

## Two new lichenicolous fungi: an *Opegrapha* and a *Plectocarpon* species (Ascomycota: Roccellaceae) from Chile

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**Abstract:** *Opegrapha invadens* Etayo on *Pannaria farinosa* and *Plectocarpon usneaustralis* Etayo on corticolous *Usnea* sp. are described as new from southern Chile.

**Key words:** lichenicolous fungi, new species, taxonomy

### Introduction

During the austral summer, in January and February of 2005 and 2006, the author had the opportunity to travel to Navarino and several localities around Punta Arenas and Valdivia, mainly in Chile, with some localities in Argentina. Many species of lichens and lichenicolous fungi were collected and here two new species of lichenicolous *Roccellaceae* are described.

*Plectocarpon* Fée (syn. *Lichenomyces* Trev.) has been studied by several authors and several new species have recently been described (Santesson 1993; Diederich & Etayo 1994; Aptroot *et al.* 1997, Hafellner *et al.* 2002, Ertz *et al.* 2003). Ertz *et al.* (2005) revised the genus world-wide and accepted 32, including one unnamed, species. They recorded two species growing on *Usnea*: *P. usneae* Diederich & Etayo, with 6-septate, 26–30 × 4–5 µm ascospores, and a *Plectocarpon* sp., whose affinities with *P. usneaustralis* are discussed in this paper.

The lichenicolous species of *Opegrapha* Ach. have received much attention during the past decades, and many species have been described. Lawrey & Diederich (2003) reported 47 lichenicolous species, but more

have recently been added (e.g. Ertz *et al.* 2004, 2005; Etayo & Aptroot 2005).

### Material and Methods

The material studied in the present work is deposited in the herbaria B, MAF and UMAG, and in the private collection of the author. Microscopical observations were made on hand-cut sections mounted in distilled water, 10% KOH (K), concentrated nitric acid (N), or Lugol's reagent (1% I<sub>2</sub>) without (I) and with KOH pre-treatment (K/I). Measurements and drawings were made on material examined in water.

### The Species

#### *Opegrapha invadens* Etayo sp. nov.

Ascomata lichenicola, rotunda, atra, non lirellata, valde invadentia in thallo *Pannariae* gallas formantia, 150–200 µm diam. vel 250 × 150–200 µm. Excipulum atrum, K–. Hymenium 90–100 µm altum. Asci 4–8-spori, 80–88 × 12–17 µm. Ascospores 3-septatae, (24–) 30–42(–47) × 5–7 µm, hyalinae vel fuscae. Pycnidia ignota.

Typus: Chile, Región de Los Lagos, P. N. Puyehue, subida al Antillanca pasando la barrera del refugio, sobre *Pannaria farinosa* en *Nothofagus* sp., 40° 27' S, 72° 01' W, 1000–1080 m, 8 February 2006, J. Etayo 23646 (VALD—holotypus, hb. Etayo—isotypus).

(Fig. 1)

*Ascomata* developing over large surfaces of the host thallus, sometimes deforming the thallus and inducing the formation of galls, rounded and almost perithecioid to slightly elongate, not branched, densely clustered

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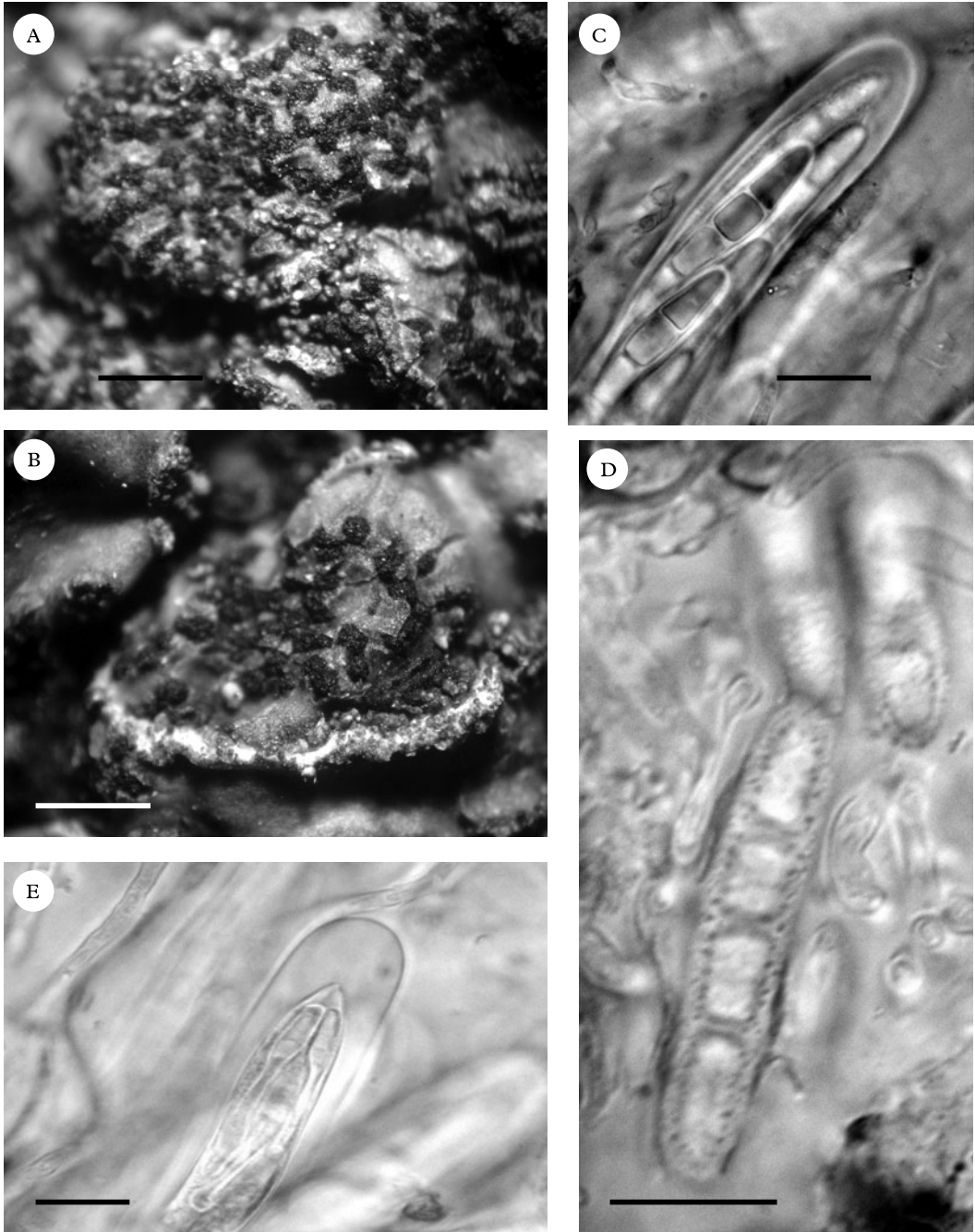


FIG. 1. *Opegrapha invadens* (holotype). A & B, habitus of the fungus producing small galls; C & E, ascus showing apex and ascospore disposition (in water); D, over-mature ascospores. Scales A & B=0.5 mm; C, D & E=10  $\mu$ m.

and contiguous, semi-immersed in the host thallus, 150–200 µm diam. or 250 × 150–200 µm. True *exciple* black, continuous under the hypothecium, 10–20 µm thick below, laterally up to 50–60 µm in upper part, K–. *Epithymenium* brownish, K–. *Hymenium* hyaline, 90–100 µm, I+ slightly blue, K/I+ blue. *Hypothecium* colourless, K–. *Hamathecium* of septate, branched to anastomosed paraphysoids, 2–2.5 µm thick. *Asci* 4–6–8-spored, clavate-cylindrical, wall apically thickened, with a K/I+ blue apical ring, 80–88 × 12–17 µm. *Ascospores* fusiform to elongate ellipsoid, 3-septate, with a thin gelatinous perispore of *c.* 1 µm, colourless or becoming brown and granulose when over-mature, (24–)30–42(–47) × 5–7 µm.

*Notes.* *Opegrapha invadens* is characterized by its very invasive, small, rounded, apothecia deforming the host thallus in swollen areas interpreted as galls, and large ascospores, especially when old. Furthermore, its habitat on *Pannaria farinosa* Elvebakk & J. Fritt-Rasm. is characteristic. The apothecia are frequently similar to perithecia, with a crenulate margin and a central ostiole but the disc tends to open and become exposed. Macroscopically and microscopically, it looks like a species of *Kalaallia* Alstrup & D. Hawksw., but the ascomata in that genus were described as being genuine perithecia (Alstrup & Hawksworth 1990). The generic position of that genus should be re-investigated. The host of *O. invadens* is a member of the *Pannaria leproloma* group, with clusters of marginal soredia or isidia, but deformed by the fungus. It has been found in three Chilean localities.

*Specimens examined.* **Chile:** Same locality as type, *f.* Etayo 23924 (hb. Etayo); Región de Los Lagos, Pumalín, alrededores del Lago Negro, renoval de coihue chilote y Tapa-tineo en versión higrófila, sobre *Pannaria farinosa*, 42° 42' 47" S, 72° 35' 05" W, 140 m, 2006, *f.* Amigo & *f.* Etayo 23586 (hb. Etayo); Región de Los Lagos, P. N. Vicente Pérez Rosales, subida al volcán Osorno, carretera desde La Ensenada, sobre *P. farinosa* en bosque de *Nothofagus dombeyi*, 41° 11' 26" S, 72° 31' 57" W, 50 m, 2006, *f.* Etayo 23881 (hb. Etayo).

***Plectocarpon usneaustralis* Etayo sp. nov.**

Ascomata lichenicola, convexa, nigra, superficie verrucosa, gallis basim constrictis, 0.4–0.7(–1.3) mm diam. Textura stromatica atrorufa, K+ atro-olivacea, N+ aurantiaco-atra. Hymenium 70–110 µm altum. Asci 6–8-spore, 90–95 × 18–20 µm. Ascosporeae 3-septatae, 18–26 × 6–8 µm, hyalinae vel atrofuscae. Pycnidia immersa. Conidia aseptata, hyalina, 4–6 × 1.2–1.5 µm.

Typus: Chile, IX Region, La Araucanía, National-park Conguillio, on *Usnea* sp. on *Nothofagus* sp., 29 November 1999, *P. Dornes* PP 50 (M—holotypus).

(Fig. 2)

*Ascomata* single, black, rounded, at first immersed, finally bursting through the host cortex and surrounded by a thalline border in the basal part (gall), surface uneven, warty, 0.4–0.7(–1.3) mm diam. Stroma multilocular, sterile stromatic tissue carbonized all around the fertile loculi, blackish-brown, K+ olivaceous-brown, N+ orange brown, with the pigment *Atra*-brown, basal part composed of wide, brown hyphae of 4–6 µm diam. *Hymenium* hyaline, 70–110 µm high, fertile loculi *c.* 200–250 µm diam.; hymenial gel I+ red, K/I+ blue. *Paraphysoids* richly anastomosing, 2–3 µm thick, apically not enlarged. *Asci* clavate, 6–8-spored, 90–95 × 18–20 µm, apical K/I+ blue ring not observed. *Ascospores* hyaline, 3-septate, slightly constricted at the septa, the four cells are more or less equal in length, 18–26 × 6–8 µm, l/b = (2.4–)3.1–3.7(–4.1); perispore distinct, hyaline, *c.* 2 µm thick, becoming dark brown granulose when over-mature.

*Pycnidia* immersed, intermixed with the ascomatal loculi, indistinguishable from them, conidiogenous cells arising directly from the stroma, simple or 1-septate, subcylindrical to obclavate, occasionally proliferating, hyaline, 9–19 × 2–3.5 µm; *microconidia* enteroblastic, bacilliform, aseptate, hyaline, smooth, 4–6 × 1.2–1.5 µm.

*Observations.* *Plectocarpon usneaustralis* must be compared with *Plectocarpon* sp. (on *Usnea* from Papua New Guinea) an unnamed species studied by Ertz *et al.* (2005). The Chilean specimens differ from those

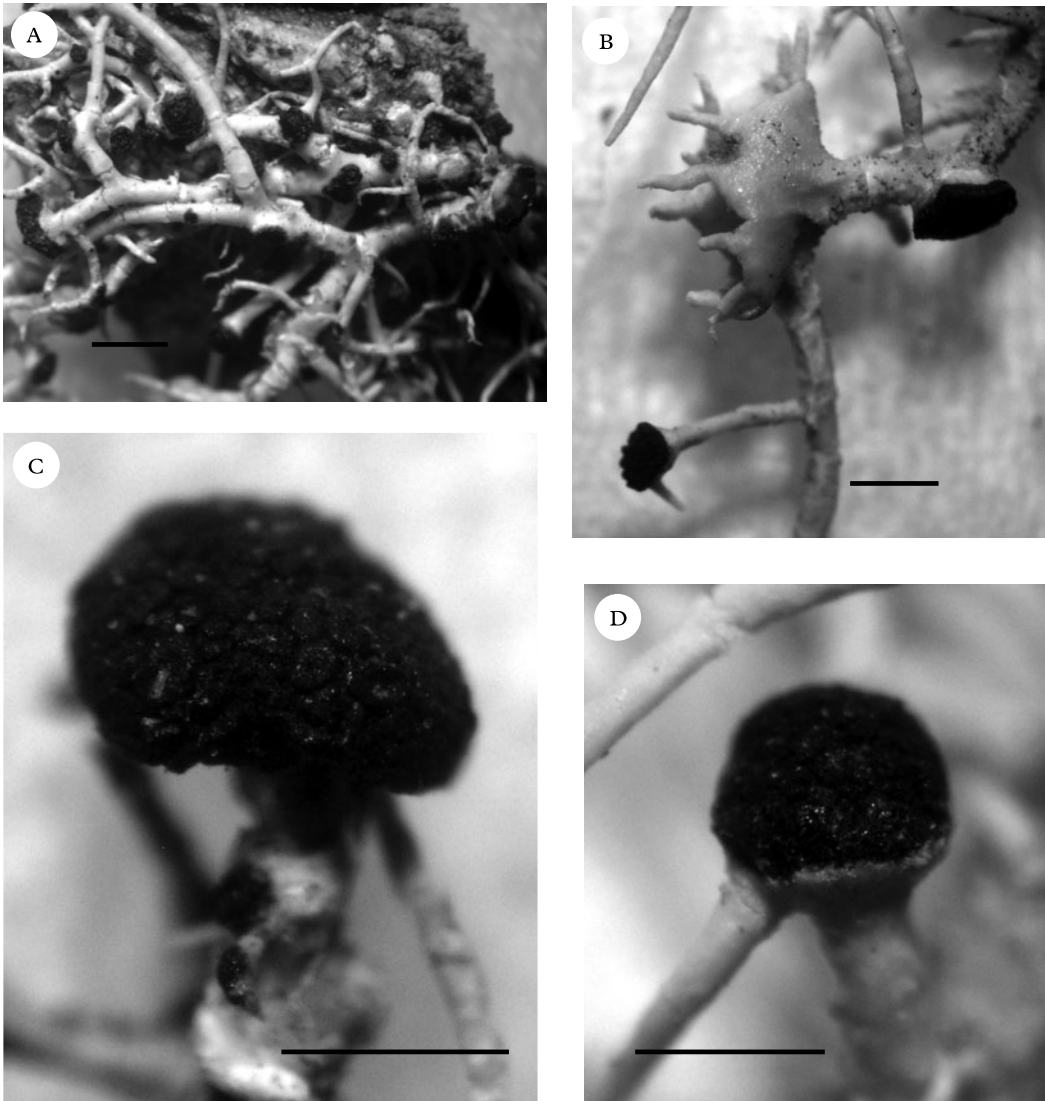


FIG. 2. *Plectocarpon usneaustralis*, habitus (holotype). Scales: A, B, C & D=0.5 mm.

from New Guinea by characters such as thickness of paraphysoids (1–2  $\mu\text{m}$  thick), the number of ascospores per ascus and ascospore size [ascospores 8 per ascus, 20–27.5  $\times$  5–6  $\mu\text{m}$ , and thick perispore (1–2  $\mu\text{m}$ ) in the specimen from New Guinea]. The habitus of the ascomata from New Guinea, as represented in Ertz *et al.* (2005), is similar to that of *P. usneaustralis*, but the ascomatal surface is only slightly uneven,

whilst that of *P. usneaustralis* is composed of cracks delimiting flattened warts. In spite of these small differences it is possible that the specimen from New Guinea is a poorly developed or young specimen of *P. usneaustralis*.

*Distribution and host.* A gall-inducing species on several small *Usnea* species in southern South Chile and perhaps Papua



New Guinea. Interestingly, it has not been collected on species of *Protousnea* that share several common lichenicolous fungi with *Usnea*, such as *Biatoropsis usnearum* Räsänen or *Lichenostigma maureri* Hafellner in southern South Chile. These two species, as well as *Abrothallus usneae* Rabenh. are commonly intermixed in some of the samples with *Plectocarpon usneaustralis* from Chile.

*Selected specimens examined. Chile:* Punta Arenas, Laguna Parrillar, bosque de lengas muy bien desarrollado, sobre *Usnea* en *Nothofagus pumilio*, 53°24'16.4"S, 71°16'1.6"W, c. 400 m, 2005, *J. Etayo* 23147 (hb. Etayo); Alrededores de Puerto Natales, bosque cerrado de *N. antarctica* cerca de cueva del *Myiodon*, sobre *Usnea* en mal estado en *N. antarctica*, 51°35'27.4"S, 72°36'22.1"W, 3–5 m, 2005, *J. Etayo* 23175, *A. Gómez-Bolea*, *L. Sancho* & *U. Söchting* (hb. Etayo); Alrededores de Puerto Natales, pista hacia Hacienda Perales, sobre *Usnea* sp. en tronco aislado, 51°33'22.3"S, 72°44'4.4"W, 10 m, 2005, *A. R. Burgaz*, *J. Etayo* 23186, *A. Gómez-Bolea*, *L. Sancho* & *U. Söchting* (hb. Etayo); Navarino, Puerto Williams, senda que atraviesa Virgen de Lourdes hacia Barranca Guarriaco por zona militar, sobre *Usnea* en arbustos, bajo lengas gruesas cerca del camino, 54°56'46.0"S, 67°34'52.2"W, 2005, 90 m, *J. Etayo* 23747, *L. García*, *A. Gómez-Bolea* & *U. Söchting* (MAF).

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