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# Occurrence of some rare weeds on the territory of Slovakia

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Abstract: Intensification of agriculture in the past 80 years in Slovakia caused the decrease of distribution and frequency of some weedy species. The recent occurrence of some rare central European weeds *Adonis flammea, Agrostemma githago*, *Bifora radians*, *Lycopsis arvensis*, *Nigella arvensis, Ranunculus arvensis* and *Vaccaria hispanica* were examined in our study in western and central Slovakia during years 2003-2004. We did not find any locality of *Vaccaria hispanica*, so the extinct status was confirmed for this species. Very rare species were *Bifora radians* (1 locality), *Lycopsis arvensis* (2 localities) and *Adonis flammea* (4 localities). *Agrostemma githago* (5 localities) was occurring only in the regions with extensive agriculture, where it can be relatively numerous. Other species were relatively more widespread, 9 localities of *Nigella arvensis*, 10 localities of *Ranunculus arvensis* were found during our survey. Historical and recent distribution of the mentioned species is discussed.

Keywords: rare weeds, recent distribution, Slovakia.

## Introduction

Since Neolith, weedy plant species had adapted gradually to specific ecological conditions in agrocoenoses. The methods used in agriculture in Central Europe have changed markedly during past 80 years. This relatively sudden conversion to intensive agriculture caused the decrease of distribution and frequency of some weeds. The native weedy flora has thus depleted and

some weed taxa were included in the red lists (ELIÁŠ 1987; FERÁKOVÁ et al. 2001). On the other hand, new alien plant species (named as quarantine weeds) invaded from Asia and North America (SKALICKÝ 1981). In the last edition of the Red List of Slovak Fern and Vascular Plants; 33 archaeophytic weedy plant species were classified as critically endangered, 24 were presented as endangered, 28 as vulnerable and approximately 25 weeds were missing and extinct (FERÁKOVÁ et al. 2001).

The aim of our study was found out the recent occurrence of seven rare Slovak weedy archaeophytes in the territory of western and central Slovakia.

## Material and Methods

The study was carried out during the years 2003 and 2004 at the following phytogeographical regions: Podunajská nížina, Biele Karpaty-south Mts., Burda, Ipeľsko-rimavská brázda, Považský Inovec Mts., Strážovské vrchy Mts. (part Drieňov), Javorie and Poľana (Fig. 1) (FUTÁK 1980). The data of the recent occurrence of rare weeds *Adonis flammea, Agrostemma githago*, *Bifora radians*, *Lycopsis arvensis*, *Nigella arvensis, Ranunculus arvensis* and *Vaccaria hispanica* were collected by using the methods of the floristic research.

The data concerning the historical distribution was achieved from herbariums BP, BRA, BRNU, BRNM, NI, NIM, KO, PR, PRC, SAV, SLO, SMBB and ZV. Herbarium specimens collected during field research are saved in herbarium NI. The nomenclature of vascular plants follows MARHOLD (1998) and used herbarium abbreviations are according to HOLMGREN ET AL. (1990) and VOZÁROVÁ & SUTORÝ (2001).

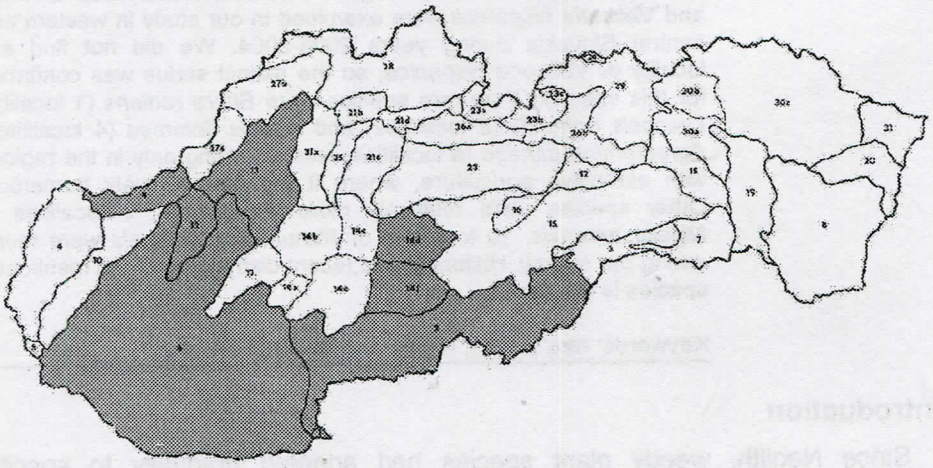

**Fig. 1. Area of study, numbers of phytogeographical regions according FUTÁK (1980).**

## Results and discussion

### *Adonis flammea* JACQ.

An annual plant, stem is 10-70 cm high; sepals are more or less hirsute and appressed to the deep scarlet. It occurs as typical weed of cereals or on the margins of fields and the fallow lands respectively (TUTIN & AKEROYD 1964). The first evidence of *A. flammea* was found in archaeological samples from early Neolithic time in Turkey (WILLERDING 1986).

FUTÁK (1982) cited that *Adonis flammea* was growing only on the western part of Slovakia at 27 localities in total. But ČEŘOVSKÝ (1999) confirmed only 3 recent habitats: Lupka hill (near Nitra town), Sokolovce village and Kamenín village. The most recent data was given by J. KUČERA (2001, in verb.) who confirmed the occurrence of *A. flammea* in the area of Sokolovce village (Biele Karpaty Mts.).

Three new localities were discovered during our field research: Kamenica nad Hronom, Bajtava and Salka. The locality near Čenkov village, reported last time in 1950 (KAVKA 1950 BRA), was confirmed during our study. All these localities are near Štúrovo town (Fig. 2). The locality on southern slope of Lupka hill near town of Nitra was not confirmed. We can thus conclude that *A. flammea* is now growing only at 5 localities in Slovakia.

### *Agrostemma githago* L.

An annual herb with a strong tap root. Stem is branched, 5-150 cm high and covered with long appressed white hairs (HAMMER, HANELT & KNÜPFLER 1982). *Agrostemma githago* has been associated with man for at least 4000 years and in Europe dwellings was present since 2000 B. C. (THOMPSON 1973). It was an abundant weed of cereal (notably wheat and rye) and other arable crops, but in all Europe declined during the period 1910-1960, largely as a result of improved seed cleaning. Now it is occasionally found at various disturbed habitats and in the gardens (FIRBANK 1988).

This species was present in Carpathians valley from 6$^{th}$ millennium B.C. (HAJNALOVÁ, 1989). DAVID & DUDICH (1997) mentioned approximately 60 localities of *A. githago* up to y. 1970, from 1970 to 1990 23 localities and after y. 1990 only12 localities. ČEŘOVSKÝ (1999) confirmed about 10 recent localities in overall Slovakia.

We found five localities of *A. githago* at the study area (Fig. 2). All recorded habitats were small-scale farming fields – 1 local population was near Nitra town (Dolné Štitáre village), a lot of micropopulations were located near Skliarovo hamlet (part of Detva town) and 3 localities with abundant number of plants were discovered around town of Krupina (southeastern margin of Krupina town; Poloma hamlet and Kňazova dolina hamlet). However DEVÁNOVÁ (2002, in verb) have stated the presence of the species at several small-scale farms in Biele Karpaty Mts., our survey at this region was unsuccessful. The summarization of our field data documented that estimation of ČEŘOVSKÝ (1999) was right,

because we don't explore some other small farms in further parts of Slovakia (Orava region, Kysuce region and in northeastern Slovakia) where recent occurrence of *A. githago* is possible.

***Bifora radians* M. BIEB.**

An annual plant, 20-40 cm high. Stem is glabreous and usually freely branched. It is the typical weed of cereal fields and vineyards, it grows often in outfields and railways embankments (TUTIN 1968; HLAVAČEK, JASIČOVÁ & ZAHRADNÍKOVÁ 1984).

*B. radians* was sparsely distributed, mainly in southern parts of Slovakia. HLAVAČEK, JASIČOVÁ & ZAHRADNÍKOVÁ (1984) mentioned 45 localities in total. Recent distribution of *Bifora radians* is not known. FERÁKOVÁ ET AL. 2001 included the species to the category DD (deficient data)

Only one locality of *B. radians* was found in whole area of study. It was at small-scale farming field near Krupina town (Fig. 4). However our study area has not covered whole territory of Slovakia, we suppose that the distribution of this weed is very scarse. The ecosozological status of this species is at least EN (endangered).

***Lycopsis arvensis* L.**

An annual or biennial hispid plant, stem 10-60 cm high, it is ascending, flowers are blue (CHATER 1972). It grows in fields (mainly in maize, potato and beet), vineyards, fallow lands, field routes etc. (BERTOVÁ & BERTA 1995). The first archaeological record of *L. arvensis* was from Bronze Age in Europe (France); the occurrence in Central Europe was approved from 3rd century B.C. in Germany (RÖSCH 1996).

The occurrence of *L. arvensis* in Slovakia is rare, in many regions is missing. BERTOVÁ & BERTA (1995) found about 40 localities up to y. 1970, 7 localities from y. 1970 to 1990, but any locality since 1990. This taxon is not included to Slovak Red List (FERÁKOVÁ et al. 2001).

Two localities of *L. arvensis* were found during our research (Fig. 4). The first locality was in large maize field near Nitra town. The species was collected in Nitra town already in 1919 (SCHEFFER 1919 SLO) and confirmed again in 1960 (MÁJOVSKÝ 1960 SLO). The second locality was found at small field at Skliarovo hamlet near Detva town. The occurrence of *L. arvensis* from this region was not known yet. Following our field data, we propose integration of archaeophyte *L. arvensis* to Red list of Slovak plant species in the category EN.

***Nigella arvensis* L.**

An annual plant, stem is erect, 10-40 cm high, flowers are bluish, 20-30 mm in diameter. *N. arvensis* is a weed of cornfields, vineyards and open grounds (TUTIN & AKEROYD 1964b). The first data of this species are from Central Europe (Germany) from 3rd to 4th century B.C. (WILLERDING 1986)

KMEŤOVÁ (1982) pointed out that *N. arvensis* was growing relatively often in all southern parts of Slovakia but it was rare in northern parts of country. The number of historical localities was more than one hundred.

Recent distribution of *N. arvensis* was scarce in the area of study (Fig. 3), only nine localities were recorded. Four documented localities were on the arable soil (Kamenica nad Hronom village – vineyards, Šrobárová village – field margin, Závada village – field margin, Nitrica village – field route). Other localities were on seminatural or ruderal habitats as margins of footways (Podhradie village, Hajnáčka village), abandoned soils (Marcelová village) and escarps of roads (Veľký Cetín village, Bajtava village).

***Ranunculus arvensis* L.**

More or less pubescent annual plant, stem is erect and 15-60 cm high, flowers are pale greenish-yellow, 4-12 mm in diameter. It is typical weed of cereal fields and disturbed grounds (TUTIN & AKEROYD 1964c).

First archaeological report of *R. arvensis* from territory of Slovakia is from 9$^{th}$ century (M. HAJNALOVÁ ined.). FUTÁK (1982) characterized distribution of *R. arvensis* in Slovakia as scattered, locally abundant, but this author stated that the distribution is not known in detail.

Our findings confirmed data given by FUTÁK (1982). *R. arvensis* was the most abundant species among observed species. We recorded 10 localities (Fig. 2.). We found the species growing at intensively farmed fields (Beša village, Kmeťovo village, Závada village, Klížske Hradište village) as well as at small-scale farming fields (Nová Bošáca village, Dolné Štitáre village, Poloma hamlet, Krupina town, Ľalíkov laz hamlet near Bzovík village, Janova Dolinka hamlet near Senohrad village). The most of local populations were abundant and the plants produced a lot of fruits.

***Vaccaria hispanica* (MILL.) RAUSCHERT**

An annual glabrous plant, stem is erect and branched above, 30-60 cm high, flowers are12-18 mm in diameter, pale or dark purplish. It is weed on the cereal fields and abandoned plots or it is cultivated in gardens (CHATER 1964). An archaeophytic species, WILLERDING (1986) mentioned occurence of *V. hispanica* in Central Europe from Bronze Age (Hungary).

Archaeological samples with *Vaccaria hispanica* seeds were not known from Slovakia, but species was found in samples from 16$^{th}$ century in Prague (M. HAJNALOVÁ ined.). HOLUB (1999) included the species to Black List of Slovak flora into the group „missing plants".

Study of historical distribution of *V. hispanica* carried out in herbariums showed that the species was distributed mainly in western part of our country (Fig. 4). It seems that it was never widespread. We found the herbarium specimens from about 40 localities. The occurrence after the year 1950 was documented only at 14 localities. The last finding was made in Bratislava in 1973 (FERÁKOVÁ 1973 SLO).

We found any locality of *V. hispanica* in our field research, so the status "missing" mentioned by HOLUB (1999) was confirmed at this moment. We suppose that the species is still growing on the territory of Slovakia. It is present in Hungary and BARINA (BARINA 2000 BP) found *V. hispanica* growing about 3 km far from Slovak-Hungarian border (Mogyorósbánya near Estergom).

## Acknowledgment

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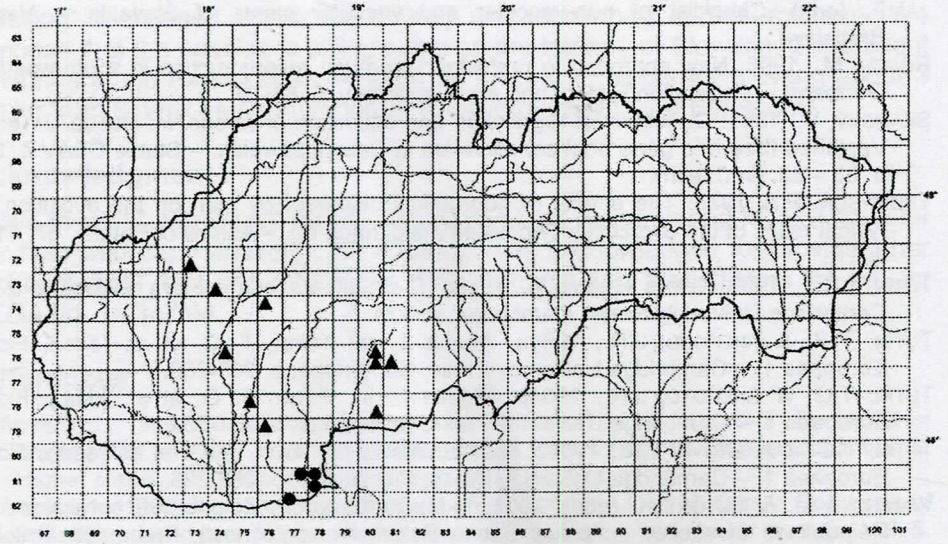
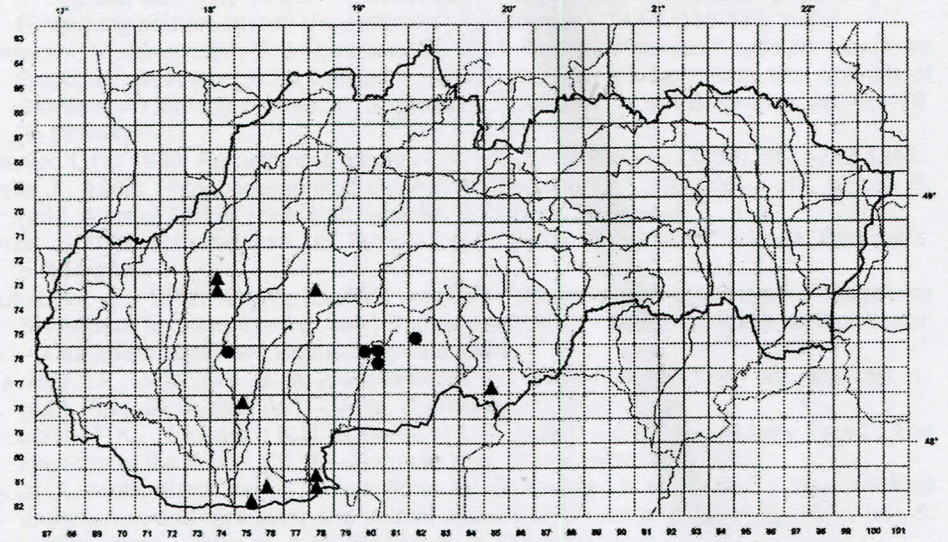


Fig. 2. The recent distribution of *Adonis flammea* Jacq. (●) and *Ranunculus arvensis* L. (▲) in the area of study.



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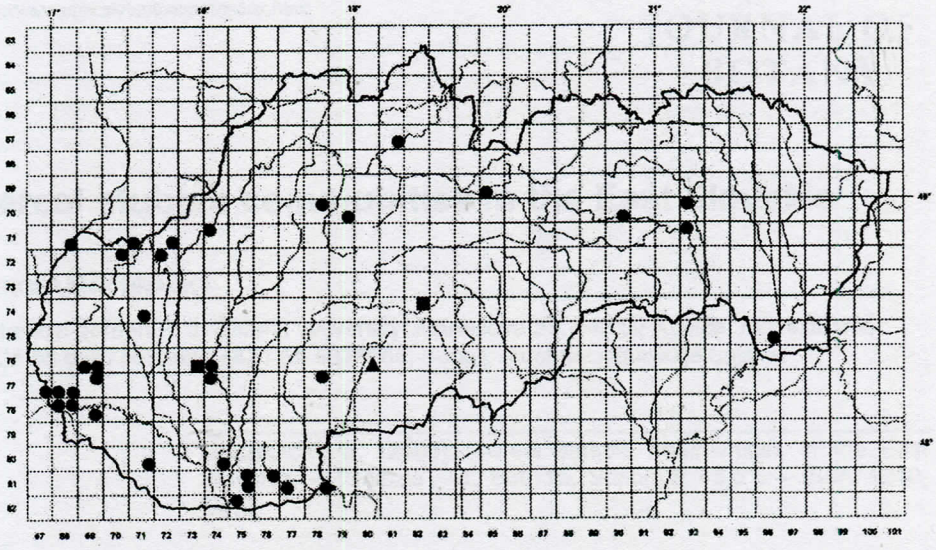

**Fig. 4. The recent distribution of *Bifora radians* M. Bieb. (▲) and *Lycopsis arvensis* L. (■) in the area of study and historical distribution of *Vaccaria hispanica* (Mill.) Rauschert (●) in Slovakia.**