

A new species of *Hypholoma* from coastal grasslands of Gallura (Sardinia, Italy)

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Vizzini A., Contu M. & Musumeci E. (2010) A new species of *Hypholoma* from coastal grasslands of Gallura (Sardinia, Italy). – *Sydowia* 62 (2): 317–323.

Hypholoma litorale is described as a new species on the basis of collections made near Olbia (Sardinia, Italy), in coastal grasslands. It seems to be close to the north-American species *H. olivaceotinctum*, but it differs in several respects both macro- and micromorphologically. Photographs of fresh material and of the main micromorphological features of the new species are provided.

Keywords: *Agaricomycetes*, *Strophariaceae*, *Hypholoma litorale* sp. nov., taxonomy.

During a survey of the macrofungi of coastal grasslands near Olbia (Sardinia), a remarkable species of *Hypholoma* (Fr.) P. Kumm. was collected. It is well characterized by a very thin veil forming a fibrillose-arachnoid pseudoannulus in fully developed basidiomata, pale ellipsoid basidiospores with a rudimental germ pore, and coarsely incrustated hyphae in the gelatinized pileipellis. A thorough worldwide bibliographic search, including monographic treatments and papers by Smith (1951), Watling & Gregory (1987), Noordeloos (1999a,b), and Vesterholt & Rald (2008), confirmed the unique nature of this species.

The aim of the paper is to provide a diagnosis, a comprehensive description, and illustrations of this new species.

Materials and Methods

The description of macro- and microscopical features are drawn from notes taken on fresh material. The observations of microscopic features were made on material mounted in distilled water, PhloxinB, Melzer's reagent, 3% KOH and in Congo red. Spore size is expressed both as a range and mean value based on 32 randomly-chosen spores. Author citations follow the Index Fungorum Authors of Fungal Names website (<http://www.indexfungorum.org/names/AuthorsOfFungalNames.asp>). Herbarium abbreviations are according to Thiers (2010).

Colour notations in the macroscopic descriptions refer to the Flora of British Fungi colour identification chart (1969). In the microscopic descriptions the following abbreviations are used: Q for the quotient of length and width of the spores and Qm for the average quotient. (Bc) is the abbreviation for Flora of British Fungi colour identification chart (1969). All the material examined is housed at TO (Herbarium generale del Dipartimento di Biologia Vegetale, Università degli Studi di Torino, Italy). The new species epithet was deposited in MycoBank (<http://www.mycobank.org/DefaultPage.aspx>).

Taxonomy

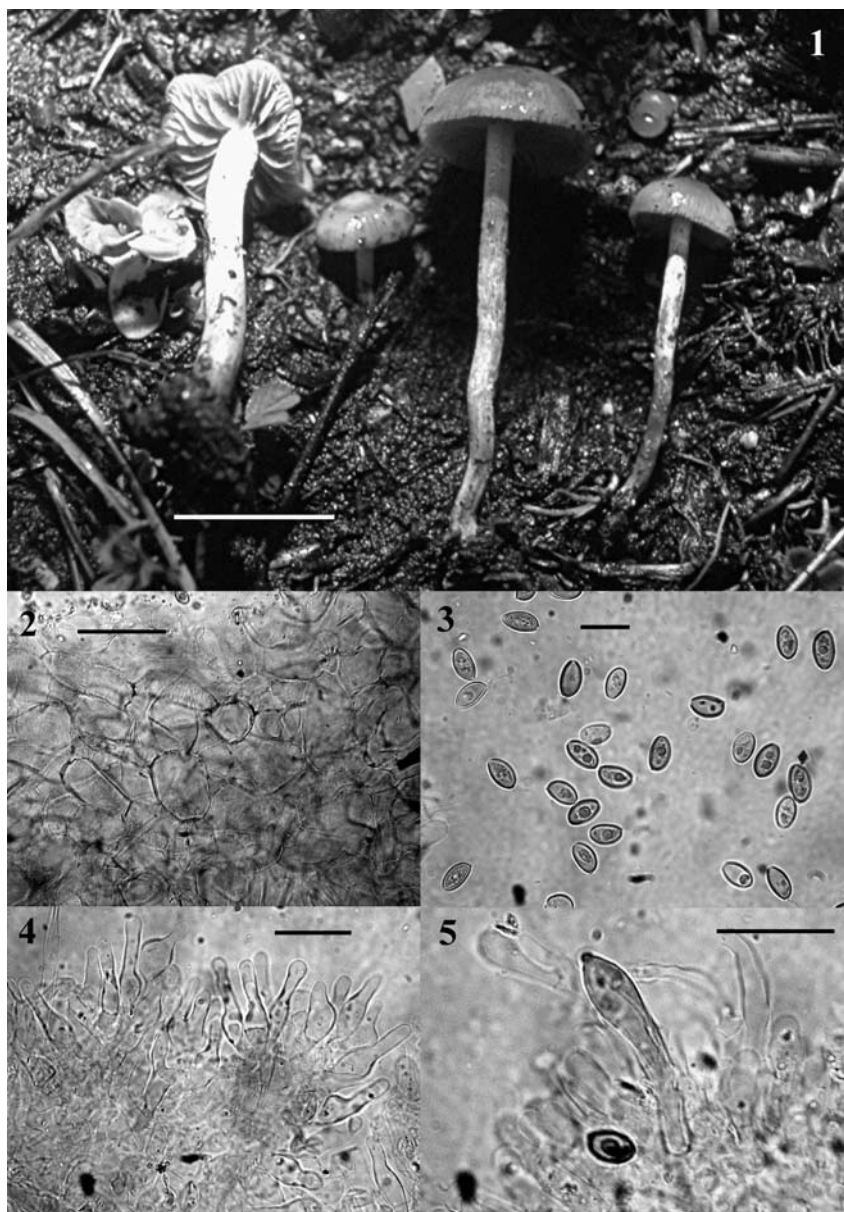
Hypholoma litorale Vizzini, Contu & Musumeci **sp. nov.** – Figs. 1–11.
MycoBank no.: MB 516534

Pileus 12–32 mm latus, convexus vel subcampanulatus dein explanatus et saepe papillatus vel umbonatus, iove pluvio viscidulus deinde siccus, laevis, olivaceo-brunneus, hygrophanus, celeriter pallide ochraceus, saepe flocculis albidis veli ad marginem obecto; iove pluvio striatus usque ad medium. Lamellae late adnatae vel triangulares, pallide violaceae vel brunneo-griseae vel ochraceo-brunneae deinde brunneae, ad aciem albiae. Stipes 35–50 x 1.5–2.5 mm, exannulatus, cylindricus vel flexuosus, ochraceus, ad basim fuscescens, in juventute pruina alba omnino decorato. Annulus subfibrillosus numquam submembranaceus. Contextus ochraceus, ad basim stipitus obscure brunneus, immutabilis, haud caerulescens. Odor gratus. Sapor mitis. Sporarum pulvis fusco-brunnea. Sporae 7.5–9(–10.5) x 4.2–5.0 (5.2) μ m, ellipsoideae-elongatae frontaliter et lateraliter, crassotunicatae sed pallidae, brunneae vel tenuiter violaceae, poro germinativo reducto vel nullo. Basidia 20–32 x 6.5–7.5 μ m, plerumque tetraspora, saepe ad medium constricta. Trama lamellarum ex cellulis largioribus, hyalinis efformata. Pleurocystidia 25–35(40) x 7–9 μ m, fusiformia-mucronata vel clavato-rostrata, in KOH 3% flavescens (crysocystidia). Cheilocystidia 22–45 x 6–8 μ m, numerosa, hyalina, ventricosa sublageniformia vel fusiformia, hyalina, tenuitunicata, collo simplici vel raro biarticulato. Pilei cutis tenuis, gelatinosa, ex hyphis intertextis, cylindricis, incrustatis, 2–5.5 μ m latis; subcutis pseudoparenchymatica. Caulocystidia praesentes, 25–37 x 5–8 μ m, hyalina, ventricosa sublageniformia vel fusiformia, tenuitunicata. Hyphae fibulatae.

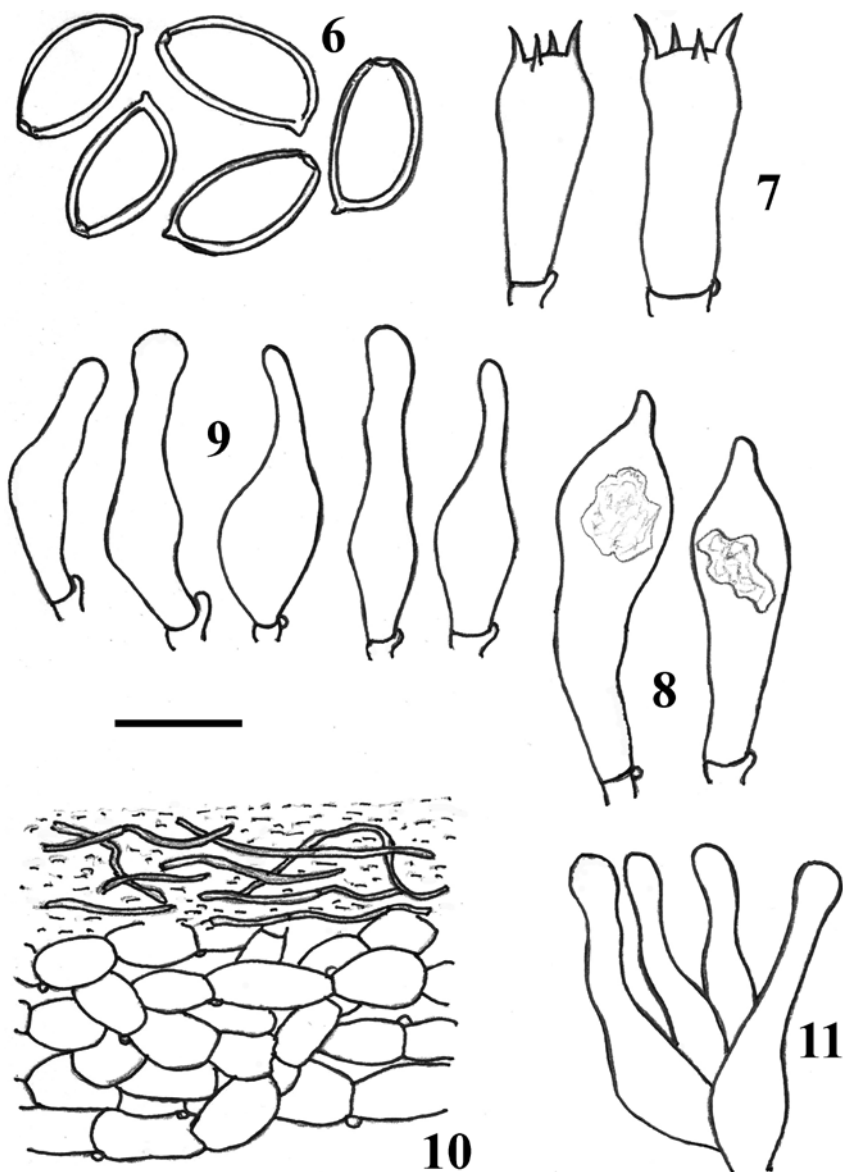
Habitat. – ad terram, in herbis locis prope mare. *Hiemalis.*

Holotypus. – Sardinia, prov. Olbia-Tempio P., Olbia, loc. “Pittulongu”, 26 Aug 2009, leg. M. Contu (TO HG1974).

Pileus 12–32 mm in diam., convex or subcampanulate, then plano-convex, subpapillate or subumbonate, lubricous, entirely striate, but soon dry, olivaceous-brown (Bc 26, 61, 62), becoming paler towards the centre, hygrophanous, readily turning pale ochre or yellow with age (Bc 51), pellicle not peeling. Veil present as a fine fibrillose-arachnoid white covering of the marginal zone of the pileus. Lamellae broadly adnate or triangular, moderately crowded, greyish-ochre (Bc 80) to brownish-violet or brown (Bc 26, 35), finally dark brown (Bc 37), edges whitish and subfloccose, not turning blue-green to blackish when bruised. Stipe 35–50 x 1.5–2.5 mm, cylindrical or slightly thickened at the base, often somewhat flexuous, hollow, ochraceous (Bc 29, 32) readily turning fuscous-brown (Bc 25, 17) downwards,



Figs. 1–5. – *Hypholoma litorale* (holotype): **1.** Fresh basidiomes (bar = 30 mm). **2.** Subpellis (bar = 40 µm). **3.** Basidiospores (bar = 10 µm). **4.** Cheileptocystidia (bar = 20 µm). **5.** Pleurocystidium (chrysocystidium) (bar = 20 µm).



Figs. 6–11. – *Hypholoma litorale* (holotype): **6.** Basidiospores (bar = 5 µm). **7.** Basidia (bar = 10 µm). **8.** Pleurocystidia (chrysocystidia) (bar = 8 µm). **9.** Cheileleptocystidia (bar = 10 µm). **10.** Pileipellis (bar = 50 µm). **11.** Caulocystidia (bar = 10 µm).

covered by an abundant, but transient, white pruina. Veil not well developed, white, cortinate, forming a thin, fibrillose annulus. Context fragile, ochraceous (Bc 29), turning dark fuscous-brown (Bc 17) towards the stipe base. Dried basidiomata are olivaceous (Bc 62). Odour rather peculiar, but hard to pin down, with a pleasant fungous component. Taste slightly fungous, mild. Spore print dark blackish-brown.

Basidiospores 7.5–9.0 (–10.5) $\times$ 4.2–5.0 (–5.2) μm ($n = 32$), on average $8.7 \times 4.59 \mu\text{m}$, $Q = 1.7\text{--}2(2.1)$, $Q_m = 1.89$, mostly with a pale brown tinge in water, more rarely pale violaceous, pale ochraceous-yellow to yellowish brown in Congo red, PhloxinB and 3%KOH, ellipsoid-subelongate in front view, sometimes also subfusiform in side view, smooth, with slightly thickened, deep brown wall and a very reduced, subtruncate germ pore, 0.5–0.8 μm wide. **Basidia** 20–32 $\times$ 6.5–7.5 μm , subclavate, usually with a medial constriction, hyaline and thin-walled, 4-spored, clamped; subhymenium thin, not well-differentiated. **Hymenophoral trama** regular, made up of very large, inflated, hyaline, catenulate cells, up to 42 μm wide. **Pleurocystidia** 25–35(40) $\times$ 7–9 μm , scarce to very rare but present as chrysocystidia, fusiform, with mucronate apex, sometimes rostrate; smooth and thin-walled, with amorphous yellowish contents, hyaline when very young. **Cheileptocystidia** 22–45 $\times$ 6–8 μm , very abundant, hyaline, ventricose-sublageniform to lageniform-subfusiform, often with a rounded apex, infrequently bifurcate, with slightly thickened wall, sometimes with a brown basal part. **Cheilochrysocystidia** very rare and observed only near the extreme edge. **Pileus surface** a gelatinized cutis made up of cylindrical 2–5.5 μm wide hyphae, tightly interwoven and coarsely encrusted by an olivaceous pigment, well differentiated from the subpellis which is composed of very large, inflated and often globose to subglobose elements, 4–40 μm wide, thin to slightly thick-walled, coarsely encrusted by a brown pigment. **Stipe** covering a cutis of parallel, cylindrical hyphae with abundant caulocystidia, 25–37 $\times$ 5–8 μm wide, having the very same morphology as cheileptocystidia. **Clamp connections** present at most septa.

Etymology. – The specific epithet is derived from the Latin adjective *litoralis*, *litoralis*, *litorale* (= coastal) and therefore meaning a species growing in coastal areas.

Habitat and distribution. – Gregarious, saprobic on graminaceous debris usually mixed with cow dung, in disturbed and sandy-peaty soil, in coastal grasslands, near the sea. In winter. Thus far known only from Sardinia.

Material examined. – ITALY, Sardinia, prov. Olbia-Tempio P., loc. “Pit-tulongu”, 6 Dec 2009, *leg.* A. Vizzini & M. Contu (TO HG1975); *ibidem*, 20 Dec 2009,

Discussion

The genus *Hypholoma* belongs to the *Strophariaceae* Singer & A.H. Sm. s. str. (Matheny *et al.* 2006, Bridge *et al.* 2008) where it is well-circumscribed by the unique combination of the presence of chrysocystidia and a pseudoparenchymatic subpellis. Within the genus, this new species seems to be close to *Hypholoma olivaceotinctum* (Kauffman.) Pomerl., a North American species described from conifer woods, growing on rich humus and on debris, and characterized by a brown-olivaceous pileus (Smith 1951); later it has been recorded also from The Netherlands on decaying grasses in grasslands on moist and sandy soil, and in moist places on dead fragments of *Phragmitis australis*, outside of the woods (Arnolds 1982, as “*Hypholoma intermedium* nom. prov.”; Noordeloos 1999a,b, as “*Psilocybe olivaceotincta* Kauffman”).

H. olivaceotinctum differs from *H. litorale* by having no veil, a slightly greasy pileus, a glabrous stipe being pruinose only at apex, bigger (up to 11–12 µm long), more narrowly ellipsoid to ventricose, and sometimes slightly amygdaliform basidiospores, definitely darker basidiospores in water mounts, and, finally, for the occurrence of minutely incrusting pigment in the hyphae of the pileus surface (Smith 1951, Noordeloos 1999a,b).

H. fulvidulum P.D. Orton, recently described from a Scottish forest (Orton 1999), is distinguished by the rusty brick or orange sienna, dry pileus surface (micromorphologically made up of a xerocutis), ellipsoid-amygdaliform basidiospores in side view, thin-walled cheilocystidia, wider pleurochrysocystidia (x 8–14 µm), smaller elements of the subpellis (< 28 µm), and a hygrophilous habitat on peaty soil or in moss.

We have not been able to find any other described species comparable with our agaric.

Acknowledgments

We are very grateful to Prof. E. Grilli (Popoli, Italy) for the critical and linguistic revision of the manuscript.

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(Manuscript accepted 31 August 2010; Corresponding Editor: Ursula Peintner)

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Artikel/Article: [A new species of *Hypholoma* from coastal grasslands of Gallura \(Sardinia, Italy\) 317-323](#)