

**Tuckermannopsis** Gyelnik  
(LECANORALES: PARMELIACEAE)

After Esslinger, Thomson (1984), and others

Rev. 4/96

Thallus foliose to subfruticose, pale olive gray to olive green to brown or blackish; cilia tapered; rhizines sparse, simple. Upper and lower cortex 1-layered, 20-50  $\mu$ m thick; cells small, thin-walled. Nonpored epicortex present; pseudocyphellae absent. Upper cortex paraplectenchymatous. Medulla C-. Sometimes sorediate or isidiate. Cell walls containing Cetraria-type lichenan (medulla I+ blue).

Apothecia borne on undersides of lobe margins, eperforate; thalline margin present. Hymenium hyaline. Asci cylindrical (to narrowly clavate), with amyloid ring structure present; axial body to 1.6-2  $\mu$ m; ocular chamber conical with narrow beak. Spores globose to subglobose, 6-10 x 4-6  $\mu$ m.

Pycnidia marginal, emergent; pycnosporangia bifusiform (to bacilliform?), sometimes sharpened at the tips, 6 x 1  $\mu$ m. Cortex sometimes with atranorin or usnic acid. Medulla with lichesterinic and protolichesterinic acids, or with orcinol depsides or depsidones (e.g., olivetoric or physodic acids). Usually on bark or wood, mostly boreal.

This description is incomplete and needs to be checked again, especially regarding the ascus structure.

**I. Thallus at least partly yellow or yellow-green, foliose.  
Usually on bark or wood, occasionally on rocks**

**1. Sorediate; soredia white, mostly marginal in linear soralia. Thallus C-, K+ pale yellow or K-, P+ pale yellow or P- (usnic in cortex; endothein, fatty acids and traces of unknown UV+ substance).** Thallus adnate, 3-7 cm broad, the lobes often  $\pm$  parallel; upper surface yellowish green; lower surface tan to white, sparsely rhizinate. Apothecia rare. Erect black marginal pycnidia sometimes present. Common on the bark of conifers and hardwoods and on rocks in northern woods. .... Allocetraria oakesiana

**1. Not sorediate. Containing caperatic acid, and unknown fatty acid.** ..... 2

**2. Pycnidia conspicuous on upper surface, blackened, emergent, mostly marginal, appearing as "tubercles"; upper surface very pale. Western N. America.** Upper surface very pale yellow. Containing caperatic acid and an unidentified fatty acid. On conifers, Yukon to Oregon and Idaho. .... Ahtiana pallidula

**2. Pycnidia inconspicuous; upper surface more distinctly**

**yellow. Eastern N. America.** Thallus adnate, 2-6 cm broad; upper surface light yellowish green, somewhat ridged (without lens); lower surface light tan, sparsely rhizinate. Apothecia and pycnidia common. Common on trunks and branches of pine trees in open woods, Great Lakes region and Appalachians. .... Ahtiana aurescens

**II. Thallus brown (to greenish or blackish),  
foliose to fruticose;  
on bark or wood**

**1. With marginal soredia.** Thallus K-, P-, C-, KC-, I-. Containing protolechesterinic and rangiformic acids, and possibly sometimes atranorin. Lobes to 3 cm long, 2-3(-10) mm wide, forming rosettes or loose and ascending to subpendent, flat to  $\pm$  channeled, irregularly branched; upper side brown or often greenish or greenish brown, rather pale, matt to shining, in places slightly sulcate; lower side paler, pale brown or whitish, smooth or with pale, dispersed or grouped rhizines. Pseudocyphellae absent. Soredia white to dark gray, a few formed on the upper surface, occasionally with small isidia which break out into soredia. Apothecia rare, terminal, circular, to 5.5 mm diam.; margins sorediate; disc chestnut brown to dark brown, flat or reflexed, matt to slightly shining, epruinose. On twigs of conifers and hardwood trees or shrubs. Arctic (Alaska, rather rare east to Greenland and Labrador), very common southwards in the west, along the coast to California and in the mountains. .... Tuckermannopsis chlorophylla

**1. Without soredia.** ..... 2

**2. With laminal isidia or isidia-like structures.** ..... 3

**2. Without isidia, but may have abundant and conspicuous pycnidia on margins.** ..... 4

**3. Isidia becoming dense and coralloid. Thallus small, seldom exceeding 2 cm in diameter; lobes adnate and narrow, dark olive-green to blackish.** Usually on wood. .... ("Cetraria" coralligera)

**3. "Isidia" short and stout, tuberculate or becoming foliate. Thallus 2-10 cm diam.; lobes ascending, suberect; upper surface pale olive green to chestnut brown or dark brown, not blackish,** rugose, with scattered warts or tubercles, supapillate to coarsely isidiate. Lobe margins becoming dissected. Lower surface wrinkled, light brown, sparsely rhizinate. Thallus foliose, not subfruticose. Medulla C-, P-, mostly K-, with scattered pale yellow areas reacting K+ yellow, KC+ yellow-orange. Containing fatty acids (and unknown K+, KC+ substance?). Apothecia common or not. On conifers in open forests, very common in the northern Rocky Mountains (Alberta to Utah and Colorado) and Cascades (British Columbia to northern California). .... T. platyphylla

**4. Lobes suberect or ascending; thallus often attached to substrate only near the center.** ..... 5

**4. Lobes not suberect or ascending, mostly appressed to the substrate.** ..... 13

**5. Lobe margins with numerous darkened spinules;** medulla K-, C-, KC-. Lobes weakly canaliculate to  $\pm$  flat; thallus 2-4 cm high, irregularly or

dichotomously branched; lobes usually 2-5 mm broad, margins  $\pm$  even. Apothecia occasional, on lateral branches. On the ground or on small shrubs, subalpine, Pacific NW. .... T. subalpina (Imsh.) Kärnef.

**5. Lobe margins not spinulose;** usually on trees or wood. Thallus pale olive-green to dark brown or greenish black. Lobes narrow. .... 5

**6. Lobes broad, mostly 5-12 mm wide, occasionally to 3-4 cm.** ..... (see T. platyphylla)

**6. Lobes narrow (mostly to 1-3 mm wide).** ..... 7

**7. Medulla I+ blue-violet. Epithecium K+ violet.** Thallus usually large, not in dense stands; 1-3 cm high; lobes usually 1-3 mm broad, weakly canaliculate, often gray (blackish, olivaceous, or pale), or brownish. Long cilia present. Apothecial marginal. With rangiformic and norrangiformic acids. Arctic, rare southwards (Great Lakes area). ....  
(Arctocetraria nigricascens)

**7. Medulla I-. Epithecium K-.** ..... 8

**8. Thallus appearing  $\pm$  distinctly fruticose, with long to short but rather narrow lobes.** ..... 9

**8. Thallus  $\pm$  foliose, with relatively short and broad lobes.** ..... 10

**9. Growing in northwestern Arctic (Alaska and northwesternmost Canada), subalpine. Branches to 3 mm broad, often simple to sparingly branched.** Medulla I-. With lichesterinic and protolichesterinic acids. Epithecium K-. Pseudocyphellae only marginal, very distinct on outer parts of lower surface. Thallus 1-2 cm tall, often simple to sparingly dichotomously branched, very irregular. Upper surface pale brown and olive-brown mottled, or dark brown, olive-green, or yellowish green, matt, smooth or rarely with transverse ridging. Lobes flat to weakly canaliculate, to 3 mm broad; marginal projections few and inconspicuous, to 0.5 mm long, or absent. Apothecia common, marginal (not apical), substipitate, to 4 mm broad; disk brown; margin slightly crenulate; spores round to subglobose. Medulla K-, C-, KC-, P-. Mainly on twigs of Betula and Salix or shrubs, occasionally on the ground, northwestern Arctic (Alaska and northwesternmost Canada), subalpine. .... Tuckermannopsis inermis (Nyl.) Kärnef.

**9. Growing in temperate (to boreal) areas, California to SW Canada. Branches narrower, usually rather richly branched.** (Species often previously treated under Cornicularia). .... (see Bryocaulon pseudosatoana Kaernefeltia californica, K. merrillii and Bryoria abbreviata)

**10. Thallus small, less than 1(-2) cm across; lobe margins [almost always?] eciliate; marginal pycnidia seldom numerous**

**and conspicuous. Apothecia often numerous and crowded, obscuring the thallus. .... ("Cetraria" sepincola)**

**10. Thallus larger, 2-8 cm across; lobe margins with scattered cilia or not; marginal pycnidia often numerous and conspicuous. Apothecia numerous but not becoming crowded. Medulla C-, KC- or C+ or KC+. .... 11.**

**11. Medulla C+ and/or KC+ red (alectoronic, or olivetoric and physodic, usually atranorin). Lobe margins with long cilia. .... 12**

**11. Medulla C-, KC-, UV- (fatty acids only); margins of lobes without long cilia but often with short spinules.** Thallus 2-8 cm diam.; upper surface pale. Thallus loosely adnate, 3-5 cm broad; lobes short, 2-6 mm wide; upper surface light brown to brown or somewhat olivaceous, weakly wrinkled. Rhizines sparse. Apothecia common, 3-10 mm wide; disk brown; rim often spinulate. Medulla K-, C-, P- (fatty acids). Usually on twigs of conifers (especially Douglas fir), north coastal and montane forests from sea level to 6500 ft in California, northward (mostly at lower elevations, and west of the Sierra-Cascade summits) to the Pacific NW, common. Small or immature specimens of T. platyphylla (lacking the usual papillae of that species) may be difficult to distinguish from this species. .... T. orbata

**12. Medulla C+ and KC+ red, UV-, with olivetoric acid (and/or physodic acid?). Thallus 2-8 cm diam.** Upper surface shiny and smooth to often weakly wrinkled (with lens), light greenish to olive brown or darker. Lower surface white to buff. Lobes 1-4 mm wide, sparsely ciliate. Apothecia numerous. Medulla K-, P-. Very common on conifers, hardwoods, and fenceposts in open woods or along roads. Especially common in the Appalachians; the map in Hale (1979) suggests that the species is widespread through most of eastern temperate N. America other than the SE coastal plain, and also from the Pacific NW south to California and Wyoming, but this is incorrect; the western material is entirely T. orbata or T. halei. .... T. ciliaris

**12. Medulla C-, KC+ pink or red, usually UV+ (alectoronic acid, often with accessory atranorin or alpha-collatolic acids), P-, K+ yellow or K-.** Thallus 2-8 cm diam.; lobes to 1-3 mm broad, forming rosettes, flat; upper surface more or less wrinkled; margins with short cilia and also pycnidia; surface dull or shining, greenish brown to brown or olive brown above, the underside white to brown with scattered rhizines. Apothecia common, marginal, pedicellate, to 3 mm broad, the margin concolorous with thallus, inflexed, irregular, the disk brown, dull, epruinose. On conifers and old conifer wood, and on Populus, Betula and Alnus, Arctic, southward to British Columbia and Alberta, and common over much of the eastern United States (or at least especially in the Great Lakes area). .... T. halei

**13. Medulla C+ and/or KC+ red (alectoronic, or olivetoric and physodic, usually atranorin). Lobe margins with long cilia.**

..... 14

**13. Medulla C-, KC-, UV- (fatty acids only); margins of lobes without long cilia but often with short spinules.** ..... 16

**14. Medulla C+ and KC+ pink or red, UV- (olivetoric and/or physodic acids).** ..... 15

**14. Medulla C-, but KC+ pink or red, usually UV+ (alectoronic acid, often with accessory atranorin or alpha-collatolic acids).**

..... (*T. halei*)

**15. Thallus 1-3 cm diam. Southwestern.** ..... ("*Cetraria*" *weberi*)

**15. Thallus 2-8 cm diam. Eastern.** ..... (*T. ciliaris*)

**16. Thallus very closely adnate. Apothecia borne on lower sides of lobe margins (?). Growing in boreal to temperate areas, eastern.**

Thallus rarely over 2 cm diam.; upper surface dark olive green to brown or blackish. Lobes ca. 0.5 mm wide, dissected. Lower surface tan, sparsely rhizinate. Apothecia common. Medulla K-, C-, P- (fatty acids). Common on branches and trunks of conifers in open wood, inconspicuous against the bark. Great Lakes area to New England, south through most of eastern U.S. except S. Florida, west to E. Texas. [Note: *T. subfendleri* is similar, but thallus to 5 cm diam., containing caperatic acid; it occurs in southern Mexico]. ..... *T. fendleri*

**16. Thallus ascending to suberect but dorsiventral. Apothecia borne on upper sides of lobe margins. Growing in arctic to boreal areas, or also further southwards but only in the west.**

..... (*Arctocetraria nigricascens* and "*Cetraria*" *sepincola*)

## Literature

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