

## Interesting species of *Conocybe* (*Agaricales*, *Bolbitiaceae*) from Gallura (NE Sardinia, Italy)

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**Key words:** *Agaricales*, *Bolbitiaceae*, *Conocybe*. – New species, new section. – Mycoflora of Italy.

**Abstract:** Some interesting records of *Conocybe* from Gallura (NE Sardinia, Italy) are presented. A new species, *C. inopinata*, and a new section, *Conocybe* sect. *Inopinatae*, are described. Microscopical drawings and colour plates of three species are given. The new combination *Conocybe brunneidisca* is proposed.

**Zusammenfassung:** Einige interessante Aufsammlungen aus der Gattung *Conocybe* aus Gallura (NE Sardinien, Italien) werden vorgestellt. Eine neue Art, *C. inopinata*, und eine neue Sektion, *Conocybe* sect. *Inopinatae*, werden beschrieben, und Mikrozeichnungen sowie Farbbilder von drei Arten werden gegeben. Die Neukombination *Conocybe brunneidisca* wird vorgeschlagen.

During the study of the mycoflora of Gallura, NE Sardinia, started in 2000, the second author, M. C., has paid special attention to the fungi growing in urban or suburban zones or in areas subjected to strong anthropogenic influence. To this aim some urban areas of Olbia city and its outskirts have been explored and, particularly, the city park "Fausto Noce", abounding in fungi and composed by many flower-beds well kept and regularly sprinkled, with an arboreous covering of *Phoenix*, *Populus* and *Salix*. In this place many interesting species, some of which new to science, have been found (CONTU 1998, 2003, 2004, 2007; CONTU & BON 2000; CONTU & ORTEGA 2002; CONTU & HAUSKNECHT 2007). In the park, within the „Tennis Club Terranova“, in a periodically wrinkled flower-bed, eight collections of a *Conocybe* species with micro-morphological characters quite uncommon for this genus have been made. This *Conocybe* is described here later on as the new species *Conocybe inopinata* and designated as the type of a new section.

In some other well kept and daily wrinkled flower-beds of Olbia city, wealthy in *Bolbitiaceae* (CONTU & HAUSKNECHT 2006), many collections have been made of a noteworthy species of section *Pilosellae*, recently described as *Conocybe nigrescens* HAUSKN. & GUBITZ (HAUSKNECHT & GUBITZ 2006), found in the garden of the nursery-school "L'Aquilone".

In a salty barren moor, with a vegetation composed by a few shrubs and scattered lawns, used as a temporary parking area for Transports Internationaux Routiers and heavy cargos in the Industrial Port of Olbia, the second author found, in 2006, a very rare species, *Conocybe roberti* SINGER & HAUSKN. It was known before from the type collection in Austria.

Another species, *Conocybe moseri* WATLING, with somewhat too pale colours, was found in a small burnt area within a wood of *Quercus suber* L. in the outskirts of Calangianus. Collections of *Conocybe* species in woods of *Quercus suber* are rare and unusual in Sardinia, even though the first author was able to find, in the material sent to him by M. C. for determination, some uncommon species as, e.g., *Conocybe tenera* (PERS.: FR.) FAYOD, together with some other species undoubtedly more common but collected in this very special habitat, for instance a small-spored form of *C. pubescens* (GILLET) KÜHNER growing on decomposed wood of *Quercus suber* and found in the vicinity of Aggius (WU 22787-22790, 27552).

Recently, the first author was able to study the type material of *Mycena brunneidisca* MURRILL, which has not been discussed in his type studies of North American species of *Bolbitiaceae* (HAUSKNECHT & al. 2004). It turned out to be a *Conocybe* species, conspecific with *Conocybe lenticulospora* WATLING. The new combination *Conocybe brunneidisca* (MURRILL) HAUSKN. is proposed.

### Type study of *Mycena brunneidisca* MURRILL (Fig. 1 e-h)

Spores:  $10\text{--}11.5\text{--}(12) \times 7.5\text{--}8\text{--}(8.5) \times 6.5\text{--}7.5 \mu\text{m}$ , average  $10.9 \times 7.9 \times 7.0 \mu\text{m}$ ,  $Q = 1.3\text{--}1.5$ , distinctly lentiform to lentiform compressed, broadly ellipsoid to submitriform in frontal view, often also angular-hexagonal or slightly compressed, with thick wall and wide germ-pore, pale rusty orange in KOH.

Basidia: 4-spored (all collapsed).

Cheilocystidia:  $15 \times 8 \mu\text{m}$ , lecythiform, only one cystidium seen.

Clamp connections: present.

Stipitipellis: consisting only of hairs and cylindrical or lageniform elements; no lecythiform caulocystidia present.

Pileipellis: hymeniform, composed by sphaeropedunculate elements ( $25\text{--}36 \times 18\text{--}23 \mu\text{m}$ ); no pileocystidia seen.

**Material examined: Jamaica:** Port Antonio, Manchioneal, 17. 12. 1908, W. A. MURRILL (NY, holotype).

The type specimen from Jamaica is in very bad condition and consists only of fragments of pilei and stipes. MURRILL (in herb.) first noting on the specimen „*Conocybe tenera*“, changed it later to „*Mycena brunneidisca* sp. nov.“ and described it as a new *Mycena* (MURRILL 1917). After examination of the type specimen WATLING (1965, in herb.) came to the conclusion that it must be a *Conocybe*, as he found lecythiform cheilocystidia. But he felt the material to be in a too bad condition to be able to decide which species it could be, and refrained of recombining it in *Conocybe*. Also HESLER (1975, in herb.) draw the same conclusion. SINGER (1978: 220) gives a detailed description of this taxon as *Bolbitius brunneodiscus* (MURR.) SACC. & TROTTER.

The first author finally succeeded in unambiguously finding non-lecythiform caulocystidia and a hymeniform pileipellis in single fragments of the type specimen as well as a single, slightly collapsed lecythiform cheilocystidium. In connection with the

lentiform, subhexagonal to slightly angular spores of  $10\text{--}11.5 \times 7.5\text{--}8 \times 6.5\text{--}7.5 \mu\text{m}$ , all microscopical characters perfectly agree with *Conocybe lenticulospora* WATLING, later described from Europe, which is a later synonym of *C. brunneidisca*.

Consequently, the following new combination is proposed:

***Conocybe brunneidisca* (MURRILL) HAUSKN., comb. nova**

**Basionym:** *Mycena brunneidisca* MURRILL 1917, North American Flora **10**: 192

≡ *Bolbitius brunneodiscus* (MURRILL) SACC. & TROTTER 1925, Sylloge Fungorum **34**: 278

= *Conocybe lenticulospora* WATLING 1980, Notes Roy. Bot. Gard. Edinburgh **38**: 351

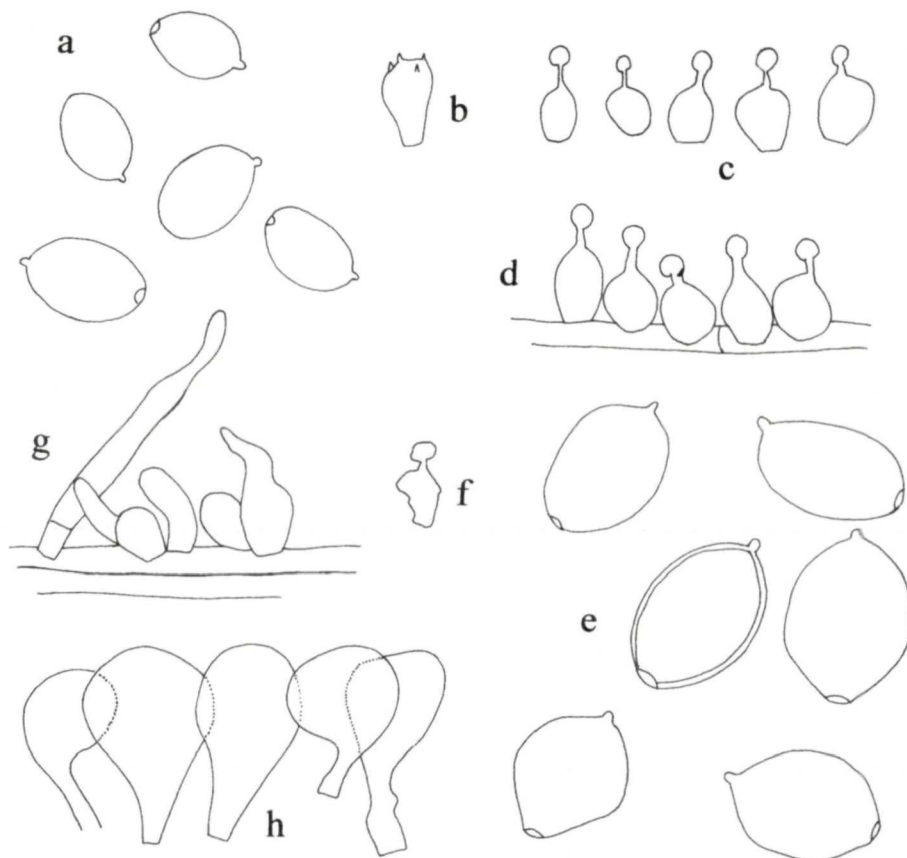


Fig. 1 a-d. *Conocybe roberti* (WU 27555). a spores,  $\times 2000$ , b basidium,  $\times 800$ , c cheilocystidia,  $\times 800$ , d stipitipellis,  $\times 800$ . e-h. *Mycena brunneidisca* (holotype). e spores,  $\times 2000$ , f cheilocystidium,  $\times 800$ , g stipitipellis,  $\times 800$ , h pileipellis,  $\times 800$ .



## List of species

### *Conocybe brunneidisca* (MURRILL) HAUSKN.

The material from Sardinia fits in all respects with typical specimens growing on dung or in fertilised meadows. It was found on leaf litter in a *Quercus suber* forest, a quite unusual habitat for that species.

**Material examined:** Italy: Sardinia, Sassari, Tempio Pausiana, Monte Baldo, 10. 5. 2004, M. CONTU (WU 27553).

### *Conocybe inopinata* HAUSKN. & CONTU, spec. nova (Figs. 2 a-f, 3)

**Latin diagnosis:** Species *Conocybi crispellae* (MURRILL) SINGER vel *Conocybi zeylandicae* (PETCH) BOEDIJN similis sed ab eis differens structura stipitipellis praecipue e caulocystidiis lecythiformibus atque paucis elementis non-lecythiformibus vel pilis imixtis constituta.

**Typus:** Italia, Sardinia, Sassari, Olbia, Parco Fausto Noce, 11. 9. 2006, M. CONTU (WU 27543, holotypus).

## Characters:

**Pileus:** 2-15 mm wide, up to 12 mm high, at first campanulate, sometimes higher than broad, later campanulate-convex to convex, rarely nearly semiglobose, in young stages rusty orange to pale reddish orange, then fulvous, buff, often with darker, orange brownish centre, hygrophanous, striate up to the centre; surface dry, in centre smooth, with age slightly to distinctly sulcate near the margin, without veil.

**Lamellae:** adnate to nearly free, crowded, narrow, at first pale brownish, then rusty with concolorous lamellar edge; slightly deliquescent when old.

**Stipe:** 30-50 mm long, 1-2 mm thick, cylindrical with slightly swollen base, at first nearly whitish to pale stramineous, ochre to pale yellowish brown in old fruit-bodies, not darkening from base upwards; surface pruinose only in young stages, soon smooth.

**Context:** quite delicate, very thin in pileus, no smell nor taste recorded.

**Exsiccatum:** pale brownish all over.

**Spores:**  $12.5-14.5 \times 8-9 \times 7-8.5 \mu\text{m}$ , average  $13.3-13.5 \times 8.3-8.4 \times 7.7-7.9 \mu\text{m}$ ,  $Q = 1.4-1.7$ , broadly ellipsoidal, slightly to distinctly lentiform, never hexagonal in frontal view, thick-walled with an up to  $2 \mu\text{m}$  broad germ-pore, rusty orange in KOH.

**Basidia:** 4-spored,  $18-23 \times 10-12.5 \mu\text{m}$ , barrel-shaped.

**Clamp connections:** not seen.

**Cheilocystidia:** lecythiform,  $14-20 \times 5-11 \mu\text{m}$ , with capitula  $2-4 \mu\text{m}$  wide.

**Pseudoparaphyses:** present in hymenium, especially in old fruit-bodies.

**Stipitipellis:** consisting of predominantly lecythiform caulocystidia similar to cheilocystidia ( $18-25 \times 6-9 \mu\text{m}$ , with capitula  $3-4 \mu\text{m}$  broad), mixed with a minority of lageniform, vesiculose to cylindrical elements and hairs, especially from the middle of stipe downwards.

**Pileipellis:** hymeniform, consisting of sphaeropedunculate to pyriform elements ( $32-50 \times 15-21 \mu\text{m}$ ); no pileocystidia seen.

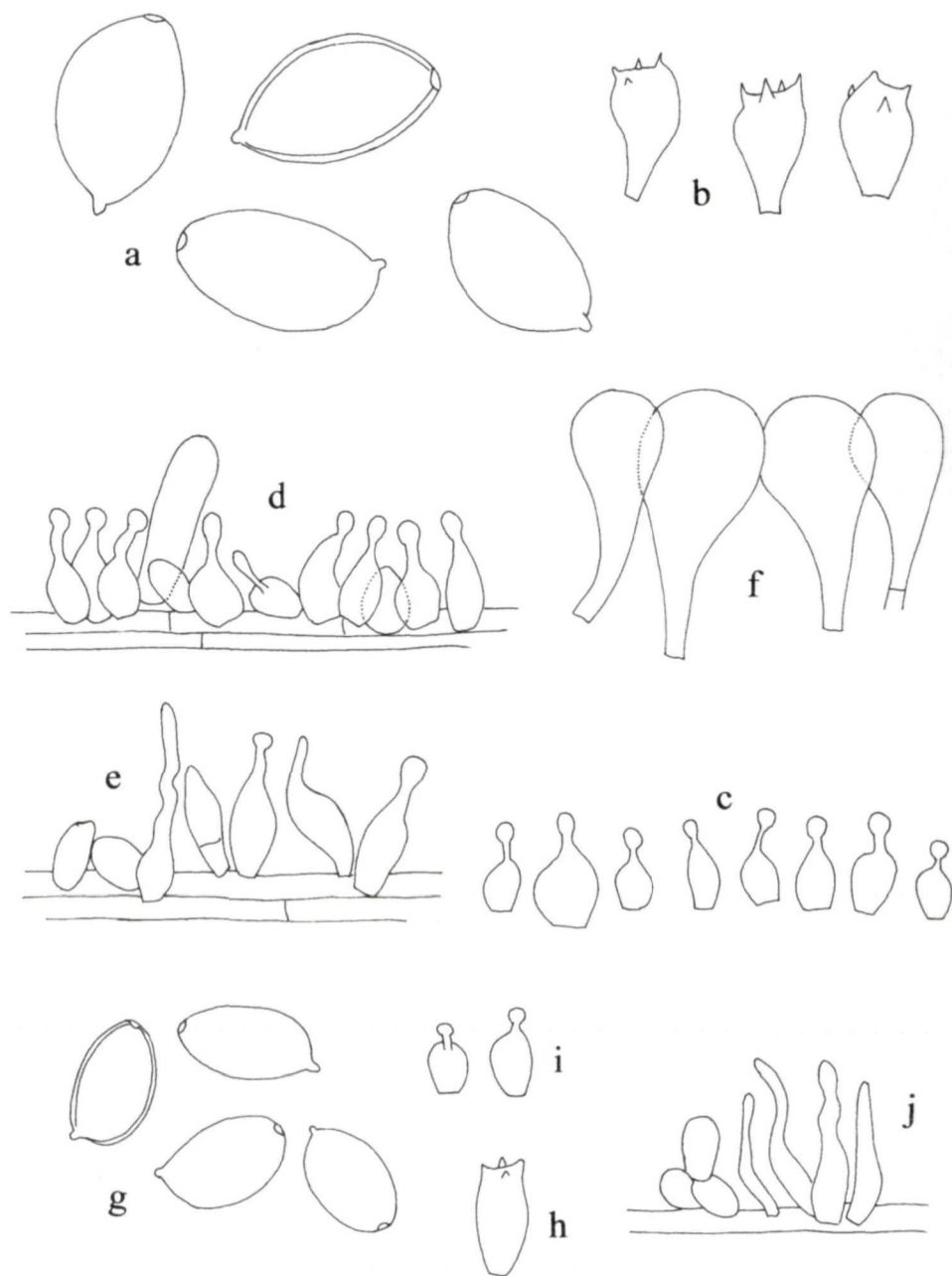


Fig. 2 a-f. *Conocybe inopinata* (holotype). a spores,  $\times 2000$ , b basidia,  $\times 800$ , c cheilocystidia,  $\times 800$ , d stipitipellis (top of stipe),  $\times 800$ , e stipitipellis (middle of stipe),  $\times 800$ , f pileipellis,  $\times 800$ . g-j. *Conocybe nigrescens* (WU 27556). g spores,  $\times 2000$ , h basidium,  $\times 800$ , i cheilocystidia,  $\times 800$ , j stipitipellis,  $\times 800$ .

**Habitat and distribution:** found in a periodically wrinkled flower-bed in a garden; only known from the type locality.

**Collections examined** (besides type): **Italy:** Sardinia, Sassari, Olbia, Parco Fausto Noce, 10. 9. 2006, M. CONTU (WU 27542); - - 12. 9. 2006, M. CONTU (WU 27544); - - 16. 8. 2007, M. CONTU (K); - - 24. 8. 2007, M. CONTU (herb. CONTU); - - 26. 8. 2007, M. CONTU (herb. CONTU); - - 28. 8. 2007, M. CONTU (herb. CONTU); - - 30. 8. 2007, M. CONTU (herb. CONTU).

The macroscopical characters are taken from the notes and colour slides made by the second author; the microscopical characters are derived from all collections of the type locality.

*Conocybe inopinata* is characterised by colours and habit as a dark *C. crispella* or a slender form of *C. zeylandica*, but differs essentially by a totally different stipe covering. Species of *Conocybe* with pseudoparaphyses (pavement cells) combined with a stipitipellis of predominantly lecythiform caulocystidia are unknown up to now worldwide – the stipe covering corresponding to sect. *Conocybe*. As the new species cannot be placed in sect. *Candidae* nor in sect. *Conocybe* (HAUSKNECHT & KRISAI-GREILHUBER 2006), a new section is proposed:

***Conocybe* sect. *Inopinatae* HAUSKN. & CONTU, sect. nova**

**Latin diagnosis:** Cheilocystidia, pseudoparaphyses et pileipellis ut in sect. *Candidae*. Stipitipellis praecipue ex elementis lecythiformibus minore parte elementis cylindricis, vesiculosis vel piliformibus immixtis constituta.

**Type species:** *Conocybe inopinata* HAUSKN. & CONTU.

**Characters:** Basidiocarp mycenoid, small to medium, with often slightly crenulated pileus margin. Lamellae mature slightly deliquescent. Stipe base equal to bulbous. Spores large, ellipsoidal, thick-walled. Pseudoparaphyses present. Stipitipellis consisting of predominantly lecythiform caulocystidia or a mixture of non-lecythiform and lecythiform elements. Gardens, flower beds.

***Conocybe moseri* WATLING**

The collection from Sardinia in burnt soil, near *Quercus suber* and *Cistus*, differs from typical specimens by somewhat paler colours. The exsiccatum, however, was very typically coloured with greyish tints on pileus and wine-red stipe. Such pale collections are rare and can be distinguished from *Conocybe rostellata* (VELEN.) HAUSKN. & SVRČEK by its larger, darker spores as well as from *C. ochrostriata* HAUSKN. by its smaller and darker spores. In both species, the spores are also more elongate ellipsoidal-amygdaliform.

**Material examined:** **Italy:** Sardinia, Sassari, Calangianus, Catala, 16. 12. 2003, M. CONTU (WU 27554).





Fig. 3. *Conocybe inopinata* (holotype). – Fig. 4. *Conocybe nigrescens* (WU 27556). – Fig. 5. *Conocybe roberti* (WU 27555). – Phot. M. CONTU.

***Conocybe nigrescens* HAUSKN. & GUBITZ (Figs. 2 g-j, 4)****Characters:**

**Pileus:** 7-25 mm wide, up to 15 mm high, campanulate to conico-campanulate with large, obtuse umbo, hygrophanous, striate up to the centre when moist; young and fresh chocolate-brown, dark brown, fading paler to buff and then non-striate; surface smooth, not pubescent.

**Lamellae:** adnexed, crowded, moderately broad, ochre to rust brown with concolorous or slightly paler edge.

**Stipe:** 40-75 mm long, 1-2 mm thick, cylindrical, slightly thickened downwards, first bicoloured with paler, ochre brownish top and darker, brown base, darkening with age and then entirely fuscous to dark brown, surface fibrillose-striate, covered with minute hairs and then pubescent.

**Context:** thin, fragile, dark ochre in stipe, fuscous-black towards the base; smell of raddish.

**Exsiccatum:** dark brown to blackish, only lamellae paler, rust brown.

**Spores:**  $8-10.5 \times 4.5-6 \mu\text{m}$ , average  $8.9-9.0 \times 5.5-5.6 \mu\text{m}$ ,  $Q = 1.5-1.9$ , ellipsoidical, not lentiform, with a slightly double wall and small, but distinct germ-pore up to  $1 \mu\text{m}$  broad, orange-yellow in KOH.

**Basidia:** 4-spored,  $18-22 \times 8-10 \mu\text{m}$ .

**Clamp connections:** present, but rare.

**Cheilocystidia:** lecythiform,  $17-20 \times 7-10 \mu\text{m}$ , with a  $2.5-4 \mu\text{m}$  broad capitula.

**Stipitipellis:** consisting only of non-lecythiform elements and hairs (up to  $30 \times 7 \mu\text{m}$ ).

**Pileipellis:** hymeniform, made up of sphaeropedunculate elements (up to  $45 \times 25 \mu\text{m}$ ), without pileocystidia.

**Habitat and distribution:** in a small, artificial grassland, accompanied by hundreds of fruit-bodies of *Conocybe albipes* (G. H. OTTH) HAUSKN.

**Material examined:** Italy: Sardinia, Sassari, Olbia City, 18. 5. 2007, M. CONTU (WU 27556); - - 20. 6. 2007, M. CONTU (WU 27557); - - 21. 6. 2007, M. CONTU (WU 27558); - - 22. 6. 2007, M. CONTU (WU 27559); - - 2. 7. 2007, M. CONTU (WU 27560).

In Europe this species, only recently described (HAUSKNECHT & GUBITZ 2006), grows predominantly indoors, in hothouses and flower pots. The Olbia collections are the first European finds outdoors and fit well with the type material. The only minor differences are the slightly broader and more intensely coloured spores, considered to be within the variability of the species.

***Conocybe roberti* SINGER & HAUSKN. (Figs. 1 a-d, 5)****Characters:**

**Pileus:** 5-10 mm wide, only up to 4 mm high, flat convex, older specimens with slightly depressed centre, hygrophanous, but desiccated not striate (possibly striate when moist), distinctly bicoloured, centre brown, brownish fuscous, margin ochre-greyish to ash-grey; surface smooth, not pubescent, with slightly plicate margin.



Lamellae: adnexed, thin, moderately distant, pale brown with whitish, flocculose lamellar edge.

Stipe: 15-25 mm long, 1-1.5 mm thick, cylindrical, base not bulbous, nearly whitish to pale ochre, finely floccose, but soon smooth.

Context: fragile, pale ochre, smell and taste none.

Exsiccatum: Pileus brownish grey with more brownish centre, stipe brownish.

Spores:  $6-8 \times 4.5-5 \mu\text{m}$ , average  $7.0 \times 4.7 \mu\text{m}$ ,  $Q = 1.35-1.6$ , broadly ellipsoidal, not lentiform, thin-walled with distinct germ-pore, ochre yellow in KOH.

Basidia: 4-spored,  $14-17 \times 7-9 \mu\text{m}$ .

Clamp connections: present.

Ammoniacal reaction: negative.

Cheilocystidia: lecythiform,  $13-18 \times 6-10 \mu\text{m}$ , with  $2.5-4 \mu\text{m}$  broad capitula.

Stipitipellis: consisting only of lecythiform caulocystidia similar to cheilocystidia, but larger ( $15-22 \times 8-10 \mu\text{m}$ , with  $3-4 \mu\text{m}$  broad capitula).

Pileipellis: hymeniform, consisting of sphaeropedunculate elements (up to  $40 \times 25 \mu\text{m}$ ), mixed with a few lecythiform pileocystidia similar to cheilocystidia.

**Habitat and distribution:** in small groups in a saline land, on sandy-gravelly, poor soil without vegetation. The species is up to now known only from the type locality, on shaded, weakly mossy place in lawn in Austria.

**Material examined:** Italy: Sardinia, Sassari, Olbia, Zona Industriale, 14. 12. 2006, M. CONTU (WU 27555).

The Olbia collection has the small fruitbodies, bicoloured pileus, moderately distant lamellae and all microscopical characters common with the type specimens (see SINGER & HAUSKNECHT 1992, HAUSKNECHT 2002). The pileus was not striate due to dry weather conditions.

*Conocybe microspora* (VELEN.) DENNIS var. *microspora* can be distinguished by much larger, unicolorous pilei and normally distant lamellae. Moreover, the spores are longer and narrower with a  $Q$  of 1.5-2.1. *Conocybe microspora* var. *brunneola* (KÜHNER & WATLING) SINGER & HAUSKN. has phaseoliform spores in addition to the above mentioned differences.

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