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Materials to the *Zygnemaceae* of Poland. II. Observations on the development cycle of *Zygnema biforme* Jao. 1947, a species new for the European flora

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Abstract

In the water sample taken on June 27, 1983 from the pond in Młogoszyn (Płock District) vegetative filaments and initial stages of conjugation of *Zygnema biforme* Jao were detected. In culture mature zygotes and their germination were observed. It is the second site of occurrence of this species in the world.

Key words: *development, Zygnema, species new for European flora*

From the pond in Młogoszyn (Płock District) with a surface area of about 2400 m^2 and about 1 m deep a water sample was taken on June 27, 1983. In it filaments of the genus *Zygnema* floating on the water were found by Floryanowicz-Czekalska. In some of them initial stages of conjugation (Fig. 1), and in the few gametangia immature zygotes were visible.

The filaments were placed in crystallisers with water from the pond and covered with a glass slide. The water was changed at 2-3-day intervals. Some *Zygnema* filaments at various developmental stages were fixed in 70 per cent ethyl alcohol. When the cultured zygotes reached maturity, they were placed in a 5 per cent KOH solution in 70 per cent ethyl alcohol. After two weeks the layers sorrounding the zygotes became visible: the monolayer exospore and the layered mesospore with pits. The zygotes have in frontal view two different shapes: rounded or rectangular with rounded base. Among the observed 150 zygotes (in frontal view) 123 were rounded and 27 rectangular with rounded base.

Parallely with observation of the development cycle (Table 1) the following

Table 1

Observations on development cycle of *Zygnema biforme* Jao

Day or period of observation	Developmental stages
1983: June 27	Vegetative filaments, some in initial phase of scalariform conjugation (Fig. 1). In gametangia scarce zygotes with four stellate green chromatophores visible inside, derived from conjugating cells.
1983: June 28–July 15	Nearly all filaments in stage of scalariform conjugation. Yellowish zygotes in gametangia. Chromatophores not visible in zygotes. Mesospore sculpture not visible.
1983: July 16–August 15	Yellowish zygotes, pits can be seen in mesospore. Zygotes in frontal plane globose or rectangular with rounded base, compressed in side view (Figs. 2, 3).
1983: August 16–-October 20	Monolayer exospore and layered mesospore are visible.
1983: October 21	Zygotes germinate inside gametangium, part of young cell is visible with one chromatophore, the second one is in the zygote (Fig. 4).
1983: October 21–-beginning of November	Filaments and zygotes disintegrate.

measurements, calculations and morphological observations were performed:

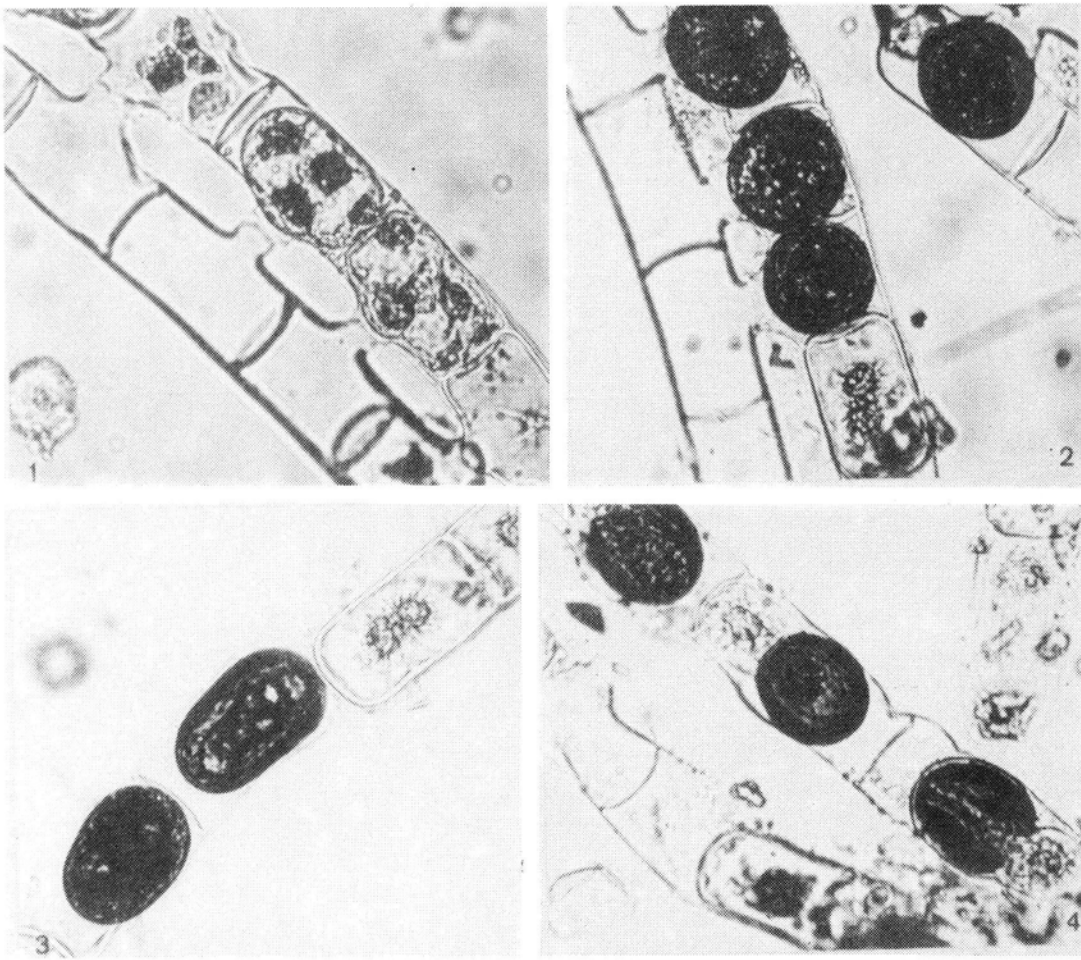
1. The breadth of 150 vegetative cells was measured, the means, the standard error and the confidence interval calculated.
2. The shapes of 150 zygotes in frontal view were inspected (Figs. 2, 3). Their length and breadth were measured and their mean calculated, so was the standard error and the confidence interval.
3. The thickness of the mesospore, the diametre of pits and their distance were measured.

The specimens were identified as *Zygnema biforme* Jao by J. Z. Kadłubowska.

This species has been described by Chin-Chin-Jao in samples taken from a pond on April 15, 1938 in China (Yangso Park) (Jao 1947). The site in Młogoszyn is the second site of this alga in the world (Kadłubowska 1972, 1984).

The dimensions of the *Z. biforme* individuals from Młogoszyn do not differ from those described by Jao. However he does not give in his diagnosis the thickness of the mesospore. The full development cycle of this species has so far not been described.

PLATE I



Figs. 1–4. *Zygnema biforme*: 1 — vegetative filaments and initial conjugation stages, 2 — globose zygotes (in frontal view), 3 — rectangular zygotes with rounded base (in frontal view), 4 — zygote germinating in gametangium

DESCRIPTION OF *ZYGNEMA BIFORME* FROM THE POND IN MŁOGOSZYN

Vegetative cells 27.2–28.8 μm broad (confidence interval 27.2–29.2 μm). Zygospores in gametangia slightly inflated on the conjugating side. Zygospores in frontal view globose of dimensions 30.4–46.0 μm × 25.6–36.8 μm (confidence interval 34.9–35.9 × 31.9–32.7 μm) or rectangular with rounded base of dimensions 35.2–48.0 μm × 27.2–35.2 μm (confidence interval 38.8–41.4 × × 29.7–31.3 μm). Exospore thin, smooth, colourless. Mesospore 5.0 μm thick, yellow with pits 1.5–2.0 μm in diametre, spacing between pits 4.0–5.0 μm.

The description of *Z. biforme* from the pond in Młogoszyn increases the number of species of the genus *Zygnema* known from Poland to ten (Kadłubowska 1984).

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Materiały do Zygnemaceae Polski. II. Obserwacje cyklu rozwojowego Zygnema biforme Jao 1947, nowego gatunku dla Europy

Streszczenie

W próbie pobranej 27.06.1983 roku ze stawu w Młogoszynie (woj. płockie) natrafiono na nitki wegetatywne i na początkowe stadia konjugacji *Zygnema biforme* Jao. W hodowli zaobserwowano dojrzałe zygoty oraz ich kiełkowanie. Jest to drugie stanowisko w świecie tego gatunku.