Fungi from palms. XXXII.[1] *Arecomyces* gen. nov., with seven new species

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Arecomyces gen. nov. is introduced to accommodate *Physalospora*-like species on palms with unicellular, hyaline, ovoid, ellipsoidal, or ellipsoid-fusiform ascospores which are surrounded by a mucilaginous sheath; broad cylindrical asci with a refractive apical ring; and ascomata which are immersed under a clypeus or pseudostroma. *Arecomyces frondicola* is designated the generic type and six other new species are described. The taxa are illustrated with interference light photomicrographs and compared with other related genera.

Keywords: Hyponectriaceae, *Arecomyces*, Palmae, rachis.

A group of fungi that I have frequently collected on palms has hyaline, unicellular ascospores surrounded by a mucilaginous sheath, broad cylindrical asci with a nonamyloid, discoid, refractive apical ring, and ascomata immersed under a clypeus or pseudostroma. The group has affinities with genera placed in the Hyponectriaceae, although the species cannot be accommodated in any described genus. Members of the Hyponectriaceae (*Familia incertae sedis sensu* Hawksworth & al., 1995) are commonly associated with palms and include *Apioclypea* K. D. Hyde, *Linocarpon* Syd. & P. Syd., *Oxydothis* Syd. & P. Syd. and *Pemphidium* Mont. The taxonomic placement of these genera in the Hyponectriaceae is rather speculative and they could also be considered appropriate candidates for other families, such as the Amphisphaeriaceae. Members of the Xylariales (Amphisphaeriaceae, Clypeosphaeriaceae, Xylariaceae) are also common on palms and include *Anthostomella* Sacc., *Astrocystis* Berk. & Broome, *Capsulospora* K. D. Hyde, *Fasciatispora* K. D. Hyde and *Nipicola* K. D. Hyde (Hyde, 1992a, 1995, 1996a, 1996b; Hyde, Fröhlich & Taylor, 1996, Læssøe & Spooner, 1994). This group from palms, is however, different from all of these genera, or other genera in these families and therefore a new genus *Arecomyces* is introduced to

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accommodate taxa in this group. It is probably best referred to the Hyponectriaceae (*sensu* Hawksworth & al., 1995).

Some ascomycete genera with hyaline ascospores and unitunicate cylindrical asci with nonamyloid refractive apical rings include *Annulatascus* K. D. Hyde, *Glomerella* Spauld. & H. Schrenk, *Lasiosphaeria* Ces. & De Not., *Physalospora* Niessl. and *Plectosphaerella* Kirschst. In *Annulatascus* (Lasiosphaeriaceae) the ascal ring is relatively massive and the ascospores are minutely ornamented and have sheaths or appendages (Hyde, 1992b). In *Glomerella* (Phyllachoraceae) ascomata are normally immersed in diseased leaf tissue, the ascal ring is inconspicuous and the ascospores are ellipsoidal (CMI Descript. 315, 1971; Uecker, 1994). In *Lasiosphaeria* the ascomata are superficial, while ascospores are mostly cylindrical (Hilber & Hilber, 1983). In *Plectosphaerella* ascomata are relatively small (90–130 µm diam) and found in diseased leaf tissue, the ascospores are ellipsoidal and biseriate (Uecker, 1993). These genera appear to be unrelated to *Arecomyces*. There are no recent treatments of *Physalospora*, although Arx & Müller (1954) illustrate the type species *P. alpestris* Niessl. and Barr (1970) discuss several species from north America. In *Physalospora* a stroma or clypeus is lacking, asci are cylindro-clavate and relatively large, and spores are longer than 20 µm (Barr, 1970; Hanlin, 1990). *Arecomyces* can be distinguished from *Physalospora* as the ascomata are immersed in a clypeus or pseudostroma, the asci are broadly cylindrical with relatively distinct apical rings, and the ascospores are relatively small (less than 20 µm long). *Physalospora* has recently been placed in the Hyponectriaceae (Barr, 1990; Hawksworth & al., 1995), and because of the similarities between that genus and *Arecomyces,* this new genus is probably also best included there. It differs from species of *Hyponectria* Sacc., in which the ascomata are immersed and thickened above by an inconspicuous clypeus and rarely more than 200 µm diam., and the ascospores are smooth-walled and lack a wide mucilaginous sheath (Barr, 1977). Species of *Arecomyces* are presently only known from palms.

Arecomyces is also similar to *Phomatospora* Sacc. in that the ascomata are immersed, the asci are cylindrical and with an apical ring, and the ascospores are unicellular, hyaline and uniseriate in the ascus. However, unlike *Phomatospora* in which the ascospores are usually striate and appendaged, the ascospores of *Arecomyces* are smooth or echinate and surrounded by a mucilaginous sheath. The asci in *Phomatospora* are also long cylindrical as compared to broadly cylindrical in *Arecomyces* and the apical ring differs; cylindrical in *Phomatospora,* and discoid in *Arecomyces*. The paraphyses in *Phomatospora* are also much wider than those in *Arecomyces,* which are narrow and embedded in a gelatinous matrix. *Phomatospora* is presently included

Tab. 1. – Synopsis of *Arecomyces* species. All measurements in µm.

	A. bruneiensis	*A. dicksonii*	*A. epigeni*	*A. frondicola*	*A. hedgerii*	*A. sekoyae*	*A. tetrasporus*
Asci	105–129 x 11–15, 8-spored	57–75 x 6–7.5, 8-spored	82–92 x 7–8, 8-spored	94–120 x 11–15, 8-spored	100–115 x 9–10, 8-spored	91–122 x 7.5–9, 8-spored	62–75 x 8–12, (2-)4-spored
Ascospores	15–19 x 6.5–8, lenticular, echinulose, with a sheath	7.5–10 x 4.5–6, oblong ellipsoidal, smooth, with a sheath	12–16 x 4–4.5, fusiform with tapered ends, echinulose, sheath wavy in outline	12.5–14 x 5–7, ellipsoid-fusiform, echinate, with a sheath	8.5–12.5 x 5–6.5, ovoid, smooth, with a sheath	12.5–15 x 5–7.5, lunate, smooth, sheath lacking	13–17 x 5–6.5, ellipsoidal, echinulose, with a sheath
Host	*Daemonorops*	*Jessenia*	*Eugeissona, Oraniopsis*	*Arenga, Calamus, Elaeis, Licuala, Oncosperma, Oraniopsis*	*Jessenia*	*Jessenia*	*Phytelephas*
Distribution	Brunei	Ecuador	Australia, Brunei	Brunei, Malaysia	Ecuador	Ecuador	Ecuador

in the *Pleurotremataceae* (Barr, 1994) or *ascomycetae incertae sedis* (Hawksworth & al., 1995).

Material has been deposited in the herbarium of The Department of Ecology and Biodiversity, University of Hong Kong (HKU). All measurements given in this paper were made from material mounted in water. A synopsis of the species in *Arecomyces* is given in Tab 1.

Taxonomy

Arecomyces K. D. Hyde, gen. nov.

Ascomata sub clypeo immersa, ellipsoidea vel subglobosa, ostiolata, solitaria vel gregaria, papillata, paraphysibus praedita. Asci (2–)4–8 spori, late cylindrici, cylindrici vel cylindrico-clavati, pedicellati, unitunicati, apparato apicali praediti. Ascosporae 1–3–seriatae, ellipsoideae, late fusiformes, ellipsoideae-fusiformes vel ovoideae, unicellulares, hyalinae, laeves vel echinulosae, tunica gelatinosa praeditae.

Typus generis. – *Arecomyces frondicola.*

Etymology. – In reference to the palm host.

Ascomata visible as slightly raised darkened discs or minute black dots or immersed under a pseudostroma on the host surface; in section ellipsoidal or subglobose, immersed under a clypeus or pseudostroma, ostiolate, papillate, solitary or gregarious. – Peridium hyaline or brown, comprising several layers of compressed or globose fungal cells. – Paraphyses hypha-like, filamentous, irregular, septate, numerous and embedded in a gelatinous matrix. – Asci (2–)4–8 spored, broadly cylindrical, pedicellate, thin-walled, unitunicate, apically truncate (or rounded), with a discoid, nonamyloid apical ring. – Ascospores uniseriate or overlapping uniseriate, ellipsoidal, broadly fusiform, ellipsoidal-fusiform or ovoid, unicellular, hyaline, smooth-walled or echinate, surrounded by a mucilaginous sheath.

Type species. – *Arecomyces frondicola.*

Key to *Arecomyces* species

1. Asci (2–)4-spored ..... *A. tetrasporus*
1. Asci 8-spored 2

2. Ascospores asymmetric, 12.5–15 x 5–7.5 µm, lacking a mucilage sheath, developing under a blackened pseudostroma .. *A. sekoyae*
2. Ascospores symmetric 3

3. Ascospores lenticular, 15–19 x 6.5–8 µm ..... *A. bruneiensis*
3. Ascospores oblong ellipsoidal, lenticular or ovoid, mostly less than 15 µm long 4

4. Ascospores mostly 12–16 µm long 5
4. Ascospores mostly less than 12 µm long 6

5. Ascospores 12.5–14 x 5–7 µm, sheath regular in outline ..... *A. frondicola*
5. Ascospores 12–16 x 4–4.5 µm, sheath wavy in outline .. *A. epigeni*

6. Ascospores oblong ellipsoidal, 7.5–10 x 4.5–6 µm, clypeate ..... *A. dicksonii*
6. Ascospores ovoid, 8.5–12.5 x 5–6.5 µm, developing under a reddish-brown pseudostroma ..... *A. hedgerii*

1. ***Arecomyces bruneiensis*** K. D. Hyde, sp. nov. – Figs. 1–12.

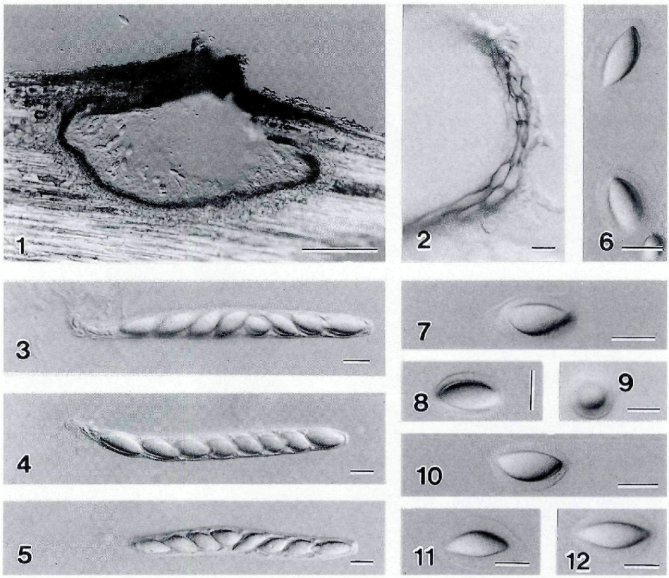
Ascomata sub clypeo immersa, 260–420 µm diam, 200–250 µm alta, subglobosa, solitaria vel gregaria, ostiolata, papillata. Asci 105–129 x 11–15 µm, 8-spori, cylindrici, breviter pedicellati, unitunicati, ad apicem truncati, apparato apicali, 4 µm diam, 1 µm alto praediti. Ascosporae 15–19 x 6.5–8 µm, uniseriatae, late fusiformes vel lenticulares, unicellulares, hyalinae, echinulosae, tunica gelatinosa praeditae.

Holotype. – BRUNEI DARUSALAM, Temburong, Kuala Belalong, Field Studies Centre, on rachis of *Daemonorops* sp., June 1993, K. D. Hyde 1728 (HKU(M)1728).

Ascomata visible as minute black ostiolar dots on the host surface; in section 260–420 µm diam, 200–250 µm high, irregularly subglobose, immersed under a clypeus, solitary or gregarious, ostiolum central (Fig. 1). – Peridium up to 12 µm wide, comprising 3–4 layers of brown-walled, elongate fungal cells (Fig. 2). – Papilla short, occasionally erumpent above the host surface, surrounded by a blackened clypeus, clypeus comprising host cells and pale brown fungal hyphae, periphyses not seen (Fig. 1). – Paraphyses up to 4 µm wide, hypha-like, filamentous, irregular, septate, numerous and embedded in a gelatinous matrix (Fig. 1). – Asci 105–129 x 11–15 µm, 8-spored, cylindrical, short pedicellate, thin-walled, unitunicate, apically truncate, with a non amyloid, discoid, refractive apical ring, 4 µm diam, 1 µm high (Figs. 3–5). – Ascospores 15–19 x 6.5–8 µm, overlapping uniseriate, lenticular, unicellular, hyaline, minutely echinulose and surrounded by a mucilaginous sheath (Figs. 6–12).

Known host. – *Daemonorops*.

Known distribution. – Brunei.



Figs. 1–12. *Arecomyces bruneiensis* (from holotype). – 1. Section of ascoma. – 2. Peridium. – 3–5. Cylindrical asci with apical ring. – 6–12. Ascospores. Note the mucilaginous sheath. – Bars: 1 = 100 µm, 2–12 = 10 µm.

Other material examined. – BRUNEI DARUSALAM, Temburong, Kuala Belalong, Field Studies Centre, on rachis of *Daemonorops* sp., June 1993, K. D. Hyde 1788 (HKU(M)1788).

2. ***Arecomyces dicksonii*** K. D. Hyde, sp. nov. – Figs. 13–21.

Ascomata sub clypeo immersa, 250–300 µm diam, 150–200 µm alta, subglobosa, solitaria vel gregaria, ostiolata, papillata. Asci 57–75 x 6–7.5 µm, 8-spori, cylindrici, breviter pedicellati, unitunicati, ad apicem truncati, apparato apicali 3 µm diam, 0.6–1 µm alto praediti. Ascosporae 7.5–10 x 4.5–6 µm, uniseriatae, oblonge ellipsoideae, unicellulares, hyalinae, laeves, tunica gelatinosa praeditae.

Etymology. – In honour of Gordon Dickson of the British Mycological Society for organising the expedition to Ecuador, where this species was collected.

Holotypus. – ECUADOR, Rio Cuyabeno, Cuyabeno, on *Jessenia* sp., Aug 1993, K. D. Hyde E12 (HKU(M)2641. Syntype at the Biology Department, Catholic University, Quito, Ecuador).

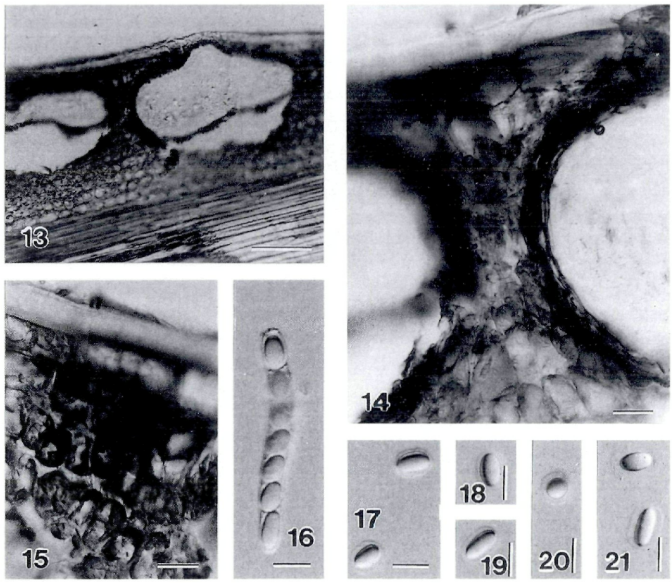


Fig. 13–21. – *Arecomyces dicksonii* (from holotype). – 13. Section of ascomata. Note the pseudostroma. – 14. Peridium. – 15. Pseudostroma. – 16. Ascus. – 17–21. Ascospores. Note the mucilaginous sheath. – Bars: 13 = 100 µm, 14–21 = 10 µm.

Ascomata visible as raised black areas, up to 250 µm diam, on the host surface; in section 250–300 µm diam, 150–200 µm high, subglobose, immersed under a clypeus and surrounded by a pale brown pseudostroma composed of host cells and pale brown fungal hyphae (*textura intricata*), solitary or gregarious, ostiolum central (Fig. 13–15). – Peridium up to 10 µm wide, comprising a few layers of brown walled compressed fungal cells (Fig. 14). – Papilla short, erumpent through the host surface, black, surrounded by a halo of white tissue and outer blackened clypeus, periphyses not seen (Fig. 13). – Paraphyses up to 3 µm wide, hypha-like, filamentous, irregular, septate, numerous and embedded in a gelatinous matrix. – Asci 57–75 x 6–7.5 µm, 8-spored, cylindrical, short pedicellate, thin-walled, unitunicate, apically truncate, with a non amyloid, discoid, refractive apical ring, 3 µm diam, 0.6–1 µm high (Fig. 16). – Ascospores 7.5–10 x 4.5–6 µm, overlapping uniseriate, oblong ellipsoidal, one-celled, hyaline, smooth, surrounded by a wide mucilaginous sheath (Figs. 17–21).

Known hosts. – *Jessenia*.
Known distribution. – Ecuador.

This species differs from *A. hedgerii* in which the ascomata develop under a reddish brown pseudostroma.

3. ***Arecomyces epigeni*** K. D. Hyde, sp. nov. – Figs. 22–30.

Ascomata sub clypeo immersa, 420–500 µm diam, 160–200 µm alta, subglobosa vel ellipsoidea, solitaria vel gregaria, ostiolata, papillata. Asci 82–92 x 7–8 µm, 8-spori, late cylindrici, breviter pedicellati, unitunicati, ad apicem truncati, apparato apicali J-, 3 µm diam, 1.5–2 µm alto praediti. Ascosporae 12–16 x 4–4.5 µm, 1(–2)-seriatae, fusiformes, hyalinae, unicellulares, echinulosae, tunica gelatinosa praeditae.

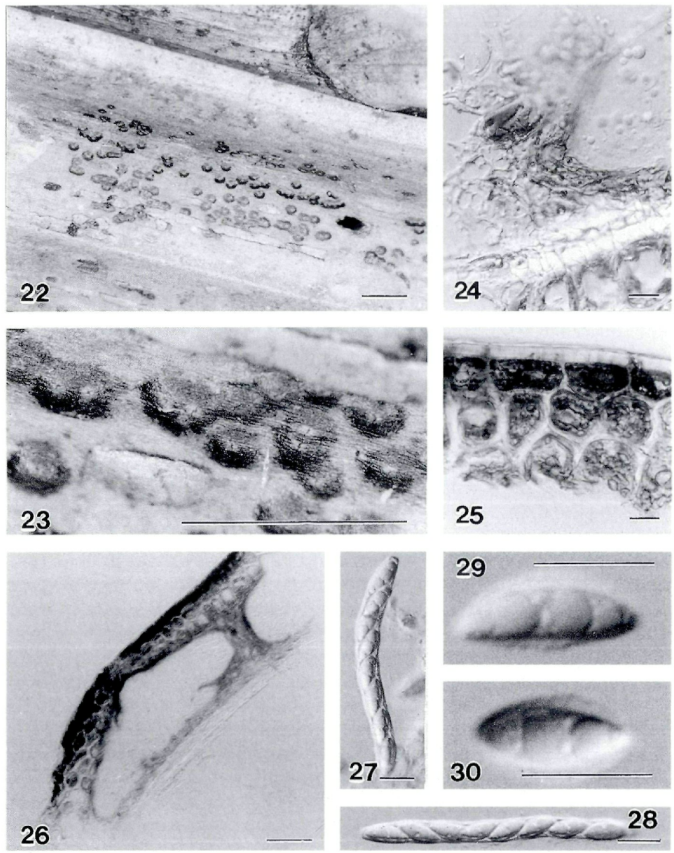
Etymology. – From the Latin *epigenous* meaning „developing on the surface".

Holotypus. – AUSTRALIA, north Queensland, Mt Lewis, on rachis of *Oraniopsis* sp., Aug 1992, K. D. Hyde 1529 (HKU(M)1529).

Ascomata visible as raised black conical areas, up to 300 µm diam, with lighter coloured centres, on the host surface; in section 420–500 µm diam, 160–200 µm high, subglobose or ellipsoidal, immersed under a blackened clypeus and surrounded by a pale brown pseudostroma composed of host cells and pale brown fungal hyphae (*textura intricata*), solitary or mostly gregarious, ostiolum central (Figs. 22–26). – Peridium 10–20 µm wide, comprising several layers of brown-walled fungal cells in the form of *textura angularis* (Fig. 24). – Papilla periphysate, umbilicate, white region around neck caused by lack of blackened fungal tissue of clypeus in this region (Fig. 26). – Paraphyses up to 4 µm wide, hypha-like, filamentous, irregular, septate, numerous and embedded in a gelatinous matrix (Fig. 27). – Asci 82–92 x 7–8 µm, 8-spored, broad cylindrical, short pedicellate, thin-walled, unitunicate, apically truncate, with a non amyloid, discoid, refractive apical ring, 3 µm diam, 1.5–2 µm high (Figs. 27, 28). – Ascospores 12–16 x 4–4.5 µm, 1(–2)-seriate, fusiform with tapered ends, unicellular, hyaline, echinulose, surrounded by a mucilaginous sheath. Sheath wavy in outine and wider in the centre than at the ends (Figs. 29, 30).

Known hosts. – *Eugeissona*, *Oraniopsis*.
Known distribution. – Australia, Brunei.

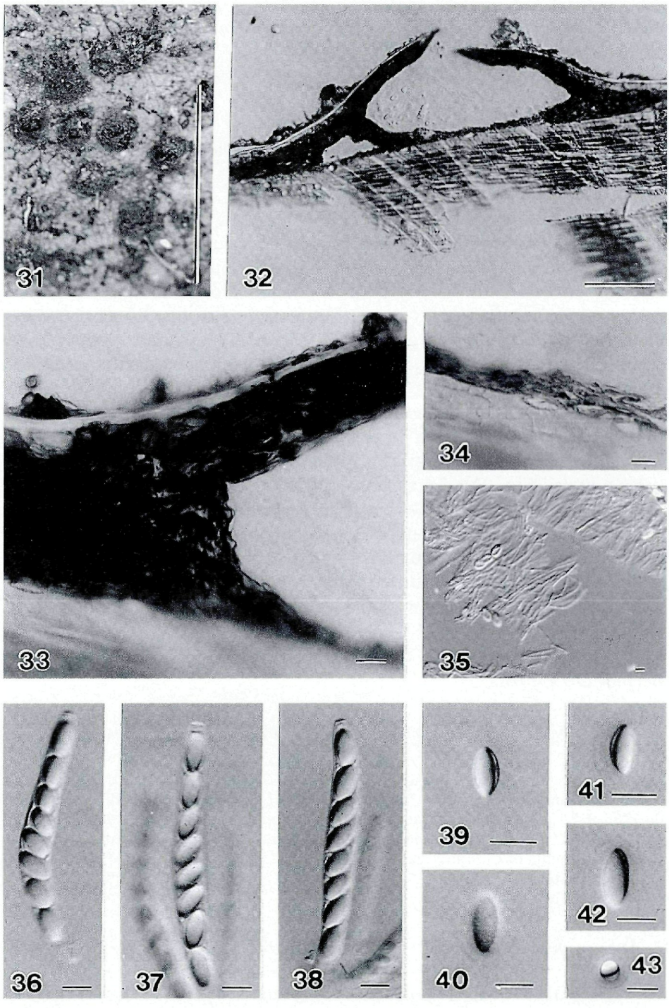
Other material examined. – AUSTRALIA, north Queensland, Bamaga, Lockerbie, on rachis of palm, Feb 1992, K. D. Hyde 1012 (HKU(M)1012). – BRUNEI DARUSALAM, Temburong, Kuala Belalong, Field Studies Centre, on rachis of *Eugeissona minor*, June 1993, K. D. Hyde 1798 (HKU(M)1798).



Figs. 22–30. – *Arecomyces epigeni* (from holotype). – 22, 23. Ascomata on host surface. Note the whitish region around the neck. – 24. Section of peridium. – 25. Stroma. – 26. Section of ascomata. Note the clypeus and lighter region around the ostiole. – 27, 28. Cylindrical asci with apical ring. – 29, 30. Ascospores. Note the mucilaginous sheath which is wavy in outline. – Bars: 22, 23 = 1 mm; 26 = 100 µm, 24, 25, 27–31 = 10 µm.

4. ***Arecomyces frondicola*** K. D. Hyde, sp. nov. – Figs. 31–43.

Ascomata sub clypeo immersa, 250–350 µm diam, 120–150 µm alta, lenticularia, solitaria vel gregaria, ostiolata, papillata. Asci 94–120 x 11–15 µm, 8-spori, cylindrici, breviter pedicellati, unitunicati, ad apicem truncati, apparato apicali 5 µm



Figs. 31–43. – *Arecomyces frondicola* (from holotype). – 31. Appearance of ascomata on host surface. – 32, 33. Sections of ascomata. Note the clypeus and pseudostroma. – 34. Peridium. – 35. Paraphyses. – 36–38. Asci with apical ring. – 39–43. Ascospores with mucilage sheath. – Bars: 31 = 1mm, 32 = 100 µm, 33–43 = 10 µm.

diam, 1 µm alto praediti. Ascosporae 12.5–14 x 5–7 µm, uniseriatae, late fusiformes, unicellulares, hyalinae, echinulosae, tunica gelatinosa praeditae.

Etymology. – From the Latin *frondicola* meaning „dwelling on leaves".

Holotypus. – BRUNEI, Temburong, Kuala Belalong, Field Studies Centre, on rachis of *Arenga undulatifolia*, July 1993, K. D. Hyde 1713 (HKU(M)1713).

Ascomata visible as raised, faintly darkened, or blackened, shiny areas, up to 300 µm diam, on the host surface (Fig. 31); in section 250–350 µm diam, 120–150 µm high, lenticular, immersed under a clypeus and surrounded by a dark pseudostroma composed of host cells and brown fungal hyphae (*textura intricata*), solitary or gregarious, ostiolum central (Figs. 32, 33). – Peridium up to 14 µm wide, comprising 1–3 layers of hyaline or pale brown-walled compressed fungal cells (Fig. 34). – Papilla short, occasionally protruding slightly above the host surface, surrounded by the blackened clypeus, periphyses not seen. – Paraphyses up to 5 µm wide, hypha-like, filamentous, irregular, septate, numerous and embedded in a gelatinous matrix (Fig. 35). – Asci 94–120 x 11–15 µm, 8-spored, cylindrical, short pedicellate, thin-walled, unitunicate, apically truncate, with a non amyloid, discoid, refractive apical ring, 5 µm diam, 1 µm high (Figs. 36–38). – Ascospores 12.5–14 x 5–7 µm, overlapping uniseriate, ellipsoid-fusiform, unicellular, hyaline, echinulose, surrounded by a wide mucilaginous sheath (Figs. 39–43).

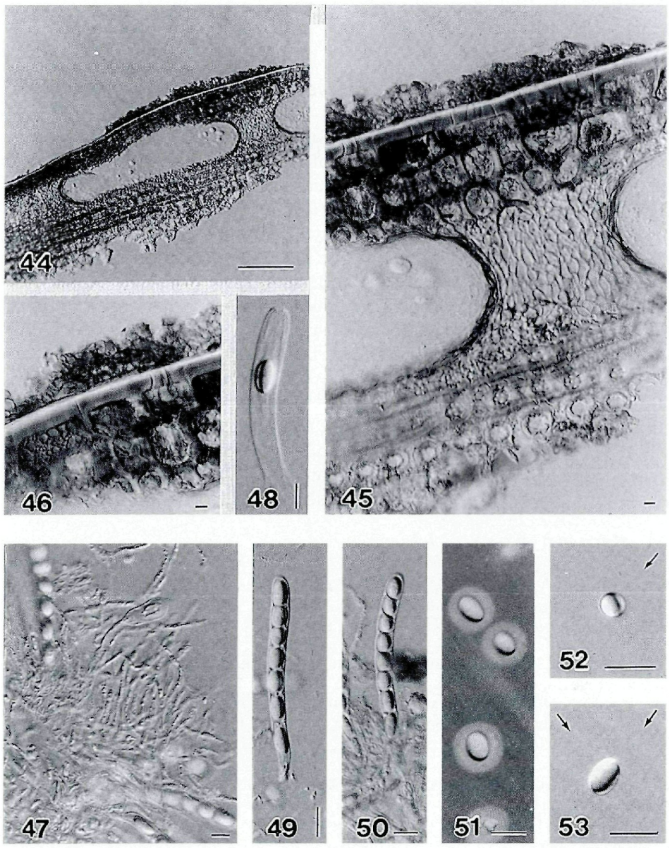
Known hosts. – *Arenga*, *Calamus*, *Elaeis*, *Licuala*, *Oncosperma*, *Oraniopsis*.

Known distribution. – Brunei Darussalam, Malaysia.

Other material examined. – BRUNEI DARUSSALAM, Temburong, Kuala Belalong, Field Studies Centre, on rachis of *Licuala* sp., June 1993, K. D. Hyde 1735 (HKU(M)1735). – On rachis of *Oncosperma horridum*, June 1993, K. D. Hyde 1738 (HKU(M)1738). – Bandar Seri Begawan, Jalan Muara, Kampong Kapok Kanan, on rachis of *Calamus* sp., Nov 1992, K. D. Hyde 1980 (HKU(M)1980). – MALAYSIA, Pasoh Forest Reserve, on rachis of *Elaeis guineensis*, Nov 1992, K. D. Hyde 1646a (HKU(M)1646a).

5. ***Arecomyces hedgerii*** K. D. Hyde, sp. nov. – Figs. 44–53.

Ascomata in stromate ferrugineo immersa, 300–350 µm diam, 100–130 µm alta, ellipsoidea, solitaria vel gregaria, ostiolata, papillata. Asci 100–115 x 9–10 µm, 8-spori, cylindrici, breviter pedicellati, unitunicati, ad apicem rotundati, apparato apicali 4 µm diam, 1–1.5 µm alto praediti. Ascosporae 8.5–12.5 x 5–6.5 µm, uniseriatae, ovoideae, unicellulares, hyalinae, laeves, tunica gelatinosa praeditae.



Figs. 44–53. – *Arecomyces hedgerii* (from holotype). – 44. Section of ascoma. Note the superficial stroma and immersed pseudostroma. – 45. Cells of stroma. – 46. Palisade-like cells between adjacent ascomata and peridium. – 47. Paraphyses. – 48–50. Asci with apical ring. – 51–53. Ascospores with mucilage sheath. – Bars: 44 = 100 µm, 45–53 = 10 µm.

Etymology. – In honour of John Hedger of the British Mycological Society for organising the expedition to Ecuador, where this species was collected.

Holotypus. – ECUADOR, on rachis of *Jessenia* sp., Aug 1993, K. D. Hyde E85a (HKU(M)2685. Syntype at the Biology Department, Catholic University, Quito, Ecuador).

Ascomata immersed under a very slightly raised reddish brown area on the host surface; in section 300–350 µm diam, 100–130 µm high, ellipsoidal, immersed under a superficial reddish brown stroma comprising fungal cells in the form of *textura globulosa* (Figs. 44–46), and surrounded by a pale brown pseudostroma composed of host cells and pale brown fungal hyphae (*textura intricata*), solitary or gregarious, adjacent ascomata separated by a region of vertically orientated light brown walled palisade-like cells (Fig. 46), ostiolum central. – Peridium up to 10 µm wide, comprising a few layers of brown walled compressed fungal cells (Fig. 46). – Papilla short, erumpent through the host surface, periphyses not seen. – Paraphyses up to 3 µm wide, hypha-like, filamentous, irregular, septate, numerous and embedded in a gelatinous matrix (Fig. 47). – Asci 100–115 x 9–10 µm, 8-spored, cylindrical, short pedicellate, thin-walled, unitunicate, apically rounded, with a non amyloid, discoid, refractive apical ring, 4 µm diam, 1–1.5 µm high (Figs. 48–50). – Ascospores 8.5–12.5 x 5–6.5 µm, uniseriate, ovoid, unicellular, hyaline, smooth, surrounded by a wide mucilaginous sheath (Figs. 51–53).

Known host. – *Jessenia*.

Known distribution. – Ecuador.

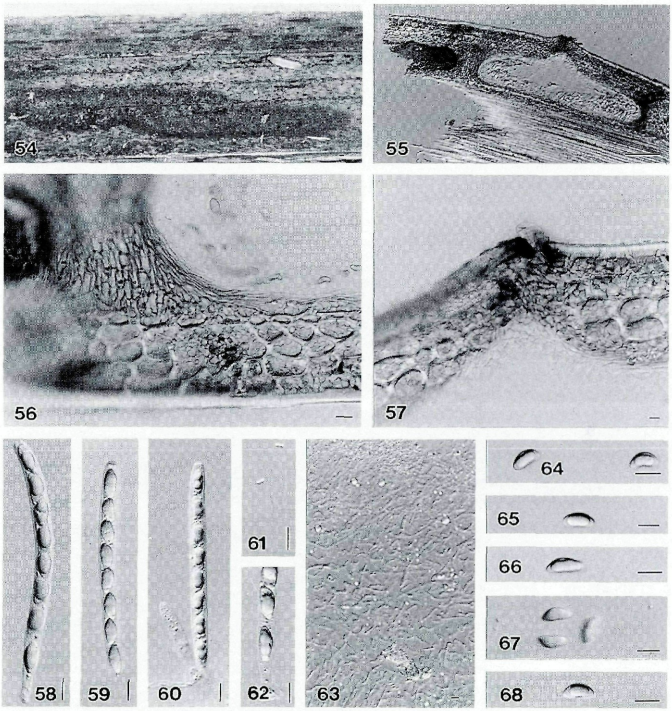
6. ***Arecomyces sekoyae*** K. D. Hyde, sp. nov. – Figs. 54–68.

Ascomata in stromate immersa, 400–600 µm diam, 150–200 µm alta, ellipsoidea, gregaria, ostiolata, papillata. Asci 91–122 x 7.5–9 µm, 8-spori, cylindrici, breviter pedicellati, unitunicati, apicem rotundati, apparato subapicali 4 µm diam, 1.5 µm alto praediti. Ascosporae 12.5–15 x 5–7.5 µm, uniseriatae, lunatae, unicellulares, hyalinae, laeves.

Etymology. – Named after the people of the Cuyabeno region in Ecuador, 'the Sekoya'.

Holotypus. – ECUADOR, Cuyabeno, on rachis of *Jessenia* sp., Aug 1993, K. D. Hyde E78 (HKU(M)2682. Syntype at the Biology Department, Catholic University, Quito, Ecuador).

Ascomata immersed under very slightly raised dark brown to black areas, up to 50 x 5 µm, on the host surface (Fig. 54); in section 400–600 µm diam, 150–200 µm high, ellipsoidal, surrounded by a pale brown pseudostroma composed of host cells and pale brown fungal hyphae (*textura intricata*), gregarious (Fig. 55), adjacent ascomata separated by a region of vertically orientated light brown-walled palisade-like cells (Fig. 56), ostiolum central. – Peridium up to 12 µm



Figs. 54–68. – *Arecomyces sekoyae* (from holotype). – 54. Appearance of pseudostroma on the host surface. – 55. Section of ascoma. Note the superficial immersed pseudostroma. – 56. Palisade-like cells between adjacent ascomata and peridium. – 57. Ostiole. – 58–62. Asci with apical ring. – 63. Paraphyses. – 64–68. Lunate ascospores. – Bars: 54 = 1 µm, 55 = 100 µm, 56–68 = 10 µm.

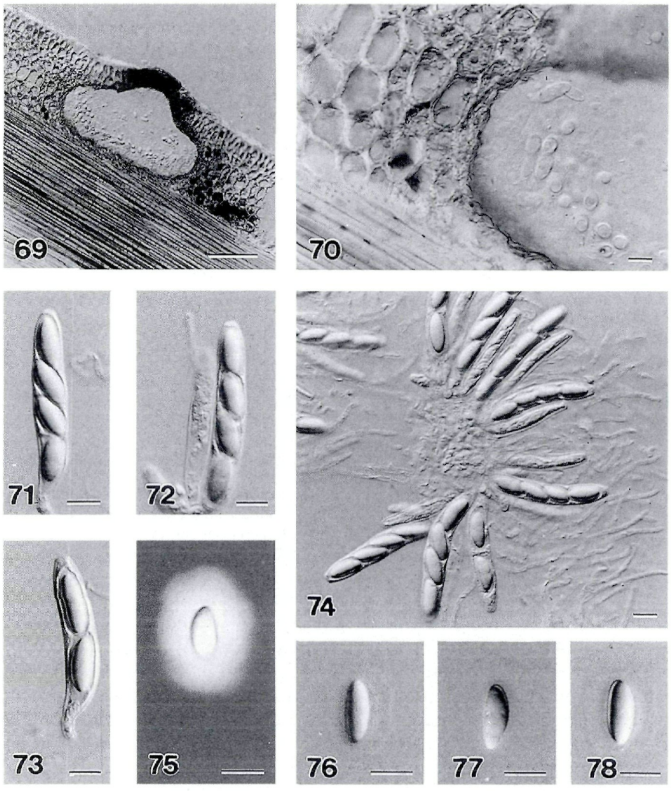
wide, comprising a few layers of pale brown-walled elongate fungal cells (Fig. 56). – Papilla short, slightly erumpent through the host surface, periphyses not seen (Fig. 57). – Paraphyses up to 4 µm wide, hypha-like, filamentous, irregular, septate, numerous and embedded in a gelatinous matrix (Fig. 63). – Asci 91–122 x 7.5–9 µm, 8-spored, cylindrical, short pedicellate, thin-walled, unitunicate, apically rounded, with a non amyloid, discoid, refractive subapical ring, 4 µm diam, 1.5 µm high (Figs. 58–62). – Ascospores 12.5–15 x 5–7.5 µm, uniseriate, lunate, unicellular, hyaline, smooth, lacking a sheath (Figs. 64–68).

Known host. – *Jessenia*.

Known distribution. – Ecuador.

7. ***Arecomyces tetrasporus*** K. D. Hyde, sp. nov. – Figs. 69–78.

Ascomata sub clypeo immersa, 300 µm diam, 150 µm alta, subglobosa, solitaria vel gregaria, ostiolata, papillata. Asci 62–75 x 8–12 µm, (2–)4-spori, late cylindrici, breve pedicellati, unitunicati, ad apicem truncati, apparato apicali 4 µm diam,



Figs. 69–78. – *Arecomyces tetrasporus* (from holotype). – 69. Section of ascoma. Note the clypeus. – 70. Peridium. – 71–74. Asci and paraphyses. – 75–78. Ascospores. Note the mucilage sheath in India Ink (75). – Bars: 69 = 100 µm, 70–78 = 10 µm.

1.5 µm alto praediti. Ascosporae 13–17 x 5–6.5 µm, uniseriatae, ellipsoideae, unicellulares, hyalinae, echinulosae, tunica gelatinosa praeditae.

Etymology. – From *tetraspora* in relation to the asci containing mostly 4 spores.

Holotypus. – ECUADOR, Cuyabeno, on rachis of *Phytelephas* sp., Aug 1993, K. D. Hyde E119 (HKU(M)2714. Syntype at the Biology Department, Catholic University, Quito, Ecuador).

Ascomata visible as small black ostiolar dot on the host surface; in section 300 µm diam, 150 µm high, subglobose, immersed under a clypeus and surrounded by a pale brown pseudostroma composed of host cells and pale brown fungal hyphae (*textura intricata*), solitary or gregarious, ostiolum central (Fig. 69). – Peridium up to 10 µm wide, comprising a few layers of brown-walled compressed fungal cells (Fig. 70). – Papilla short, occasionally protruding slightly above the host surface, surrounded by the blackened clypeus, periphyses not seen (Fig. 69). – Paraphyses up to 4 µm wide, hypha-like, filamentous, irregular, septate, numerous and embedded in a gelatinous matrix (Fig. 74). – Asci 62–75 x 8–12 µm, (2–) 4-spored, broad cylindrical, short pedicellate, thin-walled, unitunicate, apically truncate, with a non amyloid, discoid, refractive apical ring, 4 µm diam, 1.5 µm high (Figs. 71–74). – Ascospores 13–17 x 5–6.5 µm, overlapping uniseriate, ellipsoidal, unicellular, hyaline, echinulose and surrounded by a wide mucilaginous sheath (Figs. 75–78).

Known host. – *Phytelephas*.

Known distribution. – Ecuador.

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