CHARA STRIGOSA A. BRAUN (CHARACEAE) IN POLANDANDRZEJ HUTOROWICZ¹ AND ANDERS LANGANGEN²¹Inland Fisheries Institute,
M. Oczapowskiego 10, 10-719 Olsztyn-Kortowo, Poland²Hallagerbakken 82b,
1256 Oslo, Norway

(Received: April 15, 1998. Accepted: September 21, 1998)

ABSTRACT

Chara strigosa is reported from several lakes in Poland. The finds were published by Izabella Dąmbska in 1966, but have not been recognised internationally, presumably because Dąmbska's article was published in a local paper in Polish. We give a short description of *Charetum strigosae* first described by Dąmbska. One of the lakes with *C. strigosa* is reported with luxuriant growth of a blue-green bacteria common in water blooms. There is a need to survey these lakes in order to prevent an increasing eutrophication.

KEY WORDS: Freshwater algae, *Chara strigosa*, *Charetum strigosae*, Characeae, distribution, Poland.

INTRODUCTION

The Norwegian author is working on a survey of the ecology and distribution of *Chara strigosa* (Langangen in prep.). In connection with this work the occurrence of the species in Poland appeared to be unsure. According to Dąmbska (1964) the species is not found in Poland, while Krause (1997) reports doubts about the occurrence of the species in the country. He says "Fundmeldungen aus einem See bei Suwałki in Nordost-Polen nicht bestätigt".

In this short communication we confirm the occurrence of *Chara strigosa* in Poland, and we will describe specimens from one locality.

The fennoscandian distribution of *C. strigosa* is given in Vaarama (1954).

LOCALITY

Northeast Poland: Suwałki Lakeland, Lake Hańcza, northeast bay, on sand and silt bottom, 2 m depth. 15 October 1996. Leg. A. Hutorowicz

Specimens deposited in Herb.Ol (Department of Botany and Nature Protection, Olsztyn, University of Agriculture and Technology), Poland and Herb. O (Oslo), Norway.

DESCRIPTION OF SPECIMENS FOUND

Plants to 7 cm high. Heavily incrusting, greyish in colour. Internodes up to 1 cm long. Stem diameter up to 400 µm (Fig. 1). Cortex triplostichous, tylacanthous. Spine-cells very dense, solitary or clustered, 2-3 times as long as stem diameter. Stipulodes very well developed in upper row.

Lower row varying, but in some instances as long as upper row and bending in the same direction (Fig. 2). Number of branchlets 6-7 in a whorl, to 7 mm, 0.5-1 times as long as the internodes. Each branchlet with 7 segments. End segment with 1-2 cells, ecorticated. Cortex on branchlet is normal. Anterior bracts-cells and bracteoles longer than oogonium, to 1 mm long. Posterior bract-cells 150 µm long. Ripe oospores, 600 µm long and 350 µm wide, black and with low ridges (Fig. 3). Antheridia not seen.

Charetum strigosae (Dąmbska 1966)

The first record of *Chara strigosa* is given in Dąmbska (1966). She reports the species from two lakes in Northeast Poland, and she also describes *Charetum strigosae* as a new phytosociological association. (*Charetum strigosae* described in Krause (1969) is therefore invalid).

The association *Charetum strigosae* is described from Lake Hańcza in Northeast Poland. In this lake *Chara strigosa* grows in dense stands. In general *Chara strigosa* is found in deep, cold and clear lakes. Lake Hańcza, the deepest lake in Poland (106 m) has some similarities with high mountain lakes, with stony shores and deep water close to the shores. The bottom where the algae are found is stony with sand and fine silt.

Charetum strigosae is developed on depths from 0.5 to 3 m, with very dense mats from 1 to 2 m, where it covers the shore 90 to 100%. pH is around 7.0.

Accompanying species are: Elodeides: *Potamogeton perfoliatus* L., *P. alpinus* Balb., *P. praelongus* Wulf., *Myriophyllum spicatum* L and *Elodea canadensis* Michx. Helophytes: only *Equisetum limosum* L. There were no lemnae and nymphaeides.

Accompanying charophytes are: *Chara rudis* A. Br. in Leonh., *Chara globularis* Thuill., *Chara filiformis* Hertzsch,

Chara contraria A.Br. ex Kützing and *Chara aspera* Deth. ex Willd. A complete floristic description of the association can be found in Table 1, Dąbska (1966).

The reason why this association has not been known to other charologist must be that the original article (Dąbska 1966) was published in a local paper, in Polish with a summary in English.

THE SITUATION TODAY

Chara strigosa was again collected in Lake Hańcza in 1996 by A. Hutorowicz (Hutorowicz 1997a, 1997b). This is 30 years after the investigation of Izabella Dąbska. In September 1996 Hutorowicz reported luxuriant growth of *Microcystis aeruginosa* Kützing and *M. ichthyoblabe* Kützing, transparency of only 2 meters (Hutorowicz 1997a), against 5 to 9 meters which has been measured regularly in the period 1925-1994 (Zdanowski & Hutorowicz 1997). Lake Wigry is also strongly eutrophicated as it since 1995 has received cleaned sewage water from the town of Suwałki. In August 1996 *Ceratium hirundinella* (O.F. Müll.) Bergh. flowered in this lake.

It is well documented that eutrophication is unsuitable for charophytes (Forsberg 1965) and it is therefore reasonable to believe that the charophytes in these lakes will decrease. In the same area there are presumably more lakes with charophytes. Lake Hańcza with *Chara strigosa* is located within Landscape, and Lake Wigry within National Park. The need is urgent to survey the situation in these lakes in order to prevent further eutrophication.

Fig. 1. *Chara strigosa* collected in Lake Hańcza in 1996. Part of a specimen showing first 4 whorls (Bar=1 mm).

Figs 2-3. *Chara strigosa*. Details of specimens from Lake Hańcza.

Fig. 2. Part of the stem with joint. Spine-cells, solitary or clustered, 2-3 times as long as stem diameter (Bar=1 mm).

Fig. 3. Oospore (Bar=200 μ m).

Fig. 4. Distribution of the stands of *Chara strigosa* A. BRAUN in Poland. 1 – Lake Hańcza; 2 – Lake Wigry; 3 – Lake Okmin.

Known distribution of Chara strigosa in Poland (Fig. 4):

Region: Suwałki Lake District (in Northeast Poland)

1. Lake Hańcza, at a depth of 0.5-3.0 m, on sandy, sandy-silty or silty bottom between the stones, 27.7.1964 leg. I. Dąbska (Dąbska 1966, Chudziak 1994), 15.10.1996 leg. A. Hutorowicz.
2. Lake Wigry, in northern part of the lake, at a depth of 2 m, on sandy bottom, with *Chara aspera*, sporadically, 25.7.1964 leg. I. Dąbska? (Dąbska 1966).
3. Lake Okmin, no detailed data available, 2.7.1974 leg. H. Tomaszewicz (det. I. Dąbska) (Chudziak 1994).

LITERATURE CITED

- CHUDZIAK E. (ed.), 1994. Ramienice-Kolekcja prof. Izabelli Dąbskiej. Zakład Hydrobiologii Uniwersytetu im. Adama Mickiewicza w Poznaniu. 244 pp. (In Polish).
- DĄBSKA I., 1964. Charophyta-Ramienice. Volume 13 in Flora Ślaskowa Polski. Warszawa. 126 pp. (In Polish).
- DĄBSKA I., 1966. Zbiorowiska Ramienic Polski. Poznańskie Towarzystwo Przyjaciół Nauk. Wydział Matematyczno-Przyrodniczy. Prace Komisji Biologicznej 31: 1-75. (In Polish with English summary).
- FORSBERG C., 1965. Environmental conditions of Swedish charophytes. Symbolae Botanicae Upsaliensis 18: 1-67.
- HUTOROWICZ A., 1997a. *Chara strigosa* A.Br. w jeziorze Hańcza na Suwalszczyźnie. 16 Sympozjum Sekcji Fykologicznej Polskiego Towarzystwa Botanicznego. p. 25. (In Polish).
- HUTOROWICZ A., 1997b. Ramienice wód północno-wschodniej Polski. 1. *Chara strigosa* A.Br. Ramienica szczecińska – budowa morfologiczna i występowanie. [Summary: Characeae in the waters of north-east Poland. 1. *Chara strigosa* A.Br. – morphology and occurrence]. IRS. Komunikaty Rybackie 3: 8-10. (In Polish).
- KRAUSE W., 1969. Zur Characeenvegetation der Oberheinebene. Archiv für Hydrobiologie, Supplement 35: 202-253.
- KRAUSE W., 1997. Charales (Charophyceae). Süßwasserflora von Mitteleuropa, Band 18. Gustav Fischer. Jena. pp. 202.
- VAARAMA A., 1954. On the ecology and fennoscandian area of *Chara strigosa* A. Br. Vegetatio. p. 177-184.
- ZDANOWSKI B., HUTOROWICZ A., 1997. Charakterystyka hydrochemiczna Czarnej Hańczy i wpływ tej rzeki na wody jezior Hańcza i Wigry. In: L. Krzysztofiak (ed.) Zintegrowany Monitoring Środowiska Przyrodniczego. Stacja Bazowa Wigry (Wigierski Park Narodowy). Biblioteka Monitoringu Środowiska, Warszawa. p. 29-47. (In Polish)

WYSTĘPOWANIE *CHARA STRIGOSA* A. BRAUN (CHARALES) W POLSCE

STRESZCZENIE

Klasyczne opracowanie dotyczące zbiorowisk ramienic z terenu Polski Dąbskiej (1966), w którym opisano występowanie *Chara strigosa* oraz *Charetum strigosae* jako nowy zespół, ukazało się w języku polskim w lokalnym wydawnictwie. Prawdopodobnie było to przyczyną, że w najnowszym kluczu do oznaczania ramienic z serii Süsswasserflora von Mitteleuropa (Krause 1997), znalazła się uwaga powątpiewająca w występowanie tego gatunku w Polsce. Pierwszeństwo w wyodrębnieniu i opisie zespołu *Charetum strigosae* należy również do Dąbskiej (1966) a nie do Krause'go (1967).

Współczesne w Polsce stanowiska *Chara strigosa* przedstawia rys. 4.

Rośliny zebrane przez autora 15.10.1996 z jeziora Hańcza miały wysokość do 7 cm, były silnie inkrustowane, szarawe. Nibylodyga o średnicy do 400 µm, o międzywęźlach do 1 cm długości, silnie okolcowana (Fig. 1). Kolce pojedyncze lub w pęczkach, 2-3 razy dłuższe niż średnica nibylodygi. Przylistki górnego rzędu bardzo dobrze rozwinięte. Przylistki dolnego rzędu zmienne, miejscami równie długie jak górnego rzędu (Fig. 2). Nibyliscie po 6-7 w okółku, do 7 mm długie, połowę krótsze lub tak długie jak międzywęźla. Każdy nibylisc siedmiosegmentowy, okorowany za wyjątkiem 1-2 ostatnich komórek. Okorowanie nibylisci normalne. Bracteolae dłuższe niż oogonium, ok. 1 mm długości. Dojrzałe oospory, 600 µm długie i 350 µm szerokie, czarne z lekko wystającymi listewkami (Fig. 3). Plemniostanów nie znaleziono.

SŁOWA KLUCZOWE: *Chara strigosa*, *Charetum strigosae*, ramienice, występowanie, Polska.