

Endangered and threatened rush plants in Żuławy Wiślane (northern Poland)

Renata Afranowicz

University of Gdańsk, Department of Plant Taxonomy and Nature Conservation, Laboratory of Geobotany and Plant Conservation, Al. Legionów 9, 80-441 Gdańsk, Poland, e-mail: biora@univ.gda.pl

Abstract: The paper presents results of the research concerning endangered and threatened rush species such as: *Alisma gramineum*, *A. lanceolatum*, *Carex disticha*, *Hippuris vulgaris*, *Rumex aquaticus* and *Stellaria crassifolia*. The aim of this study was to recognise distribution and to evaluate resources and contemporary state of this plant group in Żuławy Wiślane. The distribution is based on the published historical and present data from the last 130 years and on the results of field works in 2001-2005 years. The evaluation of nature resources, based on the distribution of valuable species, shows that Drużno lake is a distinguishable part of Żuławy Wiślane. For many years that area has been the place of concentration of several rare and endangered species populations.

Key words: rare and threatened species, rush plants, distribution, Żuławy Wiślane, northern Poland

The contemporary flora of Żuławy Wiślane (northern Poland) has developed under the influence of natural processes connected with the accumulating activity of Wisła river and the anthropogenic changes. For centuries human impact on this region modified water conditions and expressed, among others, in constructing a dense network of ditches and flood embankments as well as regulating river beds. The relevant changes in habitats led to the flora transformation. The aim of the research is to recognize distribution and to evaluate the resources and contemporary state of the endangered and threatened rush species within the studied area.

The objects of the compilation were rush species belonging to various threat categories in Gdańskie Pomerania region (Markowski & Buliński 2004). The material consists of historical and contemporary published data as well as own data collected in 2001-2005. These sources of information were used to analyse species occurrence within Żuławy Wiślane from the end of 19th century till present. Species localities are given in subsquares (5 x 5 km) within ATPOL squares (10 x 10 km) (Zajac 1978). Those subsquares are signed as: a – upper-left part of ATPOL square; b – upper-right; c – lower-left; d – lower-right (compare Markowski & Buliński 2004).

Alisma gramineum Lej. – DA91d: between Bystra and Wiślina, Motława river (Abromeit *et al.* 1898-1940); DA93b: Rybina, the right bank of Wisła Królewiecka river (Środa 1991b); DB04c: SE of

Rakowiska, the pond; DB21b: W of Kończewice, the pond; Mątowy Wielkie, the pond; DB22a: Mątowy Wielkie, the pond (Środa *et al.* 2002); DB22c: Mątowy Wielkie, the pond (Środa 1991a; Środa *et al.* 2002).

Alisma lanceolatum With. – DA81d: Gdańsk Sobieszewo, the bank of Wisła river (Preuss 1911 after Kępczyński & Rutkowski 1991); DB04c: SE of Rakowiska, the pond (Środa *et al.* 2002); DB05a: Kępa Rybacka, Nogat river (Środa *et al.* 2002); DB14a: near Rakowo, the pond (Środa 1991a); DB21b: W of Kończewice, the pond (Środa *et al.* 2002); DB22a: Mątowy Wielkie, the pond (Środa *et al.* 2002); DB23a: W of Kamienica, the ditch (Środa *et al.* 2002).

Carex disticha Hudson – DA92b: about 1 km S of Przegalina, the left bank of WisłaPrzekop river (Smykowska 2001); DA93d: about 1,2 km W of PGR Nowotna (Afranowicz 2004); DB15bd, DB16ac, DB25b: the 'Drużno Lake' nature reserve (Schulz 1941; Markowski *et al.* 2002); DB16c: Komorowo Żuławskie (Środa *et al.* 2002); DB25b: Dzierzgonka, Dzierzgoń river (Środa *et al.* 2002); DB32a: Mątawa Forest, the glade (Jelinowski 1969);

Hippuris vulgaris L. – DA81d: about 1,2 km SE of Sobieszewo; about 0,6 km SE of Sobieszewo; about 0,3 km SE of Sobieszewko; DA91d: about 1,5 km SE of Miłocin; DA92a: about 1,6 km SE of Sobieszewska Pasta; Trzciniowo, about 1 km SE of Sobieszewska Pastwa (Afranowicz 2004); DB03b: near Cyganki; DB05d: near Elbląg (Abromeit *et al.* 1898-1940);

DB14c: about 1,5 km N of Kaczynos; DB15d: about 1,8 km S of Żurawiec (Afranowicz 2004); DB22a: Mątowy Wielkie, the pond (Środa *et al.* 2002);

Rumex aquaticus L. – DB15bd, DB16ac, DB25b: the 'Drużno Lake' nature reserve (Mowszowicz 1954; Kluszczyńska & Szmeja 1979; Markowski *et al.* 2002);

Stellaria crassifolia Ehrh. – DB15bd, DB16ac, DB25b: the 'Drużno Lake' nature reserve (Schulz 1941; Markowski *et al.* 2002).

The group of endangered and threatened rush species in Żuławy Wiślane is represented by the following species: *Alisma gramineum*, *A. lanceolatum*, *Carex disticha*, *Hippuris vulgaris*, *Rumex aquaticus* and *Stellaria crassifolia*. On regional red lists of plants of Gdańskie Pomerania – GP (Markowski & Buliński 2004) and Western Pomerania – WP (Żukowski & Jackowiak 1995) they are ranked to various threat categories: *Alisma gramineum* GP – CR, WP – V; *Alisma lanceola-*

tum GP – VU, WP – I; *Carex disticha* GP – NT, WP – V; *Hippuris vulgaris* GP – VU; *Rumex aquaticus* GP – NT, WP – V; *Stellaria crassifolia* GP – CR, WP – E.

On a scale of Poland *Alisma gramineum*, *A. lanceolatum*, *Hippuris vulgaris* are vulnerable species and *Stellaria crassifolia* a endangered one (Zarzycki & Szelać 2006).

The evaluation of nature resources, based on distribution of valuable species, shows that Drużno lake is a distinguishable part of Żuławy Wiślane. For many years that area has been the place of concentration of several rare and endangered species populations. Only here *Rumex aquaticus* i *Stellaria crassifolia* were noted, although the second one hasn't been confirmed recently (Markowski *et al.* 2002).

Acknowledgements. I would like to express my gratitude to Dr Ryszard Markowski for providing the compilation of floristic data concerning the occurrence of vascular plant species in Żuławy Wiślane. I also thank Dr Joanna Bloch-Orłowska very much for helping in translation of this paper.

References

- ABROMEIT J., NEUHOFF W. & STEFFEN H. 1898-1940. Flora von Ost- und Westpreussen. Vol. 1-6, 1248 pp. Kommission-verlag Gräfe und Unzer, Berlin-Königsberg.
- AFRANOWICZ R. 2004. Związki współczesnego zróżnicowania florystyczno-fitocenotycznego delty Wisły z genezą i antropogenicznymi przekształceniami siedlisk. Ph. D. Thesis, Department of Plant Taxonomy and Nature Conservation, University of Gdańsk.
- JELINOWSKI T. 1969. Flora naczyniowa Lasu Mątawskiego na Żuławach. Acta Biol. Med., Soc. Sci. Gedan. 14: 525-547.
- KĘPCZYŃSKI K. & RUTKOWSKI L. 1991. Występowanie *Alisma lanceolatum* With. w różnych zbiorowiskach roślinnych na terenie otaczającym Dolną i Środkową Wisłę. Acta UNC, Biol. 38(77): 93-103.
- KLUSZCZYŃSKA K. & SZMEJA K. 1979. Współczesny etap w przemianach roślinności jeziora Drużno. Zesz. Nauk. UG, Biol. 1: 35-49.
- MARKOWSKI R. & BULIŃSKI M. 2004. Ginące i zagrożone rośliny naczyniowe Pomorza Gdańskiego. Acta Bot. Cassub. Monogr. 1: 1-75.
- MARKOWSKI R., BULIŃSKI M. & SĄGIN P. 2002 (mscr.). Opracowanie flory naczyniowej i zbiorowisk roślinnych faunistycznego rezerwatu przyrody 'Jezioro Drużno'. Zróżnicowanie, stan zachowania i zagadnienia ochrony. ECOTONE Sp. J., Sopot.
- MOWSZOWICZ J. 1954. Zarys roślinności kwiatowej jeziora Drużno. Pol. Arch. Hydrobiol. 2(1): 253-257.
- PREUSS H. 1911. Die Vegetationsverhältnisse der westpreussischen Ostseeküste. Ber. Versamml. Westpreuss. Bot.-Zool. Vereins Danzing 33: 1-119.
- SCHULZ M. 1941. Die Vegetation des Drausengebietes. Schrift. Physik.-Ökon. Gesell. Königsberg 72(1): 1-118.
- SMYKOWSKA S. N. 2001. Flora naczyniowa Wyspy Sobieszewskiej – przestrzenne zróżnicowanie oraz ocena różnorodności florystycznej. MSc Thesis, Department of Plant Taxonomy and Nature Conservation of the University of Gdańsk.
- ŚRODA M. 1991a. Roślinność wodna Żuław. I. Klasy: *Lemnetea*, *Charetea*, *Litoretellea uniflorae*. In: J. NOWICKI (ed.). Rozpoznanie i ochrona ekosystemów, pp. 47-57. Wyd. IMUZ-ART, Falenty/Elbląg-Olsztyn.
- ŚRODA M. 1991b. Roślinność wodna Żuław. II. Klasa *Potamogetonetea*, związek *Potamogetonion*. In: J. NOWICKI (ed.). Rozpoznanie i ochrona ekosystemów, pp. 59-68. Wyd. IMUZ-ART, Falenty/Elbląg-Olsztyn.
- ŚRODA M., SZAREJKO T. & DZIEDZIC J. 2002. Flora roślin naczyniowych siedlisk wodnych, podmokłych i łąkowopastwiskowych Żuław Wiślanych. Acta Bot. Cassub. 3: 49-85.
- ZAJĄC A. 1978. Założenia metodyczne 'Atlasu rozmieszczenia roślin naczyniowych w Polsce'. Wiad. Bot. 22(3): 145-155.
- ZARZYCKI K. & SZELAĆ Z. 2006. Red list of the vascular plants in Poland. In: Z. MIREK, K. ZARZYCKI, W. WOJEWODA & Z. SZELAĆ (eds.). Red list of plants and fungi in Poland, pp. 9-20. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków.
- ŻUKOWSKI W. & JACKOWIAK B. 1995. List of endangered and threatened vascular plants in Western Pomerania and Wielkopolska (Great Poland). In: W. ŻUKOWSKI & B. JACKOWIAK (eds.). Endangered and threatened vascular plants of Western Pomerania and Wielkopolska. Publications of the Department of Plant Taxonomy of the Adam Mickiewicz University of Poznań 3: 9-96. Bogucki Wyd. Nauk., Poznań.