

Gyalideopsis floridae, sp. nov. a New Lichenicolous Lichen from Florida (Gomphillaceae, Ascomycetes)

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Abstract. *Gyalideopsis floridae*, a lichenicolous lichen growing on *Parmotrema* in Florida (U.S.A.) is described as new. It is distinguished from all hitherto known species of the genus by multispored asci and simple ascospores.

During our studies on lichenicolous species of Leotiales with dark apothecia; hyaline, aseptate ascospores; non-amyloid asci; and linear, sparsely branched paraphyses (Diederich & Etayo 2000; Etayo & Diederich 2000), we examined several specimens of a lichenicolous lichen growing on species of *Parmotrema* in Florida (U.S.A.); they are distinguished by aseptate ascospores, multispored asci, and anastomosing paraphyses. A comparison with other lichenicolous fungi and lichens revealed strong resemblances to the predominantly tropical genus *Gyalideopsis* Vězda (Gomphillaceae), the members of which are mainly corticolous or foliicolous. Species of the family Gomphillaceae are mainly characterized by the presence of hyphophores (absent in some species), fissitunicate (?) asci, a non-amyloid hymenium, and richly branched and anastomosing paraphyses (Lücking 1997; Vězda & Poelt 1987). Recently, three lichenicolous, non-lichenized species of *Gyalideopsis* have been described, all growing on foliicolous lichens (Lücking 1997; Lücking & Sérusiaux 1998). All hitherto known species of *Gyalideopsis* have septate or muriform ascospores and a maximum of eight ascospores per ascus. Despite these differences, we believe that the species on *Parmotrema* fits *Gyalideopsis* quite well, and the inclusion in this genus is therefore proposed here.

MATERIAL AND METHODS

The material examined is kept in LG and NY and in the personal collections of the authors and of O. Breuss (Vienna). Macroscopical examination was carried out using a binocular microscope at a magnification of $\times 40$. Microscopical studies of hand-made sections were done using tap water, a 5% aqueous solution of KOH (K), concentrated nitric acid (N), commercial bleach (C), and Lugol's reagent without (I) and with pre-treatment with K (KI). All measurements were done using sections examined in water.

GYALIDEOPSIS FLORIDAE Etayo & Diederich, sp. nov. FIGS. 1–2

Gyalideopsis lichenisata in *Parmotrematis* thallis lichenicola, ascomatibus atris, ascis multisporis et ascosporis aseptatis insignis.

TYPE: U.S.A. FLORIDA. Duval County, Big Talbot Island State Park, along trail to 'Scrubby Bluff', 1.1 mi. (1.76 km) from N end of park, 2.2 mi. (3.5 km) from S end of park, on *Parmotrema rigidum*, 17.XII.1988, R. C. Harris 23890 (NY, holotype; hb. Diederich, hb. Etayo, isotypes).

Thallus very thin, continuous, forming dispersed greenish gray patches on surface of host thallus, when well-developed slightly raised over surface of host thallus, 100–250(–1,000) μm diam. and 15–20 μm thick; photobiont belonging to Chlorococcales, cells subspheric to ellipsoid, 5–8 μm diam.; hyphae hyaline to brownish. *Apothecia* 0.2–0.4 (–0.5) mm diam., rounded, plane, sessile, basally slightly constricted, dark brown to black; disc at first smooth, becoming rough when mature, sometimes with umbo-like structures or with several newly formed apothecia within disc; margin slightly prominent, concolorous with disc, thick and rough, devoid of hairs, when young sometimes with irregular lobes curved over disc. Exciple dark reddish brown, K+ dark olivaceous brown, N+ lighter orange brown, often irregular, 10–30(–40) μm thick, composed of branched, radiating hyphae embedded in gelatinous matrix (examined in C), in water appearing as prosoplectenchyma with reduced cell lumina; hypothecium prosoplectenchymatous, pale brown, to 15 μm ; hymenium colorless, I– and KI–, 30–50 μm , with branched and strongly anastomosing interascal filaments of 0.5–1.0 μm diam.; epithecium partly covered by irregular, brown (same pigment as exciple), gelatinous granules that might be remnants of excipular tissue covering disc when young, without crystals (examined in polarized light). Asci clavate, 28–37 \times 12–18 μm , multi-spored (with at least 128 asco-

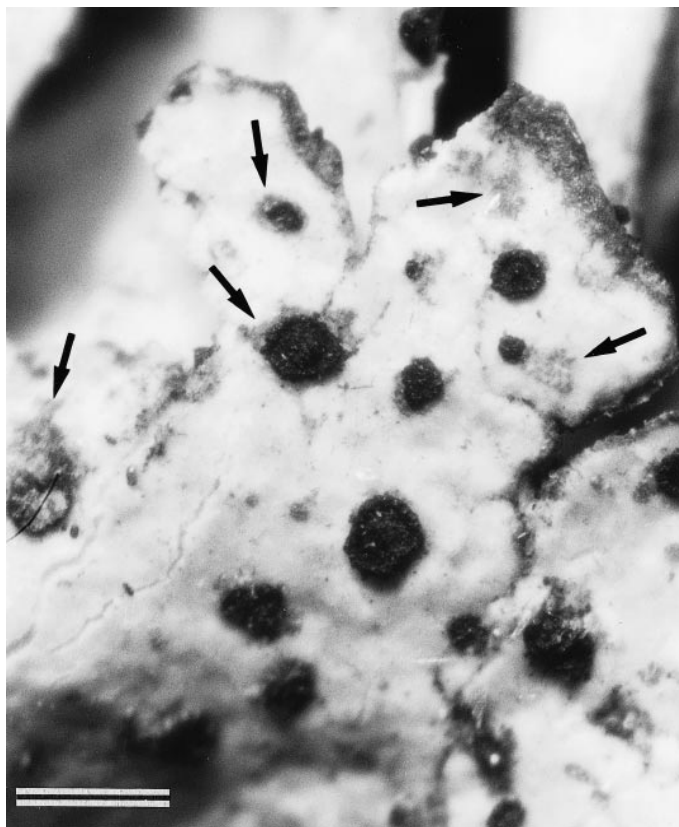


FIGURE 1. Thallus of *Parmotrema submarginale* with *Gyalideopsis floridae*. Note the minuscule grayish thalli of the *Gyalideopsis* (arrows) (Harris 23652A NY). Scale bar = 1 mm.

spores), wall laterally thin, apically distinctly thickened, often biconvex, rarely with small apical beak, entirely KI- (but endoplasma KI+ orange). Ascospores hyaline, aseptate, subspheric to broadly ellipsoid, 2–4 μm diam., with one large guttule, dead ascospores rarely becoming brownish in ascus. *Conidiomata* not observed.

Hosts.—*Parmotrema perforatum* (Jacq.) A. Massal., *P. rigidum* (Lynge) Hale, and *P. submarginale* (Michx.) De Priest & B. Hale [= *P. michauxianum* (Zahlbr.) Hale].

Distribution.—The new species is quite common in northern Florida, but so far has not been found elsewhere.

Paratypes.—U.S.A. FLORIDA. Dixie Co., Steinhatchee Wildlife Management Area, on *Parmotrema perforatum*, Buck 24329 (LG, NY); Duval Co., Big Talbot Island State Park, on *P. rigidum*, Buck 15495 (NY); Liberty Co., Apalachicola National Forest, on *P. perforatum*, Buck 19026 (NY); Marion Co., Ocala National Forest, on *Parmotrema* sp., Breuss 12014 (hb. Breuss, hb. Etayo); Putnam Co., Ocala National Forest, on *P. submarginale*, Harris 23652A (NY, hb. Diederich, hb. Etayo); Santa Rosa Co., Blackwater River State Forest, on *P. rigidum*, Buck 24606 (NY).

DISCUSSION

Superficially, the new species might be mistaken for a non-lichenized lichenicolous fungus developing over thalli of *Parmotrema*. However, a careful examination reveals the presence of numerous grayish green patches over the host thallus that represent minuscule thalli belonging to the *Gyalideopsis*, which is, therefore, clearly lichenized. These patches are easily visible when young, but more or less obscured in older populations (e.g., in the type specimen).

Gyalideopsis floridae shares several important features with the core of the genus *Gyalideopsis*, like the type of hamathecium and exciple, but is distinguished from all other known species by the aseptate ascospores and the multisporous asci. The septation of ascospores in this genus is a variable character, ranging from 1- or pluriseptate to submuriform or even muriform (Lücking 1997), and it is thus perfectly acceptable to include a species with aseptate ascospores. As far as we know, no species of *Gyalideopsis* with multi-spored asci has been recognized until now; all hitherto known spe-

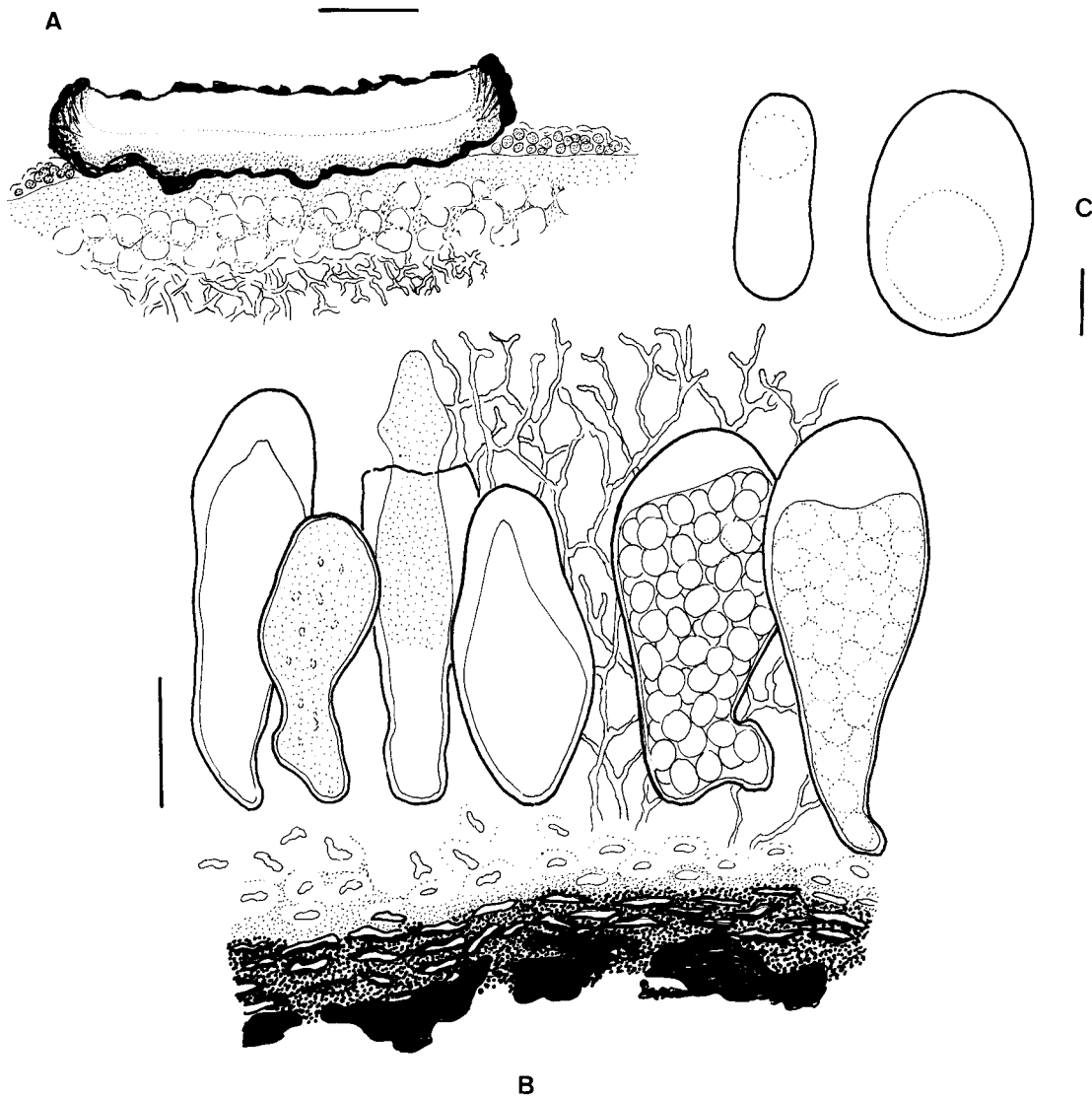


FIGURE 2. *Gyalideopsis floridae* (Harris 23652A NY). — A. Section through an ascoma; note the minuscule thallus surrounding the ascoma, developing over the cortex of the host. — B. Hymenium, asci and paraphyses. — C. Ascospores. Scale bars = 100 μm (A), 10 μm (B), 1 μm (C).

cies having 1–8-spored asci. However, if we accept as a general rule that the total volume of all ascospores within one ascus is more or less constant within the genus, then it might not be unreasonable to suggest that many small ascospores are physiologically equivalent to fewer large ones.

The asci of *G. floridae* are clearly fissitunicate (Fig. 2). Those of *Gyalideopsis s. str.* are similar, but nevertheless slightly different, the discharge never being of the jack-in-the-box type (Lücking, pers. comm.). It is possible that *G. floridae* does not belong to *Gyalideopsis*, but for the time being the inclusion in this genus seems to be the best solution. The asci also resemble those of some

members of the Arthoniales, but in that order the ascus wall is generally KI+ blue at the apex.

Gyalideopsis floridae is not known to produce hyphophores, a type of conidiomata commonly found in other species of the genus; such hyphophores are also missing in some other taxa like *G. minutissima* Lücking or *G. pallida* Lücking (Lücking 1997).

The lichenicolous way of life is unusual within the genus, although three such species have recently been described: *G. parvula* Hafellner & Vězda (on species of Ectolechiaceae), *G. epithallina* Lücking (on *Gyalideopsis vulgaris*), and *G. cochlearifer* Lücking & Sérus. (on Gomphillaceae) (see

Lücking 1997; Lücking & Sérusiaux 1998). None of these taxa is said to possess its own thallus. These three species are all confined to foliicolous hosts, and they may represent delichenized taxa that have given up their own photobiont after becoming commensalistic on other lichens and taking advantage of their similar photobiont. *Gyalideopsis floridae*, on the other hand, most probably did not find its favorite algae in the thallus of *Parmotrema* or cannot penetrate through the thick cortex of its host, and continues to have its own minuscule thallus. Interestingly, all known lichenicolous taxa of *Gyalideopsis* have relatively small ascospores with few septa: those of *G. cochlearifer* are 1-septate, $7-8 \times 2.0-2.5 \mu\text{m}$, of *G. epithallina* 1(-3)-septate, $6-9 \times 2.5 \mu\text{m}$ and of *G. parvula* 1-3-septate, $9-13 \times 2.5 \mu\text{m}$ (Kalb & Vězda 1988, pp. 43-44; Lücking 1997, pp. 66-67; Lücking & Sérusiaux 1998). However, in our opinion, the particularly small and poorly septate ascospores in the lichenicolous taxa are not an indication of a close relationship, but rather some kind of adaptation to the lichenicolous way of life.

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