

***Entoloma reinwaldii*, a rare species new to Croatia**

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Abstract — *Entoloma reinwaldii* is recorded as new to Croatian mycobiota and described. The description is accompanied by black and white photographs of fresh basidiocarps and microscopic characters.

Key words — *Entolomataceae*, *Agaricales*, taxonomy, biodiversity, biogeography

Introduction

During the research of rockrose garigue (*Cistus* spp.) mycobiota in Mediterranean part of Croatia in 2000, we found two collections of beautiful pink-colored species of *Entoloma* (Fr.) P. Kumm. After microscopic examination and consultation of the literature it became clear that our collections belonged to a then undescribed species of subgenus *Leptonia* (Fr.) Noordel., section *Cyanula* (Romagn.) Noordel. Soon after that, Noordeloos & Hausknecht (2001) described this species as new, under the name *Entoloma reinwaldii*, from a similar Mediterranean habitat in Italy.

Materials and methods

Our study of *Entoloma reinwaldii* is based on two collections consisting of nine basidiocarps. The photograph of basidiocarps was taken in the field. The description of macroscopic characters is based on observations of fresh basidiocarps. Basidiocarps were preserved by drying. Microscopic features were observed by a light microscope (brightfield) with magnification up to 1500 × and photographed with a digital camera. The description and photographs of microscopic characters were made from rehydrated dried specimens mounted

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in 5% potassium hydroxide (KOH) solution. Spore measurements were made from the mounts of lamellae and based on calibrated digital photographs. One mature basidiocarp was selected from each collection and 50 randomly selected spores (100 spores in total) were measured without the apiculus. Spore measurements (length, width) are given as: (min.) stat. min.–av.–stat. max. (max), where “min.” = minimum (lowest measured value), “stat. min.” = statistical minimum (arithmetic average minus two times standard deviation), “av.” = arithmetic average, “stat. max.” = statistical maximum (arithmetic average plus two times standard deviation), “max.” = maximum (highest measured value). The range of arithmetic averages (av.) of spore measurements of each particular collection is also given. Standard deviation (SD) of spore length and width is given as: min.–total–max, where “min.” = collection with lower SD value, “total” = SD value of all 100 measured spores, and “max” = collection with higher SD value. The length/width ratio of spores is given as the “Q” value (min.–av.–max.), and the range of arithmetic averages of “Q” value (Q av.) of each particular collection is also given. Both Croatian collections with accompanied data are deposited at the Croatian National Fungarium in Zagreb (CNF).

Taxonomic description

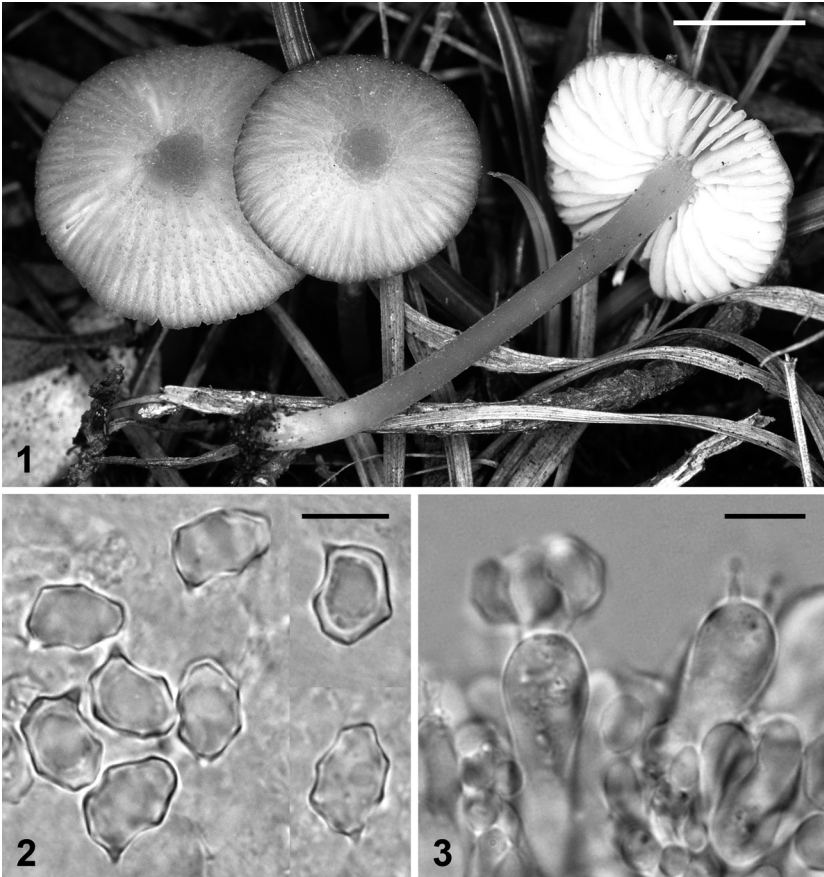
Entoloma reinwaldii Noordel. & Hauskn.,

Boll. Gruppo Micol. G. Bresadola, n.s. 43(3): 26, 2001.

FIGS 1–9

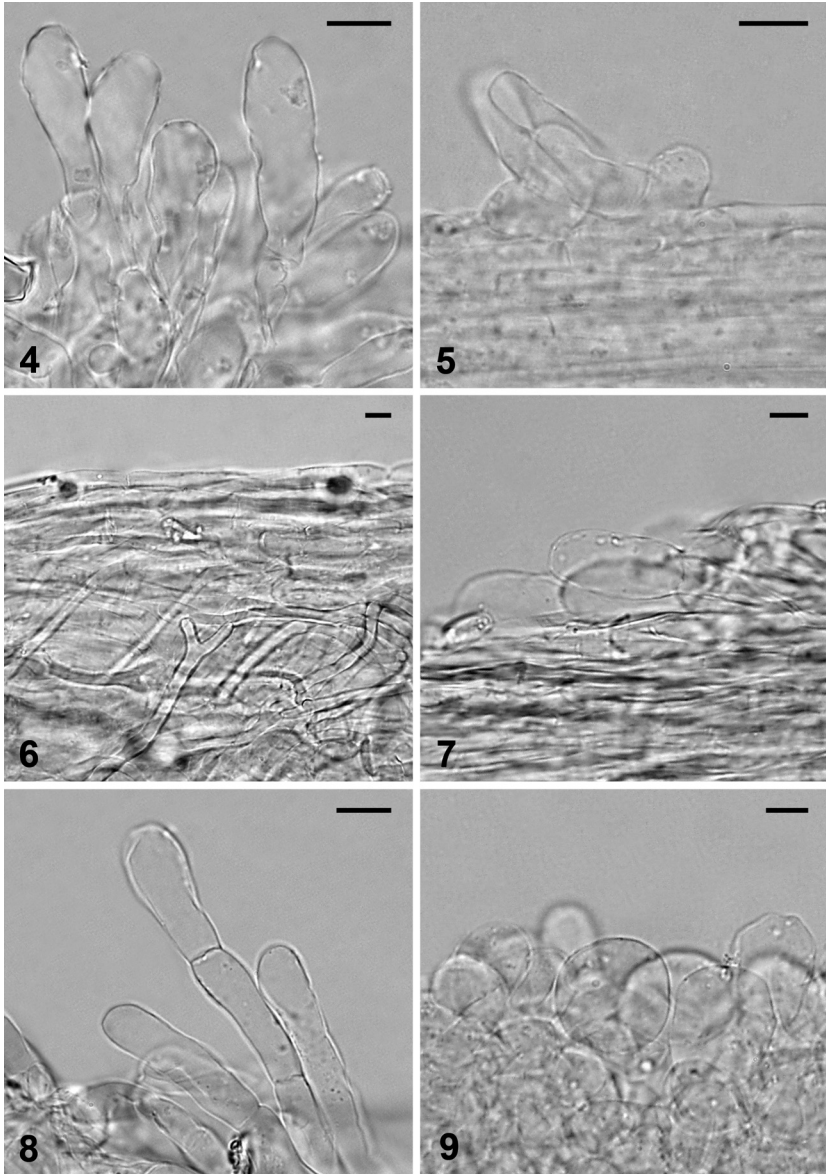
PILEUS 13–22 mm broad, subhemispherical to truncately conical at first, later convex to plano-convex, often with applanate or depressed center, hygrophanous, pink, lilac pink, orangish pink or brownish pink when moist, pale pink on drying, more intensely colored at center, translucently striate up to 3/4 of radius, minutely squamulose, also somewhat radially fibrillose near margin, dry. LAMELLAE adnexed to emarginate, moderately distant to moderately crowded, whitish to pinkish (sometimes with lilac tinge) at first, then dirty pink, with entire, concolorous edge. STIPE 35–60 × 1.5–2.5 mm, subcylindrical, slightly broadened at apex, dirty pink, minutely pubescent to pruinose under a hand-lens (especially at apex), lower part often glabrous, white tomentose at base, dry, fistulose. CONTEXT whitish to pinkish. SMELL weak, pleasant. TASTE mild, somewhat fruity.

SPORES (9.6–)10.0–11.3–12.5(–12.7) × (6.7–)6.8–7.8–8.9(–9.1) μm, av. 11.2–11.3 × 7.8–7.9 μm; SD = 0.64–0.64–0.64 × 0.47–0.51–0.55, Q = 1.22–1.44–1.68, Q av. = 1.43–1.45, heterodiametrical, with (5–)6–8(–9) regular to irregular angles in side view, dirty yellowish with some pink reflections in KOH (pink color more visible in water), thin-walled. BASIDIA 25–36 × 9–13 μm, clavate to subcylindrical, 4-spored, thin-walled, clampless. LAMELLAR EDGE sterile towards the margin of the pileus, heterogeneous towards the stipe. CHEILOCYSTIDIA



Figs 1–3. *Entoloma reinwaldii*. 1. Basidiocarps. 2. Spores. 3. Basidia.
Bars: 1 = 10 mm; 2 & 3 = 10 µm.

usually septate, thin-walled, hyaline, terminal elements clavate to subcylindrical, $17\text{--}61 \times 6\text{--}14 \mu\text{m}$. PLEUROCYSTIDIA absent. HYMENOPHORAL TRAMA regular, composed of $1.5\text{--}23 \mu\text{m}$ broad, thin-walled, hyaline hyphae. PILEIPELLIS a cutis (except at disc) composed of hyaline to brownish, thin-walled hyphae, with scattered bundles of repent to ascending, clavate to subcylindrical, $7\text{--}20 \mu\text{m}$ broad terminal elements; a hymeniderm to trichoderm at disc, composed of inflated elements, $23\text{--}50 \times 12\text{--}28 \mu\text{m}$; pigment intracellular. REFRACTIVE HYPHAE abundant in pileitrama, also present in hymenopodium, $2.5\text{--}8\text{--}(10) \mu\text{m}$ broad, yellowish, thin-walled. STIPITIPELLIS a cutis composed of thin-walled, hyaline hyphae, with scattered bundles of ascending, \pm cylindrical elements (especially at apex of stipe). CLAMP CONNECTIONS absent.



Figs 4–9. *Entoloma reinwaldii*. 4. Cheilocystidia. 5. Stipitipellis. 6. Pileipellis (cutis) and pileitrama with refractive hyphae. 7. Bundles of repent terminal elements in pileipellis. 8. Bundles of ascending terminal elements in pileipellis. 9. Pileipellis at disc (hymeniderm). Bars = 10 μ m.

HABITAT: Garigue with *Cistus monspeliensis*, *C. salviifolius*, *C. incanus*, *Erica arborea*, *Juniperus oxycedrus* subsp. *macrocarpa*, and *Phillyrea* sp., on soil.

COLLECTIONS EXAMINED: CROATIA, Istria, Premantura peninsula (near the town of Pula), 44°46'07"N, 13°55'04"E, alt. 25 m, 2 December 2000, leg. Z. Tkalčec & A. Mešić (CNF 1/2111, 1/2117).

Discussion

Entoloma reinwaldii is characterized by pink basidiocarps, collybioid habit, minutely squamulose, hygrophanous, and translucently striate pileus, pileipellis a trichoderm to hymeniderm at center and a cutis with scattered bundles of repent hyphae elsewhere, absence of clamp connections, and clavate to cylindrical cheilocystidia. In the section *Cyanula*, nine more European species with pink or distinctly pink tinged pileus are known. *Entoloma catalaunicum* (Singer) Noordel., *E. queletii* (Boud.) Noordel., *E. roseotinctum* Noordel. & Liiv, *E. roseum* (Longyear) Hesler, and *E. rufocarneum* (Berk.) Noordel. can be differentiated from *E. reinwaldii* by their not hygrophanous and not (or hardly) translucently striate pileus. *Entoloma ianthinum* (Romagn. & J. Favre) Noordel. differs by complete absence of cheilocystidia, *E. ursulae* Noordel. et al. differs by dark blue stipe, *E. callirhodon* Hauskn. & Noordel. differs by darker (reddish lilaceous), fimbriate lamellar edge, and *E. cyanulum* var. *roseolum* Noordel. & Sullock-Enzlin differs by somewhat larger spores, papillate pileus, and smaller basidiocarps. Descriptions and illustrations of these species can be found in Noordeloos (1992, 2004).

Entoloma reinwaldii is a rare species. According to our knowledge, hitherto it has been found in four European countries: Italy (Noordeloos & Hausknecht 2001), France (Lejeune 2001), Spain (Vila & Caballero 2007), and Croatia. In each of these countries, the species is known from only one locality. In Italy, it was found on 19 and 21 November 1997 (two records), in province of Foggia, Mattinata, Tratturita, in Mediterranean macchia of *Pistacia lentiscus*, *Cistus monspeliensis*, *Quercus coccifera*, and *Q. ilex*. In France, it was found on 10 September 2000, in Robertsau forest at the periphery of Strasbourg, in a forest of *Populus* sp., *Acer* sp., and *Corylus* sp. In Spain, it was found on 7 October 2006, in Serra d'Heures, Sant Hilari Sacalm (Girona), in a forest of *Corylus avellana*, *Quercus pubescens*, *Fagus sylvatica* and *Fraxinus* sp. It can be concluded that *Entoloma reinwaldii* lives in different types of habitats with wood or shrub vegetation, in Mediterranean and continental climates.

Our collections show some differences compared to collections described in the literature. (i) Lilac tinges in the pileus, which are present in some basidiocarps of our collections, are not mentioned by any other author. Moreover, in his dichotomous key Noordeloos (2004: 814, 815) emphasized that the pileus of

Entoloma reinwaldii has no lilaceous tinge. (ii) In our collections lamellae are adnexed to emarginate, while in the other descriptions lamellae are said to be more variable and also can vary from adnate to (sub)decurrent. (iii) Spores in the French collection (Lejeune 2001) are slightly shorter ([8.8–]10–11.2 × 8 μm). (iv) Noordeloos & Hausknecht (2001) and Lejeune (2001) described lamellar edge as completely sterile, while basidiocarps in our collections have sterile (towards the margin of the pileus) to heterogeneous (towards the stipe) lamellar edges. The collection of Vila & Caballero (2007) also shows variability of lamellar edge, where cheilocystidia are abundant in some basidiocarps and absent in others. (v) All authors described pileipellis at the center of pileus as a trichoderm, while basidiocarps in our collections have a hymeniderm to trichoderm with more inflated elements. (vi) Our collections have abundant refractive hyphae in pileal trama (also present in the hymenopodium), which is not mentioned by the other authors.

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