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DESMIDIACEÆ FROM SOUTH INDIA**

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TRIPLASTRUM, A NEW MEMBER OF THE DESMIDIACEÆ FROM SOUTH INDIA*

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THE alga forming the subject of this communication was collected in December 1940 from a paddy field near Madras. It occurred in a stray manner among other algæ and was present only for a very short period.

The alga is small, straight and cylindrical with a well-defined median constriction (Text-figs. 1-3; Pl. IX, Fig. 1). It is 13-14 μ broad and is about 8-10 times as long as broad. The ends of the semi-cells are somewhat dilated and trilobed, each lobe being broadly rounded and bearing two to four short spines (Text-figs. 1-5; Pl. IX, Fig. 1). The cell wall is smooth and hyaline. In each cell there are four chloroplasts arranged in a median row, each semi-cell having two chloroplasts (Text-fig. 1; Pl. IX, Fig. 1). The chloroplasts are axile with 6-8 radiating plates and a large central pyrenoid (Text-fig. 1; Pl. IX, Fig. 1). The nucleus is situated at the isthmus region.

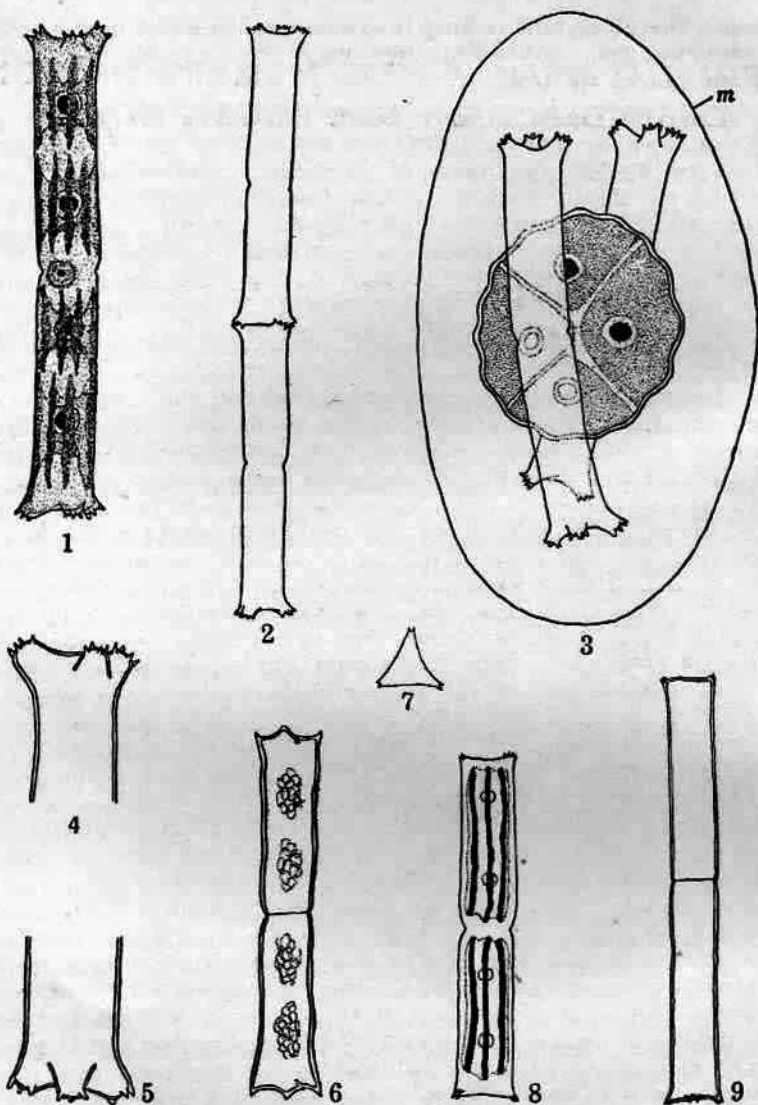
The zygote is formed in the usual manner by two cells coming near each other and becoming enveloped in a common mucilage (Text-fig. 3). It is spherical and has a thick wall with a crenate margin and measures 42.0 μ in diameter (Text-fig. 3; Pl. IX, Figs. 2, 3).

DISCUSSION

The alga in its elongated shape, circular cross-section and in having two median axile chloroplasts with radiating plates in each semi-cell, comes very close to *Penium*. But it differs from *Penium* in having trilobed terminal portions. It resembles *Pleurotænium* to a certain extent in its general shape, but is quite distinct from *Pleurotænium* in having trilobed ends and also in having two median axile chloroplasts in each semi-cell. Again, it shows some resemblance to *Icthyocercus*, but in *Icthyocercus*, the ends are flattened and bilobed as in *Tetmemorus*, whereas in the present alga the ends are definitely trilobed. Finally, in having trilobed ends, it shows some resemblance to *Staurastrum*, but it differs from *Staurastrum* in having two median axile chloroplasts in each semi-cell.

From the foregoing it is quite evident that the alga combines in a way some features or other characteristics of each of the above-mentioned genera, but cannot be referred to any one of them. It

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Text-figs. 1-9.—Fig. 1. A cell showing the chloroplasts, nucleus and the trilobed ends; each lobe bearing 3 spines ($\times 725$). Fig. 2. Two cells just after division remaining in contact with one another ($\times 550$). Fig. 3. Two cells conjugating with one another with the fully formed zygote in between them ($\times 550$). (Drawn from living material) (*m*, limit of the mucilaginous envelope). Figs. 4 and 5. The ends of two different specimens to show quadri-spinate and trispinate lobes ($\times 1125$). Fig. 6. *Triplastrum abbreviatum* (Turner) comb. nov. (Redrawn from Turner, 1892) ($\times 750$). Figs. 7-9. *Triplastrum simplex* (Allorge) comb. nov. (Redrawn from Allorge, 1924) ($\times 715$).

appears, therefore, best to keep it in a new genus which may be called *Triplastrum* gen. nov. The alga may be named *Triplastrum indicum* gen. et sp. nov.

A desmid somewhat very closely resembling the present alga was described by Turner (1892) and referred by him to the genus *Triploceros* under the name of *Triploceros abbreviatum* Turner (Text-fig. 6). The description of this desmid is as follows: "Fronde linear, inflated at extremities; showing a constriction at the central portion which forms a shallow angular notch on each side. Ends truncated and inflated, the inflated portion forming 3-4 shallow lobes, each terminated by a short tooth. A very rare species of which I have obtained only two specimens. G. C. Wallich" (Turner, 1892, p. 27).

According to Bailey who established the genus *Triploceros*, the main characteristics of the genus are: Frond binate; segments straight, much elongated, with numerous whorls of knot-like projections; ends of the segments three lobed; lobes bidentate" (Bailey, 1850, p. 37). Thus the two main features of the genus as originally defined are, (1) the whorls of knot-like projections and (2) the three-lobed ends of the segments. Turner (1892, p. 27), while referring his desmid to the genus *Triploceros*, states: "This little form seems a trifle anomalous, when compared with others of the genus, but I think the terminal lobes decide its position." This means that Turner completely ignores the first main feature of the genus *Triploceros*, viz., the whorls of knot-like projections, and takes into consideration only the second feature of the genus, viz., the lobed ends of the segments. This ignoring by Turner of one of the two main features of the genus, viz., the whorls of knot-like projections, in order to include his alga in the genus *Triploceros* is, in the opinion of the present authors, quite unwarranted. Moreover, even the terminal lobes of *Triploceros abbreviatum* as figured by Turner are not like those of a *Triploceros* at all (cf., West, 1911, pp. 55-56, Fig. 7; Smith, 1924, Pl. 55, Figs. 5-9; Krieger, 193, Pl. VIII, Figs. 3, 3 a). Again according to West who examined specimens of *T. gracile* which were collected by him from the same area as the one from which Bailey collected his form, the terminal portions of the segments are flat and bear "two divergent processes somewhat obliquely disposed and bispinate (rarely trispinate) at their extremities. Alternating with these processes are two shorter apical lobes each of which terminates in an upwardly curved spine" (West, 1911, p. 56). Thus both in the absence of the whorls of the verrucæ and in the nature of the terminal lobes, Turner's desmid is quite unlike a *Triploceros* and so, in the opinion of the authors, will have to be removed from that genus.

On the other hand, Turner's alga, in its general shape and structure, shows a great resemblance to the present desmid and may, therefore, be included in the present new genus *Triplastrum* and named as *Triplastrum abbreviatum* (Turner) comb. nov. The chloroplast of Turner's form has not been described by him, but,

judging from his figure (Turner, 1892, Pl. IV, Fig. 17), the chloroplasts are evidently four, two in each semi-cell, and placed in a median row as in the present alga.

Allorge (1924, p. 464) described from France a desmid which resembled *T. abbreviatum* Turner and followed Turner in referring this desmid to the genus *Triploceros* as *Triploceros simplex* (Text-figs. 7-9). This alga also will have to be removed from the genus *Triploceros* for the reasons stated already in the case of *T. abbreviatum* and included in the present genus as *Triplastrum simplex* (Allorge) comb. nov. In this form, however, Allorge describes the chloroplast as single in each semi-cell. But his figure (Text-fig. 8) shows two medianly placed pyrenoids in each chloroplast suggesting that what appears as a single chloroplast, is very probably double as in the present alga.

DESCRIPTION

Triplastrum gen. nov.

Cells small, elongate, cylindrical with a well-defined median constriction; semi-cells straight, with nearly parallel sides; ends three or four lobed, each lobe bearing one or more short spines; chloroplasts four, two in each semi-cell; arranged in a median row each chloroplast axile with radiating plates and a central pyrenoid; zygospore spherical, thick-walled with a crenate margin.

Triplastrum indicum sp. nov.

Cells small, 8-10 times as long as broad, with a well-defined median constriction; semi-cells straight, cylindrical, with sides nearly parallel; ends slightly inflated, trilobed, each lobe broadly rounded and bearing 2-4 short spines; cell wall smooth and hyaline; chloroplasts two in each semi-cell, arranged in a median row; each chloroplast axile, with radiating plates and a central pyrenoid; zygospore spherical, thick-walled with crenate margin; cells 80.5-91.9 μ long; 13.4-14.0 μ broad at the base of the semi-cells and 14.0-16.7 μ broad at the apices; isthmus 11.7 μ broad; zygote 42.0 μ in diameter.

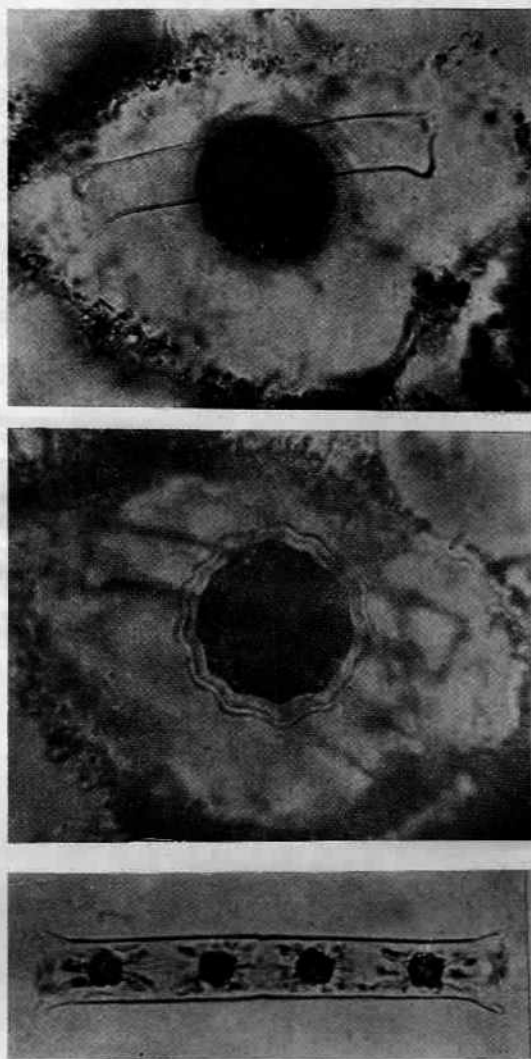
Habitat.—Among other algæ in a paddyfield, Madras, South India.

Triplastrum abbreviatum (Turner) comb. nov.

(*Triploceros abbreviatum* Turner. "The Freshwater Algæ of India," *Kunigl. Svensk. Vetenskap. Akad. Handl.*, 1892, 25, p. 27.)

Cells small about 6 times as long as broad with a shallow median constriction; semi-cells straight, cylindrical with nearly parallel sides; ends truncated and inflated, the inflated portion forming 3-4 shallow lobes, each lobe bearing a single spine; membrane smooth; chloroplasts probably two in each semi-cell arranged in a median row; zygospore not known; cells 65-85 μ long; 11-15 μ broad at the isthmus; 13-17 μ broad at the apices.

Habitat.—Raneengunge, North India (Wallich).



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 FIG. 1. Photomicrographs of a cell showing the four axile chloroplasts and trilobed ends, each lobe bearing three short spines ($\times 700$).
 FIG. 2. Photomicrograph of two conjugating cells with the zygote lying between them ($\times 520$).
 FIG. 3. Same as Fig. 2 taken at another focus to show the empty cells ($\times 520$).

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Triplastrum simplex (Allorge) comb. nov.

(*Triploceros simplex*, Allorge. "Desmidiées du Lac de Grand-Lieu," *Rev. Algol.*, 1924, 1, p. 464.)

Cells small 6-10 times as long as broad with a shallow median constriction; semi-cells straight, cylindrical with nearly parallel sides; ends not prominently inflated, trilobed, each lobe bearing two spines; membrane smooth and hyaline; chloroplast one (two?) in each semi-cell; each chloroplast axile with 4-5 radiating plates; zygospore not known; cells 60-75 μ long; 7.5-9.0 μ broad; 9-10.5 μ broad at the apices (without spines) and 10-11.5 μ broad (with spines); isthmus 7-8 μ broad.

Habitat.—In lake Grand-Lieu, Paris, France (Allorge).

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