

## Yellow vetchling (*Lathyrus aphaca* L.) and round-seeded vetchling (*Lathyrus sphaericus* Retz.) – two species rediscovered for the flora of Slovakia

Dagmar Olejková<sup>1</sup>, Jaroslav Košťál<sup>2</sup>, Ľuba Ďurišová<sup>3</sup> & Pavol Eliáš Jr.<sup>3</sup>

<sup>1</sup> Lúčna 2256/13, SK-958 06 Partizánske, Slovakia, dagmar.olejkova@gmail.com

<sup>2</sup> State Nature Conservancy of the Slovak Republic, Administration of the Ponitrie Protected Landscape Area, Samova 3, SK-949 00 Nitra, Slovakia, jaroslav.kostal@sopsr.sk

<sup>3</sup> Institute of Plant and Environmental Sciences, Slovak University of Agriculture, Tr. A. Hlinku 2, SK-949 76 Nitra, Slovakia; luba.durisova@uniag.sk, pavol.elias.jun@gmail.com

---

Olejková D., Košťál J., Ďurišová Ľ. & Eliáš P. Jr. (2022): Yellow vetchling (*Lathyrus aphaca* L.) and round-seeded vetchling (*Lathyrus sphaericus* Retz.) – two species rediscovered for the flora of Slovakia. – Thaiszia – J. Bot. 32 (1): 055-065.

**Abstract:** This paper presents information about new findings of two regionally extinct *Lathyrus* species: *L. aphaca* and *L. sphaericus*. A relatively large population of the *Lathyrus aphaca* was found along a unpaved road through abandoned pear orchards at the northern edge of the Dolné Vestenice village (W Slovakia, Strážovské vrchy Mts.) in 2019 where it occurs in species-rich shrub vegetation of the *Berberidion* alliance. *L. sphaericus* was found in 2020 on the dry rocky slopes of Kusá hora hill near Kozárovce (SW Slovakia, Štiavnické vrchy Mts.). It grew in relatively species rich xero-thermophilous vegetation of the *Festucion valesiaca* alliance developed on volcanic rocks. We therefore propose to reclassify both species in the Slovak Red List of Ferns and Vascular Plants from the category "regionally extinct" to "critically endangered".

**Keywords:** central Europe, legumes, occurrence, rare species.

---

## Introduction

More than 80 taxa (7 %) of Slovak flora are considered regionally extinct according to Eliáš et al. (2015). However, the occurrence of several species belonging to this group was confirmed by intensive botanical field research recently (Tab. 1). Here, two rare annual *Lathyrus* species, previously regionally extinct, were added to the group of rediscovered species: *L. aphaca* (the last finding is from 1974) and *L. sphaericus* (the only occurrence is from 1929).

*Lathyrus aphaca*, which is easily characterized by the complete absence of leaf blades, the function of which was taken over by the leaf-like stipules, is the only representative of the *Aphaca* section (Kupicha 1983). It is no longer possible to determine the exact limits of the original distribution because it is one of the oldest cultivated plants and is also found as weed/archaeophyte accompanying cultivated crops, as evidenced, for example, by finds from ancient Egypt more than 2700 years BCE (Chrtková et al. 1977). The original range of *L. aphaca* is probably only found in the southwestern and southern parts of the Ukraine, southwestern Russia, the Middle East and the Eastern Mediterranean. The present distribution range includes all of Europe but rare towards the north, southern and eastern Asia as far as China and Japan, northern Africa, introduced also in North America, Australia and New Zealand (Meusel et al. 1965; Roskov et al. 2006). In Central Europe, *L. aphaca* has probably introduced, and is variously considered an archeophyte (Slovakia – Medvecká et al. 2012), neophyte (Germany – Gams 1975; Poland – Tokarska-Guzik et al. 2012; the Czech Republic – Danihelka et al. 2012) or doubtfully native (Austria, Hungary – Roskov et al. 2006).

*Lathyrus sphaericus* is a member of sect. *Orobastrum*. Taxa from this section are characterized by leaves with tendrils, single pair of leaflets and semi-arrow-shaped stipules (Kupicha 1983). The centre of the range of *L. sphaericus* is in Anatolia, Central and South Asia and the area around the Mediterranean, from where it reaches tropical Africa, Western, Central, Eastern and SE Europe as well as the Caucasus region (Ball 1968; Oprea 2005; Roskov et al. 2006). In Central Europe, the species has only been recorded in Austria, Hungary and Slovakia. In Austria it is not native and was first found as a neophyte only in the second half of the 20<sup>th</sup> century (Melzer & Barta 2003; Berger et al. 2011), while in the other two countries it is recently regarded as native (Chrtková 1988; Király 2009; Roskov et al. l. c.), although older works considered its occurrence as secondary (Soó 1966).

*Lathyrus sphaericus* is often confused with other two similar annual *Lathyrus* species. Important identification characters are given in the determination key following Chrtková (1988).

- 1a Leaves without leaflets, reduced to phyllodic petioles or tendrils; stipules 1–2 mm .....  
..... *L. nissolia*  
1b Leaves paripinnate with paired leaflets; stipules longer than 2 mm ..... 2

2a Stem narrow winged, glabrous; stipules 6–11 mm; all leaves with long branched tendrils; legumes 15–30 × 7–11 mm ..... *L. setifolius*  
 2b Stem wingless, glabrous or pubescent; stipules 5–7 mm; only upper leaves with short unbranched tendrils; legumes 30–40 × 4.5–6 mm ..... *L. sphaericus*

The aim of this paper is to inform about new localities of two annual *Lathyrus* species in Slovakia and to make notes on their coenology and ecological conditions of the localities. We also reassessed the threat status and its criteria for both species in Slovakia for the Slovak Red List of Ferns and Vascular Plants.

## Material and Methods

The study was conducted in the years 2019–2021. Results of this study are presented in a dot map. The map was designed using Corel Draw according to the grid mapping method described by Niklfeld (1971).

The phytosociological relevés were recorded according to the Zürich-Montpellier approach using a modified nine-grade Braun-Blanquet scale (Westhoff & Van Der Maarel 1978). Nomenclature of flowering plants follows Marhold & Hindák (1998). The syntaxa are named according to Jarolímek et al. (2008). The phytogeographical classification of Slovakia follows the work of Futák (1980). Categories and criteria of threat were applied according to the IUCN Red List Criteria (IUCN 2012).

## Results and Discussion

### *Lathyrus aphaca*

In 2019, during a survey of meadow and shrub habitats in the southern foothills of the Strážovské vrchy Mountains, the first author found a relatively large population of *Lathyrus aphaca* (Fig. 1) mainly along a field road through abandoned orchards at the northern edge of the Dolné Vestenice village (Partizánske District, Trenčiansky kraj County). The total area of the population in 2021 was about 600 m<sup>2</sup> and it included several hundred individuals. The population reached its highest abundance in relatively open shrub vegetation and is documented by the following phytosociological relevé:

**Relevé 1:** Strážovské vrchy Mts, Dolné Vestenice, abandoned pear orchard, 258 m, 48°42'25.5" N, 18°23'46.6" E, elevation 10°, exposition SE, brown soil on limestone, relevé area 16 m<sup>2</sup>, E<sub>3</sub>: 3%, E<sub>2</sub>: 55%, E<sub>1</sub>: 90 %, height of herb layer 30–50 cm, 11. 6. 2021, P. Eliáš Jr., Ľ. Ďurišová, D. Olejková.

E<sub>3</sub>: *Pyrus communis* +, *Quercus cerris* +.

E<sub>2</sub>: *Prunus spinosa* agg. 3, *Ligustrum vulgare* 2a, *Crataegus monogyna* 1, *Pyrus communis* 1, *Rosa canina* agg. 1, *Acer campestre* +, *Acer tataricum* +, *Clematis vitalba* +, *Swida sanguinea* +, *Viburnum lantana* +.

E<sub>1</sub>: *Arrhenatherum elatius* 2b, *Trifolium repens* 2b, *Achillea millefolium* 1, *Agrimonia eupatoria* 1, *Bromus hordeaceus* 1, *Cerastium holosteoides* 1, *Dactylis glomerata* 1, *Fragaria moschata* 1, *Galium mollugo* 1, ***Lathyrus aphaca* 1**, *Poa pratensis* 1, *Tanacetum vulgare* 1, *Trisetum flavescens* 1, *Vicia sativa* 1, *Alopecurus pratensis* +, *Artemisia*

*vulgaris* +, *Brachypodium sylvaticum* +, *Calamagrostis epigejos* +, *Carex spicata* +, *Carex sylvatica* +, *Carlina vulgaris* +, *Cerastium glomeratum* +, *Cirsium vulgare* +, *Crepis biennis* +, *Daucus carota* +, *Dianthus armeria* +, *Elytrigia repens* +, *Festuca pratensis* +, *Festuca rupicola* +, *Fragaria vesca* +, *Geum urbanum* +, *Gentiana cruciata* +, *Geranium columbinum* +, *Hypericum perforatum* +, *Knautia arvensis* +, *Lathyrus pratensis* +, *Ligustrum vulgare* juv. +, *Lotus corniculatus* +, *Medicago lupulina* +, *Melampyrum barbatum* +, *Melilotus officinalis* +, *Myosotis ramosissima* +, *Picris hieracioides* +, *Pimpinella major* +, *Plantago lanceolata* +, *Plantago major* +, *Prunella vulgaris* +, *Prunus spinosa* juv. +, *Ranunculus polyanthemus* +, *Rosa canina* juv. +, *Rumex crispus* +, *Sanguisorba minor* +, *Securigera varia* +, *Stenactis annua* +, *Taraxacum officinale* +, *Trifolium campestre* +, *Trifolium pratense* +, *Veronica arvensis* +, *Veronica chamaedrys* +, *Vicia tetrasperma* +, *Astragalus glycyphyllos* r, *Dipsacus fullonum* r.

The stand represents a species-rich ecotone shrub vegetation (62 taxa in E<sub>1</sub> recorded) of the *Berberidion alliance* (Jarolímek et al. 2008). As emphasised by several authors, the most typical habitat *Lathyrus aphaca* is ruderal and segetal vegetation (Gams 1975; Chrtková & Bělohávková 1995; Boža et al. 2003; Otýpková 2003; Nobis et al. 2011). Chrtková et al (1977) found that almost 80% of the localities of *L. aphaca* in Slovakia represent the above-mentioned anthropogenically influenced habitat types, while 11% of occurrences represented shrub margins (up to 35% in the Czech Republic). Therefore, the occurrence of *L. aphaca* in this type of habitat near Dolné Vestenice is not surprising. It is more difficult to explain the origin of the species in this locality. It is possible that the species arrived here already during the period of vine cultivation in 18<sup>th</sup> and 19<sup>th</sup> centuries, but it is more likely that it was introduced here by the planting of large orchards after the Second World War (Ondrejková 2019). *L. aphaca* may have been introduced here by importing fruit tree seedlings from southern Moravia, where it still occurs (Jongepier 1997; Otýpková 2003).

The last record of *Lathyrus aphaca* in Slovakia was made by T. Krippelová in SE Slovakia (Krippelová 1974). Overall, it can be assumed that the species was always rare in Slovakia at the 10 known localities (Fig. 2). The vast majority were located in the Pannonian region, only two were known from the Western Carpathians (Chrtková 1988). The rediscovery of a population is the first report in Slovakia for almost 50 years and represents the third record for the Western Carpathians. Based the rediscovery of *L. aphaca*, it should be reclassified from regionally extinct (RE) to critically endangered (CR) with criteria A2ac; B2a(ii)b(iii, iv, v). On the other hand, it is interesting that in the historic accounts on the vegetation of the territory of present-day Slovakia, this species is hardly mentioned (e. g. Lumnitzer 1791; Endlicher 1830; Reuss 1853; Holuby 1888); only one from the vineyards near Levice in SW Slovakia was published in the second half of 19<sup>th</sup> century (Knapp 1865). This is the same situation as in the Czech Republic, as was pointed out by Pyšek et al. (2012) where the species was only occasionally recorded at the beginning of the 20<sup>th</sup> century (see Chrtková et al. 1977). Due to the short residence time, it should be considered probably as a neophyte in Slovakia, but further study is needed.

Tab. 1 An overview of recently rediscovered species previously considered extinct (Eliáš et al. 2015).

| Species                       | Status in Slovak Red List | Reference         |
|-------------------------------|---------------------------|-------------------|
| <i>Anchusa barrelieri</i>     | RE                        | Bagin 2019 ined.  |
| <i>Ceterach officinarum</i>   | RE                        | Somogyi 2021      |
| <i>Ludwigia palustris</i>     | RE                        | Dítě et al. 2017  |
| <i>Ranunculus polyphyllus</i> | DD                        | Dítě et al. 2021  |
| <i>Samolus valerandi</i>      | RE                        | Kochjarová 2016   |
| <i>Stipa smirnovii</i>        | RE                        | Eliáš 2020        |
| <i>Thesium ebracteatum</i>    | RE                        | Jasík & Dítě 2017 |

Explanations: DD – data deficient (but not confirmed for more than 25 years), RE – regionally extinct (not confirmed for more than 50 years).

### *Lathyrus sphaericus*

The second author found *Lathyrus sphaericus* (Fig. 3) during floristic surveys of dry xerothermic habitats in the southern part of the Štiavnické vrchy Mts. (Kusá hora hill) near Tlmače (Levice District, Nitriansky kraj County) in a xerothermic stand dominated by *Festuca pseudodalmatica* in June 2020. The population is estimated to occupy an area of approximately 10 × 20 m. The occurrence was documented by a phytosociological relevé:



Fig. 1 *Lathyrus aphaca* L. at Dolné Vestenice: left – plant climbing on other vegetation; right – character of habitat (photo P. Eliáš Jr. & D. Olejková).

**Relevé 2:** Štiavnické vrchy, Tlmače, Kusá hora hill, 234 m, 48°17'55.13"N, 18°32'19.68" E, elevation 20°, exposition S, andesite, relevé area 25 m<sup>2</sup>, E<sub>0</sub>: 15 %, E<sub>1</sub>: 70 %, stand height 15 – 30 cm, 23. 6. 2020, J. Košťál.

E<sub>1</sub>: *Festuca pseudodalmatica* 3, ***Lathyrus sphaericus* 2a**, *Teucrium chamaedrys* 2a, *Thymus pannonicus* 2a, *Tithymalus cyparissias* 2a, *Pilosella bauhinii* 2a, *Medicago minima* 1, *Acinos arvensis* +, *Alysum alyssoides* +, *Arenaria serpyllifolia* +, *Carex praecox* +, *Elytrigia intermedia* +, *Galium glaucum* +, *Orlaya grandiflora* +, *Poa angustifolia* +, *Polycnemum majus* +, *Potentilla argentea* +, *Seseli osseum* +, *Acosta rhenana* r, *Botriochloa ischaemum* r, *Convolvulus arvensis* r, *Cota tinctoria* r, *Echium vulgare* r, *Eryngium campestre* r, *Hypericum perforatum* r, *Leopoldia tenuiflora* r, *Linaria genistifolia* r, *Melica transsilvanica* r, *Odontites vulgaris* r, *Poa bulbosa* r, *Prunus spinosa* r, *Quercus pubescens* juv. r, *Sedum acre* r, *Trifolium arvense* r, *T. campestre* r, *T. striatum* r, *Vicia hirsuta* r, *Vulpia myuros* r.

The species was present in the relatively species-rich (38 species recorded) grassland vegetation of the *Festucion valesiacae* alliance and the *Festucetum pseudodalmaticae* association. The community develops in dry and warm habitats on shallow rocky substrates formed on volcanic rocks (Dúbravková 2014).

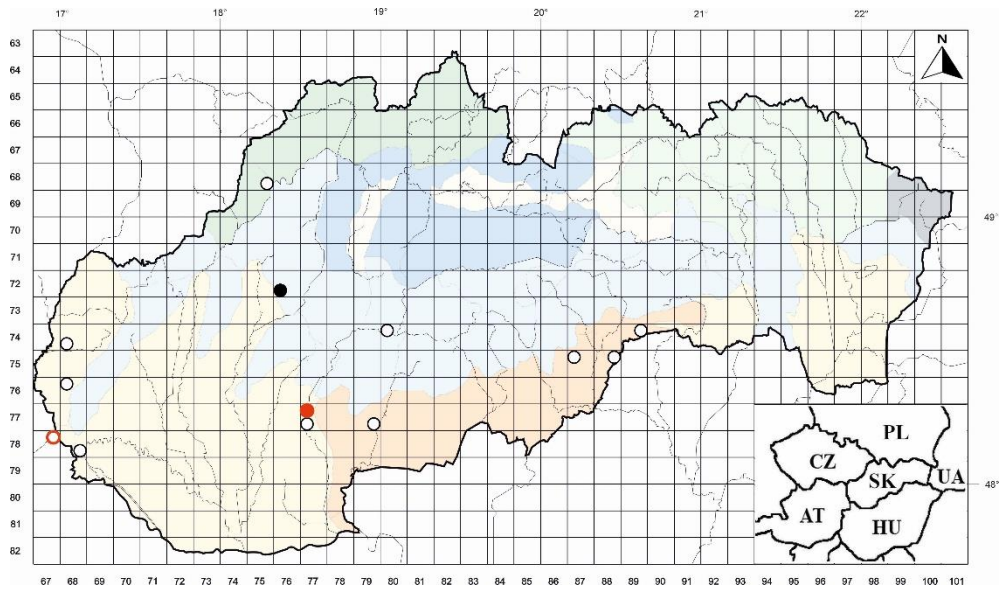
So far, *L. sphaericus* in Slovakia has previously been reported from only one locality in SW Slovakia. In 1929 it was collected by K. Ptačovský on a shrubby slope below Devín Castle near Bratislava (Chrtková 1988, Fig. 2). Thus, after more than 90 years, our research confirms the occurrence of the species in Slovakia and reports the second locality, which is generally similar as that near Devín. As *L. sphaericus* occurs in the natural habitat types without obvious human influence, it is likely that it belongs to the native species of the Slovak flora (Marhold & Hindák 1998), as Chrtková (1988) already suspected. In terms of threat, we propose to assess the species as critically endangered (CR) with criteria B2ab(i,iii,iv). The species is also listed as near threatened in the Red List of Hungary (Király 2007).

The new record of *L. sphaericus* in Slovakia follows reports in northern Hungary, where most of the localities were found along the Danube north of Budapest towards the Slovakian border (Bartha et al. 2015). Recently, it was also found near Dunakiliti (Király et al. 2015), in the Gerecse Mountains (Dobolyi 1995; Barina 2006), in the Pilis hills (Bauer 2001), as well as in the Vysehrad Mountains (Barina & Pifkó 2007). Here it grows on open stony, mostly andesitic grassland slopes, but also on calcareous, shallow soil and is also reported from anthropogenic habitats, e. g. vineyards and gravel in abandoned water reservoir. In contrast, *L. sphaericus* has first been recorded mainly in disturbed anthropogenic habitats such as fallow fields, grassy road embankments and other grassy places in Austria (Berger et al. 2011; Melzer & Barta 2003). The species was first found in the second half of the 20<sup>th</sup> century and Melzer & Barta (2003) assumed that it was introduced by grass seeds.

As data in Tab. 1 and also our findings of two *Lathyrus* species show, floristic research may yield further findings of new populations of these species as well as other regionally extinct taxa (e.g. *Allium cirrhosum*, *Hierochloe australis*, *Ranunculus millefoliatus*) in the future. It is possible that climate change plays a role here, as the



two *Lathyrus* species are essentially Mediterranean and may benefit from increased temperatures. There is, as expected, a general trend for poleward and upward (altitudinal) plant species range shifts (Parmesan & Hanley 2015). An example is in



**Fig. 2** Distribution of *Lathyrus aphaca* L. (black dot – recent locality, hollow circle – historical localities) and *L. sphaericus* Retz. (red circle – recent locality, empty red circle – historical locality) in Slovakia.



**Fig. 3** *Lathyrus sphaericus* Retz. at Kusá hora Hill: left – habitus of the individual; right – character of habitat (photo J. Košťál).

hand in Slovakia, thermophilous *Aegilops cylindrica* (Poaceae), which occurrence is bounded to the most southern parts of SW and SE Slovakia (Eliáš et al. 2013), was found recently in several localities (Krupina, Bardejov) much further north than the native distribution (Dudáš et al. 2020; Hrivnák et al. 2021). In contrary, mountain sedge *Carex rupestris* will lose suitable environmental conditions in many current occurrence sites regardless of the climate change scenario (Svitková et al. 2019).

## Acknowledgement

We are indebted to Igor Olejka (Partizánske, Slovakia) for his assistance in field research and two anonymous reviewers for valuable comments to the earlier version of paper. The study was funded by the VEGA project no. 1/0359/22

## References

- Ball P. W. (1968): *Lathyrus* L. – In: Tutin T. G., Heywood V. H., Burges N. A., Moore D. M., Valentine D. H., Walters S. M. & Webb D. A. (eds.): Flora Europaea. Vol. 2. Rosaceae to Umbelliferae, p. 136–143. – Cambridge University Press, Cambridge.
- Barina Z. (2006): A Gerecse hegység flórájának katalógusa. – Magyar Természettudományi Múzeum es a Duna Ipoly Nemzeti park Igazgatóság. – Budapest, 612 pp.
- Barina Z. & Pifkó D. (2007): Botanikai kutatások a Visegrádi-hegységben. – *Kitaibelia* 12(1): 9–25.
- Bartha D., Király G., Schmidt D., Tiborcz V., Barina Z., Csiky J., Jakab G., Lesku B., Schmotzer A., Vidéki R., Vojtkó A. & Zólyomi Sz. (2015): Magyarország edényes növényfajainak elterjedési atlasza. (Distribution atlas of vascular plants of Hungary). – Nyugatmagyarországi Egyetem Kiadó, Sopron, 329 pp.
- Bauer N. (2001): Vascular flora of the hill Strázsa-hegy and its vicinity (Pilis Mts, Hungary). – *Stud. Bot. Hung.* 32: 125–163.
- Berger A., Gilli Ch., Auer M. & Hübl E. (2011): *Lathyrus sphaericus*. – In: Fischer M. A. & Niklfeld H. (eds.): Floristische Neufunde (99–123). – *Neireichia* 6: 382.
- Boža P., Igić S., Krstić Đ., Mihailović V., Anačkov G., Vukov D. M. & Mikić A. (2003): Distribution of the *Lathyrus* L. 1753 (Fabales, Fabaceae) species in the Vojvodina Province. – *Zbornik Matice srpske za prirodne nauke* 104: 61–81. DOI: 10.2298/ZMSPN0304061B
- Chrtková A. (1988): *Lathyrus* L. Hrachor. – In: Bertová L. (ed.): *Flóra Slovenska* IV/4, p. 201–238. – Veda, Bratislava.
- Chrtková A. & Bělohávková R. (1995): *Lathyrus* L. – hrachor. – In: Slavík B., Smejkal M., Dvořáková M. & Grulich V. (eds.): *Květena České republiky* 4, p. 416–437. – Academia, Praha.
- Chrtková A., Blažková D. & Bělohávková R. (1977): *Lathyrus aphaca* v Československu [*Lathyrus aphaca* in Czechoslovakia]. – *Preslia* 49: 337–346.
- Danihelka J., Chrtěk J. Jr. & Kaplan Z. (2012): Checklist of vascular plants of the Czech Republic. – *Preslia* 84: 647–811.
- Dítě D., Balla M. & Dítě Z. (2021): *Ranunculus polyphyllus* Willd. still grows in Slovakia. – *Thaiszia – J. Bot.* 31(2): 205–212. <https://doi.org/10.33542/TJB2021-2-04>
- Dítě D., Dítětová Z., Eliáš P. jun. & Šimková A. (2017): Recent distribution and phytosociological affiliation of *Ludwigia palustris* in Slovakia. – *Acta Soc. Bot. Pol.* 86: 35–44. DOI: 10.5586/asbp.3544



- Dobolyi K. Z. (1995): Phytosociological studies of the habitat of *Achillea ochroleuca* Ehrh. on Szamár-hegy (Visegrád Mts, Hungary). – Stud. Bot. Hung. 26: 15–24.
- Dúbravková D. (2014): *Festucion valesiacae* Klika 1931. – In: Hegedúšová Vantarová K. & Škodová I. (eds.): Rastlinné spoločenstvá Slovenska. 5. Travnino-bylinná vegetácia, p. 74–103. – Veda, Bratislava.
- Dudáš M., Eliáš P. ml., Eliáš P. st., Grulich V., Hrouda L., Chrtek J. ml., Klíč V., Kochjarová J., Košťál J., Koutecký P., Meredá P. ml., Prach K. & Valachovič M. (2020): Rastliny zaznamenané na území Floristického kurzu v Bardejove. – Bull. Slov. Bot. spoločn. 42 (Suppl. 2): 35–115.
- Eliáš P. jun. (2020): Return of the lost son: *Stipa smirnovii* reconfirmed for the Slovak flora. – In: Mártonfi P. (ed): Conference 70 years of Botanical Garden of Pavol Jozef Šafárik University, Slovakia, the history and the present of the botanical research and nature conservation, p. 9. – Univerzita Pavla Jozefa Šafárika, Košice.
- Eliáš P. jun., Dítě D., Eliášová M., Ďurišová Ľ. (2013): Distribution and origin of *Aegilops* species in Slovakia. – Thaiszia-J. Bot. 23: 117–129.
- Eliáš P. Jr., Dítě D., Kliment J., Hrivnák R. & Feráková V. (2015): Red List of Ferns and Flowering Plants of Slovakia. – Biologia 70: 218–228 + electronic appendix. DOI: 10.1515/biolog-2015-0018
- Endlicher S. L. (1830): Flora Posoniensis exhibens plantas circa Posonium sponte crescentes aut frequentius cultas, methodo naturali dispositas. – Posonii, I-XXX + 1–494.
- Futák J. (1980): Fytogeografické členenie. – In: Mazúr E. (ed.): Atlas Slovenskej socialistickej republiky, p. 88. – Veda, Bratislava.
- Gams H. (1975): Familie Leguminosae. – In: Hegi G. (ed.): Illustrierte Flora von Mittel-Europa 4/3, p. 1113–1644. – Carl Hanser Verlag, München.
- Holuby J. (1888): Flora des Trencsiner Comitatus. – Trencsin, 151 pp.
- Hrivnák R., Eliáš P. ml., Belanová E., Hrivnák M., Rízová V., Tomášiková D. & Veverka D. (2021): Zaujímavé nálezy ohrozených cievnatých rastlín z územia stredného Slovenska: komentovaný zoznam údajov z rokov 2019–2020 [Interesting findings of endangered vascular plants from the territory of central Slovakia: annotated list of data from years 2019–2020]. – Bull. Slov. Bot. spoločn. 43/2: 277–298.
- IUCN (2012): Guidelines for Application of IUCN Red List Criteria at Regional and National Levels: Version 4.0. – IUCN, Gland, Switzerland & Cambridge, UK, iii + 41 pp.
- Jarolímeck I., Šibík J., Tichý L. & Kliment J. (2008): Diagnostic, constant and dominant species of the higher vegetation units of Slovakia. – In: Jarolímeck I. & Šibík J. (eds): Diagnostic, constant and dominant species of the higher vegetation units of Slovakia, p. 9–294. – Veda, Bratislava.
- Jasík M. & Dítě D. (2017): Nová lokalita *Thesium ebracteatum* (ľanolistník bezlistencový) na Slovensku. – Bull. Slov. Bot. Spoločn. 39: 73–78.
- Jongepier J. W. (1997): Nové lokality vzácných rastlín v Bílých Karpatech. – Sborn. Přírod. Klubu Uherské Hradiště 2: 5–16.
- Király G. (ed.) (2007): Vörös Lista. A magyarországi edényes flóra veszélyeztetett fajai. [Red list of the vascular flora of Hungary]. – Saját kiadás, Sopron, 73 pp.
- Király G. (ed.) (2009): Új magyar fűvészkönyv: Magyarország hajtásos növényei. Határozókulcsok (New Hungarian Herbal. The vascular plants of Hungary. Identification key). – Aggteleki Nemzeti Park Igazgatósága, Jósvalfő, 616 pp.
- Király G., Takács G. & Király A. (2015): Adatok a Kisalföld flórájához és növényföldrajzához. – Kitaibelia 20(2): 235–253. doi.org/10.17542/kit.20.23
- Knapp J. A. (1865): Correspondenz. – Österr. Bot. Zeitschrift 15: 58.

- Kochjarová J. (2016): *Samolus* L. – In: Goliašová K. & Michalková E. (eds.): Flóra Slovenska VI/4, p. 721–722. – Veda, Bratislava.
- Krippelová T. (1974): Rozšírenie synantropných rastlín v Košickej kotline [Distribution of synanthropic plants in the Košická kotlina Basin]. – Acta Inst. Bot. Acad. Sci. Slov., Series A, 2: 1–338.
- Kupicha F. (1983): The infrageneric structure of *Lathyrus*. – Notes Roy. Bot. Gard. Edinburgh 41: 209–244.
- Lumnitzer S. (1791): Flora Posoniensis exhibens plantas circa Posonium sponte crescentes secundum systema Linneanum digestas. – Lipsiae, I–VIII + 1–557.
- Marhold K. & Hindák F. (eds) (1998): Zoznam nižších a vyšších rastlín Slovenska. – Veda, Bratislava, 688 pp.
- Medvecká J., Kliment J., Májeková J., Halada Ľ., Zaliberová M., Gojdičová E., Feráková V. & Jarolímek I. (2012): Inventory of the alien flora of Slovakia. – Preslia 84: 257–309.
- Melzer H. & Barta Th. (2003): Neue Daten zur Flora von Wien, Niederösterreich und dem Burgenland. – Linzer Biol. Beitr. 35 (2): 1159–1193.
- Meusel H., Jäger E. & Weinert E. (1965): Vergleichende Chorologie der zentraleuropaischen Flora I. – Gustav Fischer, Jena, 583 pp.
- Niklfeld H. (1971): Bericht über die Kartierung der Flora Mitteleuropas. – Taxon 20: 545–571. doi.org/10.2307/1218258
- Nobis A., Nobis M. & Urbicz A. (2011): *Lathyrus aphaca* L.: the distribution, habitats and remarks on the status of the species in Poland. – Acta Soc. Bot. Pol. 83(3): 237–244. doi.org/10.5586/asbp.2011.012
- Ondrejková L. (2019): Cesty k premenám. – In: Gécziová I. & Grešner L. (eds): Dolné Vestenice. Kraj čerešní, šafranu a hokejových pukov, p. 115–150. – Dolné Vestenice.
- Oprea A. (2005): Lista critică a plantelor vasculare din România. – Ed. Universităţii Alexandru Ioan Cuza, Iaşi, 668 pp.
- Otýpková Z. (2003): Poznámky k recentnímu rozšíření plevelů v Bílých Karpatech. – Zprávy Čes. Bot. Společ. 38: 47–61.
- Parmesan C. & Hanley M. E. (2015): Plants and climate change: complexities and surprises. Ann. Bot. 116: 849–864. doi:10.1093/aob/mcv169
- Pyšek P., Danihelka J., Sádlo J., Chrtek J. Jr., Chytrý M., Jarošík V., Kaplan Z., Krahulec F., Moravcová L., Pergl J., Štajerová K. & Tichý L. (2012): Catalogue of alien plants of the Czech Republic (2nd edition): checklist update, taxonomic diversity and invasion patterns. – Preslia 84: 155–255.
- Reuss G. (1853): Května Slovenska, čili opis všech jevnosnubných na Slovensku divorostaucích a mnohých zahradních zrostlin. – František Lorber, Banská Štávnice, 496 p.
- Roskov Y. R., Bisby F. A., Zarucchi J.L., Schrire B.D. & White R. J. (eds.) (2006): ILDIS World Database of Legumes: draft checklist, version 10. <http://www.ildis.org/>
- Somogyi J. (2021): *Ceterach officinarum* [Report]. – In: Eliáš P. jun. (ed), Zaujímavější floristické nálezy. – Bull. Slov. Bot. Spol. 43/2: 319.
- Soó R. von (1966): A Magyar flóra és vegetáció rendszertani – növényföldrajzi kézikönyve [Synopsis of flora and vegetation of Hungary] 2. – Akadémiai kiadó, Budapest, 655 pp.
- Svitková I.; Svitok M.; Petřík A.; Bernátová D.; Senko D. & Šibík J. (2019): The Fate of Endangered Rock Sedge (*Carex rupestris*) in the Western Carpathians—The Future Perspective of an Arctic-Alpine Species under Climate Change. – Diversity 11: 172. <https://doi.org/10.3390/d11090172>

Tokarska-Guzik B., Dajdok Z., Zając M., Zając A., Urbisz A., Danielewicz W. & Hołdyński Cz. (2012): Rośliny obcego pochodzenia w Polsce ze szczególnym uwzględnieniem gatunków inwazyjnych. – Generalna Dyrekcja Ochrony Środowiska, Warszawa, 196 pp.

Westhoff V. & Van Der Maarel E. (1978): The Braun-Blanquet approach. – In: Whittaker R. H. (ed.): Classification of plant communities, p. 289–399. – W. Junk, The Hague.

Received: January 11<sup>th</sup> 2022

Revised: February 15<sup>th</sup> 2022

Accepted: May 2<sup>nd</sup> 2022