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A review of the *Cortinarius suberi* complex

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Abstract

The macro- and microscopic characters of two *Cortinarius* taxa in section *Malachii*, *C. suberi* and *C. brunneogriseus* are re-examined, and it is concluded that they should be separated only at the varietal level. Detailed descriptions and colour illustrations are provided.

Keywords: *Cortinarius*, *Sericeocybe, Pinus*, *Picea*, mycorrhiza.

Introduction

Cortinarius suberi Soop was described in 1990 from Scandinavian boreal *Picea* forests, in a year when the species was fairly abundant in the area. Since that period it has been found but sparingly until the season 2000, which yielded an unusually generous crop. In fact, *C. suberi* could be collected in most rich *Picea* and *Pinus* forests of the North, and it was also found (presumably the first record; see list of Studied Material) in Continental Europe.

In 1993 I described *Cortinarius brunneogriseus* [Soop 1993] from *Pinus* forests in the same general area of distribution as *suberi*. It deviated from the latter in several respects, such as hygrophanity, veil condition, colour, and spore shape. In contrast to *suberi*, *brunneogriseus* has appeared virtually every year since its publication, at least in its "traditional" localities, mainly concentrated in the north-western parts of Sweden.

A critical review of all my collections of the two taxa now indicates that they should be regarded as one species with two varieties. This paper presents the results of the review and justifies the recombination.

Taxonomic Overview

Updated descriptions of the taxa are given below.

Cortinarius suberi apparently belongs in section *Malachii* Melot, subgenus *Sericeocybe* Orton. Its general appearance is a *C. malachius* (Fr.:Fr.) Fr. with a somewhat darker hue and (mostly) lacking in violet tints. In contrast to *C. malachius*, however, the context of *suberi* is a rather saturated brown, similar to that of *C. paragaudis* Fr., another species in the same habitat, which differs mainly by a reddish veil. In fact, as was noted in the protologue, fruit-bodies of *C. suberi* — especially when mature — evoke *C. paragaudis* with a white veil. It is further stated that it resembles "*C.* cf. *bulbosus*", a taxon that was later introduced as *C. brunneogriseus*, while being less hygrophanous and more silky-fibrillose than the latter. *C. impennis* Fr. ss. N. Arnold [1993] is probably a synonym.

Cortinarius brunneogriseus was described as a *Telamonia* in section *Brunnei*, mainly because of its saturated brown context which darkens on drying. It seems bound to *Pinus*, whereas *C. suberi*, as originally described, occurs mainly in *Picea* association, while occasionally also found with *Pinus*. The taxon exhibits the overall grey-brown colours and habit of *C. suberi,* and its resemblance to the latter was emphasised in the protologue, which also mentions slightly longer spores. The main differences appear to be:

Plate 1: *Cortinarius suberi* Soop var. *suberi,* Härjedalen, Hede, Remmen 2000-08-27, KS-CO1141.

- On the average, the fruit-body is stouter, some collections yielding enormous specimens.
- The fruit-body is often frankly hygrophanous, sometimes less so but then with many hyaline streaks and spots.
- The veil is often sparser, sometimes voiding the young cap of the white, frosty cover which is typical of *C. suberi*[1], leaving the mature cap glabrous. On the other hand, the veil always leaves a white girdle, even if sometimes thin, on the stipe.
- The disk of the cutis often lacks the red-brown to orange-brown (sometimes yellow-brown) shade that is typical of *C. suberi* (in particular of young specimens).
- The fruit-body tends to darken quicker and more strongly. Dried material is always very dark, blackish.

A review of older collections, paired with an abundance of new finds, reveals considerable overlap between the two taxa in these characters. It seems nevertheless meaningful to separate one taxon as a variety, mainly based on the combination of hygrophanity and veil abundance (characters that are, in fact, often correlated). The following is therefore proposed:

1. *Cortinarius suberi* var. *suberi*: the not to slightly hygrophanous taxon with an abundant veil.
2. *Cortinarius suberi* var. *brunneogriseus* nov. comb.: the frankly hygrophanous taxon with a sparse veil.

Averages of spore size and Q-values for 19 collections are illustrated in the scatter diagrams below (Figs. 1, 2). It is evident that the populations representing the two taxa completely overlap, and that separation based on spore size is untenable. An examination of spore shape and ornamentation, as well as of the cutis structure, does not reveal any significant difference. One collection (KS-CO1126) has a more subglobose spore shape (shown as the top-most point in Fig. 1, and the lowest value in Fig. 2), but as it exhibits no other tangible difference and the spore measurements are within the range for the taxon, this sample is not considered special.

[1] Note that the photograph of the type of *C. suberi*, published in Soop [1998-2000], shows fruit-bodies wit h an unusually copious veil, especially on the undeveloped specimen.

Plate 2: *Cortinarius suberi* var. *brunneogriseus* (Soop) Soop nov. comb., Härjedalen, Långå, Skansberget 2000-08-18, KS-CO1124.

Descriptions of taxa

Cortinarius suberi* Soop var. *suberi Plate 1

Illustrations: Soop 1990b, Soop 2001.

Cap 3-8 cm in diameter, rounded to obtusely conical, then convex to campanulate with a decurved margin.

Cutis dry, weakly hygrophanous or only towards the margin, partly separable; young shining white, fibrillose, later absorbing to pale grey-brown; centre yellowish-grey, later slightly flushed orange-brown to red-brown; often with radial, hyaline veins and scattered, coarse, darker fibrils outside disk; margin white to pale greyish micaceous from felty fibrils, young with a white rim.

Stipe clavate, often robust, 5–10 × 0.8–1.2 cm, bulb <3 cm; pale grey-brown to buff with a white, silky, fibrillose, absorbing coating and (sometimes thick) white girdles; base darker grey-brown; apex sometimes with a bluish, evanescent tinge.

Veil and *cortina* pale grey to white, not darkening, (fairly) copious.

Gills pale grey-brown to cinnamon, rarely with a faint purple tinge; edge paler; moderately crowded (L=54–64, l=1–2), fairly broad.

Flesh grey-brown to cinnamon, marbled darker brown, sometimes with a faint, evanescent, violet tinge; odor and taste faint, pleasant, agaricoid; more or less darkening, exsiccata often dark-grey to black, at least in gills.

Reactions: NaOH, formalin nil, phenol slowly reddish-lilac, guayac nil or weakly green.

Microscopy: Spores (6)6.5–8.5(9) × (4)4.5–5.5(6.5) μm, obtusely ellipsoid to subglobose, moderately verrucose. Epicutis thin of parallel, hyaline hyphæ × 2–4 μm; hypoderm of short, rounded, ± irregular elements 20–40 μm long, the layer containing a band of distributed, grey-brown pigment, vaguely bounded by a second layer of ± parallel, elongate, hyaline hyphæ 50-100 × 10–15 μm.

Ecology: In rich *Picea* or *Pinus* forests, scattered to gregarious, terrestrial; rare, but fairly abundant certain years; boreal, rarely found south of Dalecarlia in Sweden.

Studied material: Sweden, Dalarna, Östbjörka 1988-08-18, herb S (holotypus), KS-CO333 (isotypus); Härjedalen, Hede, Sörviken 1988-08-17, KS-CO330 and 1990-08-25, KS-CO437; Härjedalen, Hede, Remmen 1991-08-30, KS-CO502; Närke, Fellingsbro, Frötuna 1993-08-26, KS-CO649; Närke, Arboga, Åtorp 1994-09-13, KS-CO678; Härjedalen, Långå, Skansberget 2000-08-18, KS-CO1126; Dalarna, Mora, Bonäsheden 2000-08-24, KS-CO1134, KS-CO1135; Dalarna, Rättvik, Enån 2000-08-25, KS-CO1137; Dalarna, Rättviksheden 2000-08-25, KS-CO1138; Härjedalen, Hede, Remmen 2000-08-27, KS-CO1141; Dalarna, Mora, Vinäsheden 2000-09-12, KS-CO1154. *Italy*, Bolzano, Grosser Monticolo 2000-10-10, KS-CO1164, *leg.* F. Bellú.

***Cortinarius suberi* var. *brunneogriseus* (Soop) Soop nov. comb.** Plate 2

Basionymon: *C. brunneogriseus* Soop in Agarica 12(21), 1993, p. 114.

Illustrations: Soop 1993 *sub C. brunneogriseus*; Soop 2001.

The variety differs from the type by a more hygrophanous cap, a less copious veil leaving the disk more or less glabrous, and duller, more greyish colours. It is often considerably more robust with a cap measuring 5–12 cm in diameter and stipe 8–15 x 1–2.4 cm with a bulb up to 4.5 cm thick. The gills are usually more distant (L=36–46).

While the darkening of fruit-bodies is weaker and less consistent for the type variety, var. *brunneogriseus* invariably darkens strongly, the exsiccata becoming dark grey-brown to ash-grey or blackish. This is reflected in the hypodermal hyphæ, which contain a granular, greyish necro-pigment. On the other hand, it is worth observing that the *veil* never darkens (as is the case in section *Brunnei*), remaining white even on dried material.

Ecology: While the type variety grows in both *Picea* and *Pinus* forests, var. *brunneogriseus* is exclusively encountered with *Pinus*, often among *Cladonia* spp. in the forest bed of the pine heaths in the North. It appears to be even more northerly than the type variety, with a strong western bias. The variety has never been recorded from the Baltic area [H. Lindström, *pers. comm.*], and the easternmost find is west of Ånge in Medelpad, Sweden.

Studied material: Sweden, Härjedalen, Hede, Remmen 1991-08-31, herb S (holotypus), KS-CO511 (isotypus); Härjedalen, Hede, Sörviken 1990-09-05, KS-CO442; Härjedalen, Långå, Skansberget 2000-08-18, KS-CO1124; Härjedalen, Hede-Långå, 2000-08-28, KS-CO1142.

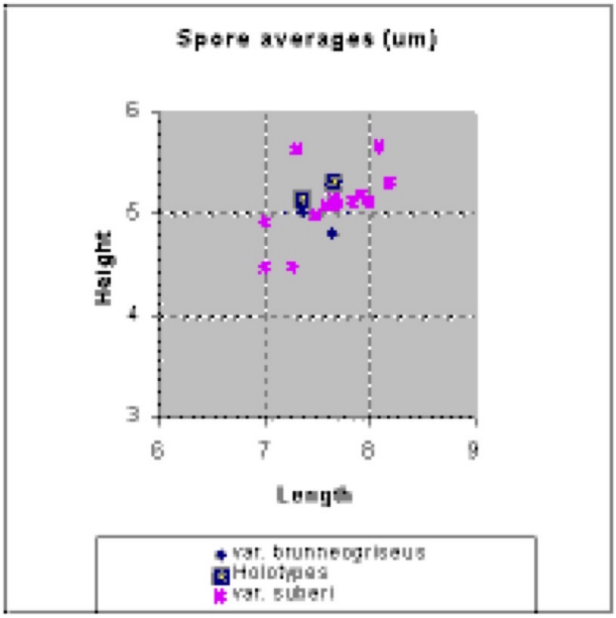

Fig. 1

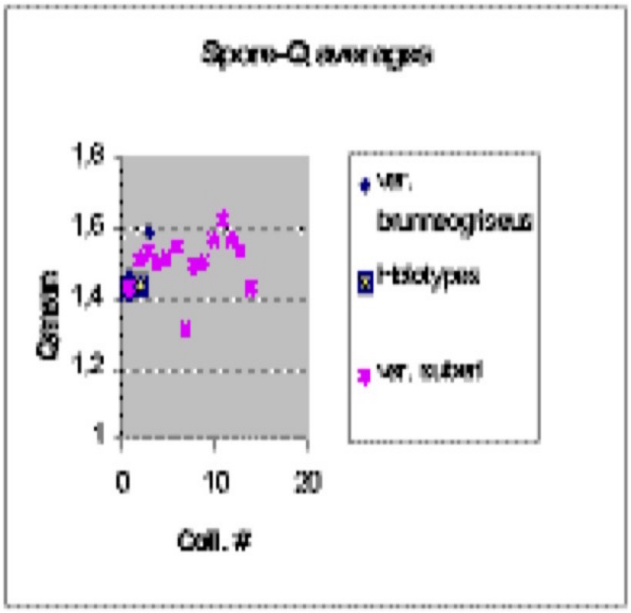

Fig. 2

Spore size and Q-values for 19 collections. Each point represents an average of 7-15 measurements from one collection, performed in oil immersion with a 5% NH_3 mount.

[Note after publication: The collection from Långå, depicted above, probably represents a different taxon, *C. albogaudis* Kytöv. & al. (2009). This was the collection intended for the holotype of var. *brunneogriseus*, but KS-CO511 (var. *suberi*) was submitted instead. Therefore, as shown by DNA sequencing, the two varieties are co-taxic. Unfortunately, the forest in the Långå locality has subsequently been clear-cut, so no further confirmation is possible.]

Related taxa

A few separating characters between var. *suberi* and the very similar *C. malachius* were mentioned above. In addition, the latter differs macroscopically by a finely squamulose cap which yields a peculiar micaceous texture on drying. With some training it is possible to distinguish the species in the field, but sometimes only a microscopic examination allows a definite identification, the spores of *C. malachius* being markedly longer (9-11.5 µm).

Slim specimens of var. *suberi* may also be confused with grey-brown *Telamoniæ* in section *Privigni*, such as *C. triformis* Fr. var. *fuscopallens* Fr., often abundant in the same habitat. But the context of the latter is never as conspicuously brown as that of *C. suberi*, whose exsiccata usually darken to blackish grey, a feature never observed in Privigni.

Another similar but rare species is occasionally found in the calcareous conifer forests of the North. *C. diosmus* Kühn. exhibits generally pale colours and a darkening context, but differs by a brighter, silvery surface and a special odour, reminiscent of that of *C. hinnuleus*. Both *C. triformis* and *C. diosmus* possess spores of approximately the same size as *C. suberi*.

It may be worth mentioning that the rare *C. poppyzon* Melot, also in *Malachii*, has been recorded at least twice from Sweden. It differs from var. *suberi* by a somewhat brighter, more ochraceous cutis, a non-darkening context, and slimmer spores.

Var. *brunneogriseus* often grows with different pine-associated varieties of *C. brunneus* (Pers.:Fr.)Fr. (including the uncommon var. *clarobrunneus* Lindstr. & Melot, which possesses similar spores), and older, darkened specimens may be difficult to separate. But when the fruit-bodies are fresh and not too dry, there is normally no problem to recognise var. *brunneogriseus* from its much paler and greyer colours and from its weaker hygrophanity. Often the taxon is also considerably more robust than members of the *C. brunneus* complex. On the whole, it now seems fairly obvious that the relation to *Brunnei* is superficial, and that the taxon belongs, like the type, in *Malachii*.

Another similar species, often encountered together with var. *brunneogriseus*, is *C. quarciticus* Lindstr. It produces spores in the same size range, but displays, at least when fresh, a peculiar, mottled cap texture, a frankly violaceous context, and most often a conspicuous, rounded stipe bulb. In addition it has unusually crowded gills for a *Sericeocybe*, the combination of characters evoking a *Phlegmacium* in section *Cærulescentes*.

Finally, it may be worth noting that var. *brunneogriseus* is quite similar to *C. disjungendus* Karst., a closely related taxon of the same general coloration (including a darkening flesh) and habit, but growing in deciduous woods, especially with *Betula*. It may be macroscopically separated by a somewhat brighter, more reddish tint on the disk, and an often hard and tapering stipe, but its main character lies in the unusually large spores (9-12 × 6-7 µm). The relationships within this complex were explored in Soop [1995][2].

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[2] The taxon, tentatively interpreted as *C. brunneofulvus* Fr. in the mentioned paper, is probably identical to *C. brunneus* var. *clarobrunneus*.

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