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 km², 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.

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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% NH₄OH, 3% KOH, or ammoniacal Congo Red. All measurements were made in 10% NH₄OH 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


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

Main characters — Chalky white cap, hyaline stipe and isodiametric spores.
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 × 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 × 6.0–8.0 µm, on average 7.0–7.6 × 6.6–7.2 µm, Q = 1.0–1.1(–1.2), isodiametric, many-angled, rather thin-walled. Basidia 17–35 × 7–12 µm, 4-spored, clavate, clamped. Lamella edge fertile. Cystidia absent. Pileipellis an ixocutis of narrow, cylindric hyphae 2–7 µm in diameter, in a thin layer overlaying a subpellis composed of inflated elements 22–70 × 5–19 µm, gradually passing into a pileitrama of inflated elements 30–120 × 5–30 µm. Pigment not present. Stipitipellis a compact cutis of narrow hyphae 2–9 µm 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.


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.


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.

Sporae 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, cylindric 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).*

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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 basidio- 
carps, 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

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

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

Sporae 6.0–8.5 × 5.5–7.5 µm isodiametrales. Cystidia desunt. Pilepellis cutis hyphis 3.5–7.5
µm 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,
cylindric, 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 µm (spores), 30 µm (pileipellis).
Spores 6.0–8.5 × 5.5–7.5 µm, on average 7.3 × 6.9 µm, Q = 1.0–1.15, angles weak, 5–7- or many-angled, reminiscent of the spores of *Rhodocybe*. Basidia 20–35 × 6–8 µm, 4-spored, clamped. Lamella edge fertile. Cystidia absent. Pileipellis an ixocutis of narrow, cylindric to inflated hyphae 22–55(–70) × 3.5–7.5 µm; subpellis made up of cylindric to inflated hyphae to 30 µm in diameter. Pigment pale brown, intracellular in pileipellis. Hymenophoral and pileitrama consisting of short, cylindric to inflated hyphae, 17–45 × 3–7 µm. Stipitipellis a cutis of narrow, cylindric to 3 µm 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° 22' S, 147° 17' 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 & Noordeloos, *spec. nov*. — Fig. 4, Plate 4

Pileus 30–80 mm latus conico-convexus expansus leviter umbonatus bruneus indogoticus tinctus toto tomentosulus demum rimosus vel rugulosus. Stipes 30–70 × 5–7 mm (apex) × 12 mm (basis) coeruleo-fibrillosus.


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 30–80 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 = 28–42, 1 = 3–7. Stipe 30–70 × 5–7 mm (apex) × 12 mm

(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 pal-lid, 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) × 5.5–7.5 µm, on average 6.5–7.5 × 6.1–6.7 µm, Q = 1.0–1.2, (sub)isodiametric, with 5–7 weak angles and relatively thick walls. Basidia 20–34 × 8–15 µm, (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 × 20 µm. Pigment brown, intracellular. Pileitrama and hymenophoral trama made up of relatively short elements, 40–120 × 7–20 µm. Clamp-connections abundant in all tissues.

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


Fig. 4. *Entoloma indigoticoumbrinum*. Spores and pileipellis. Bar = 10 µm (spores), 30 µm (pilei-pellis).
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, cylindric 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 kermandii 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 intracellulari spadiceus. Fibulae adsunt.


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, cylindric, 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.

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


The rather small, many-angled spores are distinctive for the \textit{E. nitidum} group, but in \textit{E. kermandii} the spores are more pronouncedly angled than in \textit{E. nitidum} and \textit{E. indicotombrinum}. The stout basidiocarps are reminiscent of \textit{E. bloxamii}, which usually lacks distinct purple-violaceous tinges. \textit{Entoloma kermandii} also has some similarity to \textit{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. \textit{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.


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

Spores 9.0–11.0 × 8.5–10.0 µm, Q = 1.1–1.25, Qav = 1.15, isodiametric, 5- or 6-angled with rather distinct angles. Basidia 20–40 × 7.0–11 µm, 4-spored, clamped. Lamella edge fertile. Cheilocystidia absent. Hymenophoral trama regular, made up of medium-sized, cylindric to slightly inflated elements, 50–120 × 5–20 µm. 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. Stipitellis with numerous cylindric-flexuous caulocystidia, to 9 µm in diameter. Clamp-connections frequently observed in pileipellis, stipitellis and hymenium.

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


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, subquadrate spores,
E. burkillii Massee 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 profunce indigotius innate fibrillosus.

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


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

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


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. trachyosphorum 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


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, cylindric, 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 6.0–8.0 × 5.5–7.5 μm, Q = 1.0–1.2, Qav = 1.05, isodiametric with 5 to many weak angles, thin-walled. Basidia 14–20 × 4–10 μm, 4-spored, clamped. Lamella edge fertile. Cystidia absent. Hymenophoral trama regular, made up of short, cylindric elements, 40–90 × 8–20 μm. Pileipellis a thin (ixo)cutis of cylindric hyphae, 3–9 μm.
in diameter; subpellis well-developed, made up of inflated elements, 20–50(–90) × 6.0–20 µm. Pigment pale brown, intracellular in pileipellis. Clamp-connections frequent.

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


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

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


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
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 adnexit, 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 × 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.

Spores 9.5–14 × 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 × 6–11 \( \mu \text{m} \), 4-spored, clampless. Lamella edge sterile. Cheilocystidia not observed. Pileipellis 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 × 5–19 \( \mu \text{m} \). Stipitpellis 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.

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


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


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.

Sporae 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 ×
4–20 µm. 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 cylindric to fusiform elements, up to 20 µm in diameter. Stipitipellis a cutis of narrow, cylindric hyphae, up to 12 µm in diameter. Clamp-connections absent.

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


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


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, 1 = 3–5, 2 tiers of lamellulae. Stipe
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 spermatic. 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, Qav = 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.


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 concico-convexus expansus umbernatus hygrophanus translucido-striatus fumosus minute aerifero-pruinosus. Stipes 20–70 × 2–4 mm fumosus innate fibrillosus vel subpolitus. Odore saporeque nulis.


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 recurrent tooth, segmentiform to subventricose, to 6 mm deep,
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 \(10–13(–13.5) \times 7.0–10 \mu m\), on average \(11.5–12 \times 8.3–9.0 \mu m\), \(Q = 1.2–1.5\), many-angled (6 or 7) in side-view with rather blunt angles, thin-walled. Basidia \(20–32 \times 7–10 \mu m\), 4-spored, clamped. Lamella edge heterogeneous. Cheilocystidia \(20–49(–65) \times 4–12 \mu m\), 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 \(\mu m\) 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 \(\mu m\). Clamp-connections present.

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

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.


**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 lubricious 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

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

Habitat & distribution — Widespread in wet sclerophyll forests.


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


Sporae (9.5–)10–14 × 7.0–9.5(–10) µm irregulariter 5–6-angulatae, heterodiametrales, interdum cruciformae. Cystidia desunt. Pileipellis trichoderma elementis ad 20 µm latis. Pigmentum intracellularare. Fibulae adsunt


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 30–45 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 mm deep, greyish pink with irregular, concolorous edge, rather crowded, L = 50–60, l = 3–5. Stipe 55–70 × 3–4 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–)10–14 × 7.0–9.5(–10) µm, on average 11.0–12.5 × 7.1–8.2 µm, Q = 1.2–1.8, 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, 60–200 × 6–20 µm. Pileipellis a cutis of rather wide, inflated hyphae with trichodermal
tufts of clavate, ascending elements, 40–120 × 10–20 µm with very abundant brown pigment. Pileitrama regular, similar to hymenophoral trama. Clamp-connections rare, but present.

Habitat & distribution — Widespread in wet sclerophyll forests.


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


Sporae parvae 6.0–7.0(–7.5) × 5.0–7.0 µm isodiametrales tenuiparietales. Cystidia desunt. Pileipellis cutis hyphis cylindraceis vel inflatis 4.0–9.0 µm latis pigmento valde incrustantibus formata fibulae presentes.

Etymology — Fuligineus = 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 spermatic.

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).

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


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, fibrillos-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, spathula-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. Pileitrama regular, made up of inflated elements. Pigment rather diffusely intracellular, brown. Clamp-connections rare, seen at base of basidia and in pileipellis.
Habitat & distribution — Widespread but relatively uncommon, in wet sclerophyll forests and rainforests.

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.
Sporae parvae 7.0–9.0 × 7.0–8.5 µm (sub)isodiametales. Cystidia nulla. Pileipellis trichoderma elementis fusoideus 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, cylindric, 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.


Habitat & distribution — Widespread, in wet sclerophyll forests.


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


Etymology — Sepia = dark brown, velutinus = velvety, referring to the sepiacoloured, velvety pileus.

Main characters — Habit mycenoid to collybioid, pileus very dark sepiac brown, entirely velutinous, lamellae broadly adnate with decurrent tooth, stipe pallid, polished, cheilocystidia very prominent, lageniform, spores large, heterodiamic.
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 × 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) × 7.0–9.0(–10) µm, heterodiametric with 6–8, pronounced, rounded angles. Basidia 24–40 × 9–14 µm, 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.

Fig. 18. *Entoloma sepiaceovelutinum*. Spores, cheilocystidia, and pileipellis. Bar = 10 µm (spores), 30 µm (cheilocystidia and pileipellis).
Hymenophoral trama regular, made up of cylindric to inflated elements, 50–190 × 6–23 µm. Pileipellis a cutis with transition to a trichoderm, particularly at centre, made up of long, cylindric to clavate terminal elements, 30–70 × 6–20 µm. Pileitrama regular, made up of cylindric to slightly inflated elements, 60–160 × 7–22 µm. 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.


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.


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 hygrophanous, 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) µm, Q = 1.3–1.8, Qav = 1.50, heterodiametric, 6–8-angled in side-view with pronounced angles. Basidia 33–40 × 9–14 µm, 4-spored, clampless. Lamella edge heterogeneous. Cheilocystidia 20–30 × 5–9 µm, irregularly cylindric, narrowly clavate or lageniform, rather thin-walled and inconspicuous.
Pileipellis a cutis with transitions to a trichoderm, made up of cylindric to inflated hyphae to 20 µm in diameter, with clavate terminal elements of 40–125 × 11–25 µm. Pileitrama regular, consisting of rather narrow cylindric hyphae 4.5–9 µm 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 µm in diameter. Caulocystidia absent. Clamp-connections absent.

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


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 obcurioir glaber vel centro minute squamulosus. Stipes 11–20 × 1.5–3 mm pileo concolorus glabrus politus.


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

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


**Entoloma australoroseum** 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


Holotypus: Australia, Tasmania, Donnellys Road, 43° 07' S, 146° 54' 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-red (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, cylindric, 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 7.5–10 × (5.0–)5.5–7(–7.5) µm, on average 8.5–9.3 × 6.1–6.5 µm, Q = 1.2–1.6, usually 5–7-angled in side-view with pronounced angles. Basidia 22–34 × 8–11 µm, 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, cylindric, or lageniform cheilocystidia 20–43 × 8–14 µm, 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 indigoticumbrinum*.
Plate 5. *Entoloma kermandii.*

Plate 7. *Entoloma coeruleogracilis*.

Plate 8. *Entoloma contrastans.*
Plate 9. *Entoloma chrysopus*.

Plate 10. *Entoloma maldea*. 
Plate 11. *Entoloma obscureotenax*.

Plate 12. *Entoloma fumosopruinosum*. 
Plate 13. *Entoloma brevispermus*.

Plate 15. *Entoloma fuligineopallescens*.

Plate 16. *Entoloma stellatum*.
Plate 17. *Entoloma lepiotoides.*

Plate 18. *Entoloma sepiaceovelutinum.*
Plate 19. *Entoloma austroprunicolor.*

Plate 20. *Entoloma austroroseum.*

Plate 22. *Entoloma obscureovirens.*
Plate 23. *Entoloma albidosimulans*.

Plate 24. *Entoloma roseoluteolum*. 
Plate 25. *Entoloma aurantiolabes.*

Plate 27. *Entoloma stramineopallescens*.

Plate 28. *Entoloma albidocoeruleum*.

Plate 29. *Entoloma tomentosilacinum*. 
Plate 30. *Entoloma camarophyllus*.

Plate 31. *Entoloma australrhodocalyx*. 
Plate 32. *Entoloma percrinitum*.

Plate 33. *Entoloma choanomorphum*. 

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granulose, pale carmine, intracellular pigment. Hymenophoral trama regular, made up of cylindric elements, 60–120 × 5–15 µm, often with some pale brownish intracellular pigment. Pileipellis a cutis with transitions to a trichoderm, made up of repent, cylindric hyphae, 4–14 µm in diameter, with (sub)clavate terminal elements, 34–70 × 5–16 µm. 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.


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 marginem inflexum obscure grisoebrunneus vel grisoeater interdum virido tintus centro velutino demum squamuloso versus marginem virgatus. Lamellae roseae grisoe-tinctae marginem fimbriato. Stipes 30–60 × 3–10 mm pileo grisoevirens fibrillosus.


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

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


*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
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


Sporae 8.5–11 × 7.0–8.5 µm 6–7-angulatae. Acies lamellarum sterilis. Cheilocystidia 20–50 × 5.0–9.5 µm cylindracea vel clavata. Pilepellis trichodermalis elementis 4.0–14 µm latis elementis terminals ad 20 µm latis, epigmentatis. Fibulae adsunt.


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 planate 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.

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**Fig. 23. Entoloma albidosimulans. Spores, cheilocystidia, and pileipellis. Bar = 10 µm (spores), 30 µm (cheilocystidia and pileipellis).**
Stipe 20–30 × 2–3 mm, cylindric, 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 µm, on average 10.0–10.6 × 7.5–7.7 µm, 6- or 7-angular with rather simple angles. Basidia 18–30 × 7.0–11 µm, 4-spored, clamped. Lamella edge sterile, with dense clusters of fusiform, lageniform, cylindric to narrowly clavate cheilocystidia, 20–50 × 5.0–9.5 µm, rarely interspersed with scattered basidia. Brilliant granules not observed or sparse. Pileipellis a cutis with transitions to a trichoderm, made up of cylindric hyphae, 4.0–14 µm in diameter, with clavate terminal elements, to 20 µm 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 clamped 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, cylindric cheilocystidia.

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


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-fibrillosse towards margin. Lamellae adnate, segmentiform, to 4 mm deep, pink, with concolorous, entire edge, thin,
moderately crowded, with 2 tiers of lamellulae. Stipe 60–65 × 4.0–55 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 × (6.0–)7.0–8.0 µm, (5- or) 6- or 7-angled in side-view. Basidia 15–22 × 7.0–11 µm. Lamella edge fertile. Cystidia absent. Hymenophoral trama regular, made up of cylindric to slightly inflated elements, to 18 µm 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 × 11–20 µm with pale pinkish brown intracellular pigment. Pileitrama regular, made up of inflated elements, 40–120 × 6.0–20 µm with abundant brilliant granules. Vascular hyphae abundant. Stipitipellis a cutis of cylindric hyphae 5.0–9.0 µm in diameter. Clamp-connections absent.

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


*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 ritaee* 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 aurario labes.


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).](image-url)
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 µm, Q = 1.2–1.6, rather irregularly 5–7-angled in side-view, Basidia 19–32 × 8.0–11 µm, 4-spored, clampless. Lamella edge sterile. Cheilocystidia cylindric-clavate, 19–40 × 6.0–13 µm, usually colourless, occasionally with brown intracellular pigment. Hymenophoral trama regular, made up of cylindric to inflated elements, to 20 µm in diameter. Pileipellis a transition between a cutis and a trichoderm, made up of cylindric to inflated hyphae, 8–15 µm in diameter, with clavate terminal elements, to 26 µm 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.


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


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 µm (spores), 30 µm (cheilocystidia and pileipellis).
Spores 10–11 × 7.0–8.0 µm, Q = 1.2–1.6, 6- or 7-angled in side-view. Basidia 28–35 × 5–11 µm, 4-spored, clampsless. Lamella edge sterile. Cheilocystidia 40–60 × 8–14 µm, clavate with brown, intracellular pigment. Hymenophoral trama regular, made up of cylindrical hyphae, to 15 µm broad. Brilliant granules abundant. Pileipellis a cutis of cylindrical hyphae, 4–16 µm in diameter, with scattered trichodermal tufts of clavate terminal elements, 40–60 × 8–14 µm. Pigment golden brown, intracellular in pileipellis and upper pileitrama. Pileitrama regular to irregular, made up of cylindrical to inflated hyphae, to 25 µm in diameter. Brilliant granules abundant in trama. Clamp-connections absent.

Habitat & distribution — Common, in wet sclerophyll forests.


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 rubescenipes 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


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

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

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

Fig. 27. *Entoloma stramineopallescens*. Spores, cheilocystidia, and pileipellis. Bar = 10 µm (spores), 30 µm (cheilocystidia and pileipellis).

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


Fig. 28. *Entoloma albidoceeruleum*. Spores, cheilocystidia, and pileipellis. Bar = 10 Űm (spores), 30 Űm (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, hygrophanous, 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.


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


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.

Sporae (5.5–)6.0–7.0 × 5.5–7.0 µm (sub)isodiametricae. Cystidia desunt. Pileipellis trichoderma elementis septatis inflates 10–15 µm latis pigmentis intracellulosae vel parietalis constituit. Fibulae rarae.


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.
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 × 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 fibrilloose, shiny, with white basal tomentum. Odour farinaceous or spermatic. Taste salty to farinaceous.

Spores (5.5–)6.0–7.0 × 5.5–7.0 µm, Q = 1.0–1.2, isodiametric to subisodiametric, with very thin walls, slightly but distinctly 7–many-angled in side-view. Basidia 30–40 × 9–13 µm, 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 µm in diameter with trichodermal clusters of (semi)erect septate terminal endings, to 20 µm 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...
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 camarophyllus G. Gates & Noordel., spec. nov. — Fig. 30, Plate 30


Etymology — Referring to the habit which resembles a Camarophyllus species.

Main characters — Habit omphalinoid, 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 Camarophyllus), 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 cartilaginous, 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, Qav = 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
minutely encrusted pigment in places. Pileipellis a compact cutis of cylindric elements, 1.5–7 µm in diameter, sometimes with some tufts of ascending, coralloid or clavate terminal elements, to 7 µm in diameter, gradually passing into pileitrama. Pileitrama subregular, made up of short, inflated elements, 22–55(–70) × 8–15 µm. Pigment difficult to observe, intracellular and parietal, or with few encrustations. Stipitipellis a cutis of cylindric hyphae 2–9 µm in diameter. Caulocystidia absent. Clamp-connections absent.

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


The spores of this remarkable species, which mimics a Camarophyllus or Camarophyllopsis, 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 australrhodocalyx* G. Gates & Noordel., *spec. nov.* — Fig. 31, Plate 31


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.


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

Main characters — Basidiocarps small, omphaloid, 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.

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

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


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, cylindric, 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

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**Fig. 32. Entoloma percrinitum.** Spores and pileipellis. Bar = 10 μm (spores), 30 μm (pileipellis).
regular, made up of cylindric to inflated elements, 50–95(–120) × 7–25 µm with brown-coloured, coarsely encrusted walls. Pileipellis a differentiated cutis with transitions to a trichoderm, made up of fascicles of septate, cylindric hyphae, 5–12 µm in diameter, with cylindric to narrowly clavate terminal elements. Pigment brown, parietal to coarsely encrusting. Pileitrama regular, made up of cylindric to inflated elements, 40–100 × 8–17 µm with brown encrusted walls. Stipitellis a cutis of cylindric hyphae, 4–10 µm 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.


This small *Entoloma* keys out in sect. Undati on account of the omphalinoid habit, isodiametric spores, and differentiated pilepellis 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 different microscopically.

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


Etymology — Choano = funnel, morphum = shaped.

Main characters — Habit omphalinoind, brown; smell strong, like burnt rubber or subsulphurous; 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 × 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 × 8.0–11 µm, Q = 1.2–1.5, irregularly 6- or 7-angular in side-view. Basidia 24–46 × 7–12 µm, 2–4-spored, clamped. Lamella edge heterogeneous. Cheilocystidia scattered to abundant, mixed among basidia, 40–100 × 6–12 × 2–5 µm, 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 × 4–18 µm. Brilliant granules not observed.
Pileipellis a cutis of cylindric to inflated hyphae, 6–12 μm in diameter, with subclavate to clavate terminal repent or slightly ascending elements, 30–60 × 8–15 μm. Pigment dark brown, intracellular in pileipellis and upper pileitrama. Pileitrama regular, made up of cylindric to inflated elements, 40–170 × 5–20 μm. Clamp-connections absent.

Habitat & distribution — Widespread, in wet sclerophyll forests.


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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