

***TYPHA SHUTTLEWORTHII* (TYPHACEAE), NEW FOR POLAND**

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Abstract. The paper presents data on the distribution of *Typha shuttleworthii* W. D. J. Koch & Sond., a species previously not reported from Poland, and gives the diagnostic characters distinguishing *T. shuttleworthii* from *T. latifolia* L. Also discussed are the habitat requirements of the species, the plant communities in which it was observed, and its status in the flora of Poland.

Key words: *Typha shuttleworthii*, distribution, habitat preferences, category of threat, Poland

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INTRODUCTION

The genus *Typha* L. is represented in the flora of Poland by three established species (*T. latifolia* L., *T. angustifolia* L., *T. laxmannii* Lepech.) and by *T. ×glauca*, a spontaneous hybrid of the first two, usually found at sites where the parent species grow together. *Typha latifolia* and *T. angustifolia* are native species, while *T. laxmannii* is an alien plant intensively spreading in Poland (Baryła *et al.* 2005; Nobis *et al.* 2006). During field investigations in southeastern Poland we recorded *Typha shuttleworthii* W. D. J. Koch & Sond., a species new to the flora of our country.

MATERIAL AND METHODS

Field investigations were carried out in the Beskid Niski Mts and Bieszczady Mts in 2005–2010. The list below gives all the localities of *Typha shuttleworthii* we recorded so far. The locations were determined with a GPS receiver (the WGS84 coordinate system) in the ATPOL grid square system (Zajac 1978; Zajac & Zajac 2001) in which capital letters indicate the 100 × 100 km square, the first two digits denote the 10 × 10 km square, and the next two digits indicate the 2 × 2 km square. A total of nine phytosociological relevés were made by the standard Braun-Blanquet method (Pawłowski 1977) at the localities where *T. shuttleworthii* was a component of homogeneous patches of vegetation. Vascular

plant species nomenclature follows Mirek *et al.* (2002), and nomenclature of syntaxa is based on Matuszkie-wicz (2001).

We revised the herbarium material of all species of the genus *Typha* L. in KRA and KRAM. The newly discovered species was revised for comparative purposes (specimens from the species ranges) in the herbaria. The *T. shuttleworthii* specimens we collected are deposited in the Herbarium of the Institute of Botany at the Jagiellonian University in Kraków (KRA).

RESULTS

***Typha shuttleworthii* W. D. J. Koch & Sond.**

in W. D. J. Koch, Syn. Fl. Germ. Helv., ed. 2: 786. 1844. – *Typha latifolia* subsp. *shuttleworthii* (W. D. J. Koch & Sond.) Stoj. & Stef., Fl. Bulg.: 66. 1933. – *T. persica* Ghahreman & Sanei, Bull. Soc. Bot. Fr. **126**: 373. 1979.

Plant perennial, up to 1.5 m high, robust. Leaves pale green, 0.5–1.0(–1.5) cm wide, as long as stem with inflorescences or slightly longer. Male and female parts of inflorescence contiguous. Female inflorescence 6–17(–20) cm long, brown when young and silvery grey with age, male inflorescence 4–9(–12) cm long and 1.5–4 times shorter than female inflorescence. Male flowers with simple hairs, anthers (1.4–)1.5–2.2(–2.6) mm long. Female flowers without scales, pistils as long

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as hairs of perigonium or only slightly longer. Seeds 0.7–0.9 mm long. Flowering period: June – September. Chromosome number $2n = 30$ (data from outside Poland).

NOTES. Morphologically, *Typha shuttleworthii* is most similar to *T. latifolia*. For that reason it has been treated as a subspecies of *T. latifolia*. *Typha shuttleworthii* was recently recognized as a distinct species (Leonova 1979; Cook 1980; Hamdi *et al.* 2009, 2010). Baryła *et al.* (2005) gave identification key to the species of the genus *Typha* recorded in Poland as well as to species that can be expected to occur in Poland. Table 1 gives the main characters distinguishing *T. shuttleworthii* from *T. latifolia*, prepared on the basis of our observations of specimens from Poland and a review of other treatments.

GENERAL DISTRIBUTION. *Typha shuttleworthii* has been reported from lower mountain elevations in many countries of Central and Southern Europe, from eastern France to Ukraine, Romania and Bulgaria (Leonova 1979; Cook 1980; Dubina *et al.* 1993; Felbaba-Klushina 2011), as well as from Turkey and Iran in Southwestern Asia (Baytop 1984; Hamdi *et al.* 2009). In Central Europe it has been reported from Germany, Austria, the Czech Republic, Slovakia, Hungary and Ukraine (Cook 1980; Dostál & Červenka 1983; Haeupler & Schönfelder 1988; Dostál 1989; Dubina *et al.* 1993; Kricsfalusy *et al.* 1999; Haeupler & Muer 2000; Jäger & Werner 2002; Kaplan 2002; Malinowski *et al.* 2002; Ondrášek 2002; Uhrin & Bača 2005; Felbaba-Klushina 2009, 2011; Hlaváček & Grulich 2009; Kwakowska 2009). The records

of *T. shuttleworthii* closest to the Polish border are as follows: Czech Republic: Bukovec, bank of the Olza River ca 250 m W of the SSW border of Poland (Hlaváček & Grulich 2009); Slovakia: near Ruski Potok village, ca 8 km S of the SE border of Poland (Uhrin & Bača 2005); Ukraine: Domaszyn village, ca 15 km S of the SE border of Poland (Kwakowska 2009), all in the Carpathians.

DISTRIBUTION IN POLAND. All the localities of *Typha shuttleworthii* recorded to date in Poland are in the Carpathian Mts (SE Poland) (Fig. 1). The first was discovered in the Beskid Niski Mts in 2005 and the others were noted in the Western Bieszczady Mts in 2010.

LIST OF LOCALITIES. BESKID NISKI MTS: Jawornik village near Komańcza, disused quarry in the Oślawa River valley, 49°21'23.6"N/22°05'16.9"E (ATPOL grid square FG45 02), ca 500 m a.s.l., ca 20 flowering specimens, *leg. A. Nobis & M. Nobis*. WESTERN BIESZCZADY MTS: Żubracze village near Cisna, swamp in Solinka stream valley, near railway tracks, 49°12'24.3"N/22°17'29.7"E (ATPOL grid square FG57 30), ca 580 m a.s.l., ca 30 flowering specimens, *leg. M. Nobis & K. Kozłowska*; Kalnica village near Wetlina, ruts in disused road, 49°12'09.5"N/22°25'35.5"E, 570 m a.s.l., ca 10 flowering specimens; roadside ditch, 49°11'42.9"N/22°25'18.2"E, 580 m a.s.l., ca 10 flowering specimens; swamp in Kalnica stream valley, 49°11'30.0"N/22°25'22.0"E (ATPOL grid square FG57 34), 570 m a.s.l., more than 80 flowering specimens, *leg. K. Kozłowska & M. Nobis*; Between Kalnica and Strzebowiska villages, roadside ditch, 49°11'12.6"N/22°24'51.7"E, 600 m a.s.l., ca 10 flowering specimens; swamp in Kalnica stream floodplain, 49°11'10.8"N/22°24'53.0"E (ATPOL grid square FG57 44), 585 m a.s.l., ca 50 flowering specimens, *leg. K. Kozłowska*; Łuh (aban-

Table 1. Comparison of the main characters distinguishing *Typha latifolia* L. and *T. shuttleworthii* W. D. J. Koch & Sond.

Taxon	<i>Typha latifolia</i>	<i>Typha shuttleworthii</i>
Character		
Male inflorescence	(5–)10–20 cm long, longer or equal, rarely somewhat shorter than female inflorescence	4–9(–12) cm long, 1.5–4 times shorter than female inflorescence
Anthers	(2.0–)2.2–3.0(–3.3) mm long	(1.4–)1.6–2.2(–2.6) mm long
Pistils	distinctly longer than hairs of perigonium	as long as hairs of perigonium or only slightly longer
Seeds	0.9–1.6 mm long	0.7–0.9 mm long
Leaves	0.8–2.0 cm wide, distinctly longer than stem with inflorescences	0.5–1.0(–1.5) cm wide, as long as stem with inflorescences or slightly longer

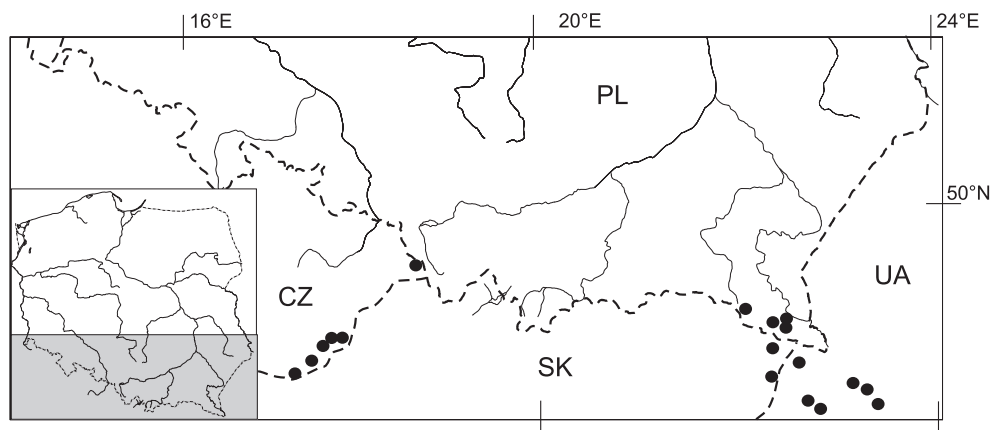


Fig. 1. Distribution of *Typha shuttleworthii* W. D. J. Koch & Sond. in Poland (PL), and the nearest localities in neighboring countries; Czech Republic (CZ) after Fajmon (2005) and Hlaváček and Grulich (2009), Slovakia (SK) after Uhrin and Bača (2005), Ukraine (UA) after Felbaba-Klushina (2009).

doned village in Wetlinka stream valley, 4–5 km N of Kalnica), wet meadow, 49°13'43.6"N/22°26'19.3"E, 545 m a.s.l., ca 30 flowering specimens; near S border of Sine Wiry Reserve, roadside ditch to Przełęcz Szczycisko pass, 49°14'16.8"N/22°26'07.8"E (ATPOL grid square FG58 10), 560 m a.s.l., ca 10 flowering specimens, *leg. K. Kozłowska & M. Nobis*; Jaworzec (abandoned village in Wetlinka stream valley, 2–3 km N of Kalnica), roadside ditch in Kobyłski stream valley, 49°12'56.6"N/22°26'24.3"E, 575 m a.s.l., ca 20 flowering specimens; ruts in disused road, 49°12'51.5"N/22°26'42.9"E, 590 m a.s.l., ca 10 flowering specimens; between Kalnica and Łuh villages, roadside ditches, 49°13'06.9"N/22°26'12.1"E (ATPOL grid square FG58 20), 560 m a.s.l., ca 70 flowering specimens, *leg. K. Kozłowska*.

HABITAT PREFERENCES. In Poland, *Typha shuttleworthii* grows in river and stream valleys, mostly in anthropogenic habitats such as roadside ditches, ruts, and old disused quarries. The plant has also been observed in wet meadows and swamps. The habitats of three localities situated in the Kalnica (Fig. 2) and Solinka stream valleys are of natural character.

The patches with *Typha shuttleworthii* we documented are quite small and usually cover a few square meters. Between 6 and 33 species were recorded in a single relevé (Table 2). *T. shuttleworthii* grows together with species typical for different plant communities: swamp species (*Phragmitetea*

class), wet meadow species (*Molinietalia* order), therophytes of silted banks of ponds, lakes and rivers (*Bidentetea* class), fen species (*Scheuchzerio-Caricetea nigrae* class), nitrophilous species of river banks (*Artemisietea* class, *Convolvuletalia* order) or even carr species (*Salicetea purpurea* class) and forest species (*Quercu-Fagetea* class). *Typha shuttleworthii* was recorded in all of the relevés; the highest constancy (over 60%) was noted for only 3 of the other species: *Equisetum palustre*, *Mentha longifolia* and *Galium rivale*.

The patches with *Typha shuttleworthii* we documented by relevés 1, 2, 3 and 4 are phytosociologically similar to rush communities of the *Phragmitetea* class. Relevés 7, 8 and 9 represent wet meadows of the *Molinietalia* order. The patches with *T. shuttleworthii* documented from relevés 5 and 6 are transitional and cannot be classified phytosociologically.

DISCUSSION

Typha shuttleworthii is the fifth established taxon of the genus *Typha* recorded in Poland to date. Baryła *et al.* (2005) previously suggested that *T. shuttleworthii* and another species, *T. minima*, might occur in Poland, and noted that they had been reported from countries bordering Poland.

The *T. shuttleworthii* populations recorded in



Fig. 2. *Typha shuttleworthii* W. D. J. Koch & Sond. at the locality in Kalnica (Western Bieszczady Mts).

SE Poland mainly occur in anthropogenic habitats. In this part of the Polish Carpathians, anthropogenic habitats, and more specifically roadside ditches in river or stream valleys, are the most frequent sites of rush communities, including species of the genus *Typha* and especially *T. latifolia*. Natural and anthropogenic habitats of *T. shuttleworthii* recorded in river and stream valleys are usually very close to each other. The straight-line distance between the known sites within its natural range is small (less than 10 km). For these reasons we consider *T. shuttleworthii* to be a native species of the Polish flora. The species may have been overlooked in Poland or, more likely, was not previously distinguished from *T. latifolia*. Our localities mark the current northern limit of the taxon's range in Central Europe.

Further localities of *T. shuttleworthii* in the Polish Carpathians may await discovery. In 2008, V. Grulich and A. Vydrová found a locality of it ca 250 m from the Polish border, in Bukovec (Czech Republic) on the bank of the Olza River (Hlaváček

& Grulich 2009). It may also occur in the Polish part of the Beskid Śląski Mts.

In Central Europe, *T. shuttleworthii* has been recorded in plant communities representing the *Phragmitetea* class as well as the *Molinetalia* order and the *Scheuchserio-Caricetea* class. In some regions of Europe, such as Germany and Switzerland (Pott 1995; Käsermann 1999), it is considered to be characteristic of the *Equiseto-Typhetum minima* association distinguished within the *Scheuchserio-Caricetea* class. It is also considered to be a component of the *Typhetum latifoliae*, *Phragmitetum communis* associations or its own monodominant *Typhetum shuttleworthii* association (Dubina *et al.* 1993; Käsermann 1999).

In SE Poland, *Typha shuttleworthii* occurs in river and stream valleys. It is sometimes difficult to specify the type of plant communities formed by *T. shuttleworthii* and accompanying species. In other cases it is a component of plant communities representing rush communities of the

Table 2. Plant communities with *Typha shuttleworthii* W. D. J. Koch & Sond. in the Polish Carpathians.

Relevé number	1	2	3	4	5	6	7	8	9	Constancy
Altitude (m a.s.l.)	580	585	490	590	570	560	570	585	545	
Date	17.07	01.08	23.09	05.08	01.08	17.07	17.07	24.09	17.07	
	2010	2010	2010	2010	2010	2010	2010	2010	2010	
Cover of shrub layer B (%)	0	0	5	0	0	0	0	0	5	
Cover of herb layer C (%)	90	90	70	20	90	50	90	85	95	
Area of record (m ²)	2.5	50	20	1	4	4	9	20	9	
Number of species	18	23	12	6	23	11	33	8	20	
<i>Typha shuttleworthii</i>	4	3(4)	3	2	2	3	1	2	1	V
Ch. All. <i>Phragmition</i>										
<i>Typha latifolia</i>	1	.	2	.	1	.	.	+	.	III
<i>Equisetum fluviatile</i>	.	2	.	.	+	.	.	.	.	II
Ch. Cl. <i>Phragmitetea</i>										
<i>Glyceria notata</i>	3	.	.	1	.	.	1	.	.	III
<i>Phalaris arundinacea</i>	.	1	.	.	.	.	.	.	+	II
<i>Veronica beccabunga</i>	1	.	.	1	.	.	.	.	.	II
Ch. O. <i>Molinetalia</i>										
<i>Equisetum palustre</i>	2	1	2	.	+	+	.	.	1	IV
<i>Filipendula ulmaria</i>	.	.	.	.	+	+	+	+	.	III
<i>Juncus effusus</i>	.	1	.	.	.	1	3	1	1	III
<i>Lythrum salicaria</i>	.	.	.	.	.	+	+	2	1	III
<i>Myosotis palustris</i>	.	1	.	.	1	.	2	.	1	III
<i>Scirpus sylvaticus</i>	.	.	1	.	.	1	2	4	5	III
<i>Angelica sylvestris</i>	.	+	.	.	+	.	.	.	.	II
<i>Caltha palustris</i>	1	2	.	.	.	.	.	.	.	II
<i>Cirsium oleraceum</i>	.	1	.	.	1	.	.	.	.	II
<i>Cirsium palustre</i>	.	+	1	.	.	.	.	.	.	II
Ch. Cl. <i>Molinio-Arrhenatheretea</i>										
<i>Mentha longifolia</i>	1	1	1	+	3	2	.	.	1	IV
<i>Ranunculus repens</i>	2	1	.	.	+	.	1	.	+	III
<i>Lathyrus pratensis</i>	.	+	.	.	1	.	2	.	+	III
<i>Agrostis gigantea</i>	.	+	.	.	+	.	.	.	.	II
<i>Agrostis stolonifera</i>	+	.	.	.	.	.	1	.	.	II
<i>Rumex acetosa</i>	.	+	.	.	.	.	+	.	.	II
Ch. Cl. <i>Artemisietea vulgaris</i>										
<i>Galium rivale</i>	+	2	.	.	3	1	1	.	1	IV
<i>Epilobium hirsutum</i>	.	.	.	.	.	+	.	.	+	II
<i>Epilobium parviflorum</i>	1	.	+	.	.	.	1	.	.	
Ch. Cl. <i>Bidentetea tripartiti</i>										
<i>Bidens tripartita</i>	.	.	.	+	.	.	1	.	.	II
Ch. Cl. <i>Scheuchzerio-Caricetea nigrae</i>										
<i>Juncus articulatus</i>	2	.	.	.	.	.	1	.	.	II
Others										
<i>Lycopus europaeus</i>	+	1	.	.	.	.	+	.	1	III
<i>Galeopsis speciosa</i>	.	+	.	.	1	.	.	.	+	II

SPORADIC SPECIES. Ch. All. *Phragmition*: *Sparganium erectum* 4(1); Ch. Cl. *Phragmitetea*: *Alisma plantago-aquatica* 4, *Carex gracilis* 8(1), *C. rostrata* 8(2), *C. vesicaria* 2(2), *Galium palustre* 1(1), *Poa palustris* 9; Ch. O. *Molinetalia*: *Deschampsia caespitosa* 6, *Trifolium hybridum* 7(1), *Valeriana officianalis* 9; Ch. Cl. *Molinio-Arrhenatheretea*: *Alopecurus pratensis* 5, *Centaurea jacea* 7(1), *Cerastium holosteoides* 7(1), *Dactylis glomerata* 5, *Elymus repens* 7, *Festuca pratensis* 7, *Holcus lanatus* 7(1),

Table 2. Continued.

Leucanthemum vulgare 7(1), *Lysimachia nummularia* 1(1), *Phleum pratense* 7(1), *Prunella vulgaris* 7(1), *Ranunculus acris* 7, *Trifolium pratense* 5, *Vicia cracca* 5(1); Ch. Cl. *Bidentetea tripartiti*: *Polygonum hydropiper* 7, *Rorippa palustris* 9; Ch. Cl. *Scheuchzeria-Caricetea nigrae*: *Ranunculus flammula* 7(1), *Carex flava* s.l. 7; Ch. Cl. *Artemisietea vulgaris*: *Cruciata laevipes* 5(1), *Urtica dioica* 5; Others: *Carex pallescens* 7, *Carex* sp. 1(1), *Chaerophyllum hirsutum* 2(1), *Eupatorium cannabinum* 3, *Juncus infexus* 2(1), *Mentha arvensis* 2(1), *Millium effusum* 2, *Potentilla erecta* 7, *Salix purpurea* B 9, B 3(1), *S. triandra* 3, *Salix* sp. 7, *Scrophularia nodosa* 6, *Stellaria graminea* 2, *S. nemorum* 5(1), *S. uliginosa* 9, *Trifolium medium* 7, *Tussilago farfara* 3, *Veronica chamaedrys* 1.

LOCATION OF RELEVÉS: 1 – Kalnica, ditch next to the church; 2 – between Kalnica and Strzebowiska, swamp in the Kalnica stream valley; 3 – Jawornik, disused quarry in the Oslawa River valley; 4 – Jaworzec, ruts in a disused road; 5 – Kalnica, swamp in the Kalnica stream valley; 6 – between Kanica and Łuh, ditch by the road; 7 – Kalnica, ruts in a disused road; 8 – Żubracze, swamp in the Solinka stream valley; 9 – Łuh, wet meadow in the Wetlinka stream valley.

Phragmitetea class and wet meadows of the *Molinietalia* order.

Typha shuttleworthii is the only species of the genus *Typha* covered by the Bern Convention. The plant is protected by law, considered rare and disappearing, and included on national red lists and/or in red data books in many European countries. It is considered extinct (EX) in Hungary (Király 2007), critically endangered (CR) in Slovakia (Feráková *et al.* 2001), Bulgaria (Randelović 1999) and the Czech Republic (Hlaváček & Grulich 2009), strongly threatened in Germany (Korneck *et al.* 1996), vulnerable (VU) in Switzerland (Käsermann 1999) and in Ukraine and adjoining regions (Felbaba-Klushyna 2011), and endangered (EN) in Serbia (Tomović *et al.* 2009).

Because *Typha shuttleworthii* has few localities in Poland and the Polish population is small (not exceeding a thousand plants) it should be treated here as a vulnerable plant species (VU).

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