

## *Rinodina etayoi*, a new saxicolous lichen species from the Canary Islands

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**Abstract:** The silicicolous lichen species, *Rinodina etayoi* Giralt & van den Boom, is described as new from inland localities of Fuerteventura and Lanzarote (Canary Islands). It is characterized by a crustose, whitish thallus containing atranorin, zeorin, chloroatranorin and stictic acid, hemispheric pseudolecanorine apothecia containing, a proper exciple interspersed with numerous and large oil drops, and by ascospores of the *Mischoblastia*-type. The joint occurrence of pannarin, stictic acid and *Mischoblastia*-type ascospores makes *R. etayoi* unique within the genus.

**Key words:** ecology, Lecanoromycetes, lichenized fungi, Macaronesia, *Physciaceae*, silicicolous, species nova, taxonomy

### Introduction

A study of specimens of the genus *Rinodina* (Ach.) Gray collected during several field trips in the Canary Islands by A. M. Brand, J. Etayo and P. P. G. van den Boom, revealed an interesting and very unusual saxicolous species, which is described here as new to science. The new species has been found only at inland localities on the two eastern, subdesertic islands, Fuerteventura and Lanzarote, growing in open situations, on well-lit volcanic rocks, in communities where the fruticose lichen genera *Ramalina* Ach. and *Seiropora* Poelt are particularly abundant. Although much *Rinodina* material has been collected from all the other Canary Islands (except El Hierro), the three lichenologists mentioned above had never collected this new species before in the Canarian Archipelago.

### Material and Methods

The study is based on specimens stored in the private herbaria of J. Etayo and P. P. G. van den Boom.

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Specimens were examined by standard techniques using stereoscopic and compound microscopes. The mycological terminology generally follows Kirk *et al.* (2001). Measurements of ascospores were made at  $\times 1000$  magnification from specimens at least 4 years old mounted in tap water; only free ascospores lying outside the asci were measured. Mean value (M) and standard deviation (SD) were calculated and the results are recorded as (minimum value observed) M–SD – M+SD (maximum value observed). M, SD and *n* (the total number of ascospores measured) are given within parentheses.

The terminology used for the apothecia follows Dughi (1952), for the asci Rambold *et al.* (1994) and for the ascospore types and ontogenies, Giralt (2001).

Chemical constituents were identified by the standard methods of thin-layer chromatography (TLC) (e.g. Culberson & Ammann 1970; Culberson *et al.* 1981; Culberson & Johnson 1982).

### The Species

#### *Rinodina etayoi* Giralt & van den Boom sp. nov.

Thallus crustaceus, rimoso-areolatus vel areolatus, albidus, substantias atranorinum, zeorinum, chloroatranorinum et acidum sticticum continens. Apothecia lecanorina, mox pseudolecanorina ad hemisphaerica, usque ad 0.8 mm diametro, atra. Discus plerumque paulo pruinosis. Excipulum proprium rufum, dense guttulatatum, guttulis oleosis, (5–)7–12  $\mu\text{m}$  diametro. Excipulum proprium et epihymenium crystallis pannarini (PD+ aurantiacis) inspersa. Ascospores typico *Mischoblastia*, (15–)16.3–19.3(–21)  $\times$  (6.5–)7.4–8.6 (–10)  $\mu\text{m}$ . Conidia bacilliformia, 3.5–5  $\times$  1  $\mu\text{m}$ .

Typus: Canary Islands, Fuerteventura, Carretera de Antigua a Betancuria, Mirador de Morrovelosa, 585 m,

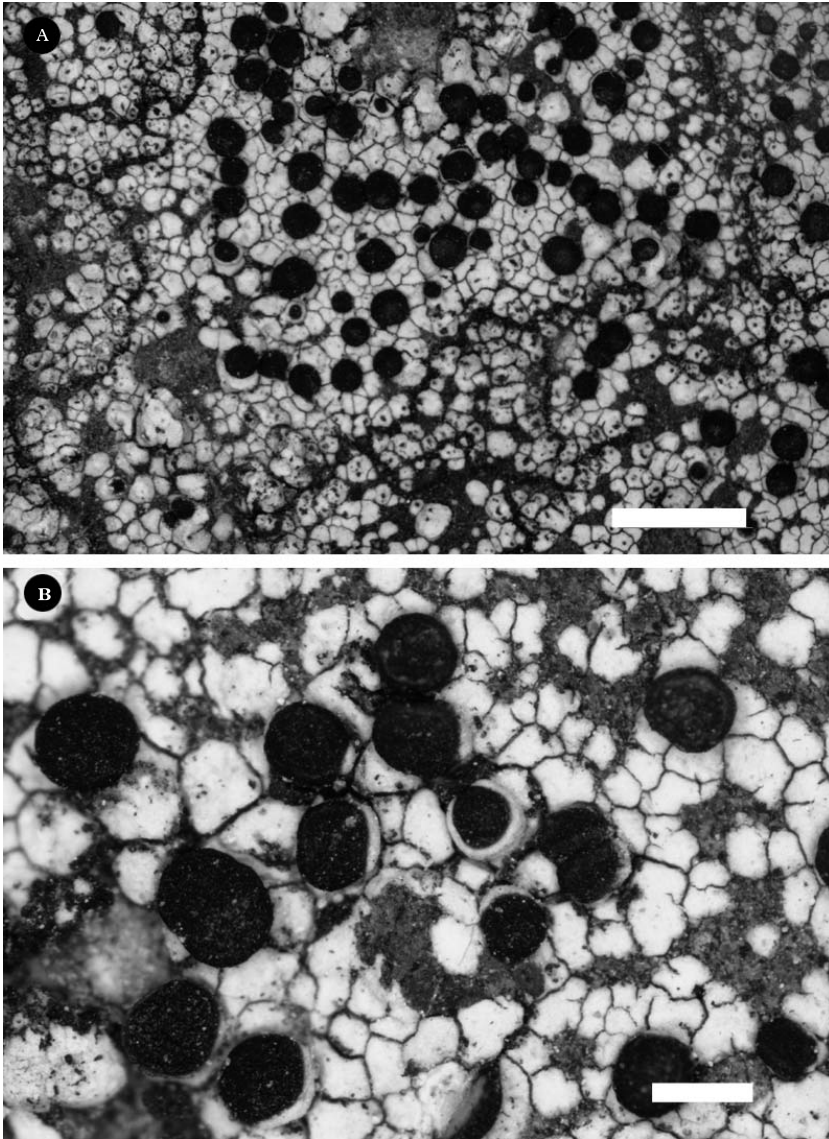


FIG. 1. *Rinodina etayoi*, habitus (holotypus). A, thallus composed of flat to subconvex areolae which often possess a central pycnidium, delimited by a black hypothalline line; B, young lecanorine apothecia losing the thalline margin and becoming pseudolecanorine. Scales: A = 2000  $\mu\text{m}$ ; B = 500  $\mu\text{m}$ .

17 July 2004, *f. Etayo & E. Ros* 22059 (LG—holotypus; hb. Etayo, hb van den Boom—isotypi).

(Figs 1 & 2)

*Thallus* epilithic, crustose, rimose-areolate to areolate, whitish, delimited or not by a

black hypothalline line. Areoles discrete to contiguous, thin, smooth, plane to subconvex, rarely becoming rather thick to bullate, often including a central pycnidium. Cortical layer 30–40  $\mu\text{m}$  thick; algal layer 50–70  $\mu\text{m}$  thick; algal cells 7–12  $\mu\text{m}$  diam.; medulla up to 200  $\mu\text{m}$  thick, I–.

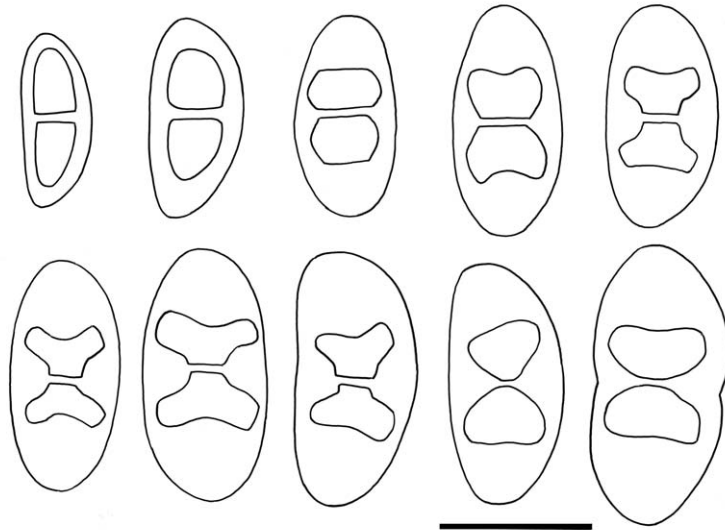


FIG. 2. *Rinodina etayoi*, ascospore ontogeny and variability (the torus is not illustrated) (hb. van den Boom 30175). Scale = 10  $\mu\text{m}$ .

*Apothecia* (0.2–)0.4–0.6(–0.8) mm diam., lecanorine when young with a very thin and almost excluded thalline margin concolorous with the thallus, rapidly becoming pseudolecanorine (= lacking a thalline exciple but having a proper exciple which contains algal cells) and hemispheric, abundant, usually dispersed, sessile, and constricted at base. Proper margin nearly indistinct except in young pseudolecanorine apothecia, rapidly excluded, black. *Disc* black, plane at first, becoming strongly convex, epruinose to thinly covered by a whitish grey pruina (more obvious when wet), PD+ orange. *Hymenium* 70–110  $\mu\text{m}$  tall, clear. *Epihymenium* brown, interspersed with crystals of pannarin reacting PD+ orange (microscope slide!) *Hypothecium* colourless, up to 150  $\mu\text{m}$  deep. *Proper exciple* reddish brown, 50–90  $\mu\text{m}$  wide, interspersed with crystals reacting PD+ orange (pannarin) and, especially in the inner part, filled with abundant and large oil drops of (5–)7–12  $\mu\text{m}$  diam. *Paraphyses* 1.5–1.8  $\mu\text{m}$  wide; apical cells (3–)4–6(–7)  $\mu\text{m}$  diam., dark brown pigmented. *Asci* 8-spored, of *Lecanora*-type, very often retaining overmature ascospores. *Ascospores* of *Mischoblastia*-type, (15–)16.3–19.3(–21)  $\times$

(6.5–)7.4–8.6(–10)  $\mu\text{m}$  (M = 17.8; 8.1; SD = 1.5; 0.7  $\mu\text{m}$ ;  $n = 64$ ), smooth to hardly ornamented at  $\times 1000$  magnification; torus very well developed, when mature slightly constricted and with an intense brown pigmentation in the septal region; ascospore ontogeny of type A, with septum in young ascospores inserted before internal wall thickenings become distinct.

*Pycnidia* abundant. *Conidia* bacilliform, 3.5–4(–5)  $\times$  0.9–1  $\mu\text{m}$ .

*Chemistry*. Thallus K+ strong yellow, C–, KC–, PD+ yellow–orange: atranorin, zeorin, chloroatranorin and stictic acid by TLC; pruina, proper exciple and epihymenium PD+ orange: pannarin by TLC.

*Etymology*. The species is named in honour of Dr Javier Etayo (Pamplona, Spain), who has collected some of the specimens and contributed substantially to the knowledge of the lichen flora in south-western Europe and, in particular, of the Canary Islands.

*Distribution and ecology*. *Rinodina etayoi* is known only from two of the Canary Islands, Fuerteventura and Lanzarote, at elevations

between 140 to 585 m. It was found only in the central and northern areas of Fuerteventura and the central area of Lanzarote. In the holotype specimen there are no associated species. However, the mountain ridge where it was collected was rich in shrubs, and populations of *Ramalina*, *Seiophora* and *Tornabea* Østh. were growing abundantly on both rocks and shrubs. In the second locality on north Fuerteventura, it was found in a rockier habitat with a few shrubs and several terricolous lichen species such as *Cladonia foliacea* (Huds.) Willd., *Psora crenata* (Tayl.) Reinke, *Squamarina cartilaginea* (With.) P. James, *Toninia tristis* (Th.Fr.) Th. Fr. ssp. *pseudotabacina* Tindal and abundant *Ramalina* and *Seiophora* on the rocks.

On Lanzarote, *R. etayoi* was found in a community with *Aspicilia calcarea* (L.) Mudd, *Caloplaca* sp., *Coscinocladium gaditanum* (Clemente) Crespo, Llimona & D. Hawksw. and *Xanthoria isidioidea* (Beltr.) Szatala.

**Observations.** *Rinodina etayoi* is characterized by its rimose to areolate, whitish thallus, its hemispheric, pseudolecanorine apothecia, its *Mischoblastia*-type ascospores and, especially, by its unique proper exciple and chemistry. According to the various revisions of the genus *Rinodina* (e.g. Malme 1902; Magnusson 1953; Sheard 1967; 2004; Mayrhofer & Poelt 1979; Mayrhofer 1983, 1984a, 1984b, Mayrhofer *et al.* 1993; Giralt *et al.* 1994, 1997; Matzer & Mayrhofer 1994, 1996; Giralt 2001; Mayrhofer & Moberg 2002; Sheard & Mayrhofer 2002; Kaschik 2006), *R. etayoi* seems to occupy an isolated position within the genus, since it is the only species hitherto described containing abundant and large oil drops in the proper excipulum and stictic acid in the thallus (in addition to atranorin, zeorin and chloroatranorin) in combination with pannarin in the proper exciple and epihymenium.

Apart from *R. algarvensis* Giralt, Barbero & van den Boom, *R. stictica* Sheard & Tønsberg and *R. verruciformis* Sheard, *R. etayoi* is the fourth *Rinodina* species known to contain stictic acid. Among other discriminating characters, in contrast to *R. etayoi*, the

other three species all have *Pachysporaria*-type ascospores and lack pannarin in the exciple and epihymenium. Further information on these taxa is given in Giralt *et al.* (1996), Sheard & Tønsberg (1995) and Sheard & Mayrhofer (2004), respectively.

Taking into account the checklist of lichens and lichenicolous fungi of insular Laurimacaronesia (Hafellner 1995) and our own data, *Rinodina etayoi* could be mistaken for the following sympatric species: a) *R. beccariana* Bagl. var. *lavicola* (M. Steiner) Matzer & H. Mayrhofer, *R. oxydata* (A. Massal.) A. Massal. and *R. rinodinoides* (Anzi) H. Mayrhofer & Scheid. because of its pseudolecanorine apothecia; b) *R. oxydata*, *R. teichophila* (Nyl.) Arnold and *R. trachytica* (A. Massal.) Bagl because of its *Mischoblastia*-type ascospores; c) for *R. santorinensis* J. Steiner because it contains pannarin. However, none of these taxa possesses the combination of characters that is diagnostic for *R. etayoi*.

Differences between *R. etayoi* and other saxicolous *Rinodina* species containing pannarin not present in the study area (e.g. *R. brandii* Giralt & van den Boom and *R. murrayii* H. Mayrhofer) can be inferred from Giralt & van den Boom (1996), Giralt *et al.* (1994) and Kaschik (2006).

The only lichenicolous fungus found on *Rinodina etayoi* is *Lichenodiplis lecanorae* (Vouaux) Dyko & D. Hawksw. It is abundantly present in the Lanzarote specimen (*P. & B. van den Boom* 30175) and in one of the Fuerteventura specimens (*P. & B. van den Boom* 25703).

**Additional specimens examined. Canary Islands:**  
**Fuerteventura:** Parque Natural de El Cardón, camino de El Cardón a Pájara, 400 m, 2004, *f. Etayo & E. Ros* 22023 (hb. Etayo); Road from Lajares to playa Majamano, malpais, 140 m, 2004, *f. Etayo & E. Ros* 21977 (hb. Etayo); 3 km NNW of La Oliva, along road to Lajares, W slope of volcano Arena, open field with lava blocks, 13°6.8'W, 28°37.9'N, 150 m, 2001, *P. & B. van den Boom* 25683 & 25703 (hb. v.d. Boom).  
**Lanzarote:** W of Tahiche, road to San Bartolomé, W of volcano Montaña de Maneje, small hill with volcanic outcrops, 13°34.2'W, 29°00.7'N, 205 m, 2003, *P. & B. van den Boom* 30175 (hb. v.d. Boom).

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