

# ***Poronia ingii* (J. D. Rogers & Læssøe) J. D. Rogers, Y.-M. Ju & F. San Martín rediscovered in Canary Islands (Spain)**

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Summary: *Poronia ingii* was first described in 1992 by Rogers & Læssøe (as *Podosordaria ingii* J. D. Rogers & Læssøe) and was so far only known from this first collection on fronds of *Phoenix dactylifera* in Canary Islands. A recent collection in the same island (La Gomera) on palm material (*Phoenix canariensis*), along with absence of records from other locations since the date of its discovery suggest a possible endemism of this species to Canary Islands and suggest a possible host-preference for palm material. The very good condition and abundance of the newly collected material allowed a safe identification and provided opportunity to illustrate this still poorly known species with colour photographs for the first time. Another collection of a very similar fungus on seeds of *Beta vulgaris*, unfortunately immature and sterile, represents either the same, morphologically slightly different species or a novel closely related one. In absence of microscopic distinctive characters, its status cannot be safely assessed until fertile material is collected.

Keywords: *Xylariaceae*, *Podosordaria*, *Lindquistia*, palmicolous ascomycetes.

Résumé : c'est à Rogers & Læssøe (1992) que l'on doit la description originale de *Poronia ingii* (sous le nom de *Podosordaria ingii* J. D. Rogers & Læssøe), et depuis lors cette espèce n'était connue que de cette récolte sur feuilles de *Phoenix dactylifera* dans les îles Canaries. Une récolte récente de cette espèce dans la même île (La Gomera) sur débris de palmier (*Phoenix canariensis*), ainsi que l'absence de récoltes signalées ailleurs depuis la date de sa première découverte, suggèrent un possible endémisme de cette espèce dans les îles Canaries et une préférence marquée pour les tissus de palmiers. Le très bon état et l'abondance du matériel récolté ont permis une identification fiable et la possibilité d'illustrer cette espèce encore mal connue, pour la première fois, par de nombreuses photos en couleur. Une seconde récolte très semblable, sur graines de *Beta vulgaris*, malheureusement immature et stérile, représente la même espèce morphologiquement légèrement différente ou une nouvelle espèce proche. En l'absence de caractères microscopiques pour les distinguer, une nouvelle récolte de matériel fertile est nécessaire pour établir son identité de manière fiable.

Mots-clés : *Xylariaceae*, *Podosordaria*, *Lindquistia*, ascomycètes palmicoles.

Resumen: *Poronia ingii* fue descrita por primera vez en 1992 por Rogers & Læssøe (como *Podosordaria ingii* JD Rogers & Læssøe) y hasta el momento sólo se conocía esta primera recolecta sobre hojas de *Phoenix dactylifera* en las Islas Canarias. La reciente recolecta en la misma isla (La Gomera) sobre restos de palmera (*Phoenix canariensis*), así como la ausencia de registros en otros lugares desde la fecha de su descubrimiento, sugieren que se trate de un posible endemismo de las Islas Canarias con una preferencia por los restos de palmera. La abundancia de material recolectado, así como su buen estado de conservación, permite una identificación fiable y nos proporciona la posibilidad de ilustrar esta especie poco conocida por primera vez con fotografías en color. Se ha realizado otra recolecta de un hongo muy similar, desarrollándose sobre semillas de *Beta vulgaris*, lamentablemente inmaduro y estéril que, o bien se trata de la misma especie con ligeras diferencias morfológicas, o bien de una nueva especie muy próxima. En ausencia de caracteres microscópicos distintivos, es necesario examinar una nueva recolecta en estado de desarrollo fértil para poder realizar una identificación fiable de la especie.

Palabras clave: *Xylariaceae*, *Podosordaria*, *Lindquistia*, ascomycetes de palmera.

## Introduction

A recent collection of *Poronia ingii* from La Gomera, Canary Islands, prompted us to report our observations on a species so far known only from the type collection. *Poronia* Willd. is a xylariaceous genus that encompasses small, mostly fimicolous, *Xylaria*-like ascomycetes characterized by flattened to rounded fertile heads with a white, cream or tan surface, associated with a synnematus *Lindquistia* Subram. & Chandrash. anamorph produced either on natural substrate or in culture. The abundant material collected allowed a thorough morphological study of both the anamorph and the teleomorph, and colour illustrations of stromata in situ. Our observations on this collection match very accurately the original description, and confirm a possible host preference for palm material. Another collection, that occurred on dicot seeds, appeared slightly deviating in the colour of young stromata and presence of long rhizomorphs, and might represent a new taxon. Unfortunately, the stromata were immature and sterile and did not allow further investigations.

## Material and methods

The material was studied fresh, but measurements were taken from dried stromata. The microscopic observations of asci, paraphyses, ascospores and conidiogenous structures were carried out in water, 1% SDS, dilute Waterman blue ink and India ink; ascus apical apparatus were tested and measured in Melzer's reagent. The specimens are deposited in MA-Fungi (Madrid) and duplicates are kept in the personal herbaria of JF and MAR.

## Description

*Poronia ingii* (J. D. Rogers & Læssøe) J. D. Rogers, Y.-M. Ju & F. San Martín, *Mycotaxon*, 67: 67 (1998).

Basionym: *Podosordaria ingii* J. D. Rogers & Læssøe, *Mycotaxon*, 44 (2): 435 (1992).

### Original diagnosis:

*Capitula stromatum rotunda, irregulariter compressa, usque ad 1 cm lata × 4 mm crassa, stipitibus usque ad 2 cm longitudine × 2 mm diam, extus fulva cum ostioliis atris, intus alba. Textura satis dura, strato carbonaceo destituo. Superficies asperata a ambitibus perithecorum et rugis. Perithecia 0.3-0.5 mm diametro. Ostiola papillata. Asci octospori, cylindrici, stipitati, 110-130 µm longitudine tota × 7-9 µm crassi, partibus sporiferis 65-72 µm longitudine, annulo apicali in liquore iodato Melzeri cyanescente, cuneato, 1.5 µm alto × 2.9 µm crasso. Paraphyses simplices, copiosae. Ascospores brunneae, unicellulares, ellipsoideo-inequilaterales, leves, (8-) 9-10.5 × 4.5-5 (-6) µm, rima germinativa recta ventrali longa praeditae. Status agamicus ad Lindquistiam pertinet. Synnemata consociata cum statu sexuali. Pars fertilis clavata, nivea, usque ad 1 mm diam, in stipite atris ca. 0.5 mm diam, usque ad 3 mm longitudine tota. Conidia et apparatus conidicus ut in genere.*

Stromatal heads rotund, irregularly compressed, up to 1 cm broad × 4 mm thick, with stipes up to 2 cm long × 2 mm diam, externally tawny with black ostioles, internally white. Texture fairly hard, lacking carbonaceous layer. Surface roughened by perithecial contours and wrinkles. Perithecia 0.3-0.5 mm diam. Ostioles pa-

pillate. Asci eight-spored, cylindrical, stipitate, 110-130 µm total length × 7-9 µm broad, with the spore-bearing part 65-72 µm long, with apical ring bluing in Melzer's iodine reagent, cuneate, 1.5 µm high × 2.9 µm broad. Paraphyses simple, abundant. Ascospores brown, unicellular, ellipsoid-inequilateral, smooth, (8-) 9-10.5 × 4.5-5 (-6) µm, with straight ventral germ slit spore-length.

Asexual state belongs to genus *Lindquistia* Subram. & Chandrashkara. Synnemata associated with sexual state. Fertile part clavate, whitish, up to 1 mm diam, on blackish stipe ca. 0.5 mm diam, up to 3 mm total length. Conidia and conidiogenesis as described for the genus.

Specimen examined: Canary Islands: Gomera, San Sebastian de la Gomera, 17°03'W, 28°04'N, cultivated zone, 14. I. 1990, Ing, B., rotten frond of *Phoenix dactylifera* L. (K: HOLOTYPE)

## Description based on the recently collected specimen

### Teleomorph

**Stromata** upright, gregarious, (9-)14-22 mm total height, the fertile heads ovoid to subglobose, (2-) 5-9 mm high × (1.2-) 3-8 mm broad; surface white turning buff to fawn upon drying, blackened in places by ascospores deposits, weakly nodulose with perithecial contours and shallow wrinkles and roughened by ostioles, soft-textured, devoid of carbonaceous tissue; interior white, solid, spongy, turning somewhat hollow upon drying; stipes well-defined, 5-15 mm high × 0.8-1.2 mm broad, pale brown, smooth to finely puckered, glabrous, coated at base with whitish to yellow mycelium. **Perithecia** subglobose, 0.3-0.45 mm diam. **Ostioles** conic-papillate, black.

**Asci** cylindrical, with eight obliquely uniseriate ascospores, 110-128 µm total length, spore-bearing part 60-70 × 8-8.5 µm, stipe 45-60 µm long, with a cuneate apical apparatus, 1.5-1.7 × 2.5 µm, bluing in Melzer's reagent.

**Paraphyses** copious, filiform, hyaline, septate, 4-5 µm broad at base, progressively tapering to the apex up to 100 µm above the asci, slightly embedded in mucilage. **Ascospores** 8.5-10.2 × 4.8-5.5 µm, ellipsoid-inequilateral with narrowly to broadly rounded ends, olivaceous brown to brown, biguttulate, smooth, with a conspicuous straight germ slit almost spore-length on the flattened side, lacking cellular appendages; remnants of mucilage can be seen around hardly mature ascospores when observed in India ink, that disappear at maturity.

### Anamorph: *Lindquistia*

**Synnemata** associated with the teleomorph, clavate, 7-10 mm high, upper part white to buff, powdery, up to 1 mm broad, lower part pale brown. **Conidiogenous** cells globose, hyaline, originating from the wall of hyaline, thin-walled disarticulating hyphae, yielding ellipsoid to subglobose **conidia** 2.5-3.5 µm diam.

**Specimens examined:** SPAIN, Canary Islands: La Gomera, Valle Gran Rey, La Calera, 28°05'43.54"N, 17°20'15.41"W, alt. 24 m, rotten frond of *Phoenix canariensis*, 04 Jan. 2011, MA-Fungi 80891, leg. Rubén Negrín, communicated by Miguel Á. Ribes, det. J. Fournier. La Gomera, Valle Gran Rey, La Calera, 28°05'33.73"N, 17°20'20.14"W, alt. 13 m, on ground with herbaceous plants, predominantly *Beta vulgaris*.

Plate 1





ris, 31 Dec. 2010, MA-Fungi 80892, leg. Rubén Negrín, communicated by Miguel Á. Ribes, det. J. Fournier.

## Discussion

The material of collection MA-Fungi 80891 studied above fits very well the original description with regard to both teleomorphic and anamorphic morphology. The generic placement of this species in *Poronia* is unambiguous due to the *Lindquistia* anamorph characterized by disarticulating conidiophores. At species level, *P. ingii* is readily distinguished from other related species based on its non-fimicolous habitat, larger fertile heads and synnematal anamorphic state (ROGERS & LÆSSØE, 1992).

There is still some confusion about fimicolous *Xylaria*-like fungi because the distinction between the three genera *Podosordaria* Ellis & Holw., *Poronia* and *Xylaria* Hill ex Schrank was only based on stromatal morphology, roughly assigning nail-shaped stromata with flat apex to *Poronia*, more globose and nodulose stromata either to *Podosordaria* or to *Xylaria* depending on the melanization of their ectostroma.

The delimitation of the genus *Poronia* from *Podosordaria* and *Xylaria* was discussed in detail by ROGERS *et al.* (1998). These authors clearly restricted the genus *Poronia* to species having a *Lindquistia* anamorph characterized by disarticulating conidiophores, moving to *Poronia* four taxa previously accommodated in *Podosordaria* (i. e., *P. australiensis* (Læssøe, C. A. Pearce & K. D. Hyde) J. D. Rogers, F., San Martin & Y.-M. Ju, *P. ingii*, *P. jugoyasan* Hara and *P. leporina* Ellis & Everh.). Later on, *Poronia pileiformis* Berk. was reinstated based on anamorphic data reported by JU & ROGERS (2001).

Because the type species of *Podosordaria*, *P. mexicana* Ellis & Holw., produces a *Xylaria*-like anamorph in culture (ROGERS *et al.*, 1998), the boundaries between *Podosordaria* and *Xylaria* remained blurred. Instead of merging *Podosordaria* into *Xylaria* which is known to be highly paraphyletic (HSIEH *et al.*, 2010), ROGERS *et al.* (1998) assigned fimicolous *Xylaria*-like fungi that form the anamorph and teleomorph on separate stromata in culture to *Podosordaria*, but they also transferred a lignicolous species (*X. entosulphurea* J. D. Rogers, F. San Martin & Y.-M. Ju) to *Podosordaria* based on strong similarities with *P. elephantii* J. D. Rogers & Y.-M. Ju.

Recent phylogenetic studies on the subfamily *Xylarioideae* based on  $\beta$ -tubulin, RPB2 and  $\alpha$ -actin sequences (HSIEH *et al.*, 2010) supported well this view in showing that *Poronia* (represented by *P. pileiformis*) and *Podosordaria* (represented by *P. muli* Rogers, Ju & San Martin and *P. mexicana*) clustered as two distinct subclades on a branch appearing basal to *Xylaria* s. l. It is hoped that further molecular data, inclu-

ding those from this recent collection of *P. ingii*, will help elucidate the complex taxonomy of those small *Xylaria*-like mostly fimicolous ascomycetes.

The occurrence of *P. ingii* on palm material reported here for the second time might indicate host specificity or at least host preference for this peculiar substrate. As reported by FRÖHLICH & HYDE (2000) and TAYLOR & HYDE (2003), host specificity of ascomycetes for palms is much higher for pathogens than for saprobes, endophytes occupying an intermediate position. For example, among the various xylariaceous ascomycetes occurring on palms, species of *Anthostomella* Sacc. exhibit more host specificity than species of *Xylaria* that are also known from bamboo, leaves or woody substrates.

The collection MA-Fungi 80892 obviously is congeneric because of its small clavate stromata associated with a synnematal *Lindquistia* anamorph. It deviates from *P. ingii* in having fawn-coloured immature stromata (vs white in *P. ingii*) originating from long filiform rhizomorphs in connection with buried seeds of *Beta vulgaris*. The paucity of data on *P. ingii* does not allow to assess whether the stromatal colour, the presence of rhizomorphs or the substrate are good diagnostic characters. For instance, in the closely related genus *Podosordaria*, the stromata of *P. tulasnei* (Nitschke) Dennis can feature long rooting stipes associated with brown rhizomorphs when they originate from buried droppings, while those occurring on superficial droppings are sessile or very short-stipitate and devoid of rhizomorphs (J. FOURNIER, personal observations). A character that both collections have in common is the presence of a sulphur yellow mycelium at the base of the stipes and on the rhizomorphs, but in absence of microscopic differential characters the status of the collection on *Beta* seeds remains unsolved until fertile material becomes available.

It is noteworthy that the recent collection of *P. ingii* illustrated herein occurred in La Gomera in January, just like the original collection. However, no conclusions about its ecology and its phenology can be drawn until many more collections that can be expected from other locations become available. This remains unfortunately true for most of species of *Poronia* and *Podosordaria*, which are either rare or easily overlooked.

## Acknowledgements

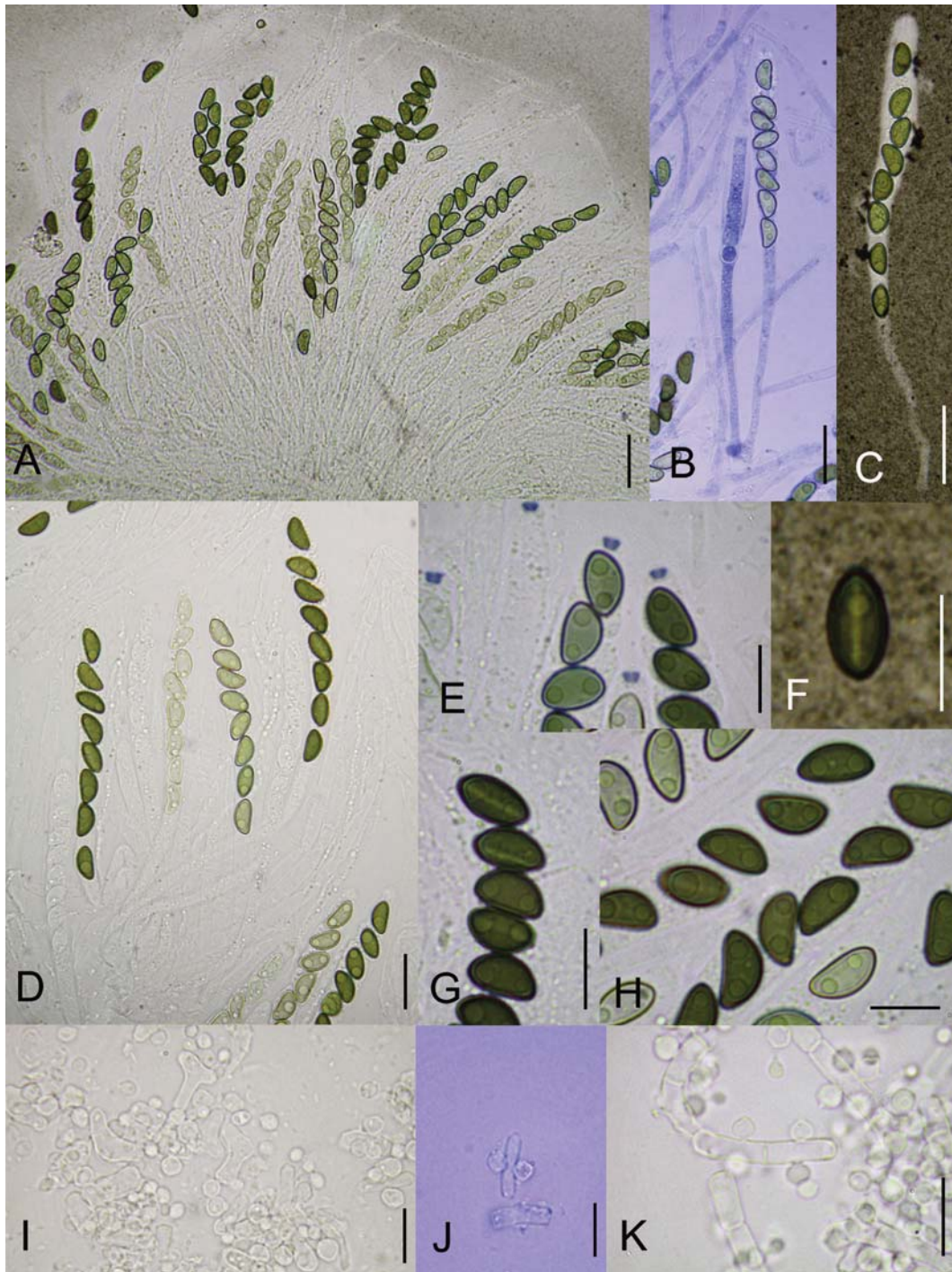
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### Plate 1 — Macroscopic characters of *Poronia ingii* MA-Fungi 80891

A: White mature stromata blackened in places by ascospores deposits. B, D: Close-up on stromatal surface showing wrinkles and papillate ostioles. C: Dissected fertile head showing the perithecial layer and the white interior. E: Close-up on the perithecial layer and the ostioles. Scale bars: A, 10 mm; B, C, 3 mm; D, E, 0.5 mm

### Plate 2 — Macroscopic characters of *Poronia* sp. MA-Fungi 80892

A: Fawn-coloured immature stromata associated with white *Lindquistia* anamorph (in situ). B: Stromata originating from long rhizomorphs in connection with buried seeds of *Beta vulgaris*. C: Detail of ovoid fertile heads and stipes. D: Dissected stromata showing the white interior. E: Sulphur yellow mycelium on the rhizomorphs. Scale bars: A, D, 10 mm; B, C, 5 mm; E, 1 mm.



**Plate 3** — Microscopic characters of *Poronia ingii* MA-Fungi 80891 (A-J) and *Poronia* sp. MA-Fungi 80892 (K).

A: Hymenium crushed in India ink, showing asci and paraphyses slightly embedded in mucilage. B: Ascus stained in blue ink. C: Ascus in India ink. D: Asci in 1% SDS. E: Ascus apical apparatus in Melzer's reagent. F: Ascospore in India ink, showing germ slit and absence of sheath or appendages. G, H: Ascospores in 1% SDS. I, K: Disarticulating conidiogenous hyphae and conidiogenous cells in 1% SDS. J: Conidiogenous hypha with two conidiogenous cells in blue ink. Scale bars: A-D: 20 µm; E-K: 10 µm.

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