

## New species of *Tricholoma* from California and Oregon

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**Abstract:** Eight *Tricholoma* species from California and Oregon are described. New taxa, *Tricholoma griseoviolaceum*, *Tricholoma muricatum*, *Tricholoma mutabile*, *Tricholoma nigrum* and *Tricholoma myomyces* var. *cystidiotum* are described. *Tricholoma vernaticum* comb. nov. is proposed.

**Key Words:** Agaricales, systematics, taxonomy, Tricholomataceae

### INTRODUCTION

Species of *Tricholoma* are common in north temperate and subtropical areas worldwide. Most species are considered obligately ectomycorrhizal, and play an important role in forest ecosystems. This paper presents in part the results of a taxonomic survey of *Tricholoma* in California (Shanks, 1994). Previous taxonomic work on *Tricholoma* in California is limited to species described by Murrill (1913) and Baroni and Ovrebø (1983). Below are described three new species and one new variety from California, and a new species from Oregon. Redescriptions of *Tricholoma dryophillum* (Murrill) Murrill and *Tricholoma moseri* Singer are also given.

### MATERIALS AND METHODS

The infrageneric classification used is that of Singer (1986). Color notations in parentheses are from Kernerup and Wanscher (1978). All studies of micromorphological features were made from dried material, mounted in 3% KOH. A minimum of 20 spores were measured from each collection, and the following statistical measures were calculated for all the spores measured of a given taxon:  $\bar{x}$  = mean length and width; E = the ratio of length/width, expressed as a range of all the spores measured; Q = the mean of E values; n = the total number of spores measured.

Measurements over 12  $\mu\text{m}$  have been rounded to the nearest whole micrometer. Unless otherwise stated, collections cited are deposited at SFSU. The following abbreviations have been used for collectors: DLL: David Largent; KMS: Kris M. Shanks; AHS: Alexander Smith; HDT: Harry D. Thiers.

### TAXONOMY

I. *Tricholoma*, subg. *Tricholoma*, sect. *Tricholoma* (Fr.)  
Staude, Die Schwämme Mitteldeutsch. 125. 1858.

***Tricholoma griseoviolaceum*** Shanks sp. nov.

FIGS. 1–3

Pileus 40–80 mm latus, viscosus, fibrillas radiantes exhibens, primitus albus, dein maturitate subviolaceo-griseus vel fumosus. Lamellae albus, incarnatescens, nun lutescens. Stipes albus. Basidiosporae  $4.8\text{--}7.2 \times 3.4\text{--}4.8 \mu\text{m}$ , ellipticae. Cheilocystidia  $26\text{--}62 \times 9.6\text{--}14\text{--}(19) \mu\text{m}$ , rara, clavata vel saccata, hyalina. Hyphae cuticulares pilei in matrice gelatinosa inclusae. Cum quercibus crescens.

*Etymology.* *Griseoviolaceum*, violet-gray coloration.

**HOLOTYPE.** USA. CALIFORNIA: San Mateo Co., Portola State Park, Summit trail, 9 Jan. 1993, K. M. Shanks 352 (SFSU).

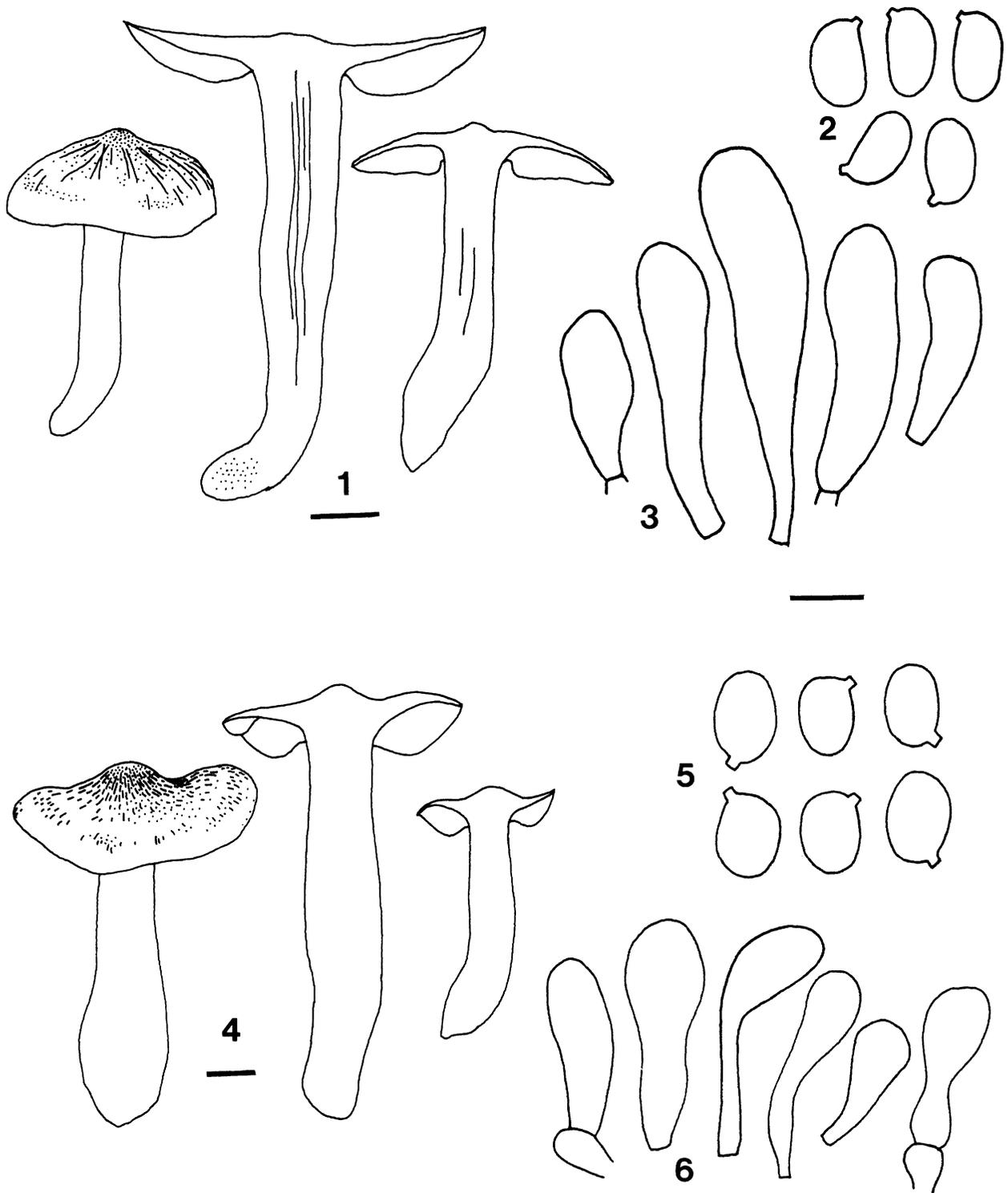
*Pileus* 40–80 mm broad, campanulate at first, a prominent umbo present in younger specimens, but mature specimens typically lacking an umbo, becoming broadly convex and finally plane with uplifted and wavy margins splitting in age (FIG. 1); surface viscid, innately radiating fibrillose; white at first or when covered in duff, developing a pale violet to violet gray (17A2-3, 17B2) ground color with irregular radiating streaks of dull violet gray, dark gray or nearly black (16E4, 16F3, 17D3-F3), at maturity dark violet gray at the disc, the margins remaining pale violet or white, often with a ring of watery dark pigment 5–8 mm from the margin, in age the disc developing paler grayish brown tones (6E3-4); context thin, white to watery gray above lamellae and near pileus surface; odor faintly farinaceous or cucumery, taste farinaceous or sweet farinaceous.

*Lamellae* sinuate, thin or somewhat thick and forking near the stipe, 3–15 mm broad, close, white, discolored pinkish brown to grayish orange (5C4, 7-9A2) in patches in age.

*Stipe* 20–130  $\times$  10–22 mm; equal or tapering slightly

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FIGS. 1-6. Features of *Tricholoma* species. 1-3. *T. griseoviolaceum* (KMS 363). 1. Basidiomata. 2. Basidiospores. 3. Cheilocystidia. 4-6. *T. mutabile* (Calhoun 81-2947). 4. Basidiomata. 5. Basidiospores. 6. Cheilocystidia. Lines represent 15 mm for basidiomata, 10  $\mu\text{m}$  for basidiospores, 20  $\mu\text{m}$  for cystidia.

towards the base (FIG. 1); base pointed or abrupt; surface dry, dull, silky-fibrillose, white, occasionally pale orange (5A3) at the base; context solid, hollow or stuffed, white or watery gray in the center.

*Basidiospores*  $4.8-7.2 \times 3.4-4.8 \mu\text{m}$  ( $\bar{x} = 5.9 \pm 0.55 \times 4.0 \pm 0.43$ ; E = 1.2-1.9; Q =  $1.5 \pm 0.15$ ; n = 142/7 collections); elliptic, hyaline, smooth, inamyloid (FIG. 2). Basidia  $28-38 \times 5.8-7.2 \mu\text{m}$ , clavate, 4-spored, hy-

aline. *Cheilocystidia* 26-62 × 9.6-14(19) μm, rare to scattered, clavate to saccate, thin-walled, often collapsing, hyaline (FIG. 3). *Pileipellis* an ixocutis; *epicutis hyphae* 2.0-4.8 μm diam, cylindrical, loosely interwoven in a gelatinous matrix; hyaline or with granular golden brown contents, rarely smooth, commonly with fine punctate to zebroid or flare-like hyaline or brown incrustations; *subcutis hyphae* 3.0-9.6 μm diam, cylindrical to slightly inflated, parallel; with punctate, zebroid or flare-like hyaline incrustations or punctate, zebroid or plaque-like brown incrustations. *Pileus trama* hyphae 2.4-19.0 μm; cylindrical near the pileipellis, inflated elsewhere, hyaline, smooth, mostly parallel. *Lamellar trama* hyphae 2.8-21.0 μm; cylindrical to inflated, hyaline, smooth, parallel. *Stipe* hyphae 2.4-14.0 μm, cylindrical to somewhat inflated, hyaline, smooth or with irregularly thickened walls, parallel. *Caulocystidia* absent. Clamp connections absent.

*Habitat.* Solitary to gregarious, associated with *Quercus* or *Lithocarpus*, December to February in coastal forests from Riverside County to Mendocino County, and low elevation Sierra Nevada forests.

*Collections examined.* USA. CALIFORNIA: Amador Co, Ione, 4 Feb. 1970, *HDT 24748*; Marin Co, Phoenix Lake, 22 Feb. 1960, *HDT 7558*; Audubon Canyon Ranch, Pitcher Canyon, 15 Dec. 1975, *Calhoun 386*; same location, 21 Jan. 1980, *Calhoun 80-1457*; Audubon Canyon Ranch, Bolinas Fairfax Rd., 8 Dec. 1984, *Calhoun 84-3904*; Marin Municipal Watershed District, Bon Tempe Lake, 27 Dec. 1984, *R.E. Halling 4062* (NY); 20 Dec. 1992, *KMS 328*; Marin Municipal Watershed District, Rock Creek Simmonds Trail, 31 Dec. 1992, *KMS 250*; Marin Municipal Watershed District, Bon Tempe Lake, 12 Jan. 1993, *KMS 363*, *KMS 364*, *KMS 365*; Tomales Bay State Park, near Shell Beach, 12 Dec. 1991, *M.T. Seidl 3251*; Mendocino Co, Jackson State Forest, 2 Dec. 1961, *Peters 723*; Riverside Co, LAMS Foray, 7 Feb. 1981, *H.E. Bigelow 15674* (NY); San Mateo Co, San Francisco Watershed, 22 Dec. 1963, *HDT 11191*; 6 Jan. 1967, *HDT 18357*; 31 Dec. 1968, *HDT 23132*; Santa Barbara Co, Los Padres National Forest, Fremont Campground, 28 Jan. 1967, *HDT 18558*; Lake Cachuma, 5 Jan. 1983, *HDT 45670*; Orcut Hill nr Santa Maria, 2 Feb. 1988, *HDT 51476*; Los Padres National Forest, Figueroa Campground, 31 Jan. 1993, *KMS 371*; Santa Clara Co, Hwy 9, Saratoga, Skyline to Sea Trail, 1 Feb. 1987, *HDT 51190*; Santa Cruz Co, Boulder Creek, 9 Dec. 1962, *HDT 9701*; 18 Jan. 1967, *HDT 18541*; 30 Dec. 1970, *HDT 27067*; Tuolumne Co, Hwy 120, Moccasin Creek Recreation Area, 27 Jan. 1979, *HDT 39354*; *HDT 39357*; Yuba Co, Bullard's Bar Recrea-

tion Area, Schoolhouse Campground, 30 Nov. 1984, *HDT 48310*; 28 Nov. 1989, *HDT 53054*.

*Discussion.*—*Tricholoma griseoviolaceum* is most likely to be confused with *T. portentosum* which also possesses a viscid pileus with radiating gray fibrils, but *T. griseoviolaceum* differs in the absence of yellow coloration of the lamellae and stipe, a violet gray rather than brownish gray pileus, lamellae that stain pinkish brown in age, a more strongly farinaceous to cucumery odor, and an association with oaks rather than pines. Micromorphologically, the two are nearly indistinguishable. *Tricholoma portentosum* has slightly larger spores and lacks cheilocystidia, but the cheilocystidia of *T. griseoviolaceum* are often collapsed and difficult to observe. *Tricholoma griseoviolaceum* may also be confused with *T. mutabile*, which also occurs in California (see description below).

***Tricholoma mutabile* Shanks sp. nov. FIGS. 4-6**

Pileus 30-90 mm latus, viscosus, glaber, interdum rugulosus, subgriseus ad marginem albidus, maturitate cinereus; sapor et odor valde farinaceus. Lamellae et stipes albus, stipes basi subrubescens. Basidiosporae 5.8-7.7 × 4.3-5.8 μm, ellipticae vel subgloboseae. Cheilocystidia 26-43 × 8.2-12 μm, cylindrica vel clavata, hyalina. Hyphae cuticulares pilei in matrice gelatinosa inclusae. Hypoderma pseudoparenchymatica.

*Etymology.* *Mutabile*, changable.

HOLOTYPE. USA. CALIFORNIA: Yuba Co., Bullard's Bar Recreation Area, Schoolhouse Campground, 17 Dec. 1993, *K. M. Shanks 424* (SFSU).

*Pileus* 30-90 mm broad, broadly convex or plano-convex, with a broad or prominent umbo, center sometimes depressed in age, margins down-turned, often becoming uplifted and wavy or lobed in age (FIG. 4); surface viscid, glabrous, rarely faintly tomentose on the disc, often radially rugulose between the disc and margin, pale warm gray (17B2, 14D2) or pale violet gray (9D3-9C2) on the disk, progressively paler towards the margin with irregular darker gray streaks; margins white; pileus darkening in age to dark gray (9F4) or medium gray (9E3, 7D2) with violet tones, occasionally with yellow brown (4B4) areas, margin remaining silvery gray to white; context white, grayish in age or when waterlogged, very thin, taste and odor strongly sweet farinaceous or reminiscent of grapefruit.

*Lamellae* sinuate, thin, close, white, discoloring pale golden brown (5D4-7) in age.

*Stipe* 50-100 × 9-25 mm, equal or slightly clavate, base abrupt; surface dry, silky fibrillose, white, discoloring pale golden brown (5C5) with handling; context solid or hollow, white or watery gray, base of stipe dull pink or pale orange.