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*Original Scientific Paper*

# *Typha shuttleworthii* in Ukraine and adjoining regions: tendencies of dynamics of distribution, ecological and coenotic peculiarities

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**ABSTRACT:** We present the results of analysis of the distribution of *Typha shuttleworthii* Koch & Sonder and tendencies of dynamics of its distribution in the Ukraine and adjoining regions. We regard *T. shuttleworthii* as a vulnerable taxon throughout Ukraine and adjoining regions, and the problem of conservation of its scattered localities is part of the problem to improve the hydrological balance and protection of river basin water resources. We established that until the 1990s this species had become rare in countries of the Carpathian Region, and during the last 10 to 15 years its natural habitats were situated mainly within protected areas. In particular, in the Ukrainian Carpathians its populations were found only at the East Beskids. The problem of conservation of *T. shuttleworthii* localities is related to restoration of the hydrological regime of landscapes and protection of river basin water resources.

**Key words**: *Typha shuttleworthii*, area, distribution, ecology, communities, threats.

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## INTRODUCTION

Recently, ecologists have paid particular attention to communities of natural hygro- and hydrophilous ecosystems, because of the anthropogenic transformation provoking lowering of the landscapes' subterranean waters and eutrophication of those water reservoirs. Their localities are being ruined, with some species reaching the edge of extinction.

Decrease of the number of *Typha shuttleworthii* Koch & Sonder natural habitats demonstrates manifestation of these phenomena throughout Europe, and was a main reason for including this species in the Species List of the Bern Convention (1979).

The area of *T. shuttleworthii* is the European temperate-meridional oceanic (Dubina *et al.* 1993), and the species is distributed mainly in the C and partly S Europe from the Western Pyrenees via W and C Alps, mountain and lowland parts of C Europe including the Carpathians and partly in the Balkans (Podesva 2008). It is considered as a lower alpine element of the flora (Kasermann 1999). It is also an indicator of over-damped valley and mountain ecotopes of the alluvial parts of reservoirs having soil and surface flooding. Plants grow at the littorals of oligotrophic and mesotrophic reservoirs, along the edges of eutrophic marshes, in bogs and damp meadows. In the communities belonging to the classis *Phragmito-Magno-Caricetea* Klika in Klika et Novak 1941 *T. shuttleworthii* is part of the monodominant association *Typhetum shuttleworthii* Soo 1927 or associations *Typhetum latifoliae* Soo 1927, *Equiseto-Typhetum minimae* Br.-Bl. in Volk 39, *Phragmitetum communis* (Gams 1927) Schmale 1939 (Dubina *et al.* 1993; Kaserman 1999). This species was also characteristic for the communities belonging to the classis *Scheuchzerio-Caricetea fuscae* Tx. 1937, ordo *Caricetalia davallianae* Br.-Bl. 1949, alliances *Caricion atrofusco-saxatilis* Nordhaben 1943 (Ellenberg *et al.* 1991) and *Caricion davallianae* Klika 1934.

The purpose of this manuscript is to present our point of view on the modern distribution of *T. shuttleworthii* in

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C and E Europe including an analysis of its phytocoenotic peculiarities and the threat level of existing populations. In addition, we paid particular attention to communities of *T. shuttleworthii* in the Ukrainian Carpathians. [Sentence transferred here as it is usual to finish Introduction with a statement of the aims of the research.]

## MATERIAL AND METHODS

Our treatment was based on a detailed examination of the available literature on geography and phytocoenotic peculiarities of *T. shuttleworthii* Koch & Sonder (Dubina *et al*. 1993; Sanda *et al*. 1998, Kasermann 1999) as well as the findings of a study of this species in Ukraine in 2004-2009. We also examined the herbarium collections in Ukraine (CHER, KW, LW, LWS, UU) and Hungary (BP) because in the past the Transcarpathia was part of this country. All taxa mentioned in the Flora of Ukraine taxa correspond to the "Checklist" of Mosyakin & Fedoronchuk (1999).

## RESULTS

At the present time *T. shuttleworthii* is regarded as vulnerable throughout C Europe. Therefore it is under protection in France, Germany and Austria. It is very rare in the flora of Bulgaria, and there are data on its CR state (Ranđelović, 1999) or EN state (Tomović *et al.,* 2009) in Serbia.

In the Carpathians *T. shuttleworthii* is distributed at the eastern border of its area and here it is rarer than in C and S Europe. This species was thought to have disappeared from the Czech Republic and Slovakia (Cerovsky *et al*. 1994), but afterwards it was found at four localities in these two countries: in the White Carpathians and close to them and a little later additional four localities were noted in the territory of the Poloniny National Park (Uhrin & Baca 2005; Podesva 2008). In the "Red list of ferns and flowering plants of Slovakia" (Ferakova *et al*. 2001) it is assessed as being a critically endangered species. It is rare in Romania too, and approximately ten localities were known from this country (Gritescu *et al*. 1966; Dihoru & Dihoru 1994).

In Ukraine *T. shuttleworthii* grows in the western part of the Forest-Steppe and Steppe Regions (Dubina *et al*. 1993). It was also noticed on the northern and southern macroslopes of the Ukrainian Carpathians (Zapalowicz 1906; Margittai 1923). In the Ukraine *T. shuttleworthii* was known only from the literature records, as there are no herbarium specimens in the main herbaria of this region.

In Budapest, in the herbarium of the Natural Museum (BP), we found several specimens of *T. shuttleworthii* collected in the Volcanic Carpathians and in the Transcarpathian lowland (part of the current Ukrainian Carpathians: prore Turja Remeta, 11.1882. № 251702b Dietz; in palude in paree, superior vallis Czerna potok pr. Szarwosret, Bereg, 8.1911. № 346494 Margittai and in palude Szernye ud Makaria, 7.1927, com. Bereg, №1392 Margittai; in aquis stagnalibus pr. Batyj , 7.1921, № 476640 Margittai.

Unfortunately, it was impossible to confirm the existence of the species in the foregoing localities in the Volcanic Carpathians. Also, bogs in the Transcarpathian lowland in which *T. shuttleworthii* evidently grew were destroyed many years ago.

Only quite recently four new localities of *T. shuttleworthii* were found at the Eastern Beskids, in the beech forest belt, altitude 600 to 750 m. Data on the former two localities were published by Kvakovska (2008) and Barsukevich & Danylyk (2009), and data on the latter two by us (Felbaba-Klushina, 2009). The first locality is placed at the head of the Uzh river (territory of the Uzhanski National Park), and the second at the head of the Stryi river. Meanwhile, we found the latter two nearby localities of *T. shuttleworthii* at the head of the Latorytsa river.

At the northern macro-slope of the East Beskydy (head of the Uzh river) *T. shuttleworthii* grows on the over-damped slope (area about 50 $m^2$). At the south macro-slope in the territory of the Uzhanski National Park this species was noted in the wetland located at the spring source (area about 100 $m^2$).

We found two localities of this species in the upper Latorytsa river (south macro-slope) where it was growing along the periphery of the eutrophic carex-moss marsh. By their floristic composition, these communities look like those described in Slovakia (Uhrin, Baca, 2005). In both cases, the communities occupied small areas (18 to 22 $m^2$) at the foothills of spring sources. In Laz Ravine, the communities were situated close to a carbonate carex-moss marsh in which *Carex davalliana* Smith dominated.

The other locality was in Chorna Vilkha Ravine, on the southern spurs of the Watershed Range. It was also related to a slope wetland receiving both subterranean and surface waters and this locality was contiguous with a eutrophic carex-moss marsh with participation of *Carex nigra* (L.) Reichard , *C. flava* L., and *C. echinata* Murray.

This species mainly forms monodominant communities belonging to the association *Typhetum shuttleworthii* Soo 1927, alliance *Phragmition communis* Koch 1926, order *Phragmitetalia communis* Koch 1926, classis *Phragmito-Magno-Caricetea* Klika in Klika et Novak 1941 (Sanda *et al*. 1998; Kaserman 1999; Dubina *et al*. 1993). It can also be found within associations of the alliances *Caricion atrofusco-saxatilis* Nordhaben 1943 (Kaserman 1999) and *Caricion davallianae* Klika 1934, of the order *Caricetalia davallianae* Br.-Bl. 1949, and classis *Scheuchzerio-Caricetea fuscae* Tx. 1937.

*Typha shuttleworthii* was included in the "Transcarpathian Red List" (Kricsfalusy *et al*., 1999) but it is not included in the "Red Book of Ukraine" (Anonymous 2009).

As a result of our proposal, a local botanical reserve was created in the upper Latorytsa river (Laz) to protect *Typha shuttleworthii* and *Carex davalliana*.

## CONCLUSIONS

According to the literature and the results of our study, *Typha shuttleworthii* is a vulnerable taxon throughout Ukraine and adjoining regions. After examination of the distribution of this species in Europe, we noted a decrease of the number of *Typha shuttleworthii* Koch & Sonder natural habitats, and it is especially rare in the countries of the Carpathian Region. During recent years its natural populations were noted mainly in protected territories. In particular, in the Ukrainian Carpathians its populations were found in the East Beskids and only in four localities.

Because the communities of *T. shuttleworthii* occupy small territories mainly of eutrophic marshes, over-damped slopes and are localized at the foothills of spring sources, their conservation is part of the problem of improving the hydrological balance and protection of river basin water resources.

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REZIME

# *Typha shuttleworthii* u Ukrajini i okolnim regijama: dinamika distribucije, ekološke i cenološke osobenosti

Ljubov Felbaba-Klushyna

U radu se daju rezultati analize rasprostranjenja *Typha shuttleworthii* Koch & Sonder i tendencije dinamike njegove distribucije u Ukrajini i okolnim oblastima. *T. shuttleworthii* je ugrožen takson širom Ukrajine, ali i okolnih oblasti. Problemi koji se javljaju u zaštiti ovog taksona su raštrkani lokaliteti koji su u nepovoljnom hidrološkom režimu. Posle najnovijih istraživanja jasno je da je vrsta sve redja u Karpatskom regionu, a tokom poslednjih 10-15 godina njena prirodna staništa nalaze se samo u okviru zaštićenih područja. U Ukrajini njena populacija nalazi se samo u Istočnom Beskidsu. Problem zaštite lokaliteta *T. shuttleworthii* povezan je sa restoracijom hidrološkog režima predela i zaštite vodenih resursa.

**Key words:** *Typha shuttleworthii*, areal, rasprostranjenje, ekologija, zajednice, ugrožavanje.