FALL PANICGRASS *Panicum dichotomiflorum* Michx. – A NEW ALIEN SPECIES IN THE FLORA OF BOSNIA AND HERZEGOVINA

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**Abstract**

A new alien species for the flora of Bosnia and Herzegovina was found, namely *Panicum dichotomiflorum* Michx., fall panicgrass. In early autumn 2015, during fieldwork on the banks of the Krivaja River near Zavidovići (Central Bosnia), the second author came across a dense population of an unknown grass species. Based on the collected material and the relevant literature the first author has determined the taxon as *Panicum dichotomiflorum* Michx.

Fall panicgrass is an annual arable weed and ruderal plant of American origin with a limited distribution in Europe. The paper presents a short morphological description and illustrations of the species based mainly on the collected specimens, as well as the distribution of the taxon.

**Keywords:** alien species, weed, morphology, distribution.

**Introduction**

*Panicum dichotomiflorum* belongs to sect. *Dichotomiflora* (Hitch.) Honda. No representative of sect. *Dichotomiflora* is spontaneous in the flora of Bosnia and Herzegovina and *P. dichotomiflorum* cannot be confused with other species of *Panicum* from this flora.

The native distribution range is North and South America and it is widely naturalized in southern Europe, Asia and Australia. It has been reported in Europe as established in Azerbaijan, Albania, Austria, Belgium with Luxembourg, Czech Republic, Croatia, France, Germany, Georgia, Great Britain, Hungary, Italy, Netherlands, Poland, Romania, Russia, Slovakia, Slovenia, Spain, Switzerland, Turkey and Ukraine (Valdés & Scholz, 2009).

The first record of this species for the territory of Former Yugoslavia (on the banks of the open channels, near Turopolje in Central Croatia) was reported by Hulina (1985), as well as in maize fields, on field paths and boundaries (Ilijanić & Marković 1986). It is also reported in Slovenia (Csiky *et al.*, 2004; Jogan, 2007).
Material and methods

During fieldwork in 2015 in the area of Central Bosnia, the second author found a new alien species for the flora of Bosnia and Herzegovina, *Panicum dichotomiflorum* Michx. Digital photographs and GPS coordinates were taken in field.


Herbarium samples (No. inv. XX XXX) are stored in the Herbarium of the National Museum of Bosnia and Herzegovina (SARA).

![Figure 1. *Panicum dichotomiflorum* Michx. (Drawing from the book *Danmarks græser*, by Jens Christian Schou with permission of author).](image-url)
Results and discussion

Panicum dichotomiflorum Michx. Fl. Bor.-Amer. 1: 48. 1803 (syn. Panicum chloroticum Nees ex Trin.), also known as fall panicgrass, originated in North and South America, and is widely naturalized in Asia, Australia and parts of Europe.

The first finding of this species for Bosnia and Herzegovina is coming from Central Bosnia 2015, in the village Hadžine Vode near Zavidovići, on the banks of Krivaja river (44° 14' 18.07" N; 18° 28' 48.81" E), with several massive colonies on both sides of the river.

It especially grows in disturbed habitats: waste places, along moist or wet (periodically flooded) road sides, riverbanks, and as a weed in cultivated areas. Our findings in Central Bosnia: midstream of the river Bosna, between Žepče and Maglaj (Žepče, Zavidovići, Maglaj), Krivaja River downstream of Ribnica and the town of Banovići. The largest population recorded is in maize fields near Žepče (Fig.3).

The invasive character: Although it is not known yet from other localities in Bosnia and Herzegovina, its wide spread throughout the world leads to us considering it as a species with a fairly high invasive potential into disturbed habitats. Even fall panicgrass is classified as invasive in Croatia (Boršić et al., 2008, Nikolić et al., 2014) we recognized it as naturalized non-invasive taxa according to its behavior observed in the investigated area. For the time being it does not show the ability of invasive expansion, but this possibility cannot be excluded.

The genus Panicum L. is one of the largest genera of grasses, and comprises approximately 300 species of worldwide distribution. The majority of species are of tropical or subtropical origin (Zuloaga & Soderstrom, 1985). In the flora of Europe, Panicum is represented by only six species (Clayton, 1980). The majority of Panicum species recognized in Europe belong to sect. Panicum L. (leaf sheaths rounded and hairy, lower glumes acute to attenuate) and sect. Dichotomiflora (Hitch.) Honda (leaf sheaths compressed, glabrous, lower glumes truncate to subacute) (Clayton, 1980, Freckmann and Lelong, 2003).

In the flora of Bosnia and Herzegovina only two species of the genus Panicum have been recorded so far: Panicum capillare L. and Panicum miliaceum L. (Beck, 1903, Slavnić, 1960). From these two P. dichotomiflorum can be easily distinguished by compressed and glabrous leaf sheaths.

To identify this new species, we offer the adjusted key according to Clayton (1980), Freckmann and Lelong (2003) and Verloove (2014).
1. Lower glume $\frac{1}{4}$ of spikelet length. Leaf sheaths compressed, glabrous, lower glumes truncate to subacute

*P. dichotomiflorum*

1. Lower glume more than $\frac{1}{2}$ of spikelet length. Leaf sheaths rounded and hairy, lower glumes acute to attenuate
2. Panicle usually more than $\frac{1}{2}$ the length of the entire plant

*P. capillare*

2. Panicle less than $\frac{1}{2}$ the length of the entire plant

*P. millaceum*

Figure 2. *Panicum dichotomiflorum* Michx. in the town of Zavidovići (Photo by Šemso Šarić).
Panicum dichotomiflorum (Fig. 1) is a fibrous-rooted annual grass, with geniculate or ascending stem, up to 50 – 150 cm high. Size varies greatly, depending on competition from other plants for soil moisture and nutrients. The stem often has a zigzag appearance because it bends at the nodes (Fig. 2). Mature leaves are 10-50 cm long and 5-25 mm wide, with a prominent pale green midvein. The ligules are 1 – 2 mm long, roundly obtuse, membranous and are surrounded by thick, small, white hairs. The sheaths are often compressed glabrous, ciliate on the margin. The spikelets are grouped in large, many-flowered and diffuse panicles, 10-40 cm long. The spikelets are narrowly elliptical, deciduous, 2 – 3 mm long, acute, often greenish purple. Lower glume is ¼ as long as the spikelet, truncate or broadly triangular. Upper glume and lower lemma acute. The caryopsis is ca 2 mm long, yellow-brown, and elliptic (Hitchcock, 1950, Clayton, 1980).

Fall panicgrass has become a nuisance in cultivated fields, such as maize, alfalfa and soybeans. The species is also recorded as a pernicious weed in maize fields in some countries of Europe (Jensen et al., 2011). Fall panicgrass became a particular problem in maize fields when atrazine came into popular use in the 1950s and 1960s. Atrazine controls many weeds but has little or no effect on fall panicgrass, which flourishes in the absence of competition. The best control method for fall panicgrass in cultivated fields is to establish a shady crop canopy, because fall panicgrass must have full sun to grow (Thompson et al., 1971). Fall panicgrass has been blamed for causing nitrate poisoning and extreme sensitivity to light in livestock of any skin that is not protected from the sun (Nikolić et al., 2014).

Figure 3. The distribution of Panicum dichotomiflorum in the Bosnia and Herzegovina.
This species flowers from June to October and reproduces entirely by seeds that mature in late summer and fall. Seeds can be dispersed by wind and animals. The mode of introduction in our flora is not certain. It is possible that it happened accidentally, but can be introduced with birdseeds and from other sources. The potential invasive characteristics of the species should be monitored in the coming years.

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References

BECK, G., 1903: Flora Bosne i Hercegovine i Novopazarskog Sandžaka. Sarajevo.


