

ALPAKESIOPSIS GEN. NOV., AND ADDITION TO COELOMYCETES FROM PAKISTAN

S.Q. ABBAS, B.C. SUTTON*, A.GHAFFAR AND A. ABBAS**

*Department of Botany,
Federal Urdu University of Arts, Sciences & Technology,
Gulshan-e-Iqbal Campus, University Road, Karachi, Pakistan.*

Abstract

Alpakesiopsis gen.nov., and *A. ghaffari* sp.nov., belonging to Coelomycetes are illustrated, described and compared with related taxa.

Introduction

In continuing the studies on revision of and addition to fungi of Pakistan, an unknown plant collected by Sultan Ahmad (IMI No. 202284) revealed an interesting appendage bearing Coelomycetous fungus, which is clearly different from other appendaged bearing Coelomycetous genera. However it has some similarities with *Alpakesia*, therefore it is named as *Alpakesiopsis* Abbas, Sutton, Ghaffar & Abbas is described, illustrated and compared with allied genera.

***Alpakesiopsis* Abbas, Sutton, Ghaffar et Abbas gen. nov.**

Fig. 1 (A, B, C, D, E)

Fig. 2 (A, B)

Etym.: *Alpakesa et opsia* = like (faces).

Conidiomata eustromatica, separata vel aggregata, unilocularia vel multilocularia, globosa vel applanato-globosa vel convoluta vel irregularia. Parietes 5-10 cellulis crassis ex textura angulari, ad stratis duobus compositis. Stratum exterior cellulis crassis, nigris ad parvis consistens. Gradatim hyalinis versus stratum interius. In conidiomata multilocularia parietes inter-loculares excellulis tenuioribus, hyalinis compositis. *Conidiophora* hyalina, laevia, septata, *sympodialiter* ramosa, ex cellulis interioribus parietum originata. *Cellulae conidiogenae* in conidiophoris incorporatae, cylindraceae vel lageniformes, hyalinae, generatim non-proliferationibus, raro cum proliferationibus, enterogenibus et stationaribus. Conidia hologenitica, fusiformia, hyalina, 3-5 septata, cellulae conidii uninucleatae, cellulae apices et bases obtusae sed parietibus extremis crassioribus, 6-9 appendicibus enucleatis, apicalibus, simplicibus, cellularibus orratae.

Sp. typ.: *Alpakesiopsis ghaffarii* Abbas, Sutton et Abbas sp.nov.

***Alpakesiopsis* Abbas, Sutton, Ghaffar & Abbas gen. nov.**

Conidiomata eustromatic, solitary or aggregated, unilocular to multilocular, globose to applanate globose, or convoluted to irregular in shape. Wall composed of textura

*C.A.B. International Mycological Institute, Bakeham Lane, Egham, Surrey, TW20 9TY, U.K.

**Department of Botany, University of Karachi, Karachi-75270, Pakistan.

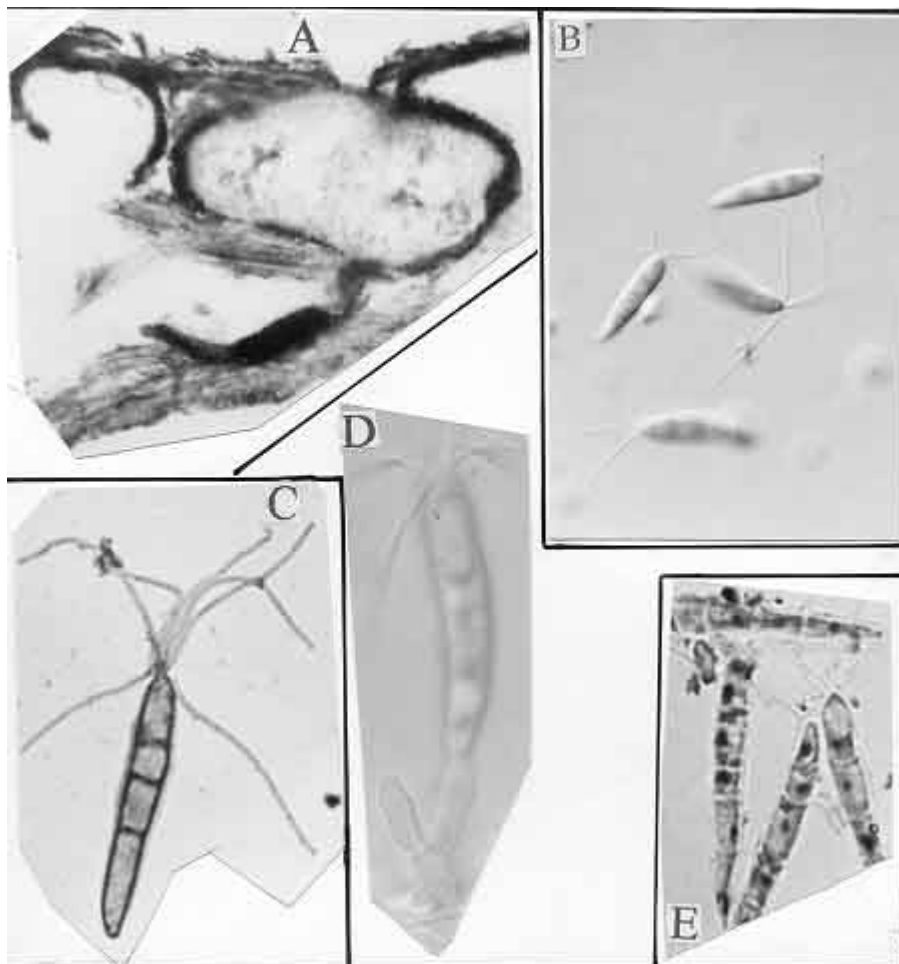


Fig. 1. *Alpakesiopsis ghaffarii* (A) V.S. of conidioma, 100X; (B) conidia, 1000X; (C) conidia stained in Leifson's flagella stain, 1800X; (D) conidiogenous cells with conidia, 1800X; (E) conidia stained in Geimsa HCl stain, 1800X.

angularis, black, 5-10 cells thick, generally differentiated into two layers, the outer layer consisting of smaller thick-walled black cells, which become gradually hyaline towards the inner layer. In multilocular conidiomata the cells of the wall separating the locules are thinner and more hyaline than elsewhere. *Conidiophores* hyaline, smooth, sympodially branched, septate, developed all around the locules from the innermost layer of the conidiomatal wall. *Conidiogenous cells* integrated, cylindrical to lageniform, hyaline, generally non-proliferating but some times proliferating enterogenous and stationary. Periclinal thickening minute. *Conidia* hologenous, fusiform, hyaline, 3-5 euseptate, conidial cells uninucleate. Apical and basal cells obtuse but with the end walls thicker than the lateral walls. Apical cell about twice as wide as the basal cell, with 6-9 apical, simple, cellular, enucleate appendages.

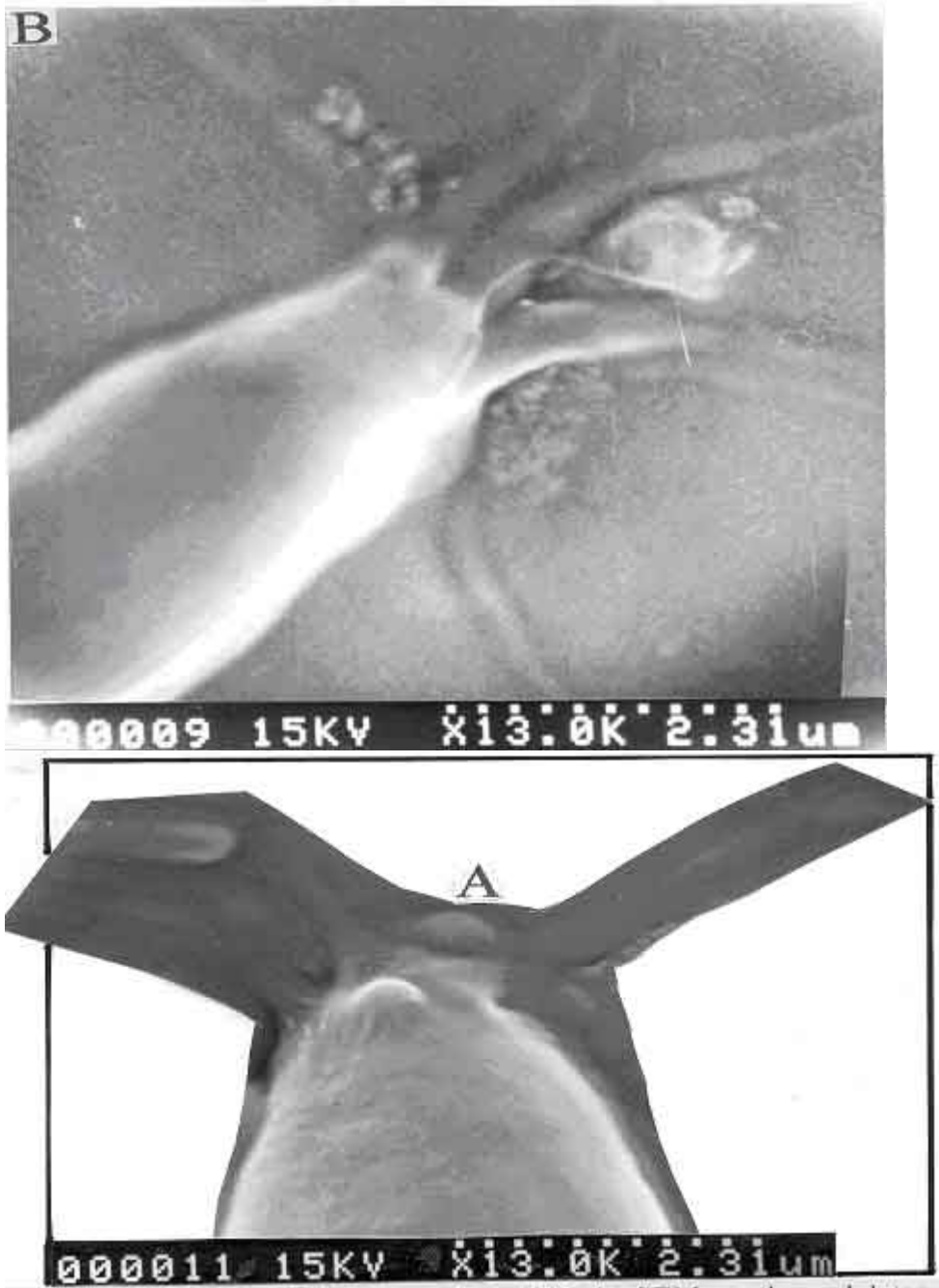


Fig. 2. *Alpakesiopsis ghaffarii* (A, B) conidia in SEM, early and later stages of appendages development.

Sp. typ.: *Alpakesiopsis ghaffarii* Abbas, Sutton & Abbas sp. nov.

Alpakesiopsis differs significantly from several pycnidial and acervular genera with hyaline or pale brown, septate, conidia bearing several apical appendages. The closest genus as name implies is *Alpakesa* Subram. & Ramakr. (Sutton, 1980). *Alpakesa* resembles *Alpakesiopsis* in having 0-3 septate, hyaline conidia with several cellular, simple, apical appendages but differs in the pycnidial conidiomata, absence of conidiophores, and non-proliferating conidiogenous cells. In *Alpakesiopsis* generally conidiogenous cells are non-proliferating but sometimes they proliferate enterogenous and stationary. Sutton (1980) accepted only three species in *Alpakesa*. Of these, *A. nolinae* has 3-septate conidia, which is closest to *Alpakesiopsis*, but the conidial morphology markedly differs in both genera. In *Alpakesa* conidia are cylindrical, with an obtuse apex and truncate base with a prominent frill. Appendages arise from the upper broad surface of the apical cell. Optical microscopy studies showed that the gap-like structure present below the region from which appendages arise is actually a small cell containing less cytoplasm and no nuclei. In *Alpakesiopsis* conidia are fusiform to conical, 3-5-septate, the apex twice as wide as the base, both ends with prominent wall thickening, and a base lacking any marginal frill. Furthermore there is no separating cell at the base of the appendages. There are 6-9 appendages arising from a narrow region whereas in *Alpakesa* the appendages arise from a broad surface. The appendages in both genera are cellular, simple and enucleate but wider in *Alpakesa* than in *Alpakesiopsis*.

Hyalotiella Papendorf (Nag Raj, 1974; Sutton, 1980) is another genus resembling *Alpakesiopsis* in having eustromatic conidiomata, non-proliferating conidiogenous cells, branched conidiophores and 3-septate pale brown conidia with an apical hyaline cell and uninucleate conidial cells. However *Alpakesiopsis* differs from *Hyalotiella* in conidiophores in some respects and in its conidial morphology. Conidiophores are wide, septate and sympodial in *Alpakesiopsis* but filiform, septate and branched at the base. Though non-proliferating conidiogenous cells are present in both the genera but in *Hyalotiella* some time they proliferate sympodially while some time in *Alpakesiopsis* conidiogenous cells proliferate enterogenously and stationary. Conidia in *Hyalotiella* are 3-septate, pale brown except for the hyaline apical cell whereas conidia are 3-5 septate and hyaline in *Alpakesiopsis*. Appendages are also different in both genera. In *Alpakesiopsis* 6-9 simple, cellular, enucleate appendages arise separately from the narrow apical region of the apical cell whereas in *Hyalotiella* the hyaline apical cell elongates to form an apical appendage which then divides to form 2-4 branches.

Hyalotiopsis Punithalingam (1970) resembles *Alpakesiopsis* in non-proliferating conidiogenous cells which sometimes do proliferate sympodially with 3-euseptate conidia with apical appendages, but it differs in having pycnidial conidiomata and no conidiophores. Conidial morphology is also different in both genera since in *Hyalotiopsis* conidia are cylindrical or slightly curved, pale brown, each end cell paler, multinucleate, cells of variable size, end cells longer than the median cells, with 2 apical cellular appendages branched 2-4 times, whereas, in *Alpakesiopsis* conidia are 3-5 septate, hyaline and cells are of equal size and uninucleate. Appendages number 6-9, and are apical, cellular and simple, originating separately from different loci. *Chaetospora* Faurel & Schotter (Sutton, 1980) is another genus which resembles *Alpakesiopsis* in non-proliferating conidiogenous cell and hyaline, cylindrical or fusiform, 4-septate appendaged conidia. However *Chaetospora* has pycnidial conidiomata, no conidiophores and 4-septate conidia, with the median cells unequal, the lower being longer with 3-4 apical, simple, cellular, septate appendages.

Parahyalotiopsis Nag Raj (Thaug, 1975; Nag Raj, 1976) also resembles *Alpakesiopsis* in having 3-septate, uninucleate conidia with 2-4 apical, simple or occasionally branched appendages. However it is distinguished by the pycnidial conidiomata and absence of conidiophores and enterogenous and progressively proliferating conidiogenous cells. Conidia in *Parahyalotiopsis* are cylindrical or oblong, 3-septate, brown, minutely verruculose, obtuse at the apex and with a truncate base, median cells smaller than the end cells, apical cell with 2-4 simple, hyaline, enucleate appendages, arising separately from different loci. Conidia in *Alpakesiopsis* are 3-5 septate, fusiform, hyaline, smooth, with cells of equal size, the apical cell about twice as wide as the basal cell which is the smallest cell in the conidium. Appendages in both genera are similar in origin and morphology, except that in *Parahyalotiopsis* there are 2-4 and in *Alpakesiopsis* 6-9. *Pseudorobillarda phragmitis* (Cunnell) Morelet (Punithalingam & Woodhams, 1986; Abbas *et al.*, 1998) shows some similarities with *Alpakesiopsis*. The resemblance lies in the absence of conidiophores, enterogenous and stationary proliferating conidiogenous cells hyaline, cylindrical, smooth-walled, 3-septate conidia in which cells are uninucleate, and 3 or 4 apical appendages. *P. phragmitis* can be separated from *Alpakesiopsis* by the pycnidial conidiomata, cylindrical conidia in which the apex is narrower than the base, 3-4 simple, enucleate appendages, whereas in *Alpakesiopsis* conidia are 3-5 septate, fusiform, apex obtuse and wider than the truncate base, with 6-9 apical, simple, hyaline, cellular appendages arising from the apical cell. *Pestalozzina* (Sacc.) Sacc. (Nag Raj, 1974) also resembles *Alpakesiopsis* in certain respects, the presence of conidiophores and 4-septate, appendaged conidia. However, it can be distinguished in having pycnidial conidiomata, reduced conidiophores, enterogenous and progressively proliferating conidiogenous cell and the 4-septate conidia in which the apical and basal cells are hyaline and smaller than the median brown cells. The apical cell has many simple, cellular appendages not confined to the distal end of apical cells but also originating from the subapical region. The basal cell has a single, excentric, simple, cellular appendage. In contrast to this, *Alpakesiopsis* has eustromatic conidiomata, well-developed septate conidiophores, and non-proliferating conidiogenous cells which later proliferate enterogenous and stationary and 3-5 septate, hyaline, fusiform conidia, in which the basal appendage is absent but the apical cell has 6-9 simple, cellular, unicellular, enucleate appendages.

Discosia Lib., (Sutton, 1980) also resembles *Alpakesiopsis* in having eustromatic conidiomata, non-proliferating conidiogenous cells and 3-septate, hyaline conidia. However it differs in the absence of conidiophores, 3-septate hyaline straight or slightly curved conidia with one subapical and one suprabaasal setula. *Bartalinia* Tassi (Morgan Jones *et al.*, 1972; Sutton, 1980) is also similar to *Alpakesiopsis* in having hyaline or pale brown, 4-septate conidia. However *Bartalinia* differs in having pycnidial conidiomata, no conidiophores, conidiogenous cells proliferating enterogenously and progressively with 1-2 percurrent proliferations, 4-septate conidia with the longest penultimate basal cell with one basal cellular, excentric appendage and the apical cell with 2-3 apical, simple, hyaline appendages. In contrast *Alpakesiopsis* has eustromatic conidiomata, septate conidiophores, non-proliferating conidiogenous cells, sometimes proliferating enterogenous and progressively. Conidia are 3-5-septate, hyaline, with cells of uniform size, fusiform, apex wider than the base, with 6-9 simple, apical, cellular, unicellular, enucleate appendages arising from the apical cell. There is no basal appendage. *Doliomyces* Steyaert (Sutton, 1980) can also be compared with *Alpakesiopsis*. It is similar in having branched septate conidiophores, 3-5-septate, cylindrical, appendaged conidia, but it differs from *Alpakesiopsis* in having pycnidial conidiomata, 1-2

enterogenous and progressively proliferating conidiogenous cells and 3-5 septate conidia, the apical and basal cells of which are hyaline, and median cells dark brown and thick-walled. Several lateral simple, cellular appendages arise from the apical cell and a single, simple, cellular, excentric appendage from the basal cell. *Ciliochorella* Syd., (Sutton, 1980) shows some resemblance to *Alpakesiopsis* in the eustromatic conidiomata which are common in *Ciliochorella* and only occasional in *Alpakesiopsis*. Conidiogenous cells proliferate enterogenous and stationary, and 3-septate, appendaged conidia, however it can be distinguished in having eustromatic conidiomata which are flattened, subcuticular or epidermal or lenticular, whereas in *Alpakesiopsis* conidiomata are oval, globose to applanate-globose and unilocular to multilocular. Conidiophores are absent in *Ciliochorella* but present, well-developed and septate in *Alpakesiopsis*. However, the main distinction lies in conidial morphology. Conidia in *Ciliochorella* are 3-septate, with unequal cells, the apical and basal cells smaller and hyaline, the median cells very pale brown and larger. From the apical cell two simple cellular appendages arise, one of them lateral and the other apical and the basal cell is prolonged into a single, simple cellular, central, endogenous appendage. In comparison to this, conidia in *Alpakesiopsis* are fusiform, 3-5 septate, hyaline, without a basal appendage but with 6-9 simple, hyaline, cellular, unicellular, enucleate appendages arising from the apical cell.

Tiarosporella Höhn. (Punithalingam, 1981b) may also be compared with *Alpakesiopsis*. Both genera have apical appendaged conidia. However *Tiarosporella* differs markedly from *Alpakesiopsis* in the pycnidial conidiomata, two types of conidiogenous cells, permanent conidiogenous cell which proliferate enterogenously and progressively and aseptate conidia, each with several acellular appendages at the apex. *Alpakesiopsis* has eustromatic conidiomata, one type of conidiogenous cells, and 3-5 septate, hyaline conidia the apical cell with 6-9 apical, cellular, simple, enucleate appendages, which arise separately. *Nealpakesa* Punithalingam (1981a) shows resemblance to *Alpakesiopsis* in the presence of septate conidiophores, enterogenous and progressively proliferating conidiogenous cells, and hyaline appendaged conidia, but differs by the presence of pycnidia and aseptate conidia with 2 dichotomously branched, cellular, appendages.

***Alpakesiopsis ghaffarii* Abbas, Sutton & Abbas sp. nov.**

Fig. 1 (A, B)

Conidiomata eustromatica, separata vel 4-5 conidiomata aggregata, unilocularia vel multilocularia, globosa vel applanato-globosa vel convoluta vel irregularia, 126-210 x 210-760 μm . Parietes 5-10 cellulis crassi ad 10.5-42 μm lati ex textura angulari ad stratis duobus compositi, stratum exterior cellulis crassis, nigris ad parvis consistans, gradatim hyalinis versus stratum interius. In conidiomata multilocularia, parietes interloculares ex cellulis tenuioribus, hyalinis compositi. *Conidiophora* hyalina, laevia, septata, sympodialiter ramosa, ex cellulis interibus parietum originata 10-20 x 3-3.5 μm . *Cellulae conidiogena*e cylindraceae vel, hyalinae, laeves, in conidiophoris incorporatae, generatim non-proliferationibus, raro proliferationibus, enterogenibus 8-16 x 2-4 (7.2) μm . *Conidia* hologenitica, fusoidea, hyalina, 3-5 septata, 16-32 x 4-6 μm cellulae conidorum uninucleatae, cellulae apices et bases obtusae sed perietibus extremis crassioribus, 6-9 appendicibus enucleatis, apicalibus, simplicibus, cellularibus orratae 16-32 x 0.6-1.2 μm , appendibus inequalibus, ad apicem 0.6-0.8 μm lata, ad basim 0.8-1.2 μm lata.

In ramis emortuis, hospes plante ignotus, Lahore, Pakistan, S. Ahmad (IMI 202284), holotypus.

***Alpakesiopsis ghaffarii* Abbas, Sutton et Abbas sp. nov.**

In honour of Professor Dr. Abdul Ghaffar, an eminent Mycologist and Plant Pathologist of Pakistan.

Conidiomata eustromatic, solitary or aggregated in groups of 4-5, unilocular to multilocular, globose to applanate-globose or convoluted to irregular in shape, 126-210 x 210-760 μm . Wall composed of *textura angularis*, black, 5-10 cells thick and 10.5 - 42 μm wide, generally differentiated into two layers, the outer one consisting of black, thick-walled, smaller cells becoming gradually hyaline in the inner layer. In multilocular conidiomata the walls separating the locules are more hyaline than the parietal wall. *Conidiophores* hyaline, smooth, sympodially branched, septate, developed all around the locules from the innermost layer of the conidiomatal wall, 10-20 X 3-3.5 μm . *Conidiogenous cells* cylindrical to hyaline, generally non-proliferating however some time proliferate enterogenous and stationary with minute periclinal thickenings, 8-16 x 2-4 (7.2) μm . *Conidia* hologenous, fusoid, hyaline, 3-5 septate, each cell uninucleate, 16-32 X 4-6 μm , apical and basal cell obtuse, but end walls thicker than the lateral walls. The apical cell is about twice as wide as the basal cell. Appendages 6-9, apical, simple, cellular, enucleate, arising separately from the apical cell 16-32 X 0.6-1.2 μm , not uniform in thickness, 0.6-0.8 μm at the apices and 0.8-1.2 μm wide at the bases.

Specimen examined

***Alpakesiopsis ghaffarii* Abbas, Sutton & Abbas sp. nov.**

On twigs of unidentified plant, Lahore, Pakistan, S. Ahmad (IMI 202284), holotype.

References

- Abbas, S.Q., B.C. Sutton and A. Ghaffar. 1998. Studies on nuclei and appendages in some Coelomycetes. *Pak. J. Bot.*, 30: 51-68.
- Morgan-Jones, G., T.R. Nag Raj and B. Kendrick. 1972. Genera Coelomycetarum. V. *Alpakesa* and *Bartalinia*. *Can. J. Bot.*, 50: 877-882.
- Nag Raj, T.R. 1974. Icones generum Coelomycetum VI. Univ. *Waterloo Biol. Ser.*, 13: 1-41.
- Nag Raj, T.R. 1976. Miscellaneous Microfungi. I. *Can. J. Bot.*, 54: 1370-1376.
- Punithalingam, E. 1970. Studies on Sphaeropsidales in culture. *Mycol. Pap.* (CAB, IMI) Kew, 119: 1-24.
- Punithalingam, E. 1981a. New microfungi from cereals and grasses III. *Nova Hedwigia*, 34: 137-150.
- Punithalingam, E. 1981b. Conidiation and appendage formation in *Tiarosporella paludosa* Sacc. & Fiori. *Nova Hedwigia*, 34: 539-566.
- Punithalingam, E. and J.E. Woodhams. 1986. The conidial appendages and nuclei in *Pseudorobillarda* spp. *Nova Hedwigia*, 43: 485-498+8 plates.
- Sutton, B.C. 1980. The *Coelomycetes* (CAB, IMI) Kew, Surrey, U.K. pp. 696.
- Thaug, M.M. 1975. Miscellaneous fungi from Burma. *Trans. Br. Mycol. Soc.*, 64: 307-312.

(Received for publication 31 December 2001)