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Fungi from palms. XX[1]. The genus *Guignardia*

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Hyde, K. D. (1995). Fungi from palms. XX. The genus *Guignardia*. Sydowia 47(2): 180–198.

Eight species in the genus *Guignardia* from palm hosts are accepted. These species are described and illustrated and a dichotomous key is provided.

Keywords: Ascomycetes, palmae, taxonomy.

Members of the genus *Guignardia* are found in the foliage of gymnosperms, herbaceous dicotyledons and monocotyledons (Hanlin, 1990). Hanlin (1990) reports distinguishing features to include dark-brown, globose or subglobose, ostiolate ascomata, a pseudoparenchymatous centrum, and distinct mucilaginous appendages which occur at one or both ends of the spore. The anamorphs are species of *Phyllosticta* Pers., with a *Leptodothiorella* Höhn. spermatial state. In some species ascospores may be surrounded by a mucilaginous sheath or lack sheaths or appendages altogether (Hyde, pers. obs.).

Fröhlich & Hyde (1995) described *Guignardia candeloflamma* J. Fröhl. & K. D. Hyde from leaf spots on an unidentified palm collected in Irian Jaya and Australia. The first *Guignardia* Viala & Ravaz from palms was described as early as 1914 by Rehm. Ten *Guignardia* names associated with palms have been published since and a single species is known from *Freycinetia* in the Pandanaceae (Rehm, 1913; Saccardo, 1917; von Arx & Müller, 1954; Hino & Katumoto, 1965; Punithalingam, 1974). *Guignardia*-like species from palms may also have been described under *Desmotascus* F. Stev., *Laestadia* Auersw., *Phomatospora* Sacc., *Physalospora* Niessl and *Melanops* Nitschke.

Twenty five *Guignardia* or *Guignardia*-like species have been described from palms and many of these have been examined. Some species in the genera mentioned above were also studied. Eight species are recognised in this paper, while the rest are transferred or synonymised. I suspect that there may be many more undiscovered

[1] XIX in Sydowia 47(1): 38–43.

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Tab. 1. – Comparative data of species of *Guignardia* from palms.

	G. arengae Rehm	*G. calami* (Syd. & P. Syd.) Arx & E. Müll.	*G. candeloflamma* J. Fröhl. & K. D. Hyde	*G. cocoës* (Petch) K. D. Hyde	*G. cocogena* (Cooke) Punith.	*G. manokwaria* K. D. Hyde	*G. migrans* (Rehm) K. D. Hyde	*G. ryukyuensis* I. Hino & Katum.
Hosts	*Arenga*, unidentified palm	*Areca?*, *Calamus*, *Caryota?*, *Cocos*	*Pinanga*	*Cocos*	*Archontophoenix*, *Cocos*, *Trachycarpus*	*Gelubia?*	*Arenga*	*Arenga*
Habit	Dead leaves or petioles	Living leaf	Spot on living leaf	Leaf spot on living leaves	Leaves	Dead petioles	Leaf spot on living leaves	Living petioles
Ascomata	320–500 µm diam, 65–120 µm high	100 µm diam	50–105 x 22.5–50 µm diam	250–300 µm diam	100–130 µm diam	200 µm diam, 100 µm high	400 µm diam, 100 µm high	350–400 µm diam, 280–350 µm high
Asci	40–100 x 20–28 µm	42–72 x 14–18 µm	91–140 x 17.5–25 µm	75–125 x 20–25 µm	62–100 x 10–12 µm	70–100 x 20–24 µm	54–82 x 22–38 µm	70–85 x 18–23 µm
Ascospores	18–26 x 8–13 µm	15–19 x 7–8 µm	17.5–25 x 7.5–11 µm	23–26.5 x 9–10 µm	13–20 x 5–6.5 µm	22–30 x 8–12 µm	19–24 x 8.5–12 µm	23–28 x 6.5–7 µm
	Roughened wall	Remnants of a mucilaginous sheath	Pad and candle-flame-shaped appendages	Germ pores and remnants of	End mucilaginous caps mucilage	Irregular mucilaginous sheath	No sheath or appendages	No appendages
Distribution	Indonesia, Philippines	Burma, India, Indonesia, Philippines	Australia, Indonesia	Solomon Islands	China, Guyana, Malaysia	Indonesia	Philippines	Japan

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species in nature. This paper brings together information available on these *Guignardia* species on palms and the somewhat closely related family Pandanaceae, including new records, with diagnoses, discussions and illustrations. This study is mainly based on herbarium material and all microscopic measurements were made in water. A dichotomous key to the species of *Guignardia* on palms and a table of comparative features (Tab. 1) is provided.

Key to species of *Guignardia* on palms

1. Ascospores with bipolar germ pores 2
1. Ascospores lacking germ pores 3

2. Ascospores 23–26.5 µm long, surrounded by remnants of mucilage, associated with spots on living leaves of *Cocos* ..... *G. cocoës*
2. Ascospores 22–30 µm long, surrounded by a mucilaginous sheath, which is wavy in outline, on dead palm petioles ... *G. manokwaria*

3. Ascospores with bipolar appendages 4
3. Ascospores surrounded by mucilaginous sheath or lacking sheaths or appendages 5

4. Appendages cap-like ..... *G. cocogena*
4. Basal appendages pad-like and polar appendages candle-like ..... *C. candeloflamma*

5. Ascospores 15–19 µm long ..... *G. calami*
5. Ascospores mostly longer than 19 µm 6

6. Ascospores with a rough wall, on dead leaves ..... *G. arengae*
6. Ascospores smooth-walled, on living leaves or petioles 7

7. Ascospores 19–24 x 8.5–12 µm, associated with spots on leaving leaves ..... *G. migrans*
7. Ascospores 23–28 x 6.5–7 µm, on living petioles ..... *G. ryukyuensis*

Taxonomy

1. ***Guignardia arengae*** Rehm, Leaft. Phil. Bot. 6: 2195. 1914. – Figs. 1–14.
≡ *Melanops arengae* (Rehm) Petr., Ann. Mycol. 32: 391. 1934.

A s c o m a t a developing under slightly raised regions, 520–910 µm diam, which have a darkened outer rim and light-coloured centre, containing a central blackened ostiolar dot (Fig. 1); in vertical section 320–500 µm diam, 65–120 µm high, lenticular or subglobose,

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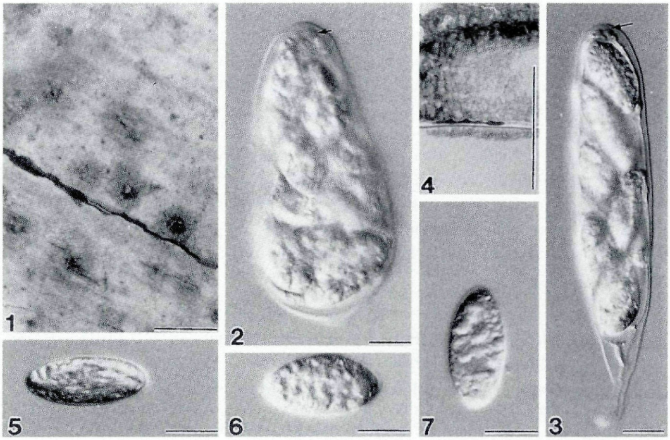

Figs. 1–7. *Guignardia arengae* (from holotype). – 1. Appearance of ascomata on host surface. – 2, 3. Asci. Note the apical ring (arrowed). – 4. Section of ascoma. – 5–7. Ascospores. – Bars, 1 = 1 mm; 4 = 100 µm; 2,3, 5–7 = 10 µm.

immersed, surrounded by variable stromatic development, with a central ostiole, axis vertical to the host surface (Figs. 4, 8, 10). – Stromata covering ascoma comprising host epidermal cells coloured light-brown by intracellular fungal hyphae (Figs. 4, 8, 10). – Peridium composed of brown-walled *textura globulosa*, inwardly compressed (Figs. 4, 10). – Pseudoparaphyses ca 4 µm wide, hypha-like, filamentous, numerous, irregular and branching (Fig. 12). – Asci 40–100 x 20–28 µm, 8-spored, ovoid, saccate or clavate, pedicel short, or absent, thick-walled, bitunicate, apically rounded with a J^- subapical ring, 5 µm high, 2 µm diam (fissitunicate dehiscence not seen) (Figs. 2, 3, 9, 11). – Ascospores 18–26 x 8–13 µm, 2–3-seriate, ellipsoidal, unicellular, hyaline, thin-walled, roughened (Figs. 5-7, 13, 14).

Known distribution. – Indonesia, Philippines.

Known hosts. – *Arenga*, indetermined palm.

Material examined. – PHILIPPINES: Laguna Province, Los Baños, on dead leaf of *Arenga mindorensis*, Dec. 1913, C. F. Baker No. 2170, S (holotype). – INDONESIA: Irian Jaya, Manokwari, on terrestrial dead palm frond in freshwater swamp, Mar. 1992, K. D. Hyde & N. Raga, KDH 1204a, BRIP 22747. Ibid., KDH 1215, BRIP 22748.

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G. arengae is closest to *G. calami*, but the former has larger ascospores with a very finely roughened wall. Because this ornamentation is fine it is not visible in the micrographs (Figs. 5-7, 13, 14), but can be seen in material mounted in water using interference contrast microscopy.

The specimens from Irian Jaya (Figs. 8-14) occurred on petioles as compared to leaves and had narrower ascospores (18–25 x 8–9 µm, vs. 21–26 x 11–13 µm). Ascospores, however, had a roughened wall similar to that observed in *G. arengae* and therefore the fungi are considered to be the same. Pseudoparaphyses were seen in the material from Irian Jaya and were ca 4 µm wide, hypha-like, filamentous, numerous, irregular and branching (Fig. 12). Asci had fissitunicate dehiscence.

2. ***Guignardia calami*** (Syd. & P. Syd.) Arx & E. Müll., Beitr. Kryptogamenflora Schweiz 11: 55. 1954. – Figs. 15–22.

≡ *Physalospora calami* Syd. & P. Syd., Ann. Mycol. 9: 407. 1911.
≡ *Melanops calami* (Syd. & P. Syd.) Petr., Ann. Mycol. 32: 375. 1934.
= *Physalospora transversalis* Syd. & P. Syd., Ann. Mycol. 9: 407. 1911.
= *Physalospora arecae* Höhn., Sber. Akad. Wiss. Wien 121: 383. 1912.
= *Melanops banosensis* Petr., Ann. Mycol. 32: 436. 1934.
= *Guignardia banosensis* (Petr.) Arx & E. Müll., Beitr. Kryptogamenflora Schweiz 11: 57. 1954.

Anamorph. – *Phyllosticta arecae* Höhn.

Leaf spots up to 25 mm long, 8 mm wide, rectangular, outer portion dark-brown, inner portion necrotic and light-brown (Figs. 15, 16). – Ascomata forming under globose raised darkened areas in the leaf spot, solitary or clustered; in vertical section, up to 100 µm diam, globose or subglobose, immersed, with a central ostiole (Fig. 17). – Peridium thin, composed of a few layers of brown angular cells (Fig. 17). – Pseudoparaphyses of short chains of ovoid cells (Fig. 19). – Asci 42–72 x 14–18 µm, 8-spored, broad-cylindrical to ellipsoidal, short pedunculate, bitunicate, fissitunicate dehiscence not seen, apically rounded with an ocular chamber and subapical ring (Fig. 18). – Ascospores 15–19 x 7–8 µm, 2–3 seriate, ovoid or somewhat irregularly ovoid, hyaline, unicellular, often surrounded by remnants of a mucilaginous sheath (Figs. 20–22).

Known distribution. – Burma, India, Indonesia, Philippines.

Known hosts. – *Areca?, Calamus, Caryota?, Cocos.*

Material examined. – BURMA: Bilin, on leaves of *Cocos nucifera*, 14 Jan. 1908, E. M. Butler, Herb. Crypt. Ind. Orient. No 1218, S (holotype of *Physalospora transversalis*). – INDIA: Chittagong, associated with leaf spots of *Calamus*

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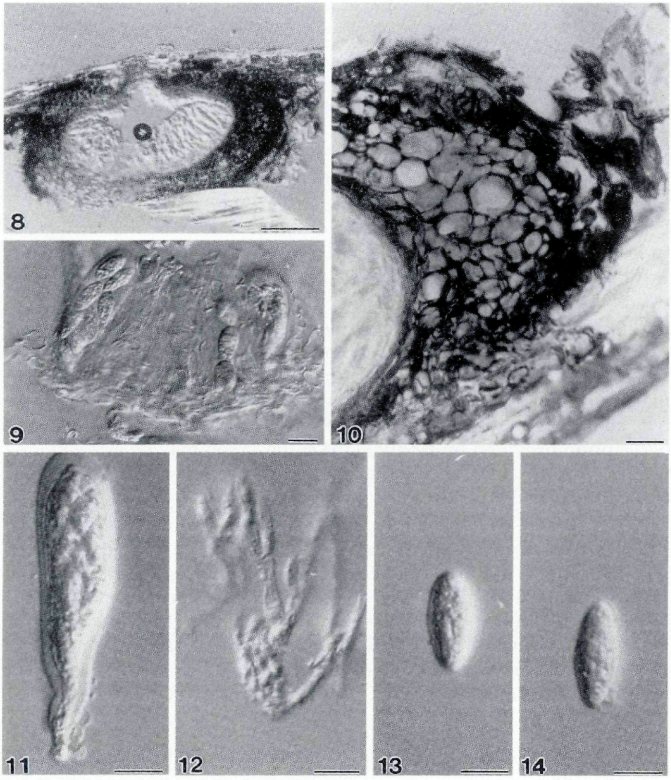

Figs. 8–14. *Guignardia arengae* (BRIP 22747). – 8, 10. Sections of ascomata. – 9. Squash of ascoma contents. – 11. Ascus. – 12. Pseudoparaphyses. – 13, 14. Ascospores. – Bars 8, 9 = 100 µm; 10–14 = 10 µm.

tenuis, 15 Dec. 1907, R. Sen, 1217, S (holotype of *Physalospora calami*). – INDONESIA: Java, Buitenzorg, on leaf of *Areca*, 1907, Höhnel, FH (holotype of *Physalospora arecae*). – PHILIPPINES: Province Laguna, Los Baños, on leaf of *Caryota* sp., 5 Nov. 1913, M. B. Raimundo, C. F. Baker No. 1988, S (lectotype of *Melanops banosensis*).

G. calami is associated with rectangular leaf spots on *Calamus* in India and is easily distinguishable from *G. arengae*, which occurs on

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dead leaves of *Arenga* in the Philippines. The ascospores of *G. calami* are smaller (15–19 x 7–8 µm vs. 18–26 x 8–13 µm) and smooth-walled with mucilage, compared to the roughened wall of the ascospores in *G. arengae*. *Physalospora transversalis* occurs on a different host, *Cocos*, but in other respects is identical to *G. calami* and therefore is considered a synonym. Because *G. calami* is associated with distinctive leaf spots on *Calamus*, the synonymy of *G. banosensis*, which is recorded on 'agbestogera' (leaves of *Caryota* sp.), seems unlikely. The type material of *G. banosensis*, however, is poor and a description of the species cannot be confirmed. For the time being the fungi are treated as conspecific although I suspect this is doubtful. Fresh collections of *G. banosensis* are needed to conclusively solve this problem.

Physalospora arecae was synonymised with *Guignardia calami* (von Arx & Müller, 1954). The sample loaned from FH contained two packages, both with leaves of *Areca* sp. with similar spots, 1–2 cm in diam, with a darkened outer margin. I examined numerous leaf spots, but could locate no ascomata with asci or ascospores. From the description provided by Höhnel (1912) the taxon may be synonymous with *G. calami* and until further material becomes available I prefer to treat it as such.

There are two packages held in S containing material of *Physalospora calami*. One is marked Ser. No. 1217, while the other has no number, although all other details, including the morphology of the taxon are identical. The package No. 1217 has fungal material of higher quality and is chosen as the lectotype. The anamorph of *G. calami* is considered to be *Phyllosticta arecae* Höhn. (von Arx & Müller, 1954), because *P. arecae* is treated as its synonym. Several other synonyms of *P. arecae* are listed by Sivanesan (1984).

3. ***Guignardia candeloflamma*** J. Fröhl. & K. D. Hyde, Mycol. Res. 99: 110. 1995.

Leaf spots 15–45 x 10–22 mm, ellipsoidal, identical on both leaf surfaces, light-brown, with a zonate, medium-brown centre becoming grey with age and a distinct, thin, dark-brown border. – Ascomata 50–105 x 22.5–50 µm ($\bar{x}$= 69 x 36 µm, n = 20), immersed, globose to cylindrical, with an eccentric ostiole. – Peridium 6–13 µm thick, composed of one to three layers of brown, polyhedral or cuboid cells. – Stromata absent, but the ascomata may appear dark from above due to the dark pigmentation of the cells of the peridium. – Centrum pseudoparenchymatous and composed of small, sphaerical cells 6–10 µm diam, which form short chains when the centrum breaks or is disrupted. – Asci 91–140 x 17.5–25 µm

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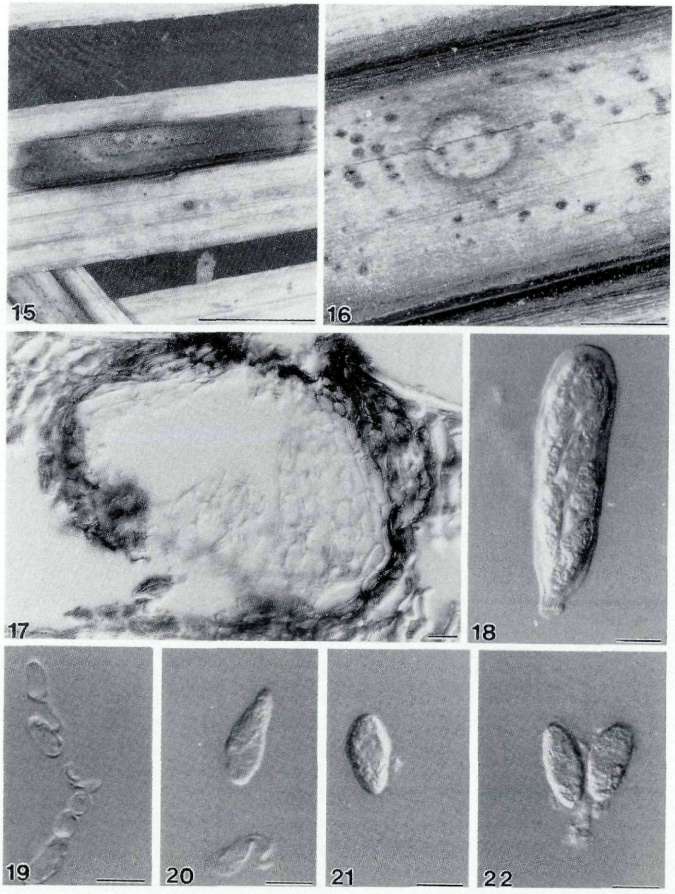

Figs. 15–22. *Guignardia calami* (from lectotype). – 15, 16. Leaf spots. – 17. Section of ascoma. – 18. Ascus. – 19. Pseudoparaphyses. – 20–22. Ascospores. – Bars: 15 = 10 mm; 16 = 1 mm; 17–22 = 10 µm.

($\bar{x}$ = 115 x 20 µm, n = 50), 8-spored, clavate to pyriform, with a short stalk, bitunicate and with an ocular chamber. – Ascospores 17.5–25 x 7.5–11 µm ($\bar{x}$ = 21 x 9.5 µm, n = 50), biseriate, hyaline, one-celled, ellipsoidal, with a rounded apex and bullet-shaped base, with a

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distinct mucilaginous appendage at each end, a 2.25 x 10.25 µm pad at the apex and a ca 19.2 µm long candle-flame-shaped process at the base.

Known distribution. – Australia, Indonesia.

Known host. – *Pinanga*.

Material examined. – AUSTRALIA: north Queensland, Smithfield, Woodman's Nursery (The Palm Factory), living leaf of an unidentified *Pinanga* sp., Feb. 1992, J. Fröhlich & K. D. Hyde, KDH 1023, BRIP 20472 (holotype). – INDONESIA: Irian Jaya, Marauke, on living leaf of an unidentified palm, Mar. 1992, K. D. Hyde & N. Raga, KDH 1267, BRIP 20398.

Guignardia candeloflamma is easily distinguished from other *Guignardia* species on palms by its unique appendages. It was illustrated by Fröhlich & Hyde (1995).

4. ***Guignardia cocoës*** (Petch) K. D. Hyde, comb. nov. – Figs. 23-29.
≡ *Desmotascus cocoës* Petch, Ann. R. Bot. Gard. Peradeniya 7: 300. 1922.

Leaf spots brown, necrotic, with concentric rings of blackened dots. – Ascomata developing under raised, slightly darkened areas, occasionally erumpent and cracking the host surface, mostly solitary (Fig. 23); in vertical section 250–300 µm diam, subglobose, immersed beneath the host cuticle, ostiolate (Fig. 24). – Peridium up to 25 µm wide, composed of a few layers of brown-walled angular cells (Fig. 25). – Pseudoparaphyses not seen. – Asci 75–125 x 20–25 µm, 8-spored, clavate, pedunculate, bitunicate, fissitunicate, apically rounded, with an ocular chamber (Fig. 26). – Ascospores 23–26.5 x 9–10 µm, 2–3-seriate, irregularly ellipsoidal, unicellular, hyaline, with apical button-like germ pores and remnants of mucilage (Figs. 27–29).

Known distribution. – Solomon Islands.

Known host. – *Cocos*.

Material examined. – SOLOMON ISLANDS: on leaves of *Cocos nucifera*, Jun. 1917, Petch, K (holotype).

This species from palms is distinct from other taxa in several important aspects. Ascospores are longer than in most other species (Tab. 1) and have polar germ pores. It is closest to *G. manokwaria*, which differs in its fusoid-rhomboid ascospores surrounded by a mucilaginous sheath, which is irregular and wavy in outline (Figs. 40–43).

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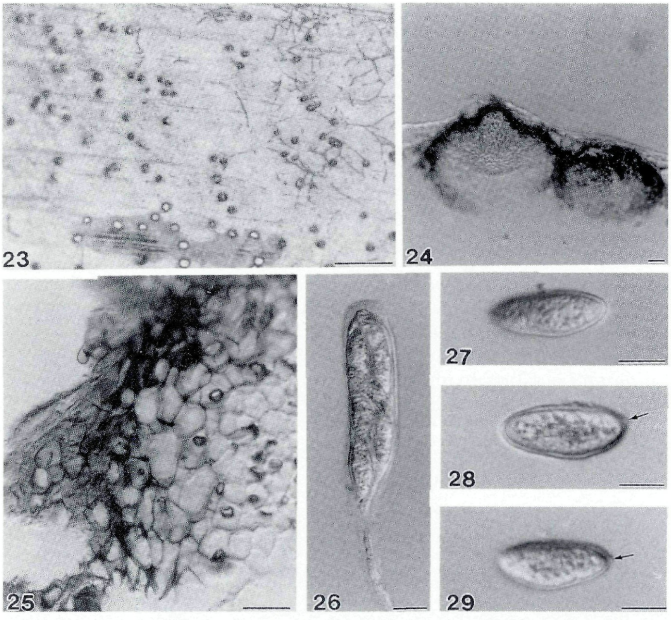

Figs. 23–29. *Desmotascus (=Guignardia) cocoës* (from holotype). – 23. Ascomata on leaf. – 24. Section of ascomata. – 25. Peridium. – 26. Ascus. – 27–29. Ascospores. Note the germ pores (arrowed). – Bars: 23 = 1 mm, 24–29 = 10 µm.

5. ***Guignardia cocogena*** (Cooke) Punith., Mycol. Pap. 136: 21. 1974. – Figs. 30–33.

≡ *Sphaeria cocogena* Cooke, Grevillea 5: 102. 1877.
≡ *Metasphaeria cocogena* (Cooke) Sacc., Syll. Fung. 2: 172. 1883.
= *Guignardia cocoicola* Punith., Mycol. Pap. 136: 15. 1974.

Anamorph. – *Phyllosticta cocoicola* (Bat.) Sivanesan, The bitunicate ascomycetes and their anamorphs: 169. 1974.

Ascomata developing under slightly raised darkened areas, solitary (Fig. 30); in vertical section 100–130 µm diam, globose or subglobose (Fig. 31), with an eccentric neck. – Peridium up to 10 µm wide, composed of 3–4 layers of brown-walled angular cells (Fig. 31). – Asci 62–100 x 10–12 µm, 8-spored, clavate, pedunculate, thick-walled, bitunicate, apically rounded, with an ocular chamber

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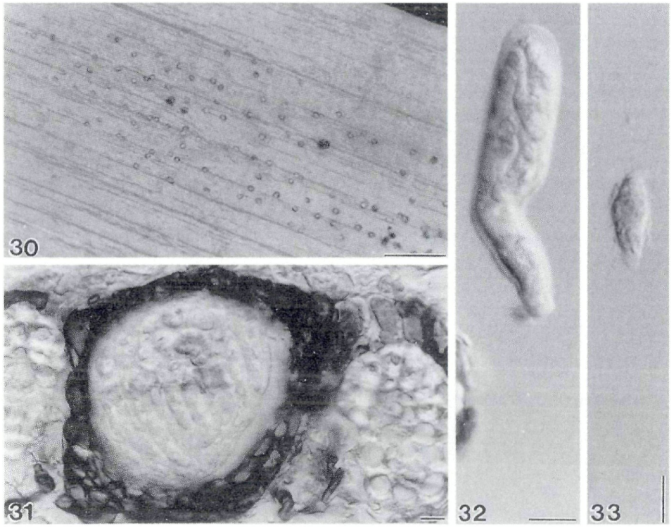
(Fig. 32). – Ascospores 13–20 x 5–6.5 µm, 2–3-seriate, fusiform to ellipsoidal, unicellular, hyaline, wider in the mid-region, ends rounded with mucilaginous caps (Fig. 33).

Known distribution. – China, Guyana, Malaysia.

Known hosts. – *Archontophoenix*, *Cocos*, *Trachycarpus*.

Material examined. – GUYANA: Georgetown (Demerara), on leaves of *Cocos nucifera* L., K (holotype). – MALAYSIA: Sabah, isolated from pinnae of *Cocos nucifera*, 1973, P. S. W. Liu, IMI 166144 (holotype of *G. cocoicola*).

Ascospores of *Guignardia cocogena* and *G. cocoicola* are identical in shape, overlap in size (13–20 x 5–6.5 µm vs 13–16 x 4–7 µm) and have similar polar mucilaginous pads. J. Taylor (pers. comm.) has also isolated this taxon as an endophyte from *Trachycarpus fortunei* in China and a saprophyte on *Archontophoenix alexandrae* in Penang, Malaysia. The spore dimensions (15–17.5 x 5–6.25 µm & 13.25–17 x 6.25–7 µm respectively) form a range between *G. cocogena* and *G. cocoicola* and therefore I consider all these taxa to be conspecific. *G. cocoicola* was isolated from a pinna of *C. nucifera* by



Figs. 30–33. *Guignardia cocogena* (from holotype). – 30. Ascomata on leaf surface. – 31. Section of ascomata. – 32. Ascus. – 33. Ascospore. – Bars: 30 = 1 mm; 31–33 = 10 µm.

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Punithalingam (1974) and was probably also an endophyte in that situation.

6. ***Guignardia manokwaria*** K. D. Hyde, sp. nov. – Figs. 34–43.

Ascomata 200 µm diam, 100 µm alta, conica, immersa. Asci 70–100 x 20–24 µm, 8-spori, clavati, pedunculati, bitunicati, fissitunicati, apparato apicali praediti. Ascosporae 22–30 x 8–12 µm, 2–3-seriatae, fusiformes vel fusiformes-rhomboideae, unicellulae, hyalinae, tunica gelatinosa praeditae.

Holotypus. – INDONESIA: Irian Jaya, Manokwari, on rachides of dead *Golubia*?, Mar. 1992, K. D. Hyde & N. Raga, KDH 1206, BRIP 22749.

Etymology. – In reference to the location Manokwari.

Ascomata developing under slightly darkened areas, occasionally erumpent and cracking the host surface, mostly solitary (Fig. 35); in vertical section ca 200 µm diam, 100 µm high, conical, immersed beneath the host cuticle with an erumpent apex, base flattened, with a thin spreading stroma at the periphery of the ascoma (Fig. 34). – Peridium up to 30 µm wide, thin below, composed of dark-brown-walled angular cells at the sides (Fig. 36). At the periphery is a wedge of dark-brown angular cells which extends as a thin line between adjacent ascomata (Fig. 34). – Pseudo-paraphyses up to 4 µm diam, hypha-like, filamentous, composed of short cylindrical cells, 8-10 x 4 µm diam (Fig. 39). – Asci 70–100 x 20–24 µm, 8-spored, clavate, pedunculate, bitunicate, fissitunicate, apically rounded with an ocular chamber and faint ring (Figs. 37, 38). – Ascospores 22–30 x 8–12 µm, 2–3-seriate, fusiform or fusiform-rhomboid, unicellular, hyaline, with apical button-like germ-pores and surrounded by a mucilaginous sheath with an irregular wavy outline (Figs. 40–43).

Known distribution. – Indonesia.

Known host. – *Golubia*?

Material examined. – INDONESIA: Irian Jaya, Manokwari, on rachides of dead *Gelubia*?, Mar. 1992, K. D. Hyde & N. Raga, KDH 1206, BRIP 22749.

This is a new *Guignardia* species from palms, which is distinct from others in several important ascospore characteristics. Ascospores are longer than those of most other species (Tab. 1) and their shape is fusoid-rhomboid. Furthermore they are surrounded by a

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mucilaginous sheath which is irregular and wavy in outline, and have apical germ pores (Figs. 40–43).

7. ***Guignardia migrans*** (Rehm) K. D. Hyde, comb. nov. – Figs. 44–51.
≡ *Phomatospora migrans* Rehm, Leaft. Phil. Bot. 6: 2195. 1914.
≡ *Catacauma migrans* (Rehm) Höhn., Ann. Mycol. 16: 247. 1918.

Leaf spots up to 3 cm diam, ovoid, composed of concentric rings of light and darker tissue, some with a central necrotic tan region. The leaf tissue of the spot is whitish purple in colour and

Tab. 2. – Remarks on *Guignardia*-like species from palms.

Species	Notes
Catacauma migrans	≡ *Guignardia migrans*
C. palmicola	Not a *Guignardia*
C. sabal	Not a *Guignardia*
C. torrendiella	Not a *Guignardia*
Desmotascus cocoës	≡ *Guignardia cocoës*
Guignardia arecae	No type available
G. arengae	Accepted in this paper
G. calami	Accepted in this paper
G. banosensis	≡ *Guignardia calami*
G. candeloflamma	Accepted in this paper
G. cocoës	Comb. nov. in this paper
G. cocogena	Accepted in this paper
G. cocoicola	≡ *Guignardia cocogena*
G. freycinetiae	≡ *Micronectriopsis freycinetiae*
G. manokwaria	New in this paper
G. migrans	Accepted in this paper
G. ryukyensis	Accepted in the paper
Laestadia cocophila	Type lacking mature material
Melanops arengae	≡ *Guignardia arengae*
M. banosensis	≡ *Guignardia calami*
M. calami	≡ *Guignardia calami*
Metasphaeria cocogena	≡ *Guignardia cocogena*
Phomatospora cylindrotheca	Not a *Guignardia*
P. pandani	Not a *Guignardia*
P. migrans	≡ *Guignardia migrans*
Physalospora arecae	≡ *Guignardia calami*
P. asbolae	No type available
P. astrocaryi	No type available
P. calami	≡ *Guignardia calami*
P. cocoës	Type lacking good material
P. pandani Ellis & Everh.	Not a *Guignardia*
P. pandani Stevens & Pierce	Homonym of *Physalospora pandani* Ellis & Everh.
P. rhacheophila	Type lacking good material
P. tecta	No type available
P. transversalis	≡ *Guignardia calami*
Sphaerella cocophylla	Type lacking mature material
Sphaeria asbolae	No type available

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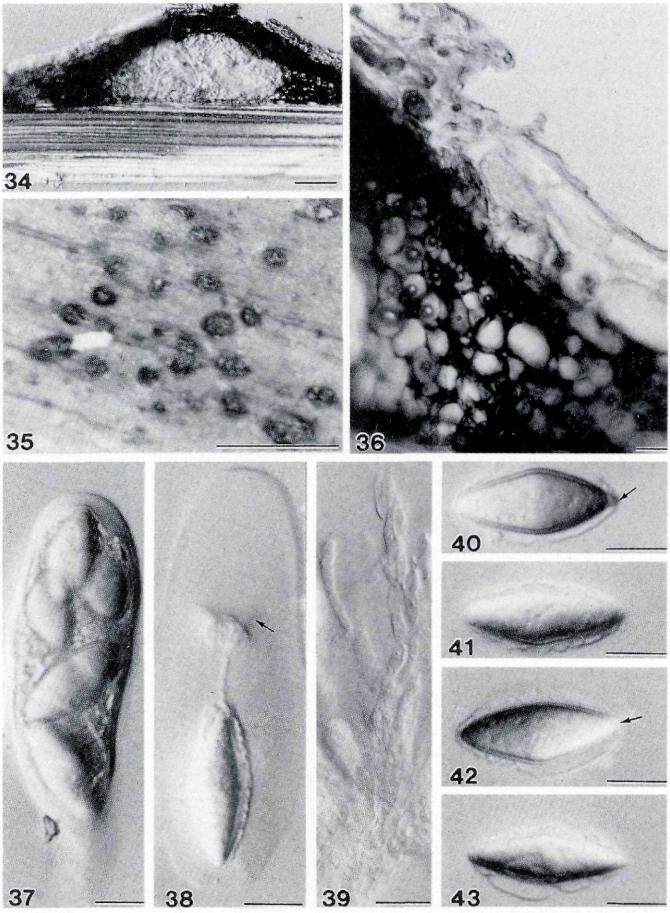

Figs. 34–43. *Guignardia manokwaria*. – 34. Section of ascoma. – 35. Ascomata on frond surface. – 36. Peridium. – 37, 38. Asci. Note the subapical ring (arrowed). – 39. Pseudoparaphyses. – 40–43. Ascospores. Note the germ pores (arrowed). – Bars: 35 = 1 mm, 34, 36–43 = 10 μm.

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darker in the region of the concentric rings of ascomata, the outer leaf tissue is brown in colour (Figs. 44, 45). – Ascomata c. 400 µm diam, 100 µm high, forming under slightly raised dark areas with an outer dark ring, cylindrical (Fig. 50), with an eccentric ostiole. – Peridium composed of a few layers of pale brown-walled angular cells (Figs. 50, 51). – Pseudoparaphyses not seen. – Asci 54–82 x 22–38 µm, 8-spored, clavate to ovoid, thick-walled, bitunicate (fissitunicate dehiscence not seen), apically rounded, with an ocular chamber and subapical ring (Figs. 46, 47). – Ascospores 19–24 x 8.5–12 µm, 2–3-seriate, ellipsoidal, unicellular, hyaline, smooth-walled, lacking sheaths or appendages (Figs. 48, 49).

Known distribution. – Philippines.

Known host. – *Arenga*.

Material examined. – PHILIPPINES: Laguna Province, Los Bañõs, on leaves of *Arenga saccharifera*, 8 Jan. 1913, S. Reyes, C.F. Baker No. 1425, S (holotype).

Phomatospora migrans was synonymised with *Guignardia arengae* by von Arx & Müller (1954), however the species are distinct. *G. arengae* sporulates on dead leaves of *Arenga*, while *P. migrans* is associated with spots on living leaves of the same host. The ascospores in *P. migrans* are also shorter and narrower than those of *G. arengae* and lack a roughened wall. *P. migrans* shows all of the characteristics of the genus *Guignardia*, therefore a new combination is proposed.

8. ***Guignardia ryukyuensis*** I. Hino & Katumoto, Bull. Fac. Agric. Yamaguti Univ. 16: 608. 1965.

Ascomata 350–400 µm diam, 280–350 µm high, subglobose or depressed-globose, immersed, solitary or gregarious. – Peridium 25–30 µm wide, composed of a few layers of brown angular cells. – Asci 70–85 x 18–23 µm, 8-spored, clavate or cylindric-clavate, pedunculate, thick-walled, bitunicate (fissitunicate dehiscence not discussed), apically rounded (no details of apical structures noted). – Ascospores 23–28 x 6.5–7 µm, 2-seriate, fusoid or oblong-fusoid, unicellular, hyaline, ends rounded or obtuse, without sheaths or appendages.

Material examined. – JAPAN: Ins. Taketomi, Ryûkyû, in living petiole of *Arenga engleri* Becc., 5 Apr. 1963, I. Hino, YAM.

In the holotype of *G. ryukyuensis* there are three fungi; a *Colletotrichum*-like species, a second coelomycete and what appears

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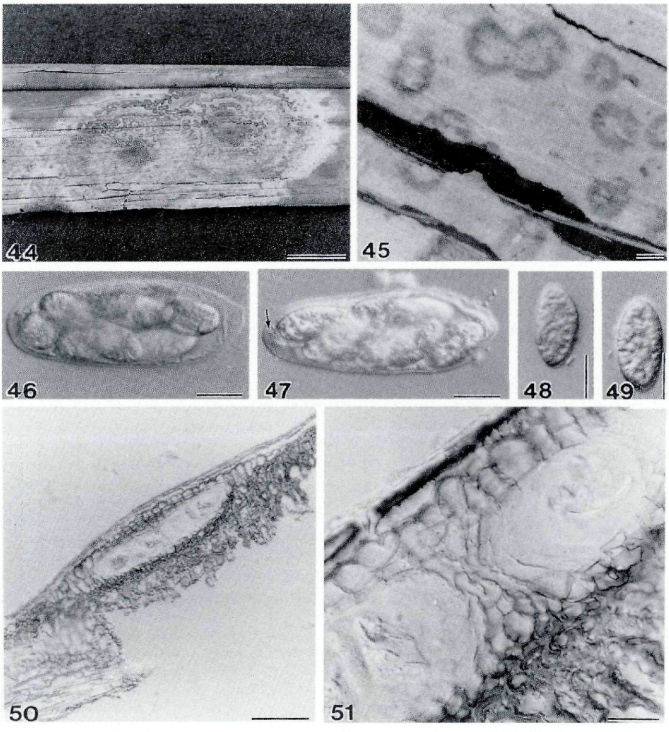

Figs. 44–51. *Guignardia migrans*. – 44, 45. Leaf spot and ascomata. – 46, 47. Asci. Note the apical ring (arrowed). – 48, 49. Ascospores. – 50, 51. Sections of ascomata. – Bars: 44 = 1 mm, 45, 50 = 100 μm, 46–49, 51 = 10 μm.

to be an immature ascomycete (*Guignardia*?). I dissected several apparently 'mature' ascomata, but could find no ascospores or asci similar to those described for *G. ryukyuensis*. The descriptions and illustrations are therefore taken from Hino & Katumoto (1965) until fresh material can be studied.

G. ryukyuensis differs from *G. arengae* in having equally long, but thinner ascospores than *G. arengae* and should be retained as a distinct species.

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Doubtful species

Guignardia arecae Sacc., Atti Accad. Sci. Veneto-Trentina-Istriana 10: 63. 1917.

Type material of this taxon is not available at PAD or K and its location is unknown. Saccardo (1917) described the ascospores as being 12–14.5 x 5.5–6 µm, ellipsoidal to oblong with rounded apices and hyaline and I have no reason to doubt that this is a good, small-spored *Guignardia*. No material, however, can be found and too little is known of this taxon.

Guignardia freycinetiae Rehm, Phil. J. Sci. Sect. C. Bot. 8: 184. 1913.

The location of type material of this taxon is unknown since it is not available at S. From the description of Rehm (1913) it is unlikely to be a *Guignardia*. Höhnel (1918) introduced the monotypic genus *Micronectriopsis* Höhn. to accommodate it.

Laestadia cocophila (Cooke) Sacc., Syll. Fung. 1: 431. 1882.

≡ *Sphaerella cocophylla* Cooke, Grevillea 5: 102. 1877.

Type material borrowed from K contained *Cocos* leaves with patches with small fruiting bodies. None of the fruiting bodies were mature. Saccardo (1882) reported ascospores as being 10 µm long and hyaline and asci as obclavate. This may be a small spored *Guignardia*, but its true identity cannot be established.

Material examined. – GUYANA, Demerara, on leaves of *Cocos nucifera* (K, holotype of *Sphaerella cocophylla* Cooke).

Physalospora asbolae (Berk. & Broome) Cooke, Grevillea 20, 82 (1891).

≡ *Sphaeria asbolae* Berk. & Broome, Fungi of Ceylon: 307 (1871).

Material is not available at K and therefore the identity of this taxon cannot be determined.

Physalospora astrocaryi Henn., Hedwigia 48: 107. 1908.

From the description provided by Hennings (1908) this is a characteristic *Guignardia* species. *P. astrocaryi* is associated with pallid effuse spots on leaves of *Astrocaryi rostrati*. The ascospores are given as 20–30 x 10–13 µm, fusoid, straight or curved, obtuse, hyaline, with a mucilaginous sheath. Type material of this species deposited at B, however, is no longer available, and therefore its identity is considered doubtful.

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Physalospora cocoës Caballero, An. J. Bot. Madr. 1: 177. 1941.

This species is reported to occur on living leaves of *Cocos australis* Mart. in Spain (Caballero, 1941). The description suggests a *Guignardia* species, although asci are described to be 'incrassati.' I have examined the holotype, but could find no mature ascomata and therefore not enough is known of this fungus to determine its correct identity.

Material examined. – SPAIN: on living leaves of *Cocos australis*, 24 Apr. 1938, Caballero, MA.

Physalospora rhacheophila Sacc., Att. Accad. Sci. Veneto-Trentina-Istriana. 10: 64. 1917.

From the diagram on the packet, the specimen appears to be a *Guignardia* species with ascospores annotated as 17–19 x 6 μm and asci 55–60 x 8–9 μm. On careful examination of the samples, however, I could find no evidence of the described taxon, only a *Diplodia* and a species of *Phyllosticta*, the latter which may be the anamorph. Not enough is known of this species to treat it further.

Material examined. – PHILIPPINES, Luzon, Laguna, Los Baños, on dead rachis of *Arenga mindorensis*, Dec 1915, C. F. Baker 2747 & 3931 (PAD).

Physalospora tecta Winter, Hedwigia 24: 29. 1885.

The description of *P. tecta* provided by Saccardo (1891) is characteristic of *Guignardia* and the ascospore size (16–21 x 8–9 μm) is similar to that of *G. calami*. Type material is unavailable at B and its location is unknown.

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