

***Arecomyces* new to Brazil, including *A. attaleae* sp. nov.**

Nadja S. VITORIA^a, Maria A. Q. CAVALCANTI^a,
Kevin D. HYDE^{b, c} & Jose L. BEZERRA^{d*}

^aUniversidade Federal de Pernambuco, Departamento de Micologia,
Av. Prof. Nelson Chaves, s/nº, 50670-901, Recife, PE, Brazil

^bSchool of Science, Mae Fah Luang University, Chiang Rai 57100, Thailand

^cBotany and Microbiology Department, College of Science, King Saud University,
Riyadh 1145, Saudi Arabia

^dUniversidade Estadual de Santa Cruz, Departamento de Ciências Agrárias,
Rodovia Ilhéus-Itabuna, Km 16, 45662-900, Ilhéus, BA, Brazil,
email: jlulabezerra@hotmail.com

Abstract – *Arecomyces* is a genus only known from palms and in this paper is reported for the first time from Brazil. *Arecomyces attaleae* is a new species from *Attalea funifera*, a palm in Bahia State, Brazil. It is described and illustrated and compared with congeneric species. This new taxon is distinguished mainly by its large ascospores. *Arecomyces bruneiensis* was found on *Elaeis guineensis* in Pernambuco State, Brazil and is reported for the first time in South America. A synopsis of all known *Arecomyces* species is also provided.

Brazilian Ascomycota / Brazilian Atlantic Rainforest / taxonomy / Hyponectriaceae

INTRODUCTION

Arecomyces K.D. Hyde is a tropical genus comprising nine species of which there is no known anamorph and all are associated with palms (Hyde, 1996; Hyde & Fröhlich, 2003). *Arecomyces* belongs in the Hyponectriaceae and is characterized by ascomata immersed beneath a clypeus or a pseudostroma, with broadly cylindrical, unitunicate asci, with a J⁻ discoid apical ring. Ascospores are aseptate, hyaline, smooth-walled or echinulate, and surrounded by a mucilaginous sheath. Within the Areaceae, the host range of *Arecomyces* species is wide and the geographic distribution of each species is also exceptionally broad (Fröhlich & Hyde, 2000) ranging from Asia to South America.

We are investigating the microfungi on palms in the Atlantic Rainforest of Northeastern Brazil (Vitoria et al., 2008; Souza et al., 2008). In this paper two *Arecomyces* species are described: one a new species, *Arecomyces attaleae* and the other *Arecomyces bruneiensis* which has not been reported from the American continent. A synopsis of all known *Arecomyces* species is also presented (Table 1).

MATERIAL AND METHODS

Dead leaves of *Attalea funifera* and *Elaeis guineensis* were collected in the municipalities of Una, in Bahia State and in Recife, Pernambuco State, respectively. The specimens collected are deposited in the CEPEC Herbarium (Mycological Collection) in Itabuna, Bahia. Observations under the stereomicroscope were followed by study of squash preparations and vertical, free hand made sections of the ascomata. Morphological features are described, measured and photographed using a Carl Zeiss microscope. All measurements were made in water preparations. The samples were stained with lacto-glycerol cotton blue.

RESULTS

Arecomyces attaleae N.S. Vitoria & J.L. Bezerra, sp. nov. (Figs. 1-15, 30)

Mycobank 519534

Ascomata 620-750 × 110-250 µm, *immersa, subglobosa vel lenticularis, ostiolata, solitaria*. *Asci* 145-212.5 × (12-) 12.5-30 µm, *8-spore, unitunicati, apparatus apicali refractivo, inconspicuus*. *Ascospores* 18-29 × 8-15 µm, *oblongae, unicellulares, hyalinae, echinulosae, tunica gelatinosa praeditae*.

Etymology: in reference to the host genus, *Attalea*.

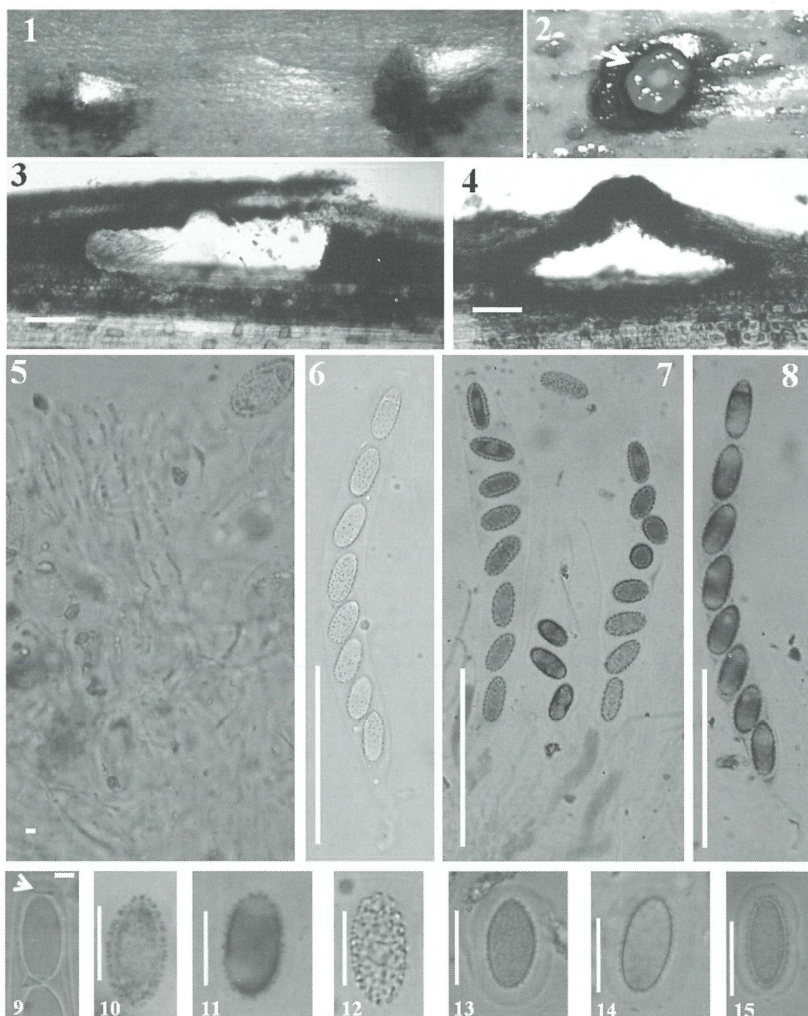
Ascomata visible on the host surface as raised black conical areas with a central, short papilla (Fig. 1); in tangential section showing a shining, viscous, peripheral hymenium (Fig. 2); in vertical section 620-750 µm diam, 110-250 µm high, subglobose or lenticular, immersed under a blackened clypeus, with variable amounts of lateral stromatic tissue, solitary, ostiolate (Figs. 3-4). *Papilla* 100-187 µm thick, short, periphysate, umbilicate, surrounded by a blackened clypeus. *Clypeus* reduced to a small area adjacent to the ostiole, composed of host cells filled with dark hyphae. *Peridium* 37.5-53 µm thick, comprising several layers of brown-walled hyphal cells. *Paraphyses* ca 2 µm wide, septate, filiform, numerous (Fig. 5); within ascomata the paraphyses are located in the middle and asci at the periphery of the locule (Fig. 30a). *Asci* 145-212 × (12-) 12-30 µm, 8-spored, broadly cylindrical, short pedicellate, unitunicate, with a non amyloid, discoid, refractive, inconspicuous apical ring, 5 µm diam, 0.5 µm high (Figs. 6-8). *Ascospores* 18-29 × 8-15 µm, uniseriate, oblong, hyaline or yellowish, echinulate and surrounded by a mucilaginous sheath (Figs. 9-15).

Host species: *Attalea funifera*

Known distribution: Brazil

Material examined: BRAZIL: Bahia, Una, Estação Experimental Lemos Maia (ESMAI), S15°16.207', H039°05.532', 86m elevation, on dead leaf (rachis) of *Attalea funifera*, July 2009, Nadja Vitoria (CEPEC 2089, **holotype**).

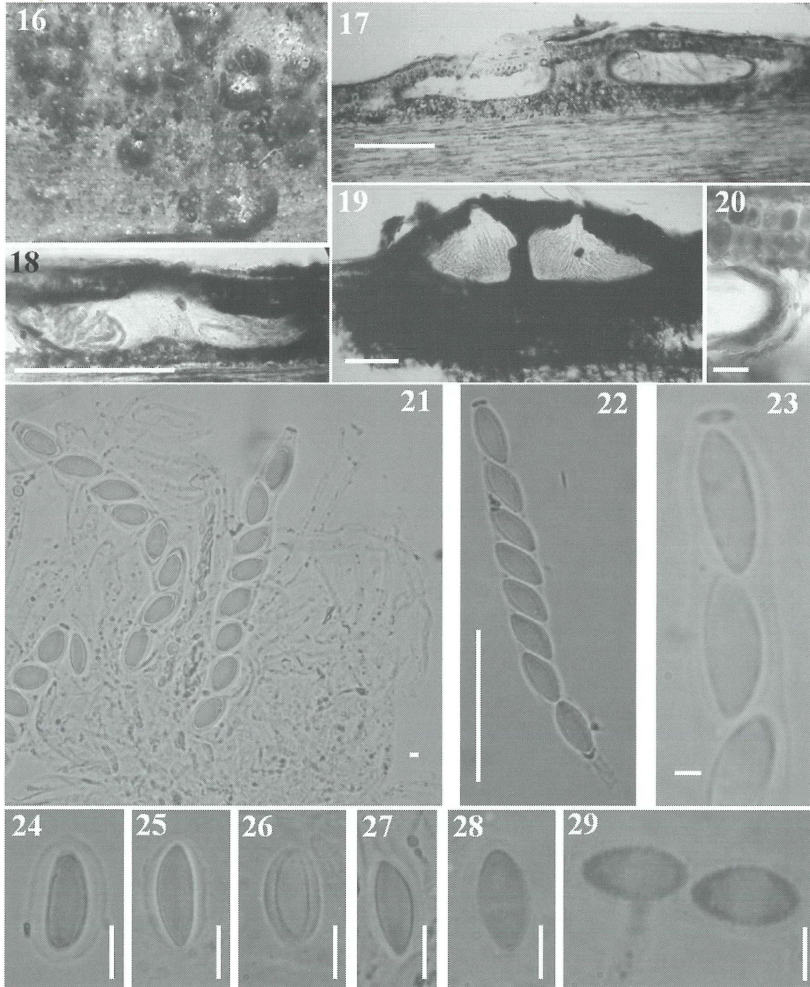
Remarks: The ascomata and ascospores of all other *Arecomyces* species are smaller than those of *A. attaleae* (Table 1). In *A. attaleae* ascospores are symmetric, oblong, hyaline or yellowish, echinulate and considerably larger (18-29 × 8-15 µm). The asci are longer, broadly cylindrical with a non amyloid, refractive, inconspicuous apical ring. The ascomata are larger than other species with asci arranged in the periphery of the locule. *Arecomyces licualae* is a somewhat similar species as to ascospore length but differ in other features such as ascomata size and shape, asci length and width and ascospores width.



Figs 1-15. *Arecomyces attaleae* (from holotype). **1.** Ascomata on host surface. **2.** Tangential section exposing hymenium (Arrow). **3-4.** Sections of ascomata. **5.** Paraphyses. **6-8.** Asci. **9.** Apical ring (arrowed). **10-15.** Ascospores (note the mucilaginous sheath and echinulate wall) (scale bars: 3-5, 8-10 = 100 μ m; 6 = 20 μ m; 7 = 2 μ m; 11 = 5 μ m; 12-17 = 15 μ m).

Arecomyces bruneiensis K.D. Hyde, Sydowia 48 (2): 228 (1996) (Figs. 16-29)

Ascomata visible as raised, blackened dots on the host surface (FIG.16); in vertical section 310-450 μ m diam, 100-230 μ m high (Figs. 17-19), irregularly subglobose or lenticular, flattened conical, solitary or gregarious, ostiolate, immersed under a blackened clypeus. **Ostirole** central with hyaline periphyses and surrounded by a blackened clypeus. **Clypeus** composed of host cells and hyphae. **Peridium** up to 10 μ m, comprising several layers of brown-walled, elongate cells (Fig. 20). **Paraphyses** up to 4 μ m wide, filamentous, septate, numerous. **Asci** 100-153 \times 10-15 μ m, 8-spored, cylindrical, short pedicellate, unitunicate, with a non



Figs 16-29. *Arecomyces bruneiensis* (CEPEC 2088). **16.** Ascomata on host surface. **17-19.** Sections of ascomata. **20.** Section of peridium. **21.** Paraphyses and Asci. **22.** Ascus. **23.** Apical ring. **24-29.** Ascospores (scale bars: 19-31 = 200 µm; 22 = 20 µm; 23 = 2 µm; 24 = 100 µm; 25 = 5 µm; 26-31 = 10 µm).

amyloid, discoid-shaped, refractive apical ring, 4-4.2 µm diam, 1-1.8 µm high (FIGS.21-23). **Ascospores** 14-20 × 5-7 (-8) µm, ellipsoid, hyaline, echinulate, uniseriate, and surrounded by a mucilaginous sheath (Figs. 24-29).

Host species: *Daemonorops*, *Elaeis*.

Known distribution: Brazil (this paper), Brunei (Hyde and Fröhlich 2003)

Material examined. BRAZIL: Pernambuco, Recife, Parque Estadual Dois Irmãos, S08°00'36.9", W34°56'57.2", 30 m alt., on dead leaf (rachis) of *Elaeis guineensis*, November 2009, Nadja Vitoria (CEPEC 2088).

Remarks: The material examined is similar to *A. bruneiensis* in all measurements (Table 1). This is the first record of *A. bruneiensis* in America.

Table 1. Synopsis of *Arecomyces* species

<i>Taxa</i>	<i>Asci</i> (μm)	<i>Ascospores</i> (μm)	<i>Ascospores</i> (<i>features</i>)	<i>Host</i>	<i>Known distribution</i>
<i>Arecomyces attaleae</i> sp. nov.	145-212.5 \times 12-30	18-29 \times 8-15	Oblong, hyaline or yellowish, echinate, with a sheath	<i>Attalea</i>	Brazil
<i>A. bruneiensis</i> (CEPEC 2088)	100-152.5 \times 10-15	14-20 \times 5-7 (-8)	Ellipsoid, hyaline, echinate, with a sheath	<i>Elaeis</i>	Brunei, Brazil
<i>A. bruneiensis</i> K.D. Hyde	105-129 \times 11-15	15-19 \times 6.5-8	Lenticular, hyaline, echinulose, with a sheath	<i>Daemonorops</i>	Brunei
<i>A. dicksonii</i> K.D. Hyde	57-75 \times 6-7.5	7.5-10 \times 4.5-6	Oblong ellipsoidal, smooth, with a sheath	<i>Jessenia</i>	Ecuador
<i>A. epigeni</i> K.D. Hyde	82-92 \times 7-8	12-16 \times 4-4.5	Fusiform with tapered ends, echinulose, sheath wavy in outline	<i>Eugeissona</i> <i>Oraniopsis</i>	Australia, Brunei
<i>A. frondicola</i> K.D. Hyde	94-120 \times 11-15	12.5-14 \times 5-7	Ellipsoid-fusifforme, echinate, with a sheath	<i>Arenga</i> , <i>Calamus</i> , <i>Elaeis</i> , <i>Licuala</i> , <i>Oncosperma</i> , <i>Oraniopsis</i>	Brunei, Malaysia
<i>A. hedgerii</i> K.D. Hyde	100-115 \times 9-10	8.5-12.5 \times 5-6.5	Ovoid, smooth, with a sheath	<i>Jessenia</i>	Ecuador
<i>A. sekoyae</i> K.D. Hyde	91-122 \times 7.5-9	12.5-15 \times 5-7.5	Lunate, smooth, sheath lacking	<i>Jessenia</i>	Ecuador
<i>A. tetrasporus</i> K.D. Hyde	62-75 \times 8-12	13-17 \times 5-6.5	Ellipsoidal, echinulose, with a sheath	<i>Phytelephas</i>	Ecuador
<i>A. calami</i> K.D. Hyde & J. Fröhlich	75-100 \times (8.8-) 10-12.5	14-17.5 \times 4.5-7	Ellipsoidal to fusiform, with a sheath	<i>Calamus</i>	Brunei
<i>A. licualae</i> K.D. Hyde & J. Fröhlich	67-102.5 \times (10-) 12-19.5	16.3-22.5 \times 4.5-6.5 (-7)	Navicular, smooth, with a thin, inconspicuous mucilaginous sheath	<i>Licuala</i>	Brunei

Arecomyces new to Brazil, including *A. attaleae* sp. nov.

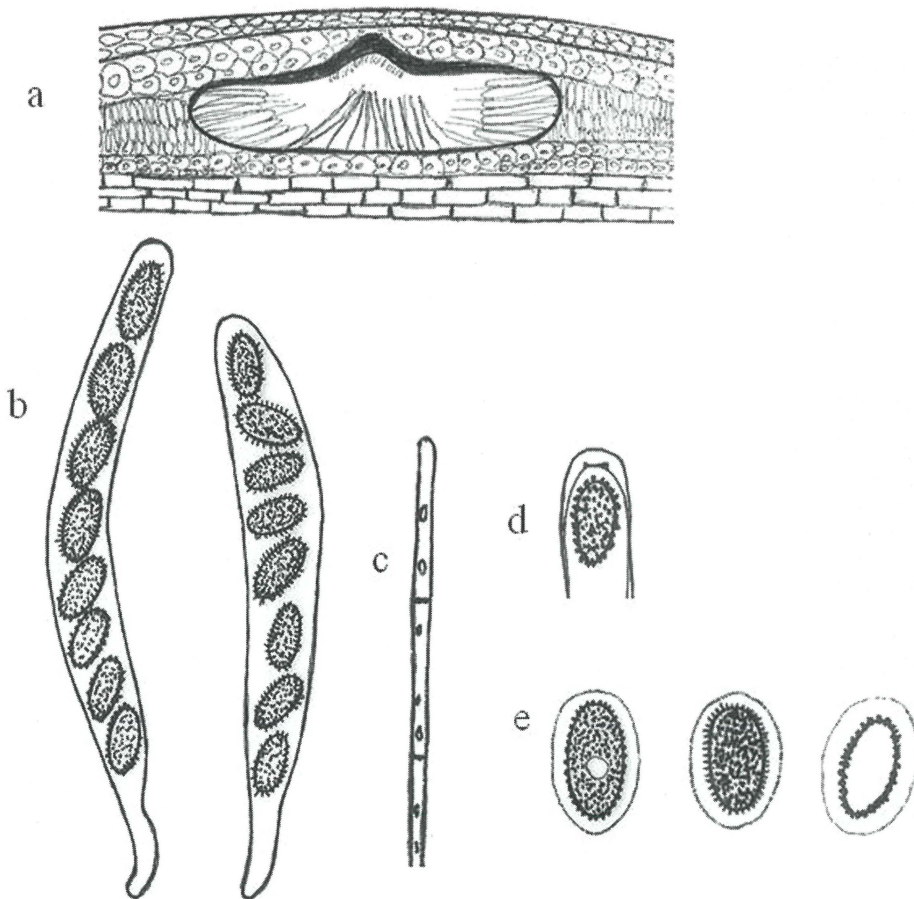


Fig. 30. *Arecomyces attaleae* (from holotype). **A.** Ascogonia. **B.** Asci. **C.** Paraphyses. **D.** Ascus apex ring. **E.** Ascospores.

Acknowledgements. The authors thank CAPES-MEC Brazil and CNPq-Brazil for scholarships and CEPLAC for facilities and laboratories use to conduct part of this research.

REFERENCES

- HYDE K.D., 1996 — Fungi from palms. XXXII. *Arecomyces* gen. nov., with seven new species. *Sydowia* 48: 224-240.
- HYDE K.D. & FRÖHLICH, J., 2003 — *Nigramammilla calami* gen. et sp. nov. and *Arecomyces calami*, *A. licualae* and *Pseudohalonectria palmae* spp. nov. from palms. *Cryptogamie Mycologie* 24: 13-20.
- SOUZA C.A.P., VITORIA N.S., BEZERRA J.L., LUZ E.D.M.N., INACIO C.A. & DIANESE J.C. 2008 — *Camarotella brasiliensis* sp. nov. (Phyllachoraceae) on *Syagrus schizophylla* (Arecaceae) from Brazil. *Mycotaxon* 103: 313-317.
- VITÓRIA N.S., BEZERRA J.L., GRAMACHO K.P. & LUZ E.D.M.N., 2008 — *Camarotella torrendiella* comb. nov. e *C. acrocomiae*: agentes etiológicos das lixas coqueiro. *Tropical Plant Pathology* 33 (4): 295-301.