A revision of the genus Kretzschmaria (Ascomycota, Xylariaceae) in Cuba

Authors: Recio Herrera, Gloria M., and Maldonado González, Susana G.

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GLORIA M. RECIO HERRERA[1*] & SUSANA G. MALDONADO GONZÁLEZ[1]

A revision of the genus *Kretzschmaria* (*Ascomycota*, *Xylariaceae*) in Cuba

Abstract

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In the present paper, collections deposited in HAJB and determined as *Kretzschmaria* and *Hypoxylon* with stromatic morphology similar to some taxa called "ustulinoid" were re-examined macroscopically and microscopically. Eight species of *Kretzschmaria* are recognized. *Kretzschmaria cetrarioides*, *K. clavus*, *K. coenopus*, *K. micropus* and *K. zonata* are corroborated for Cuba. *Kretzschmaria milleri*, *K. pavimentosa* and *K. sandvicensis* constitute new records for Cuba. A dichotomous key for the identification of the treated species and also their descriptions, distributions in Cuba and preliminary IUCN Red List categorizations are included in this work.

Additional key words: systematics, kretzschmarioid taxa, ustulinoid taxa, *Hypoxylon*

Introduction

Recio (1991) published the results of the first study of the genus *Kretzschmaria* Fr. (*Ascomycota*, *Xylariaceae*) in Cuba, in which *K. clavus* (Fr. : Fr.) Sacc., *K. coenopus* (Fr. : Fr.) Sacc. and *K. micropus* (Fr. : Fr.) Sacc. were corroborated and *K. cetrarioides* (Welw. & Curr.) Sacc. was recorded for the first time in the country.

Dennis (1961) and Van der Gucht (1995) considered *Kretzschmaria coenopus* as a synonym of *K. clavus*. Later, Rogers & Ju (1998) shared this opinion and proposed a new taxonomic treatment for the genus accepting 16 taxa distributed according to the morphology as kretzschmarioid and ustulinoid taxa, represented by *K. clavus* and *K. deusta* (Hoff. : Fr.) P. Martin, respectively. In addition, Rogers & Ju (l.c.) reported *K. zonata* (Lév.) P. Martin for the first time in Cuba.

Considering the limited knowledge about the Cuban taxa of *Kretzschmaria*, fundamentally with respect to the ustulinoid taxa, the aim of this paper is to update the information about this genus in Cuba.

Material and methods

Materials deposited in the mycological collection at the National Botanic Garden Herbarium, HAJB (M) as *Kretzschmaria* (kretzschmarioid taxa) and some collections previously determined as *Hypoxylon* Bull, with similar characters to ustulinoid fungi, *H.* cf. *cerebrinum* (Fée) Cooke, *H.* cf. *cyclopicum* Speg. and *H. deustum* (Hoffm. : Fr.) Grev., were re-examined.

A stereo microscope was used to observe the characteristics of the stromata and perithecia. The characters of the asci and ascospores were observed in slides mounted in Melzer's iodine reagent and KOH 10 %, respectively, in a bright-field microscope.

Citation of herbarium codes follows Holmgren & al. (1990).

Due to the impossibility of revising the original materials related to *Kretzschmaria*, determinations of Cuban specimens were based on the descriptions offered by Rogers & Ju (1998), following also the order they used to characterize the structures of the taxa cited.

1 Jardín Botánico Nacional, Universidad de La Habana, Carretera del Rocío km 3½, Calabazar, Boyeros, CP 19230, La Habana, Cuba; *e-mail: gmrecioherrera@yahoo.es (author for correspondence); hajb@rect.uh.cu, sgmaldonado@fbio.uh.cu

Results and discussion

The presence of *Kretzschmaria cetrarioides*, *K. clavus*, *K. coenopus*, *K. micropus* and *K. zonata* in Cuba is corroborated. *Kretzschmaria milleri* J. D. Rogers & Y.-M. Ju, *K. pavimentosa* (Ces.) P. Martin and *K. sandvicensis* (Reichardt) J. D. Rogers & Y.-M. Ju are recorded for the first time in Cuba.

None of the accepted species appears in the Red List of Cuban fungi (Mena & al. 2012). Our experience and the available information allow us to assign them a preliminary categorization of Least Concern (LC) following IUCN (2012).

Finally, we consider it interesting that although the most common hosts for *Xylariaceae* are "dicot" plants, two species treated in this paper were on monocots: *Kretzschmaria coenopus* on *Bactris cubensis* Burret (*Palmae*) and *K. pavimentosa* on unidentified *Palmae*. Rogers & Ju (1998) cited *K. cetrarioides* and *K. pavimentosa* on oil palm and monocot wood, respectively.

Key to accepted species of *Kretzschmaria* in Cuba

1. Stromata tapering downwards into a definite attachment 2
– Stromata attached to substrate with narrow connectives 5
2. Attachments of stromata totally or partially strap-like 3
– Attachments of stromata cylindrical 4
3. Attachments of stromata strap-like; fertile heads of stromata free or fused to base, forming sheets, containing several perithecia; ascospores 25–30 × 8–12 µm . . . . . 1. ***K. cetrarioides***
– Attachments of stromata at first strap-like, later compressed cylindric; fertile heads of stromata not fused, containing 1 or 2 perithecia; ascospores 26–32 × 8–11 µm . . . . . 4. ***K. micropus***
4. Ascospores 25–33 × 6–9 µm, germ slit 11–19 (–20) µm . . . . . 2. ***K. clavus***
– Ascospores 29–38 × 7–11 µm, germ slit 22–29 µm . . . . . 3. ***K. coenopus***
5. Stromata generally with steep thick crenate margins; ascospores dark brown, fusiform-inequilateral, with acute ends sometimes pinched, 31–50 × 8–12 µm, germ slit much less than spore length . . . . . 6. ***K. pavimentosa***
– Stromata usually with sloped margins; ascospores with germ slit slightly less than or nearly equalling spore length 6
6. Ostioles coarsely papillate; ascospores dark brown, fusiform to ellipsoid, inequilateral, with narrowly rounded ends occasionally pinched, 38–47 × 11–16 µm, germ slit straight, slightly less than spore length . . . . . 5. ***K. milleri***
– Ostioles finely papillate to moderately papillate . . 7
7. Ascospores with acute ends very frequently pinched, 25–37 × 9–12 µm . . . . . 8. ***K. zonata***
– Ascospores with narrowly to broadly rounded ends not pinched, 33–43 × 8–11 µm . 7. ***K. sandvicensis***

Descriptions of the species

1. *Kretzschmaria cetrarioides* (Welw. & Curr.) Sacc., Syll. Fung. 2: xxix. 1883 ≡ *Hypoxylon cetrarioides* Welw. & Curr. in Trans. Linn. Soc. London 26: 282. 1867 ≡ *Rhopalopsis cetrarioides* (Welw. & Curr.) Cooke in Grevillea 11: 94. 1883. – Fig. 1A; 2A, B.

Stromata with subglobose, obconical or obovoid fertile heads, mainly flattened at ends, 1–5 mm in diam., containing several perithecia, frequently fused into a crust to 9 cm in diam., tapering downwards into radiating, cylindrical to mainly strap-like stipes, free or concrescent to base, forming sheets, at first with a brown hyphal cover, soon glabrescent; surface greyish to blackish, slightly cracked on upper part and more deeply on sides, umbos infrequent, sporadically covered with remnants of outermost layer or with very small polygonal areas; immediately beneath surface carbonaceous; tissue between and beneath perithecia whitish to dark brown, coriaceous to woody, frequently disintegrating. *Perithecia* subglobose to obovoid, 0.9–1.3 mm high, 0.6–1 mm in diam. *Ostioles* conical-papillate. *Asci* not observed. *Ascospores* unicellular, dark brown, ellipsoid to inequilateral, with narrowly rounded ends, 25–30 × 8–12 µm, smooth, germ slit not easily distinguished, straight, more than 20 µm, less than spore length.

Remarks — Van der Gucht (1995) considered the grade of branching stipes as the main difference between *Kretzschmaria cetrarioides* and *K. clavus*. In our opinion the range of the germ slit length cited by this author (24–26 µm and 16–20 µm, respectively) represents the most significant difference between these species. Recio (1991) cited a > 20 µm germ slit length for *K. cetrarioides*.

Specimens examined — Cuba: La Habana Province: Boyeros, road between Calle 100 and Carretera de las Guásimas, on very wet dead trunk, 15 Nov 1990, *M. Benítez & M. Camino* (HAJB M6666); Calabazar, Jardín Botánico Nacional, Arroyo Pancho Simón, 25 Jan 1990, *M. Benítez & al.* (HAJB M6628, HAJB M6629); ibid., on dry dead trunk of *Guazuma tomentosa*, 31 Jan 1991, *M. Benítez & D. López* (HAJB M6689); ibid., Zona Ecológico-Didáctica, on dead stump of *Ficus pandurata*, 5 Oct 1995, *M. Clavel* (HAJB M7438). — Pinar del Río Province: Sandino, Península de Guanahacabibes, S of Bolondrón, 0–50 m, moist semi-deciduous forest, on wood of *Peltophorum adnatum*, 17 Nov 1976, *G. Recio* (HAJB M2986); San Cristóbal, Río Manantial, on dead trunk, 12 Apr 1987, *R. Rankin* (HAJB M5895).

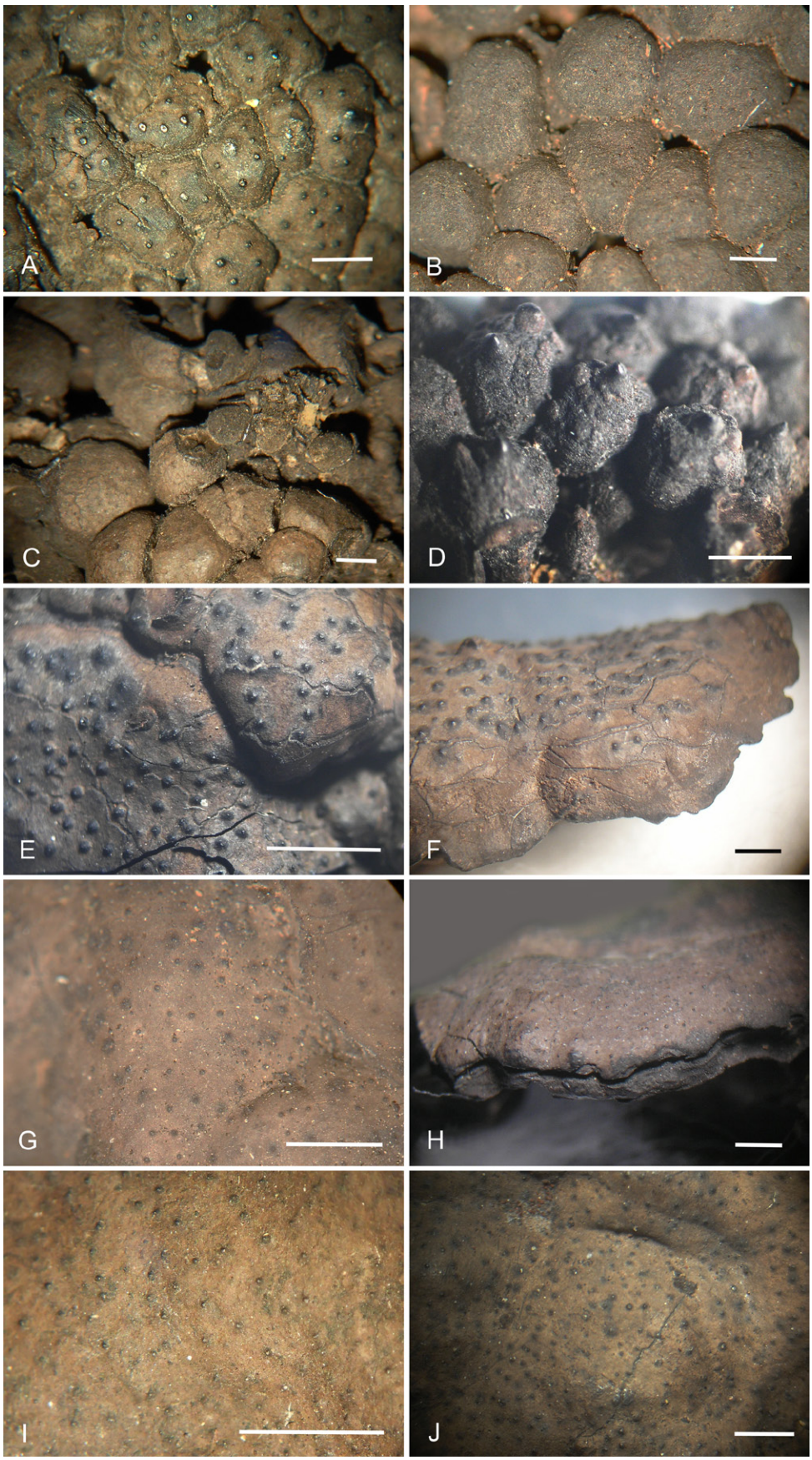

Fig. 1. A–J: stromatal surfaces in *Kretzschmaria* – A: *K. cetrarioides*; B: *K. clavus*; C: *K. coenopus*; D: *K. micropus*; E, F: *K. milleri*; G, H: *K. pavimentosa*; I: *K. sandvicensis*; J: *K. zonata*; F, H: detail of margin. – Scale bars: A–J = 2 mm.

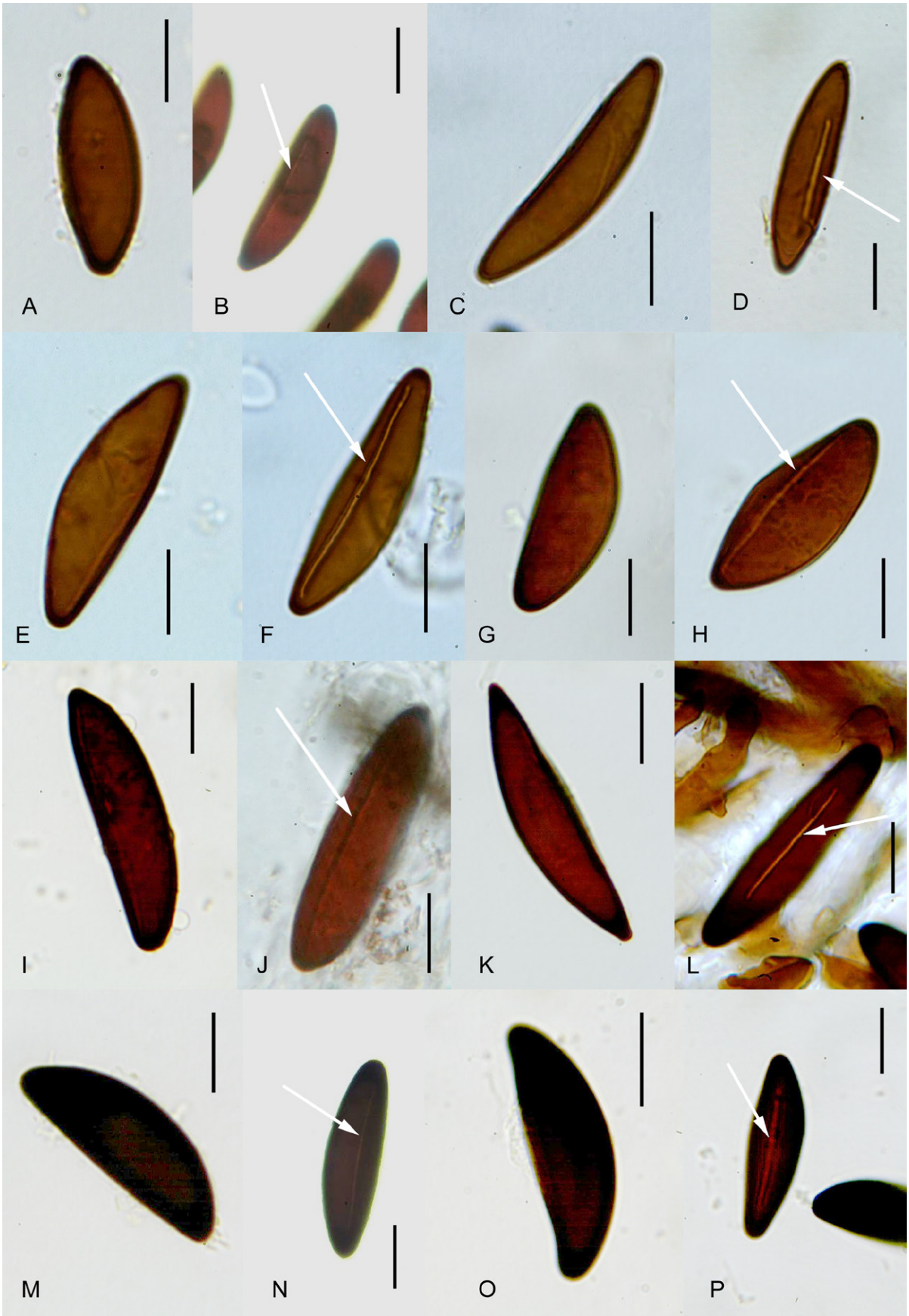

Fig. 2. A–P: spores in *Kretzschmaria* – A, B: *K. cetrarioides*; C, D: *K. clavus*; E, F: *K. coenopus*; G, H: *K. micropus*; I, J: *K. milleri*; K, L: *K. pavimentosa*; M, N: *K. sandvicensis*; O, P: *K. zonata*. – Arrows indicates germ slit. – Scale bars: A–P = 10 µm.

2. *Kretzschmaria clavus* (Fr. : Fr.) Sacc., Syll. Fung. 2: xxix. 1883 ≡ *Sphaeria clavus* Fr. in Linnaea 5: 543. 1830; Fr. : Fr., Syst. Mycol. Index: 162. 1832 ≡ *Hypoxylon clavus* (Fr. : Fr.) Mont. in Ann. Sci. Nat., Bot., ser. 2, 13: 355. 1840 ≡ *Rhopalopsis clavus* (Fr. : Fr.) Cooke in Grevillea 11: 94. 1883. – Fig. 1B; 2C, D.

Stromata with subglobose to obconical fertile heads, mainly rounded at ends, 3–6 mm in diam., containing several perithecia, frequently fused into a crust, tapering downwards into radiating ± cylindrical stipes, simple or branched, up to 5 mm high, smooth; surface brown-coppery to dark brown, blackish, occasionally covered with remnants of outermost layer or with very small polygonal areas; immediately beneath surface carbonaceous; tissue between and beneath perithecia whitish to dark brown, coriaceous to woody, frequently disintegrating. *Perithecia* subglobose to obovoid, 1.2–1.4 mm high, 0.6–1 mm in diam. *Ostioles* finely conical-papillate. *Asci* not complete, spore-bearing part 207–217 µm long, with apical ring bluing in Melzer's iodine reagent, urn-shaped, 4.5–6 µm high, 3–4 µm wide. *Ascospores* unicellular, brown to dark brown, ellipsoid, inequilateral, with narrowly rounded ends, 25–33 × 6–9 µm, smooth, germ slit straight, 11–19(–20) µm, less than spore length.

Remarks — See the following species.

Specimens examined — Cuba: Granma Province: Buey Arriba, surroundings of Arroyo Barrio Nuevo, on bark of damp and rotten trunk, 16 May 1988, *M. Camino* (HAJB M5827); Bartolomé Masó, Parque Nacional Turquino, Santo Domingo, UZC La Platica y Jiménez, road from the campsite Medina to the headquarters La Plata, on dry dead trunk, 25 May 1998, *M. Camino* (HAJB M8072). — Holguín Province: Frank País, N slope of Sierra Cristal, Brazo Grande, on wood, 7 Apr 1987, *M. Camino & M. Rodríguez* (HAJB M5187). — La Habana Province: Boyeros, Calabazar, Jardín Botánico Nacional, nursery, 20 Feb 1990, *M. Benítez* (HAJB M6630). — Pinar del Río Province: Candelaria, Loma El Salón, on wood, 29 Dec 1981, *G. Recio & N. Ipsán* (HAJB M3860); Soroa, Río Hondo, on wood, 28 Aug 1984, *G. Recio & al.* (HAJB M4251); Los Tumbos, on dead trunk, 19 Aug 1987, *S. Maldonado & al.* (HAJB M5437); San Cristóbal, Río Taco-Taco, between Rangel and Aspiro, on base of dead standing trunk, 25 Aug 1989, *M. Camino & H. D. Gómez* (HAJB M6474). — Sancti Spíritus Province: Banao, Reserva Ecológica "Alturas de Banao", Hoyo del Naranjal, road to Cortinas Blancas, margins of Río Higuanojo, on dead trunk, 21 Feb 2001, *M. Camino & al.* (HAJB M8774b).

3. *Kretzschmaria coenopus* (Fr. : Fr.) Sacc., Syll. Fung. 2: xxix. 1883 ≡ *Sphaeria coenopus* Fr. in Linnaea 5: 542. 1830; Fr. : Fr., Syst. Mycol. Index: 162. 1832 ≡ *Hypoxylon coenopus* (Fr. : Fr.) Mont. in Ann. Sci. Nat., Bot., ser. 2, 13: 356. 1840 ≡ *Xylaria coenopus* (Fr. : Fr.) Berk. & M. A. Curtis in J. Acad. Nat. Sci. Philadelphia, ser. 2, 2: 285. 1853. – Fig. 1C; 2E, F.

Stromata with subglobose, obconical or occasionally turbinate fertile heads, mainly flat at ends, 3.5–7 mm in diam., containing numerous perithecia, packed in dense swarms, frequently compressed or deformed by mutual pressure, tapering downwards into radiating, subcylindrical stipes, simple or branched, up to 6 mm high, smooth; surface brown-coppery to dark brown, blackish, ± cracked, incipient umbos occasionally observed, sporadically covered with remnants of outermost layer or with very small polygonal areas; immediately beneath surface carbonaceous; tissue between and beneath perithecia whitish to dark brown, coriaceous to woody, disintegrating. *Perithecia* subglobose to ovoid, 0.9–1.4 mm high, 0.5–0.7 mm in diam. *Ostioles* mainly convex-papillate. *Asci* not observed. *Ascospores* unicellular, brown to dark brown, ellipsoid, inequilateral, with narrowly rounded ends, 29–38 × 7–11 µm, smooth, germ slit straight, 22–29 µm, less than spore length.

Remarks — In spite of the similarity of characters present in *Kretzschmaria clavus* and *K. coenopus*, Dennis (1957) treated *K. coenopus* as a distinct species according to the form of the fertile heads, dimensions and branching of the stipes, number of perithecia and prominence of the ostiolar papillae. Dennis (1961) considered *K. coenopus* as synonym of *K. clavus*. Later, Martin (1970) treated *K. coenopus* as an independent species. Recio (1991) considered *K. coenopus* as an independent species based on the statistical study of the germ slit lengths in Cuban specimens. This criterion is maintained in this paper. Van der Gucht (1995) and Rogers & Ju (1998) considered *K. coenopus* as a synonym of *K. clavus*.

Specimens examined — Cuba: Holguín Province: Moa, Río Yagrumaje, 300–400 m, mountain rainforest, on dead trunk of *Bactris cubensis*, 8 Nov 1969, *H. Kreisel* (HAJB M1336). — La Habana Province: Boyeros, Calabazar, Jardín Botánico Nacional, Pabellón de Exposición No. 3, on dead trunk, 21 Sep 1989, *M. Benítez & M. Clavel* (HAJB M6501). — Pinar del Río Province: Los Palacios, San Diego de los Baños, La Catalina, 4 Dec 1976, *G. Recio* (HAJB M3107); Candelaria, Sierra del Rosario, Loma El Salón, on wood, 29 Dec 1981, *G. Recio & N. Ipsán* (HAJB M3860); ibid., 9 Mar 1982, *G. Recio & N. Ipsán* (HAJB M3864); ibid., on wood, 15 Jul 1982, *G. Recio & N. Ipsán* (HAJB M3886, HAJB M3888); ibid., on wood, 18 Dec 1982, *G. Recio & M. Benítez* (HAJB M3975); ibid., on dead trunk, 18 Dec 1982, *G. Recio & M. Benítez* (HAJB M3976); ibid., on dead trunk, 18 Dec 1982, *G. Recio & M. Benítez* (HAJB M3977); ibid., on dead trunk, 9 Apr 1983, *G. Recio & M. Benítez* (HAJB M3996); ibid., on dead trunk, 9 Apr 1983, *G. Recio & M. Benítez* (HAJB M3997); ibid., on wood,

21 Jul 1983, *G. Recio & al.* (HAJB M4080); ibid., on wet dead trunk, 23 Feb 1990, *M. Benítez* (HAJB M6616). — Santiago de Cuba Province: Gran Piedra, on wet dead trunk, 26 Apr 1989, *M. Benítez* (HAJB M6242).

4. *Kretzschmaria micropus* (Fr. : Fr.) Sacc., Syll. Fung. 2: xxix. 1883 ≡ *Sphaeria micropus* Fr. in Linnaea 5: 542. 1830; Fr. : Fr., Syst. Mycol. Index: 169. 1832 ≡ *Hypoxylon micropus* (Fr. : Fr.) Berk. in J. Linn. Soc., Bot. 10: 383. 1869 ≡ *Rhopalopsis micropus* (Fr. : Fr.) Cooke in Grevillea 11: 94. 1883. – Fig. 1D; 2G, H.

Stromata with subglobose slightly compressed fertile heads, up to 2 mm in diam., containing 1 or 2 perithecia, densely aggregated, generally with 1 lateral developed umbo; stipes cylindrical to mainly cylindrical-compressed, simple or branched, covered with brown hyphae, at base horizontally arranged, totally free or a little concrescent; surface dark brown to blackish, cracked in a very distinct form with light brown and blackish areas; immediately beneath surface carbonaceous; tissue between and beneath perithecia whitish to dark brown, coriaceous to woody, disintegrating. *Perithecia* subglobose, 1–1.8 mm high, 0.6–1.6 mm in diam. *Ostioles* sharply conical-papillate. *Asci* not observed. *Ascospores* unicellular, dark brown, ellipsoid to inequilateral, with narrowly rounded ends, 26–32 × 8–11 µm, smooth, germ slit not easily distinguished, straight, more than 20 µm, less than spore length.

Remarks — In this fungus the fertile heads are usually not fused forming large crusts, as in *Kretzschmaria cetrarioides*, but the morphology of the ascospores is very similar.

Specimens examined — Cuba: Guantánamo Province: Baracoa, path to Yunque de Baracoa, on wet dead trunk of *Mangifera indica*, 7 Jul 2004, *M. Camino* (HAJB M10382). — Sancti Spíritus Province: Fomento, Sierra de Sancti Spíritus, between Gavilanes and Caballete de Casa, on wood, 16 Nov 1975, *M. Rodríguez* (HAJB M2728).

5. *Kretzschmaria milleri* J. D. Rogers & Y. M. Ju in Mycotaxon 68: 363. 1998. – Fig. 1E, F; 2I, J.

Stromata pulvinate to effuse pulvinate, 1–4 cm in diam., 1–2.5 mm thick, attached to substrate with narrow connectives, with crenate margins; surface brown-coppery, cracked; immediately beneath surface carbonaceous; tissue between and beneath perithecia whitish to dark brown, coriaceous to woody, disintegrating. *Perithecia* obovoid, 1.3–2.8 mm high, 0.5–1.2 mm wide. *Ostioles* coarsely papillate to somewhat conical. *Asci* not complete, with apical ring bluing in Melzer's iodine reagent, urn-shaped, 10–13 µm high, 6–8 µm wide. *Ascospores* dark brown, fusiform to ellipsoid, inequilateral, with narrowly rounded ends occasionally pinched, 38–47 × 11–16 µm, smooth, germ slit straight, slightly less than spore length.

Remarks — This fungus differs from the remaining ustulinoid taxa here studied by the presence of coarsely papillate ostiolar openings.

Specimens examined — Cuba: Guantánamo Province: Baracoa, Arroyo Blanco, 200–250 m, rainforest of *Carapa guianensis*, 28 Apr 1970, *H. Kreisel* (HAJB M2077); Sierra Azul, 500 m, rainforest, 17 Feb 1978, *M. Rodríguez* (HAJB M3395). — Pinar del Río Province: Candelaria, Loma El Salón, on stump, 23 Feb 1990, *M. Benítez* (HAJB M6621). — Santiago de Cuba Province: Gran Piedra, 1000–1100 m, 21 Feb 1970, *H. Kreisel* (HAJB M1726).

6. *Kretzschmaria pavimentosa* (Ces.) P. Martin in J. S. African Bot. 42: 74. 1976 ≡ *Hypoxylon pavimentosum* Ces. in Atti Accad. Sci. Fis. 8: 18. 1879 ≡ *Ustulina pavimentosa* (Ces.) Cooke in Grevillea 12: 3. 1883. – Fig. 1G, H; 2K, L.

Stromata aggregated or fused, discoid or effuse pulvinate, 1–10 cm in diam., 1–3.5 mm thick, attached to substrate with narrow connectives, generally with steep thick crenate margins; surface brown-coppery to dark brown; immediately beneath surface carbonaceous; tissue between and beneath perithecia white to grey, coriaceous to woody, becoming dark brown and disintegrating. *Perithecia* obovoid to tubular, 1.1–1.9 mm high, 0.6–1.3 mm wide. *Ostioles* papillate. *Asci* not complete, with apical ring bluing in Melzer's iodine reagent, c. 6.8 µm high, 3.5–5.5 µm wide. *Ascospores* dark brown, fusiform-inequilateral, generally with acute ends sometimes pinched, 31–50 × 8–12 µm, smooth, germ slit straight, much less than spore length.

Remarks — Kretzschmaria pavimentosa differs from the other ustulinoid taxa here treated mainly in the steepness and thickness of the stromata margins and in the ascospore germ slit being much less than the spore length.

Specimens examined — Cuba: Guantánamo Province: Baracoa, near Río Duaba, road of ascent to Yunque de Baracoa, evergreen mesophyllous forest, on dry trunk, 17 Apr 1986, *M. Camino* (HAJB M4808); banks of Río Toa, between Tabajó and Bernardo, 1 km from W margin, destroyed montane rainforest, on dead trunk of *Jambosa vulgaris*, 18 Apr 1986, *M. Camino* (HAJB M4834, HAJB M4844); Arroyo Punta Gorda, Arroyón, gallery forest, on wet dead trunk, 27 Apr 1986, *M. Camino* (HAJB M4945). — La Habana Province: Boyeros, Calabazar, Jardín Botánico Nacional, nursery,

on dead trunk of *Palmae*, 17 Sep 1987 (HAJB M5480). — Pinar del Río Province: Candelaria, Soroa, road to Las Terrazas, on rotten trunk, 7 Jul 1981, *S. Maldonado & G. Recio* (HAJB M3804); ibid., Orquideario, 10 Apr 2002, *M. Camino* (HAJB M9179); Loma El Salón, 400–500 m, on wood, Mar 1984, *G. Recio & al.* (HAJB M4196); La Palma, Reserva Ecológica Mil Cumbres, surroundings of Río Ancón, interception between N slope of Sierra Chiquita and S slope of Pan de Guajaibón, on dead trunk, 13 Nov 2004, *M. Cabarroi & al.* (HAJB M10627). — Santiago de Cuba Province: Gran Piedra, 1000–1100 m, on rotten wood, 21 Feb 1970, *H. Kreisel* (HAJB M1728). — Sancti Spíritus Province: Fomento, hills SW of Gavilanes, 300–500 m, on dead trunk lying on ground, 9 Nov 1979, *M. Rodríguez* (HAJB M3615).

7. *Kretzschmaria sandvicensis* (Reichardt) J. D. Rogers & Y. M. Ju in Mycotaxon 48: 366. 1998 ≡ *Hypoxylon sandvicense* Reichardt in Sitzungsber. Kaiserl. Akad. Wiss., Wien, Math.-Naturwiss. Cl., Abt. 1, 75: 6. 1877. = *Ustulina tessulata* Berk. ex Cooke in Grevillea 12: 3. 1883. – Fig. 1I; 2M, N.

Stromata separated, aggregated or fused, 1.5–7 cm in diam., 2–3 mm thick, attached to substrate with narrow connectives, with crenate margins; surface brown-coppery to dark brown, with reticulate cracks; immediately beneath surface carbonaceous; tissue between and beneath perithecia brown to dark brown. *Perithecia* globose to obovoid, 1.3–1.8 mm high, 0.6–1.5 mm wide. *Ostioles* papillate to finely papillate. *Asci* not complete, with apical ring bluing in Melzer's iodine reagent, urn-shaped, 7–9 µm high, 3–4.5 µm wide. *Ascospores* unicellular, dark brown, fusiform to ellipsoid, inequilateral, 33–43 × 8–11 µm, smooth, germ slit straight, slightly less than or nearly equalling spore length.

Remarks — The ascospore morphology of *Kretzschmaria sandvicensis* and *K. milleri* is similar, but the ostiolar papillae are very different.

Specimens examined — Cuba: Cienfuegos Province: Cumanayagua, Sierra del Escambray, road between Los Tornos and El Naranjo, on base of very wet living trunk, 3 Nov 1987, *M. Rodríguez* (HAJB M5518). — Pinar del Río Province: Candelaria, ascent to Loma El Salón, on dry stump, 23 Feb 1990, *M. Benítez* (HAJB M6617). — Sancti Spíritus Province: Fomento, hills SW of Gavilanes, 300–500 m, on dead trunk lying on ground, 9 Nov 1979, *M. Rodríguez* (HAJB M3615).

8. *Kretzschmaria zonata* (Lév.) P. Martin in J. S. African Bot. 42: 75. 1976 ≡ *Sphaeria zonata* Lév. in Ann. Sci. Nat., Bot., ser. 3, 3: 48. 1845 = *Ustulina zonata* (Lév.) Sacc., Syll. Fung. 1: 352. 1882. – Fig. 1J; 2O, P.

Stromata separated, aggregated or fused, 0.5–6 cm in diam., 2–3.5 mm thick, attached to substrate with narrow connectives, with sloped crenate margins; surface brown-coppery to dark brown, with reticulate cracks; immediately beneath surface carbonaceous; tissue between and beneath perithecia brown to dark brown. *Perithecia* mainly globose to obovoid, sometimes tubular, 1.3–1.7 mm high, 0.8–1.4 mm wide. *Ostioles* coarsely papillate. *Asci* not complete, with apical ring bluing in Melzer's iodine reagent, urn-shaped, 5–6 µm high, 3–4 µm wide. *Ascospores* unicellular, dark brown, fusiform to ellipsoid, inequilateral, with acute ends very frequently pinched, 25–37 × 9–12 µm, smooth, germ slit straight, slightly less than spore length.

Remarks — *Kretzschmaria zonata* is characterized by the presence of sloped stromata margins and ascospores very frequently with pinched ends.

Specimens examined — Cuba: Artemisa Province: Caimito, Loma del Esperón, Las Auras, on wet dead trunk, 13 Jul 1989, *G. Recio & M. Camino* (HAJB M6426). — La Habana Province: Boyeros, Calabazar, Jardín Botánico Nacional, Arroyo Pancho Simón, on dry dead stump, 31 Jan 1991, *M. Benítez & D. López* (HAJB M6688). — Pinar del Río Province: Candelaria, Sierra del Rosario, Loma El Salón, 400–500 m, seasonal evergreen forest, on wood, 9 Apr 1983, *G. Recio & M. Benítez* (HAJB M3995); Soroa, Río Hondo, on wood, 20 Jul 1984, *G. Recio & al.* (HAJB M4220). — Sancti Spíritus Province: Trindad, Topes de Collantes, Finca Cuba, on rotten stump, 14 Apr 1991, *M. Camino* (HAJB M6784); Banao, source of Arroyo Dos Leones, road between the ridge of La Sabina and the ridge of Caja de Agua, 620 m, on wet dead trunk, 19 Sep 1997, *Eliasson & al.* (HAJB M7871).

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