



Euphorbia davidii Subils (Euphorbiaceae), a new alien species in the flora of Serbia

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ABSTRACT: *Euphorbia davidii* Subils (Euphorbiaceae), toothed spurge, is a plant native in N-America, introduced in Europe about fifty years ago. There were no published data about the occurrence of this species in Serbia. Populations of this alien weed were noticed in 2007 in two localities in Vojvodina (Serbia) on the arable fields between the villages Aleksa Šantić and Pačir (CR78) and also app. 10-12 km further between villages Pačir and Đurđin (CR88 according to 10×10 km UTM). The populations of toothed spurge were distributed in several patches, in a total area of app. 3 ha. In 2013 the area of distribution was app. 7 ha, and the abundance of this species also increased. As a new alien species in Serbia *Euphorbia davidii* should be further monitored, considering its invasive character and potential spreading from the site where it has been recorded.

KEY WORDS: Alien, toothed spurge, invader, non-native

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Euphorbia davidii Subils, Kurtziana 17 (1984) 125, Syn.: *Euphorbia dentata* var. *gracillima* Millsp., Pittonia 2 (1890) 90; *Euphorbia dentata* var. *lancifolia* Farwell, Amer. Midl. Nat. 8 (1923) 273, toothed spurge, from the *E. dentata* group is a relatively new alien in Europe's flora. It is native in North Mexico, USA, Canada, but introduced in South America (Argentina), Australia and Europe (GELTMAN 2012). Both *Euphorbia davidii* and *E. dentata* s. str. from the *E. dentata* agg. have been reported from Europe (e.g. MIKHEEV 1971, YENA 2011). After revision of published data and herbarium materials collected since 1968, BARINA *et al.* (2013) indicate that only *E. davidii* can be confirmed in Europe. There are known populations in Russia, Ukraine, Moldavia, Romania, Bulgaria, Hungary, Italy, Belgium, Switzerland and France (BARINA *et al.* 2013). There were no published data on the presence of this species in Serbia (JANKOVIĆ & NIKOLIĆ 1972, VRBNIČANIN *et al.* 2004, ANAČKOV *et al.* 2013) yet.

The aim of this paper is to present the occurrence of the toothed spurge *Euphorbia davidii*, an alien plant recorded for the first time in the flora of Serbia.

The research was based on personal field study and on literature data. Plants were photographed by digital camera (Canon Power Shot A810), material was collected and herbarium examples were prepared. Herbarium specimens were deposited at the private collection of the Vajgand family. The distribution map of *E. davidii* in Serbia was made using 10×10 km grid square based on the Universal Transverse Mercator (UTM) projection. The identification of collected plants was based on morphological characters from the literature, e.g. GELTMAN 2012, OPREA *et al.* 2012, BARINA *et al.* (2013).

The *Euphorbia davidii* was recorded between the villages Aleksa Šantić and Pačir (CR78) and also app. 10-12 km from the first location between the villages Pačir and Đurđin (CR88 according to 10×10 km UTM) (Vojvodina, Serbia) (Fig. 1.).



Fig. 1. Distribution of *Euphorbia davidii* in Serbia

The populations were first noticed in 2007 in four crop fields distributed in several patches in a total area of app. 3 ha. In the six years leading to 2013, the area of distribution of toothed spurge had expanded to app. 7 ha and the abundance of species also increased.

Description: *Euphorbia davidii* is an annual plant, 20–50 cm tall, stem oppositely branched, pubescent, with two layers of hairs: upper of sparse, more-or-less patent longer hairs and lower denser, shorter, downwards, multicellular; leaves are opposite, petiolate, the lamina up to 6(–8) cm

long, lanceolate to elliptical, sometimes red-spotted, the base attenuate, the margin crenate-serrate, the apex acute to acuminate, hairy on both surfaces (denser on the lower side) (Fig. 2a), the hairs with a larger basal cell and verrucose walls; Inflorescence (pleiochasium) terminal; cyathia app. 2.5 mm long, with one marginal gland, the rim irregularly lobed and fringed, and lacinia glandular; bracteoles inside cyathium with non-glandular lacinia; staminate flowers up to 15 per cyathium; (Fig. 2b), pistillate flower exceeding cyathia, the ovary usually glabrous, the stigma two-lobed; capsule 3–5 × 4.5–5 mm, glabrous; seeds a little longer than wide (2.5–2.8 × 2.1–2.5 mm), on cross section tetragonal, on its surface there are relatively few irregularly formed tubercula, with a large yellow reniform caruncle (GELTMAN 2012, OPREA *et al.* 2012). Populations in the investigated area flowered in August–September, and fruited in September–October.

The populations of toothed spurge in Serbia occurred on ploughed fields, with chernozem-like soil. This alien weed can be found on different substrate, e.g. limestone gravel in places with sandy-clayey soil (VLADIMIROV & PETROVA 2009).

Way of introduction. The origin of the introduction of *Euphorbia davidii* in Serbia is unknown; the plant might have appeared along railways or together with crop seeds. It seems that *E. davidii* started to spread in Europe with the massive import of crop seeds from N. America in 1960–1980s (GELTMAN 2012). In some European countries it was introduced and is spreading mainly along railways (BARINA *et al.* 2013).

Invasiveness. According to the observations of toothed spurge populations in Serbia in the last six years, the weed easily spread and formed more or less dense patches in the crop fields, the area of distribution more than doubled. The majority of the weed population could be destroyed by row cultivation, nevertheless a lot of toothed spurge individuals remained between crops and are spreading further.



Fig. 2a,b. *Euphorbia davidii* a) leaf, lower side, b) Inflorescence (ciathya)

This species has been discovered in Hungary in an arable field and seemingly it behaves as a typical summer annual arable weed: the ground cover of *E. davidii* varied within the field between 0.1-30%, and it formed dense patches where the vegetation cover of maize was thinner (PINKE *et al.* 2012). The related species *E. dentata* s. str. had been cultivated in the botanical gardens of the Russian Empire (e.g. St Petersburg, Tartu) for a long time. Nevertheless, this plant did not escape from cultivation and did not become an invasive plant (GELTMAN 2012). In North America, *E. dentata* agg contains several taxa from which *E. dentata* s. str. (diploid $2n=28$) has not got an invasive character, but *E. davidii* (tetraploid $2n=56$) can be considered as invasive. These two taxa differ in a number of morphological characters as well as by ploidy level, but could not be distinguished upon habitus (GELTMAN 2012). PHELOUNG *et al.* (1999) assessed *E. davidii* in Australia to have a medium impact on the environment, but a significant impact on agricultural land. According to BARINA *et al.* (2013), most of the European populations are small and restricted to railway areas; however, the species can also invade agricultural fields. Due to its wide distribution, the growing number of recently established populations and its invasive ability (PYŠEK *et al.* 2004), special attention should be paid to changes in distribution and population sizes in Europe (LAMBTON *et al.* 2008, BARINA *et al.* 2013).

The *Euphorbia davidii* in Serbia should be permanently monitored, considering its potential spread from the site where it has been recorded.

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REZIME

Euphorbia davidii Subils (Euphorbiaceae), nova invazivna vrsta u flori Srbije

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Euphorbia davidii Subils (Euphorbiaceae), nova strana vrsta u flori Srbije otkrivena je na dva lokaliteta u Vojvodini, između sela Pačira i Đurđina kao i između Pačira i Alekse Šantića. Vrsta je prvi put primećena 2007. godine kao korov okopavina u usevima i od tada je praćeno širenje njenih populacija. U radu je dat morfološki opis vrste, priložene su i fotografije biljaka, a takodje su prikazana i dosadašnja iskustva o načinu širenja i invazivnosti ove vrste.

Ključne reči: Strana vrsta, flora Srbije, invazivna vrsta, korov.