

New discovered adventive plants from eastern Slovakia

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Jehlík V., Májeková J. & Zaliberová M. (2013): New discovered adventive plants from eastern Slovakia. – Thaiszia – J. Bot. 23 (1): 61-66. – ISSN 1210-0420.

Abstract: In August 2012, a floristic research was carried out in the rail transshipment yards in eastern Slovakia. A special attention was paid to the adventive plants including invasive weeds. During the research, one new species – *Euphorbia davidii* – and three rare species – *Geranium purpureum*, *G. sibiricum*, and *Grindelia squarrosa* – were recorded for the Slovak flora. All the species were probably introduced through the Eastern migration route. Two of these invasive or potentially invasive species, *E. davidii* and *G. squarrosa*, are expected to be spread also in the future. New Slovak localities of all included species are presented in this paper; some data on the European distribution and identification are also provided.

Keywords: railway, transshipment yards, adventive plants, Eastern migration route.

Introduction

After the year 1945 (the end of the 2th World War), the transshipment yard Čierna nad Tisou (later also its broader surroundings) represented the most frequent area for the spreading of alien (adventive) plant species not only in Slovakia, but also in all former Czechoslovakia. For this migration stream, JEHLÍK (1970, cf. JEHLÍK & HEJNÝ 1974) used the term “Eastern migration route” for the first time in phytogeography.

Since September 1964, the migrations of adventive plants from the East have been occasionally investigating in the localities of eastern Slovakia (JEHLÍK 1998,

JEHLÍK & DOSTÁLEK 2008). In this paper, we present data about the distribution of four species of special interest, *Euphorbia davidii*, *Geranium purpureum*, *G. sibiricum*, and *Grindelia squarrosa*.

Material and methods

The phytosociological relevé was made according to the Zürich-Montpellier school using the 7-degree Braun-Blanquet scale of abundance and dominance (BRAUN-BLANQUET 1964). Herbarium specimens are deposited in the Herbarium of the Institute of Botany in Bratislava (SAV). Geographic nomenclature follows ANONYMUS (1994).

Results

Euphorbia davidii Subils (Fig. 1)

Euphorbia davidii – species of the subgenus Poinsettia (Grah.) House – represents a new introduced vascular plant species in Slovakia. It is related to *E. dentata* Michx., which is often difficult to distinguish from. The list of distinguishing characters of both species was published by BARINA et al. (2013). Description and illustration of *E. davidii* was published by SUBILS (1984).

New locality: Východoslovenská nížina lowland: Maťovské Vojkovce (Michalovce district), classification yard Maťovce, scattered in yard, 48°33'23,3", 22°07'18,2", 106 m a.s.l., 23.8.2012 (SAV).



Fig. 1. *Euphorbia davidii* in the classification yard Maťovce (foto: Jana Májeková).

The species *E. davidii* was introduced to Slovakia through the Eastern migration route, probable from Ukraine. In Ukraine, there are also the nearest localities of its occurrence, e.g. Chop and Mukachevo found out in 1992 (BARINA et al. 2013, cf. GUZIK et al. 1997). Imported cereals could be a source of diasporas. This North American species was recorded in Europe along the railways, on the railway stations, sometimes also like a weed in arable lands, e.g. in vineyards, soya fields, cereals, maize fields, and rarely also in the sea or river ports, and other industrial localities. In Ukraine, V. Jehlík and M. Shevera collected the species also in the commercial port Izmail on the Danube river (17.9.2003, PRA). The species has not been observed in the river ports in the central Europe till now. Problem of the spreading of *E. davidii* in Europe was summarised by BARINA et al. (2013) and its further spreading can be expected. In Europe, *E. davidii* has been recorded in Belgium, Bulgaria, France, Hungary, Italy, Moldavia, Romania, Russia, Switzerland, and Ukraine. It is already considered to be quarantine or invasive weed in some areas (cf. GUZIK et al. 1997, BARINA et al. 2013).

***Geranium purpureum* Vill.**

New localities: Východoslovenská nížina lowland: Čierna nad Tisou (Trebišov district), railway station, 48°25'10,4", 22°05'09,9", 102 m a.s.l., 22.8.2012 (SAV); Maťovské Vojkovce (Michalovce district), classification yard Maťovce, 48°33'28,5", 22°07'43,1", 106 m a.s.l., 23.8.2012 (SAV); Bánovce nad Ondavou (Michalovce district), railway station, 48°40'46,7", 21°50'06,7", 121 m a.s.l., 24.8.2012 (SAV); Košická kotlina basin: Košice, main railway station, 48°43'35,9", 21°16'00,3", 205 m a.s.l., 25.8.2012 (SAV). In all localities the species was found in the rail yards.

Geranium purpureum has the European-Mediterranean distribution. It is related species to *G. robertianum* L. and distinguishing characters of both species were published e.g. by SLAVÍK (1997), ROTHMALER et al. (2002), RŮŽIČKA & KOBLÍŽEK (2009), and ELIÁŠ JUN. (2011). The first record of *Geranium purpureum* in Slovakia is from 2000 (Zaliberová 2000 SAV, MEDVECKÁ et al. 2012). Recently, the species is known from more Slovak localities, but only from the rail yard and the railway stations (ELIÁŠ JUN. 2011, PODROUŽKOVÁ MEDVECKÁ et al. 2011). The species is characterised as a naturalised neophyte (MEDVECKÁ et al. 2012).

***Geranium sibiricum* L.**

New localities: Východoslovenská nížina lowland: Dobrá (Trebišov district), rail yard in the area of the grain silo, at the west end of the transshipment yard Čierna nad Tisou, very rarely, 48°25'02,4", 22°02'59,6", 101 m a.s.l., 21.8.2012 (SAV); Košická kotlina basin: Košice, main railway station, very rarely in the yard, 48°43'52,6", 21°15'51,7", 205 m a.s.l., 25.8.2012 (SAV).

Distinguishing characters of *Geranium sibiricum* and its related species are presented e.g. by JASIČOVÁ (1982) and SLAVÍK (1997). It is a Central-East Asiatic species, introduced and naturalised sporadically also in central Europe, exclusively in the synanthropic biotopes (SCHMIDT 2004). To central Europe, it

spreads probably by the Eastern migration route. JASIČOVÁ (1982) presented only two localities of its occurrence in Slovakia. MEDVECKÁ et al. (2012) characterised the species as naturalised with quite rare distribution in Slovakia; for the first time, it was recorded in 1924.

***Grindelia squarrosa* (Pursh) Dunal (Fig. 2)**

New locality: Východoslovenská nížina lowland: Čierna nad Tisou (Třebišov district), in the periphery of the railway line at the west end of the transshipment yard, sandy substrate, more specimens, 48°25'11,9", 22°04'20,8", 102 m a.s.l., 22.8.2012 (SAV). Floristic composition is represented by relevé 1.

Relevé 1: 10 m², E₁: 65%, E₀: 0%, slightly sandy rocky soil with skeleton, lashed on the surface.

E₁: *Grindelia squarrosa* (Pursh) Dunal 2.2 (flowering), *Centaurea diffusa* Lam. flore albo 3.2, *Ambrosia artemisiifolia* L. 1.2, *Calamagrostis epigejos* (L.) Roth 1.2, *Setaria viridis* (L.) P. Beauv. var. *viridis* +.2, *Cichorium intybus* L. r.2, *Artemisia absinthium* L. r.2, *Echium vulgare* L. r.2.

Description of *Grindelia squarrosa* was published e.g. by SKALICKÁ (2004) and STUBBENDIECK et al. (1995). The species is native to North America. In Europe,



Fig. 2. *Grindelia squarrosa* in the rail transshipment yard Čierna nad Tisou (foto: Jana Májeková).

it is planted and sporadically escapes from cultivation. In the last century, it started to spread in Ukraine from where it expanded to Moldavia and, later, probably, also into central Europe (cf. PROTOPOPOVA 1991). In Ukraine, it occurs like a weed in steppe and forest steppe zone. Nowadays, it can be included among the adventive species of the Eastern migration route. The first record of *G. squarrosa* in Slovakia is from the year 1992 at the ore transshipment in Košice (JEHLÍK 1998, MEDVECKÁ et al. 2012); the species was introduced there most likely with the iron ore from Krivoj Rog in Ukraine. It is probably a neophyte, at the beginning of its spreading.

Acknowledgements

Comments on the manuscript by Soňa Jančovičová (Comenius University in Bratislava) were helpful. We are grateful to company Transped in Dobrá for permission to conduct research on their property and to Mária Ihnátová for provision of the accommodation. The research was supported by the VEGA Grant Agency of the Ministry of Education and Slovak Academy of Sciences (grant no. 2/0098/11).

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Received: March 5th 2013
Revised: May 16th 2013
Accepted: May 17th 2013