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RUMICETUM PALUSTRIS (TIMÁR 1950) W. FISCHER 1978, NEW PLANT COMMUNITY FROM *BIDENTETEA TRIPARTITI* R. TX., LOHM. ET PRSG 1950 CLASS IN SW POLAND

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ABSTRACT: Natural water reservoirs are very valuable floristic sites in Poland. Among them, the most important for preservation of biodiversity of plant communities are lakes, rivers, oxbow lakes and fishponds. The long-term process of human pressure on habitats of this type caused disturbance to their biological balance. Changes in the water regime, industrial development and chemisation of agriculture, especially in the period of last two hundred years, led to systematic disappearance of localities of many plant communities. *Rumicetum palustris* (Timár 1950) W. Fischer 1978, of *Bidentetea tripartiti* R. Tx., Lohm. et Prsg 1950 class, has been described for the first time in Hungary and Germany. This association rarely develop, usually on muddy or sandy banks or bottoms of lakes, ponds, rivers, oxbow lakes. In Poland, *Rumicetum palustris* has not been yet observed. During current studies of phytocenosis *Rumicetum palustris* in 2005–2014 were found six localities in fish-breeding ponds and oxbow lakes of Odra river in south-west Poland.

KEY WORDS: annual wetland herbs, fish-breeding ponds, oxbow lakes, endangered plant communies, distribution, phytosociology.

Introduction

Natural water reservoirs are very valuable floristic sites in Poland. Among them, the most important for preservation of biodiversity of plant communities are lakes, rivers, oxbow lakes and fish-breeding ponds. The long-term process of human pressure on habitats of this type caused disturbance of their biological balance. Currently fish ponds are among the most valuable areas where aquatic, rush and alluvial vegetation occur. The process of disappearance of plant communities associated with aquatic and wet habitats can be effectively halted only through agreement between pond owners and wildlife protection services, based on a thorough analysis of both environmental phenomena and economic needs. Changes in the water regime, industrial development and chemisation of agriculture, especially in the period of last two hundred years, led to systematic disappearance of localities of many plant communities (e.g. Tomaszewicz 1979; Tomaszewicz and Kłosowski 1985; Szumiec 1995; Falkowski and Nowicka-Falkowska 2004; Spałek 2005, 2006a,b, 2008; Spałek and Nowak 2003). *Rumicetum palustris* has been described for the first time in Hungary (Timár 1950) and Germany (Fischer 1978). This association sporadicaly develop, usually on muddy or sandy banks or bottoms of lakes, ponds, rivers, old river beds (Timár 1950; Fischer 1978; Philippi 1984; Pott 1995; Schubert et al. 1995; Passarge 1996; Jarolímek et al. 1997). *Rumex palustris* is a characteristic species for this association. In Poland it is mainly found in the valleys of Wisła and Odra rivers and their larger tributaries (Zając and Zając 2001). It usually grows in open, damp sites, on muddy or sandy-muddy soil. It is mostly found in communities of *Bidentetea tripartitae* class (Dostál 1989; Oberdorfer 1994; Pott 1995; Schubert et al. 1995; Passarge 1996; Jarolímek et al. 1997). Within *Rumicetum palustris* two subassociations were distinguished so far: *Rumicetum maritimi typicum* and *Rumicetum maritimi chenopodietosum* (Fischer 1978; Passarge 1996). In Germany, *Rumicetum palustris* belongs to associations that are in the near threatened category (Rennwald 2000). In Poland, *Rumicetum palustris* has not been yet described.

Material and methods

The fieldwork was conducted during the growth seasons in 2005–2014. *Rumicetum palustris* community was studied with the methods of the Zurich-Montpellier School of Phytosociology (Braun-Blanquet 1964; Dzwonko 2007). The relevés were taken on plots that are homogeneous and representative of the phytocoenoses with larger surfaces. In the case of small-area phytocoenoses, the relevés covered the whole plot. The phytosociological nomenclature and the syntaxonomical appendix are based on Oberdorfer (1994), Pott (1995), Passarge (1996) and Rennwald (2000). The species names of vascular plants are given according to Mirek et al. (2002).

Results

Phytocenoses of *Rumicetum palustris* has been found for the first time in Lower Silesia and Wielkopolska region in south-west Poland in fish-breeding ponds and oxbow lakes of Odra river. They very rarely develop on the bottom of the fish-breeding ponds without water, on damp, and banks of oxbow lakes, usually sandy or sand-muddy soil. They were found in four fish-breeding ponds and two oxbow lakes (Fig. 1):

- Janisławice near Sośnie in fish-breeding pond (Spiek Pond) – 51.462751 N, 17.540252 E; ATPOL square CE0288.
- Jelcz-Laskowice in the oxbow of Odra river (near Jelcz-Laskowice Nature

Reserve) – 51.007862 N, 17.313203 E; ATPOL square CE6116.

- Niedźwiedzice near Chojnów in fish-breeding pond – 51.305506 N, 16.030726 E; ATPOL square BE2232.
- Przemków in fish-breeding pond (Przemkowskie Ponds) – 51.551672 N, 15.795465 E; ATPOL square BD9057.
- Rybin near Syców in fish-breeding pond (Gać Pond) – 51.357418 N, 17.723737 E; ATPOL square CE2401.
- Wojszyn near Głogów in the oxbow lake of Odra river – 51.671757 N, 16.180072 E; ATPOL square BD8326.

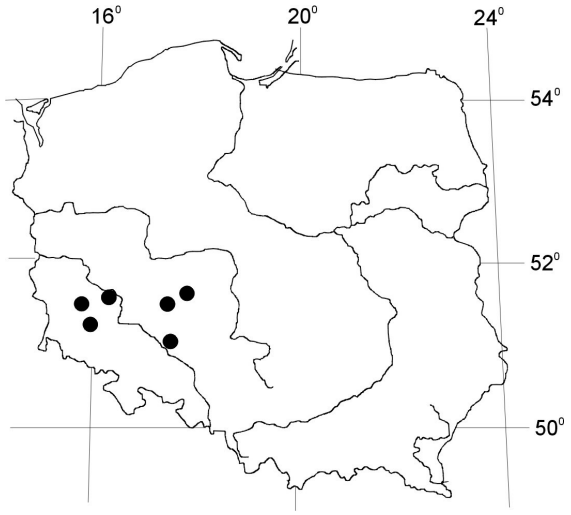

Fig. 1. Localities of *Rumicetum palustris typicum* (Timár 1950) W. Fischer 1978 in Poland.

In fish-breeding ponds phytocenoses of *Rumicetum palustris* usually appear in the second year after pond drying and cover the area of max. 10-100 m^2. In the oxbow lakes they cover the area of max. 20-80 m^2. *Rumex palustris* dominates there. *Bidens tripartita* and *Ranunculus sceleratus* are less observed (Tab. 1). Phytocenoses of *Rumicetum palustris* usually adjoin other communities of *Bidentetea tripartitae* class, fragmentarily formed phytocenoses of *Phragmitetea* or *Isoëto-Nanojuncetea* class. Usually *Rumicetum palustris* is floristically poor. From 6 to 14 (10 on average) units of classification were noted. 28 plant species were totally noted in its phytocenoses (Tab. 1).

Discussion

Due to the floristic composition, phytocenoses of *Rumicetum palustris* in Poland were classified to the typical subassociations – *Rumicetum palustris typicum* (Fischer 1978; Passarge 1996). Based on the performed geobotanical studies, in fish-breeding ponds, three phases can be observed within *Rumicetum palustris*, like some communities from *Elatini-Eleocharition ovatae* alliance and *Isoëto-Nanojuncetea* class, e.g. *Eleocharetum ovatae* (Popiela 1997, 2005; Poschlod 1996; Šumberová 2011) – the initial, optimal and terminal. In the first year after flushing out the water from the pond or lowering the water level on the bottom or at the bank, its initial phase appeared. It was created by small population of *Rumex palustris* and *Ranunculus sceleratus* (Tab. 1, relevé 1, 3) or characteristic species from *Isoëto-Nanojuncetea* class (Tab. 1, relevé 3, 9, 10). If a pond is being dried for a period longer than one year, the association physiognomy will change, the vegetation is more dense and optimal phase will develop with clear dominatioin of *Rumex palustris*. In following years, if a pond is not flooded, the terminal phase will appear and large plants become more frequent and abundant. Then *Phragmites australis*, *Glyceria maxima* and *Typha angustifolia* of *Phragmitetea* class start to prevail (Tab. 1, relevé 7).

Due to relatively frequent occurrence of the species characteristic for this association in Poland – *Rumex palustris*, it is highly probable it will often appear especially in the valley of Wisła river and its main tributaries as well as complexes of fish-breeding ponds Zając and Zając 2001). Therefore, occurrence and distribution of this association in our country needs further studies.

Bibliography

Braun-Blanquet J. 1964. Pflanzen-soziologie, Grundzüge der Vegetationskunde. Dritte Auflage. Springer Verlag, Wien–New York, 865 pp.

Dostál J. 1989. Nová kvétena ČSSR. 1. Academia, Praha, 1548 pp.

Dzwonko Z. 2007. Przewodnik do badań fitosocjologicznych. Sorus, Inst. Bot. UJ, Poznań– Kraków, 308 pp.

Fischer W. 1978. Über einige Bidentetalia-Gesellschaften im westlichen Branderburg. Gleditschia 6: 177–185.

Jarolímek I., Zaliberová M., Mucina L., Mochnacký S. 1997. Rastlinné spoločenstwa Slovenska. 2. Synantropná vegetácia. Veda, Vyd. Slov. Akad. Vied, Bratislava, 416 pp.

Mirek Z., Piękoś-Mirkowa H., Zając A. & Zając M. 2002. Flowering plants and pteridophytes of Poland. A checklist. In: Z. Mirek (ed.) Biodiversity of Poland. 1. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków, 442 pp.

Passarge H. 1996. Pflanzengesellschaften Nordostdeutschlands. I. Hydro- und Therophytosa. J. Cramer, Berlin-Stuttgart, 283 pp.

Philippi G. 1984. Bidentetea-Gesellschaften aus dem südlichen und mittleren Oberrheingebiet. Tuexenia 4: 49–79.

Popiela A. 1997. Zbiorowiska namułkowe z klasy *Isoëto-Nanojuncetea* Br.-Bl. et Tx. 1943 w Polsce. Monographiae Botanicae 80: 1–59.

Popiela A. 2005. *Isoëto-Nanojuncetea* species and plant communities in their eastern disribution range (Poland). Phytocoenologia 35: 283–303.

Poschlod P. 1996. Population biology and dynamics of rare short-living pond mud plant, *Carex bohemica* Schreber. Verhandlungen der Gesselschaft für Ökologie 25: 321–337.

Pott R. 1995. Die Pflanzengesellschaften Deutschlands. 2 Aufl. E. Ulmer, Stuttgart, 622 pp.

Rennwald E. (red.) 2000. Rote Liste der Pflanzengesellschaften Deutschlands mit Anmerkungen zur Gefährdung. W: E. Rennwald (ed.), Verzeichnis und Rote Liste der Pflanzengesellschaften Deutschlands. Schriftenreihe für Vegetationskunde 35: 393–592.

Schubert R., Hilbig W., Klotz S. 1995. Bestimmungsbuch der Pflanzengesellschaften Mittel- und Nordostdeutschlands. G. Fischer, Jena–Stuttgart, 402 pp.

Spałek K. 2005. *Scirpetum radicantis* Hejný in Hejný et Husák 1978 in Poland. Thaiszia 15: 43-51.

Spałek K. 2006a. Threatened plant communities as an indicator of fishponds value: an example from Silesia (SW Poland). In: D. Gafta, J. Akeroyd (eds), Nature Coservation. Concepts and Practice: 195–198. Springer Verlag, Berlin–Heidelberg.

Spałek K. 2006b. *Utricularietum australis* Th. Müller et Görs 1960 in Poland. Acta Societatis Botanicorum Poloniae 75(3): 253–256.

Spałek K. 2008. *Nymphaeetum candidae* Miljan 1933 in Poland. Acta Societatis Botanicorum Poloniae 77(4): 339–343.

Spałek K., Nowak A. 2003. *Scirpetum radicantis* Hejný in Hejný et Husák 1978 em. Zahlh. 1979, a plant association new to Poland. Acta Societatis Botanicorum Poloniae 72(4): 347–350.

Šumberová K. 2011. Vegetation of annual wetland herbs. In: M. Chytrý (ed.), Vegetation of the Czech Republic. 3. Aquatic

and Wetland Vegetation: 309–346. Academia, Praha.

Szumiec M. A. 1995. The role of carp pond ecosystem management in wetland conservation. Acta Hydrobiologica 37, Suppl. 1: 13–20.

Timár L. 1950. A Tiszameder növényzete Szolonok és Szeged között. A Debreceni Tud. Biol. Intézeteinek Évk. 1: 72-45.

Tomaszewicz H. 1979. Roślinność wodna i szuwarowa Polski (klasy: *Lemnetea*, *Charetea*, *Potamogetonetea*, *Phragmitetea*) wg stanu zbadania na rok 1975. Rozprawy Uniwersytetu Warszawskiego, Warszawa, 324 pp.

Tomaszewicz H., Kłosowski S. 1985. Roślinność wodna i szuwarowa jezior Pojezierza Sejneńskiego. Monographiae Botanicae 67: 69–141.

Zając A., Zając M. (eds) 2001. Atlas rozmieszczenia roślin naczyniowych w Polsce. Nakł. Prac. Chorol. Komp. Inst. Bot. UJ, Kraków, 714 pp.

Tab. 1. *Rumicetum palustris typicum* (Timár 1950) W. Fischer 1978 in Poland.

Relevé number	1	2	3	4	5	6	7	8	9	10	C
Date	06.08 2005	11.09 2006	23.08 2008	14.09 2009	10.07 2010	10.07 2010	25.08 2011	21.07 2012	13.08 2014	07.09 2014	
Locality	N	N	P	P	JL	JL	P	W	R	J	
Cover of herb layer [%]	30	50	35	55	55	40	50	45	50	45	
Area of relevé [m^2]	20	30	30	20	50	50	80	60	50	50	
Number of species in relevé	9	7	14	10	11	8	9	6	12	13	
Ch. *Rumicetum palustris*											
Rumex palustris	3	3	4	3	3	3	3	3	3	3	V
Ch. *Bidention tripartiti*											
Ranunculus sceleratus	1	+	1	+	+	+	.	.	.	+	IV
Polygonum hydropiper	.	.	.	2	1	+	.	.	+	+	II
Bidens cernua	.	.	.	1	.	.	1	.	+	+	II
Polygonum minus	+	.	1	.	.	.	+	.	.	.	II
Ch., D.* *Bidentalia tripartiti, Bidentetea tripartiti*											
Bidens tripartita	1	+	1	1	.	2	1	+	1	1	V
*Echinochloa crus-galli**	1	.	+	.	1	.	.	.	+	+	III
Bidens radiata	+	1	.	.	.	.	.	+	.	.	II
Ch. *Phragmitetea*											
Phragmites australis	+	1	+	.	.	1	2	1	.	.	III
Glyceria maxima	.	.	.	1	1	+	2	+	+	+	III
Typha latifolia	.	.	.	.	+	1	1	+	.	1	II
Carex acutiformis	1	.	.	1	+	.	1	.	.	.	II
Alisma plantago-aqutica	.	.	.	+	1	.	.	.	+	.	II
Oenanthe aquatica		.	+	.	+	+	.	.	.	.	II
Ch. *Isoëto-Nanojuncetea*											
Cyperus fuscus	.	.	+	1	.	.	.	.	+	+	III
Peplis portula	.	.	+	+	.	.	.	.	.	+	II
Plantago intermedia	.	.	+	.	.	.	.	.	+	+	II
Accompanying species											
Lysimachia vulgaris	+	+	+	.	.	.	.	.	.	+	II
Lythrum salicaria	.	.	+	.	.	.	+	.	.	.	I

Sporadic: **Ch. *Phragmitetea***: *Eleocharis palustris* 3(1), *Rumex hydrolapathum* 5(1), *Galium palustre* 5(+), *Rorippa palustris* 2(+), *Scutellaria galericulata* 3(+); **Ch. *Isoëto-Nanojuncetea***: *Elatine hexandra* 10(+), *Eleocharis ovata* 9(+), *Limosella aquatica* 9(1), *Potentilla anserina* 9(+).

Explanations: J – Janisławice, J – Jelcz-Laskowice, N – Niedźwiedzice, P – Przemków, R – Rybin, W – Wojszyn; Ch. – characteristic species, D. – differential species, C – constancy.