

Studies in *Bacidia* sensu lato (lichenized Ascomycetes: Lecanorales). II. Six new combinations in *Fellhanera* Vězda

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Abstract: In the framework of ongoing studies on tropical representatives of *Bacidia* sensu lato, six species so far included in that genus are transferred to *Fellhanera*: *Fellhanera africana* (Vězda) Lücking comb. nov. (Bas.: *Bacidia africana* Vězda), *Fellhanera albidocincta* (Vain.) Lücking comb. nov. (Bas.: *Bilimbia albidocincta* Vain.), *Fellhanera fragilis* (Vězda) Lücking & Kalb comb. nov. (Bas.: *Bacidia fragilis* Vězda), *Fellhanera mastothallina* (Vain.) Lücking & Sérusiaux comb. nov. (Bas.: *Bacidia mastothallina* Vain.), *Fellhanera naevia* (Vain.) Lücking & Cáceres comb. nov. (Bas.: *Bacidia naevia* Vain.), and *Fellhanera submicrommata* (Vězda) Lücking & Kalb comb. nov. (Bas.: *Bacidia submicrommata* Vězda). *Fellhanera angustispora* Lücking is reduced into synonymy with *F. naevia*.

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Introduction

In the typological concept of Zahlbruckner (1921–1940), *Bacidia* made up one of the largest genera of crustose lichens, and this applied also to foliicolous representatives (Santesson 1952). Subsequent attempts to achieve a more natural classification resulted in the transfer of many species to newly established, often non-related genera (Vězda 1986, 1991; Ekman 1996). Of the more than 60 foliicolous species accepted in *Bacidia* sensu lato until recently (Vězda 1980; Sérusiaux 1993), only 18 are currently retained in this genus (Lücking *et al.* 2000). In the course of an ongoing revision of tropical representatives of *Bacidia* sensu lato (Kalb *et al.* 2000), we realized that none of these taxa belongs to *Bacidia* sensu stricto as defined by Hafellner (1984) and Ekman

(1996), and instead should be referred to the *Pilocarpaceae*. While new genera will be introduced for two distinct species groups (Lücking *et al.*, unpubl.), six taxa can be accommodated in the genus *Fellhanera* as circumscribed by Lücking (1997).

Fellhanera africana (Vězda) Lücking comb. nov.

Bacidia africana Vězda, *Folia Geobot. Phytotax.*, Praha, 10: 415 (1975); type: Tanzania, Pöcs 6397 (hb. Vězda—holotype!).

(Fig. 1A & B)

Diagnostic features. Thallus foliicolous, continuous, thin, smooth, pale greenish grey. Apothecia very rare, adnate, rounded to irregular in outline, 0.3–0.4 mm diam.; disc orange, slightly convex; margin thin, chamois-coloured. Excipulum prosoplectenchymatous. Hypothecium yellowish. Paraphyses slightly branched. Asci of the *Byssoloma*-type. Ascospores 3-septate, oblong, 14–16 × 2–3 µm. Conidiomata pycnidia, flask-shaped, chamois-coloured, with an up to 1 mm long beak; conidia simple, oblong-bacillar, *c.* 2 × 1 µm.

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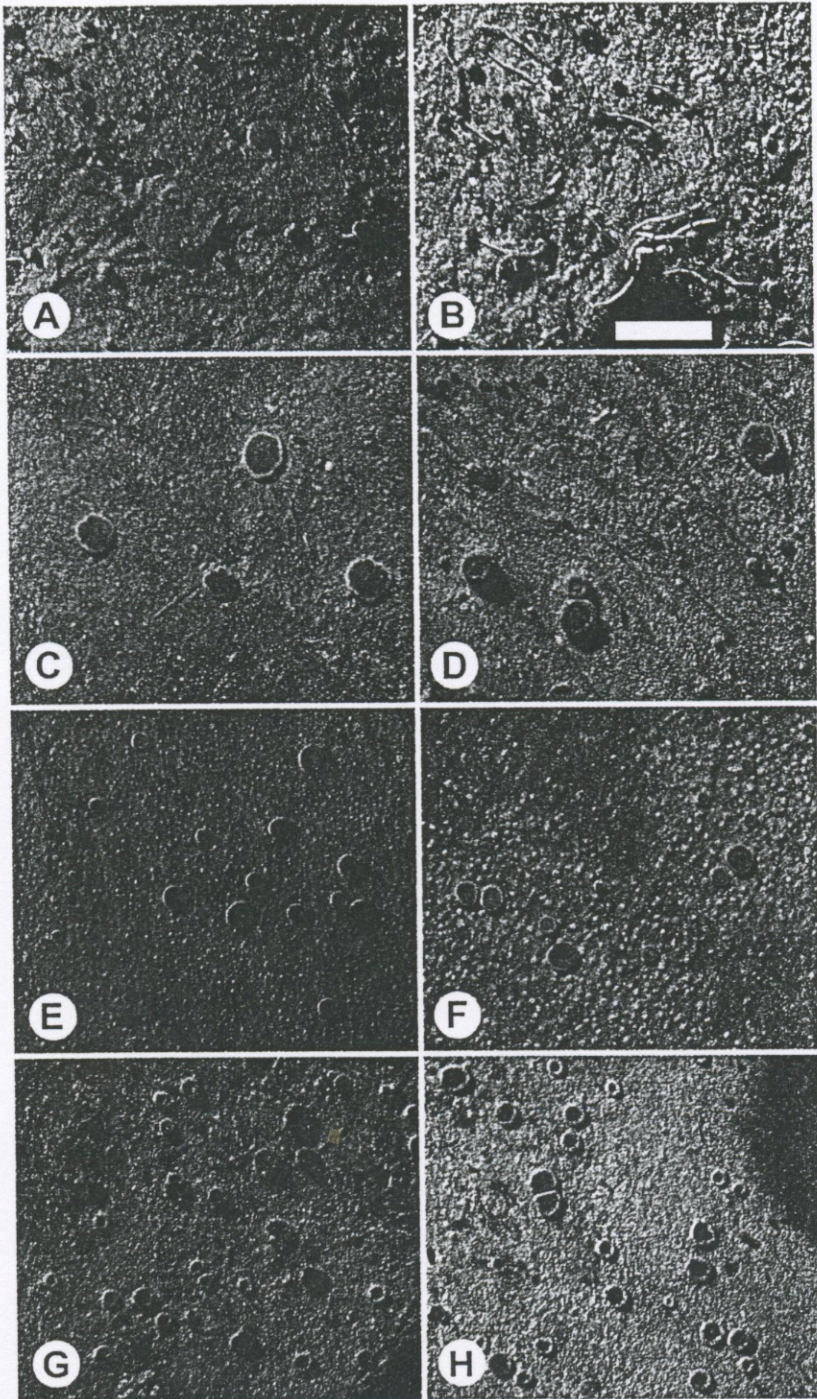


FIG. 1. *Fellhanera* species. A & B, *F. africana*, B with pycnidia (holotype); C, *F. albidocincta* (holotype); D, *F. fragilis* (holotype); E & F, *F. mastothallina* (E, Papua New Guinea; F, New Caledonia); G & H, *F. submicrommata* (G, holotype; H, Guyana). Scale = 1 mm.

Notes. *Fellhanera africana* is quite an enigmatic lichen whose taxonomic affinities are difficult to establish. Externally its apothecia are similar to those of *Byssoloma minutissimum* Kalb & Vězda, and its ascus-type demonstrates that it does belong to the *Pilocarpaceae*. However, none of the genera currently accepted in this family fits perfectly. Except for the *Byssoloma*-like appearance, the excipular structure points to *Fellhaneropsis*, while the conidia are of the same type as found in *Bapalmuia*, *Byssolecania* and the *Fellhanera fuscata* group (Lücking 1997). Flask-shaped, beaked pycnidia are rare among foliicolous lichens but widespread in other groups of lichens; they are found in the Ostropales (e.g. *Psorotheciopsis*) and Gyalectales (e.g. *Coenogonium*), but also in the *Pilocarpaceae*, for example *Fellhanera vandenberghenii* (Sérus.) Vězda (Santesson 1952; Sérusiaux 1983; Lücking 1999). As with *F. albidocincta* (see below), we refrain from establishing a separate genus for this taxon and instead refer it to *Fellhanera*, which we consider the most inclusive genus in the *Pilocarpaceae* (Lücking 1997).

Additional specimens examined. **Democratic Republic of Congo:** Kivu: Irangi, INRS Reserve, 850 m, foliicolous, 1978, Lambinon 78/262 (LG).—**Papua New Guinea:** Madang: Brahman Mission, S of Ramu river, lowland forest regrowth after selective logging, foliicolous, 1995, Sérusiaux 15805 (LG).

***Fellhanera albidocincta* (Vain.)
Lücking comb. nov.**

Bilimbia albidocincta Vain., *Ann. Acad. Sci. Fenn.*, ser. 1, 15: 84 (1921).—*Bacidia albidocincta* (Vain.) Zahlbr., *Catal. Lich. Univ.* 4: 99 (1926); Santesson, *Symb. Bot. Ups.* 12: 469 (1952); type: Philippines, Robinson s.n. (TUR-Vainio 21560—holotype!).

(Fig. 1C)

Diagnostic features. Thallus foliicolous, thin, continuous to irregularly dispersed, smooth, pale greenish to brownish grey. Apothecia sessile, rounded, 0.3–0.5 mm diam.; disc orange-brown to brown, flat to slightly convex; margin distinct, persistent, chamois-coloured, with a finely pilose surface. Excipulum encrusted with colourless

crystals; after dissolving the crystals in KOH, its internal parts appear paraplectenchymatous, while external parts are composed of short hyphae with cylindrical to slightly inflated cells. Hypothecium brownish. Paraphyses branched and anastomosing. Asci of the *Byssoloma*-type. Ascospores 3-septate, oblong-ellipsoid, 12–16 × 3–4 µm. Conidiomata unknown.

Notes. Santesson (1952) considered *Bilimbia albidocincta* Vain. and *B. annua* Vain., both established in the same paper (Vainio 1921), to be conspecific and adopted the former epithet for a species apparently restricted to tropical Asia. Its status remained unclear until we examined the type material of *Bilimbia albidocincta* and *B. annua*, and several recent collections from tropical Africa, Asia and Australia.

Bilimbia annua is characterized by a pale bluish grey thallus and small, yellowish apothecia with a thin, compact margin with a finely byssoid surface. The exciple is encrusted with colourless crystals and, after application of KOH, dissolves almost completely into free hyphae with cylindrical cells. This taxon is conspecific with two recently described species in the genus *Byssoloma*, *B. dimerelloides* Sipman & Aptroot and *B. clauzadei* Kalb & Vězda, and the new combination *Byssoloma annuum* (Vain.) Thor, Lücking & Matsumoto has been introduced for it (Thor et al. 2000).

The type material of *Bilimbia albidocincta* is not very well-developed. However, other collections gave us a better understanding of the range of variation of this taxon. *Bilimbia albidocincta* differs from *B. annua* by the absence of a bluish tinge in the thallus, the larger apothecia with orange-brown to brown disc and thicker margin, and the internal structure of the exciple. As in the latter species, it is encrusted with crystals, but its inner parts remain paraplectenchymatous after application of KOH, while only the outer parts consist of free hyphae. We are therefore convinced that *B. albidocincta* represents a distinct taxon. On the other hand, its generic position is uncertain. While the partly byssoid exciple

suggests placement in *Byssoloma* (a similar excipular structure is known in *B. syzygii* Vězda & Vivant), the inner paraplectenchymatous part is more typical of *Fellhanera*. Lücking (1997) proposed that unless sound arguments justify the establishment of separate genera, such transitional species should be referred to the phylogenetically more inclusive genus, which is believed to be *Fellhanera* (Lücking 1997).

Additional specimen examined. South Africa: Henssen 28248 (hb. Henssen).

***Fellhanera fragilis* (Vězda) Lücking & Kalb comb. nov.**

Bacidia fragilis Vězda, *Folia Geobot. Phytotax.*, Praha, 10: 417 (1975); type: Tanzania, Pócs 6476 (hb. Vězda—holotype!).

(Fig. 1D)

Diagnostic features. Thallus foliicolous, continuous, smooth, pale brownish grey. Apothecia sessile, rounded, 0.5–0.6 mm diam.; disc dark brown, flat to very slightly convex; margin distinct, persistent, chamois-coloured. Excipulum typically paraplectenchymatous. Hypothecium reddish brown, K+ purplish. Paraphyses branched and anastomosing. Asci of the *Byssoloma*-type. Ascospores (7–)11–15(–19)-septate, cylindrical, 35–55 × 3–5 µm, often broken into parts. Conidiomata unknown.

Notes. The relationships between this taxon and *Bacidia brasiliensis* (Müll. Arg.) Zahlbr. on one hand, and the group of species eventually separated as *Fellhanera* on the other, were discussed by Vězda (1975a). Initially, we considered *Bacidia fragilis* to be more closely related to the *Bacidia brasiliensis*-aggregate than to *Fellhanera sensu stricto*. However, the comparatively broad ascospores and the branched and anastomosing paraphyses justify its inclusion in *Fellhanera*. Indeed, this species seems to be the extreme of a series of species with an increasing number of ascospore septa, ranging from *F. misionensis* Ferraro & Lücking (1-septate), *F. rhapsidophylli* (Rehm) Vězda (3-septate), *F. subfuscatula* Lücking (5-

septate), *F. fuscatula* (Müll. Arg.) Vězda (7-septate), *F. longispora* Lücking (7–11-septate), and *F. fragilis*. A particular feature of the latter species is the K+ purplish hypothecium, which is not observed in the other species mentioned.

Additional specimen examined. Kenya: Coastal Province: Kwale District, Shimba Hills, 4°19'S, 39°21'E, 300 m, foliicolous, ix 1985, Kalb & Schrögl s.n. (hb. Kalb).

***Fellhanera mastothallina* (Vain.) Lücking & Sérus. comb. nov.**

Bacidia mastothallina Vain., *Ann. Acad. Sci. Fenn. ser. A*, 15: 64 (1921); Santesson, *Symb. Bot. Ups.* 12: 451 (1952).—*Bacidina mastothallina* (Vain.) Vězda in Vězda et al., *Ann. Naturh. Mus. Wien* 99B: 738 (1997); type: Philippines, Robinson & Ramos 11900 (TUR—holotype!).

(Fig. 1E & F)

Diagnostic features. Thallus foliicolous, continuous, verrucose, pale greenish to brownish grey; verrucae pale brownish to orange-red, filled with ochraceous brown crystals. Apothecia sessile, rounded, 0.3–0.5 mm diam.; disc dark brown, flat to very slightly convex; margin thin but usually persistent, pale grey. Excipulum encrusted with colourless crystals; after dissolving the crystals in KOH, internal parts appear para- and external parts proso-plectenchymatous. Hypothecium dark brown. Paraphyses simple to slightly branched. Asci of the *Byssoloma*-type. Ascospores 7-septate, cylindrical, 22–32 × 3–4 µm. Conidiomata unknown.

Notes. *Fellhanera mastothallina* is a very characteristic species, being widespread in tropical Asia and often locally abundant. Santesson (1952) makes no statements about its relationships, and Vězda (in Vězda et al. 1997) gives no reason why he referred this taxon to *Bacidina* Vězda. The asci clearly belong to the *Byssoloma*-type, and the general appearance of the species is very much that of a genuine *Fellhanera*, although some anatomical features, i.e. the proso-plectenchymatous outer exciple and the almost simple paraphyses, do not completely

coincide with typical representatives of the genus.

Selected specimens examined. **Indonesia:** Bali: Alas Kedadung near Kuku, foliicolous, i 1989, Schumm s.n. (hb. Schumm).—**Papua New Guinea:** Madang: Balek Wildlife Reserve (near Madang), 20 m, foliicolous, 1992, Sérusiaux 13555-49 (LG).—**Australia:** Queensland: Wooroonooran National Park, Josephine Falls, 17°26'S, 145°52'E, 70 m, 1998, Streimann & Mischler 61652 (CANB).—**New Caledonia:** Sud: Monts Koghis-Dumbéa, 22°14'S, 166°30'E, 550 m, foliicolous, viii 1994, Kalb & Kalb s.n. (hb. Kalb).

***Fellhanera naevia* (Vain.) Lücking & Cáceres comb. nov.**

Bacidia naevia Vain., *Ann. Acad. Sci. Fenn., ser. A*, 15: 66 (1921); type: Philippines, Robinson 18221 (TUR—holotype, not seen; F—isotype!).

Fellhanera angustispora Lücking, *Trop. Bryol.* 13: 143 (1997); type: Costa Rica, Lücking 91-4932 (ULM—holotype!).

Diagnostic features. Thallus foliicolous, continuous, smooth to minutely farinose, pale greenish to yellowish grey. Apothecia sedentate, rounded to slightly irregular in outline, 0.15–0.3 mm diam.; disc dark brown, convex; margin absent. Excipulum indistinct. Hypothecium dark brown. Paraphyses branched and anastomosing. Asci of the *Byssoloma*-type. Ascospores 3-septate, narrowly fusiform to almost bacillar, 10–16 × 2–3 µm. Conidiomata unknown.

Notes. Santesson (1952) studied the holotype material of *Bacidia naevia* and found it too scanty to reach any conclusions about its status and affinities. The epithet remained a *nomen dubium* until we came across a part of the type collection housed in the Field Museum of Natural History in Chicago (F). Apparently, this and other type material of species described by Vainio came into the herbarium with the incorporation of the A. Herre collection. The isotype material of *Bacidia naevia*, which also includes an isotype of *Bilimbia iloilensis* Vain. (= *Byssoloma annuum*, see Thor et al. 2000), is well-developed and represents the same species that was recently described as *Fellhanera angustispora* (Lücking 1997).

***Fellhanera submicrommata* (Vězda) Lücking & Kalb comb. nov.**

Bacidia submicrommata Vězda, *Acta Mus. Silesiae, Opava, ser. A*, 24: 124 (1975); type: Guinea, Lisowski 1169 (hb. Vězda—holotype!; UPS—isotype!).

(Fig. 1G & H)

Diagnostic features. Thallus foliicolous, continuous, smooth to minutely farinose, pale bluish grey. Apothecia sessile, rounded, 0.3–0.4 mm diam.; disc blackish brown, flat to slightly convex; margin thin, in old apothecia disappearing, chamois-coloured to pale grey. Excipulum encrusted with colourless crystals; after dissolving the crystals in KOH, its internal parts appear paraplectenchymatous while its external parts are composed of short hyphae with globose cells. Hypothecium dark brown. Paraphyses branched and anastomosing. Asci of the *Byssoloma*-type. Ascospores 3-septate, oblong-ellipsoid, 12–18 × 4–5 µm. Conidiomata pycnidia; conidia simple, pear-shaped, c. 3 × 1 µm.

Notes. Vězda (1975b) considered this species to be closely related to *Bacidia micrommata* (Kremp.) R. Sant., differing by its smooth instead of verrucose thallus. We examined a number of specimens referable to *B. submicrommata* and came to the conclusion that there are additional differences, in particular the smaller apothecia with flat to slightly convex disc and thin, evanescent margin, the rather indistinct paraphyses with gelatinous walls, and the pear-shaped conidia. These features point to a relationship with *Fellhanera*, particularly with the *F. stanhopeae*-aggregate (Lücking 1997). In fact, *Bacidia submicrommata* is externally identical with *Fellhanera sublecanorina* (Nyl.) Vězda, differing only in the crystalline exciple. Both seem to form sister taxa, similar to the pair *F. stanhopeae* (Müll. Arg.) Lücking, Lumbsch & Vězda and *F. lambinonii* (Sérus.) Lücking & Sérus. (Sérusiaux 1996). *Fellhanera submicrommata* also occurs in the Neotropics, but specimens were previously referred to *F. sublecanorina* by us. Also similar is *Byssoloma anomalum*

Kalb & Vězda, but this species has ochraceous yellow crystals in the exciple, which is composed of hyphae with cylindrical cells.

Additional specimens examined. **Guyana:** *Upper Takutu:* Kuyuwini Landing, 40 km S of Aishalton, 2°06'N, 59°15'W, 230 m, foliicolous, 1992, Sipman 36921, 36922 (B).—**Peru:** *San Martín:* Tarapoto, 6°30'S, 76°20'W, 350–500 m, foliicolous, iii 1981, Santesson & Thor s.n. (UPS).

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