# The Genus *Tomentellastrum* (Aphyllophorales, Thelephoraceae s. str.)

by

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### With 8 figures

**Abstract:** A synopsis of the genus *Tomentellastrum* is presented. Nomenclatural type specimens were examined for all names considered pertinent. A key to the recognized species is included and photomicrographs of basidiospores are presented for each. Data on substratum relationships and distributions are provided. One new combination is made, *Tomentellastrumbadium* (Link per Steudal) M. Lars.

Svrček (1958, 1960) proposed *Tomentellastrum* (Bourd. & Galz.) Svrček as a segregate of *Tomentella* Pat. nom. cons., to include effused thelephoraceous fungi whose basidiocarps are with smooth hymenial surfaces, pigmented ornamented basidiospores of various configurations, cystidia absent, hyphae 3 to 9  $\mu$ m in diameter, and lacking clamp connections. Bourdot and Galzin (1924) previously had used the name *Tomentellastrum* to designate a section of *Tomentella* whose basidiocarps lacked clamp connections.

Thelephorafuscocinerea Pers.: Fries was selected by Svrcek (1958) as the generic nomenclatural type. Other taxa included in the genus by Svrček were *Tomentellastrum ceasiocinereum* Svrček, *T. atroviolaceum* (Litsch.) Svrček, *T. macrosporum* (Hoehn. & Litsch.) Svrček, *T. umbrinum* (Fries) Svrček, *T. umbrinum* f. *umbrinovirens* Svrček, (Svrček, 1960) *T. f. ardosiaca* Svrček, and *T. umbrinum* var. *lapidicola* (Bourd. & Galz.) Svrček.

<sup>\*</sup>Maintained at Madison, Wis. in cooperation with the University of Wisconsin.

Larsen (1973) placed the several forms and varieties of *Tomentellastrum umbrinum* in synonymy with *Pseudotomentella tristis* (Karst.) M. Lars., described *T. brunneofirmum* and *T. montanensis* (1967), and proposed several new combinations to the genus (1974).

A number of the species presented here have been treated in *Tomentella* (Wakefield, 1969) or *Thelephora* (Corner, 1968). Though *Tomentellastrum* appears to be intermediate between the two genera, the predominant lack of clamp connections and presence of large basidiospores provide an element of generic coherency that appears to justify the continued recognition and use of the name *Tomentellastrum*.

Recently, Stalpers (1975) typified *Alytosporium* Ehrenb. ex Link with the name *Alytosporium fuscum* (Link) ex Link (= *Tomentella subrubiginosa* Litch. = *T. rubiginosa* [Bres.] R. Maire), and proposed that Tomentella Pat. nom. cons. (already conserved against *Caldesiella* Sacc.) be conserved against *Alytosporium*. Stalpers' (1975) choice is not only appropriate but apparently fortuitous, for had he selected A. badium (Link) ex Steudel (= *Tomentellastrum floridanum* (Ell. and Ev.) M. Lars.) as type, *Alytosporium* (Link, 1824) and Tomentellastrum (Svrček, 1958) would be in conflict.

Species of *Tomentellastrum* probably have a wide distribution, particularly in temperate areas. A recent study (Larsen and Parmasto, 1975) of members of the Thelephoraceae from the Yakutian Autonomous SSR did not provide any substantial evidence for the occurrence of species of *Tomentellastrum* in that region. However, the presence of other tomentelloid fungi, though limited in kind and number, does indicate their future possible occurrence. To date, taxa of *Tomentellastrum* are known only from the North American and European continents.

This paper presents a synopsis of the known species of Tomentel-lastrum. Methodology used to examine basidiocarps and terminology used to describe shape and ornamentation of basidiospores has been presented elsewhere (Larsen, 1974). Photomicrographs of basidiospores were prepared with the aid of the Zeiss photomicroscope. Herbarium designations are those of Holmgren and Keuken (1974), and surface-color expressions are those of the Munsell System (1929 to 1942). Voucher specimens for most of the species treated are

on file in CFMR, SSMF, DAOM, and BPI. An exclamation mark (!) is used to indicate that nomenclatural types of other names have been studied.

### The Genus Tomentellastrum

Tomentellastrum (Bourd. & Galz.) Svrček Česká Mykol. 12: 68, 1958

= Tomentella Pat. Sect. Tomentellastrum Bourd. & Galz., Bull. Soc. Mycol. France 40: 137. 1924.

Basidiocarps annual, effused, arachnoid to mucedinoid, adnate to separable, rarely crustose, sometimes encrusting; fertile areas usually pale tan to dark brown; subiculum fibrous, paler or darker than the fertile area; margin usually paler than the fertile area.

Hyphal system monomitic. Subicular hyphae 2-7  $\mu$ m diam., septate and usually without clamp connections (clamps infrequent in some species), pale to dark brown, wall thickening noticeable; cordons up to 30  $\mu$ m in diam. in some species, usually infrequent, pale to dark brown; subhymenial hyphae 2-6  $\mu$ m diam., septate and usually without clamp connections (clamps infrequent in some species); basidia 40-75  $\times$  7-13  $\mu$ m, clavate, septate and usually without clamp connections at the base, 4-sterigmate; basidiospores 7-14  $\mu$ m across at the widest part (excluding ornamentation), usually elongated along one axis, oblong to nearly globose, usually regular in outline, aculeolate to echinulate, more rarely aculeate, walls appearing some shade of brown in KOH, inamyloid, acyanophilous.

Nomenclature type species — *Thelephora fuscocinerea* Pers.: Fr., Elench. Fung. 1: 171. 1828.

### **Key to the Species of Tomentellastrum**

Basidiospores mostly regular in outline, usually globose to subglobose
2. Basidiospores 7-10 $\mu$ m across
Clamp connections at some septa of subhymenial hyphae

	4. Fertile areas pale colored; basidiospores mostly subglobose
	T. alutaceo-umbrinum
	4. Fertile areas dark colored; basidiospores frequently subglobose or often slightly bent and appearing depressed on one side
5.	Clamp connections occurring infrequently at septa on subicular and subhymenial
	hyphae
5.	Clamp connections absent
	6. Subicular hyphae usually 2-3.5 μm diam <i>T. brunneofirmum</i>
	6. Subicular hyphae usually 3-7 $\mu$ m diam
7.	Basidia 10-13 µm diam T. fuscocinereum
	Basidia 7-9 $\mu$ m diam
	8. Fertile area purplish brown; hymenial surface becoming colliculose; cordons absent
	8. Fertile area medium to dull brown; hymenial surface becoming mealy granu-
	lose; cordons rare

# **Nomenclatural Summaries and Species Description**

**Tomentellastrum alutaceo-umbrinum** (Bres.) M. Lars. Mycol. Mem. 4: 107. 1974.

- = Hypochnus alutaceo-umbrinus Bres., Ann. Mycol. 1: 109. 1903.
- = Tomentella alutaceo-umbrina (Bres.) Litsch., Bull. Soc. Mycol. France 49: 66. 1933.
- = *Tomentella macrospora* Hoehn. & Litsch., Sitzungs. Kaiserl. Akad. Wissensch. Wien, Math.-naturw. Klasse 115: 1602. 1906(!).
  - = *Tomentellastrum macrosporum* (Hoehn. & Litsch.) Svrček, Česká Mykol. 12: 70. 1958.
- = *Tomentella mycophila* Bourd. & Galz., Bull. Soc. Mycol. France 40: 147. 1924(!).

Holotype – Poland, ad *Carpinum* sp., VII, V.B. Eichler no. 131(S).

Basidiocarps up to 1.0 mm thick, firm-tomentose, adnate, somewhat encrusting; fertile area pale tan to pale brown or slightly clay colored (10.0 YR 4/4); hymenial surface smooth; subiculum firm-fibrous, brown and much darker than the fertile area.

Subicular hyphae 3.5-5.5(-7)  $\mu$ m diam., septate, clamps absent, wall thickening noticeable, dull brown; subhymenial hyphae 3-7  $\mu$ m diam., septate, clamps absent, becoming thick-walled, with walls thinner towards the hymenium, pale brown to subhyaline, paler towards the

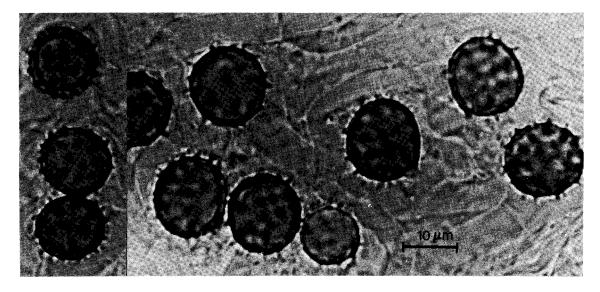


Fig. 1: *T. alutaceo-umbrinum* (from holotype of *Tomentella macrospora*).

hymenium, some parts becoming green in KOH; basidia 50-70  $\times$  9-13  $\mu$ m; basidiospores (Fig. 1) 9-14  $\mu$ m across, mostly subglobose to somewhat ellipsoid or irregularly subglobose, frequently flattened on one side, aculeolate to echinulate, walls pale to medium brown.

Distribution: U.S.A., France, Germany, Canada, Austria, Sweden, Czechoslovakia, Yugoslavia, Finland, Netherlands.

Substratum relationships: usually associated with litter and humus layers of soil, and frequently observed growing on mineral soil.

For further illustration see Larsen (1968).

# Tomentellastrumbadium (Link per Steudel) M. Lars., comb. nov.

- = *Sporotrichum badium* Link, Mag. Ges. Naturf. Freunde 3: 12. 1809 (devalidated name).
- = Alytosporium badium Link per Steudel, Nomencl. Botan., p. 154, 1824.
- = *Tomentella badia* (Link per Steudel) Stalpers, Rev. Mycol. 29: 98. 1974-1975 [1975].
- = Thelephorafloridana Ell. & Ev., J. Mycol. 2: 37. 1886(!).
  - = Tomentellastrum floridanum (Ell. & Ev.) M. Lars., Mycol. Mem. 4: 116. 1974.
- = *Hypochnus arachnoideus* (Berk. & Br.) Bres. var. *murinus* Bres., Ann. Mycol. 1: 109. 1903(!).

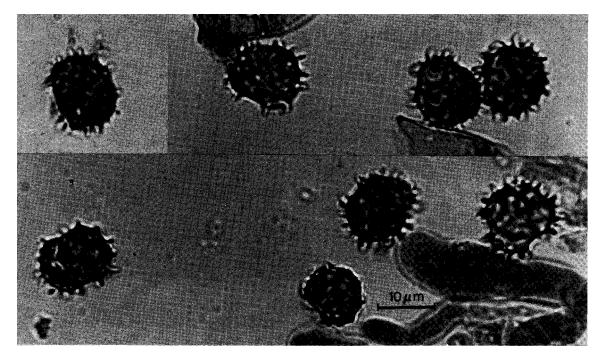


Fig. 2: T. badium (from lectotype of Thelephorafloridana).

- = *Tomentella spongiosa* (Schw.) Hoehn. & Litsch. f. *murina* (Bres.) Svrcek, Ceská Mykol. 12: 75.1958 (nomen superfluum).
- = Tomentella atroviolacea Litsch., Bull. Soc. Mycol. France 49: 53. 1933(!).
  - = Tomentellastrum atroviolaceum (Litsch) Svrcek, Ceská Mykol. 12: 70. 1958.
- = Tomentella fimbriata M.P. Chris., Dansk Bot. Ark. 19: 258. 1960(!).

Lectotype – In herbarium Persoon (ex Link), L.910.262-544 (teste Stalpers).

Basidiocarps up to 0.5 mm thick, firm to arachnoid, sometimes encrusting; fertile area medium to dull brown (7.5 YR 3/2); subiculum thin, fibrous, darker than the fertile area; hymenial surface mealygranulose to smooth.

Subicular hyphae 3-5.5(-7)  $\mu$ m diam., septate, clamps absent, dull brown to olive brown, some parts becoming green in KOH; cordons rare, up to 40  $\mu$ m diam., brown; subhymenial hyphae 2.5-5(-6)  $\mu$ m diam., septate, clamps absent, hyaline to yellowish brown, parts becoming green, bluish green or blue in KOH; basidia 40-75 × 7-9 (-11)  $\mu$ m, contents often blue or blue-green in KOH; basidiospores

(Fig. 2) 7-11(-12)  $\mu$ m across, usually irregular in outline, often somewhat globose, echinulate to rarely aculeate, walls dull to olive-brown.

Distribution: Turkey, France, Germany, U.S.A., Great Britain, Canada, Poland, Sweden, Denmark, Czechoslovakia, Netherlands, Finland, Belgium.

Substratum relationships: a variety of woody substrates, inclusive of both angiosperms and gymnosperms.

For further illustration see Larsen (1968).

# **Tomentellastrum brunneofirmum** (M. Lars.) M. Lars., Mycol. Mem. 4: 110.1974

= Tomentella brunneofirma M. Lars., Can. J. Bot. 45: 1300.1967.

Holotype – Arizona, Coronado National Forest, Greenhouse Canyon, on *Quercus* sp., J.L. Lowe and R.L. Gilbertson, JLL 9161, August 26,1958 (BPI), and isotype in SYRF.

Basidiocarps up to 0.5 mm thick, described as "soft-fleshy" when fresh, adherent, compact, almost crustose, cracking slightly on drying; fertile area medium brown (7.5 YR 3/2, 7.5 YR 4/2, 5.0 YR 3/4); subiculum thick, firm, brown.

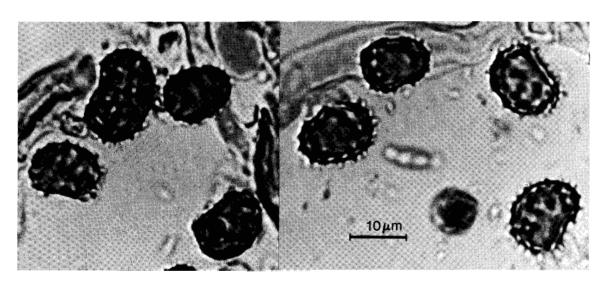


Fig. 3: T. brunneofirmum (from holotype).

Subicular hyphae 2-3.5(-4.5)  $\mu$ m diam., septate, clamps absent, slightly constricted at the septa, wall thickening apparent, brown to violaceous brown; cordons rare, up to 25  $\mu$ m diam., brown; subhymenial hyphae 3-5  $\mu$ m diam., septate, clamps absent, often constricted at the septa, wall thickening slight, yellowish-brown, some parts becoming green in KOH; basidia 40-60  $\times$  8-12  $\mu$ m; basidiospores (Fig. 3) 7-10  $\mu$ m across, usually elongated along one axis, irregular to regular in outline, somewhat globose to subglobose, often flattened on one side, aculeolate to echinulate, walls brown.

Distribution: Southwestern U.S.A., Sweden.

Substratum relationships: on a variety of woody substrates inclusive of angiosperms and gymnosperms, and observed infrequently in association with soil duff layers.

For additional illustration see Larsen (1968).

# Tomentellastrum caesiocinereum Svrček, Česká Mykol. 12: 69. 1958.

= Tomentella caesiocinerea (Svrček) M. Lars., State Univ. Coll. Forest. at Syracuse, Univ., Tech. Publ. 93, p. 130. 1968.

Holotype – Bohemia centr.: Tobolka prope Koneprusy, in trunco putr. *Quercus* sp., solo calcareo, leg. Svrcek, Kotlaba, et Pouzar, 30. VIII. 1953 (PR 162721).

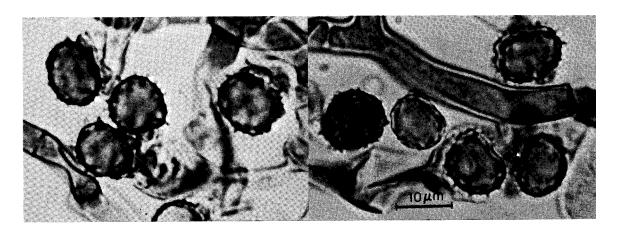


Fig. 4: *T. caesiocinereum* (from holotype).

Basidiocarps up to 0.3 mm thick, arachnoid to byssoid; fertile area grayish brown (10.0 YR 4/2); hymenial surface smooth.

Subicular hyphae of two kinds, some 2-3.5  $\mu$ m diam., septate, clamps absent, infrequently branched, dull brown; some 3.5-5.5(-6)  $\mu$ m diam., septate, clamps absent, frequently branched, dull brown; cordons up to 30  $\mu$ m diam., brown; subhymenial hyphae 3-5(-6)  $\mu$ m diam., septate; basidia 35-50  $\times$  7-9  $\mu$ m, parts blue or bluish-green in KOH; basidiospores (Fig. 4) 7 to 10  $\mu$ m across, usually elongated along one axis, regular in outline, oblong to rarely globose, often slightly bent, aculeolate to echinulate, pale yellow to tan-brown.

Distribution: Czechoslovakia.

Substratum relationships: on hardwoods and calcareous stone.

For additional illustrative material see Larsen (1968).

# **Tomentellastrum cinereo-umbrinum** (Bres.) M. Lars., Mycol. Mem. 4:111. 1974.

 $\equiv$  Hypochnus cinereo-umbrinus Bres., Stud. Trent. 7 (Ser. 2, Sci. Nat. Econom.): 62. 1926.

(Hypochnus fuscus Fr. sensu Karst., Med. Soc. Fauna Fenn. 6: 13. 1881).

Lectotype – Italy, ad truncos arb. frond. Gocciadoro, J. Bresadola, VI.1901 (BPI, ex herb. Bresadola).

Basidiocarps up to 0.7 mm thick; sometimes encrusting upright plant parts, fertile area pale to medium chocolate brown (5.0 YR 4/4 to 5.0 YR 3/4 or 7.5 YR 5/4 to 7.5 YR 4/4); hymenial surface smooth to less frequently appearing minutely granulose.

Subicular hyphae 3-5.5  $\mu$ m diam., predominantly septate without clamps or clamps infrequent, pale to dull brown; cordons up to 15  $\mu$ m diam., individual hyphae predominantly septate without clamps or clamps rare; subhymenial hyphae 3.5-4.5  $\mu$ m diam., septa mostly with clamps; basidia 40-60  $\times$  9-11  $\mu$ m, mostly clamped at the base; basidiospores (Fig. 5)9-10(-10.5)  $\mu$ m across, irregularly subglobose to irregular, usually elongated along one axis, echinulate walls pale brown.

Distribution: Finland, Italy, Spain.

Substratum relationships: on woody angiospermous substrata.

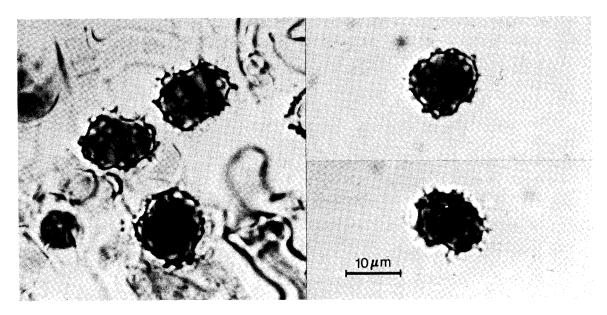


Fig. 5: T. cinereo-umbrinum (from lectotype).

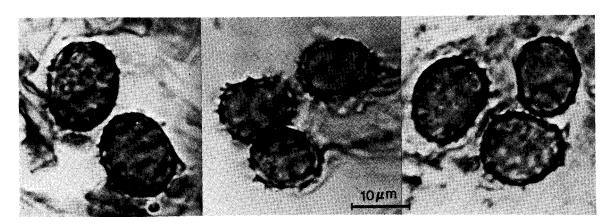


Fig. 6: *T. fuscocinereum* (from lectotype).

**Tomentellastrum fuscocinereum** (Pers.: Fr.) Svrček, Česká Mykol. 12: 69. 1958.

- *Thelephora fuscocinerea* Pers., Mycol. Europ., p. 114. 1822 (devalidated name).
- = Thelephora fuscocinerea Pers.: Fr., Elench. Fung. 1: 171. 1828.

- **■** *Tomentella fuscocinerea* (Pers.: Fr.) Donk, Med. Bot. Mus. Herb. Rijks Univ. Utrecht 9: 30. 1933.
- **■** Tomentella phylacteris Bull. per Bourd. & Maire, "...ut 'b-" without explicit rank Thelephora fuscocinerea Pers.: Fr., Bull. Soc. Mycol. France 40: 141. 1924
- = Tomentella phylacteria Bull. per Bourd. & Maire subsp. Thelephora fuscocinerea (Pers.: Fr.) Bourd & Galz., Hym. France, p. 487. 1928.

Lectotype — France [?], on soil and organic debris mixed with quartz-like crystalline material, C.H. Persoon [?] (Herb. Lugd. Bat. 910267-479 in L).

Basidiocarps up to 1.0 mm thick, annual to biennial, becoming encrusting, crustose in some parts and brittle, fertile area dull brown (near 10.0 YR 3/4), raised parts becoming dark fuscous; hymenial surface smooth but with some parts raised and assuming the form of irregular small humps and ridges; sterile margin convoluted or plicate in some parts and forming radially oriented ridges and blunt colliculi.

Subicular hyphae 3-6(-7)  $\mu$ m diam., septate, clamps absent; subhymenial hyphae 3-6  $\mu$ m diam., septate, clamps absent; basidia 60-70  $\times$  10-13  $\mu$ m; basidiospores (Fig. 6) 10 to 12  $\mu$ m across, frequently subglobose, elongated along one axis and often slightly bent, aculeolate to echinulate, pale brown.

Distribution: France.

Substratum relationships: on soil and organic debris.

The conceptual species limits of *T. fuscocinerea* are poorly understood. Persoon's type specimen may be aberrant or at least atypical. It is considered appropriate for the present to confine the application of the name to the type until additional specimens become available that are more surely identifiable with it.

**Tomentellastrum litschaueri** (Svrček) M. Lars., Mycol. Mem. 4: 119. 1974.

= Tomentella litschaueri Svrček Česká Mykol. 12: 75. 1958. (As **Thelephora** crustacea Schum. per Fr. sensu Bres., Ann. Mycol. 1: 107. 1903.)

Holotype — Poland, [on ground and organic debris, MJL], V.B. Eichler [?] 11, collection date not given, "ex herb. Bresadola" [filed as *Thelephora crustacea* in S].

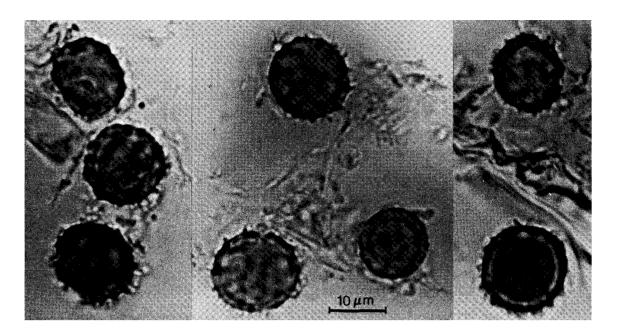


Fig. 7: *T. litschaueri* (from holotype).

Basidiocarps up to 0.5 mm thick, closely adherent and somewhat crustose, becoming brittle; fertile area medium brown to umbrinous (near 5.0 YR 3/2 or 7.5 YR 3/2); hymenial surface smooth.

Subicular hyphae 2.5-4  $\mu$ m diam., septate with clamps not observed; subhymenial hyphae 2.5-6  $\mu$ m diam., very variable in form and dimension, septate, with clamps at some septa, frequently constricted at the septa and appearing swollen and irregular; basidia 45-60  $\times$  8-10 (-11)  $\mu$ m; basidiospores (Fig. 7) 8.5-11(-12.5)  $\mu$ m across, globose to subglobose, aculeolate to echinulate, pale to medium brown.

Distribution: Poland, Czechoslovakia.

Substratum relationships: associated with soil organic debris.

**Tomentellastrum montanensis** (M. Lars.) M. Lars., Mycol. Mem. 4: 120.1974.

= Tomentella montanensis M. Lars., Can. J. Bot. 45: 1304. 1967.

Holotype — U.S.A., Montana, Montana State University Biological Station, Flathead Lake, on *Alnus* sp., R.L. Gilbertson No. 4857, 2. VIII.1964 (BPI), and isotype in SYRF.

Basidiocarps up to 0.5 mm thick, adnate compact, becoming crustose, cracking on drying and exposing the subiculum; fertile area purplish-brown (5.0 BG 5/2, 5.0 YR 6/4 to 5.0 YR 7/2); hymenia1 surface smooth, becoming somewhat colliculose in part.

Subicular hyphae 3-5.5(-6)  $\mu$ m diam., septate, clamps absent, walls often greatly thickened in localized areas; subhymenial hyphae 4-5  $\mu$ m diam., septate, clamps absent, parts becoming blue or bluish green in KOH; basidia 45-55 (-65)  $\times$  8-9(-10)  $\mu$ m; basidiospores (Fig. 8) 7-10.5  $\mu$ m across, somewhat irregular in outline and elongated along one axis, irregularly subglobose to oval and flattened slightly on one side, aculeolate to echinulate, walls pale yellowish-brown.

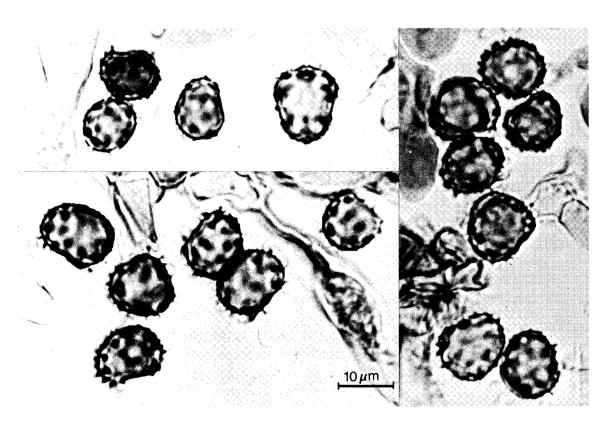


Fig. 8: T. montanensis (from holotype).

Distribution: Western U.S.A. and Canada.

Substratum relationships: associated with angiospermous and gymnospermous woody substrata.

For further illustration see Larsen (1968).

### Nomina Excludendae

## **Thelephora biennis** Fries, Syst. Mycol. 1: 449. 1821.

- = Auricularia phylacteris Bull., Herb. France. Hist. Champ., p. 286. 1791.
- = Tomentella biennis (Fries) A.M. Rogers, Mycologia 40: 634. 1948.
- **Tomentella phylacteris** Bull. per Bourd. & Maire, Bull. Soc. Mycol. France 36: 81. 1920.
- = *Hypochnus phylacteris* (Bull. per Bourd. & Maire) Rea, Trans. Brit. Mycol. Soc. 12: 222. 1927.
- = Thelephora phylacteris (Bull. per Bourd. & Maire) Corner, Nova Hedw. 27: 78, 1968.
- = Thelephora fuscocinerea Pers. a fusca Pers., Mycol. Europ., p. 114. 1822.

Lectotype: France, encrusting the bases of woody plant stems and apparently on the ground, in Bulliard, p. 286, pl. 436, figure 2, 1791; also, see Donk, p. 30. 1933.

When Fries (1821) transferred *Auricularia phylacteris* Bull. to another genus, he renamed the fungus *Thelephora biennis*. His (Fries') concept is derived completely from Bulliard's plate and text. There is no evidence that he knew the species from personal observation. This implies that the correct name for Bulliard's fungus must, of necessity, be derived from the basionym *T. biennis*. *Thelephora biennis* (= *Auricularia phylacteris*) remains unknown to me and is of uncertain application (nomen dubium). It cannot, under the present circumstances, be equated with *Thelephora fuscocinerea*, nomenclaturally, as Donk (1933) would have it.

**Thelephora caesia** Pers. per Fries, Syst. Mycol. 1: 449. 1821.

The name is considered at present to be a nomen dubium. Also see Wakefield (1969).

**Tomentella phylactris** Bull. per Bourd. & Maire "ut 'd' without explicit rank" *griseo-atra* Bour. & Galz., Bull. Soc. Mycol. France 40: 142. 1924; and as forma *griseo-atra* Bourd. & Galz., Hym. France, p. 487. 1928.

An appropriate specimen that would be considered the type of this name has not been available for study. Bourdot and Galzin's description indicates that it may be synonymous with *Tomentellastrum badium*.

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