

# Georgia Bulrush, *Scirpus georgianus* (Cyperaceae): a new alien species in the flora of Bosnia and Herzegovina and the Balkans

Semir Maslo<sup>1</sup> & Šemso Šarić<sup>2</sup>

<sup>1</sup> Primary School, Lundåkerskola, Gislaved, Sweden, e-mail: semmas@edu.gislaved.se (corresponding author)

<sup>2</sup> JP ŠPD-ZDK d.o.o Zavidovići, Bosnia and Herzegovina, e-mail: semsosumar@gmail.com

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**Abstract.** Georgia Bulrush, *Scirpus georgianus* (Cyperaceae), was discovered in July 2017 during fieldwork on the banks of the Velika Ribnica brook near river Krivaja, in the vicinity of Ribnica village near Banovići (Central Bosnia). Georgia Bulrush is native to North America, but it has been introduced in some areas beyond its natural range. This is the first record of this species for Bosnia and Herzegovina, as well as for the Balkan Peninsula. The paper presents a short morphological description and photographs of the species, based mainly on the collected specimens, and the distribution of the taxon.

**Key words:** alien species, Bulrush, distribution, morphology, naturalization

## Introduction

The genus *Scirpus* L. (Cyperaceae) is represented by six species in the European flora, of which only two are native (Jiménez-Mejías & Luceño 2011). In the flora of Bosnia and Herzegovina, only one species of the genus *Scirpus* has been recorded so far: *Scirpus sylvaticus* L. (Beck von Mannagetta 1903). During fieldwork conducted in the Central Bosnia in 2017, *S. georgianus* has been found. This is a new alien species for the flora of Bosnia and Herzegovina. In Europe, *S. georgianus* has been reported so far as introduced in Germany (Schnittler & Niedbala 1993), Slovenia (Zelnik 2004), Belgium (Verloove 2016), and Poland (Nobis & al. 2014).

## Material and methods

Digital photographs and GPS coordinates were taken in the field. Identification of the specimens was done

according to Harper (1900), Schuyler (1967), Strong (1994), Whittemore & Schuyler (2002), Zelnik (2004), and Verloove (2014, 2016). Nomenclature follows the Euro-Med checklist (Jiménez-Mejías & Luceño 2011). The specimens were collected and stored in the Herbarium of the National Museum of Bosnia and Herzegovina (SARA).

## Results and discussion

*Scirpus georgianus* Harper, in Bull. Torrey Bot. Club, 27: 331. 1900.

Synonym: *Scirpus atrovirens* var. *georgianus* (Harper) Fernald, Rhodora 23: 134. 1921

*Scirpus georgianus*, also known as Georgia Bulrush, originates from North America. It is very rare, locally naturalized alien in some parts of Europe. It belongs to a taxonomically difficult species complex – *S. atrovirens* s.l. (Verloove 2016).

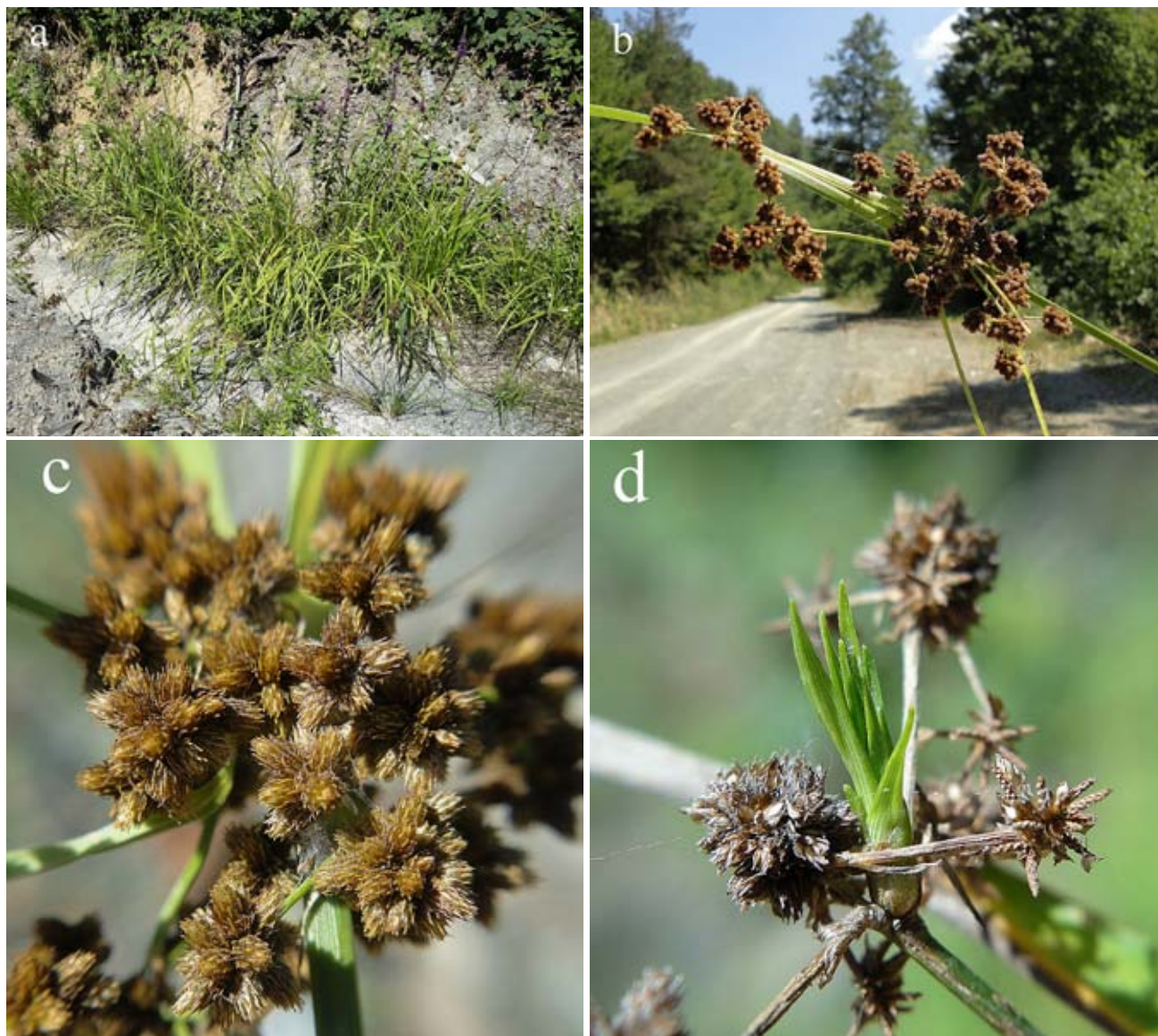
To identify this new species, we offer an adjusted key, according to Schnittler & Niedbala (1993), Zelnik (2004), and Verloove (2016).

1. Inflorescence mostly lax, green or greenish-brown. Spikelets in fascicles of 2–5(8), at the apices of ultimate rays. Perianth bristles 5–6, stiff, retrorse-barbed throughout, as long as, or slightly longer than the achene . . . . . *S. sylvaticus*
2. Inflorescence always compact, brownish-red. Spikelets in fascicles of 8–20, at the apices of ultimate rays. Perianth bristles 0–3, slender, retrorse-barbed above, shorter than the achene . . . . . *S. georgianus*

*Scirpus georgianus* (Fig. 1) is a caespitose perennial, with short tough fibrous rhizomes. Culms erect,

about 100 cm tall, 3–4-leaved. Involucral leaves about 3, the longest exceeding the umbel. Inflorescence rays branching at widely divergent angles and frequently having axillary bulblets at maturity. Spikelets ovate, 1–2 mm wide and 2–4 mm long, in numerous glomerules. Scales about 1.5 mm long, elliptic, mucronate, usually brownish. Bristles frequently lacking, or occasionally numbering 1, 2, or 3 short ones up to about  $\frac{3}{4}$  as long as the achenes. Achenes oblong, about 0.8 mm long, short-beaked, maturing in June and July. Chromosome numbers:  $n = 25, 26, 27$  (Harper 1900; Schuyler 1967).

Scattered populations of *S. georgianus* were found in ditches near the Velika Ribnica brook, approximately



**Fig. 1.** *Scirpus georgianus* in the vicinity of Ribnica village near Banovići: a). naturalized habitat; b & c). inflorescence; d). bulblets burst into leaf (Photos Š. Šarić).

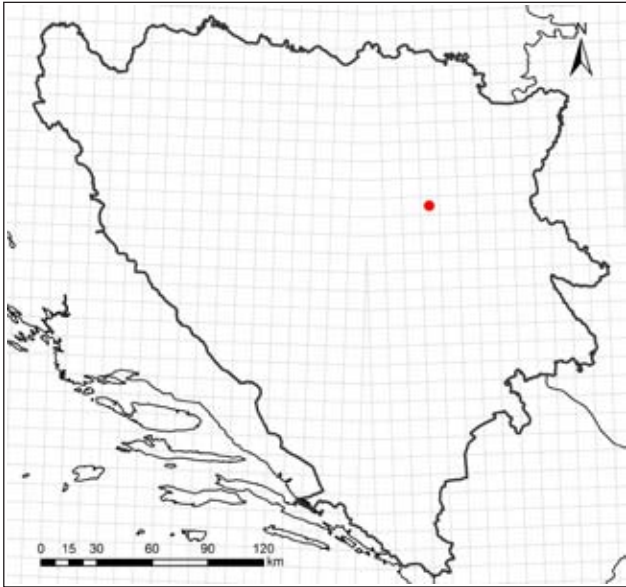


Fig. 2. Distribution of *Scirpus georgianus* in Bosnia and Herzegovina.

8 km upstream from river Krivaja, in the vicinity of Ribnica village near Banovići (44°21'10.75"N, 18°26'43.59"E) (Fig. 2). The population was numerous, with some plants up to 120 cm tall, and with high seed output. About 30 flowering specimens were recorded at a linear distance of about 10 m. *Scirpus georgianus* prefers wet habitats like inundated meadows, marshes and ditches and grows with the following species: *Alisma plantago-aquatica* L., *Ambrosia artemisiifolia* L., *Bidens tripartitus* L., *Centaureum erythraea* Rafn., *Echinochloa crus-galli* (L.) P. Beauv., *Epilobium parviflorum* Schreber., *Equisetum telmateia* Ehrh., *Erigeron annuus* (L.) Desf., *Eupatorium cannabinum* L., *Euphorbia platyphyllos* L., *Hypericum androsaemum* L., *Juncus articulatus* L., *J. effusus* L., *Lycopus europaeus* L., *Lythrum salicaria* L., *Plantago major* L., *Tussilago farfara* L., *Typha latifolia* L., and *Veronica beccabunga* L. Considering the territory occupied by the species and the number of individuals in the population, it could be inferred that *S. georgianus* was introduced to Bosnia and Herzegovina only a few years ago. It is yet unknown how this species was introduced to Bosnia and Herzegovina. Most species of the *S. atrovirens* complex are weedy and their small seeds are well adapted for accidental transport by humans and animals (Verloove 2016).

According to Richardson & al. (2000) and Pyšek & al. (2004), the observation period is too short to understand and assign it a state of naturalized species. Therefore, it must be considered an alien casual, waiting for further field investigations to achieve the proper status attribution.

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