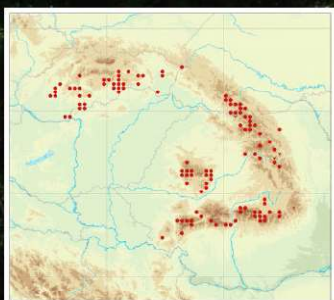


HIGH MOUNTAIN VASCULAR PLANTS OF THE CARPATHIANS ATLAS OF DISTRIBUTION

editor
Zbigniew Mirek



Kraków 2020

High mountain vascular plants of the Carpathians

Atlas of distribution

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Zbigniew Mirek

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INTRODUCTION

The Atlas provides, for the first time in the history of Carpathian floristic research, maps of 736 high mountain vascular plants of the entire Carpathian arc. The team of authors has been formed during work on the INTRABIODIV EU project. After the project's completion, we decided to produce a detailed map for all high mountain flora using grid cells and map background produced for the aforementioned project. However, for the purposes of our project (conducted in the years 2009–2020), we have modified and improved the background maps and divided each cell into four smaller (Fig. 1).

AIM AND SCOPE OF THE STUDY

Aim

The main goal of the study was creating an atlas of the entire high mountain vascular plant flora of the Carpathians as a basis for further study in the fields of taxonomy and evolutionary biogeography. Apart from the atlas itself, the planned result of the work will be a series of works devoted to:

- a. Analysis of distribution patterns and characteristics of basic geographical elements of the flora.
- b. Modern geobotanical division based on comparative analysis of the similarity of the high mountain flora of individual parts of the Carpathians.
- c. The characteristics of endemism of the high mountain flora of the Carpathians.
- d. Critical analysis of the state of threat and protection of the high mountain flora of the Carpathians (both species and area protection).
- e. Preparation of a red list of endangered and threatened species of the high mountain flora of the Carpathians.

Scope

- a. Area. The research covered the entire geomorphologically defined area of the Carpathians. Administratively, it covers Poland, Romania, Slovakia, Ukraine and small fragments of the Czechia and Hungary.
- b. Time. The authors included all the data published since the beginning of floristical investigation in the territory of the Carpathians until

now; i.e. collected in the last 200 years, both published and unpublished.

- c. Subject. Our study was devoted to all high mountain vascular plant taxa (736 altogether) occurring in the Carpathians.
- d. Treatment of high mountain category. Traditionally, we treat all the species that have their main center of distribution close to the timber line, in the subalpine zone (upper forest zone and *Pinus mugo* zone) and higher in alpine and sub-nival zones as high mountain. Considering that some species behave differently in Northern and Southern Carpathians in relation to their altitudinal distribution, there were some controversies regarding whether they are affiliated to high mountain taxa. Finally, we have included *Nardus stricta* into the group (though in Northern Carpathians the species behaves as a multizonal taxon, but not a high mountain one). On the other hand, we have excluded *Luzula sylvatica* (*L. maxima*), which is considered a high mountain plant by most Polish and Slovak botanists. The list of taxa excluded for various reasons from the final version of the Atlas is provided at the end.

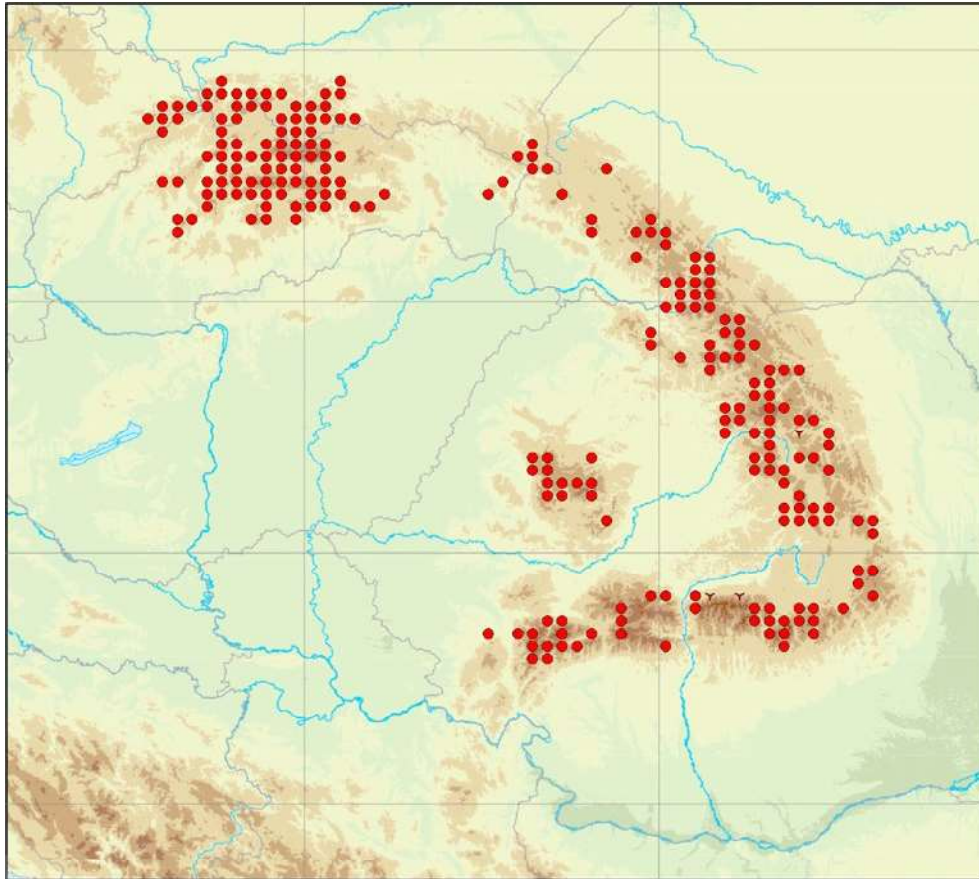
METHODS

The mapping of the species was based on a grid map defined by geographical coordinates, the whole area was divided into basic squares of ca 22.3 km × 25 km (563 km²). The corners of each square were defined by pairs of north latitude coordinates with 12 minute intervals and pairs of east longitude coordinates with 20 minute intervals. The height of a square has been marked with a letter or a digit; while its width with a number. For example, square C:51 is described by intersecting N48 00 with 48 12 and E21 00 with 21 20 (Fig. 1). Each of those basic squares has been divided into four sections (a, b, c, d), which have been used to present localities of species' distribution.

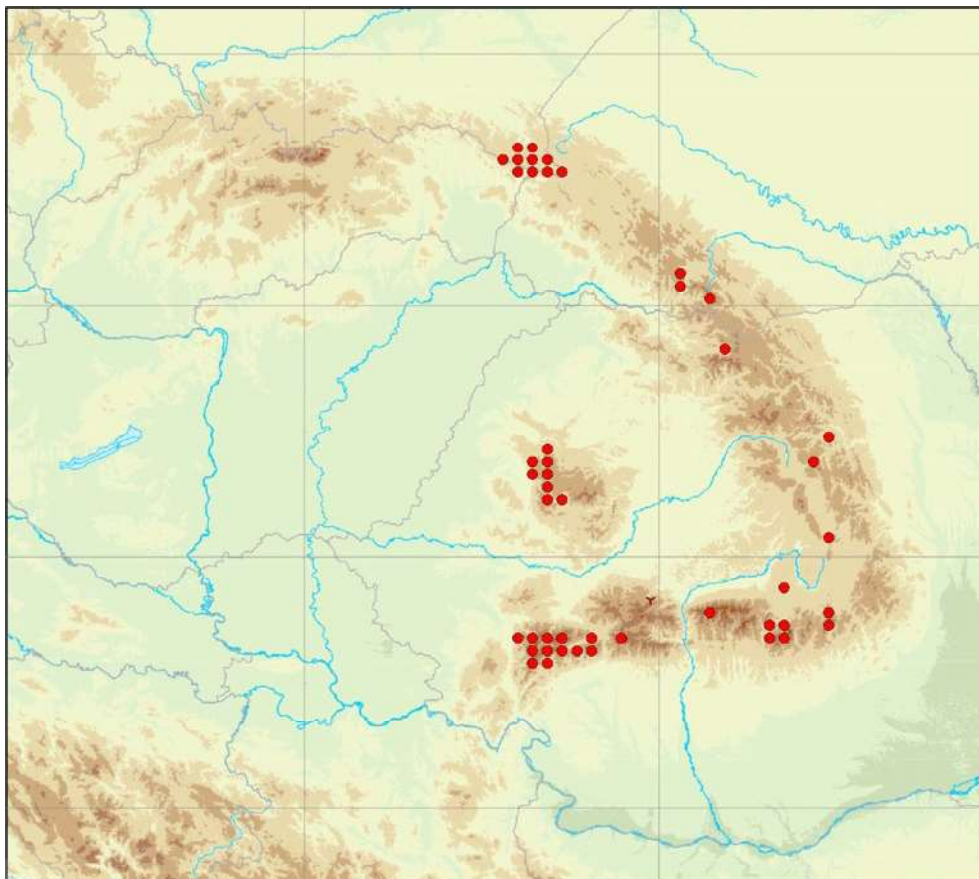
In order to automatically generate individual maps for each species, a database and a cartographic program have been created.

Maps – comments and signatures used

The maps do not differentiate between data originating from various historical periods. Most localities



Viola biflora L.



Viola dacica Borbás

INDEX OF TAXA PRESENTED ON THE MAPS

- Achillea distans* Willd. subsp. *alpina* (Rochel) Soó
Achillea lingulata Waldst. & Kit.
Achillea schurii Sch. Bip.
Achillea stricta Gremli
Achillea sudetica Opiz
Aconitum anthora L.
Aconitum bucovinense Zapał.
Aconitum × *czarnohorensse* (Zapał.) Mitka
Aconitum degenii Gáyér subsp. *degenii*
Aconitum firmum Rchb. s.l.
Aconitum firmum Rchb subsp. *fissuræ* Nyár.
Aconitum lasianthum (Rchb.) Simonk.
Aconitum lasiocarpum (Rchb.) Gáyér s.l.
Aconitum lasiocarpum (Rchb.) Gáyér subsp. *lasiocarpum*
Aconitum × *nanum* (Baumg.) Simonk.
Aconitum toxicum Rchb.
Adenostyles alliariae (Gouan.) A. Kern.
Agrostis alpina Scop.
Agrostis rupestris All.
Alchemilla acrostegia Plocek
Alchemilla aequidens Pawł.
Alchemilla amauroptera Plocek
Alchemilla amicorum Pawł.
Alchemilla aspera Plocek
Alchemilla babiogorensis Pawł.
Alchemilla bogumilii Pawlus
Alchemilla boleslai Pawł.
Alchemilla braun-blanquetii Pawł.
Alchemilla calvijflora Plocek
Alchemilla chilitricha Plocek
Alchemilla colorata Buser
Alchemilla connivens Buser
Alchemilla contractilis (Plocek) S. E. Fröhner
Alchemilla crassa (Plocek) Plocek
Alchemilla crinita Buser
Alchemilla curtisticha Plocek
Alchemilla czywczynensis Pawł.
Alchemilla decurrens Plocek
Alchemilla delitescens Plocek
Alchemilla deylii Plocek
Alchemilla echinogloba Plocek
Alchemilla erythropodoides Pawł.
Alchemilla eugenii Pawł.
Alchemilla exaperta Plocek
Alchemilla fissa Günther & Schummel
Alchemilla flabellata Buser
Alchemilla fusioidea Plocek
Alchemilla giewontica Pawł.
Alchemilla glabra Neygenf.
Alchemilla gorcensis Pawł.
Alchemilla grandiceps Plocek
Alchemilla gymnopoda Plocek
Alchemilla hoverlensis Pawlus & Lovelius
Alchemilla hyperptycha Plocek
Alchemilla incisa Buser
Alchemilla jasiewiczii Pawł.
Alchemilla kornasiana Pawł.
Alchemilla kosiarensis Plocek
Alchemilla kulczynskii Pawł.
Alchemilla ladislai Pawł.
Alchemilla lorata Plocek
Alchemilla loxotropa Plocek
Alchemilla marginata Plocek
Alchemilla megalodonta Plocek
Alchemilla microsphaerica S. E. Fröhner
Alchemilla multiloba Plocek
Alchemilla obesa Plocek
Alchemilla obtusa Buser
Alchemilla oculimarina Pawł.
Alchemilla patens Plocek
Alchemilla plicata Buser
Alchemilla polonica Pawł.
Alchemilla pseudincisa agg. (incl. *A. polonica* Pawł.,
A. pseudincisa Pawł., *A. sokolowskii* Pawł.)
Alchemilla pseudincisa Pawł.
Alchemilla pseudothmari Pawł.
Alchemilla reniformis Buser
Alchemilla rhodocycla Plocek
Alchemilla serbica (Paulin.) Pawł.
Alchemilla sericoneuroides Pawł.
Alchemilla smaragdina Plocek
Alchemilla smytzniensis Pawł.
Alchemilla sojakii Plocek
Alchemilla stanislavae Pawł. s.l. (incl. *A. zmudae* Pawł.)
Alchemilla stenoleuca Plocek
Alchemilla straminea Buser
Alchemilla suavis Plocek
Alchemilla subconnivens Pawł.
Alchemilla subcrenata Buser
Alchemilla subsessilis Plocek
Alchemilla superata Plocek
Alchemilla szaferi Pawł.
Alchemilla tacikii Plocek
Alchemilla tatricola Pawł.
Alchemilla turkulensis Pawł.
Alchemilla versipiloides Pawł.
Alchemilla virginea Plocek
Alchemilla wallischii Pawł.
Alchemilla zapalowiczii Pawł.
Allium sibiricum L.
Allium strictum Schrad.
Allium victorialis L.
Alnus viridis (Chaix) DC. subsp. *viridis*
Alopecurus laguriformis Schur

- Alyssum repens* Baumg.
Androsace chamaejasme Wulfen
Androsace lactea L.
Androsace obtusifolia All.
Androsace villosa L.
Andryala laevitomentosa (Nyár.) Greuter
Anemonastrum narcissiflorum (L.) Holub subsp. *narcissiflorum*
Antennaria carpatica (Wahlenb.) Bluff & Fingerh. subsp. *carpatica*
Anthemis carpatica Willd. s.l.
Anthemis carpatica Willd. subsp. *carpatica*
Anthemis carpatica Willd. subsp. *pyrethriiformis* (Schur) Beldie
Anthoxanthum alpinum Á. Löve & D. Löve
Anthyllis vulneraria L. subsp. *alpestris* (Schult.) Asch. & Graebn.
Aquilegia transsilvanica Schur
Arabidopsis halleri (L.) O'Kane & Al-Shehbaz subsp. *dacica* (Heuff.) Kolník
Arabidopsis halleri (L.) O'Kane & Al-Shehbaz subsp. *tatrica* (Pawl.) Kolník
Arabidopsis halleri (L.) O'Kane & Al-Shehbaz subsp. *ovirensis* sensu auct.
Arabidopsis neglecta (Schult.) O'Kane & Al-Shehbaz
Arabis alpina L. s.l.
Arabis nova Vill.
Arabis soyeri Reut. & A. Huet subsp. *subcoriacea* (Gren.) Breistr.
Arabis sudetica Tausch
Arctostaphylos alpinus (L.) Spreng.
Arctostaphylos uva-ursi (L.) Spreng. subsp. *uva-ursi*
Arenaria biflora L.
Arenaria ciliata L. s.l.
Arenaria ciliata L. subsp. *ciliata*
Arenaria ciliata L. subsp. *tenella* (Kit.) Braun-Blanq.
Arenaria rotundifolia M. Bieb.
Armeria alpina Willd.
Arnica montana L. subsp. *montana*
Artemisia eriantha Ten.
Asperula capitata Schult.
Asperula carpatica Morariu
Asperula neilreichii Beck
Asplenium viride Huds.
Aster alpinus L.
Astragalus alpinus L. subsp. *alpinus*
Astragalus australis (L.) Lam.
Astragalus depressus L.
Astragalus frigidus (L.) A. Gray subsp. *frigidus*
Astragalus norvegicus Grauer
Astragalus penduliflorus Lam.
Athyrium distentifolium Opiz
Aubrieta columnae Guss. subsp. *croatica* (Schott & al.) Mattf.
Avenula planiculmis (Schrad.) W. Sauer & Chmel.
Avenula pubescens (Huds.) Dumort. subsp. *laevigata* (Schur) Holub
Avenula versicolor (Vill.) M. Láinz subsp. *versicolor*
Barbarea lepuznica E. I. Nyár.
Bartsia alpina L.
Bellardiocloa variegata (Lam.) Kerguélen
Bellidiastrum michelii Cass.
Betula carpatica Waldst. & Kit. ex Willd.
Betula nana L. subsp. *nana*
Biscutella laevigata L. s.l.
Botrychium lanceolatum (S. G. Gmel.) Ångstr.
Botrychium lunaria (L.) Sw.
Bromus riparius Rehmann subsp. *barcensis* (Simonk.) Soó
Bruckenthalia spiculifolia (Salisb.) Rchb.
Bupleurum falcatum L. subsp. *cernuum* (Ten.) Arcang.
Bupleurum longifolium L. s.l.
Bupleurum ranunculoides L. subsp. *ranunculoides*
Calamagrostis villosa (Chaix) J. F. Gmel.
Callianthemum coriandrifolium Rchb.
Campanula abietina Griseb.
Campanula alpina Jacq.
Campanula carpatica Jacq.
Campanula cochleariifolia Lam.
Campanula kladniana (Schur) Witasek
Campanula serrata (Schult.) Hendrych
Campanula tatrae Borbás s.l.
Campanula transsilvanica Andrae
Cardamine amara L. subsp. *opicii* (J. Presl & C. Presl) Čelak.
Cardamine glauca DC.
Cardamine resedifolia L.
Cardamine rivularis Schur
Carduus glaucus Baumg.
Carduus kernerii Simonk. s.l.
Carduus personata (L.) Jacq. subsp. *albidus* (Adamović) Kazmi
Carex atrata L. s.l.
Carex atrata L. subsp. *aterrima* (Hoppe) Čelak.
Carex atrata L. subsp. *atrata*
Carex atrofusca Schkuhr
Carex bicolor All.
Carex bigelowii Schwein. agg.
Carex brachystachys Schrank
Carex brunnescens (Pers.) Poir.
Carex capillaris L. subsp. *capillaris*
Carex curvula All. subsp. *curvula*
Carex firma Host
Carex fuliginosa Schkuhr subsp. *fuliginosa*
Carex lachenalii Schkuhr
Carex parviflora Host
Carex pyrenaica Wahlenb.
Carex rupestris All.
Carex sempervirens Vill. s.l.
Centaurea kotschyana Heuff.
Centaurea nervosa Willd. subsp. *nervosa*
Centaurea phrygia L. subsp. *carpatica* (Porcius) Dostál
Centaurea pinnatifida Schur
Centaurea pseudophrygia C. A. Mey. subsp. *pseudophrygia*
Centaurea pseudophrygia C. A. Mey. subsp. *ratezatensis* (Prodan) Soó
Centaurea rodnensis Simk.

- Centaurea scabiosa* L. subsp. *alpestris* (Hegetschw.) Nyman
Cerastium alpinum L.
Cerastium arvense L. subsp. *calcicolum* (Schur) Borza
Cerastium arvense L. subsp. *glandulosum* (Kit.) Soó
Cerastium arvense L. subsp. *lerchenfeldianum* (Schur) Asch. & Graebn.
Cerastium cerastoides (L.) Britton
Cerastium eriophorum Kit.
Cerastium fontanum Baumg. subsp. *fontanum*
Cerastium latifolium L.
Cerastium transsilvanicum Schur
Cerastium uniflorum Clairv.
Cerintho alpina Schult.
Chamorchis alpina (L.) Rich.
Chrysosplenium alpinum Schur
Cicerbita alpina (L.) Wallr.
Cirsium waldsteinii Rouy
Clematis alpina (L.) Mill. subsp. *alpina*
Clinopodium alpinum (L.) Kuntze s.l.
Cochlearia tatrae Borbás
Coeloglossum viride (L.) Hartm.
Comastoma tenellum (Rottb.) Toyokuni
Cortusa matthioli L. subsp. *matthioli*
Crepis alpestris (Jacq.) Tausch
Crepis aurea (L.) Cass. subsp. *aurea*
Crepis conyzifolia (Gouan) A. Kern.
Crepis jacquinii Tausch subsp. *jacquinii*
Crepis sibirica L.
Crepis viscidula Froel. subsp. *viscidula*
Crocus vernus (L.) Hill subsp. *vernus*
Cryptogramma crispa (L.) Hook.
Cystopteris alpina (Lam.) Desv.
Cystopteris montana (Lam.) Desv.

Dactylorhiza cordigera (Fr.) Soó subsp. *cordigera*
Dactylorhiza maculata (L.) Soó subsp. *schurii* (Klinge) Soó
Delphinium elatum L. s.l.
Delphinium elatum L. subsp. *nacladense* (Zapał.) Holub
Delphinium oxysepalum Borbás & Pax
Dianthus barbatus L. subsp. *compactus* (Kit.) Heuff.
Dianthus callizonus Schott & Kotschy
Dianthus glacialis Haenke s.l.
Dianthus glacialis Haenke subsp. *gelidus* (Schott, Nyman & Kotschy) Tutin
Dianthus glacialis Haenke subsp. *glacialis*
Dianthus nitidus Waldst. & Kit.
Dianthus petraeus Waldst. & Kit. subsp. *petraeus*
Dianthus petraeus Waldst. & Kit. subsp. *simonkaianus* (Péterfi) Tutin
Dianthus praecox Willd. ex Spreng.
Dianthus spiculifolius Schur
Dianthus superbus L. subsp. *alpestris* Čelak.
Dianthus tenuifolius Schur
Diphasiastrum alpinum (L.) Holub
Diphasiastrum issleri (Rouy) Holub
Doronicum austriacum Jacq.
Doronicum carpaticum (Griseb. & Schenk) Nyman
Doronicum columnae Ten.

Doronicum stiriacum (Vill.) Dalla Torre
Draba aizoides L.
Draba compacta Schott
Draba dorneri Heuff.
Draba dubia Suter
Draba fladnizensis Wulfen
Draba haynaldii Stur
Draba kotschyi Stur
Draba pacheri Stur
Draba siliquosa M. Bieb.
Draba simonkaiana Jáv.
Draba tomentosa Clairv.
Dryas octopetala L.
Dryopteris expansa (C. Presl) Fraser-Jenk. & Jermy
Dryopteris mindshelkensis Pavlov
Dryopteris villarii (Bellardi) Schinz & Thell.

Empetrum hermaphroditum Hagerup
Epilobium alpestre (Jacq.) Krock.
Epilobium alsinifolium Vill.
Epilobium anagallidifolium Lam.
Epilobium nutans F. W. Schmidt
Erigeron alpinus L. s.l.
Erigeron alpinus L. subsp. *alpinus*
Erigeron alpinus L. subsp. *intermedius* (Rchb.) Pawł.
Erigeron atticus Vill.
Erigeron glabratus Hoppe & Hornsch ex Bluff & Fingerh.
Erigeron hungaricus (Vierh.) Pawł.
Erigeron uniflorus L.
Eriophorum scheuchzeri Hoppe
Eritrichium nanum (L.) Gaudin s.l.
Eritrichium nanum (L.) Gaudin subsp. *jankae* (Simonk.) Jáv.
Eritrichium nanum (L.) Gaudin subsp. *nanum*
Erysimum hungaricum Zapał.
Erysimum transsilvanicum Schur
Erysimum wahlenbergii (Asch. & Engl.) Simonk.
Erysimum witmannii Zaw. s.l.
Erysimum witmannii Zaw. subsp. *witmannii*
Euphorbia carpatica Woł. s.l.
Euphrasia exaristata Smejkal
Euphrasia minima DC. s.l.
Euphrasia picta Wimm.
Euphrasia salisburgensis Funck
Euphrasia stipitata Smejkal

Festuca airoides Lam.
Festuca alpina Suter
Festuca amethystina L. subsp. *orientalis* Krajina
Festuca apennina De Not.
Festuca bucegiensis Markgr.-Dann.
Festuca carpatica F. Dietr.
Festuca nigrescens Lam.
Festuca nitida Schult. subsp. *flaccida* (Schur) Markgr.-Dann.
Festuca picturata Pils
Festuca porcii Hack.
Festuca rupicaprina (Hack.) A. Kern.
Festuca saxatilis Schur
Festuca tatrae (Czakó) Degen
Festuca versicolor Tausch s.l.

Festuca versicolor Tausch subsp. *dominii* Krajina
Festuca versicolor Tausch subsp. *versicolor*

Gagea fistulosa Ker Gawl.

Galium anisophyllum Vill.

Gentiana acaulis L.

Gentiana clusii E. P. Perrier & Songoon

Gentiana frigida Haenke

Gentiana laciniata Kit.

Gentiana lutea L. subsp. *lutea*

Gentiana nivalis L.

Gentiana orbicularis Schur

Gentiana punctata L.

Gentiana utriculosa L.

Gentiana verna L. subsp. *verna*

Gentianella amarella (L.) Börner subsp. *reussii* (Tocl)
 Holub

Gentianella austriaca (A. Kern. & Jos. Kern.) Holub

Gentianella bulgarica (Velen.) Holub

Gentianella fatrae (Borbás) Holub

Gentianella germanica (Willd.) Börner

Gentianella lutescens (Velen.) Holub

Geranium caeruleatum Schur

Geranium sylvaticum L. (mainly var. *alpestre* Schur)

Geum montanum L.

Geum reptans L.

Globularia cordifolia L. subsp. *cordifolia*

Gnaphalium hoppeanum W. D. J. Koch

Gnaphalium norvegicum Gunnerus

Gnaphalium supinum L.

Gypsophila petraea (Baumg.) Rchb.

Gypsophila repens L.

Hedysarum hedysaroides (L.) Schinz & Thell. subsp.
hedysaroides

Helianthemum alpestre (Jacq.) DC. subsp. *alpestre*

Helianthemum nummularium (L.) Mill. subsp. *glabrum*
 (W. D. J. Koch) Wilczek

Helianthemum nummularium (L.) Mill. subsp.
grandiflorum (Scop.) Schinz & Thell.

Helianthemum nummularium (L.) Mill. subsp. *tomentosum*
 (Scop.) Schinz & Thell.

Helianthemum rupifragum A. Kern.

Heracleum carpaticum Porcius

Heracleum sphondylium L. subsp. *elegans* (Jacq.) Schübl.
 & G. Martens

Heracleum sphondylium L. subsp. *transsilvanicum*
 (Schur) Brummitt

Hesperis matronalis L. subsp. *candida* (Schulzer, Kanitz
 & Knapp) Thell.

Hesperis oblongifolia Schur

Hesperis slovacica (F. Dvořák) F. Dvořák

Hieracium abietogenum Szeląg

Hieracium alpinum L. s.l.

Hieracium atratum Fr. s.l.

Hieracium bifidum Hornem.

Hieracium borbasii R. Uechtr.

Hieracium borsanum Mráz

Hieracium brevipiliferum Mráz

Hieracium bupleuroides C. C. Gmel. s.l.

Hieracium caesium (Fr.) Fr.

Hieracium carpathicum Besser

Hieracium cernaeglavae (Hruby & Zahn) Mráz

Hieracium chondrillifolium Fr. subsp. *melananthium*
 (Nägeli & Peter) Zahn

Hieracium crassipedipilum (Pawł. & Zahn) Chrtek f.

Hieracium decipientiforme (Woł. & Zahn) Schljakov

Hieracium dentatum Hoppe

Hieracium deylii Mráz

Hieracium fagarasense (Nyár. & Zahn) Nyár

Hieracium fritzei F. W. Schultz s.l.

Hieracium grofae Woł.

Hieracium jarzabczynum (Pawł. & Zahn) Mráz & Chrtek f.

Hieracium koprovanum (Rech. f. & Zahn) Mráz
 & Chrtek f., ined.

Hieracium kotschyanum Heuff.

Hieracium krivanense (Woł. & Zahn) Schljakov

Hieracium liptoviense Borbás

Hieracium lubricicaule (Zahn) Borza

Hieracium magocsyanum Jáv.

Hieracium mirekii Szeląg

Hieracium mitkae Szeląg

Hieracium mlinicae (Hruby & Zahn) Chrtek f. & Mráz

Hieracium nigrescens Willd. s.l.

Hieracium nigrilacus Nyár.

Hieracium ostii-bucurae Szeląg

Hieracium pawlowskianum Nyár.

Hieracium perfoliosum Szeląg

Hieracium pietroszense Degen & Zahn s.l.

Hieracium pietroszense Degen & Zahn subsp. *pietroszense*

Hieracium piliferum Hoppe

Hieracium pilosum Froel.

Hieracium pinetophilum (Degen & Zahn) Chrtek f.

Hieracium pisatureense Nyár.

Hieracium polyphyllobasis (Nyár. & Zahn) Szeląg

Hieracium porphyriticum A. Kern.

Hieracium prenanthoides Vill.

Hieracium pseudobifidum Schur

Hieracium pseudocaesium Degen & Zahn

Hieracium ratezaticum (Nyár. & Zahn) Mráz

Hieracium retyezatense Degen & Zahn

Hieracium rohacsense Kit. s.l.

Hieracium rohacsense Kit. subsp. *rohacsense*

Hieracium scorzonerifolium Vill.

Hieracium silesiacum E. Krause

Hieracium slovacum Chrtek f.

Hieracium sparsum Friv. s.l.

Hieracium stygium R. Uechtr.

Hieracium tomasiae (Nyár. & Zahn) Nyár.

Hieracium tubulare Nyár.

Hieracium valdepilosum Vill.

Hieracium vapenicanum (Lengyel & Zahn) Chrtek f.
 & Mráz

Hieracium vierhapperi (Zahn) Szeląg

Hieracium villosum Jacq.

Hieracium zanogae Pax

Homogyne alpina (L.) Cass.

Hornungia alpina (L.) O. Appel s.l.

Hornungia alpina (L.) O. Appel subsp. *alpina*

- Hornungia alpina* (L.) O. Appel subsp. *brevicaulis* (Sprengel) O. Appel
Huperzia selago (L.) Schrank & Mart.
Hypericum richeri Vill. subsp. *grisebachii* (Boiss.) Nyman s.l. (incl. *H. richeri* Vill. subsp. *transsilvanicum*)
Hypericum richeri Vill. subsp. *grisebachii* (Boiss.) Nyman
Hypericum richeri Vill. subsp. *transsilvanicum*
Hypochaeris uniflora Vill. subsp. *uniflora*
- Jasione orbiculata* Velen.
Jovibarba globifera (L.) J. Parn. subsp. *preissiana* (Domin) Holub
Jovibarba heuffelii (Schott) Á. Löve & D. Löve
Juncus alpinoarticulatus Chaix
Juncus castaneus Sm.
Juncus filiformis L.
Juncus trifidus L.
Juncus triglumis L.
Juniperus communis L. subsp. *nana* Syme
Juniperus sabina L.
- Kernera saxatilis* (L.) Sweet subsp. *saxatilis*
Knautia longifolia (Waldst. & Kit.) W. D. J. Koch
Kobresia myosuroides (Vill.) Fiori
Kobresia simpliciuscula (Wahlenb.) Mack.
- Laserpitium krapfii* Crantz subsp. *krapfii*
Lathyrus laevigatus (Waldst. & Kit.) Gren. subsp. *laevigatus*
Leontodon croceus Haenke subsp. *croceus*
Leontodon kulczynskii Popov
Leontodon pseudotaraxaci Schur
Leontodon rilaensis Hayek
Leontopodium alpinum Cass.
Leucanthemopsis alpina (L.) Heywood subsp. *tatrae* (Vierh.) Holub
Leucanthemum gaudinii Dalla Torre
Leucanthemum waldsteinii (Sch. Bip.) Pouzar
Ligusticum mutellina (L.) Crantz
Ligusticum mutellinoides (Crantz) Vill.
Lilium jankae A. Kern.
Linaria alpina (L.) Mill.
Linum extraaxillare Kit.
Lloydia serotina (L.) Rchb.
Loiseleuria procumbens (L.) Desv.
Lomatogonium carinthiacum (Wulfen) Rchb.
Lonicera caerulea L.
Luzula alpinopilosa (Chaix) Breistr. subsp. *obscura* S. E. Fröhner
Luzula luzulina (Vill.) Racib.
Luzula luzuloides (Lam.) Dandy & Wilmott subsp. *rubella* (Hoppe ex Mert. & W. D. J. Koch) Holub
Luzula spicata (L.) DC. s.l.
Luzula sudetica (Willd.) Schult.
- Melampyrum saxosum* Baumg. s.l. (incl. *M. herbichii* Woł.)
Meum athamanticum Jacq.
Milium effusum L. subsp. *alpicola* Chrtek
- Minuartia laricifolia* (L.) Schinz & Thell. subsp. *kitaibelii* (Nyman) Mattf.
Minuartia oxypetala (Woł.) Kulcz.
Minuartia pauciflora (Kit. ex Kanitz) Dvořáková
Minuartia recurva (All.) Schinz & Thell. subsp. *recurva*
Minuartia sedoides (L.) Hiern
Myosotis alpestris F. W. Schmidt subsp. *alpestris*
- Nardus stricta* L.
Nigritella carpatica (Zapal.) Teppner, E. Klein & Zag.
Nigritella nigra (L.) Rchb. f. s.l.
Nigritella nigra (L.) Rchb. subsp. *nigra*
Nigritella rhellicani Teppner & E. Klein
Nigritella rubra (Wettst.) K. Richt. subsp. *rubra*
- Onobrychis montana* DC. subsp. *montana*
Oreochloa disticha (Wulfen) Link subsp. *disticha*
Oxyria digyna (L.) Hill
Oxytropis campestris (L.) DC. subsp. *campestris*
Oxytropis carpatica R. Uechtr.
Oxytropis halleri W. D. J. Koch subsp. *halleri*
Oxytropis neglecta Ten.
- Papaver alpinum* L. s.l.
Papaver corona-sancti-stephani Zapal.
Papaver tatricum (A. Nyár.) Ehrend. subsp. *fatraemagnae* Bernátová
Papaver tatricum (A. Nyár.) Ehrend. subsp. *tatricum*
Pedicularis baumgartenii Simonk.
Pedicularis comosa L. s.l.
Pedicularis comosa L. subsp. *campestris* (Griseb. & Schenk) Soó
Pedicularis comosa L. subsp. *comosa*
Pedicularis hacquetii Graf
Pedicularis oederi Vahl
Pedicularis verticillata L.
Persicaria alpina (All.) H. Gross
Persicaria vivipara (L.) Ronse Decr.
Petrocallis pyrenaica (L.) W. T. Aiton
Phleum alpinum L. s.l.
Phleum hirsutum Honck.
Phyteuma confusum A. Kern.
Phyteuma orbiculare L.
Phyteuma vagneri A. Kern.
Pilosella aurantiaca (L.) F. W. Schultz & Sch. Bip.
Pilosella hoppeana (Schult.) F. W. Schultz & Sch. Bip. subsp. *testimonialis*
Pilosella rhodopea (Griseb.) Szeląg
Pilosella roxolanica (Rehmann) Arv.-Touv.
Pilosella ullepitschii (Błocki) Szeląg
Pimpinella alpina Host
Pimpinella major (L.) Huds. subsp. *rubra* (Schleich.) O. Schwarz
Pinguicula alpina L.
Pinus cembra L.
Pinus mugo Turra s.l.
Plantago atrata Hoppe subsp. *carpatica* (Soó) Soó
Plantago gentianoides Sibth. & Sm.
Poa alpina L. subsp. *alpina*

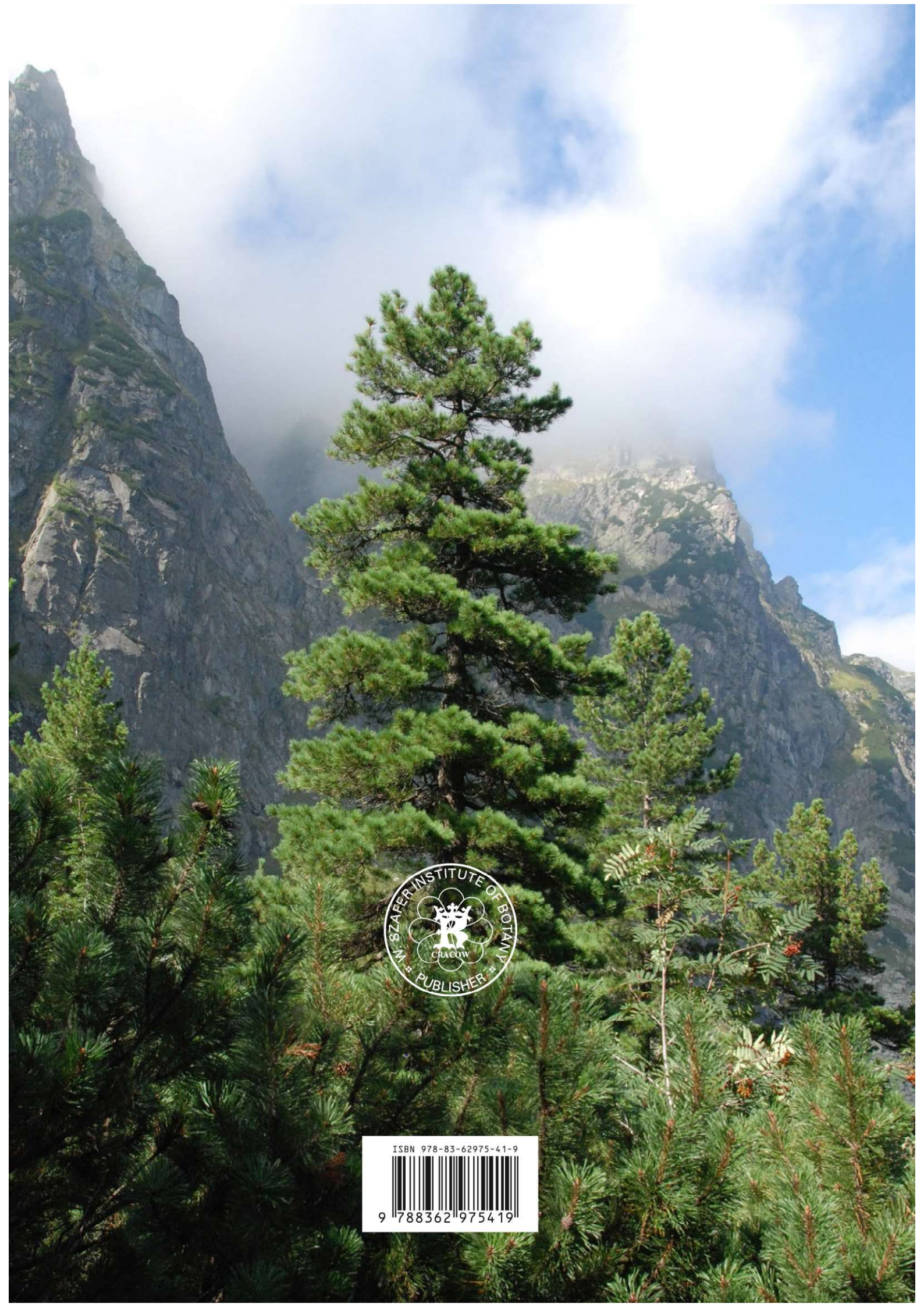
- Poa babiogorensis* Bernátová, Májovský & Obuch
Poa cenisia All. subsp. *contracta* (Nyár.) Nyár.
Poa chaixii Vill.
Poa granitica Braun-Blanq. s.l.
Poa granitica Braun-Blanq. subsp. *disparilis* (Nyár.) Nyár.
Poa granitica Braun-Blanq. subsp. *granitica*
Poa hybrida Gaudin
Poa laxa Haenke
Poa margilicola Bernátová & Májovský
Poa media Schur
Poa minor Gaudin
Poa molinerii Balb.
Poa nemoralis L. subsp. *carpatica* V. Jirásek
Poa nobilis Skalinska
Poa pumila Host
Poa rehmannii (Asch. & Graebn.) Wolosz.
Poa sejuncta Bernátová, Májovský & Obuch
Poa supina Schrad.
Polygala alpestris Rchb.
Polystichum lonchitis (L.) Roth
Potentilla aurea L. s.l.
Potentilla aurea L. subsp. *aurea*
Potentilla aurea L. subsp. *chrysocraspeda* (Lehm.) Nyman (*P. ternata* K. Koch)
Potentilla clusiana Jacq.
Potentilla crantzii (Crantz) R. M. Fritsch
Potentilla haynaldiana Janka
Primula auricula L. s.l.
Primula auricula L. subsp. *hungarica* (Borbás) Soó
Primula auricula L. subsp. *serratifolia* (Rochel) Jáv.
Primula baumgarteniana Degen & Moesz
Primula elatior (L.) L. subsp. *poloninensis* (Domin) Dostál
Primula elatior (L.) L. subsp. *tatrensis* (Domin) Soó
Primula farinosa L. subsp. *farinosa*
Primula halleri J. F. Gmel.
Primula intricata Gren. & Godr.
Primula leucophylla Pax
Primula minima L.
Prunus padus L. subsp. *petraea* (Tausch) Domin
Pseudorchis albida (L.) Á. Löve & D. Löve
Pseudorchis frivaldii (Hampe ex Griseb.) P. F. Hunt
Pulmonaria filarszkyana Jáv.
Pulsatilla alpina (L.) Delarbre subsp. *alba* Zämelis & Paegle
Pulsatilla vernalis (L.) Mill.
Pyrola carpatica Holub & Křisa

Ranunculus alpestris L. subsp. *alpestris*
Ranunculus altitattrensis Pačlová & Murín
Ranunculus breynianus Crantz
Ranunculus carpaticus Herbich
Ranunculus crenatus Waldst. & Kit.
Ranunculus glacialis L.
Ranunculus malinovskyi Elenevsky & Derv.-Sok.
Ranunculus platanifolius L.
Ranunculus pseudomontanus Schur
Ranunculus pygmaeus Wahlenb.
Ranunculus reptans L.

Ranunculus thora L.
Rhinanthus rhiphaeus Krock.
Rhodiola rosea L.
Rhododendron myrtifolium Schott & Kotschy
Ribes petraeum Wulfen
Rosa pendulina L.
Rumex alpinus L.
Rumex arifolius All.
Rumex obtusifolius L. subsp. *subalpinus* (Schur) Rech. f.
Rumex scutatus L. subsp. *scutatus*

Sagina saginoides (L.) H. Karst.
Salix alpina Scop.
Salix bicolor Willd.
Salix hastata L.
Salix helvetica Vill.
Salix herbacea L.
Salix kitaibeliana Willd.
Salix reticulata L.
Salix retusa L. s.l.
Salix retusa L. subsp. *retusa*
Salix silesiaca Willd.
Saponaria pumila Janch.
Saussurea alpina (L.) DC. s.l.
Saussurea discolor (Willd.) DC.
Saussurea porcii Degen
Saussurea pygmaea (Jacq.) Spreng.
Saxifraga adscendens L. subsp. *adscendens*
Saxifraga aizoides L.
Saxifraga androsacea L.
Saxifraga bryoides L.
Saxifraga caesia L.
Saxifraga carpatica Sternb.
Saxifraga cernua L.
Saxifraga cuneifolia L. subsp. *robusta* D. A. Webb
Saxifraga cymbalaria L.
Saxifraga hieraciifolia Willd.
Saxifraga luteoviridis Schott & Kotschy
Saxifraga marginata Sternb.
Saxifraga moschata Wulfen s.l.
Saxifraga mutata L. subsp. *demissa* (Schott & Kotschy) D. A. Webb
Saxifraga mutata L. subsp. *mutata*
Saxifraga oppositifolia L. subsp. *oppositifolia*
Saxifraga paniculata Mill.
Saxifraga pedemontana All. subsp. *cymosa* Engl.
Saxifraga retusa Gouan subsp. *retusa*
Saxifraga rotundifolia L. subsp. *rotundifolia*
Saxifraga stellaris L. subsp. *engleri* P. Fourn.
Saxifraga wahlenbergii Ball
Scabiosa lucida Vill. s.l.
Scabiosa lucida Vill. subsp. *barbata* Nyár.
Scleranthus dichotomus Schur
Scleranthus marginatus Guss.
Scleranthus uncinatus Schur
Scorzonera rosea Waldst. & Kit.
Scrophularia laciniata Waldst. & Kit.
Scutellaria alpina L.
Sedum alpestre Vill.
Sedum annuum L.

- Sedum atratum* L. subsp. *atratum*
Selaginella selaginoides (L.) Schrank & Mart.
Sempervivum carpathicum Wettst. ex Prodan
Sempervivum marmoreum Griseb.
Senecio abrotanifolius L. subsp. *carpathicus* (Herbich) Nyman
Senecio carniolicus Willd.
Senecio doricum (L.) L. subsp. *doricum*
Senecio subalpinus W. D. J. Koch
Sesleria caerulea (L.) Ard. subsp. *caerulea*
Sesleria coeruleans Friv.
Sesleria rigida Rchb.
Sesleria sadlerana Janka subsp. *tatrae* (Degen) Deyl
Sibbaldia procumbens L.
Silene acaulis L. s.l.
Silene dinarica Spreng.
Silene lerchenfeldiana Baumg.
Silene nivalis (Kit.) Rohrb.
Silene nutans L. subsp. *dubia* (Rohrb.) Zapal.
Silene pusilla Waldst. & Kit. s.l.
Silene rupestris L.
Silene vulgaris (Moench) Garcke subsp. *glareosa* (Jord.) Marsden-Jones & Turrill
Silene zawadzki Herbich
Soldanella carpatica Vierh.
Soldanella hungarica agg.
Soldanella pusilla Baumg. subsp. *pusilla*
Solidago virgaurea L. subsp. *minuta* (L.) Arcang.
Sorbus aucuparia L. subsp. *glabrata* (Wimm. & Grab.) Hedl.
Sorbus chamaemespilus (L.) Crantz
Sparganium angustifolium Michx.
Stellaria longifolia Willd.
Swertia perennis L. subsp. *alpestris* (Fuss) Simonk.
Symphyandra wanneri (Rochel) Heuff.
- Tanacetum corymbosum* (L.) Sch. Bip. subsp. *subcorymbosum* (Schur) Pawł.
Taraxacum aestivum Soest
Taraxacum albulense Soest
Taraxacum alpestre agg. (T. sect. *Alpestris* van Soest)
Taraxacum alpinum agg. (T. sect. *Alpina* G. E. Haglund)
Taraxacum crocellum Soest
Taraxacum flumineum R. Doll
Taraxacum fontanum agg. (T. sect. *Fontana* van Soest)
Taraxacum latericulium R. Doll
Taraxacum pastorum Štěpánek & Kirschner
Taraxacum pawlowskii Soest
Taraxacum perfissum Soest
Taraxacum pseudoalpestre Štěpánek & Kirschner
Taraxacum rupicaprae Štěpánek & Kirschner
Taraxacum skalnatense R. Doll
Taraxacum vidlense R. Doll
Tephroses capitata (Wahlenb.) Griseb. & Schenk
Tephroses papposa (Rchb.) Schur
Thalictrum alpinum L.
Thalictrum minus L. subsp. *carpaticum* (B. Kotula) Osvač.
- Thesium alpinum* L.
Thesium kernerianum Simonk.
Thlaspi dacicum Heuff. s.l.
Thlaspi dacicum Heuff. subsp. *banaticum* (R. Uechtr.) Jáv.
Thlaspi dacicum Heuff. subsp. *dacicum*
Thlaspi kovatsii Heuff.
Thymus alpestris (Čelak.) Tausch ex A. Kern.
Thymus bihoriensis J alas
Thymus praecox Opiz subsp. *jankae* (Čelak.) J alas
Thymus praecox Opiz subsp. *polytrichus* (A. Kern. ex Borbás) J alas
Thymus pulcherrimus Schur subsp. *pulcherrimus*
Thymus pulcherrimus Schur subsp. *sudeticus* (Borbás) P. A. Schmidt
Tofieldia calyculata (L.) Wahlenb.
Tofieldia calyculata (L.) Wahlenb. × *pusilla* (Michx.) Pers.
Tofieldia pusilla (Michx.) Pers.
Tozzia carpathica Woł.
Traunsteinera globosa (L.) Rchb.
Trichophorum alpinum (L.) Pers.
Trichophorum cespitosum (L.) Hartm. subsp. *cespitosum*
Trichophorum pumilum (Vahl) Schinz & Thell.
Trifolium badium Schreb.
Trifolium pallescens Schreb.
Trifolium pratense L. subsp. *kotulae* (Pawł.) Soják
Trifolium repens L. subsp. *ochranthum* (K. Malý) Nyár.
Trifolium repens L. subsp. *orbelicum* (Velen.) Pawł.
Trinia glauca (L.) Dumort. subsp. *carniolica* (Janch.) H. Wolff
Trisetum alpestre (Host) P. Beauv.
Trisetum flavescens (L.) P. Beauv. subsp. *purpurascens* (DC.) Arcang.
Trisetum fuscum (Schult.) Schult.
Trisetum macrotrichum Hack.
Trollius europaeus L. subsp. *transsilvanicus* (Schur) Domin
- Vaccinium gaultherioides* Bigelow
Valeriana montana L.
Veratrum album L. s.l.
Veronica alpina L.
Veronica aphylla L.
Veronica baumgartenii Roem. & Schult.
Veronica bellidioides L.
Veronica fruticans Jacq.
Veronica serpyllifolia L. subsp. *humifusa* (Dicks.) Syme
Vicia oreophila Žertová
Viola alpina Jacq.
Viola biflora L.
Viola dacica Borbás
Viola declinata Waldst. & Kit.
Viola lutea Huds. subsp. *sudetica* (Willd.) Nyman
Viola saxatilis F. W. Schmidt
- Woodsia alpina* (Bolton) Gray
Woodsia ilvensis (L.) R. Br. subsp. *ilvensis*
Woodsia pulchella Bertol.



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