
Ferrantia

42

Red List of the Vascular Plants of Luxembourg

Guy Colling

Luxembourg, 2005

To Leopold Reichling

Table of Contents

Abstract	5
Résumé	5
Zusammenfassung	5
1. Introduction	6
2. The checklist of vascular plants	6
3. Evaluation methods	6
3.1 Time scale	6
3.2. The IUCN threat categories and selection criteria	6
3.3. The application of the IUCN-categories at the national level	9
3.4. Taxonomic difficulties	10
4. Examples of classification	11
4.1 Category RE (Regionally Extinct)	11
4.2 Category CR (Critically Endangered)	11
4.3 Category EN (Endangered)	12
4.4 Category VU (Vulnerable)	13
4.5 Category R (Extremely Rare)	14
5. Red List and checklist of the vascular plants of Luxembourg	15
5.1. Legend	15
6. Discussion	55
6.1. The Luxembourg Red List in the European context	55
6.2. Habitats and threats	57
6.3. Responsibilities of Luxembourg for the conservation of endangered plant species	59
References	62
Appendix 1: The IUCN criteria for Critically Endangered, Endangered and Vulnerable species (IUCN 2001)	65
Appendix 2: Vascular plant taxa protected under Luxembourg and international legislation	69

Red List of the Vascular Plants of Luxembourg

Guy Colling

Musée national d'histoire naturelle, Service biologie des populations
25, rue Munster, L-2160 Luxembourg
guy.colling@mnhn.lu

Keywords:

Red List, checklist, threatened plants, biodiversity.

Abstract:

The Red List of the vascular plants of Luxembourg applies for the first time the revised IUCN Red List categories (IUCN 2001) at a national level. The checklist on which the Red List is based contains 1323 vascular plant taxa. Out of these, 7.6% are considered to be

Regionally Extinct (RE), 9.2% Critically Endangered (CR), 9.4% Endangered (EN), 8.2% Vulnerable (VU) and 6.3% Extremely Rare (R). Overall 34.4% of the vascular plant taxa of Luxembourg are threatened or extinct.

Résumé:

La Liste Rouge des plantes vasculaires du Luxembourg est une première application des nouvelles catégories de Liste Rouge IUCN (IUCN 2001) à un niveau national. Le catalogue, sur base duquel la liste rouge a été élaborée, contient 1323 taxons de plantes vasculaires. Parmi ceux-ci, 7,6% sont considérés comme disparus au niveau

régional (RE), 9,2% comme menacés de disparition (CR), 9,4% comme fortement menacés (EN), 8,2% comme menacés (VU) et 6,3% comme étant extrêmement rares (R). En total 34,4% des taxons de plantes supérieures du Luxembourg sont considérés comme étant menacés ou disparus.

Zusammenfassung:

Die Rote Liste der Gefäßpflanzen von Luxemburg ist eine erste Anwendung der neuen IUCN Rote Liste-Kategorien (IUCN 2001) auf nationaler Ebene. Die Florenliste der Farn- und Blütenpflanzen von Luxemburg, anhand derer die Rote Liste erstellt wurde, enthält 1323 Sippen.

Von diesen sind 7,6% regional ausgestorben (RE), 9,2% vom Aussterben bedroht (CR), 9,4% stark gefährdet (EN), 8,2% gefährdet (VU) und 6,3% extrem selten (R). Insgesamt sind 34,4% der Farn- und Blütenpflanzen von Luxemburg gefährdet oder ausgestorben.

1. Introduction

Red Lists have become an important tool for monitoring biodiversity at continental and regional scales and they have been used for defining species conservation strategies. The lists are internationally widely recognised and numerous governmental and non-governmental organisations draw on them to define areas of high conservation priority. Many environmental assessment studies are also based on Red Lists.

Unfortunately, the publication of Red Lists has been a slow process in Luxembourg. One reason for this is the small number of professional scientists studying the biological diversity of the country. A large part of the existing field data were collected by amateur botanists and zoologists, and without their contribution our knowledge about the status of rare and endangered plant species would be far less extensive. A first version of a Red List for the vascular plants of Luxembourg was compiled in 1986 by Reichling (unpublished). The categories used by Reichling made no clear distinction between the concepts of rarity and vulnerability and were not comparable to the applied IUCN categories. The present Red List now applies the revised IUCN (The World Conservation International Union) threat categories (IUCN 2001) for the first time at a national level in Luxembourg.

2. The checklist of vascular plants

Any Red List should be based on a recent checklist of taxa for the geographical area under study. It is important not to focus solely on threatened plant taxa. One should also have a close look at those taxa considered not to be endangered.

The checklist presented in this work contains all native and established alien vascular plant species of Luxembourg documented by a herbarium specimen. The existence of an unambiguously determined herbarium specimen with indication of the collection site, collection date, and the collector's name was considered as a '*conditio sine qua non*' for inclusion of a taxon in the checklist. Most specimens are part of the herbarium of the National Museum of Natural History in Luxembourg (LUX). Taxa with only literature records (Tinant 1836; Koltz 1873, 1879) were generally not considered. However, some exceptions were made to this rule. E.g., *Osmunda regalis*, already mentioned by Koltz (1879), was only recently confirmed for Luxembourg (Reichling 1990). No herbarium specimen was collected in this case for conservation reasons. The checklist was elaborated in close collaboration with Reichling,

who published many floristical observations since 1949 (Beck *et al.* 1950, 1952; Reichling 1953, 1954, 1955, 1957, 1958, 1961, 1962, 1964, 1966, 1981, 1990; Colling *et al.* 1994, 1996, 1998). I also considered the records of rare plant species published by Kariger (1955, 1957, 1958, 1959, 1961, 1962, 1990, 1992, 1995, 1997) and recently published floristical observations (Colling *et al.* 2001, 2003; Krippel & Colling 2004). The status of aquatic plants in the checklist is mainly based on the publications of Diederich (1983a, 1983b, 1984a, 1984b, 1985). Nomenclature of the checklist follows Lambinon *et al.* (2004).

3. Evaluation methods

3.1 Time scale

The Red List is based on the changes in Luxembourg's flora during the past 175 years, as the necessary information for the estimation of threat levels exists only for this period. The starting point of my evaluation is not a 'natural' landscape in the sense of wilderness existing before human beings settled in our region, but the landscape of the mid 19th century shaped by our ancestors during centuries of activities ('Kulturlandschaft'). At that moment, agriculture mainly depended on soil characteristics and the use of chemicals and artificial fertilisers was unknown. Also the melioration of marginal areas like bogs and marshes was still in its beginnings and land consolidation did not occur. The human activities had created a very diverse landscape with a huge number of different ecosystems like ploughed fields, grasslands, heaths, mires, swamps, tall-herb fens, woodlands and coppices. These were the habitats of a large number of plant species. It is probable that like elsewhere in Europe, the diversity of plant species reached a maximum in Luxembourg midway of the last century as a result of landuse practices.

3.2. The IUCN threat categories and selection criteria

The internationally recognised IUCN Criteria for assigning threat status have been used for over 30 years in various Red Lists and Red Data Books. As some deficiencies of the old system became apparent, the IUCN's Species Survival Commission Steering Committee asked for a new set of criteria to be developed, and the final version of the revised criteria was endorsed as the global standard by the IUCN Council in December 1994.

Table 1: Definitions of the IUCN threat categories (IUCN 2001, Gärdenfors et al. 2001) and the national category Extremely Rare.

Threat category	Definition
Extinct (EX)	A taxon is <i>Extinct</i> when there is no reasonable doubt that the last individual has died. A taxon is presumed extinct when exhaustive surveys in known and/or expected habitats, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild (EW)	A taxon is <i>Extinct in the Wild</i> when it is known to survive only in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed <i>Extinct in the Wild</i> when exhaustive surveys in known/and or expected habitats, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Regionally Extinct (RE)	A taxon is <i>Regionally Extinct</i> when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region or when, if it is a former visiting taxon, the last individual has died or disappeared from the region.
Critically Endangered (CR)	A taxon is <i>Critically Endangered</i> when the best available evidence indicates that it meets any of the criteria A to E for <i>Critically Endangered</i> (see appendix 1), and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	A taxon is <i>Endangered</i> when the best available evidence indicates that it meets any of the criteria A to E for <i>Endangered</i> (see appendix 1), and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	A taxon is <i>Vulnerable</i> when the best available evidence indicates that it meets any of the criteria A to E for <i>Vulnerable</i> (see appendix 1), and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is <i>Near Threatened</i> when it has been evaluated against the criteria but does not qualify for <i>Critically Endangered</i> , <i>Endangered</i> or <i>Vulnerable</i> now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Extremely Rare (R)	A taxon is <i>Extremely Rare</i> when it exists only in a few and small populations that are not at present <i>Critically Endangered</i> , <i>Endangered</i> , <i>Vulnerable</i> , <i>Near Threatened</i> or <i>Least Concern</i> . The taxon is usually localised within restricted geographical areas or habitats or is thinly scattered over a more extensive range. A loss of populations would result in the taxon qualifying for one of the threat categories above.
Least Concern (LC)	A taxon is <i>Least Concern</i> when it has been evaluated against the criteria and does not qualify for <i>Critically Endangered</i> , <i>Endangered</i> , <i>Vulnerable</i> or <i>Near Threatened</i> . Widespread and abundant taxa are included in this category.
Data Deficient (DD)	A taxon is <i>Data Deficient</i> when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. <i>Data Deficient</i> is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.
Not Evaluated (NE)	A taxon is <i>Not Evaluated</i> when it has not yet been evaluated against the criteria.

Table 2: Summary of the main thresholds of the IUCN criteria (IUCN 2001)

Criterion		Critically Endangered	Endangered	Vulnerable
A	Population reduction	≥90% over 10 yrs or 3 generations in past or future when causes of reduction are reversible and understood and ceased	≥70% over 10 yrs or 3 generations in past or future when causes of reduction are reversible and understood and ceased	≥50% over 10 yrs or 3 generations in past or future when causes of reduction are reversible and understood and ceased
		≥80% over 10 yrs or 3 generations in past or future when causes of reduction may not have ceased or may not be understood or may not be reversible	≥50% over 10 yrs or 3 generations in past or future when causes of reduction may not have ceased or may not be understood or may not be reversible	≥30% over 10 yrs or 3 generations in past or future when causes of reduction may not have ceased or may not be understood or may not be reversible
B	Small distribution – fragmented, declining or fluctuating	Extent of occurrence <100 km ² or area of occupancy <10 km ²	Extent of occurrence <5000 km ² or area of occupancy <500 km ²	Extent of occurrence <20,000 km ² or area of occupancy <2000 km ²
C	Small population size and decline	<250 mature individuals, population declining	<2500 mature individuals, population declining	< 10,000 mature individuals, population declining
D1	Very small population	<50 individuals	<250 mature individuals	< 1000 mature individuals
D2	Very restricted area of occupancy			<20 km ² or <5 locations
E	Probability of extinction	>50% within 10 years or three generations	>20% within 20 years or five generations	>10% within 100 years

Table 3: Comparison of the IUCN-threat categories (IUCN 2001) and the categories applied for Luxembourg.

IUCN-categories		Applied categories for Luxembourg	
EX	Extinct	-	
EW	Extinct in the Wild	-	
-		RE	Regionally Extinct
CR	Critical	CR	Critical
EN	Endangered	EN	Endangered
VU	Vulnerable	VU	Vulnerable
NT	Near Threatened	NT	Near Threatened
-		R	Extremely Rare
LC	Least Concern	LC	Least Concern
DD	Data Deficient	DD	Data Deficient
NE	Not Evaluated	NE	Not Evaluated

Following comments received, the criteria were recently changed and the revisions were accepted by the IUCN Council in February 2000. I applied version 3.1 of the criteria for the IUCN threat categories in the present Red List (IUCN 2001).

A brief description of the IUCN criteria is given in Table 1, and Fig.1 shows the hierarchical relationships between the categories. The published document (IUCN 2001) gives a full explanation and contains many qualifying remarks. Taxa listed as *Critically Endangered* (CR), *Endangered* (EN) or *Vulnerable* (VU) qualify as threatened species. A set of five main criteria A-E (plus an additional sub-criterion for the *Vulnerable* category) qualifies a taxon for listing at a given threat level. Within the criteria A-E, the qualifying thresholds differ. Table 2 gives a summary of the thresholds and their full description is given in Appendix 1. Taxa extinct within Luxembourg but extant in other parts of the world were classified as *Regionally Extinct* (RE) (see Gärdenfors *et al.* 2001).

Countries are permitted at the national level to define additional categories. I established the category *Extremely Rare* (R) that existed in the pre-1994 IUCN categories. This category is important to characterise plant taxa with few and small populations that are not at present *Critically endangered*, *Endangered*, *Vulnerable*, *Near threatened* or *Least Concern* (Table 3; Fig. 1). Korneck *et al.* (1996) defined a similar category for Germany.

3.3. The application of the IUCN-categories at the national level

The IUCN categories and criteria can be applied within any specified geographical area and to any taxon at or below species level. However their application at regional or national levels (as opposed to global) should follow a common set of guidelines in order to achieve a greater consistency in the application of the criteria. I followed the recommendations of Gärdenfors *et al.* (2001) for the application of IUCN Red List criteria at a national level. The procedure for assigning an IUCN category at a national level follows a two-step procedure (Fig. 2). First a taxon-by-taxon assessment based on the global IUCN criteria is made and then it is considered whether the population is isolated (i.e. behaves as an endemic taxon) or is part of a larger population. In a small country like Luxembourg, it is likely that its populations are shared with neighbouring countries. However, red-listed sessile organisms like vascular plant species, as a result of habitat destruction often have a fragmented distribution, thus reducing the probability of any significant immigration of propagules capable of surviving in the region. For that reason, plant taxa have been assigned to a threat category mainly on the basis of their situation in Luxembourg.

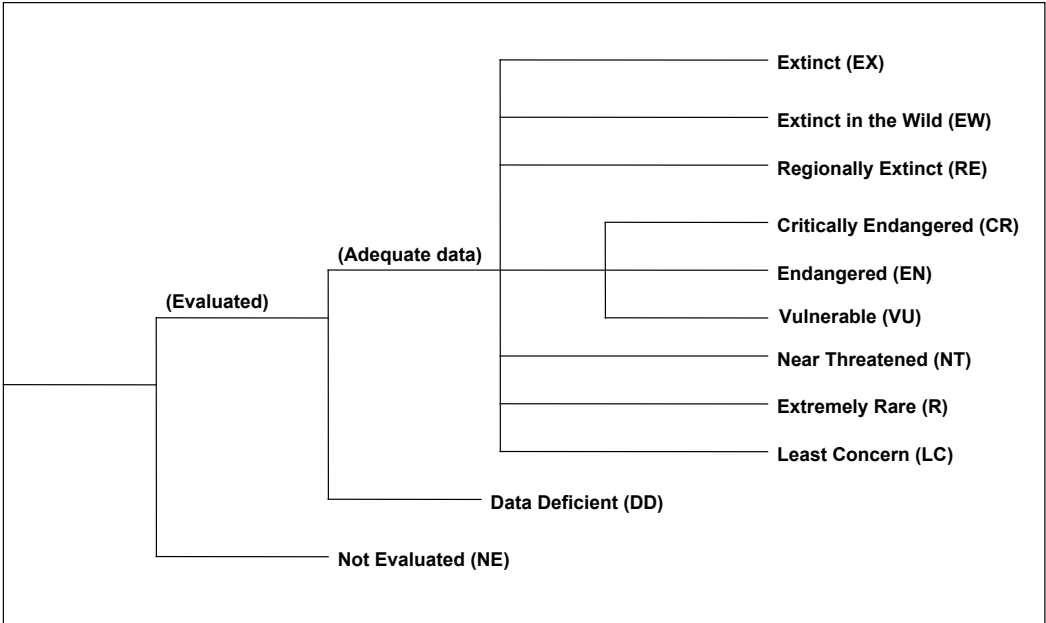


Fig. 1: Hierarchical relationships of the IUCN threat categories applied for Luxembourg. Source: adapted from IUCN (2001).

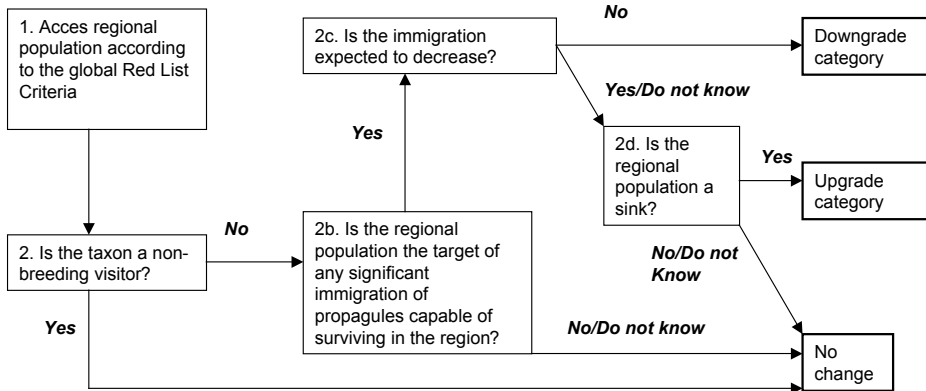


Fig. 2: Conceptual scheme of the procedure for assigning an IUCN Red List category at a regional level. Source: adapted from Gärdenfors et al. (2001).

Many criteria for assigning the IUCN-categories are based on the decline of historical population sizes and try to evaluate the period of time during which a certain species will become extinct with a certain probability. Unfortunately, data on the historical population size of rare plant species seldom exist for Luxembourg. In the process of assigning an IUCN category, I had to rely on information from historical floras (Tinant 1836; Koltz 1873, 1879), distribution maps (van Rompaey *et al.* 1979; Reichling unpublished data) and on a wide range of published and unpublished floristical observations. The frequencies indicated in the historical floras for the taxa were compared with the present situation. However, many evaluations relied on personal field observations and some subjectivity was unavoidable. The assigning of threat status of the taxa was done in close collaboration with Reichling, who has made floristical observations in Luxembourg since 1949. I decided to use the decline in the number of locations known as an estimate of population reduction. The main measure of decline was a decrease of the area of occupancy (IUCN 2001) as indicated by the reduction in the number of occupied grid squares in the distribution maps of Reichling (unpublished data), the size of the grid squares being 1 km². For many species the occurrence in one grid square corresponds to several populations in the field. However in the case of rare species, an occupied grid cell often corresponds to a single population.

Because there is no earlier Red List for Luxembourg, the application of the criterion 'A' based on the decline of the population over the last ten years or three generations (see Appendix 1), was only applied to the few taxa where this information existed (*Huperzia selago*, *Hymenophyllum tunbrigense*, *Parnassia palustris*). Criterion 'E', which requires a population viability analysis, has not

been applied to any species in this work because the necessary data to estimate the probability of extinction were not available.

3.4. Taxonomic difficulties

Species and subspecies that are difficult to distinguish are often summarized into aggregates. Apomixis often plays an important role in these cases, as in *Ranunculus auricomus* agg., *Rubus* spp., *Hieracium* spp. and *Taraxacum* spp. For *Ranunculus auricomus* agg. taxa were not distinguished at the species level in the present checklist. Our knowledge of distribution, ecology and status of this group was insufficient to allow a more detailed contribution to the Red List. For *Taraxacum* spp., 28 taxa determined by van Soest (Reichling 1981) are included in the checklist. The list of *Hieracium* taxa was completed by the revision of LUX-specimens of *Hieracium* by de Retz and van Soest (Reichling 1981). The genus *Rubus* was recently studied by Helminger (1992). He completed the checklist with the material from the LUX-herbarium (Helminger, unpublished data).

Intraspecific taxa were generally not considered for the present version of the checklist. In some cases, for which sufficient data for the status of the intraspecific taxa were available, a distinction of threat categories at subspecies level was made. Examples of this kind are *Festuca longifolia* Thuill. subsp. *pseudocostei* Auquier et Kerguelen, *Thalictrum minus* L. subsp. *pratense* (F.W. Schultz) Hand and *Tragopogon pratensis* L. subsp. *orientalis* (L.) Čelak. A complete investigation of intraspecific taxa would have unduly delayed the publication of the Red List. Y. Krippel contributed to the

evaluation of the threat status of infraspecific pteridophyte taxa.

I did not consider hybrids for the checklist with the exception of *Circaea ×intermedia* Ehrh. (*C. alpina* × *lutetiana*) which occurs without the presence of *C. alpina* and reproduces by clonal growth and *Symphytum ×uplandicum* Nyman, a fertile hybrid of *S. asperum* Lepechin and *S. officinale* L., which has outcompeted *S. asperum* in many places (Lambinon *et al.* 2004).

4. Examples of classification

In the following, the use of the different threat categories is illustrated by one example for each category. In a future version of the Red List, I plan to give a similar detailed description of each taxon listed.

4.1 Category RE (Regionally Extinct) *Drosera rotundifolia* L., Droseraceae

Distribution outside of Luxembourg: Circumpolar distribution, nearly the whole of Europe, in Southern Europe only in mountainous regions; also in the Caucasus and Lebanon, Siberia, Japan, North America, Greenland.

Former distribution in Luxembourg: Gutland: Beaufort Eltersmuer, Bascharage Boufferdanger Muer, Brouch Finstertal; Oesling: Wilwerdange Conzeffenn, Derenbach Wald, Clervaux.

Present distribution in Luxembourg: Regionally Extinct (RE).

Habitat: *Sphagnum* bogs.

Phytosociology: *Carex echinata*-*Sphagnum* bog, associated with *Carex canescens*, *Carex echinata*, *Juncus squarrosus*, *Viola palustris*, but also *Eriophorum angustifolium* and *Vaccinium oxyococcus*, vanishing if the bogs are drained.

Biology: Flowers June-August, mostly self-pollinated; sexual reproduction and clonal growth; perennial.

Status and threats: Used to be locally quite common in *Sphagnum* mires and marshes (Koltz 1873). Formerly known from 6 localities. The species became extinct at the last known locality in Bascharage Boufferdanger Muer in 1983. Regionally Extinct (RE)

Recovery goal: Since no stock is cultivated and seed is held by no institution, a reintroduction from Luxembourg material is not possible but the species could be reintroduced from material of extant Belgian localities.

4.2 Category CR (Critically Endangered) *Arnica montana* L., Asteraceae

Distribution outside of Luxembourg: European sub-oceanic distribution, in mountainous regions of Central Europe and in Western Europe from northern Spain through the French central plateau to Belgium, Luxembourg and the Netherlands.



Fig. 3: *Drosera rotundifolia*, 30.9.2001, Belgium, Marais de Vance. Photo: C. Reckinger.

Former distribution in Luxembourg: Gutland: Beaufort; Oesling: Rambrouch, Brachtenbach, Eselborn, Troine Sporbech, Derenbach Wald, Moulin de Bigonville, Wilwerdange Conzefenn, Doennange Nesselbirchen, Berl   Bamel, Grosbous Neiwis, Basbellain Fenn, Weicherdange Breichen, Binsfeld Hounert.

Present distribution in Luxembourg: Oesling: Troine Sporbech, Wilwerdange Conzefenn, Weicherdange Breichen, Binsfeld Hounert.

Main population: Oesling: Wilwerdange Conzefenn.

Habitat: Siliceous grasslands on nutrient poor soils, vanishing if the grasslands are fertilized and grazing is stopped.

Phytosociology: *Nardo-Galion* grasslands, associated with species like *Nardus stricta*, *Festuca filiformis*, *Succisa pratensis*, *Danthonia decumbens*, *Potentilla erecta*, but also *Dactylorhiza maculata* and *Pedicularis sylvatica*.

Biology: Flowers June-July, mainly pollinated by syrphid flies (Luijten *et al.* 1996); sexual reproduction and clonal growth; perennial, long-lived species.



Fig. 4: *Arnica montana*, 3.7.1996, Luxembourg, Weicherdange, Br  cher. Photo: C. Reckinger.

Status and threats: Used to be locally quite common in grazed grasslands and heaths (Koltz 1873). Formerly known from 14 localities. Now only 4 populations remain with population sizes ranging from one to 440 rosettes belonging probably only to a few old individuals. Threatened by lack of management, fragmentation and very small population size. The populations show no establishment of seedlings. Critically endangered (CR).

Recovery goal: Recovery will have been achieved when the extant Luxembourg populations have increased through management to at least 500 flowering genets each and have persisted for at least 10 years. In addition, former sites must continue to be surveyed and action taken to re-establish or reintroduce plants where appropriate. This will depend on the results of experimental research. The conservation of viable populations of *Arnica montana* in the Ardennes should be a common concern of Luxembourg, Belgium and Germany.

Management requirements: Management of sites should aim to favour seedling establishment and high seed set of flowering individuals. The reintroduction of sheep grazing will be an appropriate management technique in the abandoned grasslands. The creation of small gaps for establishment is probably necessary.

Contingency requirements: No stock is cultivated but seed is held by the Luxembourg National Museum of Natural History.

Research requirements: Results from research on the following topics would assist management planning: population biology, especially causes of mortality of young plants and seedlings, the effects of fragmentation, the effects of parasites and herbivores on reproduction, reintroduction of new populations in suitable sites; pollination biology, especially effects of very small population size on seed set.

Translocation requirements: None.

Enforcement requirements: Since all extant populations in Luxembourg are very small (< 50 individuals) and as the minimal viable population size is estimated to be 500-1000 individuals, increasing the number of plants is required.

Monitoring requirements: Surveys should be undertaken every year (number of genets, juveniles, seedlings).

4.3 Category EN (Endangered)

Pulsatilla vulgaris Mill., Ranunculaceae

Distribution outside of Luxembourg: European taxon; to the north up to England; to the east as far



Fig. 5: *Pulsatilla vulgaris*, 6.4.1999, Luxembourg, Lellingen, Am Lohr. Photo: C. Reckinger.

as the Czech Republic; to the west until northern France; to the south until the Jura, northern Switzerland and northern Yugoslavia (former sense).

Former distribution in Luxembourg: Gutland: Luxembourg Fort Olizy, Luxembourg Pulvermühl, Luxembourg Gantebein, Luxembourg Hemmerstellchen, Luxembourg Schleifmühle, Luxembourg Kaleberg, Niederdonven, Ahn Palmberg, Moersdorf Deiwelskopp, Graulinster Groeknapp, Mompach Giwischerwis, between Rosport and Dickweiler, Rosport Hild, Rosport Girsterklaus, Steinheim, Aspelt Heinrichsmühle, Altwies Stengege Berreg, Bettendorf Niederberg, Mamer Thillsmillen, Kayl Brucherberg, Esch-sur-Alzette, Differdange Termekreinchen, Dudelange Galgeberg; Oesling: Kautenbach Ueweschlaed, Kautenbach Falkenberg, Siebenaler Remelecht, Lellingen Op Baerel, Lellingen confluence Lellgerbaach-Helbichbaach.

Present distribution in Luxembourg: Gutland: Moersdorf Deiwelskopp; Oesling: Lellingen Vannar, Lellingen Op Baerel, Lellingen Héisbrich, Kautenbach Ueweschlaed.

Main population: Oesling: Lellingen Op Baerel.

Habitat: Dry calcareous or siliceous grasslands.

Phytosociology: *Mesobromion*, associated with *Brometalia*-species like *Bromus erectus*, *Cirsium acaule* and *Helianthemum nummularium*, but also with *Festuca heteropachys* and *Calluna vulgaris* on siliceous soils.

Biology: Flowers April-May; sexual reproduction, some clonal growth; perennial, long-lived species.

Status and threats: Used to be locally common. According to Koltz (1873) the species used to occur on the plateau of the Luxembourg sandstone area and in calcareous grasslands. Once known from twenty eight localities. Now only five populations remain with population sizes ranging from two to more than 7000 genets (Colling & Krippel 2001). Endangered (EN).

Recovery goal: Recovery will have been achieved when monitoring indicates stable or increasing populations in Lellingen and Moersdorf. In addition, former sites must continue to be surveyed and action taken to re-establish or reintroduce plants where appropriate. This will depend on the results of experimental research.

Site management requirements: Pending the results of research, management of sites should aim to favour seedling establishment and enhance the survival of juveniles.

Contingency requirements: No stock is cultivated, and seed is held by no institution, a situation that should be rectified.

Research requirements: Results from research on the following topics would assist the design of management actions: population biology, especially causes of mortality of seedlings and juveniles, effects of fragmentation, establishment of new populations in suitable sites.

Translocation requirements: None.

Enforcement requirements: Increasing the number of individuals in existing populations may be required pending the results of research.

Monitoring requirements: Surveys should be undertaken every five years (number of genets, juveniles).

4.4 Category VU (Vulnerable) *Dactylorhiza majalis* (Reichenb.) P. F. Hunt et Summerh., Orchidaceae

Distribution outside of Luxembourg: Central Europe.

Former distribution in Luxembourg: Gutland, Oesling.



Fig. 6: *Dactylorhiza majalis*, 15.5.2001, Luxembourg, Koedange, Poenn. Photo: C. Reckinger.

Present distribution in Luxembourg: Gutland, Oesling.

Main populations: Gutland: Dippach Bitchenheck, Koedange Poenn; Oesling: Grosbous Neiwis.

Habitat: Wet meadows mown in June-July, on heavy soils with water excess during winter, vanishing if the meadows are fertilized and tall grasses like *Alopecurus pratensis* and *Poa trivialis* are favoured. Rarely found in abandoned meadows.

Phytosociology: Selino-Molinietum, Junco-Molinietum, Senecio-Brometum racemosi, associated with *Molinion*-species like *Succisa pratensis*, *Juncus conglomeratus* and *Scorzonera humilis* but also *Calthion*-species like *Caltha palustris*, *Senecio aquaticus* and *Bromus racemosus*.

Biology: Flowers June; sexual reproduction; perennial, long-lived species.

Status and threats: Used to be quite common in wet meadows and marsh forests (Koltz 1873).

Once known from 88 grid squares of 1 km² (Reichling, unpublished data). Threatened by intensification of agriculture and fragmentation. Vulnerable (VU).

Recovery goal: Recovery will have been achieved when all existing sites have hydrological and successional conditions conducive to maintaining their populations at present or increased levels.

Site management requirements: Pending the results of research, management of sites should favour the establishment of seedlings. The low nutrient sites (*Molinion*) should be preserved as a priority by appropriate management. Extensification schemes should be applied to wet meadows still exploited by farmers.

Contingency requirements: Seed is held by no institution, a situation that should be rectified.

Research requirements: Results from research on the following topics would assist the design of management actions: population biology, especially mortality of young plants by competition from tall grasses, effects of extensification schemes, effects of habitat fragmentation, reestablishment of new populations in suitable sites.

Translocation requirements: None.

Enforcement requirements: None.

Monitoring requirements: Surveys should be undertaken every five years (number of genets, juveniles).

4.5 Category R (Extremely Rare) *Dianthus gratianopolitanus* Vill., Caryophyllaceae

Distribution outside of Luxembourg: Central Europe, from southern France to southern England, from the Jura to the Czech Republic and western Poland.

Former distribution in Luxembourg: Oesling: Stolzembourg, Michelau.

Present distribution in Luxembourg: Oesling: Michelau.

Main population: Oesling: Michelau.

Habitat: Crevices in Devonian rocks.

Phytosociology: Diantho-Festucetum, associated with species like *Silene nutans*, *Lychnis viscaria* and *Cotoneaster integerrimus*.

Biology: Flowers May-June, pollinated by diurnal butterflies; sexual reproduction, clonal growth form (mat-forming); perennial, long-lived species.



Fig. 7: *Dianthus gratianopolitanus*, 18.6.1995, Luxembourg, Michelau. Photo: C. Reckinger.

Status and threats: Only two localities known, of which one, mentioned by Koltz (1873), has disappeared. Extremely Rare (R).

Recovery goal: Recovery for this naturally rare species will be achieved when monitoring indicates a stable or increasing population in Michelau.

Site management requirements: None.

Contingency requirements: No stock is cultivated and seed is held by no institution, a situation that should be rectified.

Research requirements: Results from research on the following topics would assist the design of protection actions: population biology, pollination biology.

Translocation requirements: None.

Enforcement requirements: None.

Monitoring requirements: Surveys should be undertaken every five years (number of genets, juveniles).

5. Red List and checklist of the vascular plants of Luxembourg

5.1. Legend

Taxon name	
Threat category (adapted from IUCN 2001)	
RE	Regionally Extinct
CR	Critically Endangered
EN	Endangered
VU	Vulnerable
NT	Near Threatened
R	Extremely Rare
LC	Least Concern
DD	Data Deficient
NE	Not Evaluated
Status	
N	Native
EA	Established alien
Criteria sub-heads	
A	Population reduction
B	Small distribution – fragmented, declining or fluctuating
C	Small population size and declining
D1	Very small population
D2	Very restricted area of occupancy
For complete description of the criteria see Appendix 1.	
Habitat types	
FOR	Woodlands, forest edges and cuttings
ROC	Rocks and screes
AQU	Aquatic habitats and springs
FRE	Freshwater margins and damp mud
MAR	Marshes, swamps and wet grasslands
DRY	Dry and mesophile grasslands and heathlands
RUD	Fallow land, ruderal communities and arable fields
GRA	Intensively managed grasslands

5.2 Account of individual plant taxa

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Acer campestre</i> L.	LC	N		FOR
<i>Acer platanoides</i> L.	LC	N		FOR
<i>Acer pseudoplatanus</i> L.	LC	N		FOR
<i>Achillea millefolium</i> L.	LC	N		DRY
<i>Achillea nobilis</i> L.	CR	EA	B2b(iv)	DRY
<i>Achillea ptarmica</i> L.	LC	N		MAR
<i>Acinos arvensis</i> (Lam.) Dandy	VU	N	B2b(iv,v)	DRY
<i>Aconitum lycoctonum</i> L. subsp. <i>vulparia</i> (Reichenb.) Nyman	VU	N	B1a+2b(v)	FOR
<i>Acorus calamus</i> L.	LC	EA		FRE
<i>Actaea spicata</i> L.	LC	N		FOR
<i>Adonis aestivalis</i> L.	RE	N		RUD
<i>Adonis annua</i> L.	RE	N		RUD
<i>Adonis flammea</i> Jacq.	RE	N		RUD
<i>Adoxa moschatellina</i> L.	LC	N		FOR
<i>Aegopodium podagraria</i> L.	LC	N		FOR
<i>Aethusa cynapium</i> L.	LC	N		RUD
<i>Agrimonia eupatoria</i> L.	LC	N		DRY
<i>Agrimonia procera</i> Wallr.	LC	N		FOR
<i>Agrostemma githago</i> L.	RE	N		RUD
<i>Agrostis canina</i> L.	NT	N		MAR
<i>Agrostis capillaris</i> L.	LC	N		DRY
<i>Agrostis gigantea</i> Roth	LC	N		RUD
<i>Agrostis stolonifera</i> L.	LC	N		MAR
<i>Agrostis vinealis</i> Schreb.	NT	N		DRY
<i>Aira caryophyllaea</i> L.	VU	N	B1a+2b(iv,v)	DRY
<i>Aira praecox</i> L.	VU	N	B1a+2b(iv,v)	DRY
<i>Ajuga chamaepitys</i> (L.) Schreb.	RE	N		RUD
<i>Ajuga genevensis</i> L.	EN	N	B2b(iii,iv)	DRY
<i>Ajuga pyramidalis</i> L.	EN	N	B2b(iii,iv); C2a(i)	DRY
<i>Ajuga reptans</i> L.	LC	N		MAR
<i>Alchemilla filicaulis</i> Buser	VU	N	B1a+2b(iv)	DRY
<i>Alchemilla glabra</i> Neygenf.	LC	N		MAR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Alchemilla monticola</i> Opiz	R	N		DRY
<i>Alchemilla vulgaris</i> L.	R	N		DRY
<i>Alchemilla xanthochlora</i> Rothm.	LC	N		DRY
<i>Alisma lanceolatum</i> With.	CR	N	C2a(i)	AQU
<i>Alisma plantago-aquatica</i> L.	LC	N		FRE
<i>Alliaria petiolata</i> (Bieb.) Cavara et Grande	LC	N		FOR
<i>Allium oleraceum</i> L.	LC	N		DRY
<i>Allium rotundum</i> L.	EN	N	B2b(iv); D1	RUD
<i>Allium scorodoprasum</i> L.	EN	N	C2a(ii)	DRY
<i>Allium ursinum</i> L.	LC	N		FOR
<i>Allium vineale</i> L.	LC	N		DRY
<i>Alnus glutinosa</i> (L.) Gaertn.	LC	N		MAR
<i>Alopecurus aequalis</i> Sobol.	VU	N	B1a+2b(iv,v)	MAR
<i>Alopecurus geniculatus</i> L.	LC	N		MAR
<i>Alopecurus myosuroides</i> Huds.	LC	N		RUD
<i>Alopecurus pratensis</i> L.	LC	N		GRA
<i>Alopecurus rendlei</i> Eig	NT	N		MAR
<i>Althaea hirsuta</i> L.	CR	N	B2b(iii,iv)	RUD
<i>Althaea officinalis</i> L.	R	N		MAR
<i>Alyssum alyssoides</i> (L.) L.	NT	N		ROC
<i>Amaranthus retroflexus</i> L.	LC	EA		RUD
<i>Amelanchier ovalis</i> Med.	R	N		ROC
<i>Anacamptis pyramidalis</i> (L.) L.C.M. Rich	VU	N	B2b(iv)	DRY
<i>Anagallis arvensis</i> L.	LC	N		RUD
<i>Anagallis arvensis</i> L. subsp. <i>arvensis</i> f. <i>arvensis</i>	LC	N		RUD
<i>Anagallis arvensis</i> L. subsp. <i>arvensis</i> f. <i>carnea</i> (Schrank) Hyl.	LC	N		RUD
<i>Anagallis arvensis</i> L. subsp. <i>foemina</i> (Mill.) Schinz et Thell.	VU	N	B1a+2b(iv,v)	RUD
<i>Anchusa arvensis</i> (L.) Bieb.	LC	N		RUD
<i>Anemone nemorosa</i> L.	LC	N		FOR
<i>Anemone ranunculoides</i> L.	LC	N		FOR
<i>Anemone sylvestris</i> L.	RE	N		FOR
<i>Angelica sylvestris</i> L.	LC	N		MAR
<i>Antennaria dioica</i> (L.) Gaertn.	RE	N		DRY
<i>Anthemis arvensis</i> L.	LC	N		RUD

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Anthemis cotula</i> L.	CR	N	B1a+2b(iv,v)	RUD
<i>Anthemis tinctoria</i> L.	LC	N		RUD
<i>Anthericum liliago</i> L.	VU	N	B2b(iv,v)	ROC
<i>Anthoxanthum odoratum</i> L.	LC	N		GRA
<i>Anthriscus caucalis</i> Bieb.	RE	EA		RUD
<i>Anthriscus sylvestris</i> (L.) Hoffm.	LC	N		GRA
<i>Anthyllis vulneraria</i> L.	LC	N		DRY
<i>Apera interrupta</i> (L.) Beauv.	LC	EA		RUD
<i>Apera spica-venti</i> (L.) Beauv.	LC	N		RUD
<i>Aphanes arvensis</i> L.	LC	N		RUD
<i>Aphanes australis</i> Rydb.	EN	N	B2b(iii,v)	RUD
<i>Apium nodiflorum</i> (L.) Lag.	EN	N	B2b(iv)	FRE
<i>Aquilegia vulgaris</i> L.	NT	N		FOR
<i>Arabidopsis thaliana</i> (L.) Heynh.	LC	N		RUD
<i>Arabis glabra</i> (L.) Bernh.	VU	N	B2b(iv,v)	FOR
<i>Arabis hirsuta</i> (L.) Scop.	LC	N		DRY
<i>Arabis pauciflora</i> (Grimm) Garcke	R	N		FOR
<i>Arctium lappa</i> L.	LC	N		RUD
<i>Arctium minus</i> (Hill) Bernh.	LC	N		RUD
<i>Arctium nemorosum</i> Lej.	LC	N		FOR
<i>Arctium tomentosum</i> Mill.	VU	N	B2b(iv)	RUD
<i>Arenaria serpyllifolia</i> L.	LC	N		ROC
<i>Aristolochia clematitis</i> L.	EN	N	B2b(iii,iv)	FOR
<i>Arnica montana</i> L.	CR	N	B1a+2b(v); D1	DRY
<i>Arnoseris minima</i> (L.) Schweigg. et Körte	RE	N		RUD
<i>Arrhenatherum elatius</i> (L.) Beauv. ex J. et C. Presl	LC	N		GRA
<i>Artemisia absinthium</i> L.	NT	N		RUD
<i>Artemisia vulgaris</i> L.	LC	N		RUD
<i>Arum maculatum</i> L.	LC	N		FOR
<i>Asarum europaeum</i> L.	EN	N	C2a(ii); D1	FOR
<i>Asparagus officinalis</i> L.	LC	EA		RUD
<i>Asperula cynanchica</i> L.	NT	N		DRY

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Asplenium adiantum-nigrum</i> L.	LC	N		ROC
<i>Asplenium fontanum</i> (L.) Bernh.	RE	N		ROC
<i>Asplenium obovatum</i> Viv. subsp. <i>billotii</i> (F.W. Schultz) O. Bolòs, Vigo, Masalles et Ninot	RE	N		ROC
<i>Asplenium ruta-muraria</i> L.	LC	N		ROC
<i>Asplenium scolopendrium</i> L.	NT	N		FOR
<i>Asplenium septentrionale</i> (L.) Hoffmann	LC	N		ROC
<i>Asplenium trichomanes</i> L.	LC	N		ROC
<i>Asplenium trichomanes</i> L. subsp. <i>pachyrachis</i> (Christ) Lovis et Reichst.	DD	N		ROC
<i>Asplenium trichomanes</i> L. subsp. <i>quadri-valens</i> D. E. Meyer	LC	N		ROC
<i>Asplenium trichomanes</i> L. subsp. <i>trichomanes</i>	LC	N		ROC
<i>Asplenium trichomanes</i> L. nsubsp. <i>staufferi</i> Lovis et Reichst.	R	N		ROC
<i>Asplenium viride</i> Huds.	RE	N		ROC
<i>Asplenium ×alternifolium</i> Wulfen	R	N		ROC
<i>Asplenium ×murbeckii</i> Dörfler	R	N		ROC
<i>Aster amellus</i> L.	CR	N	B1a; C2a	DRY
<i>Aster novi-belgii</i> L.	LC	EA		FRE
<i>Astragalus glycyphyllos</i> L.	LC	N		FOR
<i>Athyrium filix-femina</i> (L.) Roth	LC	N		FOR
<i>Atriplex patula</i> L.	LC	N		RUD
<i>Atriplex prostrata</i> Boucher ex DC.	LC	N		RUD
<i>Atropa bella-donna</i> L.	LC	N		FOR
<i>Avena fatua</i> L.	LC	N		RUD
<i>Avenula pratensis</i> (L.) Dum.	EN	N	B2b(iii,iv)	DRY
<i>Avenula pubescens</i> (Huds.) Dum.	NT	N		DRY
<i>Ballota nigra</i> L.	LC	N		RUD
<i>Barbarea intermedia</i> Boreau	LC	N		RUD
<i>Barbarea vulgaris</i> R. Brown	LC	N		RUD
<i>Bellis perennis</i> L.	LC	N		GRA
<i>Berberis vulgaris</i> L.	EN	N	B1a+2b(iv)	FOR
<i>Berteroa incana</i> (L.) DC.	LC	N		RUD
<i>Berula erecta</i> (Huds.) Coville	VU	N	B2b(iv,v)	FRE
<i>Betula pendula</i> Roth	LC	N		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Betula pubescens</i> Ehrh.	NT	N		FOR
<i>Bidens cernua</i> L.	VU	N	B1a+2b(iv,v)	FRE
<i>Bidens frondosa</i> L.	LC	EA		FRE
<i>Bidens tripartita</i> L.	LC	N		FRE
<i>Blackstonia perfoliata</i> (L.) Huds.	RE	N		DRY
<i>Blechnum spicant</i> (L.) Roth	VU	N	B1a+2b(iv)	FOR
<i>Blysmus compressus</i> (L.) Panzer ex Link	CR	N	B1a+2b(iv)	MAR
<i>Bolboschoenus maritimus</i> (L.) Palla	CR	N	C2a(ii)	FRE
<i>Botrychium lunaria</i> (L.) Swartz	EN	N	B2b(iii,iv); C2a(i)	DRY
<i>Brachypodium pinnatum</i> (L.) Beauv.	LC	N		DRY
<i>Brachypodium sylvaticum</i> (Huds.) Beauv.	LC	N		FOR
<i>Brassica nigra</i> (L.) Koch	LC	N		RUD
<i>Briza media</i> L.	LC	N		DRY
<i>Bromus arvensis</i> L.	LC	N		RUD
<i>Bromus commutatus</i> Schrad.	LC	N		RUD
<i>Bromus erectus</i> Huds.	LC	N		DRY
<i>Bromus hordeaceus</i> L.	LC	N		GRA
<i>Bromus inermis</i> Leyss.	LC	N		RUD
<i>Bromus lepidus</i> Holmberg	RE	EA		RUD
<i>Bromus racemosus</i> L.	LC	N		MAR
<i>Bromus ramosus</i> Huds.	LC	N		FOR
<i>Bromus secalinus</i> L.	CR	N	B1a+2b(iv); C2a(i)	RUD
<i>Bromus sterilis</i> L.	LC	N		RUD
<i>Bromus tectorum</i> L.	LC	N		RUD
<i>Bryonia dioica</i> Jacq.	LC	N		FOR
<i>Bunias orientalis</i> L.	LC	EA		RUD
<i>Bunium bulbocastanum</i> L.	VU	N	B2b(iv)	RUD
<i>Bupleurum falcatum</i> L.	LC	N		DRY
<i>Bupleurum rotundifolium</i> L.	RE	EA		RUD
<i>Butomus umbellatus</i> L.	VU	N	B1a+2b(iv)	AQU
<i>Buxus sempervirens</i> L.	VU	N	B1a; D1	FOR
<i>Calamagrostis arundinacea</i> (L.) Roth	R	N		FOR
<i>Calamagrostis canescens</i> (Web.) Roth	EN	N	B2b(iv)	FOR
<i>Calamagrostis epigejos</i> (L.) Roth	LC	N		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Calamintha menthifolia</i> Host	EN	N	B1a+2b(iv)	FOR
<i>Calendula arvensis</i> L.	CR	N	B1a+2b(iv)	RUD
<i>Calepina irregularis</i> (Asso) Thell.	LC	EA		RUD
<i>Calla palustris</i> L.	RE	N		MAR
<i>Callitriche hamulata</i> Kütz. ex Koch	LC	N		AQU
<i>Callitriche obtusangula</i> Le Gall	R	N		AQU
<i>Callitriche palustris</i> L.	EN	N	B2b(iii,iv)	AQU
<i>Callitriche platycarpa</i> Kütz.	LC	N		AQU
<i>Callitriche stagnalis</i> Scop.	LC	N		AQU
<i>Calluna vulgaris</i> (L.) Hull	LC	N		DRY
<i>Caltha palustris</i> L.	NT	N		MAR
<i>Calystegia sepium</i> (L.) R. Brown	LC	N		FRE
<i>Campanula cervicaria</i> L.	RE	N		FOR
<i>Campanula glomerata</i> L.	EN	N	B1a+2b(iv)	DRY
<i>Campanula patula</i> L.	CR	N	B1a+2b(iv)	DRY
<i>Campanula persicifolia</i> L.	LC	N		FOR
<i>Campanula rapunculoides</i> L.	LC	N		RUD
<i>Campanula rapunculus</i> L.	LC	N		DRY
<i>Campanula rotundifolia</i> L.	LC	N		DRY
<i>Campanula trachelium</i> L.	LC	N		FOR
<i>Capsella bursa-pastoris</i> (L.) Med.	LC	N		RUD
<i>Cardamine amara</i> L.	LC	N		MAR
<i>Cardamine bulbifera</i> (L.) Crantz	R	N		FOR
<i>Cardamine flexuosa</i> With.	LC	N		FOR
<i>Cardamine hirsuta</i> L.	LC	N		RUD
<i>Cardamine impatiens</i> L.	LC	N		FOR
<i>Cardamine pratensis</i> L.	LC	N		GRA
<i>Cardaminopsis arenosa</i> (L.) Hayek	LC	N		ROC
<i>Cardaria draba</i> (L.) Desv.	LC	EA		RUD
<i>Carduus crispus</i> L.	LC	N		RUD
<i>Carduus nutans</i> L.	LC	N		RUD
<i>Carex acuta</i> L.	LC	N		MAR
<i>Carex acutiformis</i> Ehrh.	LC	N		MAR
<i>Carex brizoides</i> L.	R	N		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Carex canescens</i> L.	VU	N	B2b(iv,v)	MAR
<i>Carex caryophyllea</i> Latourr.	LC	N		DRY
<i>Carex cuprina</i> (Sandór ex Heuffel) Nendtvich ex A. Kerner	VU	N	B2b(iv,v)	MAR
<i>Carex davalliana</i> Smith	RE	N		MAR
<i>Carex demissa</i> Vahl ex Hartman	LC	N		MAR
<i>Carex depauperata</i> Curt. ex With.	RE	N		FOR
<i>Carex diandra</i> Schrank	CR	N	C2a(ii); D1	MAR
<i>Carex digitata</i> L.	LC	N		FOR
<i>Carex distans</i> L.	EN	N	B1a+2b(iii,iv)	MAR
<i>Carex disticha</i> Huds.	LC	N		MAR
<i>Carex divulsa</i> Stokes	LC	N		FOR
<i>Carex echinata</i> Murray	VU	N	B2b(iv,v)	MAR
<i>Carex elata</i> All.	CR	N	C2a(ii)	MAR
<i>Carex elongata</i> L.	LC	N		FOR
<i>Carex flacca</i> Schreb.	LC	N		DRY
<i>Carex flava</i> L.	EN	N	B1a+2b(iii,iv)	MAR
<i>Carex hirta</i> L.	LC	N		GRA
<i>Carex hostiana</i> DC.	CR	N	B1a+2b(iv)	MAR
<i>Carex humilis</i> Leyss.	R	N		ROC
<i>Carex lepidocarpa</i> Tausch	VU	N	B1a+2b(iv,v)	MAR
<i>Carex montana</i> L.	VU	N	B2b(iv,v)	FOR
<i>Carex muricata</i> L. subsp. <i>lamprocarpa</i> Čelak	LC	N		FOR
<i>Carex nigra</i> (L.) Reichard	LC	N		MAR
<i>Carex ornithopoda</i> Willd.	CR	N	C2a(ii)	AQU
<i>Carex ovalis</i> Good.	LC	N		MAR
<i>Carex pallescens</i> L.	LC	N		FOR
<i>Carex panicea</i> L.	LC	N		MAR
<i>Carex paniculata</i> L.	LC	N		MAR
<i>Carex pendula</i> Huds.	LC	N		FOR
<i>Carex pilosa</i> Scop.	EN	N	C2a(ii); D1	FOR
<i>Carex pilulifera</i> L.	LC	N		FOR
<i>Carex pseudocyperus</i> L.	EN	N	B2b(iii,iv)	FRE
<i>Carex pulicaris</i> L.	CR	N	B1a+2b(iv)	MAR
<i>Carex remota</i> Jusl. ex L.	LC	N		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Carex riparia</i> Curt.	EN	N	B2b(iii,iv)	MAR
<i>Carex rostrata</i> Stokes	LC	N		MAR
<i>Carex spicata</i> Huds.	LC	N		DRY
<i>Carex strigosa</i> Huds.	VU	N	B1a+2b(iv)	FOR
<i>Carex sylvatica</i> Huds.	LC	N		FOR
<i>Carex tomentosa</i> L.	LC	N		DRY
<i>Carex umbrosa</i> Hoppe	R	N		FOR
<i>Carex vesicaria</i> L.	LC	N		MAR
<i>Carex vulpina</i> L.	VU	N	B2b(iv,v)	MAR
<i>Carlina vulgaris</i> L.	LC	N		DRY
<i>Carpinus betulus</i> L.	LC	N		FOR
<i>Carum carvi</i> L.	LC	N		DRY
<i>Catabrosa aquatica</i> (L.) Beauv.	CR	N	B1a+2b(iv)	FRE
<i>Caucalis platycarpus</i> L.	RE	N		RUD
<i>Centaurea calcitrapa</i> L.	RE	EA		RUD
<i>Centaurea cyanus</i> L.	VU	N	B2b(iv,v)+2c(iii,iv)	RUD
<i>Centaurea jacea</i> L.	LC	N		DRY
<i>Centaurea jacea</i> subsp. <i>grandiflora</i> (Gaudin) Schübl. et Martens	LC	N		DRY
<i>Centaurea jacea</i> subsp. <i>nigra</i> (L.) Bonnier et Layens	LC	N		DRY
<i>Centaurea montana</i> L.	NT	N		FOR
<i>Centaurea repens</i> L.	CR	EA	C2a(ii)	RUD
<i>Centaurea scabiosa</i> L.	LC	N		DRY
<i>Centaurea stoebe</i> L.	RE	EA		DRY
<i>Centaureum erythraea</i> Rafn	VU	N	B2b(iv,v)	DRY
<i>Centaureum pulchellum</i> (SW.) Druce	VU	N	B2b(iv,v)+2c(iii,iv)	FRE
<i>Centranthus ruber</i> (L.) DC.	LC	EA		ROC
<i>Centunculus minimus</i> L.	EN	N	B1a+2b(iv)	RUD
<i>Cephalanthera damasonium</i> (Mill.) Druce	NT	N		FOR
<i>Cephalanthera longifolia</i> (L.) Fritsch	VU	N	B2b(iv)	FOR
<i>Cephalanthera rubra</i> (L.) L. C. M. Rich.	VU	N	B1a+2b(iv,v)	FOR
<i>Cephalaria gigantea</i> (L.) Roem. et Schultes	R	EA		DRY
<i>Cerastium arvense</i> L.	LC	N		DRY

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Cerastium brachypetalum</i> Pers.	LC	N		ROC
<i>Cerastium fontanum</i> Baumg.	LC	N		GRA
<i>Cerastium glomeratum</i> Thuill.	LC	N		RUD
<i>Cerastium pumilum</i> Curt.	LC	N		DRY
<i>Cerastium semidecandrum</i> L.	LC	N		DRY
<i>Ceratophyllum demersum</i> L.	VU	N	B1a	AQU
<i>Ceterach officinarum</i> Willd.	VU	N	B1a+2b(v)	ROC
<i>Chaenorhinum minus</i> (L.) Lange	LC	N		RUD
<i>Chaerophyllum aureum</i> L.	RE	N		FOR
<i>Chaerophyllum bulbosum</i> L.	R	N		FRE
<i>Chaerophyllum temulum</i> L.	LC	N		FOR
<i>Cheiranthus cheiri</i> L.	LC	EA		ROC
<i>Chelidonium majus</i> L.	LC	N		RUD
<i>Chenopodium album</i> L.	LC	N		RUD
<i>Chenopodium bonus-henricus</i> L.	CR	N	B2b(iv,v)	RUD
<i>Chenopodium botrys</i> L.	CR	EA	C2a(ii)	RUD
<i>Chenopodium glaucum</i> L.	EN	N	B1a+2c(iv)	RUD
<i>Chenopodium hybridum</i> L.	CR	N	B2b(iv,v)	RUD
<i>Chenopodium murale</i> L.	RE	N		RUD
<i>Chenopodium polyspermum</i> L.	LC	N		RUD
<i>Chenopodium rubrum</i> L.	R	N		RUD
<i>Chenopodium urbicum</i> L.	RE	N		RUD
<i>Chenopodium vulvaria</i> L.	RE	N		RUD
<i>Chondrilla juncea</i> L.	CR	N	B1a+2b(iv)	RUD
<i>Chondrilla latifolia</i> Bieb.	EN	EA	B1a	RUD
<i>Chrysosplenium alternifolium</i> L.	LC	N		AQU
<i>Chrysosplenium oppositifolium</i> L.	LC	N		AQU
<i>Cichorium intybus</i> L.	LC	N		RUD
<i>Circaea alpina</i> L.	CR	N	D1	FOR
<i>Circaea lutetiana</i> L.	LC	N		FOR
<i>Circaea xintermedia</i> Ehrh.	VU	N	B2b(iv,v)	FOR
<i>Cirsium acaule</i> Scop.	VU	N	B2b(iv,v)	DRY
<i>Cirsium arvense</i> (L.) Scop.	LC	N		RUD
<i>Cirsium eriophorum</i> (L.) Scop.	LC	N		RUD

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Cirsium oleraceum</i> (L.) Scop.	LC	N		MAR
<i>Cirsium palustre</i> (L.) Scop.	LC	N		MAR
<i>Cirsium vulgare</i> (Savi) Ten.	LC	N		RUD
<i>Claytonia perfoliata</i> Donn ex Willd.	LC	EA		RUD
<i>Clematis vitalba</i> L.	LC	N		FOR
<i>Clinopodium vulgare</i> L.	LC	N		DRY
<i>Coeloglossum viride</i> (L.) Hartman	CR	N	B1a+2b(iv); D1	DRY
<i>Coincya monensis</i> (L.) Greuter et Burdet subsp. <i>cheiranthos</i> (Vill.) Aedo, Leadlay et Muñoz Garmendia	VU	N	B2b(iv)	ROC
<i>Colchicum autumnale</i> L.	VU	N	B2b(iv,v)	MAR
<i>Colutea arborescens</i> L.	LC	EA		FOR
<i>Comarum palustre</i> L.	VU	N	B2b(iv,v)	MAR
<i>Conium maculatum</i> L.	NT	N		RUD
<i>Conopodium majus</i> (Gouan) Loret	CR	N	C2a(ii); D1	FOR
<i>Conringia orientalis</i> (L.) Dum.	RE	N		RUD
<i>Consolida regalis</i> S.F. Gray	CR	N	B1a+2b(iv,v)	RUD
<i>Convallaria majalis</i> L.	NT	N		FOR
<i>Convolvulus arvensis</i> L.	LC	N		RUD
<i>Conyza canadensis</i> (L.) Cronq.	LC	EA		RUD
<i>Cornus mas</i> L.	LC	N		FOR
<i>Cornus sanguinea</i> L.	LC	N		FOR
<i>Coronopus squamatus</i> (Forssk.) Aschers.	EN	N	B1a	RUD
<i>Corrigiola litoralis</i> L.	R	N		FRE
<i>Corydalis cava</i> (L.) Schweigg. et Koerte	VU	N	B1a+2b(iv,v)	FOR
<i>Corydalis solida</i> (L.) Clairv.	LC	N		FOR
<i>Corylus avellana</i> L.	LC	N		FOR
<i>Corynephorus canescens</i> (L.) Beauv.	EN	N	B1a+2b(v); C2a(i)	DRY
<i>Cotoneaster integerrimus</i> Med.	NT	N		ROC
<i>Crataegus laevigata</i> (Poiret) DC.	LC	N		FOR
<i>Crataegus monogyna</i> Jacq.	LC	N		FOR
<i>Crataegus rhipidophylla</i> Gandoge.	LC	N		FOR
<i>Crepis biennis</i> L.	LC	N		GRA
<i>Crepis capillaris</i> (L.) Wallr.	LC	N		GRA
<i>Crepis foetida</i> L.	EN	N	B1a+2b(iv)	RUD
<i>Crepis paludosa</i> (L.) Moench	LC	N		MAR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Crepis polymorpha</i> Pourr.	LC	N		RUD
<i>Crepis praemorsa</i> (L.) F. W. Walther	RE	N		DRY
<i>Crepis pulchra</i> L.	CR	N	B2b(iv,v)	RUD
<i>Crepis sancta</i> (L.) Bornm. subsp. <i>nemausensis</i> (Gouan) Babc.	LC	EA		RUD
<i>Cruciata laevipes</i> Opiz	LC	N		GRA
<i>Cuscuta epilinum</i> Weihe	RE	N		RUD
<i>Cuscuta epithymum</i> (L.) L.	CR	N	B1a+2b(iv)	DRY
<i>Cuscuta europaea</i> L.	LC	N		FRE
<i>Cuscuta lupuliformis</i> Krocke	LC	EA		FRE
<i>Cymbalaria muralis</i> Gaertn., B. Mey. et Scherb.	LC	EA		ROC
<i>Cynodon dactylon</i> (L.) Pers.	LC	EA		RUD
<i>Cynoglossum officinale</i> L.	VU	N	B1a+2b(iv,v)	RUD
<i>Cynosurus cristatus</i> L.	LC	N		GRA
<i>Cyperus flavescens</i> L.	RE	N		FRE
<i>Cyperus fuscus</i> L.	R	N		FRE
<i>Cypripedium calceolus</i> L.	RE	N		FOR
<i>Cystopteris fragilis</i> (L.) Bernh.	LC	N		ROC
<i>Cytisus scoparius</i> (L.) Link	LC	N		DRY
<i>Dactylis glomerata</i> L.	LC	N		GRA
<i>Dactylis polygama</i> Horvátovszky	R	N		FOR
<i>Dactylorhiza fuchsii</i> (Druce) Soó	VU	N	B1a+2b(iv,v)	MAR
<i>Dactylorhiza incarnata</i> (L.) Soó	CR	N	B1a; D1	MAR
<i>Dactylorhiza maculata</i> (L.) Soó	EN	N	B1a+2b(iv)	DRY
<i>Dactylorhiza majalis</i> (Reichenb.) P. F. Hunt et Summerh.	VU	N	B2b(iv,v)	MAR
<i>Dactylorhiza praetermissa</i> (Druce) Soó	CR	N	D1	MAR
<i>Danthonia decumbens</i> (L.) DC.	VU	N	B2b(iv,v)	DRY
<i>Daphne mezereum</i> L.	NT	N		FOR
<i>Daucus carota</i> L.	LC	N		GRA
<i>Deschampsia cespitosa</i> (L.) Beauv.	LC	N		MAR
<i>Deschampsia flexuosa</i> (L.) Trin.	LC	N		FOR
<i>Dianthus armeria</i> L.	VU	N	B2b(iv,v)	DRY
<i>Dianthus carthusianorum</i> L.	VU	N	B2b(iv,v)	DRY
<i>Dianthus deltoides</i> L.	EN	N	B1a+2b(iv,v)	DRY
<i>Dianthus gratianopolitanus</i> Vill.	R	N		ROC

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Digitalis grandiflora</i> Mill.	VU	N	B2b(iv,v)+2c(iii,iv)	FOR
<i>Digitalis lutea</i> L.	NT	N		FOR
<i>Digitalis purpurea</i> L.	LC	N		FOR
<i>Digitaria ischaemum</i> (Schreb. ex Schweigg.) Muhlenb.	LC	N		RUD
<i>Digitaria sanguinalis</i> (L.) Scop.	EN	N	B1a+2b(iv)	RUD
<i>Diphasiastrum tristachyum</i> (Pursh) Holub	RE	N		DRY
<i>Diplotaxis muralis</i> (L.) DC.	R	N		ROC
<i>Diplotaxis tenuifolia</i> (L.) DC.	LC	N		ROC
<i>Dipsacus fullonum</i> L.	LC	N		RUD
<i>Dipsacus pilosus</i> L.	NT	N		FOR
<i>Draba muralis</i> L.	EN	N	B1a+2b(iv); C2a(i)	ROC
<i>Drosera rotundifolia</i> L.	RE	N		MAR
<i>Dryopteris affinis</i> (Lowe) Fraser-Jenkins	LC	N		FOR
<i>Dryopteris affinis</i> (Lowe) Fraser-Jenkins subsp. <i>affinis</i>	R	N		FOR
<i>Dryopteris affinis</i> (Lowe) Fraser-Jenkins subsp. <i>borreri</i> (Newmann) Fraser-Jenkins	VU	N	B1a+2b(iv,v)	FOR
<i>Dryopteris affinis</i> subsp. <i>cambrensis</i> Fraser-Jenkins var. <i>distans</i> (Fiori) Fraser-Jenkins	R	N		FOR
<i>Dryopteris carthusiana</i> (Vill.) H. P. Fuchs	LC	N		FOR
<i>Dryopteris dilatata</i> (Hoffm.) A. Gray	LC	N		FOR
<i>Dryopteris filix-mas</i> (L.) Schott	LC	N		FOR
<i>Dryopteris</i> × <i>complexa</i> Fraser-Jenkins	R	N		FOR
<i>Echinochloa crus-galli</i> (L.) Beauv.	LC	N		RUD
<i>Echinops sphaerocephalus</i> L.	LC	EA		RUD
<i>Echium vulgare</i> L.	LC	N		RUD
<i>Eleocharis acicularis</i> (L.) Roem. et Schult.	R	N		FRE
<i>Eleocharis ovata</i> (Roth) Roem. et Schult.	R	N		MAR
<i>Eleocharis palustris</i> (L.) Roem. et Schult.	LC	N		MAR
<i>Eleocharis quinqueflora</i> (F.X. Hartm.) O. Schwartz	CR	N	B1a; C2a(ii)	MAR
<i>Eleocharis uniglumis</i> (Link) Schultes	CR	N	B1a+2b(iv)	MAR
<i>Elodea canadensis</i> Michaux	LC	EA		AQU
<i>Elodea nuttallii</i> (Planch.) St John	LC	EA		AQU
<i>Elymus caninus</i> (L.) L.	LC	N		FOR
<i>Elymus repens</i> (L.) Gould	LC	N		RUD

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Epilobium angustifolium</i> L.	LC	N		FOR
<i>Epilobium ciliatum</i> Rafin.	LC	EA		RUD
<i>Epilobium collinum</i> C.C. Gmel.	LC	N		ROC
<i>Epilobium dodonaei</i> Vill.	LC	EA		RUD
<i>Epilobium hirsutum</i> L.	LC	N		MAR
<i>Epilobium lanceolatum</i> Seb. et Mauri	LC	N		ROC
<i>Epilobium montanum</i> L.	LC	N		FOR
<i>Epilobium obscurum</i> Schreb.	LC	N		MAR
<i>Epilobium palustre</i> L.	VU	N	B2b(iv,v)	MAR
<i>Epilobium parviflorum</i> Schreb.	LC	N		MAR
<i>Epilobium roseum</i> Schreb.	LC	N		RUD
<i>Epilobium tetragonum</i> L.	LC	N		RUD
<i>Epimedium alpinum</i> L.	R	EA		FOR
<i>Epipactis atrorubens</i> (Hoffm.) Besser	VU	N	B2b(iv,v)	DRY
<i>Epipactis helleborine</i> (L.) Crantz	LC	N		FOR
<i>Epipactis leptochila</i> (Godf.) Godf.	R	N		FOR
<i>Epipactis microphylla</i> (Ehrh.) Swartz	R	N		FOR
<i>Epipactis muelleri</i> Godf.	VU	N	B2b(iv,v)	FOR
<i>Epipactis palustris</i> (L.) Crantz	EN	N	B1a+2b(iv,v)	MAR
<i>Epipactis purpurata</i> Smith	VU	N	B2b(iv,v)	FOR
<i>Epipogium aphyllum</i> Swartz	R	N		FOR
<i>Equisetum arvense</i> L.	LC	N		RUD
<i>Equisetum fluviatile</i> L.	LC	N		MAR
<i>Equisetum hyemale</i> L.	LC	N		FOR
<i>Equisetum palustre</i> L.	LC	N		MAR
<i>Equisetum sylvaticum</i> L.	LC	N		FOR
<i>Equisetum telmateia</i> Ehrh.	LC	N		FOR
<i>Eragrostis minor</i> Host	LC	EA		RUD
<i>Erica tetralix</i> L.	RE	N		DRY
<i>Erigeron acer</i> L.	LC	N		ROC
<i>Erigeron annuus</i> (L.) Pers.	LC	EA		RUD
<i>Eriophorum angustifolium</i> Honck.	EN	N	B1a+2b(iv,iv)	MAR
<i>Eriophorum latifolium</i> Hoppe	CR	N	B1a; D1	MAR
<i>Eriophorum vaginatum</i> L.	RE	N		MAR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Erodium cicutarium</i> (L.) L' Hérít.	LC	N		RUD
<i>Erophila verna</i> (L.) Chevall.	LC	N		ROC
<i>Eryngium campestre</i> L.	LC	N		DRY
<i>Erysimum cheiranthoides</i> L.	LC	EA		RUD
<i>Eupatorium cannabinum</i> L.	LC	N		FRE
<i>Euphorbia amygdaloides</i> L.	LC	N		FOR
<i>Euphorbia cyparissias</i> L.	LC	N		DRY
<i>Euphorbia dulcis</i> L.	NT	N		FOR
<i>Euphorbia esula</i> L.	EN	N	B1a+2b(iv)	RUD
<i>Euphorbia exigua</i> L.	LC	N		RUD
<i>Euphorbia helioscopia</i> L.	LC	N		RUD
<i>Euphorbia peplus</i> L.	LC	N		RUD
<i>Euphorbia platyphyllos</i> L.	LC	EA		RUD
<i>Euphorbia stricta</i> L.	LC	N		RUD
<i>Euphrasia nemorosa</i> (Pers.) Wallr.	EN	N	B1a+2b(iv)	DRY
<i>Euphrasia officinalis</i> (L.) subsp. <i>rostkoviana</i> (Hayne) F. Townsend	CR	N	B2b(iv,v)	DRY
<i>Euphrasia stricta</i> Wolff ex Lehm.	EN	N	B1a+2b(iv)+2c(iv)	DRY
<i>Evonymus europaeus</i> L.	LC	N		FOR
<i>Fagus sylvatica</i> L.	LC	N		FOR
<i>Falcaria vulgaris</i> Bernh.	EN	EA	B1a+2b(iv)	RUD
<i>Fallopia convolvulus</i> (L.) Á. Löve	LC	N		RUD
<i>Fallopia dumetorum</i> (L.) Holub	LC	N		FOR
<i>Fallopia japonica</i> (Houtt.) Ronse Decraene	LC	EA		FRE
<i>Fallopia sachalinensis</i> (F. Schmidt Petrop.) Ronse Decraene	LC	EA		FRE
<i>Festuca altissima</i> All.	LC	N		FOR
<i>Festuca arundinacea</i> Schreb.	LC	N		MAR
<i>Festuca filiformis</i> Pourret	LC	N		DRY
<i>Festuca gigantea</i> (L.) Vill.	LC	N		FOR
<i>Festuca heteropachys</i> (St-Yves) Patzke ex Auquier	LC	N		ROC
<i>Festuca heterophylla</i> Lam.	CR	N	B1a+2b(iv)	FOR
<i>Festuca lemanii</i> Bast.	VU	N	B2b(iv,v)	DRY
<i>Festuca longifolia</i> Thuill. subsp. <i>pseudocostei</i> Auquier et Kerguélen	EN	N	B1a+2b(v)	ROC

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Festuca pratensis</i> Huds.	LC	N		GRA
<i>Festuca rubra</i> L.	LC	N		GRA
<i>Filago arvensis</i> L.	CR	N	B1a+2b(v)	RUD
<i>Filago lutescens</i> Jord.	RE	N		RUD
<i>Filago minima</i> (Smith) Pers.	EN	N	B1a+2b(iv,v)	RUD
<i>Filago pyramidata</i> L.	RE	N		RUD
<i>Filago vulgaris</i> Lam.	CR	N	B1a+2b(iv)	RUD
<i>Filipendula ulmaria</i> (L.) Maxim.	LC	N		MAR
<i>Filipendula vulgaris</i> Moench	CR	N	B1a+2b(iv)	DRY
<i>Fragaria moschata</i> Weston	LC	N		FOR
<i>Fragaria vesca</i> L.	LC	N		FOR
<i>Fragaria viridis</i> Weston	LC	N		DRY
<i>Frangula alnus</i> Mill.	LC	N		FOR
<i>Fraxinus excelsior</i> L.	LC	N		FOR
<i>Fumaria densiflora</i> DC.	RE	N		RUD
<i>Fumaria officinalis</i> L.	LC	N		RUD
<i>Fumaria parviflora</i> Lam.	CR	N	B1a+2b(iv,v)	RUD
<i>Fumaria vaillantii</i> Loisel.	EN	N	B1a+2b(iv,v)+2c(iv)	RUD
<i>Gagea lutea</i> (L.) Ker-Gawl.	VU	N	B2b(iv,v)	FOR
<i>Gagea pratensis</i> (Pers.) Dum.	CR	N	B1a+2b(iv)	RUD
<i>Gagea villosa</i> (Bieb.) Duby	CR	N	B2b(iv,v)	RUD
<i>Galeopsis angustifolia</i> Ehrh. ex Hoffmann	LC	N		ROC
<i>Galeopsis bifida</i> Boenningh.	LC	N		RUD
<i>Galeopsis ladanum</i> L.	LC	N		ROC
<i>Galeopsis segetum</i> Neck.	LC	N		ROC
<i>Galeopsis tetrahit</i> L.	LC	N		RUD
<i>Galinsoga parviflora</i> Cav.	LC	EA		RUD
<i>Galinsoga quadriradiata</i> Ruiz et Pav.	LC	EA		RUD
<i>Galium aparine</i> L.	LC	N		RUD
<i>Galium boreale</i> L.	R	N		ROC
<i>Galium glaucum</i> L.	RE	N		DRY
<i>Galium mollugo</i> L.	LC	N		GRA
<i>Galium odoratum</i> (L.) Scop.	LC	N		FOR
<i>Galium palustre</i> L.	LC	N		MAR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Galium pumilum</i> Murray	VU	N	B2b(iv,v)	DRY
<i>Galium saxatile</i> L.	LC	N		DRY
<i>Galium spurium</i> L.	CR	N	B2b(iv)	RUD
<i>Galium sylvaticum</i> L.	LC	N		FOR
<i>Galium tricornerutum</i> Dandy	RE	N		RUD
<i>Galium uliginosum</i> L.	LC	N		MAR
<i>Galium verum</i> L.	LC	N		DRY
<i>Genista anglica</i> L.	CR	N	C2a(ii); D1	DRY
<i>Genista germanica</i> L.	RE	N		DRY
<i>Genista pilosa</i> L.	LC	N		ROC
<i>Genista tinctoria</i> L.	LC	N		DRY
<i>Genistella sagittalis</i> (L.) Gams	LC	N		DRY
<i>Gentiana cruciata</i> L.	RE	N		DRY
<i>Gentianella ciliata</i> (L.) Borkh.	VU	N	B2b(iv,v)	DRY
<i>Gentianella germanica</i> (Willd.) Börner	CR	N	B1a+2b(iv,v)	DRY
<i>Geranium columbinum</i> L.	LC	N		RUD
<i>Geranium dissectum</i> L.	LC	N		RUD
<i>Geranium molle</i> L.	LC	N		RUD
<i>Geranium pratense</i> L.	EN	N	B1a+2b(iv)	MAR
<i>Geranium pusillum</i> L.	LC	N		RUD
<i>Geranium pyrenaicum</i> Burm. f.	LC	N		RUD
<i>Geranium robertianum</i> L.	LC	N		FOR
<i>Geranium rotundifolium</i> L.	R	N		ROC
<i>Geranium sanguineum</i> L.	R	N		FOR
<i>Geranium sylvaticum</i> L.	VU	N	B2b(iv,v)	FOR
<i>Geum rivale</i> L.	EN	N	B1a+2b(iv)	FOR
<i>Geum urbanum</i> L.	LC	N		MAR
<i>Glebionis segetum</i> (L.) Fourr.	LC	N		RUD
<i>Glechoma hederacea</i> L.	LC	N		GRA
<i>Glyceria declinata</i> Bréb.	LC	N		FRE
<i>Glyceria fluitans</i> (L.) R. Brown	LC	N		FRE
<i>Glyceria maxima</i> (Hartm.) Holmberg	VU	N	B2b(iii,iv)	FRE
<i>Glyceria notata</i> Chevall.	LC	N		FRE
<i>Gnaphalium sylvaticum</i> L.	LC	N		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Gnaphalium uliginosum</i> L.	LC	N		FRE
<i>Goodyera repens</i> (L.) R. Brown	LC	EA		FOR
<i>Gratiola officinalis</i> L.	RE	N		FRE
<i>Groenlandia densa</i> (L.) Fourr.	R	N		AQU
<i>Gymnadenia conopsea</i> (L.) R. Brown	VU	N	B2b(iii,iv)	DRY
<i>Gymnadenia odoratissima</i> (L.) L. C. M. Rich.	RE	N		DRY
<i>Gymnocarpium dryopteris</i> (L.) Newm.	LC	N		FOR
<i>Gymnocarpium robertianum</i> (Hoffmann) Newm.	LC	N		ROC
<i>Gypsophila muralis</i> L.	CR	N	B1a+2b(iv)	FRE
<i>Hedera helix</i> L.	LC	N		FOR
<i>Helianthemum nummularium</i> (L.) Mill.	NT	N		DRY
<i>Helianthus tuberosus</i> L.	LC	EA		RUD
<i>Helichrysum arenarium</i> (L.) Moench	RE	N		DRY
<i>Helleborus foetidus</i> L.	VU	N	B1a+2b(iv)	FOR
<i>Helleborus viridis</i> L. subsp. <i>occidentalis</i> (Reut.) Schiffn.	LC	N		FOR
<i>Heracleum mantegazzianum</i> Somm. et Lev.	LC	EA		RUD
<i>Heracleum sphondylium</i> L.	LC	N		GRA
<i>Herminium monorchis</i> (L.) R. Brown	RE	N		DRY
<i>Herniaria glabra</i> L.	NT	N		RUD
<i>Herniaria hirsuta</i> L.	RE	N		RUD
<i>Hesperis matronalis</i> L.	LC	EA		FOR
<i>Hieracium bauhinii</i> Schultes ex Besser	LC	N		ROC
<i>Hieracium caespitosum</i> Dum.	NE	EA		RUD
<i>Hieracium diaphanoides</i> Lindeb.	NE	N		ROC
<i>Hieracium glaucinum</i> Jord.	LC	N		ROC
<i>Hieracium lachenalii</i> C. C. Gmel.	LC	N		FOR
<i>Hieracium lactucella</i> Wallr.	EN	N	B1a+2b(iv,v)	DRY
<i>Hieracium laevisgatum</i> Willd.	LC	N		FOR
<i>Hieracium maculatum</i> Schrank	NE	N		ROC
<i>Hieracium murorum</i> L.	LC	N		FOR
<i>Hieracium pilosella</i> L.	LC	N		DRY
<i>Hieracium piloselloides</i> Vill.	R	EA		ROC
<i>Hieracium sabaudum</i> L.	LC	N		FOR
<i>Hieracium schmidtii</i> Tausch	NE	N		ROC

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Hieracium umbellatum</i> L.	LC	N		FOR
<i>Hieracium wiesbaurianum</i> Uechtr. ex Baenitz	NE	N		ROC
<i>Hieracium zizianum</i> Tausch	NE	N		ROC
<i>Hierochloe odorata</i> (L.) Beauv.	RE	N		MAR
<i>Himantoglossum hircinum</i> (L.) Spreng.	EN	N	B1a+2b(iv)+2c(iv)	DRY
<i>Hippocrepis comosa</i> L.	LC	N		DRY
<i>Hippocrepis emerus</i> (L.) Lassen	R	EA		FOR
<i>Hippuris vulgaris</i> L.	R	EA		AQU
<i>Holcus lanatus</i> L.	LC	N		GRA
<i>Holcus mollis</i> L.	LC	N		FOR
<i>Holosteum umbellatum</i> L.	EN	N	B1a+2b(iv,v)	RUD
<i>Hordelymus europaeus</i> (L.) Harz	LC	N		FOR
<i>Hordeum jubatum</i> L.	R	EA		RUD
<i>Hordeum murinum</i> L.	LC	N		RUD
<i>Hordeum secalinum</i> Schreb.	VU	N	B2b(iii,iv)	GRA
<i>Humulus lupulus</i> L.	LC	N		FOR
<i>Huperzia selago</i> (L.) Bernh. ex Schrank et Mart.	CR	N	A1a B1a+2b(v); C2a(ii); D1	ROC
<i>Hydrocharis morsus-ranae</i> L.	LC	EA		AQU
<i>Hydrocotyle vulgaris</i> L.	RE	N		FRE
<i>Hymenophyllum tunbrigense</i> (L.) Smith	EN	N	A1a C2a(ii); D1	ROC
<i>Hyoscyamus niger</i> L.	LC	N		RUD
<i>Hypericum dubium</i> Leers	LC	N		MAR
<i>Hypericum elodes</i> L.	RE	N		MAR
<i>Hypericum hirsutum</i> L.	LC	N		FOR
<i>Hypericum humifusum</i> L.	LC	N		FOR
<i>Hypericum maculatum</i> Crantz	LC	N		MAR
<i>Hypericum montanum</i> L.	LC	N		FOR
<i>Hypericum perforatum</i> L.	LC	N		DRY
<i>Hypericum pulchrum</i> L.	LC	N		FOR
<i>Hypericum tetrapterum</i> Fries	LC	N		MAR
<i>Hypochoeris glabra</i> L.	RE	N		DRY
<i>Hypochoeris maculata</i> L.	RE	N		DRY
<i>Hypochoeris radicata</i> L.	LC	N		DRY
<i>Iberis amara</i> L.	NT	N		ROC

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Ilex aquifolium</i> L.	LC	N		FOR
<i>Illecebrum verticillatum</i> L.	CR	N	C2a(ii); D1	FRE
<i>Impatiens glandulifera</i> Royle	LC	EA		FRE
<i>Impatiens noli-tangere</i> L.	LC	N		FOR
<i>Impatiens parviflora</i> DC.	LC	EA		FOR
<i>Inula britannica</i> L.	RE	N		FRE
<i>Inula conyzae</i> (Griesselich) Meikle	LC	N		DRY
<i>Inula salicina</i> L.	NT	N		DRY
<i>Iris pseudacorus</i> L.	VU	N	B2b(iv)	MAR
<i>Isatis tinctoria</i> L.	EN	EA	B1a+2b(iv)	RUD
<i>Isolepis setacea</i> (L.) R. Brown	VU	N	B2b(iv)	FRE
<i>Jasione montana</i> L.	VU	N	B2b(iii,iv)	DRY
<i>Juglans regia</i> L.	LC	EA		FOR
<i>Juncus acutiflorus</i> Ehrh. ex Hoffmann	LC	N		MAR
<i>Juncus articulatus</i> L.	LC	N		MAR
<i>Juncus bufonius</i> L.	LC	N		FRE
<i>Juncus bulbosus</i> L.	LC	N		MAR
<i>Juncus capitatus</i> Weig.	RE	N		FRE
<i>Juncus compressus</i> Jacq.	VU	N	B2b(iii,iv)	MAR
<i>Juncus conglomeratus</i> L.	LC	N		MAR
<i>Juncus effusus</i> L.	LC	N		MAR
<i>Juncus filiformis</i> L.	CR	N	B1a C2a(ii); D1	MAR
<i>Juncus inflexus</i> L.	LC	N		MAR
<i>Juncus squarrosus</i> L.	CR	N	B1a+2b(iv)	MAR
<i>Juncus subnodulosus</i> Schrank	EN	N	B1a+2b(iv)	MAR
<i>Juncus tenuis</i> Willd.	LC	EA		FRE
<i>Juniperus communis</i> L.	EN	N	B1a+2b(iv)+2b(v)	DRY
<i>Kickxia elatine</i> (L.) Dum.	EN	N	B2b(iv,v)	RUD
<i>Kickxia spuria</i> (L.) Dum.	EN	N	B2b(iv,v)	RUD
<i>Knautia arvensis</i> (L.) Coulter	LC	N		DRY
<i>Koeleria albescens</i> DC.	LC	N		DRY
<i>Koeleria macrantha</i> (Ledeb.) Schultes	R	N		DRY
<i>Koeleria pyramidata</i> (Lam.) Beauv.	LC	N		DRY
<i>Laburnum anagyroides</i> Med.	R	EA		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Lactuca perennis</i> L.	R	N		DRY
<i>Lactuca saligna</i> L.	CR	N	B1a+2b(iv)	RUD
<i>Lactuca serriola</i> L.	LC	N		RUD
<i>Lactuca virosa</i> L.	NT	N		RUD
<i>Lamium album</i> L.	LC	N		RUD
<i>Lamium amplexicaule</i> L.	LC	N		RUD
<i>Lamium galeobdolon</i> (L.) L.	LC	N		FOR
<i>Lamium maculatum</i> L.	LC	N		FOR
<i>Lamium purpureum</i> L.	LC	N		RUD
<i>Lapsana communis</i> L.	LC	N		FOR
<i>Lapsana communis</i> L. subsp. <i>intermedia</i> (Bieb.) Hayek	R	EA		ROC
<i>Larix decidua</i> Mill.	LC	EA		FOR
<i>Laserpitium latifolium</i> L.	R	N		FOR
<i>Lathraea squamaria</i> L.	R	N		FOR
<i>Lathyrus aphaca</i> L.	LC	N		RUD
<i>Lathyrus hirsutus</i> L.	CR	N	B1a; C2a(ii)	RUD
<i>Lathyrus linifolius</i> (Reichard) Bässler	LC	N		FOR
<i>Lathyrus niger</i> (L.) Bernh.	R	N		FOR
<i>Lathyrus nissolia</i> L.	CR	N	B1a+2b(iv)	RUD
<i>Lathyrus pratensis</i> L.	LC	N		GRA
<i>Lathyrus sylvestris</i> L.	NT	N		FOR
<i>Lathyrus tuberosus</i> L.	LC	N		RUD
<i>Leersia oryzoides</i> (L.) Swartz	CR	N	B1a+2b(v)	FRE
<i>Legousia speculum-veneris</i> (L.) Chaix	EN	N	B1a+2b(iv,v)+2c(iv)	RUD
<i>Lemna gibba</i> L.	LC	N		AQU
<i>Lemna minor</i> L.	LC	N		AQU
<i>Lemna trisulca</i> L.	VU	N	B1a+2b(iv)	AQU
<i>Leontodon autumnalis</i> L.	LC	N		GRA
<i>Leontodon hispidus</i> L.	LC	N		GRA
<i>Leontodon saxatilis</i> Lam.	NT	N		ROC
<i>Leonurus cardiaca</i> L.	CR	N	B1a+2b(iv)	RUD
<i>Lepidium campestre</i> (L.) R. Brown	LC	N		RUD
<i>Lepidium densiflorum</i> Schrad.	LC	EA		RUD
<i>Lepidium latifolium</i> L.	VU	N	B1a+2b(iv)	FRE

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Lepidium ruderales</i> L.	LC	N		RUD
<i>Leucanthemum vulgare</i> Lam.	LC	N		DRY
<i>Ligustrum vulgare</i> L.	LC	N		FOR
<i>Limodorum abortivum</i> (L.) Swartz	RE	N		FOR
<i>Limosella aquatica</i> L.	R	N		FRE
<i>Linaria arvensis</i> (L.) Desf.	RE	N		RUD
<i>Linaria repens</i> (L.) Mill.	EN	N	B2b(iv,v)	ROC
<i>Linaria supina</i> (L.) Chazelles	DD	N		RUD
<i>Linaria vulgaris</i> Mill.	LC	N		RUD
<i>Linum austriacum</i> L. subsp. <i>austriacum</i>	CR	EA	B1a	DRY
<i>Linum catharticum</i> L.	LC	N		DRY
<i>Linum tenuifolium</i> L.	EN	N	B2b(iv,v)	DRY
<i>Listera ovata</i> (L.) R. Brown	LC	N		FOR
<i>Lithospermum arvense</i> L.	EN	N	B1a+2b(iv,v)+2c(iv)	RUD
<i>Lithospermum officinale</i> L.	EN	N	B1a+2b(iv)	FOR
<i>Lithospermum purpureoaceruleum</i> L.	VU	N	B1a+2b(iv)	FOR
<i>Lolium multiflorum</i> Lam.	LC	EA		GRA
<i>Lolium perenne</i> L.	LC	N		GRA
<i>Lolium remotum</i> Schrank	RE	EA		RUD
<i>Lolium temulentum</i> L.	RE	EA		RUD
<i>Lonicera periclymenum</i> L.	LC	N		FOR
<i>Lonicera xylosteum</i> L.	LC	N		FOR
<i>Lotus corniculatus</i> L.	LC	N		DRY
<i>Lotus pedunculatus</i> Cav.	LC	N		MAR
<i>Lunaria rediviva</i> L.	R	N		FOR
<i>Luzula campestris</i> (L.) DC.	LC	N		DRY
<i>Luzula luzuloides</i> (Lam.) Dandy et Wilmott	LC	N		FOR
<i>Luzula multiflora</i> (Ehrh.) Lej.	LC	N		DRY
<i>Luzula pilosa</i> (L.) Willd.	LC	N		FOR
<i>Luzula sylvatica</i> (Huds.) Gaudin	LC	N		FOR
<i>Lychnis flos-cuculi</i> L.	LC	N		MAR
<i>Lychnis viscaria</i> L.	VU	N	B2b(iv,v)	ROC
<i>Lycium barbarum</i> L.	R	EA		ROC
<i>Lycopodiella inundata</i> (L.) Holub	RE	N		FRE

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Lycopodium annotinum</i> L.	R	N		FOR
<i>Lycopodium clavatum</i> L.	CR	N	B1a+2b(iv); D1	DRY
<i>Lycopus europaeus</i> L.	LC	N		MAR
<i>Lysimachia nemorum</i> L.	LC	N		FOR
<i>Lysimachia nummularia</i> L.	LC	N		GRA
<i>Lysimachia vulgaris</i> L.	LC	N		MAR
<i>Lythrum hyssopifolia</i> L.	CR	N	B1a+2b(iv,v)	FRE
<i>Lythrum portula</i> (L.) D.A. Webb	VU	N	B1a+2b(iii,iv)+2b(v)	FRE
<i>Lythrum salicaria</i> L.	LC	N		MAR
<i>Mahonia aquifolium</i> (Pursh) Nutt.	LC	EA		FOR
<i>Maianthemum bifolium</i> (L.) F. W. Schmidt	LC	N		FOR
<i>Malus sylvestris</i> (L.) Mill.	LC	N		FOR
<i>Malva alcea</i> L.	VU	N	B2b(iv)	RUD
<i>Malva moschata</i> L.	LC	N		DRY
<i>Malva neglecta</i> Wallr.	LC	N		RUD
<i>Malva sylvestris</i> L.	VU	N	B2b(iii,iv)	RUD
<i>Marrubium vulgare</i> L.	RE	EA		RUD
<i>Matricaria discoidea</i> DC.	LC	N		RUD
<i>Matricaria maritima</i> L. subsp. <i>inodora</i> (C. Koch) Soó	LC	N		RUD
<i>Matricaria recutita</i> L.	LC	N		RUD
<i>Medicago arabica</i> (L.) Huds.	R	N		RUD
<i>Medicago falcata</i> L.	LC	N		DRY
<i>Medicago lupulina</i> L.	LC	N		DRY
<i>Medicago minima</i> (L.) L.	EN	N	B1a+2b(iv,v)	DRY
<i>Medicago polymorpha</i> L.	LC	N		RUD
<i>Melampyrum arvense</i> L.	EN	N	B1a+2b(iv,v)+2c(iv)	DRY
<i>Melampyrum cristatum</i> L.	EN	N	B1a+2b(iv,v)+2c(iv)	FOR
<i>Melampyrum pratense</i> L.	LC	N		FOR
<i>Melica ciliata</i> L.	R	N		ROC
<i>Melica nutans</i> L.	LC	N		FOR
<i>Melica uniflora</i> Retz.	LC	N		FOR
<i>Melilotus albus</i> Med.	LC	EA		RUD
<i>Melilotus altissimus</i> Thuill.	LC	N		RUD
<i>Melilotus officinalis</i> Lam.	LC	EA		RUD

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Mentha aquatica</i> L.	LC	N		MAR
<i>Mentha arvensis</i> L.	LC	N		MAR
<i>Mentha longifolia</i> L.	R	N		FRE
<i>Mentha pulegium</i> L.	CR	N	B1a	FRE
<i>Mentha spicata</i> L.	R	EA		RUD
<i>Mentha suaveolens</i> Ehrh.	R	N		FRE
<i>Menyanthes trifoliata</i> L.	VU	N	B2b(iii,iv)	MAR
<i>Mercurialis annua</i> L.	LC	N		RUD
<i>Mercurialis perennis</i> L.	LC	N		FOR
<i>Mespilus germanica</i> L.	R	EA		FOR
<i>Meum athamanticum</i> Jacq.	CR	N	B1a+2b(iv); D1	DRY
<i>Milium effusum</i> L.	LC	N		FOR
<i>Mimulus moschatus</i> Dougl. ex Lindl.	LC	EA		MAR
<i>Minuartia hybrida</i> (Vill.) Schischkin	VU	N	B2b(iii,iv)	DRY
<i>Misopates orontium</i> (L.) Rafin.	EN	N	B2b(iv,v)	RUD
<i>Moehringia trinervia</i> (L.) Clairv.	LC	N		FOR
<i>Moenchia erecta</i> (L.) Gaertn., B. Mey. et Scherb.	RE	N		DRY
<i>Molinia caerulea</i> (L.) Moench	LC	N		MAR
<i>Moneses uniflora</i> (L.) A. Gray	RE	EA		FOR
<i>Monotropa hypopitys</i> L.	LC	N		FOR
<i>Montia fontana</i> L.	VU	N	B2b(iv,v)	AQU
<i>Montia minor</i> C. C. Gmel.	RE	N		FRE
<i>Mycelis muralis</i> (L.) Dum.	LC	N		FOR
<i>Myosotis arvensis</i> (L.) Hill	LC	N		RUD
<i>Myosotis cespitosa</i> C. F. Schultz	R	N		MAR
<i>Myosotis discolor</i> Pers.	EN	N	B2b(iv,v)	DRY
<i>Myosotis nemorosa</i> Besser	LC	N		MAR
<i>Myosotis ramosissima</i> Rochel ex Schultes	NT	N		DRY
<i>Myosotis scorpioides</i> L.	LC	N		MAR
<i>Myosotis stricta</i> Link ex Roem. et Schult.	CR	N	B1a	DRY
<i>Myosotis sylvatica</i> Ehrh. ex Hoffmann	LC	N		FOR
<i>Myosoton aquaticum</i> (L.) Moench	LC	N		MAR
<i>Myosurus minimus</i> L.	CR	N	B2b(iv,v)	RUD
<i>Myriophyllum alterniflorum</i> DC.	R	N		AQU

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Myriophyllum spicatum</i> L.	LC	N		AQU
<i>Myriophyllum verticillatum</i> L.	VU	N	B1a	AQU
<i>Myrrhis odorata</i> (L.) Scop.	LC	EA		RUD
<i>Najas marina</i> L.	VU	N	B2b(iii)	AQU
<i>Narcissus pseudonarcissus</i> L.	VU	N	B1a+2b(iv)	FOR
<i>Nardurus maritimus</i> (L.) Murb.	R	N		DRY
<i>Nardus stricta</i> L.	EN	N	B1a+2b(iv,v); C2a	DRY
<i>Nasturtium officinale</i> R. Brown	EN	N	B2b(iv)	MAR
<i>Neotinea ustulata</i> (L.) R.M. Bateman, Pridgeon et M. W. Chase	RE	N		DRY
<i>Neottia nidus-avis</i> (L.) L. C. M. Rich.	LC	N		FOR
<i>Nepeta cataria</i> L.	RE	N		RUD
<i>Neslia paniculata</i> (L.) Desv.	RE	N		RUD
<i>Nuphar lutea</i> (L.) Smith	R	N		AQU
<i>Nymphaea alba</i> L.	R	EA		AQU
<i>Nymphoides peltata</i> (S. G. Gmel.) O. Kuntze	RE	N		AQU
<i>Odontites vernus</i> (Bellardi) Dum.	EN	N	B2b(iv,v)	RUD
<i>Oenanthe aquatica</i> (L.) Poiret	VU	N	B2b(iii,iv)	MAR
<i>Oenanthe fistulosa</i> L.	CR	N	B2b(iv,v)	MAR
<i>Oenanthe peucedanifolia</i> Pollich	CR	N	B1a+2b(iv)	MAR
<i>Oenothera biennis</i> L.	LC	EA		RUD
<i>Oenothera glazioviana</i> Michelli	LC	EA		RUD
<i>Oenothera parviflora</i> L.	LC	EA		RUD
<i>Onobrychis viciifolia</i> Scop.	LC	N		DRY
<i>Ononis repens</i> L.	LC	N		DRY
<i>Ononis spinosa</i> L.	CR	N	B1a+2b(iv,v)	DRY
<i>Onopordum acanthium</i> L.	EN	EA	B1a+2b(iv)	RUD
<i>Ophioglossum vulgatum</i> L.	EN	N	B1a+2b(iv)	MAR
<i>Ophrys apifera</i> Huds.	EN	N	B2b(iv,v)	DRY
<i>Ophrys fuciflora</i> (F.W. Schmidt) Moench	EN	N	B2b(iv,v)	DRY
<i>Ophrys insectifera</i> L.	EN	N	B2b(iv,v)	DRY
<i>Ophrys sphegodes</i> Mill.	CR	N	B2b(v,iv); D1	DRY
<i>Orchis anthropophora</i> (L.) All.	EN	N	B2b(iii,iv)	DRY

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Orchis coriophora</i> L.	RE	N		MAR
<i>Orchis mascula</i> (L.) L.	VU	N	B2b(iii,iv)	DRY
<i>Orchis militaris</i> L.	VU	N	B2b(iii,iv)	DRY
<i>Orchis morio</i> L.	EN	N	B1a+2b(iv,v)	DRY
<i>Orchis purpurea</i> Huds.	VU	N	B2b(iv)	FOR
<i>Orchis simia</i> Lam.	RE	N		DRY
<i>Oreopteris limbosperma</i> (Bellardi ex All.) Holub	VU	N	B1a+2b(iv)	FOR
<i>Origanum vulgare</i> L.	LC	N		FOR
<i>Ornithogalum pyrenaicum</i> L.	R	N		FOR
<i>Ornithogalum umbellatum</i> L.	LC	EA		RUD
<i>Ornithopus perpusillus</i> L.	VU	N	B2b(iv,v)	ROC
<i>Orobanche alba</i> Steph. ex Willd.	EN	N	B1a+2b(iv)	DRY
<i>Orobanche caryophyllacea</i> Smith	CR	N	B1a+2b(iii,iv)	DRY
<i>Orobanche elatior</i> Sutton	RE	N		DRY
<i>Orobanche hederæ</i> Duby	R	N		FOR
<i>Orobanche lutea</i> Baumg.	R	N		DRY
<i>Orobanche minor</i> Smith	RE	N		RUD
<i>Orobanche picridis</i> F. W. Schultz	RE	N		RUD
<i>Orobanche purpurea</i> Jacq.	EN	N	B2b(iv,v)	DRY
<i>Orobanche ramosa</i> L.	RE	N		RUD
<i>Orobanche rapum-genistæ</i> Thuill.	EN	N	B1a+2b(iv,v)	DRY
<i>Orobanche teucrii</i> Holandre	CR	N	B1a+2b(iii)	DRY
<i>Orthilia secunda</i> (L.) House	CR	EA	B1a+2b(iv)	FOR
<i>Osmunda regalis</i> L.	CR	N	C2a(ii); D1	FOR
<i>Oxalis acetosella</i> L.	LC	N		FOR
<i>Oxalis corniculata</i> L.	R	EA		RUD
<i>Oxalis fontana</i> Bunge	LC	EA		RUD
<i>Papaver argemone</i> L.	EN	N	B2b(iv,v)+2c(iv)	RUD
<i>Papaver dubium</i> L.	VU	N	B2b(iv,v)	RUD
<i>Papaver rhoeas</i> L.	NT	N		RUD
<i>Parietaria judaica</i> L.	R	N		ROC
<i>Parietaria officinalis</i> L.	RE	EA		ROC
<i>Paris quadrifolia</i> L.	LC	N		FOR
<i>Parnassia palustris</i> L.	CR	N	A1a C2a(ii); D1	MAR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Pastinaca sativa</i> L.	LC	N		RUD
<i>Pastinaca sativa</i> L. subsp. <i>urens</i> (Req. ex Godr.) Čelak	R	EA		RUD
<i>Pedicularis palustris</i> L.	EN	N	B1a+2b(iv,v)+2c(iv)	MAR
<i>Pedicularis sylvatica</i> L.	CR	N	B2b(iii)+2b(v); C2a(ii)	DRY
<i>Persicaria amphibia</i> (L.) S. F. Gray	LC	N		AQU
<i>Persicaria bistorta</i> (L.) Samp.	LC	N		MAR
<i>Persicaria hydropiper</i> (L.) Spach.	LC	N		MAR
<i>Persicaria lapathifolia</i> (L.) Delarbre	LC	N		RUD
<i>Persicaria maculosa</i> S. F. Gray, nom. conserv. propos.	LC	N		RUD
<i>Persicaria minor</i> (Huds.) Opiz	EN	N	B2b(iv,v)	FRE
<i>Persicaria mitis</i> (Schränk)	EN	N	B1a+2b(iv,v)	FRE
<i>Petasites hybridus</i> (L.) Gaertn., B. Mey. et Scherb.	LC	N		FRE
<i>Petrorhagia prolifera</i> (L.) P. W. Ball et Heywood	LC	N		DRY
<i>Peucedanum carvifolia</i> Vill.	CR	N	B2b(iii)+2b(iv)	MAR
<i>Peucedanum cervaria</i> (L.) Lapeyr.	VU	N	B2b(iii)+2b(iv)	FOR
<i>Phalaris arundinacea</i> L.	LC	N		MAR
<i>Phegopteris connectilis</i> (Michaux) Watt	LC	N		FOR
<i>Phleum nodosum</i> L.	LC	N		DRY
<i>Phleum phleoides</i> (L.) Karst.	CR	N	B1a+2b(iv)	DRY
<i>Phleum pratense</i> L.	LC	N		GRA
<i>Phragmites australis</i> (Cav.) Steud.	LC	N		MAR
<i>Phyteuma nigrum</i> F. W. Schmidt	LC	N		FOR
<i>Phyteuma spicatum</i> L.	LC	N		FOR
<i>Picea abies</i> (L.) Karst.	LC	EA		FOR
<i>Picris hieracioides</i> L.	LC	N		RUD
<i>Pimpinella major</i> (L.) Huds.	LC	N		GRA
<i>Pimpinella saxifraga</i> L.	LC	N		DRY
<i>Pinus nigra</i> Arnold	LC	EA		FOR
<i>Pinus sylvestris</i> L.	CR	N	B1a; C2a(ii)	FOR
<i>Plantago lanceolata</i> L.	LC	N		GRA
<i>Plantago major</i> L.	LC	N		RUD
<i>Plantago media</i> L.	LC	N		DRY
<i>Platanthera bifolia</i> (L.) L. C. M. Rich.	VU	N	B2b(iv)	FOR
<i>Platanthera chlorantha</i> (Cust.) Reichenb.	VU	N	B2b(iv)	FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Poa annua</i> L.	LC	N		RUD
<i>Poa bulbosa</i> L.	R	N		DRY
<i>Poa chaixii</i> Vill.	LC	N		FOR
<i>Poa compressa</i> L.	LC	N		ROC
<i>Poa nemoralis</i> L.	LC	N		FOR
<i>Poa palustris</i> L.	VU	N	B1a+2b(iv)	MAR
<i>Poa pratensis</i> L.	LC	N		GRA
<i>Poa trivialis</i> L.	LC	N		GRA
<i>Podospermum laciniatum</i> (L.) DC.	RE	N		RUD
<i>Polemonium caeruleum</i> L.	R	EA		MAR
<i>Polygala amarella</i> Crantz	CR	N	B1a+2b(iv)+2b(iii)	DRY
<i>Polygala calcarea</i> F. W. Schultz	VU	N	B2b(iii,iv)	DRY
<i>Polygala comosa</i> Schkuhr	LC	N		DRY
<i>Polygala serpyllifolia</i> Hose	VU	N	B1a+2b(iv)	DRY
<i>Polygala vulgaris</i> L.	LC	N		DRY
<i>Polygonatum multiflorum</i> (L.) All.	LC	N		FOR
<i>Polygonatum odoratum</i> (Mill.) Druce	NT	N		FOR
<i>Polygonatum verticillatum</i> (L.) All.	LC	N		FOR
<i>Polygonum aviculare</i> L.	LC	N		RUD
<i>Polypodium interjectum</i> Shivas	LC	N		FOR
<i>Polypodium vulgare</i> L.	LC	N		FOR
<i>Polypodium ×mantoniae</i> Rothm.	R	N		FOR
<i>Polystichum aculeatum</i> (L.) Roth	NT	N		FOR
<i>Polystichum lonchitis</i> (L.) Roth	EN	N	B1a+2b(iv)	FOR
<i>Polystichum setiferum</i> (Forssk.) Woyнар	R	N		FOR
<i>Polystichum ×bicknellii</i> (Christ) Hahne	R	N		FOR
<i>Populus tremula</i> L.	LC	N		FOR
<i>Potamogeton alpinus</i> Balb.	RE	N		AQU
<i>Potamogeton berchtoldii</i> Fieb.	LC	N		AQU
<i>Potamogeton crispus</i> L.	LC	N		AQU
<i>Potamogeton lucens</i> L.	R	N		AQU
<i>Potamogeton natans</i> L.	LC	N		AQU
<i>Potamogeton nodosus</i> Poiret	LC	EA		AQU
<i>Potamogeton obtusifolius</i> Mert. et Koch	R	N		AQU

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Potamogeton pectinatus</i> L.	LC	N		AQU
<i>Potamogeton perfoliatus</i> L.	EN	N	B1a+2b(iv)	AQU
<i>Potamogeton polygonifolius</i> Pourr.	EN	N	B1a+2b(iv)	AQU
<i>Potamogeton pusillus</i> L.	LC	N		AQU
<i>Potamogeton trichoides</i> Cham. et Schlecht.	RE	N		AQU
<i>Potentilla anserina</i> L.	LC	N		RUD
<i>Potentilla argentea</i> L.	LC	N		DRY
<i>Potentilla erecta</i> (L.) Räuschel	NT	N		DRY
<i>Potentilla incana</i> P. Gaertn., B. Mey. et Scherb	CR	N	C2a(ii); D1	ROC
<i>Potentilla leucopolitana</i> P. J. Muell.	RE	N		ROC
<i>Potentilla neumanniana</i> Reichenb.	LC	N		DRY
<i>Potentilla recta</i> L.	LC	EA		RUD
<i>Potentilla reptans</i> L.	LC	N		RUD
<i>Potentilla rupestris</i> L.	EN	N	B2b(iv,v)	ROC
<i>Potentilla sterilis</i> (L.) Garcke	LC	N		FOR
<i>Potentilla supina</i> L.	R	N		FRE
<i>Prenanthes purpurea</i> L.	RE	N		FOR
<i>Primula elatior</i> (L.) Hill	LC	N		FOR
<i>Primula veris</i> L.	VU	N	B2b(iv,v)	DRY
<i>Prunella grandiflora</i> (L.) Scholler	CR	N	B2b(iv)	DRY
<i>Prunella laciniata</i> (L.) L.	EN	N	B2b(iv,v)	DRY
<i>Prunella vulgaris</i> L.	LC	N		GRA
<i>Prunus avium</i> (L.) L.	LC	N		FOR
<i>Prunus mahaleb</i> L.	CR	N	B2b(iv)	FOR
<i>Prunus padus</i> L.	LC	N		FOR
<i>Prunus spinosa</i> L.	LC	N		FOR
<i>Pseudofumaria lutea</i> (L.) Borkh.	LC	EA		ROC
<i>Pteridium aquilinum</i> (L.) Kuhn	LC	N		FOR
<i>Puccinellia distans</i> (L.) Parl.	LC	EA		RUD
<i>Pulicaria dysenterica</i> (L.) Bernh.	VU	N	B2b(iii,iv)	MAR
<i>Pulicaria vulgaris</i> Gaertn.	RE	N		FRE
<i>Pulmonaria montana</i> Lej.	VU	N	B1a+2b(iv)	FOR
<i>Pulmonaria obscura</i> Dum.	LC	N		FOR
<i>Pulsatilla vulgaris</i> Mill.	EN	N	B1a+B2b(iv,v)	DRY

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Pyrola media</i> Swartz	R	N		FOR
<i>Pyrola minor</i> L.	LC	N		FOR
<i>Pyrola rotundifolia</i> L.	NT	N		FOR
<i>Pyrus communis</i> subsp. <i>pyraster</i> (L.) Ehrh.	LC	N		FOR
<i>Quercus petraea</i> (Mattuschka) Lieblein	LC	N		FOR
<i>Quercus pubescens</i> Willd.	EN	N	B1a	FOR
<i>Quercus robur</i> L.	LC	N		FOR
<i>Radiola linoides</i> Roth	RE	N		FRE
<i>Ranunculus acris</i> L.	LC	N		GRA
<i>Ranunculus aquatilis</i> L.	CR	N	C2a(ii)	AQU
<i>Ranunculus arvensis</i> L.	EN	N	B2b(iv,v)	RUD
<i>Ranunculus auricomus</i> L.	LC	N		FOR
<i>Ranunculus bulbosus</i> L.	LC	N		DRY
<i>Ranunculus circinatus</i> Sibth.	R	N		AQU
<i>Ranunculus ficaria</i> L.	LC	N		FOR
<i>Ranunculus flammula</i> L.	LC	N		MAR
<i>Ranunculus fluitans</i> Lam.	VU	N	B2b(iv)	AQU
<i>Ranunculus hederaceus</i> L.	CR	N	B2b(iv)	MAR
<i>Ranunculus lingua</i> L.	RE	N		FRE
<i>Ranunculus peltatus</i> Schrank	VU	N	B1a+2b(iv)	AQU
<i>Ranunculus penicillatus</i> (Dum.) Bab.	LC	N		AQU
<i>Ranunculus platanifolius</i> L.	EN	N	B1a+2b(iv,v); C2a(i); D1	FOR
<i>Ranunculus repens</i> L.	LC	N		MAR
<i>Ranunculus sardous</i> Crantz	EN	N	B2b(iv,v)	RUD
<i>Ranunculus sceleratus</i> L.	EN	N	B2b(iv,v)	MAR
<i>Ranunculus serpens</i> Schrank	LC	N		FOR
<i>Ranunculus trichophyllus</i> Chaix	VU	N	B1a+2b(iv)	AQU
<i>Raphanus raphanistrum</i> L.	LC	N		RUD
<i>Reseda lutea</i> L.	LC	N		RUD
<i>Reseda luteola</i> L.	LC	N		RUD
<i>Rhamnus cathartica</i> L.	LC	N		FOR
<i>Rhinanthus alectorolophus</i> (Scop.) Pollich	EN	N	B1a+2b(iv,v)	DRY
<i>Rhinanthus angustifolius</i> C. C. Gmel.	CR	N	B1a+2b(iv)	DRY
<i>Rhinanthus minor</i> L.	NT	N		MAR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Rhynchospora alba</i> (L.) Vahl.	RE	N		MAR
<i>Ribes alpinum</i> L.	LC	N		FOR
<i>Ribes nigrum</i> L.	LC	N		FOR
<i>Ribes rubrum</i> L.	LC	N		FOR
<i>Ribes uva-crispa</i> L.	LC	N		FOR
<i>Rorippa amphibia</i> (L.) Besser	LC	N		FRE
<i>Rorippa palustris</i> (L.) Besser	LC	N		FRE
<i>Rorippa stylosa</i> (Pers.) Mansf. et Rothm.	CR	N	B2b(v); C2a(ii); D1	DRY
<i>Rorippa sylvestris</i> (L.) Besser	LC	N		FRE
<i>Rosa arvensis</i> Huds.	LC	N		FOR
<i>Rosa canina</i> L.	LC	N		FOR
<i>Rosa micrantha</i> Borrer ex Smith	CR	N	C2a(ii)	FOR
<i>Rosa rubiginosa</i> L.	VU	N	B2b(iv,v)	DRY
<i>Rosa spinosissima</i> L.	EN	N	B1a+2b(iv)	DRY
<i>Rosa stylosa</i> Desv.	CR	N	C2a(ii)	FOR
<i>Rosa tomentosa</i> Smith	LC	N		FOR
<i>Rosa villosa</i> L.	CR	N	B2b(iii,iv)	FOR
<i>Rubus adornatus</i> P. J. Mueller ex Wirtgen	NE	N		FOR
<i>Rubus arduennensis</i> Libert ex Lejeune	NE	N		FOR
<i>Rubus armeniacus</i> Focke	NE	N		FOR
<i>Rubus baruthicus</i> Weber	NE	N		FOR
<i>Rubus bertramii</i> G. Braun	NE	N		FOR
<i>Rubus bifrons</i> Vest	NE	N		FOR
<i>Rubus bonus-henricus</i> Matzke-Hajek	NE	N		FOR
<i>Rubus britannicus</i> W. M. Rogers	NE	N		FOR
<i>Rubus caesius</i> L.	NE	N		FOR
<i>Rubus camptostachys</i> G. Braun	NE	N		FOR
<i>Rubus canescens</i> DC.	NE	N		FOR
<i>Rubus condensatus</i> P. J. Mueller	NE	N		FOR
<i>Rubus cuspidatus</i> P. J. Mueller	NE	N		FOR
<i>Rubus dechenii</i> Wirtgen	NE	N		FOR
<i>Rubus eifeliensis</i> Wirtgen	NE	N		FOR
<i>Rubus erubescens</i> Wirtgen	NE	N		FOR
<i>Rubus fimbriifolius</i> P. J. Mueller et Wirtgen	NE	N		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Rubus flexuosus</i> P. J. Mueller et Lefèvre	NE	N		FOR
<i>Rubus fruticosus</i> L.	NE	N		FOR
<i>Rubus fuscus</i> Weihe	NE	N		FOR
<i>Rubus grabowskii</i> Weihe in Guenther <i>et al.</i>	NE	N		FOR
<i>Rubus gracilis</i> J. et C. Presl	NE	N		FOR
<i>Rubus hadracanthos</i> G. Braun	NE	N		FOR
<i>Rubus hostilis</i> P. J. Mueller et Wirtgen	NE	N		FOR
<i>Rubus idaeus</i> L.	NE	N		FOR
<i>Rubus langei</i> Jensen ex Frid. et Gelert	NE	N		FOR
<i>Rubus loehrii</i> Wirtgen	NE	N		FOR
<i>Rubus macrophyllus</i> Weihe et Nees	NE	N		FOR
<i>Rubus melanoxyton</i> P. J. Mueller et Wirtgen	NE	N		FOR
<i>Rubus micans</i> Godron et Grenier	NE	N		FOR
<i>Rubus montanus</i> Libert ex Lej.	NE	N		FOR
<i>Rubus nemorosus</i> Hayne et Wildenow	NE	N		FOR
<i>Rubus nessensis</i> W. Hall subsp. <i>scissoides</i> H. E. Weber	NE	N		FOR
<i>Rubus neumannianus</i> H. E. Weber et H. Vannerom	NE	N		FOR
<i>Rubus oblongifolius</i> P. J. Mueller et Wirtgen	NE	N		FOR
<i>Rubus omalodontos</i> P. J. Mueller et Wirtgen	NE	N		FOR
<i>Rubus oreades</i> P. J. Mueller et Wirtgen	NE	N		FOR
<i>Rubus orthostachys</i> G. Braun	NE	N		FOR
<i>Rubus pannosus</i> P. J. Mueller et Wirtgen	NE	N		FOR
<i>Rubus pedemontanus</i> Pinkwart	NE	N		FOR
<i>Rubus perperus</i> H. E. Weber	NE	N		FOR
<i>Rubus praecox</i> Bertol.	NE	N		FOR
<i>Rubus pyramidalis</i> Kaltenbach	NE	N		FOR
<i>Rubus radula</i> Weihe	NE	N		FOR
<i>Rubus raduliformis</i> Sudre	NE	N		FOR
<i>Rubus rosaceus</i> Weihe	NE	N		FOR
<i>Rubus rudis</i> Weihe	NE	N		FOR
<i>Rubus saxatilis</i> L.	NE	N		FOR
<i>Rubus saxicola</i> P. J. Mueller	NE	N		FOR
<i>Rubus sprengelii</i> Weihe	NE	N		FOR
<i>Rubus steracanthos</i> P. J. Mueller ex Boulay	NE	N		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Rubus sulcatus</i> Vest	NE	N		FOR
<i>Rubus vestitus</i> Weihe	NE	N		FOR
<i>Rubus viscosus</i> Weihe ex Lejeune et Courtois	NE	N		FOR
<i>Rumex acetosa</i> L.	LC	N		GRA
<i>Rumex acetosella</i> L.	LC	N		DRY
<i>Rumex conglomeratus</i> Murray	LC	N		RUD
<i>Rumex crispus</i> L.	LC	N		RUD
<i>Rumex hydrolapathum</i> Huds.	EN	N	B1a+2b(iv)	FRE
<i>Rumex maritimus</i> L.	EN	N	B2b(iv,v)	FRE
<i>Rumex obtusifolius</i> L.	LC	N		GRA
<i>Rumex sanguineus</i> L.	LC	N		FOR
<i>Rumex scutatus</i> L.	EN	EA	B1a+2b(iv)	ROC
<i>Sagina apetala</i> Ard.	EN	N	B2b(iv,v)+2c(iv)	ROC
<i>Sagina nodosa</i> (L.) Fenzl	RE	N		MAR
<i>Sagina procumbens</i> L.	LC	N		ROC
<i>Sagittaria sagittifolia</i> L.	EN	N	B1a+2b(iv)	FRE
<i>Salix alba</i> L.	LC	N		FRE
<i>Salix aurita</i> L.	LC	N		MAR
<i>Salix caprea</i> L.	LC	N		FOR
<i>Salix cinerea</i> L.	LC	N		MAR
<i>Salix fragilis</i> L.	LC	N		FRE
<i>Salix pentandra</i> L.	LC	EA		FRE
<i>Salix purpurea</i> L. var. <i>lambertiana</i> (Smith) Koch	LC	N		FOR
<i>Salix repens</i> L.	CR	N	B2b(iii,iv)	MAR
<i>Salix triandra</i> L.	LC	N		FRE
<i>Salix viminalis</i> L.	LC	N		FRE
<i>Salvia pratensis</i> L.	EN	N	B2b(iv,v)	DRY
<i>Salvia verticillata</i> L.	EN	EA	B2b(iv)	RUD
<i>Sambucus ebulus</i> L.	LC	N		FOR
<i>Sambucus nigra</i> L.	LC	N		FOR
<i>Sambucus racemosa</i> L.	LC	N		FOR
<i>Sanguisorba minor</i> Scop.	LC	N		DRY
<i>Sanguisorba officinalis</i> L.	EN	N	B1a+2b(iv,v)	MAR
<i>Sanicula europaea</i> L.	LC	N		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Saponaria officinalis</i> L.	LC	N		RUD
<i>Saxifraga granulata</i> L.	LC	N		DRY
<i>Saxifraga rosacea</i> Moench subsp. <i>sponhemica</i> (C. C. Gmel.) D. A. Webb	R	N		ROC
<i>Saxifraga tridactylites</i> L.	NT	N		ROC
<i>Scabiosa columbaria</i> L.	LC	N		DRY
<i>Scabiosa columbaria</i> L. subsp. <i>pratensis</i> (Jord.) J. Duvigneaud et Lambinon	CR	N	B2b(iii,iv)	DRY
<i>Scandix pecten-veneris</i> L.	CR	N	B2b(iii,iv)	RUD
<i>Schoenoplectus lacustris</i> (L.) Palla	EN	N	B1a+2b(iv)	FRE
<i>Schoenoplectus tabernaemontani</i> (C. C. Gmel.) Palla	CR	N	B1a+2b(iii)	MAR
<i>Scilla bifolia</i> L.	VU	N	B1a+2b(iv,v)	FOR
<i>Scirpus sylvaticus</i> L.	LC	N		MAR
<i>Scleranthus annuus</i> L.	LC	N		RUD
<i>Scleranthus perennis</i> L.	LC	N		ROC
<i>Sclerochloa dura</i> (L.) Beauv.	RE	EA		RUD
<i>Scorzonera humilis</i> L.	EN	N	B2b(iv,v)	MAR
<i>Scrophularia auriculata</i> L.	CR	N	B2b(iii,iv)	FRE
<i>Scrophularia nodosa</i> L.	LC	N		FOR
<i>Scrophularia umbrosa</i> Dum.	VU	N	B2b(iv)	FRE
<i>Scutellaria galericulata</i> L.	LC	N		MAR
<i>Scutellaria minor</i> Huds.	CR	N	B1a+2b(iii); C2a(i)	MAR
<i>Securigera varia</i> (L.) Lassen	LC	EA		RUD
<i>Sedum acre</i> L.	LC	N		ROC
<i>Sedum album</i> L.	LC	N		ROC
<i>Sedum forsterianum</i> Smith	LC	N		DRY
<i>Sedum rubens</i> L.	RE	N		ROC
<i>Sedum rupestre</i> L.	LC	N		ROC
<i>Sedum sexangulare</i> L.	EN	N	B1a+2b(iv)	ROC
<i>Sedum telephium</i> L.	LC	N		ROC
<i>Selinum carvifolia</i> (L.) L.	VU	N	B2b(iii,iv)	MAR
<i>Sempervivum tectorum</i> L.	RE	EA		ROC
<i>Senecio aquaticus</i> Hill	EN	N	B2b(iv,v)	MAR
<i>Senecio erucifolius</i> L.	LC	N		DRY
<i>Senecio inaequidens</i> DC.	LC	EA		RUD
<i>Senecio jacobaea</i> L.	LC	N		GRA

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Senecio ovatus</i> (Gaertn., B. Mey. et Scherb.) Willd.	LC	N		FOR
<i>Senecio sarracenicus</i> L.	CR	N	C2a(ii)	FRE
<i>Senecio sylvaticus</i> L.	LC	N		FOR
<i>Senecio vernalis</i> Waldst. et Kit.	LC	EA		RUD
<i>Senecio viscosus</i> L.	LC	N		RUD
<i>Senecio vulgaris</i> L.	LC	N		RUD
<i>Serratula tinctoria</i> L.	CR	N	B2b(iii,iv)	DRY
<i>Seseli annuum</i> L.	CR	N	B2b(iii,iv)	DRY
<i>Seseli libanotis</i> (L.) Koch	VU	N	B2b(iv)	ROC
<i>Sesleria caerulea</i> (L.) Ard.	R	N		DRY
<i>Setaria pumila</i> (Poir.) Roem. et Schult.	EN	N	B2b(iv)	RUD
<i>Setaria verticillata</i> (L.) Beauv.	LC	N		RUD
<i>Setaria viridis</i> (L.) Beauv.	LC	N		RUD
<i>Sherardia arvensis</i> L.	EN	N	B2b(iv,v)	RUD
<i>Silaum silaus</i> (L.) Schinz et Thell.	LC	N		MAR
<i>Silene armeria</i> L.	R	N		DRY
<i>Silene conica</i> L.	RE	N		DRY
<i>Silene dichotoma</i> Ehrh.	CR	EA	B2b(iv,v)	RUD
<i>Silene dioica</i> (L.) Clairv.	LC	N		FOR
<i>Silene latifolia</i> Poir. subsp. <i>alba</i> (Mill.) Greuter et Burdet	LC	N		RUD
<i>Silene noctiflora</i> L.	CR	N	B2b(iv,v)	RUD
<i>Silene nutans</i> L.	LC	N		ROC
<i>Silene vulgaris</i> (Moench) Garcke	LC	N		FOR
<i>Sinapis arvensis</i> L.	LC	N		RUD
<i>Sisymbrium officinale</i> (L.) Scop.	LC	N		RUD
<i>Solanum dulcamara</i> L.	LC	N		FRE
<i>Solanum nigrum</i> L.	LC	N		RUD
<i>Solidago canadensis</i> L.	LC	EA		RUD
<i>Solidago gigantea</i> Ait.	LC	EA		RUD
<i>Solidago virgaurea</i> L.	LC	N		FOR
<i>Sonchus arvensis</i> L.	LC	N		RUD
<i>Sonchus asper</i> (L.) Hill	LC	N		RUD
<i>Sonchus oleraceus</i> L.	LC	N		MAR
<i>Sorbus aria</i> (L.) Crantz	LC	N		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Sorbus aucuparia</i> L.	LC	N		FOR
<i>Sorbus latifolia</i> (Lam.) Pers.	R	N		FOR
<i>Sorbus semiincisa</i> Borbás	LC	N		FOR
<i>Sorbus torminalis</i> (L.) Crantz	LC	N		FOR
<i>Sparganium emersum</i> Rehm.	EN	N	B1a+2b(iv)	AQU
<i>Sparganium erectum</i> L.	LC	N		AQU
<i>Sparganium natans</i> L.	RE	N		AQU
<i>Spergula arvensis</i> L.	LC	N		RUD
<i>Spergula pentandra</i> L.	RE	N		RUD
<i>Spergularia rubra</i> (L.) J. et C. Presl	LC	N		ROC
<i>Spirodela polyrhiza</i> (L.) Schleid.	R	N		AQU
<i>Stachys alpina</i> L.	VU	N	B1a+2b(iv)	FOR
<i>Stachys annua</i> (L.) L.	CR	N	B2b(iv,v)	RUD
<i>Stachys arvensis</i> (L.) L.	EN	N	B2b(iv,v)	RUD
<i>Stachys officinalis</i> (L.) Trev.	LC	N		DRY
<i>Stachys palustris</i> L.	LC	N		MAR
<i>Stachys recta</i> L.	VU	N	B2b(iii,iv)	DRY
<i>Stachys sylvatica</i> L.	LC	N		FOR
<i>Stellaria alsine</i> Grimm	LC	N		MAR
<i>Stellaria graminea</i> L.	LC	N		DRY
<i>Stellaria holostea</i> L.	LC	N		FOR
<i>Stellaria media</i> (L.) Vill.	LC	N		RUD
<i>Stellaria nemorum</i> L.	LC	N		FOR
<i>Stellaria palustris</i> Retz.	CR	N	C2a(ii)	MAR
<i>Succisa pratensis</i> Moench	VU	N	B2b(iii,iv)	MAR
<i>Symphytum officinale</i> L.	LC	N		FRE
<i>Symphytum xuplandicum</i> Nyman	NE	EA		RUD
<i>Syringa vulgaris</i> L.	LC	EA		ROC
<i>Tamus communis</i> L.	EN	N	B1a; C2a(i)	FOR
<i>Tanacetum parthenium</i> (L.) Schultz-Bip.	LC	EA		RUD
<i>Tanacetum vulgare</i> L.	LC	N		RUD
<i>Taraxacum acutangulum</i> Markl.	NE	N		GRA
<i>Taraxacum adamii</i> Claire	NE	N		GRA
<i>Taraxacum alatum</i> Lindb. f.	NE	N		GRA

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Taraxacum anglicum</i> Dahlst. ex Druce	NE	N		MAR
<i>Taraxacum copidophyllum</i> Dahlst.	NE	N		GRA
<i>Taraxacum crispulum</i> Hagl.	NE	N		GRA
<i>Taraxacum dahlstedtii</i> Lindb. f.	NE	N		GRA
<i>Taraxacum dilatatum</i> Lindb. f.	NE	N		GRA
<i>Taraxacum duplidentifrons</i> Dahlst.	NE	N		GRA
<i>Taraxacum ekmanii</i> Dahlst.	NE	N		GRA
<i>Taraxacum haematicum</i> Hagl.	NE	N		GRA
<i>Taraxacum hollandicum</i> v. Soest	NE	N		MAR
<i>Taraxacum lacistophylloides</i> Dahlst.	NE	N		ROC
<i>Taraxacum lacistophyllum</i> (Dahlst.) Raunk.	NE	N		ROC
<i>Taraxacum ochrochlorum</i> Hagl.	NE	N		GRA
<i>Taraxacum pectinatiforme</i> Lindb. f.	NE	N		GRA
<i>Taraxacum reichlingii</i> v. Soest	RE	N		MAR
<i>Taraxacum rivulare</i> v. Soest	RE	N		GRA
<i>Taraxacum rubicundum</i> (Dahlst.) Dahlst.	NE	N		ROC
<i>Taraxacum scanicum</i> Dahlst.	NE	N		ROC
<i>Taraxacum sellandii</i> Dahlst.	NE	N		GRA
<i>Taraxacum silesiacum</i> Dahlst. ex Hagl.	NE	N		ROC
<i>Taraxacum subpallidissimum</i> v. Soest	NE	N		GRA
<i>Taraxacum subundulatum</i> Dahlst.	NE	N		GRA
<i>Taraxacum tortilobum</i> Florstr.	NE	N		ROC
<i>Taraxacum trilobatum</i> Palmgren	NE	N		GRA
<i>Taraxacum undulatifforme</i> Dahlst.	NE	N		GRA
<i>Taraxacum undulatum</i> Lindb. f. et Markl.	NE	N		GRA
<i>Taxus baccata</i> L.	LC	EA		FOR
<i>Teesdalia nudicaulis</i> (L.) R. Brown	LC	N		ROC
<i>Tephroseris helenitis</i> (L.) Nordenstam	EN	N	B1a+2b(iv,v)	ROC
<i>Tetragonolobus maritimus</i> (L.) Roth	EN	N	B2b(iv)	DRY
<i>Teucrium botrys</i> L.	VU	N	B1a+2b(iv)	ROC
<i>Teucrium chamaedrys</i> L.	VU	N	B1a+2b(iv)	DRY
<i>Teucrium montanum</i> L.	RE	N		DRY
<i>Teucrium scorodonia</i> L.	LC	N		FOR
<i>Thalictrum flavum</i> L.	VU	N	B1a+2b(iv)	MAR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Thalictrum minus</i> L. subsp. <i>pratense</i> (F.W. Schultz) Hand	CR	N	B2b(iii,iv)	DRY
<i>Thelypteris palustris</i> Schott	CR	N	C2a(ii)	MAR
<i>Thesium pyrenaicum</i> Pourr.	CR	N	C2a(ii)	DRY
<i>Thlaspi arvense</i> L.	LC	N		RUD
<i>Thlaspi caerulescens</i> J. et C. Presl	LC	N		DRY
<i>Thlaspi montanum</i> L.	RE	N		DRY
<i>Thlaspi perfoliatum</i> L.	LC	N		RUD
<i>Thymelea passerina</i> (L.) Coss. et Germ.	RE	N		RUD
<i>Thymus praecox</i> Opiz	R	N		ROC
<i>Thymus pulegioides</i> L.	LC	N		DRY
<i>Tilia cordata</i> Mill.	LC	N		FOR
<i>Tilia platyphyllos</i> Scop.	LC	N		FOR
<i>Torilis arvensis</i> (Huds.) Link	EN	N	B1a+2b(iv,v)	RUD
<i>Torilis japonica</i> (Houtt.) DC.	LC	N		FOR
<i>Tragopogon pratensis</i> L.	LC	N		DRY
<i>Tragopogon pratensis</i> L. subsp. <i>orientalis</i> (L.) Čelak.	CR	N	B2b(iii,iv)	DRY
<i>Trichomanes speciosum</i> Willd.	LC	N		ROC
<i>Trifolium alpestre</i> L.	CR	N	B2b(iii)	DRY
<i>Trifolium arvense</i> L.	LC	N		DRY
<i>Trifolium aureum</i> Pollich	EN	N	B2b(iv)	DRY
<i>Trifolium campestre</i> Schreb.	LC	N		DRY
<i>Trifolium dubium</i> Sibth.	LC	N		GRA
<i>Trifolium fragiferum</i> L.	LC	N		DRY
<i>Trifolium hybridum</i> L.	LC	EA		GRA
<i>Trifolium medium</i> L.	LC	N		DRY
<i>Trifolium micranthum</i> Viv.	RE	N		DRY
<i>Trifolium montanum</i> L.	VU	N	B2b(iv)	DRY
<i>Trifolium ochroleucon</i> Huds.	VU	N	B1a+2b(iv)	DRY
<i>Trifolium pratense</i> L.	LC	N		GRA
<i>Trifolium repens</i> L.	LC	N		GRA
<i>Trifolium rubens</i> L.	CR	N	B2b(iii,iv)	DRY
<i>Trifolium striatum</i> L.	EN	N	B2b(iv,v)	DRY
<i>Triglochin palustre</i> L.	CR	N	B2b(iii,iv)	MAR
<i>Trisetum flavescens</i> (L.) Beauv.	LC	N		GRA

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Turgenia latifolia</i> (L.) Hoffm.	RE	N		RUD
<i>Tussilago farfara</i> L.	LC	N		RUD
<i>Typha angustifolia</i> L.	EN	N	B1a+2b(iv,v)	FRE
<i>Typha latifolia</i> L.	LC	N		FRE
<i>Ulex europaeus</i> L.	CR	EA	B2b(iv)	FOR
<i>Ulmus glabra</i> Huds.	LC	N		FOR
<i>Ulmus laevis</i> Pallas	CR	N	D1	FOR
<i>Ulmus minor</i> Mill.	LC	N		FOR
<i>Urtica dioica</i> L.	LC	N		RUD
<i>Urtica urens</i> L.	CR	N	B2b(iii,iv)	RUD
<i>Utricularia australis</i> R. Brown	EN	N	B2b(iv)	AQU
<i>Utricularia vulgaris</i> L.	EN	N	B2b(iv)	AQU
<i>Vaccaria hispanica</i> (Mill.) Rauschert	RE	N		RUD
<i>Vaccinium myrtillus</i> L.	LC	N		FOR
<i>Vaccinium oxycoccos</i> L.	CR	N	B2b(iii,iv)	MAR
<i>Vaccinium vitis-idaea</i> L.	CR	N	B2b(iii)	DRY
<i>Valeriana dioica</i> L.	EN	N	B2b(iv,v)	MAR
<i>Valeriana repens</i> Host	LC	N		MAR
<i>Valeriana wallrothii</i> Kreyer	LC	N		FOR
<i>Valerianella carinata</i> Loisel.	LC	N		RUD
<i>Valerianella dentata</i> (L.) Pollich	EN	N	B2b(iv,v)+2c(iv)	RUD
<i>Valerianella locusta</i> (L.) Laterr.	LC	N		RUD
<i>Valerianella rimosa</i> Bast.	EN	N	B2b(iv,v)+2c(iv)	RUD
<i>Vallisneria spiralis</i> L.	CR	EA	B2b(iv)	AQU
<i>Verbascum densiflorum</i> Bertol.	VU	N	B1a+2b(iv)	RUD
<i>Verbascum lychnitis</i> L.	LC	N		ROC
<i>Verbascum nigrum</i> L.	LC	N		RUD
<i>Verbascum phlomoides</i> L.	RE	N		RUD
<i>Verbascum pulverulentum</i> Vill.	CR	N	C2a(ii)	ROC
<i>Verbascum thapsus</i> L.	NT	N		RUD
<i>Verbena officinalis</i> L.	LC	N		RUD
<i>Veronica agrestis</i> L.	LC	N		RUD
<i>Veronica anagallis-aquatica</i> L. subsp. <i>anagallis-aquatica</i>	EN	N	B2b(iv)	FRE
<i>Veronica anagallis-aquatica</i> L. subsp. <i>aquatica</i> Nyman	CR	N	B2b(iv)	FRE

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Veronica arvensis</i> L.	LC	N		RUD
<i>Veronica beccabunga</i> L.	LC	N		FRE
<i>Veronica chamaedrys</i> L.	LC	N		DRY
<i>Veronica filiformis</i> Smith	R	EA		GRA
<i>Veronica hederifolia</i> L.	LC	N		RUD
<i>Veronica montana</i> L.	LC	N		FOR
<i>Veronica officinalis</i> L.	LC	N		FOR
<i>Veronica persica</i> Poir.	LC	EA		RUD
<i>Veronica polita</i> Fries	EN	N	B2b(iv,v)	RUD
<i>Veronica praecox</i> All.	RE	N		RUD
<i>Veronica scutellata</i> L.	EN	N	B2b(iv)	MAR
<i>Veronica serpyllifolia</i> L.	LC	N		GRA
<i>Veronica teucrium</i> L.	CR	N	B2b(iii,iv)	DRY
<i>Veronica triphyllos</i> L.	CR	N	B2b(iv,v)	RUD
<i>Veronica verna</i> L.	CR	N	B2b(iii,iv)	RUD
<i>Viburnum lantana</i> L.	LC	N		FOR
<i>Viburnum opulus</i> L.	LC	N		FOR
<i>Vicia cracca</i> L.	LC	N		GRA
<i>Vicia hirsuta</i> (L.) S. F. Gray	LC	N		RUD
<i>Vicia lathyroides</i> L.	CR	N	B2b(iii,iv)	DRY
<i>Vicia lutea</i> L.	LC	EA		RUD
<i>Vicia pisiformis</i> L.	CR	N	B1a	FOR
<i>Vicia sativa</i> L.	LC	EA		RUD
<i>Vicia sepium</i> L.	LC	N		FOR
<i>Vicia tenuifolia</i> Roth	LC	N		DRY
<i>Vicia tetrasperma</i> (L.) Schreb.	LC	N		RUD
<i>Vicia tetrasperma</i> (L.) Schreb. subsp. <i>gracilis</i> (DC.) Hook. f.	CR	N	B2b(iii)	RUD
<i>Vicia villosa</i> Roth	LC	EA		RUD
<i>Vinca minor</i> L.	LC	N		FOR
<i>Vincetoxicum hirundinaria</i> Med.	VU	N	B2b(iv)	FOR
<i>Viola arvensis</i> Murray	LC	N		RUD
<i>Viola canina</i> L.	EN	N	B1a+2b(iv)	DRY
<i>Viola hirta</i> L.	LC	N		FOR
<i>Viola mirabilis</i> L.	R	N		FOR

Taxon	Threat category	Status	Criteria sub-heads	Habitat type
<i>Viola odorata</i> L.	LC	N		FOR
<i>Viola palustris</i> L.	EN	N	B2b(iv,v)	MAR
<i>Viola reichenbachiana</i> Jord. ex Boreau	LC	N		FOR
<i>Viola riviniana</i> Reichenb.	LC	N		FOR
<i>Viola tricolor</i> L.	LC	N		RUD
<i>Viscum album</i> L.	LC	N		FOR
<i>Vulpia bromoides</i> (L.) S. F. Gray	CR	N	B2b(iii,iv)	DRY
<i>Vulpia myuros</i> (L.) C. C. Gmel.	EN	N	B2b(iv,v)	RUD
<i>Wahlenbergia hederacea</i> (L.) Reichenb.	CR	N	C2a(ii)	MAR
<i>Xanthium strumarium</i> L.	RE	EA		RUD
<i>Zannichellia palustris</i> L.	LC	N		AQU

6. Discussion

6.1. The Luxembourg Red List in the European context

As the present Red List is the first to be established for Luxembourg’s vascular plants, it is not possible to compare the number of species in the

different threat categories with an earlier version. Luxembourg is with more than 34% of extinct and threatened plant taxa (categories RE, CR, EN, VU) among the leading European countries (Tables 4, 5). In a recent overview of the Red Lists of 22 European countries (Korneck *et al.* 1996), the proportion of extinct and threatened plant species varied from 7% (Italy) to more than 47% (Romania). However, comparisons between countries are not straightforward because the threat criteria often differ and the areas considered vary largely.

Table 4: Frequency and proportion of the different threat categories in Luxembourg.

Plant taxa known	RE	CR	EN	VU	R	Total threatened (RE, CR, EN and VU)
1323	101 7.6%	121 9.2%	124 9.4%	109 8.2%	85 6.4%	455 34.4%

Table 5: Threatened plant taxa in central European countries.

Country	Plant taxa known	Threatened plant taxa	Extinct plant taxa
Luxembourg	1323	34.4%	7.6%
Germany	3001 ²⁾	28.4% ²⁾	1.6% ²⁾
Belgium	1415 ¹⁾	24.0% ¹⁾	4.6% ³⁾
Netherlands	1436 ¹⁾	34.6% ¹⁾	3.6% ⁴⁾
Switzerland	3144 ⁵⁾	31.5% ⁵⁾	1.6% ⁵⁾

1) Office for Official Publications of the European Communities (1995)
2) Korneck et al. (1996)
3) Delvosalle et al. (1969)
4) Weeda et al. (1990)
5) Moser et al. (2002)

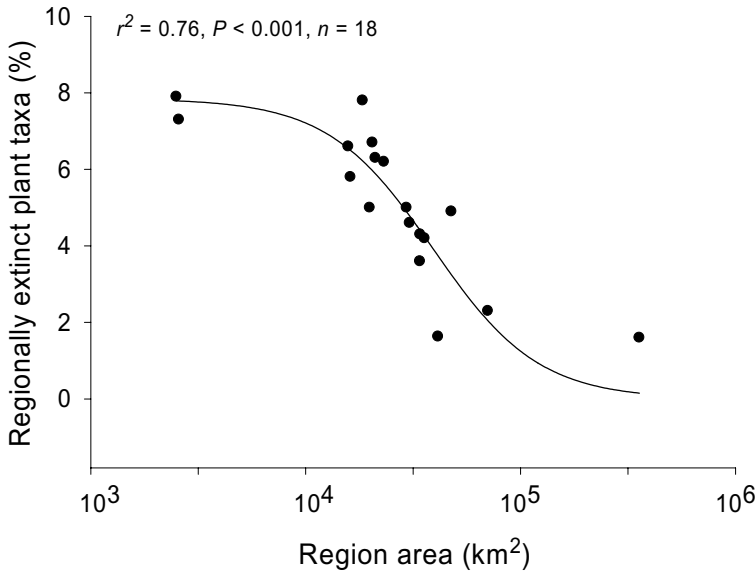


Fig. 8: The relationship between the proportion of regionally extinct plant taxa and the area for Central European countries and regions. Data were compiled for the following countries and German federal states: Luxembourg; Belgium (Delvosalle et al. 1969), Netherlands (Weeda et al. 1990); Switzerland (Moser et al. 2002); Germany and German federal states (Nordrhein-Westfalen, Saarland, Schleswig-Holstein, Thüringen, Sachsen-Anhalt, Rheinland-Pfalz, Sachsen, Hessen, Mecklenburg-Vorpommern, Brandenburg, Baden-Württemberg, Niedersachsen, Bayern) (Korneck et al. 1996). A sigmoidal function, $f(x) = 7.85/(1 + \exp(-(x-4.59)/-0.24))$, was best fit.

The proportion of extinct plant species significantly decreases with the increase of the area of the country or the region for which the Red List was established (Fig. 8). Small countries like Luxembourg, or comparable German federal states like the Saarland, experience extinction rates as high as 8%, while Germany has an extinction rate below 2%. In a 400 ha woodland park in Metropolitan Boston, the extinction rate over one century was as high as 37% (Drayton & Primack 1996). On the other extreme, 'only' 0.28% of the vascular plant taxa are considered to be extinct at the global level (pre-1994 IUCN categories *Extinct* + *Extinct/Endangered*) (Walter & Gillet 1998). This is because smaller regions or countries have fewer locations on average, and the probability of regional extinction is generally higher (Gärdenfors et al. 2001). If the study region for the establishment of a Red List is enlarged, the percentage of endangered taxa will drop. Korneck et al. (1996) mentioned that the number of extinct plant taxa was reduced by 25% in unified Germany compared to the former Red List of Western Germany because of the enlargement of the country area. Comparisons of Red Lists from

different countries should therefore consider the influence of the country size on threat levels.

In Luxembourg, the number of extinct native plant species (112) is similar to the number of established alien species (115). The total number of vascular plant species in Luxembourg has probably been about the same over the past 175 years. However, many of the established alien species are ubiquitous with a large distribution and some of them are even considered as invasive like *Heracleum mantegazzianum*, *Fallopia cuspidatum* and *F. sachalinensis*. In contrast, many endangered native plant taxa are highly specialised and live in threatened habitats like bogs, marshes or semi-natural grasslands.

Small countries like Luxembourg should not get rid of their conservation responsibilities with the argument that the locally threatened plant species still exist in neighbouring countries. Many of the plant species listed in a national Red List are also threatened in neighbouring regions and the local extinction of populations often means the loss of genetic diversity and locally adapted genotypes.

Especially small regions should be aware that local extinction is the first step to global extinction.

the same factors are responsible for the decline of many plant species.

6.2. Habitats and threats

The human influence on vegetation is very diverse, and in Luxembourg there is hardly an area without any influence. According to Korneck & Sukopp (1988), the main threat factors for the plant taxa of the German Red List are change or abandonment of land-use practices, destruction of specific habitats, landfilling, drainage, fertilisation and mining. One can assume that in Luxembourg

I made an analysis of the threat categories in relation to the main habitat types in which a certain plant taxon occurs (*cf.* Landolt 1991). As many plant species have a wide ecological range, they often do occur in more than one type of habitat. In order to avoid overlapping, the number of categories was deliberately kept low. Each plant species was designated to the type of habitat where it is most commonly found in Luxembourg. Eight main habitats or ecological groups were distinguished (Tables 6, 7).

Table 6: Threat categories in relation to main habitat types.

	Woodlands, forest edges and cuttings	Rocks and screes	Aquatic habitats and springs	Freshwater margins and damp mud	Marshes, swamps and wet grasslands	Dry and mesophile grasslands and heathlands	Fallow land, ruderal communities and arable fields	Intensively managed grasslands
RE (%)	7.9	5.9	4.0	10.9	9.9	21.8	38.6	1.0
CR (%)	10.7	3.3	3.3	7.4	20.7	29.8	24.8	-
EN (%)	9.7	7.3	4.8	8.1	14.5	28.2	27.4	-
VU (%)	25.7	5.5	8.3	6.4	18.3	24.8	10.1	0.9
NT (%)	38.9	13.9	-	-	11.1	19.4	16.7	-
R (%)	35.3	20.0	11.8	10.6	4.7	10.6	7.1	-
LC (%)	30.2	6.1	3.2	4.7	10.5	12.3	26.3	6.7

Table 7: Proportion of plant taxa in relation to main habitat types.

	Proportion of all Luxembourg plant taxa in habitat type (%)	Proportion of plant taxa occurring in habitat type that are threatened (%) (RE, CR, EN and VU)	Proportion of all threatened Luxembourg plant taxa (%) (RE, CR, EN and VU)
Woodlands, forest edges and cuttings	27.1	17.0	13.4
Rocks and screes	7.5	25.3	5.5
Aquatic habitats and springs	4.1	42.6	5.1
Freshwater margins and damp mud	5.8	48.1	8.1
Marshes, swamps and wet grasslands	11.5	48.0	16.0
Dry and mesophile grasslands and heathlands	16.3	55.6	26.4
Fallow land, ruderal communities and arable fields	22.8	37.7	25.1
Intensively managed grasslands	4.8	3.1	0.4

Woodlands, forest edges and cuttings

Plant species occurring mainly in woodlands, forest edges and cuttings represent with 358 species nearly one third of the total flora of Luxembourg, and 17% of the plant species of this group are considered to be threatened, but only 13% of the threatened plant species of Luxembourg occur in forests or similar habitats (Table 7).

Some species like *Circaea alpina*, *Osmunda regalis*, *Lycopodium annotinum* and *Viola mirabilis* are known only from one locality.

The following species that occurred in forests and similar habitats are considered to be extinct:

Anemone sylvestris, *Campanula cervicaria*, *Carex depauperata*, *Cypripedium calceolus*, *Limodorum abortivum*, *Moneses uniflora* and *Parietaria officinalis*.

While *Cypripedium calceolus* probably became extinct due to over-collecting, other light demanding species like *Anemone sylvestris*, *Campanula cervicaria* and *Limodorum abortivum* probably became extinct because of a lack of suitable management. These species need open canopies and well developed forest edges especially bordering dry grasslands. More than 50% of the threatened forest species are protected by law.

Rocks and screes

More than 25% of the plant species occurring on cliffs, exposed rocks, quarries and rock walls are considered to be threatened. But only 6% of the threatened plant species of Luxembourg occur in this kind of habitat (Table 7). Many threatened rock plants have an extremely restricted area and occur only at a few sites (e.g. *Galium boreale*, *Huperzia selago*, *Hymenophyllum tunbrigense*, *Thymus praecox*, *Saxifraga rosacea* subsp. *sponhemica*, *Dianthus gratianopolitanus* and *Potentilla incana*). More than one third (36%) of the threatened species of this group are protected by law.

Aquatic habitats and springs

Aquatic species are either threatened by direct destruction of their habitats through draining, filling of ponds and canalisation of streams or indirectly by eutrophication and pollution. Although only 4.1% of the Luxembourg plant species are aquatic, more than 40% of the taxa of this habitat group are considered to be threatened (Table 7). Many aquatic species are extremely rare as they occur only in a few localities (e.g. *Callitriche obtusangula*, *Hippuris vulgaris*, *Myriophyllum alterniflorum*, *Nuphar lutea*, *Nymphaea alba*, *Groenlandia densa*, *Potamogeton lucens*, *P. obtusifolius*, *P. pusillus*, *Ranunculus aquatilis* and *R. circinatus*).

Nearly one third of the threatened aquatic plant species are protected by law.

Freshwater margins and damp mud

Nearly one half of the plant species occurring on freshwater margins and damp mud are considered to be threatened and 8% of the threatened plant species of Luxembourg occur in this kind of habitat (Table 7). Many species of the alluvial area and the *Isoëto-Nanojuncetea* communities need open, moist soil conditions due to regular disturbances. *Radiola linoides*, *Gypsophila muralis*, *Illecebrum verticillatum* and *Lythrum hyssopifolia* are typical examples. The filling of temporary ponds and the intensification of agricultural practices are the main factors responsible for their decline. Only 16% of the plant species occurring on freshwater margins and damp mud are protected by law, a situation that should be rectified.

Marshes, swamps and wet grasslands

Half of the 152 species occurring in bogs, marshes and in wet grasslands are considered to be threatened and species of these habitats account for 16% of the total number of threatened Luxembourg plant taxa (Table 7). Only a few wet areas remain at present after a long history of drainage and land reclamation. In wet grasslands, the change of traditional agricultural practices is one of the main factors responsible for the serious decline of many plant species. Nutrient poor wet grasslands are one of the most threatened habitats in Luxembourg. Species like *Carex pulicaris*, *Dactylorhiza incarnata*, *Eleocharis quinqueflora*, *Juncus filiformis*, *Stellaria palustris*, *Vaccinium oxycoccus* and *Wahlenbergia hederacea* are strongly threatened because they occur only in one or very few localities and their population size is often very small. Less than 40% of the threatened plant species occurring in marshes, swamps and wet grasslands are protected by law, a situation that should be rectified because of the ongoing destruction of these habitats.

Dry and mesophile grasslands and heathlands

Species occurring in dry and mesophile grasslands and heathlands depend on the continuation of the traditional agricultural practices that created these habitats over centuries. While dry grassland species are mainly threatened because of encroachment by scrubs due to a lack of suitable management, the typical flora of mesophile grasslands disappears by excessive fertilising and early cutting. More than half of the plant taxa occurring in these habitats are considered to be threatened (Table 7). Many species like *Arnica montana*, *Coeloglossum viride*, *Genista anglica*, *Lycopodium clavatum*, *Meum athamanticum*, *Ononis spinosa*, *Ophrys sphegodes*, *Pedicularis sylvatica* and *Rorippa stylosa* are highly endangered and specific

conservation measures are urgently needed. *Tragopogon pratensis* subsp. *orientalis*, which formerly occurred in meadows along the Moselle River, is threatened with extinction because of the disappearance of its habitat. More than 40% of the threatened plant species of this habitat group are protected by law.

Fallow land, ruderal communities and arable fields

More than one third of the plant species occurring on fallow land, arable fields and in ruderal communities are considered to be threatened (Table 7). This habitat group is characterised by communities with regular disturbances like ploughed fields, but it also integrates fallow lands in early succession stages and edges of trails.

Changes in farming practices had a very strong impact on the weed flora. Many species of arable lands, as *Consolida regalis*, *Filago arvensis*, *Scandix pecten-veneris*, *Silene noctiflora* and *Stachys annua*, have only a few localities left and changes in agricultural practices could exterminate these populations in a very short time. *Ex-situ* conservation of seeds collected in the wild can be

an option to conserve the most threatened taxa. Contractual conservation measures as unsprayed field margins are also of great importance. Less than 2% of the threatened species of this habitat group are protected by law.

Intensively managed grasslands

Only very few plant species of intensively managed hay meadows and pastures are considered to be threatened (3.1%) (Table 7). Plant species like *Hordeum secalinum* are threatened by changes in farming practices like early mowing and intensive fertilising.

6.3. Responsibilities of Luxembourg for the conservation of endangered plant species

Endemics

Because of its small size, Luxembourg has no endemic vascular plant species but has a special responsibility for the conservation of plant taxa

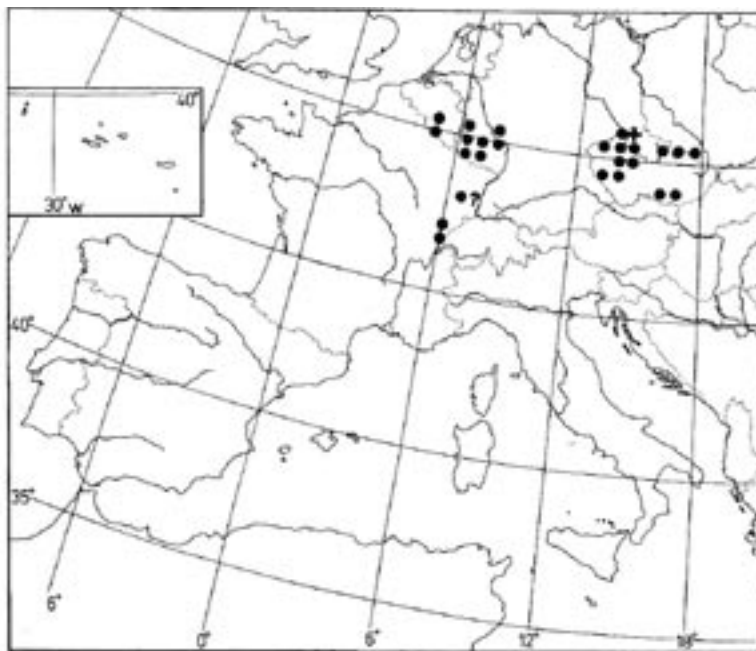


Fig. 9: European distribution of *Saxifraga rosacea* Moench subsp. *sponhemica* (C. C. Gmel.) D. A. Webb. The mapping unit is the 50-km square of the UTM (Universal Transverse Mercator) grid maps of Atlas Florae Europaeae (Jalas et al. 1972). ■: native occurrence, †: extinct, △: record uncertain (as to identification or locality). Reproduced from Jalas, J., Suominen, J., Lampinen, R. & Kurtto, A. (eds.), Atlas Florae Europaeae 12: Resedaceae to Platanaceae, 1999, by permission of the Committee for Mapping the Flora of Europe, and Societas Biologica Fennica Vanamo.

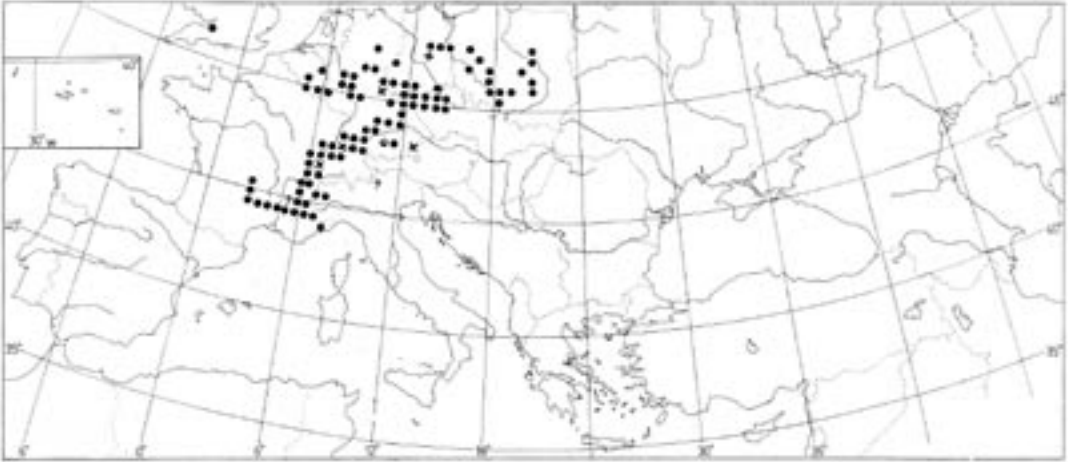


Fig. 10: European distribution of *Dianthus gratianopolitanus* Vill.. The mapping unit is the 50-km square of the UTM (Universal Transverse Mercator) grid maps of Atlas Florae Europaeae (Jalas et al. 1972). •: native occurrence, +: extinct, ×: probably extinct, ■ status unknown or uncertain, * record uncertain (as to identification or locality). Reproduced from Jalas, J. & Suominen, J. (eds.), Atlas Florae Europaeae 7: Caryophyllaceae (Silenoideae), 1986, by permission of the Committee for Mapping the Flora of Europe, and Societas Biologica Fennica Vanamo.

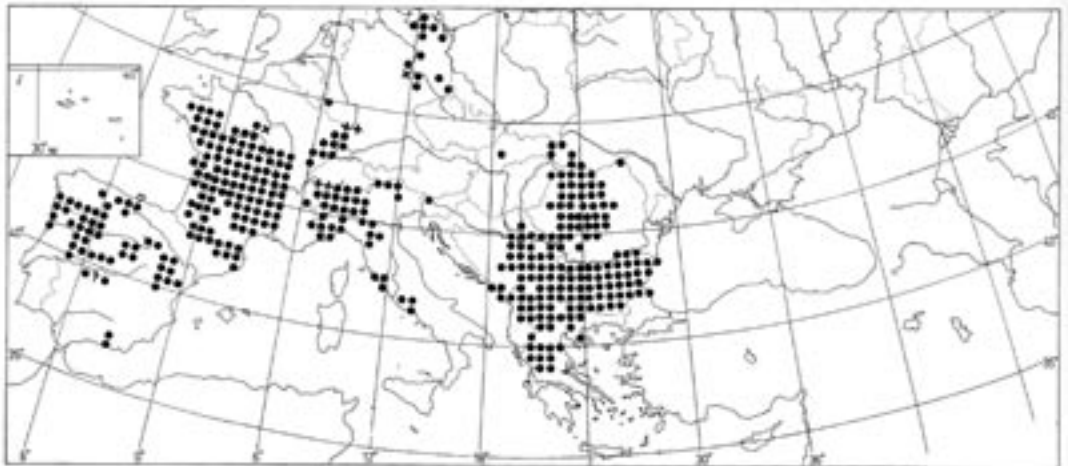


Fig. 11: European distribution of *Rorippa stylosa* (Pers.) Mansf. et Rothm.. The mapping unit is the 50-km square of the UTM (Universal Transverse Mercator) grid maps of Atlas Florae Europaeae (Jalas et al. 1972). •: native occurrence, ■ introduction (established alien), +: extinct, ×: probably extinct, * record uncertain (as to identification or locality). Reproduced from Jalas, J. & Suominen, J. (eds.), Atlas Florae Europaeae 10: Cruciferae (Sisymbrium to Aubrieta), 1994, by permission of the Committee for Mapping the Flora of Europe, and Societas Biologica Fennica Vanamo.

that occur only within a small geographical area, including Luxembourg. In Luxembourg, only one species belongs to this category:

Saxifraga rosacea subsp. *sponhemica* (R), occurs on cliffs in neighbouring Germany (Nahegebiet, Eifel, Pfalz), neighbouring Belgium and France (Ardennes), French Jura, southwest Poland, Czech Rep., Slovakia and in Luxembourg (Oesling) (Fig. 9).

Taxa with a restricted Middle European Area

These vascular plant taxa have a restricted distribution in Central Europe, and Luxembourg should contribute to the conservation of the following species that may become endangered worldwide if they should decline further in neighbouring countries. In Luxembourg, only



Fig. 12: European distribution of *Hymenophyllum tunbrigense* (L.) Smith. The mapping unit is the 50-km square of the UTM (Universal Transverse Mercator) grid maps of Atlas Florae Europaeae (Jalas et al. 1972). •: native occurrence, *: extinct, x: probably extinct. Reproduced from Jalas, J. & Suominen, J. (eds.), Atlas Florae Europaeae 1: Pteridophyta (Psilotaceae to Azollaceae), 1972, by permission of the Committee for Mapping the Flora of Europe, and Societas Biologica Fennica Vanamo.

one species belongs to this category: *Dianthus gratianopolitanus* (R) (Fig. 10)

Taxa with isolated populations

The following vascular plant taxa have isolated populations in Luxembourg, far from their main distribution area, and their conservation is of special biogeographical interest:

Rorippa stylosa (CR) (Fig. 11)

Hymenophyllum tunbrigense (EN) (Fig. 12)

Worldwide threatened species

Three vascular plant species of the present Red List are considered to be threatened in many parts of their world distribution area (cf. Korneck et al. 1996):

Cuscuta epilinum (RE)

Epipogium aphyllum (R)

Potamogeton trichoides (RE)

Walter & Gillett (1998) mentioned *Bromus grossus* Desf. ex. DC. as a regionally extinct taxon for Luxembourg. This indication is based on the only known Luxembourg locality for *B. grossus* Desf. ex. DC. subsp. *eburensis* (Nyman) Tournay, which is a synonym of *B. bromoideus* (Lej.) Crépín, given by E. Fischer (Lefort 1950). However, *Bromus grossus* Desf. ex. DC. subsp. *eburensis* (Nyman) Tournay is not included in the present version of the Red List as no herbarium specimen from Luxembourg is known.

Acknowledgements

I thank L. Reichling for his many useful observations during the elaboration of the checklist and for his most valuable contribution to the evaluation of the threat category of the Luxembourg plant taxa; P. Diederich and D. Matthies for useful comments on earlier versions of the manuscript; L. Stomp for correcting the manuscript; E. Künsch for gathering historical records; C. Reckinger for contributing photographs of threatened plant species; T. Helminger for contributing unpublished notes on *Rubus* spp.; Y. Krippel for the evaluation of the threat category of infraspecific pteridophyte taxa and N. Stomp for continuous support of the project.

References

- Beck E., Jungblut F., Lefort F. L., Reichling L. & Stumper R. 1950. - Herborisations faites au Grand-Duché de Luxembourg en 1949. Bulletin de la Société des Naturalistes luxembourgeois 54: 161-207.
- Beck E., Jungblut F., Lefort F. L., Reichling L. & Stumper R. 1952. - Herborisations faites au Grand-Duché de Luxembourg en 1951. Bulletin de la Société des Naturalistes luxembourgeois 56: 67-88.
- Colling G., Reichling L. & Helminger T. 1994. - Notes floristiques 1990-1993. Bulletin de la Société des Naturalistes luxembourgeois 95: 119-134.
- Colling G. & Reichling L. 1996. - Notes floristiques 1994-1995. Bulletin de la Société des Naturalistes luxembourgeois 97: 25-38.
- Colling G., Parent G. & Reichling L. 1998. - Notes floristiques. Observations faites dans le Luxembourg et régions voisines belges et allemandes (1996-1997 et observations antérieures). Bulletin de la Société des Naturalistes luxembourgeois 99: 27-43.
- Colling G. & Krippel Y. 2001. - Notes floristiques. Observations faites au Luxembourg (1998-1999). Bulletin de la Société des Naturalistes luxembourgeois 101: 33-47.
- Colling G. & Krippel Y. 2003. - Notes floristiques. Observations faites au Luxembourg (2000-2001). Bulletin de la Société des Naturalistes luxembourgeois 103: 3-23.
- Delvosalle L., Demaret F., Lambinon J. & Lawalrée A. 1969. - Plantes rares disparues ou menacées de disparition en Belgique: L'appauvrissement de la flore indigène. Service Réserves Naturelles domaniales et de la Conservation de la Nature, Travaux. 4: 1-129.
- Diederich P. 1983a. - Le genre *Callitriche* L. au Grand-Duché de Luxembourg. Dumortiera 26: 13-22.
- Diederich P. 1983b. - Le genre *Potamogeton* L. s.l. au Grand-Duché de Luxembourg et dans les régions voisines. Dumortiera 27: 26-36.
- Diederich P. 1984a. - Le genre *Ranunculus* L. subgen. *Batrachium* (DC.) Gray au Grand-Duché de Luxembourg. Dumortiera 28: 1-5.
- Diederich P. 1984b. - Les monocotylédones aquatiques (excl. *Potamogeton* s.l.) du Grand-Duché de Luxembourg. Dumortiera 29-30: 34-42.
- Diederich P. 1985. - Les dicotylédones (excl. *Callitriche* et *Ranunculus*) et ptéridophytes aquatiques au Grand-Duché de Luxembourg et dans les régions voisines. Dumortiera 32: 12-20.
- Drayton B. & Primack R. B. 1996. - Plant species lost in an isolated conservation area in metropolitan Boston from 1894 to 1993. Conservation Biology 10: 30-39.
- Gärdenfors U., Hilton-Taylor C., Mace G. & Rodríguez J. P. 2001. - The application of IUCN Red List Criteria at regional levels. Conservation Biology 15: 1206-1212.
- Helminger T. 1992. - Liste der in Luxemburg wildwachsenden Brombeeren (*Rubus* L. subgenus *Rubus*). Bulletin de la Société des Naturalistes luxembourgeois 93: 99-111.
- IUCN 2001. - IUCN Red List Categories: Version 3.1. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.
- Jalas J. & Suominen J. (eds) 1972. - Atlas Florae Europaeae. Distribution of vascular plants in Europe. 1 Pteridophyta (*Psilotaceae* to *Azollaceae*). The Committee for Mapping the Flora of Europe, Helsinki, 121 pp.
- Jalas J. & Suominen J. (eds) 1986. - Atlas Florae Europaeae. Distribution of vascular plants in Europe. 7 *Caryophyllaceae* (*Silenoidae*). The Committee for Mapping the Flora of Europe, Helsinki, 229 pp.
- Jalas J. & Suominen J. (eds) 1994. - Atlas Florae Europaeae. Distribution of vascular plants in Europe. 10 *Cruciferae* (*Sisymbrium* to *Aubretia*). The Committee for Mapping the Flora of Europe, Helsinki, 224 pp.
- Jalas J., Suominen J., Lampinen R. & Kurtto A. (eds) 1999. - Atlas Florae Europaeae. Distribution of vascular plants in Europe. 12 *Resedaceae* to *Platanaceae*. The Committee for Mapping the Flora of Europe, Helsinki. 250 pp.
- Kariger J.-J. 1955. - Recherches botaniques dans le Sud-Ouest du Grand-Duché entre 1942 et 1954. Bulletin de la Société des Naturalistes luxembourgeois 59: 89-100.
- Kariger J.-J. 1957. - Florule d'Esch-sur-Alzette (Grand-Duché de Luxembourg). Bulletin de la Société des Naturalistes luxembourgeois 60: 48-57.
- Kariger J.-J. 1958. - La flore des environs de Rodange. Bulletin de la Société des Naturalistes luxembourgeois 61: 199-212.
- Kariger J.-J. 1959. - Florule de la capitale: Le Wurthsberg de Clausen et quelques hauteurs analogues. Bulletin de la Société des Naturalistes luxembourgeois 62: 59-81.

- Kariger J.-J. 1961. - Plantes intéressantes, rares ou nouvelles pour le Grand-Duché trouvées en 1957 et 1958. Bulletin de la Société des Naturalistes luxembourgeois 63: 100-103.
- Kariger J.-J. 1962. - Florule et végétation de Pulvermühl (Luxembourg). Bulletin de la Société des Naturalistes luxembourgeois 64: 53-75.
- Kariger J.-J. 1990. - Auf der Suche nach Seltenheiten und Verschwundenem 1970-1989. Bulletin de la Société des Naturalistes luxembourgeois 90: 71-101.
- Kariger J.-J. 1992. - Auf der Suche nach Seltenheiten und Verschwundenem 1990 und 1991. Mit Rückblick und Bezugnahme auf die Zeit seit 1945. Bulletin de la Société des Naturalistes luxembourgeois 93: 113-137.
- Kariger J.-J. 1995. - Auf der Suche nach Seltenheiten und Verschwundenem 1992-1994. Mit Rückblick und Bezugnahme auf die Zeit seit 1945. Bulletin de la Société des Naturalistes luxembourgeois 96: 51-66.
- Kariger J.-J. 1997. - Flora und Biotope der Siechenhoffelsen und der Schoettermarjal (Stadt Luxemburg). Bulletin de la Société des Naturalistes luxembourgeois 98: 31-40.
- Koltz J.-P.-J. 1873. - Prodrome de la Flore du Grand-Duché de Luxembourg, Première partie. Plantes Phanérogames. Imprimerie de V. Buck, Luxembourg, 278 pp.
- Koltz J.-P.-J. 1879. - Prodrome de la Flore du Grand-Duché de Luxembourg, Seconde partie. Plantes Cryptogames ou Acotylédonnées. Recueil des Mémoires et des Travaux publiés par la Société Botanique du Grand-Duché de Luxembourg 4-5: 175-426.
- Korneck D., Schnittler M. & Vollmer I. 1996. - Rote Liste der Farn- und Blütenpflanzen (Pteridophyta et Spermatophyta) Deutschlands. Schriftenreihe für Vegetationskunde 28: 21-187.
- Korneck D. & Sukopp H. 1988. - Rote Liste der in der Bundesrepublik Deutschland ausgestorbenen, verschollenen und gefährdeten Farn- und Blütenpflanzen und ihre Auswertung für den Arten- und Biotopschutz. Schriftenreihe für Vegetationskunde 19: 1-210.
- Krippel Y. & Colling G. 2004. - Notes floristiques. Observations faites au Luxembourg (2002-2003 et observations antérieures). Bulletin de la Société des Naturalistes luxembourgeois 105: 27-56.
- Lambinon J., Delvosalle L. & Duvingneaud J. 2004. - Nouvelle Flore de la Belgique, du Grand-Duché de Luxembourg, du Nord de la France et des Régions voisines (Ptéridophytes et Spermatophytes). Cinquième édition. Editions du patrimoine du jardin botanique national de Belgique, Meise, 1167 pp.
- Landolt E. 1991. - Gefährdung der Farn- und Blütenpflanzen in der Schweiz mit gesamtschweizerischen und regionalen roten Listen. Bundesamt für Umwelt, Wald und Landschaft (BUWAL), Bern, 185 pp.
- Lefort F. L. 1950. - Contribution à l'histoire botanique du Luxembourg. Bulletin de la Société des Naturalistes luxembourgeois 54: 31-160.
- Luijten S. H., Oostermeijer J. G. B., van Leeuwen N. C. & den Nijs H. C. M. 1996. - Reproductive success and clonal genetic structure of the rare *Arnica montana* (Compositae) in The Netherlands. Plant Systematics and Evolution 201: 15-30.
- Office for Official Publications of the European Communities 1995. - Europe's environment: Statistical compendium of the Dobbris assessment. Luxembourg.
- Moser D. M., Gygas A., Bäumler B., Wyler N. & Palese R. 2002. - Rote Liste der gefährdeten Farn- und Blütenpflanzen der Schweiz. Bundesamt für Umwelt, Wald und Landschaft (BUWAL), Bern; Zentrum des Datenverbundnetzes der Schweizer Flora, Chambésy; Conservatoire et Jardin botaniques de la ville de Genève, Chambésy. BUWAL-Reihe «Vollzug Umwelt», 118 pp.
- Reichling L. 1953. - Herborisations faites dans le Grand-Duché de Luxembourg en 1952. Bulletin de la Société des Naturalistes luxembourgeois 57: 155-182.
- Reichling L. 1954. - Herborisations faites dans le Grand-Duché de Luxembourg en 1953. Bulletin de la Société des Naturalistes luxembourgeois 58: 76-134.
- Reichling L. 1955. - Notes floristiques. Observations faites dans le Grand-Duché de Luxembourg en 1954. Bulletin de la Société des Naturalistes luxembourgeois 59: 57-88.
- Reichling L. 1957. - Notes floristiques. Observations faites dans le Grand-Duché de Luxembourg en 1955. Bulletin de la Société des Naturalistes luxembourgeois 60: 20-47.
- Reichling L. 1958. - Notes floristiques. Observations faites dans le Grand-Duché de Luxembourg en 1956. Bulletin de la Société des Naturalistes luxembourgeois 61: 63-123.
- Reichling L. 1961. - Notes floristiques. Observations faites dans le Grand-Duché de Luxembourg en 1957 et 1958. Bulletin de la Société des Naturalistes luxembourgeois 63: 19-99.

- Reichling L. 1962. - Notes floristiques. Observations faites dans le Grand-Duché de Luxembourg en 1959. Bulletin de la Société des Naturalistes luxembourgeois 64: 3-52.
- Reichling L. 1964. - Notes floristiques. Observations faites dans le Grand-Duché de Luxembourg en 1961. Bulletin de la Société des Naturalistes luxembourgeois 66: 95-129.
- Reichling L. 1966. - Notes floristiques. Observations faites dans le Grand-Duché de Luxembourg de 1962 à 1964. Bulletin de la Société des Naturalistes luxembourgeois 69: 34-53.
- Reichling L. 1981. - 30 années d'observations floristiques au Luxembourg 1949-1979. Bulletin de la Société des Naturalistes luxembourgeois 83-84: 75-95.
- Reichling L. 1990. - Observations floristiques au Luxembourg 1980-1989. Bulletin de la Société des Naturalistes luxembourgeois 90: 55-70.
- Tinant F. A. 1836. - Flore luxembourgeoise ou description des plantes phanérogames recueillies et observées dans le Grand-Duché de Luxembourg, classées d'après le système sexuel de Linné. J.-P. Kuborn, Luxembourg, 512 pp.
- Van Rompaey E., Delvosalle L. (& coll.) 1979. - Atlas de la flore belge et luxembourgeoise. Ptéridophytes et spermatophytes. Jardin botanique national de Belgique, Meise, 292 pp.
- Walter K. S. & Gillet H. J. (eds) 1998. - 1997 IUCN Red List of Threatened Plants. Compiled by the World Conservation Monitoring Center. IUCN - The World Conservation Union, Gland, Switzerland and Cambridge, UK, LXIV + 862 pp.
- Weeda E. J., van der Meijden R. & Bakker P. A. 1990. - Rode Lijst van de in Nederland verdwenen en bedreigde planten (*Pteridophyta* et *Spermatophyta*) over de periode 1.1.1980 - 1.1.1990. Gorteria 16: 1-26.

Appendix 1

The IUCN criteria for Critically Endangered, Endangered and Vulnerable species (IUCN 2001)

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of $\geq 90\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
2. An observed, estimated, inferred or suspected population size reduction of $\geq 80\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
3. A population size reduction of $\geq 80\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 80\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in

the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 100 km² and estimates indicating at least two of a–c:
 - a. Severely fragmented or known to exist at only a single location.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
2. Area of occupancy estimated to be less than 10 km², and estimates indicating at least two of a–c:
 - a. Severely fragmented or known to exist at only a single location.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.

C. Population size estimated to number fewer than 250 mature individuals and either:

1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR
 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a–b):
 - a. Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 50 mature individuals, OR
 - (ii) at least 90% of mature individuals in one subpopulation.
 - b. Extreme fluctuations in number of mature individuals.
 - D. Population size estimated to number fewer than 50 mature individuals.
 - E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).
- generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
3. A population size reduction of $\geq 50\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
 4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 50\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 5000 km², and estimates indicating at least two of a–c:
 - a. Severely fragmented or known to exist at no more than five locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 2. Area of occupancy estimated to be less than 500 km², and estimates indicating at least two of a–c:
 - a. Severely fragmented or known to exist at no more than five locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:

- A. Reduction in population size based on any of the following:
 1. An observed, estimated, inferred or suspected population size reduction of $\geq 70\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
 2. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three

- (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 - C. Population size estimated to number fewer than 2500 mature individuals and either:
 1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future) OR
 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a–b):
 - a. Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 250 mature individuals, OR
 - (ii) at least 95% of mature individuals in one subpopulation.
 - b. Extreme fluctuations in number of mature individuals.
 - D. Population size estimated to number fewer than 250 mature individuals.
 - E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).
- the following:
- (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
2. An observed, estimated, inferred or suspected population size reduction of $\geq 30\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
 3. A population size reduction of $\geq 30\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
 4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 30\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 20,000 km², and estimates indicating at least two of a–c:
 - a. Severely fragmented or known to exist at no more than 10 locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:

- A. Reduction in population size based on any of the following:
 1. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of

- (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- 2. Area of occupancy estimated to be less than 2000 km², and estimates indicating at least two of a–c:
 - a. Severely fragmented or known to exist at no more than 10 locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 10,000 mature individuals and either:
 - 1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR
 - 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a–b):
 - a. Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 1000 mature individuals, OR
 - (ii) all mature individuals are in one subpopulation.
 - b. Extreme fluctuations in number of mature individuals.
- D. Population very small or restricted in the form of either of the following:
 - 1. Population size estimated to number fewer than 1000 mature individuals.
 - 2. Population with a very restricted area of occupancy (typically less than 20 km²) or number of locations (typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.

Appendix 2

Vascular plant taxa protected under Luxembourg and international legislation

Key: *Règlement grand-ducal du 19.8.1989 concernant la protection intégrale et partielle de certaines espèces de la flore sauvage, Luxembourg; A: fully protected plant species; B1: partially protected plant species; EC Habitat & Species Directive, Annex IIb: designation of protected areas for plant species; Annex IVb: special protection necessary for plant species; Annex Vb: exploitation of

plants to be subjected to management if necessary; Bern Convention, Appendix I: special protection for plant species; CITES, Appendix I: trade permitted only in exceptional circumstances; Appendix II: trade subject to licensing; EC regulations treat all species of orchids as if they were listed in Appendix I (category C1).

Taxon	Lux. Regulation 1989*	EC Habitats Directive annex	Bern Convention Appendix Appendix	CITES Appendix
<i>Aconitum lycoctonum</i> subsp. <i>vulparia</i>	A			
<i>Ajuga pyramidalis</i>	A			
<i>Allium rotundum</i>	A			
<i>Amelanchier ovalis</i>	A			
<i>Anacamptis pyramidalis</i>	A			II (C1)
<i>Anemone ranunculoides</i>	B1			
<i>Aquilegia vulgaris</i>	A			
<i>Aristolochia clematitis</i>	A			
<i>Arnica montana</i>	A			
<i>Asplenium fontanum</i>	A			
<i>Asplenium obovatum</i> subsp. <i>billotii</i>	A			
<i>Asplenium scolopendrium</i>	A			
<i>Asplenium viride</i>	A			
<i>Aster amellus</i>	A			
<i>Berberis vulgaris</i>	B1			
<i>Blackstonia perfoliata</i>	A			
<i>Blechnum spicant</i>	A			
<i>Botrychium lunaria</i>	A			
<i>Butomus umbellatus</i>	B1			
<i>Buxus sempervirens</i>	A			
<i>Calla palustris</i>	A			
<i>Cardamine bulbifera</i>	A			
<i>Centaurea montana</i>	B1			
<i>Centaureum erythraea</i>	A			
<i>Centaureum pulchellum</i>	A			
<i>Cephalanthera damasonium</i>	A			II (C1)
<i>Cephalanthera longifolia</i>	A			II (C1)
<i>Cephalanthera rubra</i>	A			II (C1)
<i>Ceratophyllum demersum</i>	A			
<i>Ceterach officinarum</i>	A			
<i>Circaea alpina</i>	A			
<i>Comarum palustre</i>	A			
<i>Convallaria majalis</i>	B1			
<i>Corydalis cava</i>	A			

Taxon	Lux. Regulation 1989*	EC Habitats Directive annex	Bern Convention Appendix	CITES Appendix
<i>Cotoneaster integerrimus</i>	A			
<i>Crepis praemorsa</i>	A			
<i>Cuscuta epithymum</i>	A			
<i>Cypripedium calceolus</i>	A	IIb, IVb	I	II (C1)
<i>Dactylorhiza majalis</i>	A			II (C1)
<i>Dactylorhiza fuchsii</i>	A			II (C1)
<i>Dactylorhiza incarnata</i>	A			II (C1)
<i>Dactylorhiza maculata</i>	A			II (C1)
<i>Dactylorhiza praetermissa</i>	A			II (C1)
<i>Daphne mezereum</i>	A			
<i>Dianthus armeria</i>	A			
<i>Dianthus carthusianorum</i>	A			
<i>Dianthus deltoides</i>	A			
<i>Dianthus gratianopolitanus</i>	A			
<i>Digitalis grandiflora</i>	A			
<i>Digitalis lutea</i>	A			
<i>Drosera rotundifolia</i>	A			
<i>Epipactis atrorubens</i>	A			II (C1)
<i>Epipactis helleborine</i>	A			II (C1)
<i>Epipactis leptochila</i>	A			II (C1)
<i>Epipactis microphylla</i>	A			II (C1)
<i>Epipactis muelleri</i>	A			II (C1)
<i>Epipactis palustris</i>	A			II (C1)
<i>Epipactis purpurata</i>	A			II (C1)
<i>Epipogium aphyllum</i>	A			II (C1)
<i>Equisetum hyemale</i>	A			
<i>Equisetum sylvaticum</i>	A			
<i>Equisetum telmateia</i>	A			
<i>Eriophorum angustifolium</i>	A			
<i>Eriophorum latifolium</i>	A			
<i>Eriophorum vaginatum</i>	A			
<i>Filipendula vulgaris</i>	A			
<i>Genista anglica</i>	A			
<i>Genista germanica</i>	A			
<i>Geranium sanguineum</i>	B1			
<i>Goodyera repens</i>	A			II (C1)
<i>Gymnadenia conopsea</i>	A			II (C1)
<i>Gymnadenia odoratissima</i>	A			II (C1)
<i>Helichrysum arenarium</i>	A			
<i>Helleborus foetidus</i>	A			
<i>Helleborus viridis</i> subsp. <i>occidentalis</i>	A			
<i>Himantoglossum hircinum</i>	A			II (C1)
<i>Hydrocotyle vulgaris</i>	A			
<i>Hymenophyllum tunbrigense</i>	A			
<i>Ilex aquifolium</i>	A			
<i>Iris pseudacorus</i>	B1			

Taxon	Lux. Regulation 1989*	EC Habitats Directive annex	Bern Convention Appendix	CITES Appendix
<i>Jasione montana</i>	B1			
<i>Juniperus communis</i>	A			
<i>Lactuca perennis</i>	A			
<i>Laserpitium latifolium</i>	A			
<i>Limodorum abortivum</i>	A			II (C1)
<i>Listera ovata</i>	A			II (C1)
<i>Lithospermum purpureocaeruleum</i>	A			
<i>Lunaria rediviva</i>	A			
<i>Lychnis viscaria</i>	A			
<i>Lycopodium annotinum</i>	A	Vb		
<i>Lycopodium clavatum</i>	A	Vb		
<i>Melampyrum arvense</i>	A			
<i>Melampyrum cristatum</i>	A			
<i>Mentha pulegium</i>	A			
<i>Menyanthes trifoliata</i>	A			
<i>Meum athamanticum</i>	A			
<i>Najas marina</i>	A			
<i>Narcissus pseudonarcissus</i>	A			
<i>Neotinea ustulata</i>	A			II (C1)
<i>Neottia nidus-avis</i>	A			II (C1)
<i>Nuphar lutea</i>	A			
<i>Nymphaea alba</i>	B1			
<i>Nymphoides peltata</i>	A			
<i>Oenanthe aquatica</i>	A			
<i>Oenanthe fistulosa</i>	A			
<i>Oenanthe peucedanifolia</i>	A			
<i>Ophioglossum vulgatum</i>	A			
<i>Ophrys apifera</i>	A			II (C1)
<i>Ophrys fuciflora</i>	A			II (C1)
<i>Ophrys insectifera</i>	A			II (C1)
<i>Ophrys sphegodes</i>	A			II (C1)
<i>Orchis anthropophora</i>	A			II (C1)
<i>Orchis coriophora</i>	A			II (C1)
<i>Orchis mascula</i>	A			II (C1)
<i>Orchis militaris</i>	A			II (C1)
<i>Orchis morio</i>	A			II (C1)
<i>Orchis purpurea</i>	A			II (C1)
<i>Orchis simia</i>	A			II (C1)
<i>Oreopteris limbosperma</i>	A			
<i>Ornithogalum pyrenaicum</i>	A			
<i>Osmunda regalis</i>	A			
<i>Parnassia palustris</i>	A			
<i>Pedicularis palustris</i>	A			
<i>Pedicularis sylvatica</i>	A			

Taxon	Lux. Regulation 1989*	EC Habitats Directive annex	Bern Convention Appendix	CITES Appendix
<i>Peucedanum carvifolia</i>	B1			
<i>Peucedanum cervaria</i>	A			
<i>Platanthera bifolia</i>	A			II (C1)
<i>Platanthera chlorantha</i>	A			II (C1)
<i>Polystichum aculeatum</i>	A			
<i>Polystichum lonchitis</i>	A			
<i>Potentilla rupestris</i>	A			
<i>Pulsatilla vulgaris</i>	A			
<i>Quercus pubescens</i>	A			
<i>Ranunculus aquatilis</i>	A			
<i>Ranunculus hederaceus</i>	A			
<i>Ranunculus platanifolius</i>	A			
<i>Rosa spinosissima</i>	A			
<i>Sagittaria sagittifolia</i>	B1			
<i>Salvia pratensis</i>	B1			
<i>Sanguisorba officinalis</i>	B1			
<i>Saxifraga rosacea</i> subsp. <i>sponhemica</i>	A			
<i>Scilla bifolia</i>	A			
<i>Scorzonera humilis</i>	B1			
<i>Sempervivum tectorum</i>	A			
<i>Senecio sarracenicus</i>	A			
<i>Serratula tinctoria</i>	A			
<i>Seseli annuum</i>	A			
<i>Seseli libanotis</i>	A			
<i>Silene armeria</i>	A			
<i>Stellaria palustris</i>	A			
<i>Tamus communis</i>	A			
<i>Thelypteris palustris</i>	A			
<i>Tragopogon pratensis</i> subsp. <i>orientalis</i>	B1			
<i>Trichomanes speciosum</i>		IIb, IVb	I	
<i>Trifolium alpestre</i>	A			
<i>Trifolium montanum</i>	A			
<i>Trifolium ochroleucon</i>	A			
<i>Trifolium rubens</i>	A			
<i>Trifolium striatum</i>	A			
<i>Triglochin palustre</i>	A			
<i>Typha angustifolia</i>	A			
<i>Utricularia australis</i>	A			
<i>Utricularia vulgaris</i>	A			
<i>Vaccinium oxycoccos</i>	A			
<i>Vallisneria spiralis</i>	A			
<i>Veronica teucrium</i>	A			
<i>Vicia lathyroides</i>	A			
<i>Vicia pisiiformis</i>	A			
<i>Vincetoxicum hirundinaria</i>	A			
<i>Viola mirabilis</i>	A			
<i>Viola palustris</i>	B1			

INSTRUCTIONS TO AUTHORS

Please check our internet site <http://www.mnhn.lu> for the latest version of these instructions!

Scope

FERRANTIA is a series of monographic works (20-250 pages in final layout) dealing with life and earth sciences, preferably related in some way or other to the Grand-Duchy of Luxembourg.

It publishes original results of botanical, zoological, ecological, geological, mineralogical, paleontological, geophysical and astrophysical research and related fields.

A complete issue of FERRANTIA may be devoted to several papers on a single topic as the responsibility of an invited editor.

Copyright

The submission of a manuscript to FERRANTIA implies that the paper must not have been accepted for publication or be under consideration elsewhere.

Copyright of a published paper, including illustrations, becomes the property of the publisher. Requests to reproduce material from FERRANTIA should be addressed to the editor.

Reviewing

Articles submitted for publication are reviewed by the editorial board and by one or two referees. The final decision on acceptance or rejection of the manuscript is taken by the editorial board. Manuscripts not prepared according to the following instructions to authors will be returned for correction prior to review.

Nomenclature

Papers with a systematic content should strictly follow the International Codes of Nomenclature.

Specimens

We recommend that the authors should deposit at least a part of the type material in the MNHN collections.

Publication dates

FERRANTIA pays special attention to publication dates, which are always specified to the day of publication.

Manuscripts

Manuscripts, without limitation of the number of pages, must conform strictly to the instructions to authors, and should be sent to the Editor:

FERRANTIA

Travaux scientifiques du Musée national d'histoire naturelle de Luxembourg

25, rue Munster

L-2160 Luxembourg

Format

Manuscripts must be submitted as paper copy in triplicate in A4 format, preferably double-spaced, with margins of at least 3 cm and all pages numbered.

If possible, an electronic version of the text may also be sent as unformatted Word document (PC or MAC) (font Times New Roman, 10 pt). Tables (Word, Excel) and figures (300 dpi in the page size of the journal) may also be sent electronically.

Structure

Papers are to be written in simple, correct and concise French, German or English. They should be organized as follows:

- a brief title (should not include the name of new taxa);
- a suggested running head (no more than 50 characters);
- name(s) and first name(s) of author(s), followed by their full address(es) and, if possible, e-mail or fax number;
- abstracts in English, French and German, each 200-800 words long; new taxa names should be included in the abstract; the abstract should be precise and descriptive, in order to be reproduced as such in data bases; avoid vague sentences such as "three new species are described" or "species are compared to species already known"; include precise differential characters;
- text of the article, in the following order: Introduction, Abbreviations used, Material and methods, Results and/or Observations, Discussion, Acknowledgements, References. The arrangement of the parts "Results/Observations" and "Discussion" may be modulated according to the length and subject of the article; very long papers may include a table of contents;
- for systematic descriptions, each description should follow the order: name of taxon with author and date, synonymy, type material, etymology, material examined, distribution, diagnosis and/or description, remarks.
- description of geological features should include type level, type horizon, type locality. This order may be

adapted according to the concerned groups: consult a recent issue of FERRANTIA;

- taxon names must be stated with author (and publication date, separated by a comma, where appropriate) at least once at the first mention. At subsequent mentions of the same taxon, or other taxa of the same genus, the genus name may be abbreviated (*Rosa canina* L. to *R. canina*).
- use n. sp., n. gen., n. fam., etc. for new taxa;
- use italicized words only for taxa of generic and sub-generic ranks;
- use lowercase characters for authority names
- references to illustrations and tables should be indicated as follows: (Fig. 1), (Fig. a, d), (Fig. 2a-d), (Figs 3; 6), (Figs 3-5; Tab. 2); (Tab. 1); for German texts use Abb. instead of Fig.
- footnotes should not be used.

Tables and figures

Copies of all figures and tables should be included with the manuscript. They can be either included in the text at the correct locations with their legends or referenced in the text and included as annexes.

The editorial board will pay special attention to the quality and relevance of illustrations. Colored illustrations are accepted where appropriate and necessary.

Line drawings must be in Indian ink or high quality laser printouts; high contrast Photographs are required,

Illustrations can be grouped into composite plates the elements of which are identified by letters (a, b, c...). Plates are not placed at the end of the article: they will be considered as figures and numbered as such. Arrange figures to fit in one (70 x 200 mm) or two columns (144 x 200 mm) or one half page (144 x 100 mm). Letters, numbers, etc., for each figure, are to be indicated on an accompanying overlay, not on the original figure. They will be inserted by the printer. A scale bar is required for each figure, when appropriate. No diagram or table is to exceed one page; longer tables should be divided.

References

In main text, references to authors, in lower case, should be presented without comma before year, as follows: Smith (2001), Smith (2001, 2002), (Smith 2001), (Smith 2001; Jones 2002), (Smith & Jones 2003, 2005), (Smith, Jones & Johnson 2003), Smith (2001: 1; 2003: 5), Smith (2001: fig. 2).

References should be presented as follows, in alphabetical order. Do not abbreviate journal names:

Høeg J. T. & Lützen J. 1985. - Comparative morphology and phylogeny of the family Thompsoniidae (Cirripedia: Rhizocephala: Akentrogonida) with description of three new genera and seven new species. *Zoologica Scripta* 22: 363-386.

Marshall C. R. 1987. - Lungfish: phylogeny and parsimony, in Bernis W. E., Burggren W. W. & Kemp N. E. (eds), *The Biology and Evolution of Lungfishes*, *Journal of Morphology* 1: 151-152.

Röckel D., Korn W. & Kohn A. J. 1995. - *Manual of the Living Conidae. Volume 1: Indo-Pacific Region*. Christa Hemmen, Wiesbaden, 517 p.

Schwaner T. D. 1985. - Population structure of black tiger snakes, *Notechis ater niger*, on off-shore islands of South Australia: 35-46, in Grigg G., Shine R. & Ehmann H. (eds), *Biology of Australasian Frogs and Reptiles*. Surrey Beatty and Sons, Sydney.

Proofs and reprints

Proofs will be sent to the author (or the first author) for correction and must be returned within two weeks by priority air mail. Authors will receive twenty-five reprints free of charge; further reprints can be ordered at a charge indicated on a form supplied with the proofs.

Page layout of final publication

paper size	170 x 240 mm
page size	144 x 200 mm
number of columns	2
column width	70 mm
space between columns	4 mm
top margin	22 mm
bottom margin	18 mm
inside margin	15 mm
outside margin	11 mm

Fonts

Body text: Palatino linotype (serif), 9pt

Titles, legends, headers, footers: Trebuchet (sans-serif)

LISTE DES NUMÉROS PARUS À CETTE DATE:

Les volumes de la série «FERRANTIA» paraissent à intervalles non réguliers.

Travaux scientifiques du Musée national d'histoire naturelle (1981-1999)

- I Atlas provisoire des Insectes du Grand-Duché de Luxembourg. Lepidoptera. 1^{ère} partie (Rhopalocera, Hesperidae). Marc Meyer et Alphonse Pélles, 1981.
- II Nouvelles études paléontologiques et biostratigraphiques sur les Ammonites du Grand-Duché de Luxembourg, de la Province du Luxembourg et de la région Lorraine attenante. Pierre L. Maubeuge, 1984.
- III Revision of the recent Western Europe species of genus *Potamocypris* (Crustacea, Ostracoda). Part 1: Species with short swimming setae on the second antennae. Claude Meisch, 1984.
- IV Hétéroptères du Grand-Duché de Luxembourg
1. *Psallus* (*Hylopsallus*) *pseudoplatani* n. sp. (Miridae, Phyllinae) et espèces apparentées. Léopold Reichling, 1984.
2. Quelques espèces peu connues, rares ou inattendues. Léopold Reichling, 1985.
- V La bryoflore du Grand-Duché de Luxembourg: taxons nouveaux, rares ou méconnus. Ph. De Zuttere, J. Werner et R. Schumacker, 1985.
- VI Revision of the recent Western Europe species of genus *Potamocypris* (Crustacea, Ostracoda). Part 2: Species with long swimming setae on the second antennae. Claude Meisch, 1985.
- VII Les Bryozoaires du Grand-Duché de Luxembourg et des régions limitrophes. Gaby Geimer et Jos. Massard, 1986.
- VIII Répartition et écologie des macrolichens épiphytiques dans le Grand-Duché de Luxembourg. Elisabeth Wagner-Schaber, 1987.
- IX La limite nord-orientale de l'aire de *Conopodium majus* (Gouan) Loret en Europe occidentale. Régine Fabri, 1987.
- X Epifaune et endofaune de *Liogryphaea arcuata* (Lamarck). Contribution à l'écologie des populations de *Liogryphaea arcuata* (Lamarck) dans le Sinémurien au NE du Bassin de Paris. Armand Hary, 1987.
- XI Liste rouge des Bryophytes du Grand-Duché de Luxembourg. Jean Werner, 1987.
- XII Relic stratified scress occurrences in the Oesling (Grand-Duchy of Luxembourg), approximate age and some fabric properties. Peter A. Riezebos, 1987.
- XIII Die Gastropodenfauna der «angulata-Zone» des Steinbruchs «Reckingerwald» bei Brouch. Hellmut Meier et Kurt Meiers, 1988.
- XIV Les lichens épiphytiques et leurs champignons lichénicoles (macrolichens exceptés) du Luxembourg. Paul Diederich, 1989.
- XV Liste annotée des Ostracodes actuels non-marins trouvés en France (Crustacea, Ostracoda). Claude Meisch, Karel Wouters et Koen Martens, 1989.
- XVI Atlas des lichens épiphytiques et de leurs champignons lichénicoles (macrolichens exceptés) du Luxembourg. Paul Diederich, 1990.
- XVII Beitrag zur Faunistik und Ökologie der Schmetterlinge im ehemaligen Erzabbaugebiet "Haardt" bei Düldeingen. Jos. Cungs, 1991.
- XVIII Moosflora und -Vegetation der Mesobrometen über Steinmergelkeuper im Luxemburger und im Bitburger Gutland. Jean Werner, 1992.
- 19 Ostracoda. Nico W. Broodbakker, Koen Martens, Claude Meisch, Trajan K. Petkovski and Karel Wouters, 1993.
- 20 Les haies au Grand-Duché de Luxembourg. Konjev Desender, Didier Drugmand, Marc Moes, Claudio Walzberg, 1993.
- 21 Ecology and Vegetation of Mt Trikora, New Guinea (Irian Jaya / Indonesia). Jean-Marie Mangen, 1993.
- 22 A checklist of the recent non-marine ostracods (Crustacea, Ostracoda) from the inland waters of South America and adjacent islands. Koen Martens & Francis Behen, 1993.
- 23 Ostracoda. Claude Meisch, Roland Fuhrmann, Karel Wouters, Gabriele Beyer and Trajan Petrovski, 1996.
- 24 Die Moosflora des Luxemburger Oeslings. Jean Werner, 1996.
- 25 Atlas des ptéridophytes des régions lorraines et vosgiennes, avec les territoires adjacents, Georges Henri Parent, 1997.
- 26 Evaluation de la qualité des cours d'eau au Luxembourg en tant qu'habitat pour la loutre. Groupe Loutre Luxembourg, 1997.
- 27 Notes Paléontologiques et Biostratigraphiques sur le Grand Duché de Luxembourg et les régions voisines. Pierre Louis Maubeuge & Dominique Delsate, 1997.
- 28 Die Moosflora der Kleinen Luxemburger Schweiz (Müllertal). Florian Hans, 1998.

- 29 Etude sur les genres *Globorilusopsis* Maubeuge, 1994 et *Simoniceras* n. gen. du Lias Supérieur du Grand-Duché de Luxembourg (Calyptotomati-da). Pierre Louis Maubeuge, 1998.
- 30 L'Ichthyofaune du Toarcien luxembourgeois. Cadre général et catalogue statistique. Dominique Delsate, 1999.
- 31 Proceedings of the 3rd European Batdetector Workshop. 16-20 August 1996 Larochette (Lux.). Christine Harbusch & Jacques Pir (eds.), 1999.
- 32 Les collections paléontologiques du Musée national d'histoire naturelle de Luxembourg. Fossiles du Trias et du Jurassique. Dominique Delsate, Chris Duffin & Robi Weis, 1999.
- 33 Die Fledermäuse Luxemburgs (Mammalia : Chiroptera). Christine Harbusch, Edmée Engel, Jacques Pir, 2002.
- 34 The Protura of Luxembourg. Andrzej Szeptycki, Norbert Stomp, Wanda M. Weiner, 2003.
- 35 Liste rouge des bryophytes du Luxembourg. Jean Werner, 2003.
- 36 Paléontologie au Luxembourg. Simone Guérin-Franiatte (éd.), 2003.
- 37 Verbreitungsatlas der Amphibien des Großherzogtums Luxemburg. Roland Proess (éd.), 2003.
- 38 Trois études sur la Zone Rouge de Verdun. I. Herpétofaune. II. La diversité floristique. III. Les sites d'intérêt botanique et zoologique. Georges H. Parent, 2004.
- 39 Verbreitungsatlas der Heuschrecken des Großherzogtums Luxemburg. Roland Proess, 2004.
- 40 Les macrolichens de Belgique, du Luxembourg et du nord de la France - Clés de détermination. E. Sérusiaux, P. Diederich & J. Lambinon, 2004.
- 41 Die Fauna der Quellen und des hyporheischen Interstitials in Luxemburg unter besonderer Berücksichtigung der Milben (Acari), Muschelkrebse (Ostracoda) und Ruderfusskrebse (Copepoda). Reinhard Gerecke, Fabio Stoch, Claude Meisch, Isabel Schrankel, 2005.
- 42 Red List of the Vascular Plants of Luxembourg. Guy Colling, 2005

FERRANTIA (2002-)

Envoyez votre commande aux adresses indiquées
à la page 2 de la couverture.
