

SPIROGYRA.

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A number of instances are on record where irregularities occur as to the form, conjugation or general behavior in the genus Spirogyra. Among these may be mentioned a paper by Gregory¹ which illustrates a number of specimens of Spirogyra which show branches given off. In one instance a figure is given showing a branch which has itself divided into two branches. See Fig. 2 of Gregory's paper. This, as the author states, is due probably to monads. Attention is also called to the well-known galls of Vaucheria and of Oscillatoria, the latter due to the entrance of zoöspores of Chytridiae. In the Spirogyra cells which branch, as Gregory shows, these all proceed from the convex side of the cell. This appearance of these branches on the convex or stretched side of the cell recalls a similar disposition in the arrangement of roots on the convex side of the main root, which, however, in the case of the roots, is a response to the mechanical factors that are operative.

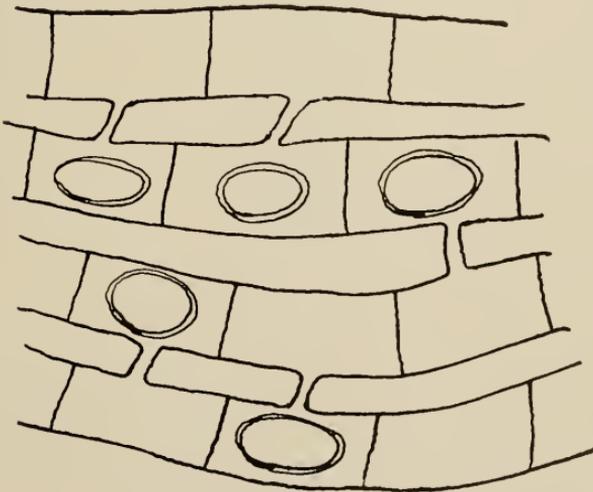


Fig. 1. *Spirogyra crassa* x 300.

A paper by the writer² in 1910 showed conjugation in two different species of Spirogyra, as *Spirogyra crassa* and *Spirogyra communis*. In another paper³ I have called attention especially to the question of irregular cases of conjugation in Spirogyra.

In this paper also the literature is referred to in so far as it pertains to the topic under discussion. Chief among these was the paper

¹ Gregory, Emily L. Bulletin of the Torrey Botanical Club, 1892, Vol. 19, pp. 75-79.

² Andrews, F. M. Bulletin of the Torrey Botanical Club, 1910, Vol. 38, p. 299.

³ Andrews, F. M. Proceedings of the Indiana Academy of Science, 1912, pp. 89-91.

of Tröndle,¹ who mentions a rather unusual case of irregular conjugation. An instance of deviation in form is shown in a paper by Pickett.² Another instance is given by Weatherwax of branching, etc., under the conditions there numerated. So far, however, as the branching of



Fig. 2. *Spirogyra elongata* x 400.

Spirogyra is concerned, this has been known for many years.

As Sachs³ says, if one cuts up the long filaments of *Spirogyra* and the pieces are laid on wet peat, some of the cells put out branched colorless tubes, which behave like roots. In fact, somewhat similar results take place, as Sachs says, in highly organized plants, as in the rooting of several shoots in many vascular plants; and the stimulus of contact in the development of structures, as in *Cuscuta*. So that branching may be produced in *Spirogyra* not only from a diseased condition but also at times by injuries.

The writer has observed another case of somewhat more compli-

¹ Tröndle, A. Ueber die Kopulation und Keimung von *Spirogyra*, *Botanische Zeitung*, 1907, Bd. 65, p. 192.

² Pickett, F. L. *Bulletin of the Torrey Botanical Club*, 1912, Vol. 39.

³ Weatherwax, Paul. *Proceedings of the Indiana Academy of Science*, 1914, pp. 203-206.

⁴ Sachs, J. *Vorlesungen über Pflanzen Physiologie Zweite Auflage*, 1887, p. 40.

cated conjugation in *Spirogyra* than the one referred to in the paper above mentioned. This material formed a sort of net on the water. When examined it showed not only some further examples of the deviations in conjugation mentioned in the paper just cited, but also a few more complicated cases of what I term net conjugation on account of several filaments being held together in the process. Being associated often in such dense masses, it is really not so surprising that such examples of conjugation would occur, but rather we should have the right to expect that it would be more frequent than has heretofore been reported. Figure 1 gives a picture of one case. This figure is a camera drawing and, as will be seen, four filaments are concerned in the process.

Another deviation from the ordinary is shown by Fig. 2. This is also a camera drawing. The material was obtained from the same place as that from which Fig. 1 was made. Most of the *Spirogyra* in the water where this material was obtained was *Spirogyra elongata*, but there was also a considerable quantity of *Spirogyra communis* and *Spirogyra crassa*. In a few instances some cells were observed where the number of chloroplasts varied. As shown in Fig. 2, a few of the cells had two chloroplasts, whereas the usual number of chloroplasts is one.

