

Dirina Fr.
(ARTHONIALES)

After Tehler, 1983

Rev. 5/94

Thallus crustose, superficial, effuse or delimited, not lobate or fruticose; surface becoming cracked, often slightly verruculose or areolate, sometimes bullate, usually creamy white to white-gray or white-green, sometimes dark gray or gray-brown or white-yellow, usually pruinose soemittmes subglabrous; prothallus brown or sometimes nearly white, loose, but when contiguous crust-like and black. Soralia when present punctiform, rimiform, globose or maculiform. Cortex with hyphae anticlinally arranged, individual hyphae hyaline or nearly so in a hyaline or pale yellow-brown, gelatinous matrix; numerous crystals often incorporated in the layer making the separate hyphae hard to distinguish; epicortex absent. Medulla always white and cretaceous but near the substrate often composed of loose hyphae. Photobiont Trentepohlia.

Ascomcarps apothecoid or stromatoid, lecanorine, nearly always present and numerous (except in sorediate forms), solitary or aggregated, usually sessile with constricted base, rarely substipitate, sometimes immersed, evenly distributed over thallus surface, except near the margins; disc pruinose, white-gray to dark gray; thalline margin when young entire, when old undulating or strongly undulating; true exciple (parathecium) thin or inconspicuous. Hypothecium carbonaceous or dark brown, always sharply defined towards the altogether white medulla. Hymenium hyaline, 50-150 μ m thick; paraphysoids unbranched or sparsely branched, 1-2 μ m diam.; hymenial strands thin or inconspicuous. Epithecium brownish, 35-80 μ m thick; paraphysoids continued from hymenium, branched and intertwined; apices smooth or ornamented and \pm colored, 1-3 μ m diam.; incorporated crystals often make the separate hyphae hard to distinguish. Asci clavate, fissi- or semi-fissitunicate, 70-120 x 12-18 μ m, the apex thickened with a small, internal I+ blue ring, Opegrapha-type; spores constantly 8, hyaline and smooth, when old sometimes brownish and slightly ornamented, fusiform or obtusely fusiform-curved or sometimes straight, often with one end tapered more than the other, 3-septate.

Pycnidia numerous, few or absent, evenly dispersed over thallus surface, often with a preference for the margins or the immediate margin, immersed or slightly elevated like black or dark brown dots; microconidia thread-like and sickle-shaped, 12-16 x 1 μ m; macroconidia not seen. Erythrin, lecanoric acid and an unidentified substance. Cortex C+ red, K-, KC+ red, P-; medulla C+ red, KC+ red or C-, KC-, K-, P-. Hymenium I+ blue, best seen in the transition zone epithecium/hymenium and hypothecium/hymenium and in the hymenial strands. On dry underhangs in calcareous and siliceous environments. Type species: D. repanda Fr. = D. ceratoniae (Ach.) Fr.

1. Thallus C-. (see Schismatomma spp. and Roccellina spp.; the species of Roccellina reported from N. America are C-, but some of the other species are C+ red).

1. Cortex C+ red or pink (erythrin and lecanoric acid); roccellic acid absent. Medulla white, at least close to the substrate consisting of loose hyphae. Thallus less than 1 mm thick, non-lobate, not soft, tightly attached, usually white-green or creamy white, glabrous or only moderately pruinose, not strongly cretaceous, appearing well developed and "healthy". Individuals growing together in a mosaic pattern usually forming large uniform societies. Free

prothallus thin, white-brown to dark brown. Cortical hyphae anticlinally arranged. Hypothecium distinct against the white medulla. Coast of California and Baja California. 2

2. Medulla C-. Thallus to 0.5 mm thick, white-green, seldom white-yellow, smooth and pruinose, more or less areolate or even bullate. Medulla often dirty white. Cortex 10-50 µm thick. Ascocarps 0.5-2 mm diam., often substipitate and easily separable from the thallus. Spores 23-28 x 4-5 µm. Unknown substance B absent. On bark or rock. 3

2. Medulla C+ pink or red. Thallus to 1 mm thick, areolate-rimose, non-lobate, creamy white or white-gray. Medulla white. Cortex 35-65 µm thick. Ascocarps 1.5-2 mm wide, sessile with constricted base, tightly fastened to the thallus. Unknown substance B present. Spores 24-30 x 6-8 µm. On rock. 4

3. Not sorediate. D. paradoxa f. paradoxa

3. Sorediate. (D. paradoxa f. sorediata)

4. Not sorediate. D. catalinaria f. catalinaria

4. Sorediate; soralia slightly pruinose, often globose or capitate. D. catalinaria f. sorediata

D. catalinariae Hasse

Thallus smooth to slightly verruculose, areolate or bullate, creamy white to white-gray, slightly pruinose, 0.2-1.1 mm thick; prothallus brown or dark brown; cortex with incorporated crystals, 35-65 µm thick; medulla cretaceous, but near the substrate consisting of loose hyphae; soralia often present (f. sorediata Tehler), punctiform when young and usually capitate when old. Ascocarps apothecioid, numerous or few, always present (except in f. sorediata), usually solitary, sometimes aggregated in substipitate clusters, sessile with constricted base, 0.5-2.0 mm diam.; disk white-gray; thalline margin entire when young, undulating when old; hymenial strands few and thin but usually conspicuous; epithecium with paraphysoid tips 2-3 µm diam. Spores fusiform, curved or straight, (20.6-)23-29(-36.3) x (3.9-)5-6(-6.8) µm. Pycnidia evenly dispersed over thallus surface with not preference for the margin. Erythrin, lecanoric acid, unidentified substance B; cortex and medulla C+ red. On vertical and overhanging rocks and cliffs, above the littoral and away from the sea spray, coast of southern California and Baja California with adjacent islands. Locally common. The sorediate form has a somewhat wider distribution especially inland and a higher tolerance for unfavorable environments.

D. mexicana Tehler

Thallus epilithic, crustose, sometimes slightly bullate, effuse, compact, coherent, rimose, smooth, epruinose to slightly pruinose, varying from white to white-grayish to white-yellowish, 0.2-0.5 mm; prothallus when free-growing byssoid, brown, when contiguous crust-like and black; calcium oxalate present. Cortex with anticlinally arranged hyphae, 20-40 µm thick; hyphae ornamented or with attached crystals, hyaline; surface gel granular, pruina thin or absent; medulla white, cretaceous; thallus gel granular;

thalline hyphae ornamented or with attached crystals, thin-walled (less than 1 μm), hyaline, ca. 2-3 μm diam.; hypomedullary plectenchyma absent; soralia and isidia not seen.

Ascomata numerous, evenly dispersed over thallus surface, pluiocarpocentral (hymenial strands present), solitary, developing mutually with the thallus, circular or elongated in outline, immersed or subimmersed, 0.4-0.8 mm diam.; discs 0.2-0.3 mm diam., exposed, flat or concave, white pruinose at least when young; thalline margin usually immersed and coinciding with the thallus but often slightly elevated and set off against the thallus by a brownish marginal surface; proper exciple thin with parallel-arranged hyphae. Hypothecium dark brown (carbonaceous), not extending down to the substratum; hamathecium parphysoidal; hymenium hyaline, 70-90 μm ; parphysoids sparsely branched, more or less conglutinated, hyaline, ca. 1 μm diam.; epithecium brown, 35-45 μm ; gel brownish, granular; hyphae slightly branched, unseparable, with slightly calvate, ca. 2 μm diam., verrucose tips, brownish, calcium oxalate present; asci clavate, 70-90 x 15 μm ; ascospores fusiform, curved, smooth, 3-septate, not constricted at septa, hyaline, (20-)21-27(-29) x 5-6(-7) μm .

Pycnidia solitary, immersed, dark brown, 0.05-0.1 mm diam.; microconidia filiform, curved or semi-curved, hyaline, (9-)10-13(-15) x <1 μm ; macroconidia absent.

Photobiont Trentepohlia sp., cells often conspicuously trichally arranged but also coccal, ca. 10 μm , heteromorous.

Thallus C+ red in rimulae and thalline margin, otherwise C-, K-, P-, I-, KI-; hypothecium K+ dark olive-green, I-, KI-; hymenium K-, I-, KI+ blue; epithecium K-, I+ blue, K+ blue; asci I-, KI+ blue. Major substances: erythrin and unknown A; minor substances: unknown B; traces: orsellinic and lecanoric acids.

On vertical or overhanging rocks and cliffs, Mexico: Baja California Norte and Sur, and Sinaloa.

D. paradoxa (Fée) Tehler

Thallus \pm smooth and pruinose, when saxicolous \pm areolate or even bullate. Asocarps 0.5-2.0 mm diam. Spores fusiform, curved or straight, (19.6-)23-28(-33.3) x (2.9-)4-5(-5.9) μm . Erythrin, lecanoric acid. On bark, Florida; also found on rocks in the Caribbean. (The f. sorediata Tehler is described from Peru and is not yet known from N. America). This description, based on Tehler's 1983 description of "D. approximata ssp. hioramii", needs to be expanded, but I am not sure how much of his general description of D. approximata can be applied, and I haven't seen a description of D. paradoxa as a species.

Literature

Purvis, O. W. 1992. Dirina. In: Purvis, et al., Lichen Flora of Great Britain and Ireland.

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Tehler, A., G. B. Feige & H. T. Lumbsch. 1995. Dirina mexicana, a new species from the Sonoran Desert of Mexico. Lichenologist 27: 255-259.