

CONTRIBUTIONS TO OUR KNOWLEDGE OF SOUTH INDIAN ALGAE

VI. Sexual Reproduction in *Crucigenia lauterbornei* Schmidle.*

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IN a *Crucigenia lauterbornei* Schmidle collected in some rain water pools, at Nekkundram in Madras, stages which strongly pointed to the presence of an oogamous type of reproduction were observed. These observations are being described here.

Crucigenia lauterbornei formed very large colonies. The usual mode of reproduction was by the formation of four (or rarely two) autospores in each cell and the four daughter cells remained attached to one another after dissolution of the mother wall. In this way the alga formed large colonies.

In the present collection the contents of some of the cells of the colony divided into 8, 16, or 32 daughter protoplasts instead of 2 or 4 autospores (Figs. 1-5). Despite observation for a long time these protoplasts did not escape. The cells resembled antheridial cells formed in another coccoid alga reported earlier (Iyengar and Ramanathan, 1940, p. 197). These cells are very probably antheridial cells just prior to their escape of antherozoids (Figs. 1-3, 5).

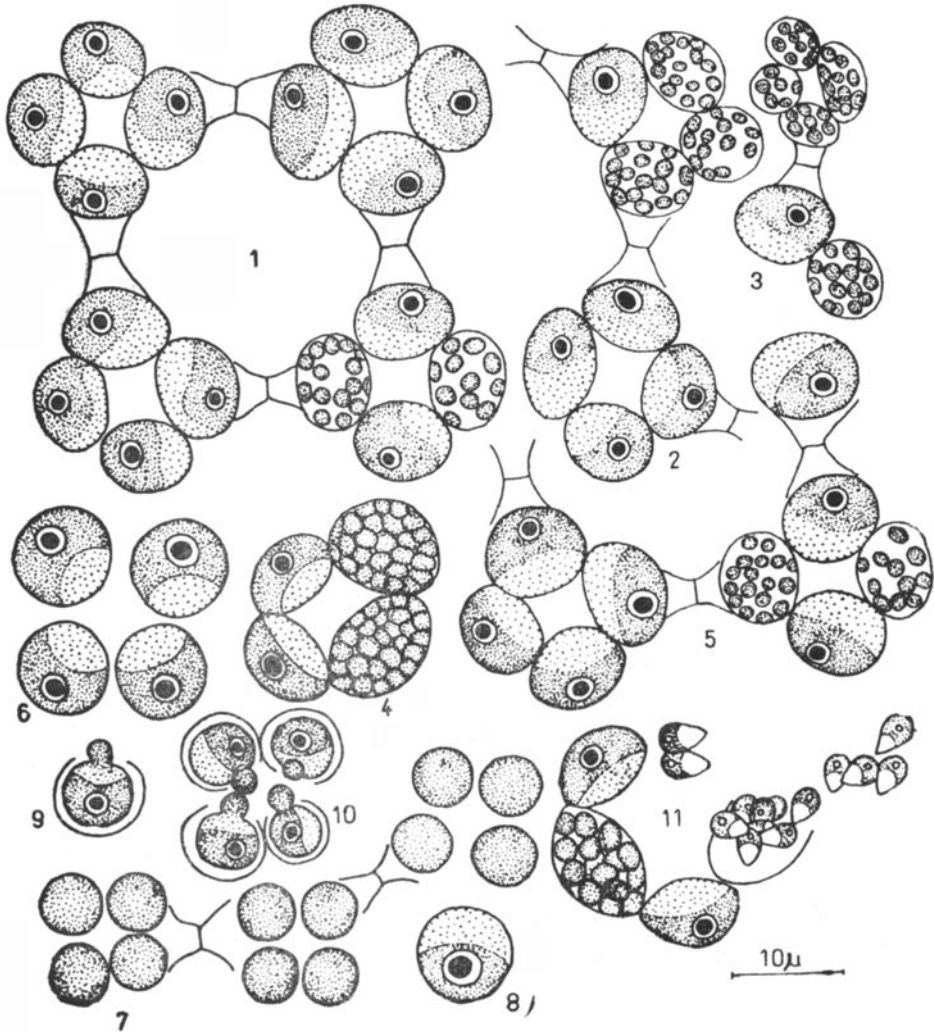
When the antheridial cells divided to form antherozoids the cells with the divided protoplasts becomes slightly reddish-brown in colour, while the ordinary cells with the contents undivided remained bright green. The antheridial cells usually began division at about 4.30 p.m., or sometimes earlier.

No oogonial cells or eggs were found in this collection, though in a number of colonies the cells had become very much enlarged and somewhat

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† The late Prof. M. O. P. Iyengar, left behind a large amount of unpublished material. According to his desire these are being published as a series of contributions. —T. V. Desikachary.

rounded. These rounded cells probably represent the oogonial cells similar to those found in *Dictyosphaerium indicum* (see Iyengar and Ramanathan, 1940, p. 197). But their escape was not observed.



FIGS. 1-11. *Crucigenia lauterbornei* Schmidle. FIGS. 1-5. Antherozoid formation; FIGS. 6, 7 and 8. Oogonia formation and liberation of free naked eggs; FIGS. 9 and 10. Showing stages of fertilization (?); FIG. 11. Antheridial cells showing free antherozoids.

(FIGS. 1-3, 5, \times 2,400 after Iyengar and Ramanathan; the rest, \times 2400, after Iyengar).

In a collection of this alga from the same locality (20-12-1956) made later by the senior author, some colonies were found (between 11 p.m. and

midnight) in which the contents of the enlarged cells were seen fusing with a tiny cell as shown in Figs. 6-8 and 9, 10, as also a few cells which had lost their flagella and which looked like tiny chlamydomonadine cells (Fig. 11) were found. The actual fertilization was not, however, observed though the material was kept under observation for a long time. The antheridial cells were $7.5 \times 10.5 \mu$, the antherozoid cells measured $2.0 \times 3.3 \mu$ and the egg cells $8-10 \mu$ in diam.

There is thus a strong suspicion that *Crucigenia lauterbornei* reproduced oogamously and that the alga is dioecious. In this it resembles the few other genera of the autosporous forms in which oogamous reproduction is reported, such as *Micractinium*, *Golenkinia* and *Dictyosphaerium* (Korshikov, 1937; Iyengar and Ramanathan, 1940; Iyengar and Balakrishnan, 1956).

REFERENCES

- Iyengar, M. O. P. and Balakrishnan, M. S. "On sexual reproduction in a new species of *Golenkinia*." *J. Indian bot. Soc.*, 1956, **35**, 371-373.
- and Ramanathan, K. R. .. "On sexual reproduction in a *Dictyosphaerium*," *Ibid.*, 1940, **18**, 195-200.
- Korshikov, A. A. .. "On the sexual reproduction (oogamy) in the Micractineae," *Proc. Kharkov A. Gorkay State Univ.*, 1937, **10**, 109-126.