

## REMARKS ON *POTAMOGETON* HYBRIDS BASED ON CHARACTERS OF *P. × SALICIFOLIUS* WOLFG. FROM A NEW LOCALITY IN POLAND

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### ABSTRACT

Information on *Potamogeton* hybrids, their identification, taxonomy, ecology and distribution has not been sufficiently recognised yet. Based on characters of *P. × salicifolius* (= *P. perfoliatus* × *P. lucens*) from a new locality in Poland — the Gatno lake (the Kaszuby Lakeland in NW Poland) — general comments on *Potamogeton* hybrids identification are introduced. The description of *P. × salicifolius* morphology from the Gatno lake are presented. Analysis of quantitative morphological characters of these specimens provided new information on variability of this taxon. The distribution map of *P. × salicifolius* in Poland, the original draft of *P. × salicifolius* based on specimens from the Gatno lake and the table with comparison of *P. × salicifolius* and the characters of parental species are also provided.

KEY WORDS: *Potamogeton* hybrids, variability, distribution, *Potamogeton × salicifolius* Wolfg.

### INTRODUCTION

*Potamogeton* hybrids are taxonomically important because once established they could persist for many years spreading vegetatively (Preston 1995). Hybridisation in the genus *Potamogeton* has not been sufficiently recognised in Poland yet. Each new locality of *Potamogeton* hybrids provides information on frequency of occurrence and the distribution of these taxa. During a detailed, repeated study of hybrid population the habitat, hybrid fitness, biology and accompanying species can be assessed. This is invaluable information for recognising not only the number of *Potamogeton* hybrids occurring in Poland, but also for finding out whether these taxa are important components of the local floras.

Despite the fact that hybridisation in the genus *Potamogeton* is accidental, some species can hybridise more often than the others, for example *P. × angustifolius* J. Presl which is commonly distributed, whereas *P. × nericius* Hagstr. is very rare. The analysis of hybrid distribution pattern will only be possible if general distribution maps are prepared for these taxa.

During the field study in the Kaszuby Lakeland (Pojezierze Kaszubskie) in July 2002 a new locality of *Potamogeton × salicifolius* Wolfg. — the hybrid between *P. perfoliatus* and *P. lucens* — was recognised. The parental taxa distributions in Poland are presented in the „Distribution

Atlas of vascular plants in Poland” (Zajac A., Zajac M. 2001). This is the fifth locality of this rare *Potamogeton* hybrid in Poland (Fig. 1). The remaining four localities were revealed in the course of the revision of *Potamogeton* specimens collected in Polish Herbaria (approximately 5000 herbarium sheets, Zalewska-Gałosz unpublished). This taxon has not been identified in Poland before this revision (Lilienfeldówna 1919; Szafer et al. 1953; Mirek et al. 1995). During the revision also other rare *Potamogeton* hybrids were discovered (Zalewska-Gałosz 2002).

The aim of this paper is firstly to attract the florists' attention to *Potamogeton* hybrids problem and secondly to give new information on morphological variation of *P. × salicifolius* Wolfg.

### RECOGNITION

The recognition of *Potamogeton* hybrids based on comparative morphology solely is only possible when hybridisation takes place between the broad-leaved species of *Potamogeton*. In order to confirm the hybrid origin of the linear-leaved *Potamogeton* taxa isozymes study or DNA investigation should be conducted (Hollingsworth et al. 1995a, 1995b; Fant et al. 2001).

*Potamogeton* taxa could show extreme range of variation (Wiegleb 1988; Kaplan 2002) and are regarded as difficult

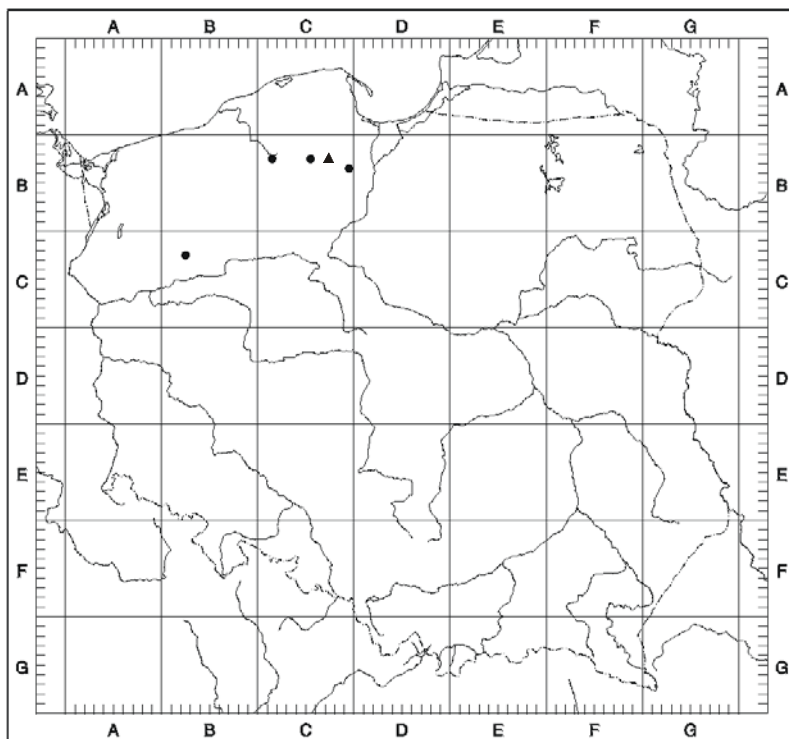


Fig. 1. Distribution map of *Potamogeton* × *salicifolius* Wolfg. in Poland using the ATPOL grid square system; s – the new locality.

for identification (Fassett 1940). Characters of two different (parental) *Potamogeton* species should be noticed on a given specimen if it is to be regarded as a hybrid. These characters can be modified by influence of the genes from one parental taxon, which, in turn, could give a new character (often median between the parental ones). If a studied specimen does not possess the characters of two different taxa, it must be the effect of (sometimes extreme) variation.

*Potamogeton* × *salicifolius* Wolfg. from the Gatno lake resembles *P. perfoliatus* — one of its parent — in habit, but has distinctly different leaf base and stipules (Table 1, Fig. 2, 3). The habits of parental species (*P. perfoliatus* and *P. lucens*) are showed in „Atlas flory polskiej i ziem ościennych” (Mądalski 1977). This hybrid is extremely variable (Preston 1995). In some cases, when *P.* × *salicifolius* Wolfg. has slightly amplexicaul to semi-amplexicaul leaf base the differentiation between *P.* × *salicifolius* and *P.* × *nitens* is impossible if based on comparative morphology solely. The described specimens of *P.* × *salicifolius* Wolfg. have a cuneate leaf base thus such misidentification is excluded.

#### DESCRIPTION

*Stem* up to 0.4 m, terete, unbranched; nodal glands absent. Submerged leaves with the lamina 38-48-(52) mm long, 0.7-12 (-15) wide, translucent, yellowish green, narrowly oblong, gradually narrowed to a sessile base, apiculate and often slightly mucronate at the apex, denticulate and undulate at the margin; midrib prominent, bordered on each side by a narrow band of lacunae, the lateral veins 3 (4) on each side, 1 more prominent than the rest because bordered by a narrow band of lacunae, the secondary veins frequent, ascending, very few transverse towards the margin. Floating leaves absent. Stipules 10-14 (-16) mm, open, translucent hyaline, rounded at the apex, veins inconspicuous when dry, 2 slightly more prominent than the others but not forming distinct ribs. Turions and inflorescences not seen.

The specimens of *P.* × *salicifolius* Wolfg. from the Gatno lake are generally smaller than observed before by some authors (Preston 1995; Wiegleb, Kaplan 1998; Zalewska-Gałosz 2002). Such width and length of leaves and length of stipules for this taxon have not been noticed before.

TABLE 1. Comparison of important characters of: *P. lucens*, *P. perfoliatus* and *P.* × *salicifolius* from the Gatno lake.

Character	<i>P. perfoliatus</i>	<i>P.</i> × <i>salicifolius</i>	<i>P. lucens</i>
Leaf base	Amplexicaul, sessile	Gradually tapering (cuneate), sessile	Abruptly or sometimes gradually tapering, on short petiole
Leaf apex	Rounded to obtuse, often slightly hooded	Apiculate and slightly mucronate	Mucronate
Stipule	Fugacious, not present by mature leaves	Delicate but persistent, without winged ribs	Strong, persistent, with winged ribs up to 3/4 of the leaf length

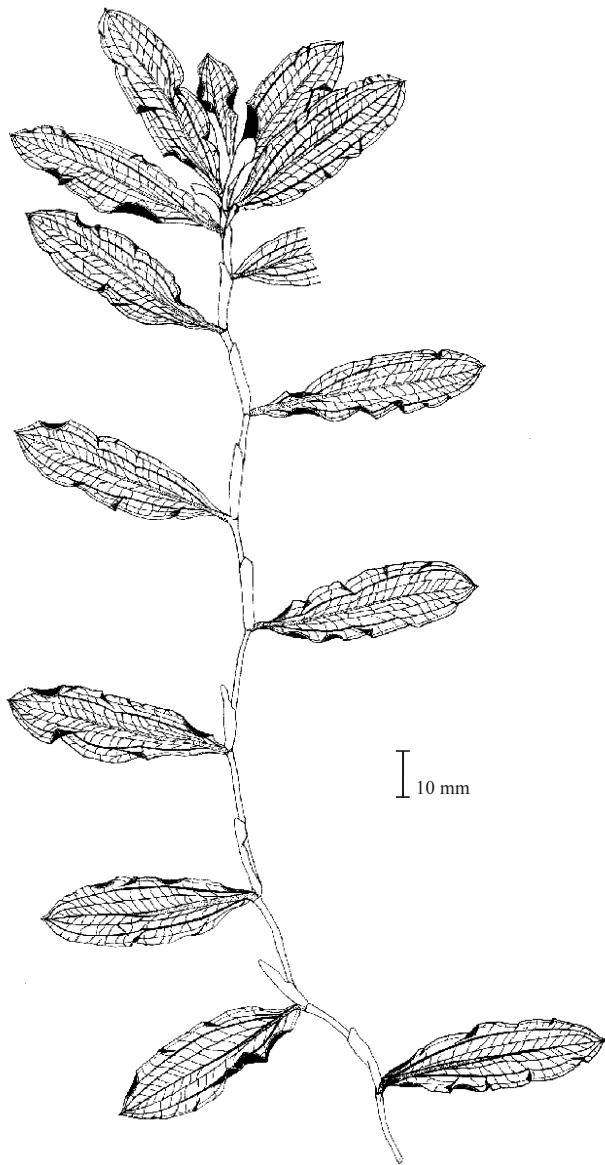


Fig. 2. The habit of *P. x salicifolius* Wulfg. from the Gatno lake. Based on herbarium sheet no. 0204443 (KRA).

#### LOCALITY

In July 2002 *Potamogeton x salicifolius* Wulfg. grew in the north-western part of the Gatno lake, 8 kilometres away from Kościerzyna, in the Kaszuby Lakeland, North-Western part of Poland, CB27 grid square system, according to ATPOL (Zajac 1978). *P. x salicifolius* Wulfg. thrived on sandy bottom, in 0.4 m deep, mesotrophic water together with one of its parents – *P. perfoliatus*, which was very abundant in this lake. The other parental taxon *P. lucens* was absent in the lake. The population was small, consisting of five vertical, unbranched shoots, growing close to each other (distance up to 1 m between shoots). Shoots were vegetative only and probably arose from the same rhizome. The shoots showed very little morphological variation, which could confirm its genetic identity. Monitoring of this population in the next seasons is needed. Two herbarium sheets of *P. x salicifolius* Wulfg. from this locality were collected and deposited in KRA (no. 0204443, 0204445).

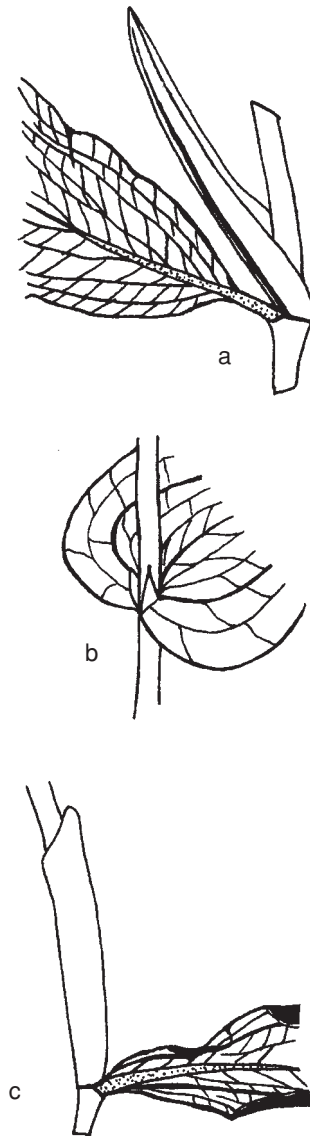


Fig. 3. Schematic illustration of the leaf base: a) *P. lucens*; b) *P. perfoliatus*; c) *P. x salicifolius* from the Gatno lake.

#### CONCLUSION

*Potamogeton* hybrids are still insufficiently recognised not only in Poland, but also all over the world. Capacity of hybrids to persist and spread vegetatively makes them morphologically and taxonomically important. Monitoring of hybrid localities in the future can provide new facts on their biology, habitat, variability and distribution.

#### LITERATURE CITED

- FANT J.B., PRESTON C.D., BARRETT J.A. 2001. Isozyme evidence for the origin of *Potamogeton x sudermanicus* as a hybrid between *P. acutifolius* and *P. berchtoldii*. *Aquatic Bot.* 71: 199-208.
- FASSETT N.C. 1940. A manual of aquatic plants. McGraw-Hill Book Co., New York, ss. 382.
- HOLLINGSWORTH P.M., GORNALL R.J., PRESTON C.D. 1995a. Genetic variation in British populations of *Potamogeton coloratus* (Potamogetonaceae). *Pl. Syst. Evol.* 197: 71-85.

- HOLLINGSWORTH P.M., GORNALL R.J., PRESTON C.D. 1995b. Isozyme evidence for hybridisation between *Potamogeton natans* and *P. nodosus* (Potamogetonaceae) in Britain. Bot. J. Linn. Soc. 117: 59-69.
- KAPLAN Z. 2002. Phenotypic plasticity in *Potamogeton* (Potamogetonaceae). Folia Geobot. 37: 141-170.
- LILIENTELDÓWNA F. 1919. Najadaceae, Jezierzowate. [In:] Flora Polska. Rośliny naczyniowe Polski i Ziemi Ościennych. Raciborski M., Szafer W. (eds), Tom I. Paprotniki, Iglaste i Jednoliścienne, Akademia Umiejętności, Kraków, pp. 67-87 (in Polish).
- MAŁAŁSKI J. (ed.). 1977. Atlas flory polskiej i ziem ościennych. Florae Polonicae terrarumque adiacentium iconographia. T 2 (1). PWN, Warszawa–Wrocław–Kraków (in Polish and Latin).
- MIREK Z., PIĘKOŚ-MIRKOWA H., ZAJĄC A., ZAJĄC M. 1995. Vascular plants of Poland. A checklist. Polish Bot. Stud. Guideb. Ser. 15: 1-308.
- PRESTON C.D. 1995. Pondweeds of Great Britain and Ireland. Botanical Society of the British Isles, London, B.S.B.I., Handbook Nr. 8, pp. 352.
- SZAFER W., KULCZYŃSKI S., PAWŁOWSKI B. 1953. Rośliny Polskie. Opisy i klucze do oznaczania wszystkich gatunków roślin naczyniowych rosnących w Polsce bądź dziko, bądź zdziczałych lub częściej hodowanych. xxviii + ss.1020. PWN, Warszawa (in Polish).
- WIEGLEB G. 1988. Notes on pondweeds – outlines for a monographical treatment of the genus *Potamogeton* L. Feddes Repert. 99 (7, 8) 249-266.
- WIEGLEB G., KAPLAN Z. 1998. An Account of the Species of *Potamogeton* L. (Potamogetonaceae). Folia Geobot. 33: 241-316.
- ZAJĄC A. 1978. Atlas of distribution of vascular plants in Poland (ATPOL). Taxon 27 (5, 6): 481-484.
- ZAJĄC A., ZAJĄC M. (eds). 2001. Distribution atlas of vascular plants in Poland. pp. 425-426. Edited by Laboratory of Computer Chorology, Institute of Botany, Jagiellonian University, Cracow.
- ZALEWSKA-GAŁOSZ J. 2002. Occurrence and distribution of *Potamogeton* hybrids (Potamogetonaceae) in Poland. Feddes Repert. 113 (5, 6): 380-393.

UWAGI O MIESZAŃCACH *POTAMOGETON*  
NA PODSTAWIE CECH *P. × SALICIFOLIUS* WOLFG.  
Z NOWEGO STANOWISKA W POLSCE

STRESZCZENIE

Informacje na temat mieszańców *Potamogeton*, ich identyfikacji, taksonomii, ekologii i rozmieszczeniu są nadal niewystarczające. Na podstawie cech *P. × salicifolius* z jeziora Gatno – nowego stanowiska w Polsce – przedstawiony został sposób identyfikacji mieszańców *Potamogeton*. Zamieszczono opis morfologii *P. × salicifolius* z jeziora Gatno. Analiza jego ilościowych cech morfologicznych dostarczyła nowych informacji na temat zmienności tego mieszańca. W pracy zamieszczono także mapę rozmieszczenia *P. × salicifolius* w Polsce, oryginalną rycinę okazów z jeziora Gatno oraz tabelę z zestawieniem cech *P. × salicifolius* i gatunków rodzicielskich.

**SŁOWA KLUCZOWE:** mieszańce *Potamogeton*, zmienność, rozmieszczenie, *Potamogeton × salicifolius* Wolfg.