

## TARAXACUM SECT. ERYTHROSPERMA IN SLOVAKIA III: TARAXACUM PARNASSICUM DAHLST., NEW LOCALITIES AND NOTES ON ITS DISTRIBUTION AND TAXONOMY

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(Received: 29 January 2021; Accepted: 3 January 2022)

The paper presents new records of *Taraxacum parnassicum*, the most common member of *Taraxacum* section *Erythrosperma* in Slovakia. The species has been recorded in most of the 31 phytogeographical districts of Slovakia. At least 25 new localities were discovered, and many old ones were confirmed. *T. parnassicum* prefers natural and semi-ruderal sites on limestone, rarely on volcanic and sandy soils, predominantly not shaded. The majority of populations occur from the lowland to supracolline vegetation belt, mainly at elevations of 140–700 m a.s.l., with the altitudinal maximum at 1,410 m a.s.l. A distribution map is given with the list of localities from the whole territory of Slovakia as well as short discussion about its taxonomy and ploidy level.

Key words: apomixis, Central Europe, chorology, lesser dandelion

### INTRODUCTION

The third part of our series dealing with revision of chorology of *Taraxacum* section *Erythrosperma* in Slovakia focuses on the species *Taraxacum parnassicum*. It follows up previous studies on *T. cristatum* Kirschner *et al.* (Dudáš 2019) and *T. danubium* A. J. Richards (Dudáš *et al.* 2020a).

The species is usually a delicate plant with remarkable (and relatively unique) determination characteristics making this beautiful taxon popular even among non-specialists. It is one of few *Taraxacum* species widely recognised by botanists. For a long period, it was widely known as *Taraxacum silesiacum* G. E. Haglund, and under this name majority of publications were published. Evaluation of Dahlstedt's original material of *T. parnassicum* Dahlst. by H. Øllgaard led to synonymising of *T. silesiacum* with *T. parnassicum* (Lundevall and Øllgaard 1999). According to Doll (1973) it belongs to *T. silesiacum* group together with other 8 species. However, taxa listed by Doll are probably only superficially similar (besides *T. badius* now synonymous with *T. parnassicum*) and probably do not share true relationship.

Although the genetic relationship to other European taxa of lesser dandelions is still unknown, some Central European species are superficially similar. However, it has several very remarkable morphologic characters, making the species easily recognisable from such species. In Central Europe, it can be misidentified with young plants of *T. danubium*, *T. rubicundum* (Dahlst.) Dahlst. or *T. arcuatum* (Tausch) Dumort. The most remarkable difference from these three superficially similar taxa is the absence of pollen grains, which also cause that capitulum is flat in *T. parnassicum* (on the contrary to distinctly convex capitula of other taxa). Another very remarkable characteristic is the acute triangle terminal lobe, all three mentioned taxa have terminal lobe more or less obtuse (Fig. 1). Lateral lobes of *T. parnassicum* are usually simple, they are deltoid and regularly arranged, usually not having any distinct tooth on their margins (as it is usually present on distal margin of lateral lobes in *T. rubicundum* and *T. arcuatum*), and never distinctly blunt at the tip as it is in *T. danubium*. The involucre of *T. parnassicum* has irregularly broad inner involucre bracts, which is quite unique among Central European taxa of lesser dandelions (besides the species, it is known only in one other, yet undescribed species of the *T. proximum* group and that differs by longer outer bracts and different shape and colour of achenes). The species is remarkable by its later phenology, flowering circa 1 (or 2) week(s) later than most of lesser dandelions in Central Europe. Achenes are dark violet-brown, but remarkably brick-red when immature (e.g. Reisch and Schmid 2001, Šuvada *et al.* 2012, Vašut 2003).

The species is a triploid apomictic microspecies with a chromosome number  $2n = 3 \times = 24$ . The triploid chromosome number was previously reported by Májovský *et al.* (1970, 1974), Marhold *et al.* (2007), Richards (1970) and Šuvada *et al.* (2012). This was further confirmed by flow-cytometric meas-

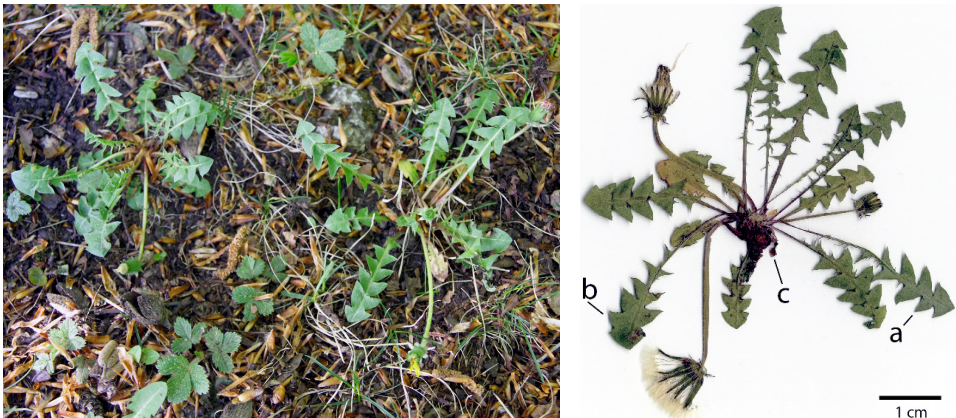


Fig. 1. *Taraxacum parnassicum*. General habitus of live plants (left) and details on herbarium specimen (right), a = deltoid and regularly arranged lateral lobes, b = clustered terminal and neighbouring lobes and c = absence of tunica (Orig. M. Dudáš)

urements (Dudáš *et al.* 2013, Šuvada *et al.* 2012). Chromosome counts and ploidy level from Slovakia correspond to those from other parts of Europe, e.g. Czechia (Trávníček *et al.* 2010, Vašut 2003), Germany (Uhlemann 2000), Poland (Małecka 1969, Wolanin and Musiał 2017), the Netherlands (den Nijs *et al.* 1978) and Great Britain (Dudman and Richards 1997).

Dahlstedt described the species based on the material cultivated from seeds, which originated from Mt Parnassos in Greece (Dahlstedt 1926). Haglund (1938) described species *T. silesiacum* (based on Dahlstedt's unpublished work) from the vicinity of nowadays city Legnica in Poland [Liegnitz in Silesia]. Species is recently known from major part of Europe (e.g. Aquaro and Peruzzi in Conti *et al.* 2007, Doll 1973, Dudman and Richards 1997, Mosyakin and Fedoronchuk 1999, Richards 1991, Sell and Murrell 2006, van Soest 1957, Wendt 2001, Wendt and Øllgaard 2015) and is considered a common species especially in Central and Southern Europe (see e.g. in Kallen *et al.* 2003, Sackwitz *et al.* 1998, Štěpánek and Kirschner 2012, 2014, Uhlemann 1996, 2003, Vašut 2003, Wolanin and Musiał 2017, and many floristical records cited in these publications). Records from Slovakia are scarce and yet provided only incomplete overview of its distribution in the territory (Dudáš *et al.* 2020b, Kirschner and Štěpánek 1995, Májovský *et al.* 1970, 1974, Richards 1970, Šuvada 2010, Šuvada *et al.* 2012).

Some authors observed its regional preference for calcareous substrates (e.g. Reisch and Schmid 2001, 2002, Schmid and Horn 1995), but it was not observed as general phenomenon and other authors observed its distribution ecologically broader and not narrowly limited to such habitats (e.g. Uhlemann 1996, 2003, Vašut 2003).

The aim of this study was to provide detailed information on distribution of *T. parnassicum* in Slovakia, based on our intensive study of Slovak dandelions by field observations and revision of herbarium specimens from public herbaria collections.

## MATERIAL AND METHODS

The study was carried out during the years 2008–2020. We used only revised herbarium sheets and own collected material from the field research to determine the species distribution in Slovakia. The data were obtained from the public Central European herbaria including: BBZ, BP, BRA, BRNM, BRNU, HLO, HNTS, KO, LTM, MOP, NI, OL, OLM, PL, PMK, PR, PRC, SAV, SLO, SMB, SMBB, SNV, TM, ZAM, ZV and Richard's type collection deposited in Great Britain (OXF). The herbarium abbreviations are according to Thiers (2020+) and also Vozárová and Sutorý (2001) for small local museum collections. Results of this study are presented on the dot map designed by the program ArcGIS, version 9.2. The grid on the map follows the one described by Niklfeld (1971). The list of localities was compiled according to recommen-

dations of Flóra Slovenska, which we applied in our previous studies (Dudáš 2019, Dudáš *et al.* 2020a).

The ploidy level was detected by flow-cytometry following previously published work (Koprivý *et al.* 2019).

## RESULTS AND DISCUSSION

### *Distribution in Slovakia*

*Taraxacum parnassicum* has a scattered distribution in Slovakia (Fig. 2). The presence of the species was recorded in 7 and 23 phytogeographical districts and subdistricts of the Pannonian (*Pannonicum*) and Carpathian (*Carpathicum*) biogeographical regions, respectively. Although it seems it has large distribution, the species is not very frequent at many localities. It predominantly occurs on calcareous type of substrates (limestone, dolomite and travertine) in Slovakia (Fig. 3), but occasionally it was found on sandy or volcanic substrates. This is in contrast with the wider ecological claims of *T. cristatum* (Dudáš 2019) or *T. danubium* (Dudáš *et al.* 2020a), which do not strictly prefer calcareous substrates.

### *Characteristic of Taraxacum parnassicum populations in Slovakia*

The ploidy level of *T. parnassicum* is known to be triploid (Dudáš *et al.* 2013, Májovský *et al.* 1970, 1974, Marhold *et al.* 2007, Richards 1970 and Šuvadla

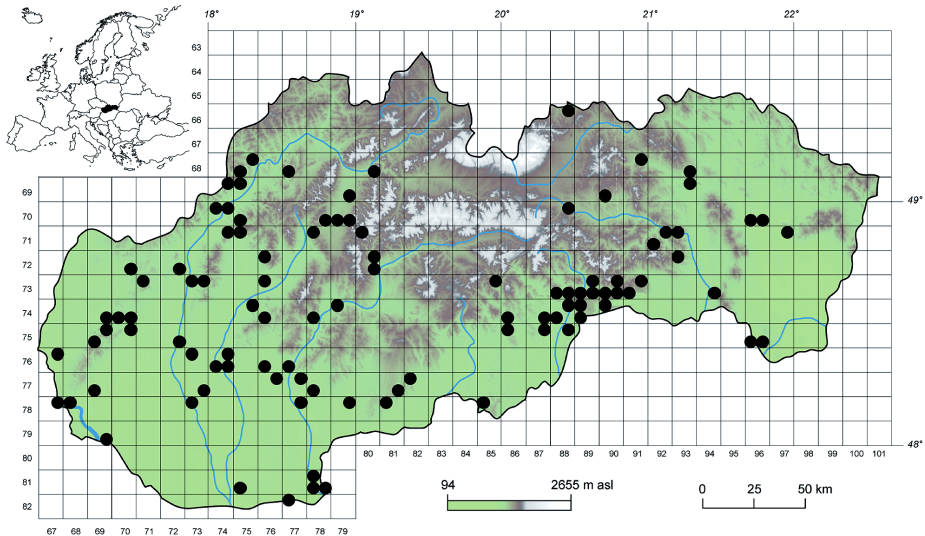


Fig. 2. The overall distribution of *Taraxacum parnassicum* in Slovakia (black dots)



*et al.* 2012). We additionally confirmed it by flow-cytometric measurement of plants from the Spišský hrad castle hill, having the  $2C = 2,716$  pg ( $2n \sim 3\times$ ).

*Taraxacum parnassicum* often prefers semi-ruderal sites in natural steppe grasslands in Slovakia. It often grows along pathways and field roads in dry grasslands or pastures, but also in light and open forests (mostly oak forests, less frequently hornbeam or locust woods). Especially frequent occurrence is along pathways in hilly cultural sites (recently touristic hotspots), which have been deforested for centuries, such as castle hills, chapels, churches, calvaries, sightseeing towers and similar. In most cases it grows on limestone and travertine substrates, rarely on other types of substrates.

This microspecies occupies a wide range of altitudes from the Pannonian lowlands to the Carpathian mountain beech zone. The highest documented occurrence was found at 1,410 m a.s.l. in the Veľká Fatra Mts on the top of the hill Bágľov kopec (collected by D. Bernátová in 1976, voucher specimen deposited in BBZ, revised by J. Štěpánek, published in Kliment 2008: 280) and near the rock at Kráľová studňa in ca 1,340 m (for details see Appendix). The lowest elevations of its occurrence were noticed at about 125 m a.s.l. in the southern part of the lowlands Východoslovenská nížina and Podunajská nížina.

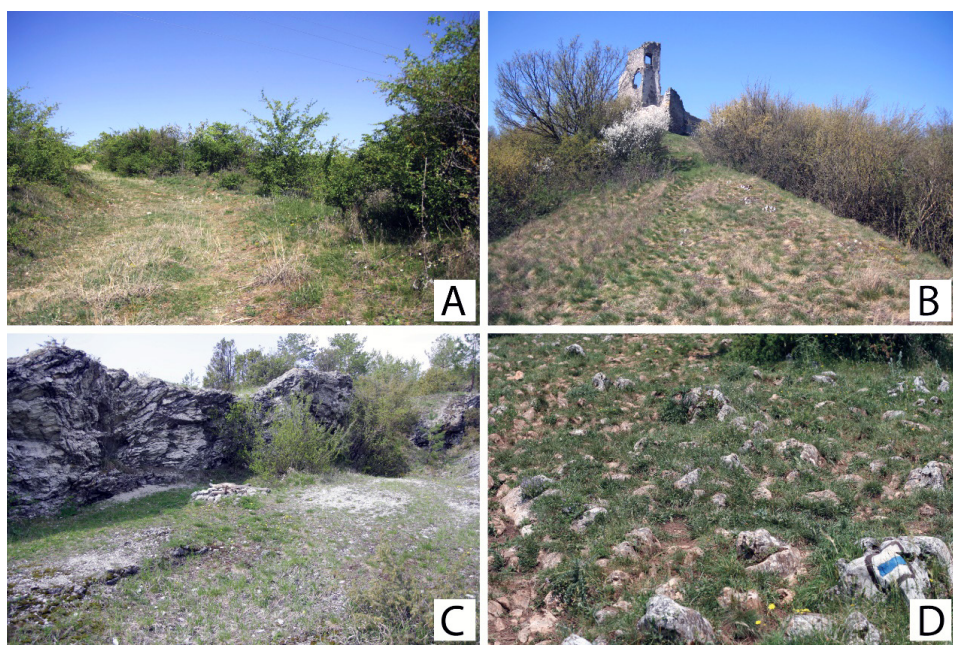


Fig. 3. Different types of biotopes of *T. parnassicum* in Slovakia: Zemplínske vrchy Mts, Ladmovské vápence Nature reserve, middle grassy belt of field road (A), Beskydské predhorie hill area, castle Brekovský hrad, tourist paths towards castle ruins, *Festucetum valesiaca* (B), Nízke Beskydy hill area, Demjatské kopce Nature reserve, calcareous rocky places (C) and Slovak Karst, plain Silická planina, limestone karst areas (D) (Photo: M. Dudáš)

## CONCLUSIONS

The article presents the results of study of chorology and ecology of *Taraxacum parnassicum* in Slovakia. It is the third part of small series dealing with revision of lesser dandelions in the territory of Slovakia.

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*Acknowledgements* – We are grateful to J. Štěpánek (Průhonice, Czechia) for the determination of herbarium material, V. Kolarčík (Košice, Slovakia) for the detection of ploidy level of living plants and L. Mártonfiová for the correction of English language. Thanks are also due to all colleagues who helped me in the field course and to M. Marcinčinová (Košice, Slovakia) for graphical help. This study was supported by internal grant VVGS-PF-2018-751 (MD).

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## Appendix

### List of revised voucher specimens and localities in Slovakia

**Pannonicum** – (*Matricum*) **1. Burda Mts:** Leľa, SW from village, field road (Dudáš 2018 KO). – Kamenica nad Hronom, xerothermic hillside, 178 m (Šuvada 2008 KO). – Kováčovské kopce hills, locust wood near Kamenica nad Hronom (Richards & Májovský 1968 OXF). – Kováčovské kopce hills, Kováčov, hillside, 203 m (Richards & Májovský 1968 OXF; Hodoval 1969 BRA; Šuvada 2008 KO). – Kováčov, field road near railway underpass, 113 m (Dudáš 2017 KO). **2. Ipel'sko-rimavská brázda Region:** Podlužany, cemetery near church, xerothermic hillside (Smetanová 2008 LTM). – Levice, Vápnik hill [= Šiklôš hill], 250 m (Klokner 1973 PMK; Kmeťová 1975 SAV). – Levice, Horša (Pospíšil 1956 BRNM). – Horšianska dolina (Májovský 1965 SLO). – Šiatorská Bukovinka, Šomoška castle, road to the castle, 520 m (Šuvada 2008 KO). – Levkuška, pasture, 230 m (Šuvada 2007 KO). – Levkuška, hillside over crossroad, 212 m (Šuvada 2007 KO). – Hrušovo, stone quarry, 237 m (Šuvada 2008 KO). – Plášťovce, Šípka Nature Reserve, 280 m (Šuvada 2007 KO). – Plášťovce, meadows (Smetanová 2010 LTM). – Plášťovce, site Bende (Smetanová 2015 LTM). – Plášťovce, site Tulipánka, forest steppe (Smetanová 2012 LTM). – Čebovce, forest steppe, 297 m (Šuvada 2007 KO). – Modrý Kameň, Kalvária, path, 405 m (Šuvada 2008 KO, NI). – Modrý Kameň, Modrokamenská lesostep Nature Reserve (Šuvada 2008 NI). –



Modrý Kameň, hill Pavlov hrb (Hendrych 1961 PRC). – Drienčany, pasture, 256 m (Šuvada 2007 KO). – Drienčany, abandoned stone-pit (Majeský 2008 OL). – Leváre, Strelnice, stream Drienovský potok (Kliment 1976 SAV). – Meliata, rocky slope over Muráň stream, 200 m (Hallonová 1983 SMBB). **3. Slovenský kras Karst:** Brzotín, margins of the Silická planina plateau, between the hills 677 and 663 m (Kláštterský 1933 PR). – Plešivec, plain Plešivecká hora (Dostál J. 1933 PRC). – Plešivec, Plešivecká Plain, site Horná lúka (Šuvada in Virók *et al.* 2016: 736). – Plešivec, Plešivecká planina, Ostrý vršok hill, 711 m (Šuvada 2008 KO). – Vidová, Teplá stráň site (Šuvada in Virók *et al.*, l. c.). – Plešivec, site (Kláštterský 1935 PR). – Gemerská Hôrka, railway underpass near pension Skalná ruža, 235 m (Dudáš 2020 KO). – Kunova Teplica, Plešivská planina, rocks over village, 605 m (Šuvada 2008 KO). – Ardovo, forest steppe (M. Deyl 1962 PR). – Jovice, Dievčenská skala rock, 660 m (Dudáš 2018 KO). – Silica, Silická Plain, site Garbockovo (Šuvada in Virók *et al.* l. c.). – Silica, Silická planina, Fabiánka, 605 m (Šuvada 2008 KO). – Silica, Silická Plain, path towards cave Silická ľadnica, 500 m (s. coll. 1988 SLO; Dudáš 2016 OL). – Kečovo, cave Čertova diera (Šuvada in Virók *et al.* l. c.). – Kečovo (Malý 1998 BRNU). – Jablonov nad Turňou, Soroška (Lizoň 1965 BRA; Michálek 1965 BRA; T. cf. *parnassicum*). – Jablonov nad Turňou, slope over railway station (Mikoláš 1997 KO). – Hrhov, hill Pavlovský vrch (Šuvada in Virók *et al.* l. c.). – Bôrka, hill Matesova skala (Šuvada in Virók *et al.* l. c.). – Hrhov, Pod palotou (Šuvada in Virók *et al.* l. c.). – Hrhov, Okružle hill, 319 m (Šuvada 2007 KO). – Zádiel, along paths on calcareous rocks above the Zádiel valley (Vašut & Vašutová 2004 OL). – Háj, Zádielská planina, sheep farm, 755 m (Šuvada 2009 KO). – Háj, meadows Vyšné lúky (Šuvada in Virók *et al.* l. c.). – Turňa nad Bodvou, site Hradná stráň, 525 m (Dudáš 2017 not.). – Turňa nad Bodvou, castle hill, 320 m (Vašut & Vašutová 2004 OL; Šuvada 2008 KO). – Háj, site Pod Miglincom (Šuvada in Virók *et al.* l. c.). – Háj, between hill 577 and 692 (Kláštterský & M. Deyl 1933 PR). – Jasov, castle hill, sightseeing point on the top (Dudáš, Pivňák & Chernikova 2018 KO).

(*Eupannonicum*) **4. Záhorská nížina Lowland:** Plavecký Štvrtok, site Na piesku, 150 m (Ptačovský 1929 SAV). **5. Devínska Kobyla Mts:** Devín, Devínska Kobyla Nature Reserve, 328 m (Šuvada 2012: 88). – Devínska Kobyla, slope (Ptačovský 1922 SAV; Mikeš 1933 PRC; Michalko 1957 SAV; Bertová 1971 SAV; Tetera 1995 PRC). – Devínska Kobyla, locust woods (Richrads 1968 OXF). – Lamač, church of St. Rozália (Letz 1996 SAV). – Lamač, near the quarry (Letz 1996 SAV). **6. Podunajská nížina Lowland:** Bratislava, Vajnory, Panónsky háj (Štěpánek 1985 PRC; Grulich 1991 BRNU). – Šúr, pasture (Ptačovský 1955 SAV). – Šamorín, meadow (Kláštterský & M. Deyl 1935 PR). – Močenok, field road towards farmstead (Šuvada 2008 KO). – Kráľová nad Váhom, in village near dam (Schwarzová 1975 SLO). – Chotín, site Chotínske piesky, 139 m (Šuvada 2008 KO). – Sasinkovo (s. col. 1960, 1961, 1967 BRA). – Horné Orešany, pasture (Ptačovský 1930 SAV). – Vieska nad Žitavou, pasture (Fr. Nábělek 1956 SAV). – Arboretum Mlyňany (Fr. Nábělek 1954 SAV). – Hlohovec, Sedliská, Soroš Nature Reserve, path, 219 m (Dudáš 2017 BRNU, KO; Richards 1970: 86, 2n = 24; Májovský *et al.* 1970: 59, 2n = 24). – Kozárovce, hill Zadný vrch, xerothermic forests, andesite, ca. 300 m (Kláštterský 1933 PR). – Čenkov (Májovský 1962 SLO). **8. Východoslovenská nížina Lowland:** Sedliská-Podčičva, Čičva castle ruins, xerothermic slopes in the castle ruins (S. Hejný 1957 PR; Dudáš 2020 KO). – Malá Bara, Stredný vrch hill, field road on SW slope, and over cemetery, 171 m (Šuvada 2008 KO; Dudáš 2016 OL, 2017 BRNU, KO). – Malá Bara, Stredný vrch hill, over cemetery, field road (Dudáš 2017 KO). – Ladmovce, Šomoš hill, Kašvár Nature Reserve, karst depressions and xerothermic slopes, 127 m (Šuvada 2007 KO; Vašut 2010 OL; Dudáš 2012 KO; Dudáš 2015 OL). – Ladmovce, Baba hill (Futák 1951 NI). – Viničky, meadows over vineyard, 190 m (Futák 1959 SAV, T. cf. *parnassicum*).

*Carpaticum occidentale* – (*Praecarpaticum*) **9. Biele Karpaty Mts:** Podbranč, castle (Ščepka 1969 SAV, *T. cf. parnassicum*). **10. Malé Karpaty Mts:** Brezová pod Bradlom, slopes over road towards Hradište (Králik 1969 SLO). – Plavecký Sv. Mikuláš, pasture (Menc 1935 PL). – Plavecké Podhradie, hill Pohanská hora, quarry (Krippel 1955 SLO; Bertová 1977 SAV, 2n = 24). – Veľká Vápenná, hilltop (Futák & Zahradníková 1962 SAV). – Kuchyňa, Modranská skala, 382 m (Valachovič 2008 SAV). – Buková (Ščepka 1971 SAV, *T. cf. parnassicum*). – Buková, hill Ostrý Kameň (Malý 1991 BRNU). – Trstín, hill Holý vrch, quarry (E. Králik & Feráková 1972 SLO). – Čachtice, castle Čachtický hrad, xerothermic grasses (Futák 1943 SLO; Vašut 2008 OL; Eliáš jun. 2009 NI). – Nové Mesto nad Váhom, along the road between Višňová and Čachtice (Žertová 1959 PR). **11. Považský Inovec Mts:** Lúka, xerothermic hillside NE from village, 237 m (Dudáš 2017 KO, *T. cf. parnassicum*). – Nové Mesto nad Váhom, castle Tematín, xerothermic grasses (Weber 1925 PR; *T. cf. parnassicum*; Skřivánek 1947 BRNM). **12. Tribeč Mts:** Klátová Nová Ves, Kolesnica hill, pasture (Kováčiková 1972 SLO). – Nitra, Plieška hill, path, 340 m (Dudáš 2017 KO). – Nitra, Lupka, path, 241 m (Dudáš 2017 KO). – Nitra, Zoborská lesostep, cave Svoradova jaskyňa (Dudáš 2017 KO). – Nitra, Zobor Mt (Tetera 1995 PRC). – Nitra, Hrnčiarovce, pasture (Pospíšil 1956 BRNM). – Skýcov, hill Vápenný vrch, 500 m (Kováčiková 1975 SAV). – Sádok, pine wood near church (Kováčiková 1972 SLO). **13. Strážovské and Súľovské vrchy Mts:** hill Malý Manín (Urbanová 1991 ZAM, *T. cf. parnassicum*). – Dubnica nad Váhom, in the grass on the dike lining the Váh river, 227 m (Majeský 2017 OL). – Kubrá, 250 m (Schidlay 1933 BRA). – Omšenie, roadside (Schidlay 1939 BRA). – Omšenie, Bartošovica, sightseeing point, 649 m (Dudáš 2017 KO). – Slatinka nad Bebravou, dolomite slope, 340 m (Futák 1960 SAV). – Uhrovské Podhradie, castle Uhrovský hrad, rocks under SE wall (Dudáš 2020 KO). – Partizánske, Hradište, xerothermic grasses near the church of St. Barnabas, 235 m (Vašut & Vašutová 2004 OL). **14b. Vtáčnik Mts:** Žarnovica, Revíštské Podhradie, xerothermic grasses near the castle ruins (Vašut & Vašutová 2004 OL). **14c. Kremnické vrchy Mts:** Malachov, rocks Malachovské skalky (Turisová 1996 SMBB). – Banská Bystrica, Radvaň, slopes under power line over coomb, 465 m (Manica 1961 ZV). – site Radvaňská Jamka, SW slopes, 450 m (Manica 1962 ZV). **14e. Štiavnické vrchy Mts:** Šášovské Podhradie, castle Šášovský hrad (Vašut & Vašutová 2004 OL). – Hronský Beňadik, Slovenská brána, forest road from Monastery towards rock Beňadická skala, 200 m (Smetanová 2010 LTM). **15. Slovenské rudohorie Mts:** Hrušovo, over Blh River, NE (Kliment 1977 SAV). – Hrušovo, stone-pit (Majeský 2008 OL). – Krásnohorské Podhradie, xerothermic grasses near the castle Krásna Hôrka (Vašut & Vašutová 2004 OL). **16. Muránska planina Plateau:** Tisovec, Hradová, Čeremošná, Šajba (Vraný 1924 BRA, PRC). – Tisovec, Hradová (Futák 1970 SAV). **17. Slovenský Raj Mts:** Letanovce, Ihrík hill, near cave Gackova jaskyňa, 630 m (Dudáš 2018 BRA, BRNU, KO). **18. Stredné Podornádie Region:** Ružín, Ružínske skaly rocks, pastures (Mikoláš 1993, 1998 KO). – Malá Lodina, under crest of Ružínske skaly rocks (Mikoláš 1998 KO). – Košické Hámre, Drienková skala rock, 600 m (Dudáš 2017 KO). – Veľká Lodina, Humenec (Mikoláš 1987 KO). – Košice, part Kavečany, Zoological garden, rest of xerothermic vegetation between horses and ostriches (Dudáš 2020 KO). **19. Slanské vrchy Mts:** Kapušany, tourist path towards Kapušanský hrad castle, open oak-pine forest, 399 m (Dudáš 2019 KO). – Slanec, xerothermic woods, [...in monte Várhegy (730 m) ad vicum Slanec] (Klásterský 1935 PR; *T. cf. parnassicum!*). **20. Vihorlat Mts:** Chlmec, Mt Skalka, top, 308 m (Dudáš 2019 BRNU, KO; Dudáš *et al.* Thaszia J. Bot. 30(1): 106, 2020). – Chlmec, Chlmecká skalka Nature Reserve, field road, 430 m (Dudáš 2019 BRNU, KO; Dudáš *et al.* Thaszia J. Bot. 30(1): 106, 2020).

(*Eucarpaticum*) **21a. Lúčanská Malá Fatra Mts:** Žiar Mts, Jasenov, west hillside over village (Škovirová 1981 TM). – Jasenov, Vyšehrad hill, top, 829 m (Dudáš 2017 KO). **21c. Veľká Fatra Mts:** Bágľov hill, at the top, 1,410 m (Bernátová 1976 BBZ sec. Kliment *et al.* 2008: 280). – Ostrá hill, Juriašovo valley, mouth to Blatnická valley (Bernátová 1977 BBZ sec. Kliment *et al.* l. c.). – Šútovo, vrch Sokol, 500 m (Hubová 1976 SAV). – Kráľová studňa, below rock, S slope, ca 1,340 m (Schidlay 1953 SAV; Dudáš 2014 not., *T. cf. parnassicum*). **22. Nízke Tatry Mts:** Banská Bystrica, near road from Ulmanka towards Staré Hory (Futák 1930 SLO). **24. Pieniny Mts:** rocks Haligovské skaly (Michalko 1953 SLO). – Bednáre, Haličovské skaly Nature Reserve, path, ca 700 m (Vašut 1998 OL).

(*Intracarpaticum*) **25. Turčianska kotlina Basin:** Blatnica, in village (Textorisová 1912 PRC). – Ondrašová, Hôrky, S slope (Škovirová 1986 TM). – Turčianske Jaseno (Vašut 2003 OL). – Mošovce, pastures in E outskirts (Vašut 2003 OL). **26b. Spišské kotliny Basins:** Spišské Podhradie, castle Spišský hrad, xerothermic vegetation on travertines around castle, rare, 620 m (Dudáš 2020 KO).

(*Beschiadicum occidentale*) **27a. Biele Karpaty Mts (northern part):** Mestečko, rock Mestecká skala, 400 m (Pospíšil 1963 BRNM). – Lednica, Lednické hradné bralo, 478 m (Dudáš 2017 KO). – Vršatské Podhradie, Chmeľová, crest, 915 m (Dudáš 2017 KO). – Vršatec (Pečinka 2000 OL). – Červený Kameň, Rocks Babek in the Vršatec Massif (Černoch 1958 BRNM; *T. cf. parnassicum*). – Dolná Súča, Mt Krasín, southern foothill, field road (Dudáš 2018 KO).

(*Beschiadicum orientale*) **30b. Čergov Mts:** Kamenica, southern foothill of castle hill, path (Dudáš 2017 KO; Dudáš *et al.* Thaszia J. Bot. 30(1): 106, 2020). **30c. Nízke Beskydy Mts:** Brekov, castle Brekovský hrad, rocks on S slope under SW wall, 265 m (Hadinec 1977 PRC; Dudáš 2020 KO). – Demjata, Demjatské kopce Nature Reserve, north limestone site near path, 394 m (Dudáš 2016 OL, 2017 KO; Dudáš *et al.* Thaszia J. Bot. 30(1): 106, 2020).

**Unclear (not mapped):** Raštún, 700 m (Kmeťová & Gajarský 1968 SAV).