

SHORT NOTE

Nitella mucronata (BR.) MIQUEL (Charophyta) in the Czech RepublicLenka CAISOVÁ^{1,2*}, Štěpán HUSÁK² and Jiří KOMÁREK^{1,2}¹University of South Bohemia, Faculty of Sciences, Branišovská 31, CZ –370 05 České Budějovice, Czech Republic²Institute of Botany, Academy of Sciences of the Czech Republic, Dukelská 135, CZ – 379 82 Třeboň, Czech Republic * corresponding author, e-mail: lcaisova@gmail.cz

Abstract: *Nitella mucronata* is designated as “extremely rare species” of Charophyta in the Czech Republic in the recent publication of HUSÁK (2001), where only one locality in South Moravia is cited. However, according to literary sources and personal experience there exist more of localities of this species in the Czech Republic. Recently (in summer 2007) has been found *N. mucronata* in peat bog Velká Ohrazenice near a village Doňov near Veselí nad Lužnicí (south Bohemia). It is possible to suppose that this species occurs at other localities in the Czech Republic. All old and recent data about the distribution of this species, detailed description and ecological characters are summarized in our article.

Key words: Charophyta, determination, distribution, *Nitella mucronata*, taxonomy

Introduction

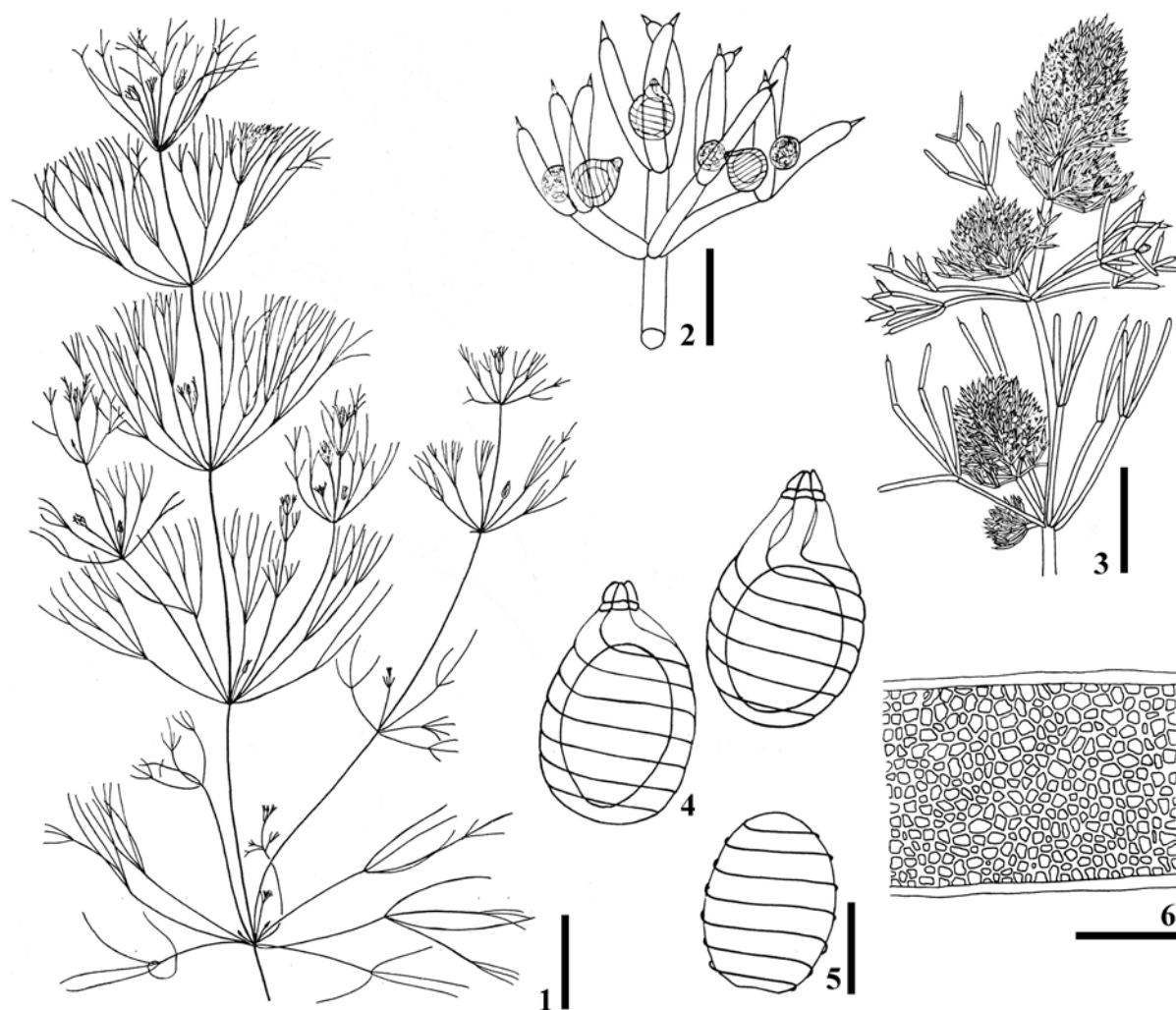
Over the last century, the distribution of the charophyte *Nitella mucronata* (BR.) MIQUEL has declined dramatically in the Czech Republic. It used to be a common species throughout the Czech Republic (VILHELM 1914), and had a worldwide distribution (Central and South America, Africa, Asia, Europe; (DAMBSKA 1964). However, according to HUSÁK (2001), it is now an “extremely rare species” in the Czech Republic, and has been confirmed to occur only in one locality, i.e. a pool in the Boří forest between Poštorná and Valtice (south Moravia). The main cause of the decline of *N. mucronata* is probably area draining and climate change (drying and freezing of corresponding habitats). Yet, there are indications that *N. mucronata* may have a sporadic, but wider distribution (GRULICH & VYDROVÁ 2006, HUSÁK orig. data) than those localities that have been cited in the past and which have not been recently confirmed (LHOTSKÝ & ROSA 1955, HINDÁK et al. 1975, POULÍČKOVÁ et al. 2004). These modern localities include (1) the military area of Boletice in south Bohemia (GRULICH & VYDROVÁ 2006), and (2) the peat bog Velká Ohrazenice near the village of Doňov near Veselí nad Lužnicí (south Bohemia).

Because little is known generally about the

distribution of Charophyta in the Czech Republic, we compiled all historical and current data about the distribution of localities reported for *N. mucronata* in the Czech Republic and along with ecological information.

Morphology

N. mucronata is monoecious, and is up to 20 – 30 cm tall. The stem is rather slender, without incrustation, and has a green to brown (Fig. 1). The internodes are firm, and are 1 – 2 times the length of the branchlets. Six branchlets are present in a whorl. Sterile branchlets are usually bifurcate and fertile ones are trifurcate (Fig. 3). The terminal cells of branchlets are very short and tapered, forming a spear (mucro) (Fig. 2). Gametangia are solitary or conjoined at all branchlet nodes, but commonly absent at the first node, without mucus. Oogonia are solitary or geminate, 430–625 µm long, and 420–450 µm wide. Mature oospores have a brown to black colour with marked strip. Antheridia are solitary and are always smaller than oogonia, 200–310 µm in diameter.



Figs 1–6. *Nitella mucronata* (adjusted according to following literature): 1 – Macroscopic habitus (DAMBSKA 1964), scale bar 1 cm; 2 – Ends of branching (spear, mucro) (DAMBSKA 1964), scale bar 0.5 cm; 3 – Branchlet node with oogonia and antheridia (KRAUSE 1997), scale bar 0.5 cm; 4 – Morphology of oogonia (DAMBSKA 1964), scale bar 0.2 cm; 5 – Morphology of oospore (KRAUSE 1997), scale bar 0.5 cm; 6 – Details of oospore wall with reticulate ornamentation (URBANIAK 2007), scale bar 40 µm.

Diagnostic features

Identification of *Nitella mucronata* requires a magnifying glass or a binocular microscope. Diagnostic features include the characteristic ends of branches (spear, mucro, Fig. 2), the typical morphology of the oogonia (reticulate ornamentation on the surface of mature oospores, Figs 4, 5, 6).

Species taxonomy

Taxonomic concept of this species is complicated. For example WOOD & IMAHORI (1964) recognized several forms according to morphology. Their classification was denied by MIGULA (1897),

who found out polymorphic (morphology) of *N. mucronata*. According to ALLEN (1928) *N. mucronata* shows considerable variability in its morphology. A review of the variability in this species was given by WOOD & IMAHORI 1964.

N. mucronata s. l. is closely related to *N. pseudoflabellata* and *N. gracilit* (PAL et al. 1962). *N. pseudoflabellata* is different in large number of rays at the second and ultimate furcations. The primary rays are always longer than half the length of the entire branchlet (PAL et al. 1962). *N. gracilis* has distinctive morphology of oospore. On the oospore wall are granulate or punctate ornamentation easy to see by light microscope (URBANIAK 2007).

Ecology

The ecological requirements of *N. mucronata* are not very well known. According to DĄBBSKA (1964) it prefers intermediate trophic levels and low levels of organic pollution and a pH of about 7. The species grows in pools, lakes, ditches and streamlets, from a depth of several cm to 20 m (DĄBBSKA 1964, HUSÁK 1985, URBANIAK 2007). Specimens occurred in groups (from 2 to many plants) at peat bog Velká Ohrazenice. This alga needs stagnant or slowly flowing water with fine-grained sapropel or sand on the bottom.

Distribution

N. mucronata is distributed worldwide (Central and South America, Africa, Asia, Europe) (DĄBBSKA 1964). In Europe it has been reported as common from Finland, Hungary, Spain, Poland and France, and it is also known from

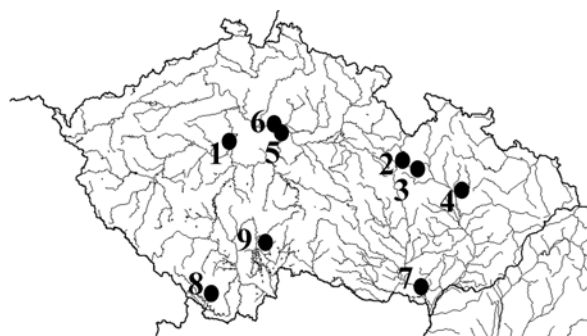


Fig. 7. Distribution of *Nitella mucronata* in the Czech Republic. Locations: 1 – Královská Obora near Prague (VILHELM 1914); 2 – Nový Valdek (LHOTSÝ & ROSA 1955); 3 – Svitavy (LHOTSÝ & ROSA 1955); 4 – Olomouc region (LHOTSÝ & ROSA 1955); 5 – Velký Osek (collected by Rydlo in 1999); 6 – Kluk (Nymburk region) (collected by Rydlo in 2000); 7 – forest Boří les (HUSÁK 2001); 8 – Boletice (GRULICH & VYDROVÁ 2003); 9 – Velká Ohrazenice (collected by Caisová in 2007).

a few localities in Ireland, Norway and Turkey, (KRAUSE 1997). In the Czech Republic (Fig. 7) has been reported from Královská Obora, Prague region (VILHELM 1914), Olomouc, Nový Valdek, Svitavy (LHOTSÝ & ROSA 1955), Velký Osek, Kluk - Nymburk region (collected by Rydlo in 1999, 2000; unpublished data), Boří forest (HUSÁK 2001), Boletice (GRULICH & VYDROVÁ 2006) and Velká Ohrazenice (collected by Caisová in 2007, unpublished data). It is likely that some of these

localities no longer exist, e. g. Královská Obora which was destroyed in the 19th century (VILHELM 1914). Further research of *N. mucronata* is needed to develop further our knowledge of its morphology, ecological requirements and its distribution in the Czech Republic.

References

- ALLEN, G.O. (1928): Charophyte notes from Saharanpur, U. P. – Journal of Indian botanical society 7 (2): 46–69, figs 1–13, pls 1–6.
- DĄBBSKA, I. (1964): Charophyta. Flora slodkowodna Polski 13. – 126 pp., PWN, Warszawa.
- GRULICH, V. & VYDROVÁ, A. (2006): Zpráva Natura 2006. – www.calla.cz/data/boletice/studie
- HINDÁK, F., KOMÁREK, J., MARVAN, P. & RŮŽIČKA, J. (1975): Kl'úč na určovanie výtrusných rastlín. – 396 pp., SPN, Bratislava.
- HUSÁK, Š. (1985): Parožnatky (Charophyta) v mělkých vodních ekosystémech ČSSR. [Charophyta in shallow water ecosystem in the ČSSR]. – In: Zborn. VII. Konf. Čs. Limnol. Spol., Nitra, DT ČSVTS Žilina, 165–168 pp.
- HUSÁK, Š. (2001): Vegetace parožnatěk (Charophyceae vegetation). – In: M. CHYTRÝ, T. KUČERA & KOČI, M. (eds): Katalog biotopů České republiky, 23–25 pp., Agentura ochrany přírody a krajiny ČR, Praha.
- KRAUSE, W. (1997): Charales (Charophyceae). – In: Ettl, H., Gärtner, G., Heynig, H. & Mollenhauer, D. (eds): Süßwasserflora von Mitteleuropa 18: 1–202 pp., Gustav Fischer Verlag, Jena.
- LHOTSÝ, O. & ROSA, K. (1955): Soupis moravskoslezských sinic a řas [Verzeichnis der Mährisch – Schlesischen algen]. – 260 pp., Nakladatelství Československé akademie věd, Praha.
- MIGULA W. (1897): Die Characeen. – In: Rabenhorst, L. (ed.): Kryptogamenflora von Deutschland, Österreich und der Schweiz, 765 pp., Kummer, Leipzig.
- PAL, B. P., KUNDU, B. C., SUNDARAINGAM, V. S. & VENKATARAMAN, G. S. (1962): Charophyta. – 130 pp., Indian council of agricultural research, New Delhi.
- POULÍČKOVÁ, A., LHOTSÝ, O., DRÍMALOVÁ, D. (2004): Prodromus sinic a řas ČR. – Czech Phycology 4: 19–33.
- URBANIAK, J. (2007): Differences in morphology and oospore wall ornamentation in *Nitella racilis* (Smith) Agardh 1828 and *Nitella mucronata* (A. Braun) Miquel 1840 (Charales, Charophyceae) from Poland. – Biologia, in press.
- VILHELM, J. (1914): Monografická studie o českých parožnatkách [A revision of the Charophyta in the Czech Republic]. – Věstník král. české spol. nauk, Třída II: 1–168.
- WOOD, R. D. & IMAHORI, K. (1964): A revision of the Characeae. 2nd part - Iconograph of the Charophyceae. – sine pag., Weinhein Verlag J. Cramer, New York.