

SUBCUTANEOUS PHAEOPHYCOMYCOSIS CAUSED BY *Bipolaris hawaiiensis*. A CASE REPORT

Alcyr Ribeiro COSTA (1), Edward PORTO (2), Alceu Hidearu TABUTI (1), Carlos da Silva LACAZ (2), Neusa Yurico SAKAI-VALENTE (1), Wanira Márcia MARANHÃO (1) & Maria Conceição RODRIGUES (3)

SUMMARY

A case of phaeohyphomycosis caused by *Bipolaris hawaiiensis* is reported. The patient, an immunocompetent host, presented a verrucous lesion on the first finger of the left foot. Dematiaceous septate hyphae and yeast-like elements were seen in direct and histological examination. The isolated strain was identified on the basis of micro and macromorphological aspects. Treated with electrocoagulation, the lesions healed and presented no relapse after two years follow-up.

KEY WORDS: *Bipolaris hawaiiensis*; Phaeohyphomycosis; Dematiaceous yeast-like cells.

INTRODUCTION

The etiologic agents of phaeohyphomycosis are fungi of the family **Dematiaceae**, found in haysticks, thorn, roots, decaying vegetation, rotting wood, forest litter and other organic material and metals. The causal agents are introduced in the skin through traumatic implantation.

Bipolaris hawaiiensis (= *Drechslera hawaiiensis*) is a dematiaceous **Hyphomycetes**, division **Deuteromycota** with its teleomorph form in the genus *Cochliobolus*.

Bipolaris hawaiiensis (Bugnicourt ex M. B. Ellis) UCHIDA & ARAGAKI 1979, was first described from rice grains in Hawai as *Drechslera hawaiiensis*. It has been isolated from many different plants and from soil, textiles and other

substrata, mainly in tropical and subtropical countries^{5, 6}.

Some species of the genus *Bipolaris* are etiologic agents of cutaneous, subcutaneous and disseminated phaeohyphomycosis. Several species, formerly included in the genus *Drechslera*, *Helminthosporium* and *Curvularia* were transferred and included in the genus *Bipolaris* and *Exserohilum*^{2, 8, 10, 11}.

The genus *Cochliobolus*, division **Ascomycota** was described by Drechsler in 1934. The species of *Cochliobolus* are heterothallic. The conjugation of two monoascosporic strains with compatible nuclei is necessary for the production of fertile perithecia^{14, 15}.

- (1) Hospital do Servidor Público Estadual "Francisco Morato de Oliveira". Serviço de Dermatologia (Direção: Dr. J. A. S. Sittart). São Paulo, SP, Brasil.
 - (2) Laboratório de Micologia Médica — Instituto de Medicina Tropical de São Paulo e Laboratório de Investigação Médica, LIM-53 — Hospital das Clínicas, Faculdade de Medicina da Universidade de São Paulo. São Paulo, SP, Brasil.
 - (3) Divisão de Tisiologia e Pneumologia. Laboratório de Micologia Médica — Instituto Clemente Ferreira. São Paulo, SP, Brasil.
- Address for correspondence: Prof. Carlos da Silva Lacaz — Instituto de Medicina Tropical de São Paulo — Av. Dr. Enéas de Carvalho Aguiar, 470. CEP 05403 São Paulo, SP, Brasil.

McGINNIS et al¹¹ describe for the pathogenic species of *Bipolaris* three teleomorphs:

Anamorph	Teleomorph
<i>Bipolaris hawaiiensis</i>	<i>Cochliobolus hawaiiensis</i>
<i>B. australiensis</i>	<i>C. australiensis</i>
<i>B. spicifera</i>	<i>C. spicifer</i>

The authors report a case of subcutaneous phaeohyphomycosis with verrucous lesion in the first finger of the left foot caused by *Bipolaris hawaiiensis*.

CASE REPORT

A 61-years-old mulatto male, agriculture worker from Registro, São Paulo, was hurted with the axe six years ago in the first finger of the left foot. Later, a prurient bleeding "wart" appeared in the lesion and enlarged slowly.

At the clinical examination the patient presented a verrucous hiperkeratotic lesion of 3,5 x 4 cm in area with dark points in the surface (Fig. 2). The patient did not present lymphangitis or palpable nodes.

Biopsy material was studied by direct, mycological and histopathological examinations.

The lesion was treated by electrocoagulation with later healing and no relapse was seen after two years.



Fig. 1 — Verrucous brownish lesion in the finger of the left foot, with dark points in the surface.



Fig. 2 — Microscopic examination of scales of the lesion in potassium hydroxide mount showing light-brown septate hyphae with irregular contour and two joined yeast-like cells after vegetative reproduction (X 200).

HISTOPATHOLOGY

H.E. stained sections of skin lesion demonstrated epidermis with ortho and parakeratosis; absent, normal or thickened granular layer and intense, irregular acanthosis. Spongiosis and exocytosis of neutrophils were also present. In the dermis, there was heavy, mixed inflammatory infiltrate constituted of lymphocytes, histiocytes, plasma cells and neutrophils. Crowding of epithelioid cells, neutrophils, eosinophils and Langhans type multinucleate giant cells was observed in focal areas. Inside giant cells, thickwalled, yeast-like cells and scanty light-brown, septate, short hyphae were observed. Some yeast-like cells demonstrated vegetative reproduction by binary fission. These, above described, fungal elements stained black with GROCOTT-GOMORI silver stain. (Fig. 3).

MYCOLOGY

a) Direct examination

Direct examination of skin scales in 20% potassium hydroxide showed light brown septate hyphae and yeast-like cells, some with vegetative reproduction by binary fission (Fig. 2).

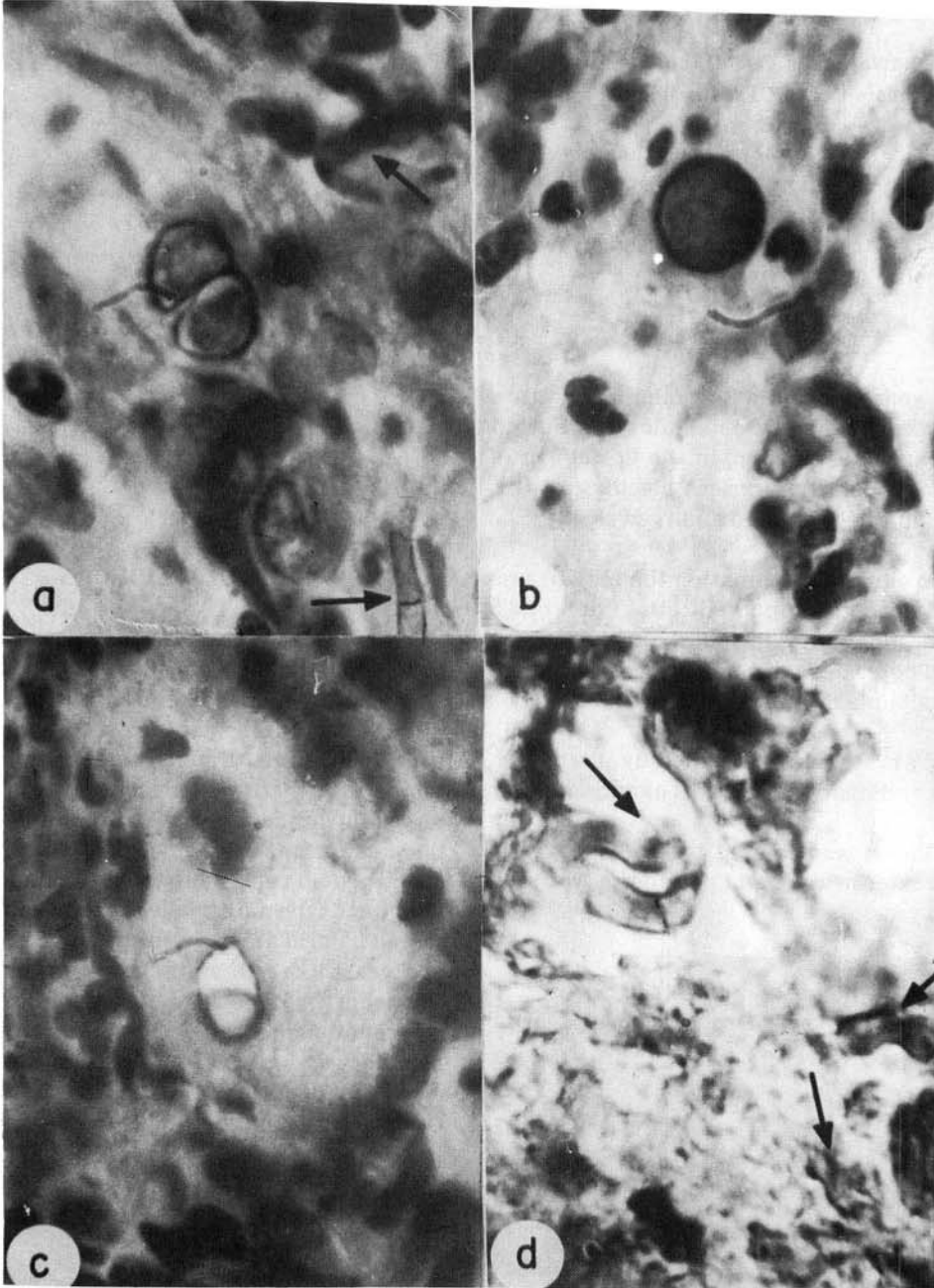


Fig. 3 — Histologic sections stained with H.E., from a case of subcutaneous phaeohyphomycosis caused by *B. hawaiiensis*. a) Light-brown septate hyphae (arrows) and two joined yeast-like cells after reproduction by binary fission (X 400); b, c, d). Other spherical and elongate yeast-like cells and (arrows) septate hyphae (X 400).

b) Macroscopic aspect

At room temperature the colony on potato dextrose agar was effuse, initially grey and cottonous, gradually became blackish brown.

c) Micromorphology

Microscopic examination of an unstained slide culture of *Bipolaris hawaiiensis* on potato dextrose agar¹⁶ showed septate light brown hyphae. The conidiophores were solitary, flexuous or geniculate, septate, light brown. Conidia straight, oblong or ellipsoidal, rounded at the ends, light ochreous, four to six light septa with truncate dark hilum were observed. The hila, in the basal portion of the conidia were dark, truncate, continuous to the cell wall (Fig. 4b).

According to the descriptions reported by other researchers^{5, 6} the authors concluded by the mycological diagnosis of *B. hawaiiensis*.

Infertile perithecia of *Cochliobolus*, probably *C. hawaiiensis* were spontaneously obtained in the same slide culture on potato dextrose agar. (Fig. 4d).

DISCUSSION

Dematiaceous fungi have become increasingly recognized as significant human pathogens in the past 15 years. A burgeoning population of immunosuppressed patients, which makes up a disproportionately high percentage of those infected with these fungi, has probably increased the true incidence of phaeohyphomycotic disease¹².

Based on the degree of involvement in the host, phaeohyphomycosis may be superficial, cutaneous, corneal, subcutaneous, and systemic. Seventeen genera of dematiaceous fungi have been described as etiologic agents of phaeohyphomycosis in human and animals².

We describe a clinical case of subcutaneous phaeohyphomycosis with a verrucous lesion in the first finger of the left foot caused by *Bipolaris hawaiiensis*. Multiple therapeutic modalities are available for common cutaneous infections. In our case, electrocoagulation was suitable with no relapse after two years.

Mycological study of the clinical material showed the presence of infertile perithecia of *Cochliobolus* Drechsler 1934, probably *C. hawaiiensis*, were obtained in the same slide culture on potato dextrose agar. The maturing type was not performed because we did not have compatible monoascosporic isolates. The three valid species of *Cochliobolus* are heterothallic^{11, 14, 15}. Only perithecia without asci and ascospores were obtained in slide culture. Probably it was due to the apart presence of the ascogonium or antheridium without their fusion¹⁶. After the culture was maintained by five months at room temperature, slide culture was performed. No conidia or perithecia were observed. The medium of V-8 15%¹¹ for stimulation of conidia production of *B. hawaiiensis* was not used.

Numerous isolates had been originally identified as *Drechslera* species and described in the literature as etiologic agents of phaeohyphomycosis. According to these findings, none of the isolates belonged to *Drechslera* species, but they were classified as *Bipolaris* and *Exserohilum* species. Three *Bipolaris* species, namely, *B. australiensis*, *B. hawaiiensis* and *B. spicifera* are recognized as being pathogenic for humans and animals¹¹.

The spectrum of infections caused by species of *Bipolaris* and *Exserohilum* is summarized in the literature⁴.

B. hawaiiensis has been known as a causative agent of pulmonary infection⁸, meningoencephalitis⁷, nasal obstruction⁹, with bone destruction¹⁹, sinusitis¹¹, granulomatous encephalitis¹³ corneal ulcer³, intracranial and paranasal sinus infection¹⁷. A report of 9 cases and review of the literature of phaeohyphomycosis caused by the fungal genera *Bipolaris* and *Exserohilum* was described¹.

The findings in this paper demonstrate that organisms previously considered only as phytopathogens^{5, 6}, may produce phaeohyphomycosis in humans.

Our results agree with literature descriptions and also emphasize the importance of the *B. hawaiiensis* pathogenicity.

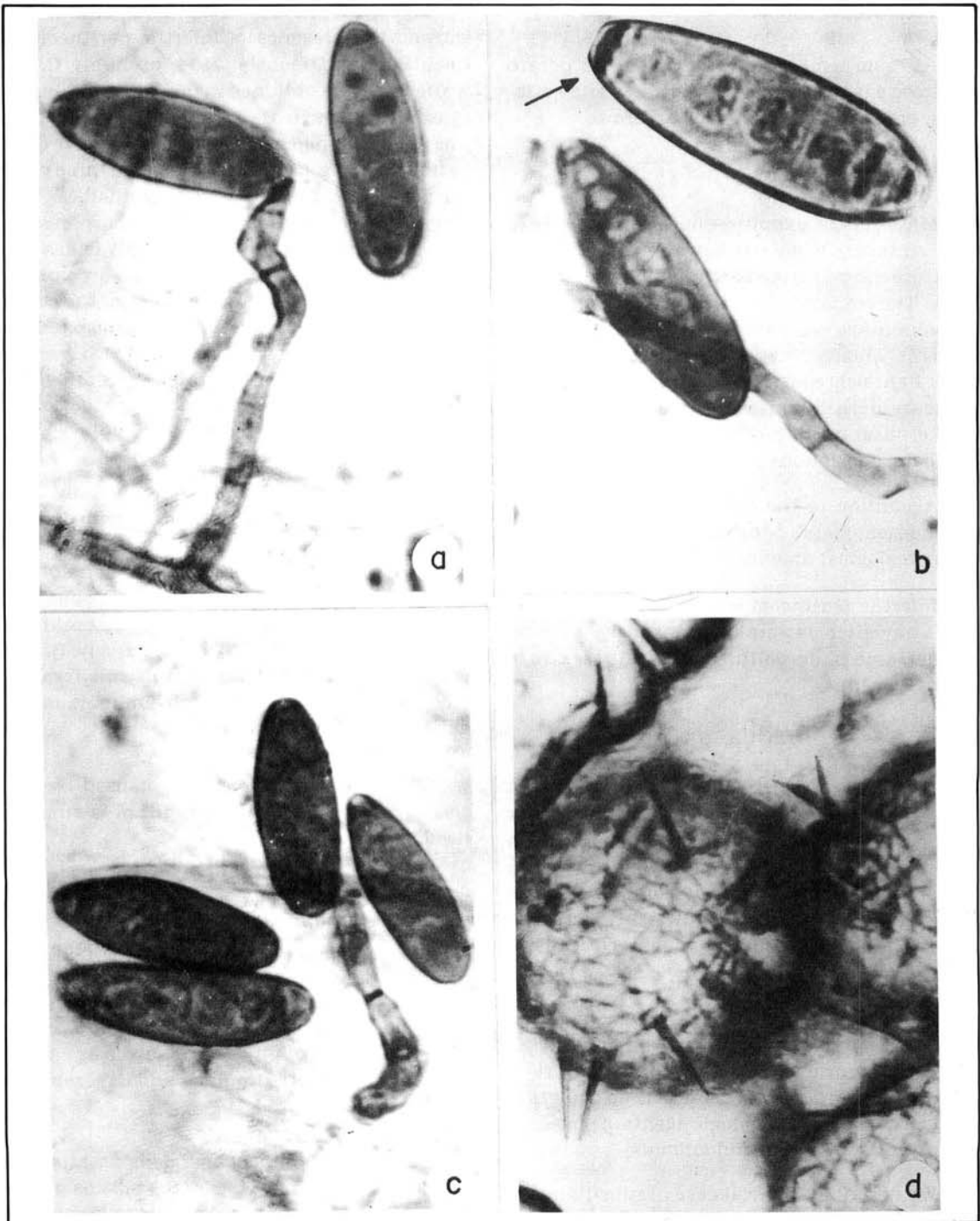


Fig. 4 — *Bipolaris hawaiiensis* (= *Drechslera hawaiiensis*) isolated from subcutaneous phaeohyphomycosis. a) Flexuous, septate, light-brown conidiophore and dark hilum in the insertion point of the conidium (X 250); b) Ellipsoidal, straight, light-brown conidia, rounded at both ends, with a thick cell wall and six light pseudosepta. Conidium with truncate dark hilum (arrow) continuous to the cell wall (X 250); c) Detached conidia of the anamorph *B. hawaiiensis* (X 250); d) Infertile, globose perithecia, probably *Cochliobolus hawaiiensis* (teleomorph), with several spine-like setae, spontaneously obtained in the same slide culture (X 40).

RESUMO

Feohifomicose subcutânea causada por *Bipolaris hawaiiensis*. Registro de um caso.

Os autores descrevem um caso de feohifomicose com lesão verrucosa no hálux esquerdo. O paciente não apresentava sinais clínicos de deficiência imunológica. Os exames direto e histopatológico mostraram células leveduriformes e poucas hifas septadas, demacióides, essenciais ao diagnóstico desta micose. O cultivo em lâmina permitiu identificar o hifomiceto como *Bipolaris hawaiiensis*.

A eletrocoagulação foi usada como tratamento, com cura do processo, não havendo recidiva após dois anos.

ACKNOWLEDGEMENTS

We thank to Mrs. Sônia Cecília Damazio for secretarial assistance.

REFERENCES

- ADAM, R. D.; PAQUIN, M. L.; PETERSEN, E. A.; SAUBOLLE, M. A.; RINALDI, M. G.; CORCORAN, J. G.; GALLIANI, J. N. & SOBONYA, R. E. — Phaeohyphomycosis caused by the Fungal Genera *Bipolaris* and *Exserohilum*. A report of 9 cases and review of the literature. *Medicine*, 65: 203-217, 1986.
- AJELLO, L. — Hyalohyphomycosis and phaeohyphomycosis: two global entities of public health importance. *Eur. J. Epidem.*, 2: 243-251, 1986.
- ANANDI, V.; SURYAWANSHI, N. B.; KOSHI, G.; PADHYE, A. A. & AJELLO, L. — Corneal ulcer caused by *Bipolaris hawaiiensis*. *J. med. Vet. Mycol.*, 26: 301-306, 1988.
- BURGES, G. E.; WALLS, C. T. & MAIZE, J. C. — Subcutaneous phaeohyphomycosis caused by *Exserohilum rostratum* in immunocompetent host. *Arch. Derm.*, 123: 1346-1350, 1987.
- DE HOOG, G. S. — On the potentially pathogenic dematiaceous hyphomycetes. In: HOWARD, D. H. & HOWARD, L. F., ed. — *Fungi pathogenic for humans and animals*. Part A. Biology, New York, Marcel Dekker, 1983. p. 149-216.
- ELLIS, M. B. — Dematiaceous *Hyphomycetes*. Kew, Surrey, Commonwealth Mycological Institute, 1976. p. 415.
- FUSTE, F. J.; AJELLO, L.; THRELKED, R. & HENRY Jr., J. E. — *Drechslera hawaiiensis*: causative agent of a fatal meningo-encephalitis. *Sabouraudia*, 11: 59-63, 1973.
- KOENIG, H.; WARTER, A.; BIEVRE, C. de; WALLER, J.; WEITZBLUM, E. & MORAND, G. — Mycose pulmonaire a *Drechslera hawaiiensis*. *Bull. Soc. franç. Mycol. med.*, 13: 373-376, 1984.
- KOSHI, G.; ANANDI, V.; KURIEN, M.; KIRUBAKARAN, M. G.; PADHYE, A. A. & AJELLO, L. — Nasal phaeohyphomycosis caused by *Bipolaris hawaiiensis*. *J. med. Vet. Mycol.*, 25: 397-402, 1987.
- McGINNIS, M. R. — Chromoblastomycosis and phaeohyphomycosis: new concepts, diagnosis, and mycology. *Amer. Acad. Derm.*, 8: 1-16, 1983.
- McGINNIS, M. R.; RINALDI, M. G. & WINN, R. E. — Emerging agents of phaeohyphomycosis: pathogenic species of *Bipolaris* and *Exserohilum*. *J. clin. Microbiol.*, 24: 250-259, 1986.
- McGINNIS, M. R. & HILGER, A. E. — Infections caused by black fungi (editorial). *Arch. Derm.*, 123: 1300-1302, 1987.
- MORTON, S. J.; MIDTHUN, K. & MERZ, W. G. — Granulomatous encephalitis caused by *Bipolaris hawaiiensis*. *Arch. Path. Lab. Med.*, 110: 1183-1185, 1986.
- NELSON, R. R. — *Cochliobolus intermedius*, the perfect stage of *Curvularia intermedia*. *Mycologia*, 52: 775-778, 1960.
- NELSON, R. R. — The perfect stage of *Helmonthosporium spiciferum*. *Mycologia*, 56: 196-201, 1964.
- PORTO, E.; TAKAHASHI, N.; HEINS, E. M. & LACAZ, C. da S. — Nuevo metodo para microcultivo de hongos. *Rev. argent. Micol.*, 4: 24-29, 1981.
- RUBEN, S. J.; SCOTT, T. E. & SELTZER, H. M. — Intracranial and paranasal sinus infections due to *Drechslera*. *South. med. J.*, 80: 1057-1058, 1987.
- STOCKDALE, P. M. — *Nannizia incurvata* gen. nov., sp. nov., a perfect state of *Microsporium gypseum* (Bodin) Guiart et Grigorakis. *Sabouraudia*, 1: 41-48, 1961.
- YOUNG, C. N.; SWART, J. G.; ACKERMAN, D. & DIVIDGE-PITTS, K. — Nasal obstruction and bone erosion caused by *Drechslera hawaiiensis*. *J. Laryng.*, 92: 137-143, 1978.

Recebido para publicação em 29/6/1990.

Aceito para publicação em 06/9/1990.