

FUNGI OF DELHI

XXVII. NEW ADDITIONS TO INDIAN SPECIES OF *CHAETOMIUM*

by MADHU RIKHY, GEETA MALHOTRA and K. G. MUKERJI, *Department of Botany, University of Delhi, Delhi-110007*

(Received 4 March 1975)

This paper describes four rare species of *Chaetomium* from India. These species have been isolated by incubating the substrate in moist chambers for seven days at $27 \pm 1^\circ$. Of these two were isolated from green wheat leaf-surface, one from bark of *Ficus benghalensis*, and the fourth from rabbit dung.

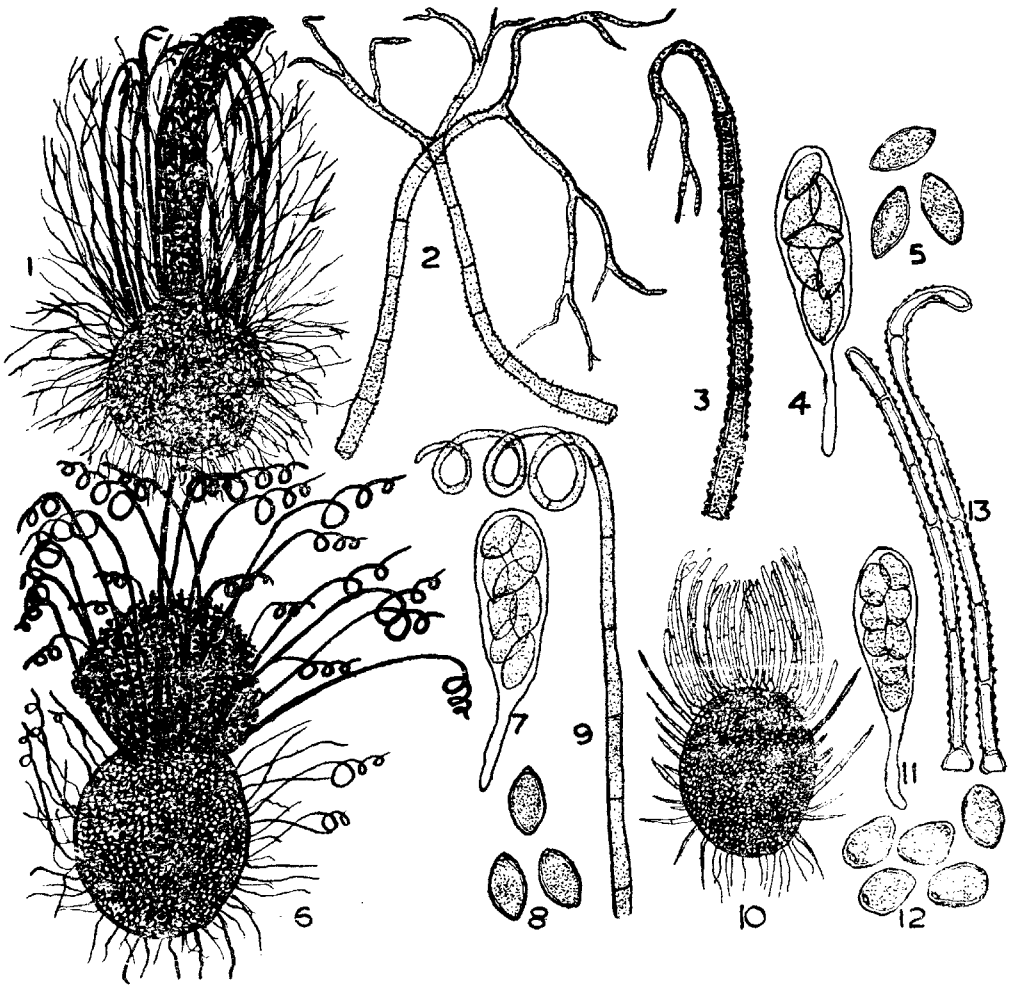
CHAETOMIUM CUNICULORUM, FÜCKEL, *Symb. Mycol.*, **89**, (1869).
= *C. CRISTATUM*, AMES *Mycologia*, **41**, 693 (1949).

Colonies fast growing on dung pellets; moderately growing on rabbit dung agar, 3 cm in 10 days at $27 \pm 1^\circ$; perithecia scattered to closely arranged, black to brownish-black, globose to subglobose, ostiolate, $200-320 \times 160-300 \mu$ (Fig. 1). Terminal hairs of two types, one finely branched, septate, $400-500 \mu$ long and $2.5-3.5 \mu$ wide at base, tips blunt (Fig. 2) and the other type of hairs long, $450-600 \mu$ long and $5-6.5 \mu$ wide at base, black, stiff, septate, few, arising from the ostiolar region, rough, branched only at the tips, irregularly dichotomous (Fig. 3). Lateral hairs many, slender, branched merging with the terminal hairs, $200-250 \mu$ long and $2.5-3 \mu$ at base, gradually tapering. Asci club-shaped, 8-spored, $40-50 \times 8-12 \mu$ (Fig. 4). Ascospores dark olive-brown, ellipsoid, apiculate at both ends, $6-10.5 \times 4-5.5 \mu$ (Fig. 5).

This was isolated from rabbit dung (collected on 3rd May, 1970) on which this has been commonly reported from various parts of the world (Bainier 1910; Ames 1961). A living culture of this isolate has been deposited in the CMI, Kew under reference number IMI 155487.

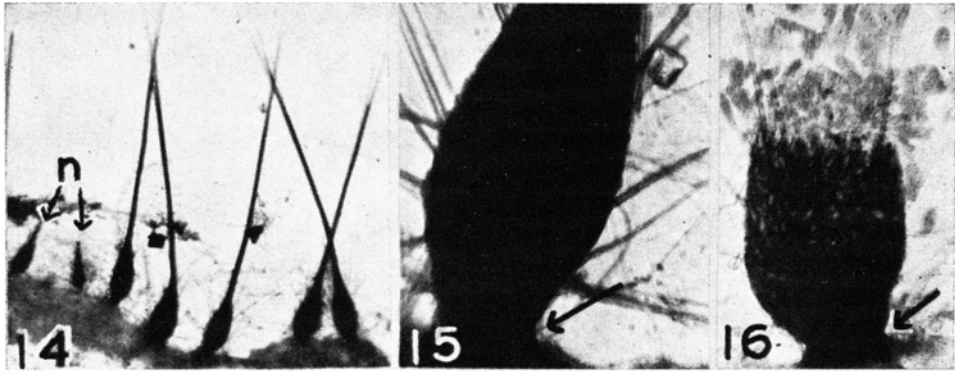
CHAETOMIUM LONGIROSTRE (FARROW) AMES, U. S. Army Res. & Dev. Ser., **2**, 29 (1961); Seth, *Beihefte Zur Nova Hedwigia*, **37**, 80 (1970).
= *CHAETOCERATOSTOMA LONGIROSTRE* FARROW, *Mycologia*, **47**, 418 (1955).

Colonies moderately growing on oat meal agar, reaching 3-3.5 cm in seven days at $27 \pm 1^\circ$. On green wheat leaves it grows quite moderately. First developing mycelia on surface only; perithecia developed abundantly after ten days with disappearance of surface mycelia. Perithecia dark brown to nearly black, ovate to elongate, $85-180 \times 50-90 \mu$, attached to the substratum with well developed rhizoids. In some fruiting bodies a well developed stalk-like structure is also present, $40-90 \times 10-15 \mu$ (Figs. 14-16 arrow). Most of the young perithecia exhibit a true short neck, $100-200 \times 10-17.5 \mu$ (Fig. 14, n). Peridium semitransparent, membranous, made of angular to irregularly shaped cells (Fig. 16). Terminal hairs long, dark



FIGS. 1-13. 1-5, *Chaetomium cuniculorum*: 1, mature perithecium $\times 85$; 2, branched terminal hair $\times 150$; 3, stiff terminal hair $\times 150$; 4, ascus $\times 900$; 5, ascospores $\times 1000$; 6-9, *Chaetomium subspirale*: 6, mature perithecium $\times 50$; 7, ascus $\times 1000$; 8, ascospores $\times 1000$; 9, terminal hair $\times 110$; 10-13, *Chaetomium varisporum*: 10, mature perithecium $\times 115$; 11, ascus $\times 650$; 12, ascospores $\times 650$; 13, terminal hairs $\times 350$.

brown to dark olive brown, slender, straight, originating from tips of the beaks, in bundles, distinct and separate forming a narrow spore exit through which the ascospores are released in a cirrhus; septate, 500-1800 μm long and 4-7 μm wide at base, smooth, tapering to pointed tips which are light coloured (Fig. 14). Lateral hairs short, straight, smooth, few and scattered, tapering to pointed tips, 225-500 μm long, 3-5 μm wide at base (Fig. 15). Asci 8-spored, clavate, 30-35 \times 10-12.5 μm , stipe short, evanescent (Fig. 16); ascospores hyaline when young, dark brown at maturity, subglobose, apiculate to subapiculate at both ends 10-12 \times 7-10 μm , released in a single column in the narrow passage formed by the terminal hairs.



Figs. 14-16. *Chaetomium longirostre* : 14, 15, mature perithecia, 14×45 ; 15 $\times 290$; 16, ruptured perithecium liberating asci. $\times 290$.

Chlamydospores are formed on side branches of the aerial hyphae, globose to subglobose, 10-14 μ in diameter, smooth, thick-walled, pale yellowish-brown in colour.

This species is very closely related to *C. longicolleum* Krzem. and Badura. The present isolate closely resembles the type, except the size of perithecia, asci and ascospores. Haksworth (1971) and Haksworth and Wells (1973) place this species in the genus *Chaetoceratostoma*. The validity of the genus *Chaetoceratostoma* is doubtful as it differs from the genus *Chaetomium* only by a single character—“terminal hairs adhering to form a long neck through which the ascospores are discharged”. However, in rest of the characters, all the three species of *Chaetoceratostoma* show similarity to *Chaetomium*. While classifying *Chaetomium* and allied forms under Melanosporaceae, Muller and Von Arx (1973) have not given any reference of the genus *Chaetoceratostoma*. In our present studies we have definitely seen that the neck is not formed by the fusion of the base of terminal hairs but it actually is the extension of ostioles, and the hairs arise from this terminally. Secondly we have definitely seen that like all *Chaetomium*s this species also releases ascospores in a cirrus.

Many other workers are also of the opinion that this species should be considered as *Chaetomium longirostre* (Ames 1961; Seth 1973 and Udagawa *et al.* 1973).

This was isolated from green leaves of wheat collected on Jan '74. This was first isolated from soil in U.S.A. (Farrow 1955; Ames 1961).

CHAETOMIUM SUBSPIRALE CHIVERS, *Proc. Am. Acad.*, **48**, 84 (1912).

Colonies growing on Czapek's agar, 5.5 cm in 10 days at $27 \pm 1^\circ$. Perithecia scattered, oval to ellipsoid, ostiolate, light brown to brownish-black, $260-350 \times 220-280 \mu$, fixed to the substratum with a dense mass of brownish rhizoids, producing at maturity an irregular cirrus of black spore mass entangled in terminal hairs (Fig. 6). Terminal hairs long, smooth, 390-650 μ long and 3.5-4.5 μ wide at base, lower 2/3 straight, upper 1/3 spirally coiled, olivaceous-brown (Fig. 9). Lateral hairs short, slightly tapering, $35-95 \times 3.5-4 \mu$, some tightly coiled spirally

at the tips. Asci 8-spored, club shaped, $35-40 \times 9-12 \text{ m}\mu$ (Fig. 7); ascospores pale olive, elliptical, apiculate at both ends, $6-10 \times 5.5-8 \text{ m}\mu$ (Fig. 8).

This was isolated from bark of *Ficus benghalensis* collected on 20th December, 1973.

CHAETOMIUM VARISPORUM UDAGAWA ET HORIE, *Rep. Tattori Mycol. Inst., Japan*, **10**, 430 (1973).

Colonies slow growing, forming white mycelial mat with numerous scattered perithecia fixed to the substratum with distinct rhizoids. Perithecia dark olive-black to black, globose to subglobose, $190-220 \times 150-205 \text{ m}\mu$ (Fig. 10). Terminal hairs arcuate, incurved, septate, unbranched, olive-brown to brown, $80-200 \text{ m}\mu$ long, $2.5-3 \text{ m}\mu$ wide at base, minutely rough, tips blunt (Fig. 13). Lateral hairs pale olive to brown, short, minutely roughened, straight to irregular, tapering to rounded tips, $60-80 \text{ m}\mu$ long and $2-2.5 \text{ m}\mu$ wide at base. Asci 8-spored, clavate, evanescent, $40-60 \times 10-13 \text{ m}\mu$ (Fig. 11). Ascospores olive to dark olive grey, variable in shape, $10-14 \times 5-10 \text{ m}\mu$, smooth (Fig. 12).

This was isolated from rabbit dung pellets collected on 13th May, 1972, from bark of mango collected on 9th March, 1973, and on wheat leaves collected in November, 1973.

C. varisporum is distinct from other species of *Chaetomium* in possessing irregular ascospores (Gams 1966; Rikhy and Mukerji 1973) and in having arcuate unbranched terminal hairs.

ACKNOWLEDGEMENTS

The authors are thankful to Dr. D. L. Hawksworth for confirming identification of one of the species and to Professor H. Y. Mohan Ram for facilities.

REFERENCES

- Ames, L. M. (1961). A Monograph of the Chaetomiaceae. U. S. Army Res. and Dev. Ser. **2**, 125 pp.
- Bainier, G. (1910). Mycotheque de l'Ecole de Pharmacia. XXX. Monographie des *Chaetomidium* et des *Chaetomium*. *Bull. Soc. mycol. Fr.*, **25**, 191-237.
- Farrow, W. M. (1955). A new species of *Chaetocerotostoma*. *Mycologia*, **47**, 416-419.
- Gams, W. (1966). Zwei Arten von *Chaetomium* mit unregelmässig geformten ascosporen. *Nova Hedwigia*, **12**, 385-388.
- Hawksworth, D. L. (1971). A revision of the genus *Ascotricha* Berk. Commonwealth Mycological Institute Mycol. Pap. No. **126**, 5.
- Hawksworth, D. L., and Wells, H. (1973). Ornamentation on the terminal hairs in *Chaetomium* Kunze ex Fr. and some allied genera. Commonwealth Mycological Institute Mycol. Pap. No. **134**, 12.
- Muller, E., and von Arx, J. A. (1973). Pyrenomycetes, Meliolales, Cornophorales, Sphaeriales. In: *The Fungi*, Vol IV A, pp. 87-132. (Eds. G. C. Ainsworth, F. K. Sparrow and A. S. Sussman). Academic Press, London and New York.
- Rikhy, M., and Mukerji, K. G. (1973). Fungi of Delhi. XXVI. Three new ascomycetes. *Kavaka*, **1**, 37-41.
- Seth, H. K. (1970). A monograph of the genus *Chaetomium*. *Beith. Nova Hedwigia*, **37**, pp 130.
- Udagawa, S., Furuya, K., and Horie, Y. (1973). Notes on some ascomycetous microfungi from soil. *19. Bull. natn. Sci. Mus., Tokyo*, **16**, 503-520.
- Udagawa, S., and Horie, Y. (1973). Three *Chaetomium* species from Thailand soil. *Rep. Tottori Mycol. Inst., Japan*, **10**, 429-435.