

FUNGI IMPERFECTI FROM MADRAS—V

CURVULARIA

BY C. V. SUBRAMANIAN

(University Botany Laboratory, Madras)

Received March 30, 1953

(Communicated by Prof. T. S. Sadasivan, F.A.Sc.)

THIS paper is a systematic account of some species of *Curvularia* collected by me recently. Two new species, *C. indica* and *C. palmarum* are described. Eight other species are recorded: *C. maculans*, *C. lunata*, *C. pallescens*, *C. andropogonis*, *C. trifolii*, *C. inaequalis*, *C. falcata* and *C. uncinata*. Of these, all species except *C. lunata* are new records for India. The only other species known from this country is *C. penniseti* (Mitra) Boedijn.

19. *Curvularia maculans* (Bancroft) Boedijn, in *Bull. Jard. bot. Buitenz.*, Ser. III, 1933, 13: 125, ic.

Basinym: *Spondylocadium maculans* Bancroft (1913); see also Mason E. W., 1928, *Annotated Account of the Fungi Received at the Imperial Bureau of Mycology*, List II, Fascicle 1, p. 5.

Conidiophores brown, simple, unbranched, erect, straight or bent, septate, up to 5μ broad, of variable length. Conidia borne in spirals towards the tip of the conidiophore, brown, barrel-shaped, broadest in the middle, 3-septate, the two middle cells concolorous with each other and darker than the apical and basal cells, the apical and the basal cells with broadly rounded outline, the basal cell with a distinct scar, 22×12.8 ($17-26 \times 11-16$) μ .

Two collections have been seen: on dead culms of *Scirpus* sp., Poona-mallee (Chingleput District, Madras State), 24-2-1953, coll. C. V. S., Herb. M.U.B.L. No. 848-III; on dead leaf-sheath of *Musa paradisiaca* L., Athur Farm (Chingleput District, Madras State), 2-12-1951, coll. C. V. S., Herb. M.U.B.L. No. 650.

Both collections agree well with the description given by Boedijn (1933).

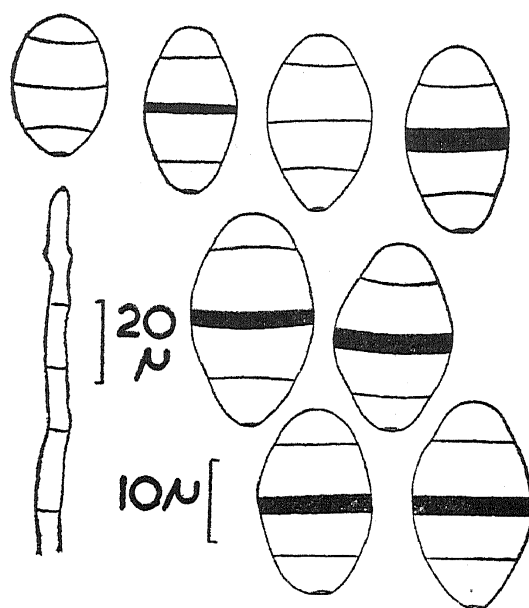


FIG. 1. *Curvularia maculans* : from Herb. M.U.B.L. No. 848-III.

20. *C. lunata* (Wakker) Boedijn, 1933, in *Bull. Jard. bot. Buitenz.*, Ser. III, 13: 127, ic.; Groves, J. W. and Skolko, A. J., 1945, *Canad. J. Res.*, C, 23: 101, ic.

Basinym: *Acrothecium lunatum* Wakker (1898). Saccardo, *Syll. Fung.*, 14: 1089, 1899; see also Mason, E. W., 1928, *Annotated Account of the Fungi Received at the Imperial Bureau of Mycology*, List II, Fascicle 1, p. 5.

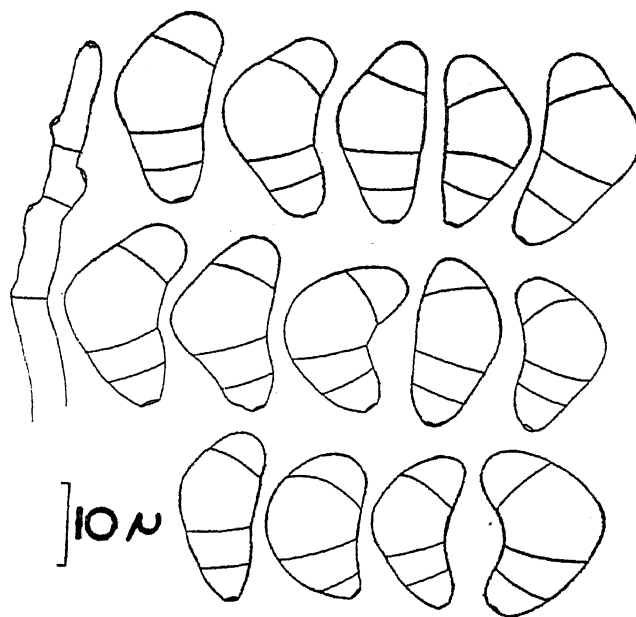


FIG. 2. *Curvularia lunata* : from Herb. M.U.B.L. No. 174.

Conidiophores brown except towards the tip where they are paler, simple, unbranched, septate, $3-6\mu$ broad, of variable length, geniculate towards the tip. Conidia boat-shaped, brown, 3-septate, the third cell from the base conspicuously larger, broader and darker than the others, curved or sometimes straight, each with a subhyaline, rounded apical cell, and a subhyaline, somewhat obconical basal cell which bears a scar indicating the point of attachment to the conidiophore, 21×10 ($17-24 \times 8-12$) μ .

Three collections have been examined: on dead culms of grass, Marina, opposite the University Buildings, Madras, 3-3-1951, coll. C. V. S., Herb. M.U.B.L. No. 165; on dead stubble of *Eleusine coracana* Gaertn., Vandalur (Chingleput District, Madras State), 6-4-1951, coll. C. V. S., Herb. M.U.B.L. No. 174; on dead leaf of *Borassus flabellifer* L., University Botany Laboratory campus, Madras, 23-4-1951, coll. C. V. S., Herb. M.U.B.L. No. 218.

All the three collections agree well with the description given by Boedijn (1933).

21. *C. pallescens* Boedijn, in *Bull. Jard. bot. Buitenz.*, Ser. III, 1933, 13: 127, ic.; Groves, J. W. and Skolko, A. J., *Canad. J. Res.*, C, 1945, 23: 102, ic.

Conidiophores brown, simple, unbranched, septate, with geniculate tip, $3.2-5.6\mu$ broad, of variable length. Conidia produced in spirals

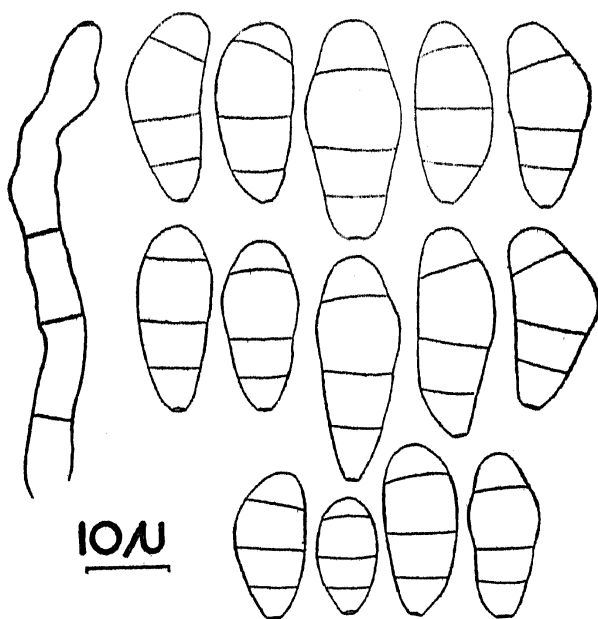


FIG. 3. *Curvularia pallescens* : from Herb. M.U.B.L. No. 91-II.

towards the tip of the conidiophore, pale brown, somewhat cylindrical, mostly straight or only with a slight curvature, 3-septate, the middle two cells slightly darker in colour than the basal and apical cells, apical cell hyaline and with rounded tip, the basal cell subhyaline, shaped like a crucible and with a scar at the base indicating the point of attachment with the conidiophore, 22×9 ($14-28 \times 6-12$) μ .

The majority of the conidia lack a distinct curvature, although the third cell from the base may be slightly larger than the others. The middle two cells are pale brown and concolorous with each other, whereas the basal and the apical cells are subhyaline.

Only one collection has been seen: on dead palm leaf, University Botany Laboratory campus, Madras, 22-2-1951, coll. C. V. S., Herb. M.U.B.L. No. 91-II.

22. *C. andropogonis* (Zimmermann) Boedijn, in *Bull. Jard. bot. Buitenz.*, Ser. III, 1933, 13: 128, ic.

Basinym: *Napicladium andropogonis* Zimmermann (1902). Saccardo, *Syll. Fung.*, 1906, 18: 594.; see also Mason, E. W., 1928, *Annotated Account*

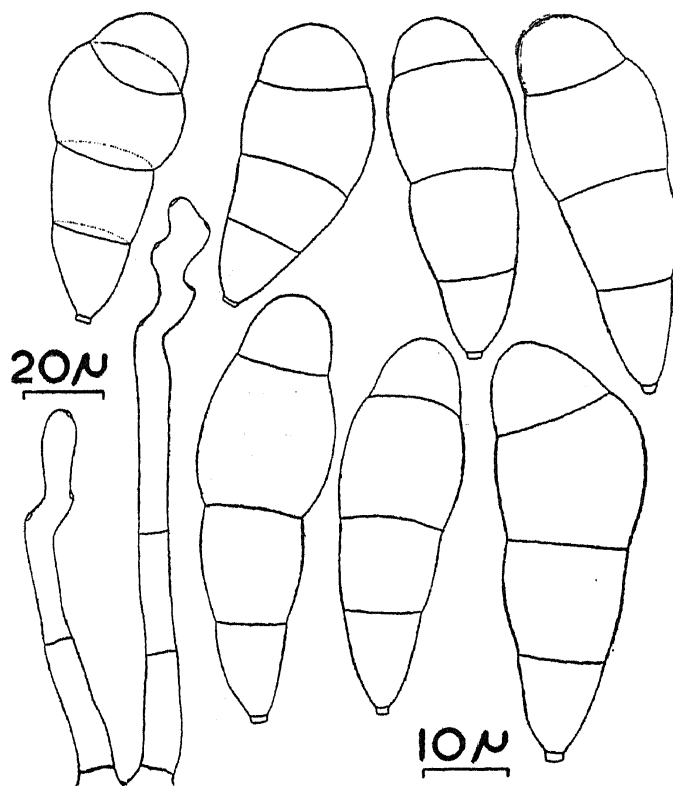


FIG. 4. *Curvularia andropogonis* : from Herb. M.U.B.L. No. 94.

of the Fungi Received at the Imperial Bureau of Mycology, List II, Fascicle 1, p. 5.

Conidiophores brown, simple, unbranched, septate, geniculate and paler towards the tip, $3-4\mu$ broad, of variable length. Conidia pale brown in colour, somewhat ellipsoidal, 3-septate, constricted at the septa, the third cell from the base larger, broader and darker than the others, the apical cell with a broadly rounded tip, the basal cell elongate-obconical and with a prominent, small, short, hyaline pedicel at the base where it is attached to the conidiophore, 45×15.5 ($40-53 \times 14-18$) μ .

Only one collection has been examined: on dead leaves of *Dichanthium annulatum* Stapf., Agri-Horticultural Society's Gardens, Teynampet, Madras 25-2-1951, coll. C. V. S., Herb. M.U.B.L. No. 94.

The fungus agrees well with the description given by Boedijn (1933).

23. *C. trifolii* (Kauffman) Boedijn, in *Bull. Jard. bot. Buitenz.*, Ser. III, 1933, 13: 128; Groves, J. W. and Skolko, A. J., *Canad. J. Res.*, C, 1945, 23: 101, ic.

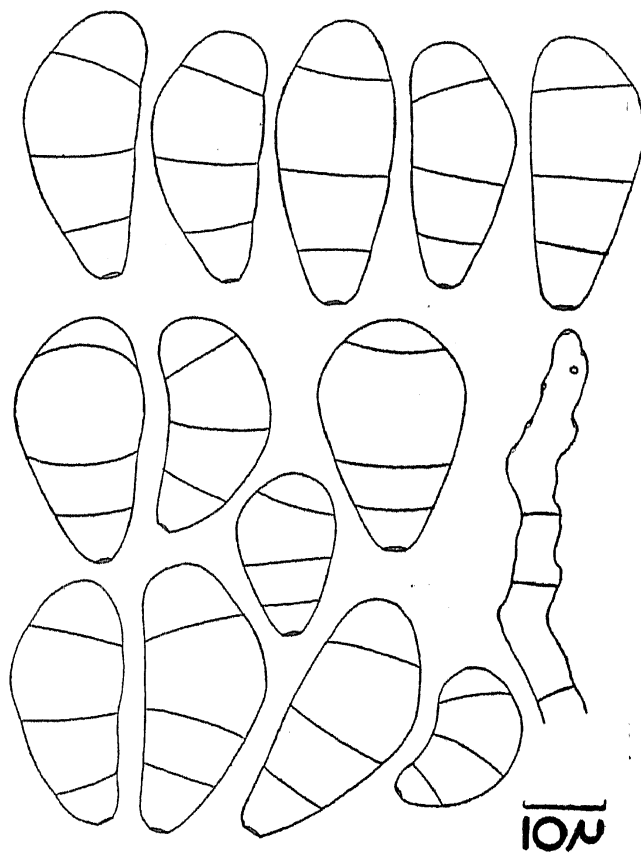


FIG. 5. *Curvularia trifolii*: from Herb. M.U.B.L. No. 851-I.

Basinym: *Brachysporium trifolii* Kauffman (1920). Saccardo, *Syll. Fung.*, 1931, 25: 835; see also Mason, E. W., 1928, *Annotated Account of the Fungi Received at the Imperial Bureau of Mycology*, List II, Fascicle 1, p. 5.

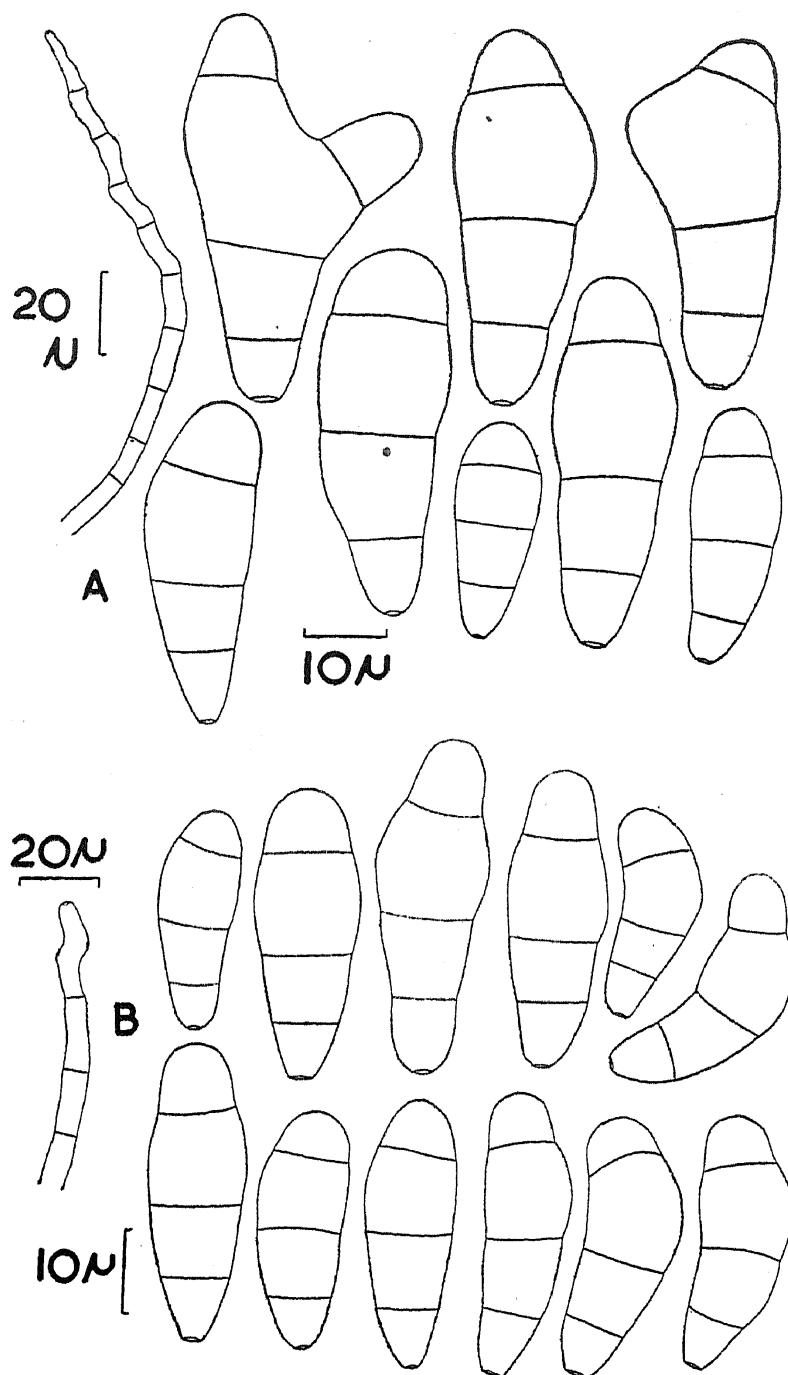


FIG. 6. *Curvularia indica* : A, from type specimen, Herb. M.U.B.L. No. 851-II; B, from Herb. M.U.B.L. No. 848-II.

Conidiophores brown, simple, unbranched, septate, geniculate and paler at the tip, $3.3\text{--}4.8\ \mu$ in diameter, of variable length. Conidia brown, unequally ventricose-fusiform, curved or sometimes somewhat straight, 3-septate, not constricted at the septa, the third cell from the base larger, broader and darker than the others, the apical cell with a smoothly rounded tip, the basal cell crucible-shaped with a distinct scar at the base indicating the point of attachment to the conidiophore, 28.8×13.4 ($19\text{--}36 \times 11\text{--}16$) μ .

Only one collection has been seen: on dead culms of *Scirpus* sp., Poonamallee (Chingleput District, Madras State), 24-2-1953, coll. C. V. S., Herb. M.U.B.L. No. 851-I.

The fungus collected by me comes nearest to *C. trifolii*, as re-described by Groves and Skolko (1945, pp. 101-102, ic.) after examining the type specimen. The measurements of the conidia of the type specimen as given by Groves and Skolko are: $25\text{--}35\text{--}(38) \times 11\text{--}15\ \mu$, and the measurements of the conidia in my collection are similar. It is true that my fungus has a substratum different from that on which the species was originally described, but this is of not much importance in a genus like *Curvularia*, species of which have been reported on diverse substrata.

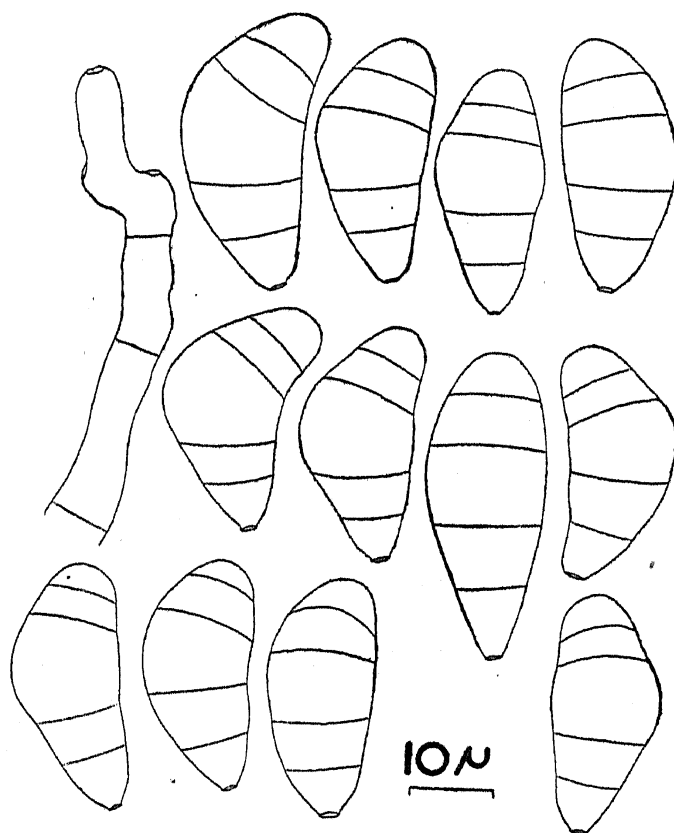


FIG. 7. *Curvularia inaequalis*: from Herb. M.U.B.L. No. 104.

24. *Curvularia indica* Subramanian sp. nov.

Conidiophori simplices, brunnei, erecti, recti vel curvati, septati, $4.8-8.3\ \mu$ lati, longitudinis variabilis. Conidia spiraliter infixa apicibus conidiophorum, ellipsoidea, ut plurimum recta, raro curvata, brunnea, 3-septata, tenuiter constricta ad septa, vel nullo modo constricta, cellula tertia supra basim ampliori et latiori cæteris, cellula apicali lævi, rotundata ad apicem, cellula basali catino simili, insignita cicatrice infra, $24-47 \times 8-16\ \mu$.

Habitat in culmis emortuis *Scirpi* sp., Poonamallee (Chingleput District, Madras), 24-2-1953, legit. C. V. S., Herb. M.U.B.L. Nos. 851-II (Typus), 848-II.

C. indica Subramanian sp. nov.

Conidiophores brown, simple, erect, straight or bent, septate, $4.8-8.3\ \mu$ broad, of variable length. Conidia borne in spirals towards tip of the conidiophore, ellipsoidal, mostly straight, seldom curved, brown, 3-septate, slightly constricted at the septa or not at all, the third cell from the base larger and broader than others, the apical cell with a smoothly rounded tip, the basal cell crucible-shaped with a scar at the base, $24-47 \times 8-16\ \mu$.

Habit.: on dead culms of *Scirpus* sp., Poonamallee (Chingleput District, Madras State), 24-2-1953, coll. C. V. S., Herb. M.U.B.L. Nos. 851-II (Type), 848-II.

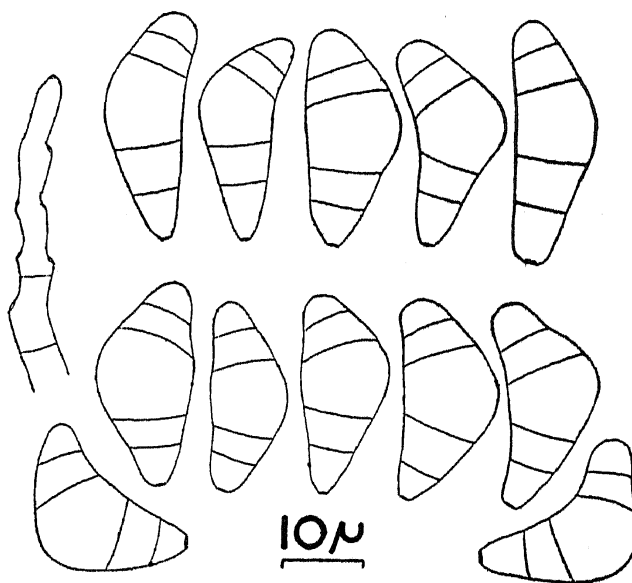


FIG. 8. *Curvularia falcata* : from Herb. M.U.B.L. No. 91-III.

The measurements of the conidia in the two collections are:

Herb. M.U.B.L. No. 851-II: 39×13.1 ($25-47 \times 9-16$) μ ;

„ 848-II: 33×11.4 ($24-40 \times 8-13$) μ .

My fungus has 3-septate spores and is easily placed in the Lunata group. Amongst the seven known species of this group, it comes nearest to *C. stapeliae* (du Plessis) Hughes and du Plessis (Hughes, 1951, p. 28), originally described from South Africa by du Plessis as *Triposporium stapeliae* du Plessis. The measurements of conidia in *C. stapeliae* are given by Hughes (1951) as: $26-41 \times 10-15 \mu$. The size of the conidia of my fungus falls largely within the range covered by *C. stapeliae*, despite the fact that a few conidia were longer (up to 47μ). The conidia of my fungus, however, differ from those of *C. stapeliae* in the following features: (i) the conidia are not conspicuously curved as in *C. stapeliae*, but the majority of them are straight; (ii) in the case of conidia of *C. stapeliae* the third cell from the base alone is the darkest, but in my fungus the two middle cells are concolorous with each other and are darker than the apical and the basal cells.

On the basis of these differences, my fungus has been described as a new species.

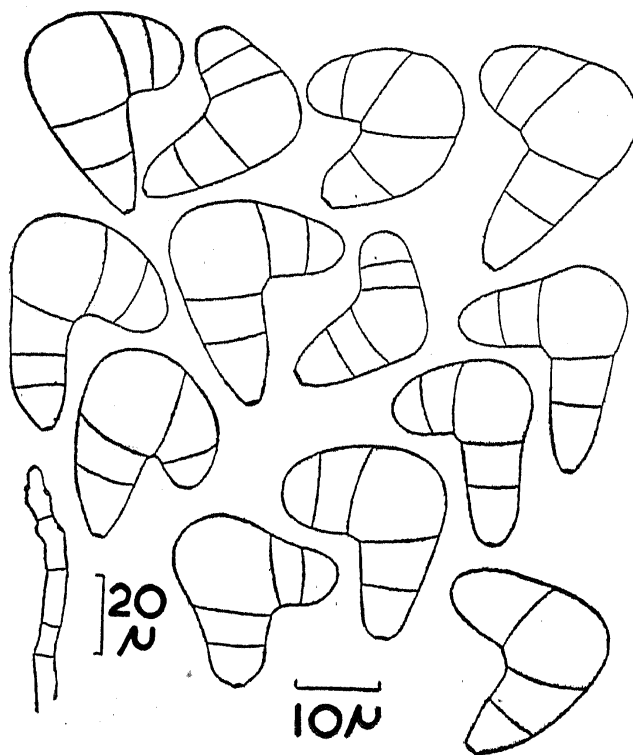


FIG. 9. *Curvularia uncinata* : from Herb. M.U.B.L. No. 848-I.

25. *C. inæqualis* (Shear) Boedijn, in *Bull. Jard. bot. Buitenz.*, Ser. III, 1933, 13: 129; Groves, J. W. and Skolko, A. J., *Canad. J. Res.*, C, 1945, 23: 97, ic.

Basinym: *Helminthosporium inæquale* Shear, in *Bull. Torrey bot. Cl.*, 1907, 34: 307. Saccardo, *Syll. Fung.*, 1913, 22: 1391; see also Mason, E. W., 1928, *Annotated Account of the Fungi Received at the Imperial Bureau of Mycology*, List II, Fascicle 1, p. 5.

Conidiophores brown, simple, unbranched, septate, up to 5μ broad, of variable length, geniculate towards the tip. Conidia borne in spirals, brown, 4-septate, the middle cell the broadest and the darkest, lower and upper

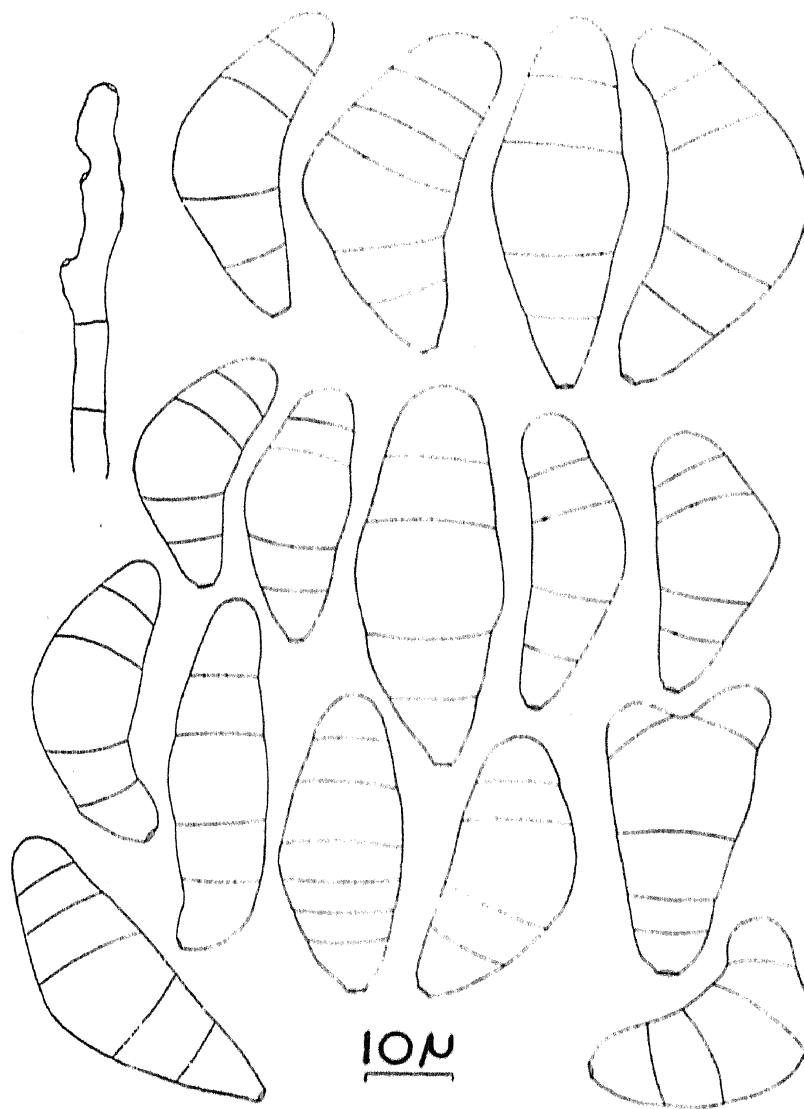


FIG. 10. *Curvularia palmarum* ; from type specimen, Herb. M.U.B.L. No. 132.

cells progressively paler in colour, the two basal cells longer than the two apical ones, apical cell with a smoothly and broadly rounded tip, the basal cell obconical with a scar indicating the point of attachment to the conidiophore, 29.4×13.6 ($27-37 \times 11-18$) μ .

Only one collection has been seen: on dead leaves of palm (?*Cocos nucifera* L.), Velacheri (near Guindy, Madras), 25-2-1951, coll. C. V. S., Herb. M.U.B.L. No. 104.

This species, originally placed in the Lunata group by Boedijn (1933), has been transferred to the Geniculata group by Groves and Skolko (1945) after a study of the type specimen, and my fungus agrees with the description given by Groves and Skolko.

26. *C. falcata* (Tehon) Boedijn (as *C. flacata*), in *Bull. Jard. bot. Buitenz.*, Ser. III, 1933, 13: 130; Groves, J. W. and Skolko, A. J., *Canad. J. Res.*, C, 1945, 23: 99, ic.

Basinym: *Acrothecium falcatum* Tehon (as *A. flacatum*), 1919, in *Bot. Gaz.*, 67: 509, ic.; Saccardo, *Syll. Fung.*, 1931, 25: 813; see also Mason, E. W., 1928, *Annotated Account of the Fungi Received at the Imperial Bureau of Mycology*, List II, Fascicle 1, p. 5.

Conidiophores brown, simple, unbranched, septate, 3-5 μ broad, variable in length, geniculate towards the tip. Conidia brown, unequally ventricose-fusiform, conspicuously curved, rarely otherwise, 4-septate, the middle cell the broadest and the darkest of all, the lower and the upper cells becoming progressively paler, the apical cell somewhat conical and with a rounded tip, the basal cell obconical and narrowing below to a basal scar indicating the point of attachment to the conidiophore, 25×10.4 ($22-29 \times 9-12$) μ .

Only one collection has been seen: on dead palm leaf, University Botany Laboratory campus, Madras, 22-2-1951, coll. C. V. S., Herb. M.U.B.L. No. 91-III.

This fungus comes nearest to *C. falcata* amongst the species belonging to the Geniculata group. A re-description of the species based on a study of the type specimen is given by Groves and Skolko (1945) and the conidial measurements given by them are: $(22)-24-28-(31) \times (10)-12-13-(14)$ μ .

27. *C. uncinata* Bugnicourt, in *Rev. gén. Bot.*, 1950, 57: 73 (photographs given).

Conidiophores brown, simple, unbranched, septate, up to 5 μ broad, of variable length. Conidia brown, 4-septate, the middle cell the largest, broadest and darkest of all, conspicuously bent at an angle of 90° or more

and hence shaped like a hammer or markedly uncinata, the lower and the upper two cells becoming progressively paler, the two apical cells shorter than the two basal cells, the apical cell with a smoothly rounded tip, the basal cell somewhat obconical and with a prominent scar at the base indicating the point of attachment to the conidiophore, 24×12.6 ($20-29 \times 9-15$) μ .

Only one collection has been seen: on dead culms of *Scirpus* sp., Poonamallee (Chingleput District, Madras State), 24-2-1953, coll. C. V. S., Herb. M.U.B.L. No. 848-I.

This species was first described on *Oryza sativa* L. from Indo-China by Bugnicourt (1950) and my fungus agrees well with the description given by Bugnicourt. Bugnicourt's description indicates the following range in size for the conidia: $18-32 \times 8.6-12.7 \mu$. In my fungus some conidia are up to 15μ broad. The middle cell in my fungus is somewhat verrucose and, although Bugnicourt's description does not indicate any such peculiarity for his fungus, his photograph of the spores of the species suggests a somewhat verrucose middle cell. I have, therefore, placed my fungus in *C. uncinata*.

28. *Curvularia palmarum* Subramanian sp. nov.

Conidiophori brunnei, simplices, erecti, recti vel curvati, septati, $3-5 \mu$ lati, variabilis longitudinis. Conidia spiraliter infixi apicibus conidiophorum, fusiformia vel falcata, vel inæqualiter fusiformi-ventricosa, brunnea, 4-septata, cellula media omnium maxima, latissima atque obscurissima, cellulis superioribus atque inferioribus pallidioribus atque angustioribus, cellula apicali lævi atque rotundata ad apicem, cellula basali late rotundata vel obconica, insignita cicatrice distincta, 37.6×14.2 ($27-48 \times 11-20$) μ .

Habitat in foliis emortuis *Cocos nucifera* L., Luz, Mylapore, Madras, 6-3-1951, legit C. V. S. (Herb. M.U.B.L. No. 132).

Curvularia palmarum Subramanian sp. nov.

Conidiophores brown, simple, erect, straight or bent, septate, $3-5 \mu$ broad, of variable length. Conidia borne in spirals towards tip of the conidiophore, fusiform or falcate or unequally fusiform-ventricose, brown, 4-septate, the middle cell the largest, broadest and darkest, the upper and lower cells paler and narrower, apical cell with smoothly rounded tip, basal cell broadly rounded or obconical with a distinct scar, 37.6×14.2 ($27-48 \times 11-20$) μ .

Habit.: on dead leaf of *Cocos nucifera* L., Luz, Mylapore, Madras, 6-3-1951, coll. C. V. S., Herb. M.U.B.L. No. 132.

This fungus is easily placed in the Geniculata group. The measurements of the conidia are different from those of any species in this group so far known and I, therefore, consider my fungus as a new species.

I am grateful to Prof. T. S. Sadasivan for critically reading the manuscript and to Prof. H. Santapau for the Latin diagnoses of the two new species.

REFERENCES

- | | |
|------------------------------------|---|
| Boedijn, K. B. | .. "Ueber einige phragmosporen Dematiaceen," <i>Bull. Jard. bot. Buitenz.</i> , Ser. III, 1933, 13, 120-34. |
| Bugnicourt, F. | .. "Les espèces du genre <i>Curvularia</i> isolées des semences de riz," <i>Rev. gén. Bot.</i> , 1950, 57, 65-77. |
| Groves, J. W. and
Skolko, A. J. | "Notes on seed-borne fungi, III. <i>Curvularia</i> ," <i>Canad. J. Res.</i> , C, 1945, 23, 94-104. |
| Hughes, S. J. | .. "Studies on micro-fungi, XII. <i>Triposporium</i> , <i>Tripospermum</i> , <i>Cerato-sporella</i> , and <i>Tetraposporium</i> (gen. nov.)," <i>Mycol. Pap.</i> , C.M.I., 1951, 46, 35 pp. |