

**Peltula** Nyl.

(HEPPIACEAE [called PELTULACEAE by Awasthi])

After Wetmore, 1970

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Thallus areolate, squamulose to peltate or subfruticose, heteromerous, usually dorsiventral, corticate at least on the lower surface; paraplectenchymatous throughout or with a wooly (loose) medulla; attached to substrate by a small area of rhizoids or an umbilicus; soredia present or absent; upper surface usually olive to black; medulla white, loosely woven.

Apothecia immersed, frequently covering the entire squamule, with or without a thalline rim and with or without a proper exciple; hypothecium pale; paraphyses unbranched; asci clavate, unitunicate, with a gelatinous sheath; tholus I+ blue; spores many (16100 or more), minute, simple, hyaline, with a gelatinous sheath.

Pycnidia immersed; fulcrum exobasidial; pycnosporos fusiform or bacilliform. No identified substances. Photobiont Anacystis. On soil or rock, especially in arid or semiarid areas, temperate to tropical.

**1. Thallus peltate with finely sorediate margins; on rock. .... 2**

**1. Thallus squamulose, peltate or subfruticose; without sorediate margins. .... 4**

**2. Squamules small (12 mm diameter), thin (0.20.3 mm); margins deeply lobed and undulate; squamules ascending, dark olive; apothecia sessile with prominent margins. Southwestern U.S. .... P. bolanderi**

**2. Squamules large (over 3 mm diam.). Upper surface dark brown or greenish brown. Apothecia ± immersed. .... 3**

**3. Squamules with delimited orbicular to linear soralia (marginal or laminal). Squamules 310(15) mm diameter, ± isodiametric, usually thick (0.20.5 mm), undulate, shelllike, rather coriaceous; margins entire to notched, sinuous or deeply lobed, slightly thickened, downrolled (or curved up, when sorediate, according to Poelt); upper surface tan to grayish olive green or olive brownish, smooth or scabrid; separated or often in ± crowded, congested clumps, but rarely overlapping; soredia bluegray, granular, rather coarse; lower surface smooth, pale buff to brownish red; umbilicus ± central, rigid, to 0.4 mm**

diam. Apothecia usually immersed many per squamule; disc punctiform or sometimes expanded, to 0.7(1.0) mm wide, without thalline margin. Asci with a gelatinous heath, 100120 x 2127 um; spores 100 or more, ellipsoid to fusiform, 67.6 x 34.5 um (according to Galloway; need to check other sources, including the original of Poeltthe translation gives "57 x 415", which is probably a typo). Pycnidia immersed, minute, black; conidiafusiform, 3.4 x 1.5 um. On hard rock (or also soil according to Galloway). Western U.S. and Mexico, and northeastern

U.S. ....P. euploca

**3. Delimited soralia absent but soredia sometimes produced here and there from margins.** Squamules to 15 mm diam., orbicular, plane to slightly undulate; margins generally downcurved, but sometimes upcurved, entire or lacerate; upper side minutely areolatescabrous, olivaceous to brown, with thin necral layer over photobiont layer of uneven thickness; medulla of loose hyphae; underside smooth, matt or glossy, pale carneous brown; cortex of paraplectenchymatous cells, sometimes with palisade appearance, ca. 2040 um deep. Apothecia many per squamule, mainly immersed, appearing as black points at surface. Spores subglobose to ellipsoid, 56 x 34 um, occasionally with pseudoseptum. On dry, steep, ± shaded, hard rock faces, Arizona. .... P. africana (also see Bdel)

**4. Thallus placodiiform with distinct elongated lobes, areolate in center; with black capitate soralia on the surface;** spores subglobose to globose; epihymenium K+ red or K. On noncalcareous rocks. Southwestern U.S. and Mexico. ....P. placodizans

**4. Thallus not placodiiform and not sorediate. ....4**

**5. Thallus dwarf fruticose, finely isidiate, sterile,** greenblack to black; medulla loose with hollow areas. On noncalcareous rocks. Southwestern U.S. and Mexico. ....P. clavata

**5. Thallus peltate, squamulose or areolate, or subfruticose but with apothecia. .... 6**

**6. Apothecia expanded, with broad discs. .... 7**

**6. Apothecia immersed, with punctiform discs, or thallus without apparent apothecia. .... 15**

**7. Asci with 8 spores; spores 1524 x 610 um. Epihymenium K. On**

- soil. Throughout most of U.S. (except Pacific NW), and Mexico. ....(see Heppia lutosa)
7. **Asci with 16100 or more spores; spores less than 10 um long.** ..... 8
8. **Epihymenium K+ redviolet.** ..... 9
8. **Epihymenium K.** ..... 13
9. **Thallus black or brown; peltate;** with many small, immersed apothecia on surface; medulla loose; spores ellipsoid, 4.66.1 x 3.0 um. On rock. Southwestern U.S. and Mexico. ....P. omphaliza
9. **Thallus olive; squamulose to areolate.** ..... 10
10. **Spores globose to subglobose.** On soil. .... 11
10. **Spores ellipsoid to oval, 4.57.6 x 3.0 um.** Medulla cellular. On rock or sometimes soil. Southwestern U.S. ....P. obscurans v. obscurans
11. **Upper and lower cortex K+ redviolet;** thallus with pale spots on upper side. Southwestern U.S. ....P. radicata
11. **Cortex K.** ..... 12
12. **Squamules large (26 mm diameter), concave, the margin entire, downrolled; medulla loose.** Apothecia large (0.53 mm). Southwestern U.S. and Mexico. ....P. richardsii
12. **Squamules smaller (14 mm diameter), flat to concave; margin entire when young, slightly lobed when older, usually thickened and upturned and darker than rest of the squamule; medulla cellular.** Mexico to the Great Plains. ....P. polyspora
13. **Thallus deeply lobed, imbricate or polyphyllous, attached by umbilicus; medulla cellular; spores oval, 6.07.6 x 3.04.5 um.** On soil or rock. Southwestern U.S. and Mexico. ....P. obscurans v. hassei
13. **Thallus only slightly lobed, or entire.** ..... 14
14. **Squamules deeply concave, attached by umbilicus; apothecia often filling the squamules, without raised thalloid rim; medulla cellular; spores 6.17.7 x 3.44.6 um.** On rock with thin layer of soil. Mexico, to southern California. ....P. michocanensis
14. **Squamules convex or almost flat, attached by tuft of rhizoids or by umbilicus; apothecia with raised thalloid rim; medulla usually loose; spores 4.67.7 x 2.04.6 um.** On rock. Southwestern U.S. and Mexico. ....P. obscurans v. deserticola
15. **Growing on soil.** ..... 16

15. Growing on rock. .... 18
16. Medulla loose; squamules large (26 mm), concave with downturned margins; upper surface smooth; attached by tuft of few large rhizines. ....(see P. richardsii)
16. Medulla cellular. .... 17
17. Squamules broadly attached by rhizoids; often with granular margin; upper surface rough; algae in vertical columns. ....(see Heppia lutosa)
17. Squamules narrowly attached by umbilicus or few rhizoids; margins often deeply lobed. ....(see P. obscurans v. hassei)
18. Thallus of scattered isolate, peltate squamules 13 mm in diameter; margins slightly lobed; medulla loose; several immersed apothecia per squamule. [If squamules to 15 mm diam., see P. africana] ....(see P. omphaliza)
18. Thallus not peltate but continuous; squamules deeply lobed or lobes inflated at tips. .... 19
19. Lobes flat, thin, deeply lobed; medullar cellular. ....(see P. obscurans v. hassei)
19. Lobes swollen and inflated; medulla loose with hollow areas. .... 20
20. Thallus close to substrate, not over 1 mm tall; apothecia usually present but immersed. California and N. Carolina. ....P. zahlbruckneri
20. Thallus subfruticose, often to 47 mm long, ascending, branched. Southeastern U.S. .... 21
21. Lobes terete, not twisted or "offset", usually one immersed apothecium in the tip of a lobe. Georgia. ....P. cylindrica
21. Lobes flattened (to cylindrical), twisted, and "offset", fertile lobes often larger and with several immersed apothecia per lobe. Mature lobes cylindrical to narrowly loriform and sometimes digitate, 510 times longer than wide, with apex often acuminate or convex, though sometimes truncate. Alabama. ....P. tortuosa

## Literature

Awasthi. 19 . Microlichens of India, etc.

Bdel, 19 . [Need to get info. from this].

Galloway, D. 1985. Flora of New Zealand Lichens.

Rogers, 19 . Genera of Australian Lichens.

Swinscow, T. and H. Krog. 19\_\_. Macrolichens of east Africa.

Wetmore, C. 19\_\_. The lichen family Heppiaceae in North America. [Need to incorporate full descriptions from this]