

DISTRIBUTION OF SPRING Ephemeral GRASS *SCLEROCHLOA DURA* IN SLOVAKIAMatej DUDÁŠ<sup>1\*</sup>, Pavol ELIÁŠ JUN.<sup>2</sup>, Simona PETROVIČOVÁ<sup>1</sup><sup>1</sup>P. J. Šafárik University, Institute of Biology & Ecology, Department of Botany, Faculty of Science, Mánesova Str. 23, Košice SK-041 54, Slovakia<sup>2</sup>Slovak University of Agriculture, Department of Botany, Tr. A. Hlinku Str. 2, Nitra SK-949 76, Slovakia

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**Abstract**

Dudáš M., Eliáš P. jun., Petrovičová S., 2019: Distribution of spring ephemeral grass *Sclerochloa dura* in Slovakia. – *Botanica*, 25(1): 3–15.

The distribution of spring ephemeral grass *Sclerochloa dura* in Slovakia was studied using herbarium specimens deposited at the public herbaria, and literature sources. The targeted field research was carried out. The species was recorded continually in the Pannonian parts of the country in lowlands, hills and in lower parts of adjacent mountains, where the number of sites decreased with a rising altitude. *Sclerochloa dura* is a characteristic species of the alliance *Polygono-Coronopodion* and prefers trampled sites and field roads. Distribution map of species was provided.

**Keywords:** Central Europe, occurrence, *Poaceae*, spring ephemeral species, trampled sites.

**INTRODUCTION**

The genus *Sclerochloa* belongs to the tribus *Poae* within the *Poaceae* family and comprises only two taxa: *Sclerochloa woronowii* (Hack.) Tzvel. ex Born [syn. *Desmazeria woronowii* (Hack.) Ovcz., *Scleropoa woronowii* Hack.] and *S. dura* (L.) P. Beauv. [syn. *Crassipes annus* Swallen, *Cynosurus durus* L., *Poa dura* (L.) Scop.] (VALDÉS & SCHOLZ, 1999). The first one is distributed in Syria, the Caucasus, Iran, Afghanistan and Central Asia. It is characterized by scabrous culm, lower glum with three veins and anthers 0.8–1 mm long. The latter, *S. dura*, is a single species of the genus, occurs in Europe. It is characterized by a smooth culm, a lower glum with 4–5 veins and anthers 0.8–1.3 mm long (BOR, 1968; TZVELEV, 1976).

*Sclerochloa dura* is a spring ephemeral thermophilous grass species with short life cycle (ELIÁŠ, 1996). The species is considered to be Mediterranean-Continental-European (Euro-Asian) geo-

lement (MEUSEL et al., 1965) with wide distribution area in central and eastern Mediterranean, Apennine Peninsula, Balkan Peninsula, Central Europe, Turkey, south-western and central Asia, northern India (Kashmir), north-western China and north-western Africa (MEUSEL et al., 1965; BOR, 1968; TZVELEV, 1976; SHOULIANG & PHILLIPS, 2006). The species has been introduced into North America (now assessed as invasive in the USA), Argentina and southern Australia (BOR, 1968; ZAJĄC, 1987; BRANDENBURG & ESTES, 1991; CONERT, 1998). Its northern limit of the distribution area in Europe reaches central Poland (ZAJĄC & ZAJĄC, 2001) and central Germany (ZAJĄC, 1987), rarely is noted in northern Germany (ROTHMALER et al., 1976). It is regarded an archaeophyte in Central Europe (ZAJĄC, 1987; TERPÓ et al., 1999; HALADA, 1997; MEDVECKÁ et al., 2012).

*Sclerochloa dura* is a grass species with short life cycle lasting ca. 60 days from germination of seeds in March to ending of life cycle in June. From ecological point of view, it belongs to the species with

R-strategy (GRIME, 1979). The seeds quickly germinate in spring using the soil moisture for fast growth and completing their life cycle throughout one to two months. The unfavourable period in summer survived in form of seeds (ELIÁŠ, 1996).

The occurrence and coenological affinity of *Sclerochloa dura* has been partly studied in Slovakia. DOMIN et al. (1936–1945) have published the first map of its distribution in former Czechoslovakia. The studies on local distribution and phytocoenological characteristics have been performed for Moravia (ŠMARDA, 1963, map 209), the southern part of central Slovakia (HENDRYCH & CHRTEK, 1964), the Podunajská nížina Lowland (AMBROS, 1996; ELIÁŠ, 1977, 1986; ELIÁŠ jun., 2018), Burda Hills (KORNECK, 1969), Košická kotlina Basin (KRIPPELOVÁ, 1977, map 8), the Žitavská pahorkatina upland (ELIÁŠ, 1978, 1990), Bohemia and Moravia (CHRTEK & ŽÁKOVÁ, 1990). As can be seen from the above, the data on the species distribution are either older or fragmental, referring only to some parts of the territory of Slovakia. Therefore, the aim of our study was to present the real distribution and ecology of the species in the area of Slovakia using herbarium materials, published and unpublished works and own field research. We also summarized the ecological and coenological requirements of the species.

## MATERIALS AND METHODS

The study and field research were performed in 2014–2018. We used herbarium specimens from 19 public herbaria of Slovakia, the Czech Republic and Hungary (BP, BRA, BRNU, BRNM, HLO, KO, OL, OLM, MMI, MOP, NI, PMK, PR, PRC, SAV, SLO, SMBB, TTM and ZAM [=Museum of Považie region]), acronyms followed THIERS (2018) and some small local herbaria (VOZÁROVÁ & SUTORÝ, 2001); published studies on flora and vegetation and unpublished field notes obtained from the database of locations of higher plants deposited at the Plant Science and Biodiversity Centre, Slovak Academy of Sciences, Bratislava, Slovakia. The map was designed using the programme ArcGis, version 9.2. The mapping grid follows the traditionally used CEBA (Central European Basic Area) grid template described by NIKLFELD (1971). The list of revised specimens and other records was provided in Appendix 1. Tax-

onomy and nomenclature of vascular plants follow MARHOLD et al. (2007), nomenclature of syntaxa follows JAROLÍMEK et al. (2008).

The rules of Flóra Slovenska project (GOLIAŠOVÁ & MICHALKOVÁ, 2016) were accepted to process the list of localities (Appendix 1). The data obtained via the study of herbarium specimens as well as literature sources were included together. The localities within particular districts were listed in the direction from west to east. The names of municipalities were provided according to the work of MAJTÁN (1972). Alternative or older names (original names mentioned by collectors) were indicated in square brackets.

## RESULTS AND DISCUSSION

### Distribution in Slovakia

*Sclerochloa dura* has been found altogether in 20 phytogeographical districts and subdistricts in Slovakia. Of these, eight are situated in the area of the Pannonic flora (*Pannonicum*) and twelve in the adjacent area of the Carpathian flora (*Carpaticum*) (FUTÁK, 1980).

The species has occupied 222 quadrants of the CEBA grid template, so it is relatively frequent in Slovakia. As shown on the distribution map (Fig. 1), the species occurs in two more or less separated areas in the southern part of Slovakia. The first one is situated in the south-western part of the country in the Podunajská nížina Lowland and the Burda Hills from where it has penetrated to suitable warm habitats in the southern parts of the adjacent hillsides of *Carpaticum*. ELIÁŠ (1990) has recognized the northern limit of *S. dura* occurrence in south-western Slovakia in the line Bratislava – Smolenice – Nové Mesto nad Váhom – Trenčín – Partizánske – Nová Baňa. Our data supported this opinion. Interestingly, in western Slovakia, *S. dura* is rare in the Záhorská nížina Lowland, only eight localities were recorded there (Appendix 1). We believe that this is due to the predominant type of acidic sandy soils in this area (BEDRNA, 2008), which do not meet the ecological requirements of the species. Our data confirmed also the data obtained by OŽAHELOVÁ et al. (1997). They have stated *S. dura* as endangered species with sporadic occurrence in the inundation area of the Morava River.

The second area of the occurrence of *S. dura* is located in the south-eastern part of Slovakia in two

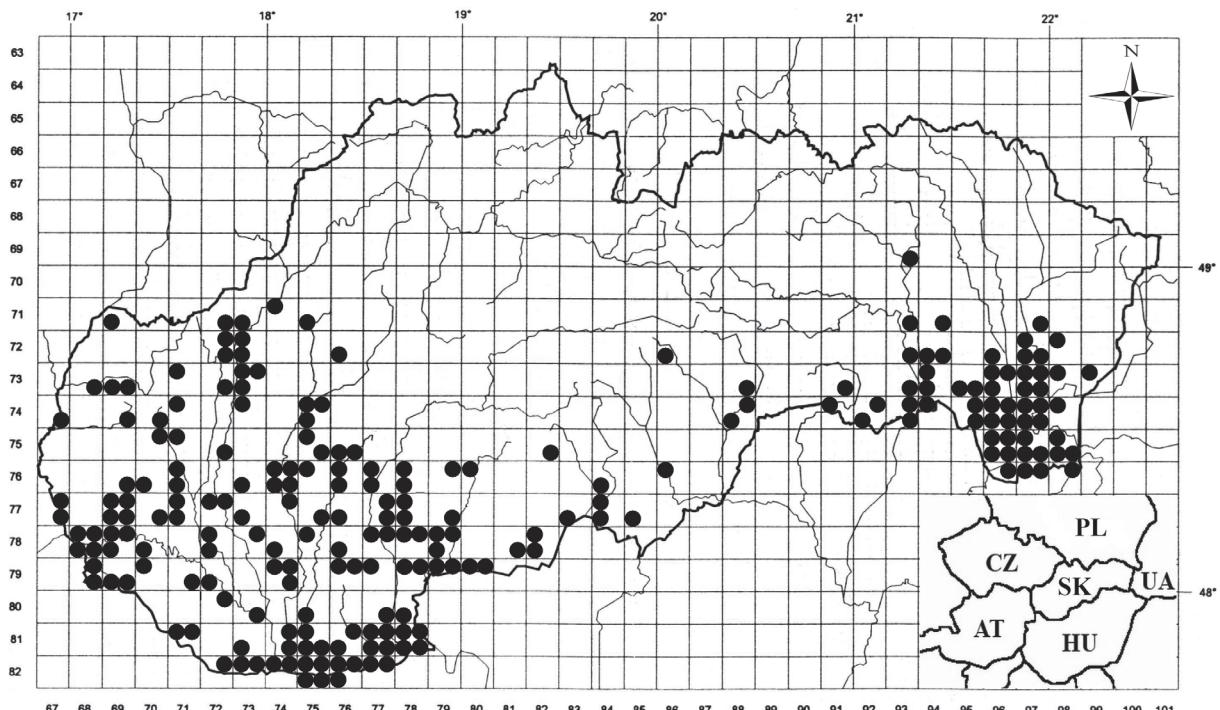


Fig. 1. Distribution of *Sclerochloa dura* in Slovakia

phytogeographical districts: the Košická kotlina Basin and the Východoslovenská nížina Lowland. Based on our data, we stated the northern limit in the line Košice – Ploské – Herľany – Kapušany pri Prešove – Sečovce – Vranov nad Topľou – Michalovce – Sobrance in south-eastern Slovakia.

Both of these areas are more or less interconnected by several localities along the Slovak-Hungarian border in the phytogeographical districts: the Ipel'sko-rimavská brázda Region and the Slovenský kras Karst. *S. dura* has penetrated there in the past from the territory of northern Hungary, where it is now relatively abundant (BARTHA et al., 2015; VÍRÓK et al., 2016).

From the vertical distribution point of view, the number of sites decreases sharply with rising altitudes. The species occupies particularly lowlands (97% of localities), it is rare in hills (3%) and missing in the foothills and mountains, respectively. ELIÁŠ (1983) has pointed out that the maximum altitudinal limit is in the Mt. Pyramída (Tribeč Mts.) over the Nitra town (SW Slovakia) in 520 m a.s.l., we found the similar data. The species was observed in the ruins of the Tematín castle (Považský Inovec Mts., SW Slovakia) in 575 m a.s.l. We recorded also the mini-

mum limit in ca 96–98 m a.s.l. between the villages of Viničky and Klin nad Bodrom (the Východoslovenská nížina Lowland, SE Slovakia).

Distribution of *S. dura* continues from western Slovakia into the Czech Republic, where the species has also two main areas of distribution, first in north-western Bohemia and another one in southern Moravia (ZÁZVORKA in KAPLAN et al., 2015); however, it is rare there and is evaluated in the category C2b (recently in 1–5 localities, populations declining) = IUCN category endangered (EN) (GRULICH, 2012). Similar situation is in Poland. *S. dura* rarely grows in central and the south-eastern part of the country (ZAJĄC & ZAJĄC, 2001), and, according to NOBIS & PAUL (2014), is threatened with extinction. In Slovakia, the species is not evaluated in the actual Red List (ELIÁŠ et al., 2015) due to considerable number of localities. We believe that the species is even more frequent on the Podunajská nížina Lowland and the southern part of central and eastern Slovakia (the Ipel'sko-rimavská brázda Region and the Slovenský kras Karst), but data are lacking. Similarly, few occurrence data before the year 2000 in Východoslovenská nížina Lowland (SE Slovakia) distorted the real distribution (cf. MÁRTONFI, 2014), whereas our field

research showed very common occurrence mainly on roadsides, field roads, vineyards, rural squares and trampled sites. The small number of localities was caused due to overlooking of the germinated individuals in spring, or collectors have considered the species as very frequent and, therefore, not recorded and/or sampled. Very common occurrence is also in Pannonian Basin in Hungary (BARTHA et al., 2015), northeastern Croatia (NIKOLIĆ, 2015), northern Serbia – in Vojvodina (JOSIFOVIĆ, 1976), western Romania (OPREA, 2005) and Bulgaria (ASSYOV & PETROVA, 2006).

### Ecology and coenology

HALADA (1997) considers *Sclerochloa dura* as an apophyte in the area of Slovakia, which has been enlarged to places managed or affected by humans. It requires open and sunny trampled sites as paths, middle belts of field roads and edges of roadsides, slightly saline pastures, open places in vineyards, football pitches, rural squares and settlements, parking places, bus and train stops, marketing places and abandoned quarries and castle ruins. In the Podunajská nížina Lowland and the Východoslovenská nížina Lowland, we recorded large patches of monodominant *Sclerochloa dura* stands mainly in the middle belts of field roads, roads in vineyards, trampled plots near train stops in small villages and nearly parking places.

The taxon is diagnostic species of the class *Polygono arenastri-Poetea annuae* and the alliance *Matricario matricarioidis-Polygonion arenastri* (JAROLÍMEK et al., 2008). Within this alliance, *Sclerochloa dura* is reported from several associations: *Poo annue-Coronopetum squamati*, *Matricario-Polygonetum arenastri*, *Polygono arenastri-Lepidietum ruderale*, *Poetum annuae* and especially *Sclerochloa durae-Polygonetum arenastri* (JAROLÍMEK et al., 1997). It has also been recorded in some other ruderal weed communities (ELIÁŠ, 1977; KRIPPELOVÁ, 1981; VÍRÓK et al., 2016).

As we found out during field research, *S. dura* stands were most often accompanied by *Capsella bursa-pastoris*, *Erophila verna*, *Lolium perenne*, *Poa annua* and *Polygonum aviculare*. Those stands represent vegetation of the association *Sclerochloa durae-Polygonetum avicularis*. In the Czech Republic and Slovakia, the phytosociological relevés of the association *Sclerochloa durae-Polygonetum*

*avicularis* have been recorded from the warmest regions: in north-western Bohemia, southern and central Moravia and southern Slovakia (KORNECK, 1969; JAROLÍMEK et al., 1997; LANÍKOVÁ, 2009). In Slovakia, the data have been obtained from the Bratislava city in the Podunajská nížina Lowland (JAROLÍMEK, 1985), Trnava city, the Žitavská pahorkatina upland (ELIÁŠ, 1990), along the valley of the Váh River (MUCINA, 1977), the Košická kotlina Basin (KRIPPELOVÁ, 1977, 1981) and one relevé is available from the southern part of the Východoslovenská nížina Lowland (ZALIBEROVÁ, 1982).

The association *Sclerochloo-Polygonetum* is a central European-subcontinental community, which occurs dispersedly in western Slovakia, whereas it retreats from field roads into the village residential areas (ELIÁŠ, 1996). The association *Sclerochloo-Polygonetum arenastri* is evaluated as potentially endangered (ELIÁŠ, 1984, 1987; JAROLÍMEK et al., 1997), but it has been found at the present new sites in different parts of Bratislava city (RENDEKOVÁ, 2015) and in the town of Trnava (ELIÁŠ, 1977, 1979). These communities are species-poor and linked to trampled sites, unpaved roads, pastures and sunny sites. The soil has enough moisture in spring and it dries out in summer (CHRTEK & ŽÁKOVÁ, 1990). In Slovakia and the Czech Republic, these communities are considered as threatened as they have quickly disappeared from countryside because of intensive urbanization of villages, ending of pasture management and overgrowing of pastures, reconstruction of roads and decline of domestic breeding of farm animals (ELIÁŠ, 1996).

### ACKNOWLEDGEMENTS

We are grateful to the curators of all visited herbaria. Thanks also to Martin Pizňák (Košice, Slovakia) for acquirement of the herbarium specimens, and to M. Valachovič (Bratislava, Slovakia) and P. Eliáš sen. (Trnava, Slovakia) for the comments on the previous version of the manuscript. Thanks also to anonymous reviewers for valuable comments.

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## PAVASARINIŲ EFEMERINIŲ ŽOLIŲ *SCLEROCHLOA DURA* PAPLITIMAS SLOVAKIJØ

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### Santrauka

Pavarinių efemerinių žolių *Sclerochloa dura* paplitimas Slovakijoje buvo tiriamas, naudojant herbariumų kolekciją pavyzdžius ir literatūros šaltinius. Buvo vykdomi ir tiksliniai lauko tyrimai. Rūšis pastoviai buvo fiksuota Pannono regiono

žemumose, kalvose ir žemutinėse gretimų kalnų dalyse, kuriose, didėjant aukščiui, rūšies dažnumas mažėjo. *Sclerochloa dura* yra būdinga *Polygono-Coronopodium* sajungos rūšis. Pateiktas rūšies platinimo žemėlapis.

## APPENDIX 1. THE LIST OF REVISED HERBARIUM SPECIMENS AND RELATED LITERATURE SOURCES OF *SCLEROCHLOA DURA* IN SLOVAKIA

Herbarium codes follow THIERS (2018) and VOZÁROVÁ & SUTORÝ (2001). References for published records from sources not listed in References chapter are given in abridged form including the page of a particular *Sclerochloa dura* record. For unpublished field records, the name(s) of author(s) are given followed the year of noted (not. or ined.). Records are arranged following the phytogeographical division of Slovakia by FUTÁK (1980) and assigned to the quadrants of the CEBA grid template (for its description see NIKLFELD 1971). In some instances, place names are given in the original language in parentheses. Abbreviations: N – north, S – south, W – west, E – east and its combination.

### Pannonicum

**District 1. Burda Hills:** Bajtava, Na salašoch site, field road (Dudáš, 2017 KO). – Leľa, collective farm, field road (Dudáš, 2017 KO). – Kamenica nad Hronom, slopes over village (Kmeťová & Peniašteková, 1983 SAV). – Kamenica nad Hronom, near the Hron River, rocky site (Jos. Dostál, 1964 PR). – Kováčov, Skalky Hill, hillside (Klika, 1937 PR). – Kamenica nad Hronom, Nové vinohrady site, roadside (Dudáš, 2017 KO). – Kováčov, ruderal sites (Jos. Dostál, 1952 PRC). – Kováčov, near the Danube River (Domin, 1929 PRC; Weber, 1935 BRNU). – Kováčov (Weber, 1935 PR). – Chľaba [Helemba], grassy site (Domin & Jirásek, 1938 PRC; Opluštílová, 1946 SLO). – Chľaba, Priehoř, field road (Dudáš, 2017 BRNU, KO). – Kováčovské kopce Hills, Leléd (Krist, 1933 BRNU).

**District 2. Ipeľsko-rimavská brázda Region:** Tekovská Nová Ves, vineyard (Futák, 1941 SLO). – Levice, Kalvária, Kusá hora Hill, field road (Jirásek, 1936 PRC; V. Urbanová, 1993 ZAM). – Levice, Kusá hora Hill, xerotherm on andesite (Vozárová, 1993 BRA). – Levice, andesite hill (Májovský, 1967 SLO). – Mýtne Ludany, Sziklós hegy (= Vápnik Hill, Šiklóš Hill) (Knap Oesterr. Bot. Z., 14: 49, 1865; Krist, 1935 BRNU). – Devičany (Neuhäuslová-Novotná, s. dato. ined.). – Bátorovce, dry sites (Kupčok Biolog. práce SAV, 2/9: 54, 1956). – Horša, andesite tuffs (Futák, 1952 ined.). – Between Horša and Malé Krškany villages (Futák Biologia, 8: 10,

1953). – Malý Kiar, field edge W from Dolná hora Hill, 220 m (Eliáš jun. & Račko, 2014 NI). – Bory, field road to Nové vinice Hill, 190 m (Eliáš jun., 2018 NI). – Domadice, between Mačkáš and Korbáš settlements – Santovka (all Chrték Acta Univ. Carol. Biol., 1: 30, 1961). – Demandice, road edge near gas station (Eliáš jun., 2017 NI). – Sazdice, farmstead Agata (Futák Sborn. prác ochr. prír. v Západoslov. kraji, 47, 1962). – Bielovce S, field road toward to river dam, 114 m (Eliáš jun., 2017 NI). – Bajtava, field edge (Feráková & Peniašteková, 2010 SAV). – Salka, Sovie vinohrady site, field road, 129 m (Eliáš jun., 2018 NI). – Salka, roadside (Dudáš, 2017 KO). – Hontianske Tesáre (Domin, 1932 ined.). – Dudince-Merovce (Chrték l.c., 1961). – Plášťovce, Šípka (F. Mladý, 1959 PRC). – between Plášťovce and Slatinka villages (Šipošová, 1994 SAV). – Plášťovce, southern part (Chrték, l.c. 1961). – Dolné Rykynčice (Domin, 1932 ined.). – Horné Semerovce (Chrték, l.c. 1961). – Tupá, around railway passage, 128 m (Eliáš jun., 2018 NI). – Hrkovce (Domin, 1932 ined.; Chrték l.c., 1961). – Šahy (Záborský, 1967 SLO). – Šahy, between Vinice and Olvárske zeme, roadside (Dudáš, 2017 KO). – Šahy, SW, trampled hillside, 130 m (Eliáš jun., 2018 NI). – Veľká Ves nad Ipľom, roadsides (Dudáš, 2018 not.). – Balog nad Ipľom, Ipel' river dam, 131 m (Eliáš jun., 2018 NI). – Balog nad Ipľom, roadside in village (Dudáš, 2017 ined.). – Bátorová, Zábuška site (Hendrych Acta Univ. Carol., 1: 48, 1964). – Bátorová, vineyards, Karikáš (Domin, ined.). – Opatovská Nová Ves (Hendrych, l.c. 1961). – Sklabíná (Hendrych, l.c. 1961). – Želovce, Šošár spa (= Slanisko site) – Kiarov (both Hendrych, l.c. 1961). – Trenč, field road (Žertová, 1957 PR). – Lučenec (Futák, 1953 SAV; Figura, 2015 not. sec biomonitoring.sk). – Trebel'ovce, Babský potok stream, field road (Martincová & Turisová, 1995 SMBB). – Fiľakovské Kláčany, Haľoš Hill [=collis Halyos] (Smejkal 1965 BRNU). – Fiľakovo, castle (Holub & Moravec Biolog. Práce, 11/6: 71, 1965). – Belina (Pénzes (Msc.), 1944; Holub & Moravec l.c., 1965). – Rimavská Sobota [Rimaszombat], marketing place (Fábry, 1867 BRA; Futák, 1948 ined).

**Districts 2. Ipeľsko-rimavská brázda Region/6. Podunajská nížina Lowland:** Levice, meadow, 154 m (Osvaldová, 1958 NI).

**Districts 2. Ipel'sko-rimavská brázda Region/14e. Štiavnické vrchy Mts.:** Krupina (Chrtek, l.c. 1961).

**District 3. Slovak Karst:** Plešivec, roadside (Szabóová, 2012 not. sec biomonitoring.sk). – Vidová, road to Plešivecká planina Plateau (Holub Preslia, 29: 215, 1957). – Vidová (Holub in Hendrych & Chrtek Acta Univ. Carol. Biol., 46, 1964). – Plešivecká planina Plateau, field road toward to Koniart Plateau (Klášterský, 1958 PR). – Drienovec [Šomod', Somogy], spa (Jos. Dostál, 1933 PRC). – Drieňovec (Dostál in Hendrych & Chrtek, l.c.).

**District 4. Záhorská nížina Lowland:** Závod, Lepna (Banásová, 1993 not. sec biomonitoring.sk). – Devínske Jazero, xerothermous habitats in gardening settlement (Májeková et al. Bull. Slov. Bot. Spoločn., 40/1: 60, 2018). – Devínska Nová Ves, near the Morava River (Ptačovský, 1936 SAV). – Šaštín, football pitch (Slavoňovský, 1961 BRNU). – Skalica [Uherská Skalica, Szakolczam], ruderal site (Slinger, 1928 PR, PRC). – Skalica [Petingeum] (Weber, 1920 BRA). – Borský Mikuláš, sand road (Grulich, 1983 MMI). – Bílkové Humence, fragment of bog 3,5 km NNE from village (Grulich & Trávníček, 1989 MMI).

**District 5. Devínska Kobyla Hills:** Devínska Nová Ves [Devényujfalú] (Meryk, 1899 SAV; Kříštek, 1938 PRC). – Devínska Kobyla, limestone (Klášterský & Deyl, 1935 PR). – Devín, cycle road towards Devínska Nová Ves (Ptačovský (Msc.), 1936; Feráková, 1996 SLO). – Šibeničník Hill, oak forest (Valenta, 1938 BRA). – Bratislava-Karlova Ves, Karloveská Street (Feráková, 2017 SAV). – Bratislava, Dúbravka, Damborského Street, path near tram railway (Feráková, 2014 SAV). – Bratislava, Hlavy Hill (Valenta, 1939 BRA). – Karlova Ves (Wiesbauer, 1871a: 6).

**District 6. Pudunajská nížina Lowland:** Bratislava, Námestie slobody square (Brižický, 1944 SLO; Futák, 1945 SLO; Opluštilová, 1946 SLO; Schidlay, 1949 BRA). – Bratislava, Dynamitka, road edge (Ptačovský, 1923 SAV; Schidlay, 1932 BRA). – Bratislava, Pečniansky les (= forest) [Posonii, Danubii Pötschen] (Scheffer, 1922 BP). – Bratislava [Pressburg], Zuckermandel, Žižkova street (Fuchs, 1859 SLO). – Petržalka (Májovský Acta Fac. Rer. Natur. Univ. Com. Bot., 2/7–9: 369, 1958). – Jarovce, field road (Mered'a jun., 2008 SAV). – Rusovce, Gajarské

polia fields (Mráz & Somogyi, 1998 SAV). – Rusovce (Majeková, 2005 not. sec biomonitoring.sk). – Modra, on roads (Holuby, 1856 PR). – Pezinok, Cačala, abandoned vineyards and meadows (s. coll. 1977 SAV). – between Pezinok and Limbach, vineyard (Chrtek jun., 1989 PRC). – Pezinok [Bazinium] field roads (Holuby, 1897 BRA, 1900, 1910, 1914, 1915 PRC). – Pezinok, on meadow (Holuby, 1919 BRA). – Viničné [Schweinsbach], on roads (Holuby, 1900 BRA, NI). – Svätý Jur, Šúr (Degen, 1913 BP; Nábělek, 1936 SAV, BRA; Švestka, 1938 BRNM; Ptačovský, 1938, 1957 SAV; Kmet'ová, 1965 SAV; Mikoláš, 1986 MOP). – Šúr, on dam near Vajnory (Letz, 1994 SAV). – Bratislava, Vajnory, Panónsky háj, farmstead Čierna Voda (Grulich, 1986 MMI; Grulich, 1991 BRNU). – Čierna Voda, field (Trávníček, 1991 OL). – Grob, road (Zigmundík, 1913 BRA). – Bratislava, Podstaničné/Liszt square (Eliáš sen., 2018 ined.). – Bratislava-Vinohrady, train station (Jarolímek Acta Bot. Slov., ser. A, 9: 69, 1986). – Bratislava, Zlaté Piesky (Chrtek jun., 1989 PRC). – Ivanka pri Dunaji (Kaleta, 1962 BRA). – Biskupice pri Dunaji (Futák, 1945 SLO). – Čunovo, Veľké jazero Lake, gravel path (Valachovič, 2012 SAV). – Šamorín (A. Láska, 1930 PRC; Klášterský & Deyl, 1935 PR). – Vištuk, road edge (Zaliberová 1990 BRA). – Senec, fishpond (Ptačovský, 1937 SAV). – Štvrtok na Ostrove, pasture (Jasičová, 1957 SAV). – Nové Košariská, field road near railway station (Eliáš sen., 2018 ined.). – Kvetoslavov, train station (s. coll. 1958 ined.). – Mierovo [Sklenárovo], pasture (s. coll. 1957 ined.). – Boleráz (E. Králik, 1978 SLO). – Boleráz, Klčovany train station, road (E. Králik, 1978 SLO). – Trnava, sugar refinery (Hajdúk, 1978 BRA). – Trnava, Kamenný mlyn, dam (Zlatošová, 1987 TTM). – Trnava, Ružindolská street (Schulzová, 1954 NI). – Trnava, field roads (Frantová, 1944 SLO; Frantová Prí. sb. II, 176, 196, 200, 1947). – Trnava, in city (Eliáš Biológia, 32/1: 21, Tab. 4, 1977). – Trnava, Linčianska street (Eliáš sen., 2018 ined.). – Trnava, Zátvor (Eliáš sen., 2018 ined.). – Voderady (Eliáš Folia Geobot. Phytotaxa, 14/4: 346, 1979). – Križovany nad Dudváhom, field road (Eliáš sen., 2018 ined.). – Križovany nad Dudváhom, paths in train stop (Eliáš jun., 2017 NI). – Malá Mača, field road (Eliáš jun., 2017 NI). – Sládkovičovo, field roads (Potůček Acta Rer. Natur. Mus. Nat. Slov., Bratislava, 12/1: 116, 1966). – Vy-

drany, bank of melioration ditch (Dvořák, 1970 BRA). – Dunajská Streda, Lesná (Černoch, 1950 BRNM). – Šaľa, railway station (Eliáš sen. 2018 ined.). – Gabčíkovo (Krippelová Bull. Slov. Bot. Spoločn., 3/1: 3, 1981). – between towns of Nové Mesto nad Váhom and Čachtice (Holuby Oesterr. Bot. Z.17: 277, 1867). – Stráže-Krakovany (Domin, 1938 ined.). – Hlohovec, train station, path (Feráková & Vavro, 2014 SAV). – Hlohovec, Gábor, on road to cross (Feráková, 1965 SLO). – Gábor-Stará hora Hill (both Feráková Acta Fac. Rerum. Nat. Univ. Comen., ser. Bot., 14: 269, 1967). – Blanáre (Feráková & Ješko Acta Fac. Rerum. Nat. Univ. Comen., ser. Bot., 16: 66, 1970). – Sered', on bank of river towards Šintava (Dvořák, 1975 BRA). – Sered', railway station (Eliáš sen., 2018 ined.). – Šoporňa, dead oxbow (Niková, 1973 SLO). – Báb, Alexandrov dvor, field road (Eliáš Acta Bot. Acad. Slov., 1978). – Galanta, NE (Hrúby Verhandlungen des Naturforschenden Vereins in Brünn 1942: 107). – Horné Saliby, farmstead Dolná lúka, road (Kmeťová et al., 1996 SAV). – between Veľké Dvorníky and Dunajský Klátov villages, meadow edge (Dvořák, 1970 BRA). – Topoľníky (Vrba, 1957 NI). – Veľký Meder, pasture (Weber, 1935 BRA, PR; Krist 1937 BRNU). – Veľký Meder, Čalovo (Weber, s. d. PR). – Okoč, near road towards Čalovo (Šipošová, 1993 SAV). – Číčov, the Danube River, dam (Skaličká, 1976 PRC). – Beckov, near the Váh River (Weber, 1934 BRA, 1938 PR). – Beckov, field roads (Holuby, 1876 BRA). – Beckov Castle (Dvořák, 1965 BRA). – Nové Mesto nad Váhom (s. coll. 1933 PR). – Považany, Kríž nad Váhom [Svätý Kríž], road to the Váh River (Weber, 1934 PR, PRC). – Váh valley near Tematínske kopce Hills (Weber, 1924 BRA). – Moravany (Domin, 1938 ined.). – Moravany, valley over chemical factory (Hrúby, l.c. 1942: 107). – Moravany nad Váhom, in valley on road to Marhát (Michalko et al., 1965 SAV). – Banka (Domin, 1938 ined.; Hrúby, l.c. 1942: 110). – Ratnovce (Domin, 1938 ined.). – Hájske, fragment of saline soil (Grulich, 1989 MMI). – Močenok [= Sládečkovce], Síky saline soil (Grulich, 1989 MMI). – Horný Jatov [Alsó Jattó], vineyards (Scheffer, 1923 BP). – Bačala farmstead (Krist Halof. Veg. Slov., 1941: 57). – Veľký Meder, Hauszig (Valenta, 1937 BRA). – Kolárovo (Májovský & Hejný, 1953 SLO). – Kolárovo, Malý Dunaj, dam (Feráková, 1989 SLO). – between towns of Kolárovo and

Komárno, field roads (Husák, 1978 PR). – Žitavská Tôň (Chrtek et al., Preslia, 44: 63, 1972). – Zemianska Olča (Mudrochová, 2008 not. sec biomonitoring. sk). – Okánikovo, saline soil (Čvančara, 1973 PR, BRNU). – Okánikovo, fallow (Grulich, 1986 MMI). – Veľké Kosihy, saline soil (Klokner, 1959, 1967 PMK). – Horná Zlatná, field road (Grulich, 1986 MMI). – Zlatná na Ostrove, saline meadows (Dvořák, 1963 BRA; Weber, 1936 BRA; Krist Halof. Veg. Slov., 1941: 67). – Trenčín [Trencsin] (Brancsik, 1899 BRA). – Dražovce, train station (Michálek, 1964 BRA). – Podhorany (Eliáš, 1984 not. sec biomonitoring. sk). – Lupka (Suza, 1928 ined.). – Nitra, shopping centre OC Centro Nitra, trampled site, 138 m (Eliáš jun., 2017 NI). – Nitra, Kalvária, steppe grassland (Osvaldová, 1955 NI; Dvořák, 1964 BRNU; Deylová, 1974 PR). – Nitra, Hill 220, under Zobor (Šourek, 1950 PR). – Nitra, along the Nitra River, behind airport (Vláčky, 1932 PRC). – Horné Krškany, pastures (Osvaldová, 1954 NI; Jos. Dostál, 1968 PR). – Jatov [Jató], train station, road (Spudilová & Kršková, 1954 PRC). – Palárikovo [Slovenský Meder], saline site (Weber, 1933 BRA). – Palárikovo, Číky farmstead, 115 m (Eliáš jun., 2001 NI). – Šurany, Okomáň saline site (Kirschner & Štěpánek, 1987 PR). – Šurany, Albertov dvor, 120 m (Eliáš jun., 2001 NI). – Palárikovo, Svätojurský dvor farmstead, 109 m (Osvaldová, 1955 NI). – Martovce [Mártoš], field edge (Klásterský, 1952 PR). – Martovce, road edge towards bridge over the Nitra River (Vydrová, 1983 BRNU; Šipošová, 2000 SAV). – Horný Vek (Chrtek et al., l.c. 1972). – Martovce, Alluvium of Stará Nitra, field road, 108 m (Eliáš jun., 2017 NI). – Zlatná na Ostrove, Pavol, saline soil (Klokner, 1966 PMK). – Nová Stráž, saline soil (Weber, s.d. PR). – Nová Stráž (Krist Halof. Veg. Slov., 1941: 67). – Komárno, Lándor farmstead, road (Chrtek et al., l.c. 1972; Grulich 1989 MMI). – Komárno-tehelňa (Chrtek et al., l.c. 1972). – Chotín, Ďulov dvor, road (Jos. Dostál, 1960 PR). – Komárno, in city (V. Géra, 1947 BP). – near railway Komárno-Iža (Krist Halof. Veg. Slov., 1941: 69). – Timoradza, road (Schidlay, 1930 BRA). – Topoľčany (Eliáš, 1977 ined.). – Topoľčany, Old city (Eliáš, 1977 in Ambros et al., 1996). – Topoľčany, bus station, trampling site (Eliáš sen., 2018 ined.). – Solčany (Grulich, 1994 in Ambros l.c.). – Jelenec, village (Eliáš sen., Rosalia, 6: 152, 1990; Eliáš sen., 2012 in

Eliáš jun., 2018: 86). – Ladice N, path to cemetery (Eliáš sen., Rosalia l.c.). – Neverice, village (Eliáš sen., Rosalia, l.c.; Eliáš sen., in Eliáš jun., 2018). – Choča, village (Eliáš sen., Rosalia, l.c.). – Sľažany, Dolné Sľažany (Eliáš sen., Acta Ecol., 1978; Eliáš sen., Rosalia, l.c.; Eliáš sen., in Eliáš jun., 2018: 7). – Velčice, village (Eliáš Bull. Slov. Bot. Spoločn., 8/2: 1, 1986, Eliáš sen., Rosalia, l.c.; Eliáš sen., 2018 ined.). – Host'ovce, near the house no. 95 (Eliáš sen., Rosalia, l.c.). – Obyce (Eliáš sen., Koment. prehľad rastl. spoloč.: mikroregión Tribečsko, 2017: 14; Eliáš sen., in Eliáš jun., 2018: 7). – Machulince (Eliáš sen., in Eliáš jun., 2018: 7). – Zlaté Moravce (Eliáš sen., in Eliáš jun., 2018: 7). – Zlaté Moravce, Robotnícka Street (Eliáš sen., 2018 ined.). – Žirany (Brabec, 1995 PR). – Vráble, square, in flowerbeds (Šípošová, 2001 SAV). – Komjatice, NE, field road, 126 m (Eliáš jun., 2018 NI). – Bajč, road (Jos. Dostál, 1954 PR; Chrtek et al., l.c. 1972). – Nové Zámky (Deyl, 1935 PR). – Hurbanovo (Szabóová, 2002 not. sec biomonitoring.sk). – Hurbanovo – Dolný Peter (both Chrtek et al., l.c. 1972). – Svätý Peter [Dolný Peter] (Klokner Acta Rer. Nat. Mus. Nat. Slov., Bratislava, 20: 77, 1974). – Chotín (Futák, 1958 SAV; Chrtek et al., 1970 PRC; Jos. Dostál, 1970 PR). – Šrobárová, NW (Chrtek et al., l.c. 1972; Szabóová, 2002 not. sec biomonitoring.sk). – Iža, Harcsás (Chrtek et al., 1970 PRC). – Iža, saline site (Valenta, 1937 BRA). – Ďulov dvor (Chrtek et al., l.c. 1972). – Marcelová (Weber, 1936 BRA; Chrtek et al., 1970 PRC). – Marcelová, Slovosivo, sand dune (Šípošová & Peniašteková, 1989 SAV). – Marcelová, Bašov kopec Hill, Mašan court (Chrtek et al., l.c. 1972). – Iža, Danube, dam (Skalická, 1976 PRC). – Patince, road between Patinský canal and dead oxbow of the Žitava River (=Virt) (Šípošová, 1993 SAV). – Patince, spa (Chrtek et al., l.c. 1972; Trávníček, 1989 OL). – Vieska nad Žitavou, train station, road (F. Nábělek, 1954 SAV). – Telince, rocks near road (Májovský, 1958 SLO). – Beša (Grulich, 1989 MMI; Valenta, 1999 BRA). – Podhájska, grassland near swimming pool, trampled site, 140 m (Eliáš jun., 2017 NI). – Dedinka (Futák, 1952 ined.; Májovský Acta Fac. Rer. Natur. Univ. Com. Bot., 2/7–9: 369, 1958). – Gbelce, Drieňová hora Hill [Somlyó hegy], field roads (Klokner, 1970 PMK; Májovský Acta Fac. Rer. Natur. Univ. Com. Bot., 2/7–9: 369, 1958; Klokner Acta Rer. Nat. Mus. Nat. Slov., Bratislava, 20: 77, 1974). – Vojnice, NW (Chrtek et al., l.c. 1972). – Modrany (Chrtek et al., l.c. 1972; Klokner Acta Rer. Nat. Mus. Nat. Slov., Bratislava, 20: 77, 1974). – Moča (Chrtek et al., l.c. 1972). – between Moča [Dunamocs] and Kravany nad Dunajom [Karva] villages (Weber, 1936 BRA, PR). – Radvaň nad Dunajom (Chrtek et al., l.c. 1972). – Kozárovce, Zani Hill, andesites (Klášterský & Deyl, 1933 PR). – Kozárovce, Skala Hill, road (Sutorý, 1989 BRNM). – Kozárovce, field road, 220 m (Eliáš jun., 2010 NI). – Levice, field edge (Štrba & Gogoláková in Eliáš jun (ed). Bull. Slov. Bot. Spoločn., 29: 188, 2007). – Levice, path in city (Růžička, 1993 OLM). – Nitra, fields W from city (Štrba & Gogoláková, l.c. 2007). – Tekovské Lužany [Tekovské Šarluhy], vineyards (Futák, 1952 ined.; Májovský Acta Fac. Rer. Nat. Univ. Comen. Bot., 2/7–9: 369, 1958). – Bíňa (Krist, 1935 BRNU; Holubičková & Kropáčová Veget. pomery okr. Štúrovo: 304–307, 1956). – Kamenín, Kamenný Most (Smejkal, 1962 BRNU). – Diva, field road, 122 m (Eliáš jun., 2018 NI). – Kamenín [Kamendín], saline meadow (Domin, 1936 ined; M. Deyl, 1951 PR; Černoch, 1953 BRNM; Popovič, 1955 SAV; Klementík, 1966 SLO; Vavro, 1974 HLO; Svobodová & Řehořek, 1979 NI; Szabóová, 2010 not. sec biomonitoring.sk). – Kamenín, Čistiny Nature Reserve (Svobodová & Řehořek Zborn. odb. prác V. Západoslov TOP-u, zv. IV: 27, 1988). – Kamenín, Alsó rétek, saline soil (Krist, 1936 BRNU; Šourek, 1951 PR). – Kamenín, vineyards (Futák, 1958 ined.). – Kamenný Most, farmstead (Unar, 1976 BRNU). – Kamenný Most, saline soil (Májovský, 1961 SLO). – Jurský Chlm (Trávníček, 1989 OL). – Belianske kopce, Modrý majer farmstead [Ďarmotské kopce, Kékitó pusztá] (Domin & Jirásek, 1938 PRC). – Kekito pusztá; Puszkes Hill (Domin, 1938 ined.). – Čenkov (Weber, 1936 BRA, PR; Kavka, 1950 BRA; Pečinka, 1999 OL). – Čenkov (Holubičková & Kropáčová, l.c. 1956). – Mužla, saline meadow (Weber, 1935 BRA; Řepka, 1982 BRNM). – Mužla (Holubičková & Kropáčová, l.c. 1956). – Veľký Pesek (Futák, 1952 ined.). – Nána (Jos. Dostál, 1954 PR; Klášterský, 1958 PR; Holubičková & Kropáčová, l.c. 1956). – Štúrovo (Dvořák, 1954 BRA; Šmarda, 1952 BRNM; Žertová, 1952 PR). – Štúrovo, Nový Dvor (Jos. Dostál, 1952 PRC). – Štúrovo, hotel Dunaj, shambles (Smejkal, 1950 BRNU). – Štúrovo, estuary of the Hron River (F. Dvořák, 1978 BRNU). – Hronská

Kamenica, near the Hron River (Krist, 1933 BRNU).

**Districts 6. Podunajská nížina Lowland/12.**  
**Tribeč Mts.:** Súľovce, Vlčia skala Hill, pasture (Kováčiková, 1979 SAV). – Velčice-Pod Hôrkou, field road (Eliáš sen., 2018 ined.). – Nitrianske Hrnčiarovce (Svobodová, 1985 ined.).

**District 7. Košická kotlina Basin:** Turňa nad Bodvou (Mikoláš, 1995 MOP). – Turňa nad Bodvou, restaurant “Pod hradom”, field road (Dudáš, 2018 not.). – Komárovce, hill 194 (Krippelová, 1974: Acta inst. Bot. SAV A2, 185–186, map 8). – Buzica, south of village (Krippelová, l.c. 1974). – Zdoba, road along the Torysa River (Krippelová, l.c. 1974; Krippelová Biologia, 32/1: 26–27, 1977). – Haniska, trampled sites (Krippelová, l.c. 1974). – Seňa, trampled sites (Krippelová, l.c. 1974). – Kechnec, near road – Milhost', trampled sites (both Krippelová, l.c. 1974). – Kechnec, train station (Mikoláš, 1998 KO). – Sady nad Torysou, Byster (Krippelová, l.c. 1977). – Košická Polianka, roadside near bridge – Vyšná Hutka, bus stop (both Dudáš, 2016 KO). – Nižná Myšľa, parking plot near railway crossing (Dudáš, 2016 KO). – Trstené pri Hornáde (Krippelová, l.c. 1974; Šmíd, 1996 KO).

**District 8. Východoslovenská nížina Lowland:** Lúčky, Čierna voda canal, field road (Dudáš, 2018 not.). – Zemplínska Teplica, roadsides in village (Dudáš, 2018 not.). – Egreš, road edge in village – Čel'ovce, roadside (both Dudáš, 2016 KO). – Nižný Žipov, Za mostom site, field road – Stanča, roadside (both Dudáš, 2017 ined.). – Michaľany, roadside (Dudáš, 2016 KO). – Kazimír, roadside (Dudáš, 2016 NI). – Čerhov, train station (Šimková, 2015 ined.). – Černochov, roadside (Dudáš, 2016 KO). – Hriadky, roadsides (Dudáš, 2018 not.). – Trhovište, bus stop (Dudáš & Šupinská, 2016 KO). – Bánovce nad Ondavou, field road (Dudáš, 2016 KO). – Malý Ruskov, parking at fishpond (Dudáš, 2016 KO). – Zemplínsky Klečenov, roadside (Dudáš, not. 2017). – Zemplínske Hradište, field roads – Kožuchov, field roads (both Dudáš, 2016 KO). – Zemplínske Hradište, Trnávka River, dam (Dudáš, 2016 KO). – Zemplínsky Branč, roundabout, roadside – Zemplínsky Branč, cemetery – Novosad, W, roadside – Hrčel', field roads (all Dudáš, 2016 KO). – Hraň, field roads (Dudáš, 2016 BRNU). – Sirník, roadside – Novosad, E, roadside (both Dudáš, 2016 KO). – Kašov, field road near

church – Veľká Tŕňa, field road – Malá Tŕňa, wine cellars – Brehov, the Ondava River, dam – Cejkov, bus stop near former drying plant (all Dudáš, 2016 KO). – Cejkov, Kašovská Str, roadside (Dudáš, 2017 ined.) – Zemplínske Jastrabie, roadside (Dudáš, 2016 KO). – Malá Tŕňa, Tokaj tourist tower – Veľká Bara, Čelejka tavern – Veľká Bara, vineyards – Černochov, field roads (all Dudáš, 2016 KO). – between villages of Černochov and Malá Bara – Slovenské Nové Mesto (both Domin, 1932 ined.). – Slovenské Nové Mesto, Čubákova samota settlement, field road – Borša, field roads – Zemplín, dam (all Dudáš, 2016 KO). – Viničky [Seleška], Baba, ruderal site (Futák, 1951 ined.; J. Dostál, 1952 PRC). – Ladmovce, village edge (Futák, 1955 ined.). – Streda nad Bodrogom, roadsides. – Malý Kamenc, roadsides (both Dudáš, 2018 not.). – Veľký Kamenc, road to castle (Chrtek, 1988 PR; Dudáš, 2016 KO). – Trnava pri Laborci, roadside (Dudáš, 2017 ined.). – Vinné, field road to castle (Unar, 1979 BRNU). – Michalovce, train station, shambles (Slabá, 1973 PR). – Pozdišovce, field roads (Dudáš, 2018 KO). – Sliepkovce, roadside (Dudáš, 2017 ined.). – Bracovce roadside – Ložín, roadside (both Dudáš, 2016 KO). – Lastomír, roadside (Dudáš, 2017 ined.). – Falkušovce, roadside (Dudáš, 2016 KO). – Budkovce, roadside (Futák, 1950 ined.; Dudáš, 2017 ined.). – Malčice, S, field roads (Behrendsen Oesterr. Bot. Z., 34: 686, 1876; Michalko Veg. pomery pohoria Vihorlat, 1957: 175; Dudáš, 2016 KO). – Markovce, roadsides (Dudáš, 2018 not.). – Zemplínske Kopčany, Kopčianske slanisko saline soil, field road (Dudáš, 2016 BRNU). – Malé Raškovce, field roads – Zemplínske Kopčany, cemetery – Kucany, field roads – Oborín, field roads – Beša, S, dam – Brehov, Kamenná Moľva, field road on sand dune (all Dudáš, 2016 KO). – Svätá Mária, roadsides. – Svätá Mária, Kerestúr farmstead (both Dudáš, 2018 not.). – Malý Horeš, vine cellars – Svätuše, roadside (both Dudáš, 2016 KO). – Veľký Horeš, sand dune (Eliáš in Mártonfi (ed.), 2014: 65). – Veľký Horeš, field roads (Dudáš, 2016 KO). – Strážne [Órós] (Margittai, 1922 BP). – Strážne, collective farm, field road (Dudáš, Hroudová, Fér, Rydlo & Čertner, 2014 ined.; Dudáš, 2016 KO). – Veľký Horeš, railway crossing – Malý Horeš, Onča farmstead (both Dudáš, 2016 KO). – Iňačovce, Senné rybníky Nature Reservation, field road (Pečinka, 1998 OL). – Veľké Kapušany (Futák, 1950

ined). – Leles, forest edge (Dvořák, 1957 BRA). – Leles (Mikoláš, 1989 KO). – Kapoňa [Iacus Belgitó ad Kaponyam] (Margittai Magyar Bot. Lapok., 32: 96, 1933). – Dobrá, road near railway crossing – Čierna nad Tisou, field roads – Malé Trakany, roadsides – Malé Trakany, the Tisa River, sandy beach (all Dudáš, 2016 KO). – Jenkovce (Michalko Veg. pomery pohoria Vihorlat, 1957: 175).

### Carpaticum

**District 9. Biele Karpaty Mts.:** Zemianske Podhradie [Ns. Podhragy], field roads (Holuby, 1845 SLO, 1887 BRNM, 1897 BRA). – Bzince (Holuby Flora des Trencsiner Comitatus, 1888). – Bošáca (Husák, 1972 PR). – Bohuslavice, roads (Holuby, 1898, 1900 BRA).

**District 10. Malé Karpaty Mts.:** Plavecký Mikuláš, Kršlenica Hill, southern hillside, 290 m (Eliáš jun., 2018 NI). – Trstín, Holý vrch Hill, W slope (Ružička, 1954 SAV). – Dechtice, Katarínska (= ruined church) (Zlatošová, 1980 TTM). – Višňové (Hajný, 1927 PRC). – Brezovské kopce Hills, Brezová-Vrátne (Domin, 1931 PRC).

**District 11. Považský Inovec Mts.:** Tematín [Temář] (Weber, s. d. PR). – Tematín Castle [Temetvény] (Holuby Flora des Trencsiner Comitatus, 1888).

**District 12. Tribeč Mts.:** Turčianky, field road toward to abandoned quarry, 223 m (Eliáš jun., 2018 NI). – Krnča, field road (Eliáš sen., 2018 ined.). – Súľovce, pasture, Húšťavy Hill, W slope (Šipošová & Kováčiková Acta Bot. Slov. SAV, 5: 103, 1979). – Kovarce-Palagy, field road, Húšťavy Hill (Kováčiková, 1974 SAV). – Nitra, Pyramída Hill, on the top, ca. 540 m (Svobodová & Řehořek, 1977 NI, Eliáš Živa, 5: 173, 1983). – Zobor (Suza, 1928 BRNU; Lizoň, 1964 BRA). – Zobor, vineyards (Vlach, 1929: 276). – Pyramída, hill, trampling sites (Eliáš Živa, 5: 173, 1983).

**District 13. Strážovské and Súľovské vrchy Mts.:** Dolné Vestenice, locus aridis (Weber, 1930 BRA).

**District 14a. Pohronský Inovec Mts.:** Tekovské Nemce, pasture in village (Svobodová & Řehořek, 1974 NI).

**District 14d. Poľana Mts.:** between villages of Šálková and Poniky (s. col. 1870 SLO).

**District 14e. Štiavnické vrchy Mts.:** Prenčov, Čistá Voda [Prenčow, Ciszta voda] (Bubela, 1882 PRC; Kmeť, 1890 BP, 1892 BRA; Cserey, 1892 BRA; Kmeť, 1894 BP). – Pukanec (Kupčok Biolog. práce SAV, 2/9: 54, 1956).

**District 14f. Javorie Mts.:** Ábelová (Figura, 2015 not. sec biomonitoring.sk).

**District 16. Muránska planina Plateau:** Muráň, station (Soják, 1958 PR).

**District 19. Slanské vrchy Mts.:** Kapušany pri Prešove (Suza, 1930 BRNU). – Ploské, left bank of the Torysa River, trampled site (Krippelová, l.c. 1974). – Herľany [Rank-Herlain] (ex herb. Ullepitsch, 1880 PRC; Scherfel, 1880 SAV). – Svinica (Degen, 1928 BP; Krippelová, l.c. 1974). – Bohdanovce, bus stop (Dudáš, 2018 not.). – Bohdanovce, trampled site – Nižná Hutka, left bank of the Torysa River, near bridge – Polianka, left bank of the Torysa River, near bridge (all Krippelová, l.c. 1974). – Vyšná Myšľa, trampled site (Krippelová l.c., 1974).

**District 25. Turčianska kotlina Basin:** Sklabiňa (Domin, s. dato ined.)

### Common data (not mapped):

Bratislava, ruderal sites (Deyl, 1953 PR). – Bratislava, paths (Holuby, 1857 SLO). – Bratislava, Saslanod (Schidlay, 1932 BRA). – Žitný ostrov Island (Májovský & Michalko, 1951 SLO). – Ipeľské Predmostie, wet meadows (Peniašteková, 1991 SAV). – Zaboš (Májovský Acta Fac. Rer. Natur. Univ. Com. Bot., 2/7–9: 369, 1958).