

Carbonea (Hertel) Hertel
(LECANORALES: LECANORACEAE)

After Ozenda & Clauzade, 1970, and Galloway & James, 1992

Rev. 5/94

Thallus immersed or \pm superficial. Apothecia lecideine, sessile, subconcave to plane or subconvex, the margin distinct and persistent, the exciple rather strongly developed, the inside pigmented and often carbonaceous, not "cellular"; hymenium often 70 μ m or more high; spores narrowly ellipsoid (l:w = 2.3-3.3:1), thin-walled. Apothecia black, shiny, epruinose; thalline exciple absent; true exciple well developed, persistent, raised, black, opaque; hyphae dark-pigmented; hypothecium pale yellow-brown to blue-green in upper parts, dark red-brown to brown-black below, K-; hymenium colorless in lower parts, dull blue or \pm vivid blue-green to emerald green above; paraphyses simple (to branched?), 1-2 μ m thick, rather strongly conglutinated, only occasionally anastomosing, the walls gelatinized, the tips clavate-thickened to 3.5 μ m; epihymenium mostly dark (greenish to blue-green or emerald green, or blackish); asci 8-spored, clavate, smooth (not cross-striated), the outer wall of the ascus rather thin; tholus Lecanora-type; spores simple, colorless. Pycnidia immersed; conidogenous cells elongate, ampuliform, enteroblastic, arising singly or in small groups; pycnospores curved, **thread-like**, simple, colorless. Photobiont chlorococcoid. No substances. On rock (usually? siliceous) or parasitic on other lichens.

1. Parasitic on Candelariella vitellina. Pycnidia absent. Thallus immersed in host. Epithecium smoky blue, greenish blue or emerald. Spores 7-12(-13) x (4-)5-6(-7) μ m, ellipsoid, the ends rounded.C. vitellinaria

1. Not parasitic.2

2. Thallus \pm well-developed, chalky white with black hypothalline line. Hypothecium brown or brown-orange; spores 6-15 x 3-7 μ m. On calcareous rocks. ...C. atronivea

2. Thallus endolithic or very thin. Hypothecium brown-black; spores 11-13 x 4-5 μ m. Pycnidia usually present. On siliceous rocks. [See fuller description under Lecidea s. lato].C. vorticosa

C. atronivea (Arnold) Hertel

Thallus I-, C-, K-, chalky white to snow white or slightly grayish, to 1.5 mm thick, 3-20 mm broad, continuous to rimose-areolate; hypothallus black, forming a \pm discontinuous line. Apothecia 0.2-1.5 μ m diam., adnate to slightly immersed, little or not projecting, black even when wet, epruinose; margin thin, long persistent, entire to undulate; disc flat to convex, black, shining, epruinose, often umbonate. Hymenium 50-65 μ m, hyaline or greenish; epihymenium blue-green. Hypothecium brown or red-brown. Exciple carbonaceous black, the part toward the lower medulla in thin sections appearing with radiating colors, reddish brown toward hypothecium. Asci narrowly clavate. Spores oblong or ellipsoid-oblong, moderately thick-walled, not halonate, 6-15 x 3-7 μ m. Thallus K- or + lemon-yellow, C-, KC-, P-; medulla I-. On

calcareous rock. Arctic-alpine.

C. vitellinaria (Nyl.) Hertel

Thallus immersed in the host. Epithecium smoky blue, greenish blue or emerald. Spores 7-12(-13) x (4-)5-6(-8) μm , ellipsoid, the ends rounded. Apothecia adnate or partly immersed; exciple dark brown carbonized, appearing paraplectenchymatous; disk 0.2-0.7 mm broad, black, flat to partly convex or irregular; hypothecium hyaline or brownish; epihymenium dark blue or greenish blue; hymenium hyaline to bluish above; asci clavate; spores 8 pers ascus, elliptical or ovate. On thallus of Candelariella, parasitic. Arctic, south to Colorado and Illinois.

C. vorticosa (Flörke) Hertel

Thallus usually lacking, when present of very thin whitish or yellowish layer over the rock, C-, K-, I- or weakly I+. Apothecia in small, closely pressed together groups, to 0.9 mm broad, the base often strongly constricted; disk flat or slightly convex, black, epruinose, shining. Epihymenium blue green and grading in color well into upper hymenium. Exciple narrow, well defined, black or brown-black, paraplectenchymatous, the outer part somewhat columnar. Hypothecium 60-120 μm , dark brown to brown black but lighter in color than the exciple. Paraphyses conglutinate, sometimes branched and anastomosing, 1.7-2.5 μm thick, the tips scarcely thickened. Asci cylindrico-clavate, 40-50 x 10-14 μm . Spores 8, simple, elongate-ovate, not halonate, 8.5-15 x 3.5-5.5 μm . On acid and very seldom somewhat calcareous rocks. Arctic=alpine, Ellesmere Island to Alaska, S to Quebec, Alberta, and Washington. Reports from Arizona, New Mexico, and southern California, and some of the ones from Washington, are doubtful.

Literature

Galloway, D. and P. W. James. 1992. Carbonea. In: Purvis, et al., Lichen Flora of Great Britain and Ireland.

Ozenda, P. and G. Clauzade. 1970. Les Lichens.

Thomson, J. W. 1997. American Arctic Lichens II. The Microlichens..