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**Wybrane glony zbiorników zaporowych, rzeki Soły
i stawów karpowych**

**Selected algae of dam reservoirs, the River Soła,
and carp ponds**

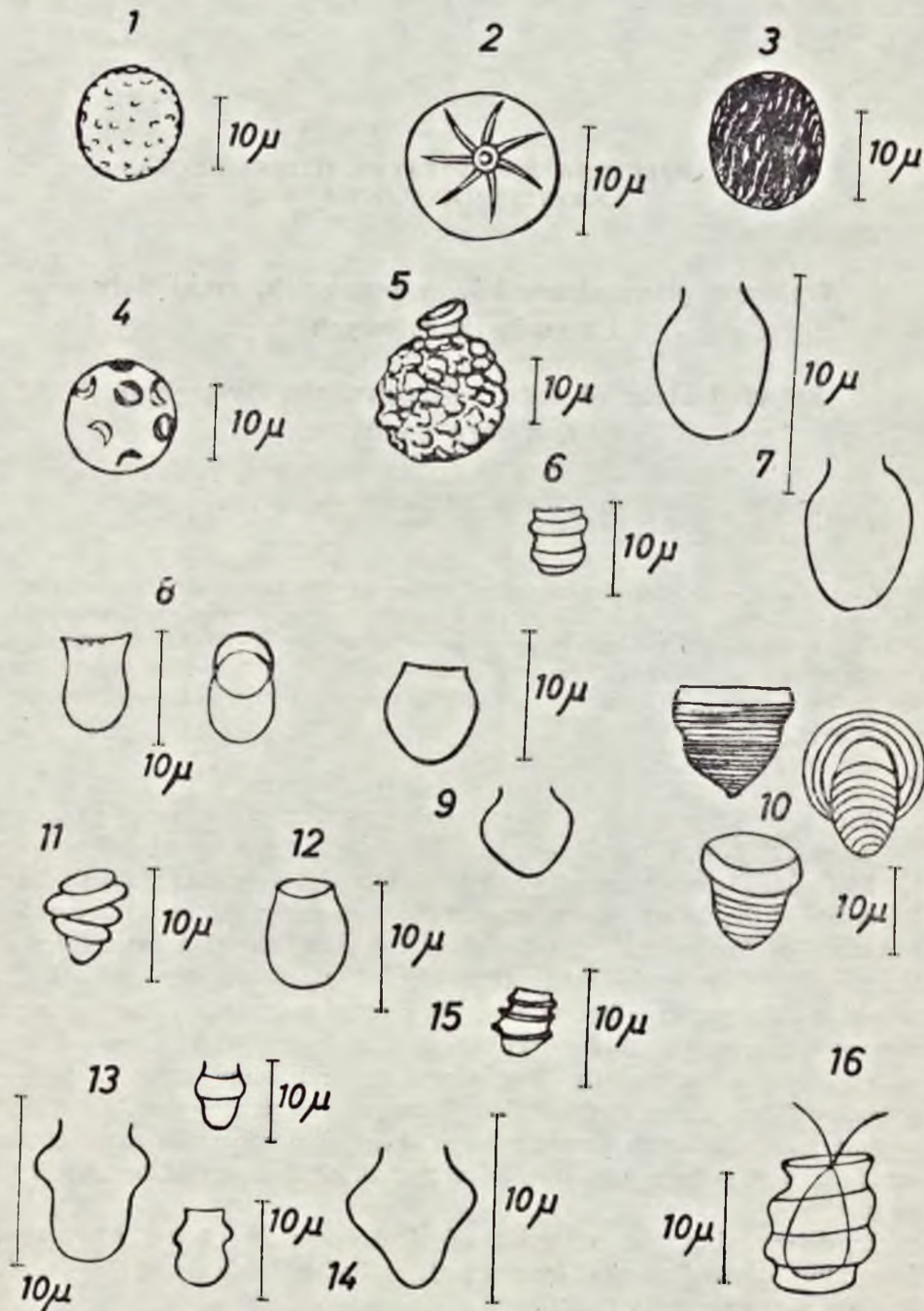
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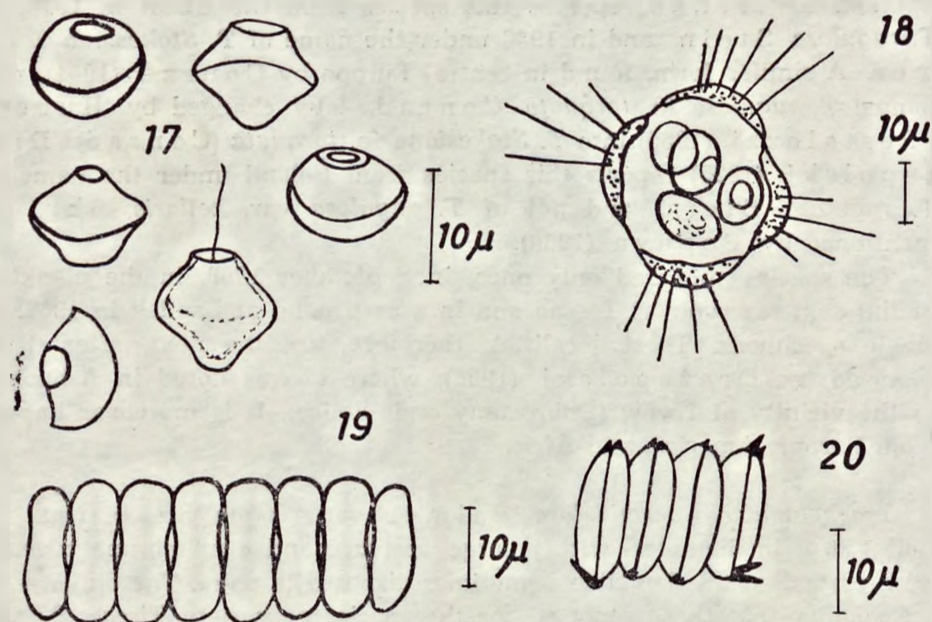
Abstract — 5 euglenin species of the genus *Trachelomonas*, 12 species and one variety of chrysophytes of the genera *Pseudokephyrion*, *Kephyrion*, *Kephyriopsis*, and *Chrysococcus*, and 3 species of green algae of the genera *Scenedemus* and *Siderocystis* were determined as being rare or new for Poland. They were found in the plankton of fishponds, in dam reservoirs, and in the river Soła (Provinces of Katowice and Kraków).

Within the framework of investigations conducted for many years by the Laboratory of Water Biology of the Polish Academy of Sciences in Kraków, algae from different water environments were also studied: from fishponds of the Ochaby Complex and the dam reservoirs of Goczałkowice (Province of Katowice), from the river Soła, and the dam reservoirs of Czaniec, Porąbka, and Tresna (Province of Kraków). In some of the materials rare species, often unknown in Poland, were found. Among them, chrysophytes, mostly of the *Kephyrion*, *Pseudokephyrion*, *Chrysococcus*, or euglenins — especially *Trachelomonas* and some green algae — prevailed. The species of these first three genera were especially difficult to determine. Although they appeared in great numbers in some of the samples, mostly from dam reservoirs, not all of them could be identified to species.

In determining, the collection of algal drawings of the Algological Laboratory of the Botanical Institute of the Polish Academy of Sciences in Kraków was extremely useful.

Trachelomonas nigra Sw i r. (fig. 1) 16—18.2 μ l., 15—17.4 μ br. Cells with a granulated membrane, from dark-brown to black in colour.





Ryc.

Figs. 1-20. 1 — *Trachelomonas nigra*, 2 — *Tr. radiosa*, 3 — *Tr. Stokesiana*, 4 — *Tr. vermiculosa*, 5 — *Trachelomonas* sp., 6 — *Pseudokephyrton cylindricum*, 7 — *P. Entzti*, 8 — *P. inflatum*, 9 — *P. minustissimum*, 10 — *P. Schilleri*, 11 — *P. spirale*, 12 — *Kephyrion planctonicum*, 13 — *K. Rubri-claustri*, 14 — *K. Rubri-claustri* var. *amphora*, 15, 16 — *K. spirale*, 17 — *Kephyriopsis globosa*, 18 — *Siderocystis fusca*, 19 — *Scenedesmus balatonicus*, 20 — *S. circumfusus*.

This species appeared very frequently in the plankton of the dam reservoirs of Goczałkowice, Czaniec, Porąbka, and Tresna, at different depths, in the years 1967 and 1969.

It was reported from Poland by D r e ż e p o l s k i (1925) from fishponds in the vicinity of Lwów (Dobrostany, Wolice).

Trachelomonas radiosa Fritsch? (fig. 2). Cell 15 μ in diameter, with a punctate membrane and 7 very distinct ribs radiating from the aperture towards the centre. The cell is slightly smaller and has a smaller number of ribs than in the diagnosis of Huber-Pestalozzi (1955), who reports 12 ribs.

Only one specimen was found in the plankton of the dam reservoir at Goczałkowice in September 1967.

As far as we know, this species has not previously been reported from Poland. It is known from South Africa (Huber-Pestalozzi 1955).

Trachelomonas Stokesiana Palmer (fig. 3). Cell 14–15 μ l., 11.6–12 μ br. Huber-Pestalozzi (1955) quotes after Palmer (1905) a maximum length of 18 μ , and Popova (1966), of 16–18 μ . In her

opinion, Swirenko reported this species from the USSR in 1915, as *T. rugulosa* Stein, and in 1938 under the name of *T. Stokesiana* Palmer. A similar form, found in central Europe by Conrad (1941), was named *T. rugulosa* fo. *torquata* Conrad, later changed by Huber-Pestalozzi (1955) into *T. Stokesiana* fo. *torquata* (Conrad). Dreżepolski (1925) reports this species from Poland under the name of *T. rugulosa* Stein, and not of *T. rugulosa* var. *collaris* Skv., as mentioned by Popova (1966).

The species appeared only once, in September 1969, in the plankton of the dam reservoir at Tresna and in a carp pond at Landek in 1967, as single specimens. These localities, therefore, are the next, after those reported by Dreżepolski (1925), where it was noted in fishponds in the vicinity of Lwów (Dobrostany and Wolice). It is moreover known from Europe, America, and Africa.

Trachelomonas vermiculosa Palmer var. *Tiszae* Szab. (fig. 4). Cell 15.6 μ in diameter, with a large aperture and a membrane covered with curved, sparse lamellae, sometimes disposed in pairs. The dimensions are smaller than those reported for the species or variety *Tiszae* Szab. by Huber-Pestalozzi (1955), and larger than those of variety *minor* Skv. However, owing to the disposition of the lamellae, they correspond more to the features of the variety *Tiszae* Szab.

In July 1967 2 cells of this variety were found in the plankton of the dam reservoir at Goczałkowice.

As far as we know, on the basis of the accessible literature, neither this species nor its variety have hitherto been known from Poland.

The species is reported from North America and northern Manchuria (Huber-Pestalozzi 1955).

Trachelomonas sp. (fig. 5). Cell 21.3 μ in diameter, collar about 7 μ broad and long. The cell is spherical, the membrane dark-brown, of an uneven, wavy, and nodular structure. These protuberances were so considerable that they resembled warts. The cell had a high and distinct collar, and a broad aperture with wavy folded back borders. The single specimen, found in the plankton of the transfer pond at Golysz in September 1967, could not be identified to species on the basis of the accessible literature. In size and shape it might correspond to the species *T. tuberculata* Middelh. (1948) but differed from it in its collar, with either does not exist at all in *T. tuberculata* or is very low.

Pseudokephyrion cylindricum Bourrelly (fig. 6). Lorica 6.6 μ l., 5.4 μ br. at the base. Other features in accordance with the description.

It was fairly frequently found in samples of plankton from Tresna and Porąbka in September 1967. Its shape resembled that of *Kephyriopsis cylin-*

drica (Lackey) Fott, the development processes of which, among other chrysophytes, are described by Matvienko (1962) as well as that of *Kephyrion cylindricum* (Lackey) Conrad, reported from fishponds in Hungary (Hortobágyi 1963). It is also discussed by Bourrelly (1963), without giving its appearance. It is known from ponds in France (Bourrelly, cited by Starmach 1968).

Pseudokephyrion Entzii Conrad (*Kephyriopsis Entzii* (Conr.) Fott, *Chrysococcus hemisphaerica* Lackey) (fig. 7). Lorica 7.2—9.1 μ l., 4.6—6.1 μ br., aperture 3—3.5 μ br. The specimens found were slightly larger than those of Hortobágyi (1963) for *Kephyriopsis Entzii* (Conrad) Fott (*Pseudokephyrion Entzii* Conrad). But the shape of the loricae as presented by the above-mentioned author differed from those described by other authors (Kuksi 1965, Danilova 1966). The shape of the specimens described by us most resembled those presented by Kuksi (1965) and by Fott and Ettl (1959).

This species was repeatedly found in plankton of the dam reservoirs at Tresna and Porąbka in the years 1967 and 1969.

It was reported from Belgium (Conrad 1939, cit. by Huber-Pestalozzi 1941), from the dam reservoir near Siedlce in Czechoslovakia (Fott and Ettl 1959), from Swiss lakes (Pavoni 1963), from fishponds in Hungary (Hortobágyi 1963), from the USSR, the Novosibirsk dam reservoir (Kuksi 1965), and from mi bays near the Danube (Danilova 1966).

Pseudokephyrion hiemale Hilliard (fig. 21 a). Lorica 7.1 μ l., 4.1 μ br., 2.2 μ at the opening. Other features also in accordance with the diagnosis.

It was found sporadically in the plankton of dam reservoir at Porąbka in 1969 and in a pond at Landek in 1968.

Found by Hilliard (1967) in a lake in Alaska.

It has not been reported probably from Poland.

Pseudokephyrion inflatum Hilliard (fig. 21 b). Lorica 8.1 μ l., 5.4 μ br. Other features, as well as the size, in accordance with the description.

It appeared in the dam reservoir at Porąbka in 1969.

The species was found by Hilliard (1967) in a lake in Alaska.

Pseudokephyrion minutissimum Conr. (figs. 9, 21 c). Lorica of a round and conical shape, 6.7—7 μ l., 6.7—7.2 μ br. Loricae of 7.6 μ in diameter were also found. The dimensions of the loricae were greater than those given by Danilova (1966) and Starmach (1968), after Conrad, but could be contained within the limits of the dimensions mentioned by Kuksi (1965). Besides these, single specimens 4.2 μ in diameter, thus

with dimensions that could be included in the diagnosis of *Matvienko* (1965), were found in the plankton of the dam reservoir at Tresna in 1969.

It was noted fairly frequently in the plankton of dam reservoirs in July and September 1967, most numerous in the Goczalkowice reservoir.

This species was hitherto unknown from Poland. It was reported from the plankton of the Novosibirsk dam reservoir (Kuksi 1965) and also from the mi bays near the Danube (Danilova 1966) in the USSR, and from the plankton of ponds in Belgium (cit. Starmach 1968).

Pseudokephyrion Schilleri (Schiller) Conrad (*Pseudokephyrion conicum* Schiller) (figs. 10, 21 d-h). Loricae 9.7—12.3 μ l., greatest breadth 12—13.5 μ , aperture 8.5—9 μ br. The loricae walls golden-brown in colour. Other features in accordance with the description.

Single specimens of this species were found in the dam reservoirs at Goczalkowice, Porąbka, and Tresna in the years 1967 and 1969 and also in a fishpond at Landek in 1968.

It had probably not been reported hitherto from Poland. Known from the plankton of rivers and old river-beds in the vicinity of Vienna (cit. Huber-Pestalozzi 1941). Besides, Bourrelly (1963) discusses it, among other chrysophytes, from a systematic point of view, without mentioning the stations.

Pseudokephyrion spirale Schmid (fig. 11). Lorica 8.5 μ l., greatest breadth 7.1 μ . Noted singly in the plankton of dam reservoirs at Czaniec and Porąbka in May and July 1969.

A species not mentioned from Poland. Cited as being found in pond nannoplankton in the vicinity of Vienna (cit. Huber-Pestalozzi 1941). Bourrelly (1963) discusses it also, without giving the localities.

Chrysococcus minutus (Fritsch) Nygaard (*Trachelomonas volvocina* fo. *minuta* Fritsch) (fig. 21 i). Lorica about 5 μ in diameter, with two very distinct warts near the aperture which distinguished it from the species *Trachelomonas volvocina*, very numerous in the investigated material.

It was also found, sometimes in great quantities, in the plankton of dam reservoirs in the years 1967 — and 1969 and in that of fishponds at Landek.

It has probably not been reported hitherto from Poland. Known from South Africa and Denmark (cit. Huber-Pestalozzi 1941).

Kephyrion planctonicum Hilliard (fig. 12). Loricae 7.3—9.6 μ l., 6.1—7.5 μ br., aperture 2.3—3.9 μ br. The specimens found had a slightly greater span of dimensions than that mentioned by Hilliard (1967).

The species was repeated in the plankton of the dam reservoirs at



Ryc. 21. Niektóre z omawianych *Chrysophyceae*.

Fig. 21. Some of the described *Chrysophyceae*. a — *Pseudokephyrion hiemale*, b — *P. inflatum*, c — *P. minutissimum*, d, e, f, g, h — *P. Schillerii*, i — *Chrysococcus minutus*, j, k, l — *Kephyrion spirale*, m, n — *K. Rubri-claustri* (x 600), (Fot., Phot. J. Starmach).

Tresna and Porąbka in the years 1967 and 1969 and in the commercial carp pond at Gołysz in 1964. Found by Hilliard (1967) in a lake in Alaska.

Kephyrion Rubri-claustri Conrad (figs. 13, 21 l-n). Lorica 7.2—8.7 μ l., 5.5—6.7 μ br., aperture 3.3—4.2 μ in diameter. The observed loricae were slightly larger and broader than those cited by Chmeleva (1964), but with measurements very similar to those stated by Kuksi (1965).

The species was noted in the plankton of a fishpond at Gołysz in 1964, and in the dam reservoirs of Goczalkowice, Czaniec, Porąbka, and Tresna in the years 1967 and 1969. It usually appeared in great numbers and at Porąbka in 1969 it was, besides the species *Dinobryon divergens*, the most frequent plankton component. It has not been reported hitherto from Poland, although it is probably common in waters of a different type.

It is known from numerous occurrence in pond plankton in Belgium (cit. Huber-Pestalozzi 1941), from Lettish ponds near the Baltic Sea (Chmeleva 1964), from the river Ob and the Novosibirsk reservoir (Kuksi 1965), and from mi bays near Danube (Danilova 1966) in USSR.

Among the specimens loricae were found with a broader and more protruding anterior part and with a posterior one more narrowly rounded. Loricae of this shape are considered as being the variety of *Kephyrion Rubri-claustri* Conrad var. *amphora* (Lack.) Conr. (fig. 14).

Kephyrion spirale (Lackey) Conrad (*Chrysococcus spiralis* Lackey) (figs. 15, 16, 21 j-l). Lorica 6.1 μ l., 4.9 μ br. Other features in accordance with the diagnosis. This species was repeatedly found in the plankton of 3 dam reservoirs (Czaniec, Tresna, Porąbka) in June 1967 and May and July 1969, at different depths.

It has not hitherto been noted from Poland. Reported from pond plankton in Belgium (cit. Huber-Pestalozzi 1941), from Swiss lakes (Pavoni 1963) and from the USSR, from Lettish ponds near the Baltic Sea (Chmeleva 1964), and also from the plankton of the river Ob and the Novosibirsk reservoir (Kuksi 1965). It is known, beyond Europe, from the ponds and lakes of Alaska (Hilliard 1967).

Moreover, Matvienko (1962) discusses the reproduction of some chrysophytes (of *Kephyrion spirale*, among others) without naming their localities, similarly as Bourrelly (1963), who describes and compares the morphological features of some of their species, giving drawings.

The appearance of the specimens we observed most resembled those described by Kuksi (1965).

Kephyriopsis globosa Hilliard, *Pseudokephyrion globosa* (Hilliard) (Starmach 1968) (fig. 17). Lorica 9—9.7 μ l., 10.5—

—11.7 μ br., height of the neck 2 μ , aperture 3.4—5 μ . Other features as in the diagnosis.

It occurred singly in a carp ponds at Landek in September 1968. On the basis of the accessible literature no localities with this species have been noted in Poland; known from lake plankton in Alaska (Hilliard 1967).

Siderocystis fusca K o r s h i k . (*Siderocystopsis fusca*) K o r s h i k o v nov. comb. S w a l e (fig. 13).

The size of the colony is about 40 μ , the size of cells 9.8 \times 7.5 μ , length of spines about 15 μ . One colony of this species was found in the plankton of the dam reservoir at Porąbka, in July 1969.

The species, as far as we know, has not hitherto been reported from Poland. It is known from ponds and lakes of the USSR (K o r s h i k o v 1953) and from river plankton in England (S w a l e 1964).

Scenedesmus balatonicus H o r t o b . (fig. 19). The largest cell 19.5 μ l., and 7.1 μ br. Cenobiae composed of 8 cells were observed, with characteristic very distinct lacunas.

The species appeared singly in the dam reservoir of Porąbka, at different depths, in September 1969.

This is a species seldom noted from Polish terrains. Szklarczyk-G a z d o w a reported it earlier (1965, 1967) from the plankton of fishponds in the basin of the Upper Vistula and from Mydlniki near Kraków.

Ssenedesmus circumfusus H o r t o b . (fig. 20). Cell 17.2 μ l., 5.2 μ br. Only cenobiae composed of 4 cells were found.

It occurred singly in transfer and commercial fishponds at Gołysz and Landek, in the years 1958—1968, as well as in the dam reservoirs at Goczałkowice, Porąbka, and Tresna (1967, 1969).

As far as we know, this species has not hitherto been reported from Poland. It is known from Rumania (P é t e r f i 1964) and Hungary (U h e r k o v i c h 1966).

STRESZCZENIE

W próbach planktonu pobranych ze stawów rybnych Zespołu Gospodarstw Doświadczalnych Gołysz (woj. katowickie), należących do Zakładu Biologii Wód PAN w Krakowie, jak również ze zbiorników zaporowych w Goczałkowicach (woj. katowickie), Tresnej, Porąbce i Czańcu (woj. krakowskie), natrafiono na rzadkie lub nie podawane z Polski gatunki glonów. Wśród nich opisano 5 gatunków euglenin z rodzaju *Trachelomonas*, 12 gatunków i 1 odmianę chrysofitów z rodzaju *Pseudokephyrion*, *Kephyrion*, *Kephyriopsis* i *Chrysococcus* oraz 3 gatunki zielenic z rodzajów *Scenedesmus* i *Siderocystis*.

REFERENCES

- Bourelly P., 1963. Loricae and cysts in the *Chrysophyceae*. Annals of the New York Academy of Sciences. 108, 421—429.
- Chmeleva N. N., 1964. Novye i redkie dlja Sovetskogo Sojuza chrizofitovye vodorosli iz prudov pribaltiki — *Chrysophyta* e stagnis balticis nova et pro URSS rara. Novosti Sist. Nizš. Rastenij. 14—18.
- Danilova L. E., 1966. Nanoplanktonni zolotysti vodorosti (*Chrysophyta*) pryduhaj-skich lymaniv — Nanoplanktonic *Chrysophyta* of Danube estuaries. Ukr. Bot. Žurn. 23, 5, 46—55.
- Dreżepolski R., 1925. Przyczynek do znajomości polskich Euglenin (Supplément à la connaissance des Eugléniens de la Pologne). Kosmos. 50, 173—270.
- Fott B., H. Ettl, 1959. Das Phytoplankton der Talsperre bei Sedlice. Preslia. 31, 218—245.
- Hilliard D. K., 1967. Studies on *Chrysophyceae* from some ponds and lakes in Alaska. VII. Notes on the genera *Kephyrion*, *Kephyriopsis* and *Pseudokephyrion*. Nova Hedwigia. 14, 1, 39—56.
- Hortobágyi T., 1963. Algen aus den Fischteichen von Buzsák. V. Nova Hedwigia, 6, 3+4, 353—390.
- Huber-Pestalozzi G., 1941. Das Phytoplankton des Süßwassers. Die Binnengewässer. 2, 1. Stuttgart. E. Schweizerbart.
- Huber-Pestalozzi G., 1955. Das Phytoplankton des Süßwassers. Die Binnengewässer. 4. Stuttgart. E. Schweizerbart.
- Korschikov O. A., 1953. Vyznačnyk prsnovodnych vodorostej Ukrainskoi RSR. Pidklas protokokovi (*Protococcinae*). 5, Akad. Nauk Ukr. RSR, Kyiv.
- Kuksi M. S., 1965. Nekotorye redkie vidy vodoroslei vstrečennye v planktone r. Obi i Novosibirskogo vodočranilišča. Trudy Lening. Sibirskogo Bot. Sada. 10, 57—61.
- Matvienko O. M., 1962. Pro statevij proces u zolotistich vodoroslej (*Chrysophyta*). Ukr. Bot. Žurn. 19, 1, 45—51.
- Middelhoek A., 1948. A propos de quelques espèces du genre *Trachelomonas* Ehrbg. et du genre *Strombomonas* Defl. trouvées aux Pays-Bas. Hydrobiologia. Acta Hydrobiologica, Limnologica et Protistologica, 1, 1, 78—89.
- Palmer T. C., 1905. Delaware Valley forms of *Trachelomonas*. Proc. Acad. Nat. Sci. Philadelphia 57, 665—675.
- Favoni M., 1963. Die Bedeutung des Nannoplankton im Vergleich zum Netzplankton. Schweiz. Ztschr. f. Hydrol. 25, 2, 219—341.
- Péterfi L. S., 1964. Latest data on the *Chlorophyceae* of the Hendorf — Netus Fish — Lake from Transylvania = (Rumania). Nova Hedwigia. 8, 3/4, 311—318.
- Popova T. G., 1966. Flora sporovych rastenij SSSR. Evglenovye vodorosli. 8. Izdatelstvo „Nauka“. Moskva. Leningrad.
- Starmach K., 1968. *Chrysophyceae* — Złotowiciowce. Flora Ślód. Polski 5. Warszawa. PWN.
- Szklarczyk-Gazdowa C., 1965. Plankton wybranych stawów rybnych dorzecza Górnej Wisły, ze szczególnym uwzględnieniem zielenic — Plankton of certain fish ponds in the upper Vistula basin. Monographiae Botanicae. 19, 85—147.
- Szklarczyk-Gazdowa C., 1967. Nowy dla Polski gatunek z rodzaju *Scenedesmus*. *S. balatonicus* Hortob. — A species of the genus *Scenedesmus* new to Poland: *S. balatonicus* Hortob. Fragmenta Floristica et Geobotanica. Ann. 13, 3, 451—453.

- Swale E. M. F., 1964. Notes on *Siderocystopsis fusca* (Korshikov) nov. comb. (*Siderocystis fusca* Korshikov) in culture. Brit. phycol. Bull. 2, 5, 313—316.
- Uherkovich G., 1966. Die Scenedesmus — Arten Ungarns. Akadémiai Kiadó, Budapest. Verlag der Ungarischen Akademie der Wissenschaften.

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