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Labrocarpon gen. nov. for *Melaspilea canariensis*, with the description of *Buelliella protoparmeliopsis* sp. nov. from South America

Sergio PÉREZ-ORTEGA and Javier ETAYO

Abstract: The new genus *Labrocarpon* is introduced for the species *Melaspilea canariensis* based on the presence of excipular periphysoids. In addition, *Buelliella protoparmeliopsis* is described from Chile, the twelfth species of the genus. Notes on the two new taxa and related species are provided.

Key words: Chile, lichen, lichenicolous fungi, *Protoparmeliopsis*

Introduction

Lichenicolous fungi are a poorly known group of organisms in many parts of the world. This is especially true of the tropics and the Southern Hemisphere where only a limited amount of work has been conducted. South America is one of the regions where the gaps in our knowledge of lichenicolous fungi are especially large, notwithstanding some recent works that have highlighted the great diversity at a local level in different areas of the continent (Wedin 1994; Etayo 2002; Etayo & Sancho 2008).

During our studies on Chilean lichenicolous fungi an apparently undescribed species growing on *Protoparmeliopsis* sp. came to light; it is here described as a new species belonging to *Buelliella* (*Dothideomycetes*, incertae sedis). The new species shares many characters with species in the genus *Melaspilea* (*Melaspilaceae*, *Arthoniomycetes*). During comparisons with lichenicolous members of *Melaspilea*, it became evident that a new genus should be described for *M. canariensis*. The new genus *Labrocarpon* to accommodate *M. canariensis* and the new species in *Buelliella* are both described in the present paper.

S. Pérez-Ortega: Departamento de Biología Vegetal II, Facultad de Farmacia, Universidad Complutense, Plaza de Ramón y Cajal s/n, Ciudad Universitaria, E-28040 Madrid, Spain, Email: sperezortega@farm.ucm.es
J. Etayo: Navarro Villoslada 16, 3º dcha., E-31003, Pamplona, Spain.

Material and Methods

Specimens were examined under Nikon SMZ 600 and Meiji stereomicroscopes. Hand-cut sections of ascomata were studied in distilled water, KOH and I (Lugol's iodine). Samples were observed under Olympus CH and Nikon Eclipse 80i microscopes fitted with 'Nomarski' differential interference contrast and a Nikon DS-Fi1 digital image system. Measurements of the length and width were made using the Nikon Image Analyze System® as were the microphotographs. The habit photograph was taken using a MP-65mm Canon Lens fitted to a 40D Canon digital camera. For ascospore size, extreme measured values are given in parentheses, average and standard deviation (given in italics) were calculated after manually rejecting 10% of the highest and 10% of the lowest of all the measured values.

Taxonomy

Labrocarpon Etayo & Pérez-Ortega, gen. nov.

MycoBank No: MB 515228

Ascomata lirelliformia, nigra, latiora in medio et stricta in lateralibus, labri forma, sulco angustato; excipulum atrobrunneum ad carbonaceum, pseudoparenchymaticum, continuum et basi inmersa in lichen hospedanti; periphysoides valde ampliphicatae; paraphyses ramosae, septatae; asci late clavati, bitunicati; ascosporae ellipsoideae, 1-septatae, leviter constrictae, brunneae ubi maturitatae, laeves.

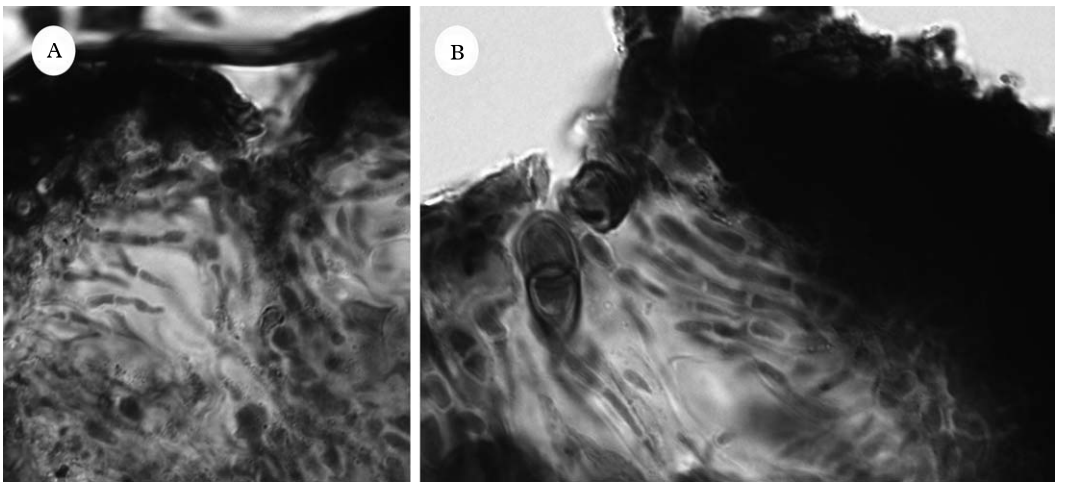

FIG. 1. *Labrocarpon canariensis* (*Pérez-Ortega* 706). A & B, details of periphysoids in the excipule.

Typus: *Labrocarpon canariensis* (D. Hawksw.) Etayo & Pérez-Ortega.

Etymology. 'Labrum' refers to the shape of the ascomatal margin, typically thickened in the centre forming a lip shape.

Labrocarpon canariensis (D. Hawksw.) Etayo & Pérez-Ortega comb. nov.

MycoBank No: MB 515229

Melaspilea canariensis D. Hawksw., *Lichenologist* **14:** 84 (1982); type: Canary Islands, Tenerife, S. Juan de Reparo, Mirador de Garachico, 1978, *P. B. Topham* (IMI 259313–holotype, not seen).

(Fig. 1 A & B)

With the exception of the periphysoids documented here, *Labrocarpon canariensis* has been described and drawn in detail by Hawksworth (1982); for this reason we omit repetition of a full description.

Remarks. *Melaspilea* Nyl. is a genus with *c*. 80 species described worldwide (Ryan & Nimis 2004), which includes lichenized, saprotrophic and lichenicolous taxa. The systematic position of the genus is uncertain; it is currently placed within the family *Melaspileaceae* W. Watson together with *Encephalographa* A. Massal. and placed provisionally in the order *Arthoniales* (Lumbsch & Huhndorf 2007), although previous authors included *Melaspileaceae* within the *Graphidales* (Poelt 1974), *Patellariaceae* (von Arx & Müller 1975) or *Buelliaceae* (Eriksson 1981). Numerous authors have pointed to the need of a thorough revision of *Melaspilea* as it seems to be heterogeneous (Hawksworth 1982; Hawksworth 1992; Ryan & Nimis 2004). Eriksson (1981) and Hawksworth (1992) remarked that the type species of *Melaspilea*, *M. arthoniodes* (Fée) Nyl., appears to be close to *Buellia*. Later, Matzer (1996) studied the type species and pointed out that it differs from some *Opegrapha* species with 1-septate ascospores in having a non-amyloid hymenium and laterally thin and apically strongly thickened ascus wall. Nograsek & Matzer (1991) observed a distinct Congo red-reaction in the tholus of the species and that old spores exhibited a brown pigment on the surface and in the cell wall.

The newly segregated genus *Labrocarpon* differs mainly from *Melaspilea* s. str. by the periphysoids covering the inner part of the excipulum (Fig. 1A & B), a feature lacking in *Melaspilea*. The genus *Poeltinula* Hafellner has some similarities to *Labrocarpon*, but the absence of a periphysoid layer, the asci with an I+ blue tholus, and the halonate ascospores separate it from the new genus and suggest a closer relationship to members of the *Rhizocarpaceae* (Hafellner 1984; Ihlen

& Ekman 2002). The genus *Odontotrema* (*Ostropales*), with several lichenicolous species (Diederich *et al*. 2002), also has a periphysoid layer covering the upper inner part of exciple, but the apothecia are not lirellate, its asci are functionally unitunicate and normally I and KI+ blue, and the hyaline ascospores are completely different from those in *L. canariensis*.

Distribution and host. So far, *L. canariensis* is known from the Canary Islands, from where it was first described by Hawksworth (1982), Madeira (Hafellner 1995), Italy (Nimis 1993), mainland Spain (Calatayud *et al*. 1995) and Brazil (Diederich 2003). It is here reported as new to Portugal. *Labrocarpon canariensis* lives on an unidentified saxicolous whitish yellow crust that probably belongs to the genus *Pertusaria*.

Further material studied. **Portugal:** *Lisboa*: Sintra, granitic boulders in *Pinus halepensis* forest, on *Pertusaria* sp., *c*. 250 m, 38° 45′ 37″ N, 9° 25′ 57″ W, 22 viii 2006, *S. Pérez-Ortega & A. Álvarez Lafuente* (hb. Pérez-Ortega 706).—**Spain:** material from the Canary Islands studied here is listed in Etayo (1996, 2000) and Boom & Etayo (2006).

Buelliella protoparmeliopsis Etayo & Pérez-Ortega sp. nov.

MycoBank No: MB 515230

Ascomata lirelliformia ad disciformia, nigra, 250–540 × 180–530 µm; excipulum atrobrunneum ad carbonaceum, pseudoparenchymaticum, continuum et base inmersum. Paraphyses ramosae, septatae. Asci subclavati ad subglobosi, bitunicati, 48–66 × 8–16 µm, 8-spori. Ascosporae late ellipsoidae, 1-septatae, constrictae, cellulis plus minusve differibus, brunneae ubi maturitatae, (14–)*18* ± *1·7* (–21) × (4–)*6* ± *1·2* (–10) [cellulae infera]–(5–)*8* ± *1·5* (–12)[cellulae supera].

Typus: Chile, [VII Region, Maule] Valle central, carretera de Rancagua a Termas de Cauquenes, cerros con acacias y cactus, sobre *Protoparmeliopsis* sp., *c*. 400 m, 31 January 2008, *J. Etayo* 24468 (MAF—holotypus).

(Fig. 2 A–G)

Ascomata elongate, lirelliform when young, broadly fusiform or ± roundish when mature, unbranched, arising singly or more or less crowded, confluent, black, disc sometimes slit-like, although usually roundish, margin usually convex and uneven, 250–540 × 180–530 µm. *Excipulum* carbonaceous, dark brown to black depending on the thickness of section (Fig. 2D), well-developed, continuous and penetrating up to 120 µm into the host thallus, giving the appearance of a short stalk (Fig. 2B), 30–45 µm thick in the upper part, pseudoparenchymatous throughout, formed by 8–14 rows of angular cells, mostly 5–8 µm, interspersed with dark brown granules that turn black in K (Fig. 2D), cells in the outer layers with thicker walls, up to 3 µm wide. *Subhymenium* hyaline, *c*. 30–50 µm tall. *Hymenium* hyaline, *c*. 65–100 µm tall, I−. *Epihymenium* comprising the tips of the paraphyses, immersed in a dark brown matrix (Fig. 1G), up to 14 µm thick, K−, N− or orangish brown. Hamathecium of cellular paraphyses, branched and anastomosed, especially towards their bases, hyaline, thick-walled, 2–4 µm wide, with clear apical thickenings to 5 µm (Fig. 2G). *Asci* bitunicate in structure, fissitunicate, clavate to subclavate, often with a short stalk, thickened at the apex, often with a distinct apical beak when young, I−, 48–66 × 8–16 µm (*n* = 12), 8-spored. *Ascopores* broadly ellipsoid, 1-septate, visibly constricted at the septum, cells of unequal size, lower cell narrower than upper cell (Fig. 2H), with rounded apices, hyaline when young, becoming light brown at maturity, smooth-walled, (14–)*18* ± *1·7* (–21) × (4–)*6* ± *1·2* (–10) [lower cell]–(5–)*8* ± *1·5* (–12) [upper cell] (*n* = 35), usually with one or two guttules inside each cell, surrounded by an irregular gelatinous sheath when very young.

Pycnidia not known.

Etymology. The epithet '*protoparmeliopsis*' refers to its lichenicolous habit on *Protoparmeliopsis* M. Choisy, a genus resurrected by Hafellner & Türk (2001) for the *Lecanora muralis* group.

Ecology and distribution. *Buelliella protoparmeliopsis* lives on an unidentified species of *Protoparmeliopsis* growing on rock in savanna vegetation of *Acacia* and *Cereus*, in the VII Region, Maule, central Chile. It seems to be parasymbiotic as no damage has been

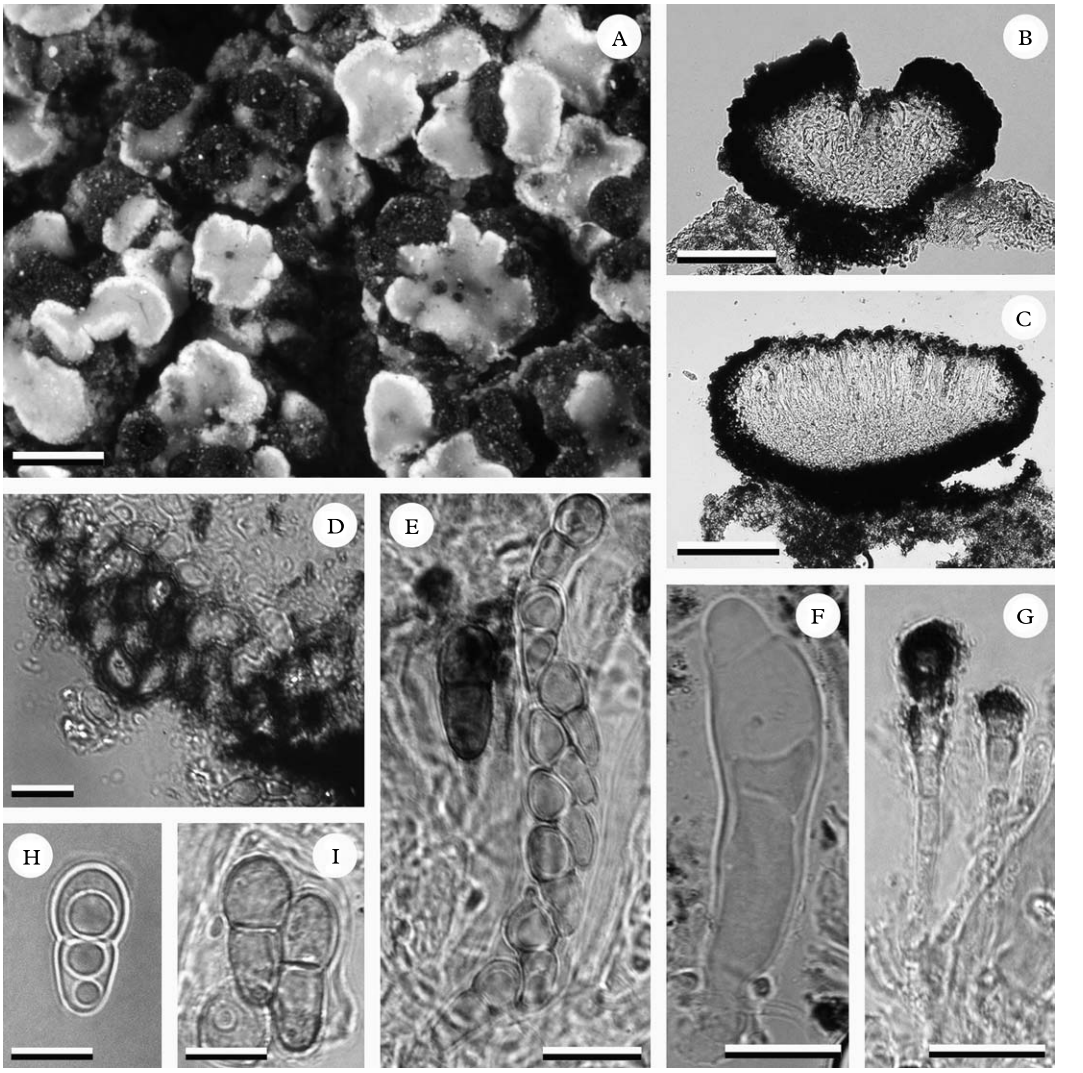

FIG. 2. *Buelliella protoparmeliopsis* (holotype). A, habit; B, young ascomata with slit-like opening; C, mature ascomata with roundish exposed disc; D, longitudinal section of excipulum showing the dark matrix which confers the carbonaceous aspect; E, mature asci with eight ascospores; F, young asci showing two layers; G, paraphyses and their apical apices surrounded by the dark pigmented matrix; H, young hyaline ascospore; I, mature brown ascospores. All photographs taken of material mounted in water. Scale bars: A = 500 μm; B & C = 100 μm; D–F = 15 μm; G–I = 10 μm.

observed to the host thallus despite the numerous ascomata of the lichenicolous fungi found in some areas of the thallus. So far, the new fungus is known only from the type locality, where it was found growing only on one thallus; an extensive search failed to find more colonized thalli in the same and surrounding localities.

Remarks. *Buelliella* Fink is a genus of lichenicolous fungi with apothecioid ascomata, initially closed, bitunicate asci with negative or very slightly I+ blue reaction with iodine and with 2-celled ascospores, initially colourless, later becoming brown. Eleven species have been described so far: *B. colombiana, B. dirinariae, B. eximia, B. inops, B.*

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lecanorae, *B. minimula*, *B. nuttallii*, *B. physciicola*, *B. poetschii*, *B. pusilla* and *B. trypethelii* (Fink 1935; Hafellner 1979, 1985; Kalb 1990; Santesson 1994; Aptroot *et al*. 1997; Etayo 2002; Hafellner *et al*. 2002, 2008; Suija & Alstrup 2004). *Buelliella protoparmeliopsis* must be compared with the three species of *Buelliella*, *B. lecanorae*, *B. inops* and *B. trypethelii*, with a brown epihymenium. The other eight taxa do not have this pigment in the epihymenium, remaining instead only hyaline to weakly pigmented (Suija & Alstrup 2004). The recently named *B. lecanorae* (Suija & Alstrup 2004) grows on corticolous species of the *Lecanora subfusca* group [i.e. *L. chlarotera* Nyl., *L. pulicaris* (Pers.) Ach., and *L. argentata* (Ach.) Malme], and is known from Estonia (Suija & Alstrup *op. cit*.). Apart from the different host and habitat, *B. lecanorae* possesses much smaller apothecia, < 200 μm diam.; a brown, reddish brown epihymenium reacting N+ slightly red; and a shorter hymenium 60-65 μm tall. *Buelliella inops* also has smaller apothecia, 150–200 μm wide, and a shorter hymenium (45–55 μm tall) and grows on *Caloplaca* species. The habitat of the last species may be similar to that of *B. protoparmeliopsis*, as it lives in Mediterranean regions of Australia, Mexico and the USA. Finally, *B. trypethelii*, known on *Trypethelium* spp. in Guyana and the USA., also has smaller apothecia (300–450 μm diam.) but differs in possessing a reddish black, N+ red epihymenium very different from that of the new species.

The new species recalls some lichenicolous species of *Melaspilea*. Three lichenicolous species of *Melaspilea* are currently recognized, namely *Melaspilea canariensis* D. Hawksw. (combined in this paper within the new genus *Labrocarpon*), on *Pertusaria* sp., *M. leciographoides* Vouaux on sterile *Verrucaria* in England and France (Hawksworth 1992), and *M. lentiginosa* (Leight.) Müll.Arg. on *Phaeographis dendritica*, known from England, France and Ireland (Hawksworth 1992). *Melaspilea gallowayii* S. Kondr. on *Pseudocyphellaria dissimilis* and known from Australia and New Zealand, has been recently transferred to the arthonioid genus *Plectocarpon* (Ertz *et al*. 2005).

Buelliella protoparmeliopsis is similar in some respects to *Labrocarpon canariensis*. While *M. canariensis* has lirellate ascomata, split-like and to 400 μm long and 150 wide, in *B. protoparmeliopsis* the ascomata take on the lirellate form only when the apothecia are crowded against each other; when growing singly, the apothecia are disc-like, and individual apothecia can then be up to 500 μm diam. Furthermore, they live on different hosts: *L. canariensis* occurs on a greyish to yellowish sterile crustose species of *Pertusaria*, and *B. protoparmeliopsis* lives on an unidentified species of *Protoparmeliopsis*. Ascus and ascospore sizes are very similar in the two species, but the exciple of *L. canariensis* differs by appearing to almost cover the disc, and by possessing a well developed layer of periphysoids in the inner part; these periphysoid filaments are septate, simple and 7–12 × 2–3 μm. *Buelliella protoparmeliopsis* lacks this character.

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