Original Paper

Sedobassia sedoides (Pall.) Freitag & G. Kadereit in Slovakia: native species or alien weed?

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The paper is aimed to explain occurrence and origin of *Sedobassia sedoides* in Slovakia because data presented in literature are not clear and complete. During our research, the occurrence of *Sedobassia sedoides* was confirmed in the Slovak flora on two reliable documented sites (Lednické Rovne, Bíňa) and one questionable location (Iliavka). Our research has confirmed that the species must be regarded as casual alien in the Slovak flora. Except cultivation in botanical garden of Lednické Rovne (West Slovakia, E: 18° 17′ 13.04″ N: 49° 17′ 11.09″) at the beginning of 19th century, the single occurrence was documented in 1872 in ruderal habitat of the Bíňa village. The distribution map is also presented.

Keywords: alien plants, distribution, flora, *Sedobassia sedoides*, Slovakia

1. Introduction

Bassia is a genus of flowering plants in the *Chenopodiaceae* family which are distributed in the western Mediterranean to eastern Asia including both annuals and perennial sub-shrubs (Aellen, 1979). The genus is defined also by its three types of C4 „kochioid" leaf anatomy (Muhaidat et al., 2007). The Bassia species mainly occurs in steppe and desert ecosystems, some species can be found in ruderal sites and salt marshes up to subalpine altitudes (Collins and Blackwell, 1979; Mosyakin, 2004). In the Central Europe, three species are native (*Bassia sedoides*, *B. laniflora*, *B. prostrata*) and one species, *Bassia scoparia*, has spread here as invasive quarantine weed (Aellen, 1979; Jehlík, 1998).

Recently, the new genus *Sedobassia* Freitag & G. Kadereit was separated from traditionally accepted genus *Bassia* on the basis of different molecular sequences of ITS, rbcL, ATPB-rbcL and ndhF (Kadereit and Freitag, 2011). Those authors noted that isolated position of the genus *Sedobassia* in the molecular trees is corroborated by its peculiar C3/C4-intermediate leaf anatomy which is unique in *Camphorosmeae* (Carolin, 1983; H. Freitag, pers. obs.).

This new genus is monotypic – so it includes only single species *Sedobassia sedoides* (Pall.) Freitag and G. Kadereit [syn. *Kochia sedoides* Schrad., *Bassia sedoides* (Schrad.) Asch., Fig. 1]. The species is occurred from Hungary and countries of former Yugoslavia to Asian part of Russia, China and Mongolia (Zhu et al., 2003; Uotila, 2011). As an alien introduced also in the Czech Republic, Poland, Latvia, Estonia and Finland (Tomšovic, 1990; Sukhorukov

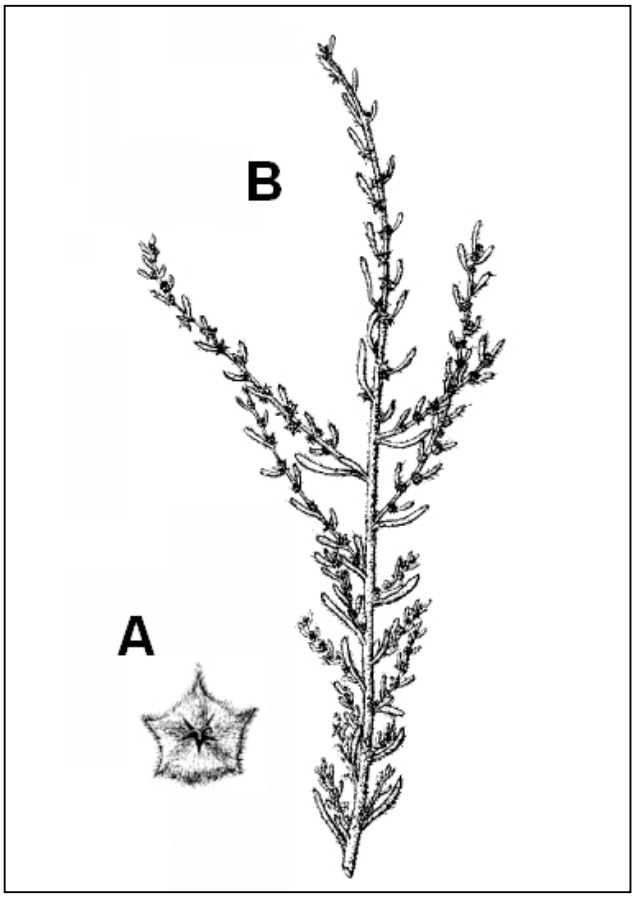

Figure 1 *Sedobassia sedoides*: A – fruit, B – habit of the upper part (Modified from Zhu et al., 2003)

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and Uotila, 2007; Uotila, 2011) and it was reported from Algeria in the North Africa, too (Maire, 1962). The species was also reported from Slovakia (Dostál, 1991; Medvecká et al., 2012), but exact data have been still lacking. The paper is aimed to explain occurrence and origin of *Sedobassia sedoides* in Slovakia.

2. Material and methods

According to Zhu et al. (2003) *Sedobassia sedoides* is 10 – 60 cm tall annual herb; stem is erect, branched mostly from near middle, lanate-pilose. Leaves are linear, terete, 3 – 17 × 1 – 1.5 mm, fleshy, densely appressed pubescent and with a few villous hairs, base attenuate, apex obtuse. Flowers usually grouped in 2 or 3 per axillary glomerule. Perianth 5-lobed; abaxial appendages of segments triangular, subequaling the perianth. A fruit is smooth, broadly ovoid utricle.

The specimens of the species were studied in herbaria in Hungary (BP), the Czech Republic (BRNM, BRNU, MMI, MZ, OLM, PR, PRC) and in Slovakia (BRA, LTM, NI, KO, PMK, SAV, SLO and ZV). Herbarium abbreviations are according to Vozárová and Sutorý (2001). Result of this study is presented on the point map. The map was designed by program ArcGis, version 9.2. The numbers of grids squares follow work of Niklfeld (1971). Coordinates of localities were taken from Google Earth. Phytogeographical divisions of Futák (1980) are also used. Nomenclature of flowering plants follows Marhold and Hindák (1998).

3. Results and discussion

During our study, only three data of *Sedobassia sedoides* were found in Slovakia (Fig. 2). Holuby (1888) mentioned it from the Lednické Rovne settlement in the Biele Karpaty Mts, but only as a cultivated plant. The species was cultivated there by A. Rochel, personal physician of the count of Johan Aspremont in years 1800 – 1811 and 1816 – 1820 (Vozárová, 2010). Rochel cultivated about 2,000 wild and ornamental plant species in botanical garden, among them also *Sedobassia sedoides*. This location represents the oldest occurrence of *S. sedoides* in Slovakia and it folded together with the destruction of the botanical garden in the mid – 19th century.

The second location was found in the Podunajská nížina Lowland. *Sedobassia sedoides* was collected here by L. Simonkai in September 1872 (Simonkai 1872 BP). The collector characterized the location as "in arenosis collium ad pagum Bény" = in sandy hill near the Bíňa village (Bény in Hungarian). Later Feichtinger (1899) stated the location of *B. sedoides* more exactly; it grew on the hill with the basilica in the centre of the village. The species has been occurring here only temporarily and later failed to confirm it (Domin, 1937; David, 2009). The presence of the species in this location has followed the occurrence in NW Hungary near the Esztergom settlement where some locations were known in the late 19th century. All those locations were not confirmed recently (Barina, 2003). Changes in land use are likely the reasons of termination of those locations, especially the

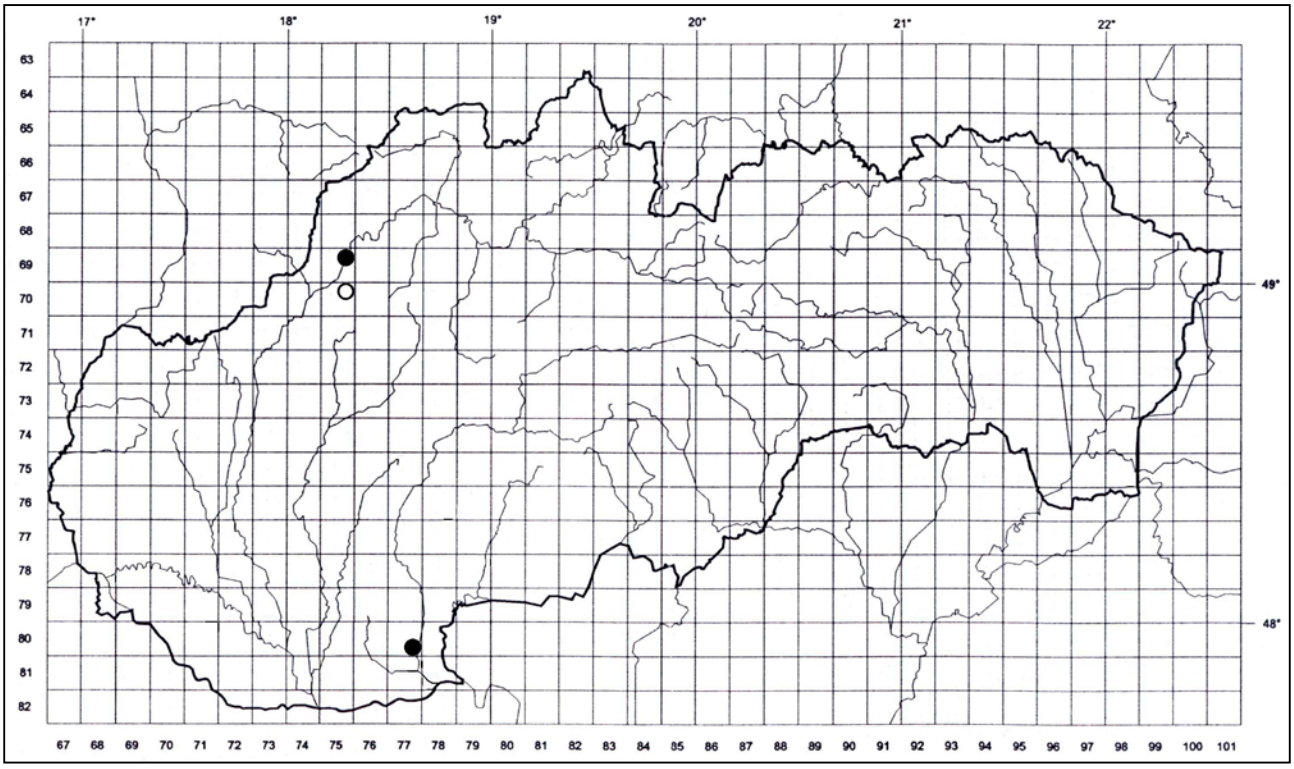

Figure 2 Distribution of *Sedobassia sedoides* in Slovakia in the past: • – reliable documented locations in Lednické Rovne (1888) and Bíňa (1872), o – doubtful location in Ilávka (1989)

absence of grazing. Moderate and heavy grazing promotes spreading of annual xerophylous plants of *Bassia sedoides* while extensive grazing or its absence caused the decline to extinction of the species at sites (Novikova et al., 2011).

The third location is doubtful. Dostál (1989) and Dostál and Červenka (1991) mentioned *S. sedoides* from the Ilávka village (now Iliavka, part of the Ilava town), but we found no reliable herbarium vouched or literature reference to this data. Here are two possible explanations of this information: i) either he inaccurately transposed data of Holuby (1888) on the prevalence of *S. sedoides* near Lednické Rovne (this location is not so far from Iliavka) or ii) he found this species here but he published the finding not. It would be similar to the case of *Aegilops geniculata* which J. Dostál mentioned in his determination keys (Dostál, 1998; Dostál and Červenka, 1992), but herbarium voucher of this species was found in 2010 in the Dostál`s unprocessed herbarium material (Eliáš et al., 2013).

If we want to evaluate the origin of *S. sedoides* in Slovakia, we must to rely on data J. Dostál again. The author first presents an occurrence of the species in Slovakia as questionable (Dostál, 1948, 1954), but, despite lack of real data, he regarded it as native species of Slovakia in his later works (Dostál, 1989; Dostál and Červenka, 1991). Its occurrence was situated to saline habitats in the lower part of the Hron River (Dostál and Červenka, 1991), although the species was not mentioned in earlier or current works related to halophytic habitats in this area (e.g. Krist, 1940; Vicherek, 1973; Dítě et al., 2009). Inconsistent data on the origin of the species in our territory have led to it being introduced into alien species of Slovak flora (Medvecká et al., 2012). As the first occurrence the authors reported year 1948 – the year of the first issue of Dostál determination key to Czechoslovak flora (Dostál, 1948). We consider as a correct evaluation of the alien status of the species by Medvecká et al. (2012), viz. the inclusion of the species to the group of casual aliens of Slovakia. In addition to cultivation in the Botanic Garden in the Lednické Rovne village, *S. sedoides* is known only from location in the Bíňa settlement. The character of the habitat – man-made raised mound with the Basilica, is clearly secondary and the species was introduced here as weed probably with draft animals of basilica visitors.

4. Conclusions

The occurrence of *Sedobassia sedoides* was confirmed in the Slovak flora on two reliable documented sites (Lednické Rovne, Bíňa) and one questionable location (Iliavka). Our research has confirmed that the species was correctly included to casual weedy aliens of the Slovak flora, but the period of introduction is necessary to move more than 70 years to the past, to year 1872. Temporary re-introduction of *S. sedoides* in our territory can also not be excluded in the future.

5. Acknowledgement

We are thankful to the curators of herbaria visited during the study as well as to the anonymous reviewers for valuable comments to the manuscript. The research was made due the support of the Slovak Scientific Grant Agency VEGA (Grants No 2/0003/12 and 2/0008/13).

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