

Nomenclatural novelties : Steven A. Trudell & Andrew D. Parker

*Tricholoma ammophilum* A.D. Parker, Grubisha & S.A. Trudell, sp. nov.

IF 558775

Holotype WTU F-073083

Diagnosis: A member of the genus *Tricholoma*, by virtue of its fleshy, centrally stipitate basidiomes with smooth, white, tardily amyloid basidiospores, terrestrial occurrence in association with ectomycorrhizal trees, and ITS barcode sequence. Separated from other species in the genus by the stocky stature, farinaceous odour and taste, typical occurrence in densely gregarious groups on sandy soils in association with *Populus*, North American geographic range, and ITS barcode sequence.

Description: Pileus 6–12 cm wide, convex when young, becoming broadly convex to nearly plane with slightly sunken disc, shape often somewhat irregular due to crowding by adjacent basidiomes; surface viscid when moist, often with adhering plant debris and soil, glabrous; pale brown to reddish brown, darker over the disc, paler or whitish toward the margin; margin inrolled at first, often becoming uplifted and undulating. Context thick, whitish; odor and taste farinaceous. Lamellae adnexed to sinuate, broad, close; white, staining reddish brown especially along the edge; lamellulae abundant. Stipe 5–10 cm long, 1–3 cm thick, nearly equal, sometimes tapered at the base or slightly clavate, solid; white at first, then browning in age. Basidiospores ( $n = 150$ , from four collections)  $4.5\text{--}6.5 \times 3.0\text{--}4.5 \mu\text{m}$ , mean  $5.4 \times 3.7 \mu\text{m}$ , predominantly ellipsoid,  $Q = 1.23\text{--}1.69$ , mean 1.48; smooth, thin-walled, hyaline, tardily amyloid. Basidia  $25\text{--}36 \times 5\text{--}9 \mu\text{m}$ , clavate, 4-spored. Cheilocystidia and pleurocystidia not observed. Pileipellis an ixocutis of cylindrical, interwoven, parallel to ascending hyphae,  $1.5\text{--}6.0 \mu\text{m}$  wide, in a gelatinous matrix; subpellis interwoven, with cylindrical to slightly inflated hyphae,  $3\text{--}10 \mu\text{m}$  wide. Clamp-connections not observed.

Etymology: From the Greek “ammos” = sand and “philos” = loving; recognizing the species’ common name in the Pacific Northwest, “the sandy,” based on its frequent occurrence in sandy soils.

Ecology and distribution: Scattered or often in dense close-packed groups or clusters in sandy soil. Ectomycorrhizal with *Populus* species, most commonly *P. balsamifera*. Widely distributed in North America, but seemingly most common in the West.

Specimens examined: USA. Alaska: Chugach National Forest, Seward Ranger District (Kenai Peninsula), Quartz Creek Campground, in mixed forest with *Picea glauca*, *Populus tremuloides*, and *Betula papyrifera*, plus accessory *Populus balsamifera* subsp. *trichocarpa*, and *Alnus*, S.A. Trudell SAT-16-237-12, 24 Aug 2016 (Holotype), GenBank MW597140 (ITS), MZ514884 (rpb2), MZ970671 (tcf1); Girdwood, under *Populus balsamifera* subsp. *trichocarpa* in city park, WTU F-065863, S.A. Trudell SAT-10-241-07, 29 Aug 2010, GenBank MW597248 (ITS). Washington: Pend Oreille Co., Colville National Forest, under *Populus balsamifera* subsp. *trichocarpa*, WTU F-073015, A.D. Parker 051013-1, 13 Oct 2005, GenBank MW597199 (ITS); Pierce Co., Mt. Baker-Snoqualmie National Forest, Buck Creek Recreation Area, Forest Road 7160, in mixed forest with *Populus balsamifera* subsp. *trichocarpa*, WTU F-073202, Noah Siegel 3426, 20 Oct 2018, GenBank MW597315 (ITS).

Notes: The name *T. populinum* has been misapplied to this species, but that European species differs in ITS sequence and geographic range, not being known to occur in North America.

*Tricholoma atrofibrillosum* S.A. Trudell, A.D. Parker & E.T. Cline, sp. nov.

IF 558776

Holotype WTU F-073048

Diagnosis: A member of the genus, *Tricholoma*, by virtue of its fleshy, centrally stipitate basidiomes with smooth, white, tardily amyloid basidiospores, terrestrial occurrence in association with ectomycorrhizal trees, and ITS barcode sequence. Separated from other species in the genus by the umbonate yellowish pileus with black to dark brownish disc and prominent dark radial fibrils, whitish lamellae and stipe that develop yellow tones in places, occurrence with *Picea* and *Tsuga*, North American geographic range, and ITS barcode sequence.

Description: Pileus 3–9 cm wide, broadly conical or convex at first, becoming broadly convex with an umbo; surface viscid at first, then dry, surface yellowish with a blackish or very dark brownish disc and abundant similarly dark radial fibrils, giving an overall dark olivaceous yellow appearance; margin inrolled at first, often slightly upturned and splitting radially in age. Context white to yellowish, fragile; odor and taste not distinctive or slightly farinaceous. Lamellae adnexed to sinuate, often seceding, subdistant to close, broad; whitish or tinged yellowish in places or overall; lamellulae abundant. Stipe 3–9 cm long, 1–2 cm thick, equal or sometimes slightly clavate, solid, smooth, dry, whitish to yellowish. Basidiospores ( $n = 165$ , from four collections)  $5.5\text{--}8.0 \times 4.5\text{--}6.5 \mu\text{m}$ , mean  $6.6 \times 5.5 \mu\text{m}$ , subglobose to ellipsoid,  $Q = 1.05\text{--}1.41$ , mean 1.21; smooth, thin-walled, hyaline, tardily amyloid. Basidia  $35\text{--}46 \times 7.5\text{--}9 \mu\text{m}$ , clavate, 4-spored. Cheilocystidia scattered, variously shaped, clavate to utriform, hyaline, thin-walled; pleurocystidia not observed. Pileipellis an ixocutis of cylindrical, interwoven, parallel to ascending, often darkly encrusted hyphae  $3\text{--}8 \mu\text{m}$  wide in a gelatinous matrix; subpellis parallel to interwoven, cells cylindrical to moderately inflated,  $3\text{--}17 \mu\text{m}$  wide. Clamp-connections not observed.

Etymology: From the Latin “ater” = black and “fibrilla” = fiber, for the dark fibrils on the pileus surface.

Ecology and distribution: Solitary, scattered, or in groups under conifers, especially *Picea sitchensis*; fairly common along the Pacific Coast from California to southern Alaska.

Specimens examined: USA. Alaska: Girdwood, in *Picea sitchensis*-*Tsuga* forest with occasional *Populus balsamifera* subsp. *trichocarpa* and *Alnus*, S.A. Trudell SAT-16-244-15, 31 Aug 2016 (Holotype), GenBank MW597267 (ITS), MZ514885 (rpb2), MZ970672 (tef1); Mitkof Island, Petersburg, Sandy Beach Trail, in *Picea sitchensis*-*Tsuga*-*Alnus* forest, WTU F-010258, S.A. Trudell SAT-09-254-08, 11 Sep 2009; Cordova, Chugach National Forest, Cordova Ranger District, Haystack Trail, in *Picea sitchensis*-*Tsuga* forest, WTU F-065669, S.A. Trudell SAT-11-244-03, 1 Sep 2011, GenBank MW597242 (ITS). Idaho: Bonner Co., Priest Lake, Idaho Panhandle National Forests, Trapper Creek Trail, in mature mixed conifer forest with *Abies grandis*, *Tsuga heterophylla*, *Picea engelmannii*, and *Thuja plicata*, WTU F-073023, A.D. Parker 140920-2, GenBank MW597224 (ITS).

Notes: The name *T. sejunctum* has been misapplied to this taxon, but that angiosperm-associated European species differs in its paler pileus fibrils and is not known to occur in North America. *Tricholoma subsejunctum* Peck, described from the northeastern USA, differs by ITS sequence but is morphologically very similar and apparently can be sympatric with *T. atrofibrillosum*, at least in southern Alaska.

*Tricholoma leucoxanthum* S.A. Trudell, A.D. Parker & E.T. Cline, sp. nov.

IF 558778

Holotype WTU F-073078

Diagnosis: A member of the genus, *Tricholoma*, by virtue of its fleshy, centrally stipitate basidiomes with smooth, white, tardily amyloid basidiospores, terrestrial occurrence in association with ectomycorrhizal trees, and ITS barcode sequence. Separated from other species in the genus by

the medium-sized to large white basidiomes that develop yellow stains, pungent complex odor, geographic range in North America, association with *Picea*, and ITS barcode sequence.

Description: Pileus 5–15 cm wide, hemispheric to convex when young, becoming nearly plane, sometimes with a low umbo; surface dry, dull, smooth, white at first, becoming creamy white to pale ochraceous, staining yellow to dull yellow or brown when handled or in age; margin straight, then often undulating in age. Context white; odor complex, a mix of pungent, disagreeable, and coal tar-like, with a floral or fruity component; taste mild or somewhat acrid or bitter. Lamellae adnexed to sinuate, narrow, close; white to cream, becoming yellowish in age, especially near the edge; lamellulae abundant. Stipe 5–10 cm long, 1–2.5 cm thick, slightly clavate when young, becoming nearly equal, dry, smooth to somewhat fibrillose, white at first, staining yellow when handled or in age. Basidiospores ( $n = 130$ , from five collections)  $4\text{--}7 \times 3\text{--}5 \mu\text{m}$ , mean  $5.4 \times 4.0 \mu\text{m}$ , subglobose to ellipsoid,  $Q = 1.10\text{--}1.57$ , mean 1.35; smooth, thin-walled, hyaline, tardily amyloid. Basidia  $25\text{--}40 \times 6\text{--}8 \mu\text{m}$ , clavate, 4-spored. Cheilocystidia occasionally present, scattered, irregularly cylindrical; pleurocystidia not observed. Pileipellis an interwoven cutis; hyphal elements narrow to somewhat inflated, mostly  $5\text{--}12.5 \mu\text{m}$  wide with rounded to slightly clavate terminal elements; subpellis not well differentiated. Clamp connections occasional.

Etymology: From the Greek “leukos” = white and “xanthos” = yellow, for the whitish basidiomes that develop yellow stains.

Ecology and distribution: Known from the Pacific Northwest north to interior Alaska in conifer and mixed forests with *Picea* present.

Specimens examined: USA. Alaska: Fairbanks, Chena Lakes Recreation Area, in *Picea glauca*-*Betula papyrifera* forest, WTU F-065905, S.A. Trudell SAT-11-217-10, 5 Aug 2011, GenBank MW597249 (ITS); Chugach National Forest, Seward Ranger District (Kenai Peninsula), Crescent Creek Trail, in mixed forest of mostly *Picea glauca*, *Tsuga*, *Populus tremuloides*, and *Betula papyrifera*, with *Populus balsamifera* subsp. *trichocarpa* and occasional *Alnus*, WTU F-065768, S.A. Trudell SAT-11-241-08, 29 Aug 2011, GenBank MW597245, MW597246 (both ITS); S.A. Trudell SAT-14-239-16, 27 Aug 2014 (Holotype), GenBank MW597296 (ITS), MZ970669 (rpb2), MZ970680 (tef1); Chugach National Forest, Seward Ranger District (Kenai Peninsula), Cooper Landing, Broadview Station, in mixed forest with *Picea glauca*, *Betula papyrifera*, *Populus tremuloides*, and shrubby *Alnus*, WTU F-073077, S.A. Trudell SAT-14-238-14, 26 Aug 2014, GenBank MW597295 (ITS). Washington: Pend Oreille Co., Colville National Forest, Slate Creek Trail, in mixed forest with *Picea engelmannii* and *Populus*, WTU F-073029, A.D. Parker 141006-2, 6 Oct 2014, GenBank MW597229 (ITS).

Notes: The name “*T. sulphurescens*” has been applied to this species, but that angiosperm-associated European species is not known to occur in western North America. *Tricholoma leucoxanthum* is closely related and morphologically very similar to the European *T. boreosulphurescens* Mort. Christensen & Heilmann-Clausen, from which it differs by slightly smaller basidiospores and ITS barcode sequence.

*Tricholoma megalophaeum* N. Siegel, S.A. Trudell & A.D. Parker, sp. nov.

IF 558779

Holotype: WTU F-073091

Diagnosis: A member of the genus *Tricholoma* by virtue of its fleshy, centrally stipitate basidiomes with smooth, white, tardily amyloid basidiospores, terrestrial occurrence in association with ectomycorrhizal trees, and ITS barcode sequence. Separated from other species in the genus by the generally large basidiomes with dry, umbonate, darkly colored pileus, occurrence in moist forests in association with *Picea*, and ITS barcode sequence.

Description: Pileus 6–15 cm wide, conical and umbonate when young, in age becoming broadly conical to convex, usually with a broad umbo; dry, appressed-fibrillose, faintly virgate; very dark

olivaceous gray over a yellowish ground color; margin incurved to inrolled when young, in age becoming undulating and uplifted. Context thick, very firm, fibrous in the stipe, grayish in the cap and whitish to grayish in the stipe; odor slightly farinaceous, sometimes somewhat like green corn, taste mild to slightly farinaceous. Lamellae deeply adnexed, edges slightly eroded in age, pale cream with a grayish cast when young, dingy grayish yellow in age; lamellulae abundant. Stipe 7–15 cm long, 1–5 cm thick, equal or somewhat clavate with abrupt rounded to bulbous base, dry, fibrillose-scaly, whitish to pale yellowish, sometimes with slight orangish stains in age. Basidiospores (n = 150, from four collections) 6.5–10.5 × 4.5–7.0 μm, mean 8.1 × 6.1 μm, subglobose to ellipsoid, Q = 1.06–1.59, mean 1.34; smooth, thin-walled, hyaline, tardily amyloid. Basidia 33–44 × 8–10 μm, clavate, 4-spored. Cheilocystidia occasional; pleurocystidia not observed. Pileipellis a cutis breaking up into trichoderm scales; hyphal elements dark, cylindrical, often encrusted, 2.5–10 μm wide with cylindrical to slightly clavate terminal elements; subpellis of mostly interwoven, inflated cells, 5–20 μm wide. Clamp connections not observed.

**Etymology:** From the Greek “megas” = large, great and “phaios” = dark, recognizing the large size and dark cap color of the basidiomes.

**Ecology and distribution:** So far known only from coastal *Picea sitchensis*-*Tsuga heterophylla* forests in California and Washington.

**Specimens examined:** USA. California: Humboldt Co., Prairie Creek Redwood State Park, Davison Road, Elk Trail, under *Picea sitchensis*, WTU F-073204, Noah Siegel NS1105, 22 Nov 2013, GenBank MW597317 (ITS); Noah Siegel NS4666, 4 Nov 2019 (Holotype), under *Picea sitchensis*, GenBank MW597305 (ITS), MZ514888 (rpb2), MZ970675 (tef1); Spruce Grove, under *Picea sitchensis*, WTU F-073080, Noah Siegel 18-XI-2016, 18 Nov 2016, GenBank MW597299 (ITS). Washington: Jefferson Co., Olympic National Park, Hoh River Valley, South Snider-Jackson Primitive Trail, in old-growth conifer forest with *Picea sitchensis*, *Tsuga heterophylla*, and *Pseudotsuga menziesii*, WTU F-047868, S.A. Trudell SAT-00-297-38a, 23 Oct 2000, GenBank MW597237 (ITS).

**Notes:** *Tricholoma guldeniae* is a very similar species described from Norway (and reported, but not confirmed, from easternmost North America [Newfoundland]) that also occurs primarily with *Picea* in near-coastal environments. Based on published illustrations, its cap is paler in color, at least at maturity.

*Tricholoma venenatoides* S.A. Trudell, A.D. Parker & M.J. Gordon, sp. nov.

IF 558789

Holotype: WTU F-073089

**Diagnosis:** A member of the genus, *Tricholoma*, by virtue of its fleshy, centrally stipitate basidiomes with smooth, white, tardily amyloid basidiospores, terrestrial occurrence in association with ectomycorrhizal trees, and ITS barcode sequence. Separated from other species in the genus by the generally robust stature, overall whitish coloration, brown-scaly pileus surface, farinaceous odor and taste, occurrence in West Coast montane conifer forests, abundant clamp connections, and ITS barcode sequence.

**Description:** Pileus 5–13 cm wide, convex when young, becoming broadly convex-umbonate; surface dry; whitish with variably dense brownish squamules that become less distinct and lighter in color toward the whitish margin; margin incurved at first, at times becoming uplifted and undulating. Context moderately thick, white to pale gray; odor and taste farinaceous. Lamellae adnexed to sinuate, close, moderately broad; white to buff; edge entire; lamellulae numerous. Stipe 5–13 cm long, 1–2.5 cm thick, more or less equal, solid; surface fibrillose, whitish to buff, darkening somewhat in age. Basidiospores (n= 184, from 17 collections) 7.0–10.5 × 5.0–7.5 μm, mean 8.4 × 5.7 μm, broadly ellipsoid to oblong, Q = 1.27–2.00, mean 1.48; smooth, thin-walled, hyaline, tardily amyloid. Basidia 44–65 × 8–12 μm, mostly clavate, 4-spored. Cheilocystidia scarce, similar in length

to basidia, ventricose-rostrate; pleurocystidia not observed. Pileipellis a cutis breaking up into trichoderm scales of interwoven, cylindrical to slightly inflated cells 4–11 µm wide; subpellis poorly differentiated. Clamp-connections present at most septa.

**Etymology:** The specific epithet reflects the similarity of the species to *Tricholoma venenatum* (Greek “-o + eides” = a thing that is like).

**Ecology and distribution:** Known from California to British Columbia in montane conifer forests with *Pseudotsuga menziesii* and usually *Abies*.

**Specimens examined:** USA. Oregon: Douglas Co., Umpqua National Forest, Diamond Lake Ranger District, in mixed forest with *Pseudotsuga menziesii*, *Abies concolor*, and *Calocedrus decurrens*, Ron Hamill 18-1009, 25 Nov 2018, GenBank MW597298 (ITS); Linn Co., Willamette National Forest, Sweet Home Ranger District, Hwy 126 near Koosah Falls, S.A. Trudell SAT-19-298-14, 25 Oct 2019 (Holotype), in mixed conifer forest with *Pseudotsuga menziesii*, *Tsuga heterophylla*, *Thuja plicata*, *Abies grandis*, and *Alnus rubra*, GenBank MW597303 (ITS), MZ514891 (rpb2), MZ970678 (tef1); Umpqua National Forest, Tiller Ranger District, in mixed forest with *Pseudotsuga menziesii*, *Abies concolor*, *Calocedrus decurrens*, and *Arbutus menziesii*, Gretchen Vos 14-465, 4 Dec 2014; USDI Bureau of Land Management, Roseburg District, South River Resource Area, in mixed forest with *Pseudotsuga menziesii*, *Abies concolor*, *Calocedrus decurrens*, and *Arbutus menziesii*, Julianne Spelletich 14-25, 8 Dec 2014; Jackson Co., USDI Bureau of Land Management, Medford District, Butte Falls Resource Area, in mixed forest with *Pseudotsuga menziesii*, *Abies concolor*, and *Arbutus menziesii*, Richard Brock 13-473, 21 Nov 2013, Gretchen Vos 14-399, 13 Nov 2014, Gretchen Vos 14-453, 1 Dec 2014; Josephine Co., USDI Bureau of Land Management, Medford District, Grants Pass Resource Area, in mixed forest with *Pseudotsuga menziesii*, *Calocedrus decurrens*, *Pinus ponderosa*, and *Arbutus menziesii*, Scot Loring 13703, 14 Dec 2014, Scot Loring 13720, 16 Dec 2014, Scot Loring 13727, 16 Dec 2014, Richard Brock 16-215, 26 Nov 2016, Richard Brock 16-234, 2 Dec 2016, Richard Brock 16-243, 4 Dec 2016, Gretchen Vos 16-229, 11 Dec 2016, Richard Callagan 612-16, 13 Dec 2016; Klamath Co., USDI Bureau of Land Management, Lakeview District, Klamath Falls Resource Area, in mixed forest with *Pseudotsuga menziesii*, *Abies concolor*, *Calocedrus decurrens*, and *Pinus lambertiana*, Gretchen Vos 14-378, 6 Nov 2014, Gretchen Vos 14-415, 15 Nov 2014.

**Notes:** This species has been referred to as *Tricholoma venenatum*, which is an eastern North American angiosperm-associated species not known to occur in the West. *Tricholoma smithii* Ovrebo & Hughes is a very similar close relative that occurs in the Rocky Mountains, has slightly larger basidiospores, and also was previously referred to as *T. venenatum*.

*Tricholoma badicephalum* (Zeller) N. Siegel, S.A. Trudell & M.J. Gordon, comb. nov.

IF 558782

Basionym: *Armillaria badicephala* Zeller, *Mycologia* 27(5): 459 (1935)

*Tricholoma glaucescens* (A.H. Sm.) Matheny, comb. nov.

IF 558783

Basionym: *Armillaria caligata* var. *glaucescens* A.H. Sm., *Beih. Sydowia* 8: 372 (1979)

*Armillaria badicephala* Zeller, *Mycologia* 27(5): 459 (1935)

Holotype: NY 657606; H.P. Barss, s.n., 19 Nov 1933, Newport, Lincoln Co., Oregon, USA.

Epitype: WTU F-073095 (here designated, IF 558784), Noah Siegel NS1006, 29 Oct 2013; under *Pinus contorta* and *Arctostaphylos uva-ursi* in sandy soil with groundcover of mosses and fruticose lichens; Honeyman State Park, Lane Co., Oregon, USA; GenBank MW597309 (ITS), MZ514886 (rpb2), MZ970673 (tef1).

*Melanoleuca dryophila* Murrill, *Mycologia* 5(4): 217 (1913)

Holotype: NY 774992; USA: California, Santa Clara Co., Stanford University, J. McMurphy 27, 21 Jan 1903.

Epitype: WTU F-073055 (here designated, IF 558791), S.A. Trudell SAT-17-041-02, 10 Feb 2017; mixed woodland with *Quercus agrifolia*, *Pinus*, *Arbutus menziesii*, and *Arctostaphylos*; off Highway 154 and Stagecoach Road, west of San Marcos Pass, Los Padres National Forest (or private inholding), Santa Barbara Co., California, USA; GenBank MW597274 (ITS), MZ514887 (rpb2), MZ970674 (tef1).

*Armillaria arenicola* Murrill, *Mycologia* 4(4): 212 (1912)

Holotype: NY 586560; USA: Oregon, Lincoln Co., Newport, W.A. Murrill 1044, 13 Nov 1911.

Epitype: WTU F-068823 (here designated, IF 558787); S.A. Trudell SAT-16-319-01, 14 Nov 2016; coastal dune forest with *Pinus contorta*, *Picea sitchensis*, *Pseudotsuga menziesii*, and *Tsuga heterophylla*; Oregon Dunes National Recreation Area, US Hwy 101 between mileposts 200 and 201, Douglas Co., Oregon, USA; GenBank KY660032 (ITS), MZ514889 (rpb2), MZ970676 (tef1).

*Melanoleuca platyphylla* Murrill, *Mycologia* 5(4): 219 (1913)

Holotype: NY 775009; USA: Washington, King Co., Seattle, W.A. Murrill 419, 20 Oct 1911.

Epitype: WTU-F-073003 (here designated, IF 558788); S.A. Trudell SAT-13-313-16, 9 Nov 2013; mixed conifer forest with *Pseudotsuga menziesii*, *Tsuga heterophylla*, and *Thuja plicata*; HJ Andrews Experimental Forest, McKenzie River Ranger District, Willamette National Forest, Lane County, Oregon, USA; GenBank MW597187 (ITS), MZ970668 (rpb2), MZ970679 (tef1).

Notes: These actions are one outcome of a study to assess the application of names to Pacific Northwest North American *Tricholoma* specimens, including phylogenetic analyses and morphological, ecological, and biogeographical observations. A report from the study will be available upon request from the first author at email: mycecol@uw.edu.