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Fellhanera gyrophorica, a new European species with conspicuous pycnidia

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Abstract: *Fellhanera gyrophorica* Sérus., Coppins, Diederich & Scheidegger is described as new from Europe (Austria, Lithuania, Luxembourg, Poland, Switzerland and Ukraine). It is a sterile corticolous species with conspicuous and sometimes shortly stalked pycnidia whose outer walls produce gyrophoric acid. Its position in the genus *Fellhanera* (*Pilocarpaceae*) is tentative and further studies may necessitate its transfer to another genus.

Introduction

The genus *Fellhanera* Vězda is widely distributed in tropical, subtropical and temperate areas, with many foliicolous species. According to recent generic delimitations within the *Pilocarpaceae*, it is the most inclusive genus and forms the basis of the family as it supposedly exhibits most of the plesiomorphic character states (Lücking 1997; Lücking *et al.* 2001). The family so far includes the genera *Badimia* Vězda, *Bapalmuia* Sérus., *Byssoloma* Trevis., *Byssolecania* Vain., *Fellhanera* Vězda and *Fellhaneropsis* Sérus. & Coppins, but further genera should be distinguished in the forthcoming years (Kalb *et al.* 2000).

Details of the species included in the genus can be found in Vězda (1986), Lücking *et al.* (1994), Sérusiaux (1996), Lücking (1997) and Lücking *et al.* (2001).

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The continental European lichen flora includes the widespread and well-known *Fellhanera bouteillei* (Desm.) Vězda and *F. subtilis* (Vězda) Diederich & Sérus. *Fellhanera christiansenii* Sérus. & Vězda is restricted to Italy (Calabria) where it is quite rare (Puntillo *et al.* 2000). The recently described *F. viridisorediata* Aptroot *et al.* is known from Austria, Belgium, Germany, Wales, S Sweden and The Netherlands (Aptroot *et al.* 1998; Ekman & Arup 2000; Orange 1999; Spier & Aptroot 2000) while *F. ochracea* Sparrius & Aptroot has been found in Great Britain, The Netherlands and Switzerland (Sparrius & Aptroot 2000). A key to the species of W Europe is provided by Sparrius & Aptroot (2000). A further new species is described in this paper.

The Species

Fellhanera gyrophorica Sérus., Coppins, Diederich & Scheidegger sp. nov.

=*Fellhanera* sp. 1 in Diederich, P., *Trav. Sci. Mus. nat. hist. nat. Luxemb.* **14:** 102 (1989).
=*Fellhanera* sp. in Scheidegger, C. *et al.*, *Mitt. Aargau. Naturf. Ges.* **33:** 179 (1991).
=*Fellhanera* sp. in Diederich, P. & Sérusiaux, E., *The Lichens and Lichenicolous Fungi of Belgium and Luxembourg. An Annotated Checklist.* Musée national d'histoire naturelle, Luxembourg: 101, (2000).

FIG. 1. Thallus and pycnidia of *Fellhanera gyrophorica* on bark of *Carpinus* (photograph taken in the field by C. Scheidegger in Ukraine, Zhornava, 27 v 1998). Scale = 1 mm.

Species corticola semper sterilis, pycnidiis conspicuis, sessilibus vel breviter stipitatis (stipite usque ad 30 µm longo), pariete externo C+ rubro reagenti (acidum gyrophoricum continenti); conidia obpyriformia, raro ellipsoidea vel biclavata, 3–3·5 × 1–1·5 µm.

Typus: Austria, Steiermark, Oststeirisches Hügelland, Bezirk Feldbach, Gleichenberger Kogel, Steinbruch W des Kogels und nördliche Abhänge, 380 m, 19 March 1993, auf Borke von *Alnus glutinosa*, *B. Wieser* 1987 (GZU—holotype).

(Fig. 1)

Thallus corticolous, or invading corticolous mosses and liverworts, forming large and conspicuous patches up to 2–3 cm across, or streaks along the bark fissures up to 5–6 cm long, or dispersed and hardly seen amongst other crustose species or bryophytes and then quite indistinct, pale yellowish green to green, sometimes with a slight bluish tinge, made up of scattered to densely aggregated goniocysts and thus finely farinose or scurfy granular, rather thin or much thicker when well-developed and then granular-warted, rarely with a felt-like appearance, never smooth nor isidioid; margin ill-defined, without prothallus. *Photobiont* most probably a species of *Chlorococcaceae*, with green, spherical cells, 6–10(–12) µm diam.

Pycnidia always present, sessile or slightly stalked, sometimes aggregated in clusters, pinkish to pale orange-brown, with their outer wall slightly pruinose when well-developed and typically reacting C+ red because of production of gyrophoric acid (checked by TLC for several specimens, incl. the type), 0·1–0·25 mm diam., and up to 0·1–0·2 (–0·3) mm high; stalk indistinct or *c.* 20–30 µm in height; ostiole conspicuous, widely gaping or filled with a glut of conidia; cavity unilocular and lined with the conidiogenous layer; conidiophores made of hyaline, elongate cells; conidiogenous cells elongate or more typically slightly ampulliform, 3–7(–8) × 1·5–3·5 µm. *Conidia* acrogenous, unicellular, typically obpyriform,

or rarely ellipsoid or biclavate, (2·5–)3–3·5 (–4) × (0·7–)1–1·5 µm.

Observations. This species has been known to us for more than ten years and has been filed or even mentioned in several publications (Diederich 1989; Scheidegger *et al.* 1991; Diederich & Sérusiaux 2000) as a species of *Fellhanera*. Lack of ascomata of course precludes any final decision on its generic position. Now that we have studied collections from many countries in Europe and failed to find any published epithet for it, we have decided to publish it as new in the genus *Fellhanera*. Indeed, its pycnidia produce obpyriform conidia that are typical for many species of that genus, for example the so-called *F. subternella* group (Lücking 1997). Production of gyrophoric acid in the pycnidial walls is, however, somewhat divergent as the secondary metabolites so far detected in the *F. subternella* group include only zeorin, usnic and isousnic acids (Lücking *et al.* 1994), and no depsides nor depsidones; the recently described *F. viridisorediata*, however, is known to produce roccellic acid (Aptroot *et al.* 1998). The pycnidia of *Fellhanera gyrophorica* are sessile or shortly stalked; such a characteristic is so far unknown in the *Pilocarpaceae* except for the recently described and neotropical *F. pilomarginata* Lücking (Lücking 1997) whose conidiogenous layer is rather wide-exposed, making the conidiomata much closer in appearance to sporodochia than to genuine pycnidia.

Similar conidia are also known in the related *Byssoloma*, also a member of the *Pilocarpaceae*, and the placement of this new species in that genus could be contemplated. There is however no decisive argument for such a decision, and we have thus decided to maintain the first choice made more than ten years ago.

Remarkably similar in appearance to *F. gyrophorica* is *Micarea pycnidiophora* Coppins & P. James, which also has C+ red pycnidia (gyrophoric acid). However, the latter has longer, bacilliform conidia, 3·8–6 × 1–1·2 (–1·5) µm, a photobiont with smaller cells (4–7 µm diam.), and a more oceanic distribution. The related *M. stipitata* Coppins & P. James has C − pycnidia that are borne on often branched stalks, even larger conidia, 6–8 × 1–1·8 µm, and an even stronger oceanic distribution.

Several other European corticolous species frequently occur without ascomata, but with conspicuous pycnidia. Such species that might be confused with *F. gyrophorica* are listed below [none of these has pycnidia producing gyrophoric acid, and all species, except for *Fellhanera ochracea* and *Fellhaneropsis vezdae*, do not belong to the genera to which they are currently assigned and should eventually be moved elsewhere]:

Bacidia carneoglauca (Nyl.) A.L. Sm.—pycnidia white-pubescent, larger, 0·2–0·4 mm diam.; conidia oblong, *c.* 4–6 × 1·5 µm, and typically with a median constriction; thallus UV+ pink (xanthones); usually on rocks.

Bacidia viridifarinosa Coppins & James—like *B. carneoglauca* but pycnidia smaller, 0·15–0·26 mm diam., and thallus farinose sorediate; often on bark but also on rocks.

Bacidia trachona (Ach.) Lettau—pycnidia dark grey to bluish black, with walls that react K+ purple; conidia bacillar, 3–5 × 1–1·5 µm; thallus PD+ red (argopsin); usually on rocks.

Catillaria albida Coppins & Vězda—pycnidia white but typically pruinose and shortly stipitate; conidia bacillar or ellipsoid, 2·8–3·5(–3·8) × 0·8–1·2 µm.

Fellhanera ochracea Sparrius & Aptroot—pycnidia typically orange-brown and conidia also obpyriform but slightly longer (4–6 µm).

Fellhaneropsis vezdae (Coppins & P. James) Sérus. & Coppins—pycnidia pinkish brown, with filiform conidia (20–)30–43 × 0·5–1 µm; thallus generally thinner and smoother.

Lecidea doliiformis Coppins & P. James—pycnidia grey-brown to dark grey, with walls containing a brownish pigment reacting K − , N+ reddish brown, and an additional green pigment near the ostiole reacting K+ intensifying and N+ red; conidia oblong, 3·5–5 × 1·5–2 µm.

Distribution and ecology. Fellhanera gyrophorica has been found in Austria, Lithuania, Luxembourg, Poland, Switzerland and Ukraine, and thus appears to be a Central European species. So far it has not been found in the Western parts of Europe and is, for example, unknown in well-explored areas such as Scandinavia, Great Britain and the Pyrenees (France and Spain). It seems to be typical of well-preserved, rather shady and humid, broad-leaved forests at low elevations.

In the type locality, *Fellhanera gyrophorica* has been collected on several phorophytes, both deciduous (*Alnus*, *Fagus* and *Quercus*) and coniferous (*Picea*) trees, and associated species found with the specimens available include *Anisomeridium polypori*, *Graphis scripta*, *Lepraria lobificans*, *Loxospora elatina*, *Micarea prasina* and *Opegrapha vulgata*. In Luxembourg, the species is found close to *Arthonia vinosa* and *Lepraria lobificans*, and both localities where it has been found are considered to be forests with a long historical continuity (Diederich 1991). According to the detailed notes provided by A. Zalewska for the Polish locality, the Borecka Forest is an almost pristine forest, and associated species of *F. gyrophorica* are *Micarea prasina* and *Opegrapha vulgata*. In Switzerland most localities are in lowland, mixed deciduous forests with indigenous *Abies alba*. In these habitats *F. gyrophorica* is confined to stands with a rich epiphytic lichen flora (e.g. *Menegazzia terebrata*, *Fellhanera bouteillei*, *F. ochracea*, *F. subtilis*, *F. viridisorediata*, *Fellhaneropsis vezdae*, *Graphis elegans*, *Micarea adnata* and *Thelotrema lepadinum*), which indicates their high ecological continuity. Because of the strong bryophyte competition in the microhabitat occupied by *F. gyrophorica*, often very few accompanying lichen species are found with it. In the Ukrainian Carpathians *F. gyrophorica* has been found on young (*c.* 40 years old) *Carpinus betulus* with ubiquitous epiphytic bryophytes, liverworts and lichen species (e.g. *Frullania dilatata*, *Hypnum cupressiforme*, *Graphis scripta*, *Lepraria lobificans*, *Melanelia glabratula*, *Phlyctis argena* and *Pyrenula nitida*).

Specimens examined. **Austria:** *Oberösterreich*: Almtal, Almbrücke hinter Tierpark, alt. 570 m, on *Picea abies*, 1997, *F. Berger* 11261 (hb Berger). *Steiermark*: Oststeirisches Hügelland, Bezirk Feldbach, 2 km NW von Feldbach, Kornberger Teiche, auf Borke von *Quercus robur*, *Picea abies* und *Fagus sylvatica*, 1993, *B. Wieser* 1688 (checked by TLC), 1689, 1692 (checked by TLC) & 1988 (GZU).—**Lithuania:** *Trakai distr.*: Varniku forest, on trunk of *Quercus robur* in old pine-oak forest, 1998, *J. Motiejunaite* 3150 (BILAS, LG; checked by TLC); Viesvile strict nature reserve, quarter no. 60, area 9, on trunk of *Alnus glutinosa* in old alder-ash forest, 1998, *J. Motiejunaite* 3707 (BILAS).—**Luxembourg:** *Gutland*: NEE Haller, Halerbaach, sur *Quercus*, 1986, *P. Diederich* 7595 (hb Diederich); SE Beaufort, Haupeschbaach, sur *Quercus*, 1986, *P. Diederich* 7616 (hb Diederich).—**Poland:** *Suwatki distr.*: Borecka Forest (sg. 50), 'Lipowy Jar' reserve, old *Carpinus-Quercus-Tilia* (*Tilio-Carpinetum*), 1996, *A. Zalewska* 1356 (OLS; checked by TLC).—**Switzerland:** *Aargau*: Vordemwald, on *Fagus* in a mixed forest with *Abies alba*. *Quercus* sp. and *Fagus sylvatica*, one thallus found in ix 1990, gone in 1997 because of bryophyte competition, *C. Scheidegger* (hb Scheidegger). *Bern*: Därligen, on *Abies alba* in an old-growth *Abies-Fagus* forest along a gorge, 15 v 1999, *C. Scheidegger* (hb Scheidegger); Commune of Neuenegg, on *Fagus sylvatica* in a humid mixed forest, 30 v 1997, *C. Scheidegger* (hb Scheidegger) [the population has been damaged by the storm 'Lothar' on 26th December 1999]; Wachseldorn, on *Abies alba* in an *Abies* forest, 1996, *M. Frei* (G); Teufenthal, on *Abies alba* in a mixed *Picea abies* forest, 1998, *I. Roth & M. Frei* (G).—**Ukraine:** *Zakarpatska oblast*: Velyky Berezny distr.: Kostrino forestry, Nimetzky ['German'] stream, alt. *c.* 350 m, on trunk of large *Abies* by side stream, 1988, *B. Coppins et al.* 19274 (E, hb Scheidegger; checked by TLC); near village of Zhornava, Parashynsky stream, 370–400 m, on *Carpinus*, 1998, *B. Coppins et al.* 19275 (E, hb Scheidegger; checked by TLC).

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