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# Phylloblastia inexpectata (Verrucariaceae), a new species of foliicolous lichen from Western Europe and Madeira

#### Emmanuël SÉRUSIAUX, Brian J. COPPINS and Robert LÜCKING

**Abstract:** *Phylloblastia inexpectata* Sérus., Coppins & Lücking is a newly described foliicolous lichen, known from England, Scotland, Southern Italy and Madeira. It is distinguished from similar and related species by the absence of isidia and the smaller size of its ascospores. *Phylloblastia pocsii* is reported from Papua New Guinea for the first time.

Key words: England, Italy, Scotland, neotenic, Papua New Guinea, Phylloblastia pocsii, Pocsia.

#### Introduction

In his recent monograph of foliicolous lichens in the Neotropics, Lücking (2006) reassessed the characteristics and the delimitation of the genus Phylloblastia Vain., now assigned to the Verrucariaceae. The most diagnostic characters can be summarized as follows: thallus crustose but sometimes very minutely squamulose, ecorticate or with a thin, paraplectenchymatous cortex; discshaped to scutelliform isidia often present; photobiont a green undetermined alga with cells usually angular-rounded and in irregular groups or plates; perithecia sessile, hemispherical to subglobose, pale orange to black; paraphyses absent but periphyses typically present; asci fissitunicate; ascospores mostly 8 per ascus, oblong to cylindrical, transversally septate to muriform, without constrictions at the septa, colourless. Lücking (2006) follows the earlier assumptions of Lücking (1992) and McCarthy (1999) and reduces the genus Pocsia Vězda into synonymy with Phylloblastia as both genera share the most important characters of their perithecia, including hamathecium, asci and ascospores. The genus thus delimited comprises eleven species, all foliicolous in tropical and subtropical areas, the most conspicuous and well-known ones being P. amazonica Kalb & Vězda (Neotropics) and P. dolichospora Vain. (Paleotropics); both having a developed, microsquamulose thallus producing disc-shaped isidia, sessile and subglobose perithecia and cylindrical, usually spirally contorted, muriform ascospores that exceed 100 µm in length. Another related genus is Psoroglaena Müll. Arg., now also including Macentina Vězda and Leucocarpia Vězda (Harada 2003; Lücking 2006), a widespread genus with several species in Europe but no foliicolous representative so far outside the tropics. Psoroglaena is very close to Phylloblastia but apparently distinguished by its usually yellowish perithecia with a neck-like projection of the ostiolar area, a usually microsquamulose to filamentous, rarely crustose thallus, and more or less fusiform ascospores.

Quite unexpectedly, a recent survey of folicolous material from Europe and Macaronesia, which had been set aside as 'unknown taxa' for quite a long time, led to the discovery of a species of the genus

Emmanuël Sérusiaux: Plant Taxonomy & Conservation Biology Unit, University of Liège, Sart Tilman B22, B-4000 Liège, Belgium. eserusiaux@ulg.ac.be Brian J. Coppins: Royal Botanic Garden Edinburgh, Edinburgh EH3 5LR, U.K.

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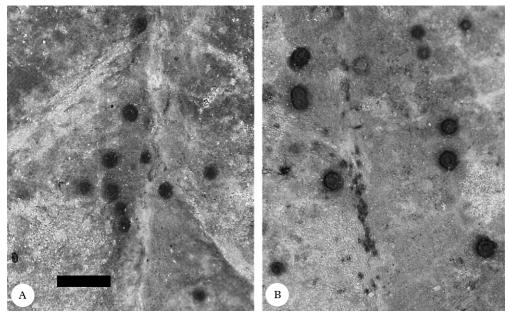


Fig. 1. Phylloblastia inexpectata, general habit. A, Scotland, B. J. Coppins 13118 (isotypus, LG); B, Madeira, v. 1992, E. Sérusiaux s. n. (LG). Scale=1 mm.

*Phylloblastia* which turned out to be new to science. This paper is dedicated to its description.

#### Methods

The material was examined in distilled water, in lactophenol cotton-blue (LCB; FLUKA Chemika 61335) or in Lugol's solution (IKI; Lugol solution SIGMA L-6146). The measurements always refer to material mounted in water.

#### The Species

#### Phylloblastia inexpectata Sérus., Coppins & Lücking sp. nov.

A speciebus generi cum 3-septatis ascosporis differt ascoporis fusiforme ellipticis  $14-16 \times 4 \cdot 5-5 \ \mu m$ .

Typus: Great Britain, Scotland, V.C. 74, Wigtownshire, Portpatrick, Dunskey Glen Woods, alt. c. 30 m, on living leaves of *Prunus laurocerasus* by stream, 21 iv 1989, *B. J. Coppins* 13118a (E—holotypus; LG—isotypus).

(Figs 1-3)

Thallus foliicolous, mainly developed along the main nerve of the leaves, very thin

and inconspicuous, brownish green or pale greyish green, often with a pinkish tinge, smooth (tiny soredioid granules sometimes present and interpreted as belonging to another unknown species), up to 5 mm across but usually much less, c. 15-25 µm thick; cortex formed of a single layer of horizontally arranged, cylindrical to irregular cells with rather rounded ends, measuring c.  $7-13 \times 5-7 \,\mu\text{m}$ , some of them forming irregular rows, typically present near the usually lacking elsewhere, perithecia, especially on margins of the thallus, or reduced to irregular rows of elongated cells. Photobiont cells green, mostly rounded, 5-10 µm diam., forming irregular rounded aggregates or plates, and intermixed with hyphae.

Perithecia sessile, hemispherical when young but soon depressed at their top and thus appearing as applanately wart-shaped, 0·1–0·15 mm diam. and less than 0·1 mm high, pinkish brown to almost black, sometimes with a darker reddish tinge around the ostiole, apparently laterally covered by a thin algal layer until fully mature. Excipulum

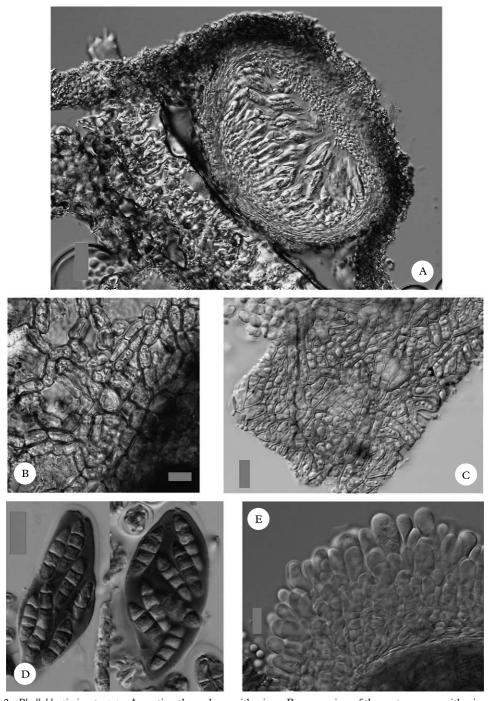


Fig. 2. *Phylloblastia inexpectata*. A, section through a perithecium; B, upper view of the cortex near perithecium; C, upper view of well-developed cortex; D, asci with mature ascospores; E, immature hymenium expelled from perithecium [A, B, D, E, Scotland, B. J. Coppins 13118 (isotypus, LG); C, Madeira, v. 1992, *E. Sérusiaux* s. n. (LG)]. All in lactophenol, except D in IKI. Scales: A=25 µm; B–E=10 µm.

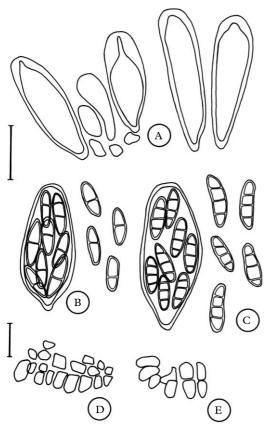


FIG. 3. *Phylloblastia inexpectata*. A, immature asci; B & C, asci and ascospores; D & E, periphyses. [A, B, E, Madeira, v. 1992, *E. Sérusiaux* s. n. (LG). C–D, Scotland, *B. J. Coppins* 13118 (isotypus, LG)]. Scales: A – C=20 μm; D & E=10 μm.

colourless, formed of compressed and vertically elongated hyphae,  $10-15\,\mu\mathrm{m}$  thick on lateral parts; outer wall well-developed, typically subparaplectenchymatous, pale to dark brown, up to  $20-25\,\mu\mathrm{m}$  thick. *Periphyses* always present, made of a layer of cells with a triangular-ovoid apex,  $c.~5\times3\,\mu\mathrm{m}$ . *Asci* clavate or obovoid,  $40-48\times c.15\,\mu\mathrm{m}$ , with a rather thin wall except at the apex, without any structure in the upper part, wall IKI – but protoplasma typically IKI+reddish brown. *Ascospores* 8 per ascus, fusiform-elliptical, the upper median and distal cells slightly clavate, with rounded ends, 3-septate, not constricted at the septa,

(10–)14–16 × (4–)4·5–5  $\mu m$ , protoplasma IKI+ reddish brown.

Pycnidia not found.

Remarks. Although it displays slight differences with the characteristics of the genus in having very short periphyses with a triangular-ovoid apex and non-cylindrical ascospores, this species falls within the genus Phylloblastia as circumscribed by Lucking (2006) because of its brown, applanate depressed perithecia with a characteristic wall structure. The periphyses reach at least  $10~\mu m$  in other species (up to  $50~\mu m$  in P. amazonica and P. dolichospora), and its ascopsores are narrowly elliptical and not typically cylindrical as in all other species (except for P. borhidii in which they are fusiform-ellipsoid).

other species have 3-septate ascospores: P. borhidii (Farkas & Vězda) Lücking and P. triseptata (Kalb & Vězda) Lücking. The principal diagnostic differences with P. inexpectata are the absence of isidia and the size of ascospores. Phylloblastia borhidii has been described from Tanzania (Farkas & Vězda 1987, sub Macentina borhidii) and has also been reported from the Neotropics (as Pocsia borhidii; Lücking & Kalb 2000). However, the latter populations differ by their smaller ascospores and might represent a separate taxon (Lücking 2006). The thallus of P. borhidii frequently produces scutelliform isidia, mostly on thalli lacking perithecia, and its ascospores measure  $18-23 \times 4.5-5 \,\mu\text{m}$   $(10-13 \times 2.5-$ 3.5 in the neotropical specimens). Phylloblastia triseptata has been described from Australia/Oueensland and New South Wales (Vězda & Kalb 1991, sub Pocsia triseptata). Its perithecia stand usually single on the centre of orbicular thalli and its ascospores are more cylindrical and slightly curved and measure  $24-26 \times 3.5-4 \mu m$ .

The septation and size of ascospores in the collections from Italy and Madeira differ somewhat from those found in the type from Scotland and in the collection from England. In the last two collections (as indicated in the description above), ascospores are typically 3-septate and measure

 $14-16 \times 4.5-5 \,\mu\text{m}$ . In the other two collections (Madeira and Italy), most 1-septate, and hardly reach c.  $12 \times 4 \mu m$ , and might be dispersed as such (in microscopic preparations in water, they are easily expulsed from the asci). We have been quite puzzled by such observations and thus examined 12 apparently mature perithecia in the collection from Madeira; we found 3-septate ascospores of the same size as those from the type in one of them. Such a phenomenon is not rare in foliicolous lichens, which are ephemeral and thus must produce and disperse their diaspores (in this case ascospores) as soon as possible, even in immature conditions. The differences in septation and size of ascospores are thus interpreted as the result of a neotenic phenomenon (development?).

Ecology and distribution. With the present material at hand, Phylloblastia inexpectata is known from distant localities: in Scotland and England (British Isles), in Southern Italy and in Madeira (Macaronesia). No doubt it is overlooked because of its inconspicuous thallus and tiny, flattened perithecia; it is easily mistaken for a non-lichenized fungus and will probably turn out to occur in other localities with a rich foliicolous lichen flora, such as the Western Pyrenees in France.

In Madeira, the species has been detected once, in rather well-developed conditions, on living leaves of Laurus azorica growing together with scattered thalli of Strigula nitidula and Tapellaria epiphylla. The foliicolous lichen flora of the laurisilva in Madeira is locally luxurint and includes very rare species endemic to Macaronesia such as Byssoloma kalbii, Strigula fossulicoloides and S. macaronesica (Roux & Sérusiaux 2004; Sérusiaux 1996).

In Italy, the species has been detected in small quantities in foliicolous material from the locality described in detail by Puntillo *et al.* (2000). This site is located at 150 m altitude in Campania, a region which experiences a typical mediterranean climate. It is a closed, mainly deciduous forest with a dense *Buxus* understorey in a deep gorge,

with almost permanent water-saturated air conditions which permit the development of luxuriant epiphytic bryophytes, a rich corticolous lichen flora with many suboceanic species and a surprisingly diverse foliicolous lichen flora, mainly on leaves of *Buxus sempervirens*. Indeed, 17 species of foliicolous lichens and their lichenicolous fungi are reported by Puntillo *et al.* (2000) and since then, the lichenicolous *Lambinonia strigulae* has been found in the same locality (Sérusiaux & Diederich 2005). *Phylloblastia inexpectata* also grows on living leaves of *Buxus sempervirens* in this locality.

The collection from Wigtownshire in south-west Scotland has been chosen as the type because it is well-developed, even though it was growing on living leaves of an introduced shrub species (Prunus laurocerasus). However, at this locality it was also found at the drip tip of a leaf of the native Hedera helix (Coppins 13118b). This locality is a coastal valley of mainly secondary woodland, but with a few older trees (Coppins & Gilbert 1990: 189). At the site in East Lothian in south-east Scotland, it also occurs on an introduced shrub, the invasive Rhododendron ponticum s. lat. This woodland, which is c. 3 km from the coast, was planted on open ground in 1707, felled in the 1940s and subsequently replanted with a wide variety of broadleaved and coniferous trees, both native and non-native. The English site in East Suffolk is a group of Buxus bushes at the west-facing edge of a boundary woodland around a parkland, c. 13 km from the coast.

The development of foliicolous lichens on several phorophytes outside their natural range is a well-known feature with this ecological group in Western Europe. It has been reported in other taxonomic groups, such as *Gyalectidium setiferum* which is known on needles of planted *Abies* in Brittany (France), *Strigula buxi* (France, on the southern shore of Lac Léman—type locality) and *S. nitidula* (Brittany/France) both of which are known on living leaves of planted *Buxus sempervirens* outside of its natural range (Puntillo et al. 2000; Roux & Sérusiaux 2004).

Additional specimens examined. Great Britain: England: V.C. 25, East Suffolk: Great Glenham, Glenham House, 62/346619, on leaves of Buxus sempervirens, 10 vi 2004, P. M. Earland-Bennett & C. J. B. Hitch s.n. (E, hb Hitch). Scotland: V.C. 74, Wigtowntownshire: as for holotype, on leaf of Hedera helix, Coppins 13118b (E). V.C. 82, East Lothian: Tyninghame, Binning Wood, 36/5980, alt. 15 m, on leaves of Rhododendron ponticum s.lat., 2005, B. J. & A. M. Coppins 21725 (E).—Italy: Campania, Salerno, Morigerati, grotta del Bussento, on leaves of Buxus sempervirens, 1997, D. Puntillo 10404 (CLU, LG).-Madeira: Châo do Louros, un peu au N du col d'Encumeada, laurisilve peu dégradée avec Laurus azorica, Persea indica, Clethra arborea, etc., alt. 800 m, sur feuilles de Laurus, v 1992, E. Sérusiaux s.n. (LG, hb Lücking).

#### Other report

During this study, material of the genus gathered from other parts of the world has been examined and it is interesting to report upon the occurrence of *Phylloblastia pocsii* (Farkas & Vězda) Lücking in Papua New Guinea. The species has been described (under *Macentina pocsii* Farkas & Vezda) from Tanzania and eastern RDC (Democratic Republic of Congo) by Farkas & Vezda (1993) and is thus probably a paleotropical taxon.

Specimen examined: **Papua New Guinea:** Madang prov., S side of Ramu river, Brahman Mission, c. 2–3 km W of Brahman Mission (5°45′S 145°20′E), 100 m, lowland forest regrowth after selective logging, on living leaves, 29 × 1995, *E. Sérusiaux* s.n. (LG) [Field expedition with A. Aptroot, P. Lambley & H. Sipman].

We wish to thank our colleague and friend Dr Domenico Puntillo for having made large and interesting collections of foliicolous lichens from southern Italy available to us. Also, Dr Chris Hitch for sending the material from Suffolk, and for information on the locality. We also appreciated the suggestions and comments of both referees (Dr H. Harada and an anonymous colleague).

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