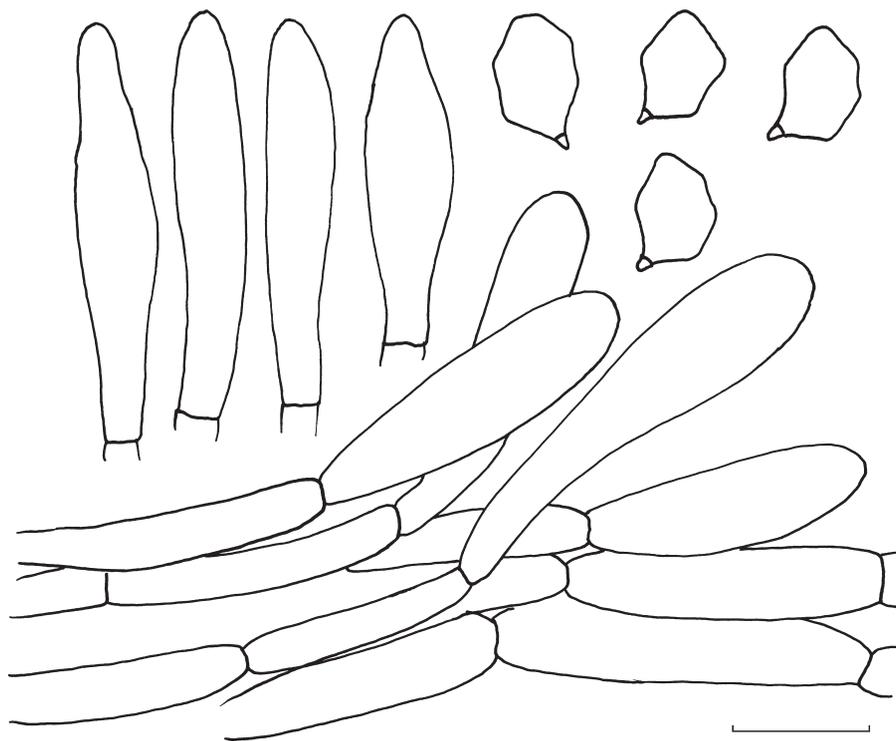


Fig. 20. *Entoloma austroroseum*. Spores, cheilocystidia, and pileipellis. Bar = 10 μm (spores), 30 μm (cheilocystidia and pileipellis).

Spores  $7.5\text{--}10 \times 6.0\text{--}8.0 \mu\text{m}$ , on average  $8.5\text{--}9.3 \times 6.1\text{--}7.3 \mu\text{m}$ ,  $Q = 1.2\text{--}1.6$ , heterodiametric, 5–7-angled in side-view. Basidia  $32\text{--}55(\text{--}65) \times 6\text{--}12(\text{--}15) \mu\text{m}$ , slender, with long stalk, 4-spored, clampless. Lamella edge fertile. Cheilocystidia clavate with no obvious pigment. Hymenophoral trama regular, made up of cylindrical elements,  $60\text{--}100 \times 5\text{--}9 \mu\text{m}$  with abundant brilliant granules. Pileipellis a trichoderm to a hymeniderm at centre, consisting of cylindrical to clavate terminal elements,  $30\text{--}70 \times 8\text{--}23 \mu\text{m}$ , with abundant pink intracellular pigment. Pileitrama regular, made up of cylindrical hyphae,  $7\text{--}24 \mu\text{m}$  in diameter. Brilliant granules abundant. Clamp-connections absent.

Habitat & distribution — Known only from the type locality, a gully within a wet sclerophyll forest.

*Collections examined.* AUSTRALIA: Tasmania, Myrtle Forest  $42^\circ 52' \text{S}$ ,  $147^\circ 09' \text{E}$ , 18.III.1999, G. Gates E239 & D. Ratkowsky; idem, 19.IV.2001, G. Gates E1101 & D. Ratkowsky (holotype L; isotype HO).

*Entoloma austroroseum* is very similar to *E. roseum* (Longyear) Hesler from the Northern Hemisphere, but the cheilocystidia are differently shaped. No similar species is described in the works of Horak (1973, 1980) from Australasia and New Zealand.

## 21. *Entoloma carminicolor* G. Gates & Noordel., *spec. nov.* — Fig. 21, Plate 21

Pileus 12–20 mm latus convexus demum expansus umbilicatus margine inflexus obscure rufo-carmineus minute squamulosus. Lamellae adnexae roseae rufo margine fimbriato. Stipes 30–35 × 3–5 mm pileo concolorus glabrus politus.

Sporae  $7.5\text{--}10 \times (5\text{--})5.5\text{--}7(\text{--}7.5) \mu\text{m}$  5–7-angulatae heterodiametricae. Acies lamellarum sterilis. Cheilocystidia  $20\text{--}43 \times 8\text{--}14 \mu\text{m}$  cylindracea vel clavata. Pileipellis cutis vel trichoderma elementis latis pigmentis intracellulosis. Fibulae absentes.

Holotypus: Australia, Tasmania, Donnellys Road,  $43^\circ 07' \text{S}$ ,  $146^\circ 54' \text{E}$ , 3.IV.1999, G. Gates E354 & D. Ratkowsky (HO 543541; isotypus in L).

Etymology — Carmine-coloured.

Main characters — Basidiocarps deep carmine-red, small-spored, with sterile lamella edge.

Pileus 12–20 mm broad, 3–4 mm high, plano-convex with umbilicate centre, with deflexed margin, uniformly deep carmine-red to ruby-pink (K. & W. 12F6), not hygrophanous, not translucently striate, dry, finely squamulose in umbilicus only. Lamellae adnate with decurrent tooth, segmentiform, narrow, to 3 mm deep, grey-pink with carmine-red flocculose edge. Stipe 30–35 × 3–5 mm, cylindrical, or laterally flattened and longitudinally grooved, paler than pileus but with similar carmine colour, glabrous, dry, brittle, polished, base with white tomentum. Odour spermatic. Taste sweetish, saliva inducing.

Spores  $7.5\text{--}10 \times (5.0\text{--})5.5\text{--}7(\text{--}7.5) \mu\text{m}$ , on average  $8.5\text{--}9.3 \times 6.1\text{--}6.5 \mu\text{m}$ ,  $Q = 1.2\text{--}1.6$ , usually 5–7-angled in side-view with pronounced angles. Basidia  $22\text{--}34 \times 8\text{--}11 \mu\text{m}$ , 4-spored, clampless. Lamella edge entirely sterile, of the *E. serrulatum*-type, composed of a dense strand of hyphae running along the edge with, at irregular intervals, dense bundles of clavate, cylindrical, or lageniform cheilocystidia  $20\text{--}43 \times 8\text{--}14 \mu\text{m}$ , thin-walled, except for the apical part, which is slightly thickened and refringent, with

(text continued on p. 205)



Plate 1. *Entoloma cretaceum*.



Plate 2. *Entoloma albomagnum*.



Plate 3. *Entoloma manganaensis*.



Plate 4. *Entoloma indigoticoumbrinum*.



Plate 5. *Entoloma kermantii*.



Plate 6. *Entoloma coeruleomagnum*.





Plate 7. *Entoloma coeruleogracilis*.



Plate 8. *Entoloma contrastans*.





Plate 9. *Entoloma chrysopus*.



Plate 10. *Entoloma maldea*.



Plate 11. *Entoloma obscuretenax*.



Plate 12. *Entoloma fumosopruinosum*.



Plate 13. *Entoloma brevispermus*.



Plate 14. *Entoloma fibrosopileatum*.



Plate 15. *Entoloma fuligineopallesces*.



Plate 16. *Entoloma stellatum*.



Plate 17. *Entoloma lepiotoides*.



Plate 18. *Entoloma sepiaceovelutinum*.



Plate 19. *Entoloma austroprunicolor*.



Plate 20. *Entoloma austroroseum*.



Plate 21. *Entoloma carminicolor*.



Plate 22. *Entoloma obscureovirens*.



Plate 23. *Entoloma albidosimulans*.



Plate 24. *Entoloma roseoluteolum*.



Plate 25. *Entoloma aurantiolabes*.



Plate 26. *Entoloma rufobasis*.



Plate 27. *Entoloma stramineopallens*.



Plate 28. *Entoloma albidocoeruleum*.



Plate 29. *Entoloma tomentosolilacinum*.



Plate 30. *Entoloma camarophyllus*.



Plate 31. *Entoloma austrorhodocalyx*.



Plate 32. *Entoloma percrinitum*.



Plate 33. *Entoloma choanomorphum*.

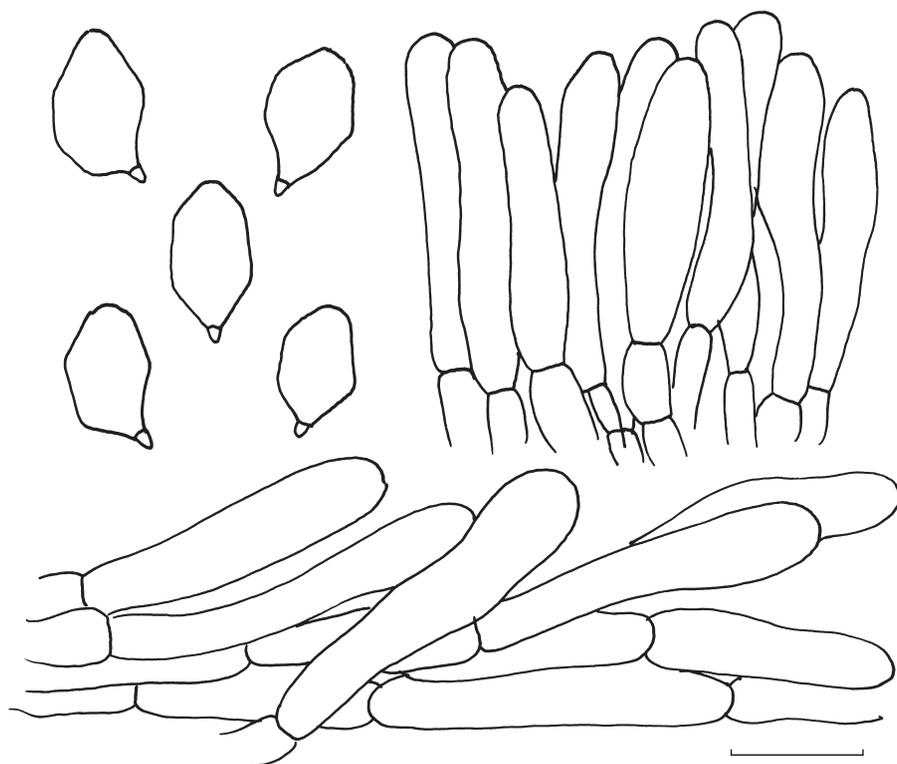


Fig. 21. *Entoloma carminicolor*. Spores, cheilocystidia and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (cheilocystidia and pileipellis).

granulose, pale carmine, intracellular pigment. Hymenophoral trama regular, made up of cylindric elements, 60–120  $\times$  5–15  $\mu\text{m}$ , often with some pale brownish intracellular pigment. Pileipellis a cutis with transitions to a trichoderm, made up of repent, cylindric hyphae, 4–14  $\mu\text{m}$  in diameter, with (sub)clavate terminal elements, 34–70  $\times$  5–16  $\mu\text{m}$ . Pigment pinkish red, intracellular in pileipellis and upper pileitrama. Brilliant granules present in trama. Clamp-connections absent.

Habitat & distribution — Known only from a single site, a wet sclerophyll forest/ woodland near Geeveston, Tasmania.

*Collections examined.* AUSTRALIA: Tasmania, Donnellys Road, 43° 07' S, 146° 54' E, 3.IV.1999, G. Gates E354 & D. Ratkowsky (holotype HO; isotype L); idem, 30.V.2001, G. Gates E930 & D. Ratkowsky.

*Entoloma carminicolor* is a characteristic species with its deep carmine-red basidiocarps and flocculose (in part), coloured lamella edge. Similar species from other regions are *E. puroides* E. Horak, described from Papua New Guinea, with a smooth pileus and brown lamella edge, and the European *E. rufocarneum* (Berk.) Noordel., which differs among other things by having larger spores, and a concolorous, fertile lamella edge.

22. **Entoloma obscureovirens** G. Gates & Noordel., *spec. nov.* — Fig. 22, Plate 22

Pileus 20–48 mm latus convexus demum expansus umbilicatus margine inflexus obscure griseobrunneus vel griseoater interdum virido tinctus centro velutino demum squamuloso versus margine virgatus. Lamellae roseae griseo-tinctae margine fimbriato. Stipes 30–60 × 3–10 mm pileo griseovirens fibrillosus.

Sporae 8.5–12 × 6.0–8.0  $\mu\text{m}$  6-angulatae heterodiametricae. Acies lamellarum steriles. Cheilocystidia 40–85 × 9–20  $\mu\text{m}$  cylindracea vel clavata. Pileipellis cutis vel trichoderma elementis 45–90 × 11–22  $\mu\text{m}$  pigmentis intracellulosis. Fibulae absentes.

Holotypus: Australia, Tasmania, Wielangta, 42° 42' S, 147° 51' E, 5.V.2005, G. Gates E2157 & D. Ratkowsky (HO 543540; isotypus in L).

Etymology — Obscureus = dark, virens = becoming green.

Main characters — A rather stout, dark coloured *Leptonia* with opaque, virgate, grey-brown pileus, greenish grey, fibrillose stipe, and soapy-acrid taste.

Pileus 20–48 mm broad, plano-convex when young, becoming applanate with age with a slightly depressed centre, with straight margin, uniformly very dark charcoal-grey or grey-brown, often with green hue when young, becoming grey-brown with brownish grey centre when old, not hygrophanous, not translucently striate, radially virgate-fibrillose with velutinous then minutely squamulose centre, becoming somewhat paler with age (K. & W. 5E6). Lamellae adnexed to free, segmentiform, to 9.5 mm deep, flesh-coloured pink with grey tinge, becoming yellowish with age, thin, crowded, with 2 tiers of lamellulae. Stipe 30–60 × 3–10 mm, cylindric or slightly broadened towards base, or laterally compressed with longitudinal groove, dry, stuffed or fistulose, grey-green (K. & W. 1D3-2), often bright yellow at base, usually rather strongly longitudinally fibrillose with loose fibrils, base whitely tomentose. Odour indistinct. Taste rancid, soapy, burning.

Spores 8.5–11 × 6.0–8.0  $\mu\text{m}$ , Q = 1.2–1.7, heterodiametric with (5 or) 6 or 7 (or 8) angles in side-view. Basidia 20–40 × 8.0–12  $\mu\text{m}$ , 4-spored, clampless. Lamella edge sterile, composed of dense clusters of cylindric to clavate or fusiform cheilocystidia, 40–85 × 9–20  $\mu\text{m}$ , thin-walled, originating from a dense band of hyphae running along the lamella edge. Hymenophoral trama regular, made up of cylindric hyphae, 4–20  $\mu\text{m}$  in diameter, with brilliant granules. Pileipellis a cutis with transitions to a trichoderm, made up of clavate terminal elements, 45–90 × 11–22  $\mu\text{m}$  with abundant, brown, intracellular pigment. Pileitrama regular, made up of cylindric to slightly inflated hyphae, to 30  $\mu\text{m}$  in diameter, with brilliant granules and scattered vascular hyphae. Stipitipellis a cutis with transitions to a trichoderm, made up of clavate to fusiform terminal elements (caulocystidia), 30–80 × 6.0–19  $\mu\text{m}$ , with dark grey-brown, intracellular pigment. Clamp-connections absent.

Habitat & distribution — Relatively rare, known only from wet sclerophyll forests in south-eastern Tasmania.

*Collections examined.* AUSTRALIA: Tasmania, Wielangta, 42° 42' S, 147° 51' E, 23.II.1999, G. Gates E132 & D. Ratkowsky; idem, 20.III.1999, G. Gates E268 & D. Ratkowsky; idem, 15.I.2002, G. Gates E1399 & D. Ratkowsky; idem, 5.V.2005, G. Gates E2157 & D. Ratkowsky (holotype HO; isotype L); idem, 23.XI. 2005, G. Gates E1022 & D. Ratkowsky.

*Entoloma obscureovirens* has been observed at the type locality for many years, and its variability is therefore well known. The stout habit, dark pileus, greenish stipe and hot burning taste are distinctive. It belongs to sect. *Cyanula*, and keys out near the

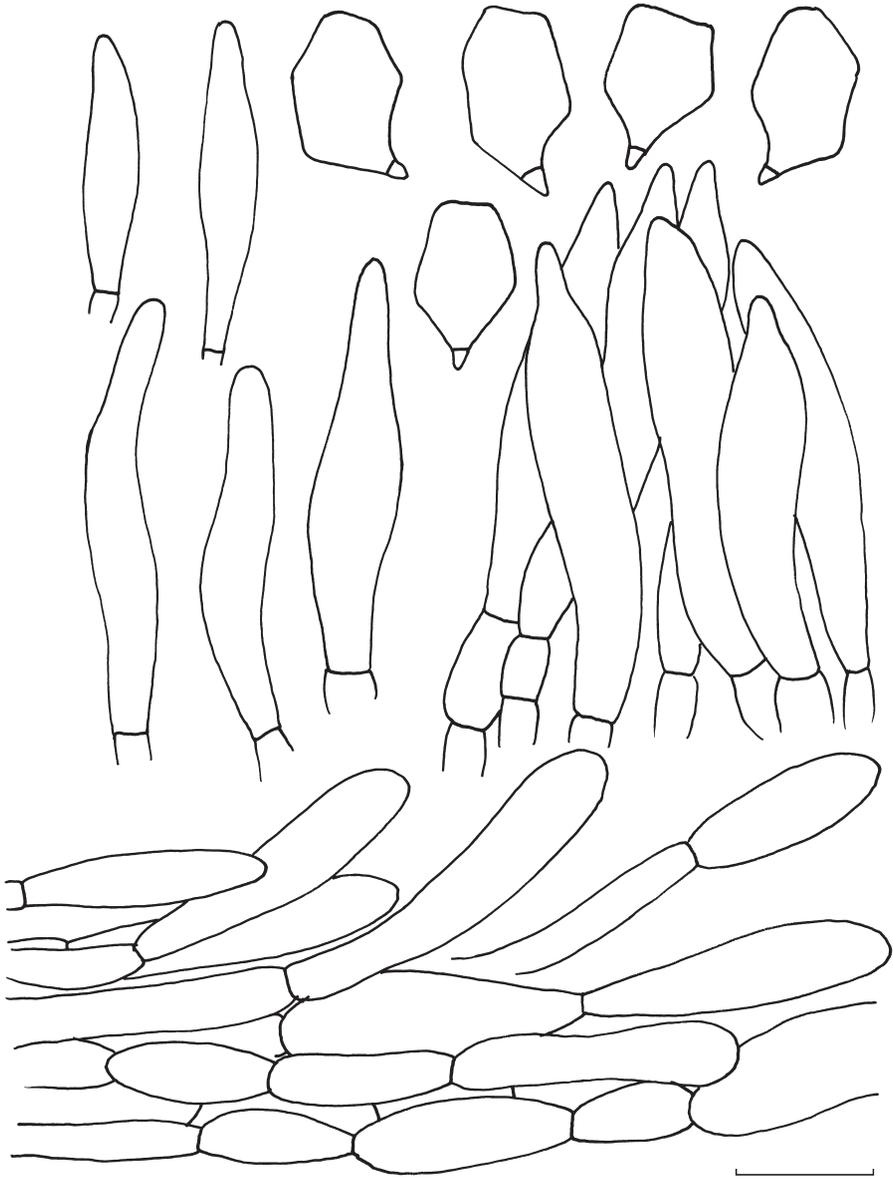


Fig. 22. *Entoloma obscureovirens*. Spores, cheilocystidia, caulocystidia, and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (cheilocystidia, caulocystidia, and pileipellis).

European species *E. griseoviridulum* Courtec. (Noordeloos, 2005), which differs in having a less fibrillose, slightly differently coloured stipe and an *E. serrulatum*-type structure of the lamella edge. No similar species could be found in the works of Horak (1973, 1978, 1980).

23. **Entoloma albidosimulans** G. Gates & Noordeloos, *spec. nov.* — Fig. 23, Plate 23

Habitus collybioideus. Pileus 10–35 mm latus albus tomentosus. Stipes 20–30 × 2–3 mm albus politus.

Sporae 8.5–11 × 7.0–8.5  $\mu\text{m}$  6–7-angulatae. Acies lamellarum sterilis. Cheilocystidia 20–50 × 5.0–9.5  $\mu\text{m}$  cylindracea vel clavata. Pileipellis trichodermalis elementis 4.0–14  $\mu\text{m}$  latis elementis terminalis ad 20  $\mu\text{m}$  latis, epigmentatis. Fibulae adsunt.

Holotypus: Australia, Tasmania, Growing Swallet, 42° 41' S, 146° 30' E, 22.IV.2004, *M.E. Noordeloos 2004065* (CTAB145) (HO 543556; isotypus in L).

Etymology — *Albidus* = whitish, *simulans* = resembling, referring to the likeness with *Entoloma sericellum*.

Main characters — A small, white collybioid species, resembling *E. sericellum* (Fr.) P. Kumm. with 6- or 7-angled spores and a sterile lamella edge.

Pileus 10–35 mm broad, convex, becoming applanate with age, with or without slight central depression, with deflexed then straight margin, pure white when fresh, slowly changing to pale yellow-ochre or pink with age (Mu. 10 YR 8/4, K. & W. 4A2-3), not hygrophanous, not translucently striate, finely tomentose all over, becoming radially fibrillose with age. Lamellae adnate, often slightly to distinctly emarginate with distinct decurrent tooth, segmentiform to ventricose, to 6 mm deep, white then pink, with entire or slightly fimbriate, concolorous edge, moderately distant, L = 40, l = 3–7.

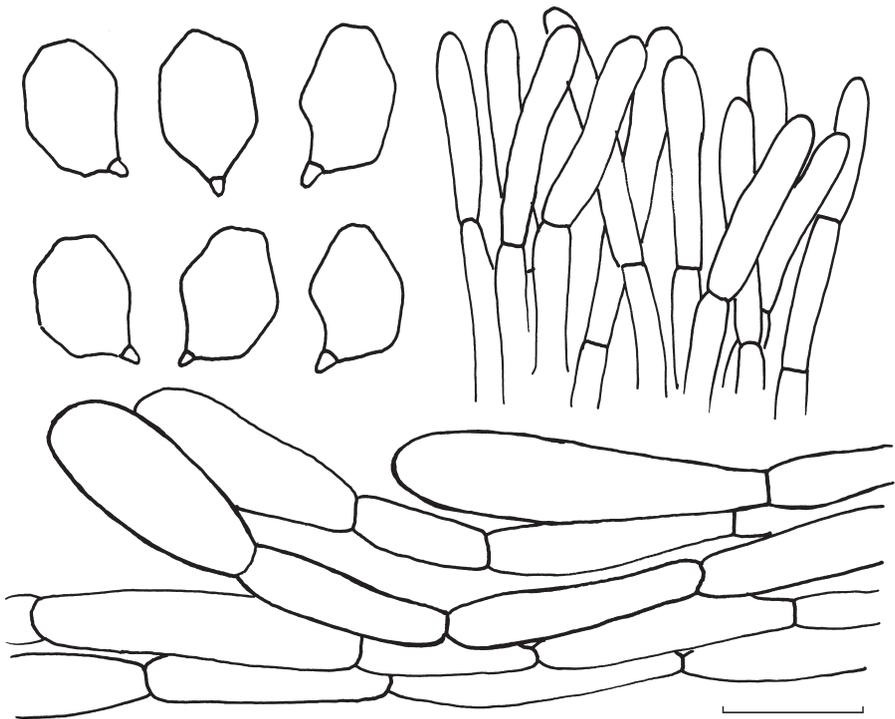


Fig. 23. *Entoloma albidosimulans*. Spores, cheilocystidia, and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (cheilocystidia and pileipellis).

Stipe 20–30 × 2–3 mm, cylindrical, often distinctly broadened towards base, white to yellowish, innately fibrillose appearing almost smooth and polished, glabrous. Odour indistinct or pleasant (a typical *Leptonia* smell). Taste mild.

Spores 8.5–11 × 7.0–8.5  $\mu\text{m}$ , on average 10.0–10.6 × 7.5–7.7  $\mu\text{m}$ , 6- or 7-angled with rather simple angles. Basidia 18–30 × 7.0–11  $\mu\text{m}$ , 4-spored, clampless. Lamella edge sterile, with dense clusters of fusiform, lageniform, cylindrical to narrowly clavate cheilocystidia, 20–50 × 5.0–9.5  $\mu\text{m}$ , rarely interspersed with scattered basidia. Brilliant granules not observed or sparse. Pileipellis a cutis with transitions to a trichoderm, made up of cylindrical hyphae, 4.0–14  $\mu\text{m}$  in diameter, with clavate terminal elements, to 20  $\mu\text{m}$  in diameter. Pigment absent. Clamp-connections absent or very rarely present in hymenium.

Habitat & distribution — Widespread, in wet sclerophyll forests and rainforests.

*Collections examined.* AUSTRALIA: Tasmania, Growling Swallet, 42° 41' S, 146° 30' E, 22.IV.2004, M.E. Noordeloos 2004065 (CTAB145) (holotype HO; isotype L); Mt Field NP, 42° 41' S, 146° 42' E, 31.V.2003, G. Gates E1848 & D. Ratkowsky; Scottsdale, Forester Road, 41° 06' S, 147° 37' E, 29.IV.2006, M.E. Noordeloos 2006034.

The present species was identified as *E. sericellum* in the field, because of the general colour and habit of the basidiocarps. Microscopically, however, there are quite striking differences, particularly with regard to the sterile lamella edge and clampless hyphae. Also, molecular data show that it has a distant position with regard to *E. sericellum*. No similar species could be traced in the literature. The papers of Horak (1973, 1980) lead to *E. niveum* G. Stev. from New Zealand, which differs strikingly in the fibrillose, translucently striate pileus, smaller and narrower spores, capitate cheilocystidia, and encrusting pigment in the pileipellis. *Entoloma peralbidum* E. Horak has abundant clamp-connections, encrusting pigment, and somewhat more slender spores. *Entoloma parasericellum* Corner & E. Horak from Sabah has larger spores, a simple cutis-like pileipellis, and very long, cylindrical cheilocystidia.

#### 24. *Entoloma roseoluteolum* G. Gates & Noordel., *spec. nov.* — Fig. 24, Plate 24

Habitus collybioideus. Pileus 25–35 mm latus roseus leviter violaceo-tinctus leviter translucido-striatus radialiter romoso-fibrillosus centro squamulosus. Stipes 60–65 × 4.0–5.5 mm albido-flavus politus.

Sporae 10–12 × (6.0–)7.0–8.0  $\mu\text{m}$  (5–)6–7-angulatae. Acies lamellarum fertilis. Pileipellis trichodermalis elementis 11–22  $\mu\text{m}$  latis pigmentis intracellulosis. Fibulae adsunt.

Holotypus: Australia, Tasmania, Kermadie Falls, Lower Track, 43° 12' S, 146° 52' E, 9.I.2005, G. Gates E2074 & D. Ratkowsky (HO 543539; isotypus in L).

Etymology — Roseus = pink, luteolum = yellowish, referring to the colour of the basidiocarp.

Main characters — A slender *Leptonia* with a pink pileus tinged with violet, finely squamulose at centre, stipe polished, yellowish, spores large, cheilocystidia absent.

Pileus 25–35 mm broad, plano-convex with depressed to umbilicate centre, with straight margin, not hygrophanous, slightly translucently striate at margin, pink (K. & W. 7A3) with pale violet margin (18A4), centre darker reddish pink or Venetian red (8E6), breaking up in small squamules at centre, radially virgate-fibrillose towards margin. Lamellae adnate, segmentiform, to 4 mm deep, pink, with concolorous, entire edge, thin,

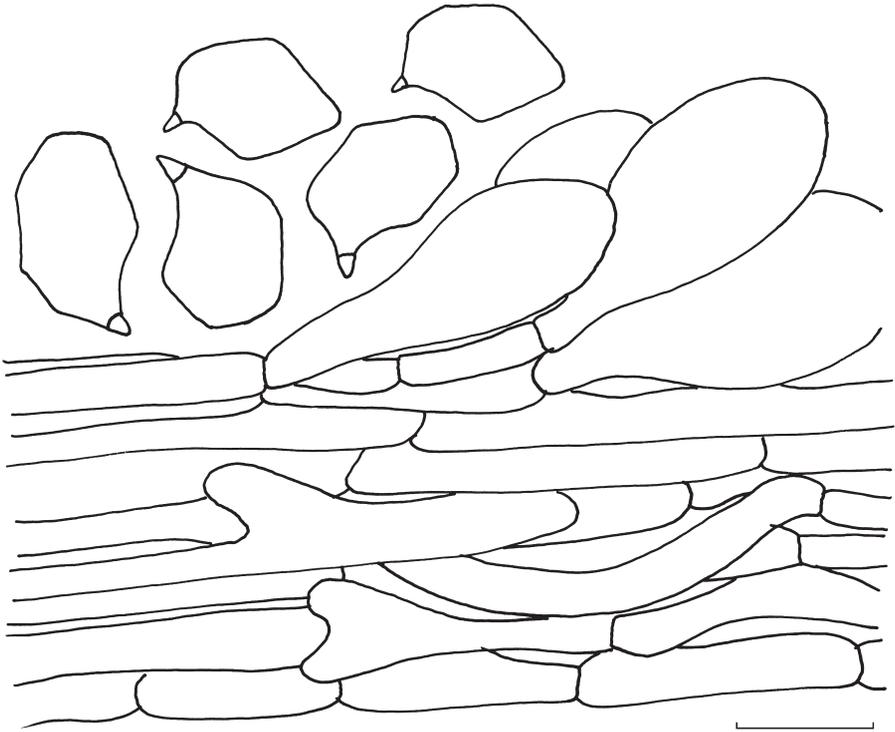


Fig. 24. *Entoloma roseoluteolum*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

moderately crowded, with 2 tiers of lamellulae. Stipe 60–65  $\times$  4.0–5.5 mm, cylindric with slightly enlarged base, slender, equal or flexuous, very pale yellowish or whitish (3A2), polished. Context thin, pinkish in pileus, pale yellow in stipe, more intensely yellowish in stipe base. Odour not distinctive. Taste saliva inducing.

Spores 10–12  $\times$  (6.0–)7.0–8.0  $\mu\text{m}$ , (5- or) 6- or 7-angled in side-view. Basidia 15–22  $\times$  7.0–11  $\mu\text{m}$ . Lamella edge fertile. Cystidia absent. Hymenophoral trama regular, made up of cylindric to slightly inflated elements, to 18  $\mu\text{m}$  in diameter with abundant brilliant granules. Pileipellis a cutis with transitions to a trichoderm of cylindric to inflated hyphae, with clavate terminal elements, 30–70  $\times$  11–20  $\mu\text{m}$  with pale pinkish brown intracellular pigment. Pileitrama regular, made up of inflated elements, 40–120  $\times$  6.0–20  $\mu\text{m}$  with abundant brilliant granules. Vascular hyphae abundant. Stipitipellis a cutis of cylindric hyphae 5.0–9.0  $\mu\text{m}$  in diameter. Clamp-connections absent.

Habitat & distribution — Known only from the type locality, a wet sclerophyll forest.

*Collection examined.* AUSTRALIA: Tasmania, Kermadie Falls, Lower Track, 43° 12' S, 146° 52' E, 9.I.2005, G. Gates E2074 & D. Ratkovsky (holotype HO; isotype L).

*Entoloma roseoluteolum* is distinctive because of the pinkish pileus with violaceous tinges and pallid, polished stipe. It clearly belongs to sect. *Cyanula* on account of the brilliant granules in the trama and clampless hyphae. There are no similar species

known from the Southern Hemisphere. *Entoloma ritae* Noordel. & Wölfel from Europe is somewhat similar, but differs among other things by the lack of violaceous tinges in the pileus, and the abundance of clamp-connections.

25. ***Entoloma aurantiolabes*** G. Gates & Noordel., *spec. nov.* — Fig. 25, Plate 25

Habitus collybioideus. Pileus usque ad 30 mm latis brunneo violaceo-tinctus demum ochraceus translucido-striatus radialiter fibrillosus centro squamulosus. Stipes 20–50 × 2–4 mm initio violaceo-griseo tinctus demum pallide brunneus politus. Toto aurantio labes.

Sporae 10–12 × 7.5–9.0 μm, 5–7-angulatae. Cheilocystidia 19–40 × 6.0–13 μm cylindracea vel clavata. Pileipellis trichodermalis elementis 8–15 μm latis pigmentis intracellulosi. Fibulae desunt.

Holotypus: Australia, Tasmania, North West Bay River, 42° 57' S, 147° 12' E, 18.V.2004, G. Gates E2000 & D. Ratkowsky (HO 543544; isotypus in L).

Etymology — *Aurantius* = orange, *labes* = spotted.

Main characters — A *Leptonia* with violet-blue tinges in pileus and stipe, which fade with age; all parts stain with orange splotches when bruised.

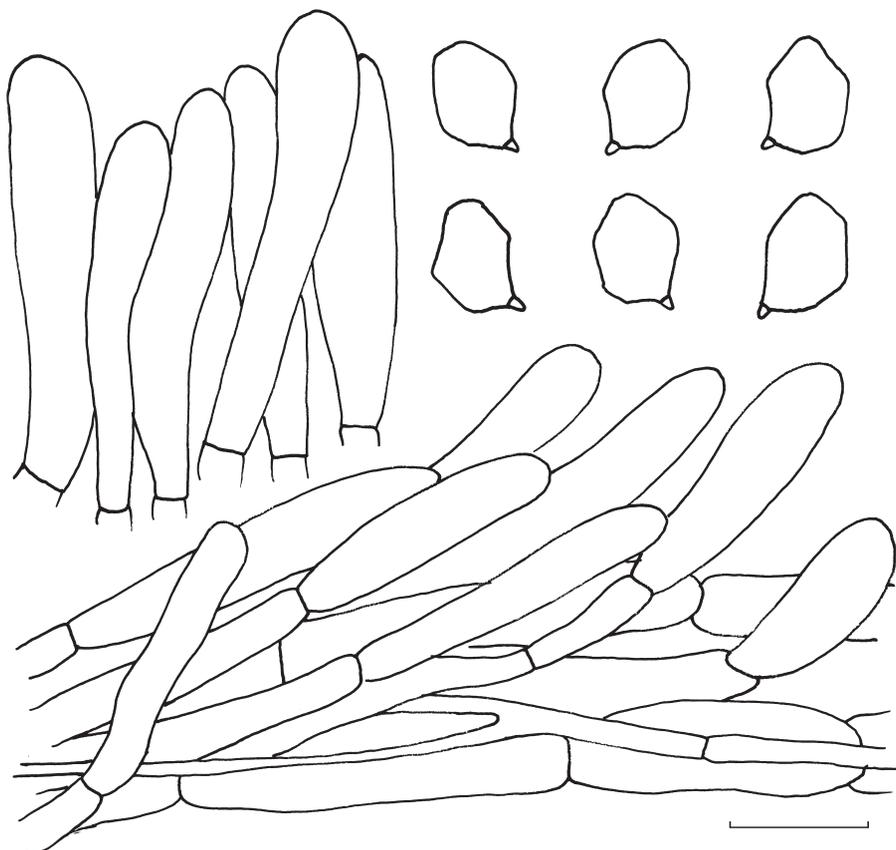


Fig. 25. *Entoloma aurantiolabes*. Spores, cheilocystidia, and pileipellis. Bar = 10 μm (spores), 30 μm (cheilocystidia and pileipellis).

Pileus to 30 mm broad, conico-campanulate to convex or plano-convex with slightly to distinctly depressed centre, very variable in colour, ranging from violet-brown to brown-ochre or pallid brown, violet hue slowly disappearing with age, more yellow-brown towards margin, developing bright orange splotches with age or when bruised, not truly hygrophanous, translucently striate when moist to half the radius, centre slightly villose-squamulose, more innately radially fibrillose towards margin. Lamellae adnate to subdecurrent, segmentiform to subventricose, to 4 mm deep, pallid grey pink or pale cream-coloured, with entire, concolorous, rarely partly stained brown edge, staining mottled orange with age or when bruised, moderately thin, rather crowded, with 2 tiers of lamellulae. Stipe 20–50 × 2–4 mm, cylindric or laterally compressed and longitudinally grooved, distinctly tinged blue-grey or violaceous grey, especially in the upper part and in young, fresh specimens, and in the basal part more yellowish grey, dry, glabrous, polished, with white basal tomentum, with orange splotch at base, particularly when old or bruised. Odour indistinct. Taste musty, earthy.

Spores 10–12 × 7.5–9.0  $\mu\text{m}$ ,  $Q = 1.2\text{--}1.6$ , rather irregularly 5–7-angled in side-view, Basidia 19–32 × 8.0–11  $\mu\text{m}$ , 4-spored, clampless. Lamella edge sterile. Cheilocystidia cylindric-clavate, 19–40 × 6.0–13  $\mu\text{m}$ , usually colourless, occasionally with brown intracellular pigment. Hymenophoral trama regular, made up of cylindric to inflated elements, to 20  $\mu\text{m}$  in diameter. Pileipellis a transition between a cutis and a trichoderm, made up of cylindric to inflated hyphae, 8–15  $\mu\text{m}$  in diameter, with clavate terminal elements, to 26  $\mu\text{m}$  in diameter. Pigment brownish grey, intracellular in pileipellis. Brilliant granules present in trama. Clamp-connections absent.

Habitat & distribution — In dry and wet sclerophyll forest, preferably in mulch in open, more or less sun-lit places among tree ferns and in more open situations.

*Collections examined.* AUSTRALIA: Tasmania, Donnelly's Rd., Geeveston, 43° 07' S, 146° 54' E, 12.VI.1999, *G. Gates E596* & D. Ratkowsky; idem, 2.V.2006, *M.E. Noordeloos 2006051*; North West Bay River, 42° 57' S, 147° 12' E, 18.V.2004, *G. Gates E2000* & D. Ratkowsky (holotype HO; isotype L).

This *Leptonia* usually starts with a distinctly violaceous brown pileus, particularly at centre, which fades with age to golden brown or paler, losing the violaceous tinge completely. The same applies to the stipe, which is a delicate blue-grey violet in youth and fades to brown with age. Another remarkable feature is the orange mottling that occurs on the pileus, lamellae and stipe, particularly when bruised. Microscopically this species has rather irregularly shaped spores. Taxonomically it is placed near the group *E. longistriatum* (Peck) Noordel.

## 26. *Entoloma rufobasis* G. Gates & Noordel., *spec. nov.* — Fig. 26, Plate 26

Habitus collybioideus. Pileus 15–40 mm latus brunneus paulisper hygrophanus translucido-striatus radialiter fibrillosus centro squamulosus. Stipes 40–50 × 2–5 mm albidulus versus basim rufescens politus.

Sporae 10–11 × 7.0–8.0  $\mu\text{m}$  6–7-angulatae. Cheilocystidia 40–60 × 8–14  $\mu\text{m}$  cylindracea vel clavata. Pileipellis trichodermalis elementis 40–60 × 8–14  $\mu\text{m}$  pigmentis intracellulosis. Fibulae desunt.

Holotypus: Australia, Tasmania, Growling Swallet, 42° 41' S, 146° 30' E, 19.V.1999, *G. Gates E525* & D. Ratkowsky (HO 543560; isotypus in L).

Etymology — Rufus = reddish, basis = base, referring to the reddening base of the stipe.

Main characters — Pileus tan-brown, translucently striate, rather smooth, lamellae with brown edge, stipe very pale beige, polished, with reddening base, spores simple, regular.

Pileus 15–40 mm broad, convex to hemispheric, often truncate with slightly umbilicate centre, with involute to deflexed then straight margin, warm tan-brown (K. & W. 5C4), uniformly coloured or with darker brown to grey-brown central spot, translucently striate when moist to 2/3 of radius, weakly hygrophanous, pallescent on drying, glabrous except for the very finely squamulose centre. Lamellae broadly adnexed or adnate-emarginate, segmentiform to ventricose, to 8 mm deep, pink or ochre-pink, with brown, fimbriate edge, moderately distant, with 2 tiers of lamellulae. Stipe 40–50 × 2–5 mm, cylindric, broadened towards base, very pale beige to almost white, glabrous, polished, base whitely tomentose, turning orange-red or apricot-pink with age or when bruised.

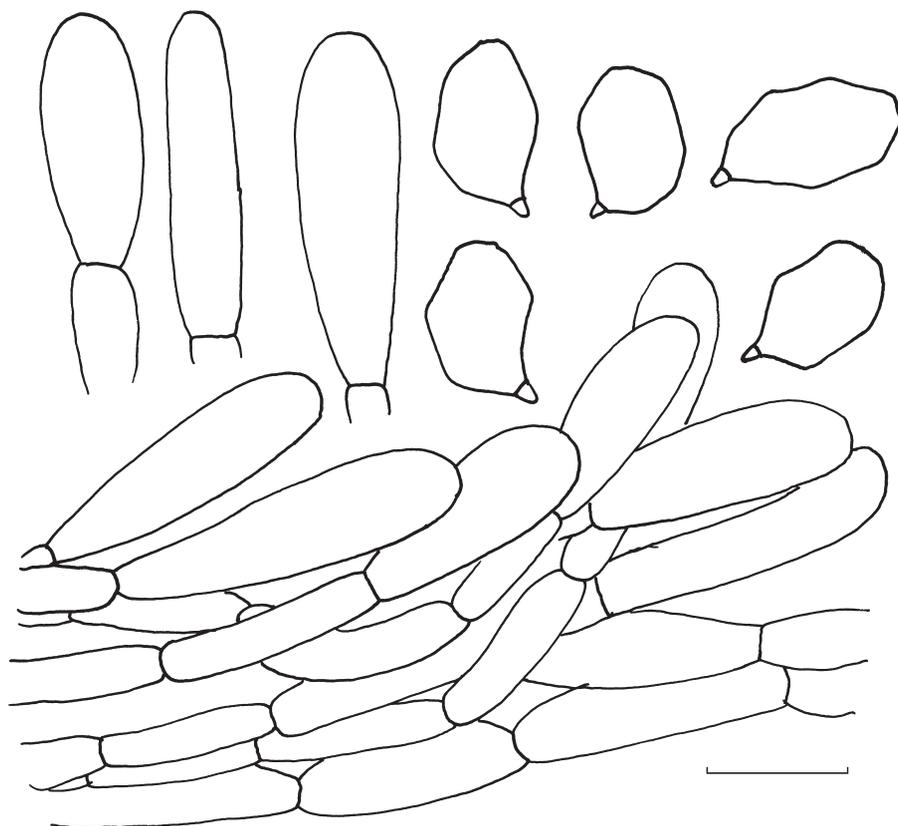


Fig. 26. *Entoloma rufobasis*. Spores, cheilocystidia, and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (cheilocystidia and pileipellis).

Spores 10–11 × 7.0–8.0  $\mu\text{m}$ ,  $Q = 1.2\text{--}1.6$ , 6- or 7-angled in side-view. Basidia 28–35 × 5–11  $\mu\text{m}$ , 4-spored, clampless. Lamella edge sterile. Cheilocystidia 40–60 × 8–14  $\mu\text{m}$ , clavate with brown, intracellular pigment. Hymenophoral trama regular, made up of cylindric hyphae, to 15  $\mu\text{m}$  broad. Brilliant granules abundant. Pileipellis a cutis of cylindric hyphae, 4–16  $\mu\text{m}$  in diameter, with scattered trichodermal tufts of clavate terminal elements, 40–60 × 8–14  $\mu\text{m}$ . Pigment golden brown, intracellular in pileipellis and upper pileitrama. Pileitrama regular to irregular, made up of cylindric to inflated hyphae, to 25  $\mu\text{m}$  in diameter. Brilliant granules abundant in trama. Clamp-connections absent.

Habitat & distribution — Common, in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Growling Swallet, 42° 41' S, 146° 30' E, 19.V.1999, *G. Gates E525* & D. Ratkowsky (holotype HO; isotype L); idem, 4.VI.2002, *G. Gates E1552* & D. Ratkowsky; Lake Skinner Track, 42° 57' S, 146° 44' E, 11.IV.1999, *G. Gates E392* & D. Ratkowsky; Old Hartz Mtn. Track, 43° 12' S, 146° 52' E, 19.III.2002, *G. Gates E1462* & D. Ratkowsky.

This *Leptonia* is remarkable because of the vivid tan-coloured pileus, strongly contrasting with the pale stipe, the orange-red discolouration of the stipe base and the brown lamella edge. The translucently striate pileus places it in the vicinity of *E. longistriatum*, from which it mainly differs in the more brightly coloured pileus and orange-red discolouration of the stipe. *Entoloma turci* (Bres.) M.M. Moser, normally with such a discolouration of the stipe base, differs clearly in having a non-translucent dark brown pileus, and more intensely coloured yellow-brown stipe. *Entoloma rubescentipes* E. Horak, another *Leptonia* having a reddish tinged stipe base, differs in the paler pileus, concolorous lamella edge without cheilocystidia, and smaller spores.

27. ***Entoloma stramineopallescens*** G. Gates & Noordel., *spec. nov.* — Fig. 27, Plate 27

Habitus collybioideus. Pileus 5–35 mm latus pallide stramineus pallescens hygrophanus translucido-striatus glabrus centro fibrillosus. Stipes 10–40 × 10–6.5 mm albidulus politus.

Sporae 9.0–12 × 6.0–8.0  $\mu\text{m}$  5–7-angulatae. Cheilocystidia 20–40 × 5–12  $\mu\text{m}$  cylindraceus vel clavatus. Pileipellis cutis elementis 8–12  $\mu\text{m}$  latis in trichoderma transiens pigmentis intracellulosis. Fibulae desunt.

Holotypus: Australia, Tasmania, Truganini Track, 42° 56' S, 147° 21' E, 20.II.1999, *G. Gates E125* & D. Ratkowsky (HO 543545; isotypus in L).

Etymology — Stramineus = straw-coloured, pallescens = pallescent.

Main characters — Basidiocarps very pale, pileus finely squamulose at centre, stipe polished, spores large, cheilocystidia present.

Pileus 5–35 mm broad, hemispheric to convex, expanding to appanate, with slight central depression, with straight margin, rather pale straw-colour, yellowish buff or buff-white, with a distinctly darker centre (eye), when moist translucently striate at margin, hygrophanous, becoming pallescent on drying to off-white, fibrillose on disc, finely scaly at centre. Lamellae adnate to adnate-emarginate, segmentiform, moderately distant, moderately thick, to 4 mm deep, creamy-buff with hint of pink, becoming deeper pink with age, with entire edge, concolorous to lamellae face. Stipe 10–40 × 10–6.5 mm, cylindric, equal or with slightly broadened base, very pale yellow-buff to almost

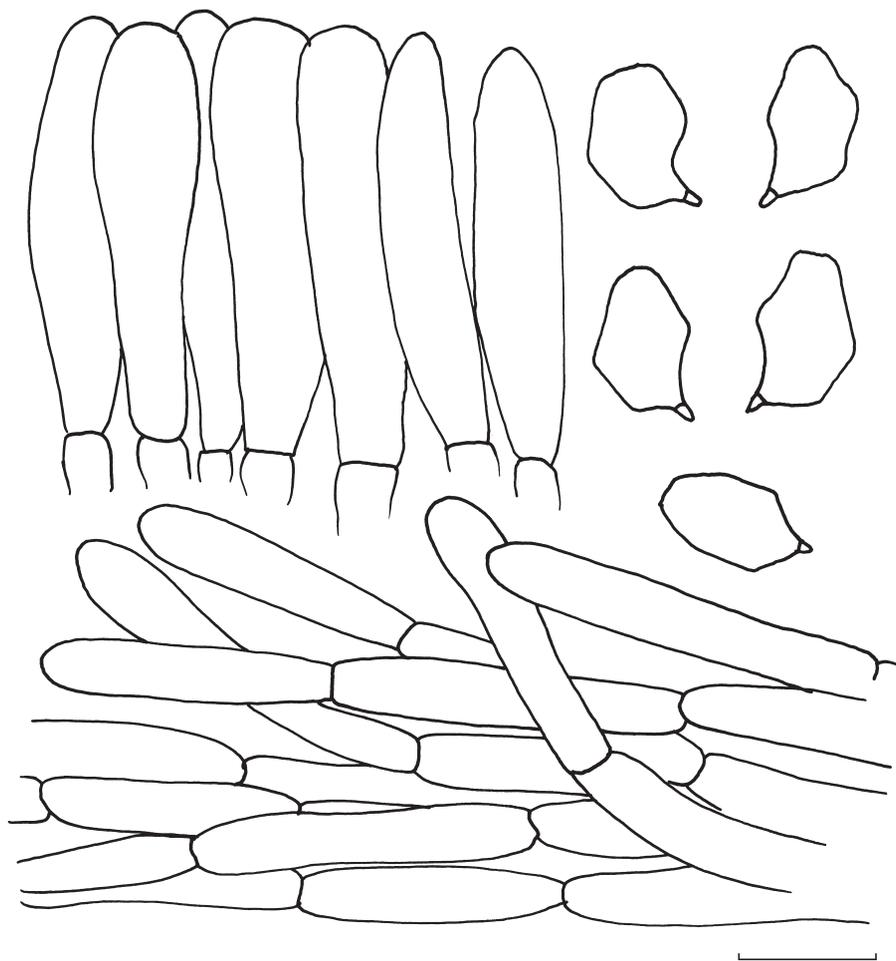


Fig. 27. *Entoloma stramineopallescens*. Spores, cheilocystidia, and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (cheilocystidia and pileipellis).

white, glabrous, polished, with white basal tomentum. Odour strongly spermatic. Taste saliva inducing.

Spores 9.0–12  $\times$  6.0–8.0  $\mu\text{m}$ ,  $Q = 1.2\text{--}1.5(-1.6)$ , 5–7-angled with blunt, somewhat irregular angles. Basidia 20–40  $\times$  8–10  $\mu\text{m}$ , 4-spored, clampless. Lamella edge sterile. Cheilocystidia 20–40  $\times$  5.0–12  $\mu\text{m}$ , cylindric to clavate, clampless. Hymenophoral trama regular, compact, made up of cylindric elements, to 20  $\mu\text{m}$  in diameter, with abundant brilliant granules. Pileipellis a cutis of repent, cylindric hyphae of 8–12  $\mu\text{m}$  in diameter with scattered tufts of clavate terminal elements, forming scales at centre of the pileus, 20–70  $\times$  9.0–20  $\mu\text{m}$  in diameter. Pigment pale brownish, intracellular. Clamp-connections absent.

Habitat & distribution — Common, widespread, in wet eucalypt forest and *Pomaderris apetala* groves.

*Collections examined.* AUSTRALIA: Tasmania, Clarks Cliffs, 43° 06–07' S, 147° 47–48' E, 13.III.2004, *G. Gates E1952* & D. Ratkowsky; Kermadie Falls Upper Track, 43° 12' S, 146° 52' E, 10.I.2002, *G. Gates E1391* & D. Ratkowsky; Tall Trees, Mt Field NP, 42° 41' S, 146° 42' E, 13.XI.1999, *G. Gates E749* & D. Ratkowsky; Truganini Track, 42° 56' S, 147° 21' E, 20.II.1999, *G. Gates E125* & D. Ratkowsky (holotype HO; isotype L).

*Entoloma stramineopallesces* is a typical member of sect. *Cyanula*, characterized by its rather pale colours, and finely scaly centre of the pileus. No similar taxa could be traced in the literature.

28. ***Entoloma albidocoeruleum*** G. Gates & Noordel., *spec. nov.* — Fig. 28, Plate 28

Habitus collybioideus. Pileus 15–47 mm latus pallidus hygrophanus translucido-striatus leviter fibrillosus subglabrus centro minute squamulosus. Stipes 35–70 × 3–7 mm coeruleus politus.

Sporae 8.0–10 × 6.0–8.0 μm 5–7-angulatae. Cheilocystidia 20–45 × 7–15 μm clavatus vel vesiculosus. Pileipellis cutis in trichoderma transiens pigmentis intracellulosi. Fibulae desunt.

Holotypus: Australia, Tasmania, Clarks Cliffs, 43° 06–07' S, 147° 47–48' E, 13.III.2004, *G. Gates E1950* & D. Ratkowsky (HO 543548; isotypus in L).

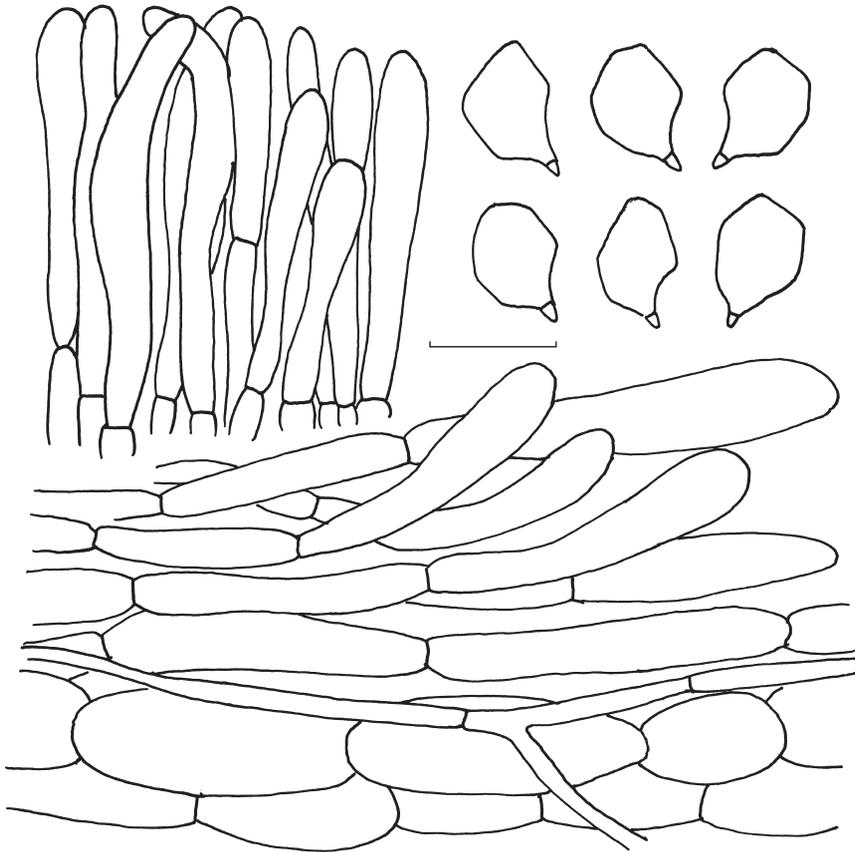


Fig. 28. *Entoloma albidocoeruleum*. Spores, cheilocystidia, and pileipellis. Bar = 10 μm (spores), 30 μm (cheilocystidia and pileipellis).

Etymology — *Albidus* = whitish, *coeruleum* = sky-blue, referring to the colours of the basidiocarp.

Main characters — Pileus very pale, strongly contrasting with the sky-blue polished stipe, small spores, cheilocystidia present.

Pileus 15–47 mm, conico-convex or campanulate, then convex or expanded, often more or less truncate with slightly depressed centre, sometimes with an umbo-like elevation, with deflexed then straight margin, pallid beige to very pale brown, sometimes almost white with ephemeral violet margin, often with slightly darker central spot, translucently striate in marginal zone when moist, hygrophorous, distinctly pallescent on drying to off-white or silky buff, glabrous or innately fibrillose, except for the minutely scaly disc. Lamellae adnate or with small decurrent tooth, subventricose, thin, to 7 mm deep, very pale pink, almost white, with entire concolorous edge, 2 tiers of lamellulae. Stipe 35–70 × 3–7 mm, cylindric or laterally compressed and longitudinally grooved, with slightly inflated base, slender, brittle, very pale sky-blue, becoming grey-blue and finally grey with age, glabrous, polished. Odour and taste slightly to distinctly farinaceous.

Spores 8.0–10 × 6.0–8.0  $\mu\text{m}$ ,  $Q = 1.2\text{--}1.5$ , 5–7-angled in side-view. Basidia 19–34 × 7–11  $\mu\text{m}$ , 4-spored, clampless. Lamella edge sterile. Cheilocystidia 22–45 × 7–15  $\mu\text{m}$ , clavate to cylindrical. Pileipellis a cutis with transitions to a trichoderm, made up of clavate terminal elements, 30–70 × 7–22  $\mu\text{m}$ . Pigment very pale, intracellular. Clamp-connections absent.

Habitat & distribution — Common in litter on floor of wet eucalypt forest.

*Collections examined.* AUSTRALIA: Tasmania, Clarks Cliffs, 43° 06–07' S, 147° 47–48' E, 13.III.2004, *G. Gates E1950* & D. Ratkowsky (holotype HO; isotype L); Duckhole Lake Track, 43° 22' S, 146° 53' E, 30.III.2002, *G. Gates E1465* & D. Ratkowsky; idem, 20.IV.2004, *M.E. Noordeloos 2004058*; Kermadie Falls, Lower Track, 43° 12' S, 146° 52' E, 5.IV.2001, *G. Gates E1074* & D. Ratkowsky; idem, 10.IV.2003, *G. Gates E1692* & D. Ratkowsky; Reuben Falls, 43° 00' S, 146° 40' E, 15.V.1999, *G. Gates E508* & D. Ratkowsky.

*Entoloma albidocoeruleum* can be placed in stirps *Asprellum* of sect. *Cyanula*. The small spores and pallid colours, as well as the often slightly decurrent lamellae place it in the vicinity of *E. lividocyanulum* Noordel., from which it differs in the sterile lamellae edge with broad cheilocystidia.

29. ***Entoloma tomentosolilacinum*** G. Gates & Noordel., *spec. nov.* — Fig. 29, Plate 29

Pileus 5–15 mm latus convexus demum expansus lilacino-griseus minute tomentosus. Stipes 15–35 × 1.5–4 mm pallide lilacino-griseus vel coeruleo-griseus fibrillosus.

Spores (5.5–)6.0–7.0 × 5.5–7.0  $\mu\text{m}$  (sub)isodiametricae. Cystidia desunt. Pileipellis trichoderma elementis septatis inflates 10–15  $\mu\text{m}$  latis pigmentis intracellulosi vel parietalis constitutis. Fibulae raras.

Holotypus: Australia, Tasmania, Lady Barron Falls Track, Mt Field NP, 42° 41' S, 146° 42' E, 31.III.2001, *G. Gates E1058* & D. Ratkowsky (HO 543549; isotypus in L).

Etymology — *Tomentosus* = tomentose, *lilacinus* = lilac, referring to the lilac, tomentose pileal surface.

Main characters — Small, collybioid species with remarkable lilac, metallic shiny pileus and bluish lilac stipe, very small spores, and a differentiated pileipellis.

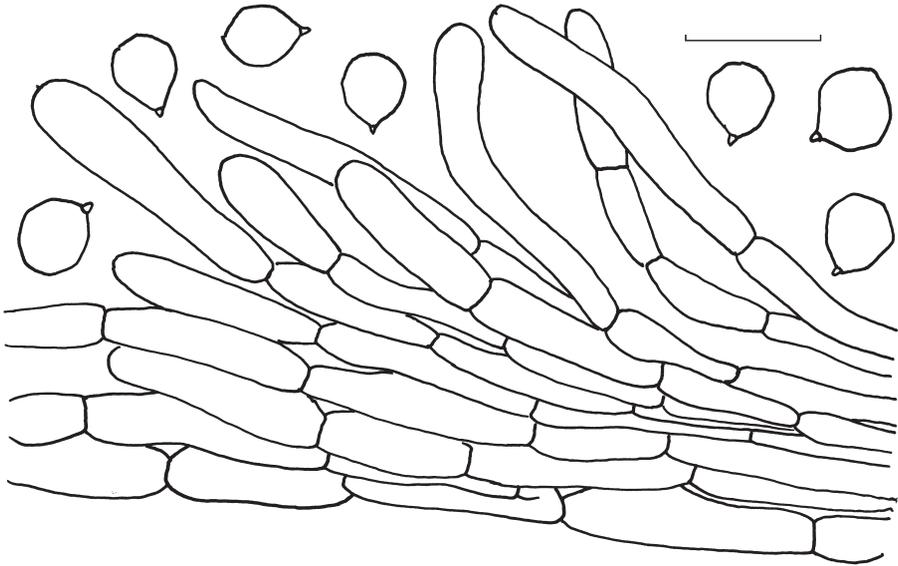


Fig. 29. *Entoloma tomentosolilacinum*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

Pileus 5–15 mm, convex to plano-convex, with blunt centre, not umbilicate, with involute then deflexed margin, lilac-grey to greyish ruby (K. & W. 12E3), with metallic sheen, not hygrophanous, not translucently striate, entirely tomentose, breaking up into very minute, imbricate squamules. Lamellae adnate, segmentiform, to 3 mm deep, moderately crowded, sordid white, with entire, concolorous edge, 2 tiers of lamellulae. Stipe 15–35  $\times$  1.5–4 mm, cylindric, straight or flexuous, sometimes slightly broadened towards base, more or less concolorous with pileus or more blue-grey, innately silky fibrillose, shiny, with white basal tomentum. Odour farinaceous or spermatic. Taste salty to farinaceous.

Spores (5.5–)6.0–7.0  $\times$  5.5–7.0  $\mu\text{m}$ , Q = 1.0–1.2, isodiametric to subisodiametric, with very thin walls, slightly but distinctly 7–many-angled in side-view. Basidia 30–40  $\times$  9–13  $\mu\text{m}$ , 4-spored, clamped. Lamella edge fertile. Cystidia absent. Hymenophoral trama regular, made up of narrow, cylindric hyphae. Pileipellis a differentiated cutis made up of septate hyphae of 10–15  $\mu\text{m}$  in diameter with trichodermal clusters of (semi)erect septate terminal endings, to 20  $\mu\text{m}$  in diameter. Pigment brown-lilac, intracellular in pileipellis and in upper pileitrama, also deposited at inner side of the hyphal walls as internal encrustations; blue, parietal in lower part of pileipellis and in upper pileitrama. Crystals frequent in pileitrama. Brilliant granules absent. Clamp-connections very rare.

Habitat & distribution — Widespread but uncommon, on the ground and on very rotten wood in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Lady Barron Falls Track, Mt Field NP, 42° 41' S, 146° 42' E, 31.III.2001, *G. Gates E1058* & D. Ratkowsky (holotype HO; isotype L); Liffey Falls, 41° 42' S, 146° 46' E, 28.III.1999, *G. Gates E296* & D. Ratkowsky; Mt Cripps Karst Area, Philrod

Track, 41° 36' S, 145° 46' E, 24.III.2005, *G. Gates E2100* & D. Ratkowsky; Scottsdale, Forester Road, 41° 06' S, 147° 37' E, 31.V.2005, *G. Gates E2175* & D. Ratkowsky.

*Entoloma tomentosolilacinum* is a small member of sect. *Leptonia*, characterized by its grey-lilac colour, small spores, and extreme scarcity of clamp-connections. The small spores are distinctive, the only other species in the section sharing this character, viz. *E. coelestinum* (Fr.) Hesler from Europe, differs clearly in the overall blue colour of the basidiocarp. The habitat on wood is not unusual for members of sect. *Leptonia*.

#### IV. OMPHALINOID TAXA

##### 30. *Entoloma camarophyllum* G. Gates & Noordel., *spec. nov.* — Fig. 30, Plate 30

Habitus omphalinoideus. Pileus 10–35 mm latus fuscobrunneus paulisper hygrophanous translucido-striatus glaber sed centro leviter fibrilloso-ruguloso. Lamellae distantes crassae. Stipes 25–40 × 2–4 mm pileo concolorus cartilagineus glaber politus. Odore saporeque rancido-farinaceis.

Sporae 8.5–16(–16.5) × 7.5–11.5 μm valde 4–9-angulatae. Cheilocystidia sparsa irregulariter clavata vel lageniformia. Pileipellis cutis compactis hyphis cylindraceis 1.5–7 μm latis. Pigmentis intracellulosis vel minute incrustatis. Fibulae desunt.

Holotypus: Australia, Tasmania, Growling Swallet, 42° 41' S, 146° 30' E, 6.IV.2000, *G. Gates E469* & D. Ratkowsky (HO 543554; isotypus in L).

Etymology — Referring to the habit which resembles a *Camarophyllum* species.

Main characters — Habit omphalinooid, brownish or greyish blonde; lamellae very distant, decurrent, often forming a pseudocollarium around the stipe; spores large and complex, clamp-connections absent.

Pileus 10–35 mm, convex to plano-convex with inflexed then deflexed margin, with slightly to deeply umbilicate centre to infundibuliform, uniformly rather dark red-brown, greyish blonde or grey-brown when young, then with paler marginal zone, remaining rather dark brown at centre (Mu. 10 YR 3/2-3, 4/3; 7.5 YR 3/2; margin 10 YR 6/3-4, 7/4, outermost margin 10 YR 8/4), translucently striate at margin only or up to 1/3 of radius when moist, slightly hygrophanous becoming lighter grey-buff, somewhat greasy when fresh, finely innately fibrillose under lens, very slightly fibrillose-subrugulose at centre. Lamellae deeply decurrent, arcuate, sometimes forming a pseudocollarium, pallid brown or pallid pink, then tinged darker pink (10 YR 8/4), with entire, thickened, sometimes hyaline edge, waxy, thick, very distant (reminiscent of *Camarophyllum*),  $L = c. 20$ ,  $l = 0-3$ . Stipe 25–40 × 2–4 mm, cylindric, often curved or flexuous, often distinctly broadened at base to bulbous, pale brown or pale greyish blonde, much paler than pileus (10 YR 8-7/4), entirely glabrous, dull. Context hyaline, whitish, somewhat cartilagineous, inner parts of pileus and stipe paler, fibrous. Odour indistinct. Taste none or sometimes like cucumber.

Spores 8.5–16(–16.5) × 7.5–11.5 μm, on average 11.8–13.2 × 9.0–9.8 μm,  $Q = 1.15-1.9$ ,  $Q_{av} = 1.4$ , very irregularly shaped, with 4–9 rather pronounced angles in side-view, sometimes appearing almost cruciform or cuboid with a large, protruding apiculus. Basidia 21–40 × 6–14 μm, 4-, rarely 2-spored, clampless. Lamella edge sterile or with scattered cheilocystidia. Cheilocystidia irregularly shaped clavate, lageniform or moniliform, often with slightly thickened, refringent wall in upper part. Hymenophoral trama irregular, made up of short, cylindric or inflated elements, with parietal and

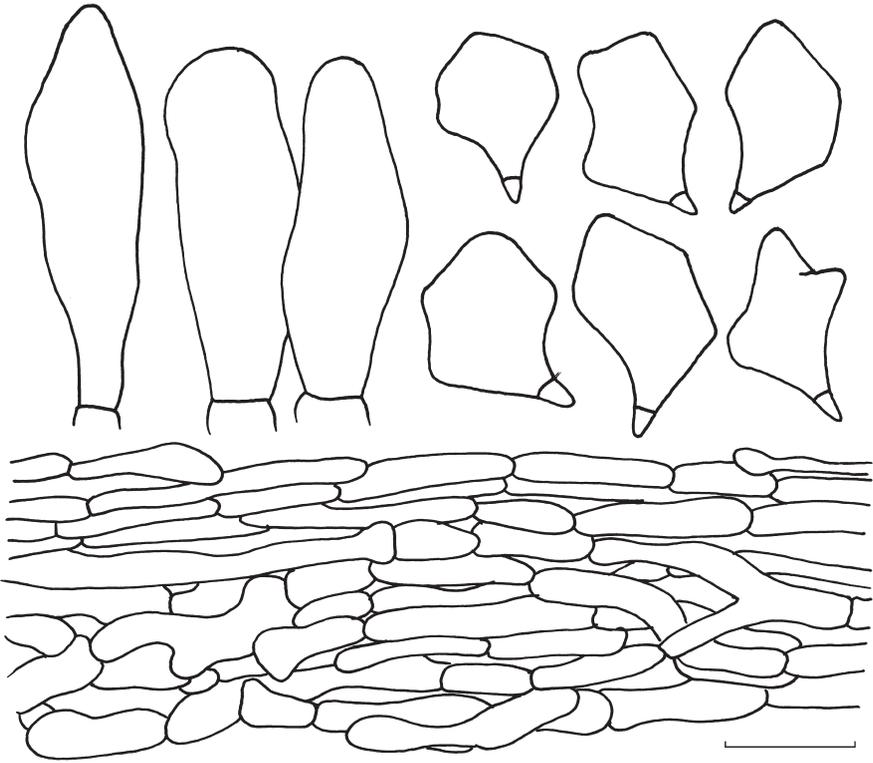


Fig. 30. *Entoloma camarophyllus*. Spores and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (pileipellis).

minutely encrusted pigment in places. Pileipellis a compact cutis of cylindric elements, 1.5–7  $\mu\text{m}$  in diameter, sometimes with some tufts of ascending, coralloid or clavate terminal elements, to 7  $\mu\text{m}$  in diameter, gradually passing into pileitrama. Pileitrama subregular, made up of short, inflated elements, 22–55(–70)  $\times$  8–15  $\mu\text{m}$ . Pigment difficult to observe, intracellular and parietal, or with few encrustations. Stipitipellis a cutis of cylindric hyphae 2–9  $\mu\text{m}$  in diameter. Caulocystidia absent. Clamp-connections absent.

**Habitat & distribution** — Widespread, in wet forests, and also found in button-grass plains at high altitudes.

*Collections examined.* AUSTRALIA: Tasmania, Growling Swallet, 42° 41' S, 146° 30' E, 6.IV.2000, G. Gates E469 & D. Ratkowsky (holotype HO; isotype L); idem, 22.IV.2004, M.E. Noordeloos 2004062; Reuben Falls, 43° 00' S, 146° 40' E, 15.V.1999, G. Gates E511 & D. Ratkowsky; Wedge Forest Reserve, 42° 50' S, 146° 16' E, 6.V.2003, G. Gates E1773 & D. Ratkowsky.

The spores of this remarkable species, which mimics a *Camarophyllus* or *Camaro-phylopsis*, are very large, very pronouncedly angled and with a strongly protruding, pointed apiculus. The species is difficult to accommodate in the current classification. Preliminary results of phylogenetic studies confirm its isolated status (Co et al., unpublished results).

**31. *Entoloma austrorhodocalyx*** G. Gates & Noordel., *spec. nov.* — Fig. 31, Plate 31

Habitus omphalinoideus. Pileus 3–15 mm latis stipesque pallide brunneus. Stipes 20–30 × 1–2 mm tenuis fragilis.

Sporae 7.8–9.5 × 7.0–9.5 μm 6–8-angulatae. Cheilocystidia desunt. Pileipellis cutis hyphis elementis septatis clavates usque ad 15 μm latis. Fibulae numerosae.

Holotypus: Australia, Tasmania, Duckhole Lake Track, 43° 22' S, 146° 53' E, 20.IV.2004, M.E. Noordeloos 2004047 (HO 543557; isotypus in L).

Etymology — Austro = southern, rhodocalyx = resembling *E. rhodocalyx*.

Main characters — Basidiocarps small, omphalinoïd, rather pale coloured, spores isodiametric, cheilocystidia lacking, clamp-connections present.

Pileus 3–15 mm broad, convex to plano-convex with umbilicate centre and deflexed, crenate margin, pale brown-grey, sometimes with a pinkish hue (K. & W. 4-5C3, 4B2, 4A2) with darker centre (4D3), dry, strongly translucently striate when moist, hygrophanous, strongly pallescent, innately radially fibrillose, becoming micaceous to lustrous grey-buff on drying. Lamellae deeply decurrent, triangular, arcuate, pale greyish pink with hyaline, sometimes slightly darker edge, very distant, L = 16–20, l = 1–3. Stipe 20–30 × 1–2 mm, very slender, fragile, cylindric, often with distinctly swollen base, pale brown to almost white at apex, darker towards base (grey-brown like centre of pileus), slightly pruinose at apex, otherwise glabrous, polished or with a few longitudinal fibrils but never silvery striate, with white basal tomentum. Odour and taste strongly spermatic.

Spores 7.8–9.5 × 7.0–9.5 μm, on average 7.8–8.9 × 6.7–8.4 μm, Q = 1.0–1.2, (sub)isodiametric, 6–8-angled in side-view with irregular, rather blunt angles. Basidia 18–25 × 6–9 μm, 4-spored, clamped. Lamella edge fertile. Cystidia absent. Pileipellis a differentiated cutis of septate, cylindric hairs with slightly inflated clavate terminal elements, to 15 μm in diameter. Pigment yellow-brown, minutely encrusting and parietal in the hyphae of pileipellis. Pileitrama regular, made up of long, fusiform elements, to 200 × 5–18 μm. Stipitipellis a cutis of narrow, cylindric hyphae 4–9 μm in diameter, finely encrusted. Clamp-connections present.

Habitat & distribution — Widespread, in wet sclerophyll forests.

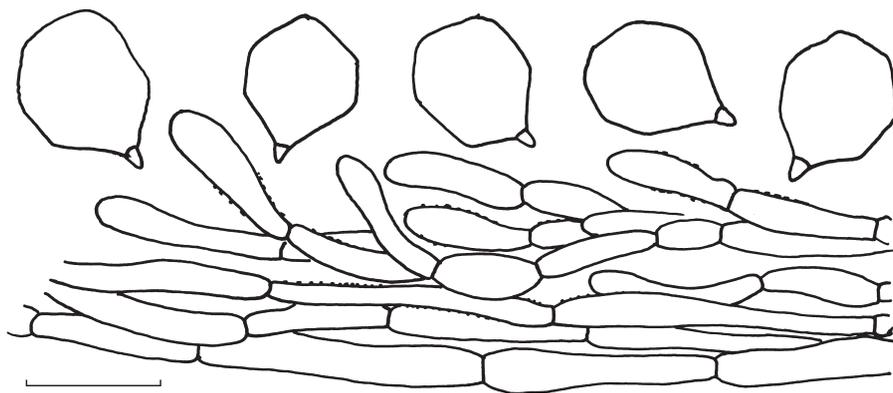


Fig. 31. *Entoloma austrorhodocalyx*. Spores and pileipellis. Bar = 10 μm (spores), 30 μm (pileipellis).

*Collections examined.* AUSTRALIA: Tasmania, Duckhole Lake Track, 43° 22' S, 146° 53' E, 20.IV.2004, *M.E. Noordeloos 2004047* (holotype HO; isotype L), idem, *M.E. Noordeloos 2004054*; Mt Field NP, 42° 41' S, 146° 42' E, 31.V.2003, *G. Gates E1840* & D. Ratkowsky.

This small species fits well in the current concept of sect. *Undati*, and keys out close to the European species *E. rhodocalyx* (Lasch) M.M. Moser from which it differs mainly by the absence of cheilocystidia. *Entoloma rancidulum* E. Horak from New Zealand may be close, but differs in having much larger spores, and a strong rancid-farinaceous taste.

**32. *Entoloma percrinitum* G. Gates & Noordel., spec. nov. — Fig. 32, Plate 32**

Habitus omphalinoideus. Pileus 10–35 mm latus obscure griseobrunneus toto aerifere-villoso. Lamellae confertae obscure griseae. Stipes 15–37 × 1–3 mm obscure griseobrunneus glabrus politus.

Sporae 7.0–8.5 × 6.0–7.5 μm 5–7-angulatae. Cheilocystidia desunt. Pileipellis cutis vel trichoderma elementis inflatis 5–12 μm latis minute incrustatis. Fibulae numerosae.

Holotypus: Australia, Tasmania, Chauncy Vale, 42° 37' S, 147° 16' E, 28.VII.2003, *G. Gates E1888* & D. Ratkowsky (HO 543547; isotypus in L).

*Etymology* — Resembling *E. crinitum* E. Horak.

*Main characters* — Habit omphalinoid, dark coloured, pileus covered in concentric aeriferous fibrils, not hygrophanous, not striate; spores small, isodiametric, cystidia absent, clamp-connections present.

Pileus 10–35 mm broad, convex with or without a small, acute umbo in central depression, with deflexed margin, uniformly dark grey-brown (K. & W. 5D3), not translucently striate, dry, slightly hygrophanous, pallescent on drying along concentric zones to pale grey-brown, entirely hoary-aeriferously fibrillose. Lamellae adnate to subdecurrent, segmentiform or subarcuate, to 9 mm deep, dark grey with whitish or concolorous edge, moderately thin, crowded. Stipe 15–37 × 1–3 mm, cylindrical, dark grey-brown, more or less concolorous with pileus, glabrous, with white basal tomentum. Odour of iodine. Taste none.

Spores 7.0–8.5 × 6.0–7.5 μm, average 7.5 × 6.3 μm, Q = 1.0–1.2, isodiametric to subisodiametric, 5–7-angled in side-view with relatively thin walls. Basidia 12–30 × 6–9 μm, 4-spored, clamped. Lamella edge fertile. Cystidia absent. Hymenophoral trama

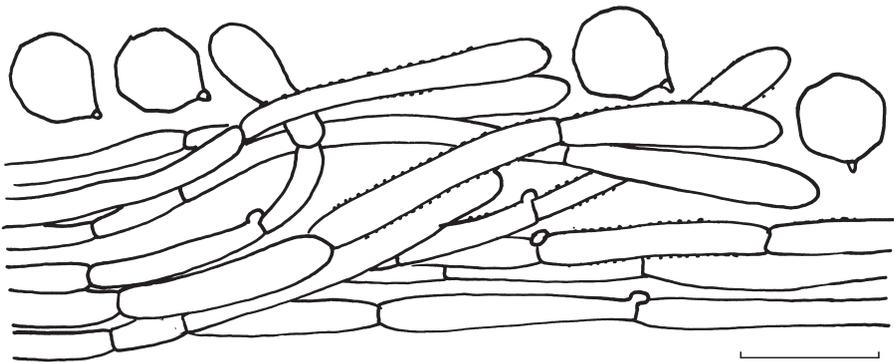


Fig. 32. *Entoloma percrinitum*. Spores and pileipellis. Bar = 10 μm (spores), 30 μm (pileipellis).

regular, made up of cylindric to inflated elements,  $50\text{--}95\text{--}(120) \times 7\text{--}25 \mu\text{m}$  with brown-coloured, coarsely encrusted walls. Pileipellis a differentiated cutis with transitions to a trichoderm, made up of fascicles of septate, cylindric hyphae,  $5\text{--}12 \mu\text{m}$  in diameter, with cylindric to narrowly clavate terminal elements. Pigment brown, parietal to coarsely encrusting. Pileitrama regular, made up of cylindric to inflated elements,  $40\text{--}100 \times 8\text{--}17 \mu\text{m}$  with brown encrusted walls. Stipitipellis a cutis of cylindric hyphae,  $4\text{--}10 \mu\text{m}$  in diameter with encrusted walls. Caulocystidia absent. Clamp-connections present in hymenium and covering layers of pileus and stipe.

Habitat & distribution — Widespread but rare, known from three locations in Tasmania.

*Collection examined.* AUSTRALIA: Tasmania, Chauncy Vale,  $42^\circ 37' \text{S}$ ,  $147^\circ 16' \text{E}$ , 28.VII.2003, G. Gates E1888 & D. Ratkowsky (holotype HO; isotype L).

This small *Entoloma* keys out in sect. *Undati* on account of the omphalinoid habit, isodiametric spores, and differentiated pileipellis of septate, strongly encrusted hairs. *Entoloma crinitum* E. Horak from New Zealand is close, but has a differently coloured pileal surface with rather pronounced squamules that are very different microscopically.

### 33. *Entoloma choanomorphum* G. Gates & Noordel., *spec. nov.* — Fig. 33, Plate 33

Habitus omphalinoideus. Pileus 15–40 mm latus obscure fuliginosus leviter hygrophanus leviter translucido-striatus glabrus. Stipes 30–55  $\times$  1.5–5 mm pileo pallidior glabrus politus. Odore valde nauseosus.

Sporae 10–14  $\times$  8.0–11  $\mu\text{m}$  6–7-angulatae. Cheilocystidia 40–100  $\times$  6–12  $\times$  2–5  $\mu\text{m}$  lageniformia vel fusiformia. Pileipellis cutis hyphis cylindraxis 6–12  $\mu\text{m}$  latis pigmentis intracellulosis. Fibulae desunt.

Holotypus: Australia, Tasmania, Wielangta,  $42^\circ 42' \text{S}$ ,  $147^\circ 51' \text{E}$ , 5.V.2005, G. Gates E2158 & D. Ratkowsky (HO 543546; isotypus in L).

Etymology — Choano = funnel, morphum = shaped.

Main characters — Habit omphalinoid, brown; smell strong, like burnt rubber or subsulphureus; large cheilocystidia present.

Pileus 15–40 mm, convex with depressed centre, margin deflexed, becoming straight, translucently striate at margin, dark brown (K. & W. 5F3, 6F4-6) or a paler brown (5D6) with darker centre, slightly hygrophanous, glabrous, radially fibrillose, often becoming radially split with age. Lamellae decurrent, arcuate to segmentiform, to 6 mm deep, whitish then pinkish brown with slightly irregular, concolorous edge, thickish, moderately distant to distant, 2 tiers of lamellulae. Stipe 30–55  $\times$  1.5–5 mm, cylindric or attenuated downwards, pale brown (blonde, horn), glabrous or with slight white bloom, with white basal tomentum. Odour strong, sulphurous or like burnt rubber. Taste burning.

Spores 10–14  $\times$  8.0–11  $\mu\text{m}$ ,  $Q = 1.2\text{--}1.5$ , irregularly 6- or 7-angular in side-view. Basidia 24–46  $\times$  7–12  $\mu\text{m}$ , 2–4-spored, clamped. Lamella edge heterogeneous. Cheilocystidia scattered to abundant, mixed among basidia, 40–100  $\times$  6–12  $\times$  2–5  $\mu\text{m}$ , lageniform to fusiform, sometimes with broadly swollen base, and long, gradually tapering or moniliform neck, thin-walled. Hymenophoral trama regular, made up of cylindric to subfusiform elements, to 150  $\times$  4–18  $\mu\text{m}$ . Brilliant granules not observed.

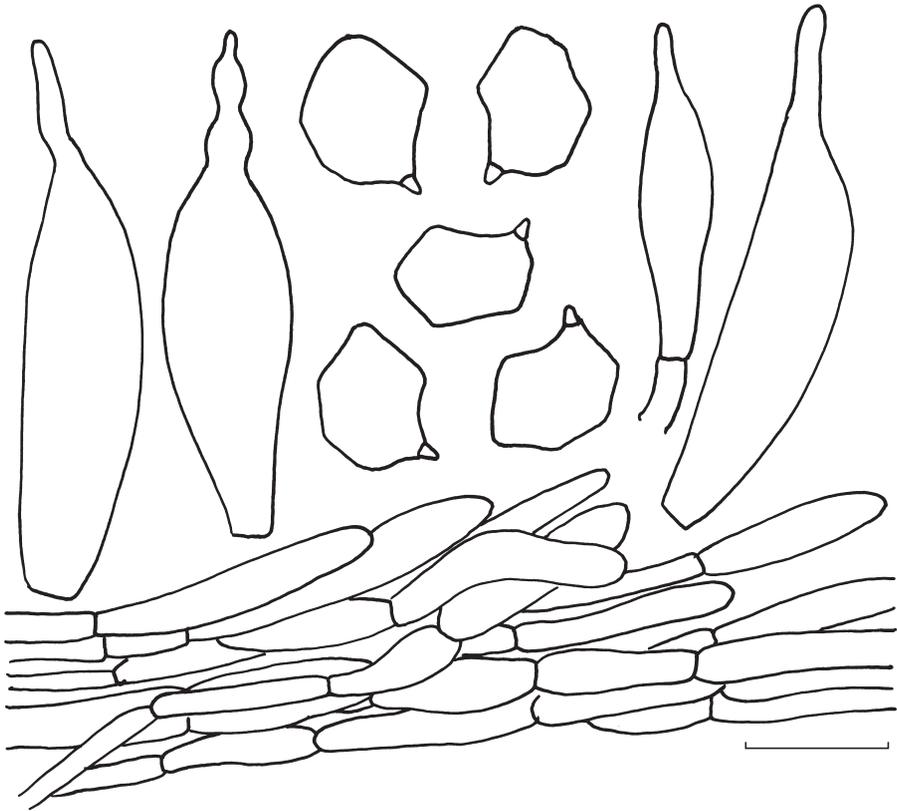


Fig. 33. *Entoloma choanomorphum*. Spores, cheilocystidia, and pileipellis. Bar = 10  $\mu\text{m}$  (spores), 30  $\mu\text{m}$  (cheilocystidia and pileipellis).

Pileipellis a cutis of cylindrical to inflated hyphae, 6–12  $\mu\text{m}$  in diameter, with subclavate to clavate terminal repent or slightly ascending elements, 30–60  $\times$  8–15  $\mu\text{m}$ . Pigment dark brown, intracellular in pileipellis and upper pileitrama. Pileitrama regular, made up of cylindrical to inflated elements, 40–170  $\times$  5–20  $\mu\text{m}$ . Clamp-connections absent.

Habitat & distribution — Widespread, in wet sclerophyll forests.

*Collections examined.* AUSTRALIA: Tasmania, Duckhole Lake Track, 43° 22' S, 146° 53' E, 9.III.2002, *G. Gates E1450* & D. Ratkowsky; North West Bay River, 42° 57' S, 147° 12' E, 1.V.2003, *G. Gates E1759* & D. Ratkowsky; Waterfall Bay, 43° 04' S, 147° 57' E, 13.III.1999, *G. Gates E217* & D. Ratkowsky; Wielangta, 42° 42' S, 147° 51' E, 5.V.2005, *G. Gates E2158* & D. Ratkowsky (holotype HO; isotype L).

*Entoloma choanomorphum* is a distinct species with its omphalinoid habit and large cheilocystidia. It shows some resemblance to *E. disputatum* E. Horak from Chile, which differs, however, in its paler colours, more simple shaped spores, and acidulous smell. *Entoloma nausiosme* Noordel. from Europe and *E. odoriferum* Hesler from North America have similar dark coloured omphalinoid basidiocarps and a strong smell, but differ in the shape of cystidia and abundant clamp-connections.

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Dr. David Ratkowsky is thanked for his help with field collecting and editing of this manuscript. We thank Kim and Peter Eastman of Forester Road, Scottsdale, for their collection and photographs of *E. albomagnum*, Michael Pilkington for his photo of *E. coeruleogracilis* and Sarah Lloyd and Ron Nagorcka for the photo and collection of *E. percrinitum* from their property at Black Sugarloaf, Birrallee. Many *Entoloma* collections were made from frequent visits to the Donnelly's Road property of Drs. Laurie Bishop and Fiona Lewis of Geeveston. Microscopic photographs were made with a Nikon Coolpix 950, a gift from Dr. Tim Baroni of the State University of New York, Cortland.

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