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On some pyrenocarpous lichens from the West Indies

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A b s t r a c t : Notes are given on nine species of pyrenocarpous lichens from the West Indies, five of which are reported for the first time from the area. *Anthracocarpon caribaeum* is described as new, *Verrucaria radiata* is a new combination.

K e y w o r d s : Lichenized Ascomycetes, pyrenocarpous lichens, *Anthracocarpon caribaeum* spec. nov., *Verrucaria radiata* comb. nov., mycoflora of the West Indies.

Introduction

Unfortunately there is no comprehensive treatment of the lichens from the West Indies. A compilation of the taxa known until the 1950s was presented by IMSHAUG (1957). Since then additions have been made in various publications. The number of reported species exceeds 1.800, many of them being regarded as endemic. However, many groups of lichens reported from the West Indies have not been critically revised.

In the course of his revisionary work on Verrucariaceae from the New World, the author encountered several species from the West Indies. As some of them are less known and might be of wider distribution though rare, short remarks on them are provided in the present paper. A new species is described in detail.

The species

Anthracocarpon caribaeum BREUSS, species nova

Ab *Anthracocarpo virescenti* sporis minoribus, ellipsoideis et excipulis basaliter pallidis distat.

T y p e : Puerto Rico, Bosque Estadal de Guajataca, Vereda Salomé, ca. 18°24'N, 66°58'W, 270-280 m, humid forest over rough limestone, 11.1.1992 W.R. Buck 21216 (NY, holotype; LI, isotype).

Thallus consisting of pale brownish squamae up to 2 mm wide and 100-200 µm thick. Upper cortex paraplectenchymatous, 20-35 µm thick, of angular cells 5-12 µm in diameter. Algal cells less than 10 µm in diameter. Medulla of intricate hyphae divided into many spherical cells of 5-10 µm diam. Lower cortex weakly differentiated, of more densely aggregated, brownish cells. Rhizohyphae colorless or slightly brownish, obscured by substratum particles, ca. 5 µm thick. Rhizines one to several per squama, pale.

Perithecia pyriform, up to 300 µm broad, exciple carbonaceous at the top, pale below. Asci clavate, ca. 50 × 16 µm. Spores biseriately arranged, regularly ellipsoidal, 13-15 (-16) × 5-6 µm.

The genus *Anthracocarpon* was recently described by BREUSS (1997) for the single species *A. virescens*, a rare Mediterranean lichen. The genus is externally similar to *Placidium* from which it differs in having carbonaceous perithecial walls and pycnidia of *Staurothele* type. A remarkable feature of *Anthracocarpon* is a subapical ring-structure in the ascustips visible by epifluorescence microscopy after staininig with calcofluorwhite as could be demonstrated by GRUBE (1999) in several genera of the Verrucariaceae. Such a ring-structure is lacking in *Placidium*. Though the epifluorescence analyses are yet too few to be used taxonomically, the ring-structure seems suitable to characterize at least smaller taxonomic entities (genera or subgenera).

The new species differs from *Anthracocarpon virescens* primarily in having basally pale exciples and small, regularly ellipsoidal spores, whereas in the latter species the exciple is carbonaceous throughout from the beginning and the spores are distinctly larger and subfusiform to ovoid-clavate in shape. Moreover, the squamae of *Anthracocarpon caribaeum* are smaller and its rhizines are pale.

Catapyrenium squamellum (NYL.) THOMSON

S p e c i m e n e x a m i n e d : Jamaica, parish of Trelawny, Barbecue Bottom, 450 m, on humus on limestone, 18°20´N, 77°33´W, 1.8.1991 H.F. Fox 7390 (hb. Fox).

One of the rarest species of the genus which was known only from California. New to the West Indies. A description is available in THOMSON (1989). The spores of the Jamaican sample are 12-18 × 5-6 µm.

Clavascidium umbrinum (BREUSS) BREUSS

S p e c i m e n s e x a m i n e d : British Virgin Islands: Anegada, on the limestone at the base of small shrubs just east of The Settlement, 4.2.1971 W.G. D´Arcy 5063 b (FH, DUKE).

The genus *Clavascidium* is externally very similar to *Placidium*, from which it is distinguished by clavate asci (BREUSS 1997). The squamae of *Clavascidium umbrinum* have a brown basal layer of intricate hyphae and are fastened to the substratum by dark rhizines. The perithecial walls are also dark. The species is scattered throughout Europe and North America, and is herewith documented for Central America for the first time. The specimen is infested by *Pyrenidium actinellum* NYL. s.l.

Endocarpon albidulum (MÜLL.ARG.) ZAHLBR.

T y p e : Cuba, C. Wright II.534 (FH).

Endocarpon albidulum is easily recognized by its densely imbricate, almost linear, dichotomously branched, narrow (less than 1 mm wide), pale brownish lobes anchored to the substratum by few, short, thin rhizines composed of intertwained hyphae. No ascocarps were seen. According to MÜLLER (1885) the spores are 25-30 × 13-16µm.

The species is so far known only from Cuba, where it was found growing on debris and cyanobacteria over rock. It is mentioned here to draw attention to this characteristic species not reported since its description and possibly endemic.

***Endocarpon pallidulum* (NYL.) NYL.**

Specimens examined: Cuba, on limestone rocks, C. Wright, Verr. Cub. n. 9, 189 (W). - Puerto Rico, Bosque Estatal de Susúa, along southern edge of reserve, ca. 18°04'N, 66°53'W, ca. 275 m, dry scrub forest over extensively exposed serpentine, 13.1.1992 R.C. Harris 27630 (NY, LI); Bosque Estadal de Guajataca, Vereda Salomé, ca. 18°24'N, 66°58'W, 270-280 m, humid forest over rough limestone, 11.1.1992 W.R. Buck 21216 (NY, LI, with *Anthracocarpon caribaeum*).

Endocarpon pallidulum is characterized by small (0.5-1.5 mm), finely lobed, loosely aggregated to imbricate squamules with dark undersides and thin (2.5-3 µm), hyaline or brownish rhizohyphae. The perithecia are up to 350 µm broad, have black walls and contain small (2.5-3 µm), globose algal cells and 2-spored asci. The spores are colorless to very pale brownish, ca. 25-30 x 11-14 µm.

Endocarpon pallidulum was originally described from the Peruvian Andes (NYLANDER 1874) and later reported from the Bahamas and Cuba (IMSHAUG 1957). It is here reported for the first time from Puerto Rico. Recently it was also found among collections from Mexico (unpubl.).

The recently described *Endocarpon neopallidulum* HARADA is hardly discernible from *E. pallidulum*. The spores of the former are said to be larger (HARADA 1993). According to my own observation the spores of the Cuban specimen are intermediate in size between the measurements given by HARADA (1993) for *E. pallidulum* and *E. neopallidulum* (25-30 x 11-14 µm versus 25-28 x 9-12.5 µm and 27-37 x 12-16 µm, respectively). The Puerto Rican specimens are sterile, one sample showing perithecia of a parasite. Minor differences in the form of the lobes ("exclusively convex throughout the length" in *E. pallidulum* and "frequently concave near the base" in *E. neopallidulum* according to HARADA l.c.) and in substratum (*E. pallidulum* on soil, *E. neopallidulum* on rocks or mosses) are of no taxonomic value. The Cuban specimens are on a thin mossy soil layer over limestone.

***Placidium lacinulatum* (ACH.) BREUSS**

Specimens examined: Bahamas: Abaco, on sand, Old Kerr's Point, 2.1.1905 L.J.K.Brace 2032 (FH, NY); Acklin's Island, Spring Point, 1905/06 L.J.K. Brace 4260 (FH, NY). Hispaniola, Dominican Republic: prov. Barahona, along road between Azua and Barahona, 28 km E of Barahona, 18°24'N, 71°08'W, desert, 11.3.1981 W.R. Buck 4245 (NY); prov. Monte Cristi, El Morro de Monte Cristi, 237 m, limestone mesa by sea (dry on leeward slope, moist on summit and windward slope), 19°54'N, 71°39'W, 8.1.1987 W.R. Buck 13930, 13935, 13960 & R.C. Harris 19500, 19524 (NY, LI); prov. Monte Cristi, SE of El Morro de Monte Cristi, ca. 20 m, low, dry forest near sea, 19°53'N, 71°39'W, 9.1.1987 W.R. Buck 13989, 13984 (NY). Porto Rico: vicinity of Guanica, Salinas de Guanica, 5.-8.3.1915 N.L. Britton & al (NY).

The genus *Placidium* has been resurrected on account of its elongate, cylindrical asci with uniseriate spores, which is an outstanding feature within the Verrucariaceae (BREUSS 1997).

Placidium lacinulatum is widespread and common on fine-grained soils especially in arid regions.

Placidium squamulosum (ACH.) BREUSS

Specimens examined: Jamaica, 1905 C.E.Cummings 117 with *Endocarpon pusillum* and *Chromatochlamys sp.* (FH). - U.S.Virgin Islands: St. Thomas, Water Island, 1913 N.L. Britton, E.G. Britton & J.A. Shafer 151 (FH, US).

Placidium squamulosum has a world-wide distribution and a wide ecological amplitude. Earlier West Indian reports of *Dermatocarpon hepaticum* and *D. lachneum* refer to that species.

Placidium tuckermanii (RAVENEL ex MONT.) BREUSS

Specimens examined: Hispaniola, Dominican Republic: prov. Independencia, along road from La Descubierta to Los Pinos, ca. 5 km NW of La Descubierta, 4 km S of Los Pinos, 1200 ft, 18°35'N, 71°46'W, limey roadside and dry forest above, 16.3.1981 W.R. Buck 4512 (NY); prov. Pedernales, Cabo Rojo, Alcoa Aluminium Company property, 17°54'N, 71°40'W, desert vegetation, in crevices of eroded limestone, 12.3.1981 W.R. Buck 4260 (NY); prov. Pedernales, 3.5 km SSW of Las Mercedes, 5 km N of intersection of road from Oviedo to Pedernales, 500 ft, 18°02'N, 71°38'W, dry forest, 14.3.1981 W.R. Buck 4504 (NY).

Placidium tuckermanii is rather widely distributed in North and Central America (see map in THOMSON 1987). It normally grows on trees. Among the cited specimens that from Cabo Rojo is from soil.

Verrucaria radiata (THOMSON) BREUSS, comb. nov.

Basionym: *Catapyrenium radiatum* THOMSON - The Bryologist **92** (1989): 191.

Type: Mexico, Yucatan, 1.5 mi S of Libre Union, 22.7.1964 C.J. McCoy 38555 (COLO).

New record: Cuba, Sancti Spiritus, near mouth of Rio Cañas, 21°50'N, 80°04'W, 10-20 m, dry thorny scrub over rough limestone, 1.7.1993 W.R. Buck 23321 (NY, LI).

Thalli forming rosettes up to more than 20 mm in diameter, thick (up to 0.7 mm), rimose areolate. Areoles in central parts flat to slightly convex. Thallus margin distinctly lobate, with narrowly elongated, distinctive lobes.

Upper cortex 20-25 µm thick, of roundish-angular cells 4-9 µm in diameter. Algal layer well delimited, continuous, about 70-90 µm high, algal cells 7-13 µm wide. Medullary tissue subparaplectenchymatous, of roundish cells 6-10 µm in diameter, those in the lower parts with brown to blackish walls, thus merging in a thick black basal layer.

Perithecia 250-400 µm wide. Exciple colorless. Spores narrowly ellipsoidal, ca. 16-20 x 5-6 µm.

Pycnidia are abundant in the Cuban specimen. They are of *Staurothele*-type, vertically somewhat elongated, up to 120 µm high and 60 µm broad, with a single narrow cavity. The conidiogenous cells are 6-8 x 2.5-3 µm. The pycnoconidia are bacillar, straight, about 1 µm wide and 5-6 µm long.

The Cuban sample has a more brownish tinge than the Mexican specimen, otherwise it agrees in every respect with the holotype.

Verrucaria radiata is one of very few species of *Verrucaria* with effigurate radiating areoles (fig. 1). This growthform is also known from e.g. *Verrucaria lobata* (THOMSON & AHTI 1994), *V. duritzii* and *V. epimaura* (BRODO & SANTESSON 1997). Externally *Verrucaria radiata* is similar to members of the genus *Placopyrenium*, but differs in its *Staurothele*-type pycnidia, whereas *Placopyrenium* has pycnidia of *Dermatocarpon*-type

(BREUSS 1998). The areolae of Verrucaria radiata are constricted basally or somewhat elongated to form stipe-like attachment organs. In contrast to *Placopyrenium* the areoles of which have a lower cortex and are fastened to the substratum by corticated stipes, the areoles of *Verrucaria radiata* are not corticated below, and the stipes originate from cracking of the dark hypothalline layer.

Verrucaria radiata is hitherto known only from the two localities given.

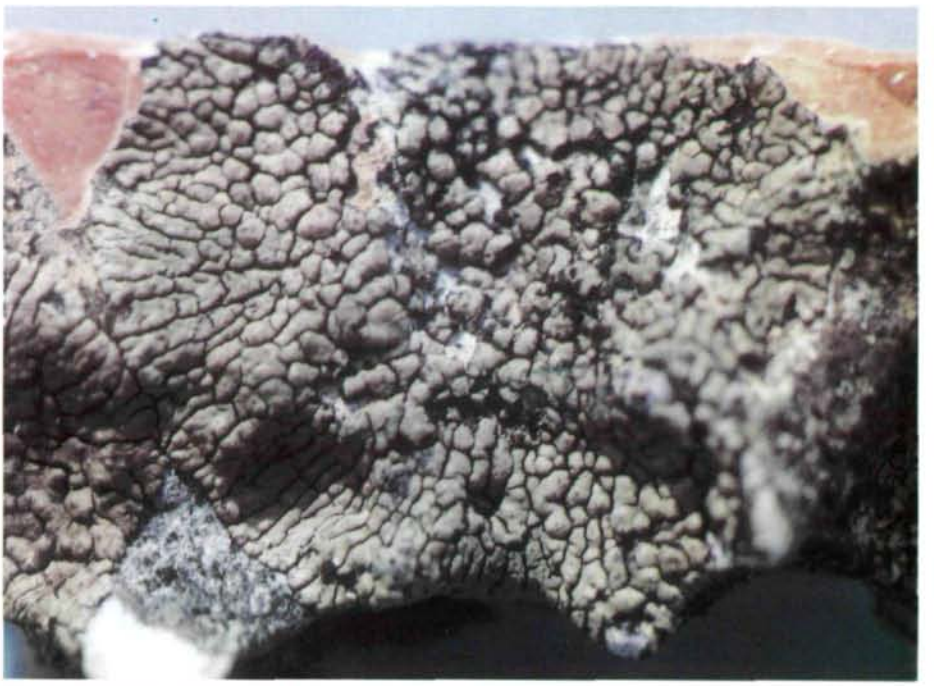

Fig. 1: *Verrucaria radiata*. Buck 23321 (LI). Habitus. Scale bar = 3 mm.

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