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MASTIGOCLADOPSIS JOGENSIS gen. et sp. nov., A NEW MEMBER OF THE STIGONEMATACEAE

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(With one plate and 13 figures in the text)

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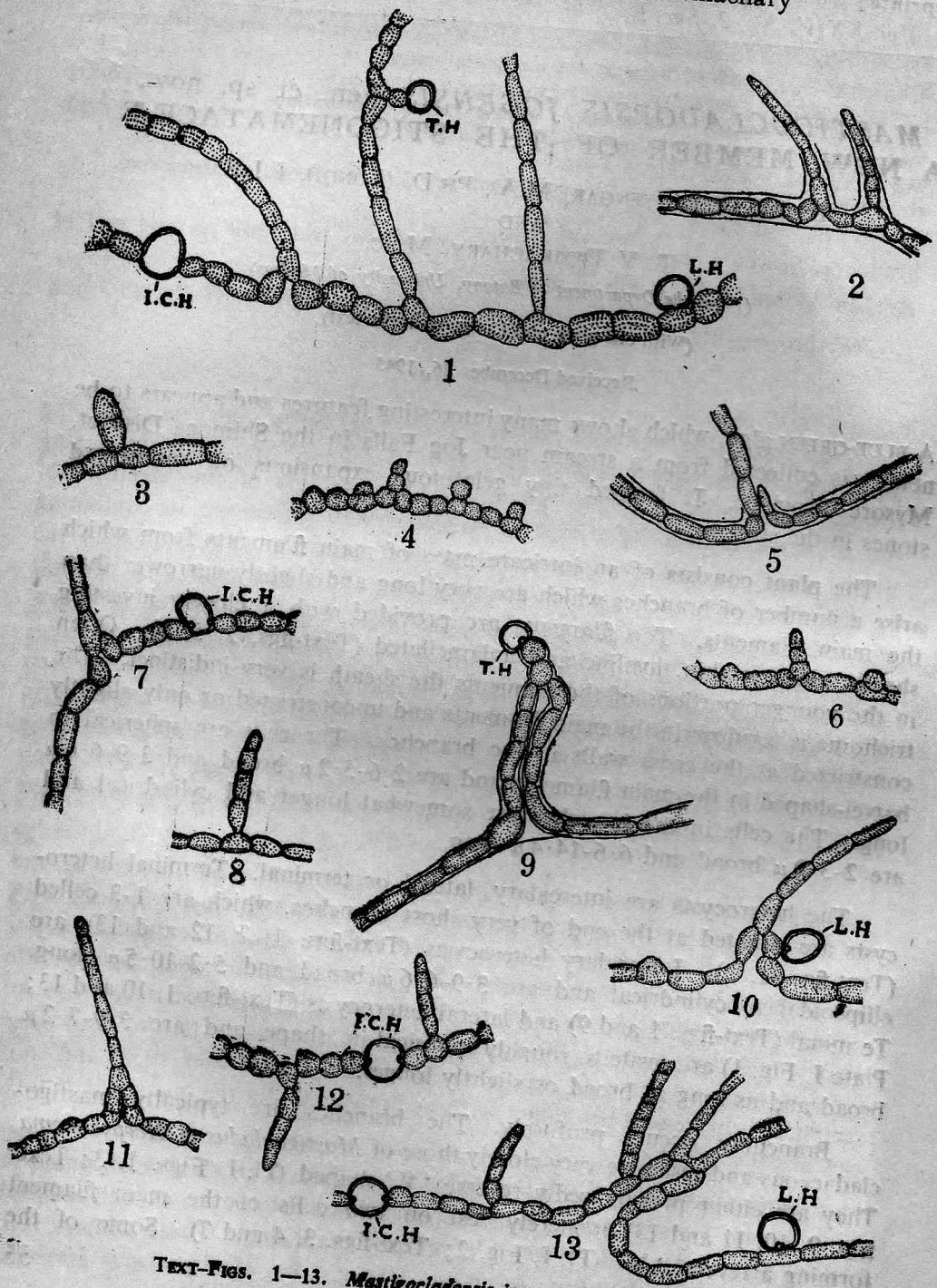
A BLUE-GREEN alga, which shows many interesting features and appears to be new, was collected from a stream near Jog Falls in the Shimoga District, Mysore Province. It formed tiny gelatinous expansions on submerged stones in the stream.

The plant consists of an intricate mass of main filaments from which arise a number of branches which are very long and slightly narrower than the main filaments. The filaments are provided with a closely investing sheath which is thin, hyaline and unlamellated (Text-figs. 2, 5, 9). Often in the younger portions of the filaments the sheath is very indistinct. The trichome is torulose in the main filaments and unconstricted or only slightly constricted at the cross walls in the branches. The cells are spherical to barrel-shaped in the main filaments and are 2·6–5·2 μ broad and 3·9–6·6 μ long. The cells in the branches are somewhat longer and cylindrical and are 2–3·9 μ broad and 6·6–14·4 μ long.

The heterocysts are intercalary, lateral or terminal. Terminal heterocysts are situated at the end of very short branches, which are 1–3 celled (Text-figs. 1, 9). Intercalary heterocysts (Text-figs. 1, 7, 12 and 13) are ellipsoidal to cylindrical and are 3·9–6·6 μ broad and 5·2–10·5 μ long. Terminal (Text-figs. 1 and 9) and lateral heterocysts (Text-figs. 1, 10 and 13; Plate I, Fig. 1) are ovate to roughly spherical in shape and are 3·9–7·2 μ broad and as long as broad or slightly longer.

Branching occurs profusely. The branches are typically mastigocladaceous and resemble very closely those of *Mastigocladus* or *Herpyzonema*. They are either pronouncedly reverse 'V'-shaped (Pl. I, Figs. 1, 3; Text-figs. 9, 10, 11 and 13) or merely rest on two cells of the main filament forming a reverse 'V' (Pl. I, Fig. 2; Text-figs. 3, 4 and 7). Some of the



TEXT-FIGS. 1—13. *Mastigocladopsis jogensis* gen. et sp. nov.

FIG. 1. Portion of a well-branched filament with intercalary, lateral and terminal heterocysts.
FIGS. 2 and 5. Portions of filaments with the sheath drawn.
FIGS. 3, 4 and 6. Young stages of Mastigocladaceous brunchings.
FIGS. 7, 9, 10, 11 and 13. Well developed Mastigocladaceous branchings.
FIGS. 8 and 12. Portions of filaments showing branching.
(All except Fig. 3 × 750 ; Fig. 3 × 1100)
(L. H. Lateral Heterocyst ; T. H. Terminal Heterocyst ; I. C. H. Intercalary Heterocyst).

branches, however, appear like true branches and rest only on one cell of the main filament (Text-figs. 8 and 12).

No hormogones or spores were observed.

SYSTEMATIC POSITION

This alga, in having both lateral and terminal heterocysts, resembles the members of the Nostochopsidaceæ. But it differs from them in having reverse 'V'-shaped branches which are characteristic of the members of the Mastigocladaceæ. The alga is therefore very interesting in combining within itself the main characteristics of two separate families, *viz.*, the Nostochopsidaceæ and the Mastigocladaceæ. This fact makes it difficult to refer it to either of these two families. It is therefore referred to a new genus, *Mastigocladopsis*, and placed in a new family by name Mastigocladopsidaceæ. The alga itself may be called *Mastigocladopsis jogensis* sp. nov. The new family proposed above may be considered as a synthetic family from which both the Nostochopsidaceæ and the Mastigocladaceæ have probably been derived; or, the family may be considered to have been derived from a common ancestor from which both the Mastigocladaceæ and the Nostochopsidaceæ took their origin.

In case the establishment of this new family should be objected to, the only alternative would be to place the new genus *Mastigocladopsis* along with *Nostochopsis, Hapalosiphon, Mastigocladus* and the other allied genera under one single family, Stigonemataceæ. But, since the differences between the families Nostochopsidaceæ, Mastigocladaceæ and Stigonemataceæ are so distinct and characteristic, the authors feel that it would be best to keep these families quite separate as was done by Geitler (1925 and 1932) and not include all the genera belonging to these families under the one single family, the Stigonemataceæ.

Seurat and Fremy (1936) recorded from Tunisia an alga which possesses both lateral (sessile) and terminal (pedicellate) heterocysts as well as intercalary heterocysts and reverse 'V'-shaped branching. These authors refer this alga to *Hapalosiphon laminosus* Hansg. ? (= *Mastigocladus laminosus*

Cohn.). Since this Tunisian alga possesses both terminal and lateral heterocysts as in the Nostochopsidaceæ and also the reverse 'V'-shaped branching characteristic of the Mastigocladaceæ, the writers feel that it must be included in the present genus, *Mastigocladopsis*.

Description

Family Mastigocladopsidaceæ

Filament sheathed and branched; branching both reverse 'V'-shaped and simple; Heterocysts intercalary, lateral and terminal.

Genus *Mastigocladopsis* gen. nov.

Filament sheathed and branched; branching both reverse 'V'-shaped and simple; trichomes with a single row of cells. Heterocysts intercalary, lateral and terminal. Hormogones and spores not known.

Mastigocladopsis jogensis sp. nov.

Filaments flexuous; branches profuse; branching both reverse 'V'-shaped and simple; branches generally thinner than the main filaments; sheath thin, hyaline and unlamellated; trichome somewhat torulose in the main filaments and unconstricted at the cross-walls in the branches; cells barrel-shaped in the main filaments (2·6-) 3·9-5·24 μ broad and 3·9-6·6 μ long; cells in the branches cylindrical, 2-3·9 μ broad and 6·6-14·4 μ long. Heterocysts intercalary, lateral and terminal at the end of very short branches, which are 1-3 cells long; inter-calary heterocysts cylindrical or ellipsoidal, 3·9-6·6 μ broad and 5·2-10·5 μ long; lateral and terminal heterocysts spherical or ovate and 3·9-7·2 μ broad.

Hab.—Growing on submerged stones in a running stream, near Jog Falls, Shimoga District, Mysore Province, S. India.

Summary

An alga which shows the characteristics of the two families, the Nostochopsidaceæ and the Mastigocladaceæ, *viz.*, both lateral and terminal heterocysts as in the former family and reverse 'V'-shaped and simple branching as in the latter family is described in detail. Owing to the combination of the characteristics of two distinct families, the alga is referred to a new genus by name *Mastigocladopsis* and placed in a new family the Mastigocladopsideaceæ.

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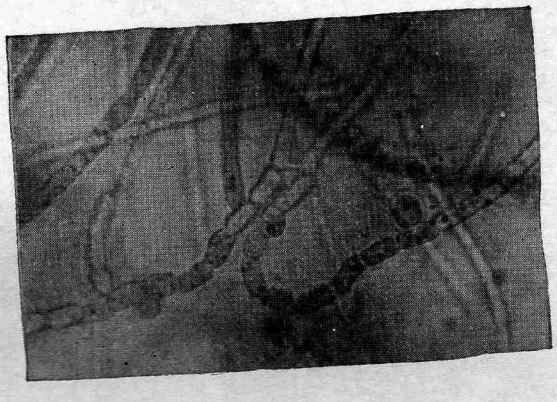
FIG. 1



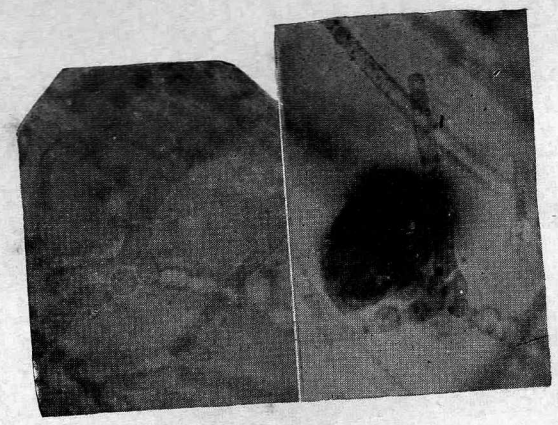


FIG. 2

FIG. 3

FIGS. 1–3. *Mastigocladopsis jogensis* gen. et sp. nov.

FIG. 1.—Photomicrographs showing a well developed mastigocladaceous branching and a lateral heterocyst.

FIGS.—2 & 3.—Photomicrographs of filaments showing mastigocladaceous branchings, (all ×850)