RESEARCH ARTICLE

FLORA OF TARNOVSKI HEIGHTS (NORTHERN BULGARIA).

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Abstract

Tarnovski Heights are located in the central part of Northern Bulgaria. Inventory of their flora was done for the first time. As a result, 964 species of wild vascular plants from 439 genera and 94 families were described. A floristic analysis was made that includes the following information: taxonomic structure, phytogeographic structure, endemic species, relic species, species with conservation status, distribution of species by biological type and by life form, medicinal plants, antropophytes. The number of invasive species is significant, almost half of the number of invasive plant species in Bulgaria.

Introduction:-

Tarnovski Heights are located in the central part of Northern Bulgaria between the rivers Vesselina and Negovanka. At the Tarnovski Heights we take the Prisovski Ridge, situated beside them. The two geographic sites are included in one protected area of the National Ecological Network of the Republic of Bulgaria, called Tarnovo Heights (with code BG0000213). This gives us reason to consider them together under the name “Tarnovski Heights”. The Tarnovski Heights are located on the border between the Middle Danubian Plain and the Middle Forebalkan. They occupy 7 quadrants from the UTM network in Bulgaria: LH67, LH77, LH86, LH87, LH96, LH97, and MH07 (Figure 1). The total area is about 360 km². The maximum height is 439.8 m above sea level.

The Tarnovski Heights are located in the Temperate Continental Climate Area, Forebalkan Climate Region. The average annual temperatures are about 10-11°C. Average January temperatures range from -1.5°C to -3.5°C. Average July temperatures are in the range of 20.0-21.5°C. The annual rainfall is about 590-650 mm with a pronounced spring-summer maximum (May-June) and winter minimum (February). The snow cover lasts between 50 and 70 days. Western winds predominate in the direction.

The fullness of the rivers is spring (March-May). The reason for this is the spring-summer maximum of precipitation and the spring melting of the snow in the mountains. Lightning is in the late summer and autumn (August-September) [1]. The largest river in the region of Tarnovski Heights is Yantra River.

According to the FAO classification the soils within the Tarnovski Heights are two types: Leptosols (LP) and Luvisols (LV). The Leptosols are subtypes of rendzic (LPk). The Luvisols are divided into two subtypes: chromic (LVx) and albic (LVa) [2].

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From a botanical-geographic point of view, Tarnovski Heights are located in the Forebalkan County of the Illyrian Provincial Region of the European Broad-leaved Forest Area [3]. Most of the Tarnovski Heights belong to the Forebalkan (eastern) floristic region. Their easternmost parts are located in the Stara Planina (medium) floristic region [4].

The first botanical studies in the region of Tarnovo Heights were conducted in 1885 by Josef Velenovski as part of his studies in Northern Bulgaria. Vassil Kovatchev also conducted his studies in the region of Veliko Tarnovo and published them in 1892 together with the data from other regions in his second botanical article “Materials on the flora of Northern Bulgaria” [5]. In 1901, the famous Bulgarian botanist Ivan Urumov published a list of established plant species in the then Tarnovo districts and Lovech districts [6]. Data on individual plant species from the region of Veliko Tarnovo are mentioned in the “Flora of the People's Republic of Bulgaria” [7, 8] and “Flora of the Republic of Bulgaria” [4, 9]. Until now, a full study of the flora of Tarnovo heights has not been carried out.

The aim of our study was to make a full inventory of the flora of Tarnovski Heights and to prepare a floristic analysis of the obtained data. This information is important due to the high conservation value of Tarnovski Heights. There are 12 protected areas and 4 protected zones of the NATURA 2000 ecological network. The protected areas are divided into 7 protected sites and 5 natural monuments [10].

Materials and Methods:-
The present study of the flora of Tarnovo heights was carried out using the route method in the period 2015-2016. The following sources are used in the determination of taxa and life forms of the plants: Handbook for Plants in Bulgaria [11], Flora of PR Bulgaria [7, 8], and Flora of the Republic of Bulgaria [4, 9]. The names of the species are under Conspectus of the Bulgarian vascular flora [12]. The abbreviations of the authors’ names of the plants are according to the International Plant Names Index [13]. The names of the family are according to APG IV [14].

The life forms are represented in the system of Raunkiaer [15]. Biological types are defined by Delipavlov et al. [11]. The floristic elements and the endemics are according to Asyov et al. [12]. The relics are presented according to Zahariev [16].
The conservation statute is recognized using the following documents: Annex II to Council Directive 92/43/EEC of the European Community to protect natural habitats and of wild fauna and flora [17], Appendix I to Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) [18], Appendix II to Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) [19], Red Data Book of the Republic of Bulgaria, Vol. 1. Plants and Fungi [20], Red List of Bulgarian vascular plants [21], Annex II, Annex III, and Annex IV to Biodiversity Act of the Republic of Bulgaria [22]. Recorded are the species included in Order for special arrangements for the conservation and use of the medicinal plants in Bulgaria [23].

The medicinal plants are under the Annex to the Medicinal Plants Act of the Republic of Bulgaria [24]. Stoyanov [25, 26], Stoyanov and Kitano [27], Petkov [28], Pamukov and Ahtardzhiev [29], Landzhe [30], Nikolov [31]. The anthropophytes are presented by Stefanov and Kitano [32]. The Invasive alien plant species are by Petrova et al. [33].

**Results and Discussion:**
As a result of our study, 964 spontaneous prevalent vascular plants belonging to 439 genera and 94 families were described. This represents 23.5% from all species, 48.1% from all genera and 67.6% from all plant families in Bulgaria. The described species represent 42.9% of the vascular plants distributed in the range 0-500 m above sea level according to Peev et al. [34]. Systematic list of identified species is presented in Appendix.

The Division Lycopodiophyta includes 1 family, 1 genus and 1 species. The Division Equisetophyta is represented by 1 family, 1 genus and 2 species. The Division Polypodiophyta is covered with 5 families, 6 genera and 8 species. The Division Magnoliophyta includes the most taxa: 87 families, 431 genera and 953 species. The distribution of taxa in them is as follows: Class Pinopsida is represented with 1 family, 1 genus and 1 species; Class Magnoliopsida includes 70 families, 334 genera and 774 species; Class Liliopsida includes 16 families, 96 genera and 178 species.

The most of the families and genera are presented with smaller number of lower taxa: from 1 to 4. The majority of families, 77 (81.9%) were presented with 1–4 genera. Only 17 (18.1%) of the families are represented by 5 or more genera (Table 1). Most genera belong to the following families: Asteraceae (53 genera), Poaceae (50 genera), and Apiaceae (29 genera). The majority of families, 55 (58.5%) were presented with 1–4 species. Only 39 (41.5%) of the families are represented by 5 or more species (Table 1). Most species belong to the following families: Asteraceae (117 species), Fabaceae (87 species), Poaceae (82 species), Lamiaceae (58 species), Rosaceae (46 species), and Apiaceae (43 species). The majority of genera were presented with 1–4 species. Only 39 (8.9%) of genera are represented by 5 or more species. Most species belong to the following genera: *Trifolium* L. (17 species), *Centaurea* L. (16 species), *Vicia* L. (16 species), *Carex* L. (15 species), *Lathyrus* L. (15 species), *Ranunculus* L. (14 species), *Euphorbia* L. (13 species), and *Veronica* L. (13 species).

**Table 1:** Families with most genera and species (5 or more)

| Families         | Genera | Species |
|------------------|--------|---------|
| Amaranthaceae    | 5      | 13      |
| Amaryllidaceae   | 11     |         |
| Apiaceae         | 29     | 43      |
| Asparagaceae     | 7      | 14      |
| Aspleniaceae     | 5      |         |
| Asteraceae       | 53     | 117     |
| Betulaceae       | 5      |         |
| Boraginaceae     | 11     | 22      |
| Brassicaceae     | 24     | 39      |
| Campanulaceae    | 10     |         |
| Caprifoliaceae   | 8      | 21      |
| Caryophyllaceae  | 17     | 38      |
| Convolvulaceae   | 7      |         |
| Crassulaceae     | 7      |         |
| Cyperaceae       | 5      | 19      |
| Euphorbiaceae    | 15     |         |
There are 54 floristic elements in the phytogeographical structure of the flora. The largest number of species belongs to following floristic elements: European-Asiatic (15.3%), Sub-Mediterranean (13.8%), and European-Mediterranean (13.8%) floristic elements. The distribution of the floristic elements correlate with the geographic location of the study area.

The endemic taxa are represented by 3 Bulgarian endemic species and 9 Balkan endemic species. The total number of endemic taxa of Tarnovski Heights is 12 species (1.2% of all species). It is significantly lower than the country average, which is 4.9% [34]. The reason for this is the low altitude of the studied area, which is characterized by a smaller number of endemic plant species.

The relic species are 59 species (6.1% of all species). Tertiary relics are 50 species (5.2% of all species). Quaternary relics are 9 species (0.9% of all species). Of these 4 species are quaternary glacial relics and 5 species are quaternary interglacial relics. The small number of quaternary relics is due to the same reason given for the presentation of the endemic species, namely the low altitude: the highest point of Tarnovo heights is located only at 439.8 m above sea level.

The species with conservation status are 64 species (6.6% of all species). In Annex II of Directive 92/43/EEC is included one species. In Annex V of Directive 92/43/EEC are included 2 species. In Appendix I of Convention on the Conservation of European Wildlife and Natural Habitats (Berne Convention) is included one species. In Appendix II of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are included 22 species. In the Red Data Book of the Republic of Bulgaria are included 10 species in two categories: Endangered – 7 species, Vulnerable – 3 species. In the Red List of Bulgarian vascular plants are included 30 species in following categories: Endangered – 7 species, Vulnerable – 13 species, Nearly Threatened – 5 species, Least Concern – 4 species, and Data Deficient – 1 species. In Annex II, Annex III, and Annex IV of the Act on Amending and Supplementing the Biological Diversity Act of the Republic of Bulgaria are included 42 species. Under ban on collecting herbs from their natural habitats are 10 species. Under restricted collection of herbs from their natural habitats are 6 species.

The analysis of life forms (Table 2) shows the predominant participation of the hemicryptophytes, 447 species (46.4%). Next in number of species are following groups: therophytes, 213 species (22.1%), cryptophytes, 109 species (11.3%), and phanerophytes, 104 species (10.8%). This distribution can be explained by the combination of
several factors: the location of the studied area in the temperate zone, the large area of the forest habitats and the arable lands on the territory of Tarnovski Heights.

**Table 2**: Distribution of the species by life form

| Group                              | Subgroup          | Number of species | Percentage |
|------------------------------------|-------------------|-------------------|------------|
| Phanerophytes (Ph)                 |                   |                   |            |
| Megaphanerophytes                  |                   | 6                 | 0.6        |
| Mesophanerophytes                  |                   | 46                | 4.8        |
| Microphanerophytes                 |                   | 32                | 3.3        |
| Nanophanerophytes                  |                   | 20                | 2.1        |
| Chamaephytes (Ch)                  |                   | 33                | 3.4        |
| Hemicryptophytes (H)               |                   | 447               | 46.4       |
| Therophytes-Hemicryptophytes (Th-H)|                   | 57                | 5.9        |
| Cryptophytes (Cr)                  |                   |                   |            |
| Geophytes                          |                   | 85                | 8.8        |
| Helophytes                         |                   | 12                | 1.3        |
| Hydrophytes                        |                   | 13                | 1.4        |
| Therophytes (Th)                   |                   | 213               | 22.1       |

The biological spectrum includes all biological types, as well as all possible transitions between them (Table 3). Most species belong to the perennial herbaceous plants, 528 species (54.8%) and belong to the annual herbaceous plants, 213 species (22.1%). The dominant presence of the perennial herbaceous plants can be explained by the wide variety of communities and habitats that occur on the territory of Tarnovski Heights. The relatively large number of annual herbaceous plants is due to the following reasons: the large area of the arable lands, the significant number of settlements and the road network between them. As a result of human intervention in these territories, the soil is not covered by dense vegetation, which is favorable for the development of annual herbaceous plants. This group of plants is represented with a large number of species also in natural habitats with shallow and eroded soil cover.

**Table 3**: Distribution of the species by biological type

| Biological type                      | Symbol | Number of species | Percentage |
|--------------------------------------|--------|-------------------|------------|
| Annual herbaceous plant              | a      | 213               | 22.1       |
| Annual or biennial herbaceous plant   | a-b    | 46                | 4.8        |
| Annual or perennial herbaceous plant | a-p    | 11                | 1.1        |
| Biennial herbaceous plant            | b      | 36                | 3.7        |
| Biennial or perennial herbaceous plant| b-p    | 27                | 2.8        |
| Perennial herbaceous plant or shrub  | p-sh   | 528               | 54.8       |
| Shrub                                | sh     | 44                | 4.6        |
| Shrub or tree                        | sh-t   | 13                | 1.4        |
| Tree                                 | t      | 45                | 4.7        |

The medicinal plants of Tarnovski Heights are 444 species, belong to 284 genera and 81 families. They represent 46.1% from all species, 64.7% from all genera and 86.2% from all plant families of vascular plants, identified in the study area. They are distributed within the following groups: 37 species of trees (8.3%), 23 species of shrubs (5.2%), 251 species of perennial plants (56.5%), 16 species of biennial plants (3.6%) and 63 species of annual plants (14.2%). The remaining 54 species (12.2%) belong to the transitional groups between them.

The presence of anthropopytes species is significant, 545 species (56.5%), distributed as follows: 17 species of trees, 18 species of shrubs, 5 species of transitional group shrubs – trees and 505 species of herbaceous plants. The number of adventive species and cosmopolitan species in the flora of Tarnovski Heights is 39 species (4.1%) and 46 species
The number of invasive species is significant. There are 29 species, which is almost half of the number of invasive plant species in Bulgaria. These species are as follows: *Acer negundo* L., *Ailanthus altissima* (Mill.) Swingle, *Amaranthus hybridus* L., *Amaranthus retroflexus* L., *Ambrosia artemisiifolia* L., *Amorpha fruticosa* L., *Bidens frondosa* L., *Cuscuta campestris* Yunck., *Datura stramonium* L., *Eclipta prostrata* L., *Elaeagnus angustifolia* L., *Elodea canadensis* Michx., *Erigeron annuus* (L.) Pers., *Erigeron canadensis* L., *Euphorbia davidii* Subils, *Galinsoga parviflora* Cav., *Gleditsia triacanthos* L., *Helianthus tuberosus* L., *Impatiens glandulifera* Royle, *Laburnum anagyroides* Medik., *Lycium barbarum* L., *Oxalis corniculata* L., *Parthenocissus quinquefolia* (L.) Planch., *Phytolacca americana* L., *Robinia pseudoacacia* L., *Solidago gigantea* Aiton, *Sorghum halepense* (L.) Pers., *Xanthium italicum* Moretti, *Xanthium spinosum* L.

The majority of invasive plants (20 species) are herbaceous plants, 5 species are trees and 4 species are shrubs. Most of these species are spread in human-influenced natural habitats and in arable lands.

Most of the invasive species (14 species) originate from North America. Originating from both North America and South America are 6 species. Originating from South America are 3 species and from Asia are 4 species. One species originates from other parts of Europe and one species originates from the Mediterranean.

In the DASIE List of Worst invasive alien species threatening biodiversity in Europe [35] are included 4 species: *Ambrosia artemisiifolia* L., *Ailanthus altissima* (Mill.) Swingle, *Impatiens glandulifera* Royle, and *Robinia pseudoacacia* L.

In the list of invasive species of EPPO [36] are included 6 species: *Ailanthus altissima* (Mill.) Swingle, *Ambrosia artemisiifolia* L., *Amorpha fruticosa* L., *Helianthus tuberosus* L., *Impatiens glandulifera* Royle, and *Solidago gigantea* Aiton. In the List of observed invasive species of EPPO [36] is included *Bidens frondosa* L.

The reasons for the wide diversity of invasive species of Tarnovski Heights are related to the geographic location of the studied territory. The Tarnovski Heights are located in the central part of Northern Bulgaria, where the main roads connecting the eastern and western parts of Northern Bulgaria, as well as Northern and Southern Bulgaria are intersected. In the study area pass many roads and rail lines, which are used very intensively. Road infrastructure is one of the main ways of spreading invasive species. Second is the passage of one of the big rivers that are internal to Bulgaria (Yantra River) through the studied territory. Part of invasive species are spread along its banks.

We recommend monitoring the distribution and number of the invasive species and taking measures to control their numbers in the protected areas and the protected zones.

**Conclusion:**

The results of the inventory of vascular plants on the territory of Tarnovski Heights show a considerable variety of vascular plants. The obtained results can be used for comparison with the data on the flora of different geographic sites in Northern Bulgaria as well as in the whole country.

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Appendix:-
Systematic list of species of vascular plants, established in Tarnovski Heights (Northern Bulgaria)

Division Lycopodiophyta
Fam. Selaginellaceae: Selaginella helvetica (L.) Spring

Division Equisetophyta
Fam. Equisetaceae: Equisetum ramosissimum Desf.; Equisetum telmateia Ehrh.

Division Polypodiophyta
Fam. Aspidiaceae: Dryopteris filix-mas (L.) Schott
Fam. Aspleniaceae: Asplenium adiantum-nigrum L.; Asplenium ruta-muraria L.; Asplenium trichomanes L.; Ceterach officinarum DC.
Fam. Athyriaceae: Cystopteris fragilis (L.) Bernh.
Fam. Hypolepidaceae: Pteridium aquilinum (L.) Kuhn
Fam. Polypodiaceae: Polypodium vulgare L.

Division Magnoliophyta
Class Pinopsida
Fam. Cupressaceae: Juniperus communis L.

Class Magnoliopsida
Fam. Acanthaceae: Acanthus balcanicus Heywood & I. Richardson; Fam. Amaranthaceae: Amaranthus blitoides S.Watson; Amaranthus crispus Terrac.; Amaranthus hybridus L.; Amaranthus lividus L.; Amaranthus paniculatus L.; Amaranthus retroflexus L.; Atriplex patula L.; Beta vulgaris L.; Chenopodium album L.; Chenopodium hybridum L.; Chenopodium polyspermum L.; Chenopodium vulvaria L.; Kochia scoparia (L.) Schrad.; Fam. Anacardiaceae: Cotinus coggyria Scop.; Fam. Apiaceae: Aegopodium podagraria L.; Aethusa cynapium L.; Angelica panicici Vandas ex Velen; Angelica sylvestris L.; Anthriscus cerefolium Hoffm.; Anthriscus nemorosa Spreng.; Anthriscus sylvestris (L.) Hoffm.; Berula erecta (Huds.) Coville; Bifora radians M.Bieb.; Bupleurum affine Sadler; Bupleurum praealtum L.; Bupleurum tenuissimum L.; Caucaulis platycarpos L.; Chaerophyllum aureum L.; Chaerophyllum bulbosum L.; Chaerophyllum byzantinum Boiss.; Chaerophyllum temulentum L.; Conium maculatum L.; Daucus carota L.; Daucus carota Sm.; Eryngium campestre L.; Ferulago campestris (Besser) Grecescu; Ferula sylvatica (Besser) Rehb.; Foeniculum vulgare Mill.; Heracleum sibiricum L.; Heracleum taniatum Velen.; Laser trilobum Borkh. ex Gaertn.; Malabaila graveolens Hoffm.; Myrrhoides nodosa (L.) Cannon; Orlaya grandiflora (L.) Hoffm.; Pastinaca sativa L.; Pastinaca umbrosa Steven ex DC.; Peucedanum alsaticum L.; Peucedanum officinale L.; Physospermum cornubiense DC.; Pimpinella saxifraga L.; Sanicula europaea L.; Scandix pecten-veneris L.; Seseli rigidum Waldst. & Kit.; Seseli tortuosum L.; Tordylium maximum L.; Tortilis arvensis (Huds.) Link; Turgenia latifolia Hoffm.; Fam. Apocynaceae: Vinca herbacea Waldst. & Kit.; Vinca minor L.; Vincetoxicum hirundinaria Medik.; Fam. Araliaceae: Hedera helix L.; Fam. Aristolochiaceae: Aristolochia clematitis L.; Asarum europaeum L.; Fam. Asteraceae: Achillea clypeolata Sm.; Achillea millefolium L.; Achillea setacea Waldst. & Kit.; Ambrosia artemisiifolia L.; Arctium lappa L.; Arctium minus Bernh.; Arctium tomentosum Mill.; Artemisia absinthium L.; Artemisia annua L.; Artemisia vulgaris L.; Aster amellus L.; Bellis perennis L.; Bidens frondosa L.; Bidens tripartita L.; Bombycilaena erecta (L.) Smoljan.; Carduus acanthoides L.; Carduus candelicans Waldst. & Kit.; Carduus crispus L.; Carduus nutans L.; Carduus thoermeri Weinm.; Carlina acanthifolia All.; Carlina vulgaris L.; Carthamus lanatus L.; Centaurea affinis Friv.; Centaurea beibersteinii DC.; Centaurea calcitrapa L.; Centaurea chrysolepis Vis.; Centaurea cyanus L.; Centaurea degenuiana J.Wagner; Centaurea diffusa Lam.; Centaurea iberica Trevir. ex Spreng.; Centaurea orientalis L.; Centaurea phrygia L.; Centaurea rocheliana (Heuff.) Dostál; Centaurea rutifolia Sm.; Centaurea scabiosa L.; Centaurea solstitialis L.; Centaurea stenolepis Kern.; Centaurea triumfettii All.; Chondrilla juncea L.; Cichorium intybus L.; Cirsium arvense (L.) Scop.; Cirsium ligulare Boiss.; Cirsium vulgare (Savi) Ten.; Cota australica Sch.Bip.; Cota tinctoria (L.) J.Gay.; Crepis foetida L.; Crepis sancta (L.) Babc.; Crepis setosa Haller f.; Crepis tectorum L.; Crupina vulgaris Pers. ex Cass.; Echinops banaticus Rochel & Borza; Echinops sphaerocephalus L.; Eclipta prostrata L.; Erigeron acer L.; Erigeron annuus (L.) Pers.; Erigeron canadenisis L.; Eupatorium cannabinum L.; Filago lutescens Jord.; Galinsoga parviflora Cav.; Helianthus tuberosus L.; Helminthotheca echioides (L.) Holub; Hieracium cymosum L.; Hieracium echioides Lumn.; Hieracium hoppeannum Schult.; Hieracium maculosa L.; Hieracium praealtum Gochnat; Hieracium racemosum Waldst. & Kit. ex Willd.; Hypochoeris maculata L.; Inula aschersoniana Janka; Inula britanica L.;
Inula conyza L.; Inula ensifolia L.; Inula germanica L.; Inula heliennum L.; Inula hirta L.; Inula salicina L.; Inula spiraefolia L.; Jacobaea vulgaris Gaertn.; Jurinea glycantha DC.; Jurinea ledebourii Bunge; Lactuca serriola L.; Lactuca virginea (L.) J.Presl. & C.Presl.; Lapsana communis L.; Leontodon crispus Vill.; Leontodon hispidus L.; Leucanthemum vulgare Lam.; Matricaria chamomilla L.; Mycelis muralis Dumort.; Onopordum acanthium (L.) Desr.; Petasites hybridus (L.) G.Gaertn., B.Mey. & Scherb.; Picris hieracioides L.; Pulicaria dysenterica (L.) Bernh.; Scorzonera hispanica L.; Senecio vernalis Waldst. & Kit.; Senecio vulgaris L.; Serratula tinctoria L.; Solidago gigantea Aiton; Sonchus arvensis L.; Sonchus asper (L.) Hill; Sonchus oleraceus L.; Tanacetum corymbosum (L.) Sch.Bip.; Tanacetum macrophyllum Sch.Bip.; Tanacetum porthenium Sch.Bip.; Tanacetum vulgare L.; Taraxacum officinale F.H.Wigg.; Taraxacum serotinum Poir.; Tragopogon dubius Scop.; Tragopogon pratensis L.; Tripleurospermum inodorum (L.) Sch.Bip.; Tripleurospermum tenuifolium Freyn ex Freyn & E.Brandis; Tussilago farfara L.; Xanthium italicum Moretti; Xanthium spinosum L.; Xanthium strumarium L.; Xeranthemum annuum L.; Fam. Balsaminaceae: Impatiens glandulifera Royle; Fam. Berberidaceae: Mahonia aquifolium (Pursh) Nutt.; Fam. Betulaceae: Betula pendula Roth; Carpinus betulus L.; Carpinus orientalis Mill.; Corylus avellana L.; Corylus colurna L.; Fam. Boraginaceae: Anchusa leptophylla Roem. & Schult.; Anchusa officinalis L.; Anchusa procera Besser ex Link; Buglossoides arvensis (L.) I.M.Johnst.; Buglossoides purpureoacaulis (L.) I.M.Johnst.; Cerinthe minor L.; Cynoglossum ceticum Mill.; Cynoglossum harringtonicum Simon.; Echium italicum L.; Echium vulgare L.; Heliotropium europaeum L.; Myosotis arvensis (L.) Hill.; Myosotis incrassata Guss.; Myosotis ramosissima Rochel; Nonea pula DC.; Onosma heterophylla Griseb.; Pulmonaria angustifolia L.; Pulmonaria mollis Ten.; Pulmonaria obscura Dumort.; Pulmonaria officinalis L.; Symphytum bulbosum K.F.Schimp.; Symphytum ottomanum Friv.; Fam. Brassicaceae: Alliaria petiolaris (M.Bieb.) Cavara & Grande; Alyssum alyssoides (L.) L.; Alyssum montanum L.; Alyssum repens Baumg.; Alyssum tortuosum Waldst. & Kit.; Arabidopsis thaliana (L.) Heynh.; Arabis sagittata (Bertol.) DC.; Arabis turrita L.; Armoracia rusticana G.Gaertn., B.Mey. & Scherb.; Aurinia saxatilis Desv.; Barbarea vulgaris W.T.Aiton; Berteroa incana (L.) DC.; Berteroa obliqua (L.) DC.; Capsella bursa-pastoris (L.) Medik.; Cardamine bulbifera Crantz; Cardamine impatiens L.; Cardaminopsis arenosa (L.) Hayek; Cardaria draba (L.) Desv.; Descurainia sophia (L.) Webb ex Prantl; Diplotaxis muralis (L.) DC.; Erophila verna (L.) Chevall.; Erysimum crepidioides Rehbn.; Erysimum cuspidatum DC.; Erysimum diffusum Ehrh.; Hesperis sylvestris Crantz; Lepidium campestre (L.) W.T.Aiton; Nasturtium officinale R.Br.; Scorpiurus australis Sect.; Spach; Sinapis arvensis L.; Sisymbrium althaeoides L.; Sisymbrium flexuosum L.; Sisymbrium foetidum L.; Sisymbrium officinale (L.) Scop.; Sisymbrium strieptissimum L.; Thlaspi alliaceum L.; Thlaspi arvense L.; Thlaspi perfoliatum L.; Thlaspi praecox Wulfen; Turritis glabra L.; Fam. Campanulaceae: Campanula bononiensis L.; Campanula glomerata L.; Campanula grossi L.; Campanula lingulata Waldst. & Kit.; Campanula persicifolia L.; Campanula rapunculoides L.; Campanula sibirica L.; Campanula sparsa Friv.; Campanula trachelium L.; Legousia speculum-veneris (L.) Chaix; Fam. Cannabaceae: Cannabis sativa L.; Humulus lupulus L.; Fam. Caprifoliaceae: Cephalaria transylvanica (L.) Roem. & Schult.; Dipsacus fullonum L.; Dipsacus laciniatus L.; Dipsacus pilosus L.; Knautia drymeia Heuff.; Knautia integrifolia Bertol.; Knautia macedonica Griseb.; Sambucus ebulus L.; Sambucus nigra L.; Scabiosa columnaria L.; Scabiosa hispidula Boiss.; Scabiosa ochroleuca L.; Scabiosa rotata M.Bieb.; Valeriana officinalis L.; Valerianella dentata (L.) Pollich; Valerianella locusta (L.) Laterr.; Valerianella pumila DC.; Valerianella ramosa Bastard; Valerianella turgida Bettecke; Viburnum lantanum L.; Viburnum opulus L.; Fam. Caryophyllaceae: Arenaria serpyllifolia L.; Cerastium arvense L.; Cerastium vulgaricum R.Uechtr.; Cerastium semidecandrum L.; Cucubalus baccefer L.; Dianthus armeria L.; Dianthus giganteus D’Urv.; Dianthus petraeus Waldst. & Kit.; Dianthus pseudarmeria M.Bieb.; Herniaria glabra L.; Herniaria hirsuta L.; Holosteum umbellatum L.; Lychins coronaria (L.) Desr.; Lychins flos-cuculi L.; Minuartia glomerata (M.Bieb.) Degen; Minuartia setacea (Thuill.) Hayek; Moehringia trinervia (L.) Clairvaux; Myosoton aquaticum Moench; Paronychia cephale Fort; Petrorphagia prolifer (L.) P.W.Ball & Heywood; Petrorphagia saxifraga Link; Saponaria glutinosa M.Bieb.; Saponaria officinalis L.; Silene alba (Mill.) É.H.L.Krause; Silene conica L.; Silene dichotoma Ehrh.; Silene italic L.; Pers.; Silene oitites Sm.; Silene viridiflora L.; Silene vulgaris (Moench) Garcke; Spargula arvensis L.; Stellaria graminea L.; Stellaria holostea L.; Stellaria media (L.) Vill.; Stellaria nemorum L.; Stellaria pallida (Dumort.) Pire; Viscaria vulgaris Roehl.; Fam. Celastraceae: Euonymus europaeus L.; Euonymus verrucosus Scop.; Parnassia palustris L.; Fam. Ceratophyllaceae: Ceratophyllum demersum L.; Fam. Cistaceae: Fumana procumbens Gren. & Godr.; Helianthemum nummularium Mill.; Rhodanthonus nuss L.; Fam. Convolvulaceae: Calystegia sepium (L.) R.Br.; Calystegia sylvatica (Kit.) Griseb.; Convolvulus arvensis L.; Convolvulus canadensis L.; Cuscuta campestris Yunck.; Cuscuta epithymum L.; Cuscuta europaea L.; Fam. Cornaceae: Cornus mas L.; Cornus sanguinea L.; Fam. Crassulaceae: Sedum acre L.; Sedum album L.; Sedum caespitosum (Cav.) DC.; Sedum hispanicum L.; Sedum maximum Suter; Sedum ochroleuca Chaix; Sedum pallidum M.Bieb.; Fam. Dioscoreaceae: Tamus communis L.; Fam. Elaeagnaceae: Elaeagnus angustifolia L.; Fam. Euphorbiaceae: Euphorbia agraria M.Bieb.;
Euphorbia amygdaoides L.; Euphorbia chamaeysce L.; Euphorbia cypririssias L.; Euphorbia davidii Subis; Euphorbia esula L.; Euphorbia helioscopia L.; Euphorbia myrsinities L.; Euphorbia nicaenesis All.; Euphorbia polychroma Kern.; Euphorbia peplus L.; Euphorbia salicifolia Host; Euphorbia sequerana Neck.; Mercurialis ovaia Sternb. & Hoppe; Mercurialis perennis L.; Fam. Fabaceae: Amorpha fruticosa L.; Anthyllis vulneraria L.; Astragalus glycyphylloides DC.; Astragalus glycyphyllos L.; Astragalus onobrychis L.; Bituminaria bituminosa (L.) C.H.Stirt.; Cercis silicquastrum L.; Chamaetsyis albus (Haq.) Rothm.; Chamaezyis ciliatius (Wahlenb.) Rothm.; Chamaezyis hirsutus Link; Chamaezyis supinus (L.) Link; Colutea arborescens L.; Coronilla scorpioides W.D.J.Koch; Corniilla varia L.; Dorycnium germanicum Rouy; Dorycnium herbaceum Vill.; Galega officinalis L.; Genista ovaia Waldst. & Kit.; Genista tinctoria L.; Gleditsia triacanthos L.; Laburnum anagyroides Medik.; Lathyrus anuus L.; Lathyrus aphaca L.; Lathyrus aureus (Steven) Boram.; Lathyrus ciceria L.; Lathyrus hirsutus L.; Lathyrus latifolius L.; Lathyrus laxiflorus Kuntze; Lathyrus niger (L.) Bernh.; Lathyrus nissolia L.; Lathyrus pratensis L.; Lathyrus sphaericus L.; Lathyrus sylvestris L.; Lathyrus tuberosus L.; Lathyrus venetus Rouy; Lathyrus vernus (L.) Bernh.; Lembstropis nigricans (L.) Griseb.; Lotus angustissimus L.; Lotus cornicularius L.; Medicago arabica (L.) Huds.; Medicago falcata L.; Medicago lupulina L.; Medicago minima (L.) Bartal.; Medicago orbicularis (L.) Bartal.; Medicago polymorpha L.; Medicago rigida (L.) All.; Medicago sativa L.; Melilotus alba Medik.; Melilotus officinalis Pall.; Ononis arenaria DC.; Ononis arvensis L.; Ononis pusilla L.; Ononis spinosa L.; Robinia pseudoacacia L.; Trifolium alpestre L.; Trifolium angustifolium L.; Trifolium arvense L.; Trifolium campestre Schreb.; Trifolium dubium Sibth.; Trifolium echinatum M.Bieb.; Trifolium fragiferum L.; Trifolium hybridum L.; Trifolium incarnatum L.; Trifolium ochroleucus Huds.; Trifolium pallidum Waldst. & Kit.; Trifolium pannonicum Jacq.; Trifolium patens L.; Trifolium repens L.; Trifolium strictum L.; Vicia angustifolia Grub.; Vicia cracca L.; Vicia dalmatica A.Kern.; Vicia grandiflora Scop.; Vicia hisruta (L.) Gray; Vicia lathyroides L.; Vicia lutea L.; Vicia melanops Sm.; Vicia narbonensis L.; Vicia pannonica Crantz; Vicia peregrina L.; Vicia pisiformis L.; Vicia sativa L.; Vicia serratifolia Jacq.; Vicia tetrasperma (L.) Schreb.; Vicia villosa Roth; Fam. Fagaceae: Quercus cerris L.; Quercus dalechampii Ten.; Quercus frainetto Ten.; Quercus pubescens Willd.; Quercus robur L.; Fam. Gentianaceae: Centaurium erythraea Rafn; Centaurium pulchellum (Sw.) Druce; Fam. Geraniaceae: Erodium cicutarium (L.) L’Hér.; Erodium cicutarium (L.) L’Hér.; Geranium africanum L.; Geranium discoutum L.; Geranium lucidum L.; Geranium molle L.; Geranium pyrenaicum Burn.f.; Geranium robertianum L.; Geranium sanguineum L.; Fam. Haloragaceae: Myriophyllum spicatum L.; Myriophyllum verticillatum L.; Fam. Hypericaceae: Hypericum boissieri Petrovich; Hypericum elegans Stephan ex Willd.; Hypericum hirsutum L.; Hypericum perforatum L.; Hypericum rochelii Griseb. & Schenk; Fam. Juglandaceae: Juglans regia L.; Fam. Lamiaceae: Acinos alpinus Moench; Acinos arvensis (L.) Dandy; Ajuga chamaepeytis (L.) Schreb.; Ajuga genevensis L.; Ajuga laxmannii (L.) Benth.; Ajuga reptans L.; Ballota nigra L.; Betonica officinalis L.; Calamintha nepeta (L.) Sav; Calamintha sylvatica Bromf.; Clinopodium vulgare L.; Galeopsis speciosa Mill.; Glechoma hederacea L.; Glechoma hirsuta Waldst. & Kit.; Lamium amplexicaule L.; Lamium galeobdolon (L.) Lam.; Lamium maculatum L.; Lamium purpureum L.; Leonurus cardiaca L.; Lycopus europaeus L.; Lycopus exaltatus L.; Marrubium peregrinum L.; Marrubium vulgare L.; Melissa officinalis L.; Melitessis officinalis L.; Mentha aquatica L.; Mentha arvensis L.; Mentha longifolia (L.) Huds.; Mentha pulegium L.; Mentha spicata L.; Nepeta cataria L.; Nepeta ucrainica L.; Origanum vulgare L.; Prunella laciniosa L.; Prunella vulgaris L.; Salvia glutinosus L.; Salvia nemorosa L.; Salvia nutans L.; Salvia ringens Sm.; Salvia scarea L.; Salvia verbenaca L.; Salvia verticillata L.; Salvia virgata Jacq.; Satureja coerulea Janka; Scutellaria altissima L.; Scutellaria columae All.; Scutellaria orientalis L.; Sideritis montana L.; Stachys annua L.; Stachys germanica L.; Stachys leucoglossa Griseb.; Stachys recta L.; Stachys sylvatica L.; Teucrium chamaedrys L.; Teucrium polium L.; Thymus callyeas ex Litv.; Thymus moesiacus Velen.; Thymus pulegioides L.; Fam. Linaceae: Linum austriacum L.; Linum bienne Mill.; Linum hirsutum L.; Linum tenuifolium L.; Fam. Loranthaceae: Viscum album L.; Fam. Lythraceae: Lythrum salicaria L.; Lythrum virgatum L.; Peplis portula L.; Fam. Malvaceae: Abutilon theophrasti Sm.; Alcea rosea (Wallst. & Kit. ex Willd.) Waldst. & Kit.; Alcea rosea L.; Althea canabina L.; Lavatera thuringiaca L.; Malva pusilla Sm.; Malva sylvestris L.; Tilia cordata Mill.; Tilia platyphyllos Scop.; Tilia tomentosa Moench; Fam. Moraceae: Morus alba L.; Morus nigra L.; Fam. Oleaceae: Fraxinus excelsior L.; Fraxinus ornus L.; Fraxinus oxycarpa Willd.; Fraxinus pallisias Wilmott; Ligustrum vulgare L.; Syringa vulgaris L.; Fam. Onagraceae; Circaea lutetiana L.; Epilobium hirsutum L.; Epilobium palustre L.; Epilobium parviflorum Schreb.; Fam. Orobanchaceae: Orobanchus arenaria Borkh.; Orobanchus cumanus Wall.; Orobanchus minor Sm.; Orobanchus pubescens D’Urv.; Orobanchus reticulata Wallr.; Fam. Oxalidaceae: Oxalis corniculata L.; Fam. Paeoniaceae: Paeonia peregrina Mill.; Fam. Papaveraceae: Chelidonium majus L.; Corydalis marschalliana Pers.; Corydalis silvenensis Velen. ex Nyman; Fumaria parviflora Lam.; Fumaria officinalis L.; Papaver dubium L.; Papaver rhoes L.; Fam. Phytolaccaceae: Phytolacca americana L.; Fam. Plantaginaceae: Globularia aphyllantha Crantz; Plantago lanceolata L.; Plantago major L.
Plantago media L.; Fam. Plumbaginaceae: Plumbago europaea L.; Fam. Polygonaceae: Polygala anatolica Boiss. & Heldr.; Polygala major Jacq.; Fam. Polygonaceae: Fallopia convolvulus (L.) Á.Löve; Fallopia dumetorum (L.) Holub; Persicaria amphibia (L.) Gray; Persicaria hydropiper (L.) Schrank; Persicaria lapathifolia (L.) Gray; Persicaria maculata (Sibth.) Gray; Persicaria minor (Huds.) Opiz; Persicaria mitis (Schrank) Assenov; Polygonum aviculare L.; Polygonum patulum M.Bieb.; Polygonum pulchellum Loisel.; Rumex acetosa L.; Rumex acetosella L.; Rumex aquaticus L.; Rumex conglomeratus Murray; Rumex crispus L.; Rumex maritimus L.; Rumex obtusifolius L.; Rumex patientia L.; Rumex pulcher L.; Rumex sanguineus L.; Fam. Portulacaceae: Portulaca oleracea L.; Fam. Primulaceae: Anagallis arvensis L.; Cyclamen hederifolium Aiton; Lysimachia nummularia L.; Lysimachia vulgaris L.; Primula veris L.; Fam. Ranunculaceae: Anemone ranunculoides L.; Anemone sylvestris L.; Clematis vitalba L.; Consolida regalis Gray; Delphinium fission Waldst. & Kit.; Helleborus odorus Waldst. & Kit. ex Willd.; Hepatica nobilis Mill.; Isopyrum thalictroides L.; Nigella damascena L.; Ranunculus acris L.; Ranunculus arcticus L.; Ranunculus bulbosus L.; Ranunculus caucasicus L.; Ranunculus fallax (Wimm. & Grab.) Sloboda; Ranunculus ficaria L.; Ranunculus illyricus L.; Ranunculus millefollia Vahl; Ranunculus nemorosus DC.; Ranunculus repens L.; Ranunculus sardous Crantz; Ranunculus sceleratus L.; Ranunculus villosus DC.; Thalictrum aquilegifolium L.; Thalictrum minus L.; Fam. Resedaceae: Reseda lutea L.;

Fam. Rhamnaceae: Pallirus spina-christi Mill.; Rhamnus saxatilis Jacq.; Fam. Rosaceae: Agrimonia eupatoria L.; Agrimonia procura Wallr.; Aremonia agrimonoides (L.) DC.; Armeniaca vulgaris Lam.; Crataegus monogyna Jacq.; Crataegus pentagyna Waldst. & Kit. ex Willd.; Cytisus oblonga Mill.; Filipendula vulgaris Moench; Fragaria moschata Duchesne; Fragaria vesca L.; Fragaria viridis Duchesne; Geum urbannum L.; Malus praeceps Borkh.; Malus sylvestris Mill.; Potentilla argentea L.; Potentilla inclinata Vill.; Potentilla laciniosa Waldst. & Kit. ex Nestl.; Potentilla micrantha Ramond ex DC.; Potentilla neglecta Baumg.; Potentilla pedata Willd.; Potentilla reptans L.; Prunus avium L.; Prunus cerasifera Ehrh.; Prunus insititia L.; Prunus mahaleb L.; Prunus spinosa L.; Pyrus nivalis L.; Pyrus pyraster (L.) Burgsd.; Pyrus sativa DC.; Rosa agrestis L.; Rosa canina L.; Rosa corymbifera Borkh.; Rosa damalis Bechst.; Rosa jundzillii Besser; Rosa micrantha Borrer; Rosa myriacantha DC.; Rosa vosagiaca Deesp.; Rubus caesius L.; Rubus canescens DC.; Rubus discolor Weiche & Nees; Rubus hirtus Waldst. & Kit.; Rubus thraustochus Focke; Sanguisorba minor Scop.; Sorbus aucuparia L.; Sorbus domestica L.; Sorbus tormental (L.) Crantz; Fam. Rubiaceae: Asperula aristata L.f.; Asperula cynanchica L.; Cruciata glabra (L.) Ehrend.; Cruciata laeives Opiz; Cruciata pedemontana (Bellardi) Ehrend; Galium album Mill.; Galium aparine L.; Galium odoratum Scop.; Galium octonarium (Klokov) Soö; Galium pseudoschizanthus Schur; Galium rubioides L.; Galium verum L.; Sherardia arvensis L.; Fam. Rutaceae: Dictamnus albus L.; Habrophyllum suaveolens G.Don.; Ruta graveolens L.; Fam. Salicaceae: Populus alba L.; Populus nigra L.; Populus tremula L.; Salix alba L.; Salix caprea L.; Salix fragilis L.; Salix purpurea L.; Fam. Santalaceae: Comandra elegans Rchfb.; Thesium simplex Velen.; Fam. Sapindaceae: Acer campestre L.; Acer heldreichii Boiss. & Heldr.; Acer negundo L.; Acer platanoides L.; Acer pseudoplatanus L.; Acer tataricum L.; Fam. Scrophulariaceae: Cymbalaria muralis G.Gaertn., B. May. & Schreb.; Digitalis ferruginea L.; Digitalis lanata Ehrh.; Kickxia elatine (L.) Dumort.; Linaria dalmatica (L.) Mill.; Linaria genistifolia (L.) Mill.; Linaria vulgaris Mill.; Melampyrum arvense L.; Odontites serotina (Lam.) Dumort.; Pseudolysimachion orchideum (Crantz) Whaber; Rhinanthus angustifolius C.C.Gmel.; Rhinanthus rumelicus Velen.; Scrophularia canina L.; Scrophularia nodosa L.; Scrophularia scopolii Hoppe ex Pers.; Scrophularia umbrosa Dunmort.; Verbascum blattaria L.; Verbascum formanekii Borbás ex Formánek; Verbascum lychnitis L.; Verbascum nigrum L.; Verbascum ovalifolium Donn.; Verbascum phlomoides L.; Verbascum phoeniceum L.; Verbascum speciosum Schrad.; Veronica anagalis-aquatica L.; Veronica arvensis L.; Veronica austriaca L.; Veronica beccabunga L.; Veronica chamaedrys L.; Veronica hederafolia L.; Veronica krumovii (Peev) Peev; Veronica officinalis L.; Veronica polita Fr.; Veronica praecox All.; Veronica teucrium L.; Veronica urticifolia Jacq.; Veronica vindobonensis (M.A.Fisch.) M.A.Fisch.; Fam. Simaroubaceae: Ailanthus altissima (Mill.) Swingle; Fam. Solanaceae: Datura innoxia Mill.; Datura stramonium L.; Lycium barbarum L.; Physalis alkekengi L.; Solanum dulcamara L.; Solanum nigrum L.; Fam. Staphyleaceae: Staphylea pinnata L.;

Fam. Ulllaceae: Ulmus glabra Huds.; Ulmus minor Mill.; Fam. Urceolaceae: Parietaria judaica L.; Parietaria officinalis L.; Urtica dioica L.; Urtica urens L.; Fam. Verbenaceae: Verbena officinalis L.; Fam. Violaceae: Viola arvensis Murray; Viola jordani Hang; Viola kitaibeliana Schult.; Viola odorata L.; Viola riviniana Red.; Viola tricolor L.; Fam. Vitaceae: Parthenocissus quinquefolia (L.) Planch.; Vitis sylvestris C.C.Gmel.;

Fam. Zygophyllaceae: Tribulus terrestris L.

Class Liliopsida

Fam. Alliaceae: Allium lanceolatum With.; Allium plantago-aquatica L.; Fam. Amaryllidaceae: Allium atropurpureum Waldst. & Kit.; Allium flavum L.; Allium moschatum L.; Allium paniculatum L.; Allium rotundum L.; Allium scorodoprasum L.; Allium spherocephalon L.; Galanthus elwesi Hook.f.; Galanthus nivalis L.;

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Sternbergia colchiciflora Waldst. & Kit.; Sternbergia lutea (L.) Ker Gawl. ex Spreng.; **Fam. Araceae**: Arum alpinum Schott & Kotschy; Arum maculatum L.; Lemna gibba L.; Lemna minor L.; **Fam. Asparagaceae**: Asparagus tenuifolius Lam.; Hyacinthella leucophaea Schur; Muscari botryoides (L.) Mill.; Muscari comosum (L.) Mill.; Muscari neglectum Ten.; Muscari tenuiflorus Tausch; Ornithogalum montanum Ten.; Ornithogalum umbellatum (L.) Desf.; Polygonatum latifolium (L.) All.; Polygonatum odoratum (Mill.) Druce; Ruscus aculeatus L.; Ruscus hypoglossum L.; Scilla bifolia L.; **Fam. Butomaceae**: Butomus umbellatus L.; **Fam. Cyperaceae**: Carex carophyllea Latour.; Carex depauperata Curtis; Carex digitata L.; Carex distans L.; Carex diversa Stokes; Carex flacca Schreb.; Carex halleriana Asso.; Carex hirta L.; Carex otrubae Podp.; Carex pendula Huds.; Carex praecox Schreb.; Carex remota L.; Carex sylvatica Huds.; Carex tomentosa L.; Carex vulpina L.; Cyperus fuscus L.; Eleocharis palustris R.Br.; Pycreus flavescens (L.) P.Beauv. ex Rchb.; Schoenoplectus lacustris (L.) Palla; **Fam. Hydrocharitaceae**: Elodea canadensis Michx.; Najas marina L.; **Fam. Iridaceae**: Crocus flavus Weston; Crocus pallasii Goldbl.; Gladiolus communis L.; Iris graminea L.; Iris pumila L.; **Fam. Juncaceae**: Juncus articulatus L.; Juncus bufonius L.; Juncus compressus Jacq.; Juncus conglomeratus L.; Juncus effusus L.; Juncus inflexus L.; Luzula campestris (L.) DC.; **Fam. Liliaceae**: Gagea arvensis (Pers.) Dumort.; Gagea lutea Ker Gawl.; Lilium martagon L.; **Fam. Orchidaceae**: Anacamptis pyramidalis (L.) Rich.; Cephalanthera damasonium Druce; Cephalanthera longifolia (L.) Fritsch.; Dactylorhiza romana (Sebast.) Soó; Epipactis helleborine (L.) Crantz.; Epipactis microphylla Sw.; Gymnadenia conopsea (L.) R.Br.; Himantoglossum caprinum Spreng.; Limodorum abortivum (L.) Sw.; Neottia nidus-avis (L.) Rich.; Ophrys apifera Huds.; Ophrys cornuta Steven ex M.Bieb.; Orchis morio L.; Orchis purpurea Huds.; Orchis simia Lam.; Orchis tridentata Scop.; Platanthera chlorantha (Custer) Rchb.; Spiranthes spiralis (L.) Chevall.; **Fam. Poaceae**: Achnatherum calamagrostis P.Beauv.; Aegilops cylindrica Host; Aegilops lortiendi Hochst.; Aegilops triuncialis L.; Agrostis capillaris L.; Aira elegantissima Schur; Alopecurus myosuroides Huds.; Anthoxanthum odoratum L.; Apera spica-venti (L.) P.Beauv.; Arrhenatherum elatius (L.) P.Beauv. ex J.Presl & C.Presl.; Avena fatua L.; Avenula compressa (Heuff.) W.Sauer & Chmel.; Botriochloa ischaemum (L.) Keng; Brachypodium pinnatum (L.) P.Beauv.; Brachypodium sylvaticum P.Beauv.; Briza media L.; Bromus arvensis L.; Bromus comutatus Schrad.; Bromus japonicus Thunb.; Bromus mollis L.; Bromus racemosus L.; Bromus squarrosus L.; Bromus sterilis L.; Calamagrostis epigeios (L.) Roth.; Catabrosa aquatica (L.) P.Beauv.; Chrysopogon gryllus (L.) Trin.; Cleistogenes serotina (L.) Keng.; Cynodon dactylon (L.) Pers.; Cynosurus cristatus L.; Cynosurus echinatus L.; Dactylis glomerata L.; Dasypyrum villosum (L.) P.Candargy.; Deschampsia caespitosa (L.) P.Beauv.; Digitaria sanguinalis (L.) Scop.; Echinocloa crus-galli (L.) P.Beauv.; Elymus caninus L.; Elymus elongatus (Host) Runemark.; Elymus hispidus (Opiz) Melderis.; Elymus repens (L.) Gould; Eragrostis minor Host; Eragrostis pilosa (L.) P.Beauv.; Festuca arundinacea Schreb.; Festuca heterophylla Lam.; Glyceria maxima (Hartm.) Holmbl.; Holcus lanatus L.; Hordeum bulbosum Link; Hordeum murinum L.; Koeleria macrantha (Lede.) Schult.; Koeleria nitidula Velen.; Koeleria simonkaii Adamovič; Leersia oryzoides (L.) Sw.; Lolium perenne L.; Lolium temulentum L.; Melica ciliata L.; Melica pica C.Koch.; Melica uniflora Retz.; Milium effusum L.; Molinia caerulea (L.) Moench; Phalaris arundinacea L.; Phleum phleoides H.Karst.; Phleum pratense L.; Phragmites australis (Cav.) Steud.; Piptatherum virescens Boiss.; Poa annua L.; Poa bulbosa L.; Poa nemoralis L.; Poa palustris L.; Poa pratensis L.; Poa trivialis L.; Sclerochloa dura (L.) P.Beauv.; Setaria italica (L.) P.Beauv.; Setaria pumila (Poir.) Roem. & Schult.; Setaria viridis (L.) P.Beauv.; Sorginium helapense (L.) Pers.; Stipa capillata L.; Stipa epilosa Martinovsky; Taeniatherum caput-medusae (L.) Nevski; Trachynia distachya (L.) Link.; Traucus racemosus (L.) All.; Vulpia ciliata Dumort.; Vulpia myuros (L.) C.C.Gmel.; **Fam. Potamogetonaceae**: Potamogeton crispus L.; Potamogeton natans L.; Potamogeton nodosus Poir.; Potamogeton pectinatus L.; **Fam. Typhaceae**: Sparganium erectum L.; Typha angustifolia L.; Typha latifolia L.; Typha laxmannii Lepech.; **Fam. Xanthorrhoeaceae**: Anthericum ramosum L.