

**Species of *Mortierella* from India — V.  
*Mortierella oligospora* Bjorling and *M. oligospora*  
var. *indica* var. nov.<sup>1)</sup>**

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With plate XXVII—XXIX.

Nine species of *Mortierella* have so far been reported from India (Mehrotra 1961, Mehrotra, Baijal and Mehrotra 1962, Mehrotra and Baijal 1963, Mehrotra and Mehrotra, 1963). Two interesting isolates are being reported here. One of them resembles in all features with *M. oligospora* Bjorling (1963) which is characterisde by the presence of small sporangiophores with delicate branches in whorl and few-sporic (1—5 spored) sporangia. This species has been placed by Linnemann (1941) in the Section Minutissima. A culture listed as *Haplosporangium bisporale* var. I Ashby was received through the courtesy of the Director, Centraal Bureau voor Schimmel Cultures Baarn, which Bjorling believed to be *M. oligospora*. This species is related to *M. reticulata* van Tieghem and Le Monnier and the two are distinguished by Bjorling (1936) in the side branches being bent downwards in the later and more delicate and bent upwards in the former. Linnemann (1941) emphasizes on the absence of the stylospores in *M. oligospora* as against their presence in *M. reticulata*. In addition to this character our comparative studies of the two species show that in *M. reticulata* <sup>2)</sup> the first cleavage of the sporangial protoplasm is longitudinal while in *M. oligospora* it is transverse to the long axis. This character has been figured by Linnemann (1941) in the description of these species but it was not mentioned as a diagnostic character of either of the two species. We think that this character is quite useful in distinguishing *M. reticulata* from *M. oligospora*. Besides, the spores in *M. reticulata* have a distinctly reticulate surface while in *M. oligospora* they are umbonate.

In our opinion our isolate, as well as the isolate received from Baarn as *Haplosporangium bisporale* var. I Oshby, should not be pla-

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<sup>1)</sup> Contribution from Botany Department, University of Allahabad, India.

<sup>2)</sup> Strain obtained from Centraal Bureau voor Schimmel Cultures, Baarn, Holland.

ced in the genus *Haplosporangium* because of the absence of "highly differentiated often very long segments from which arise peculiar sporangiophores bearing thread like terminations or lateral branches on which are produced minute sporangia containing usually only one, sometimes two spores", on which character Thaxter (1914) based his genus *Haplosporangium*.

Our second isolate resembles in all characters with *M. oligospora* Bjorling. Here also the first cleavage of the sporangial protoplasm is transverse to the long axis (Figs. 13, 24). It differs, however, in the presence of larger number of spores which is upto 12, with an average of 2—8. Another feature in which this culture differs is the continued non septate nature of the sporangiophores. In this isolate of *M. oligospora* and in the isolate received from CBS the sporangiophores are invariably septate at maturity. Also the chlamydospores in *M. oligospora* have many large blunt projections on the surface but in this second isolate they are found to be smooth. This second isolate is, therefore, being named as a new variety, *M. oligospora* var. *indica*, after the country of origin.

#### 1. *Mortierella oligospora* Bjorling.

Colonies on Oat-meal, Malt-extract agar and Potato dextrose agar with abundant aerial mycelium, often floccose; lobed on the last two media. Sporangiohphores arising mostly in groups from aerial mycelium, 100—225  $\mu$  in length, average 169  $\mu$ , tapering from 5.5—14.5  $\mu$  at the base to 1.6—2.7  $\mu$  at the apex, without rhizoids; cymosely branched, sometimes in whorls; on maturity usually undergoing septation; terminal sporangium globose, brown, 11—29  $\mu$  in diameter, average 22  $\mu$ , first segmentation of the sporangial protoplasm always transverse, 2—6 spored, mostly 2—4 spored, wall readily deliquescent, leaving a large collarette, spores not immersed in drops of liquid; sporangia of the side branches globose to elongate, 2—4 spored, 10—30  $\mu$  in diameter, wall diffluent leaving a large collarette, sporangiospores globose to angular, reticulate, 8.8—17.6 $\times$ 8—14.3  $\mu$  average 14.3 $\times$ 13.2  $\mu$  in diameter. Chlamydospores terminal or intercalary, on branches of mycelium and sporangiospores, borne singly, globose to elongate, with many large blunt projections on the surface, 15.2—22.5 $\times$ 10—20  $\mu$ , average 17.5 $\times$ 15  $\mu$ . Zygospores not seen.

Description based on Culture M-83, deposited in the Culture Collection of Botany Department, University of Allahabad and at NRRL, Peoria, Illinois, U.S.A. under No. A-12040. Isolations have been made from heavily manured garden soil, decaying bark, and forest soil at Rishikesh, Rewa etc.

2. *Mortierella oligospora* Bjorling var. **indica** B. S. Mehrotra and Baijal var. nov.

Caespites in „Oat meal agar“ „Maltextract agar“ et in „Potato dextrose agar“ aerium mycelium large efficientes, saepe floccosi, in alimento secundo et tertio tantum lobati; sporangiophora plerumque fasciatim in aërio mycelio orta, 100—137,5  $\mu$  longa, ad basin 5—20  $\mu$  crassa, superne attenuata, in apice 2—5  $\mu$  tantum lata, sine rhizinis, continua etiam in maturitate, simplicia vel cymose ramosa, ramis interdum verticillatis; sporangia globosa vel oblonga, brunneola, usque ad 37,5  $\mu$  diam., protoplasmate primum semper transverse partito, 2—12-spores, sed plerumque 2—8-spores, pariete facile deliquescente, ad basin quasi torquem formante; sporangiosporae guttulis liquidis non immersae, hyalinae, globosae vel ovoideae, demum minutissime asperulae, 10—26  $\mu$  plerumque 13,2  $\mu$  diam.; chlamydosporae laeves, globosae vel oblongae, singulariter et plerumque in apice ortae, usque ad 17,5  $\mu$  diam.; Zyosporae non visae.

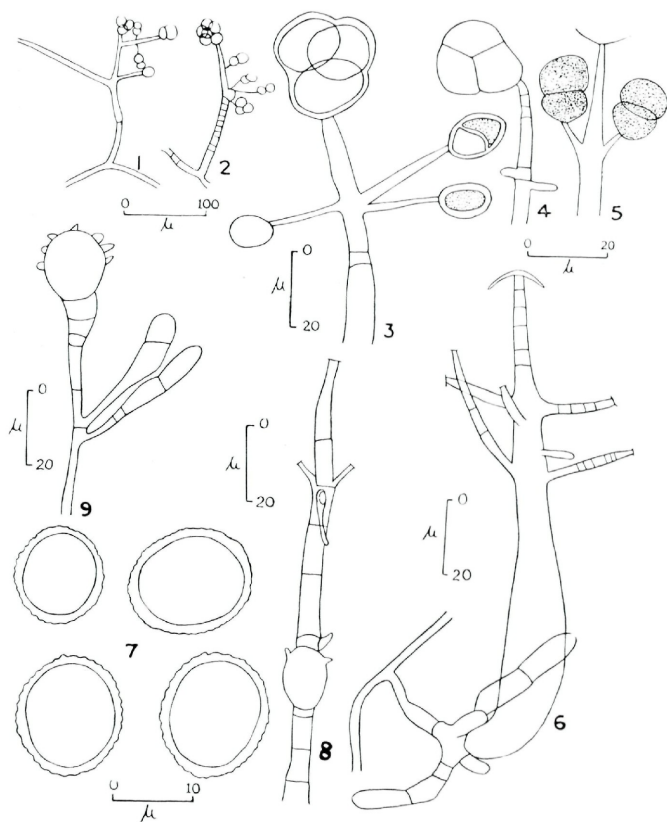
Colonies on Oat meal agar, Malt-extract agar and Potato-dextrose agar with abundant aerial mycelium, often floccose, lobed on the last two media only. Sporangiohores arising mostly in groups from aerial mycelium, 100—237,5  $\mu$  in length, 5—20  $\mu$  in diameter at the base, tapering to 2—5  $\mu$  at tip, without rhizoids, non-septate even at maturity, simple or branched cymosely with branches sometimes in whorl. Sporangia globose to elongate, light brown, up to 37,5  $\mu$  in diameter, first segmentation of the sporangial protoplasm always transverse to the long axis, two to twelve-spored, but often two to eight-spored, wall readily deliquescent, leaving a short collar at the base. Sporangiospores not immersed in drops of liquid, hyaline, globose to oval, finely roughened, 10—26  $\mu$  in diameter, mostly 13,2  $\mu$ . Chlamydospores smooth, globose to elongate, borne singly, mostly terminal, upto 17,5  $\mu$  in diameter. Zygosporae not seen.

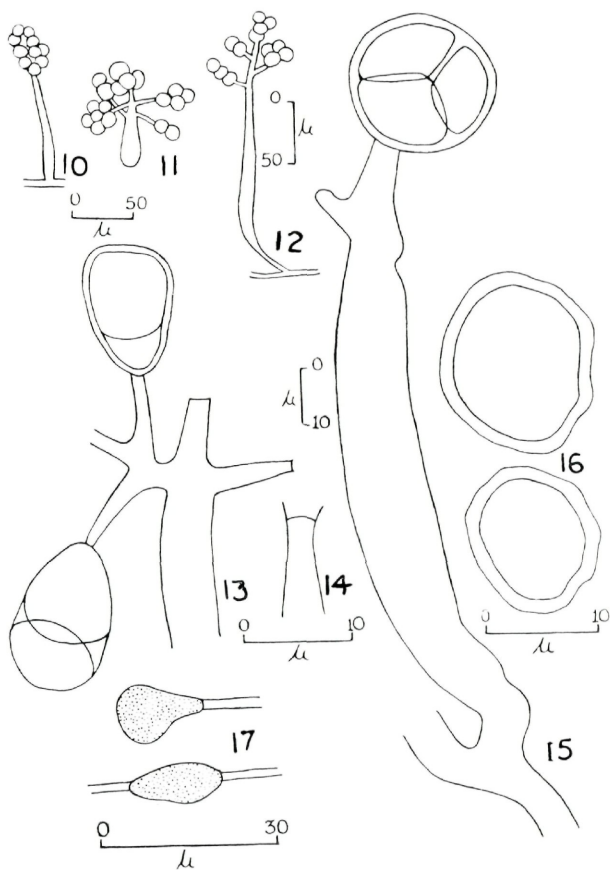
Isolated from forest soil of Hoshangabad, M. P., India, pH 6.8.

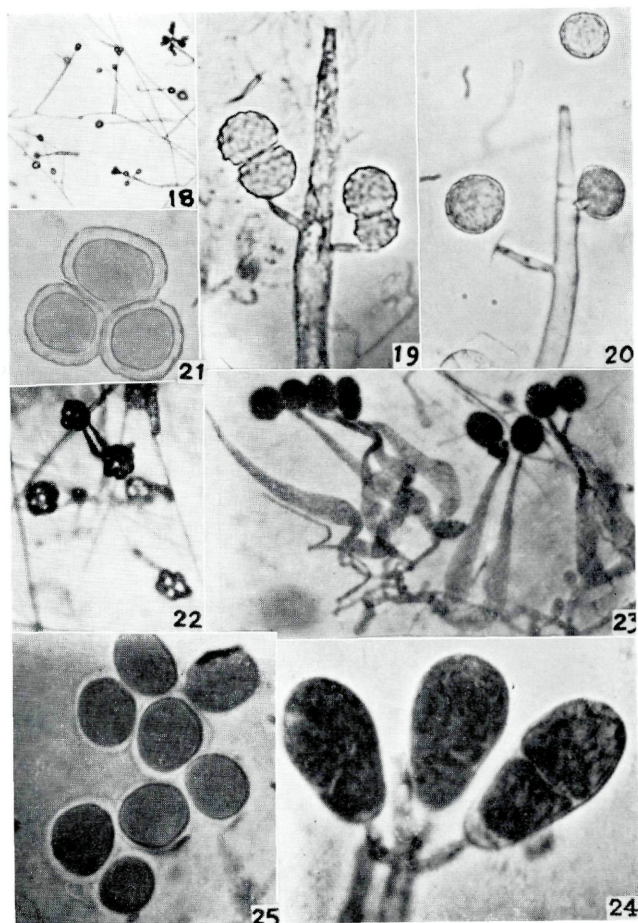
TYPE-M-85, culture deposited in the Culture Collection, Botany Department, University of Allahabad. A culture of it will also be deposited at NRRL, Peoria, Illinois, U.S.A.

#### A c k n o w l e d g e m e n t s .

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## Explanation of plates XXVII—XXIX.

Plate XXVII. *Mortierella oligospora* Bjorling. — 1—2. Two sporangiophores showing the branching pattern. (note the presence of septa in the sporangiophore in 2). — 3—5. Upper portions of three sporangiophores showing various types of sporangia at various stages of development (note that the first segmentation of sporangial protoplasm is always transverse). — 6. A complete sporangiophore after the sporangia have dehisced. — 7. Sporangiospores. — 8. A sporangiophore with an intercalary chlamydospore. — 9. A terminal chlamydospore on a hypha.

Plate XXVIII. *Mortierella oligospora* var. *indica* var. nov. — 10. A simple sporangiophore. — 11—12. Two sporangiophores to show the transverse pattern. — 13. Upper portion of a sporangiophore to show the transverse segmentation of the sporangial protoplasm. — 14. Tip of a sporangiophore showing the presence of collar. — 15. A simple sporangiophore with a mature sporangium (in tetrad) at its tip. — 16. Sporangiospores. — 17. A terminal and an intercalary chlamydospore.

Plate XXIX. 18—21. *Mortierella oligospora*. — 18. Sporangiophores as seen in Petri-dish,  $\times 59$ ; — 19. Upper portion of a sporangiophore showing transverse segmentation of the sporangial protoplasm,  $\times 727$ ; — 20. Upper portion of a sporangiophore showing a side branch with a collar and three sporangiospores,  $\times 786$ ; — 21. Sporangiospores in tetrad,  $\times 1227$ .  
*Mortierella oligospora* var. *indica*. — 22. Sporangiophores as seen in Petri-dish,  $\times 221$ . — 23. Sporangiophores in groups,  $\times 261$ . — 24. Tip of sporangiophore showing three sporangia on tips of three branches. Note the transverse segmentation of the sporangial protoplasm in one (right)  $\times 600$ .  
25. Few sporangiospores,  $\times 993$ .



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