ACHAETOMIUM, A NEW GENUS OF ASCOMYCETES

J. N. Rai, J. P. Tewari, and K. G. Mukerji
Botany Department, Lucknow University, Lucknow, India

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Abstract

A new genus of Ascomycetes, *Achaetomium*, with three species, *A. globosum* (type species), *A. strumarium*, and *A. luteum*, has been described from Indian soils. The new genus is characterized by the presence of ostiolate ascocarps devoid of hairy adornment and with wall made up of loosely interwoven hyphae, fascicled early-deliquescing asci, and dark one-celled ascospores. The new genus cannot adequately be placed in a known family.

Introduction

This paper deals with a new genus of phaeosporous Ascomycetes having evanescent asci. It is being named *Achaetomium* after the presence of *Chaetomium*-like perithecia devoid of hairy ornamentation. The three species belonging to this new genus are being named as *A. globosum*, *A. luteum*, and *A. strumarium* after the presence of globose ascospores, pure yellow colonies, and stromatic ascocarps respectively. *A. globosum* is designated as type species of the genus.

Description

Achaetomium Rai, Tewari et Mukerji gen. nov.

Ascocarpi superficiales, nullis tuberculis pilosis ornati, ostiolati, collo ostiolari nullo vel pauperrime evoluto, parietibus constantibus e hyphis inter se laxe textis. Asci octospori, fasciculati, clavati, cito deliquescentes, nulla structura apicali ornati. Ascosporae coloratae, globosae vel ellipticae, compressae vel simplices, absque appendicibus ullis, uno vel bino poro polari.

Species typica sequens.

Ascocarps superficial, devoid of hairy outgrowths, ostiolate, ostiolar neck absent or poorly developed, wall consisting of rather loosely interwoven hyphae. Asci octasporous fascicled, clavate, deliquescing very early, without any apical structures. Ascospores colored, globose, or elliptical, compressed or simple, without any appendages, with one or two polar pores.

A. globosum Rai et Tewari spec. nov. Type species (Figs. 1, 4; Figs. 7–10)

Coloniae in agaro hordeaceo ad $27 \pm 1°$ C sat rapide crescentes, ascocarpis eminenter dispersis; mycelium aëreum sparsum, album vel luteolo-giseum, mycelium vero submersum hyalinum vel aliquantum nigreolum. Facies versa agari lutea vel brunneo-lutea. Ascocarpi primo griseo-lutie, tum evadentes pleni ascosporarum massa nigra, superficiales, dispersi, ostiolati, collo ostiolari nullo, substrato fixi per hyphas rhizoideas 166.0–290.5 $\mu \times$ 166.0–265.5 μ. Asci octospori, fasciculati, clavati, evanescentes, stipitati, aporati, 56.0 $\mu \times$ 8.0 μ. Ascosporae extrusae in forma guttulae, globosae aspectu frontali, eminenter compressae lateraliter, unico poro polari, 9.6–15.2 μ diam. aspectu frontali, aspectu vero laterali 9.6–15.6 $\mu \times$ 8.0–11.2 μ.

Typus lectus mense februario anni 1960 ex regione radicum *Tamarindi indicae* ad 2 ped. angl. sub solo ad Lucknow in India; cultura typica posita

in Instituto Mycol. Commonw. ad Kew in Anglia sub numero IMI 82626; isotypi positi in collectione culturarum ARS in USA.

Colonies on oatmeal agar at 27 ± 1° C moderately fast-growing with prominently dispersed ascocarps, aerial mycelium scanty and white to yellowish-grey, submerged mycelium hyaline to somewhat blackish. Reverse agar yellow to brownish-yellow. Ascocarps greyish yellow when young, later getting filled up with black ascospore mass, superficial, dispersed, ostiolate, ostiolar neck absent, fixed to the substratum by rhizoidal hyphae, 166.0–290.5 μ × 166.0–265.5 μ. Asci octasporous, fascicled, clavate, evanescent, stipitate, aporate, 56.0 μ × 8.0 μ. Ascospores extruded in the form of a droplet, arranged uniseriately in the ascus, greyish-brown, globose in face view, prominently compressed laterally, with a single polar pore, 9.6–15.2 μ diameter in face view, in side view 9.6–15.6 μ × 8.0–11.2 μ.

A. luteum Rai et Tewari spec. nov. (Figs. 2, 5; Figs. 11–16)

Coloniae in agaro hordeaceo ad 27 ± 1° C sat rapide crescentes ascocarpis plurimis dispersis; mycelium aëreum sparsum et album vel luteum, submersum vero hyalinum vel nigreolum. Facies versa agari lutea vel brunneo-lutea. Ascocarpi primo nitenter lutei, tum apparentes pleni ascosporarum massa nigra, superficiales, dispersi, ostiolati, collo ostiolari brevissimo vel vix ullo, fixi substrato per hyphas rhizoideas, 116.2–182.6 μ × 99.6–157.7 μ. Asci octospori, fasciculati, clavati, evanescentes, stipitati, aporati, 37.0–40.7 μ × 3.7–7.4 μ, parietibus incrustratione luteola notatis. Ascosporae extrussae in forma cirrhi brevis vel guttulae, dispositae uniserialiter vel biserialiter in asco, griseo-brunneae, ellipticae, apicibus rotundatis, nonnumquam apicibus paulum retractis, unico poro polari ad utrumque apicem, 8.8–10.3 μ × 3.7–6.6 μ. Chlamydosporae abundantes in mycelio submerso.

Typus lectus in solo in saccharetо mense aprili anni 1960 ad Harchandpur, Rae Barelli in India; cultura typica posita in Instituto Mycologico Commonw. ad Kew in Anglia sub numero IMI 96678; isotypus positus in collectione nationali fungorum U.S.A.

Colonies on oatmeal agar at 27 ± 1° C moderately fast-growing with abundant dispersed ascocarps, aerial mycelium scanty and white to yellow, submerged mycelium hyaline to blackish. Reverse agar yellow to brownish-yellow. Ascocarps bright yellow when young, later appearing filled up with black ascospore mass, superficial, dispersed, ostiolate, ostiolar neck very short or almost absent, fixed to the substratum by means of rhizoidal hyphae, 116.2–182.6 μ × 99.6–157.7 μ. Asci octasporous, fascicled, clavate, evanescent, stipitate, aporate, 37.0–40.7 μ × 3.7–7.4 μ, ascus wall with yellow incrustations. Ascospores extruded in the form of a short cirrus or a droplet, arranged uniseriately or biseriately in the ascus, greyish-brown, elliptical, with pointed ends, in some cases the ends slightly drawn up, one polar pore present at each end, 8.8–10.3 μ × 3.7–6.6 μ. Abundant chlamydospores present in the submerged mycelium.

A. strumarium Rai, Tewari et Mukerji spec. nov. (Figs. 3, 6; Figs. 17–20)

Coloniae in agaro hordeaceo ad 27 ± 1° C sat rapide crescentes, ascocarpis multis evolutis in catervis eminentibus mycelio aereo sparso et albido vel

PLATE I

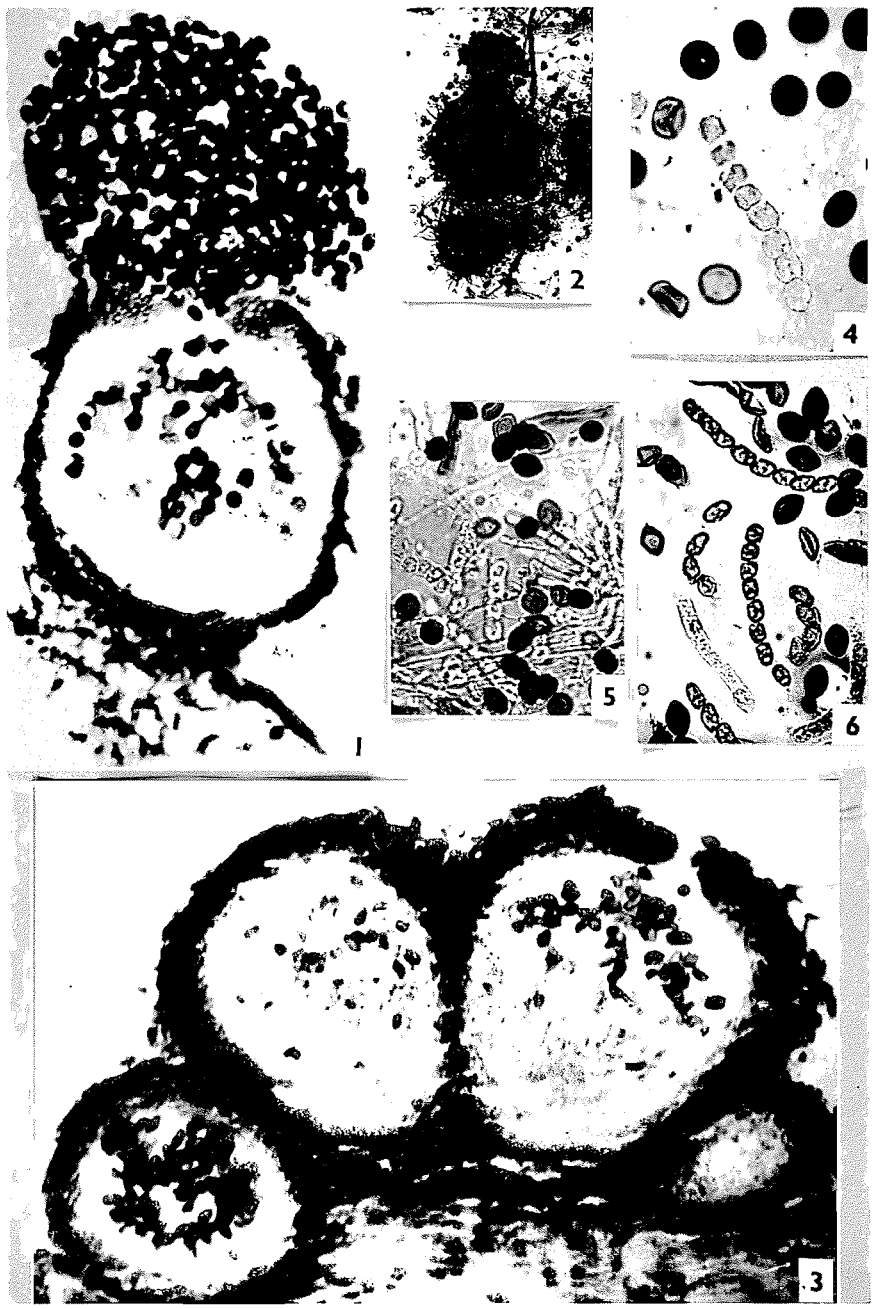
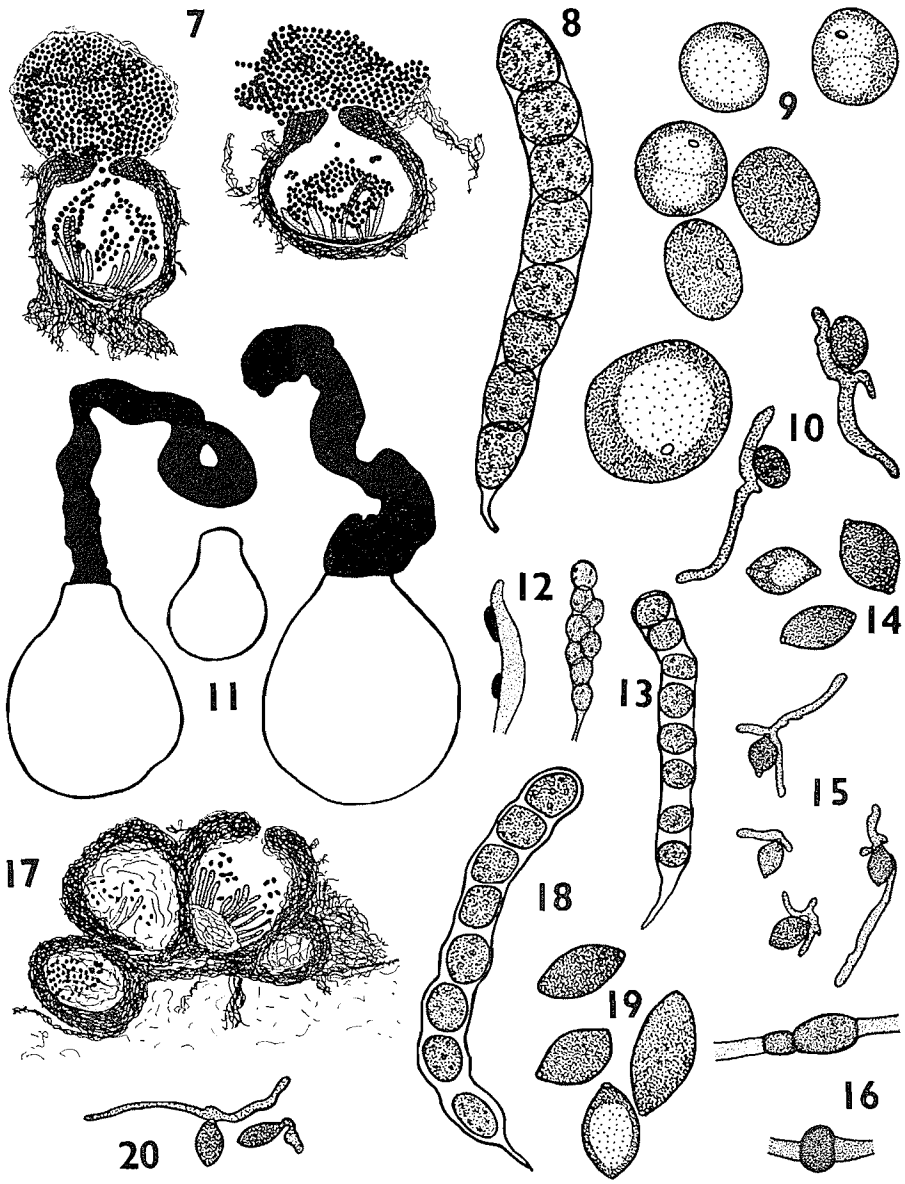


FIG. 1. *Achaetomium globosum* spec. nov. Section perithecium ×263. FIG. 2. *A. luteum.* Perithecia ×110. FIG. 3. *A. strumarium.* Section perithecia ×266. FIG. 4. *A. globosum.* Asci and ascospores ×700. FIG. 5. *A. luteum.* Asci and ascospores ×700. FIG. 6. *A. strumarium.* Asci and ascospores ×700. Oatmeal agar used in all cases.



FIGS. 7–10. *Achaetomium globosum*. 7. Section perithecia ×125. 8. Ascus ×1250. 9. Ascospores ×1250. 10. Germinating ascospores ×600.

FIGS. 11–16. *A. luteum*. 11. Perithecia ×150. 12. Asci showing incrustations ×600. 13. Ascus ×1250. 14. Ascospores ×1250. 15. Germinating ascospores ×600. 16. Chlamydospores ×600.

FIGS. 17–20. *A. strumarium*. 17. Section perithecia ×125. 18. Ascus ×1250. 19. Ascospores ×1200. 20. Germinating ascospores ×600.

brunneolo, mycelio submerso hyalino vel nigreolo. Facies versa agari lutea vel nigreola. Ascocarpi primo pallide griseo-brunnei, tum alte brunnei, superficiales, stromatici, ostiolati, collo ostiolari nullo, fixi substrato per hyphas rhizoideas, 141.1–199.2 μ × 141.1–190.9 μ. Asci octospori, fasciculati, clavati, evanescentes, stipitati, aporati, 51.8–55.5 μ × 5.1–6.6 μ. Ascosporae uniseriaaliter dispositae in asco, griseo-brunneae, ellipticae, apicibus paulum rotundatis, unico poro polari praeditae, 9.6–12.5 μ × 5.9–6.6 μ.

Typus saepissime lectus in solo post annum 1958 ad Lucknow in India; cultura typica posita in Instituto Mycologico Commonw. ad Kew, in Anglia, sub numero IMI 82624; isotypi positi in culturarum collectione ARS in USA.

Colonies on oatmeal agar at 27 ± 1° C moderately fast-growing with large number of ascocarps developing in prominent groups, aerial mycelium scanty and whitish to brownish, submerged mycelium hyaline to blackish. Reverse agar yellow to blackish. Ascocarps light greyish-brown when young, turning deep brown on ageing, superficial, stromatic, ostiolate, ostiolar neck absent, fixed to the substratum by rhizoidal hyphae, 141.1–199.2 μ × 141.1–190.9 μ. Asci octasporous, fascicled, clavate, evanescent, stipitate, aporate, 51.8–55.5 μ × 5.1–6.6 μ. Ascospores arranged uniseriately in the ascus, greyish-brown, elliptical, with slightly pointed ends, with a single polar pore, 9.6–12.5 μ × 5.9–6.6 μ.

The ascospores germinate from one pore only and there is consistency of this character in the genus. In *A. luteum* spec. nov. where the ascospores have two polar pores, only one gives rise to the germ tube.

Discussion

Family Chaetomiaceae has been defined (2) "to include those phaeosporous Ascomycetes having evanescent asci that are contained in a perithecium adorned by prominent hairs or setae" and the genera placed in the family are *Chaetomium*, *Chaetomidium*, *Ascotricha*, and *Lophotrichus*. Nannfeldt (1) "emphasized the deliquescent nature of the ascus" while other distinguishing features of the family are ostiolate ascocarps, fascicled asci, and dark membranous ascocarp wall. The new genus, *Achaetomium* Rai *et al.* thus differs from the four genera of Chaetomiaceae in lacking ascocarp hairs and dark membranous ascocarp wall. These differences make the taxonomic position of the new genus rather paradoxical, since its inclusion in the family Chaetomiaceae might bring together taxonomically unrelated forms. In light of this, the family to which *Achaetomium* Rai *et al.* should be referred can better be left an open question.

The three species referred to the new genus are quite distinct from each other. The type species, *A. globosum* Rai et Tewari has large, globose, laterally compressed, and uniporate ascospores. *A. luteum* Rai et Tewari and *A. strumarium* Rai *et al.* are distinguishable from each other and the type species in characters of the colony, ascocarp aggregations, and ascospores. In addition *A. luteum* Rai et Tewari shows incrustations on the ascus wall and abundant development of chlamydospores.

Dr. C. R. Benjamin, to whom cultures of all the three Ascomycetes were sent for opinion writes (personal communication) "I see why you have identified these only to Class. I have examined them at length, but cannot place

them. Grossly, at least, they seem congeneric. The habit of growth somewhat resembles that of members of the Melanosporaceae. The cylindrical, fascicled asci with their 1-seriate dark ascospores would seem to place them somewhere in the old Order Sphaeriales. Since the asci deliquesce rather early, perhaps these strains would fit into the Chaetomiaceae." However, the authors, pending further investigation, do not wish to commit themselves about its placement in any known family.

Acknowledgment

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