

A new genus, *Leucopholiota*, in the Tricholomataceae (Agaricales) to accommodate an unusual taxon

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Abstract: *Armillaria* subgenus *Leucopholiota* is elevated to the generic level to accommodate *Tricholoma decorosum*, originally placed in *Agaricus* tribus *Tricholoma* and best known as *Armillaria decorosa*. Included are a description of the species, illustration of the microscopic features and a discussion of the distinctive characters of this taxon.

Key Words: *Armillaria decorosa*, Systematics, *Tricholoma*

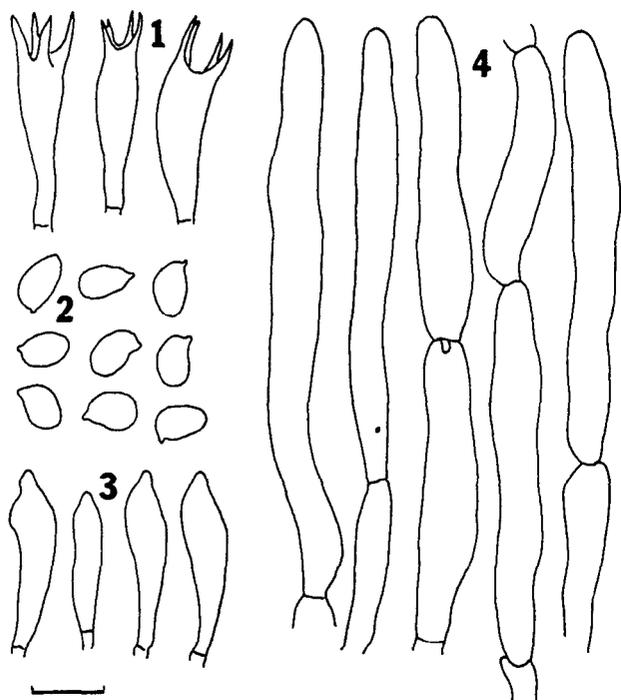
Agaricus (*Tricholoma*) *decorosus* Peck [*h* *Tricholoma decorosum* (Peck) Saccardo] was described in 1873 from New York State (Peck, 1873a). It is an infrequently-encountered, wood-inhabiting agaric that has amyloid basidiospores and recurved scales on the pileus. It has mainly an eastern North American distribution, although it has been recorded in France (Romagnesi, 1980). Due to its unusual combination of characteristics, this species has been placed in many genera over the years, but it is best known as a species of *Armillaria*.

In 1947 the combination *Armillaria decorosa* (Peck) A.H. Smith et Walters was made utilizing the broader concept of *Armillaria* that was accepted at the time, which included species with amyloid spores, and this generic placement was accepted for many years. However, Watling et al. (1982) typified *Armillaria* (Fr. : Fr.) Staude as the generic name for *Agaricus melleus* Vahl: Fr., in a tribe which Fries (1821) accepted within *Agaricus*. The species of *Armillaria* so typified are ligno-

philic, have nonamyloid spores, a pileipellis without recurved scales, and rhizomorphs. For further information on *Armillaria* species and their current generic placements, see Volk and Burdsall (1995). The accepted North American species of *Armillaria* have been circumscribed by Burdsall and Volk (1993).

There are several other genera that must be considered for this unusual species. Peck (1873a,b) originally placed the species in *Agaricus* tribus *Tricholoma*, and Saccardo (1887) was the first to formally place it in the genus *Tricholoma* (Fr. : Fr.) Staude. However, the holotype of this genus, *Tricholoma flavovirens* (Alb. et Schwein. : Fr.) Lundell, is a mycorrhizal taxon, and the species of *Tricholoma* have nonamyloid spores. Murrill (1914) made the combination *Cortinellus decorosus* (Peck) Murrill, but the genus *Cortinellus* Roze is no longer accepted (Singer, 1986), and today all of Roze's original species are included in *Tricholoma*. Singer (1943a,b) transferred *Agaricus decorosus* to *Tricholomopsis* Singer, but he failed to note the amyloid spores, the recurved scales of the pileipellis, and the lack of pleurocystidia. Neither amyloid basidiospores nor a scaly pileipellis are found in *Tricholomopsis*, and pleurocystidia are found in that genus. Smith and Walters (1947) observed the amyloid spores and transferred the taxon to *Armillaria*, a genus broadly circumscribed at the time. As stated above, *Armillaria* as now defined is not acceptable for this unique species. Bon and Courtecuisse (1987) made the combination *Floccularia decorosa* (Peck) Bon et Courtecuisse. *Floccularia* Pouzar (= *Armillaria* Kummer *sensu* Singer), with *Floccularia straminea* (Krombh.) Pouzar as the holotype, includes species with amyloid basidiospores, but they are terrestrial, putatively mycorrhizal fungi. Unlike Peck's fungus, the species of *Floccularia* lack cystidia and are not wood decomposers. The species of *Cystoderma* Fayod are litter decomposers and the macromorphology of their basidiomata can be superficially similar to *Agaricus decorosus*. Although basidiospores of *Cystoderma* species may be either amyloid or nonamyloid, their pileipellis is a polycystoderm, and the partial veil is composed of sphaerocysts (Miller, 1993). These species typically grow on the ground or in moss but never on wood.

Since *Agaricus decorosus* is physiognomically very similar to *Pholiota squarrosoides* (Peck) Sacc. and *Pholiota squarrosa* (Müll. : Fr.) Kummer, and can be easily



FIGS. 1-4. *Leucopholiota decorosa* 1. Basidia. 2. Basidiospores. 3. Cheilocystidia. 4. Trichodermial cells of the pileipellis. Bar = 10 μm for FIGS. 1-3, 25 μm for FIG. 4. O.K. Miller 18626.

mistaken for a *Pholiota* species in the field, a placement in *Pholiota* (Fr. : Fr.) Kummer must be considered. The species of *Pholiota* are also wood decomposers, but have brown, nonamyloid spores, often with an apical pore, and chrysocystidia. In fact *Pholiota* is placed in the Strophariaceae by most agaricologists. Romagnesi (1980) discussed the possibility that *A. decorosus* represents a case of sporal albinism of a species of *Pholiota*, but dismissed this hypothesis because of the absence of chrysocystidia, as well as the abundant and perfectly normal sporulation.

In conclusion, there is no logical placement of *A. decorosa* within the currently described genera of the Tricholomataceae. We propose to follow the logic of Romagnesi (1980) and elevate his subgenus *Leucopholiota* of *Armillaria* Fr. *sensu stricto* ("*Armillariella*" of Karsten) to generic status. *Leucopholiota* would be placed in the Tricholomataceae (Agaricales) and would fit very well into Romagnesi's concept of the tribe *Cystodermateae* Singer emend. Romagnesi. Singer (1986) did not include *A. decorosa* in his latest edition of Agaricales in Modern Taxonomy, but according to Singer's key, *Leucopholiota* would be best placed in the tribe *Biannularieae* with *Catathelasma* Lovejoy and *Armillaria* Kummer (*Floccularia* Pouzar). Further extensive study of subfamilial relationships will be necessary to determine the correct tribal placement. The new binomial is *Leucopholiota decorosa*.

Leucopholiota (Romagnesi) O.K. Miller, T.J. Volk et A.E. Bessette, *gen. et stat. nov.*

= *Armillaria* ss. Fries (= *Armillariella* Karsten) subgenus *Leucopholiota* Romagn., Bull. Soc. Mycol. France 96: 150. 1980.

Pileus 2-6 cm broad, conic to convex in age, dry, covered with numerous brown, pointed, recurved scales; margin often incurved until maturity. *Lamellae* adnexed, close, white; edges finely scalloped. *Stipe* 2.5-7.0 cm long, 6-12 mm thick, white, sheathed up to the superior annular zone with rusty brown, pointed, recurved scales. *Flesh* white, firm, thick. *Pileipellis* a trichodermium with fascicles of broad to slightly swollen 7.6-22.0 μm wide hyphae. *Clamp connections* scattered but present on all tissues. *Cheilocystidia* clavate with a blunt apical rostrum, thin-walled, hyaline. *Basidiospores* ellipsoidal, thin-walled, hyaline, amyloid. *Spore deposit* white. *Rhizomorphs* absent.

Habit, habitat, and distribution. Single to caespitose on decaying logs, branches, and stumps of hardwood trees; infrequent in eastern North America and rare in Europe.

TYPE: *Leucopholiota decorosa* (Peck) O.K. Miller, Volk et Bessette, *comb. nov.* **FIGS. 1-4**

= *Agaricus* (*Tricholoma*) *decorosus* Peck, Bull. Buff. Soc. Nat. Sci. 1:42. 1873.

= *Tricholoma decorosum* (Peck) Sacc., Syll. Fung. 5:111. 1887.

= *Tricholoma decorosum* (Peck) Farlow, *Icones Farlowianae* p.19, pl.17, 1929, superfluous comb.

= *Cortinellus decorosus* (Peck) Murr., *N. Amer. Flora* 10: 32. 1914.

= *Tricholomopsis decorosa* (Peck) Singer, *Mycologia* 35: 152. 1943.

= *Armillaria decorosa* (Peck) Smith et Walters, *Mycologia* 39:622. 1947.

= *Floccularia decorosa* (Peck) Bon et Courtec., *Doc. Mycol.* 18:38 1987.

Illustrations. Bessette et al. 1995: 82,83; Romagnesi, 1980: 14; Smith and Walters, 1947: 623, Fig. 1; Farlow 1929: 19, pl. 17.

Pileus 2.5-6.0 cm, wide, hemispherical when very young, becoming broadly convex and nearly plane at maturity; surface dry, covered with numerous rusty brown, pointed, recurved scales; margin incurved and often remaining so at maturity, typically uneven and coated with coarse, rusty brown fibrils. *Lamellae* adnexed, white, edges finely scalloped, close, moderately broad, with several tiers of attenuate lamellulae. *Stipe* 2.5-7.0 cm long, 6-12 mm thick, solid, equal or tapering upward, white at the apex, sheathed up to an

annular zone with rusty brown, pointed, recurved scales and coarse fibrils. *Partial veil* of coarse, rusty brown fibrils that flare upward at first. *Flesh* white, firm, moderately thick; odor not distinctive; taste mild or bitter. *Pileipellis* a trichodermium composed of fascicles of broad to slightly vesiculose hyphae 7.6-22.0 μm , thin-walled, yellowish in Melzer's solution to yellowish brown in 3% KOH. *Pileus trama* 5-10 μm diam thin-walled interwoven hyphae yellowish with scattered oleiferous cells in Melzer's solution or 3% KOH. *Lamellar trama* of parallel, thin-walled, 3.5-7.0 μm wide hyphae with scattered oleiferous cells. *Clamp connections* present on all tissues. *Cheilocystidia* 19-24 \times 3-5 μm , clavate with a blunt apical rostrum or a somewhat attenuated apex, or fusiform, thin-walled, hyaline, frequent. *Basidia* 21-32 \times 5-7 μm , clavate, thin-walled, hyaline, 4-spored. *Basidiospores* 5.5-6.0(-7.0) \times 3.5-4.0 μm , ellipsoidal, thin-walled, hyaline, amyloid. *Spore print* white.

Habit, habitat and distribution. Single to caespitose or in several clusters on decaying logs, branches, and stumps of hardwoods; fruiting from late August to November; from Maine to North Carolina, west to Michigan, Wisconsin, and Tennessee; in Europe only known from France.

Material examined. USA. NEW HAMPSHIRE: Cheshire Co., Keene, 8 Oct. 1994, Bessette 10206 (SYRF). NEW YORK: Catskill Mts, Allegany Co., Sept. 1873, C.H. Peck (HOLOTYPE NYS); Allegany Co., Genesee (Rock City), Sept. 1873, C.H. Peck (SYNTYPE NYS). NORTH CAROLINA: Buncombe Co., Montreat, 3 Sept. 1994, O.K. Miller 26109 in part (VPI), 2nd part as TJV94-37 (CFMR). VIRGINIA: Giles Co., 8 Oct. 1977, O.K. Miller 16405 (VPI), Giles Co.; 7 Oct. 1979, O.K. Miller 18626 (VPI). WISCONSIN: Sauk Co., Baxter's Hollow, Sept. 1993, Steve Nelsen (TJV 93-263) (CFMR).

Observations. The distinctive features of the genus *Leucopholiota* include a trichodermium of pointed, rusty brown, recurved scales on the cap and stalk, white gills, white amyloid spores and clavate bluntly-rostrate cheilocystidia. A color illustration of the macroscopic features is shown in Bessette et al. (1995). These characteristics, combined with the growth on decaying wood, are a combination of characters that separates

this unusual genus from other white-spored genera of the Tricholomataceae.

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