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Potamogeton ×*clandestinus* (*P. crispus* × *P. natans*, Potamogetonaceae), a new natural pondweed hybrid discovered in Europe

ALEXANDER A. BOBROV[1], JOANNA ZALEWSKA-GAŁOSZ[2] & ELENA V. CHEMERIS[1]

[1]*I. D. Papanin Institute for Biology of Inland Waters RAS, Borok, Nekouz distr., Yaroslavl reg., 152742, Russia; e-mail address: lsd@ibiw.yaroslavl.ru*

[2]*Institute of Botany, Jagiellonian University, Kopernika 27, PL-31–501 Kraków, Poland; e-mail address: joanna.zalewska-galosz@uj.edu.pl*

Abstract

In this paper *Potamogeton* ×*clandestinus* (Potamogetonaceae), a hybrid between *P. crispus* and *P. natans*, is described and illustrated. Hybrid populations were discovered in the rivers Koloshma, Nozhema and Suda in the northern part of European Russia (Vologda reg., Babaevo distr.). Confirmation of the hybrid origin is based on morphological and anatomical data and independently was tested by a direct sequencing of the nuclear ribosomal ITS region and *rpl32-trn*L intergenic spacer of chloroplast DNA. The additive ITS sequence pattern confirmed that *P.* ×*clandestinus* is a hybrid between *P. crispus* and *P. natans*. The *rpl32-trn*L intergenic spacer data revealed that *P. crispus* was the maternal parent of the hybrid. A detailed morphological and ecological description of *P.* ×*clandestinus* is provided and the taxonomic differences between the new hybrid and similar taxa are outlined.

Key words: holotype, hybridization, ITS, molecular identification, north of European Russia, *rpl32-trn*L, sequencing

Introduction

Hybridization markedly enriched the taxonomic diversity of *Potamogeton* Linnaeus (1753: 126), e.g.: Hagström (1916), Preston (1995), Wiegleb & Kaplan (1998). Currently, 37 interspecific hybrids are recognized, involving 18 *Potamogeton* species out of the total of 19 species occurring in Europe (excluding the genus *Stuckenia* Börner (1912a: 258)); numbers estimated based on Hagström (1916), Preston (1995), Wiegleb & Kaplan (1998) and subsequent literature. *Potamogeton* hybrids are mostly sterile, but due to vegetative propagation often create stable and long-persistent populations of high ecological significance (Preston 1995, Bobrov & Chemeris 2006a, 2006b, 2009a, 2009b, Zalewska-Gałosz & Ronikier 2012).

The majority of *Potamogeton* hybrids occurs sympatrically with their parental species but there are also examples of relict taxa, which survived within regions in the absence of the parental species. The most interesting examples of the latter are: *Potamogeton* ×*lanceolatifolius* (Tiselius (1897: 6)) Preston (1987: 437), the hybrid between *P. gramineus* Linnaeus (1753: 127) and *P. nodosus* Poiret in Lamarck (1816: 535), evidenced from Sweden (Kaplan & Fehrer 2011); and *P.* ×*subrufus* Hagström (1916: 241), the hybrid between *P. lucens* Linnaeus (1753: 126) and *P. nodosus*, recorded in Denmark (Zalewska-Gałosz 2010). In both cases one of the parental species is *P. nodosus* which does not belong to the modern flora of Fennoscandia. Ancient relic occurrences of hybrids are also observed in the closely related genus *Stuckenia* (formerly *Potamogeton* subgen. *Coleogeton* (Reichenbach (1845: 10)) Raunkiaer (1896: 103), see Kaplan 2008), namely *S.* ×*bottnica* (Hagström (1916: 52)) Holub (1997: 364), the hybrid between *S. pectinata* (Linnaeus (1753: 127)) Börner (1912b: 713) and *S. vaginata* (Turczaninow (1854: 66)) Holub (1984: 215), and *S.* ×*fennica* (Hagström (1916: 24)) Holub (1997: 364), the hybrid between *S. filiformis* (Persoon (1805: 152)) Börner (1912b: 713) and *S. vaginata*, as well as *S.* ×*suecica* (Richter (1890: 15)) Holub (1997: 364), the hybrid between *S. filiformis* and *S.*

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Interestingly, *Potamogeton ×clandestinus* can also thrive in extreme conditions, with current velocity reaching 1.2 m/s, which are typically unsuitable for aquatic vascular plants. Under these conditions it co-occurs predominantly with mosses and algae, such as *Fontinalis dalecarlica* Bruch et Schimp., *Hygrohypnum ochraceum* (Turn. ex Wils.) Loeske, *Platyhypnidium riparioides* (Hedw.) Dixon, *Lemanea rigida* (Sirod.) De Toni and others. The abundance of vascular macrophytes is very low in these habitats although the diversity of species is similar to that found in the other localities. The set of the most constant species in this kind of communities is preliminary the same with the first one. In total 23 taxa were found here. In two cases *P. ×clandestinus* were recorded growing in riparian communities of *Equisetum fluviatile* L. and *Iris pseudacorus* L.

The total number of taxa recorded as co-occurring with *P. ×clandestinus* is 36. It is the highest result in comparison with the community of *P. ×vepsicus*, known from the same area, where altogether 13 species were recorded (Bobrov & Chemeris 2006b), or the *Stuckenia ×fennica* association, where 19 species were recorded in total (Bobrov 2007).

Since the parental species, *Potamogeton crispus* and *P. natans*, are widely distributed and fairly frequent through Europe and North America, new records of *P. ×clandestinus* from other areas are very probable. This hybrid is one more example of the relict occurrence of pondweed hybrids in postglacial areas, which persisted and can exist without one or both parents in the same region (Wiegleb 1988, Preston 1995, Wiegleb & Kaplan 1998, Bobrov & Chemeris 2006a, 2009b, Kaplan *et al*. 2009).

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