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# Structure of the cell-wall in *Spirogyra silesiaca* Kadł. (1967)

J. Z. KADŁUBOWSKA

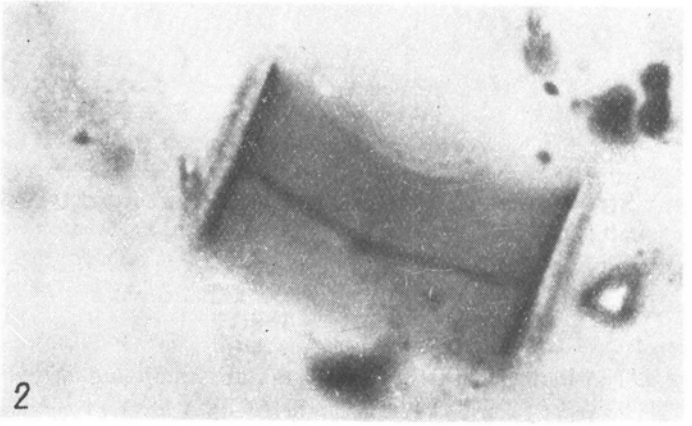
The filaments of the Spirogyras are composed of cylindrical cells arranged in single row. Each cell is surrounded with a layer of cellulose and the filament itself is enclosed in a pectic sheath which integrates the cells into a filament (Czudra 1932).

*Spirogyra silesiaca*, recently described by the present writer, shows a different structure of the cell-walls. This species was found on 5 July 1965 in a water sample taken from the pond Nowy Mały in the Experimental Pond Farm of the Laboratory of Water Biology of the Polish Academy of Sciences at Gołysz near Cieszyn. The cells of *Spirogyra silesiaca* are also cylindrical but at intervals of 10 or more microns from the transverse cell-walls there are ring-like cavities (Fig. 1). The cell-wall consists of two layers which surround not only the curved cell surface but also the bases of the cells. In *Spirogyra silesiaca* the outer layer of the cell-wall does not join the cells as it does in the majority of Spirogyras; instead, in this species the cells are integrated into a filament by rings which appear in the ring-like cavities at the ends of the cells. The diameter of the rings is the same as that of the cells and amounts to 43—52 μ, the average being 46 μ. The length of the ring is about 22 to 24 μ. On the circumference of the ring at an equal distance from either side there is an optically different stripe, 1 μ in width. This stripe may be taken as an additional transverse cell-wall but after removal and examination of the rings in the front and lateral view it appears that the stripe runs only on the circumference (Figs. 2, 3). Inside the ring the neighbouring cells come into contact with each other. Theoretically, the filament in *Spirogyra silesiaca* may be divided into cells and rings. However, it was impossible to disconnect the cells by immersing the filament into pectase but we managed to separate them by removing the ring with preparation needles. A sheath of mucilage adheres to the ring (Figs. 2, 3) while it does not appear at the ends of the cells enclosed by the rings. Thus, the mucilage sheath surrounds the cells only as far as the boundary of the ring, and further it encroaches on the ring itself. The boundary is clearly seen after staining the cells in ruthenian red or in methylene blue (Fig. 4). When the ring is removed from the ends of the stained cells the place where it ran is lighter than the rest of the preparation (Fig. 5). Cells devoid of the rings often undergo some deformations.

The structure of the filament with the cells joined by the rings is likely to facilitate the terminal conjugation, during which the transverse walls of two neighbouring

Plate I


1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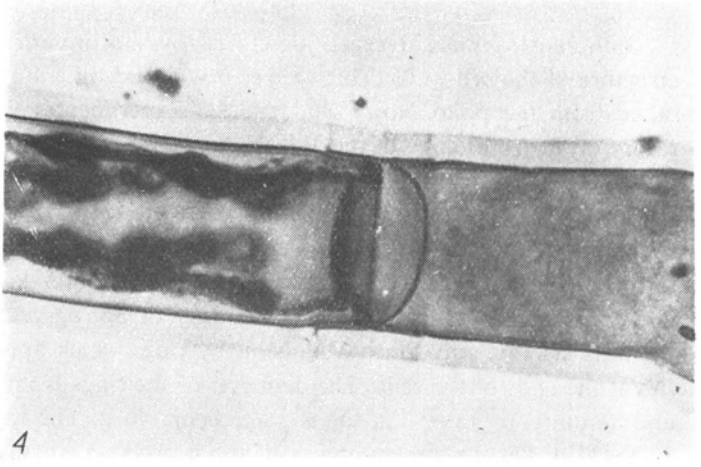
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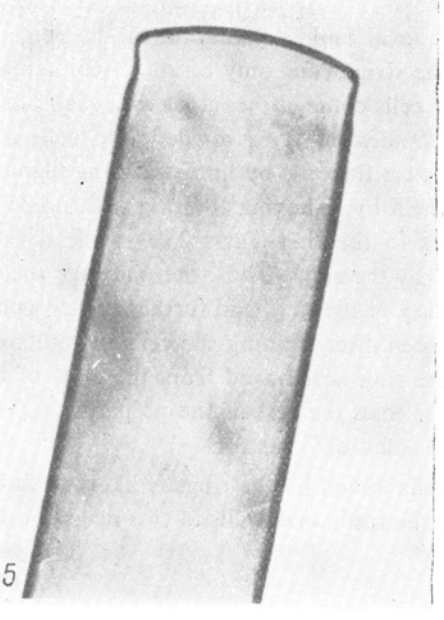
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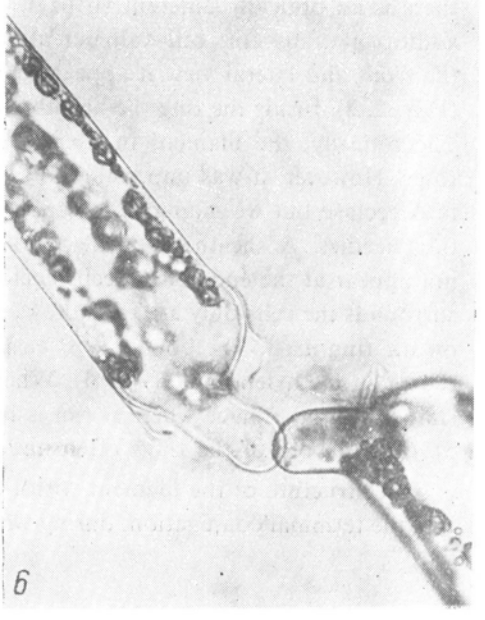
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cells produce a conjugation tube, with the growth of which they are pushed away from each other. The ring remains with one of the two cells (Fig. 6).

The structure of the cell-wall described above and for the first time reported in the paper "*Spirogyra silesiaca* sp. n." (Kadłubowska 1967) was also observed in *Spirogyra colligata* Hodgetts, a fact which induced the present writer to change the diagnosis of this species (Kadłubowska 1968).

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## LITERATURE

Czurda V. 1932, Zygnemales in Paschers Süsswasserflora von Mitteleuropa, p. 232.

Kadłubowska J. Z., 1967, Spirogyra silesiaca sp. n. Fragmenta Floristica et Geobotanica, 13, 1: 163—164.

Kadłubowska J. Z., (in print), Structure of cell-wall of *Spirogyra colligata* Hodgetts (1920) and changes of diagnosis of this species, Fragmenta Floristica et Geobotanica, 15,2.

## *Struktura ściany komórkowej Spirogyra silesiaca Kadł. (1967)*

Streszczenie

Komórki *Spirogyra silesiaca* połączone są w nitkę za pomocą pierścieni. Pierścienie mają średnicę odpowiadającą średnicy komórki, a długość od 22 do 24 μ. Na obwodzie pierścieni, w jednakowej odległości od jego brzegów, znajduje się pas o właściwościach optycznie odmiennych. Pierścień zdjęto z komórki za pomocą igieł preparacyjnych. Do pierścienia przylega warstwa śluzu. Końce komórek, na które nachodzi pierścień są pozbawione śluzu. Taką samą budowę nitki stwierdziliśmy u *Spirogyra colligata* Hodgetts, co skłoniło nas do zmiany diagnozy tego gatunku.

*Zakład Algologii*
*Katedra Systematyki i Geografii Roślin*
*Uniwersytet Łódzki*

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Plate I

Fig. 1. Ring-like cavities at the end of a cell and a ring
Fig. 2. Isolated ring in the front view with a mucilage sheath at the edges and a stripe on the circumference
Fig. 3. Two isolated rings. On the right the ring in the lateral view with a mucilage sheath. Preparation stained in ruthenian red
Fig. 4. Cells joined by the ring. Preparation stained in ruthenian red
Fig. 5. Base of the cell after removal of the ring. Preparation stained in ruthenian red
Fig. 6. Initial phase of the terminal conjugation. Visible the ring adhering to one cell.