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New species of Charophyta, *Chara polyacantha* A. Braun, in Lake Engure, Latvia

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Abstract: The new charophyte species for Latvia, *Chara polyacantha* A. Braun, was described. This species was found in Lake Engure, the third largest lake of Latvia. In 2010, *C. polyacantha* covered small, approximately 25 m^2 patch, growing both in a monodominant stand and mixed with *C. tomentosa* in the central part of the lake.

Key words: *Chara polyacantha,* Charophyta, Lake Engure, Latvia

Lake Engure is one of the most properly investigated lakes in Latvia. The investigation of the flora of the lake started at the beginning of 20th century (Kupffer 1907) and continued with more or less similar intensively ever since. The aim of our research was to obtain new information about changes of the flora and vegetation of Lake Engure. The research was carried out in all territory of lake by boat in summers of 2010-2011.

Lake Engure is situated in the western part of Latvia (Fig. 1). It is the third largest lake in the country and the largest lagoon lake in Latvia (Secchi depth 2.5 m, pH 8.8). The lake is separated from the Gulf of Riga by a 1.5-2.5 km wide sand bar with dunes. It is 19 km long and up to 4.5 km wide. The average depth of the lake is one metre, but in the deepest parts it reaches only 2.5 metres (Vīksne 1997). The aquatic vegetation in the lake is dominated by charophytes. However, due to its eutrophication, stands of other macrophytes (*Potamogeton* spp., *Najas marina*, *Nymphaea alba*, *N. candida*, *Nuphar lutea*, *Stratiotes aloides*) and unvegetated areas are increasing. The dominating emerging species in the lake are *Phragmites australis*, *Typha angustifolia* and *Scirpus lacustris*. Over the last decades, the overgrown area covered with different emerging species was gradually increasing (Vīksne 1997). In order to diminish the overgrowing of the lake, some management actions were carried out over the last decade – pasturing on the lakeshore grasslands and reed cutting in some parts.

During the vegetation survey in the summer of 2010, a new charophyte species for Latvia *Chara polyacantha* was found in Lake Engure (Fig. 1). This is the first record of this species in Latvia, which is confirmed by herbarium material. Herbarium sample of *Chara polyacantha* is stored at the Latvian Museum of Natural History.

The distribution range of this species covers Europe. According to Krause (1997), it was recorded in Germany, Poland, Denmark, Sweden, France, Portugal and the Balkans. Recently, this species has, additionally, been found in the Czech Republic where only one locality is known (Caisova & Gąbka 2009). In the British Isles, the species is recorded in shallow waters (up to 1 m deep) in alkaline, nutrient-poor pools and lakes, often associated with fen peat. The species is frequently recorded in central Ireland but rarely elsewhere in Europe (John *et al.* 2002). In Norway, *Chara polyacantha* is threatened due to eutrophication and technical intervention. The species was found on lime bottoms and muddy bottoms down to the depth of one metre (Langangen & Åsen 1996).

C. polyacantha prefers waters very rich in Ca^{+}, Mg^{2+} and SO_4^{2-}, with low concentrations of nutrients and high values of electrolytic conductivity. Most often, it appears in shallow lakes and peat excavation ponds, less frequently in rich fens. In Wielkopolska region (Poland), the species inhabits shallow zones of mesotrophic lakes (Gąbka 2009). Similarly to Lake Engure in Latvia, in Poland it forms monospecific stands.

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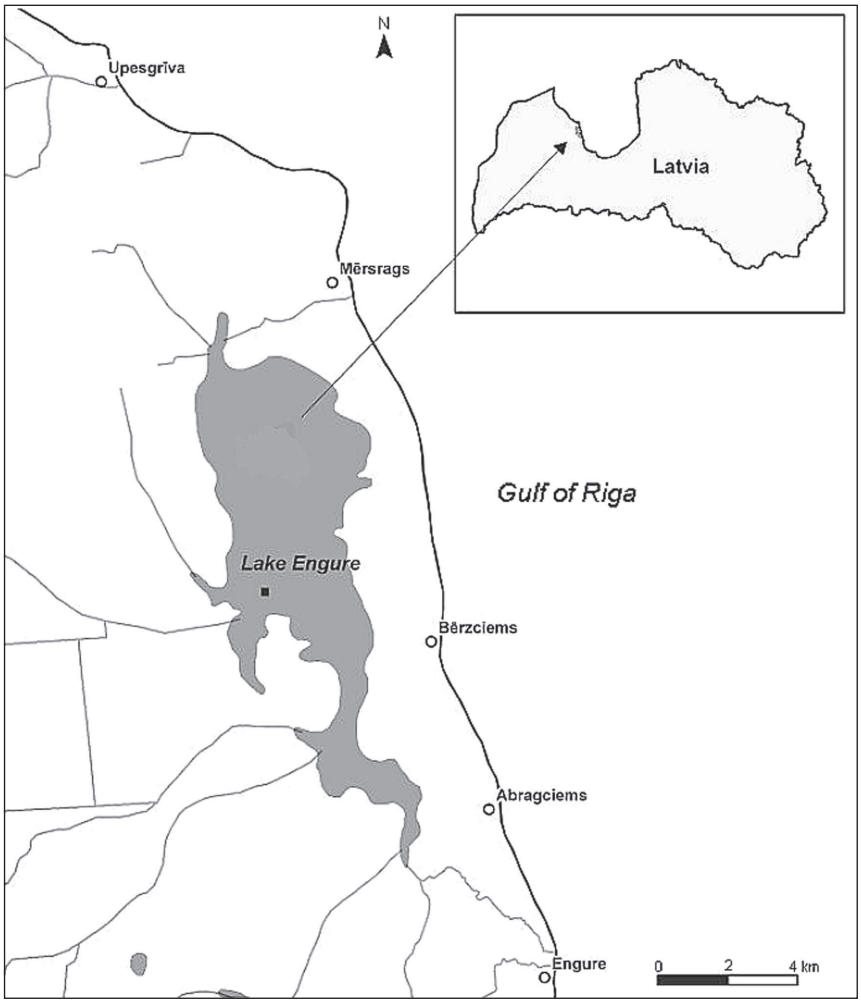

Fig. 1. Location of Lake Engure and locality of *Chara polyacantha*
Explanations: ■ – locality of the species

Thallus of *C. polyacantha* is robust, up to 50 (100) cm, grey to light green, often strongly incrusted, with dense, persistent spine-cell, longer than the axis diameter; cortex is diplostichous, the primary rows more prominent (strongly tylacanthous) (John *et al*. 2002; Caisova & Gąbka 2009), sometimes isostichous (Blindow 2004). Stipulodes are long in 2 rows, acuminate. Internodes are firm, corticated, 2-4 times the length of the branchlets. Algae monoecious with separate or conjoined gametangia at the lowest 3-4 branchlet nodes and without mucus. Oogonia solitary or geminate, incrusted, 850-1100 x 600-700 µm, mature oospores black colour with marked stripes or smooth. Antheridia are solitary and smaller, 250-500 µm in diameter (Caisova & Gąbka 2009).

In Lake Engure, *C. polyacantha* covers a small, approximately 25 m^2 patch growing both in a monodominant stand and mixed with *C. tomentosa* in the central part of the lake. This part of the lake is characterized by water depth of up to one metre, soft, silty substrate and various charophyte communities. Both sterile and fertile specimens of *C. polyacantha* were found. Thallus of algae is up to 60 cm, the youngest shoots green, the oldest – greyish from incrustation. Branchlets are 1-2 cm long, internodes are 2-4 times the length of the branchlets. Axis diameter is up to 1.2 mm, spine cells occur in bunches (2-5), always longer than axis diameter.

Lake Engure is one of charophyte species richest lakes in Latvia. Up to the year 2010, the following nine charophyte species (out of 18 freshwater charophytes species recorded in Latvia) were known from this lake – *Chara aspera, C. contraria*, *C. globularis*, *C. hispida*, *C. intermedia*, *C. rudis*, *C. tomentosa*, *C. virgata* and *Nitellopsis obtusa*. The most common of these species are *C. aspera*, *C. hispida*, *C. intermedia* and *C. tomentosa*. Other charophytes are quite common, except the very rare *Nitellopsis obtusa*.

Until 2010, *C. polyacantha* was known from literature records (Rudzroga 1995) only in the shallow coastal Lake Sloka, located in the central part of Latvia, to the southwest from the Gulf of Riga. Unfortunately, the record was not confirmed by herbarium specimens.

This is the first record of *C. polyacantha* in Latvia, but possibly more localities could be discovered in the

future. Lake Sloka (Secchi depth 2 m, pH 8.9) is very rich in Charophyta species and dominated by submerged vegetation, similarly to Lake Engure. During our last investigations (2003-2006), nine Charophyta species – *Chara aspera*, *C. contraria*, *C. globularis*, *C. hispida*, *C. intermedia*, *C. tomentosa*, *C. virgata*, *C. vulgaris* and *Nitellopsis obtusa* were registered in Lake Sloka. During the latest surveys in Lake Sloka, *C. polyacantha* was not found but further investigations are required.

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