The Lichenologist **41**(6): 615–625 (2009)
doi:10.1017/S0024282909990107

A revision of the lichen genus *Stirtonia*

André APTROOT

Abstract: The lichen genus *Stirtonia* has been revised. Thirteen species are accepted in the genus, including three new to science, viz. *S. curvata* from Irian Jaya and Java, *S. schummii* from the Seychelles and *S. neotropica* from Costa Rica and the Dutch Antilles. The known range of the genus is extended from Asian to pantropical. The genus is most diverse in the palaeotropics.

Key words: *Arthoniaceae*, Costa Rica, *Cryptothecia*, Dutch Antilles, Irian Jaya, Java, Seychelles

Introduction

The genus *Stirtonia* A. L. Sm. comprises inconspicuous, little-studied elements of the lichen flora in the tropics. Only 18 species have been validly described, 12 of which are accepted in the monograph of the genus (Makhija & Patwardhan 1998). Since then, two additional species have been described from Thailand and Indonesia by Wolseley & Aptroot (2009). Fewer than a dozen publications exist that record species of *Stirtonia*, and these include precursors to the aforementioned monograph (e.g. Makhija & Patwardhan 1987, 1994). Furthermore, most of the publications refer only to the foliicolous species that are now classified in the genera, *Amazonomyces* Bat. and *Eremothecella* Syd. (see Lücking 2008).

Stirtonia is characterized by the absence of a true hamathecium between the round asci, which produce thick-walled trans-septate ascospores. The absence of a hymenium can be best observed at the upper level where the densely anastomosing hyphae peter out and do not form an epihymenium of a different texture or colour. The interascal hyphae are not glued together and are never held in a hymenial gel. The ascigerous areas usually do contain crystals, and sometimes also algal cells. The asci are generally round to ovoid and contain mostly 8 ascospores that are only transversely septate and, at least initially, hyaline. The asci are thus formed in ascigerous areas, not in apothecia in the strict sense. These ascigerous areas can be very similar to the thallus, but can also differ markedly and become convex and/or pruinose or lirelline, and can even be surrounded by a margin of a different colour, for example, when the ascigerous areas break through the thallus. These structures do resemble apothecia and these species are distinguished from *Arthonia* by the absence of a gelatinous hymenium. The genus *Stirtonia* was lectotypified by Makhija & Patwardhan (1998) with *S. obvallata* (Stirt.) A. L. Sm.

The genus is close to *Cryptothecia* Stirt. in its key characters except for the muriform ascospores in that genus. There are no intermediate taxa known and it seems unlikely that the two genera are different developmental stages of the same lineage. However, in the absence of a phylogenetic study, it is not known whether both genera, as currently circumscribed, do or do not present monophyletic groups.

The different species of *Stirtonia* are mainly characterized by the thallus structure, crystals, colour and iodine reaction, and the colour, crystals, algae, iodine reaction and shape of the ascigerous areas, and ascospore size and septation and the absence or presence of a distinctly enlarged upper cell.

A. Aptroot: ABL Herbarium, Gerrit van der Veenstraat 107, NL–3762 XK Soest, The Netherlands. Email: andreaptroot@wanadoo.nl

The present paper provides a key to and a short description of all the accepted species. Type specimens have been studied of nearly all species and special attention paid to the following characters: chemistry, organization of the ascigerous areas, presence of calcium oxalate or other crystals in the thallus and ascigerous areas, and iodine reactions of the tissues. Illustrations already given in Makhija & Patwardhan (1998). Ascospore drawings and habitus pictures of most species, are not repeated.

Material and Methods

Identification and descriptive work was carried out at the Adviesbureau voor Bryologie en Lichenologie in the Netherlands and at the Natural History Museum, London, using an Olympus SZX7 stereomicroscope and an Olympus BX50 compound microscope with interference contrast, connected to a Nikon Coolpix digital camera. The materials are preserved in ABL, AMH, B, BM, L, NY and hb. Schumm. TLC was performed using the solvent TDA, and in some instances also HEF.

Key to the species of *Stirtonia*

1 Ascigerous zones mostly rounded, often raised above thallus level; ascospores always with thickened septa and wall, never with an enlarged end cell 2
Ascigerous zones linear, branched or anastomosing, usually not raised above thallus level; ascospores not always with thickened septa and wall, sometimes with enlarged end cell 7

2(1) Thallus Pd+ yellow, with psoromic acid 3
Thallus Pd−, without psoromic acid 4

3(2) Ascospores 50–60 µm long; ascigerous zones >1 mm wide . . . . . **S. indica**
Ascospores 75–87 µm long; ascigerous zones <1 mm wide . . . . . **S. psoromica**

4(2) Ascospores 36–45 µm long . . . . . **S. schummii**
Ascospores 45–100 µm long 5

5(4) Thallus UV+ white, with 2′-*O*-methylsuperphyllinic acid; ascospores 85–110 µm long . . . . . **S. alboverruca**
Thallus UV−, with 2′-*O*-methylperlatolic acid, without substances or with terpenoids; ascospores 45–100 µm long 6

6(5) Thallus whitish, with 2′-*O*-methylperlatolic acid; ascigerous zones raised . . . . . **S. macrocarpa**
Thallus brownish, without substances or with terpenoids; ascigerous zones not raised . . . . . **S. obvallata**

7(1) Thallus felty; ascospores 2–3-septate, septa and wall not thickened . **S. biseptata**
Thallus smooth; ascospores 4–15-septate, septa and wall thickened 8

8(7) Ascospores with enlarged upper cell 9
Ascospores without enlarged upper cell (except in immature ascospores) 10

9(8) Thallus whitish, with perlatolic acid . . . . . **S. alba**
Thallus brownish, without substances . . . . . **S. santessonii**

10(8) Ascospores 15–30 µm long; ascigerous zones inconspicuous . . . . . **S. dubia**
Ascospores 35–65 µm long; ascigerous zones usually conspicuous 11

11(10) Ascospores 4–6-septate; ascigerous zones pale anastomosing lines . . **S. ramosa**
Ascospores 7–11-septate; ascigerous zones different 12

12(11) Thallus and ascigerous zones C−, with calcium oxalate crystals; ascigerous area IKI+ violet above, IKI+ blue at the base . . . . . **S. curvata**

Thallus and ascigerous zones partly C+ red, without calcium oxalate crystals; ascigerous area IKI− . . . . . **S. neotropica**

The Species

Stirtonia alba Makhija & Patw.

Mycotaxon **67:** 296 (1998); type: Indonesia, Java, Bay of Serang, S. of Blitar, on tree, January 1959, *Groenhart* 691 (L—holotype!).

(Fig. 2A)

Thallus spreading, covering an area of up to 10 cm diam., contiguous, smooth, dirty whitish, less than 0·1 mm thick, lightly shiny, with calcium oxalate crystals, IKI+ blue.

Ascigerous zones delimited, lirelliform, irregularly stellately branched, *c*. 0·1–0·2 mm wide, up to 1·5 mm long, not raised, pale brown, not pruinose, not dotted, with calcium oxalate crystals, without algal cells, IKI+ blue. *Asci* invisible in surface view, globose to ovoid, with 8 ascospores. *Ascospores* 4–5-septate, ellipsoid, 38–60 × 14–22 µm, upper cell largest, walls and septa >1 µm thick.

Chemistry. Perlatolic acid present (TLC). Thallus and ascigerous zones C−, Pd−, KOH−, UV−.

Stirtonia alboverruca Makhija & Patw.

Biovigyanam **13:** 48 (1987); type: India, South Andaman, Chidya Tapu, 15 February 1985, *Patwardhan & Nagarkar* (AMH 85.476—holotype).

Thallus spreading, covering an area of up to 5 cm diam., contiguous, smooth, dirty whitish, less than 0·1 mm thick, lightly shiny.

Ascigerous zones delimited, round to slightly elongated in outline, raised, always higher than the thallus, white, pruinose, inconspicuously dotted when abraded, with large crystals, without algal cells. *Asci* visible as pale brown dots in surface view, globose to ovoid, with 8 ascospores. *Ascospores* 11–15-septate, ellipsoid, 85–110 × 40–45 µm, cells generally equal, walls and septa >1 µm thick.

Chemistry. 2′-*O*-methylsuperphyllinic acid present (TLC). Thallus and ascigerous zones C−, Pd−, KOH−, UV+ white.

Stirtonia biseptata Aptroot & Wolseley

In Wolseley & Aptroot, *Bibliotheca Lichenologica* **99:** 418 (2009); type: Thailand, Uthai Thani Prov., Khao Nang Rum, Viewpoint track, 12 January 1992, *Wolseley & Aguirre-Hudson* 4249 (BM—holotype!).

(Fig. 1A)

Thallus spreading, covering an area of up to 5 cm diam., contiguous, felty, pale olivaceous green, 0·1–0·2 mm thick, flaking off in one vellum, dull, without calcium oxalate crystals, but densely encrusted with tiny crystals, presumably of psoromic acid, IKI−.

Ascigerous zones delimited, linear to branched in outline, anastomosing to form a net of several cm, not raised, white, not pruinose, conspicuously pink dotted, without calcium oxalate crystals, but densely encrusted with tiny crystals, presumably of psoromic acid, without algal cells, IKI+ violet. *Asci* in surface view pink, ovoid, with 8 ascospores. *Ascospores* 2–3-septate, fusiform, 15–17 × 5–6 µm, cells generally equal, walls and septa <1 µm thick.

Chemistry. Psoromic and conpsoromic acids present (TLC). Thallus and ascigerous zones C−, Pd+ yellow, KOH−, UV−.

Note. This species is the most deviant currently accepted in the genus, characterized by the felty thallus and thin ascospore wall and septa.

Additional specimens examined. **Marshall Islands:** Ujae Atoll, Bock islet, on dead coconut tree, 1952, *Fosberg* 34370 (L!).—**Indonesia:** Java, Bay of Nglijep, S of Donomuljo, 1937, *Groenhart* 1454 & 7275 (L!); Cibodas, Mt. Gede, Pantjuran Mas., 22 iv 1050, *Nurta & Madrodji* (L!).

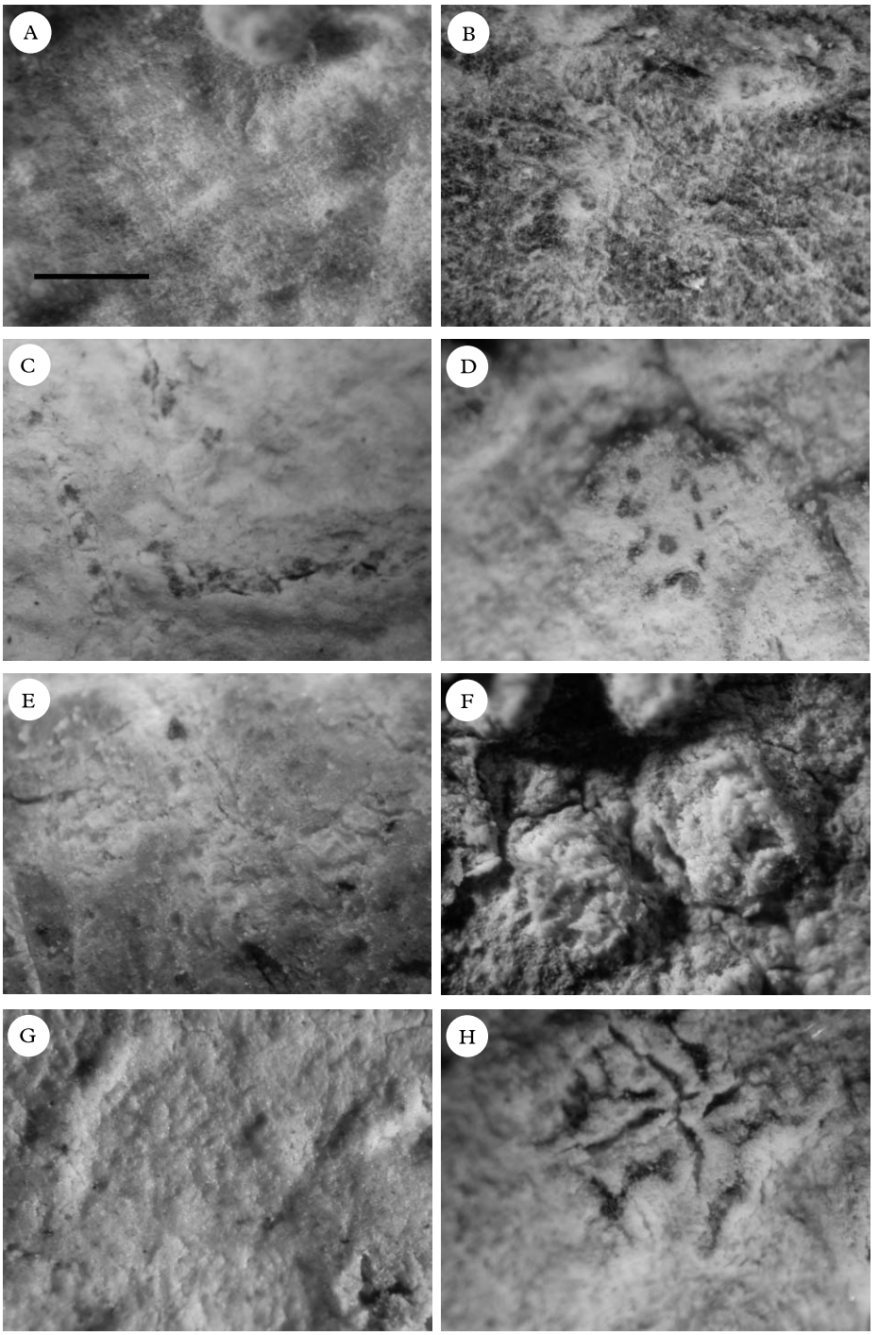

FIG. 1. *Stirtonia* species, habitus. A, *S. biseptata* (holotype); B, *S. curvata* (*Groenhart* 9555a, L); C, *S. neotropica* (isotype, B). D, *S. macrocarpa* (isotype, ABL); E, *S. obvallata* (holotype of *S. mellea*); F, *S. psoromica* (holotype) G, *S. ramosa* (isotype, ABL); H, *S. santessonii* (isotype, ABL). Scale (all to same scale) = 0·5 mm.

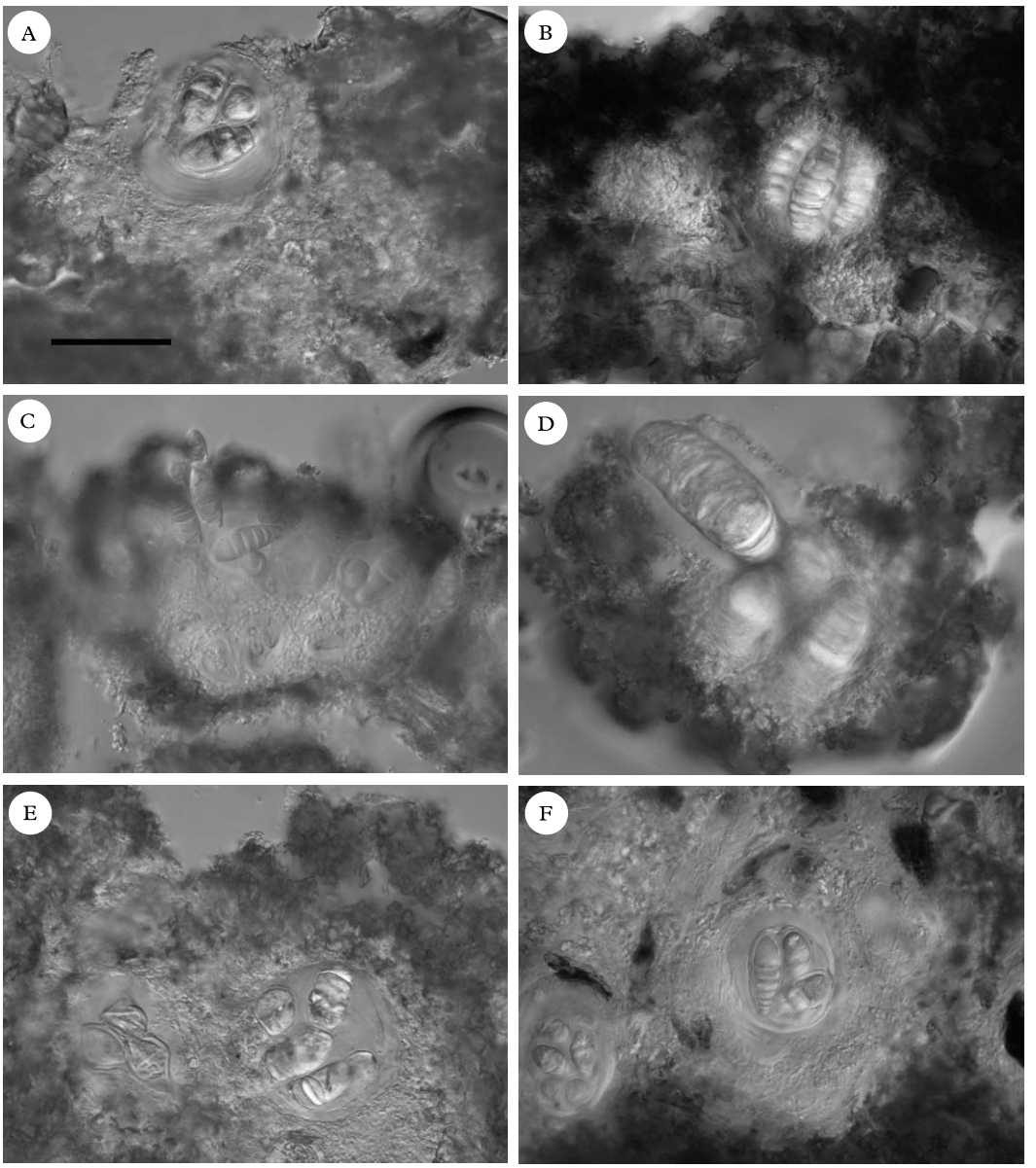

FIG. 2. *Stirtonia* species, sections through ascigerous areas. A, *S. alba* showing ascigerous area with calcium oxalate crystals and ascospores with enlarged end cells (holotype); B, *S. curvata* in IKI, showing 4-spored ascus and blue coloration in lower parts and around the asci and a violet reaction in upper part (bottom: bark cells) (holotype); C, *S. neotropica* showing dark tiny crystals above the asci (isotype, B); D, *S. obvallata* showing large ascospores and algal cells in ascigerous area (holotype of *S. mellea*); E, *S. ramosa* (isotype, ABL); F, *S. santessonii* showing ascospores with enlarged end cells (isotype, ABL). All in tap water except B which is in IKI. Scale = 50 μm (all to same scale).

Stirtonia curvata Aptroot sp. nov.

Stirtonia areis ascigeris lirelliformis thallo acidis perlatolicis continens.

Typus: Indonesia, Irian Jaya, Manokwari, *c.* 2 m alt., February 1959, *W. Vink* s.n. (L—holotypus!).

(Figs 1B & 2B)

https://doi.org/10.1017/S0024282909990107 Published online by Cambridge University Press

Thallus spreading, covering an area of up to 5 cm diam., contiguous, smooth, whitish yellow to brownish, less than 0·1 mm thick, shiny, with calcium oxalate crystals, IKI−.

Ascigerous zones delimited, angular to linear, branched or not, *c.* 0·1–0·2 mm wide, up to 1 mm long, erumpent, slightly raised, white, somewhat byssoid, not pruinose, erumpent, conspicuously red-brown or black dotted when abraded, with calcium oxalate crystals, without algal cells, IKI+ blue at the base and around the asci, upper layer IKI+ violet. *Asci* in surface view red-brown to black, single or in lines, ovoid, with 48 ascospores. *Ascospores* 7–11-septate, ellipsoid, 35–55 × 12–19 µm, often curved, cells generally equal, walls and septa > 1 µm thick.

Chemistry. Perlatolic acid present (TLC). Thallus and ascigerous zones C−, Pd−, KOH−, UV−.

Note. This new species differs from all other known species except *Stirtonia schummii* by its chemistry; it differs from *S. schummii* by its yellowish to brownish thallus.

Additional specimen examined. **Indonesia:** Java, West Bantam, track along the South brink of the Tjitadjur ravine, on tree, 1959, *Groenhart* 9555a (L!).

Stirtonia dubia A. L. Sm.

Trans. Brit. Mycol. Soc. **11:** 195 (1926); type: India, Bengal, Chinsurah, on tree, s.d., *Watt* (BM—isolectotype!).

Thallus spreading, covering an area of up to 5 cm diam., contiguous, smooth, grey whitish, less than 0·1 mm thick, slightly shiny.

Ascigerous zones seemingly not delimited but in fact lirelline and branched, *c.* 0·1 mm wide, not raised, whitish, pruinose, inconspicuously dotted when abraded, with small crystals, without algae. *Asci* visible as pale brown dots in surface view, globose to ovoid, with 8 ascospores. *Ascospores* 6–7-septate, ellipsoid, 15–30 × 6–8 µm, cells generally equal, walls and septa >1 µm thick.

Chemistry. No lichen substances detected (TLC). Thallus and ascigerous zones C−, Pd−, KOH−, UV−.

Stirtonia indica Makhija & Patw.

Mycotaxon **67:** 300 (1998); type: India, South India, Eastern Ghats, Tamil Nadu, Chittery, 21 January 1983, *Sethy* (AMH 83.47—holotype).

Thallus spreading, covering an area of up to 5 cm diam., contiguous, smooth, dirty whitish, 0·2–0·3 mm thick, slightly shiny.

Ascigerous zones delimited, round to slightly elongated in outline, 1–5 mm diam., raised, always higher than the thallus, white, pruinose, inconspicuously dotted when abraded, with calcium oxalate crystals, without algal cells. *Asci* visible as pale brown dots in surface view, globose to ovoid, with 8 ascospores. *Ascospores* 6–9-septate, ellipsoid, 50–60 × 15–22 µm, cells generally equal, walls and septa >1 µm thick.

Chemistry. Psoromic and conpsoromic acids present (TLC). Thallus and ascigerous zones C−, Pd+ yellow, KOH−, UV−.

Stirtonia macrocarpa Makhija & Patw.

Biovigyanam **13:** 48 (1987); type: India, North Andaman, Diglipur Range, Milangram, 3 January 1986, *Patwardhan & Sethy* (AMH 86.276—holotype; ABL—isotype!); (AMH 86.347—ABL, topotype!);

(Fig. 1D)

Thallus spreading, covering an area of up to 5 cm diam., contiguous, smooth, grey whitish, < 0·1 mm thick, lightly shiny, with calcium oxalate crystals, IKI+ blue.

Ascigerous zones delimited, round to slightly elongated in outline, 0·2–0·4 mm diam., raised, always higher than the thallus, white, pruinose, conspicuously brown to black dotted when abraded, with calcium oxalate crystals, without algal cells, IKI+ blue. *Asci* visible as brown to black dots in surface view, globose to ovoid, with 8 ascospores. *Ascospores* 11–16-septate, ellipsoid, 50–110 × 20–35 µm, cells generally equal, walls and septa >1 µm thick.

Chemistry. 2′-*O*-methylperlatolic acid present (TLC). Thallus and ascigerous zones C−, Pd−, KOH−, UV−.

Additional specimens examined. **Bangla Desh:** Bhawal National Park, 60 km N of Dhaka city, 9 March 2002,

Hopman (ABL!).—**Seychelles:** Praslin, National Park Sentier Glacier Noire, 30 September 2008, *Schumm* 14455 & *Frahm* (hb. Schumm!).

Stirtonia neotropica Aptroot sp. nov.

Stirtonia ascis catenulatis rubigineis.

Typus: Netherlands Antilles, Sint Eustatius, Quill National Park, Quill Trail, *c.* 200–300 m alt., 29 January 2008, *W. R. Buck 53004* (NY—holotype!, ABL—isotypus!, B—isotypus!).

(Figs 1C & 2C)

Thallus spreading, covering an area of up to 10 cm diam., contiguous, smooth, pale olivaceous, < 0·1 mm thick, slightly shiny, without calcium oxalate crystals, IKI−.

Ascigerous zones delimited, linear, branched and anastomosing, not raised, white, pruinose, conspicuously red-brown dotted when abraded, without calcium oxalate crystals but with tiny crystals above the asci causing the upper surface to be dark dotted, without algal cells. *Asci* in surface view red-brown, in lines, ovoid, with 8 ascospores, IKI−. *Ascospores* (7–)10–11-septate, ellipsoid, 35–38 × 10–12 µm, cells equal, walls and septa >1 µm thick.

Chemistry. Gyrophoric acid present (TLC). Thallus and ascigerous zones patchily C+ red, furthermore C−, Pd−, KOH−, UV−.

Note. This new species is the first of the genus to be described from the Neotropics. Its chemistry differs from all other known species.

Additional specimen examined. **Costa Rica:** Limón, 65 km SE of Limón, Manzanilla, along beach to Punta Vargas, 11 March 2004, *Sipman* 51694 (B!).

Stirtonia obvallata (Stirt.) A. L. Sm.

Trans. Brit. Mycol. Soc. **11:** 195 (1926); type: India, Bengal, Chinsurah, on tree, s.d., *Watt* (BM—isolectotype!).

Stirtonia aggregata Makhija & Patw., *Mycotaxon* **67:** 295 (1998); type: Indonesia, Java, S. coast near Kampong Nglijep, S. of Malang, on tree, January 1959, *Groenhart* 1452 (L—holotype!); *Groenhart* 4691 (L—isotype!).

New synonyms: *Stirtonia gibberulosa* Makhija & Patw., *Mycotaxon* **67:** 299 (1998); type: Indonesia, Java, Bay of Nglijep, S. of Donomuljo, on tree, January 1959, *Groenhart* 1455 (L—holotype!); *Groenhart* 557 (L—isotype!).

Stirtonia marginata Makhija & Patw., *Mycotaxon* **67**: 302 (1998); type: Indonesia, Java, Bay of Nglijep, S. of Donomuljo, on tree, September 1959, *Groenhart* 578 (L—holotype!); *Groenhart* 4697 (L—isotype!).

Stirtonia mellea Makhija & Patw., *Mycotaxon* **67:** 304 (1998); type: Indonesia, Java, Bay of Nglijep, S. of Donomuljo, on tree, September 1959, *Groenhart* 1453 (L—holotype!).

(Figs 1E & 2D)

Thallus spreading, covering an area of up to 10 cm diam., contiguous, smooth, brownish to whitish, under 0·1 mm thick, mostly endophoeodal, lightly shiny, with calcium oxalate crystals, IKI+ blue.

Ascigerous zones delimited, round to elongated and often branched and anastomosing in outline, *c.* 0·2–0·3 mm wide, erumpent through the thallus and bark, higher than most of the surrounding thallus, white, pruinose, inconspicuously dotted when abraded, with calcium oxalate crystals, often with algal cells, IKI+ blue. *Asci* not visible in surface view, globose to ovoid, with 8 ascospores. *Ascospores* 7–13-septate, ellipsoid, 45–90 × 20–39 µm, cells generally equal, walls and septa >1 µm thick.

Chemistry. No diagnostic substances detected, but various terpenoids variably present which are originating from the bark (TLC). Thallus and ascigerous zones C−, Pd−, KOH−, UV−.

Notes. The differences reported between the taxa synonymized here are not taxonomically significant and, at most, reflect age difference and some bark properties. All Indonesian specimens originate from the same area and are virtually identical. The ascospore measurements reported for *Stirtonia gibberulosa* by Makhija & Patwardhan (1998) must have been mostly based on immature material; the dimensions of the ascospore illustrated fits that species best. The Groenhart collecting numbers are not sequential but have been applied much later, and identical specimens bearing identical names can thus be regarded as isotypes; the typification is not problematical.

Additional specimens examined. **Indonesia:** Java, Bay of Tapen, Sout of Wlingi, on tree, Sept. 1959, *Groenhart*

4835, 4818, 7970, 4822, 4824, 4829 (L!, all essentially one specimen).—**Thailand:** *Uthai Thani Prov.*: Khao Nang Rum, Serrayut's plot, 1992, *Aguirre-Hudson, James & Wolseley* 2783 (BM!).

Stirtonia psoromica Aptroot & Wolseley

In Wolseley & Aptroot, *Bibliotheca Lichenologica* **99:** 419 (2009); type: Thailand, Chiang Mai Prov., Doi Suthep, Wat Palad, 25 November 1991, *Wolseley & Aguirre-Hudson* 5930 (BM—holotype!).

(Fig. 1F)

Thallus spreading, covering an area of up to 5 cm diam., contiguous, smooth, dirty whitish, less than 0·1 mm thick, slightly shiny, with calcium oxalate crystals, IKI−.

Ascigerous zones delimited, round to slightly elongated in outline, 0·3–0·7 mm diam., always higher than the thallus, white, pruinose, inconspicuously black dotted when abraded, with calcium oxalate crystals, without algal cells, IKI+ blue. *Asci* in surface view black, ovoid, with 8 ascospores. *Ascospores* generally 7–9-septate, fusiform, 75–87 × 12–16 µm, cells generally equal, walls and septa >1 µm thick.

Chemistry: Psoromic and conpsoromic acids always present (TLC). Thallus C−, Pd+ yellow, KOH−, medulla UV−.

Additional specimen examined. **Thailand:** *Uthai Thani Prov.*: Khao Nang Rum, Serrayut's plot, 14 January 1992, *Wolseley & Aguirre-Hudson* 4273 (BM!).

Stirtonia ramosa Makhija & Patw.

Biovigyanam **13:** 49 (1987); type: India, South Andaman, Alexandria Island, 6 March 1983, *Patwardhan, Nagarkar & Sethy* (AMH 85.1122—holotype; ABL—isotype!).

(Figs 1G & 2E)

Thallus spreading, covering an area of up to 5 cm diam., contiguous, smooth, dirty whitish to pale olivaceous, < 0·1 mm thick, slightly shiny, without calcium oxalate crystals, IKI−.

Ascigerous zones delimited, lirelliform, irregularly stellately branched, *c.* 0·1–0·3 mm wide, anastomosing to form a network of several cm, not or slightly raised, pale brown, not pruinose, not dotted, with calcium oxalate crystals (only near the upper surface with small crystals, probably of the secondary compounds mentioned below), without algal cells, IKI−. *Asci* invisible in surface view, globose to ovoid, with 8 ascospores. *Ascospores* (4–)5–6-septate, ellipsoid, 45–65 × 15–22 µm, all cells equal (upper cell or both end cells enlarged only in young ascospores), walls and septa >1 µm thick, postmature ascospores becoming brown.

Chemistry. 2′-*O*-methylnorsuperphyllinic and 4′-*O*-demethylsuperconfluentic acids present (TLC). Thallus and ascigerous zones C−, Pd−, KOH−, UV−.

Additional specimens examined. **India:** North Andaman, Diglipur Range, Milangram, 3 i 1986, *Sethy & Patwardhan* (AMH 86.272, ABL!); Little Andaman, Netaji Nagar, Krishna Nala, *Nagarkar & Patwardhan* (AMH 85.913, ABL!).

Stirtonia santessonii Makhija & Patw.

Biovigyanam **13:** 49 (1987); type: India, South Andaman, Redskin Island, 12 December 1985, *Nagarkar & Patwardhan* (AMH 85.1985—holotype; ABL—isotype!); (AMH 85.1986—topotype, ABL!).

(Figs 1H & 2F)

Thallus spreading, covering an area of up to 5 cm diam., contiguous, smooth, pale brownish, < 0·1 mm thick, lightly shiny, with calcium oxalate crystals, IKI−.

Ascigerous zones delimited, whitish, round, *c.* 0·5–1·5 mm diam., raised, not pruinose, with pale to dark brownish asci in lirelliform, irregularly stellately branched, *c.* 0·1–0·3 mm wide lines, with calcium oxalate crystals, without algal cells, IKI+ blue. *Asci* visible as pale to dark brown lines in surface view, globose to ovoid, with 8 ascospores. *Ascospores* 7-septate, ellipsoid, 35–50 × 13–18 µm, upper cell largest, walls and septa >1 µm thick.

Chemistry. No diagnostic substances detected (TLC). Thallus and ascigerous zones C−, Pd−, KOH−, thallus UV−, ascigerous areas UV+ white.

Stirtonia schummii Aptroot sp. nov.

Stirtonia ascosporis minimis thallo acidis perlatolicis continens.

Typus: Seychelles, Praslin, Anse Lazio, Hotel Bonbon Plume, 2 September 2008, *F. Schumm* 14438 & *J. P. Frahm* (hb. Schumm—holotypus!).

(Fig. 3A-F)

Thallus spreading, covering an area of up to 5 cm diam., contiguous, smooth, dirty whitish, less than 0·1 mm thick, slightly shiny, with calcium oxalate crystals, IKI−.

Ascigerous zones delimited, round to slightly elongated in outline, 0·3–0·8 mm diam., raised, always higher than the thallus, white, pruinose, inconspicuously dotted when abraded, with calcium oxalate crystals, without algae, IKI+ blue. *Asci* in surface view brown, ovoid, with 8 ascospores. *Ascospores* 7–9-septate, ellipsoid, 36–45 × 12–15 µm, cells generally equal, walls and septa >1 µm thick.

Chemistry. Perlatolic acid present (TLC). Thallus and ascigerous zones C−, Pd−, KOH−, UV−.

Note. This new species is the first of the genus to be described from Africa. It differs from all other known species except *Stirtonia curvata* by its chemistry, and differs from *S. curvata* by the white thallus. It is named in honour of the lichenologist Felix Schumm, who collected the type specimen and prepared the illustrations.

Additional specimen examined. **Seychelles:** Mahé, Dans Iles, on shrubs, 1973, *Norkett* 16379 (ABL!, BM!). Reported by Seaward & Aptroot (2009) as *S. gibberulosa*.

Excluded species

Stirtonia amazonica Sambo

Annali di Botan. **22:** 24 (1940).

Not studied, as it was already excluded by Makhija & Patwardhan (1998). = *Arthonia* sp.

Stirtonia macrocephala R. Sant.

Symbol. Bot. Upsal. **12**(1)**:** 60 (1952).

Not studied, as it was already excluded by Makhija & Patwardhan (1998). = *Eremothecella macrocephala* (R. Sant.) G. Thor, Sérus., Lücking & Tat. Matsumoto.

Stirtonia monospora D. D. Awasthi & K.P. Singh

Geophytology **1:** 97 (1971).

Not studied, as it was already excluded by Makhija & Patwardhan (1998) = ?*Arthonia* sp.

Stirtonia sprucei R. Sant.

Symbol. Bot. Upsal. **12**(1)**:** 60 (1952).

Type and neotropical material not studied, as it was already excluded by Makhija & Patwardhan (1998). = *Amazonomyces sprucei* (R. Sant.) Lücking, Sérus. & G. Thor (Lücking *et al*. 1998).

Discussion

After this revision, *Stirtonia* is still a small genus with only 13 accepted species. It is quite homogenous in some characters, such as the asci, ascospores and interascal filaments, but quite variable in other characters, such as iodine reactions and the gross morphology of the ascigerous areas. It is quite possible that in its present sense the genus is not monophyletic. The most aberrant element is *S. biseptata* with its byssoid thallus and thin septa.

After the previous exclusion of the foliicolous species assigned to this genus by Santesson (1952), the remaining species in the genus were known only from tropical Asia. Here, one new species each is described from Africa and the neotropics, showing that it is a pantropical genus, but most diverse in the palaeotropics.

Stirtonia species are apparently rare or at least rarely collected and only locally more abundant. For example, among a set of about 100 *Arthoniaceae* specimens from Thailand in BM, only four specimens belonged to three species of *Stirtonia*; an even larger set of *c*. 200 *Arthoniaceae* specimens from Indonesia (mainly Java) in L contained 15 specimens (with 13 numbered duplicates) representing five species.

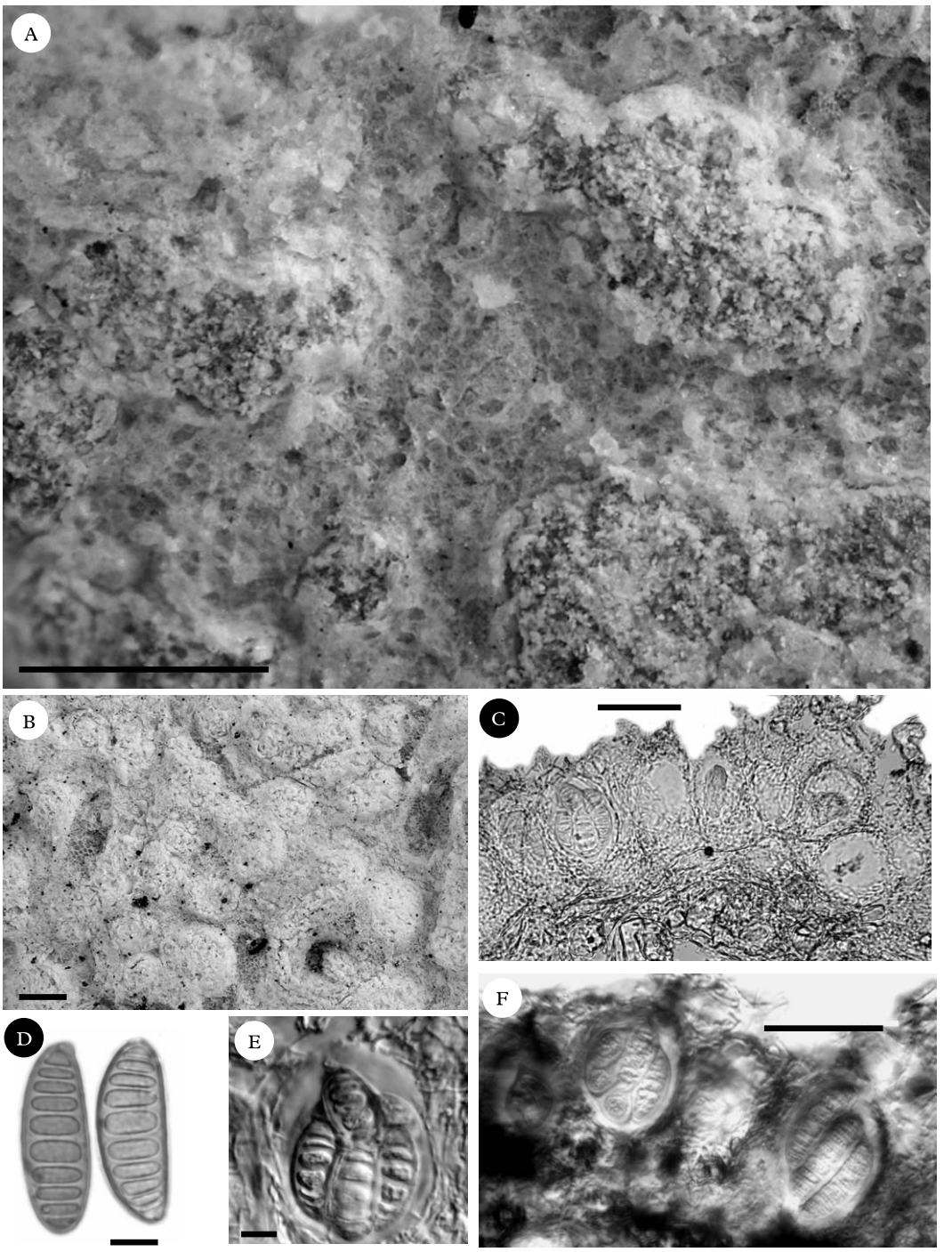

FIG. 3. *Stirtonia schummii* (holotype). A & B, habitus; C, E & F, sections through ascigerous areas in IKI; D, ascospores. Scales: A & B = 0·5 mm; C & F = 50 μm; D & E, = 10 μm.

https://doi.org/10.1017/S0024282909990107 Published online by Cambridge University Press

The author thanks Felix Schumm for sending a new species and preparing some illustrations, Urmila Makhija for kindly sending duplicates of types and other specimens upon request and Leo Spier for performing TLC on the specimens in ABL. Harrie Sipman is acknowledged for detecting the neotropical *Stirtonia* among a set of unidentified lichens and for comments on an earlier draft. The author also thanks Göran Thor for comments on an earlier draft and for various suggestions concerning the study of *Cryptotheciaceae* and Pat Wolseley (BM) and the staff at L for the loans.

References

Lücking, R. (2008) Foliicolous lichenized fungi. *Flora Neotropica* **103:** 1–866.

Lücking, R., Sérusiaux, E., Maia, L. C. & Pereira, C. G. (1998) A revision of the names of foliicolous lichenized fungi published by Batista and co-workers between 1960 and 1975. *Lichenologist* **30:** 121–191.

Makhija, U. & Patwardhan, P. G. (1987) Materials for a lichen flora of the Andaman Islands. II. The genera *Cryptothecia* and *Stirtonia*. *Biovigyanam* **13:** 43–51.

Makhija, U. & Patwardhan, P. G. (1994) A contribution towards a monograph of the lichen genus *Cryptothecia* (family Arthoniaceae). *Current Researches in Plant Sciences* **1994:** 57–72.

Makhija, U. & Patwardhan, P. G. (1998): The lichen genus *Stirtonia* (family Arthoniaceae). *Mycotaxon* **67:** 287–311.

Santesson, R. (1952) Foliicolous lichens I. A revision of the taxonomy of the obligately foliicolous, lichenized fungi. *Symbolae Botanicae Upsalienses* **12**(1)**:** 1–590.

Seaward, M. R. D. & Aptroot, A. (2009) Checklist of lichens for the Seychelles group. *Bibliotheca Lichenologica* **99:** 335–366.

Wolseley, P. A. & Aptroot, A. (2009) The lichen genera *Cryptothecia* and *Stirtonia* in Thailand. *Bibliotheca Lichenologica* **99:** 411–421.

Accepted for publication 21 *April* 2009