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**LYCHNOTHAMNUS (RUPR.) V. LEONH.
(CHARACEAE) A NEW GENUS TO THE FLORA
OF YUGOSLAVIA**

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Of four genera belonging to the family *Characeae*, only two species of the genera *Chara* and *Nitellopsis* were known in the flora of Yugoslavia. During our investigation of freshwater flora of Yugoslavia, the new genus *Lychnothamnus* (Rupr.) v. Leonh. with the species *Lychnothamnus barbatus* (Meyen) v. Leonh. has been recorded for the first time. The habitat of the species *L. barbatus* is situated in the littoral region of Lake Šipak near Kardelejevo (SR Croatia). Populations of *L. barbatus* grow on muddy substrate, in the water of pH 6.5—7.0, at a depth of 1—1.2 m.

Introduction

The literature on *Charophyta* in Yugoslavia belonging to the order *Charales* records the presence of the species of the following genera: *Nitella* Ag., *Tolypella* (A. Br.) v. Leonh., *Nitellopsis* Hy. and *Chara* Vaillant (Košanin 1907, Vilhelm 1913, Vouk 1929, 1936, Filarzky 1931, Kostić 1936, Tortić-Njegovan 1956, Golubić 1961, Lazar 1960, Petrovska 1963, Marinović, Krasnići 1970, Blaženčić, Cvijan 1980, Blaženčić 1980) has been reported. It is known that apart from the four genera mentioned there are also two recent ones: *Lychnothamnus* (Rupr.) v. Leonh. and *Lamprothamnium* A. Br., the representatives of which were not known in our flora. During our investigations of charophytes in the region of the Neretva delta in July 1981 we discovered a habitat of the species *Lychnothamnus barbatus* (Meyen) v. Leonh. in Lake Šipak. Thus, we recorded not only a new species to the freshwater flora of Yugoslavia but also a new genus which inhabits only few localities in Europe and Asia.

Material and Methods

The material was gathered on 27 July, 1981, in Lake Šipak, which is in the vicinity of Kardeljevo (SR Croatia). During the collection of the material, the pH value, depth and transparency of the water were determined. The soil type was also recorded and a list of vascular plant species living together with *Lychnothamnus barbatus* was made. The material collected was fixed in 4% formaldehyde and is kept in the collection of the Institute of Botany and Botanical Garden, Faculty of Science, Belgrade.

Results and Discussion

The genus *Lychnothamnus* (Rupr.) v. Leonh. belongs to the family of Characeae with only one species, *Lychnothamnus barbatus* (Meyen) v. Leonh., which is very rare, in spite of the great area (Europe and Asia). In Europe it inhabits only few localities in Poland, Germany, Italy and Romania (Fig. 1) while the only earlier locality is known from France, thanks to the herbarium material (Corillion 1957, Dambaska 1964, Ionescu-Teculescu 1967). Our contribution to the knowledge of distribution of this species is the mentioned locality in Yugoslavia to the rare habitats of the species *Lychnothamnus barbatus* in Europe.

Lychnothamnus barbatus is a macrophytic alga which most frequently inhabits lakes of calciumcarbonate type, while being rare in ponds or in marshy areas (Corillion 1957, Migula 1897). It occurs in mesoeutrophic and eutrophic lakes, on muddy substrate, at depths of 0.5 to 12 m, the pH value being from 6.9 to 8.6 (Dambaska 1952, Ionescu-Teculescu 1970, Šarkinene, Trajnauskajte 1973).

The habitat of *Lychnothamnus barbatus* in our country, as we have already mentioned, is situated in the freshwater karst lake of Šipak. Lake Šipak belongs to the group of the Baćinska Lakes which are northwest to the Neretva delta (Fig. 2). Differing from all other Baćinska Lakes which are connected, Lake Šipak is isolated. It is elongated, stretching in the north-south direction. It is located in a semiarid Mediterranean zone with all the characteristics of subtropical climate. Dry and humid periods interchange regularly in this area. The summers are dry and warm, while the period from November to April is characterized by a great quantity of precipitation. Uneven distribution of rainfall causes a considerable change of water level in the course of the year, approximately 60 to 160 cm. Air and water temperatures never fall below 0°C. Average annual air temperatures vary from 14.8 to 15.9°C (in winter from 6.4 to 6.9, in summer from 23.4 to 24.9°C). Maximum temperatures during summer reach 33–36°C. The water temperature in the surface layer ranges from 9.6 to 26.0°C in the course of the year (Živković 1969). With respect to the fact that *Lychnothamnus barbatus* occurs at a depth of 1 to 1.2 m when the water level is low (in July), we may assume, on the basis of the data of the average changes of the water level of the Baćinska Lakes, that when the water level is higher, it may be found at a depth of 1.6 to 2.8, i.e. in the water layers the temperatures of which do not fall below 10°C in the course of the year. The shores of Lake Šipak are slightly inclined and overgrown with macrophytic water and marshy vegetation.

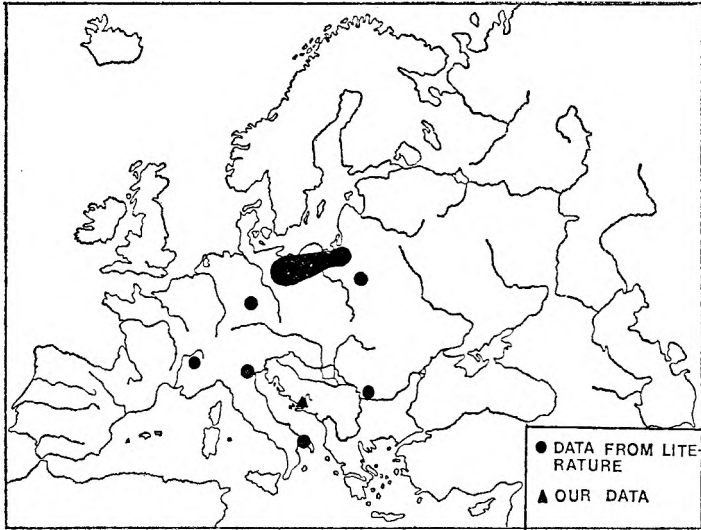


Fig. 1. Distribution of the species *Lychnothamnus barbatus* in Europe.

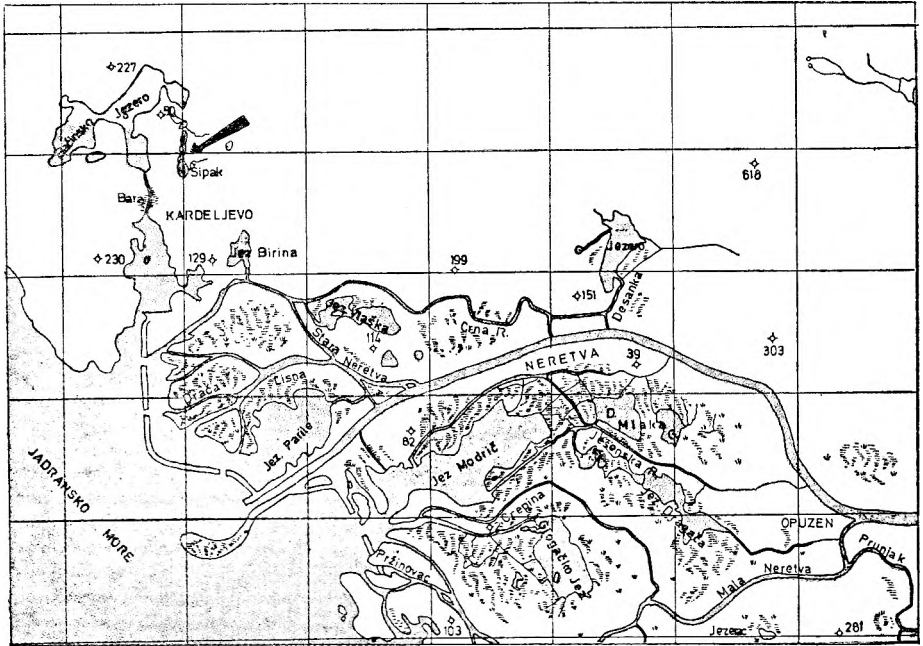


Fig. 2. Delta of the Neretva river and Lake Sipak (see arrow).

The habitat of the species *Lychnothamnus barbatus* is situated in the littoral region of the south and north parts of the lake at a depth of 1 to 1.2 m. The water is transparent to the bottom, pH 6.5–7. Populations of *Lychnothamnus barbatus* grow on muddy substrate in the coves sheltered from strong waves made on this lake by frequently strong winds. At the entrance of the coves there is a zone of macrophytic vegetation consisting of *Myriophyllum spicatum*, *Potamogeton perfoliatus* and *Ceratophyllum demersum*, which also lessens the breaking of the waves.

Apart from *Lychnothamnus barbatus*, *Chara hispida* and *Nitellopsis obtusa* of all *Charophyta* were determined in this habitat, as well as the following vascular plants: *Phragmites communis*, *Polygonum amphibium*, *Potamogeton crispus* and *Potamogeton natans*.

Individuals of the species *Lychnothamnus barbatus* are 20 to 30 cm high. The thallus is green in colour, ramose and weakly encrusted by calcium carbonate. The cortex is only partly developed at some (younger) internodes of the central axis (Fig. 3). Eight branchlets consisting of 4 to 5 segments arise from the nodes of the central axis. The length of the branchlets is up to 4 cm, while the bract-cells on them are 10 mm long. The bract-cells are elongate, thin and pointed. Below the branchlets there is a well-developed stipulodes in 1 tier consisting of needle-like cells up to 1.3 cm long. The cells of the stipulodes are twice as numerous as the branchlets in whorls.

Lychnothamnus barbatus is a monoecious species. The reproductive organs develop at the fertile branchlet nodes. The oogonium occurs between two antheridia. Two short processes resembling leaves grow under the oogonium. The oogonium is oval, 1100 to 1300 μm long, 700 to 800 μm wide, with a low coronula. The number of spiral twists seen on the oogonium is between 9 and 11. The antheridia are red-yellow, globose and smaller than the oogonium. Their width ranges from 200 to 250 μm . Fertilization takes place from July to late autumn. The oospore, developed after fertilization, is brownish-red. It comprises 7 to 8 low, pointed spiral ridges. The height of the oospore ranges from 660 to 720 μm , and its length from 460 to 500 μm .

Conclusion

Out of six recent genera of the order *Charales*, division of *Charophyta*, the species of the following genera are known in the flora of Yugoslavia: *Nitella* Ag., *Tolypella* (A. Br.) Leonh., *Nitellopsis* Hy. and *Chara* Vaillant. During our research of charophytes of the Neretva delta in 1981 we discovered in the freshwater of karst lake of Šipak a first habitat of the species *Lychnothamnus barbatus* (Rupr.) v. Leonh. in Yugoslavia. Thus we recorded not only the presence of a new species, but also of a new genus which occurs only in few localities in Europe and Asia.

Lake Šipak (Kardeljevo, SR Croatia) is situated in the semiarid Mediterranean zone with all the characteristics of subtropical climate.

Populations of the macrophytic alga *Lychnothamnus barbatus* in Lake Šipak grow in the littoral zone, at a depth of 1 to 1.2 m, on muddy substrate. The water is transparent to the bottom, pH 6.6–7.

Lychnothamnus barbatus occurs together with *Chara hispida*, *Nitelopsis obtusa*, *Phragmites communis*, *Polygonum amphibium*, *Potamogeton crispus*, *Potamogeton natans*, *Potamogeton perfoliatus*, *Myriophyllum spicatum* and *Ceratophyllum demersum*.

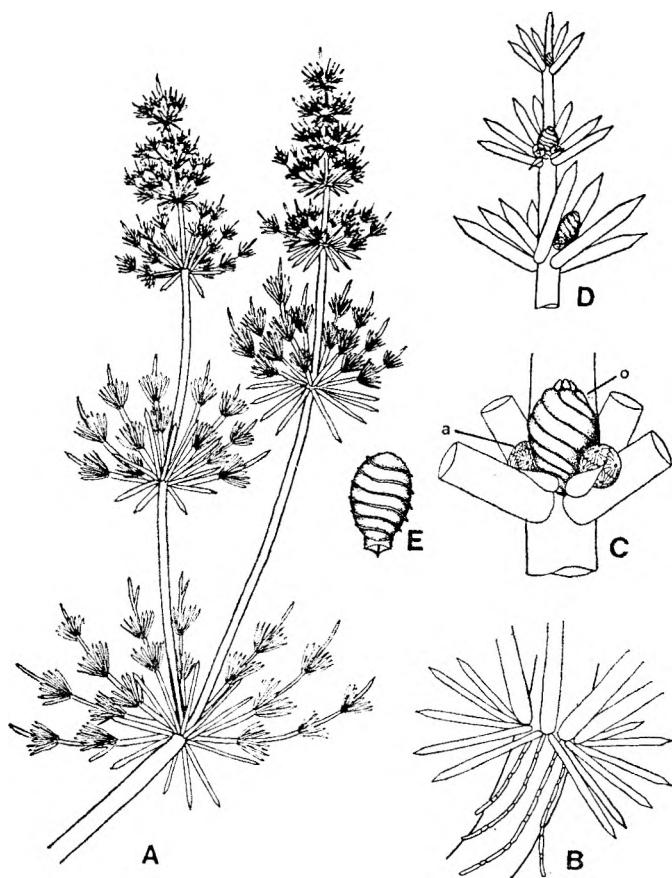


Fig. 3. *Lychnothamnus barbatus*. A — habit, B — axial node with imperfect cortex and stipulodes, C — branchlet node with oogonium (o) and antheridias (a), D — branchlet with bract-cells and conjoined gametangia, E — oospore.

The bushy thallus of *Lychnothamnus barbatus* is 20 to 30 cm high, green in colour and weakly encrusted by calcium carbonate. The cortex is partially developed on the youngest internodes. There are 8 branchlets consisting of 4—5 segments at the nodes. The length of the branchlets is up to 4 cm, while the needle-like cells of the stipulodes are up to 1.3 cm long.

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SAŽETAK

LYCHNOTHAMNUS (RUPR.) V. LEONH. (CHARACEAE) NOVI ROD
ZA FLORU JUGOSLAVIJE

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Od šest recentnih rodova reda *Charales* razdela *Charophyta* u flori Jugoslavije poznate su vrste rodova *Nitella*, *Tolypella*, *Nitellopsis* i *Chara*. Istražujući harofite u regionu delte Neretve, 1981. godine, u slatkovodnom kraškom jezeru Šipak otkrili smo prvo stanište vrste *Lychnothamnus barbatus* u Jugoslaviji. Ovim smo za slatkovodnu floru Jugoslavije zabeležili prisustvo ne samo nove vrste već i novog roda koji se u Evropi i Aziji nalazi samo na malom broju lokaliteta.

Jezero Šipak (Kardeljevo, SR Hrvatska) nalazi se u semiaridnoj mediteranskoj zoni koja ima karakteristike subtropske klime. Populacije makrofitske alge *Lychnothamnus barbatus* u jezeru Šipak razvijaju se u priobalnoj zoni na dubini od 1 do 1,2 m, na muljevitoj podlozi. Voda je providna do dna, a pH iznosi 6,5 do 7.

Lychnothamnus barbatus nalazi se zajedno sa *Chara hispida*, *Nitellopsis obtusa*, *Phragmites communis*, *Polygonum amphibium*, *Potamogeton crispus*, *Potamogeton natans*, *Potamogeton perfoliatus*, *Myriophyllum demersum*.

Žbunasti talus *Lychnothamnus barbatus* visok je 20–30 cm, zelene je boje i slabo inkrustiran kalcijumkarbonatom. Kora je delimično razvijena (nepotpuna) i nalazi se samo na najmlađim internodijama. Na nodusima glavne ose razvija se osam bočnih osa na kojima se nalazi 4–5 članaka. Dužina bočnih osa kreće se do 4 cm, a igličastih ćelija jednorednog stipularnog venca do 1,3 cm.

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