

Gyalectidium yahriae, sp. nov. (Lichenized Ascomycetes, Gomphillaceae) from Florida and Papua New Guinea

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Abstract. A new species, *Gyalectidium yahriae* Buck & Sérusiaux, is described from collections made on twigs in *Quercus* woods in Florida (U.S.A.) and from decorticated wood in the montane forest zone of Papua New Guinea. Its ascocarps are unknown, but it is easily characterized by hyphophores composed of a circle of triangular lobes and by masses of moniliform hyphae producing long cilia on their outer cells; its generic position in the lichen family Gomphillaceae is uncertain.

An unusual species of Gomphillaceae (lichenized ascomycetes) has recently been collected by the first author in Florida (U.S.A.) and submitted for examination to the second who found it to be identical with two gatherings made in the montane forest zone of Papua New Guinea by André Aptroot. Although sterile, the species is easily identified by its characteristic hyphophores. No epithet could be found for it and the species is here described as new for science.

GYALECTIDIUM YAHRIAE Buck & Sérusiaux, sp. nov.

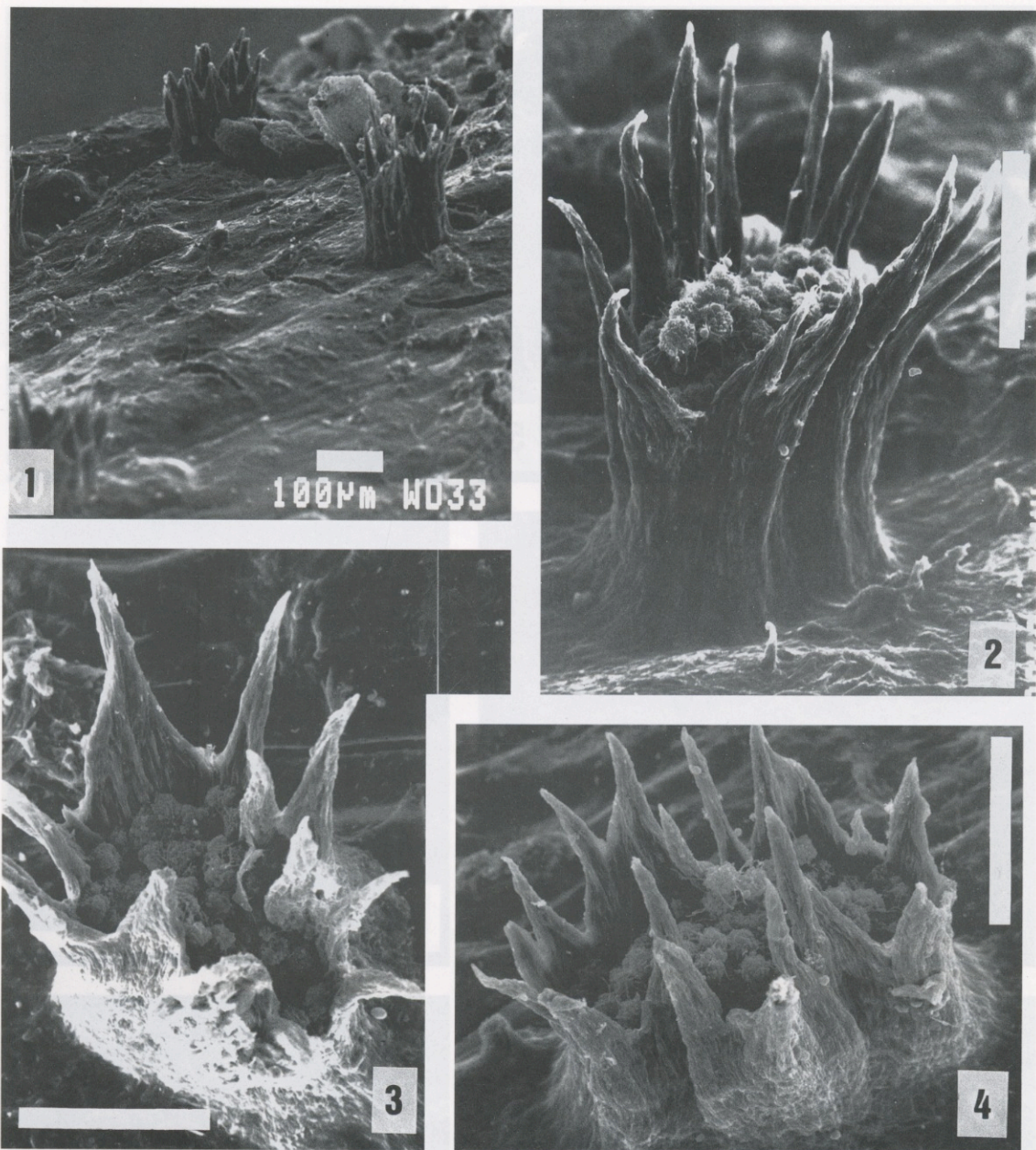
FIGS. 1–10

Thallus corticola, tenuis, viridi-cinereascens, nitidus et interdum crystallina continens; hyphophori numerosi, e triangularibus vel decrescentibus erectis lobis constati et hypharum moniliformium massulam algas continentem producentes et ciliatarum; apothecia et pycnidia ignota; alga ad Chlorococcaceaceis verosimiliter pertinens.

Thallus epiphytic, growing on small twigs and overgrowing green, powdery algal layer, forming small rounded patches, usually 0.4–0.6 cm in diam., continuous or almost so, rather shiny and varnish-like, smooth and ash green to dark green, sometimes ± spotted with low, irregular and white verrucae corresponding to oxalate crystal accumulation within thallus, thin (20–30 μm thick) but with corticiform layer forming whitish marginal prothallus. Photobiont most probably species of Chlorococcaceae, with spheric, green cells, (8–)10–20 μm in diam. Hyphophores always present, sometimes abundant, never in clusters, with at least 0.05–0.10 mm between each other, roughly circular to triangular or even polygonal in old ones, reaching 0.20–0.22 mm in diam. when old and mature, composed of 10–17

whitish to pale gray, triangular lobes, almost all being slightly curved outwards except in old hyphophores there almost upright, (190–)200–220(–250) μm long with tapering ends, surrounding mass of moniliform hyphae containing algal cells; when viewed laterally cilia appearing confluent at base and forming vase-like structure with tightening just above the hyphophore base. Moniliform hyphae (rather long hyphae strongly constricted at septa) in central mass easily seen at early stages of development, soon appearing as strings of beads, with each cell strongly inflated and ca 2.0–3.0(–3.5) × 2.0(–2.2) μm, with amorphous and arachnoid material sometimes seen between rows of cells; smaller and rounded (20–25 μm in diam.) masses eventually individualizing and moving apart from each other because of growth of long cilium (8–12 μm long) out of their edge cells; these masses representing single diaspores, expelled from hyphophores under favorable agencies (either because of mechanical agent, either droplet or animal pressure, or because of variation in hygroscopic conditions). Algal cells always present within moniliform hyphae masses, completely enclosed at early stages, becoming superficial when the masses are ready for dispersal. Apothecia and pycnidia unknown.

TYPE: U.S.A. FLORIDA. Manatee Co., Duette Park, along Duette Road 3.6 mi (5.8 km) S of SR 62, near East Fork of Manatee River, 27°32'N, 82°06'W, sandhill oak scrub, twigs of *Quercus* sp., 29 March 1998, Buck 33988 (holotype, NY). FLORIDA. Same locality and date as type, Buck 33992 (NY). Manatee Co., Duette Park, small overgrown sandhill just off Duette road ca 4 mi. (6.4 km) S of Duette, 27°32'N, 82°06'W, twigs of *Quercus myrtifolia*, 17 June 1998, Yahr 1024 (NY), twigs of *Quercus chapmanii*, 17 June 1998, Yahr 1025 (NY). Gilchrist Co., Waccasassa Flats, along Co. Rd. 232, ca 1 mi (1.6 km) W of St. Rd.

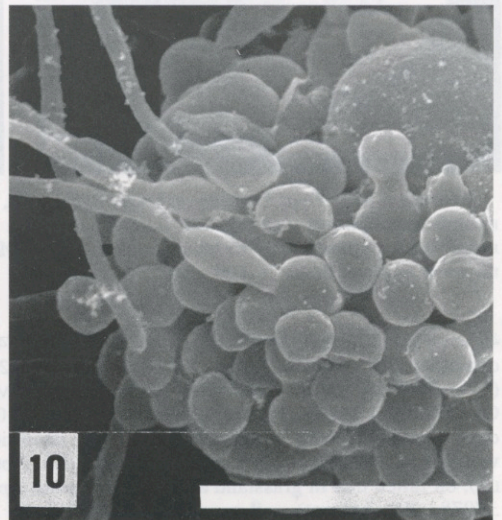
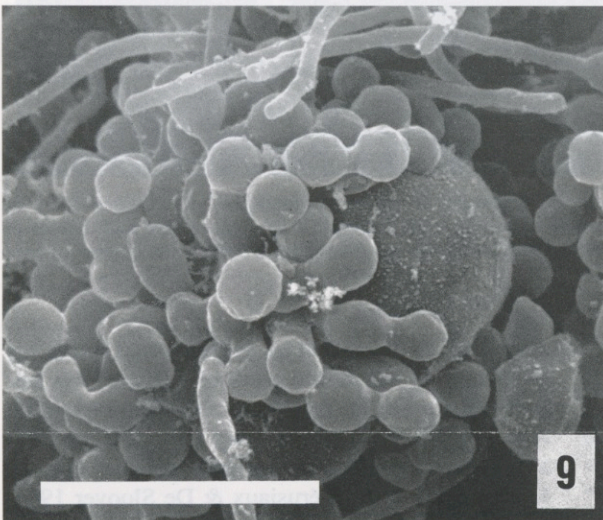
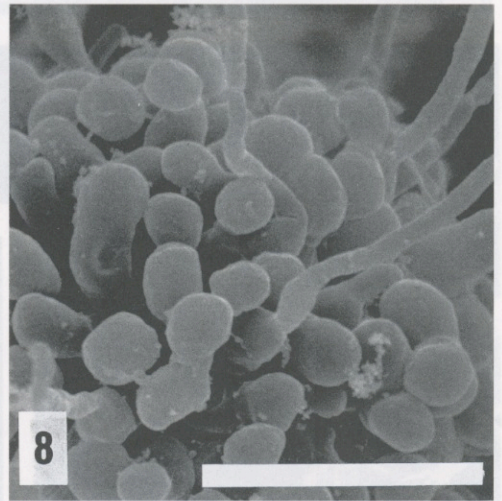
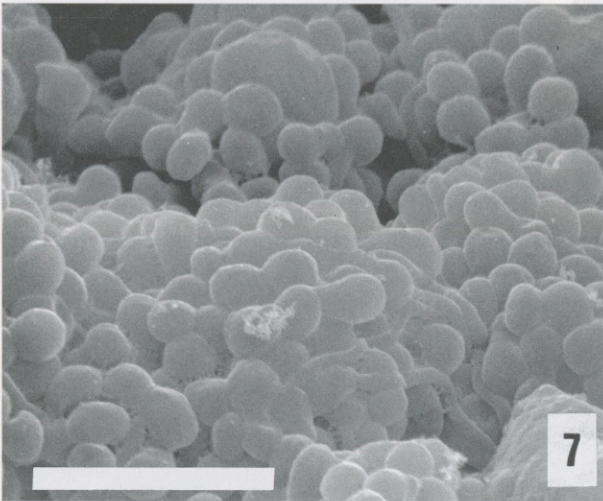
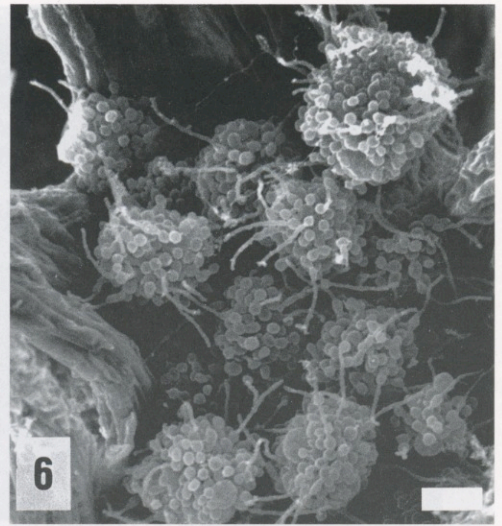
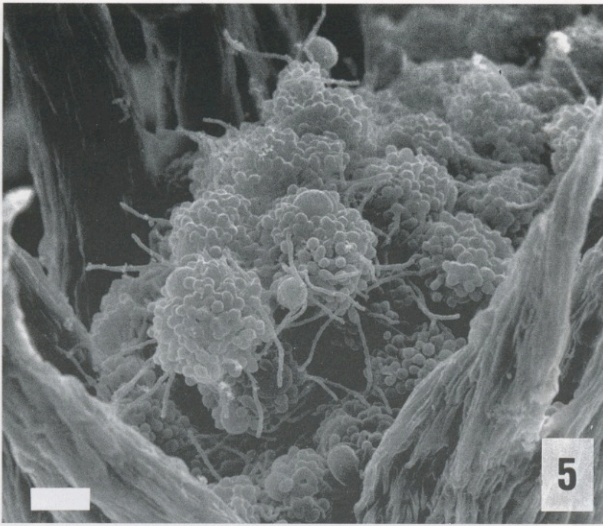


FIGURES 1–4. *Gyalectidium yahriae* (holotype), habit of hyphophores (SEM photographs).—1. Lateral view of mature hyphophores on twig.—2. Lateral view of a young hyphophore with the typical vase-like shape and masses of moniliform hyphae ready to be dispersed.—3–4. Mature hyphophores viewed from above, both with masses of moniliform hyphae. Scale = 100 μ m.

47, ca 8 mi (12.8 km) NNE of Trenton, 29°44'N, 82°46'W, disturbed oak scrub, on twigs, 5 Dec. 1993, *Buck 24424* (NY). PAPUA NEW GUINEA. NORTHERN PROVINCE. Owen Stanley Range, Myola, 9°09'S, 147°46'E, 2,100 m, open grassland with scattered shrubs, on decorticated wood, 14–19 October 1995, *Aptroot 37024* (hb. Aptroot, LG), on fallen tree in grassland at margin of forest, *Aptroot 37078a* (hb. Aptroot)—all paratypes.

The masses of moniliform hyphae (assumed to be conidia or analogous to such asexual means of

dispersal) containing algal cells, formed under the protection of the sterile parts of hyphophores immediately point to the genus *Gyalectidium* Müll. Arg., especially to two species known to produce hyphophores composed of a circle of lobes or cilia: *G. eskucheii* Sérus. (Sérusiaux & De Sloover 1986) found in tropical America and *G. setiferum* Vězda & Sérus. (Sérusiaux 1993) found in Europe (western parts of the Caucasus and SW Europe). There



FIGURES 5–10. *Gyalectidium yahriae* (holotype), details of the masses of moniliform hyphae produced by the hyphophores (SEM photographs).—5–6. Mature masses with the long cilia on their outer surfaces.—7. Immature masses with arachnoid material still present between the cells.—8. Early stages of cilia growth.—9–10. Mature masses of moniliform hyphae with photobiont cells easily seen. Scale = 10 μ m.

are however two differences: in these species as well as in all others placed in *Gyalectidium*, the individual cells of moniliform hyphae are longer (8–10 × 2 µm) and look like 'chains of sausages' and no cilia are formed, while in *G. yahriae*, these cells are quite short and look like 'strings of beads' and cilia develop on many of the outer cells. The general shape of the hyphophores is also diagnostic for *G. yahriae*; at least when young, they look like flower vases with a dentate edge. The species is presumed to be dispersed by the masses of moniliform hyphae and their associated algal cells. These function as soredia, but do not result from fragmentation of the algal layer and they thus represent an independent evolutionary line of soredia-like structures. It should also be pointed out that the diversity of asexual reproduction means within the Gomphillaceae is now known to be diverse, indeed besides the well-known bristle- or scale-like hyphophores, a species (*Echinoplaca gemmifera* R. Lücking) produces disc-like 'isidia' (Lücking 1997) and another one (*Gyalideopsis hyalina* R. Lücking) has 'campylidia' (Lücking 1999).

Within the Gomphillaceae, a lichen family suspected to be closely related to certain fungi with similar asexual reproduction means, whose sexual reproduction is unknown and therefore currently placed in the form-class hyphomycetes, found on immersed wood in tropical areas (Sérusiaux 1998), the generic boundaries are partly artificial (see Lücking 1997 for an interesting discussion on this matter). With the generic delimitation currently in use, the absence of ascocarps for the species dealt with in this paper precludes any final decision on its generic position. We have decided to describe it in *Gyalectidium*, a genus now known to be diverse (Ferraro, Lücking & Sérusiaux, *pers. comm.*), because of the similarity of its hyphophores with those of *Gyalectidium eskucheii* and *G. setiferum*, and because of the mass of moniliform hyphae intermingled with photobiont cells. In *Gyalectidium*, all species known with apothecia produce muriform ascospores that are single in the asci. Further research may necessitate the erection of a new genus for *G. yahriae*, but at this stage of studies on the family, we think such a decision would be premature.

The material from Florida is well developed and the above description is based on it; the specimens from Papua New Guinea are rather depauperate and show small discrepancies with the populations from Florida. The thallus is hardly visible and mostly white, and hyphophores are pale to dark brown, but these details may result from their substrate (decorticated wood in both collections) and from the specimens being less healthy. We nevertheless do not hesitate to assign them to the same species as

they produce the typical hyphophores and conidial masses of the species. It is of course surprising to find the same species in such remote and ecologically different areas (the coastal plain of Florida and the montane zone of Papua New Guinea) but, with the material at hand, we see no reason to consider both populations as not conspecific.

The areas in Florida in which *Gyalectidium yahriae* has been found are best characterized as scrub vegetation (Myers 1990). These xeromorphic shrub communities are dominated by evergreen oaks (*Q. chapmanii*, *Quercus geminata*, *Q. inopina*, and *Q. myrtifolia*), often with a sparse pine overstory on well drained, sandy soils. The localities in both Manatee and Gilchrist counties are adjacent to wet areas and are thus more humid than oak scrub. Such habitats are not rare in Florida, and additional localities should be sought. These scrub oak habitats are relatively rich in corticolous Gomphillaceae and, indeed, *Gyalideopsis vainioi* Kalb & Vězda is often intimately associated with *Gyalectidium yahriae*.

Papua New Guinea has an extremely rich and diverse lichen flora (Aptroot 1997; Aptroot et al. 1997) and by all means, the surroundings of the tiny village of Myola in the Owen Stanley Range are extraordinary. The locality was carefully sampled during a 1995 expedition attended by André Aptroot, Peter Lambley, Harrie Sipman, and the second author. Gomphillaceae are common in this area, but quite surprisingly not very diverse with less than 15 species collected, including the foliicolous ones and the widespread, pantropical *Gyalideopsis lambinonii* Vězda. *Gyalectidium yahriae* was not common as it was included by chance in collections made for other species.

ACKNOWLEDGMENTS

We wish to thank warmly Rebecca Yahr, for whom the species is named, for having very kindly returned to the type locality to collect further material of this new species, and André Aptroot for having placed his plentiful collections of Gomphillaceae from Papua New Guinea at our disposal. We are also very much indebted to Ido Cremasco of the Department of Botany in Liège for his help in preparing the material for SEM microscopy and to Gérard Goffinet and his group of the Department of Zoology in Liège for their advice in using the SEM microscope and equipment in their care. We are also very grateful to Theodore Esslinger, Richard Harris, Jacques Lambinon, and Robert Lücking for their help on this manuscript and for providing valuable comments and suggestions.

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ms. submitted May 5, 1999; accepted August 20, 1999.

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