Psorotichia Massal.
(LICHINACEAE)

After Hasse, Fink, Coppins, et al., and Magnusson

Rev. 5/94

Thallus crustose, granular-areolate to minutely subsquamulose or coralloid, dark greenish to black, gelatinous, not corticate, pseudoparenchymatous ± throughout (?). Surface and edges of areoles sometimes with ± globose isidia. Photobiont Chroococcidiopsis ("Xanthocapsa"), cells single or in small groups surrounded by a gelatinous sheath which is brownish near the thallus surface.

Apothecia ± immersed, urceolate to flat or slightly convex, at first closed, later open. Thalline exciple present, concolorous with thallus. True exciple, when visible, usually paler than disc, in section colorless or pale brownish, well developed laterally especially in upper part, but narrowing below, open at base. Disk red-brown to brown-black. Hymenium colorless, I+ blue. Hypothecium wedge-like. Paraphyses scarce, free or confluent, simple to (especially above) sparingly branched paraphyses, with one to several swollen apical cells. Asci cylindrical, thin-walled, I-, without apical thickening. Spores (4-)8(16-32(, simple, globular to ellipsoid, colorless, thin-walled, without a distinct perispore.

Pycnidia immersed in small warts; conidia bacilliform, simple, colorless. No substances. On usually calciferous rocks or soil.

The genus is poorly understood and requires a modern revision.

1. On soil. 2
1. On rock (sometimes disintegrating). 3

2. Thallus of contiguous squamules or small, thin, smooth to rough, irregular nodules, sometimes forming crusty patches, green-black to blackish. Apothecia ca. 0.2 mm diam., slightly immersed to adnate, numerous, nearly covering the thallus; disc deeply concave to flat or slightly convex, dull reddish, the exciple colored like the thallus, finally disappearing; hypothecium yellowish brown. Spores 8 per ascus, 16-19 x 9-11 um, irregularly arranged. Southern California. .....P. segregata

2. Thallus ± broadly expanded, subcontinuous, often forming small cushions, black, furfuraceous-granulose; granules small, erect, verrucose or indistinctly and irregularly branched; affixed by colorless hyphae penetrating ± perpendicularly into the substrate; thallus parts 0.2-0.3 mm high (with innate base 0.5 mm), with 50-80(-150) um thick, verrucose apices. Fertile verrucae larger, not or slightly

prominent. Photobiont filling the thallus, cells 8-13 um, globose, pale bluish green, with thier thick sheaths 17-20 um diam. (in K + HCl); hardly any hyphae seen between the algae, and no haustoria. Basal hyphae 5-6.5 um thick, long-celled, thick-walled, ± parallel and rarely branched. Apothecia rare, solitary, 0.45 mm acorss, 0.25 mm thick, lecanorine, semiglobose, urceolate, almost level with thallus surface; disk sunken, pale slightly sordid yellowish, uneven. Wall 50-60 um thick, filled with photobiont cells in olivaceous yellow sheaths, surface uneven from prominent groups of solitary photobiont cells; interior part almost without photobiont, pale, gelatinous, exciple-like all around, hyphae not distinct. Hypothecium 35-50 um, yellowish, I+ dark blue. Hymenium 70-80 um high, colorless, I+ dark blue; paraphyses not distinct, 1.5-1.7 um, firmly coherent also in K, apcies uncolored, not thickened. Asci 50 x 8-10 um, cylindric-clavate. Spores 8, ellipsoid, 8-10 x 5 um (perhaps not fully developed). Pycnidia 70-100 um diam., globular, quite immersed in verrucae, which are up to 200 um thick, wall 35-50 um. STerigmata ca. 8-10 um, simple, parallel; coniidia 1.7 x 0.7 um, ± oblong. On calcareous soil or on a thin layer of loess over stone. ..... P. nigra Magnusson

3. Spores 16 per ascus. Apothecia to 0.2 mm diam., Thallus squamulose; squamules small, tough, broadly lobate, sometimes forming small cushions, green to olive-green or dull black. Apothecia immersed; disc concave, brown, the exciple inconspicuous or absent; hypothecium brownish yellow; asci long-cylindrical. Spores ellipsoid, 9-13 x 5-6 um, irregularly arranged. Photobiont apparently Gloeocapsa. On disintegrating granite, southern California. .....P. squamulosa

3. Spores 8 per ascus. Apothecia mostly over 0.25 mm diameter. Thallus not squamulose. 4

4. Thallus areolate-rimose or squamulose-areolate. 5

4. Thallus granulose or coralloid. 6

5. Thallus areolate-rimose, green-black, dark dull green (in shade) to dark brown or black, mostly ca. 100 um thick; areoles 0.3-0.7 mm across, often becoming detached at the edges and appearing subsquamulose; surface and margins of areoles often with granular isidia 40-80 um diam. Photobiont cells 5-7 um diam. Apothecia to 0.5-0.8 mm diam., at first immersed with flat disc, later emergent with ± convex disc, discs reddish brown to black (then red-brown when wet); thalline margin crenulate to granular, usually persistent but sometimes excluded, pesudoparenchymatous, to ca. 75 um wide; true exciple ± evident, paler than disc, 25-40 um wide at upper surface, but soon narrowing below, of ± paralell hyphae which in the upper part have ellipsoid lumina to 9 x 4.5 um; hymenium 95-100 um, colorless, or yellowish brown in uppermost part. Paraphyses rather few, simple to sparingly branched, 1.5-2 um wide, upper

1-several cells swollen to 5 um wide. Asci 80-120 x 12-17 um. Spores 12-18(-20) x 7-9 um, ellipsoid or ± ovoid. Pycnospores 3-4 x 1 um. Photobiont Xanthocapsa? On shaded limestone, often in seepage tracks, old martared walls, or siliceous rocks subject to calcareous flushing. New York, New Jersey, Alabama, Illinois, and California. .....P. schaereri

5. Thallus squamulose-areolate, black; areoles subdispersed to subcontiguous, convex, 0.2-0.4 mm wide, to 0.2 mm thick, forming areas up to 1 cm square of ± free areoles, K+ bright brown-yellow (not reddish). Apothecia inconspicuous, punctiform, immersed, solitary, 0.3 mm diam., 100 um deep. Margin 40-60 um thick, brownish red, filled with photobiont; photobiont cells 6-8 or 10-17 um diam., pale olivaceous with brownish red, thick sheath, thus 12-17 um diam., often 2(-3) cells together; also below the apothecia a similar stratum, 60-80 um thick, with very indistinct hyphae. Exciple not developed. Hypothecium 15-25 um, colorless or yellowish, cellular with 2-2.5 um diam. cells. Hymenium 60-80 um, colorless, I- or yellowish. Epihymenium 15-25 um, bright aeruginose, N+ emerald green. Paraphyses simple, 1.7 um, apices conglutinate in K. Asci 40-50 x 7 um, cylindrical or narrowly clavate. Spores 8, in part biseriate, ovoid to subglobose, 6-7 x 5-6 um. Pycnidia immersed, 80 um, globular, or (within the apothecia) 110 um deep and 50 um broad; conidia 2-2.5 x 1 um, oblong. On calcareous rock. ..... P. minuta Magnusson

6. Thallus thin, minutely granulose to somewhat coralloid, olive brown to blackish. Apothecia 0.15-0.6 mm, adnate; discs reddish brown, concave to slightly convex; proper exciple thin and often indistinct; hypothecium hyaline or tinged with yellowish brown. Spores 16-24 x 9-12 um, 8/ascus, oblong to ovoid-ellipsoid, **irregularly** arranged. Photobiont Xanthocapsa? On soft, disintegrating sandstone among mosses, San Jacinto Mountains, California. .....P. hassei

6. Thallus composed of coralloid granules, the granules finally crowded into a thin or moderately thick, areolate crust, reddish brown to blackish. Apothecia 0.2-0.5 mm across, immersed to adnate, 1-3 per areole; disc concave, brownish black to black; thalloid exciple thin, black; spores ovoid-ellipsoid, rarely becoming 1-septate, 12-20 x 7-10 um, **irregularly** arranged. Photobiont Gloecapsa? On rocks, from Vermont to South Carolina, west to Illinois and Minnesota, with disjunct in California. ..... P. phaeococca

NOTE: Spore sizes of P. schaereri and P. hassei were accidentally reversed in previous edition of this key.

Literature

Awasthi. 19 . Microlichens of India, etc.

Coppins, B. J., O. L. Gilbert and P. M. Jorgensen. 1992. Psorotichia. In: Purvis, et al., Lichen Flora of Great Britain and Ireland.

Fink, B. 1935. Lichen Flora of the United States.

Hasse, 1913. Lichen Flora of Southern California.

Magnusson, A. H. 1940. Lichens from Central Asia.