MTT REPORT 121

The National Crop Wild Relative Strategy Report for Finland

Heli Fitzgerald

MTT

MTT REPORT 121

The National Crop Wild Relative Strategy Report for Finland

Heli Fitzgerald

The research reported here was made possible with funding from the EU Seventh Framework Programme. PGR Secure is a collaborative project funded under the EU Seventh Framework Programme, THEME KBBE.2010.1.1-03, 'Characterization of biodiversity resources for wild crop relatives to improve crops by breeding', Grant agreement no. 266394. The information published in this report reflects the views of PGR Secure partner, MTT. The European Union is not liable for any use that may be made of the information contained herein.

ISBN: 978-952-487-493-9
ISSN: 1798-6419
URN: http://urn.fi/URN:ISBN:978-952-487-493-9
http://www.mtt.fi/mttraportti/pdf/mttraportti121.pdf

Author: Heli Fitzgerald
Distribution and sale: MTT, 31600 Jokioinen
Printing year: 2013
Cover picture: Jukka Sarvarinne

Suomen viljelykasvien luonnonvaraisten sukulaislajien suojelustrategia

Heli Fitzgerald

Luonnontieteellinen Keskusmuseo, Helsingin yliopisto, kasvitieteen yksikkö, Unioninkatu 44, Helsinki, heli.fitzgerald@helsinki.fi

Viljelykasvien luonnonvaraiset sukulaislajit (crop wild relatives - CWR) ovat luonnonkasveja, jotka ovat sukua viljelykasveille, kuten esimerkiksi ravinto-, lääke-, koriste-, metsätalous-, ja rehukasveille. Ne sisältävät tärkeitä kasvigeenivaroja, joita voidaan käyttää hyväksi jalostuksessa luomaan kestävämpiä, tuottoisampia ja ilmastonmuutokseen sopeutuvia viljelylajikkeita edesauttaen tulevaisuuden ruokaturvaa. Viljelykasvien sukulaiskasvien suojelu on tavoitteena monissa kansainvälisissä sopimuksissa, mutta käytännön suojelusuunnittelu ja -menetelmät ovat pääasiassa toteutumatta. Monet CWR lajit ovat uhanalaisia tai kasvavat uhanalaisissa kasvuympäristöissä joten ne tarvitsevat pikaista tutkimusta ja suojelua. Tämä raportti on tehty osana EU rahoitettua ’PGR Secure’ projektia ja sisältää kansallisen CWR lajilistan sekä priorisoidun lajilistan, in situ ja ex situ aukkoanalyysin ja suosituksia viljelykasvien sukulaisten suojelulle Suomessa. Pyrkimyksenä on suojella mahdollisimman suuri osa CWR lajien geneettisestä monimuotoisuudesta Suomessa.

Avainsanat:

viljelykasvien luonnonvaraiset sukulaislajit, kasvigeenivarojen suojelu, kansallinen suojelustrategia, viljelykasvien villit sukulaiset

The National Crop Wild Relative Strategy Report for Finland

Heli Fitzgerald

Finnish Museum of Natural History, University of Helsinki, Botany unit, Unioninkatu 44, Helsinki, heli.fitzgerald@helsinki.fi

Crop wild relatives (CWR) are wild plant species which are related to cultivated plants such as food, medicinal, ornamental, forestry, fodder and forage species. CWR species represent important plant genetic resources. They have potential for future food security by providing genetic variability and material for plant breeding and therefore enhancing agricultural production. These new varieties may turn out to be instrumental in allowing crops to survive in the new environmental conditions resulting from climate change. CWR are now included in several international treaties, however, practical conservation actions are still largely lacking. Since CWRs are valuable wild species, mostly not included in conservation programs and themselves often threatened or growing in threatened habitats, they require urgent research and conservation actions. This report was created as part of EU funded 'PGR Secure'- project and includes a national crop wild relative checklist, prioritized list, in situ and ex situ gap analysis and suggestions for the conservation of Finnish CWR diversity, thus forming the National CWR Strategy for Finland.

Keywords:

crop wild relatives, plant genetic resources, in situ conservation, ex situ conservation, national conservation strategy, CWR

Contents

Foreword

This strategy has been compiled as part of PGR-Secure project - Novel characterization of crop wild relative and landrace resources as a basis for improved crop breeding - which is funded by the EU Seventh Framework Programme, THEME KBBE.2010.1.1-03, 'Characterization of biodiversity resources for wild crop relatives to improve crops by breeding', Grant agreement no. 266394 to MTT Agrifood Research Finland. One of the elements of the project is to create national CWR strategies. The Finnish strategy was prepared as the part of the activities within the Finnish National Programme for Plant Genetic Resources.

The main organizations involved in the project in Finland are the MTT Agrifood Research Finland that coordinates the Finnish Plant Genetic Resources Program and the Finnish Museum of National History, University of Helsinki. There was also cooperation with the National Advisory Board for Genetic Resources in Finland, the Finnish Environment Institute, the Finnish Forest Research Institute, Botanic Gardens in Finland, the National Board of Forestry, the Government of Åland and the Nordic Gene Resource Center (NordGen).

We would like to thank the following persons for their help during this project: Merja Veteläinen, and Helena Korpelainen (for supervising in the strategy preparation), as well as Elina Kiviharju, Marko Hyvärinen, Katileena Lohtander-Buckbee, Marja Ruohonen-Lehto, Sampsa Lommi, Kirsi Valanne, Raino Lampinen, Sanna Laaka-Lindberg, Matti Yli-Rekola, Ritva Hiltunen, Bertalan Galambosi, Heikki Eeronheimo, Irmeli Ahonen, Terhi Ryttäri, Eija Kemppainen, Nigel Maxted, Shelagh Kell, Jose Iriondo. University of Helsinki (the Finnish Museum of National History) also kindly contributed for the funding of the project.

At Helsinki and Jokioinen 31st October 2013

Heli Fitzgerald (Finnish Museum of Natural History) and Maarit Heinonen (MTT Agrifood Research Finland)

1 Introduction

Source: Aarne Laasonen

1.1 Definition of a crop wild relative

Crop plants can be any cultivated plant species, for example food, medicinal, ornamental, forestry, fodder and forage species. Crop wild relatives (CWR) can be defined, for example, as all taxa, which are within the same genus as the crop. '*A crop wild relative is a wild plant taxon that has an indirect use derived from its relatively close genetic relationship to a crop; this relationship is defined in terms of the CWR belonging to gene pools 1 or 2, or taxon groups 1 to 4 of the crop*' (Maxted *et al.* 2006).

CWR species represent an important genetic resource. These resources have potential in future food security by providing genetic variability and material for plant breeding and therefore enhancing agricultural production for the growing world population. These new varieties may turn out to be instrumental in allowing the crops to survive in the new environmental conditions resulting from climate change.

1.2 Crop wild relative conservation and international treaties

Since CWRs are valuable wild species which are usually not yet included in conservation programs and are often growing in threatened habitats, they require urgent conservation action. The need to conserve CWR species has been identified by policymakers. CWR are now included in several international treaties, such as the European Strategy for Plant Conservation (Planta Europa, 2008), the Global Strategy for Plant Conservation (CBD, 2010a), CBD Strategic Plan for Biodiversity 2011-2020 (CBD, 2010b), and the International Treaty on Plant Genetic Resources for Food and Agriculture (FAO, 2001). However, practical conservation actions are still largely lacking.

The Global Strategy for Plant Conservation (GSPC) includes 16 global targets set for 2020. Most relevant to this CWR strategy are following: (Target 7) '*at least 75 per cent of known threatened plant species conserved in situ*'; (Target 8) '*at least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 percent available for recovery and restoration programmes'; (Target 9) '70 per cent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, while respecting, preserving and maintaining associated indigenous and local knowledge*' (CBD, 2010a).

The European Strategy for Plant Conservation 2008-2014 (ESPC) similarly recognized the importance of CWR conservation as follows: (Target 7.1) '*60 per cent of species of European conservation priority plant and fungal species, including crop wild relatives, conserved in situ by 2014 through the implementation of national strategies for conserving priority species';* (Target 7.2) '*develop database of plant micro-reserves, genetic reserves for crop wild relatives, and where relevant other small in situ protected areas';* (Target 9.1) '*establishment of 25 European crop wild relative genetic reserves covering the major hotspots of species and genetic diversity'* (Planta Europa, 2008). This CWR strategy document answers the ESPC targets for Finland by proposing genetic reserve sites for CWR in situ conservation. It also aims to establish the Finnish CWR checklist and priority list and make suggestions/provide solutions for CWR in situ and ex situ conservation in Finland.

1.3 Finnish implementation of the plant conservation strategies

In Finland, many international agreement targets, for example those of GSPC, CBD and EU nature conservation directives, are included in the 'National Strategy and Action Plan for Conservation and Sustainable Use of Biodiversity in Finland 2006–2016' (Heikkinen, 2007). This document was revised in 2012 to form the 'Strategy for the Conservation and Sustainable Use of Biodiversity in Finland for the years 2012–2020' (Anon, 2012a). The resolution addresses the need for conserving the genetic resources of crop wild relatives and sets targets for their conservation by 2020: (Target 13) '*The genetic biodiversity of Finland's cultivated plants and their wild relatives, forest trees, fish stocks, and farmed and domesticated animals has been preserved and safeguarded.'*

The plant genetic resources in Finland are managed by the Finnish National Programme for Plant Genetic Resources which covers agriculture, forestry and horticulture. The National Advisory Board for Genetic Resources, appointed by the Ministry of Agriculture and Forestry, develops and monitors the national programme (Veteläinen *et al.* 2008). The Strategy and Action Plan for *ex situ* Conservation of Threatened Plants in Finland (Hyvärinen *et al.* 2011) has been created to guide the *ex situ* protection of threatened native plant species. A native threatened plant seedbank will be established within the EU life+ ESCAPE-project. The Finnish Environment Institute and Metsähallitus (the National Board of Forestry) share the responsibility of *in situ* conservation. This strategy answers the need to have a conservation action and strategy directed towards crop wild relative species, which are often falling between the agricultural and environmental conservation agencies/communities. The aim is to set guidelines for their optimum conservation within Finland with a European context.

1.4 Ecogeography and genetic resources of Finland

Finland is a Northern European country with a total area of 338,145 km^2. The land coverage consists of 230 000 km² forests, 33 000 km² water, 23 000 km² agricultural land, 9300 km² built-up area and 33 000 km² other areas. Finland's climate is warmed up by the Gulf Stream causing the temperatures to be slightly higher than averages across the boreal coniferous forest zone. Finland is situated between latitudes 60 and 70 degrees north, causing the climatic and growing conditions to vary considerably. The bedrock and the soil have been formed by ice ages. Finland has thousands of lakes with broken up islands and peninsulas, and the Baltic Sea coastline similarly features fragmented

archipelagos with thousands of islands. Peatlands are characteristic of Finland, as originally about one third of the country was covered by them.

Winters are generally quite mild, summers temperate and short. The short growing season is compensated by long days during the summer. Finland can be divided ecogeographically in different ways, e.g. the common division including four vegetation zone regions according to the forest vegetation type; hemiboreal, southern boreal, Middle Boreal and Northern Boreal zones according to Kalliola (1973). However, the arctic vegetation zones are predicted to shift with the climate change, causing the boreal forests to spread towards the arctic tundra and accelerating the species migration from the south (ACIA, 2005).

Since the ice ages, species have spread and migrated to Finland mainly through river valleys, interlinked lakes, moraine ridges and eskers at different stages. Populations have become differentiated and developed local subspecies or races due to natural barriers and large distances between populations. The species have mainly spread to Finland from east and northeast, but most of them are European species from the steppes of Eastern Europe. Only few species found in fells are truly northern. Finnish plant diversity is therefore a mixture of southern, northern and eastern elements. Humans have influenced the environment mainly through agriculture. The current native species include many which are associated with man-made habitats, such as ones caused by slash-and-burn agriculture and the use of meadowlands.

Forests have been Finland's most important natural resource for centuries. The private ownership of the forests is high. Finnish agriculture is based on family farms, in which forestry is an integral part, along with arable land and dairy husbandry. The major crops in Finland are barley, oat, wheat, rye, turnip rape, potato, sugar beet and forage crops (TIKE, crop production statistics, 2010). Fruit and berries such as strawberry (*Fragaria*), currants (*Ribes*), raspberry (*Rubus*) and apple (*Malus*) are important both commercially and in home garden production. Commonly widely wild harvested berries include lingonberry (*Vaccinium vitis-idaea*), blueberry (*V. myrtillus*), cranberry (*V. oxycoccus*), raspberry (*Rubus ideaus*), cloudberry (*R. chamaemorus*), arctic bramble (*R. arctus*), wild strawberry (*Fragaria vesca*) and sea-buckthorn (*Hippophae rhamnoides*) (Veteläinen *et al.* 2008).

The Finnish wild and cultivated plant species genetic resources have adapted to the climate, soil and landscape condition over thousands of years. These resources need to be safeguarded for future. Finland does not have many close wild relatives of the globally important crop species. However, many species are found at the edge of their distribution in the European context and species with generally wide distribution have distinct subspecies or races (Hämet-Ahti *et al.*, 1998; Miranto *et al.*, 2012). This is due to their remote northern location. These taxa may contain valuable genetic variation and adaptations to the European flora, since the peripheral populations can be genetically and morphologically diversified from central populations and have distinct traits allowing adaptation to environmental change (Lesica & Allendorf, 1995). It is therefore important to conserve their genetic resources.

In the global context, Europe has primary centres of diversity for several types of crops such as fruits, forages, vegetables, and oil and medicinal plants, which brings a responsibility to conserve the genetic resources of these species for the region and for the rest of the world. The Finnish CWR conservation strategy aims to provide a tool for the conservation of maximum taxonomic and genetic diversity of Finland's CWR taxa. Ideally, the CWR taxa would be conserved in key hotspot *in situ* areas established as genetic reserves. The taxa should also be included in systematic back-up conservation in *ex situ* collections.

1.5 Finland's protected areas and species

Finland has 37 national parks. Together with other nature reserves, the total protected area is about 9% of Finland's land coverage (Fig 1.). This area also includes nature reserves and other conservation areas, which are privately owned by forest industry companies or individual forest owners. The trend of privately owned conservation areas is on the increase since the government launched its METSO - Forest Biodiversity Programme for Southern Finland. It aims to increase the conservation areas in the southern Finland, where the forests are mainly privately owned. More protection is needed in the

south due to the regional imbalance of conservation area locations and conserved forest types within Finland.

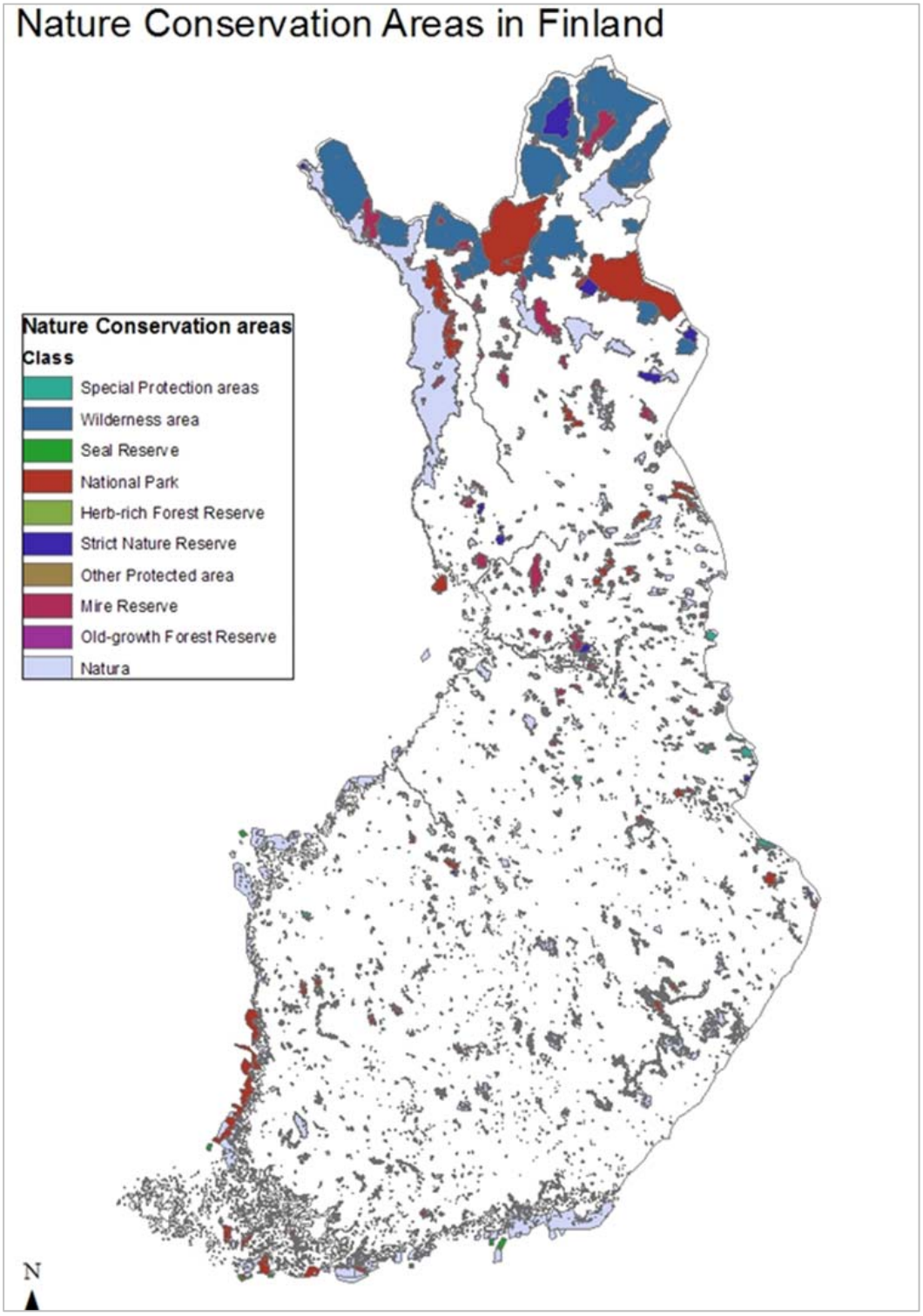


Fig. 1. Map of nature conservation areas in Finland, Source: Author

2 Methodology


Source: Aarne Laasonen

For the development of the crop wild relative *in situ* and *ex situ* conservation strategy, a floristic method (Maxted *et al*. 2011) was used. First, a Finnish National CWR checklist was created and additional data collected. Threats, uses and value of the Finnish CWR taxa were identified, thus enabling prioritization of the CWR inventory. The next stage was to undertake a gap analysis of the Finnish CWR diversity. With the complementarity analysis it was possible to identify key areas for *in situ* conservation to recommend as possible genetic reserve sites. Gaps in *ex situ* conservation were identified and suggestions made for the collection of genetically representative samples of CWR populations.

2.1 Finnish CWR checklist

Approximately 2503 vascular plant taxa are found in Finland (Hämet-Ahti *et al*., 1998; Lampinen *et al*., 2010). A draft checklist of the CWR taxa of Finland was obtained from the PGR Forum CWR Catalogue for Europe and the Mediterranean (Kell *et al.*, 2005, 2008), based on the Euro+Med PlantBase (Euro+Med, 2006), Mansfeld's World Database of Agricultural and Horticultural Crops (Hanelt and IPK Gatersleben, 2001) and additional data for forestry, ornamental, medicinal and aromatic species.

The draft checklist of 2334 CWR taxa was taxonomically harmonised with the Field Flora of Finland (Hämet-Ahti *et al*., 1998) and its update (Hämet-Ahti *et al*., 2005). The status and synonyms of the unclear taxa were checked with the Plant List (The Plant List, 2010). Nationally threatened or protected subspecies, which were not on the draft list, were added. Hybrids, synonymic taxa and apomictic species such as *Taraxacum* ssp., *Hieracium* ssp., *Ranunculus auricomus*- Group were removed due to the difficulties with identification and changing taxonomy. Native, archaeophyte, neophyte and alien species were included in the checklist. The final CWR checklist for Finland has 1905 CWR taxa (Fitzgerald *et al.* 2013).

2.2 National inventory and its prioritization

Additional data was collected for the prioritization of the checklist. The Finnish red data listed species and their ecogeographic data such as the habitat type and the main causes of threat, were obtained from the 2010 Red List of Finnish Species (Rassi et al., 2010). Additional data on endemism, native status, ecogeography and distribution was obtained from the the Field Flora of Finland (Hämet-Ahti *et al*. 1998, 2005). Other data added to the database included following: national protection status (Nature conservation degree, 1997); species listed in the EU Habitats Directive Annexes II, IV and V; EU Annex Priority species (EU, 1992); endemism in Europe (Bilz *et al.*, 2011); OEK- species, which is a list of species Finland is considered to be responsible for, including taxa which are endemic to Finland or Northern Europe and taxa with minimum of 20% of their European distribution within Finland (Rassi *et al.*, 2001).

Following additional data was included: yield of CWR-related main crops in Finland in 2010 (Tike, 2010); yield of CWR-related herb crops in Finland 2010 (Galambosi, 2007); high priority human food crops in Europe (Kell et al., 2012a) based on production quantity data at the global, European and national levels (FAOSTAT, 2009) and economic value data (Eurostat, 1995–2012). Data on taxa listed to have medicinal or pharmaceutical use or use as food, forage or fodder plants was obtained from the Mansfeld's World Database of Agricultural and Horticultural Crops (Hanelt and IPK Gatersleben, 2001); the species listed in Annex I of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) from FAO (2001); Nordic mandate species, which are the important CWR species as prepared by five NordGen thematic working groups on root, oil and fibre plants, vegetables, fruits and berries, cereals and forage plants. Finally, data on species in gene pools 1a, 1b and 2 (Harlan de Wet, 1971) or taxon groups 1b, 2 and 3 (Maxted *et al.*, 2006), referring to their potential utilization capacity based on the genetic closeness or close relation to the crop species, was collected from the Global Checklist of Priority CWR (Vincent *et al*., 2012).

The first step was to select only the indigenous and archaeophyte taxa for prioritization. Alien and neophyte taxa were therefore removed from the list. The categorisation was based on the Field Flora of Finland, which draws a line between archaeophytes and neophytes at the 17th century. Euro+Med PlantBase (Euro+Med, 2006) provided additional information on the nativity. Neophytes were removed from the priority list but kept on the national CWR checklist since it is recognized that the neophyte group in Finland includes many relatives of crop species that may have already formed adaptations to the Finnish climate. These species could therefore contain important genetic material for breeding as the commercial crop plants in Finland need to survive the Nordic conditions.

The second step was to create the prioritization criteria. Three main criteria and twelve subcriteria were selected (Table 1). Firstly, all the taxa classified vulnerable, endangered or critically endangered were selected into the priority list. Secondly, the taxa classified near threatened were selected if they had at least one point in the four 'use' subcriteria. Thirdly, the taxa not classified threatened but having more than three points in any of the twelve subcriteria were included in the prioritised list. Finally, unthreatened subspecies were removed from the list. This resulted in the prioritised CWR national inventory of 209 taxa (Fitzgerald *et al.* 2013).

Table 1. the prioritization criteria. Source: Fitzgerald et al. (2013)

1. Relative threat
a. Finnish Vascular Plant Red List Category 2010
b. National protection status
c. Species listed in the EU Habitats Directive Annexes II, IV and V and EU Annex Priority species
d. Endemism in Europe
e. OEK species (European species which Finland is responsible for conserving since a minimum of 20% of their European distribution is within the country)
2. Value
a. Yield of CWR-related main crops in Finland in 2010
b. Yield of CWR-related herb crops in Finland
c. High priority human food crops in Europe based on production quantity and economic value
3. Use
a. Medicinal/pharmaceutical use, food, forage/fodder plants
b. Species listed in Annex I of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)
c. Nordic mandate species
d. Species in GP1b-GP2 and TG1b-TG3

2.3 Gap Analysis

Originally conservationists developed gap analysis to find gaps in the habitat or ecosystem conservation. The concept of identifying areas in which selected elements of biodiversity are under-represented was proposed by Burley (1988) as a gap analysis methodology of first identifying and classifying biodiversity, then locating conservation areas managed for biodiversity and finally identifying the biodiversity underrepresented in those areas to set new conservation priorities.

Maxted *et al.* (2008) proposed to use gap analysis to evaluate CWR taxonomic and genetic diversity and to develop future strategies for their genetic conservation by following steps: (1) circumscription of target taxon and target area; (2) assessment of natural diversity, (taxonomic, genetic, ecogeographic and threat assessment); (3) assessment of current *in situ* and *ex situ* conservation strategies; (4) setting priorities for *in situ* and *ex situ* conservation action. The results of this methodology applied to the Finnish CWR diversity are shown in the following sections of the report.

2.3.1 In situ gap analysis

There are no current conservation efforts particularly for CWR species in Finland but those CWR species which are threatened, are included in the existing conservation programs. Ministry of the Environment has a responsibility to organise the monitoring of native species and to protect them. In all, 34 of the CWR priority species have a conservation action plan by the Finnish Environment Institute (SYKE, 2010). The Natural Heritage Services of Metsähallitus is responsible for conservation, management and monitoring of all the species on its land; 11 of the CWR priority species are under their extended national responsibility - a special *in situ* conservation, management and monitoring plan (Metsähallitus, 2013). Additionally, the Finnish Forest Research Institute Metla has a program to conserve the genetic resources of forest trees and 2 of the priority CWR are conserved *in situ* in the Finnish Forest Research Institute's conservation areas (Metla, 2012).

To undertake the *in situ* gap analysis, distribution data for the 209 priority taxa was obtained from Finnish Museum of Natural History in an 'YKJ- grid' format (Lampinen & Lahti, 2010). The YKJ-grid is the common coordinate grid system for Finland, used previously widely by the natural scientists. Nowadays many institutions have moved to different grid-systems but the vascular plant

species distribution data is still in the common coordinate system. Data level was chosen as 10x10 km grid. More accurate data would have been available for some species, but for uniformity, it was decided to use the 10x10 km grid squares. The threatened species location data includes rather reliable information of the native, archaeophyte and neophyte status of the locations. Only native and archaeophyte locations were selected for the analysis as the neophyte locations are suspected to be genetically alien material. Neophyte and extinct locations of the threatened species within Finland were removed from the analysis. The threatened species distribution data from 1990 onwards and non-threatened species data from 1970 onwards were used.

Identification of the key areas containing CWR within and outside of the protected areas was undertaken by complimentarity analysis, which has been used for reserve selection, especially when the funds for conservation are limited and therefore prioritisation is important. The idea of the complementarity analysis is to conserve as many taxa as possible in the minimum number of reserves. Therefore the target was to find out minimum number of sites in Finland with the maximum number of CWR taxa. The first site of maximum number of CWR taxa was found by transferring the distribution data from Excel to ArcMap. Those taxa found in the first, most CWR species rich 10x10 km grid were removed from the list before the second site was found and so on. If there were several grids with similar number of species, diverse locations and larger distance in relation to other sites were selected. Since a maximum CWR diversity was found within Åland Islands, which is an autonomous part of Finland with separate legislation and environmental administration, a second analysis was carried out by treating Åland and Continental Finland distribution data as two separate analyses.

To undertake the analysis and to create the maps in this document, open data from Maanmittauslaitos - Avoimien aineistojen tiedostopalvelu (Maanmittauslaitos, 2013) and OIVA - Ympäristö- ja paikkatietopalvelu asiantuntijoille (SYKE, 2012) was used as well as vascular plant distribution data from the Kasviatlas - Suomen putkilokasvien levinneisyyskartasto (Lampinen & Lahti, 2010). Nature conservation area shapefiles of the Åland region were obtained from the regional government (Pers. Comm. Ahonen, 2013). Additionally, the present conservation status of the priority CWR taxa was looked at. This data gives information on what percentage of the species populations are conserved in the existing protected areas (Kemppainen and Eeronheimo, 2008).

2.3.2 Ex situ gap analysis

The *ex situ* gap analysis was carried out by comparing the target taxa already in conservation and the target taxa in need of conservation, which is the 209 CWR priority taxa for Finland. The current *ex situ* collections of wild native species in Finland are conserved mostly in the Botanic Gardens. The Nordic Genetic Resource Center - NordGen - primary secures the broad diversity of genetic resources linked to food and agriculture. Some Finnish crop wild relatives are found in their collections. A seedbank for threatened native species will be established in Finland through the EU funded ESCAPE-project which will collect and conserve the threatened Finnish vascular plant species. When establishing the priority collection list (Ryttäri, 2013) for the seedbank, CWR status was taken into account along with other factors.

The data on *ex situ* conservation status of nationally threatened species in Finland was obtained from the results of EU funded project: 'Vulnerability Assessment of ecosystem services for Climate Change Impacts and Adaptation' (Miranto *et al.* 2012, Hyvärinen *et al.* 2011). The data on *ex situ* conservation status of not threatened species was obtained directly from the institutions holding the Finnish *ex situ* collections; Helsinki Botanic Gardens, Oulu Botanic Gardens, Turku Botanic Gardens, NordGen, Finnish Forest Research Institute and MTT Agrifood Research Finland. The accuracy of the origin data and genetic intactness classes (Miranto, 2005) were taken into account. Only the existing collections with origin data class 1 and genetic intactness class 1 or 2 were accepted to be in *ex situ* conservation. Additionally, only those taxa having collections from 5 or more populations were considered to be sufficiently conserved.

3 Results and Discussion


Source: Aarne Laasonen

3.1 Checklist and Inventory

Out of the 2503 vascular plant species in Finland, 76 percent (1905 taxa) are crop wild relatives, consisting of 1381 species, 492 subspecies and 32 varieties (Appendix 1). Of these, 71 percent are indigineous or archaeophyte taxa. The Finnish CWR taxa are divided into 101 families, main ones being Poaceae, Rosaceae, Cyperaceae, Brassicaceae and Asteraceae, all with more than 100 taxa represented. Out of the total CWR in Finland, 13 percent are endangered; 21 are critically endangered, 62 endangered, 62 vulnerable and 96 near threatened (Fitzgerald *et al.* 2013).

The prioritized national inventory of CWR for Finland consists of 209 taxa (Appendix 2). The prioritised CWR taxa divide into either highly threatened taxa with a narrow distribution or non-threatened taxa with wider distribution. The conservation of the genetic resources of both of these groups is important. As can be seen from Table 2, the main threat factor (Rassi *et al.*, 2010) of the prioritized CWR taxa in Finland is the overgrowing of meadows and open habitats. It is generally one of the main threats to plant species survival in Finland and is mainly due to the lack of traditional use of grassland. Habitats of the prioritized CWR are shown in Table 3.

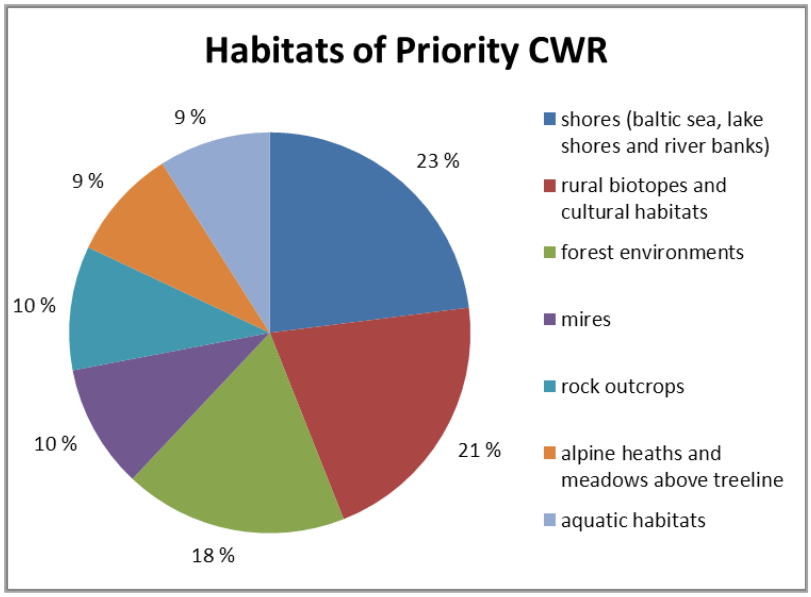


Table 2. Main factors threatening Finnish priority CWR taxa. Source: Author

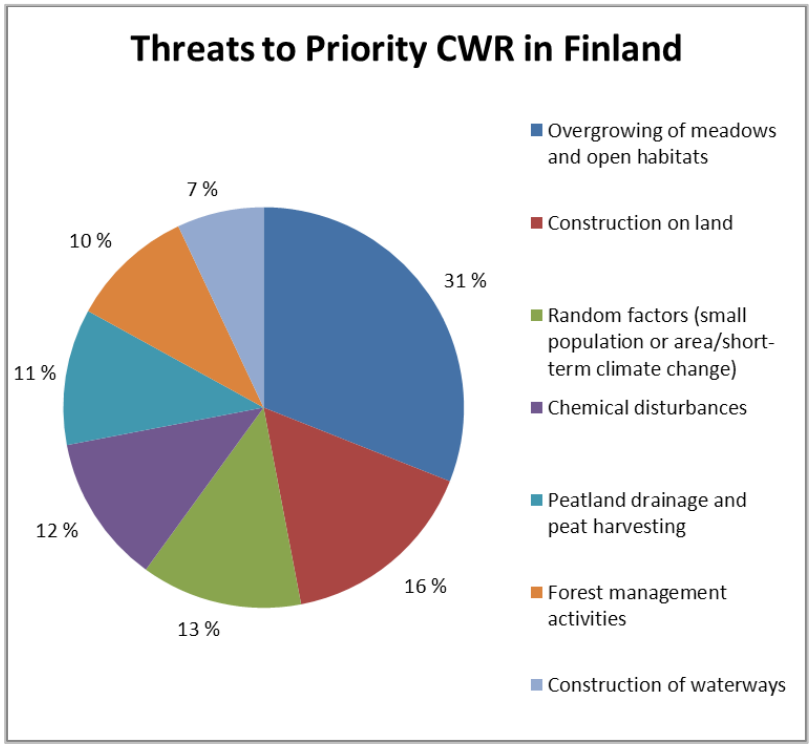


Table 3. Habitats of the Finnish priority CWR taxa. Source: Author

3.2 In situ Gap Analysis

Through the complementarity analysis, five most CWR species rich areas were found within Finland. These CWR hotspot sites, if established as genetic reserves, would conserve over 60% of the priority species. The sites are distributed in different parts of the country and are representing different habitats and regions. Beyond these sites, the 10x10 km grids contained less than five crop wild relative taxa, which were not found on the first sites. Therefore it would not be realistic to establish reserves in these grid squares.

The most species rich area for CWR in Finland is on Åland Islands. Half of the priority taxa in the analysis, 101 taxa out of total 202, were found to exist in this region. The most CWR species rich 10x10 km square within Åland as the 1st site has 65 priority taxa. The 5th site is also found within Åland Islands, with 14 taxa. Other areas coming up as CWR hotspots were: 2nd site in Oulanka in the middle-east region near the Russian border, 3rd site in Hanko Peninsula in the most southern point of mainland Finland and 4th site in the Saana and Malla fell area in the far north-western corner of Finnish Lapland near the Swedish and Norwegian border (Fig. 2.). These sites would altogether conserve 129 taxa (64 percent) out of the priority CWR taxa in Finland. These sites represent interesting culmination points as they are located in regions with generally high plant diversity due to the influence of species migration from different regions. The crop wild relative taxon lists of the 5 proposed sites are found in Appendices 3 and 4.

A separate complementarity analysis was carried out to see if the distribution of sites would change if Åland Islands and the mainland Finland were treated separately. In the second analysis, the sites within Åland remained the same, one 10x10 km square having 65 taxa and the second site having 14 taxa (Table 4). These two sites would conserve 79 taxa conserving 78 percent of the priority crop wild relatives found within Åland and 39 percent of the priority CWR found in the whole of Finland. Within the mainland Finland, the first three sites remained the same as in the first analysis; Hanko Peninsula, Oulanka and Saana and Malla fell area. Two more sites were found in the southern coastline; Helsinki Islands as the 4th site and Houtskari Islands in Turku Archipelago as the 5th site (Table 4). These five sites would conserve 108 taxa (approximately 60 percent) of the 183 priority CWR which are found in mainland Finland.

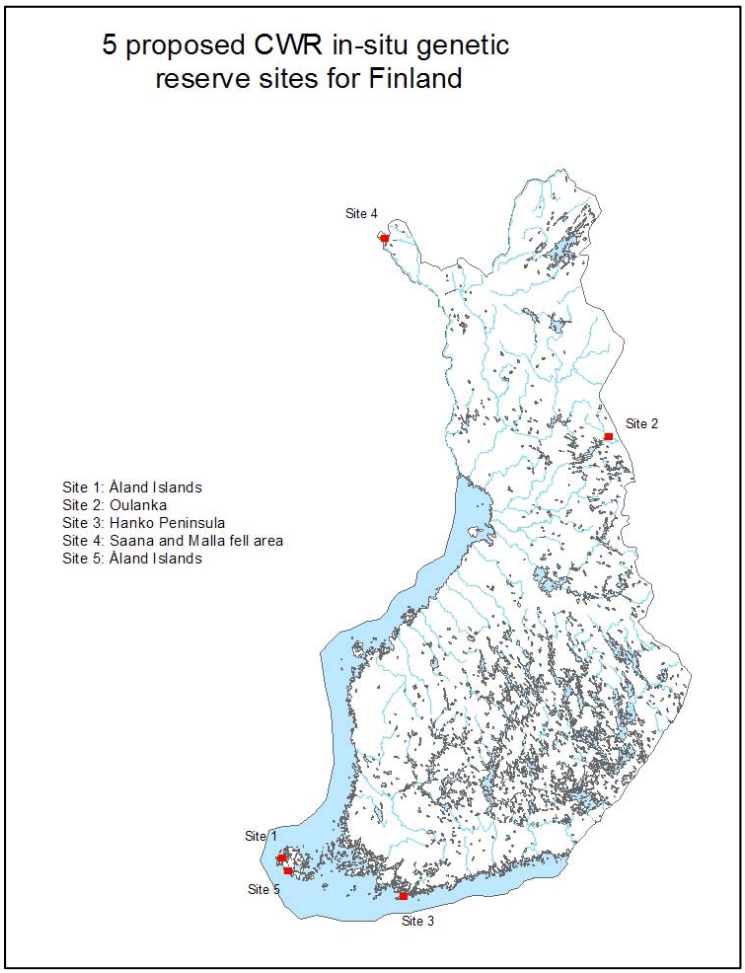


Fig. 2. The 5 crop wild relative hotspots in Finland. Source: Author

Table 4. Results of the complementarity analyses. Source: Author

Complimentarity analysis 1 (whole of Finland)				
5 sites within whole Finland	**Location**	**Grid**	**CWR taxa on only this site**	**Total CWR taxa**
Site 1	Åland Islands	670:309	65	65
Site 2	Oulanka	736:360	24	39
Site 3	Hanko Peninsula	664:328	14	51
Site 4	Saana & Malla	767:325	13	27
Site 5	Åland Islands	668:310	13	63
Complimentarity analysis 2 (Åland and mainland Finland separately)				
Åland Islands 2 sites	**Location**	**Grid**	**CWR taxa on only this site**	**Total CWR taxa**
Site 1	Åland Islands	670:309	65	65
Site 2	Åland Islands	668:310	14	63
Mainland Finland 5 sites	**Location**	**Grid**	**CWR taxa on only this site**	**Total CWR taxa**
Site 1	Hanko Peninsula	736:360	51	51
Site 2	Oulanka	664:328	23	39
Site 3	Saana & Malla	767:325	13	27
Site 4	Helsinki Islands	667:338	10	39
Site 5	Houtskari Islands	669:318	7	34

Figure 3 shows the results of both analyses. Analysis 1 displays the five proposed genetic reserve sites on the forest vegetation zones of Finland based on Kalliola (1973). Analysis 2 displays both the Åland Island and Mainland Finland sites. Based on both analyses, the sites are located on the hemiboreal and northern boreal zones. The hotspot concentration on the southern coastline is highlighted even more in the second complementarity analysis. This may leave the diversity of potential genetic resources of the southern boreal and middle boreal zones unconserved. There is a gap in the middle of the country, the lake area in the south-east and the western coastline of the Gulf of Bothnia. This may be due to the country being quite large, plant diversity generally poor and species rather evenly spread out across the land. Therefore not many 10x10 km grids stand out as particularly species rich, except for the above mentioned five sites. Analysis 1 is preferred due to the fact that it conserves similar amount of CWR taxa in fewer areas. Next, an overview of the sites and CWR taxa found within them is given.

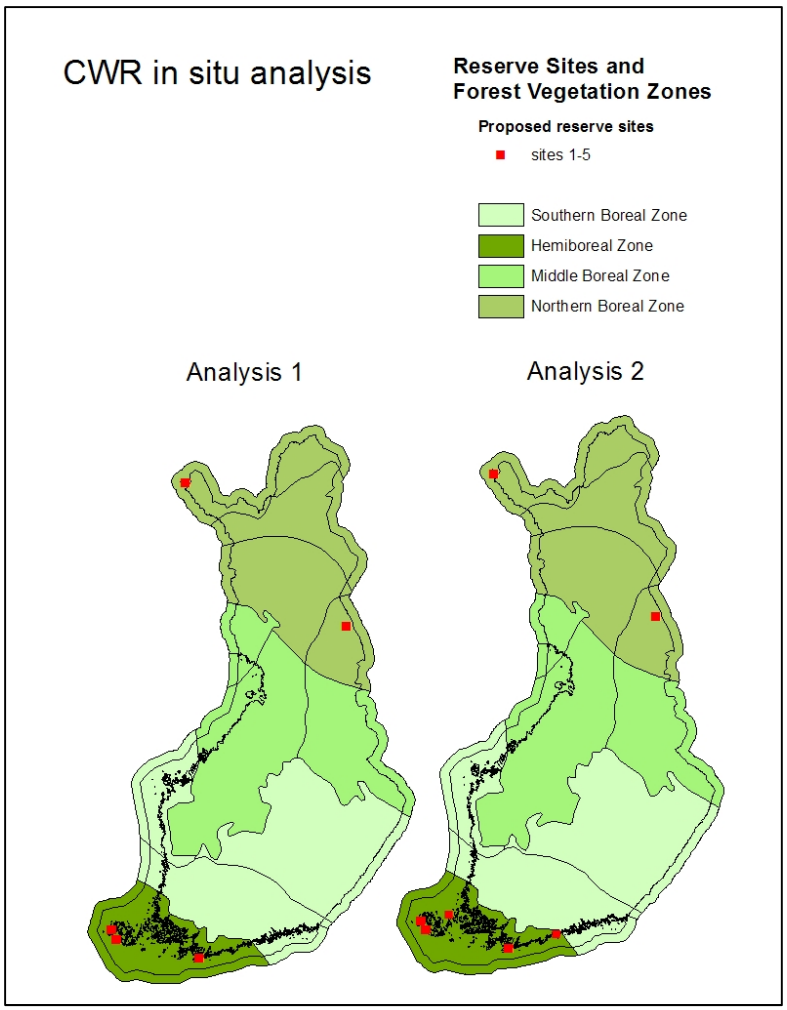


Figure 3. The CWR hotspots of the two analyses on a forest vegetation zone map. Source: Author

3.2.1 Sites 1 and 5: Åland Islands

The Åland Islands, at the junction of the Gulf of Finland and the Gulf of Bothnia, is an autonomous Swedish-speaking archipelago province of Finland in the Baltic Sea. It has a separate environmental administration and legislation. Åland comprises of the Main Island and c. 6400 smaller islands. The nature is unique with some of the most species-rich areas in Finland. Åland is covered by calcareous soil with relatively high pH, which with the traditional agriculture has led to the development of species−rich wooded meadows, groves, open pastures and heaths. The landscapes in the islands vary from pine and deciduous forests to farmlands and barren cliffs. Meadow types range from wooded meadows with pollard trees to dry and coastal meadows. The main threat to the plant species is overgrowing of meadows since the changes in agricultural practices have led to the decrease of cattle grazing and use of wooded meadows. Åland has altogether 52 small conservation areas (Anon. 2011).

The complementarity analysis revealed two sites as particularly CWR species rich within Åland; grid 670:309 and grid 668:310, both on the main island. The complementarity analysis gives the number of species which are not present in other proposed reserves. For site one it is 65 taxa and site 5 it is 13 taxa. The total number of priority CWR present in site 5 is 63 taxa, therefore there are many duplicated taxa between the two sites. The first site falls half on Eckerö and half on Hammarland. Eckerö is known to have a high diversity of species on seaside and wooded meadows. Eckerö and Hammarland region have several small conservation areas, of which few fall within this grid; Svatnö-Kaja, Näsgärdan and Ängessjö. The second site falls on the grid containing Marianhamn capital city,

but also on some smaller islands, such as Nåtö, which has high diversity of species. There are several nature conservation areas in the grid; Nåtö-Jungfruskär (124ha), Espholm (7ha) and Ramsholmen.

Ålands crop wild relatives include several taxa, which are not found elsewhere in Finland. The CWR genera found within the two proposed sites and important in terms for their priority as food/forage crops in Europe and Finland include; *Fragaria (2), Malus, Lathyrus* (3 sp.), *Vicia* (7 sp.), *Allium* (4 sp.), *Festuca* (2 sp.), *Phleum, Poa, Trifolium* (4 sp.), *Ribes, Rubus* (4 sp.) (Appendices 3 and 4). Additional taxa that may be considered important CWR in Åland are the following ones which are threatened and have a limited distribution within Finland: *Arctium nemorosum, Carex caryophyllea, Carex hostiana, Carex ornithopoda, Carex remota, Carex vulpina, Carlina vulgaris , Cladium mariscus, Crataegus monogyna, Crataegus rhipidophylla, Geranium dissectum, Polygala amarella, Polygala vulgaris, Potentilla tabernaemontani, Primula farinosa, Rosa canina, Rosa sherardii, Salicornia europaea, Sorbus intermedia, Sorbus meinichii, Spergularia media.*

3.2.2 Site 2: Oulanka

The 10x10 km grid square 736:360 is located in the Oulanka National Park area in the Northern Ostrobothnia region of Finland. This region has a unique and rich combination of northern, southern and eastern species of which many are found at the edge of their distribution range. The nutrient-rich soil in untouched pine forests, mires, river valleys and sandy riverbanks with various microclimates provide habitats for diverse flora and endangered plant species.

Large part of the grid is taken up by the Oulanka National Park. The grid includes 24 priority CWR taxa not found in the first site and 39 CWR priority taxa in total. The CWR genera important in terms for their priority as food/forage crops include for example; *Elymus* (2 sp.), *Festuca* (2 sp.), *Ribes* (1 sp.), *Rubus* (4 sp.), *Trifolium* (3 sp.) and *Vicia* (2 sp.) (Appendices 3 and 4). Some additional CWRs are found in the National Park outside of the grid, such as: *Dactylorhiza incarnata subsp. cruenta, Elymus alaskanus* ssp. *scandicus, Lonicera caerulea* and *Ranunculus lapponicus*.

3.2.3 Site 3: Hanko peninsula

The Hanko peninsula is the southernmost tip of continental Finland with a vast archipelago surrounding it. Hanko Peninsula is at the entrance of the Gulf of Finland and marks the edge of Baltic Sea proper. Geologically Hanko peninsula is a mixture of Precambrian bedrock and a moraine or sandy soils. Therefore, most of the vegetation is dry pine forests but rich organic soils with lush vegetation can also be found. The area has high species diversity and number of different biotopes harbouring many endangered species of Finland. The species richness is partially due to Hanko's location as an old and active harbour city.

The grid coming up as the third CWR rich area is 664:328. The complementarity analysis gives the number of species which are not present in other proposed reserves. For site 3 this is 14 taxa, but the total priority CWR number is 51 taxa. Several valuable taxa grow here, including; *Elymus farctus* subsp. *boreoatlanticus*, *Malus sylvestris*, *Fragaria vesca*, *Ammophila arenaria*.. Other CWR genus important in terms for their priority as food/forage crops are for example: *Lathyrus* (2 sp.), *Vicia* (5 sp.), *Allium* (2 sp.), *Festuca* (3 sp.), *Trifolium* (6 sp.), *Atriplex*, *Salsola*, *Ribes* (2 sp.), *Rubus* (4 sp.), *Urtica* (Appendices 3 and 4). The conservation areas within this grid are; Tvärminne research station nature conservation area, Santalan korpi mire reserve, Bengtsår herb-rich forest reserve and Stormossen virgin forest. Additionally there is Tammisaari and Hanko archipelago and Pohjanpitäjänlahti sea reserve, which is also a Ramsar site.

3.2.4 Site 4: Saana and Malla fell area

This 10x10 km grid (767:325) falls on the most northwest corner of Finland, called 'Käsivarsi' area. It is located 270 km north of the Arctic Circle, Arctic Ocean being only 50 km away. This alpine area is geologically and geographically at a unique location. It is at the culmination point of Finnish, Norwegian and Swedish Lapland and has the highest mountains in Finland which are part of the Scandinavian Mountains. The baserock is more alkaline and younger than elsewhere in Finland. The

rock type, water from melting snow throughout the summer and the Arctic Sea influence, all enable unusually lush growth conditions for more demanding species, many of which are endangered and do not grow elsewhere in Finland. The herb-rich forests on the fells can be compared to the ones in Åland archipelago region.

The flora in the Kilpisjärvi area is a mixture of northern boreal, alpine and arctic species. Saana and Malla Fells have highest vascular plant diversity in the Käsivarsi area (Järvinen & Lahti, 2004). Altogether 330 vascular plant taxa have been found in Malla and 340 in Saana fells, of which 47 are red-listed (Kauhanen, 2013), suggesting them to be hotspots of vascular plant diversity in the region. Similar patterns of species richness can be also found on nearby areas of the Scandinavian mountains in Sweden and Norway (Olofsson & Oksanen, 2005).

Saana fell has been designated as a protected area since 1988, covering 240 ha of the mountain slopes and an herb-rich forest reserve since 1992 with 76 ha at the base of the fell. It is also a Natura 2000 site. Malla fell was the first area in Finland to be established as a protected area with special regulations in 1916. It became a Malla Strict Nature Reserve in 1938 and covers an area of 30,5 km^2. There are many threats to the species in the area from grazing pressure, construction and recreational activities to climate change. The area was proposed in 2012 to be established as a National Park (Anon. 2012b).

The grid (767:325) covers both the protected area and the herb-rich forest reserve in the Saana fell and part of the Malla strict nature reserve. The grid contains 13 CWR priority taxa not found in the other 5 grids and 27 priority CWR taxa altogether (Fig, Appendix). CWR genus important in terms for their priority as food/forage crops in Europe found within the grid include for example: *Fragaria*, *Lathyrus*, *Vicia* (2 sp.), *Festuca* (2 sp.), *Trifolium* (2 sp.), *Ribes*, *Rubus* (4 sp.) (Appendices 3 and 4). There may be more priority CWR within the conservation areas which do not fall within the grid as most of Malla nature reserve is not covered by the grid. For example *Antennaria porsildii* (VU) and *Sedum villosum* (VU) are threatened CWR taxa found within the Saana/Malla fells (Kauhanen, 2013) but not within the grid.

3.2.5 In situ conservation status of CWR

The data on the conservation status of priority CWR covers 139 taxa and is incomplete for 80 taxa. Table 5 shows the conservation status of the priority CWR taxa; 13 percent (28 taxa) have 100 percent of their populations conserved and approximately 33 percent (68 taxa) have over 60 percent of their populations conserved within existing protected areas in Finland. Furthermore, 7 percent (16 taxa) have fewer than 10% of their populations conserved. The remaining 70 taxa fall between 10-60 percent of their populations conserved (Pers. Comm. Eeronheimo, 2013).

However, the *in situ* conservation of crop wild relatives would ideally be based on genetic reserve conservation, which can be defined as: '*the location, management and monitoring of genetic diversity in natural populations within defined areas designated for long-term conservation*' (Maxted at al. 1997). Therefore, it is not known whether the genetic diversity of the taxa is conserved even if the populations grow within a conservation area, if there are no management and monitoring practices in place for genetic resource conservation.

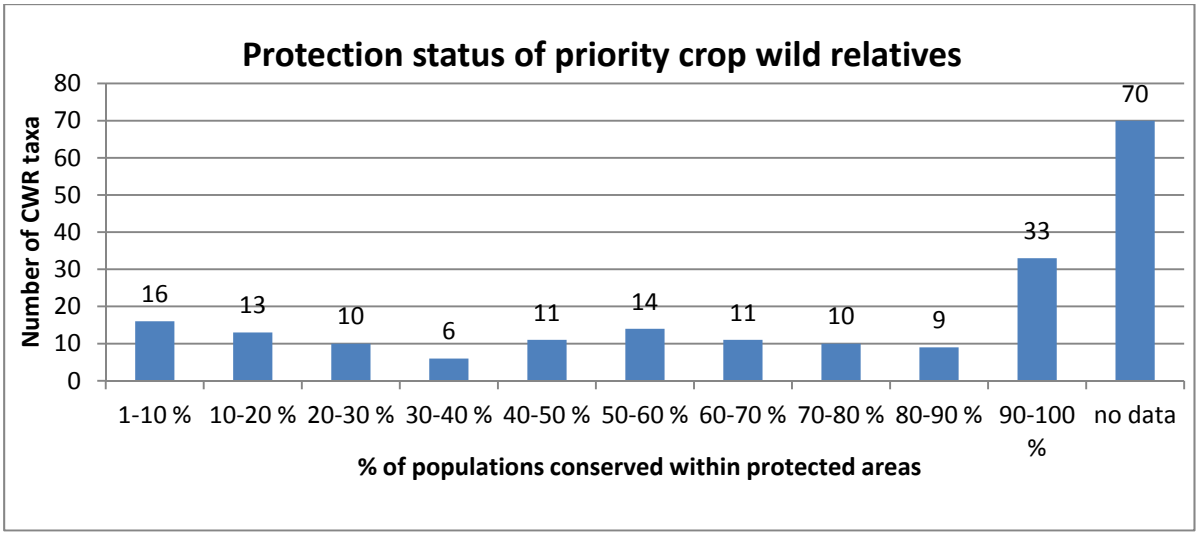


Table 5. Protection status of priority CWR taxa. Source: Author (protection status data: Eeronheimo, 2013).

3.3 Ex situ Gap Analysis

Out of the 209 priority CWR, 56 taxa are found in *ex situ* collections with origin data; 45 in the botanic gardens' living collections, seed collections or *in vitro*; 8 in NordGen seedbank and 2 in the Finnish Forest Research Institute *ex situ* program of forestry species. However, most of these collections have only one accession per taxon, even though the distribution of the species may be much wider. The collection is therefore not genetically representative, unless the taxon only exists in a single location. Only 7 of the CWR priority taxa (3 percent) are collected from a minimum of five locations; *Allium schoenoprasum* var. *schoenoprasum*, *Elymus fibrosus*, *Festuca ovina*, *Festuca rubra*, *Phleum pratense ssp. Pratense*, *Trifolium pratense* ssp. *Pratense*, *Trifolium repens*. Those priority CWR taxa and the number of their accessions which are already in *ex situ* are shown in Table 6. The 49 taxa which have been collected from fewer than five populations would need additional collecting from diverse locations of their distribution.

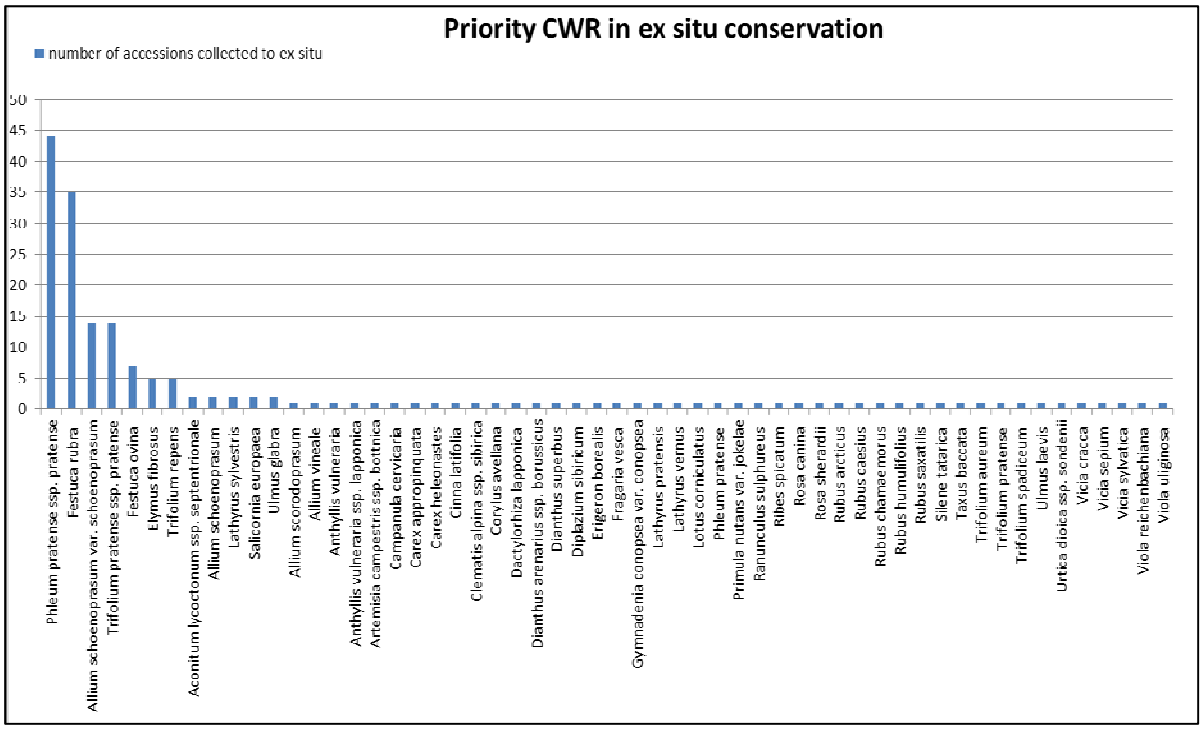


Table 6. Accessions of the priority CWR in *ex situ* conservation. Source: Author

3.3.1 Conservation Gaps

In all, 75% of the priority CWRs (160 taxa) are not in any *ex situ* collection. Of these, 18 are critically endangered, 56 endangered, 48 vulnerable, 19 near threatened and 4 already regionally extinct (Appendix 5). The figure on the distribution of the priority CWR diversity within Finland overlaid with the location data of the CWR taxa already in *ex situ* conservation gives a general idea of the *ex situ* gaps (Figure 4). The collections are mainly from the southern and northern parts of Finland, leaving the central areas uncollected. Many of the threatened priority CWR taxa, which are not yet collected *ex situ*, will be covered by the ESCAPE-project, which aims to protect at least 100 threatened priority species *ex situ* (Ryttäri, 2013). In all, 91 of the ESCAPE priority list taxa are also priority crop wild relatives. Potentially more threatened taxa than the 100 priority species will be collected in the following years by the ESCAPE project. The highest gaps in the crop wild relative *ex situ* conservation are therefore those 111 threatened taxa, which are not collected by ESCAPE and the 28 unthreatened taxa not targeted by ESCAPE at all. The taxon lists can be found in the Appendix 5. These crop wild relatives should be targeted for *ex situ* collecting action in the future.

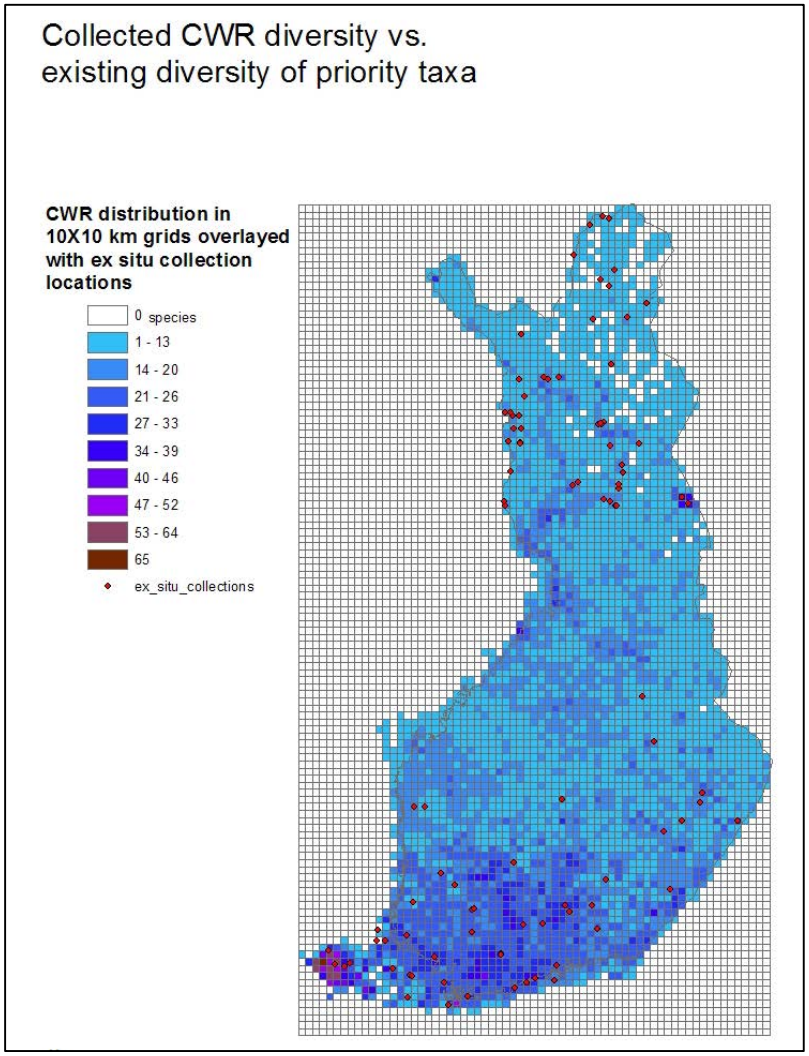


Figure 4. Existing *ex situ* collections of CWR in Finland and the *in situ* diversity. Source: Author

4 Recommendations


Source: Aarne Laasonen

4.1 Important CWR taxa

The following genera of the '18 High priority human food crops/crop groups of Europe' (Kell *et al.*, 2012) and of the 'priority human and animal food crops listed in the ITPGRFA' (FAO, 2001) are found in Finland and are therefore considered to be of particular importance: *Malus* (apple), *Fragaria* (strawberry), *Lactuca* (lettuce), *Lathyrus* (grass pea - GP1b, TG1b, GP2, TG2 only), *Elymus* (wheat complex), *Vicia* (faba bean/vetch - mainly GP1b, TG1b, GP2, TG2), *Allium* (onions), *Agrostis*, *Festuca*, *Phleum*, *Poa* (grass forages), *Trifolium* (Legume forages), *Atriplex*, *Salsola* (other forages). Additionally to those, the following CWR genera are important within Finland: *Ribes*, *Rubus*, *Hypericum* and *Urtica*, according to the yield of CWR related main crops 2010 Finland (Tike, Crop production statistics) and yield of CWR related herb crops in Finland (B. Galambosi, pers. comm.).

Due to the threat factors, Finnish CWR taxa requiring urgent conservation are those critically endangered taxa, which received most 'use' and 'value' points in the prioritization process, *Anthyllis vulneraria* ssp. *polyphylla*, *Artemisia campestris* ssp. *bottnica*, *Hypericum montanum*, *Pimpinella major*, *Rosa canina*, *Sorbus meinichii*; the critically endangered species which have additional 'threat' points, *Asperula tinctoria*, *Bromopsis benekenii*, *Dianthus superbus*, *Erica tetralix*, *Liparis loeselii*, *Melica ciliata*, *Polygonum oxyspermum*, *Puccinellia phryganodes*, *Salix pyrolifolia*, *Silene furcata* and *Sium latifolium;* and the near threatened taxa having most 'use' points, *Malus sylvestris*, *Fragaria viridis*. Additionally, there is a need to conserve the genetic resources of the non-threatened CWR taxa, which have most points in all the prioritization criteria; *Alisma wahlenbergii*, *Allium schoenoprasum*, *Fragaria vesca*, *Lathyrus sylvestris*, *Ribes nigrum*, *R. spicatum*, *Vicia cracca*, *V. hirsuta*, *V. sepium*, *V. tertrasperma* and *V. villosa*. The wild relatives of genera *Phleum* and *Fragaria* have additional value due to their relevance for current plant breeding programs in Finland.

Malus sylvestris. Source: Jukka Sarvarinne

Fragaria vesca. Source: MTT arkisto/Tarja Hietaranta

4.2 In situ implementation

Previously the crop wild relative conservation was focusing on the *ex situ* conservation, but now it is widely agreed that CWR taxa should be primarily conserved *in situ* in their natural habitats to allow the CWR populations to evolve and adapt to changing conditions. Additionally, these taxa should be sampled for *ex situ* conservation for safety backup, and their utilization in pre-breeding/breeding programs and recovery/restoration programs should be facilitated.

As a majority (76 percent) of the flora of Finland is crop wild relatives, many already exist within protected areas and are therefore passively conserved. However, it is important to include the CWR in the protected area management plan. This would ideally prevent a decline of the populations or other adverse effects from taking place. There should be a monitoring plan for the CWR taxa populations to monitor their genetic diversity and natural dynamics. The management plan should be adapted to possible traditional agricultural and farming practices if the CWR taxa require them but at the same time taking into account other important taxa in the area by harmonising their management practices with those of the CWR taxa.

CWR conservation would ideally consist of both within protected area conservation and outside of protected area conservation. The CWR taxa which are typically found growing in disturbed habitats, such as roadsides, field margins, fields or wastelands, may need a different conservation approach. Many of these species, which are considered weedy but can contain important genetic resources, might benefit from the outside of protected area conservation. As Maxted and Kell (2009) state, these habitats often contain large CWR populations, which are thriving and can potentially provide dispersal and gene flow routes for other CWR populations even in the protected areas. Similarly as with the genetic reserves, these sites will need a monitoring and management agreement and a regular interaction with the site owner.

From the threats and habitats analysis it can be seen, that one of the main actions to conserve CWR taxa in Finland would be to prevent overgrowing of shoreline meadows and open habitats, such as rural biotopes and cultural habitats. Restoration of already changed habitats would be beneficial, as previously meadow or open field habitats may hold a potential crop wild relative seedbank in the soil. For threatened species, data on the population level should be looked into.

When planning conservation of the CWR in the area, it is recommended to not follow the limitations of the grid but to follow the possible nature conservation area or reserve boundaries and look into which CWR taxa grow within the reserve and how to establish a genetic reserve within it by including the CWR taxa conservation in the maintenance and monitoring plan of the protected area. Additionally it would be recommended to look into the unconserved areas of the grid to find target locations for outside of protected area conservation.

4.3 Ex situ implementation

The 209 CWR priority taxa for Finland should be conserved *ex situ* in gene banks, such as NordGen or the new threatened wild species seedbank. The collection and sampling of the CWR taxa and the maintenance of the collections should follow commonly accepted *ex situ* guidelines, such as ‘Ensconet Seed Collecting Manual for Wild Species’ (Ensconet, 2009) and ‘Ensconet Curation Protocols & Recommendations’ (Ensconet, 2009). The seedbank should support potential users of the CWR by providing necessary and useful data and providing access to the genetic resources of crop wild relatives.

The ESCAPE-project will implement some of the *ex situ* conservation goals for crop wild relatives. A threatened species seedbank, which will be established in the Kumpula Botanic Garden of the Finnish Museum of Natural History, will collect genetically representative samples of the populations of many threatened CWR taxa along with the other threatened taxa. The species list of crop wild relatives that should be targeted for further collection since they will not be covered by ESCAPE, can be found in Appendix 5. The important CWR taxa, which are not threatened, may be conserved in

NordGen. To help detect genetically representative samples for the more widely distributed and non-threatened crop wild relative species, ecogeographical representativeness can be used (Parra- Quijano *et al*, 2012a).

4.4 Strategy limitations and future research recommendations

The following research points are recommended prior to the next strategy iteration:

- There is a need to look into the five proposed genetic reserve sites in detail to establish exact locations of the taxa within sites, the state of the target populations and to include the CWR taxa into the conservation area management and monitoring plans. More cooperation with nature management authorities is needed for the implementation of the *in situ* conservation of CWR taxa and for the further study of the priority taxa.
- The creation of a shorter priority list with experts and stakeholders would enable a more detailed analysis of the most important CWR taxa within Finland. Breeders' and other users' views should be included more broadly as they represent potential user groups of crop wild relative diversity. Novel use and potential future use of wild species could be looked into.
- The shortlisted or especially threatened CWR taxa would need conservation action plans. These should include management and monitoring plans for the populations to prevent erosion of genetic diversity. Guidelines developed for *in situ* management of crop wild relatives (Iriondo *et al.*, 2008 and 2012; Hunter *et al.*, 2012) can be used.
- Further study of the shortlist taxa could include an analysis of the genetic diversity, which would enable a more targeted *in situ* and *ex situ* conservation of crop wild relative resources. A more detailed ecogeographic study would also be an option, as studies suggest correlation between genetic and ecogeographic diversity (Maxted *et al.*, 2008b; Maxted *et al*., 2012; Parra- Quijano *et al*, 2012b). There is a need to look in more detail into the genetic diversity of CWR taxa within Finland to take into account variation between different regions and habitats when planning the CWR conservation.
- There are many wild harvested plants (WHS) in Finland, which are not included in the CWR checklist. These include berries, such as *Empetrum nigrum*, and wild vegetables and herbs. Some of these are coming into cultivation, restaurants and private people are also increasing the use of wild vegetables and herbs. There may be a need for a separate WHS checklist, which would help to ensure their sustainable and safe use.
- Additional information on the habitat improvement, assisted migration and reintroduction of some CWR taxa will be gained from the ESCAPE- project. There are several CWR taxa in the assisted migration study and in the planned reintroduction programmes. (pers. comm. Laaka-Lindberg, 2013). The habitat improvement program may also affect CWR taxa, since it will target the vulnerable habitats CWRs are found in, such as meadows, calcium rich rocky habitats and shores.
- Climate change poses a challenge to *in situ* conservation with possible shifts in the vegetation zones in future. However, *in situ* conservation allows species adaption to new climate conditions as opposed to *ex situ* conservation where species remain stagnant. Climate change scenarios can be used predict distributional changes, impacts on the species and to plan prioritisation of CWR. Each species may react differently, as a climate change study on three crop wild relative gene pools by Jarvis *et al* (2008) shows. Some of the target species lost over half of their distributional range, with the remaining populations being highly fragmented. Migration corridors and a network of reserves may assist the CWR populations to survive.

4.5 Next Strategy iteration

Next strategy iteration will take place in 5 years' time.

5 References

ACIA (2005). *Arctic Climate Impact Assessment*. Cambridge University Press, 1042 p.

Anon. (1997). *Nature Conservation Decree 160/1997 and its amendments*. Helsinki, Finland. Available at: http://www.finlex.fi/en/laki/kaannokset/1997/19970160

Anon. (2011). *Arbeten utförda inom landskapets naturreservat, naturminnen och andra skyddsobjekt*. Ålands landskapsregering. Miljobyrån. Available at: http://www.regeringen.ax/.composer/upload//Rapport_2011.pdf

Anon. (2012a). *Government Resolution on the Strategy for the Conservation and Sustainable Use of Biodiversity in Finland for the years 2012–2020, 'Saving Nature for People'*. Available at: http://www.ymparisto.fi/

Anon. (2012b). *Aloite Käsivarren suurtuntureiden kansallispuistosta*. Saanan luonnonystävät, Helsinki. Available at: www.saananluonnonystavat.fi/

Bilz M., Kell S.P., Maxted N., Lansdown R.V. (2011). *European Red List of Vascular Plants*. Publications Office of the European Union, Luxembourg.

Burley F.W. (1988). Monitoring biological diversity for setting priorities in conservation. In: Wilson E.O. and Peter F. M. (Eds) *Biodiversity*. National Academy Press, Washington DC. 227-230.

CBD (2010a). *Global Strategy for Plant Conservation 2011-2020*. Secretariat of the Convention on Biological Diversity, Montreal, Quebec, Canada. Available at: www.cbd.int/gspc/

CBD (2010b). *Strategic Plan for Biodiversity 2011-2020*. Secretariat of the Convention on Biological Diversity, Montreal, Quebec, Canada. Available at: www.cbd.int/sp/

FAO (2001). International Treaty on Plant Genetic Resources for Food and Agriculture. Food and Agriculture Organization of the United Nations. www.fao.org/AG/cgrfa/itpgr.htm

ENSCONET (2009). ENSCONET Curation Protocols & Recommendations. Available at: www.plants2020.net/document/0184/

ENSCONET (2009). ENSCONET Seed Collecting Manual for Wild Species. Available at: www.plants2020.net/document/0183/

EU (1992). The Council of the European Communities, Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. Available at: http://eurlex.europa.eu

Euro+Med (2006-). *Euro+Med PlantBase - the information resource for Euro-Mediterranean plant diversity*. Available at: http://ww2.bgbm.org/EuroPlusMed/

Eurostat (1995–2009). *Eurostat*, European Commission. (online). Available at: www.epp.eurostat.ec.europa.eu

FAOSTAT (2009). *Agricultural Crop Production Data*. (online). Available at: http://faostat.fao.org/

Fitzgerald, H., Korpelainen, H., Veteläinen, M. (2013). Prioritization of crop wild relatives in Finland, *Crop wild relative*, Issue 9. Available at: http://www.pgrsecure.org/publications

Galambosi, B. (2007). *Viljelyn merkitys luonnonyrttien raaka-ainehankinnassa Suomessa – Katsaus*. MTT- Mikkeli, Finland. Pp 17.

Hanelt, P. and IPK Gatersleben (eds.) (2001). *Mansfeld's Encyclopedia of Agricultural and Horticultural Crops*. 1-6. Springer, Berlin/Heidelberg/New York, 3645 pp. Available at: http://mansfeld.ipk-gatersleben.de

Harlan, J.R. and de Wet, J.M.J. (1971). Towards a rational classification of cultivated plants. *Taxon*, 20, 509–517

Heikkinen, I. (eds.) (2007). *Saving Nature for People - National Strategy and Action Plan for Conservation and Sustainable Use of Biodiversity in Finland 2006–2016*. Available at: http://www.cbd.int/doc/world/fi/fi-nbsap-v2-en.pdf

Hunter, D., Maxted, N., Heywood, V., *et al.* (2012). Protected Areas and the Challenge of Conserving Crop Wild Relatives. *PARKS. The International Journal of Protected Areas and Conservation*, 18.1 87.

Hyvärinen, M., Miranto, M., Hiltunen, R., Schulman, L. (2011). *Strategy and action plan for ex-situ conservation of threatened plants in Finland.* Available at: http://www.ymparisto.fi/download.asp?contentid=132157&lan=fi

Hämet-Ahti, L., Suominen, J., Ulvinen, T. and Uotila, P. (1998). *Retkeilykasvio*, 4. uudistettu painos. Luonnontieteellisen keskusmuseon kasvimuseo. Helsinki.
Hämet-Ahti, L. , Kurtto, A., Lampinen, R., Piirainen, M., Suominen, J. & Ulvinen, T. & Uotila., P. & Väre, H. (2005). Lisäyksiä ja korjauksia Retkeilykasvion neljänteen painokseen. *Lutukka*, 2005, 21. vsk, nro 2, s. 41-85.
Iriondo, J.M. , Maxted, N. and Dulloo, E. (eds.) (2008). *Conserving Plant Genetic Diversity in Protected Areas*. Wallingford, UK: CAB International.
Iriondo, J.M., Parra-Quijano, M., Lara-Romero, C. et al. (2012) Where and how? Genetic reserve site selection and development of common quality standards. *Crop Wild Relative*, Issue 8. Available at: http://www.pgrsecure.bham.ac.uk/
Jarvis, A., Lane, A. and Hijmans, R.J. (2008) The effect of climate change on crop wild relatives. *Agriculture Ecosystems & Environment*, 126, 13-23.
Järvinen, A & Lahti S. (eds.) (2004) *Suurtuntureiden luonto*. Kilpisjärven biologisen aseman 40-vuotisjuhlakirja, Palmenia-kustannus, Finland.
Kalliola, R. (1973) *Suomen kasvimaantiede*. WSOY, Porvoo, Finland.
Kauhanen H. O. (2013). Mountains of Kilpisjärvi Host An Abundance of Threatened Plants in Finnish Lapland. *Botanica Pacifica: A journal of plant science and conservation.* 2013. 2(1): 43–52.
Kell, S.P., Knüpffer, H., Jury, S.L., Maxted, N. and Ford-Lloyd, B.V. (2005). *Catalogue of Crop Wild Relatives for Europe and the Mediterranean*. University of Birmingham, Birmingham, UK. Available at: http://www.pgrforum.org/cwris/cwris.asp
Kell, S.P., Knüpffer, H., Jury, S.L., Ford-Lloyd, B.V. and Maxted, N. (2008). Crops and wild relatives of the Euro-Mediterranean region: making and using a conservation catalogue. In: Maxted, N., Ford-Lloyd, B.V., Kell, S.P., Iriondo, J., Dulloo, E. and Turok, J. (eds.) *Crop Wild Relative Conservation and Use*. CABI Publishing, Wallingford. pp. 69–109.
Kell, S.P., Maxted, N. and Bilz, M. (2012a). European crop wild relative threat assessment: knowledge gained and lessons learnt. In: Maxted, N., Dulloo, M.E., Ford-Lloyd, B.V., Frese, L., Iriondo, J.M. and Pinheiro de Carvalho, M.A.A. (eds.), *Agrobiodiversity Conservation: Securing the Diversity of Crop Wild Relatives and Landraces*. CABI Publishing, Wallingford. Pp. 218–242.
Kemppainen, E. and Eeronheimo, H. (2008) *Putkilokasvien suojelun edistäminen.* Suomen Ympäristökeskuksen raportteja, Helsinki. Available at: www.ympäristö.fi/julkaisut
Lampinen, R. and Lahti, T. (2010). *Kasviatlas 2009.* Helsingin Yliopisto, Luonnontieteellinen keskusmuseo, Kasvimuseo, Helsinki. Available at: http://www.luomus.fi/kasviatlas.
Lesica, P. and Allendorf, F. W. (1995). When Are Peripheral Populations Valuable for Conservation? *Conservation Biology*, Vol. 9, No. 4, pp. 753-760.
Maanmittauslaitos (2012). *Avoimien aineistojen tiedostopalvelu*. (online). Available at: http://www.maanmittauslaitos.fi/aineistot-palvelut/latauspalvelut/avoimien-aineistojen-tiedostopalvelu
Maxted, N., Hawkes, J. G., Ford-Lloyd, B. V. and Williams, J. T. (1997). A practical model for in situ genetic conservation. In: Maxted, N., Ford-Lloyd, B. V., Hawkes, J. G. (eds.) *Plant genetic conservation: the in situ approach*. 1997 pp. 339-367.
Maxted, N., Ford-Lloyd, B.V., Jury, S.L., Kell, S.P. and Scholten, M.A. (2006). Towards a definition of a crop wild relative. *Biodiversity and Conservation* 15(8), 2673-2685.
Maxted, N., Dulloo, E., Ford-Lloyd, B.V., Iriondo, J. M., and Jarvis, A. (2008a). Gap Analysis: A tool for complementary genetic conservation assessment. *Diversity and Distributions*, 14, 1018-1030.
Maxted, N. Iriondo, J.M. De Hond, L. et al. (2008b). "Genetic reserve management." In Iriondo, J.M. Dulloo, M.E. and Maxted, N. (eds.) *Conserving plant genetic diversity in protected areas: Population management of crop wild relatives*. Wallingford, UK: CAB International Publishing. pp. 65-87.
Maxted, N. and Kell, S.P., (2009). *Establishment of a Global Network for the In Situ Conservation of Crop Wild Relatives: Status and Needs*. FAO Commission on Genetic Resources for Food and Agriculture, Rome, Italy. 266 pp.
Maxted, N., Kell, S. and Magos Brehm, J. (2011). *Options to promote food security: on-farm management and in situ conservation of plant genetic resources for food and agriculture*. Food and Agriculture Organization of the United Nations, Rome, Italy.

Maxted, N., Kell, S., Ford-Lloyd, B., et al. (2012). Towards the Systematic Conservation of Global Crop Wild Relative Diversity. *Crop Science*, 52, 1-12.
Metla - The Finnish Forest research Institute (2012). *Genetic diversity is conserved in gene reserve forests and collections*. Available at: http://www.metla.fi/
Metsähallitus (2013). *Threatened species extended responsibility* (online). Available at: www.metsa.fi/
Miranto, M. (2005). *Living collections of botanic gardens as a means of ex situ conservation—a case study of African violets (Saintpaulia) in Europe*. M.Sc. thesis, University of Helsinki. Available at: www.ethesis.helsinki.fi/
Miranto, M., Hyvärinen, M., Hiltunen, R. and Schulman, L. (2012). Ex situ conservation of threatened native plants in Finland: analysis of the current status. *Endangered Species Research*. 17 (3), 227-236.
Olofsson, J. and L. Oksanen 2005. Effects of reindeer density on vascular plant diversity on North Scandinavian mountains. *Rangifer* 25(1), 5–18.
Parra-Quijano, M., Iriondo, J. M., Torres, E. (2012a). Improving representativeness of genebank collections through species distribution models, gap analysis and ecogeographical maps. *Biodiversity and Conservation*. 21, (1), 79-96.
Parra-Quijano, M. Iriondo, J.M. Frese, L. et al. (2012b). Spatial and Ecogeographic Approaches for Selecting Genetic Reserves in Europe. In Maxted, N.e.a. (ed.) *Agrobiodiversity Conservation: Securing the Diversity of Crop Wild Relatives and Landraces.* CABI International. pp. 20-28.
Planta Europa (2008). *A Sustainable Future for Europe; the European Strategy for Plant Conservation 2008–2014*. Plantlife International (Salisbury, UK) and the Council of Europe (Strasbourg, France). www.plantlife.org.uk/
Rassi, P., Alanen, A., Kanerva, T. et al. (eds) (2001). *The 2000 Red List of Finnish Species*. Ministry of the Environment & Finnish Environment Institute, Helsinki.
Rassi, P., Hyvärinen, E., Juslén, A. and Mannerkoski, I. (eds.) (2010). *The 2010 Red List of Finnish Species*. Ympäristöministeriö & Suomen ympäristökeskus, Helsinki.
Ryttäri, T. (2013). *ESCAPE Priority list of 100 native plants suggested for ex situ –conservation in Finland*. Suomen ympäristökeskus. (online). Available at: http://www.luomus.fi/
SYKE (2010). *Species with action plan* (online). Available at: www.ymparisto.fi/default.asp?node=1757&lan=sv
SYKE (2012). *OIVA - Ympäristö- ja paikkatietopalvelu asiantuntijoille.* (online). Available at: http://wwwp2.ymparisto.fi/scripts/oiva.asp
The Plant List (2010). Version 1. (online). Available at: http://www.theplantlist.org/
Tike, Crop production statistics (2010). *Yield of CWR related main crops 2010 Finland*. (online). Available at: www.maataloustilastot.fi
Veteläinen, M., Hulden, M. and Pehu, T. (eds.) (2008). *State of Plant Genetic Resources for Food and Agriculture in Finland - Second Finnish National Report*. Ministry of Agriculture and Forestry, Vammalan Kirjapaino Oy, Sastamala, Finland. Also available at: https://portal.mtt.fi/portal/page/portal/www/Tietopaketit/Kasvigeenivarat/5E526E87FC1DB8EEE040A8C0033C5628
Vincent, H., Wiersema, J., Dobbie, S., Kell, S.P., Fielder, H., Castenada, N., Eastwood, R., Guarino, L. and Maxted, N. (2012). *Global checklist of priority crop wild relatives* [online]. Available at: www.cwrdiversity.org.

5.1 Personal Communication

Eeronheimo, H. (2013) Metsähallitus, Luontopalvelut. *Data on the conservation status of priority CWR taxa*. Data sources: Eliölajit-tietokanta, SYKE and the Prioritized National CWR Inventory for Finland, Heli Fitzgerald.

Laaka-Lindberg S. (2013) Finnish Museum of Natural History. E-mail exchange.

6 Appendices

6.1 Appendix 1. Finnish CWR checklist

Finnish CWR checklist		
Taxon and author	**Family**	**Synonym**
Abies alba Mill.	Pinaceae	
Abies balsamea (L.) Mill.	Pinaceae	
Abies lasiocarpa (Hook.) Nutt.	Pinaceae	
Abies sibirica Ledeb.	Pinaceae	
Abies veitchii Lindl.	Pinaceae	
Acer platanoides L.	Aceraceae	
Acer platanoides L. subsp. platanoides	Aceraceae	
Acer pseudoplatanus L.	Aceraceae	
Achillea millefolium L.	Asteraceae	
Achillea ptarmica L.	Asteraceae	
Achillea salicifolia Besser	Asteraceae	
Aconitum lycoctonum L.	Ranunculaceae	
Aconitum lycoctonum L. subsp. lycoctonum	Ranunculaceae	
Aconitum lycoctonum L. subsp. septendrionale	Ranunculaceae	
Aconitum napellus L.	Ranunculaceae	
Aconitum napellus subsp. lusitanicum Rouy	Ranunculaceae	
Aconogonon alpinum (All.) Schur	Polygonaceae	
Aconogonon weyrichii (F.Schmidt) H.Hara	Polygonaceae	
Acorus calamus L.	Araceae	
Actaea erythrocarpa Fisch.	Ranunculaceae	
Actaea spicata L.	Ranunculaceae	
Aegopodium podagraria L.	Apiaceae	
Aethusa cynapium L.	Apiaceae	
Aethusa cynapium subsp. agrestis (Wallr.) Dostál	Apiaceae	
Aethusa cynapium L. subsp. cynapium	Apiaceae	
Aethusa cynapium L. var. cynapium	Apiaceae	
Agrimonia eupatoria L.	Rosaceae	
Agrimonia eupatoria L. subsp. eupatoria	Rosaceae	
Agrimonia eupatoria subsp. grandis (Asch. & Graebn.) Bornm.	Rosaceae	
Agrimonia pilosa Ledeb.	Rosaceae	
Agrimonia procera Wallr.	Rosaceae	
Agrostemma githago L.	Caryophyllaceae	
Agrostis canina L.	Poaceae	
Agrostis canina L. subsp. canina	Poaceae	
Agrostis capillaris L.	Poaceae	

Agrostis capillaris L. subsp. capillaris	Poaceae	
Agrostis clavata Trin.	Poaceae	
Agrostis gigantea Roth	Poaceae	
Agrostis gigantea Roth subsp. gigantea	Poaceae	
Agrostis mertensii Trin.	Poaceae	
Agrostis scabra Willd.	Poaceae	
Agrostis stolonifera L.	Poaceae	
Agrostis stolonifera L. subsp. stolonifera	Poaceae	
Agrostis vinealis Schreb.	Poaceae	
Aira praecox L.	Poaceae	
Ajuga genevensis L.	Lamiaceae	
Ajuga pyramidalis L.	Lamiaceae	
Ajuga reptans L.	Lamiaceae	
Alchemilla acutiloba Opiz	Rosaceae	
Alchemilla alpina L.	Rosaceae	
Alchemilla alpina L. subsp. alpina	Rosaceae	
Alchemilla baltica Juz.	Rosaceae	
Alchemilla borealis Juz.	Rosaceae	
Alchemilla cymatophylla Juz.	Rosaceae	
Alchemilla filicaulis Buser	Rosaceae	
Alchemilla filicaulis Buser subsp. filicaulis	Rosaceae	
Alchemilla filicaulis subsp. vestita (Buser) M.E.Bradshaw	Rosaceae	
Alchemilla gibberulosa H.Lindb.	Rosaceae	
Alchemilla glabra Neygenf.	Rosaceae	
Alchemilla glabricaulis H.Lindb.	Rosaceae	
Alchemilla glaucescens Wallr.	Rosaceae	
Alchemilla glomerulans Buser	Rosaceae	
Alchemilla gracilis Opiz	Rosaceae	*Alchemilla micans*
Alchemilla heptagona Juz.	Rosaceae	
Alchemilla hirsuticaulis H.Lindb.	Rosaceae	
Alchemilla leiophylla Juz.	Rosaceae	
Alchemilla monticola Opiz	Rosaceae	
Alchemilla murbeckiana Buser	Rosaceae	
Alchemilla obtusa Buser	Rosaceae	*Alchemilla obtusa*
Alchemilla plicata Buser	Rosaceae	
Alchemilla polemochora S.E.Fröhner	Rosaceae	
Alchemilla propinqua Juz.	Rosaceae	
Alchemilla sarmatica Juz.	Rosaceae	
Alchemilla semilunaris Alechin	Rosaceae	
Alchemilla subcrenata Buser	Rosaceae	
Alchemilla vulgaris L.	Rosaceae	
Alchemilla wichurae (Buser) Stefánsson	Rosaceae	
Alchemilla xanthochlora Rothm.	Rosaceae	

Alisma lanceolatum With.	Alismataceae	
Alisma plantago-aquatica L.	Alismataceae	
Alisma wahlenbergii (Holmb.) Juz.	Alismataceae	
Alliaria petiolata (M.Bieb.) Cavara & Grande	Brassicaceae	
Allium angulosum L.	Liliaceae	
Allium oleraceum L.	Liliaceae	
Allium schoenoprasum L.	Liliaceae	
Allium schoenoprasum L. subsp. schoenoprasum	Liliaceae	
Allium schoenoprasum subsp. alpinum (DC.) Čelak.	Liliaceae	
Allium scorodoprasum L.	Liliaceae	
Allium scorodoprasum L. subsp. scorodoprasum	Liliaceae	
Allium ursinum L.	Liliaceae	
Allium ursinum subsp. ucrainicum Kleopow & Oxner	Liliaceae	
Allium vineale L.	Liliaceae	
Allium vineale var. purpureum H.P.G.Koch	Liliaceae	
Alnus glutinosa (L.) Gaertn.	Betulaceae	
Alnus incana (L.) Moench	Betulaceae	
Alnus incana (L.) Moench subsp. incana	Betulaceae	
Alnus incana subsp. kolaensis (N.I.Orlova) Á.Löve & D.Löve	Betulaceae	
Alnus viridis (Chaix) DC.	Betulaceae	
Alopecurus aequalis Sobol.	Poaceae	
Alopecurus aequalis Sobol. subsp. aequalis	Poaceae	
Alopecurus arundinaceus Poir.	Poaceae	
Alopecurus geniculatus L.	Poaceae	
Alopecurus myosuroides Huds.	Poaceae	
Alopecurus pratensis L.	Poaceae	
Alopecurus pratensis L. subsp. pratensis	Poaceae	
Alyssum alyssoides (L.) L.	Brassicaceae	
Alyssum turkenistanicum Regel & Schmalh.	Brassicaceae	
Amaranthus albus L.	Amaranthaceae	
Amaranthus blitoides S.Watson	Amaranthaceae	
Amaranthus powellii S.Watson	Amaranthaceae	
Amaranthus retroflexus L.	Amaranthaceae	
Amelanchier spicata (Lam.) K.Koch	Rosaceae	
Ammophila arenaria (L.) Link	Poaceae	
Ammophila arenaria (L.) Link subsp. arenaria	Poaceae	
Anagallis arvensis L.	Primulaceae	*Anagallis arvensis subsp. foemina*
Anagallis minima (L.) E.H.L.Krause	Primulaceae	
Anchusa arvensis (L.) M.Bieb.	Boraginaceae	
Anchusa arvensis (L.) M.Bieb. subsp. arvensis	Boraginaceae	
Anchusa officinalis L.	Boraginaceae	
Andromeda polifolia L.	Ericaceae	
Andromeda polifolia L. subsp. polifolia	Ericaceae	

Anemone canadensis L.	Ranunculaceae	
Anemone nemorosa L.	Ranunculaceae	
Anemone ranunculoides L.	Ranunculaceae	
Anemone sylvestris L.	Ranunculaceae	
Anemone trifolia L.	Ranunculaceae	
Anemone trifolia L. subsp. trifolia	Ranunculaceae	
Angelica archangelica L.	Apiaceae	
Angelica archangelica L. subsp. archangelica	Apiaceae	
Angelica archangelica subsp. litoralis (Fr.) Thell.	Apiaceae	
Angelica sylvestris L.	Apiaceae	
Anisantha sterilis (L.) Nevski	Poaceae	
Anisantha tectorum (L.) Nevski	Poaceae	
Antennaria alpina (L.) Gaertn.	Asteraceae	
Antennaria canescens (Lange) Malte	Asteraceae	
Antennaria dioica (L.) Gaertn.	Asteraceae	
Antennaria nordhageniana Rune & Roønning	Asteraceae	
Antennaria porsildii E.Ekman	Asteraceae	
Antennaria villifera Boriss.	Asteraceae	
Anthemis arvensis L.	Asteraceae	
Anthemis arvensis L. subsp. arvensis	Asteraceae	
Anthemis cotula L.	Asteraceae	
Anthoxanthum alpinum Á.Löve & D.Löve	Poaceae	
Anthoxanthum odoratum L.	Poaceae	
Anthriscus sylvestris (L.) Hoffm.	Apiaceae	
Anthyllis vulneraria L.	Fabaceae	
Anthyllis vulneraria subsp. lapponica (Hyl.) Jalas	Fabaceae	
Anthyllis vulneraria subsp. polyphylla (DC.) Nyman	Fabaceae	
Anthyllis vulneraria L. subsp. vulneraria	Fabaceae	
Aphanes arvensis L.	Rosaceae	
Apium graveolens L.	Apiaceae	
Aquilegia vulgaris L.	Ranunculaceae	
Aquilegia vulgaris L. subsp. vulgaris	Ranunculaceae	
Arabis alpina L.	Brassicaceae	
Arabis alpina L. subsp. alpina	Brassicaceae	
Arabis borealis Ledeb.	Brassicaceae	*Arabis sagittata var. borealis*
Arabis glabra (L.) Bernh.	Brassicaceae	
Arabis hirsuta (L.) Scop.	Brassicaceae	
Arctagrostis latifolia (R.Br.) Griseb.	Poaceae	
Arctium lappa L.	Asteraceae	
Arctium minus Bernh.	Asteraceae	
Arctium nemorosum Lej.	Asteraceae	
Arctium tomentosum Mill.	Asteraceae	
Arctostaphylos alpinus (L.) Spreng.	Ericaceae	

Arctostaphylos uva-ursi (L.) Spreng.	Ericaceae	
Arctostaphylos uva-ursi (L.) Spreng. subsp. uva-ursi	Ericaceae	
Arenaria ciliata L.	Caryophyllaceae	
Arenaria norvegica Gunnerus	Caryophyllaceae	
Arenaria norvegica Gunnerus subsp. norvegica	Caryophyllaceae	
Arenaria serpyllifolia L.	Caryophyllaceae	
Armoracia rusticana P.Gaertn., B.Mey. & Scherb.	Brassicaceae	
Arnica angustifolia Vahl	Asteraceae	
Arnica angustifolia subsp. alpina (L.) I.K.Ferguson	Asteraceae	
Arrhenatherum elatius (L.) J.Presl & C.Presl	Poaceae	
Arrhenatherum elatius (L.) J.Presl & C.Presl subsp. elatius	Poaceae	
Artemisia absinthium L.	Asteraceae	
Artemisia biennis Willd.	Asteraceae	
Artemisia campestris L.	Asteraceae	
Artemisia campestris subsp. bottnica Kindb.	Asteraceae	
Artemisia campestris L. subsp. campestris	Asteraceae	
Artemisia vulgaris L.	Asteraceae	
Asarum europaeum L.	Aristolochiaceae	
Asarum europaeum L. subsp. europaeum	Aristolochiaceae	
Asparagus officinalis L.	Liliaceae	
Asparagus officinalis L. subsp. officinalis	Liliaceae	
Asperula tinctoria L.	Rubiaceae	
Asplenium adulterinum Milde	Aspleniaceae	
Asplenium adulterinum Milde subsp. adulterinum	Aspleniaceae	
Asplenium ruta-muraria L.	Aspleniaceae	
Asplenium ruta-muraria L. subsp. ruta-muraria	Aspleniaceae	
Asplenium septentrionale (L.) Hoffm.	Aspleniaceae	
Asplenium septentrionale (L.) Hoffm. subsp. septentrionale	Aspleniaceae	
Asplenium trichomanes L.	Aspleniaceae	
Asplenium trichomanes subsp. inexpectans Lovis	Aspleniaceae	
Asplenium trichomanes subsp. quadrivalens D.E.Mey. emend. Lovis	Aspleniaceae	
Asplenium trichomanes L. subsp. trichomanes	Aspleniaceae	
Asplenium viride Huds.	Aspleniaceae	
Astragalus alpinus L.	Fabaceae	
Astragalus alpinus L. subsp. alpinus	Fabaceae	
Astragalus alpinus subsp. arcticus Lindm.	Fabaceae	
Astragalus arenarius L.	Fabaceae	
Astragalus frigidus (L.) A.Gray	Fabaceae	
Astragalus glycyphyllos L.	Fabaceae	
Astrantia major L.	Apiaceae	
Astrantia major L. subsp. major	Apiaceae	
Athyrium distentifolium Opiz	Woodsiaceae	
Athyrium distentifolium Opiz var. distentifolium	Woodsiaceae	

Athyrium filix-femina (L.) Roth	Woodsiaceae	
Atriplex calotheca (Rafn) Fr.	Chenopodiaceae	
Atriplex glabriuscula Edmondston	Chenopodiaceae	
Atriplex hastata L.	Chenopodiaceae	
Atriplex hortensis L.	Chenopodiaceae	
Atriplex littoralis L.	Chenopodiaceae	
Atriplex longipes Drejer	Chenopodiaceae	
Atriplex longipes Drejer subsp. longipes	Chenopodiaceae	
Atriplex patula L.	Chenopodiaceae	
Atriplex praecox Hülph.	Chenopodiaceae	
Atriplex prostrata DC.	Chenopodiaceae	
Atriplex sagittata Borkh.	Chenopodiaceae	
Atriplex tatarica L.	Chenopodiaceae	
Avena fatua L.	Poaceae	
Avena fatua L. subsp. fatua	Poaceae	
Avena sativa L.	Poaceae	
Avena strigosa Schreb.	Poaceae	
Avena strigosa Schreb. subsp. strigosa	Poaceae	
Avenella flexuosa (L.) Drejer	Poaceae	*Deschampsia flexuosa*
Barbarea stricta Andrz.	Brassicaceae	
Barbarea vulgaris R.Br.	Brassicaceae	
Barbarea vulgaris var. arcuata (J.Presl & C.Presl) Fr.	Brassicaceae	
Barbarea vulgaris R.Br. var. vulgaris	Brassicaceae	
Bassia scoparia (L.) A.J.Scott	Chenopodiaceae	
Beckmannia eruciformis (L.) Host	Poaceae	
Beckmannia eruciformis (L.) Host subsp. eruciformis	Poaceae	
Beckmannia syzigachne (Steud.) Fernald	Poaceae	
Bellis perennis L.	Asteraceae	
Berberis thunbergii DC.	Berberidaceae	
Berberis vulgaris L.	Berberidaceae	
Berberis vulgaris L. subsp. vulgaris	Berberidaceae	
Berteroa incana (L.) DC.	Brassicaceae	
Beta vulgaris L.	Chenopodiaceae	
Betula nana L.	Betulaceae	
Betula pendula Roth	Betulaceae	
Betula pendula var. lapponica Lindq.	Betulaceae	
Betula pubescens Ehrh.	Betulaceae	*Betula callosa*
Betula pubescens subsp. carpatica (Willd.) Asch. & Graebn.	Betulaceae	
Betula pubescens Ehrh. subsp. czerepanovii (N.I.Orlova) Hämet-Ahti	Betulaceae	
Betula pubescens Ehrh. subsp. pubescens	Betulaceae	
Betula pubescens subsp. tortuosa (Ledeb.) Nyman	Betulaceae	
Bidens cernua L.	Asteraceae	

Bidens radiata Thuill.	Asteraceae	
Bidens tripartita L.	Asteraceae	
Bistorta major Gray	Polygonaceae	
Bistorta officinalis Delarbre	Polygonaceae	
Bistorta vivipara (L.) Delarbre, Grey	Polygonaceae	
Brachypodium pinnatum (L.) P.Beauv.	Poaceae	
Brachypodium pinnatum (L.) P.Beauv. subsp. pinnatum	Poaceae	
Brachypodium sylvaticum (Huds.) P.Beauv.	Poaceae	
Brachypodium sylvaticum (Huds.) P.Beauv. subsp. sylvaticum	Poaceae	
Brassica napus L.	Brassicaceae	
Brassica napus L. subsp. napus	Brassicaceae	
Brassica napus subsp. rapifera Metzg.	Brassicaceae	
Brassica nigra (L.) W.D.J.Koch	Brassicaceae	
Brassica rapa L.	Brassicaceae	
Brassica rapa subsp. campestris (L.) A.R.Clapham	Brassicaceae	
Briza media L.	Poaceae	
Briza media L. subsp. media	Poaceae	
Bromopsis benekenii (Lange) Holub	Poaceae	*Bromus benekenii*
Bromopsis erecta (Huds.) Fourr.	Poaceae	
Bromopsis erecta (Huds.) Fourr. subsp. erecta	Poaceae	
Bromopsis inermis (Leyss.) Holub	Poaceae	
Bromus arvensis L.	Poaceae	
Bromus arvensis L. subsp. arvensis	Poaceae	
Bromus commutatus Schrad.	Poaceae	
Bromus commutatus Schrad. subsp. commutatus	Poaceae	
Bromus hordeaceus L.	Poaceae	
Bromus hordeaceus L. subsp. hordeaceus	Poaceae	
Bromus japonicus Thunb.	Poaceae	
Bromus japonicus Thunb. subsp. japonicus	Poaceae	
Bromus secalinus L.	Poaceae	
Bromus squarrosus L.	Poaceae	
Bryonia alba L.	Cucurbitaceae	
Bunias orientalis L.	Brassicaceae	
Calamagrostis arundinacea (L.) Roth	Poaceae	
Calamagrostis canescens (Weber) Roth	Poaceae	*Calamagrostis gracilescens*
Calamagrostis canescens (Weber) Roth subsp. canescens	Poaceae	
Calamagrostis canescens subsp. vilnensis (Schult. & Schult.f.) H.Scholz	Poaceae	
Calamagrostis epigejos (L.) Roth	Poaceae	
Calamagrostis lapponica (Wahlenb.) Hartm.	Poaceae	
Calamagrostis purpurea (Trin.) Trin.	Poaceae	
Calamagrostis purpurea subsp. phragmitoides (Hartm.) Tzvelev	Poaceae	
Calamagrostis stricta (Timm) Koeler	Poaceae	

Calamintha grandiflora (L.) Moench	Lamiaceae	*Satureja grandiflora*
Calla palustris L.	Araceae	
Calluna vulgaris (L.) Hull	Ericaceae	
Caltha palustris L.	Ranunculaceae	
Caltha palustris L. subsp. palustris	Ranunculaceae	
Calystegia sepium (L.) R.Br.	Convolvulaceae	
Calystegia sepium (L.) R.Br. subsp. sepium	Convolvulaceae	
Calystegia sepium subsp. spectabilis Brummitt	Convolvulaceae	
Camelina alyssum (Mill.) Thell.	Brassicaceae	
Camelina alyssum subsp. integerrima (Čelak.) Smejkal	Brassicaceae	
Camelina microcarpa DC.	Brassicaceae	
Camelina sativa (L.) Crantz	Brassicaceae	
Campanula aparinoides Pursh	Campanulaceae	
Campanula cervicaria L.	Campanulaceae	
Campanula gieseckiana Vest	Campanulaceae	
Campanula glomerata L.	Campanulaceae	
Campanula glomerata subsp. farinosa (Rochel) Kirschl.	Campanulaceae	
Campanula glomerata L. subsp. glomerata	Campanulaceae	
Campanula latifolia L.	Campanulaceae	
Campanula patula L.	Campanulaceae	
Campanula patula L. subsp. patula	Campanulaceae	
Campanula persicifolia L.	Campanulaceae	
Campanula persicifolia L. subsp. persicifolia	Campanulaceae	
Campanula rapunculoides L.	Campanulaceae	
Campanula rotundifolia L.	Campanulaceae	
Campanula rotundifolia subsp. groenlandica (Berlin) Á.Löve & D.Löve	Campanulaceae	
Campanula rotundifolia L. subsp. rotundifolia	Campanulaceae	
Campanula trachelium L.	Campanulaceae	
Campanula trachelium L. subsp. trachelium	Campanulaceae	
Campanula uniflora L.	Campanulaceae	
Cannabis sativa L.	Cannabaceae	
Capsella bursa-pastoris (L.) Medik.	Brassicaceae	
Capsella bursa-pastoris (L.) Medik. subsp. bursa-pastoris	Brassicaceae	
Cardamine amara L.	Brassicaceae	
Cardamine amara L. subsp. amara	Brassicaceae	
Cardamine bellidifolia L.	Brassicaceae	
Cardamine bulbifera (L.) Crantz	Brassicaceae	
Cardamine flexuosa With.	Brassicaceae	
Cardamine hirsuta L.	Brassicaceae	
Cardamine impatiens L.	Brassicaceae	
Cardamine nymanii Gand.	Brassicaceae	
Cardamine parviflora L.	Brassicaceae	

Cardamine pratensis L.	Brassicaceae	
Cardamine pratensis subsp. paludosa (Knaf) Celak.	Brassicaceae	*Cardamine pratensis subsp. dentata*
Cardamine pratensis L. subsp. pratensis	Brassicaceae	
Cardaria draba (L.) Desv.	Brassicaceae	
Cardaria draba (L.) Desv. subsp. draba	Brassicaceae	
Carduus crispus L.	Asteraceae	
Carduus crispus L. subsp. crispus	Asteraceae	
Carduus nutans L.	Asteraceae	
Carduus nutans L. subsp. nutans	Asteraceae	
Carex acuta L.	Cyperaceae	
Carex acutiformis Ehrh.	Cyperaceae	
Carex appropinquata A.Schumach.	Cyperaceae	
Carex aquatilis Wahlenb.	Cyperaceae	
Carex aquatilis Wahlenb. subsp. aquatilis	Cyperaceae	
Carex arenaria L.	Cyperaceae	
Carex atherodes Spreng.	Cyperaceae	
Carex atrata L.	Cyperaceae	
Carex atrata L. subsp. atrata	Cyperaceae	
Carex atrofusca Schkuhr	Cyperaceae	
Carex bigelowii Schwein.	Cyperaceae	
Carex bigelowii Schwein. subsp. bigelowii	Cyperaceae	
Carex bohemica Schreb.	Cyperaceae	
Carex brunnescens (Pers.) Poir.	Cyperaceae	
Carex buxbaumii Wahlenb.	Cyperaceae	
Carex buxbaumii subsp. alpina (Hartm.) Liro	Cyperaceae	
Carex buxbaumii Wahlenb. subsp. buxbaumii	Cyperaceae	
Carex buxbaumii subsp. mutica (Hartm.) Isov.	Cyperaceae	
Carex canescens L.	Cyperaceae	
Carex capillaris L.	Cyperaceae	
Carex capillaris L. subsp. capillaris	Cyperaceae	
Carex capitata L.	Cyperaceae	
Carex caryophyllea Latourr.	Cyperaceae	
Carex cespitosa L.	Cyperaceae	
Carex chordorrhiza L.f.	Cyperaceae	
Carex cuprina (Heuff.) A.Kern.	Cyperaceae	*Carex otrubae*
Carex demissa Hornem.	Cyperaceae	
Carex diandra Schrank	Cyperaceae	
Carex digitata L.	Cyperaceae	
Carex dioica L.	Cyperaceae	
Carex disperma Dewey	Cyperaceae	
Carex distans L.	Cyperaceae	
Carex disticha Huds.	Cyperaceae	

Carex echinata Murray	Cyperaceae	
Carex elata All.	Cyperaceae	
Carex elata All. subsp. elata	Cyperaceae	
Carex elata subsp. omskiana (Meinsh.) Jalas	Cyperaceae	
Carex elongata L.	Cyperaceae	
Carex ericetorum Pollich	Cyperaceae	
Carex extensa Gooden.	Cyperaceae	
Carex flacca Schreb.	Cyperaceae	
Carex flacca Schreb. subsp. flacca	Cyperaceae	
Carex flava L.	Cyperaceae	
Carex fuliginosa Schkuhr	Cyperaceae	
Carex fuliginosa subsp. misandra (R.Br.) Nyman	Cyperaceae	
Carex glacialis Mack.	Cyperaceae	
Carex glareosa Wahlenb.	Cyperaceae	
Carex globularis L.	Cyperaceae	
Carex halophila F.Nyl.	Cyperaceae	
Carex hartmanii Cajander	Cyperaceae	
Carex heleonastes L.f.	Cyperaceae	
Carex hirta L.	Cyperaceae	
Carex holostoma Drejer	Cyperaceae	
Carex hostiana DC.	Cyperaceae	
Carex lachenalii Schkuhr	Cyperaceae	
Carex lapponica O.Lang	Cyperaceae	
Carex lasiocarpa Ehrh.	Cyperaceae	
Carex laxa Wahlenb.	Cyperaceae	
Carex lepidocarpa Tausch	Cyperaceae	
Carex lepidocarpa Tausch subsp. lepidocarpa	Cyperaceae	
Carex lepidocarpa subsp. jemtlandica Palmgr.	Cyperaceae	
Carex leporina L.	Cyperaceae	
Carex limosa L.	Cyperaceae	
Carex livida (Wahlenb.) Willd.	Cyperaceae	
Carex loliacea L.	Cyperaceae	
Carex mackenziei V.I.Krecz.	Cyperaceae	
Carex macloviana d'Urv.	Cyperaceae	
Carex magellanica Lam.	Cyperaceae	
Carex magellanica subsp. irrigua (Wahlenb.) Hiitonen	Cyperaceae	
Carex maritima Gunnerus	Cyperaceae	
Carex microglochin Wahlenb.	Cyperaceae	
Carex montana L.	Cyperaceae	
Carex muricata L.	Cyperaceae	
Carex muricata L. subsp. muricata	Cyperaceae	
Carex nigra (L.) Reichard	Cyperaceae	
Carex norvegica Retz.	Cyperaceae	

Carex norvegica subsp. inferalpina (Wahlenb.) Hultén	Cyperaceae	
Carex norvegica Retz. subsp. norvegica	Cyperaceae	
Carex ornithopoda Willd.	Cyperaceae	
Carex ornithopoda Willd. subsp. ornithopoda	Cyperaceae	
Carex paleacea Wahlenb.	Cyperaceae	
Carex pallens (Fristedt) Harmaja	Cyperaceae	
Carex pallescens L.	Cyperaceae	
Carex panicea L.	Cyperaceae	
Carex paniculata L.	Cyperaceae	
Carex paniculata L. subsp. paniculata	Cyperaceae	
Carex parallela (Laest.) Sommerf.	Cyperaceae	
Carex parallela (Laest.) Sommerf. subsp. parallela	Cyperaceae	
Carex pauciflora Lightf.	Cyperaceae	
Carex pediformis C.A.Mey.	Cyperaceae	
Carex pediformis C.A.Mey. subsp. pediformis	Cyperaceae	
Carex pilulifera L.	Cyperaceae	
Carex pilulifera L. subsp. pilulifera	Cyperaceae	
Carex praecox Schreb.	Cyperaceae	
Carex pseudocyperus L.	Cyperaceae	
Carex pulicaris L.	Cyperaceae	
Carex rariflora (Wahlenb.) Sm.	Cyperaceae	
Carex remota L.	Cyperaceae	
Carex rhynchophysa Fisch., C.A.Mey. & Avé-Lall.	Cyperaceae	
Carex riparia Curtis	Cyperaceae	
Carex rostrata Stokes	Cyperaceae	
Carex rotundata Wahlenb.	Cyperaceae	
Carex rupestris All.	Cyperaceae	
Carex saxatilis L.	Cyperaceae	
Carex spicata Huds.	Cyperaceae	
Carex stenolepis Less.	Cyperaceae	
Carex tenuiflora Wahlenb.	Cyperaceae	
Carex vaginata Tausch	Cyperaceae	
Carex vaginata subsp. quasivaginata (C.B.Clarke) Malyschev	Cyperaceae	
Carex vaginata Tausch subsp. vaginata	Cyperaceae	
Carex vesicaria L.	Cyperaceae	
Carex viridula Michx.	Cyperaceae	
Carex viridula var. bergrothii (Palmgr.) B.Schmid	Cyperaceae	
Carex vulpina L.	Cyperaceae	
Carlina biebersteinii Hornem.	Asteraceae	
Carlina biebersteinii Hornem. subsp. biebersteinii	Asteraceae	
Carlina biebersteinii subsp. brevibracteata (Andrae) K.Werner	Asteraceae	
Carlina vulgaris L.	Asteraceae	
Carlina vulgaris L. subsp. vulgaris	Asteraceae	

Carpinus betulus L.	Corylaceae	
Carum carvi L.	Apiaceae	
Catabrosa aquatica (L.) P.Beauv.	Poaceae	
Centaurea cyanus L.	Asteraceae	
Centaurea jacea L.	Asteraceae	
Centaurea montana L.	Asteraceae	
Centaurea phrygia L.	Asteraceae	
Centaurea phrygia L. subsp. phrygia	Asteraceae	
Centaurea scabiosa L.	Asteraceae	
Centaurium littorale (Turner) Gilmour	Gentianaceae	
Centaurium littorale (Turner) Gilmour subsp. littorale	Gentianaceae	
Centaurium pulchellum (Sw.) Druce	Gentianaceae	
Centaurium tenuifolium (M.Martens & Galeotti) B.L.Rob.	Gentianaceae	*Gyrandra tenuifolia*
Ceratochloa willdenowii (Kunth) W.A.Weber	Poaceae	*Bromus catharticus*
Chaerophyllum bulbosum L.	Apiaceae	
Chaerophyllum bulbosum subsp. prescotii (DC.) Nyman	Apiaceae	
Chelidonium majus L.	Papaveraceae	
Chenopodium album L.	Chenopodiaceae	
Chenopodium berlandieri Moq.	Chenopodiaceae	
Chenopodium bonus-henricus L.	Chenopodiaceae	
Chenopodium capitatum (L.) Ambrosi	Chenopodiaceae	
Chenopodium ficifolium Sm.	Chenopodiaceae	
Chenopodium foliosum (Moench) Asch.	Chenopodiaceae	
Chenopodium glaucum L.	Chenopodiaceae	
Chenopodium hybridum L.	Chenopodiaceae	
Chenopodium murale L.	Chenopodiaceae	
Chenopodium opulifolium W.D.J.Koch & Ziz	Chenopodiaceae	
Chenopodium polyspermum L.	Chenopodiaceae	
Chenopodium pratericola Rydb.	Chenopodiaceae	
Chenopodium rubrum L.	Chenopodiaceae	
Chenopodium simplex (Torr.) Raf.	Chenopodiaceae	
Chenopodium strictum Roth	Chenopodiaceae	
Chenopodium strictum subsp. glaucophyllum (Aellen) Aellen	Chenopodiaceae	
Chenopodium strictum subsp. striatiforme (Murr) Uotila	Chenopodiaceae	
Chenopodium strictum Roth subsp. strictum	Chenopodiaceae	
Chenopodium suecicum Murr	Chenopodiaceae	
Chenopodium urbicum L.	Chenopodiaceae	
Chenopodium vulvaria L.	Chenopodiaceae	
Chrysosplenium alternifolium L.	Saxifragaceae	
Chrysosplenium tetrandrum Th.Fr.	Saxifragaceae	
Cichorium intybus L.	Asteraceae	
Cicuta virosa L.	Apiaceae	

Cinna latifolia (Trevir.) Griseb.	Poaceae	
Cirsium arvense (L.) Scop.	Asteraceae	
Cirsium helenioides (L.) Hill	Asteraceae	
Cirsium oleraceum (L.) Scop.	Asteraceae	
Cirsium palustre (L.) Scop.	Asteraceae	
Cirsium vulgare (Savi) Ten.	Asteraceae	
Cladium mariscus (L.) Pohl	Cyperaceae	
Claytonia sibirica L.	Portulacaceae	
Clematis alpina (L.) Mill.	Ranunculaceae	
Clematis alpina subsp. sibirica (Mill.) Kuntze	Ranunculaceae	
Clinopodium vulgare L.	Lamiaceae	*Satureja vulgaris*
Cochlearia danica L.	Brassicaceae	
Cochlearia officinalis L.	Brassicaceae	
Cochlearia officinalis subsp. norvegica Nordal & Stabbetorp	Brassicaceae	
Cochlearia officinalis L. subsp. officinalis	Brassicaceae	
Colchicum autumnale L.	Liliaceae	
Colchicum autumnale L. subsp. autumnale	Liliaceae	
Commelina communis L.	Commelinaceae	
Conium maculatum L.	Apiaceae	
Conringia orientalis (L.) Dumort.	Brassicaceae	
Consolida regalis Gray	Ranunculaceae	
Consolida regalis Gray subsp. regalis	Ranunculaceae	
Convallaria majalis L.	Liliaceae	
Convolvulus arvensis L.	Convolvulaceae	
Corispermum pallasii Steven	Chenopodiaceae	
Cornus alba L.	Cornaceae	
Cornus alba L. subsp. alba	Cornaceae	
Cornus alba subsp. stolonifera (Michx.) Wangerin	Cornaceae	
Cornus sanguinea L.	Cornaceae	
Cornus sanguinea L. subsp. sanguinea	Cornaceae	
Cornus sericea L.	Cornaceae	*Cornus alba subsp. stolonifera*
Cornus suecica L.	Cornaceae	
Coronilla varia L.	Fabaceae	
Coronopus didymus (L.) Sm.	Brassicaceae	
Coronopus squamatus (Forssk.) Asch.	Brassicaceae	
Corydalis capnoides (L.) Pers.	Papaveraceae	
Corydalis intermedia (L.) Mérat	Papaveraceae	
Corydalis nobilis (L.) Pers.	Papaveraceae	
Corydalis solida (L.) Clairv.	Papaveraceae	
Corydalis solida (L.) Clairv. subsp. solida	Papaveraceae	
Corylus avellana L.	Corylaceae	
Cotoneaster integerrimus Medik.	Rosaceae	
Cotoneaster lucidus Schltdl.	Rosaceae	

Cotoneaster scandinavicus Hylmö	Rosaceae	
Cotoneaster uniflorus Bunge	Rosaceae	*Cotoniaster integerrimus var. uniflorus*
Crambe maritima L.	Brassicaceae	
Crassula aquatica (L.) Schönland	Crassulaceae	
Crataegus grayana Eggl.	Rosaceae	
Crataegus monogyna Jacq.	Rosaceae	
Crataegus monogyna subsp. nordica Franco	Rosaceae	
Crataegus rhipidophylla Gand.	Rosaceae	
Crataegus rhipidophylla subsp. lindmanii (Hrabětová) K.I.Chr.	Rosaceae	*Crataegus calycina subsp. calycina*
Crataegus rhipidophylla Gand. subsp. rhipidophylla	Rosaceae	*Crataegus calycina subsp. curvisepala*
Crataegus sanguinea Pall.	Rosaceae	
Cucumis sativus L.	Cucurbitaceae	
Cucurbita pepo L.	Cucurbitaceae	
Cuscuta epilinum Weihe	Convolvulaceae	
Cuscuta epithymum (L.) Murray	Convolvulaceae	
Cuscuta epithymum (L.) Murray subsp. epithymum	Convolvulaceae	
Cuscuta europaea L.	Convolvulaceae	
Cynoglossum officinale L.	Boraginaceae	
Cynoglossum officinale L. subsp. officinale	Boraginaceae	
Cynosurus cristatus L.	Poaceae	
Cypripedium calceolus L.	Orchidaceae	
Cytisus scoparius (L.) Link	Fabaceae	
Dactylis glomerata L.	Poaceae	
Dactylis glomerata L. subsp. glomerata	Poaceae	
Dactylorhiza baltica (Klinge) N.I.Orlova	Orchidaceae	
Dactylorhiza fuchsii (Druce) Soó	Orchidaceae	
Dactylorhiza fuchsii (Druce) Soó subsp. fuchsii	Orchidaceae	
Dactylorhiza fuchsii subsp. psychrophila (Schltr.) Holub	Orchidaceae	
Dactylorhiza incarnata (L.) Soó	Orchidaceae	
Dactylorhiza incarnata subsp. cruenta (O.F.Müll.) P.D.Sell	Orchidaceae	
Dactylorhiza incarnata (L.) Soó subsp. incarnata	Orchidaceae	
Dactylorhiza lapponica (Laest. ex Hartm.) Soó	Orchidaceae	
Dactylorhiza maculata (L.) Soó	Orchidaceae	
Dactylorhiza maculata subsp. elodes (Griseb.) Soó	Orchidaceae	
Dactylorhiza maculata (L.) Soó subsp. maculata	Orchidaceae	
Dactylorhiza majalis (Rchb.) P.F.Hunt & Summerh.	Orchidaceae	
Dactylorhiza majalis subsp. baltica (Klinge) H.Sund.	Orchidaceae	
Dactylorhiza majalis subsp. praetermissa (Druce) D.M.Moore & Soó	Orchidaceae	
Dactylorhiza sambucina (L.) Soó	Orchidaceae	

Dactylorhiza sambucina (L.) Soó subsp. sambucina	Orchidaceae	
Dactylorhiza sphagnicola (Höppner) Soó	Orchidaceae	
Dactylorhiza traunsteineri (Saut.) Soó	Orchidaceae	*Dactylorhiza curvifolia, Dactylorhiza trausteineri subsp. curvifolia*
Dactylorhiza traunsteineri subsp. lapponica (Hartm.) Soó	Orchidaceae	
Dactylorhiza traunsteineri (Saut.) Soó subsp. traunsteineri	Orchidaceae	
Danthonia decumbens (L.) DC.	Poaceae	
Danthonia decumbens (L.) DC. subsp. decumbens	Poaceae	
Daphne mezereum L.	Thymelaeaceae	
Daucus carota L.	Apiaceae	
Daucus carota L. subsp. carota	Apiaceae	
Daucus carota subsp. sativus (Hoffm.) Arcang.	Apiaceae	
Delphinium elatum L.	Ranunculaceae	
Delphinium elatum L. subsp. elatum	Ranunculaceae	
Deschampsia cespitosa (L.) P.Beauv.	Poaceae	*Deschampsia neumania*
Deschampsia cespitosa subsp. alpina (L.) Tzvelev	Poaceae	
Deschampsia cespitosa subsp. bottnica (Wahlenb.) G.C.S.Clarke	Poaceae	*Deschampsia bottnica*
Deschampsia cespitosa (L.) P.Beauv. subsp. cespitosa	Poaceae	
Descurainia sophia (L.) Prantl	Brassicaceae	
Dianthus arenarius L.	Caryophyllaceae	
Dianthus arenarius subsp. borussicus Vierh.	Caryophyllaceae	
Dianthus barbatus L.	Caryophyllaceae	
Dianthus barbatus L. subsp. barbatus	Caryophyllaceae	
Dianthus deltoides L.	Caryophyllaceae	
Dianthus deltoides L. subsp. deltoides	Caryophyllaceae	
Dianthus superbus L.	Caryophyllaceae	
Dianthus superbus L. subsp. superbus	Caryophyllaceae	
Dicentra spectabilis (L.) Lem.	Papaveraceae	
Digitalis grandiflora Mill.	Scrophulariaceae	
Digitaria sanguinalis (L.) Scop.	Poaceae	
Digitaria sanguinalis (L.) Scop. subsp. sanguinalis	Poaceae	
Diphasiastrum alpinum (L.) Holub	Lycopodiaceae	
Diphasiastrum complanatum (L.) Holub	Lycopodiaceae	
Diphasiastrum complanatum (L.) Holub subsp. complanatum	Lycopodiaceae	
Diphasiastrum complanatum subsp. montellii (Kukkonen) Kukkonen	Lycopodiaceae	
Diphasiastrum tristachyum (Pursh) Holub	Lycopodiaceae	
Diplazium sibiricum (Kunze) Sa.Kurata	Woodsiaceae	
Diplotaxis muralis (L.) DC.	Brassicaceae	
Diplotaxis tenuifolia (L.) DC.	Brassicaceae	
Dipsacus strigosus Willd.	Dipsacaceae	

Draba alpina L.	Brassicaceae	
Draba cinerea Adams	Brassicaceae	
Draba daurica DC.	Brassicaceae	
Draba fladnizensis Wulfen	Brassicaceae	
Draba incana L.	Brassicaceae	
Draba insularis Pissjauk. [non Goodd. (1940)]	Brassicaceae	*Draba valida*
Draba lactea Adams	Brassicaceae	
Draba muralis L.	Brassicaceae	
Draba nemorosa L.	Brassicaceae	
Draba nemorosa var. leiocarpa Lindblad	Brassicaceae	
Draba nemorosa L. var. nemorosa	Brassicaceae	
Draba nivalis Lilj.	Brassicaceae	
Draba norvegica Gunnerus	Brassicaceae	
Dracocephalum rusychiana L.	Lamiaceae	
Dracocephalum sibiricum (L.) L.	Lamiaceae	
Dracocephalum thymiflorum L.	Lamiaceae	
Dracocephalum triflorum L.	Lamiaceae	
Drosera intermedia Hayne	Droseraceae	
Drosera longifolia L.	Droseraceae	
Drosera rotundifolia L.	Droseraceae	
Dryas octopetala L.	Rosaceae	
Dryopteris carthusiana (Vill.) H.P.Fuchs	Dryopteridaceae	
Dryopteris cristata (L.) A.Gray	Dryopteridaceae	
Dryopteris dilatata (Hoffm.) A.Gray	Dryopteridaceae	
Dryopteris expansa (C.Presl) Fraser-Jenk. & Jermy	Dryopteridaceae	
Dryopteris filix-mas (L.) Schott	Dryopteridaceae	
Dryopteris fragrans (L.) Schott	Dryopteridaceae	
Echinochloa crus-galli (L.) P.Beauv.	Poaceae	
Echinochloa crus-galli (L.) P.Beauv. subsp. crus-galli	Poaceae	
Echium vulgare L.	Boraginaceae	
Echium vulgare L. subsp. vulgare	Boraginaceae	
Elaeagnus commutata Rydb.	Elaeagnaceae	
Eleocharis acicularis (L.) Roem. & Schult.	Cyperaceae	
Eleocharis mamillata H.Lindb.	Cyperaceae	
Eleocharis palustris (L.) Roem. & Schult.	Cyperaceae	
Eleocharis palustris (L.) Roem. & Schult. subsp. palustris	Cyperaceae	*Eleocharis palustris var. lindbergii*
Eleocharis palustris subsp. vulgaris Walters	Cyperaceae	
Eleocharis parvula (Roem. & Schult.) Bluff, Nees & Schauer	Cyperaceae	
Eleocharis quinqueflora (Hartmann) O.Schwarz	Cyperaceae	
Eleocharis uniglumis (Link) Schult.	Cyperaceae	
Eleocharis uniglumis subsp. fennica (Palla ex Kneuck.) Vestergr.	Cyperaceae	
Elodea canadensis Michx.	Hydrocharitaceae	

Elymus alaskanus (Scribn. & Merr.) Á.Löve	Poaceae	
Elymus alaskanus subsp. scandicus (Nevski) Melderis	Poaceae	*Elymus kronokensis subsp. scandicus*
Elymus alaskanus subsp. subalpinus (Neuman) Melderis	Poaceae	
Elymus caninus (L.) L.	Poaceae	*Elytrigia canina*
Elymus fibrosus (Schrenk) Tzvelev	Poaceae	
Elymus mutabilis (Drobow) Tzvelev	Poaceae	
Elymus farctus (Viv.) Runemark ex Melderis	Poaceae	*Elymus farctus subsp. boreoatlanticus, Elytrigia juncea, Elyrigia juncea subsp. boreali-atlantica*
Elymus farctus subsp. boreali-atlantica (Simonet & Guin.)	Poaceae	
Elymus repens (L.) Gould	Poaceae	*Elyrigia repens*
Epilobium adenocaulon Hausskn.	Onagraceae	
Epilobium alsinifolium Vill.	Onagraceae	
Epilobium anagallidifolium Lam.	Onagraceae	
Epilobium angustifolium L.	Onagraceae	
Epilobium ciliatum Raf.	Onagraceae	
Epilobium ciliatum Raf. subsp. ciliatum	Onagraceae	
Epilobium ciliatum subsp. glandulosum (Lehm.) Hoch & P.H.Raven	Onagraceae	
Epilobium collinum C.C.Gmel.	Onagraceae	
Epilobium davuricum Hornem.	Onagraceae	
Epilobium davuricum Hornem. subsp. davuricum	Onagraceae	
Epilobium hirsutum L.	Onagraceae	
Epilobium hornemannii Rchb.	Onagraceae	
Epilobium lactiflorum Hausskn.	Onagraceae	
Epilobium laestadii Kytöv.	Onagraceae	
Epilobium montanum L.	Onagraceae	
Epilobium obscurum Schreb.	Onagraceae	
Epilobium palustre L.	Onagraceae	
Epilobium palustre L. subsp. palustre	Onagraceae	
Epilobium parviflorum Schreb.	Onagraceae	
Epilobium roseum Schreb.	Onagraceae	
Epilobium roseum Schreb. subsp. roseum	Onagraceae	
Epilobium tetragonum L.	Onagraceae	
Epilobium tetragonum subsp. lamyi (F.W.Schultz) Nyman	Onagraceae	*Epilobium lamyi*
Epilobium tetragonum L. subsp. tetragonum	Onagraceae	
Epilobium watsonii Barbey	Onagraceae	*Epilobium adenocaulon*
Epipactis atrorubens (Hoffm.) Besser	Orchidaceae	
Epipactis atrorubens (Hoffm.) Besser subsp. atrorubens	Orchidaceae	
Epipactis helleborine (L.) Crantz	Orchidaceae	

Epipactis helleborine (L.) Crantz subsp. helleborine	Orchidaceae	
Epipactis palustris (L.) Crantz	Orchidaceae	
Equisetum arvense L.	Equisetaceae	
Equisetum arvense L. subsp. arvense	Equisetaceae	
Equisetum arvense subsp. boreale (Bong.) Á.Löve	Equisetaceae	
Equisetum fluviatile L.	Equisetaceae	
Equisetum hyemale L.	Equisetaceae	
Equisetum palustre L.	Equisetaceae	
Equisetum pratense Ehrh.	Equisetaceae	
Equisetum scirpoides Michx.	Equisetaceae	
Equisetum sylvaticum L.	Equisetaceae	
Equisetum variegatum Weber & Mohr	Equisetaceae	
Eragrostis cilianensis (All.) Janch.	Poaceae	
Eragrostis minor Host	Poaceae	
Eragrostis pilosa (L.) P.Beauv.	Poaceae	
Erica tetralix L.	Ericaceae	
Erigeron acris L.	Asteraceae	
Erigeron acris L. subsp. acris	Asteraceae	
Erigeron acris subsp. brachycephalus (H.Lindb.) Hiitonen	Asteraceae	
Erigeron acris subsp. droebachiensis (O.F.Müll.) Arcang.	Asteraceae	
Erigeron acris subsp. decoloratus (H.Lindb.) Hiitonen	Asteraceae	
Erigeron acris subsp. elongatiformis Novopokr.	Asteraceae	
Erigeron acris subsp. politus (Fr.) H.Lindb.	Asteraceae	
Erigeron borealis (Vierh.) Simmons	Asteraceae	
Erigeron canadensis L.	Asteraceae	
Erigeron humilis Graham	Asteraceae	
Erigeron uniflorus L.	Asteraceae	
Erigeron uniflorus subsp. eriocephalus (J.Vahl) Cronquist	Asteraceae	*Erigeron eriocephalus*
Erigeron uniflorus L. subsp. uniflorus	Asteraceae	
Erodium cicutarium (L.) Aiton	Geraniaceae	
Erodium moschatum (L.) Aiton	Geraniaceae	
Erophila verna (L.) Chevall.	Brassicaceae	
Erophila verna subsp. spathulata (Láng) Walters	Brassicaceae	
Erophila verna (L.) Chevall. subsp. verna	Brassicaceae	
Eruca vesicaria (L.) Cav.	Brassicaceae	
Erucastrum gallicum (Willd.) O.E.Schulz	Brassicaceae	
Erysimum cheiranthoides L.	Brassicaceae	
Erysimum cheiranthoides subsp. altum Ahti	Brassicaceae	
Erysimum cheiranthoides L. subsp. cheiranthoides	Brassicaceae	
Erysimum hieracifolium L.	Brassicaceae	*Erysimum strictum*
Erysimum repandum L.	Brassicaceae	
Eschscholzia californica Cham.	Papaveraceae	
Eupatorium cannabinum L.	Asteraceae	

Eupatorium cannabinum L. subsp. cannabinum	Asteraceae	
Euphorbia cyparissias L.	Euphorbiaceae	
Euphorbia esula L.	Euphorbiaceae	
Euphorbia esula L. subsp. esula	Euphorbiaceae	
Euphorbia helioscopia L.	Euphorbiaceae	
Euphorbia helioscopia L. subsp. helioscopia	Euphorbiaceae	
Euphorbia palustris L.	Euphorbiaceae	
Euphorbia peplus L.	Euphorbiaceae	
Euphrasia bottnica Kihlm.	Scrophulariaceae	
Euphrasia frigida Pugsley	Scrophulariaceae	
Euphrasia micrantha Rchb.	Scrophulariaceae	
Euphrasia nemorosa (Pers.) Wallr.	Scrophulariaceae	
Euphrasia rostkoviana Hayne	Scrophulariaceae	
Euphrasia rostkoviana subsp. fennica (Kihlm.) Karlsson	Scrophulariaceae	
Euphrasia rostkoviana subsp. montana (Jord.) Wettst.	Scrophulariaceae	
Euphrasia rostkoviana Hayne subsp. rostkoviana	Scrophulariaceae	
Euphrasia salisburgensis Funck	Scrophulariaceae	
Euphrasia scottica Wettst.	Scrophulariaceae	
Euphrasia stricta J.F.Lehm.	Scrophulariaceae	*Euphrasia stricta var. tenuis, Euphrasia arctica, Euphrasia saamica*
Fagopyrum esculentum Moench	Polygonaceae	
Fagopyrum tataricum (L.) Gaertn.	Polygonaceae	
Fagus sylvatica L.	Fagaceae	
Fallopia convolvulus (L.) Á.Löve	Polygonaceae	
Fallopia dumetorum (L.) Holub	Polygonaceae	
Fallopia japonica (Houtt.) Ronse Decr.	Polygonaceae	
Fallopia sachalinensis (F.Schmidt) Ronse Decr.	Polygonaceae	
Festuca arenaria Osbeck	Poaceae	*Festuca rubra aubsp. arenaria*
Festuca filiformis Pourr.	Poaceae	
Festuca gigantea (L.) Vill.	Poaceae	
Festuca heteromalla Pourr.	Poaceae	
Festuca heterophylla Lam.	Poaceae	
Festuca nigrescens Lam.	Poaceae	
Festuca ovina L.	Poaceae	
Festuca polesica Zapałł.	Poaceae	
Festuca richardsonii Hook.	Poaceae	
Festuca rubra L.	Poaceae	
Festuca rubra subsp. commutata Gaudin	Poaceae	
Festuca rubra subsp. juncea (Hack.) Soó	Poaceae	
Festuca rubra L. subsp. rubra	Poaceae	
Festuca stricta Host	Poaceae	

Festuca vivipara (L.) Sm.	Poaceae	
Filaginella uliginosa (L.) Opiz	Asteraceae	*Gnaphalium uliginosum*
Filipendula ulmaria (L.) Maxim.	Rosaceae	
Filipendula vulgaris Moench	Rosaceae	
Fragaria moschata Duchesne	Rosaceae	
Fragaria vesca L.	Rosaceae	
Fragaria viridis Duchesne	Rosaceae	
Fragaria viridis Duchesne subsp. viridis	Rosaceae	
Frangula alnus Mill.	Rhamnaceae	*Rhamnus frangula*
Fraxinus excelsior L.	Oleaceae	
Fritillaria meleagris L.	Liliaceae	
Fumaria officinalis L.	Papaveraceae	
Fumaria vaillantii Loisel.	Papaveraceae	
Galeopsis bifida Boenn.	Lamiaceae	
Galeopsis ladanum L.	Lamiaceae	
Galeopsis speciosa Mill.	Lamiaceae	
Galeopsis tetrahit L.	Lamiaceae	
Galinsoga ciliata (Raf.) S.F.Blake	Asteraceae	
Galinsoga parviflora Cav.	Asteraceae	
Galium album Mill.	Rubiaceae	
Galium album Mill. subsp. album	Rubiaceae	
Galium aparine L.	Rubiaceae	
Galium boreale L.	Rubiaceae	
Galium elongatum C.Presl	Rubiaceae	
Galium odoratum (L.) Scop.	Rubiaceae	
Galium palustre L.	Rubiaceae	
Galium palustre L. subsp. palustre	Rubiaceae	
Galium pumilum Murray	Rubiaceae	
Galium saxatile L.	Rubiaceae	
Galium schultesii Vest	Rubiaceae	
Galium spurium L.	Rubiaceae	
Galium spurium L. subsp. spurium	Rubiaceae	
Galium spurium subsp. vaillantii (DC.) Gaudin	Rubiaceae	
Galium trifidum L.	Rubiaceae	
Galium triflorum Michx.	Rubiaceae	
Galium uliginosum L.	Rubiaceae	
Galium verum L.	Rubiaceae	
Galium verum L. subsp. verum	Rubiaceae	
Gentiana nivalis L.	Gentianaceae	
Geranium bohemicum L.	Geraniaceae	
Geranium columbinum L.	Geraniaceae	
Geranium dissectum L.	Geraniaceae	
Geranium lucidum L.	Geraniaceae	

Geranium molle L.	Geraniaceae	
Geranium palustre L.	Geraniaceae	
Geranium phaeum L.	Geraniaceae	
Geranium pratense L.	Geraniaceae	
Geranium pusillum L.	Geraniaceae	
Geranium pyrenaicum Burm.f.	Geraniaceae	
Geranium pyrenaicum Burm.f. subsp. pyrenaicum	Geraniaceae	
Geranium robertianum L.	Geraniaceae	
Geranium sanguineum L.	Geraniaceae	
Geranium sylvaticum L.	Geraniaceae	
Geum aleppicum Jacq.	Rosaceae	*Geum intermedium*
Geum macrophyllum Willd.	Rosaceae	
Geum rivale L.	Rosaceae	
Geum urbanum L.	Rosaceae	
Gladiolus imbricatus L.	Iridaceae	
Glechoma hederacea L.	Lamiaceae	
Glyceria canadensis (Michx.) Trin.	Poaceae	
Glyceria declinata Bréb.	Poaceae	
Glyceria fluitans (L.) R.Br.	Poaceae	
Glyceria fluitans (L.) R.Br. subsp. fluitans	Poaceae	
Glyceria grandis S.Watson	Poaceae	
Glyceria lithuanica (Gorski) Gorski	Poaceae	
Glyceria maxima (Hartm.) Holmb.	Poaceae	
Glyceria notata Chevall.	Poaceae	
Glyceria plicata (Fr.) Fr.	Poaceae	
Glyceria striata (Lam.) Hitchc.	Poaceae	
Goodyera repens (L.) R.Br.	Orchidaceae	
Gratiola neglecta Torr.	Scrophulariaceae	
Gymnadenia conopsea (L.) R.Br.	Orchidaceae	
Gymnadenia conopsea (L.) R.Br. Var conopsea	Orchidaceae	
Gypsophila elegans M.Bieb.	Caryophyllaceae	
Gypsophila fastigiata L.	Caryophyllaceae	
Gypsophila muralis L.	Caryophyllaceae	
Helianthemum nummularium (L.) Mill.	Cistaceae	
Helianthemum nummularium (L.) Mill. subsp. nummularium	Cistaceae	
Hepatica nobilis Schreb.	Ranunculaceae	
Heracleum laciniatum	Apiaceae	*Heracleum persicum*
Heracleum mantegazzianum Sommier & Levier	Apiaceae	
Heracleum sphondylium L.	Apiaceae	
Heracleum sphondylium subsp. sibiricum (L.) Simonk.	Apiaceae	
Herniaria glabra L.	Caryophyllaceae	
Hesperis matronalis L.	Brassicaceae	

Hesperis matronalis L. subsp. matronalis	Brassicaceae	
Hippophae rhamnoides L.	Elaeagnaceae	
Hippuris tetraphylla L.f.	Hippuridaceae	
Hippuris vulgaris L.	Hippuridaceae	*Hippuris lanceolata*
Holcus lanatus L.	Poaceae	
Holcus mollis L.	Poaceae	
Holcus mollis L. subsp. mollis	Poaceae	
Hordeum jubatum L.	Poaceae	
Hordeum murinum L.	Poaceae	
Hordeum murinum L. subsp. murinum	Poaceae	
Hordeum vulgare L.	Poaceae	
Hordeum vulgare L. subsp. vulgare	Poaceae	
Humulus lupulus L.	Cannabaceae	
Huperzia selago (L.) Schrank & Mart.	Lycopodiaceae	
Huperzia selago (L.) Schrank & Mart. subsp. selago	Lycopodiaceae	
Hydrocharis morsus-ranae L.	Hydrocharitaceae	
Hylotelephium maximum (L.) Holub subsp. maximum	Crassulaceae	
Hylotelephium maximum subsp. ruprechtii (Jalas) Dostál	Crassulaceae	
Hylotelephium telephium (L.) H.Ohba	Crassulaceae	
Hyoscyamus niger L.	Solanaceae	
Hypericum hirsutum L.	Clusiaceae	
Hypericum maculatum Crantz	Clusiaceae	
Hypericum maculatum Crantz subsp. maculatum	Clusiaceae	
Hypericum montanum L.	Clusiaceae	
Hypericum perforatum L.	Clusiaceae	
Hypericum perforatum L. subsp. perforatum	Clusiaceae	
Hypericum pulchrum L.	Clusiaceae	
Hyssopus officinalis L.	Lamiaceae	
Iberis amara L.	Brassicaceae	
Iberis umbellata L.	Brassicaceae	
Impatiens capensis Meerb.	Balsaminaceae	
Impatiens glandulifera Royle	Balsaminaceae	
Impatiens noli-tangere L.	Balsaminaceae	
Impatiens parviflora DC.	Balsaminaceae	
Inula britannica L.	Asteraceae	
Inula helenium L.	Asteraceae	
Inula salicina L.	Asteraceae	
Inula salicina L. subsp. salicina	Asteraceae	
Iris pseudacorus L.	Iridaceae	
Isatis tinctoria L.	Brassicaceae	
Isatis tinctoria L. subsp. tinctoria	Brassicaceae	
Isoetes echinospora Durieu	Isoetaceae	
Isoetes lacustris L.	Isoetaceae	

Juncus alpinoarticulatus Chaix	Juncaceae	
Juncus alpinoarticulatus subsp. alpestris (Hartm.) Hämet-Ahti	Juncaceae	
Juncus alpinoarticulatus Chaix subsp. alpinoarticulatus	Juncaceae	
Juncus alpinoarticulatus subsp. fischerianus (V.I.Krecz.) Hämet-Ahti	Juncaceae	
Juncus alpinoarticulatus subsp. rariflorus (Hartm.) Holub	Juncaceae	
Juncus arcticus Willd.	Juncaceae	
Juncus arcticus Willd. subsp. arcticus	Juncaceae	
Juncus articulatus L.	Juncaceae	
Juncus articulatus L. subsp. articulatus	Juncaceae	
Juncus articulatus var. hylandri Hämet-Ahti	Juncaceae	
Juncus articulatus var. lindhardii (Wiinst.) Wiinst.	Juncaceae	
Juncus balticus Willd.	Juncaceae	
Juncus balticus Willd. subsp. balticus	Juncaceae	
Juncus biglumis L.	Juncaceae	
Juncus bufonius L.	Juncaceae	
Juncus bufonius subsp. minutulus Albert & Jahand.	Juncaceae	
Juncus bulbosus L.	Juncaceae	
Juncus compressus Jacq.	Juncaceae	
Juncus conglomeratus L.	Juncaceae	
Juncus effusus L.	Juncaceae	
Juncus effusus L. subsp. effusus	Juncaceae	
Juncus ensifolius Wikstr.	Juncaceae	
Juncus filiformis L.	Juncaceae	
Juncus gerardi Loisel.	Juncaceae	
Juncus gerardi subsp. atrofuscus (Rupr.) Printz	Juncaceae	
Juncus gerardi Loisel. subsp. gerardi	Juncaceae	
Juncus inflexus L.	Juncaceae	
Juncus minutulus (Albert & Jahand.) Prain	Juncaceae	
Juncus ranarius Songeon & E.P.Perrier	Juncaceae	
Juncus squarrosus L.	Juncaceae	
Juncus stygius L.	Juncaceae	
Juncus tenuis Willd.	Juncaceae	
Juncus trifidus L.	Juncaceae	
Juncus triglumis L.	Juncaceae	
Juncus triglumis L. subsp. triglumis	Juncaceae	
Juniperus communis L.	Cupressaceae	
Juniperus communis L. var. communis	Cupressaceae	
Juniperus communis var. saxatalis Pall.	Cupressaceae	
Knautia arvensis (L.) Coult.	Dipsacaceae	
Lactuca serriola L.	Asteraceae	
Lactuca sibirica (L.) Maxim.	Asteraceae	
Lactuca tatarica (L.) C.A.Mey.	Asteraceae	
Lamium album L.	Lamiaceae	

Lamium amplexicaule L.	Lamiaceae	
Lamium amplexicaule L. subsp. amplexicaule	Lamiaceae	
Lamium confertum Fr.	Lamiaceae	
Lamium hybridum Vill.	Lamiaceae	
Lamium purpureum L.	Lamiaceae	*Lamium molucellifolium*
Larix decidua Mill.	Pinaceae	
Larix decidua Mill. subsp. decidua	Pinaceae	
Larix gmelinii (Rupr.) Kuzen.	Pinaceae	
Larix sibirica Ledeb.	Pinaceae	
Laserpitium latifolium L.	Apiaceae	
Lathyrus japonicus Willd.	Fabaceae	
Lathyrus japonicus Willd. subsp. japonicus	Fabaceae	
Lathyrus japonicus subsp. maritimus (L.) P.W.Ball	Fabaceae	
Lathyrus linifolius (Reichard) Bässler	Fabaceae	*Lathyrus montanus*
Lathyrus niger (L.) Bernh.	Fabaceae	
Lathyrus niger (L.) Bernh. subsp. niger	Fabaceae	
Lathyrus palustris L.	Fabaceae	
Lathyrus palustris L. subsp. palustris	Fabaceae	
Lathyrus pratensis L.	Fabaceae	
Lathyrus sylvestris L.	Fabaceae	
Lathyrus tuberosus L.	Fabaceae	
Lathyrus vernus (L.) Bernh.	Fabaceae	
Lavatera thuringiaca L.	Malvaceae	
Lavatera thuringiaca L. subsp. thuringiaca	Malvaceae	
Ledum palustre L.	Ericaceae	
Ledum palustre subsp. decumbens (Aiton) Hultén	Ericaceae	
Ledum palustre L. subsp. palustre	Ericaceae	
Leersia oryzoides (L.) Sw.	Poaceae	
Lemna gibba L.	Lemnaceae	
Lemna minor L.	Lemnaceae	
Lemna trisulca L.	Lemnaceae	
Lemna turionifera Landolt	Lemnaceae	
Leontodon autumnalis L.	Asteraceae	
Leontodon autumnalis L. subsp. autumnalis	Asteraceae	
Leontodon autumnalis subsp. pratensis (W.D.J.Koch) Arcang.	Asteraceae	
Leontodon hispidus L.	Asteraceae	
Leontodon hispidus L. subsp. hispidus	Asteraceae	
Leonurus cardiaca L.	Lamiaceae	
Leonurus cardiaca L. subsp. cardiaca	Lamiaceae	
Leonurus cardiaca subsp. villosus (Spreng.) Hyl.	Lamiaceae	
Lepidium bonariense L.	Brassicaceae	
Lepidium campestre (L.) R.Br.	Brassicaceae	

Lepidium densiflorum Schrad.	Brassicaceae	
Lepidium densiflorum Schrad. subsp. densiflorum	Brassicaceae	
Lepidium densiflorum subsp. neglectum (Thell.) P. Fourn.	Brassicaceae	
Lepidium heterophyllum Benth.	Brassicaceae	
Lepidium latifolium L.	Brassicaceae	
Lepidium perfoliatum L.	Brassicaceae	
Lepidium ramosissimum A.Nelson	Brassicaceae	
Lepidium ruderale L.	Brassicaceae	
Lepidium sativum L.	Brassicaceae	
Lepidium virginicum L.	Brassicaceae	
Leucanthemum vulgare Lam.	Asteraceae	
Levisticum officinale W.D.J.Koch	Apiaceae	
Leymus arenarius (L.) Hochst.	Poaceae	
Lilium bulbiferum L.	Liliaceae	
Lilium martagon L.	Liliaceae	
Lilium martagon L. subsp. martagon	Liliaceae	
Linaria repens (L.) Mill.	Scrophulariaceae	
Linaria vulgaris Mill.	Scrophulariaceae	
Linum catharticum L.	Linaceae	
Linum usitatissimum L.	Linaceae	
Liparis loeselii (L.) Rich.	Orchidaceae	
Lithospermum arvense L.	Boraginaceae	
Lithospermum officinale L.	Boraginaceae	
Lobelia dortmanna L.	Campanulaceae	
Lobularia maritima (L.) Desv.	Brassicaceae	
Lolium multiflorum Lam.	Poaceae	
Lolium multiflorum Lam. subsp. multiflorum	Poaceae	
Lolium perenne L.	Poaceae	
Lolium remotum Schrank	Poaceae	
Lolium temulentum L.	Poaceae	
Lolium temulentum L. subsp. temulentum	Poaceae	
Lonicera caerulea L.	Caprifoliaceae	
Lonicera caerulea L. subsp. caerulea	Caprifoliaceae	
Lonicera caerulea subsp. pallasii (Ledeb.) Browicz	Caprifoliaceae	
Lonicera caprifolium L.	Caprifoliaceae	
Lonicera involucrata (Richardson) Spreng.	Caprifoliaceae	
Lonicera xylosteum L.	Caprifoliaceae	
Lotus corniculatus L.	Fabaceae	
Lotus pedunculatus Cav.	Fabaceae	*Lotus uliginosus*
Lotus tenuis Willd.	Fabaceae	
Lupinus polyphyllus Lindl.	Fabaceae	
Luzula arcuata (Wahlenb.) Sw.	Juncaceae	
Luzula arcuata subsp. arctuata	Juncaceae	

Luzula campestris (L.) DC.	Juncaceae	
Luzula campestris (L.) DC. subsp. campestris	Juncaceae	
Luzula campestris var. nivalis Laest.	Juncaceae	*Luzula nivalis, Luzula arctica*
Luzula confusa Lindeb.	Juncaceae	
Luzula divulgata Kirschner	Juncaceae	
Luzula luzuloides (Lam.) Dandy & Wilmott	Juncaceae	
Luzula luzuloides (Lam.) Dandy & Wilmott subsp. luzuloides	Juncaceae	
Luzula multiflora (Ehrh.) Lej.	Juncaceae	
Luzula multiflora subsp. frigida (Buchenau) V.I.Krecz.	Juncaceae	
Luzula multiflora (Ehrh.) Lej. subsp. multiflora	Juncaceae	
Luzula pallescens Sw.	Juncaceae	
Luzula parviflora (Ehrh.) Desv.	Juncaceae	
Luzula parviflora (Ehrh.) Desv. subsp. parviflora	Juncaceae	
Luzula pilosa (L.) Willd.	Juncaceae	
Luzula spicata (L.) DC.	Juncaceae	
Luzula spicata (L.) DC. subsp. spicata	Juncaceae	
Luzula sudetica (Willd.) DC.	Juncaceae	
Luzula wahlenbergii Rupr.	Juncaceae	
Lycopersicon esculentum Mill.	Solanaceae	
Lycopodium annotinum L.	Lycopodiaceae	*Lycopodium dubium*
Lycopodium annotinum L. subsp. annotinum	Lycopodiaceae	
Lycopodium clavatum L.	Lycopodiaceae	
Lycopodium clavatum L. subsp. clavatum	Lycopodiaceae	
Lycopus europaeus L.	Lamiaceae	
Lysimachia nummularia L.	Primulaceae	
Lysimachia punctata L.	Primulaceae	
Lysimachia thyrsiflora L.	Primulaceae	
Lysimachia vulgaris L.	Primulaceae	
Lythrum portula (L.) D.A.Webb	Lythraceae	
Lythrum salicaria L.	Lythraceae	
Lythrum salicaria L. subsp. salicaria	Lythraceae	
Malus domestica Borkh.	Rosaceae	
Malus sylvestris Mill.	Rosaceae	
Malus sylvestris Mill. subsp. sylvestris	Rosaceae	
Malva alcea L.	Malvaceae	
Malva moschata L.	Malvaceae	
Malva neglecta Wallr.	Malvaceae	
Malva pusilla Sm.	Malvaceae	
Malva sylvestris L.	Malvaceae	
Matricaria chamomilla L.	Asteraceae	
Matricaria discoidea DC.	Asteraceae	
Matteuccia struthiopteris (L.) Tod.	Woodsiaceae	

Medicago lupulina L.	Fabaceae	
Medicago sativa L.	Fabaceae	
Medicago sativa subsp. falcata (L.) Arcang.	Fabaceae	
Medicago sativa L. subsp. sativa	Fabaceae	
Melica ciliata L.	Poaceae	
Melica ciliata L. subsp. ciliata	Poaceae	
Melica nutans L.	Poaceae	
Melica picta K.Koch	Poaceae	
Melica uniflora Retz.	Poaceae	
Melilotus albus Desr.	Fabaceae	
Melilotus altissima Thuill.	Fabaceae	
Melilotus officinalis (L.) Pall.	Fabaceae	
Mentha aquatica L.	Lamiaceae	
Mentha aquatica L. var. aquatica	Lamiaceae	
Mentha aquatica L. var. litoralis	Lamiaceae	
Mentha arvensis L.	Lamiaceae	
Mentha arvensis subsp. lapponica (Wahlenb.) Neuman	Lamiaceae	
Menyanthes trifoliata L.	Menyanthaceae	
Mercurialis annua L.	Euphorbiaceae	
Mercurialis annua subsp. ambigua (L.f.) Arcang.	Euphorbiaceae	
Mercurialis perennis L.	Euphorbiaceae	
Milium effusum L.	Poaceae	
Milium effusum L. subsp. effusum	Poaceae	
Molinia caerulea (L.) Moench	Poaceae	
Molinia caerulea (L.) Moench subsp. caerulea	Poaceae	
Montia fontana L.	Portulacaceae	
Montia fontana L. subsp. fontana	Portulacaceae	
Myagrum perfoliatum L.	Brassicaceae	
Myosotis arvensis Hill	Boraginaceae	
Myosotis arvensis Hill subsp. arvensis	Boraginaceae	
Myosotis decumbens Host	Boraginaceae	
Myosotis decumbens Host subsp. decumbens	Boraginaceae	
Myosotis laxa Lehm.	Boraginaceae	
Myosotis laxa subsp. baltica (Lindm.) Nordh.	Boraginaceae	
Myosotis laxa subsp. caespitosa (Schultz) Nordh.	Boraginaceae	
Myosotis nemorosa Besser	Boraginaceae	
Myosotis nemorosa Besser subsp. nemorosa	Boraginaceae	
Myosotis ramosissima Rochel	Boraginaceae	
Myosotis ramosissima Rochel subsp. ramosissima	Boraginaceae	
Myosotis scorpioides L.	Boraginaceae	
Myosotis scorpioides L. subsp. scorpioides	Boraginaceae	
Myosotis sparsiflora Pohl	Boraginaceae	
Myosotis stricta Roem. & Schult.	Boraginaceae	

Myosotis sylvatica Hoffm.	Boraginaceae	
Myosotis sylvatica Hoffm. subsp. sylvatica	Boraginaceae	
Myrica gale L.	Myricaceae	
Myricaria germanica (L.) Desv.	Tamaricaceae	
Myricaria germanica var. bracteosa	Tamaricaceae	
Myricaria germanica (L.) Desv. var. germanica	Tamaricaceae	
Myriophyllum alterniflorum DC.	Haloragaceae	
Myriophyllum sibiricum Kom.	Haloragaceae	
Myriophyllum spicatum L.	Haloragaceae	
Myriophyllum verticillatum L.	Haloragaceae	
Myrrhis odorata (L.) Scop.	Apiaceae	
Nepeta cataria L.	Lamiaceae	
Nepeta grandiflora M.Bieb.	Lamiaceae	
Nicotiana rustica L.	Solanaceae	
Nuphar lutea (L.) Sm.	Nymphaeaceae	
Nuphar pumila (Timm) DC.	Nymphaeaceae	
Nymphaea alba L.	Nymphaeaceae	
Nymphaea candida J.Presl & C.Presl	Nymphaeaceae	
Nymphaea tetragona Georgi	Nymphaeaceae	
Oenanthe aquatica (L.) Poir.	Apiaceae	
Oenothera biennis L.	Onagraceae	
Oenothera rubricaulis Kleb.	Onagraceae	
Ononis arvensis L.	Fabaceae	
Ononis repens L.	Fabaceae	
Ophrys insectifera L.	Orchidaceae	
Orchis mascula (L.) L.	Orchidaceae	
Orchis mascula subsp. signifera (Vest) Soó	Orchidaceae	
Orchis militaris L.	Orchidaceae	
Origanum vulgare L.	Lamiaceae	
Ornithogalum umbellatum L.	Liliaceae	
Oxalis acetosella L.	Oxalidaceae	
Oxalis corniculata L.	Oxalidaceae	
Oxalis fontana Bunge	Oxalidaceae	
Panicum capillare L.	Poaceae	
Panicum miliaceum L.	Poaceae	
Panicum miliaceum L. subsp. miliaceum	Poaceae	
Papaver argemone L. subsp. argemone	Papaveraceae	
Papaver dubium L.	Papaveraceae	
Papaver nudicaule L. sensu lato	Papaveraceae	
Papaver rhoeas L.	Papaveraceae	
Paris quadrifolia L.	Liliaceae	
Parnassia palustris L.	Parnassiaceae	
Pastinaca sativa L.	Apiaceae	

Pastinaca sativa L. subsp. sativa	Apiaceae	
Pastinaca sativa subsp. urens (Godr.) Čelak.	Apiaceae	
Persicaria foliosa (H.Lindb.) Kitag.	Polygonaceae	
Persicaria hydropiper (L.) Delarbre	Polygonaceae	
Persicaria lapathifolia (L.) Delarbre subsp. lapathifolia	Polygonaceae	
Persicaria lapathifolia subsp. pallida (With.) S.Ekman & Knutsson	Polygonaceae	
Persicaria maculosa Gray	Polygonaceae	
Persicaria maculosa Gray subsp. maculosa	Polygonaceae	
Persicaria minor (Huds.) Opiz	Polygonaceae	
Petasites frigidus (L.) Fr.	Asteraceae	
Petasites hybridus (L.) P.Gaertn., B.Mey. & Scherb.	Asteraceae	
Petasites hybridus (L.) P.Gaertn., B.Mey. & Scherb. subsp. hybridus	Asteraceae	
Petasites japonicus (Siebold & Zucc.) Maxim.	Asteraceae	
Petasites spurius (Retz.) Rchb.	Asteraceae	
Peucedanum palustre (L.) Moench	Apiaceae	
Phalaris canariensis L.	Poaceae	
Phalaroides arundinacea (L.) Rauschert	Poaceae	
Phleum alpinum L.	Poaceae	
Phleum phleoides (L.) H.Karst.	Poaceae	
Phleum pratense L.	Poaceae	
Phleum pratense subsp. nodosum (L.) Arcang.	Poaceae	*Phleum pratense subsp. serotinum, Phleum bertolonii*
Phleum pratense L. subsp. pratense	Poaceae	
Phlomis tuberosa L.	Lamiaceae	
Phragmites australis (Cav.) Steud.	Poaceae	
Phragmites australis (Cav.) Steud. subsp. australis	Poaceae	
Phyllodoce caerulea (L.) Bab.	Ericaceae	
Phyteuma nigrum F.W.Schmidt	Campanulaceae	
Phyteuma spicatum L.	Campanulaceae	
Phyteuma spicatum L. subsp. spicatum	Campanulaceae	
Picea abies (L.) H.Karst.	Pinaceae	
Picea abies (L.) H.Karst. var. abies	Pinaceae	
Picea abies subsp. alpestris (Brügger) Domin	Pinaceae	
Picea abies subsp. fennica (Regel) Parfenov	Pinaceae	
Picea engelmannii Engelm.	Pinaceae	
Picea glauca (Moench) Voss	Pinaceae	
Picea mariana (Mill.) Britton, Sterns & Poggenb.	Pinaceae	
Picea obovata Ledeb.	Pinaceae	*Picea abies subsp. obovata*
Picea omorika (Pančić) Purk.	Pinaceae	
Pimpinella major (L.) Huds.	Apiaceae	
Pimpinella saxifraga L.	Apiaceae	

Pinguicula alpina L.	Lentibulariaceae	
Pinguicula villosa L.	Lentibulariaceae	
Pinguicula vulgaris L.	Lentibulariaceae	
Pinus cembra L.	Pinaceae	*Pinus sibirica*
Pinus contorta Loudon	Pinaceae	
Pinus mugo Turra	Pinaceae	
Pinus sylvestris L.	Pinaceae	
Pinus sylvestris var. lapponica Fr.	Pinaceae	
Pinus sylvestris var. rigensis (Desf.) Asch. & Graebn.	Pinaceae	
Pinus sylvestris var. septentrionalis Schott	Pinaceae	
Plantago lanceolata L.	Plantaginaceae	
Plantago major L.	Plantaginaceae	
Plantago major subsp. intermedia (Gilib.) Lange	Plantaginaceae	
Plantago major L. subsp. major	Plantaginaceae	
Plantago major subsp. winteri (Geisenh.) W.Ludw.	Plantaginaceae	
Plantago maritima L.	Plantaginaceae	
Plantago maritima subsp. juncoides (Lam.) Hultén	Plantaginaceae	
Plantago media L.	Plantaginaceae	
Plantago uniflora L.	Plantaginaceae	
Platanthera bifolia (L.) Rich.	Orchidaceae	
Platanthera bifolia (L.) Rich. subsp. bifolia	Orchidaceae	
Platanthera bifolia subsp. latiflora (Drejer) Lojtnant	Orchidaceae	
Platanthera chlorantha (Custer) Rchb.	Orchidaceae	
Platanthera chlorantha (Custer) Rchb. subsp. chlorantha	Orchidaceae	
Platanthera obtusata subsp. oligantha (Turcz.) Hultén	Orchidaceae	
Poa alpigena (Fr.) Lindm.	Poaceae	
Poa alpina L.	Poaceae	
Poa alpina L. subsp. alpina	Poaceae	
Poa angustifolia L.	Poaceae	
Poa annua L.	Poaceae	
Poa annua L. subsp. annua	Poaceae	
Poa arctica R.Br.	Poaceae	
Poa arctica R.Br. subsp. arctica	Poaceae	
Poa bulbosa L.	Poaceae	
Poa chaixii Vill.	Poaceae	
Poa compressa L.	Poaceae	
Poa compressa L. subsp. compressa	Poaceae	
Poa compressa subsp. langeana (Rchb.) Nyman	Poaceae	
Poa glauca Vahl	Poaceae	
Poa glauca Vahl subsp. glauca	Poaceae	
Poa nemoralis L.	Poaceae	
Poa nemoralis L. subsp. nemoralis	Poaceae	
Poa palustris L.	Poaceae	

Poa palustris L. subsp. palustris	Poaceae	
Poa pratensis L.	Poaceae	
Poa pratensis subsp. colpodea (Th.Fr.) Tzvelev	Poaceae	
Poa pratensis subsp. subcaerulea (Sm.) Hiitonen	Poaceae	
Poa remota Forselles	Poaceae	
Poa supina Schrad.	Poaceae	
Poa trivialis L.	Poaceae	
Poa trivialis L. subsp. trivialis	Poaceae	
Polemonium acutiflorum Willd.	Polemoniaceae	
Polemonium caeruleum L.	Polemoniaceae	
Polygala amarella Crantz	Polygalaceae	
Polygala comosa Schkuhr	Polygalaceae	
Polygala vulgaris L.	Polygalaceae	
Polygonatum multiflorum (L.) All.	Liliaceae	
Polygonatum odoratum (Mill.) Druce	Liliaceae	
Polygonum amphibium L.	Polygonaceae	*Persicaria ambhibia*
Polygonum arenastrum Boreau	Polygonaceae	
Polygonum aviculare L.	Polygonaceae	
Polygonum aviculare L. subsp. aviculare	Polygonaceae	
Polygonum aviculare subsp. boreale (Lange) Karlsson	Polygonaceae	
Polygonum aviculare subsp. microspermum (Boreau) Berher	Polygonaceae	
Polygonum aviculare subsp. neglectum (Besser) Arcang.	Polygonaceae	
Polygonum aviculare subsp. rurivagum (Boureau) Berher	Polygonaceae	
Polygonum bellardii All.	Polygonaceae	
Polygonum oxyspermum Ledeb.	Polygonaceae	
Polygonum oxyspermum Ledeb. subsp. oxyspermum	Polygonaceae	
Polypodium vulgare L.	Polypodiaceae	
Polystichum aculeatum (L.) Roth	Dryopteridaceae	
Polystichum lonchitis (L.) Roth	Dryopteridaceae	
Populus balsamifera L.	Salicaceae	
Populus laurifolia Ledeb.	Salicaceae	
Populus tremula L.	Salicaceae	
Portulaca oleracea L.	Portulacaceae	
Portulaca oleracea L. subsp. oleracea	Portulacaceae	
Potamogeton alpinus Balb.	Potamogetonaceae	
Potamogeton berchtoldii Fieber	Potamogetonaceae	
Potamogeton compressus L.	Potamogetonaceae	
Potamogeton crispus L.	Potamogetonaceae	
Potamogeton filiformis Pers.	Potamogetonaceae	
Potamogeton friesii Rupr.	Potamogetonaceae	
Potamogeton gramineus L.	Potamogetonaceae	
Potamogeton lucens L.	Potamogetonaceae	
Potamogeton natans L.	Potamogetonaceae	

Potamogeton obtusifolius Mert. & W.D.J.Koch	Potamogetonaceae	
Potamogeton pectinatus L.	Potamogetonaceae	
Potamogeton perfoliatus L.	Potamogetonaceae	
Potamogeton polygonifolius Pourr.	Potamogetonaceae	
Potamogeton praelongus Wulfen	Potamogetonaceae	
Potamogeton pusillus L.	Potamogetonaceae	
Potamogeton rutilus Wolfg.	Potamogetonaceae	
Potamogeton vaginatus Turcz.	Potamogetonaceae	
Potentilla acutifida (Markl.) A.Pedersen	Rosaceae	
Potentilla anglica Laichard.	Rosaceae	
Potentilla anserina L.	Rosaceae	
Potentilla anserina L. subsp. anserina	Rosaceae	
Potentilla anserina subsp. egedii (Wormsk.) Hiitonen	Rosaceae	
Potentilla argentea L.	Rosaceae	
Potentilla bifurca L.	Rosaceae	
Potentilla chamissonis Hultén	Rosaceae	
Potentilla crantzii (Crantz) Fritsch	Rosaceae	
Potentilla decora Markl.	Rosaceae	
Potentilla demissa Jord.	Rosaceae	
Potentilla dissecta (Wallr.) Zimmeter	Rosaceae	
Potentilla erecta (L.) Raeusch.	Rosaceae	
Potentilla fruticosa L.	Rosaceae	
Potentilla intermedia L.	Rosaceae	
Potentilla laciniosa Nestl.	Rosaceae	
Potentilla multifida L.	Rosaceae	
Potentilla neglecta Baumg.	Rosaceae	
Potentilla neumanniana Rchb. emend. Soják	Rosaceae	*Potentilla subarenaria*
Potentilla nivea L.	Rosaceae	
Potentilla norvegica L.	Rosaceae	
Potentilla palustris (L.) Scop.	Rosaceae	
Potentilla recta L.	Rosaceae	
Potentilla reptans L.	Rosaceae	
Potentilla rupestris L.	Rosaceae	
Potentilla subarenaria Zimmeter	Rosaceae	
Potentilla tabernaemontani Asch.	Rosaceae	*Potentilla neumanniana*
Potentilla thuringiaca Link	Rosaceae	
Primula elatior (L.) Hill	Primulaceae	
Primula elatior (L.) Hill subsp. elatior	Primulaceae	
Primula farinosa L.	Primulaceae	
Primula farinosa L. subsp. farinosa	Primulaceae	
Primula nutans Georgi	Primulaceae	
Primula nutans Georgi var. Jokelae	Primulaceae	*Primula nutans subsp. finmarchica*

Primula stricta Hornem.	Primulaceae	
Primula veris L.	Primulaceae	
Primula veris L. subsp. veris	Primulaceae	
Prunella vulgaris L.	Lamiaceae	
Prunus cerasus L.	Rosaceae	
Prunus domestica L.	Rosaceae	
Prunus domestica L. subsp. domestica	Rosaceae	
Prunus domestica subsp. insititia (L.) Bonnier & Layens	Rosaceae	
Prunus padus L.	Rosaceae	
Prunus padus L. subsp. padus	Rosaceae	
Prunus padus subsp. borealis Cajander	Rosaceae	
Prunus spinosa L.	Rosaceae	
Pseudotsuga menziesii (Mirb.) Franco	Pinaceae	
Pteridium aquilinum (L.) Kuhn	Dennstaedtiaceae	
Pteridium aquilinum (L.) Kuhn subsp. aquilinum	Dennstaedtiaceae	
Pteridium aquilinum subsp. latiusculum (Desv.) C.N.Page	Dennstaedtiaceae	
Puccinellia distans (L.) Parl.	Poaceae	
Puccinellia distans subsp. borealis (Holmb.) W.E.Hughes	Poaceae	
Puccinellia distans (L.) Parl. subsp. distans	Poaceae	
Puccinellia phryganodes (Trin.) Scribn. & Merr.	Poaceae	
Puccinellia phryganodes (Trin.) Scribn. & Merr. subsp. phryganodes	Poaceae	
Pulmonaria obscura Dumort.	Boraginaceae	
Pulsatilla patens (L.) Mill.	Ranunculaceae	*Anemone patens*
Pulsatilla patens (L.) Mill. subsp. patens	Ranunculaceae	
Pulsatilla vernalis (L.) Mill.	Ranunculaceae	*Anemone vernalis*
Pyrola chlorantha Sw.	Pyrolaceae	
Pyrola media Sw.	Pyrolaceae	
Pyrola minor L.	Pyrolaceae	
Pyrola norvegica Knaben	Pyrolaceae	
Pyrola rotundifolia L.	Pyrolaceae	
Pyrola rotundifolia L. subsp. rotundifolia	Pyrolaceae	
Quercus robur L.	Fagaceae	
Quercus robur L. subsp. robur	Fagaceae	
Quercus rubra L.	Fagaceae	
Ranunculus acris L.	Ranunculaceae	
Ranunculus acris L. subsp. acris	Ranunculaceae	
Ranunculus acris subsp. borealis (Regel) Nyman	Ranunculaceae	
Ranunculus acris subsp. pumilus (Wahlenb.) Á.Löve & D.Löve	Ranunculaceae	
Ranunculus aquatilis L.	Ranunculaceae	
Ranunculus bulbosus L.	Ranunculaceae	
Ranunculus bulbosus L. subsp. bulbosus	Ranunculaceae	
Ranunculus circinatus Sibth.	Ranunculaceae	
Ranunculus cymbalaria Pursh	Ranunculaceae	

Ranunculus ficaria L.	Ranunculaceae	
Ranunculus ficaria subsp. bulbilifer Lambinon	Ranunculaceae	
Ranunculus ficaria subsp. calthifolius (Rchb.) Arcang.	Ranunculaceae	
Ranunculus flammula L.	Ranunculaceae	
Ranunculus flammula L. subsp. flammula	Ranunculaceae	
Ranunculus glacialis L.	Ranunculaceae	
Ranunculus hyperboreus Rottb.	Ranunculaceae	
Ranunculus hyperboreus Rottb. subsp. hyperboreus	Ranunculaceae	
Ranunculus lapponicus L.	Ranunculaceae	
Ranunculus lingua L.	Ranunculaceae	
Ranunculus nivalis L.	Ranunculaceae	
Ranunculus peltatus Schrank	Ranunculaceae	
Ranunculus peltatus subsp. baudotii (Godr.) C.D.K.Cook	Ranunculaceae	
Ranunculus peltatus Schrank subsp. peltatus	Ranunculaceae	
Ranunculus polyanthemos L.	Ranunculaceae	
Ranunculus polyanthemos subsp. polyanthemoides (Boreau) Ahlfv.	Ranunculaceae	
Ranunculus polyanthemos L. subsp. polyanthemos	Ranunculaceae	
Ranunculus pygmaeus Wahlenb.	Ranunculaceae	
Ranunculus repens L.	Ranunculaceae	
Ranunculus reptans L.	Ranunculaceae	
Ranunculus sceleratus L.	Ranunculaceae	
Ranunculus sceleratus subsp. reptabundus (Rupr.) Hultén	Ranunculaceae	*Ranunculus reptabundus*
Ranunculus sceleratus L. subsp. sceleratus	Ranunculaceae	
Ranunculus sulphureus Phipps	Ranunculaceae	
Ranunculus trichophyllus Chaix	Ranunculaceae	*Ranunculus aquatilis var. diffusus*
Raphanus raphanistrum L.	Brassicaceae	
Raphanus raphanistrum L. subsp. raphanistrum	Brassicaceae	
Raphanus sativus L.	Brassicaceae	
Rapistrum perenne (L.) All.	Brassicaceae	
Rapistrum rugosum (L.) All.	Brassicaceae	
Reseda lutea L.	Resedaceae	
Reseda lutea L. subsp. lutea	Resedaceae	
Reseda luteola L.	Resedaceae	
Reseda odorata L.	Resedaceae	
Rhamnus cathartica L.	Rhamnaceae	
Rheum rhabarbarum L.	Polygonaceae	
Rhinanthus alectorolophus (Scop.) Pollich	Scrophulariaceae	
Rhinanthus angustifolius C.C.Gmel.	Scrophulariaceae	
Rhinanthus angustifolius C.C.Gmel. subsp. angustifolius	Scrophulariaceae	
Rhinanthus angustifolius subsp. apterus (Fr.) Hyl.	Scrophulariaceae	
Rhinanthus angustifolius subsp. grandiflorus (Wallr.) D.A.Webb	Scrophulariaceae	

Rhinanthus groenlandicus (Ostenf.) Chabert	Scrophulariaceae	
Rhinanthus minor L.	Scrophulariaceae	
Rhodiola rosea L.	Crassulaceae	
Rhododendron lapponicum (L.) Wahlenb.	Ericaceae	
Ribes alpinum L.	Grossulariaceae	
Ribes aureum Pursh	Grossulariaceae	
Ribes nigrum L.	Grossulariaceae	
Ribes rubrum L.	Grossulariaceae	
Ribes spicatum E.Robson	Grossulariaceae	
Ribes spicatum subsp. hispidulum (Jancz.) Hämet-Ahti	Grossulariaceae	
Ribes spicatum subsp. lapponicum Hyl.	Grossulariaceae	
Ribes spicatum E.Robson subsp. spicatum	Grossulariaceae	
Ribes uva-crispa L.	Grossulariaceae	
Rorippa amphibia (L.) Besser	Brassicaceae	
Rorippa austriaca (Crantz) Besser	Brassicaceae	
Rorippa palustris (L.) Besser	Brassicaceae	
Rorippa sylvestris (L.) Besser	Brassicaceae	
Rorippa sylvestris (L.) Besser subsp. sylvestris	Brassicaceae	
Rosa acicularis Lindl.	Rosaceae	
Rosa caesia Sm.	Rosaceae	
Rosa canina L.	Rosaceae	
Rosa canina L. subsp. canina	Rosaceae	
Rosa corymbifera Borkh.	Rosaceae	*Rosa corymbifera subsp. deseglisei, Rosa canina ssp. dumetorum*
Rosa glauca Pourr.	Rosaceae	
Rosa majalis Herrm.	Rosaceae	
Rosa mollis Sm.	Rosaceae	
Rosa pimpinellifolia L.	Rosaceae	
Rosa rugosa Thunb.	Rosaceae	
Rosa sherardii Davies	Rosaceae	
Rosa vosagiaca N.H.F.Desp.	Rosaceae	*Rosa dumalis*
Rubus arcticus L.	Rosaceae	
Rubus aureolus Allander	Rosaceae	*Rubus section corylifolii (incl. R. aureolus and R. pruinosus)*
Rubus caesius L.	Rosaceae	
Rubus chamaemorus L.	Rosaceae	
Rubus humulifolius C.A.Mey.	Rosaceae	
Rubus idaeus L.	Rosaceae	*Rubus section corylifolii (incl. R. aureolus and R. pruinosus)*
Rubus laciniatus Willd.	Rosaceae	

Rubus odoratus L.	Rosaceae	
Rubus plicatus Weihe & Nees	Rosaceae	
Rubus saxatilis L.	Rosaceae	
Rudbeckia laciniata L.	Asteraceae	
Rumex acetosa L.	Polygonaceae	
Rumex acetosa L. subsp. acetosa	Polygonaceae	
Rumex acetosella L.	Polygonaceae	
Rumex acetosella L. subsp. acetosella	Polygonaceae	
Rumex acetosella subsp. arenicola Elven	Polygonaceae	
Rumex acetosella subsp. tenuifolia (Wallr.) O.Schwarz	Polygonaceae	
Rumex acetosella subsp. tenuifolius (Wallr.) O.Schwarz	Polygonaceae	
Rumex alpestris Jacq.	Polygonaceae	
Rumex alpestris subsp. lapponicus (Hiitonen) Jalas	Polygonaceae	
Rumex alpinus L.	Polygonaceae	
Rumex aquaticus L.	Polygonaceae	
Rumex aquaticus L. subsp. aquaticus	Polygonaceae	
Rumex confertus Willd.	Polygonaceae	
Rumex conglomeratus Murray	Polygonaceae	
Rumex crispus L.	Polygonaceae	
Rumex crispus L. subsp. crispus	Polygonaceae	
Rumex crispus subsp. littoreus (D.S.Hardy) Akeroyd	Polygonaceae	
Rumex dentatus L.	Polygonaceae	
Rumex fueginus Phil.	Polygonaceae	
Rumex graminifolius Lamb.	Polygonaceae	
Rumex hydrolapathum Huds.	Polygonaceae	
Rumex longifolius DC.	Polygonaceae	
Rumex maritimus L.	Polygonaceae	
Rumex maritimus L. subsp. maritimus	Polygonaceae	
Rumex obovatus Danser	Polygonaceae	
Rumex obtusifolius L.	Polygonaceae	
Rumex obtusifolius L. subsp. obtusifolius	Polygonaceae	
Rumex obtusifolius subsp. silvestris Čelak.	Polygonaceae	
Rumex obtusifolius subsp. transiens (Simonk.) Rech.f.	Polygonaceae	
Rumex palustris Sm.	Polygonaceae	
Rumex pseudonatronatus Borbás	Polygonaceae	
Rumex salicifolius (Danser) J.C.Hickman	Polygonaceae	
Rumex salicifolius var. triangulivalvis (Danser) J.C.Hickman	Polygonaceae	
Rumex stenophyllus Ledeb.	Polygonaceae	
Rumex thyrsiflorus Fingerh.	Polygonaceae	
Rumex thyrsiflorus subsp. thryrsiflorus	Polygonaceae	
Rumex triangulivalvis (Danser) Rech.f.	Polygonaceae	
Ruppia cirrhosa (Petagna) Grande	Ruppiaceae	
Ruppia maritima L.	Ruppiaceae	

Sagittaria natans Pall.	Alismataceae	
Sagittaria sagittifolia L.	Alismataceae	
Salicornia dolichostachya subsp. strictissima (Gram) P.W.Ball	Chenopodiaceae	
Salicornia europaea L.	Chenopodiaceae	
Salix alba L.	Salicaceae	
Salix alba L. subsp. alba	Salicaceae	
Salix arbuscula L.	Salicaceae	
Salix aurita L.	Salicaceae	
Salix caprea L.	Salicaceae	
Salix caprea L. subsp. caprea	Salicaceae	
Salix caprea subsp. sericea (Andersson) Flod.	Salicaceae	
Salix caprea subsp. sphacelata (Sm.) Macreight	Salicaceae	
Salix cinerea L.	Salicaceae	
Salix cinerea L. subsp. cinerea	Salicaceae	
Salix daphnoides Vill.	Salicaceae	
Salix daphnoides subsp. acutifolia (Willd.) Ahlfv.	Salicaceae	
Salix daphnoides Vill. subsp. daphnoides	Salicaceae	
Salix dasyclados Wimm.	Salicaceae	
Salix fragilis L.	Salicaceae	
Salix glauca L.	Salicaceae	
Salix glauca L. subsp. glauca	Salicaceae	
Salix glauca subsp. stipulifera (Häyrén) Hiitonen	Salicaceae	
Salix hastata L.	Salicaceae	
Salix hastata L. subsp. hastata	Salicaceae	
Salix hastata subsp. subintegrifolia (Flod.) Flod.	Salicaceae	
Salix hastata subsp. vegeta Andersson	Salicaceae	
Salix herbacea L.	Salicaceae	
Salix lanata L.	Salicaceae	
Salix lanata subsp. glandulifera (Flod.) Hiitonen	Salicaceae	*Salix glandulifera*
Salix lanata L. subsp. lanata	Salicaceae	
Salix lapponum L.	Salicaceae	
Salix myrsinifolia Salisb.	Salicaceae	
Salix myrsinifolia subsp. borealis (Fr.) Hyl.	Salicaceae	
Salix myrsinifolia subsp. kolaënsis (Schljakov) Elven	Salicaceae	
Salix myrsinifolia Salisb. subsp. myrsinifolia	Salicaceae	
Salix myrsinites L.	Salicaceae	
Salix myrtilloides L.	Salicaceae	
Salix pentandra L.	Salicaceae	
Salix phylicifolia L.	Salicaceae	*Salix Phylicifolia subsp. borealis, Salix borealis*
Salix polaris Wahlenb.	Salicaceae	
Salix purpurea L.	Salicaceae	
Salix pyrolifolia Ledeb.	Salicaceae	

Salix repens L.	Salicaceae	
Salix repens subsp. argentea (E.G.Camus) & A.Camus	Salicaceae	
Salix repens L. subsp. repens	Salicaceae	
Salix repens subsp. rosmarinifolia (L.) Andersson	Salicaceae	
Salix reticulata L.	Salicaceae	
Salix rosmarinifolia L.	Salicaceae	
Salix starkeana Willd.	Salicaceae	
Salix starkeana subsp. cinerascens (Wahlenb.) Hultén	Salicaceae	*Salix xerophila*
Salix starkeana Willd. subsp. starkeana	Salicaceae	
Salix triandra L.	Salicaceae	
Salix viminalis L.	Salicaceae	
Salsola kali L.	Chenopodiaceae	*Salsola kali subsp. kali*
Salsola kali subsp. iberica Sennen & Pau	Chenopodiaceae	
Salsola kali subsp. ruthenica (Iljin) Soó	Chenopodiaceae	
Sambucus nigra L.	Caprifoliaceae	
Sambucus racemosa L.	Caprifoliaceae	
Sanguisorba minor Scop.	Rosaceae	
Sanguisorba minor Scop. subsp. minor	Rosaceae	
Sanguisorba minor subsp. muricata Briq.	Rosaceae	
Sanguisorba officinalis L.	Rosaceae	
Sanicula europaea L.	Apiaceae	
Saponaria officinalis L.	Caryophyllaceae	
Saussurea alpina (L.) DC.	Asteraceae	
Saussurea alpina (L.) DC. subsp. alpina	Asteraceae	
Saxifraga adscendens L.	Saxifragaceae	
Saxifraga adscendens L. subsp. adscendens	Saxifragaceae	
Saxifraga aizoides L.	Saxifragaceae	
Saxifraga cernua L.	Saxifragaceae	
Saxifraga cespitosa L.	Saxifragaceae	
Saxifraga cotyledon L.	Saxifragaceae	
Saxifraga foliolosa R.Br.	Saxifragaceae	
Saxifraga granulata L.	Saxifragaceae	
Saxifraga granulata L. subsp. granulata	Saxifragaceae	
Saxifraga hieraciifolia Willd.	Saxifragaceae	
Saxifraga hirculus L.	Saxifragaceae	
Saxifraga hirculus L. subsp. hirculus	Saxifragaceae	
Saxifraga hypnoides L.	Saxifragaceae	
Saxifraga nivalis L.	Saxifragaceae	
Saxifraga oppositifolia L.	Saxifragaceae	
Saxifraga oppositifolia L. subsp. oppositifolia	Saxifragaceae	
Saxifraga osloensis Knaben	Saxifragaceae	
Saxifraga rivularis L.	Saxifragaceae	
Saxifraga stellaris L.	Saxifragaceae	

Saxifraga stellaris L. subsp. stellaris	Saxifragaceae	
Saxifraga tenuis (Wahlenb.) Lindm.	Saxifragaceae	
Saxifraga tridactylites L.	Saxifragaceae	
Schedonorus arundinaceus (Schreb.) Dumont	Poaceae	
Schedonorus giganteus (L.) .J.Soreng & E.E.Terrell	Poaceae	
Schedonorus pratensis (Huds.) P.Beauv.	Poaceae	
Schoenoplectus lacustris (L.) Palla	Cyperaceae	
Schoenoplectus lacustris subsp. glaucus (Sm.) Luceño & Marín	Cyperaceae	
Schoenoplectus lacustris (L.) Palla subsp. lacustris	Cyperaceae	
Schoenus ferrugineus L.	Cyperaceae	
Scirpus radicans Schkuhr	Cyperaceae	
Scirpus sylvaticus L.	Cyperaceae	
Scolochloa festucacea (Willd.) Link	Poaceae	
Scopolia carniolica Jacq.	Solanaceae	
Scorzonera humilis L.	Asteraceae	
Scrophularia nodosa L.	Scrophulariaceae	
Scrophularia vernalis L.	Scrophulariaceae	
Scutellaria galericulata L.	Lamiaceae	
Scutellaria hastifolia L.	Lamiaceae	
Secale cereale L.	Poaceae	
Sedum acre L.	Crassulaceae	
Sedum aizoon L.	Crassulaceae	
Sedum album L.	Crassulaceae	
Sedum annuum L.	Crassulaceae	
Sedum ewersii Ledeb.	Crassulaceae	
Sedum hispanicum L.	Crassulaceae	
Sedum hybridum L.	Crassulaceae	
Sedum rupestre L.	Crassulaceae	
Sedum rupestre L. subsp. rupestre	Crassulaceae	
Sedum sexangulare L.	Crassulaceae	
Sedum spurium M.Bieb.	Crassulaceae	
Sedum telephium L.	Crassulaceae	
Sedum telephium subsp. maximum (L.) Krock.	Crassulaceae	
Sedum telephium subsp. ruprechtii Jalas	Crassulaceae	
Sedum telephium L. subsp. telephium	Crassulaceae	
Sedum villosum L.	Crassulaceae	
Sedum villosum var. glabratum Rostr.	Crassulaceae	
Selaginella selaginoides (L.) Schrank & Mart.	Selaginellaceae	
Selinum carvifolia (L.) L.	Apiaceae	
Sempervivum tectorum L.	Crassulaceae	
Senecio fluviatilis Wallr.	Asteraceae	*Senecio nemorensis*
Senecio jacobaea L.	Asteraceae	
Senecio squalidus L.	Asteraceae	

Senecio sylvaticus L.	Asteraceae	
Senecio viscosus L.	Asteraceae	
Senecio vulgaris L.	Asteraceae	
Seseli libanotis (L.) W.D.J.Koch	Apiaceae	
Seseli libanotis subsp. intermedium (Rupr.) P.W.Ball	Apiaceae	
Sesleria caerulea (L.) Ard.	Poaceae	
Setaria faberi R.A.W.Herrm.	Poaceae	
Setaria glauca (L.) P.Beauv.	Poaceae	
Setaria italica (L.) P.Beauv.	Poaceae	
Setaria italica (L.) P.Beauv. subsp. italica	Poaceae	
Setaria verticillata (L.) P.Beauv.	Poaceae	
Setaria viridis (L.) P.Beauv.	Poaceae	
Setaria viridis (L.) P.Beauv. subsp. viridis	Poaceae	
Silene acaulis (L.) Jacq.	Caryophyllaceae	
Silene acaulis (L.) Jacq. subsp. acaulis	Caryophyllaceae	
Silene armeria L.	Caryophyllaceae	
Silene baccifera (L.) Roth	Caryophyllaceae	
Silene chalcedonica E.H.L.Krause	Caryophyllaceae	
Silene conoidea L.	Caryophyllaceae	
Silene csereii Baumg.	Caryophyllaceae	
Silene dichotoma Ehrh.	Caryophyllaceae	
Silene dioica (L.) Clairv.	Caryophyllaceae	
Silene flos-cuculi (L.) Clairv.	Caryophyllaceae	
Silene furcata Raf.	Caryophyllaceae	*Silene involucrata subsp. tenella (S. furcata subsp. angustiflora)*
Silene gallica L.	Caryophyllaceae	
Silene involucrata (Cham. & Schltdl.) Bocquet	Caryophyllaceae	*Silene furcata*
Silene latifolia Poir.	Caryophyllaceae	
Silene noctiflora L.	Caryophyllaceae	
Silene nutans L.	Caryophyllaceae	
Silene nutans L. subsp. nutans	Caryophyllaceae	
Silene rupestris L.	Caryophyllaceae	
Silene suecica (Lodd.) Greuter & Burdet	Caryophyllaceae	
Silene tatarica (L.) Pers.	Caryophyllaceae	
Silene uniflora Roth	Caryophyllaceae	
Silene uniflora Roth subsp. uniflora	Caryophyllaceae	
Silene uralensis (Rupr.) Bocquet	Caryophyllaceae	*Silene wahlbergella*
Silene uralensis subsp. apetala (L.) Bocquet	Caryophyllaceae	
Silene viscaria (L.) Jess.	Caryophyllaceae	
Silene viscosa (L.) Pers.	Caryophyllaceae	
Silene vulgaris (Moench) Garcke	Caryophyllaceae	
Silene vulgaris (Moench) Garcke subsp. vulgaris	Caryophyllaceae	

Sinapis alba L.	Brassicaceae	
Sinapis alba L. subsp. alba	Brassicaceae	
Sinapis arvensis L.	Brassicaceae	
Sinapis arvensis L. var. arvensis	Brassicaceae	
Sinapis arvensis var. orientalis (L.) W.D.J.Koch & Ziz	Brassicaceae	
Sisymbrium altissimum L.	Brassicaceae	
Sisymbrium loeselii L.	Brassicaceae	
Sisymbrium officinale (L.) Scop.	Brassicaceae	
Sisymbrium officinale (L.) Scop. var. officinale	Brassicaceae	
Sisymbrium orientale L.	Brassicaceae	
Sisymbrium strictissimum L.	Brassicaceae	
Sisymbrium volgense E.Fourn.	Brassicaceae	
Sium latifolium L.	Apiaceae	
Solanum dulcamara L.	Solanaceae	
Solanum nigrum L.	Solanaceae	
Solanum nigrum L. subsp. nigrum	Solanaceae	
Solanum nigrum subsp. schultesii (Opiz) Wessely	Solanaceae	
Solanum tuberosum L.	Solanaceae	
Solidago canadensis L.	Asteraceae	
Solidago gigantea Aiton	Asteraceae	
Solidago virgaurea L.	Asteraceae	
Solidago virgaurea subsp. minuta (L.) Arcang.	Asteraceae	
Solidago virgaurea L. subsp. virgaurea	Asteraceae	
Sonchus arvensis L.	Asteraceae	
Sonchus arvensis L. subsp. arvensis	Asteraceae	
Sonchus arvensis subsp. uliginosus (M.Bieb.) Nyman	Asteraceae	
Sonchus asper (L.) Hill	Asteraceae	
Sonchus asper (L.) Hill subsp. asper	Asteraceae	
Sonchus oleraceus L.	Asteraceae	
Sorbaria sorbifolia (L.) A.Braun	Rosaceae	
Sorbus aucuparia L.	Rosaceae	
Sorbus aucuparia L. subsp. aucuparia	Rosaceae	
Sorbus aucuparia subsp. glabrata (Wimm. & Grab.) Cajander	Rosaceae	
Sorbus hybrida L.	Rosaceae	
Sorbus intermedia (Ehrh.) Pers.	Rosaceae	
Sorbus meinichii Hedl.	Rosaceae	
Sorbus teodorii Liljef.	Rosaceae	
Sparganium angustifolium Michx.	Sparganiaceae	
Sparganium emersum Rehmann	Sparganiaceae	
Sparganium erectum L.	Sparganiaceae	
Sparganium erectum L. subsp. erectum	Sparganiaceae	
Sparganium glomeratum (Laest.) Neuman	Sparganiaceae	
Sparganium gramineum Georgi	Sparganiaceae	

Sparganium hyperboreum Laest.	Sparganiaceae	
Sparganium microcarpum (Neuman) Čelak.	Sparganiaceae	
Sparganium natans L.	Sparganiaceae	
Sparganium neglectum Beeby	Sparganiaceae	
Spergula arvensis L.	Caryophyllaceae	
Spergula morisonii Boreau	Caryophyllaceae	
Spergularia marina (L.) Griseb.	Caryophyllaceae	
Spergularia media (L.) C.Presl	Caryophyllaceae	
Spergularia rubra (L.) J.Presl & C.Presl	Caryophyllaceae	
Spinacia oleracea L.	Chenopodiaceae	
Spiraea alba Du Roi	Rosaceae	
Spiraea billardii Hérincq	Rosaceae	
Spiraea chamaedryfolia L.	Rosaceae	
Spiraea japonica L.f.	Rosaceae	
Spiraea salicifolia L.	Rosaceae	
Spirodela polyrhiza (L.) Schleid.	Lemnaceae	
Stachys officinalis (L.) Trevis.	Lamiaceae	
Stachys palustris L.	Lamiaceae	
Stachys sylvatica L.	Lamiaceae	
Stellaria borealis Bigelow	Caryophyllaceae	
Stellaria crassifolia Ehrh.	Caryophyllaceae	
Stellaria crassifolia Ehrh. Var. minor	Caryophyllaceae	
Stellaria fennica (Murb.) Perfil.	Caryophyllaceae	
Stellaria graminea L.	Caryophyllaceae	
Stellaria hebecalyx Fenzl	Caryophyllaceae	
Stellaria holostea L.	Caryophyllaceae	
Stellaria humifusa Rottb.	Caryophyllaceae	
Stellaria longifolia Willd.	Caryophyllaceae	
Stellaria media (L.) Cirillo	Caryophyllaceae	
Stellaria media (L.) Cirillo subsp. media	Caryophyllaceae	
Stellaria nemorum L.	Caryophyllaceae	
Stellaria nemorum L. subsp. nemorum	Caryophyllaceae	
Stellaria palustris Hoffm.	Caryophyllaceae	
Suaeda maritima (L.) Dumort.	Chenopodiaceae	
Suaeda maritima (L.) Dumort. subsp. maritima	Chenopodiaceae	
Suaeda maritima subsp. salsa (L.) Soó	Chenopodiaceae	
Succisa pratensis Moench	Dipsacaceae	
Symphoricarpos albus (L.) S.F.Blake	Caprifoliaceae	
Symphytum asperum Lepech.	Boraginaceae	
Symphytum officinale L.	Boraginaceae	
Symphytum officinale L. subsp. officinale	Boraginaceae	
Tanacetum vulgare L.	Asteraceae	
Taxus baccata L.	Taxaceae	

Tetragonia tetragonoides (Pall.) Kuntze	Tetragoniaceae	
Thalictrum alpinum L.	Ranunculaceae	
Thalictrum aquilegiifolium L.	Ranunculaceae	
Thalictrum flavum L.	Ranunculaceae	
Thalictrum lucidum L.	Ranunculaceae	
Thalictrum minus L.	Ranunculaceae	
Thalictrum minus subsp. kemense (Fr.) Cajander	Ranunculaceae	
Thalictrum minus L. subsp. minus	Ranunculaceae	
Thalictrum minus subsp. olympicum (Boiss. & Heldr.) Strid	Ranunculaceae	
Thalictrum simplex L.	Ranunculaceae	
Thalictrum simplex subsp. boreale (F.Nyl.) Á.Löve & D.Löve	Ranunculaceae	
Thalictrum simplex L. subsp. simplex	Ranunculaceae	
Thelypteris palustris Schott	Thelypteridaceae	
Thlaspi arvense L.	Brassicaceae	
Thlaspi caerulescens J.Presl & C.Presl	Brassicaceae	
Thlaspi caerulescens subsp. brachypetalum (Jord.) O.Bolòs, Vigo, Masalles & Ninot	Brassicaceae	
Thlaspi caerulescens J.Presl & C.Presl subsp. caerulescens	Brassicaceae	
Thymus pulegioides L.	Lamiaceae	
Thymus serpyllum L.	Lamiaceae	
Thymus serpyllum L. subsp. serpyllum	Lamiaceae	
Thymus serpyllum subsp. tanaensis (Hyl.) Jalas	Lamiaceae	
Tilia cordata Mill.	Tiliaceae	
Tragopogon pratensis L.	Asteraceae	
Tragopogon pratensis subsp. orientalis (L.) Čelak.	Asteraceae	
Tragopogon pratensis L. subsp. pratensis	Asteraceae	
Trifolium arvense L.	Fabaceae	
Trifolium aureum Pollich	Fabaceae	
Trifolium campestre Schreb.	Fabaceae	
Trifolium dubium Sibth.	Fabaceae	
Trifolium fragiferum L.	Fabaceae	
Trifolium fragiferum L. subsp. fragiferum	Fabaceae	
Trifolium hybridum L.	Fabaceae	
Trifolium hybridum subsp. elegans (Savi) Asch. & Graebn.	Fabaceae	
Trifolium hybridum L. subsp. hybridum	Fabaceae	
Trifolium incarnatum L.	Fabaceae	
Trifolium medium L.	Fabaceae	
Trifolium medium L. subsp. medium	Fabaceae	
Trifolium montanum L.	Fabaceae	
Trifolium montanum L. var. montanum	Fabaceae	
Trifolium pratense L.	Fabaceae	
Trifolium pratense L. var. pratense	Fabaceae	
Trifolium repens L.	Fabaceae	
Trifolium repens L. subsp. repens	Fabaceae	

Trifolium spadiceum L.	Fabaceae	
Tripolium pannonicum (Jacq.) Dobrocz.	Asteraceae	
Trisetum flavescens (L.) P.Beauv.	Poaceae	
Trisetum flavescens (L.) P.Beauv. subsp. flavescens	Poaceae	
Trisetum spicatum (L.) K.Richt.	Poaceae	
Trisetum spicatum (L.) K.Richt. subsp. spicatum	Poaceae	
Trisetum subalpestre (Hartm.) Neuman	Poaceae	
Triticum aestivum L.	Poaceae	
Tussilago farfara L.	Asteraceae	
Typha angustifolia L.	Typhaceae	
Typha latifolia L.	Typhaceae	
Ulmus glabra Huds.	Ulmaceae	
Ulmus laevis Pall.	Ulmaceae	
Urtica dioica L.	Urticaceae	
Urtica dioica L. subsp. dioica	Urticaceae	
Urtica dioica subsp. sondenii (Simmons) Hyl.	Urticaceae	
Urtica urens L.	Urticaceae	
Vaccaria hispanica (Mill.) Rauschert	Caryophyllaceae	
Vaccinium microcarpum (Rupr.) Schmalh.	Ericaceae	
Vaccinium myrtillus L.	Ericaceae	
Vaccinium oxycoccos L.	Ericaceae	
Vaccinium uliginosum L.	Ericaceae	
Vaccinium vitis-idaea L.	Ericaceae	
Vaccinium vitis-idaea L. subsp. vitis-idaea	Ericaceae	
Valeriana officinalis L.	Valerianaceae	*Valerian officinalis var. officinalis, Valeriana stolonifera*
Valeriana sambucifolia Mikan f.	Valerianaceae	*Valeriana salina*
Valerianella locusta (L.) Laterr.	Valerianaceae	
Veratrum album L.	Liliaceae	
Veratrum album L. subsp. album	Liliaceae	
Veratrum album subsp. lobelianum (Bernh.) Arcang.	Liliaceae	
Verbascum lychnitis L.	Scrophulariaceae	
Verbascum nigrum L.	Scrophulariaceae	
Verbascum nigrum L. subsp. nigrum	Scrophulariaceae	
Verbascum thapsus L.	Scrophulariaceae	
Verbascum thapsus L. subsp. thapsus	Scrophulariaceae	
Veronica agrestis L.	Scrophulariaceae	
Veronica alpina L.	Scrophulariaceae	
Veronica alpina L. subsp. pumila	Scrophulariaceae	
Veronica anagallis-aquatica L.	Scrophulariaceae	
Veronica arvensis L.	Scrophulariaceae	
Veronica beccabunga L.	Scrophulariaceae	

Veronica chamaedrys L.	Scrophulariaceae	
Veronica chamaedrys L. subsp. chamaedrys	Scrophulariaceae	
Veronica filiformis Sm.	Scrophulariaceae	
Veronica fruticans Jacq.	Scrophulariaceae	
Veronica hederifolia L.	Scrophulariaceae	*Veronica sublobata*
Veronica hederifolia L. subsp. hederifolia	Scrophulariaceae	
Veronica incana L.	Scrophulariaceae	
Veronica longifolia L.	Scrophulariaceae	
Veronica officinalis L.	Scrophulariaceae	
Veronica opaca Fr.	Scrophulariaceae	
Veronica persica Poir.	Scrophulariaceae	
Veronica polita Fr.	Scrophulariaceae	
Veronica scutellata L.	Scrophulariaceae	
Veronica serpyllifolia L.	Scrophulariaceae	
Veronica serpyllifolia subsp. humifusa (Dicks.) Syme	Scrophulariaceae	
Veronica serpyllifolia L. subsp. serpyllifolia	Scrophulariaceae	
Veronica spicata L.	Scrophulariaceae	
Veronica spicata L. subsp. spicata	Scrophulariaceae	
Veronica verna L.	Scrophulariaceae	
Viburnum opulus L.	Caprifoliaceae	
Vicia cassubica L.	Fabaceae	
Vicia cracca L.	Fabaceae	
Vicia hirsuta (L.) Gray	Fabaceae	
Vicia lathyroides L.	Fabaceae	
Vicia sativa L.	Fabaceae	
Vicia sativa subsp. nigra (L.) Ehrh.	Fabaceae	
Vicia sativa L. subsp. sativa	Fabaceae	
Vicia sepium L.	Fabaceae	
Vicia sepium subsp. montana (W.D.J.Koch) Hämet-Ahti	Fabaceae	
Vicia sepium L. subsp. sepium	Fabaceae	
Vicia sylvatica L.	Fabaceae	
Vicia tertrasperma (L.) Schreb.	Fabaceae	
Vicia villosa Roth	Fabaceae	
Vicia villosa subsp. varia (Host) Corb.	Fabaceae	
Vicia villosa Roth subsp. villosa	Fabaceae	
Vincetoxicum hirundinaria Medik.	Asclepiadaceae	
Viola arvensis Murray	Violaceae	
Viola biflora L.	Violaceae	
Viola canina L.	Violaceae	
Viola canina L. subsp. canina	Violaceae	
Viola canina subsp. montana (L.) Hartm.	Violaceae	
Viola collina Besser	Violaceae	
Viola epipsila Ledeb.	Violaceae	

Viola hirta L.	Violaceae	
Viola mirabilis L.	Violaceae	
Viola odorata L.	Violaceae	
Viola palustris L.	Violaceae	
Viola palustris L. subsp. palustris	Violaceae	
Viola persicifolia Schreb.	Violaceae	
Viola reichenbachiana Boreau	Violaceae	
Viola riviniana Rchb.	Violaceae	
Viola rupestris F.W.Schmidt	Violaceae	
Viola rupestris subsp. relicta Jalas	Violaceae	
Viola rupestris F.W.Schmidt subsp. rupestris	Violaceae	
Viola selkirkii Goldie	Violaceae	
Viola tricolor L.	Violaceae	
Viola tricolor subsp. curtisii (E.Forst.) Syme	Violaceae	
Viola tricolor L. subsp. tricolor	Violaceae	
Viola uliginosa Besser	Violaceae	
Vulpia myuros (L.) C.C.Gmel.	Poaceae	
Vulpia myuros (L.) C.C.Gmel. subsp. myuros	Poaceae	
Zea mays L.	Poaceae	
Zea mays L. subsp. mays	Poaceae	
Zostera marina L.	Zosteraceae	

6.2 Appendix 2. Finnish CWR Prioritized Inventory

Finnish CWR prioritized Inventory			
Taxon and author	**Family**	**Synonym**	**Red List 2010**
Aconitum lycoctonum L. subsp. septendrionale	Ranunculaceae		VU
Agrimonia pilosa Ledeb.	Rosaceae		EN
Agrostis clavata Trin.	Poaceae		VU
Alchemilla hirsuticaulis H.Lindb.	Rosaceae		VU
Alisma wahlenbergii (Holmb.) Juz.	Alismataceae		EN
Allium oleraceum L.	Liliaceae		
Allium schoenoprasum L.	Liliaceae		
Allium schoenoprasum L. subsp. schoenoprasum	Liliaceae		NT
Allium scorodoprasum L.	Liliaceae		
Allium ursinum L.	Liliaceae		NT
Allium vineale L.	Liliaceae		
Ammophila arenaria (L.) Link	Poaceae		EN
Anagallis minima (L.) E.H.L.Krause	Primulaceae		EN
Anemone trifolia L.	Ranunculaceae		VU
Antennaria nordhageniana Rune & Roønning	Asteraceae		VU
Antennaria porsildii E.Ekman	Asteraceae		VU
Anthyllis vulneraria L.	Fabaceae		
Anthyllis vulneraria subsp. lapponica (Hyl.) Jalas	Fabaceae		NT
Anthyllis vulneraria subsp. polyphylla (DC.) Nyman	Fabaceae		CR
Arctium nemorosum Lej.	Asteraceae		EN
Arenaria norvegica Gunnerus	Caryophyllaceae		VU
Arnica angustifolia Vahl	Asteraceae		EN
Artemisia campestris subsp. bottnica Kindb.	Asteraceae		CR
Asperula tinctoria L.	Rubiaceae		CR
Asplenium adulterinum Milde	Aspleniaceae		VU
Asplenium ruta-muraria L.	Aspleniaceae		EN
Atriplex glabriuscula Edmondston	Chenopodiaceae		NT
Bromopsis benekenii (Lange) Holub	Poaceae	*Bromus benekenii*	CR
Campanula cervicaria L.	Campanulaceae		VU
Campanula uniflora L.	Campanulaceae		VU
Cardamine flexuosa With.	Brassicaceae		EN
Cardamine impatiens L.	Brassicaceae		EN
Cardamine parviflora L.	Brassicaceae		EN
Carex appropinquata A.Schumach.	Cyperaceae		VU
Carex bohemica Schreb.	Cyperaceae		VU
Carex caryophyllea Latourr.	Cyperaceae		VU
Carex cuprina (Heuff.) A.Kern.	Cyperaceae	*Carex otrubae*	VU

Carex hartmanii Cajander	Cyperaceae		EN
Carex heleonastes L.f.	Cyperaceae		VU
Carex hostiana DC.	Cyperaceae		EN
Carex lepidocarpa subsp. jemtlandica Palmgr.	Cyperaceae		VU
Carex lepidocarpa Tausch subsp. lepidocarpa	Cyperaceae		EN
Carex maritima Gunnerus	Cyperaceae		RE
Carex microglochin Wahlenb.	Cyperaceae		EN
Carex montana L.	Cyperaceae		RE
Carex ornithopoda Willd.	Cyperaceae		CR
Carex paniculata L.	Cyperaceae		EN
Carex pulicaris L.	Cyperaceae		VU
Carex remota L.	Cyperaceae		EN
Carex viridula var. bergrothii (Palmgr.) B.Schmid	Cyperaceae		VU
Carex vulpina L.	Cyperaceae		EN
Carlina biebersteinii Hornem.	Asteraceae		EN
Carlina vulgaris L.	Asteraceae		VU
Cinna latifolia (Trevir.) Griseb.	Poaceae		NT
Cladium mariscus (L.) Pohl	Cyperaceae		EN
Clematis 78nvolu subsp. sibirica (Mill.) Kuntze	Ranunculaceae		VU
Corylus avellana L.	Corylaceae		
Crassula aquatica (L.) Schönland	Crassulaceae		VU
Crataegus monogyna Jacq.	Rosaceae		VU
Crataegus rhipidophylla Gand.	Rosaceae		VU
Dactylorhiza incarnata subsp. cruenta (O.F.Müll.) P.D.Sell	Orchidaceae		VU
Dactylorhiza incarnata (L.) Soó subsp. incarnata	Orchidaceae		VU
Dactylorhiza lapponica (Laest. ex Hartm.) Soó	Orchidaceae		VU
Dactylorhiza traunsteineri (Saut.) Soó	Orchidaceae	*Dactylorhiza curvifolia, Dactylorhiza trausteineri subsp. Curvifolia*	VU
Dianthus arenarius subsp. borussicus Vierh.	Caryophyllaceae		EN
Dianthus superbus L.	Caryophyllaceae		CR
Diphasiastrum tristachyum (Pursh) Holub	Lycopodiaceae		EN
Diplazium sibiricum (Kunze) Sa.Kurata	Woodsiaceae		
Draba alpina L.	Brassicaceae		EN
Draba cinerea Adams	Brassicaceae		VU
Draba daurica DC.	Brassicaceae		VU
Draba fladnizensis Wulfen	Brassicaceae		VU
Draba lactea Adams	Brassicaceae		VU
Draba nemorosa L.	Brassicaceae		EN
Drosera intermedia Hayne	Droseraceae		VU
Dryopteris fragrans (L.) Schott	Dryopteridaceae		NT

Elymus alaskanus subsp. scandicus (Nevski) Melderis	Poaceae	*Elymus kronokensis subsp. scandicus*	NT
Elymus farctus subsp. boreali-atlantica (Simonet & Guin.)	Poaceae		VU
Elymus fibrosus (Schrenk) Tzvelev	Poaceae		VU
Epilobium laestadii Kytöv.	Onagraceae		EN
Epilobium obscurum Schreb.	Onagraceae		EN
Epipactis atrorubens (Hoffm.) Besser	Orchidaceae		VU
Epipactis palustris (L.) Crantz	Orchidaceae		EN
Erica tetralix L.	Ericaceae		CR
Erigeron acris subsp. decoloratus (H.Lindb.) Hiitonen	Asteraceae		VU
Erigeron borealis (Vierh.) Simmons	Asteraceae		VU
Euphrasia micrantha Rchb.	Scrophulariaceae		EN
Euphrasia rostkoviana subsp. fennica (Kihlm.) Karlsson	Scrophulariaceae		EN
Euphrasia salisburgensis Funck	Scrophulariaceae		EN
Festuca gigantea (L.) Vill.	Poaceae		EN
Festuca ovina L.	Poaceae		
Festuca polesica Zapalł.	Poaceae		NT
Festuca rubra L.	Poaceae		
Fragaria vesca L.	Rosaceae		
Fragaria viridis Duchesne	Rosaceae		VU
Galium saxatile L.	Rubiaceae		EN
Galium schultesii Vest	Rubiaceae		CR
Galium verum L.	Rubiaceae		VU
Geranium dissectum L.	Geraniaceae		EN
Gymnadenia conopsea (L.) R.Br. Var conopsea	Orchidaceae		VU
Gypsophila fastigiata L.	Caryophyllaceae		EN
Gypsophila muralis L.	Caryophyllaceae		VU
Hippuris tetraphylla L.f.	Hippuridaceae		EN
Hypericum montanum L.	Clusiaceae		CR
Juncus arcticus Willd.	Juncaceae		EN
Lactuca sibirica (L.) Maxim.	Asteraceae		
Lathyrus pratensis L.	Fabaceae		
Lathyrus sylvestris L.	Fabaceae		
Lathyrus vernus (L.) Bernh.	Fabaceae		
Leersia oryzoides (L.) Sw.	Poaceae		VU
Lepidium latifolium L.	Brassicaceae		NT
Liparis loeselii (L.) Rich.	Orchidaceae		CR
Lithospermum arvense L.	Boraginaceae		EN
Lonicera caerulea L.	Caprifoliaceae		EN
Lotus corniculatus L.	Fabaceae		
Lythrum portula (L.) D.A.Webb	Lythraceae		VU
Malus sylvestris Mill.	Rosaceae		VU
Melica ciliata L.	Poaceae		CR

Melica uniflora Retz.	Poaceae		EN
Mentha 80nvoluc L. var. aquatica	Lamiaceae		VU
Ononis arvensis L.	Fabaceae		VU
Ophrys insectifera L.	Orchidaceae		EN
Persicaria foliosa (H.Lindb.) Kitag.	Polygonaceae		EN
Phleum phleoides (L.) H.Karst.	Poaceae		NT
Phleum pratense L.	Poaceae		
Phleum pratense subsp. nodosum (L.) Arcang.	Poaceae	*Phleum pratense subsp. serotinum, Phleum bertolonii*	NT
Pimpinella major (L.) Huds.	Apiaceae		CR
Poa supina Schrad.	Poaceae		NT
Polygala amarella Crantz	Polygalaceae		VU
Polygala comosa Schkuhr	Polygalaceae		EN
Polygala vulgaris L.	Polygalaceae		VU
Polygonum oxyspermum Ledeb.	Polygonaceae		CR
Potentilla anglica Laichard.	Rosaceae		EN
Potentilla neumanniana Rchb. emend. Soják	Rosaceae	*Potentilla subarenaria*	VU
Potentilla tabernaemontani Asch.	Rosaceae	*Potentilla neumanniana*	EN
Primula farinosa L.	Primulaceae		EN
Primula nutans Georgi var. Jokelae	Primulaceae	*Primula nutans subsp. finmarchica*	VU
Primula stricta Hornem.	Primulaceae		EN
Prunus spinosa L.	Rosaceae		NT
Puccinellia phryganodes (Trin.) Scribn. & Merr.	Poaceae		CR
Pulsatilla patens (L.) Mill.	Ranunculaceae	*Anemone patens*	EN
Pulsatilla vernalis (L.) Mill.	Ranunculaceae	*Anemone vernalis*	VU
Ranunculus lapponicus L.	Ranunculaceae		
Ranunculus sulphureus Phipps	Ranunculaceae		EN
Ribes nigrum L.	Grossulariaceae		
Ribes spicatum E.Robson	Grossulariaceae		
Rosa canina L.	Rosaceae		CR
Rosa sherardii Davies	Rosaceae		EN
Rubus arcticus L.	Rosaceae		
Rubus aureolus Allander	Rosaceae	*Rubus sektio Corylifolii (sis. R. aureolus ja R. pruinosus)*	NT
Rubus caesius L.	Rosaceae		
Rubus chamaemorus L.	Rosaceae		
Rubus humulifolius C.A.Mey.	Rosaceae		RE
Rubus idaeus L.	Rosaceae	*Rubus sektio Corylifolii (sis. R. aureolus ja R. pruinosus)*	NT
Rubus saxatilis L.	Rosaceae		
Rumex maritimus L.	Polygonaceae		EN
Rumex thyrsiflorus Fingerh.	Polygonaceae		NT

Salicornia europaea L.	Chenopodiaceae		EN
Salix arbuscula L.	Salicaceae		EN•
Salix lanata subsp. glandulifera (Flod.) Hiitonen	Salicaceae	*Salix glandulifera*	VU
Salix pyrolifolia Ledeb.	Salicaceae		CR
Salsola kali L.	Chenopodiaceae	*Salsola kali subsp. kali*	EN
Saxifraga adscendens L.	Saxifragaceae		EN
Saxifraga hirculus L.	Saxifragaceae		VU
Scirpus radicans Schkuhr	Cyperaceae		EN
Sedum villosum L.	Crassulaceae		VU
Silene furcata Raf.	Caryophyllaceae	*Silene involucrata subsp. tenella (S. furcata subsp. angustiflora)*	CR
Silene tatarica (L.) Pers.	Caryophyllaceae		VU
Sium latifolium L.	Apiaceae		CR
Sorbus intermedia (Ehrh.) Pers.	Rosaceae		VU
Sorbus meinichii Hedl.	Rosaceae		CR
Sparganium neglectum Beeby	Sparganiaceae		EN
Spergularia media (L.) C.Presl	Caryophyllaceae		CR
Stellaria crassifolia Ehrh. Var. minor	Caryophyllaceae		EN
Stellaria humifusa Rottb.	Caryophyllaceae		RE
Suaeda maritima (L.) Dumort.	Chenopodiaceae		EN
Taxus baccata L.	Taxaceae		NT
Thalictrum aquilegiifolium L.	Ranunculaceae		VU
Thalictrum simplex L. subsp. simplex	Ranunculaceae		VU
Thymus serpyllum L. subsp. serpyllum	Lamiaceae		NT
Thymus serpyllum subsp. tanaensis (Hyl.) Jalas	Lamiaceae		
Trifolium aureum Pollich	Fabaceae		NT
Trifolium fragiferum L.	Fabaceae		NT
Trifolium medium L.	Fabaceae		
Trifolium montanum L.	Fabaceae		NT
Trifolium pratense L.	Fabaceae		
Trifolium repens L.	Fabaceae		
Trifolium spadiceum L.	Fabaceae		NT
Trisetum subalpestre (Hartm.) Neuman	Poaceae		NT
Ulmus glabra Huds.	Ulmaceae		VU
Ulmus laevis Pall.	Ulmaceae		VU
Urtica dioica subsp. sondenii (Simmons) Hyl.	Urticaceae		
Urtica urens L.	Urticaceae		
Valerianella locusta (L.) Laterr.	Valerianaceae		NT
Veratrum album subsp. lobelianum (Bernh.) Arcang.	Liliaceae		CR
Veronica alpina L. subsp. pumila	Scrophulariaceae		VU
Vicia cassubica L.	Fabaceae		EN
Vicia cracca L.	Fabaceae		

Vicia hirsuta (L.) Gray	Fabaceae		
Vicia lathyroides L.	Fabaceae		VU
Vicia sepium L.	Fabaceae		
Vicia sylvatica L.	Fabaceae		
Vicia tertrasperma (L.) Schreb.	Fabaceae		
Vicia villosa Roth	Fabaceae		
Viola collina Besser	Violaceae		EN
Viola persicifolia Schreb.	Violaceae		EN
Viola reichenbachiana Boreau	Violaceae		EN
Viola rupestris subsp. relicta Jalas	Violaceae		EN
Viola uliginosa Besser	Violaceae		EN

6.3 Appendix 3. CWR taxa found in 5 proposed genetic reserve sites

SITE 1 (670:309)	**63 taxa**
Allium oleraceum	*Lotus corniculatus*
Allium scorodoprasum	*Malus sylvestris*
Allium vineale	*Ophrys insectifera*
Cardamine parviflora	*Phleum phleoides*
Carex appropinquata	*Poa supina*
Carex hartmanii	*Polygala amarella*
Carex hostiana	*Polygala vulgaris*
Carex ornithopoda	*Primula farinosa*
Carex pulicaris	*Ribes nigrum*
Carex vulpina	*Ribes spicatum*
Carlina vulgaris	*Rubus caesius*
Cladium mariscus	*Rubus chamaemorus*
Corylus avellana	*Rubus idaeus*
Crassula aquatica	*Rubus saxatilis*
Crataegus monogyna	*Salicornia europaea*
Crataegus rhipidophylla	*Sorbus intermedia*
Dactylorhiza incarnata subsp. cruenta	*Sorbus meinichii*
Dactylorhiza incarnata subsp. incarnata	*Spergularia media*
Dactylorhiza traunsteineri	*Trifolium fragiferum*
Drosera intermedia	*Trifolium medium*
Epipactis palustris	*Trifolium pratense*
Festuca ovina	*Trifolium repens*
Festuca rubra	*Ulmus glabra*
Fragaria vesca	*Valerianella locusta*
Fragaria viridis	*Vicia cracca*
Galium verum	*Vicia hirsuta*
Geranium dissectum	*Vicia lathyroides*
Gymnadenia conopsea var. conopsea	*Vicia sepium*
Lathyrus pratensis	*Vicia sylvatica*
Lathyrus sylvestris	*Vicia tetrasperma*
Lathyrus vernus	*Viola persicifolia*
Liparis loeselii	
SITE 2 (736:360)	**24 taxa**
Anthyllis vulneraria ssp. lapponica	*Epipactis atrorubens*
Arnica angustifolia	*Erigeron acris subsp. decoloratus*
Asplenium ruta-muraria	*Gypsophila fastigiata*
Carex heleonastes	*Lactuca sibirica*
Carex lepidocarpa subsp. jemtlandica	*Primula stricta*
Carex viridula var. bergrothii	*Rubus arcticus*
Dianthus superbus	*Salix pyrolifolia*
Diplazium sibiricum	*Saxifraga hirculus*

Draba cinerea	*Silene tatarica*
Elymus fibrosus	*Thymus serpyllum subsp. tanaënsis*
Elymus kronokensis	*Trifolium spadiceum*
Epilobium laestadii	*Urtica dioica ssp. sondenii*
SITE 3 (664:328)	**14 taxa**
Ammophila arenaria	*Salsola kali*
Atriplex glabriuscula	*Stellaria crassifolia var. minor*
Carex paniculata	*Thymus serpyllum subsp. serpyllum*
Elymus farctus subsp. boreoatlanticus	*Trifolium aureum*
Festuca polesica	*Trifolium montanum*
Lithospermum arvense	*Urtica urens*
Lythrum portula	*Viola uliginosa*
SITE 4 (767:325)	**13 taxa**
Arenaria norvegica	*Erigeron borealis*
Campanula uniflora	*Euphrasia salisburgensis*
Carex microglochin	*Juncus arcticus*
Draba alpina	*Salix arbuscula*
Draba daurica	*Veronica alpina subsp. pumila*
Draba fladnizensis	*Viola rupestris subsp. relicta*
Draba lactea	
SITE 5 (668:310)	**13 taxa**
Allium ursinum	*Rosa canina*
Arctium nemorosum	*Rosa sherardii*
Carex caryophyllea	*Rumex thyrsiflorus*
Carex remota	*Taxus baccata*
Potentilla neumanniana	*Vicia villosa*
Potentilla tabernaemontani	*Viola reichenbachiana*
Prunus spinosa	

Total CWR in Sites:

SITE 1 (670:309)	**63 taxa**
Allium oleraceum	*Lotus corniculatus*
Allium scorodoprasum	*Malus sylvestris*
Allium vineale	*Ophrys insectifera*
Cardamine parviflora	*Phleum phleoides*
Carex appropinquata	*Poa supina*
Carex hartmanii	*Polygala amarella*
Carex hostiana	*Polygala vulgaris*
Carex ornithopoda	*Primula farinosa*
Carex pulicaris	*Ribes nigrum*
Carex vulpina	*Ribes spicatum*
Carlina vulgaris	*Rubus caesius*
Cladium mariscus	*Rubus chamaemorus*
Corylus avellana	*Rubus idaeus*
Crassula aquatica	*Rubus saxatilis*
Crataegus monogyna	*Salicornia europaea*
Crataegus rhipidophylla	*Sorbus intermedia*
Dactylorhiza incarnata subsp. cruenta	*Sorbus meinichii*
Dactylorhiza incarnata subsp. incarnata	*Spergularia media*
Dactylorhiza traunsteineri	*Trifolium fragiferum*
Drosera intermedia	*Trifolium medium*
Epipactis palustris	*Trifolium pratense*
Festuca ovina	*Trifolium repens*
Festuca rubra	*Ulmus glabra*
Fragaria vesca	*Valerianella locusta*
Fragaria viridis	*Vicia cracca*
Galium verum	*Vicia hirsuta*
Geranium dissectum	*Vicia lathyroides*
Gymnadenia conopsea var. conopsea	*Vicia sepium*
Lathyrus pratensis	*Vicia sylvatica*
Lathyrus sylvestris	*Vicia tetrasperma*
Lathyrus vernus	*Viola persicifolia*
Liparis loeselii	
SITE 2 (736:360)	**39 taxa (+4 others within national park)**
Anthyllis vulneraria ssp. lapponica	*Gypsophila fastigiata*
Arnica angustifolia	*Lactuca sibirica*
Asplenium ruta-muraria	*Polygala amarella*
Carex appropinquata	*Primula stricta*
Carex heleonastes	*Ribes spicatum*
Carex lepidocarpa subsp. jemtlandica	*Rubus arcticus*
Carex viridula var. bergrothii	*Rubus chamaemorus*
Dactylorhiza incarnata subsp. incarnata	*Rubus idaeus*
Dactylorhiza traunsteineri	*Rubus saxatilis*
Dianthus superbus	*Salix pyrolifolia*
Diplazium sibiricum	*Saxifraga hirculus*
Draba cinerea	*Silene tatarica*

Elymus fibrosus	*Thymus serpyllum ssp. tanaënsis*
Elymus kronokensis	*Trifolium pratense*
Epilobium laestadii	*Trifolium repens*
Epipactis atrorubens	*Trifolium spadiceum*
Erigeron acris subsp. decoloratus	*Urtica dioica ssp. sondenii*
Festuca ovina	*Vicia cracca*
Festuca rubra	*Vicia sylvatica*
Fragaria vesca	In Oulanka National Park additionally: *Dactylorhiza incarnata subsp. cruenta, Elymus alaskanus ssp. scandicus, Lonicera caerulea, Ranunculus lapponicus*
SITE 3 (664:328)	**51 taxa**
Allium oleraceum	*Malus sylvestris*
Allium scorodoprasum	*Ribes nigrum*
Ammophila arenaria	*Ribes spicatum*
Atriplex glabriuscula	*Rubus arcticus*
Carex appropinquata	*Rubus chamaemorus*
Carex hostiana	*Rubus idaeus*
Carex paniculata	*Rubus saxatilis*
Carex pulicaris	*Salsola kali*
Corylus avellana	*Stellaria crassifolia var. minor*
Crataegus monogyna	*Thymus serpyllum ssp. serpyllum*
Dactylorhiza incarnata subsp. incarnata	*Trifolium aureum*
Dactylorhiza traunsteineri	*Trifolium medium*
Drosera intermedia	*Trifolium montanum*
Elymus farctus subsp. boreoatlanticus	*Trifolium pratense*
Epipactis palustris	*Trifolium repens*
Festuca ovina	*Trifolium spadiceum*
Festuca polesica	*Ulmus glabra*
Festuca rubra	*Urtica urens*
Fragaria vesca	*Valerianella locusta*
Galium verum	*Vicia cracca*
Galium verum	*Vicia hirsuta*
Lathyrus pratensis	*Vicia sepium*
Lathyrus vernus	*Vicia sylvatica*
Lithospermum arvense	*Vicia tetrasperma*
Lotus corniculatus	*Viola uliginosa*
Lythrum portula	
SITE 4 (767:325)	**27 taxa**
Arenaria norvegica	*Lathyrus pratensis*
Arnica angustifolia	*Ribes spicatum*
Campanula uniflora	*Rubus arcticus*
Carex microglochin	*Rubus chamaemorus*
Draba alpina	*Rubus idaeus*
Draba daurica	*Rubus saxatilis*
Draba fladnizensis	*Salix arbuscula*
Draba lactea	*Trifolium pratense*
Erigeron borealis	*Trifolium repens*

Euphrasia salisburgensis	*Veronica alpina subsp. pumila*
Festuca ovina	*Vicia cracca*
Festuca rubra	*Vicia sepium*
Fragaria vesca	*Viola rupestris subsp. relicta*
Juncus arcticus	
SITE 5 (668:310)	**63 taxa**
Allium oleraceum	*Potentilla tabernaemontani*
Allium scorodoprasum	*Primula farinosa*
Allium ursinum	*Prunus spinosa*
Allium vineale	*Ribes nigrum*
Arctium nemorosum	*Ribes spicatum*
Carex caryophyllea	*Rosa canina*
Carex hostiana	*Rosa sherardii*
Carex ornithopoda	*Rubus caesius*
Carex pulicaris	*Rubus chamaemorus*
Carex remota	*Rubus idaeus*
Carex remota	*Rubus saxatilis*
Carex vulpina	*Rumex thyrsiflorus*
Carlina vulgaris	*Salicornia europaea*
Corylus avellana	*Sorbus intermedia*
Crataegus monogyna	*Sorbus meinichii*
Crataegus rhipidophylla	*Taxus baccata*
Dactylorhiza incarnata subsp. cruenta	*Trifolium fragiferum*
Dactylorhiza incarnata subsp. incarnata	*Trifolium medium*
Festuca ovina	*Trifolium pratense*
Festuca rubra	*Trifolium repens*
Fragaria vesca	*Ulmus glabra*
Fragaria viridis	*Valerianella locusta*
Galium verum	*Vicia cracca*
Galium verum	*Vicia hirsuta*
Geranium dissectum	*Vicia lathyroides*
Lathyrus pratensis	*Vicia sepium*
Lathyrus vernus	*Vicia sylvatica*
Lotus corniculatus	*Vicia tetrasperma*
Malus sylvestris	*Vicia villosa*
Polygala amarella	*Viola persicifolia*
Polygala vulgaris	*Viola reichenbachiana*
Potentilla neumanniana	

6.4 Appendix 4: Ex situ conservation gaps

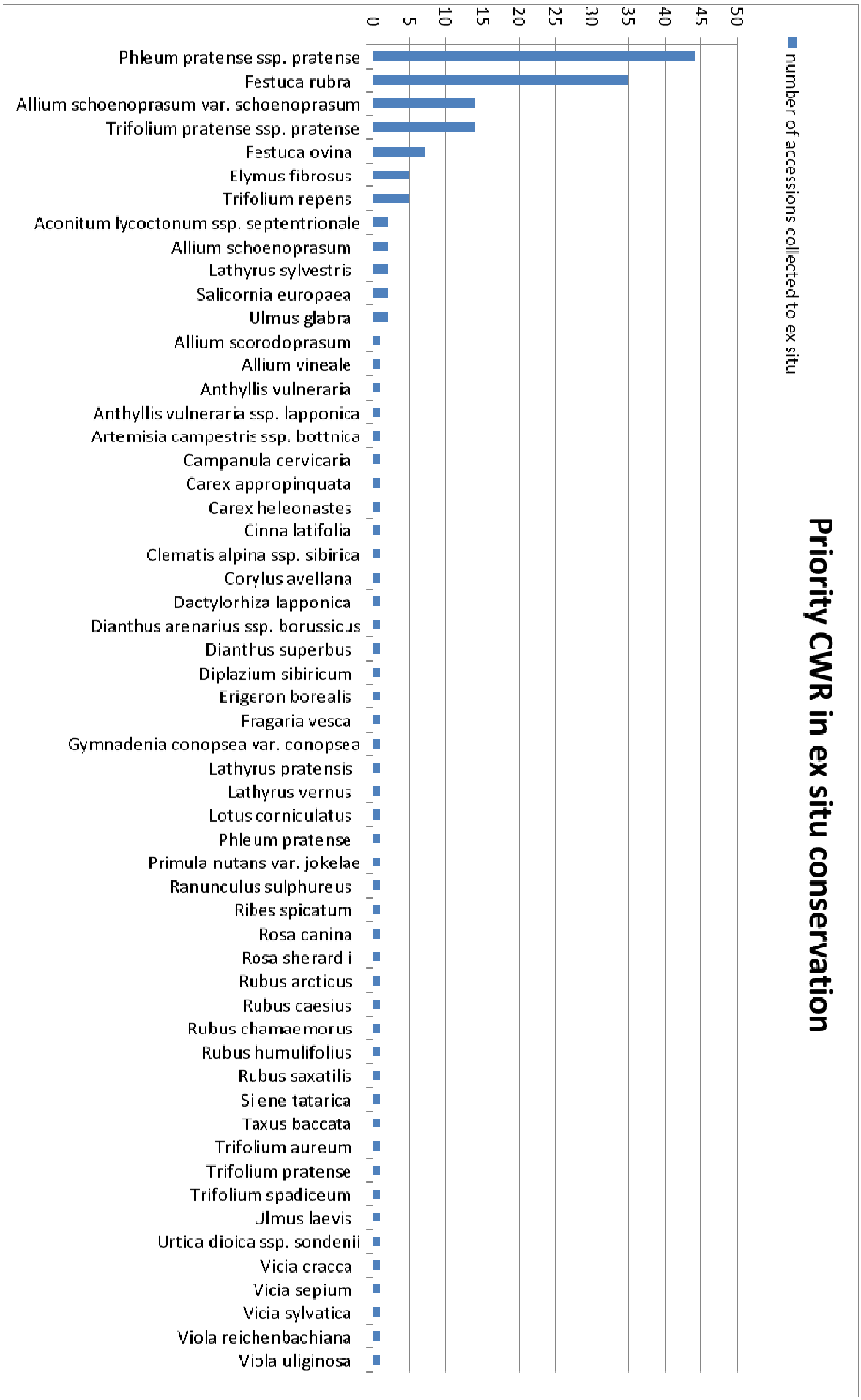
Priority CWR taxa	Red List 2010	GAPS: Neither in *ex situ* nor in Escape priority threatened taxa collecting list	GAPS: Neither in *ex situ* nor in Escape threatened taxa collecting list
Aconitum lycoctonum ssp. septentrionale	VU	x	
Agrimonia pilosa	EN		
Agrostis clavata	VU	x	
Alchemilla hirsuticaulis	VU	x	
Alisma wahlenbergii	EN		
Allium oleraceum		x	x
Allium schoenoprasum			
Allium schoenoprasum ssp. alpinum	NT	x	
Allium scorodoprasum		x	x
Allium ursinum	NT		
Allium vineale		x	x
Ammophila arenaria	EN		
Anagallis minima	EN		
Anemone trifolia	VU	x	
Antennaria nordhageniana	VU		
Antennaria porsildii	VU	x	
Anthyllis vulneraria		x	
Anthyllis vulneraria ssp. lapponica	NT	x	
Anthyllis vulneraria ssp. polyphylla	CR		
Arctium nemorosum	EN	x	
Arenaria norvegica	VU	x	
Arnica angustifolia	EN		
Artemisia campestris ssp. bottnica	CR		
Asperula tinctoria	CR		
Asplenium adulterinum	VU		
Asplenium ruta-muraria	EN		
Atriplex glabriuscula	NT	x	
Bromopsis benekenii	CR		
Campanula cervicaria	VU	x	
Campanula uniflora	VU		
Cardamine flexuosa	EN		
Cardamine impatiens	EN		
Cardamine parviflora	EN		
Carex appropinquata	VU	x	
Carex bohemica	VU	x	
Carex caryophyllea	VU	x	
Carex cuprina	VU	x	
Carex hartmanii	EN		
Carex heleonastes	VU	x	

Carex hostiana	EN		
Carex lepidocarpa ssp. jemtlandica	VU	x	
Carex lepidocarpa ssp. lepidocarpa	EN		
Carex maritima	RE		
Carex microglochin	EN	x	
Carex montana	RE		
Carex ornithopoda	CR		
Carex paniculata	EN		
Carex pulicaris	VU	x	
Carex remota	EN	x	
Carex viridula var. bergrothii	VU	x	
Carex vulpina	EN		
Carlina biebersteinii	EN	x	
Carlina vulgaris	VU	x	
Cinna latifolia	NT		
Cladium mariscus	EN		
Clematis alpina ssp. sibirica	VU	x	
Corylus avellana		x	x
Crassula aquatica	VU		
Crataegus monogyna	VU	x	
Crataegus rhipidophylla	VU	x	
Dactylorhiza incarnata ssp. cruenta	VU		
Dactylorhiza incarnata ssp. incarnata	VU	x	
Dactylorhiza lapponica	VU	x	
Dactylorhiza traunsteineri	VU	x	
Dianthus arenarius ssp. borussicus	EN		
Dianthus superbus	CR		
Diphasiastrum tristachyum	EN		
Diplazium sibiricum		x	x
Draba alpina	EN		
Draba cinerea	VU		
Draba daurica	VU	x	
Draba fladnizensis	VU	x	
Draba lactea	VU	x	
Draba nemorosa	EN	x	
Drosera intermedia	VU	x	
Dryopteris fragrans	NT	x	
Elymus alaskanus ssp. scandicus	NT	x	
Elymus farctus ssp. boreoatlanticus	VU		
Elymus fibrosus	VU		
Epilobium laestadii	EN		
Epilobium obscurum	EN		
Epipactis atrorubens	VU	x	
Epipactis palustris	EN		
Erica tetralix	CR		
Erigeron acris ssp. decoloratus	VU		

Erigeron borealis	VU	x	
Euphrasia micrantha	EN		
Euphrasia rostkoviana ssp. fennica	EN		
Euphrasia salisburgensis	EN		
Festuca gigantea	EN		
Festuca ovina			
Festuca polesica	NT	x	
Festuca rubra			
Fragaria vesca		x	x
Fragaria viridis	VU	x	
Galium saxatile	EN		
Galium schultesii	CR		
Galium verum	VU	x	
Geranium dissectum	EN	x	
Gymnadenia conopsea var. conopsea	VU	x	
Gypsophila fastigiata	EN		
Gypsophila muralis	VU	x	
Hippuris tetraphylla	EN		
Hypericum montanum	CR		
Juncus arcticus	EN	x	
Lactuca sibirica		x	x
Lathyrus pratensis		x	x
Lathyrus sylvestris		x	x
Lathyrus vernus		x	x
Leersia oryzoides	VU		
Lepidium latifolium	NT	x	
Liparis loeselii	CR		
Lithospermum arvense	EN	x	
Lonicera caerulea	EN		
Lotus corniculatus		x	x
Lythrum portula	VU	x	
Malus sylvestris	VU	x	
Melica ciliata	CR		
Melica uniflora	EN		
Mentha aquatica var. aquatica	VU	x	
Ononis arvensis	VU		
Ophrys insectifera	EN		
Persicaria foliosa	EN		
Phleum phleoides	NT	x	
Phleum pratense			
Phleum pratense ssp. nodosum	NT	x	
Pimpinella major	CR		
Poa supina	NT	x	
Polygala amarella	VU	x	
Polygala comosa	EN		
Polygala vulgaris	VU	x	

Polygonum oxyspermum	CR		
Potentilla anglica	EN		
Potentilla neumanniana	VU	x	
Potentilla tabernaemontani	EN		
Primula farinosa	EN		
Primula nutans var. jokelae	VU		
Primula stricta	EN	x	
Prunus spinosa	NT	x	
Puccinellia phryganodes	CR		
Pulsatilla patens	EN		
Pulsatilla vernalis	VU	x	
Ranunculus lapponicus		x	x
Ranunculus sulphureus	EN		
Ribes nigrum		x	x
Ribes spicatum		x	x
Rosa canina	CR		
Rosa sherardii	EN		
Rubus arcticus		x	x
Rubus aureolus	NT	x	
Rubus caesius		x	x
Rubus chamaemorus		x	x
Rubus humulifolius	RE		
Rubus idaeus	NT	x	
Rubus saxatilis		x	x
Rumex maritimus	EN		
Rumex thyrsiflorus	NT	x	
Salicornia europaea	EN	x	
Salix arbuscula	EN•	x	
Salix lanata ssp. glandulifera	VU	x	
Salix pyrolifolia	CR		
Salsola kali	EN		
Saxifraga adscendens	EN		
Saxifraga hirculus	VU		
Scirpus radicans	EN		
Sedum villosum	VU	x	
Silene furcata	CR	x	
Silene tatarica	VU	x	
Sium latifolium	CR		
Sorbus intermedia	VU	x	
Sorbus meinichii	CR		
Sparganium neglectum	RE		
Spergularia media	CR		
Stellaria crassifolia var. minor	EN		
Stellaria humifusa	RE		
Suaeda maritima	EN		
Taxus baccata	NT	x	

Thalictrum aquilegiifolium	VU	x	
Thalictrum simplex ssp. simplex	VU	x	
Thymus serpyllum ssp. serpyllum	NT	x	
Thymus serpyllum ssp. tanaensis		x	x
Trifolium aureum	NT	x	
Trifolium fragiferum	NT	x	
Trifolium medium		x	x
Trifolium montanum	NT	x	
Trifolium pratense			
Trifolium repens			
Trifolium spadiceum	NT	x	
Trisetum subalpestre	NT	x	
Ulmus glabra	VU	x	
Ulmus laevis	VU	x	
Urtica dioica ssp. sondenii		x	x
Urtica urens		x	x
Valerianella locusta	NT	x	
Veratrum album ssp. lobelianum	CR		
Veronica alpina ssp. pumila	VU	x	
Vicia cassubica	EN		
Vicia cracca		x	x
Vicia hirsuta		x	x
Vicia lathyroides	VU	x	
Vicia sepium		x	x
Vicia sylvatica		x	x
Vicia tertrasperma		x	x
Vicia villosa		x	x
Viola collina	EN		
Viola persicifolia	EN		
Viola reichenbachiana	EN		
Viola rupestris ssp. relicta	EN		
Viola uliginosa	EN		


Priority CWR in ex situ conservation
number of accessions collected to ex situ
0
5
10
15
20
25
30
35
40
45
50
Phleum pratense ssp. pratense
Festuca rubra
Allium schoenoprasum var. schoenoprasum
Trifolium pratense ssp. pratense
Festuca ovina
Elymus fibrosus
Trifolium repens
Aconitum lycoctonum ssp. septentrionale
Allium schoenoprasum
Lathyrus sylvestris
Salicornia europaea
Ulmus glabra
Allium scorodoprasum
Allium vineale
Anthyllis vulneraria
Anthyllis vulneraria ssp. lapponica
Artemisia campestris ssp. bottnica
Campanula cervicaria
Carex appropinquata
Carex heleonastes
Cinna latifolia
Clematis alpina ssp. sibirica
Corylus avellana
Dactylorhiza lapponica
Dianthus arenarius ssp. borussicus
Dianthus superbus
Diplazium sibiricum
Erigeron borealis
Fragaria vesca
Gymnadenia conopsea var. conopsea
Lathyrus pratensis
Lathyrus vernus
Lotus corniculatus
Phleum pratense
Primula nutans var. jokelae
Ranunculus sulphureus
Ribes spicatum
Rosa canina
Rosa sherardii
Rubus arcticus
Rubus caesius
Rubus chamaemorus
Rubus humulifolius
Rubus saxatilis
Silene tatarica
Taxus baccata
Trifolium aureum
Trifolium pratense
Trifolium spadiceum
Ulmus laevis
Urtica dioica ssp. sondenii
Vicia cracca
Vicia sepium
Vicia sylvatica
Viola reichenbachiana
Viola uliginosa

MTT CREATES VITALITY THROUGH SCIENCE

MTT REPORT 121

www.mtt.fi/julkaisut

MTT, FI-31600 Jokioinen, Finland
Tel. +358 29 5300 700, email julkaisut@mtt.fi