MATERIALS TO THE ZYGLEMACEAE OF POLAND V.
TWO SPIROGYRA SPECIES NEW FOR POLAND

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ABSTRACT

Spirogyra occidentalis (Transeau) Czarda 1932 and S. scrobiculata (Stockmayer) Czarda 1932, two species new in the Polish flora and S. pseudovarians Czarda 1930, a species only cited in literature, are described in samples collected in central Poland. The diagnosis of S. occidentalis and S. pseudovarians has been supplemented with measuring data of the inflated sterile cells in conjugation filaments. The figures show the hitherto unknown inflated sterile cells.

KEY WORDS: Spirogyra, taxonomy, morphology.

INTRODUCTION

The form, size and sculpture of the zygote walls and their pigmentation are all very important characters for the identification of the Spirogyra species. The outer zygote wall i.e. exospore is usually colourless and transparent, the median wall, i.e. the mesospore, is distinguished by its yellow to brown colour. Obviously only specimens with mature zygote walls can be named with any degree of satisfaction.

In this report we present Spirogyra species differing among other things by the sculpture of the zygote wall.

RESULTS

As a result of taxonomic, critical analysis of the Spirogyra genus two species new for Poland are described: S. occidentalis (Transeau) Czarda and S. scrobiculata (Stockmayer) Czarda. Besides, the description, microphotographs and drawings of Spirogyra pseudovarians Czarda are also included, because this species was formerly cited only from Poland (Kadłubowska 1995).

These species were not included in earlier publications concerning the Zygmemaceae of Poland (Kadłubowska 1972, 1986).

Detailed descriptions and microphotographs supplement data of their vegetative, generative stages and zygote wall sculpture. Reviewing world literature makes establishing the distribution of these species in the world possible.

Description of the investigated species

Spirogyra occidentalis (Transeau) Czarda 1932 (Figs 1, 2, 6)
(Spirogyra velata var. occidentalis Transeau 1914)

S. occidentalis has been described for the first time in North America (citation after Czarda 1932). Localities of this species are known in Kharkov (Ukraine, Rundina 1988), Germany? (Kolkwitz and Krieger 1944), Canada, United States of America, British Columbia (Transeau 1951), Tunisia and Algeria (Gauthier-Liévre 1965).

This species was identified in a sample taken in May 1964 from a ditch in grassland in Walewice (near Łowicz). Its vegetative and generative stages, with mature zygotes were the basis for this identification.

Description of S. occidentalis from Walewice: vegetative cells 35-46 \( \mu \)m, with plane end walls. One chloroplast. Conjugation scalariform. The conjugation canal is widened in the middle and formed equally by both gametangia. The female gametangia cylindrical or rarely slightly inflated on the conjugating side. Zygotes ellipsoid with rounded ends: 36-40 x 52-65 \( \mu \)m. The exospore is colourless and transparent of 2 layers, of which the outer is smooth, the inner is scrobiculate, the mesospore is yellow-brown, smooth (Fig. 6). The sterile cells in conjugation filaments are inflated, measuring 50-60 \( \mu \)m.

Morphological features and dimensions of specimens of S. occidentalis from Walewice, except occasionally some inflated sterile cells, are congruent with the descriptions and original drawings of Transeau (1951) and Gauthier-Liévre (1965). The microphotographs (Figs 1, 2) are a documentation of inflated sterile cells, generative stages and sculpturing of the zygote wall of this species, new for the Polish flora and rare for Europe.

Relying on the descriptions by Transeau (1951), Gauthier-Liévre (1965) and our investigations, we believe that Czarda's diagnosis concerning the zygote wall structure, which reads: "Exospore dick, plat, farblos. Mesospore dick, gelb-braun, von ausserher kreisförmig, grubig" (Czarda 1932, p. 183) should be changed into: Exospore is colourless of 2 layers, of which the outer is smooth, the inner is scrobiculate, the mesospore is yellow-brown, smooth.
Figs 1-2. *Spirogyra occidentalis*. Fig. 1. Inflated sterile cells. x500. Fig. 2. Scalariform conjugation. x500.

Figs 3-4. *Spirogyra pseudovarians*. Fig. 3. Inflated sterile cell. x1000. Fig. 4. Scalariform conjugation. x1000.
Spirogyra scrobiculata (Stockmayer) Czurda 1932 (Figs 5, 8) (Spirogyra varians Kütz. var. scrobiculata Stockmayer 1894)

S. scrobiculata has been described by Czurda from Linz and Lunz (Austria). Stands of this species in Europe are known also in Finland (Cedercreutz 1934), Germany, Italy (Kolkwitz and Krieger 1944) and Denmark (Kadlubowska and Christensen 1979). Transeau (1951) reported S. scrobiculata in North America, Gauthier-Lièvre (1965) in Algeria, Yamagishi (1966) in Japan and Kargupta et. al. (1987) in India. Mistakenly, Randhawa (1959) and Yamagishi (1966) cited this species from Australia instead of Austria.

This species was identified in a sample collected on January 11, 1972 from the pond in Żabiczki (Łódź District). Its vegetative and generative stages with mature zygoetes were the basis for its identification.

Description of S. scrobiculata from Żabiczki: vegetative cells 34-42 μm with plane end walls. One chloroplast, scalariform, conjugation. The conjugation canal is formed by both gametangia. The female gametangia slightly inflated up to 49 μm on the conjugating side. The ellipsoid zygoetes are 33-37 x 60-62 μm. The exospore is smooth and transparent, the mesospore is yellow-brown, scrobiculated. The sterile cells in conjugation filaments are inflated on both sides to 62 μm.

Morphological features and dimensions of S. scrobiculata from Żabiczki are congruent with the descriptions and drawings of Czurda (1932), Transeau (1951), Gauthier-Lièvre (1965) and Yamagishi (1966), only the width of the vegetative cells is slightly larger. In several zygoetes a brown polar thickening, unobserved in this species till now, was recorded. The filaments of this species were mixed with S. granulata Jao. S. scrobiculata is new for the Polish flora.

S. pseudovarians Czurda 1930 (Figs 3, 4, 7)

Spirogyra pseudovarians was established by Czurda (1930) on the basis of the samples from Mittersee from Lunz (Austria). Czurda's diagnosis is supplemented by original drawings of the scalariform conjugation and optical section of the zygote wall.

The species has been reported also from the vicinity of Prague (Czurda 1932) and Switzerland (Nipkov 1962). Nipkov published original figures of the germination of its zygote and details of the zygote's wall structure. Localities of this species are known in Denmark (Kadlubowska and Christensen 1972) and in India (Kargupta et. al. 1987; Kargupta and Jha 1995). These publications report only sites without descriptions and drawings.

S. pseudovarians is also cited, without description of sites and drawings by Kadlubowska (1995). In this report we supply the missing data on this species, of which the localities are infrequent in the world. In the work of Randhawa (1959) Fig. 419 of S. pseudovarians is after Czurda not after Skuja.

S. pseudovarians was identified in a sample collected on October 18, 1965 from a pond in grassland in Borkowice (near Tomaszów Mazowiecki).

Description of S. pseudovarians from Borkowice: vegetative cells 39-45 μm, with plane end walls. One chloroplast. Conjugation scalariform (Fig. 4), conjugating tubes formed by both gametangia. Female gametangia slightly inflated on the conjugating side. Zygoetes ellipsoid 39-44 x 55-70 μm. Exospore thick, transparent, scrobiculated; mesospore brown, smooth. Sterile cells in conjugation filaments inflated to 60 μm on the conjugating side (Fig. 3). Morphological features and dimensions of S. pseudovarians from Borkowice are con-
gruent with those given from Austria and Switzerland, also with our observations concerning conjugation, zygotes’ shape and sculpturing of exosporde, and are also congruent with the drawings of Czurda and microphotographs of Nipkov. This species is distinguished by a heavy transparent shallow scrobiculate exosporde. The microphotograph of the inflated sterile cells in conjugating filaments were hitherto unknown.

LITERATURE CITED


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MATERIAŁY DO ZYGEMENACEAE POLSKI V. DWA NOWE DLA POLSKI GATUNKI RODZAJU SPIROGRIA LINK

STRESZCZENIE

W próbach z centralnej Polski zidentyfikowano i opisano dwa nowe dla Polski gatunki: Spirogyra occidentalis (Transseu) Czurda 1932 i S. scrobiculata (Stockmayer) Czurda 1932 oraz Spirogyra pseudovarians Czurda 1930, gatunki tylko dotychczas cytowanej w spisach. Diagnozy S. occidentalis i S. pseudovarians zostały uzupełnione o dane i nieznane dotychczas ilustracje dotyczące węzデンów komórek wegetatywnych w niktach koniugujących.

SŁOWA KLUCZOWE: Spirogyra, taksonomia, morfologia.