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MICRODICTYON TENUIUS (AG.) DECSNE.
(PRELIMINARY NOTE)**

BY M. O. P. IYENGAR, M.A., PH.D. (LOND.), F.I.S.

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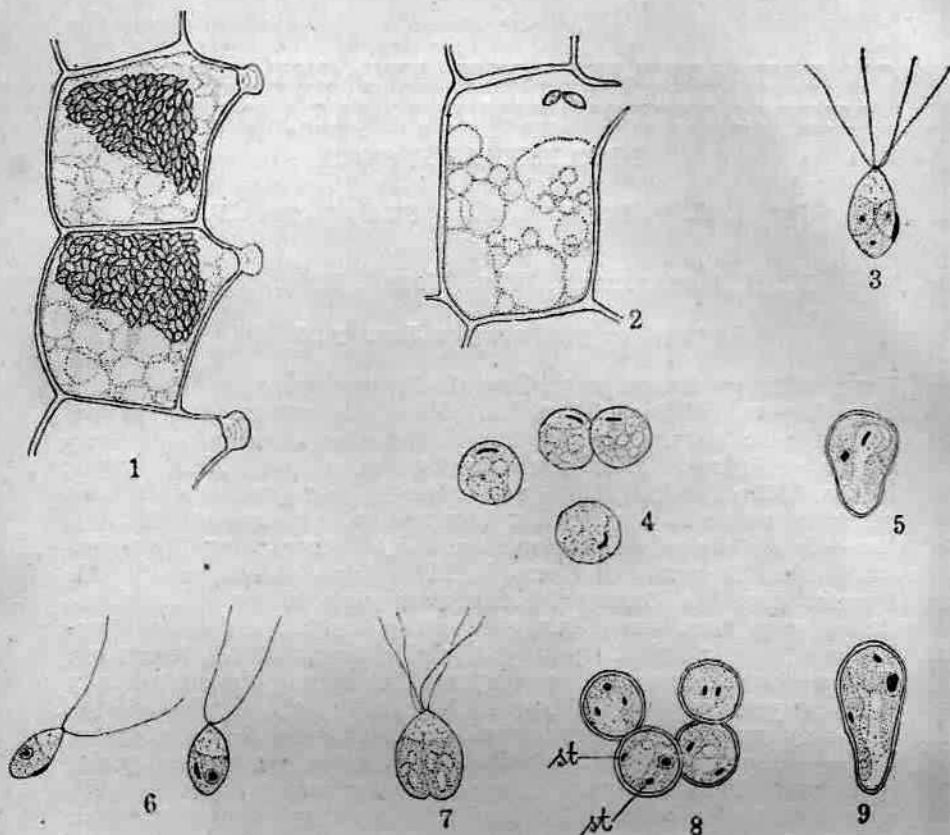
Received for publication on January 25, 1941

VERY little is known regarding the reproduction in the genus *Microdictyon*. Wille (1897, p. 151) states that swarmspores may be formed from all the cells of the thallus, but does not give any details or figures. Most of the authors after him (Collins, 1909; Printz, 1927; Setchell, 1929) who refer to the reproduction in this genus do not add any further information. Boergesen (1925) is the only author who has given some details regarding the reproduction in this genus. He found in *Microdictyon Calodictyon* (Mont.) Decsne. from the Canary Islands, that some of the cells of the thallus were transformed into zoosporangia with short conical projections, having apical openings for the escape of the swarmers. He described the swarmers as zoospores, but did not observe actually their escape from the cells, nor did he mention the number of cilia in the swarmers. His figures also show only a number of rounded bodies without any cilia, presumably swarmers, inside the opened sporangia. Thus the exact nature of the swarmers, whether they were biciliate or quadriciliate and whether they were gametes or zoospores is still unknown.

The authors collected recently at Rameswaram in South India a species of *Microdictyon*, coming near *Microdictyon tenuius* (Ag.) Decsne. and brought the alga in a living condition to Madras and followed its life-history in laboratory cultures. The plants in the cultures produced plenty of swarmers on a number of days. The swarmers were formed in any cell of the thallus. The swarmers when fully formed became compacted into a dark mass in one portion of the cell, leaving the remaining portion of the cell cavity occupied by a refractive frothy mucilage (Pl. III, Figs. 1 and 2; Text-fig. 1). The swarmers escaped outside through a conical opening (Text-figs. 1 and 2) similar to that observed by Boergesen (1925) in *Microdictyon Calodictyon*.

The plants forming swarmers were of two types, one set of plants forming only biciliate gametes (Text-fig. 6) and the other forming only quadriciliate zoospores (Text-fig. 3). The two sets of plants were quite similar to one another in their external

* From the University Botany Laboratory, Madras.



Text-figs. 1-9. *Microdictyon tenuis* (Ag.) Decsne. Fig. 1. Two cells with fully formed swimmers ready for release: note the swimmers compacted into a dark mass towards one portion of the cell and the remaining portion of the cell-cavity filled with frothy, refractive mucilage. Fig. 2. A sporangial cell after the escape of the swimmers, showing the frothy mucilage and two swimmers left behind. Fig. 3. A quadriloculate zoospore. Fig. 4. Zoospores just come to rest. Fig. 5. Zoosporic germling 24 hours old. Fig. 6. Biciliated gametes. Fig. 7. Conjugation of two gametes. Fig. 8. Zygotes surrounded with a wall and showing two eyespots in each. Fig. 9. Zygotic germling 24 hours old. *st.*: eyespot (Figs. 1 & 2 $\times 370$; rest $\times 1070$).

appearance. The quadriloculate swimmers after swimming for some time settled down and grew into small germlings (Text-figs. 4, 5). The biciliated swimmers, on the other hand, kept swarming for a long time and finally degenerated and died. No fusion was observed between the biciliated swimmers produced from any single thallus. But in some of the cultures where a number of different thalli were kept together, a large number of zygotes were seen, each one having two eyespots, suggesting clearly that they were the result of fusion of the swimmers from the different thalli (Text-fig. 8; Pl. III, Fig. 3). In one instance a late stage in the

conjugation of the two biciliated gametes was observed where the fusion of the protoplasts was not yet complete (Text-fig. 7). The fact that the gametes from the same plant did not conjugate but degenerated and that plenty of zygotes were formed in cultures in which a number of different thalli were placed together suggests that the sexual plants are evidently dioecious. The zygotes after surrounding themselves with a wall germinated immediately and formed small germlings quite similar to those formed by the zoospores (Text-fig. 9).

A cytological study of the alga showed that there are two types of plants, one haploid having 16-18 chromosomes and the other diploid having 32-36 chromosomes. Reduction division was observed in the diploid plant just before swarmer formation. Typical synzetic and diakinetic stages (Pl. III, Figs. 4, 5) were observed and 16-18 bivalents were counted during diakinesis.

The facts detailed above clearly point to the existence of an alternation of a haploid sexual with a diploid asexual generation in *Microdictyon tenuius* (Ag.) Decsne., quite similar to what is seen in the Cladophoraceæ and Ulvaceæ and also in the allied genus *Anadyomene* (Iyengar and Ramanathan, 1940).

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EXPLANATION OF PLATE III

- FIG. 1. Thallus with practically all the cells forming swarmers. $\times 45$.
- FIG. 2. A portion of the above enlarged; note the swarmers compacted into a dark mass towards one portion of the cell and the remaining portion of the cell-cavity filled with a frothy, refractive mucilage. $\times 132$.
- FIG. 3. Zygotes, with the two eyespots clearly seen in some of them; (the arrows point to the two eyespots in one of the zygotes). $\times 1250$.
- FIGS. 4 & 5. Synaptic and diakinetic stages respectively of the reduction division. (Fig. 4 $\times 1875$, Fig. 5 $\times 1460$).

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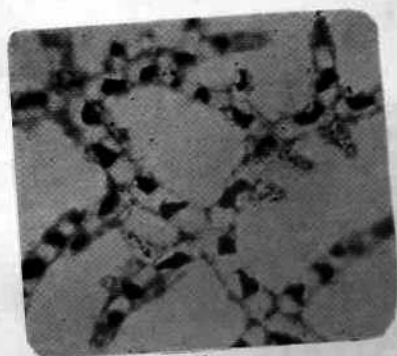
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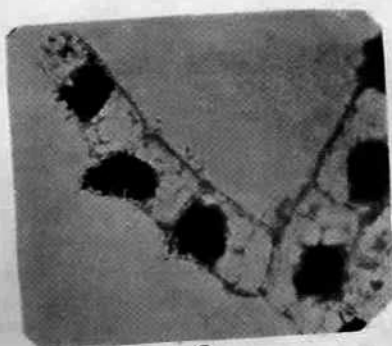
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EXPLANATION OF PLATE III

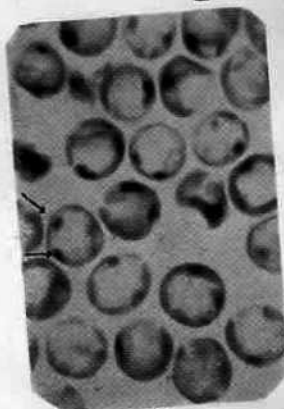
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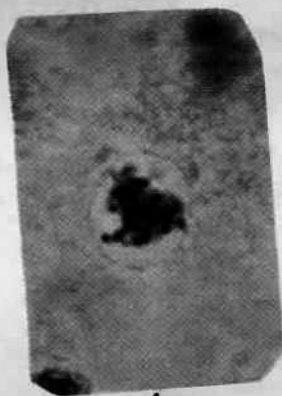
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