# Ukrainian section I.

**Date**: September 28, 1998

**Country**: Ukraine

**Name of wetland**: Upper Tisa between headwaters and Tyachiv

**Geographical Coordinates**: 23°30' W - 24°30' E - 47°04' S - 48°20' N

**Altitude**: 204-1650 m above Baltic sea level (a.s.l.)

**Area**: 90 000 ha

**Overview**: The headwaters of River Tisa, formed by the confluence of the rivers Chorna and Bila Tisa in the Transcarpathian Region (Ukrainian territory), with their picturesque landscapes, extremely wide biological diversity and original cultural features, are great natural and historical values of international importance and should be reckoned as part of the European natural heritage.

**Wetland type**: M, N, Ts, U, Va, W

**Ramsar Criteria**: 1a, c; 2a, b, d; 3b; 4a

**Map of site included**? see Map

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**General location**: Ukraine, Transcarpathian Region, Tyachiv and Rahiv districts.

**Physical features**: The morphostructures of the region are extremely varied. In the section between Tyachiv and Dilove River Tisa and its tributaries, rivers Tereblya and Teresva, belong to the Verhovyna morphostructures. The low-mountain and middle-mountain erosional tectonic relief with peaks of 600-700 m a.s.l., which was formed on Oligocene sediments, prevails here.

The Polonyna morphostructure, the highest part of the Ukrainian Carpathians, has a high and middle-mountain relief. The morphostructure covers the Svydovets, Chornohora and Maramarosh morphostructures of lower orders. The Svydovets morphostructure is an extension of the Polonyna ridge. The Svydovets watershed line has retained marks of the Pleistocene glaciation. The inter-stream ridges have

flat tops (plains). The Chornohora morphostructure embraces the highest mountain massif of the Ukrainian Carpathians. The mountain ridge crest with rounded tops belongs to the zone of the most stable cretaceous sandstones and conglomerates. On the massif slopes there are well-preserved glacial relief forms and stone placers widely spread over them. The Maramarosh morphostructure embraces the Rahiv and Strimchak morphostructures. The former is situated on the left bank of River Tisa. The deep valleys, steep slopes, considerable altitudes, presence of rocky crests differentiate this massif from the other mountain group. The rocks are presented by crystal slates, gneisses and marble limestones.

In the area of the region various soil types are distributed: meadow and bog soils on alluvium, sod-podzolic soils on alluvium, as well as mountain meadow brown soils and sod brown soils. The characteristics of the first type of soils were given in the Ramsar sheet II. The sod-podzolic soils on the alluvium of low terraces are spread in the Pritisyanska Plain with the relief showing low hills, ridges and low lands. Shallow arrangement of ground waters provides gleization of the lower part of the profile. The humic alluvial horizon is not deep (does not exceed 20 cm), clearly grey, structureless and dispersed. The alluvial horizon is distinctly separated, strongly leached out, porous, 10 to 15 cm thick. Soil acidity is high, the pH of the soil extract is 3.9 to 4.8. The soils do not provide favourable conditions for plant growth due to their high acidity, structurelessness of the upper horizons and gleization of the lower ones. Brown mountain forest soils developed on the slopes within the forest belt from the foots of the mountains to 1100-1500 m a.s.l. Their mother rock is the aluvium-deluvium of the crystal rock flysch and magmatic deposits. Depending on the thickness and presence of rock debris there are deep (116 to 120 cm), middle-deep (60 to 75 cm) and shallow (40 to 50 cm) soils, as well as slightly and highly stony ones. The soils of this type are acidic (pH is about 4.0), not saturated by bases, considerably enriched by mobile aluminium, poor in mobile phosphorus and potassium. Mountain-meadow brown soils occur in the subalpine and alpine belts on the altitudes of 1100 to 1600 m. They were formed under the meadow and shrub vegetation. Their characteristic feature is the presence of peat turf or peat 10 to 12 cm thick. Under this there is the humic horizon (15 to 20 cm) with its markedly granular structure. The soils have a high actual acidity (pH 3.5-4.5), are well supplied with nitrogen, but are poor in phosphorus and potassium. The sod brown soils occur in all vertical belts of the mountain zone on forest-free plots used as natural fodder-producing areas. They developed as a result of the superimposment of the sod layer on the brown earths in the process of soil formation. They differ from the brown forest soils by the presence of darkish brown horizon of 20 to 30 cm thickness. There is a transitory greyish-brown horizon, 60 to 80 cm deep with nut-structure, which turns into the eluvium of bedrock (sandstone, slate, flysch). The soils have a medium supply of mobile forms of nitrogen and potassium, somewhat less of phosphorus, and a comparatively high acidity (pH 4.5- 5.0).

**Hydrological values**: River Tisa is the main water artery of Transcarpathia. It is formed by the confluence of rivers Chorna Tisa and Bila Tisa, four kilometres behind Rahiv.

River Chorna Tisa rises in the north-west slope of the Svydovets ridge on the altitude of 1400 m a.s.l. Its length is 49 km, the catchment area is 567 km2. This is a typical mountain river with high banks and a deep, slightly sinuous valley. Its channel width varies from 10 to 25-30 m. Its depth in the drought period being 0.2-0.5 m becomes 4 to 6 m in the period of floods. Cutting across the highest part of the Polonyna ridge, the river flows to south-west to River Bila Tisa.
River Bila Tisa rises in the south-west slope of the Chornohora on the altitude of 1650 m a.s.l. and flows in the latitudinal direction from east to west. Before the town of Velyky Bychkiv the river flows along a narrow valley with steep slopes and has a marked mountain character. In this section its tributaries (rivers Kosivska and Shopurka) from the right side, and River Visheu from the Romanian side drain into River Tisa. The average speed of the current is 2-4 m/sec. River Shopurka is formed by the confluence of Mala Shopurka and Serednya Rika, its length is 13 km (41 km together with Mala Shopurka), the catchment area is 283 km2. It is a river of the mountain type with the stream gradient of 26 m/km. Its current speed in the drought periods is 2-3 m/sec.
Behind Velyky Bychkiv and up to Tyachiv the valley of River Tisa widens, and near the town of Bushtyno it reaches 3 to 5 km. The river here is of the piedmont character, its bed is 40-80 m wide. The lowest registered minimum water level in the observed section near Tyachiv was 54 cm, the highest maximum one was 694 cm, the amplitude of water levels is 748 cm. In this section its largest East-Transcarpathian right-side tributary, River Teresva, with a length of 56 km and a catchment area of 1220 km2, flows into River Tisa. Before the village of Dilove River Teresva flows in a deep and narrow valley having a bottom width of 100-400 m. The width of the riverbed is 20 to 40 m, its depth is 0.5-1.0 m. Behind the village of Dubove the valley widens to 1-2 km. The riverbed is winding, branched with numerous isles, its width is 30-60 m, the depth of the river is 0.5-2 m.
The hydrological conditions of River Tisa is characterised by the abrupt changes of levels, instability of the flow and unstable ice formations on the river.
The most important determiner of the river flow is the characteristics of precipitation distribution. The highest amount of precipitation falls in the headwater area and can reach 1500 mm per annum, while in the piedmont areas this can reduce to 600-700 mm per annum. The daily amount of precipitation can reach 100 to 130mm and exceeds the average monthly standards. In the warm periods of year rains are responsible for flood runoff formation, and drastic thaws cause winter floods. It should be noted that winter floods sometimes have large scales.
The hydrochemical description of the waters of River Tisa is presented in Table 1 (Appendix).
The spring high water formation in the mountain section of River Tisa is essentially influenced by the conditions of runoff development in the prevernal period.
Taking into account the marked gradient of the riverbed in its mountain section (15.5 m/km near Rahiv, 12.7 m/km near Dilove), the level rise during the flood is very drastic, the abatement of high waters is slow, with numerous peaks caused by rainfalls.

The extreme values of water levels in River Tisa in the area of Rahiv-Tyachiv for the period of a series of years are given in Table 2 (Appendix).

The average water flow rate, according to observations made for River Tisa - Rahiv during a number of years, is 23.9 m3/sec, the average yearly specific discharge is 22.3 l/sec × km2, for River Tisa - Dilove it is 34.1 m3/sec and 28.7 l/sec × km2, respectively.

From Dilove to below Tyachiv River Tisa flows along the state border with Romania, so some hydrological observation data are incomplete or are not available.

**Ecological features**: The Region is characterized by an extremely high diversity of biotopes. Forest, meadow, waterside and anthropogenic biotopes prevail here, as well as ones of rocks, stone fields, bogs and ecotones. The zonalitz of vegetation cover is pronounced, it is represented by the piedmont, mountain (upper, lower) and highland (subalpine, alpine) belts. In terms of phytogeography there are 6 floristic areas: the Khust-Solotvino (Maramarosh) depression, the inter-stream area between rivers Tereblya and Teresva, the Maramarosh Alps, the Chornohora, the Svydovets, the Horhans.

The principal plant types are represented by forest (Vaccinio-Piceetea, Querco-Fagetea, Quercetea robori-petraeae, Alneteca glutinosae, Salicetea purpureae), meadow (Molinio-Arrhenatheretea, Nardo-Callunetea, Festuco- Brometea, Salicetea herbaceae, Caricetea curvulae, Elyno-Seslerietea), shrub and undershrub (Betulo-Adenostyletea, Loiseleurio-Vaccinietea, Vaccinio- Juniperetea), waterside and wetland (Phragmito-Magnocaricetea, Montio- Cardaminetea, Scheuchzerio-Caricetea fuscae) and pioneer communities (Asplemnietea rupestris, Thlaspietea rotundifolii). Segetal communities - Plantaginetea, Galio-Urticetea - also have local distribution.

**Noteworthy flora**: The flora of the region is very rich and diverse. It reckons over 1000 vascular plant species. These include particularly endemic (94), rare taxa, as well as those included in the Red Data Book of Ukraine (118). A total of 366 vascular plant species of the region need protection.

For the annotated list of vascular plants and plant communities of the River Tisa basin, which include all of Transcarpathia, see the Appendix.

**Noteworthy fauna**: The fauna of the River Tisa headwaters and its valley is heterogeneous and varies with the hydrological and landscape-botanical features of the localities. Generally one can speak of two aspects of the fauna: the first is associated with the most mountaneous part of River Tisa (from the rivers Chorna and Bila Tisa approximately as far as their confluence behind Rahiv.); the second is from Rahiv down the river as far as Tyachiv. Of course, this is only a conventional boundary between the two sections. Nevertheless, in the first section the following characteristic species prevail, see the Appendix.

**Social and cultural values**: The human population of the Upper Tisa have passed a complicated path of the historic development. The Hutsul ethnic group had

formed here, which, along with the general Ukrainian and East Slavic features, has some specific traits of culture and mode of life. The Hutsuls, unlike other Transcarpathian ethnic groups, have the grazing type of cattle breeding as their main occupation. Crop farming is of minor importance, and woodwork has been an auxiliary occupation there for a long time. The cultural-historic processes in the lives of the Upper Tisa people developed in close relationship with the Carpathian regional development at large. They reached the highest rise in the Hallstatt period - the decisive one in the Thracian culture (8th-7th centuries B.C.). The monuments of this culture are connected with salt- and iron-works. Later on, after the tribes from the Forest Steppe had penetrated into Transcarpathia and assimilated with the South Thrakian tribes, the Kushtanovitsa culture formed there. The culture of the Celts, or La Tene culture, exerted its influence there around the 5th-2nd centuries B.C. After the decline of Celtic dominance, at the beginning of Anno Domini, the Getae-Thracian, or Getae-Dacian culture formed in the Carpathian region. This is one of the few cultures which had a true highland character. The late Roman period is famous for its original culture of Carpathian burial mounds, which was created by the Getae-Thracian tribes, and partly by the Slavs. This culture was likely to unite the Carpes - an old population of the region in the 2nd-4th centuries. The flourishing of the early Middle Age culture of the Slavs (Prague, Penkovo cultures) took place in the 6th-7th centuries. At the doorstep of the 10th century the culture of Luka-Raikovetska developed; at that time the Slavic tribes of the Carpathian Croatians formed their first unions: the principalities. There are numerous monuments of the above cultures displayed in the region.

In the Hutsul land economy cattle breeding, and first of all sheep breeding, was always the key branch. These domestic animals were of the greasing type (with seasonal herding) and were managed on the basis of collective ownership. Other kinds of farm animals like goats, cows, horses were also on grazing. The population have performed woodwork, logging and transportation of timber long since. Wood materials were used for construction, making tools and utensils, charcoal, pitch; they were used as fuel, etc. Important auxiliary occupations of the Hutsuls have been also apiculture, hunting, fishing, gathering mushrooms, berries and medicinal plants.

**Land tenure/ownership**:

*Tyachiv district rada, Tyachiv district state administration*

Bushtyno settlement rada, Tyachiv town rada, Bedevlya village rada, Teresva settlement rada, Hrushovo village rada, Dibrova village rada, Solotvino settlement rada.

*Rahiv district rada, Rahiv district state administration*

Bila Tserkva village rada, Veliky Bychkiv settlement rada, Luzhanska village rada, Dilove village rada, Kostylivo village rada, Rahiv town rada, Bilinska village rada, Kvasy village rada, Yasinya settlement rada, Chorna Tysa village Rada, Roztoka village rada, Vidrychanska village rada, Bohdan village rada, Luhy village rada.

**Current land use**: The main territories are piedmont and mountain zones used for agricultural purposes (livestock, crop farming), for forestry and recreation. The Rahiv and Tyachiv districts have a state border with Romania. Their socio-economic specificity differs from that of other districts in the complicated conditions of living and in economic activity, particularly in agricultural work, because of the shortage of arable lands. A substantial part of the land is situated on slopes which make farming hard. The high density of the population living mainly in the River Tisa basin, sharpens the problems of employment. In both districts there are some useful minerals, the greatest attention is attached to the exploitation of marble and salt. As to the branches of industry, the most developed are forestry and wood-processing industry. In agriculture meat production, dairy live-stock farming and gardening are the principal fields. The population's supply with land in the Rahiv and Tyachiv districts is the poorest in the region: there is 0.1 ha and 0.3 ha of arable land per one resident of the district, respectively.

Among the promising lines of land management there is the development of ecological (green) tourism and agricultural tourism. These lines are planned to be developed on the international level.

**Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects:**

Floods are frequent phenomena in the region. Some of them have caused considerable material damage to the objects of national economy and private possessions, they also were responsible for ecological catastrophes.

The floods affected most badly the Rahiv and Tyachiv districts in October 1992 and December 1993. During these floods the sewage disposal structures were damaged in Tyachiv, the Teresva wood works, Solotvino and Bushtyno. Highways of local and state importance were seriously damaged, too. Specially serious detriment was caused to the forest paths and forest engineering structures. The deficit of budget means less assistance for speedy recovery.

**Conservation measures taken**: In the Tyachiv and Rahiv districts over 80 valuable objects of "natural reserve stock" (NRS) as well as areas of different categories of reservation have been drawn under protection. In addition, in these districts over 90 mineral sources are registered. The largest among the natural reserve objects is the Carpathian Biosphere Reserve (CBR) occupying ane area of 57.800 ha. As the territory of CBR was expanded in 1997, over 13 objects and areas of NRS were incorporated into it. Since these objects are numerous, in 1998 the State Department of Eco-safety carried through and co-ordinated the work on compiling their inventory.

**Along the stream of River Tisa the following objects and areas of natural reserve stock are situated:**

«Apshinetsky» - a hydrological reservation of state level; its area is 105 ha, Yasynya State Forest and Hunting Organization. The coniferous virgin forest and a dense network of water sources, giving rise to mountain streams which drain into River Chorna Tisa, are under protection.

«Radyansky Karpaty» - a forest reservation of local level. Its total area is 648.9 ha. It is a highly productive beech virgin forest with a considerable admixture of field maple, sycamore and other tree species. It is a gene pool for obtaining a stable forest tree seed base. It is of scientific and economic importance.

«Stanislav» - a botanical reservation of local level. Its area is 5.3 ha, Yasynya State Forest and Hunting Organization. Rare plants having been entered the Red Data Book of Ukraine are protected.

«Andromeda» - a botanical natural monument of local level. Its area is 6.0 ha, Chorna Tysa village, «Markovets» natural landmark. The sphagnum bog and a number of rare plant species are protected.

«Chorna Tysa» - an ichtyological reservation of local level. Its extent is 39.3 km2, Yasynya State Forest and Hunting Organization, Svydovets and Stanislav forestries. Rare valuable fish species are under protection.

**Conservation measures proposed but not yet implemented**: The present natural reserve stock of the River Tisa headwaters requires a certain degree of optimization. First of all, it is necessary to expand the territory of the Carpathian Biosphere Reserve (CBR) in the vertical gradient, to include subalpine and alpine vegetation types. It is worthwhile also to expand the present reserve massifs. A new reserve massif should be organized in the Svydovets, where now only a few small reservations are scattered in the area. As the last stage, it seems necessary to unite the CBR massifs, today isolated, into a single functional structure through the system of ecological corridors.

**Current scientific research and facilities**: The scientific research in the region concerns mainly biodiversity studies in the Carpathian Biosphere Reserve (CBR) and a series of other projects, which, to a certain extent, embrace the Upper Tisa Region. Among these there are the following which seem to be the most important:

1. Conservation of Carpathian biodiversity (Global Ecological Fund, 1994-1996). Performers: CBR; Institutes of Botany and Zoology, NAS, Ukraine; Institute of Carpathian Ecology, NAS, Ukraine; Universities of Lviv, Uzhgorod, Chernivtsi.
2. Red Data List of Transcarpathia: threatened plant species and communities (Systematic Association of Great Britain, 1995-1997). Performers: V. V. Kricsfalusy, G. B. Budnikov, A. V. Mihály.
3. Ramsar Wetland Area in the Upper Tisa Region (Ramsar Small Grants Fund, 1998). Performers: Ruthenia Carpathian Ecological Club.

**Current conservation education**: Ecological education has become especially active recently. Among the most important actions there are those carried on by the «Ruthenia» Carpathian EcoClub, the «Eco-Eks» non-governmental organization and the «Karpaty» EcoClub.

The «Ruthenia» Carpathian EcoClub (V. V. Kricsfalusy, A. Ye. Lugovoj, V. I. Sabadosh), together with the Regional Forest Department, organized a series of educational seminars for the workers of 4 forestries (about 300 people) of this region, and published a manual titled «Forests of Transcarpathia» (1997). This

activity became possible through the help of the Carpathian Euroregion Development Fund. At the same time practical lessons were organized, as well as the mobile exhibition «Fauna of Transcarpathia and its conservation» (A. Ye. Lugovoj, L. A. Potish) which were sponsored by the ISAR Fund.

In addition, in the regional press (Kárpáti Igaz Szó, Novyny Zakarpattya, Yedinstvo-Plus, Rio-Inform) materials of eco-educational character are being published like, for example, the last series of articles under the general heading «Looking through the pages of the Red Data Book». Seven articles have already been published under that heading: «Beetles», «Butterflies», «Fish», «Amphibians», etc. (author: A. Ye. Lugovoj). Though the articles Transcarpathian nature conservation is addressed at large, at the same time they directly concern River Tisa and its valley.

The «Eco-Eks» NGO organizes All-Ukrainian ecological camps for schoolchildren in the CBR every year. Members of the EcoClub «Karpaty» take part in the work.

**Current recreation and tourism**: The Upper Tisa - Hutsul Land - is the most popular place for tourism in Transcarpathia, due to the diverse relief of the locality, wonderful mountain landscapes with picturesque lakes, slopes of different steepness and length for skiing, interesting walking and water routes, etc. There are a lot of tourist centres and shelters in Hutsul land. In Rahiv there is the «Tisza» tourist center (its shelter in the mountains is named «Perelisok»), in the village of Kobyletska Polyana one can find the «Trembita» tourist centre, in Yasinya there is «Edelveis» with two branches («Hoverla» and «Drahobrat»), and the «Moldova». The construction of two tourist hotels has been launched in Kvasy and Yasinya. The programme of recreation at these centres includes excursions by bus and on foot, skiing in the mountains, etc.

**Jurisdiction**:

Administrative structures of district level:
Rahiv district rada and Rahiv District State Administration
295800 Rahiv, 1 Miru Str.
Tyachiv district rada and Tyachiv District State Administration
295710 Tyachiv, 30 Nezalezhnosti Sq.
Administrative structures of regional level:
Regional Rada and Regional State Administration
294008 Uzhgorod, 4 Narodna Sq.
Regional Forest Department
294008 Uzhgorod, 4 Narodna Sq.
Regional Department of Agriculture and Food Products
294008 Uzhgorod, 2A Kotsubinsky Str.
State Department of Eco-safety in Transcarpathian Region
294008 Uzhgorod, 4 Narodna Sq.

**Management authority**: The objects and areas of the natural reserve stock belong to the following administrative structures:

- the Carpathian Biosphere Reserve is under the Ministry of Natural Environment and Nuclear Safety of Ukraine;
- the other objects - forest reservations and natural monuments - are under the protection of forest enterprises forming a part of the State Forest Committee;
- mineral sources outside the state forests are under the protection of agricultural enterprises and village radas.

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## *Appendix*

Hydrological values:

Table 1.
**Chemical characteristics of the water of River Tisa**

| Components(мg/l) | Site of samples | | | |
|---|---|---|---|---|
| | Rahiv 1 Км up | Rahiv 1 Км down | V.Bychkiv | Tyachiv |
| Biological Oxygen Demand | 1.7–3.6 | 2.3–7.6 | 1.6–6.6 | 1.6–5.8 |
| Ammonium | 0.0–0.17 | 0.0–0.9 | 0.0–0.7 | 0.0–0.7 |
| Nitrite | 0.000–0.014 | 0.000–0.017 | 0.000–0.040 | 0.000–0.060 |
| Nitrate | 0.80–6.00 | 1.00–7.00 | 1.00–5.65 | 1.00–6.60 |
| SSAS | 0.000–0.017 | 0.000–0.080 | 0.000–0.040 | 0.000–0.004 |
| Chloride | 7.1–14.5 | 7.1–14.2 | 6.2–17.7 | 10.3–56.8 |
| Sulphate | 16.0–31.3 | 16.0–29.5 | 11.7–36.0 | 11.7–32.0 |
| Iron | 0.10–0.22 | 0.20–0.90 | 0.20–1.10 | 0.10–0.55 |
| Phosphates | 0.21–0.58 | 0.32–0.80 | 0.11–0.50 | 0.19–0.50 |

Table 2.
**Water level changes**

| Place of observation | Water levels | | Amplitude of water level changes |
|---|---|---|---|
| | lowest minimum | highest maximum | |
| 1. River Tisa - Rahiv | 13 см | 255 см | 268 см |
| 2. River Tisa - Dilove | 27 см | 400 см | 427 см |
| 3. River Tisa - V.Bychkiv | 30 см | 448 см | 478 см |
| 4. River Tisa - Tyachiv | 54 см | 694 см | 748 см |

## *Annotated list of vascular plants*

Aceraceae

Acer campestre L.
A. platanoides L.
A. pseudoplatanus L.
A. tataricum L.

Adoxaceae

Adoxa moschatellina L.

Alismataceae

Alisma lanceolatum With.
A. plantago-aquatica L.
Sagittaria sagittifolia L.

Amaranthaceae

Amaranthus hybridus L.
A. retroflexus L.
A. lividus L.

Amaryllidaceae

Galanthus nivalis L.
Leucojum aestivum L.
Leucojum vernum L.
Narcissus angustifolius Curt.

Apiaceae

Aegopodium podagraria L.
Aethusa cynapium L.
Angelica sylvestris L.
Anthriscus nitida Garcke.
A. sylvestris (L.) Hoffm.
Astrantia major L.
Bupleum longifolium L.
B. ranunculoides L.
Carum carvi L.
Chaerophyllum aromaticum L.
Ch. bulbosum L.
Ch. cicutaria Vill.
Ch. temulum L.
Cnidium dubium (Schkuhr) Thell.
Conium maculatum L.
Eryngium campestre L.
E. planum L.
Ferulago sylvatica (Bess.) Reichb.
Heracleum carpaticum Porc.
H. palmatum Baumg.
H. sphondylium L.
Laser trilobum (L.) Borkh.
Laserpitium alpinum Waldst. et Kit.
L. latifolium L.
L. pruthenicum L.
Libanotis montana Crantz.
Ligusticum mutellina (L.) Crantz.
Oenanthe aquatica (L.) Poir.
O. banatica Heuff.
O. silaifolia Bieb.
Peucedanum carvifolia Vill.
P. cervaria (L.) Lapeyr.
P. oreoselinum (L.) Moench
P. palustre L.
Pimpinella major (L.) Huds.
P. saxifraga L.
Pleurospermum austriacum (L.) Hoffm.
Sanicula europaea L.
Selinum carvifolia (L.) L.

Apocynaceae

Vinca minor L.

Araceae

Arum intermedium Schur
A. maculatum L.
Calla palustris L.

Araliaceae

Hedera helix L.

Aristolochiaceae

Aristolochia clematitis L.
Asarum europaeum L.

Asclepiadaceae

Vincetoxicum hirundinaria Medik.

Aspleniaceae

Asplenium adiantum-nigrum L.
A. cuneifolium Viv.
A. ruta-muraria L.
A. septentrionale (L.) Hoffm.
A. trichomanes L.
A. viride Huds.
Phyllitis scolopendrium (L.) Newm.

Asteraceae

Achillea carpatica Blocki ex Dubovik
A. distans Waldst. et Kit.
A. millefolium L.
A. setacea Waldst. et. Kit.
A. stricta Schleich.
A. schurii Sch. Bip.
Achyrophorus maculatus (L.) Scop.
A. uniflorus (Vill.) Bluff.
Adenostyles alliare (Gouan) Kern.
Ambrosia artemisiifolia L.
Antennaria dioica (L.) Gaertn.
A. carpatica (Wahlenb.)R. Br.
Anthemis arvensis L.
A. carpatica Waldst. et Kit.
A. cotula L.
A. subtinctoria Dobrocz.
Aposeris foetida (L.) Less.
Arctium lappa L.
A.minus Bernh.
A. tomentosum Mill.
Arnica montana L.
Artemisia absinthium L.
A. annua L.
A. scoparia Waldst. et Kit.
A. vulgaris L.
Aster alpinus L.
A. amellus L.
Barkhausia rhoeadifolia Bieb.
B. setosa DC.
Bellis perennis L.
Bidens cernuus L.
B. radiata Thiull.
B. tripartita L.
Carduus biscolorifolius Klok.
C. collinus Waldst. et Kit.
C. crispus L.
C. kerneri Simk.
C. fortior Klok.
Carlina acaulis L.
C. biebersteinii Bernh.
Carpesium cernuum L.
Centaurea carpatica (Porc.) Porc.
C. cyanus L.
C. diffusa Lam.
C. jacea L.
C. kotschyana Heuff.
C. marmarosiensis (Jav.) Czer.
C. mollis Waldst. et Kit.
C. pannonica (Heuff.) Hayek.
C. phrygia L.
C. rhenana Boreau.
C. scabiosa L.
C. stricta Waldst. et Kit.
Chondrilla juncea L.
Cichorium intybus L.
Cirsium arvense (L.) Scop.
C. canum (L.) All.
C. erisithales (Jacq.) Scop.
C. oleraceum Scop.
C. palustre (L.) Scop.
C. setosum Bieb.
C. vulgare (Savi) Ten.
C. waldsteinii Rouy
Crepis biennis L.
C. capillaris (L.) Wallr.
C. conyzifolia (Gouan) Dalla Torre
C. paludosa (L.) Moench
C. tectorum L.
C. tristis Klok.
Cyclachaena xanthiifolia (Nutt.) Fresen.
Doronicum austriacum Jacq
D. carpaticum (Griseb et Schenk.) Nym.
D. clusii (All.) Tausch.
D. longifolium Griseb et Schenk.
D. hungaricum (Sadl.) Reichenb.
Echinops exaltatus Schrad.
E. sphaerocephalus L.
Erechtites hieracifolius (L.) Rafin
Erigeron acer L.
E. alpinus L.
E. canadensis L.
Eupatorium cannabinum L.
Filago arvensis L.
F. germanica L.
F. minima Fries
Galinsoga ciliata (Raf.) Blake
G. parviflora Cav.
Gnaphalium luteo-album L.
G. norvegium Gunn.
G. supinum L.
G. sylvaticum L.
G. uliginosum L.
Helichrysum arenarium (L.) DC.
Hieracium acutisquamum Naeg. et Peter

H. alpinum L.
H. amaureuilema (Naeg. et Peter) Juxip
H. apatelium Naeg. et Peter
H. apiculatum Tausch
H. atrellum (Zahn) Juxip.
H. aurantiacum L.
H. auricula Lam. et DC.
H. aquilonare (Naeg. et Peter) Juxip.
H. bupleurifolioides )Zahn) Juxip.
H. bupleurifolium Tausch
H. colliniforme (Naeg. et Peter) Juxip
H. conium Arv.-Touv.
H. decipiens Tausch
H. festinum Jord.
H. fritzei F.Schultz
H. floribundum Wimm. et Grab.
H. galbanum (Dahlst.) Norrl.
H. gentile Jord.
H. glaucescens Bess.
H. gymnogenum (Zahn. )Juxip.
H. knaffi (Eelak) Juxip
H. krasanii Woloszcz.
H. laevigatum Willd.
H. lomnicense Woloszcz.
H. marginale (Varp. Et Peter.) Juxip.
H. megalomastix (Naeg. et Peter) Juxip.
H. melanocephalum Tausch
H. mukacevense Juxip.
H. nigrescens Juxip.
H. onegense (Norrl.) Norre.
H. pellucidum Laest.
H. pilosella L.
H. pocuticum Woloszcz.
H. plicatulum (Zahn) Juxip
H. praecurrens Vukot.
H. rehmanii (Naeg. et Peter) Juxip.
H. regiomontanum Naeg. et Peter
H. rigidum C. Hartm.
H. rohascense Kit.
H. rojowskii Rehm.
H. roxolanicum Rehm.
H. rubricymigerum Naeg. et Peter
H. scabiosum (Surde) Juxip.
H. serratifolium Jord.
H. spathopyllum Naeg. et Peter
H. sterromastix (Naeg. et Peter) Juxip.
H. subnigrescens (Fries) Juxip.
H. sudetorum (Naeg. et Peter) Juxip.
H. tatrense (Naeg. et Peter) Juxip.
H. transsilvanicum (Heuff.) Juxip.
H. tricheilem (Naeg. et Peter) Juxip.
H. umbellatum L.
H. umbelliferum Naeg. et Peter
H. vagum Jord.
H. villosum Jacq.
H. virgultorum Jord.
H. volhynicum Naeg. et Peter
H. wimmeri Uechtr.
Homogyna alpina (L.) Cass.
Hypachoeris glabra L.
H. radicata L.
Inula brittanica L.
I. ensifolia L.
I. helenium L.
I. hirta L.
I. salicina L.
I. vulgaris (Lam.) Trevisari
Lactuca serriola Torner
L. stricta Waldst. et Kit.
Lapsana communis L.
Leontodon autumnalis L.
L. croceus Haenke
L. danubialis Jacq.
L. gutzulorum V.Vassil.
L. pseudotaraxaci Schur
L. repens Schur
L. schischkinii V.Vassil.
Leontopodium alpinum L.
Leucanthemum vulgare Lam.
Linosyris vulgaris Cass.
Matricaria matricarioides (Less.) Porter ex Britt.
M. recutita L.
Mycelis muralis (L.) Reichb.
Onopordon acanthium L.
Petasites albus (L.) Gaertn.
P. hybridus (L.) Gaertn.
P. kablikianus Tausch.
Picris hieracioides L.
Ptarmica lingulata DC.
P. vulgaris Chornaw. ex DC.
Pulicaria vulgaris Gaertn.
Pyrethrum clusii Fisch. ex Reichb.
P. corymbosum (L.) Schrank
Saussurea alpina (L.) DC.
S. discolor (Willd.) DC.
S. porcii Degen
Scariola viminea (L.) J. et C. Presl.
Scorzonera humilis L.
S. rosea Waldst. et Kit.
Senecio aquaticus Huds.
S. barbareifolium Krock.
S. capitatus (Wahlb.) Steud.
S. carniolicus Willd.
S. carpaticus Herbich.
S. erucifolius L.

S. fluviatilis Wallb.
S. fuchsii Gmel.
S. jacobaea L.
S. nemorensis L.
S. paludosus L.
S. paluster (L.) DC.
S. papposus (Reichb.) Less.
S. pratensis (Hoppe) DC.
S. rivularis (Waldst. et Kit.) DC.
S. subalpinus Koch
S. sylvaticus L.
S. vernalis Waldst. et Kit.
S. viscosus L.
S. vulgaris L.
Serratula intermis Gilib.
Solidago alpestris Waldst. et Kit.
S. canadensis L.
S. virgaurea L.
Sonchus arvensis L.
S. asper (L.) Hill.
S. oleraceus L.
S. palustris L.
Stenactis annua (L.) Nees.
Tanacetum vulgare L.
Taraxacum alpinum (Hoppe) Hegetschw. et Heer.
T. fontanum Hand-Mazz.
T. nigricans (Kit.) Reichb.
T. officinale Web. et Wigg.
Telekia speciosa (Schreb.) Baumg.
Tragopogon dubius Scop.
T. transcarpaticus Klok.
Tripleospermum inodorum (L.) Sch. Bip.
Tussilago farfara L.
Xanthium albinum (Widder) H.Scholz
X. spinosum L.
X. strumarium L.

Athyriaceae

Athyrium filix-femina (L.) Roth.
A. distentifolium Tausch ex Opiz
Cystopteris fragilis (L.) Bernh.
C. montana (Lam.) Desv.
C. regia (L.) Desv.
C. sudetica A. Br. et Milde.

Balsaminaceae

Impatiens noli-tangere L.
I. parviflora DC.

Berberidaceae

Berberis vulgaris L.

Betulaceae

Alnus glutinosa (L.) Gaertn.
A. incana (L.) Willd.
Betula pendula Roth.
Carpinus betulus L.
Corylus avellana L.

Blechnaceae

Blechnum spicant (L.) Roth.

Boraginaceae

Anchusa barrelieri (All.) Vitm.
A. italica Retz.
A. officinalis L.
A. pseudochroleuca Shost.
Asperugo procumbens L.
Cerinthe minor L.
Cynoglossum officinale L.
Echium vulgareL.
Lappula myosotis Moench
Lithospermum arvense L.
L. officinale L.
L. purpureo-coeruleum L.
Lycopsis arvensis L.
Myosotis alpestris F.W.Schmidt
M. arvensis (L.) Hill
M. caespitosa K.F.Schultz
M. discolor Pers.
M. nemorosa Bess.
M. ramosissima Rochel ex Schult.
M. stricta Link ex Roem. et Schult.
M. strigulosa Reichb.
M. sylvatica (Ehrh.) Hoffm.
Omphalodes scorpioides (Haenke) Schrank
Pulmonaria filarszkyana Jav.
P. mollissima A.Kerner
P. obscura Dum.
P. rubra Schott.
Stophiostoma sparsiflorum (Mikan) Turcz.
Symphytum besseri Zaverucha
S. cordatum Waldst. et Kit.
S. officinale L.
S. popovii Dobrocz.

S. tanaicense Stev.

Brassicaceae

Alliaria petiolata (Bieb.) Cavara et Grande
Alyssum desertorum Stapf.
A. hirsutum Bieb.
Arabidopsis thaliana (L.) Heynh.
Arabis alpina L.
A. hirsuta (L.) Scop.
Barbarea stricta Andrz.
B. verna (Miller) Ascherson
B. vulgaris R. Br.
Biscutella laevigata L.
Berteroa incana (L.) DC.
Brassica campestris L.
Bunias erucago L.
B. orientalis L.
Camelina alyssum (Mill.) Thell.
C. albiflora Kotschy
Capsella bursa-pastoris L.
Cardamine amara L.
C. graeca L.
C. dentata Schulz
C. flexuosa With.
C. hirsuta L.
C. impatiens L.
C. matthiolii Moretti
C. opizii Presl.
C. palustris Peterm.
C. parviflora L.
C. pratensis L.
C. rivularis Schur
C. trifolia L.
Cardaminopsis arenosa (L.) Hayek
C. halleri (L.) Hayek
C. neglecta (Schult.) Hayek
C. ovirensis (Wulfen) Thell. ex Jáv.
C. petraea (L.) Hiit.
Conringia orientalis (L.) Andrz.
Dentaria bulbifera L.
D. glandulosa Waldst. et Kit.
Descurainia sophia (L.) Schur
Draba aizoides L.
D. carinthiaca Hoppe
Erophila krockeri Andrz.
E. verna (L.) Bess.
Eruca sativa Mill.
Erysimum cheiranthoides L.
E. cuspidatum (Bieb.) DC
Hesperis candida Kit.
H. matronalis L.
Lepidium campestre (L.) R.Br.
L. densiflorum Schrad.
L. draba L.
L. perfoliatum L.
L. ruderale L.
Lunaria rediviva L.
Nasturtium officinale (L.) R.Br.
Neslea paniculata (L.) Desv.
Psilolema calycinum (L.) C.A.Mey.
Raphanus raphanistrum L.
R. sativum L.
Rorippa amphibia (L.) Bess.
R. palustris L.
R. prostrata (Desv.) Schinz.
R. pyrenaica (Lam.) Reich.
R. sylvestris (L.) Bess.
Sinapis arvensis L.
Sisymbrium altissimum L.
S. loeselii L.
S. officinalis (L.) Scop.
S. orientale L.
S. strictissimum L.
Thlaspi alliaceum L.
T. arvense L.
T. daccium Heuff.
Turritis glabra L.

Butomaceae

Butomus umbellatus L.

Callitrichaceae

Callitriche cophocarpha Sendtner.

Campanulaceae

Adenophora liliifolia (L.) Bess.
Campanula abietina Griseb. et Schenk.
C. alpina Jacq.
C. bononiensis L.
C. carpatica Jacq.
C. cervicaria L.
C. glomerata L.
C. kladniana (Schur) Witasek
C. latifolia L.
C. patula L.
C. persicifolia L.
C. polymorpha Witasek
C. rapunculoides L.
C. sarrata (Kit.) Hendrych.
C. trachelium L.
Jasione montana L.

Phyteuma orbiculare l.
Ph. spicatum L.
Ph. tetramerum Schur
Ph. vagneri Kern.

Cannabaceae

Humulus lupulus L.

Caprifoliaceae

Linnaea borealis L.
Lonicera caerulea L.
L. nigra L.
L. xylosteum L.
Sambucus ebulus L.
S. nigra L.
S. racemosa L.
Viburnum opulus L.

Caryophyllaceae

Agrostemma githago L.
Arenaria brevifolia Gilib.
Cerastium arvense L.
C. caespitosum Gilib.
C. cerastoides (L.) Britt.
C. dubium (Bast.) Guepin
C. fontanum Baumg.
C. glomeratum Thuill.
C. lanatum Lam.
C. pumilum Curt.
C. sylvaticum Waldst. et Kit.
C. tauricum Spreng.
Coronaria flos cuculi (L.) A.Br.
Cucubalus baccifer L.
Dianthus armeria L.
D. carthusianorum L.
D. carpaticus Woloszcz.
D. commutatus (Zapal.) Klok.
D. compactus Kit.
D. deltoides L.
D. glabriusculus (Kit.) Borb.
D. pseudobarbatus Bess.
Elisanthe noctiflora (L.) Rupr.
E. zawadskii (Herbich) Klok.
Eremogone micradenia (P. Smirn) Ikonn.
Gypsophila muralis L.
G. paniculata L.
Heliosperma carpaticum (Zapal.) Klok.
Holosteum umbellatumL.
Kohlrauschia prolifera Kunth
Melandrium album (Mill.) Garcke
M. dioicum (L.) Coss. et Germ.
M. nemorale (Heuff.) A.Br.
Minuartia oxypetala (Woloszcz.) Kulcz.
M. zarencznyi (Zapal.) Klok.
Moehringia muscosa L.
M. trinervia (L.) Clairv.
Myosoton aquaticum (L.) Moench
Sagina nodosa (L.) Fenzl.
S. procumbens L.
S. saginoides (L.) Karst.
S. subulata (Sw.) Presl.
Saponaria officinalis L.
Scleranthus annuus L.
S. perennis L.
S. unicatus Schur
Silene anglica L.
S. carpatica (Zapal.) Czopik.
S. dichotoma Ehrh.
S. dubia Herbich
S. fabaria (L.) Sibth et Smith
S. jundzilli Zapal.
S. nemoralis Waldst. et Kit.
S. nutans L.
S. vulgaris (Moench) Garcke
Spergula vulgaris Boenn.
Spergularia campestris (L.) Aschers.
S. marina (L.) Griseb.
Stellaria alsine Grimm
S. barthiana Schur
S. diffusa Willd.
S. graminea L.
S. holostea L.
S. media (L.) Vill.
S. nemorum L.
S. palustris Retz.
Viscaria vulgaris Bernh.

Celastraceae

Euonymus europaeae L.

Ceratophyllaceae

Ceratophyllum demersum L.
C. submersum L.

Chenopodiaceae

Atriplex nitens Schk.
A. oblongifolia Waldst. et Kit.
A. patula L.

Chenopodium album L.
Ch. bonus-henricus L.
Ch. botrys L.
Ch. foliosum Aschers.
Ch. hybridum L.
Ch. glaucum L.
Ch. murale L.
Ch. polyspermum L.
Ch. urbicum L.
Ch. viride L.
Polycnemum heuffelli Lang.
Salsola pestifera Nels.

Cistaceae

Helianthemum grandiflorum (Scop.) Lam. et DC.

Convolvulaceae

Calystegia sepium (L.) R. Br.
Convolvulus arvensis L.

Cornaceae

Cornus mas L.
Swida sanguinea (L.) Opiz

Crassulaceae

Sedum acre L.
S. alpestre Vill.
S. annuum L.
S. atratum L.
S. carpaticum G. Reuss
S. sexangulare L.
Sempervirum montanum L.
Jovibarba preissiana (Domin) Omelcz. et Czopik
Rodiola rosea L.

Cucurbitaceae

Bryonia alba L.
B. dioica Jacq.
Echinocystis lobata (Michx.) Torr.
Sicyos angulata L.

Cupressaceae

Juniperus communis L.
J. excelsa Bieb.
J. sabina L.
J. sibirica Burgsd.

Cuscutaceae

Cuscuta campestris Yunck.
C. epilinum Weiche
C. epithymum Murr.
C. europaea L.
C. lupuliformis Koch.
C. viciae Koch.

Cyperaceae

Blysmus compressus (L.) Panz. ex Link.
Bulboschoenus maritimus (L.) Palla
Carex acuta Good.
C. acutiformis Ehrh..
C. brizoides L.
C. buekii Wimm.
C. caespitosa L.
C. canescens L.
C. contiqua Hoppe
C. digitata L.
C. divulsa Stokes
C. echinata Murr.
C. flacca Schreb.
C. flava L.
C. hirta L.
C. inflata Huds.
C. lasiocarpa Ehrh.
C. leporina L.
C. muricata L.
C. otrubae Podp.
C. pallescens L.
C. panicea L.
C. pilosa Scop.
C. praecox Schreb.
C. pseudocyperus L.
C. remota L.
C. riparia Curt.
C. sylvatica Huds.
C. tomentosa L.
C. umbrosa Host.
C. vaginata Tausch.
C. verna Chaix.
C. vesicaria L.
C. vulgares Fries.
C. vulpina L.
Cyperus flavescens (L.) Beauv. ex Reicht.
Eleocharis acicularis (L.) R. Br.
E. carniolica Koch

E. intersita Zinserl.
E. palustris (L.) R.Br. s str.
E. uniglumis (Link.) Schult.
Pycreus flavescens (L.) Beauv. ex Reichb.
Schoenoplectus lacustris (L.) Palla
Schoenus ferrugineus L.

Dipsacaceae

Dipsacus laciniatus L.
D. pilosus L.
D. sylvestris Huds.
Knautia arvensis (L.) Coult.
K. dipsacifolia (Host) Gren. et Godr.
Scabiosa columbaroa L.
S. ochroleuca L.
S. opaca Klok.
Succisa pratensis Moench
Succisella inflexa (Klok.) G. Beck.

Droseraceae

Drosera rotundifolia L.

Dryopteridaceae

Dryopteris assimilis S.Walker
D. carthusiana (Vill.) H.P. Fuchs
D. cristata (L.) A. Gray
D. filix-mas (L.) Schott.
D. lanceolato-cristata (Hoffm.) Asson
Gymnocarpium dryopretis (L.) Newm.
G. robertianum (Hoffm.) Newm.
Phegopteris connectilis (Michx.) Watt.
Polystichum aculeatum (L.) Roth.
P. braunii (Spenn.) Fée
P. lonchitis (L.) Roth

Elatinaceae

Elatine alsinastrum L.
E. ambigua Wight.
E. hydropiper L.

Empetraceae

Empetrum nigrum L.

Equisetaceae

Equisetum arvense L.
E. fluviatile L.
E. hiemale L.
E. telmateia Ehrh.
E. palustre L.
E. pratense Ehrh.
E. ramosissimum Desf.
E. sylvaticum L.

Ericaceae

Andromeda polifolia L.
Calluna vulgaris (L.) Hill.
Ledum palustre L.
Loiseleuria procumbens (L.) Desv.
Rhododendron kotschy Simonk.

Euphorbiaceae

Euphorbia amygdaloides L.
E. angulata Jacq.
E. carniolica Jacq.
E. carpatica Woloszcz.
E. cyparissias L.
E. helioscopia L.
E. lingulata Heuff.
E. lucida Waldst. et Kit.
E. palustris L.
E. peplus L.
E. platyphyllos L.
E. purpurata Thuill.
E. serrulata Thuill.
E. sojakii (Chrtek. et Køisa) Dubovik
E. tristis Bieb. ex Bess.
E. villosa Waldst. et Kit.
E. virgata Waldst. et Kit.
Mercurialis perennis L.

Fabaceae

Anthyllis affinis Brittinger
A. alpestris Reichb.
Astragalus cicer L.
A. glycyphyllos L.
A. krajinae Domin
Coronilla elegans Panc.
C. varia L.
Dorycnium herbaceum Vill.
D. suffruticosum Vill.
Hedyzarum hedyzaroides (L.) Schinz et Thell.
Genista elata (Moench) Wench.

G. germanica L.
G. oligosperma (Andre) Simk.
G. tinctoria L.
Lathyrus hirsutus L.
L. laevigatus (Waldscht. et. Kit.) Gren.
L. niger (L.) Bernh.
L. pratensis L.
L. sylvestris L.
L. transsilvanicus (Spreng.) Reichb.
L. tuberosus L.
L. vernus (L.) Bernh.
Lembotropis nigricans (L.) Griesb.
Lens cullinaris Medic.
Lotus corniculatus L.
L. tenuis waldscht. et Kit.
Medicago falcata L.
M. lupulina L.
Melilotus albus Medik.
M. officinalis (L.) Pall.
Ononis arvensis L.
Oxytropis carpatica Uechtr.
Sarothamnus scoparius (L.) Koch.
Trifolium alpestre L.
T. arvense L.
T. aureum Poll.
T. campestris Schreb.
T. dubium Sibth.
T. montanum L.
T. medium L.
T. ochroleucum Huds.
T. pannonicum Jacq.
T. pratense L.
T. repens L.
T. rubens L.
T. spadicetum L.
Vicia angustifolia L.
V. cassubicus L.
V. cracca L.
V. dumetorum L.
V. hirsuta (L.) S.F. Gray
V. lathyroides L.
V. pannonica Crantz.
V. sordida Waldst. et Kit.
V. sylvatica L.
V. tetrasperma (L.) Moench
V. villosa Roth.

Fagaceae

Fagus sylvatica L.
Quercus cerris L.
Q. dalechampii Ten.
Q. petraea (Mattuschka) Liebl.
Q. polycarpa Schur
Q. robur L.

Gentianaceae

Centaurium pulchellum (Swartz) Druce
Gentiana asclepiadea L.
G. axillaria (F.M.Schmid) Murb.
G. carpatica Wettst.
G. ciliata L.
G. cruciata L.
G. excisa C.Presl.
G. lacciniata Kit.
G. lingulata C.A.Agardh.
G. lutea L.
G. pneumonanthe L.
G. praecox A. et J.Kerner
G. punctata L.
G. verna L.
Menyanthes trifolia L.
Swertia alpestris Baumg.
S. punctata Baumg.

Geraniaceae

Erodium cicutarium (L.) L'Herit
Geranium alpestre Schur
G. columbinum L.
G. dissectum L.
G. macrorrhizum L.
G. molle L.
G. palustre L.
G. phaeum L.
G. pratense L.
G. pusillum L.
G. pyrenaicum Burm
G. robertianum L.
G. sanguineum L.
G. sylvaticum L.

Halorrhagidaceae

Myriophyllum spicatum L.
M. verticillatum L.

Hippuridaceae

Hippuris vulgaris L.

Huperziaceae

Huperzia selago (L.) Bernh. ex Schrank et Mart.

Hydrocaryaceae

Trapa natans L.

Hydrocharitaceae

Hydrocharis morsus-ranae L.
Stratiotes aloides L.

Hypericaceaea

Hypericum alpigenum Kit.
H. hirsutum L.
H. maculatum Crantz
H. montanum L.
H. perforatum L.
H. tetrapterum Fries.

Hypolepidaceae

Pteridium aquilinum (L.) Kuhn.

Iridaceae

Crocus banaticus J. Gay
C. heuffelianus Herb.
Iris germanica L.
I. hungarica Waldst. et Kit
I. pseudacorus L.
I. graminea L.
I. pseudocyperus Schur
I. sibirica L.
Sisyrinchium angustifolium Mill.

Juncaceae

Juncus articulatus L.
J. atratus Krock.
J. bufonius L.
J. bulbosus L.
J. castaneus Smith.
J. compressus Jacq.
J. effusus L.
J. fuscoater Schreb.
J. gerardii Loisel.
J. inflexus L.
J. macer S.F.Gray
J. obtisulflorus Ehrh. ex Hoffm.
J. trifidus L.
J. triglumis L.
Luzula flavescens (Host.) Gaudin
L. luzuloides (Lam.) Dandy et Wilm.
L. multiflora (Ehrh.) Lejeune
L. pallescens (Wahlb.) Bess.
L. pilosa (L.) Willd.
L. spicata DC.
L. subpillosa (Gilib.) V.Krecz.
L. sudetica (Willd.) DC.
L. sylvatica (Huds.) Gaudin

Juncaginaceae

Scheuchzeria palustris L.
Triglochin palustres L.

Lamiaceae

Acinos baumgartenii (Simk.) Klok.
A. thymoides Moench
Ajuga genevensis L.
A. reptans L.
Ballota nigra L.
Betonica officinalis L.
Chaiturus marrubiastrum (L.) Reichb.
Clinopodium vulgare L.
Elsholtzia ciliata (Thunb.) Hyl.
Galeobdolon luteum Huds.
Galeopsis bifida Boenn.
G. pubescens Bess.
G. speciosa Mill.
G. tetrahit Mill.
Glechoma hederacea L.
G. hirsuta Waldst. et Kit.
Lamium album L.
L. laevigatum L.
L. purpureum L.
Leonurus cardiaca L.
L. quinquelobatus Gilib.
Lycopus europaeus L.
Melittis mellissophyllum L.
Mentha aquatica L.
M. arvensis L.
M. longifolia (L.) L.
M. pulegium L.
M. verticillata L.
Nepeta cataria L.
Origanum vulgare L.
Prunella grandiflora (L.) Scholl.
P. laciniata (L.) L.
P. vulgaris L.
Salvia glutinosa L.
S. pratensis L.
S. verticillata L.

Scutellaria galericulata L.
S. hastifolia L.
Stachys alpina L.
S. annua (L.) L.
S. germanica L.
S. palustris L.
S. recta L.
S. sylvatica L.
Teucrium chamaedrys L.
Thymus alternans Klok.
Th. cyrcumcinctus Klok.
Th. enervius Klok.
Th. subalpestris Klok.
Th. ucrainicus (Klok. et Shost.) Klok.

Lemnaceae

Lemna gibba L.
L. minor L.
L. trisulca L.

Lentibulariaceae

Pinguicula alpina L.
P. vulgaris L.
Utricularia bremii Heer.
U. vulgaris L.

Liliaceae

Allium angulosum L.
A. montanum F.W.Schmidt
A. oleraceum L.
A. scorodoprasum L.
A. sibiricum L.
A. ursinum L.
A. victorialis L.
A. vineale L.
Anthericum ramosum L.
Asparagus tenuifolius Lam.
Colchicum autumnale L.
Convallaria majalis L.
Erythronium dens-canis L.
Fritillaria meleagris L.
Gagea lutea (L.) Ker. - Gawl.
G. minima (L.) Ker. - Gawl.
G. pratensis (Pars.) Dum.
G. spathacea (Hayne) Salisb.
G. vileosa (Bieb.) Duby
Leopoldia comosa (L.) Parl.
Lilium bulbiferum L.
L. martagon L.
Lloydia serotina (L.) Reichb.
Majanthemum bifolium (L.) F.W.Schmidt
Muscari racemosum L.
M. transsilvanicum Schur
Ornithogalum boucheanum (Knuth.) Aschers.
O. gussonei Ten.
O. umbellatum L.
Paris quadrifolia L.
Polygonatum multiflorum (L.) All.
P. officinale (L.) All.
P. verticillatum (L.) All.
Scilla subtriphylla (Schur) Dom.
Streptopus amplexifolius (L.) DC.
Veratrum album L.

Linaceae

Linum catharticum L.
L. extraaxillare Kit.
L. trigynum L.

Loranthaceae

Loranthus europaeus Jacq.
Viscum album L.

Lycopodiaceae

Diphasium alpinum (L.) Rothm.
Lycopodium annotinum L.
L. clavatum L.

Lythraceae

Lythrum hyssopifolia L.
L. salicaria L.
L. virgatum L.
Peplis portula L.

Malvaceae

Abutilon teophrasti Medik.
Althaea officinalis L.
Hibiscus trionum L.
Lavatera trimestris L.
Malva crispa (L.) L.
M. excisa Reichb.
M. mauritania L.
M. neglecta Wallr.
M. rotundifolia L.

Marsileaceae

Marsilea quadrifolia L.

Monotropaceae

Hypopithys monotropa Crantz

Nymphaeaceae

Nuphar luteum (L.) Sm.
Nymphaea alba L.
N. candida Presl.

Onocleaceae

Matteuccia struthiopteris (L.) Tod.

Oleaceae

Fraxinus angustifolia Vahl.
F. excelsior L.
F. ornus L.
Ligustrum vulgare L.

Onagraceae

Chamerion angustifolium (L.) Scop.
C. dodenaei (Vill.) Wimm.
Circaea alpina L.
C. intermedia Ehrh.
C. lutetiana L.
Epilobium alpestre (Jacq.) Krock.
E. anagallidifolium Lam.
E. collinum C.C.Gmel.
E. dominii M.Pop.
E. hirsutum L.
E. montanum L.
E. nutans F.W. Schmidt
E. palustre L.
E. roseum Schreb.
E. tetragonum L.
Ludwigia palustris (L.) Ell.
Oenothera biennis L.
Oe. parviflora L.
Oe. rubricaulis Klebahn.

Ophioglossaceae

Botrychium lunaria (L.) Sw.
B. matricariifolium A.Br. ex Koch

Orchidaceae

Cephalanthera rubra (L.) Rich.
Epipactis atrorubens (Hoffm.) Schult.
E. helleborine (L.) Crantz.
Listera ovata R.Br.
Neottia nidus-avis (L.) Rich.
Orchis incarnata L.
O. maculata L.
O. majalis Reichb.
O. militaris L.
O. morio L.
O. palustris Jacq.
O. sambucina L.
O. ustulata L.
Platanthera bifolia (L.) Rich.
P. chlorantha (Cust.) Reichb.
Traunsteinera globosa (L.) Reichb.

Orobanchaceae

Orobanche alba Steph.
O. reticulata Wallr.
O. flava Mart.

Oxalidaceae

Oxalis acetosella L.
O. europaea Jord.

Papaveraceae

Chelidonium majus L.
Corydalis bulboza (L.) DC.
C. intermedia (L.) Merat
C. solida (L.) Swartz.
Fumaria officinalis L.
F. schleicheri Soy-Willem.
Papaver rhoeas L.
P. somniferum L.

Pinaceae

Abies alba Mill.
Larix polonica Racib.
Picea abies (L.) Karst.
P. montana Schur
Pinus cembra L.
P. mugo Turra

Plantaginaceae

Plantago alpina L.
P. altissima L.
P. aristata Michx
P. atrara Hoppe
P. indica L.
P. intermedia Gilib.
P. lanceolata L.
P. major L.
P. media L.
P. stepposa Rupr.

Poaceae

Agropyron pectinatum (Bieb.) Beauv.
Agrostis alpina Scop.
A. canina L.
A. gigantea Roth.
A. rupestris All.
A. stolonifera L.
A. tenuis Sibth.
Alopecurusaequalis Sobol.
A. geniculatus L.
A. pratensis L.
Anisantha sterilis (L.) Nevski.
A. tectorum (L.) Nevski.
Anthoxanthum odoratum L.
Apera spica-venti (L.) Beauv.
Arrhenatherum elatius (L.) J. et C.Presl.
Bellardiahloa violacea (Bell.) Chiov.
Beckmannia eruciformis Host
Botryochloa ischaemum (L.) Keng.
Brachypodium pinnatum (L.) Beauv.
B. sylvaticum (Huds.) Beauv.
Briza media L.
Bromus arvensis L.
B. commutatus Schrad.
B. japonicus Thunb.
B. mollis L.
B. secalinus L.
Calamagrostis arundinacea (L.) Roth
C. canescens (Web.) Roth
C. epigeios (L.) Roth
C. pseudophragmites (Hall.) Koel.
C. villosa (Chaix) J.F.Gmell.
Cynodon dactylon (L.) Pers.
Cynosurus cristatus L.
Dactylis glomerata L.
D. polygama Horvát
Danthonia alpina Vest.
Deschampsia flavescenss (L.) Beauv.
D. caespitosa (L.) Beauv.
Digitaria ischaemum (Schreb.) Muehl.
D. pectiniformis (Herard) Tzvel.
D. sanguinalis (L.) Scop.
Echinochloa crus-galli (L.) Beauv.
Elytrigia intermedia (Host) Nevski
E. repens (L.) Desv. ex Nevski
Eragrostis minor Host
E. pilosa (L.) Beauv.
Festuca altissima All.
F. amethystina L.
F. arundinacea Schreb.
F. carpatica Dietr.
F. drymeja Mert. et Koch
F. duriuscula L.
F. fallax Thuill.
F. gigantea (L.) Vill.
F. heterophylla Lam.
F. orientalis (Hack.) V. Krecz. et Borb.
F. ovina L.
F. picta Kit.
F. porcii Hack.
F. pratensis Huds.
F. rubra L.
F. saxatilis Schur
F. supina Schur
F. tenuifolia Sibth.
F. varia Haenke
Glyceria fluitans (L.) R. Br.
G. maxima (C. Hartm.) Holub
G. nemoralis Uechtr. et Koern.
G. plicata Fries
Helictotrichon alpinum (Schmith) Henrard.
H. planiculme (Schrad.) Pilg.
H. pubescens (Huds.) Pilg.
H. versicolor (Vill.) Pilg.
Holcus lanatus L.
H. mollis L.
Hordelymus europaeus (L.) Harz.
Hordeum leporinum Link
H. murinum L.
Koeleria pyramidata (Lam.) Beauv.
Leersia oryzoides (L.) Swartz.
Lerchenfeldia flexuosa (L.) Schur
Lolium perenne L.
Melica nutans L.
M. picta C.Koch
M. transsilvanica Schur
M. uniflora Retz.
Milium effusum L.
Molinia coerulea (L.) Moench
Nardus stricta L.
Oreochloa disticha (Wulf.) Link
Panicum implicatum Scribn.

Phleum alpinum L.
Ph. hirsutum Honck.
Ph. phleoides (L.) Karst.
Ph. pratense L.
Ph. montanum C.Koch
Phragmites communis Trin.
Poa alpina L.
P. angustifolia L.
P. annua L.
P. balfourii Parn.
P. bulbosa L.
P. chaixii Vill.
P. granitica Br.-Bl.
P. media Schur
P. nemoralis L.
P. palustris L.
P. pratensis L.
P. remnannii Aschers. et Graebn.
P. remota Forsell.
P. trivialis L.
P. turfosa Litw.
Puccinellia distans (L.) Parl.
Roegneria canina (L.) Nevski
Sclerochloa dura (L.) Beauv.
Scolochloa festucacea (Willd.) Link.
Sesleria coerulans Friv,
S. heufleriana Schur
Setaria glauca (L.) Beauv.
S. verticillata (L.) Beauv.
S. viridis (L.) Beauv.
Sieglingia decumbens (L.) Bernh.
Stipa pulcherrima C.Koch
Trisetum alpestre (Host) Beauv.
T. ciliare (Kit.) Domin
T. flavescens (L.) Beauv.
Ventenata dubia (Leers) Schultz.
Vulpia myuros (L.) C.C.Gmell.
Zerna aspera (Murr.) Panz.
Z. erecta (Huds.) S.F.Gray
Z. intermis (Leyss.) Lindm.
Z. ramosa (Huds.) Lindm.

Polygalaceae

Polygala comosa Schkuhr.
P. subamata Fritsch
P. vulgaris L.

Polygonaceae

Oxyria digyna (L.) Hill.
Polygonum aviculare L.
P. bistorta L.
P. convolvulus L.
P. dumetorum L.
P. hydropiper L.
P. incanum (F.W.)Schmidt.
P. minus Huds.
P. mite Schrank
P. nodosum Pers.
P. persicaria L.
P. vivparum L.
Rumex acetosa L.
R. acetosella L.
R. alpinus L.
R. carpaticus Zapal.
R. conglomeratus Murr.
R. crispus L.
R. maritimus L.
R. sanquineus L.
R. scutatus L.
R. stenophyllus Ledeb.
R. sylvestris (Lam.) Wallr.
R. thyrsiflorus Fingehr.

Polypodiaceae

Polypodium vulgare L.

Potamogetonaceae

Potamogeton acutifolius Link.
P. berchtoldii Fieb.
P. compressus L.
P. crispus L.
P. gramines L.
P. lucens L.
P. natans L.
P. obtusifolius Mert et Koch
P. pectinatus L.
P. perfoliatus L.
P. praelongus Wulf.
P. pusillus L.
Zannichellia palustris L.

Primulaceae

Anagallis arvensis L.
Hottonia palustris L.
Lysimachia nemorum L.
L. nummularia L.
L. punctata L.
L. vulgaris L.
Primula elatior (L.) Hill

P. farinosa L.
P. halleri J.F.Gmell.
P. minima L.
P. poloniensis (Domin) Fed.
P. vulgaris Huds.
Soldanella hungarica Simonk.
S. montana Willd.
Trientalis europaea L.

Pyrolaceae

Moneses uniflora (L.) Gray
Orthilia secunda (L.) House
Pyrola carpatica Holub et Krisa
P. minor L.
P. rotundifolia L.

Ranunculaceae

Aconitum bucoviense Zapal.
A. firmum Reichb.
A. hosteanum Schur
A. jacquinii Reichb.
A. moldavicum Hacq.
A. nanum Baumg.
A. paniculatum Lam.
A. paniculatum Reichb.
Actaea spicata L.
Anemone narcissiflora L.
A. nemorosa L.
A. ranunculoides L.
A. sylvestris L.
Aquilegia nigricans Baumg.
A. vulgaris L.
Atragene alpina L.
Batrachium aquatile (L.) Dum.
B. foeniculareum (Gilib.) V. Krecz.
B. gilibertii V.Krecz.
Caltha cornuta Schott, Nym. et Kotschy
C. laeta Schott, Nym. et Kotschy
C. palustris L.
Cinicifugs europaea N. Schipcz.
Clematis integrifolia L.
C. recta L.
C. vitalba L.
Consolida orientalis (J. Gay) Schroed.
C. paniculata (Host) Schur
C. regalis S.F. Gray
Ficaria verna Huds.
Helleborus purpurascens Waldst. et Kit.
Hepatica nobilis Mill.
Isopyrum thalictroides L.
Myosurus minimus L.
Nigella arvensis L.
Ranunculus acris L.
R. arvensis L.
R. auricomus L.
R. breyninus Crantz
R. bulbosus L.
R. carparicus Herb.
R. cassubicus L.
R. flammula L.
R. hornschuchii Hoppe
R. illyricus L.
R. kladnii Schur
R. lanuginosus L.
R. lateriflorus DC.
R. lingua L.
R. montanus Willd.
R. platanifolius L.
R. polyanthemos L.
R. polyphyllus Kit.
R. pseudobulbosus Schur
R. repens L.
R. sardous Crantz
R. sceleratus L.
R. stevenii Andrz.
R. tatrae Borb.
Thalictrum aquilegifolium L.
T. flavum L.
T. lucidum L.
T. minus L.
T. simplex L.
Trollius europaeus L.

Resedaceae

Reseda lutea L.
R. luteola L.

Rhamnaceae

Frangula alnus Mill.
Rhamnus catharica L.

Rosaceae

Agrimonia eupatoria L.
Alchemilla acutiloba Opiz
A. alpestris F.W. Schmidt
A. czwczynensis Pawl.
A. flabellata Bus.
A. gracilis Opiz
A. incisa Bus.
A. monticola Opiz
A. obtusa Bus.

A. subcrenata Bus.
A. szaferi Pawl.
A. turkulensis Pawl.
A. zapalowiczii Pawl.
A. xanthochloa Rothm.
Aremonia agrimonoides (L.) DC.
Aruncus vulgaris Raf.
Cerasus avium (L.) Moench
Comarum palustre L.
Cotoneaster integerrimus Medik
C. melanocarpus Lodd.
Crataegus calycina Peterm.
C. curvisepala Lindm.
C. laevigata (Poir.) DC.
C. lipskyi Klok.
C. pseudokyrtostyla Klok.
Dryas octopetala L.
Filipendula vulgaris Moench
F. ulmaria (Z.) Mixim.
Fragaria moschata Duch.
F. vesca L.
F. viridis Duch.
Geum allepicum Jacq.
G. rivale L.
G. urbanum L.
Malus sylvestris Mill.
Padus avium Mill.
Parageum montanum (L.) Hara
Pentaphylloides fruticosa (L.) Duham.
Potentilla anserina L.
P. argentea L.
P. aurea L.
P. canescens Bess.
P. crantzii (Crantz) Beck.
P. erecta (L.) Hampe
P. impolita Wahlenb.
P. leucotricha Borb.
P. norvegica L.
P. obscura Willd.
P. reptans L.
Poterium polygamum Waldst. et Kit.
P. sanguisorba L.
Prunus spinosa L.
Pyrus communis l.
Rosa agrestis Savi
R. canina L.
R. corymbifera Borkh.
R. crenatula Chrshan.
R. czackiana Bess.
R. dumalis Bechst.
R. eglanteria L.
R. elliptica Tausch
R. jundzillii Bess.
R. lazarenkoi Chrshan.
R. micrantha Smith
R. minimalis Chrshan.
R. mucatscheviensis Chrshan.
R. pendulina L.
R. schmalhauseniana Chrshan.
R. slobodjanii (Chrshan.) Dubovik
R. subafzeliana Chrshan.
R. tomentosa Smith
R. transsilvanica Schur
R. uncinella Bess.
Rubus caesius L.
R. candicans Weihe
R. discolor Weihe et Nees
R. hirtus Waldst. et Kit.
R. idaeus L.
R. nessensis W. Hall.
R. plicatus Weihe et Nees
R. saxatilis L.
R. serpens Weihe
R. sulcatus Vest ex Tratt.
R. villicaulis Koehler ex Weihe et Nees
Sanguisorba officinalis L.
Sorbaria sorbifolia (L.) A.Br. ????
Sorbus aria (L.) Crantz
S. aucuparia L.
S. torminalis (L.) Krantz
Spiraea crenata L.
S. ulmifolia Scop.

Rubiaceae

Asperula campanulata (Vill.) Klok.
A. cincinnata Klok.
A. cynanchica L.
A. odorata L.
A. rivalis Sibth. Et Smith
Galium aparine L.
G. bellatulum Klok.
G. boreale L.
G. carpaticum Klok.
G. cruciata (L.) Scop.
G. glabratum Klok.
G. hercynicum Weig.
G. intermedium Schult.
G. kerneranum Klok.
G. maximum G. Moris
G. mollugo L. s. str.
G. palustre L.
G. pseudoaristatum Schur
G. pseudomollugo Klok.
G. pumilum Murr.
G. rubioides L.

G. suberectum Klok.
G. tricornutum Dandy
G. uliginosum L.
G. vaillantii DC.
G. vernum Scop.
G. verum L.

Salicaceae

Populus alba L.
P. canescens Smith
P. nigra L.
P. tremula L.
Salix alba L.
S. alpina Scop.
S. aurita L.
S. caprea L.
S. cinerea L.
S. daphnoides Will.
S. eleagnos Scop.
S. fragilis L.
S. hastata L.
S. herbacea L.
S. kitaibeliana Willd.
S. lapponum L.
S. pentandra L.
S. phylicifolia L.
S. purpurea L.
S. reticulata L.
S. retusa L.
S. silesiaca Willd.
S. triandra L.
S. viminalis L.

Salviniaceae

Salvinia natans (L.) All.

Santalaceae

Thesium alpinum L.
Th. linophyllon L.

Saxifragaceae

Chrysosplenium alpinum Schur
Ch. alternifolium L.
Grossularia reclinata (L.) Mill.
Parnassia palustris L.
Ribes alpinum L.
R. carpaticum Schult.
Saxifraga adscendens L.
S. aizoides L.
S. androsacea L.
S. bryoides L.
S. bulbifera L.
S. carpatica Reichb.
S. cymosa Waldst. et Kit.
S. luteoviridis Schott et Kotschy
S. oppositifolia L.
S. paniculata Mill.
S. stellaris L.

Scrophulariaceae

Antirrhinum oronthium L.
Bartsia alpina L.
Chaenorrhinum minus (L.) Lange
Digitalis grandiflora Mill.
Euphrasia brevipila Burn. et Gremli
E. coerulea Hoppe ex Fuernhohr
E. kerneri Wettst.
E. montana Jord.
E. parviflora Schagerstrom
E. picta Wimm.
E. rostkoviana Hayne.
E. salisburgensis Funk.
E. stricta D. Wolff ex J.E. Lehm
E. tatrae Wettst.
E. tenuis (Brenn.) Wettst.
Gratiola officinalis L.
Kickxia elatine (L.) Dum.
Lathraea squamaria L.
Linaria genistifolia (L.) Mill.
L. vulgaris Mill.
Lindernia procumbens (Krock.) Borb.
Melampyrum arvense L.
M. harbichii Woloszcz.
M. laciniatum Koschew. et Zing.
M. nemorosum L.
M. pratense L.
M. saxosum Baung.
M. vulgatum Pers.
Pedicularis hacquettii Graff.
P. oederi Vahl.
P. palustris L.
P. sylvatica L.
P. verticilata L.
Rhinanthus aestivalis (Zing.) Schischk. et Serg.
Rh. aestivalis (Zing.) Schischk. et Serg.
Rh. alectorolophus (Scop.) Pol.
Rh. alpinus Baumg.
Rh. angustifolius Gmel.
Rh. minor L.
Rh. nigricans Meinsh.

Rh. serotinus (Schoenh.) Oborny
Rh. vernalis (Zing.) Schischk et Serg.
Scrophularia nodosa L.
S. scopolii Hoppe ex Pers.
Tozzia carpathica Woloszcz.
Verbascum blattaria L.
V. densiflorum Bertol.
V. lanatum Schrad.
V. lychnitis L.
V. nigrum L.
V. phlomoidesL.
Veronica alpina L.
V. anagallis-aquatica L.
V. aphylla L.
V. austriaca L.
V. bachofenii Heuff.
V. baumgartenii Roem. et Schult
V. beccabunga L.
V. bellidoides L.
V. chamaedrys L.
V. dentata F.W.Schmidt.
V. fruticans Jacq.
V. fruticulosa L.
V. gentianoides Vahl.
V. montana L.
V. officinalis L.
V. paniculata L.
V. persica Poir.
V. scutellata L.
V. serpyllifolia L.
V. spicata L.
V. teucrium L.
V. urticifolia Jacq.
V. verna L.

Selaginellaceae

Selaginella selaginoides (L.) link.
S. helvetica Link.

Solanaceae

Atropa belladonna L.
Datura stramonium L.
Hyoscyamus niger L.
Physalis alkekengi L.
Scopolia carniolica Jacq.
Solanum dulcamara L.
S. nigrum L.

Sparganiaceae

Sparganium erectum L.
S. minimum Wallr.
S. simplex Huds.

Staphyleaceae

Staphylea pinnata L.

Tamaricaceae

Myricaria germanica (L.) Desv.

Taxaceae

Taxus baccata L.

Thelypteridaceae

Oreopteris limbosperma (All.) Holub

Thymelaeaceae

Daphne mezereum L.

Tiliaceae

Tilia argentea Desf. ex DC.
T. cordata Mill.
T. platyphyllos Scop.

Typhaceae

Typha angustifolia L.
T. latifolia L.
T. shuttlewortii Koch et Sond.

Ulmaceae

Ulmus elliptica C.Koch
U. glabra Huds.
U. laevis Pall.
U. minor Mill.
U. suberosa Moench

Urticaceae

Parietaria erecta Mert. et Koch
Urtica dioica L.
U. kioviensis Rogov.
U. urens L.

Vacciniaceae

Oxycoccus microcarpus Turcz. ex Rupr.
O. palustris Pers.
Rhodococcum vitis-idaea (L.) Avror.
Vaccinium uliginosum L.
V. vitis-idaea L.

Valerianaceae

Valeriana angustifolia Tausch.
V. dentata (L.) Poll.
V. dioica L.
V. exalta Mikan
V. nitida Kreyer
V. sambucifolia Mikan
V. simplicifolia (Reichb.) Kabath.
V. stolonifera Czern.
V. tripteris L.

Verbenaceae
Verbena officinalis L.

Violaceae

Viola alba Bess.
V. ambigua Waldst. et Kit.
V. arenaria DC.
V. arvensis Murr.
V. biflora L.
V. canina (L.) Reichb.
V. dacica Borb.
V. declinata Waldscht. et Kit.
V. hirta L.
V. matutina Klok.
V. mirabilis L.
V. montana L.
V. odorata L.
V. palustris L.
V. pumila Chaix
V. reichenbachiana Jord. ex Boreau
V. riviniana Reichb.
V. saxatilis F.W. Schmidt
V. stagnina Kit.
V. suavis Bieb.
V. uliginosa Bess.

Vitaceae

Vitis sylvestris C.C.Gmell.

## *Annotated list of plant communities*

## *Vegetation syntaxa prodromus*

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-Rumici scutati-Rhodioletum rosei Malinovski et al. 91

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-Tussilago-Calamagrostietum pseudophragmitis (Pawłowski et Walas 49) Malinovski et al. 91

Salicetea herbaceae Br.-Bl. et al. 47
Salicetalia herbaceae Br.-Bl. in Braun-Blanquet et Jenny 26
Salicion herbaceae Br.-Bl. in Braun-Blanquet et Jenny 26
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-Luzuletum spadiceae Br.-Bl. 26
-Polytricho-Poetum deylii Malinovski et al. 91
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-Potentillo-Polytrichetum communis Malinovski et al. 91
Arabidetalia coeruleae Rübel 33
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-Salicetum retuso-reticulatae Br.-Bl. 26

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-Senecio carpaticus-Seslerietum coerulantis Ishbirdin et al. 91
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## *Annotated list of animals*

Fish: - Salmo trutta m. fario L., Gobio uranoscopus carpatorossicus Vladykov, Cottus poecilopus Heckel.; amphibians: - Triturus montandoni Boul, T. alpestris Laur., Bufo bufo L.; reptiles: - Lacerta vivipara Jacquin; nesting birds - Cinclus cinclus L. and Motacilla cinerea Tunst.; mammals: - Sorex alpinus Schinz. At the same time, down the river, behind Rahiv, such species are more typical as Thymalus thymalus L., Gobio albipinnatus Fang., Cobitis aurata montana Vladykov, Cottus gobio gobio Heck. The density of the above mentioned species decreased drastically, however, and Triturus vulgaris L., T. cristatus Laur., Bufo viridis Laur. appear. Lacerta vivipara Jacquin is replaced by Lacerta agilis. Cinclus cinclus L. does not nest along the central section of the stream any longer. Great numbers of the birds winter there, the density of Motacilla cinerea Tunst. declines conspicuously, while the number of Motacilla alba L. increases.

It should be noted that in the past there were artificial water basins in the very head of River Tisa, which were used for organizing timber rafting. These basins played an important role as spawning places for amphibians, including Red Data Book species, as well as sites for a series of hydrophilic birds - Podiceps spp., Ardea cinerea L., Charadrius spp., etc. Such basins should be reconstructed, since there are no natural lakes in the area of the Tisa headwaters.

In the forests which are near the polonynas (alpine meadows) there are species interesting for the European fauna such as Elaphe longissima Laur., Aegolius funereus L., Glaucidium passerinum L., Ursus arctos L., Lynx lynx L., Cervus elaphus montanus Bot. which have survived here.

Finally, the River Tisa valley is an important route for the seasonal migrations of birds, the Jablonets mountain pass with River Chorna Tisa being the most marked migration line.

The mammal fauna of the Upper Tisa is rather rich and diverse. Insectivorous mammals are represented by 9 species; very notable among them are Sorex alpinus Schinz and Neomys anomalus Cabera, which have entered the Red Data Book of Ukraine. Erinaceus europaeus occurs only sporadically in the studied area.

The bat fauna, though it is a numerous group of mammals in the region, is not diverse in the River Tisa plain. Practically, only Myotis daubentoni Kuhl., Plecotus austriacus Fischer, Nyctalus noctula Schreb. and Pipistrellus pipistrellus Schreb. were found there. Other species very rarely fly to the river plain for hunting. All bats are very useful animals, they and their habitats should be protected.

Predators are represented by 13 species: Martes martes L. and M. foina Erxleb., Mustela putorius L., M. lutreola L., M. nivalis L., M. erminea L., Meles meles L., Lutra lutra L., Ursus arctos L., Canis lupus L., Vulpes vulpes L., Felis sylvestris Schreb., and Lynx lynx L. Among these the mink, the stoat, the badger, the otter, the European wild cat and the lynx have entered the Red Data Book of Ukraine. Small predators and Lutra lutra L. live in the river plain more or less permanently. For the others the river plain is only hunting place. Some species, like the wolf, rarely the bear and the lynx, may sometimes cause a conspicuous detriment to the hoofed livestock and domestic animals while the otter can reduce the amount of fish. The other species

are mainly useful, since they consume a considerable amount of mice. Practically, all these species are valuable game, but, due to their small numbers, hunting for some of them is forbidden, for the others it is restricted.

Artiodactyles. There are 3 species - Sus scrofa L., Capreolus capreolus L., and Cervus elaphus L.. In the river plain they do not stay for long, they come here only for watering and resting. All the three species are game, their shooting is restricted. They are valued for their meat and hunting trophies.

Leporids are represented by Lepus europaeus Pall. It comes to the river plain to have a rest and take up fat.

The most numerous and representative group of mammals in the River Tisa plain are the rodents. There are about 15 rodent species, namely: Sciurus vulgaris L., Glis glis L. and Muscardinus avellanarius L., Rattus norvegicus Bark., Mus musculus L., Apodemus agrarius Pall., A. sylvaticus L., A. flavicollis Melch., Clethrionomys glareolus Schreb., Arvicola sherman Shaw., Microtus arvalis Pall., M. subterraneus De Selys Longchamps. Glis glis, Microtus arvalis, Clethrionomys glareolus, and M. subterraneus occur only in places where the forest is close to the riverbed. Rattus norvegicus and Mus musculus, however, can be seen near human settlements. The occurance of the muskrat is not impossible in this area. Mice settle in the river plain reluctantly, since the frequent floods cause great damage to their populations.