



## New Graphidaceae from northern Argentina

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### Abstract

Six new species of Graphidaceae are described from northern Argentina: *Graphis tetracarbonisata*, with apical carbonization and additional patchy carbonization at the basis of the labiae, ascomata of the *anguilliradians*-morph, ascospores submuriform, 15–19-septate and with a few longitudinal septa, 73–87 × 13–16 µm, and thallus containing substances of the stictic acid complex; *Leucodecton pustulatum*, with gnarled confluent pustules and substances of the stictic acid complex; *Ocellularia marmorata*, which is close to *O. auberianoides* but with maculate thallus, blackened columella and without secondary chemistry; *O. misionensis*, differing from *O. obturascens* in the more complex, carbonized columella and lack of secondary substances; *O. papillifera*, with a thick thallus covered with papillae resembling pseudocyphellae and with large, columnar crystal clusters; and *Rhabdodiscus argentinensis*, similar to *R. auberianus* but with erumpent ascomata, smaller, consistently 3-septate ascospores, and stictic acid in addition to psoromic acid.

**Key words:** Iguazú, Chaco, Corrientes, Jujuy, Misiones, Salta, taxonomy

### Introduction

The forests in northern Argentina are the most tropical part of the country, including the area of the well-known Iguazú waterfalls on the border with Brazil. The region comprises evergreen tropical rain forests in the eastern part (Province of Misiones) and semi-deciduous subtropical forest to the West, for instance in the Chaco province. The lichens in this area are still incompletely known, except for foliicolous taxa (Sérusiaux & De Sloover 1986; Ferraro 1997), selected crustose groups (Ferraro & Michlig 2011, 2013), and some groups in Parmeliaceae (Ferraro & Elix 1993; Michlig & Ferraro 2010). During a ten-day field trip by three of the authors in February 2013, special attention was paid to Graphidaceae, focusing on the core groups that include both graphidoid and thelotremoid species, but excluding subfamily Gomphilloideae (Hodkinson 2012; Rivas Plata et al. 2012a). Here we summarize our findings on some of the new species found, including results of taxonomic studies on earlier collections during a workshop held in 2009 at IBONE (Instituto de Botánica del Nordeste) in Corrientes.

### Material and methods

Descriptive work was carried out at ABL in Soest using an OLYMPUS SZX7 dissecting microscope and an OLYMPUS BX50 compound microscope with interference contrast, connected to a NIKON Coolpix digital camera, as well as at The Field Museum, Chicago, using a LEICA MS5 dissecting microscope and a ZEISS Axioskop 2 compound microscope. Sections were mounted in tap water, in which all measurements were taken.

The chemistry of the type specimens was investigated by thin-layer chromatography (TLC) using solvent A (Orange *et al.* 2010).

### Taxonomic treatment

A total of 52 species of Graphidaceae was identified in material from northern Argentina, including six species new to science and 46 additional species, many of them new records for Argentina (Table 1, Fig. 1, Fig. 2).

**TABLE 1.** Further species of graphidoid and thelotremoid Graphidaceae reported from northern Argentina. Ch = Chaco, Co = Corrientes, J = Jujuy, M = Misiones, S = Salta.

Species	Locality	Voucher
<i>Diorygma confluens</i> (Fée) Kalb, Staiger & Elix	Co: Road to Misiones	Moncada <i>et al. s.n.</i> (CTES)
<i>Diorygma epiglaucum</i> (Müll. Arg.) Kalb, Staiger & Elix	M: Parque Nacional Iguazú	Ferraro <i>et al.</i> 10644 (ABL, CTES)
<i>Diorygma junghuhnii</i> (Mont. & Bosch) Kalb, Staiger & Elix	M: Parque Provincial Uruguái	Michlig & Niveiro 84 (CTES)
<i>Diorygma poitaei</i> (Fée) Kalb, Staiger & Elix	M: Puerto Iguazú	Ferraro <i>et al.</i> 10598 (ABL, CTES, F)
<i>Diploschistes conceptionis</i> Vain.	S: Parque Nacional Baritú	Ferraro 8840 (CTES)
<i>Diploschistes muscorum</i> subsp. <i>bartlettii</i> Lumbsch	S: Reserva El Nogalar	Ferraro 9102 (CTES)
<i>Diploschistes scruposus</i> (Schreb.) Norman		Ferraro 8742, 8769, 8893 (CTES, F)
<i>Glyphis atrofusca</i> (Müll. Arg.) Lücking	Formosa, Camino al Aibal	Ferraro 8612 (CTES)
<i>Glyphis cicatricosa</i> Ach.	S: Parque Nacional Baritú	Michlig <i>et al.</i> 1260b (CTES, F)
<i>Graphis acharii</i> Fée	M: Reserva Natural Estricta San Antonio	Michlig & Niveiro 2028 (CTES)
<i>Graphis angustata</i> (Eschw.) Müll. Arg.	M: Parque Provincial Moconá	Michlig & Niveiro 1838 (CTES)
<i>Graphis aurita</i> Eschw.	M: Parque Provincial Esmeralda	Michlig <i>et al.</i> 803 (CTES, F)
<i>Graphis chloroalba</i> Makhija & Adaw.	Ch: Parque Pampa del Indio	Ferraro <i>et al.</i> 10722 (ABL, CTES)
<i>Graphis chrysocharpa</i> (Raddi) Spreng.	M: Parque Provincial Moconá	Michlig <i>et al.</i> 1807 (CTES)
<i>Graphis cincta</i> (Pers.) Aptroot	Ch: Parque Chico	Ferraro <i>et al.</i> 10848 (ABL, CTES)
<i>Graphis crebra</i> Vain.	Ch: Selvas de Río de Oro	Ferraro <i>et al.</i> 10941 (ABL, CTES)
<i>Graphis dealbata</i> Nyl.	M: Reserva Natural Estricta San Antonio	Michlig & Niveiro 1985, 2033 (CTES, F)
<i>Graphis flavens</i> Müll. Arg.	M: Parque Nacional Iguazú	Ferraro <i>et al.</i> 10666 (ABL, CTES)
<i>Graphis hyphosa</i> Staiger	Ch: Parque Pampa del Indio	Ferraro <i>et al.</i> 10802 (ABL, CTES, F)
<i>Graphis librata</i> C. Knight	Ch: Parque Pampa del Indio	Ferraro <i>et al.</i> 10721 (ABL, CTES)
<i>Graphis lineola</i> Ach.	M: Parque Provincial Cruce Caballero	Sandoval 65 (CTES)
<i>Graphis parilis</i> Kremp.	S: Parque Nacional Baritú	Ferraro 8723 (CTES)
<i>Graphis polystriata</i> Makhija, A. Dube, Adaw. & Chitale	M: Reserva Natural Estricta San Antonio	Michlig & Niveiro 1995 (CTES)

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TABLE 1. (Continued)

Species	Locality	Voucher
<i>Graphis pseudoserpens</i> Chaves & Lücking	S: Parque Nacional El Rey	Ferraro et al. 7864 (CTES, F)
<i>Graphis puiggarii</i> (Müll. Arg.) Lücking	M: Reserva de Biosfera Yabotí, Parque Provincial Moconá	Michlig et al. 987 (CTES)
<i>Graphis pyrrocheiloides</i> Zahlbr.	Co: Parque Nacional Mburucuyá	Ferraro et al. 8176b (CTES)
<i>Graphis rimulosa</i> (Mont.) Trevis.	S: Parque Nacional Baritú	Michlig et al. 1251a (CTES)
<i>Graphis subhianscens</i> (Müll. Arg.) Lücking	M: Reserva Natural Estricta San Antonio	Michlig & Niveiro 1941 (CTES)
<i>Graphis submarginata</i>	Jujuy, Parque Nacional Calilegua	Ferraro et al. 5834 (CTES)
<i>Graphis subvirginia</i> Nyl.	M: Reserva Natural Estricta San Antonio	Michlig & Niveiro 2008 (CTES, F)
<i>Graphis vestitoides</i> (Fink) Staiger	M: Parque Provincial Moconá	Michlig et al. 890, 892 (CTES)
<i>Melanotrema platystomum</i> (Mont.) Frisch	M: Parque Nacional Iguazú	Ferraro & Popoff 6772 (CTES, F)
<i>Myriotrema congestum</i> (Hale) Hale	M: Parque Nacional Iguazú	Ferraro & Popoff 6808 (CTES)
<i>Myriotrema erodens</i> R. C. Harris	M: Parque Nacional Iguazú	Ferraro & Popoff 7196 (CTES)
<i>Ocellularia auberianoides</i> (Nyl.) Müll. Arg.	M: Puerto Iguazú	Ferraro et al. 10521 (ABL, CTES, F)
<i>Phaeographis caesiodiscus</i> Staiger	M: Reserva Natural Estricta San Antonio	Michlig & Niveiro 2067 (CTES)
<i>Phaeographis dendritica</i> (Ach.) Müll. Arg.	M: Reserva Natural Estricta San Antonio	Michlig & Niveiro 1998 (CTES)
<i>Phaeographis heterochroa</i> Zahlbr.	S: Camino de Lipeo a Los Toldos	Ferraro 8874 (CTES)
<i>Phaeographis inconspicua</i> (Fée) Müll. Arg.	S: Parque Nacional Baritú	Michlig et al. 1246a (CTES)
<i>Phaeographis lecanographa</i> (Nyl.) Staiger	S: Reserva El Nogalar	Ferraro 9103, 9104 (CTES)
<i>Phaeographis lindigiana</i> Müll. Arg.	Co: Parque Nacional Mburucuyá	Ferraro et al. 8256 (CTES)
<i>Phaeographis sculpturata</i> (Ach.) Staiger	M: Reserva Natural Estricta San Antonio	Michlig & Niveiro 2012 (CTES)
<i>Platygramme caesiopruinosa</i> (Fée) Fée	S: Parque Nacional Baritú	Michlig et al. 1260a (CTES)
<i>Reimnitzia santensis</i> (Tuck.) Kalb	Ch: Parque Nacional Chaco	Michlig & Niveiro 1057 (CTES)
	Co: Parque Nacional Mburucuyá	Ferraro et al. 8090 (CTES)
	J: Parque Nacional Calilegua	Ferraro 8441 (CTES)
	M: Parque Nacional Iguazú	Ferraro & Popoff 6916 (CTES)
<i>Rhabdodiscus crassus</i> (Müll. Arg.) Frisch	M: Puerto Iguazú	Ferraro et al. 10524 (ABL, CTES, F)
<i>Stegobolus berkeleyanus</i> Mont.	M: Parque Nacional Iguazú	Ferraro & Popoff 6805 (CTES)

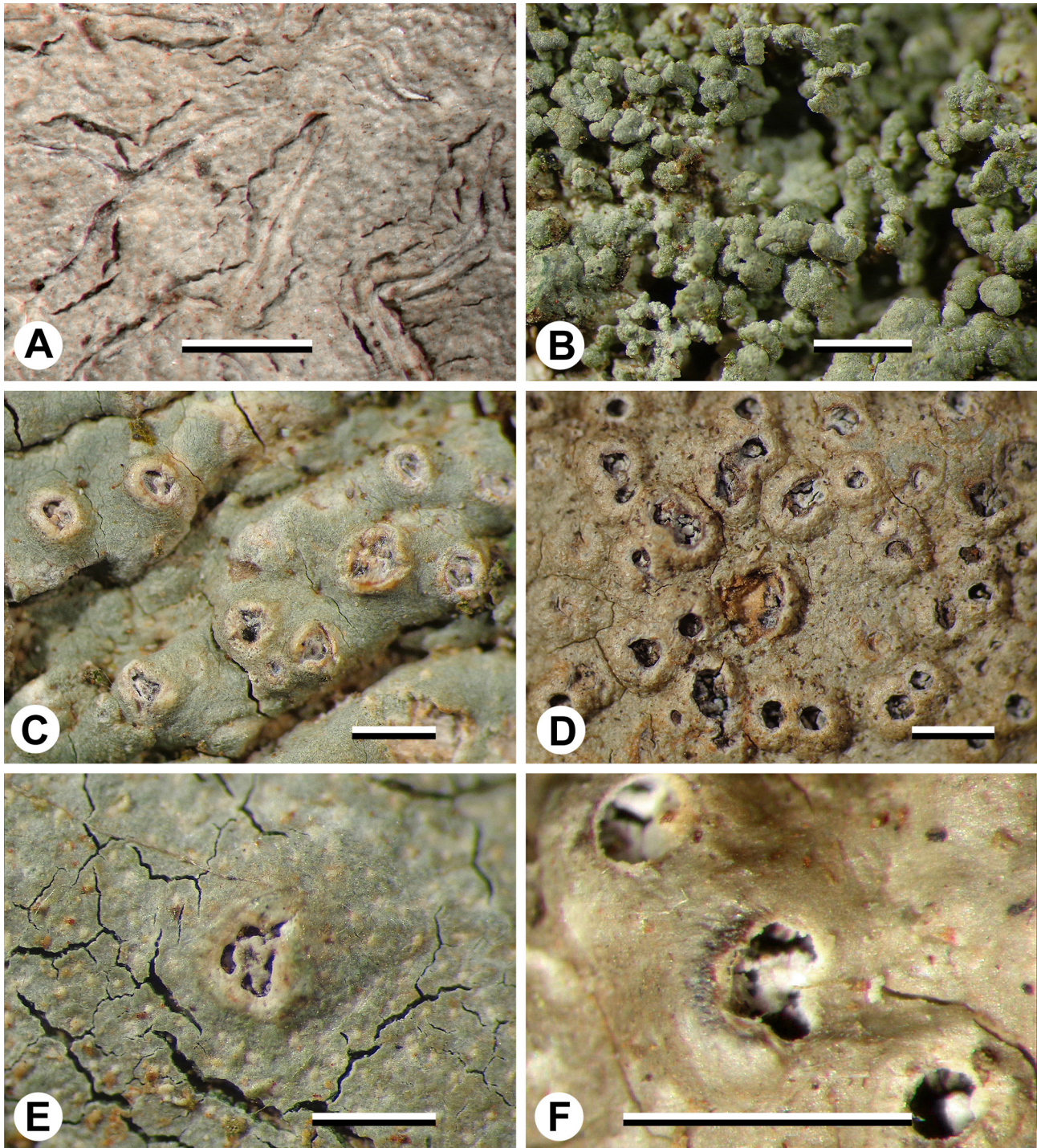


*Graphis tetracarbonisata* L.I. Ferraro, Lücking, Aptroot & M. Cáceres, *sp. nov.* (Fig. 1A)

Mycobank #807256

A new species of *Graphis* with apical carbonization and with additional patchy carbonization at the basis of the labiae, ascomata of the *anguilliradians*-morph, ascospores submuriform, 15–19-septate and with a few longitudinal septa, 73–87 × 13–16 μm, thallus with substances of the stictic acid complex.

**Type:**—ARGENTINA. Corrientes, Parque Nacional Mburucuyá, Potrero Tung, on tree; 17 October 2006; *L.I. Ferraro 8169* (holotype CTES!).



**FIGURE 1.** A. *Graphis tetracarbonisata* (holotype). B. *Leucodecton pustulatum* (isotype). C. *Ocellularia marmorata* (isotype). D. *O. misionensis* (isotype). E. *O. papillifera* (isotype). F. *Rhabdodiscus argentinensis* (holotype). Scale = 1 mm.

Thallus corticolous, up to 5 cm diam., up to 150 µm thick, continuous; surface uneven to verruculose, pale greenish grey, slightly shiny; prothallus absent. Thallus in section with cartilaginous upper cortex, irregular algal layer, and clusters of crystals; photobiont *Trentepohlia*. Apothecia lirelliform, flexuose, radiately branched, immersed to erumpent, with apically complete thalline margin, 5–15 mm long, 0.3–0.4 mm wide, 0.3–0.5 mm high; disc concealed; proper margin thin, labia entire, appearing dark grey; thalline margin thick, of the same colour as the thallus. Excipulum entire, both apically and basally carbonized, 25–45 µm wide, black where carbonized, else brownish; completely covered by corticate algiferous thallus including clusters of crystals; hypothecium prosoplectenchymatous, 15–35 µm high, pale yellowish; hymenium 175–250 µm high, colourless, not interspersed, paraphyses hyaline, unbranched; epithecium granulose, 5–10 µm high, brown. Asci fusiform, 130–190 × 20–28 µm. Ascospores 4 per ascus, oblong to fusiform, submuriform with 15–19 transverse and 0–1 longitudinal septa (few), 70–90 × 13–16 µm, 5–6 times as long as wide, colourless.

**Secondary chemistry:**—Stictic acid (thallus in sections with K+ persistently yellow efflux).

**Distribution and ecology:**—On bark of trees in evergreen forest; known only from northeastern Argentina.

**Remarks:**—This new species is characterized by the peculiar, incomplete carbonization, present apically and basally. Thus far, the only other species known with this kind of carbonization is *Graphis mirabilis* Lücking, Sipman, Umaña & Chaves in Lücking *et al.* (2008: 92), described from Costa Rica. That species differs in several features from *G. tetracarbonisata*: the prominent lirellae with striate labia, the much larger, distinctly muriform ascospores, and the lack of secondary substances. Among species with completely carbonized excipulum, entire labia, and stictic acid chemistry, similar to the new species are *G. subturgidula* Lücking & Sipman in Lücking *et al.* (2008: 112), from Costa Rica, *G. sarawakensis* Hale ex Lücking in Lücking *et al.* (2009: 440), from Borneo, and *G. schroederi* Zahlbruckner (1921: 228), from Tanzania. The first differs in its prominent lirellae and ascospores with terminal muriform septation, whereas the second also has prominent lirellae, in addition to completely muriform, broader ascospores. The latter agrees with the new species in most features except the completely carbonized excipulum, less branched lirellae, and ascospores lacking any longitudinal septa.

***Leucodecton pustulatum* L.I. Ferraro, Lücking, Aptroot & M. Cáceres, sp. nov.** (Fig. 1B)

*Mycobank* #807257

*Differing from other species of Leucodecton in the coarsely pustulate thallus.*

**Type:**—ARGENTINA. Misiones: Puerto Iguazú, near Hotel Selvático Don Horacio; 230 m; on tree bark in evergreen tropical rainforest; 22 February 2013, L.I. Ferraro, A. Aptroot & M.E.S. Cáceres 10569 (holotype CTES!; isotypes ABL!, F!).

Thallus corticolous, epiperidermal, up to 5 cm diam., continuous; surface coarsely pustulate, as if exfoliating, but in sections with periderm layers attached to the underside, light greyish green; prothallus absent. Thallus in section 200–250 µm thick, ecorticate, with massive photobiont layer 100–130 µm thick, strongly encrusted with very large, sometimes columnar clusters of calcium oxalate crystals, and distinct medulla, 100–130 µm thick, filled with numerous small, grey crystals. Photobiont *Trentepohlia*; cells rounded to irregular in outline, in irregular groups or layers, yellowish green, 6–12 × 5–10 µm. Ascomata not observed.

**Secondary chemistry:**—Stictic, constictic (major), cryptostictic, and hypostictic (minor) acids.

**Distribution and ecology:**—On bark of trees in evergreen forest; known only from northeastern Argentina.

**Remarks:**—This species is here formally described even in the absence of ascomata, due to the characteristic, coarsely pustulate thallus; however, even without ascomata, the thallus anatomy and chemistry place this species in the genus *Leucodecton* Massalongo (1860: 325). Few species in Graphidaceae are known to produce a pustulate thallus. *Ocellularia pustulata* Rivas Plata & Lücking (2013: 30), described from Peru, has pustules developing into soralia and further differs by its psoromic acid chemistry. *Wirthiotrema santessonii* (Hale) Rivas Plata & Frisch in Rivas Plata *et al.* (2010b: 201), from tropical Africa, has a smooth, corticate thallus with small crystal clusters but otherwise agrees with *Leucodecton pustulatum* in secondary chemistry.

**Additional specimen examined:**—ARGENTINA. Misiones: Puerto Iguazú, Parque Nacional Iguazú, Camping Nandú; 200 m; on tree bark in evergreen tropical rainforest; 28 April 2004, L.I. Ferraro & O. Popoff 7402 (CTES).



***Ocellularia marmorata* L.I. Ferraro, Lücking, Aptroot & M. Cáceres, sp. nov.** (Fig. 1C)

Mycobank #807258

Differing from *Ocellularia auberianoides* in the apically carbonized excipulum and columella and the lack of secondary substances.

**Type:**—ARGENTINA. Misiones: Puerto Iguazú, near Hotel Selvático Don Horacio; 230 m; on tree bark in evergreen tropical rainforest; 22 February 2013, L.I. Ferraro, A. Aptroot & M.E.S. Cáceres 10522 (holotype CTES!; isotypes ABL!, F!).

Thallus corticolous on branches, epiperidermal, up to 5 cm diam., continuous; surface smooth to uneven, minutely grainy, pale greyish green; prothallus absent. Thallus in section 100–120 µm thick, with thin, loose, paraplectenchymatous cortex, 5–10 µm thick, rather thick photobiont layer, 70–100 µm thick, encrusted with very regular, large, columnar clusters of calcium oxalate crystals, and indistinct medulla, 10–20 µm thick. Photobiont *Trentepohlia*; cells rounded to irregular in outline, in irregular groups, green, 8–11 × 6–10 µm. Ascomata rounded to irregular in outline, erumpent, with almost complete thalline margin, 0.6–1.0 mm diam., 0.15–0.2 mm high; disc covered by 0.3–0.5 mm wide pore, partially filled with irregular columella; proper margin thick, entire to fissured, visible as white rim around the pore; thalline margin entire to fissured, smooth, light greyish green. Excipulum entire, prosoplectenchymatous, mostly yellowish brown but becoming carbonized apically, 30–50 µm wide, fused with thalline margin; laterally covered by algiferous, corticate thallus containing periderm layers; columella present, plug-shaped to broad-stump-shaped but becoming irregular with bridges towards the margin, mostly yellowish brown but becoming carbonized apically, up to 150 µm high; hypothecium prosoplectenchymatous, 5–10 µm high, hyaline; hymenium 100–120 µm high, hyaline, clear; epithecium indistinct, 5–10 µm high, hyaline. Paraphyses unbranched, apically smooth; periphysoids absent; asci cylindrical to narrowly clavate, 100–110 × 10–12 µm. Ascospores 8 per ascus, ellipsoid, 5–7-septate, 20–30 × 6–8 µm, 3–4 times as long as wide, hyaline, distoseptate with lens-shaped lumina, I+ violet-blue.

**Secondary chemistry:**—No substances detected by TLC.

**Distribution and ecology:**—On bark of trees in evergreen forest; known only from northeastern Argentina.

**Remarks:**—This new species is close to *Ocellularia auberianoides* (Nyl.) Müller (1891: 395), but differs in the apically carbonized excipulum and columella and the lack of secondary substances; also, the apothecia in *O. auberianoides* are more regular with a more distinctly developed irregular columella and with entire margins. The latter was found at the same locality and the differences are consistent. *Ocellularia marmorata* is also somewhat similar to another new species described below, *O. papillifera*, but that species has a completely carbonized columella and non-carbonized excipulum, as well as a thicker, cracked thallus with numerous papillae.

**Additional specimens examined:**—ARGENTINA. Misiones: Parque Nacional Iguazú; on tree bark in evergreen tropical rainforest; 28 April 2004, L.I. Ferraro & O. Popoff 7152a, 7195 (CTES, F).

***Ocellularia misionensis* L.I. Ferraro & Lücking, sp. nov.** (Fig. 1D)

Mycobank #807259

Differing from *Ocellularia obturascens* in the complex, carbonized columella and lack of secondary substances.

**Type:**—ARGENTINA. Misiones: Parque Nacional Iguazú; on tree bark in evergreen tropical rainforest; August 2003, L.I. Ferraro & O. Popoff 6809 (holotype CTES!; isotype F!).

Thallus corticolous on branches, epiperidermal, up to 5 cm diam., continuous; surface smooth to uneven, minutely grainy, pale yellowish brown; prothallus absent. Thallus in section 100–150 µm thick, with thin, loose, paraplectenchymatous cortex, 5–10 µm thick, rather thick photobiont layer, 50–100 µm thick, encrusted with very regular, large, columnar clusters of calcium oxalate crystals, and medulla, 30–50 µm thick. Photobiont *Trentepohlia*; cells rounded to irregular in outline, in irregular groups, green, 8–12 × 6–10 µm. Ascomata rounded to irregular in outline, erumpent to prominent, with almost complete thalline margin, 0.6–1.2 mm diam., 0.2–0.3 mm high; disc covered by 0.3–0.7 mm wide pore or becoming more exposed in old ascomata, partially filled with irregular, white-pruinose columella forming radiate bridges towards the margin in old ascomata; proper margin thin, indistinct; thalline margin entire, smooth, light yellowish-brown. Excipulum entire, prosoplectenchymatous, orange-brown, 50–70 µm wide, fused with thalline margin and difficult to separate from amorphous periderm layer; laterally covered by algiferous, corticate thallus containing periderm layers; columella present, initially plug-

shaped to broad-stump-shaped but becoming irregular with radiate bridges towards the margin in old ascomata, carbonized, up to 200 µm high; hypothecium prosoplectenchymatous, 5–10 µm high, hyaline; hymenium 100–120 µm high, hyaline, clear; epithecium indistinct, 5–10 µm high, hyaline. Paraphyses unbranched, apically smooth; periphysoids absent; asci cylindrical, 100–110 × 10–12 µm. Ascospores 8 per ascus, uniseriate, broadly oval, submuriform with 1–3 transverse and 0–1 longitudinal septa per segment, 10–13 × 8–10 µm, 1.2–1.4 times as long as wide, brown (hyaline when immature), distoseptate with lens-shaped lumina, I+ violet-blue when young, I– when mature.

**Secondary chemistry:**—No substances detected by TLC.

**Distribution and ecology:**—On bark of trees in evergreen forest; known only from northeastern Argentina.

**Remarks:**—*Ocellularia misionensis* belongs in the *O. bahiana* group and combines features of several species. The complex columella is most similar to that of *O. obturascens* (Nyl.) Hale in Egan (1987: 164), but in the latter it is less complex and not carbonized; in addition, *O. obturascens* contains protocetraric acid. A widespread species in this group which lacks secondary substances is *O. urceolaris* (Ach.) Sprengel (1827: 242) which, however, differs in the lack of a columella or sometimes forms a rudimentary, simple pseudocolumella.

***Ocellularia papillifera* L.I. Ferraro, Lücking, Aptroot & M. Cáceres, sp. nov.** (Fig. 1E)

Mycobank #807260

*Differing from Ocellularia auberianoides in the carbonized columella and lack of secondary substances.*

**Type:**—ARGENTINA. Misiones: Puerto Iguazú, near Hotel Selvático Don Horacio; 230 m; on tree bark in evergreen tropical rainforest; 22 February 2013, L.I. Ferraro, A. Aptroot & M.E.S. Cáceres 10523 (holotype CTES!; isotypes ABL!, F!).

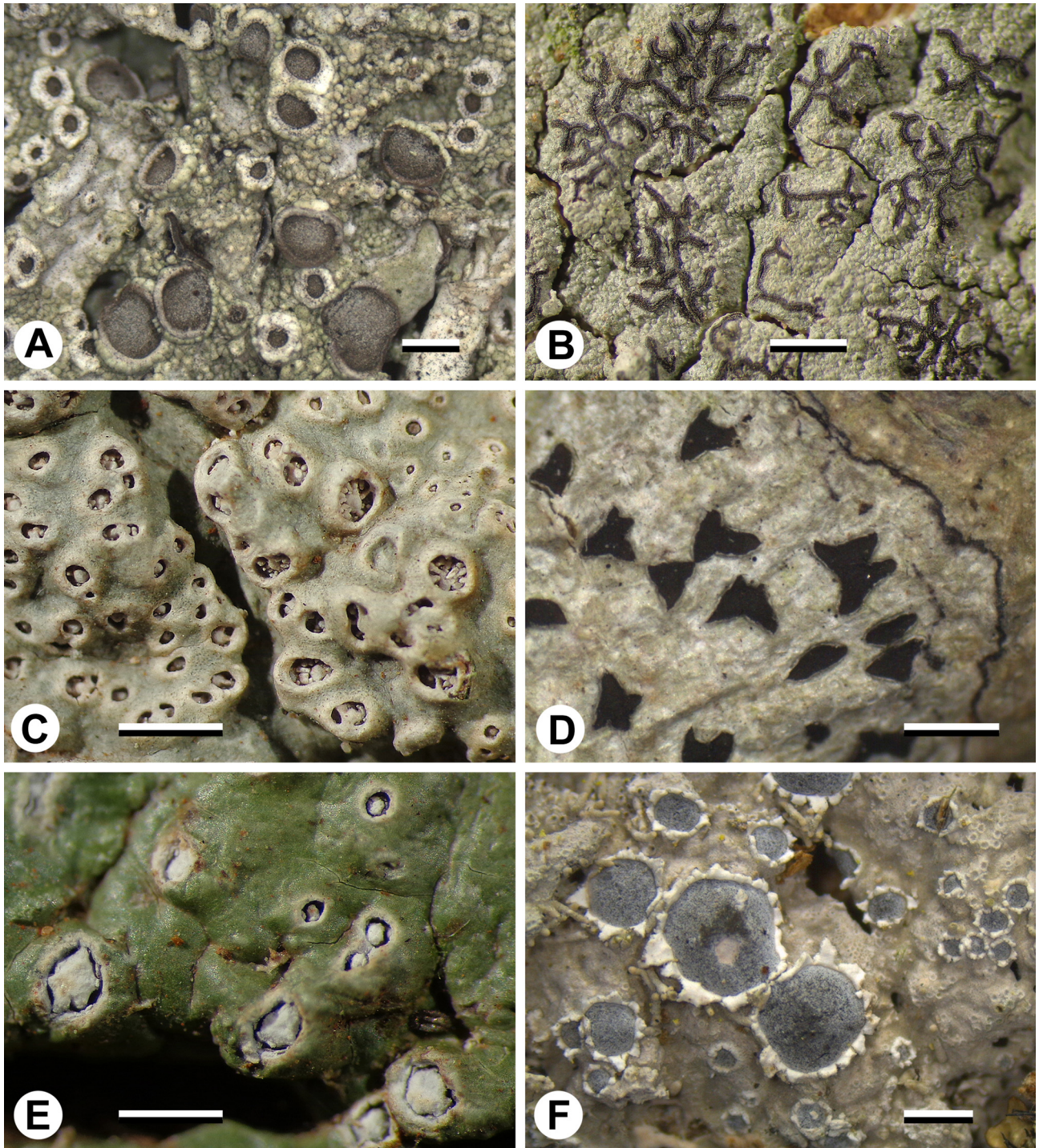
Thallus corticolous on branches, epiperidermal, up to c. 5 cm diam., continuous; surface smooth to uneven and frequently with fine cracks, densely white-papillose, pale greyish green; papillae 0.05–0.1 mm diam., white, sometimes with fine cracks and then resembling pseudocypbellae; prothallus absent. Thallus in section 150–200 µm thick, with thin, loose, paraplectenchymatous cortex, 5–10 µm thick, rather thick photobiont layer, 70–120 µm thick, encrusted with very regular, large, columnar clusters of calcium oxalate crystals that protrude above the photobiont layer into the cortex, and distinct medulla, 50–70 µm thick, with numerous grey crystals; papillae anatomically formed by cavities including hyphal tissue resembling ascoma or pycnidia initials, but no conidia observed. Photobiont *Trentepohlia*; cells rounded to irregular in outline, in irregular groups, green, 7–11 × 6–10 µm. Ascomata rounded to irregular in outline, erumpent, with almost complete thalline margin, at first myriotremoid but becoming rather large, 0.7–1.0 mm diam., 0.15–0.2 mm high; disc covered by 0.3–0.5 mm wide pore, more or less filled with irregular columella; proper margin thin, entire to slightly fissured, visible as white rim around the pore; thalline margin entire, smooth, light greyish green. Excipulum entire, prosoplectenchymatous, yellowish brown, 20–30 µm wide, fused with thalline margin; laterally covered by algiferous, corticate thallus containing periderm layers; columella present, initially finger-like to plug-shaped but becoming irregular with bridges towards the margin, carbonized, up to 150 µm high; hypothecium prosoplectenchymatous, 5–10 µm high, hyaline; hymenium 100–120 µm high, hyaline, clear; epithecium indistinct, 5–10 µm high, hyaline. Paraphyses unbranched, apically smooth; periphysoids absent; asci cylindrical to narrowly clavate, 90–110 × 10–12 µm. Ascospores 8 per ascus, ellipsoid, 5–7-septate, 25–30 × 7–8 µm, 3–4 times as long as wide, hyaline, distoseptate with lens-shaped lumina, I+ violet-blue.

**Secondary chemistry:**—No substances detected by TLC.

**Distribution and ecology:**—On bark of trees in evergreen forest; known only from northeastern Argentina.

**Remarks:**—This species is rather unusual as it combines a thallus structure known from unrelated genera such as *Leucodecton* with *Ocellularia*-type ascomata. The only species in the *Ocellularia* clade with such thallus structure are found in the *O. bahiana* group (Rivas Plata *et al.* 2012b, 2013), but these have almost invariably non-carbonized columellae and brown, often muriform ascospores, except for *O. auberianoides* with hyaline, transversely septate ascospores. The numerous papillae found on the thallus are most likely pycnidial or ascoma initials, but neither conidia nor young asci were found in any of them.





**FIGURE 2.** A. *Diploschistes muscorum* subsp. *bartlettii* (Ferraro 9102). B. *Graphis hyphosa* (Ferraro et al. 10802). C. *Ocellularia auberianoides* (Ferraro et al. 10521). D. *Phaeographis lindigiana* (Michlig & Niveiro 1704). E. *Rhabdodiscus crassus* (Ferraro et al. 10524). F. *Reimnitzia santensis* (Michlig et al. 308). Scale = 1 mm.

***Rhabdodiscus argentinensis* L.I. Ferraro, Aptroot & M. Cáceres, sp. nov.** (Fig. 1F)

Mycobank #807261

Differing from *Rhabdodiscus auberianus* in the erumpent ascomata, smaller, persistently 3-septate ascospores, and containing stictic acid in addition to psoromic acid.

**Type:**—ARGENTINA. Misiones: Puerto Iguazú, Parque Nacional Iguazú; 200 m; on tree bark in evergreen tropical rainforest; 27 August 2003, L.I. Ferraro & O. Popoff 6763 (holotype CTES).



Thallus corticolous, epiperidermal, up to 5 cm diam., continuous; surface smooth, olive-green; prothallus absent. Thallus in section 80–120 µm thick, with prosoplectenchymatous cortex, 10–15 µm thick, photobiont layer 15–25 µm thick, and irregular medulla, 70–100 µm thick, strongly encrusted with numerous small, grey crystals that partially dissolve in K, and clusters of calcium oxalate crystals. Photobiont *Trentepohlia*; cells rounded to irregular in outline, in irregular groups, yellowish green, 6–12 × 6–10 µm. Ascomata rounded, erumpent, 0.4–0.9 mm diam., 0.2–0.3 mm high; disc covered by 0.1–0.3 mm wide pore, almost filled with the white-topped columella; columella at first plug-shaped but becoming irregular and forming bridges in older ascomata; proper margin thin distinct, visible as white rim around the pore; thalline margin smooth, olive-green. Excipulum entire, completely carbonized down to below the hypothecium, 30–60 µm wide, fused with covering thalline layer; laterally covered by algiferous, corticate thallus containing orange-brown, amorphous periderm layer, 100–200 µm thick; columella present, initially plug-shaped but becoming irregular in older ascomata, completely carbonized but upper part with thick cover incrustated with numerous, small, grey crystals, 200–300 µm wide, carbonized part up to 120 µm high, with white cover up to 200 µm high; hypothecium prosoplectenchymatous, 10–20 µm high, hyaline; hymenium 90–110 µm high, hyaline, clear; epithecium indistinct, 5–10 µm high, hyaline. Paraphyses unbranched, apically smooth; periphysoids absent; asci cylindrical to narrowly clavate, 90–110 × 10–12 µm. Ascospores 8 per ascus, ellipsoid, 3-septate, 12–15 × 5–7 µm, 2–3 times as long as wide, brown, distoseptate with lens-shaped lumina, young I+ violet-blue, mature I–.

**Secondary chemistry:**—Psoromic (major), subpsoromic, and 2'-*O*-demethylpsoromic (minor) acids (medulla P+ yellow) as well as stictic acid (medulla in section with K+ persistently yellow efflux).

**Distribution and ecology:**—On bark of trees in evergreen forest; known only from northeastern Argentina.

**Remarks:**—This new species combines typical features of the genus *Rhabdodiscus* Vainio (1921: 184) and is most similar in overall morphology to *R. auberianus* (Nyl.) Vainio (1921: 184). It differs by the less prominent ascomata and smaller, consistently 3-septate ascospores from the latter. In addition, it produces stictic acid besides psoromic acid, the typical substance for this genus. Thus far, only three other species are known with such chemistry: *Ocellularia gerardii* Sipman in Sipman *et al.* (2012: 128), *Myriotrema mammillare* (Hale) Hale (1980: 134) and *M. uniseptatum* (Hale) Hale (1980: 135). The first has a non-carbonized excipulum, lacks a columella, and has hyaline ascospores. *Myriotrema mammillare* has annulate ascomata with narrow pore, a dark brown excipulum, and also lacks a columella and has hyaline ascospores. *Myriotrema uniseptatum* has completely immersed ascomata with narrow pore and a hyaline excipulum and (irregular) columella, and also differs by its 1-septate, hyaline ascospores.

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