

New floristic records from Central Europe 12 (reports 164-175)

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Abstract: The presented 12th part of the series includes twelve new records of vascular plants from Poland, Slovakia and the Ukrainian Carpathians. In Poland, two alien species, *Ficus carica* and *Geranium rotundifolium* are mentioned. New localities of *Angelica archangelica*, *Primula halleri* and *Ranunculus thora* were recorded in the Ukrainian Carpathians. New alien for the flora of Slovakia, *Knautia macedonica*, is firstly reported and new localities for *Pseudofumaria lutea*, *Salvia abrotanoides* × *S. yangii* and *Thladiantha dubia* were found. Phytogeographically interesting finding of critically endangered *Centaurea solstitialis* in the Bukovské vrchy Mts. was recorded and the spreading of *Tribulus terrestris* by railway traffic to secondary habitats was observed. New localities of the Eastern Carpathian subendemic taxon *Thymus alternans* in the Bukovské vrchy and Vihorlat Mts is presented with its distribution map.

Keywords: alien, Carpathians, chorology, native species, new findings, Poland, red list species, Slovakia, vascular plants.

This is an ongoing report in the established series dealing with new chorological data on higher vascular plants in Central Europe (for details, see Thaiszia – J. Bot. 28 (1), pp. 79–80, 2018).

The nomenclature of taxa follows the Euro+Med PlantBase (Euro+Med 2006-) and/or Chromosome number survey of the ferns and flowering plants of Slovakia (Marhold et al. 2007), herbarium acronyms follow Thiers (2023+).

The publication includes contributions by M. Dudáš (164-166), R. Hrivnák (167), Y. Kobiv (168-170), M. Majerová (171), B. Malec (172-173), A. Pliszko & A. Górecki (174) and A. Pliszko & G. Pacyna (175) arranged alphabetically.

Matej Dudáš (reports 164-166)

Slovakia

164. *Pseudofumaria lutea* (L.) Medik.: the Spišské kotliny Basins, Levoča, historical city wall on Baštová St. from the edge with Uhoľná St. up to the Grammar School Janka Francisciho-Rimavského, tens of plants, 565 m, from 49°01'41.80"N 20°35'14.41"E to 49°01'34.18"N 20°35'08.83"E, 6989d, 6. 9. 2023, M. Dudáš, KO 37611.

Pseudofumaria lutea is a species with its origin in the southern foothills of the Central and the Western Alps (Lidén 2011+). In Slovakia, it is an alien plant and Medvecká et al. (2012) consider the species as a casual neophyte. In Slovakia, it was recorded rarely from Bratislava and Košice (Mártonfi 2002) and recent new data are only sporadic, e. g. Banská Štiavnica, Kremnica, Revúca (Slezák et al. 2011), Zvolen, Ružomberok (Letz et al. 2013), Nitra, Pezinok, Košice (Dudáš et al. 2023), where it was recorded on historical city walls, retaining walls and castle walls. In Levoča, the species colonized historical walls on Baštová St. from the edge with Uhoľná St. up to the Grammar School Janka Francisciho-Rimavského Gymnasium, in the section of ca. 300 m over 20 plants grew directly on the wall. The species is visibly thriving here and continues to spread along street.

165. *Salvia abrotanoides* (Kar.) Sytsma × *S. yangii* B. T. Drew: the Košická kotlina Basin, Košice, Sever, naturalised along the path at the edge of Vodárenská Street, near the Fresh supermarket, 8 flowering and several sterile plants, 211 m, 48°44'27.49"N 21°15'20.9"E, 7293d, 23. 7. 2023, M. Dudáš, KO 37601, 37602, Fig. 1.

Cultivated plants of *Salvia abrotanoides* × *S. yangii* (still without nothospecific epithet) were probably created by artificial crossing in Europe during the 20th century (Grant 2007; Bonari et al. 2017). Both species, *S. abrotanoides* and *S. yangii* are the members of *Salvia* subgenus *Perovskia* (Kar.) J. B. Walker et al. (syn. *Perovskia* Kar., *Perovskia* Benth.). The escaping of this hybrid has been recorded in several countries, e.g. in France (Verloove 2008) and in Belgium (Verloove 2014, both ut *Perovskia atriplicifolia*), in Italy (Bonari et al. 2017), in Austria (Rožánek 2016, ut *P. ×superba*) and in the Czech Republic (Mered'á 2021). Other findings reported from Europe under the name *Perovskia atriplicifolia* probably refer to the hybrid, because this taxon is often understood in a wider sense, including not only *S. yangii*, but also the hybrid *S. abrotanoides* × *S. yangii*. In Slovakia, this hybrid is often cultivated in

city centers, but only two records were published from Bratislava, Staré Mesto (Mereďa 2021). This is the third record of garden escaping in Slovakia.



Fig. 1 Herbarium specimen of *Salvia abrotanoides* × *S. yangii* from plants escaped from cultivation in Košice (scanned by M. Dudáš).

166. *Thymus alternans* Klokov: the Vihorlat Mts, Beňatina, roadside in the direction of Inovce, north above the flooded quarry, vegetation *Brachypodium pinnati*, frequent, exp. SE, 484 m, 48°48'56.4"N 22°20'41.3"E, 71100c, 27. 6. 2021, M. Dudáš, KO 36226. – Inovce, chapel W above the village, dry edge of meadow, exp. N, 518 m, frequent, 48°49'18.4"N 22°20'55.4"E, 71100c, 27. 6. 2021, M. Dudáš, KO 36227. – Inovce, road E from the village in the direction of Ruský Hrabovec, anthill, exp. E, 472 m, 48°49'33.5"N 22°21'46.8"E, 71100c, 27. 6. 2021, M. Dudáš, KO 36228. – the Bukovské vrchy Mts, Príslop, bus stop in the centre of the village, roadside, scattered, 426 m, 49°02'18.2"N 22°19'40.6"E, 6999d, 20. 6. 2021, M. Dudáš, KO 36223. – Príslop, Pohár hill, roadside, anthill, exp. S, 560-580 m, 49°03'12.8"N 22°18'51.5"E, 6999b, 29. 6. 2022, M. Dudáš, KO 37104. – Stakčín, Grúnik Nature Reserve, dry meadow, rare, exp. S, 295 m, 49°00'41.9"N 22°14'06.5"E, 6999c, 29. 6. 2022, M. Dudáš, KO 37107, 37108. – Stakčín, [former village] Dara, Geological education locality, roadside of the road 558, frequent, exp. S, 460 m, 49°02'48.0"N 22°17'29.3"E, 6999d, 20. 6. 2021, M. Dudáš, KO 36224. – Stakčín, Jalová, Starina water reservoir, xerothermic vegetation on the northern bank near the crossroad to former village of Ostrožnica, scattered, exp. S, 344 m, 49°04'23.3"N 22°14'45.9"E, 6999a, 11. 6. 2021, M. Dudáš, KO 36225. – Stakčín, Jalová, Gazdoráň Nature Reserve, anthill at field road, exp. S, 485 m, 49°02'56.8"N 22°16'09.5"E, 6999d, 12. 6. 2022, M. Dudáš, KO 36876. – Stakčín, Jalová, Gazdoráň (508 m), meadow on the top, 500 m, 49°03'04.6"N 22°16'11.2"E, 6999d, 12. 6. 2022, M. Dudáš, KO 36877. – Runina, meadow at northern edge of the village, anthill near green-marked tourist path, frequent, exp. S, 570 m, 49°04'32.9"N 22°24'29.6"E, 69100a, 29. 6. 2022, M. Dudáš, KO 37105. – Uličské Krivé, hill Hukov (462 m), meadow, exp. NNW, 386 m, 48°59'06.9"N 22°26'38.9"E, 70100b, 22. 6. 2022, M. Dudáš, KO 37109. – Nová Sedlica, Information center of National Park Poloniny Administration, roadside ca 100 m north from the building, frequent, 445m, 49°03'14.6"N 22°31'06.0"E, 69101a, 17. 6. 2016, M. Dudáš & A. Rákai, KO 32391.

Other herbarium specimens examined: [former village] Ruské, near challet of NP [national park] Východné Karpaty (V. Mikoláš, 25. 6. 1998, KO 20781). – the Bukovské vrchy Mts, bus stop at the crossroad towards the villages Topoľa and Runina, 49°01'34"N 22°21'10.9"E, 355-357 m (R. Seman, 2. 7. 2007, KO 36105, 36106).

Eastern Carpathian subendemic tetraploid taxon distributed in Slovakia, Ukraine and Romania (Kliment 1999). *T. alternans* is probably a species from the group of evolutionarily younger taxa, which could arise by allopolyploidization as a tetraploid. As the possible parent taxa, probably *T. pulegioides* from the subsect. *Alternantes* Klokov and some representative of the subsect. *Isolepides* (Borbás) Halácsy can be considered (Mártonfi & Mártonfiová 1997). It is distributed all over Ukrainian Carpathians and adjacent Romanian Eastern Carpathians, elsewhere in the Apuseni Mts and in Transylvania it is rare (Ciocârlan 2012; Nachychko 2014; Nachychko et al. 2017). The species was confirmed by Mártonfi (1996) for the first time, based on the revision of herbarium specimens in the herbarium of Comenius University (acronym

SLO) collected by J. Májovský near Runina village (NE Slovakia). Later it was recorded near the villages of Topoľa, Ruský Potok and Nová Sedlica (Hájek et al. 1999; Mráz 2000; Dall'Acqua et al. 2017). The species recently occurs in the Bukovské vrchy Mts and the Vihorlat Mts (Fig. 2), where it is regionally frequent and often grows with *T. pulegioides*, with which it can sometimes be confused. It grows often on anthills in dry meadows and along field roads and also on scrubby slopes in the range of altitude from 295 to 580 m. In higher altitudes in mountain ranges it does not occur and is replaced by *T. pulegioides*.

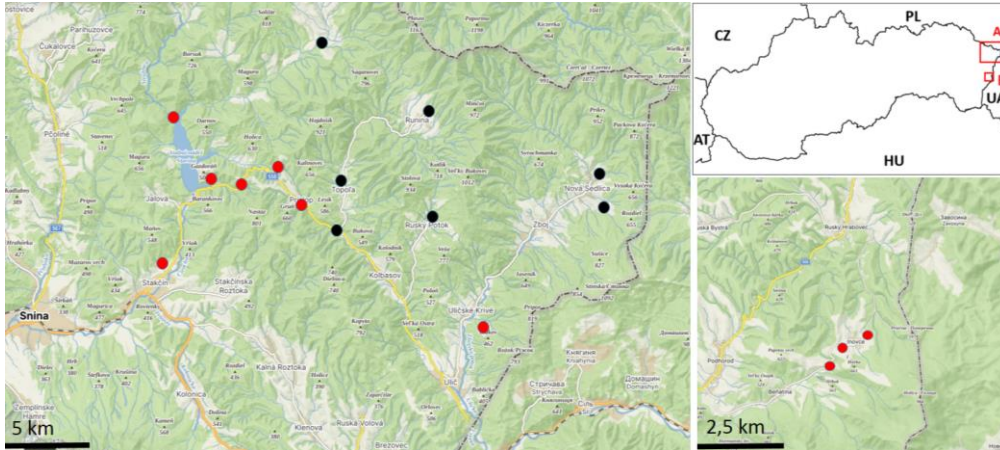


Fig. 2 Distribution of *Thymus alternans* in Slovakia. Black dots represent previously published data, red dots show new records. International codes of countries are shown.

Richard Hrivnák (report 167)

Slovakia

167. *Tribulus terrestris* L.: the Podunajská rovina Lowland, Šaľa, railway station, hundreds of individuals, 116 m, 48°8'49.177"N 17°51'45.385"E, 7873c, 11. 8. 2022, R. Hrivnák, SAV. – the Rimavská kotlina Basin, Lenartovce, railway station, thousands of individuals, 153 m, 48°18'9.943"N 20°19'32.735"E, 7687d, 17. 8. 2022, R. Hrivnák, SAV. – the Rimavská kotlina Basin, Tornaľa, railway station, less than 20 individuals, 181 m, 48°25'15.428"N 20°19'47.644"E, 7587d, 17. 8. 2022, R. Hrivnák, SAV.

The species was historically known from the south-western part of Slovakia, the Podunajská and the Borská nížina Lowlands, from sandy natural habitats as well as artificial habitats such as abandoned fields or edges of roads (Zahradníková 1982). Later, it spread by railway traffic to secondary habitats such as rail yards and platforms (Eliáš 1977; Májeková et al. 2014). Recently, several records from these habitats were found across the whole of southern Slovakia (e.g. Eliáš 2014; Májeková et al. 2014; Dudáš et al. 2019). Distribution of the species is concentrated mainly in western Slovakia, while findings from the central (Duchoň & Zajac 2020; Eliáš 2020) and eastern part (Májeková et al. 2016, 2021a; Dudáš et al. 2019) are relatively less frequent).

Yuriy Kobiv (reports 168-170)

Ukrainian Carpathians

168. *Ranunculus thora* L.: Ivano-Frankivska Oblast, Verkhovyna District, the Chornohora Mts, Mt. Brebeneskul, alpine grassland, gentle NNE slope, 1903 m, 48°06'02.2"N 24°34'48.7"E, 28. 6. 2017, Y. Kobiv, LW 215615.

Ranunculus thora is distributed in the high-mountain areas of the temperate European mountains from the Pyrenees to the Carpathians (Meusel & Jäger 1992). In the Ukrainian Carpathians, it occurs above 1650 m a.s.l. in the highest mountain massifs: the Chornohora, the Svydovets and the Marmarosh Mts (Chopyk 1976; Kyyak 2013). The species is rare and included in the Red Data Book of Ukraine (Didukh 2009). It is calcicole (Zarzycki et al. 2002) and most of the Ukrainian localities refer to the Chornohora Mts, where the species was reported from the following mountains: Petros, Dantsyr, Turkul, Kizly, Shpytsi, Rebra, Gutyn, Pohorilets, Pip Ivan, and Butynec cirque (Zapałowicz 1889; Kyyak 2013). The species was also mentioned from the NW slope of Mt. Brebeneskul at 1970 m a.s.l. (Kyyak 2013) about 1.5 km eastwards from the newly reported locality. The Ukrainian authors reasonably consider *R. thora* a saxicolous species with low-numbered populations (Kyyak & Cherepanyn 2008; Kyyak 2013).

However, the discovered population is rather unique and does not fit that pattern. It occurs in the *Seslerio bielzii-Caricetum sempervirentis* grassland community with a dense (95 %) vegetation cover and is situated on a gentle (3°) slope devoid of the rocks. The population covers ca. 200 m² and includes about 2,500 flowering individuals, which exceeds the size of previously described Ukrainian populations (Kyyak & Cherepanyn 2008).

169. *Primula halleri* J. F. Gmel.: Ivano-Frankivska Oblast, Verkhovyna District, the Chornohora Mts, Mt. Brebeneskul, steep scree, E slope, 1875 m, 48°05'59.4"N 24°35'15.1"E, 4. 7. 2018, Y. Kobiv, LW 215616.

Primula halleri is distributed in the high-mountain areas of the temperate European mountains from the Alps to the Carpathians (Meusel et al. 1978). According to literature data (Chopyk 1976; Kyyak 2013), in the Ukrainian Carpathians it is rare and occurs on the rocky calcium-rich steep slopes within 1430–1850 m a.s.l. in the highest mountain massifs: the Chornohora, the Svydovets and the Marmarosh Mts. The species is included in the Red Data Book of Ukraine (Didukh 2009). In the Chornohora Mts, *P. halleri* has been known from the E slope of Mt. Hoverla at 1660–1730 m a.s.l. (Zapałowicz 1889; Kyyak 2013) and from the NE slope of Kizi Ulohy glacial cirque between Mt. Munchel and Mt. Brebeneskul at 1740 m a.s.l. The reported locality is situated not far from the latter one, but significantly higher. Moreover, its location is the highest in the Ukrainian Carpathians. The population is low-numbered and includes only about 15 flowering individuals, which could signal that it is critically endangered.

170. *Angelica archangelica* L.: Ivano-Frankivska Oblast, Nadvirna District, the Chornohora Mts, Mt. Hoverla, along the stream in *Alnetum viridis*, NE slope, 1580 m, 48°09'56.0"N 24°30'36.3"E, 8. 7. 2020, Y. Kobiv, LW 215617.

In the Carpathians, *A. archangelica* is considered a glacial relict (Dítě et al. 2018), which occurs in that region at the edge of its Eurasian range (Meusel et al. 1978), like other wetland species with a similar distributional pattern (Kobiv et al. 2022). Its Carpathian populations are rare and mostly small (Piękoś-Mirkowa & Mirek 2006). They are restricted to wet habitats, mainly at the streams in the subalpine and upper montane zones. This fully applies to the Ukrainian part of the Eastern Carpathians, where *A. archangelica* is sporadically distributed in several mountain massifs, particularly in the Chornohora.

Zapałowicz (1889) reported on a number of its localities on the Transcarpathian side of the Chornohora while he considered the species rare on its NE side and mentioned only three of them in the southern part of that mountain massif. In some of these historical localities, the species has been exterminated, because the plant's roots are very popular in traditional medicine (Popescu et al. 2012). The discovered population is situated in the NE glacial cirque of Mt. Hoverla and stretches about 50 m along the stream, which flows through the green alder scrub. Such conditions impede access to the site that could have preserved the population from extermination in the past. The area belongs to the strictly protected zone of the Carpathian National Nature Park now, which ensures the future survival of the population. It includes about 15 flowering individuals while numerous seedlings prove the effective seed recruitment.

Monika Majerová (report 171)

Slovakia

171. *Knautia macedonica* Griseb.: the Podunajská nížina Lowland, Zavar, unmanaged flat meadow between the private gardens (mowed 1 or 2 times per year), two well-grown flowering plants, 136 m, 48°21'06.5"N 17°40'00.0"E, 7672a, 22. 5. 2023, M. Majerová, SAV, Fig. 3.

Macedonian scabious is a native species of the Balkan Peninsula (Tutin 1976; Pyšek et al. 2022) which originally inhabits scrub and open forests (Tutin 1976). In Slovakia, this species belongs to popular ornamental plants cultivated in gardens. The presented locality is the first evidence of a spontaneous spread of *K. macedonica* in our territory. Since we observed this species in the intravillan of the village, we assume that the source of its spreading is the cultivation in adjacent private gardens. According to Kutlvař et al. (2019), who studied the invasive potential of several species in perennial plantations, *K. macedonica* easily spreads to the surrounding area. Our findings confirm its ability to escape from cultivated areas and spread into native habitats. In the Czech Republic, the species was first recorded as non-native in 2018 by Lepší & Lepší (2019).

Knautia macedonica is very similar to our native field scabious (*Knautia arvensis*), but they can be distinguished from each other by several morphological characters. *K. macedonica* possesses leaves evenly distributed along the stem and basal leaves are usually withered at anthesis. Corolla is usually dark red, sometime lilac or pink (Tutin 1976). *K. arvensis* possessess green basal leaves and corolla is violet or blue (Tunçkol et al. 2021).

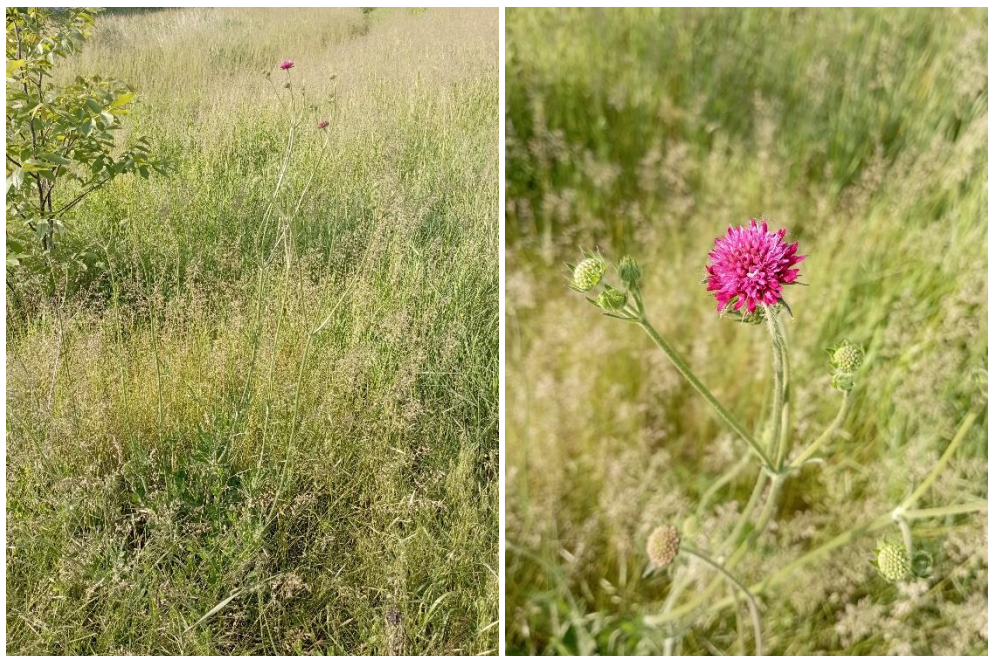


Fig. 3 *Knautia macedonica*, new alien for the flora of Slovakia in the Podunajská nížina. Biotope (left) and detail of inflorescence (right). Photographed by M. Majerová.

Bořivoj Malec (reports 172-173)

Slovakia

172. *Thladiantha dubia* Bunge: the Bukovské vrchy Mts., Uličské Krivé, ditch on the margin of deciduous forest opposite to Kováčová lúka site, abundant on length ca 20 m, 320 m, 48°59'59.4"N 22°25'34.8"E, 14. 8. 2023, 70100b, B. Malec, photodocumentation.

Note of editor: *Thladiantha dubia* is a species with the origin in southeastern Asia and in Slovakia is considered casual neophyte (Medvecká et al. 2012). It is grown as an ornamental plant for covering fences and pergolas and sporadically escaped from cultivation. This record is the second one for the Bukovské vrchy Mts (Hadač & Terray 1991; Eliáš 2008).

173. *Centaurea solstitialis* L.: the Bukovské vrchy Mts., Ulič, Grúň, close to water tower reservoir, 1,2 km north of Municipal office, cutt meadow, 10 plants, 300 m, 48°58'13.4"N 22°25'14.2"E, 70100b, 14. 8. 2023, B. Malec, Fig. 4.

Note of editor: species with its origin in southern and eastern Europe, Central Asia, Caucasus, Turkey and northern Africa (Greuter 2006+). In Slovakia, it occurred only in southwestern part of the territory in several localities (Feráková 1999), but currently, only two populations are known, in Bratislava on southern slope of castle hill and in Pastovce (Májeková et al. 2021b). It is a critically endangered species of Slovak flora (Eliáš et al. 2015) and is included in the Red Book (Feráková 1999). The origin of the species in Ulič is not exactly known, but it can certainly be considered secondary. It is the first record in the Bukovské vrchy Mts (Hadač & Terray 1991) and from eastern Slovakia as whole.



Fig. 4 *Centaurea solstitialis* in the new locality in the Bukovské vrchy Mts. Detail of inflorescence (left) and stem with leaves (right). Photographed by B. Malec.

Artur Pliszko & Artur Górecki (report 174)

Poland

174. *Ficus carica* L.: southern Poland, Lesser Poland Province, Kraków, ruderal place between the tram shelter and the fence by the road, one juvenile individual, 211 m, 50°01.898'N 19°55.257'E, 03. 07. 2023, Fig. 5.

Ficus carica is native to south-eastern Europe and south-western Asia (Zhekum & Gilbert 2003; Wunderlin 1997). It was introduced to other parts of Europe and Asia, as well as to Africa, North America, South America and New Zealand. It is widely cultivated for its edible fruit and medicinal properties (Wunderlin 1997; POWO 2023a).

Ficus carica is cultivated in some regions in Poland; however, it requires special care against frost in winter. So far, only two spontaneous plant localities have been found in Poland, and it is considered a casual alien species (Urbisz 2011; Mirek et al. 2020). This is the first non-garden record of *F. carica* in Kraków and Lesser Poland Province. Most likely, it was introduced unintentionally by throwing away or losing the fruit by a person who travelled by public transport. The plant grew behind the tram shelter and was about 1 m tall. Moreover, it had a thickened, woody stem at

the base which suggests that it has been present at the new locality for at least two seasons. It seems that the glass of the tram shelter and the fence located in its vicinity (Fig. 5) are effective protection against low temperatures, enabling the plant to survive the winter. Nevertheless, *F. carica* should be removed or replanted so as not to damage the transport infrastructure through its expanding root system.

Interestingly, fig seed finds have been reported from medieval archaeological sites in Kraków (Mueller-Bieniek & Woch 2012; Mueller-Bieniek et al. 2015). Although the fruits were most likely imported, it is not excluded that it was possible to grow *F. carica* in the region during the medieval thermal optimum (Woch 2012).



Fig. 5 *Ficus carica* in Kraków, southern Poland: the plant shown from the front (A) and side (B) of a tram shelter. Photographed by A. Pliszko.

Artur Pliszko & Grzegorz Pacyna (report 175)

Poland

175. *Geranium rotundifolium* L.: southern Poland, Lesser Poland Province, Kraków, railway area, several hundred individuals, 212 m, 50°02.056'N 19°56.877'E, 17. 06. 2023, Fig. 6.

Geranium rotundifolium is native to most of Europe as well as northern Africa and west-southern and central Asia (Xu & Aedo 2008; POWO 2023b). It was introduced to some countries in central, eastern and northern Europe (i.e., Czechia, Poland, Latvia, Estonia and Norway), eastern Asia, southern Africa, Tasmania, North America and South America (CABI Compendium 2022). It is usually found on steppes, rocky slopes, roadsides, railway areas, rubble heaps and waste ground (Xu & Aedo 2008; Májeková et al. 2014; Leach 2020).

In Poland, *G. rotundifolium* is treated as a casual alien species (Tokarska-Guzik et al. 2012; Mirek et al. 2020) and so far, it has been reported from five localities (Urbisz

2011; Trojecka-Brzezińska 2017). However, some localities are doubtful due to the lack of herbarium materials that would confirm the correctness of the determinations made by other researchers (Urbisz 2011). *G. rotundifolium* is often confused with *G. molle* L. and *G. pusillum* L., but it differs from these two species by rounded petals, smooth mericarps and an unpleasant odor similar to that of *G. robertianum* L. (Rutkowski 2004; Xu & Aedo 2008). To the best of our knowledge, this is the first record of *G. rotundifolium* in Lesser Poland Province. Taking into account the relatively high number of individuals (> 500) and their distribution over a 70 m section along the railway tracks, it can be assumed that the species has been present at the new locality for more than two seasons. Most likely, it was introduced by rail transport or with track ballast during the renovation of railway tracks near the Bonarka station. The spread of *G. rotundifolium* into railway areas has already been observed in Poland (Trojecka-Brzezińska 2017), as well as in other European countries (Májeková et al. 2014; Jasprica et al. 2017; Leach 2020). Further long-term observations are required to confirm the establishment of the species in the Polish flora.



Fig. 6 *Geranium rotundifolium* in Kraków, southern Poland: A – habit, B – upper part of the plant, C – blade of the basal leaf, D – fruit and the upper leaf, E – railway area near the Bonarka station. Photographed by A. Pliszko.

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