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„Recent changes in high mountain vegetation differ among plant communities“

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Alexander Gritsch, BSc

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Betreut von:	Univ.-Prof. Mag. Dr. Stefan Dullinger

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Introduction

Since 1880 the global average temperature has increased by 0.85°C (Austrian Panel on Climate Change (APCC) 2014). The magnitude of warming did, however, vary across space with temperate mountain ranges like the European Alps being particularly affected (*c.* +2°C, APCC (2014)). Due to this more pronounced temperature increase and the 'nowhere-to-go' situation mountain biodiversity is considered to be particularly vulnerable to climate change (Nogués-Bravo et al. 2007; Loarie et al. 2009). Indeed, evidence for surprisingly rapid changes to plant species distributions and plant community composition have been reported from high mountain areas during the recent decades (e.g. Grabherr et al. 1994; Walther et al. 2005; Pauli et al. 2007, 2012; Holzinger et al. 2008; Parolo & Rossi 2008; Vittoz et al. 2009; Odland et al. 2010; Gottfried et al. 2012; Kopp & Cleland 2014) and grim projections on the possible future of European alpine plant diversity under predicted 21st century climatic trends have been published (Thuiller et al. 2005; Engler et al. 2011; Dullinger et al. 2012).

Recent range dynamics of mountain plants and their interpretation are, however, less unambiguous than it might seem at first glance. First, not all species have shifted their ranges upward, as one would expect under warming, but many species did not change their distribution and a sizable minority has even moved in the opposite direction. Some of these downward shifts are likely driven by changes to precipitation rather than temperature (Crimmins et al. 2011), but many others are not readily explainable by climatic alterations (Lenoir et al. 2010). Second, attempts to correlate observed upward shifts to measured temperature trends have also delivered equivocal results (Gottfried et al. 2012; Grytnes et al. 2014) and alternative drivers of mountain plant species movement have hence been discussed (Kammer et al. 2007). Third, projections of severe loss of alpine plant species have been challenged by demonstrating the extremely pronounced microclimatic variation in alpine terrain: this variability suggests that species might easily find safe sites nearby in addition to moving upwards by several hundred altitudinal meters when climate warms (Scherrer & Körner 2011). Finally, the majority of studies reporting changes to alpine plant distributions have concentrated on a very peculiar topographical position in the alpine landscape, namely on summits, by either repeating historical mountain top surveys (e.g. Grabherr et al. 1994; Grytnes et al. 2014) or by using recently established monitoring sites (Gottfried et al. 2012; Grytnes et al. 2014). Uppermost peaks often represent exposed, wind-swept sites, however, with less than average snow depth in winter, earlier melt-out in spring and a relatively scarce vegetation cover. Summit vegetation should hence be exposed to low temperature stress more pronouncedly than many other habitats in alpine terrain and its amelioration by a warming climate thus particularly effective. Moreover, the low vegetation cover could decrease biotic resistance against colonization by new species (Olsen & Klanderud 2014). As a corollary, dynamics of summit floras are not necessarily representative for changes at other sites of the alpine landscape, or for recent trends of the “average” alpine vegetation.

In this paper we shift the focus from mountain tops to this “average” alpine vegetation by revisiting sampling plots from typical calcareous alpine grassland and snowbed sites which, together, predominate in the alpine belt of the Calcareous Alps (Ellenberg 2009). We analysed these re-samples on changes in α-, β- and γ-diversity as well as on indicator values for temperature and on the average height of the component species. We ask whether trends in these community attributes have changed within the approximately 20 years between original and resurvey and if so, whether these trends were consistent among communities.

Methods

Study area

The study area covers the upper subalpine and alpine belts of four neighboring mountain ranges of the Northeastern Austrian Alps (Mt. Hochschwab, Mt. Schneealpe, Mt. Rax and Mt. Schneeberg, 15° E to 16° E and 47°30' N to 47°50' N, approximately 150 km²). The whole mountain system is formed by Mesozoic limestone and dolomites. Summit heights vary between 1900 and 2300 m asl.. Climatic conditions are temperate humid. The vegetation is characterized by a mosaic of prostrate pine (*Pinus mugo* Turra) shrubland and different grassland types at the treeline. Above the treeline, grasslands dominated by either *Carex firma* Host or by *Carex sempervirens* Vill. and *Sesleria albicans* Kit. ex Schult. prevail, together with rock and scree substrates sparsely covered by herbaceous plant communities.

In the region (weather station Reichenau/Rax; www.zamg.ac.at/histalp) mean annual temperature (1985- 2013) increased by 0,3°C compared to the period 1961-1990, summer temperature (June to August) increased by the same amount, winter (December to February) temperature by 0.2°C(cf. Fig. 1), Focusing on shorter intervals, the years preceding our re-sample (2000-2013) had an annual mean temperature exceeding the mean of 1985-1999 by 0.8°C.

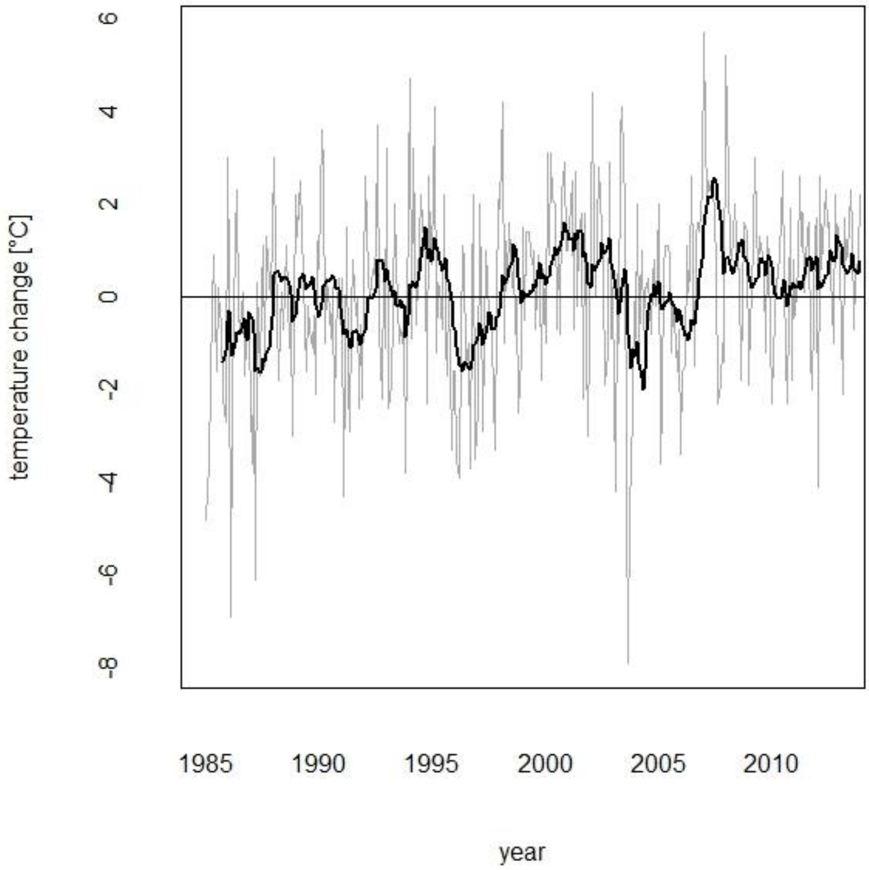

Figure 1: Deviation between the monthly mean temperature from 1985 to 2013 and the monthly mean temperature of the period 1961-1990 (grayish line) recorded in the weather station Reichenau/Rax. The black line represents the moving average over a period of 10 years. (data: www.zamg.ac.at).

Annual precipitation sums increased by 23% from 811mm (period 1961-1990) to 995mm (1995-2013), trends were similar for the summer (19mm, 18%) and winter (9mm, 19%) months. In the period 2000-2013 annual precipitation sums increased by 10% (105mm) compared to the period 1985-1999 (cf. Figure 2).

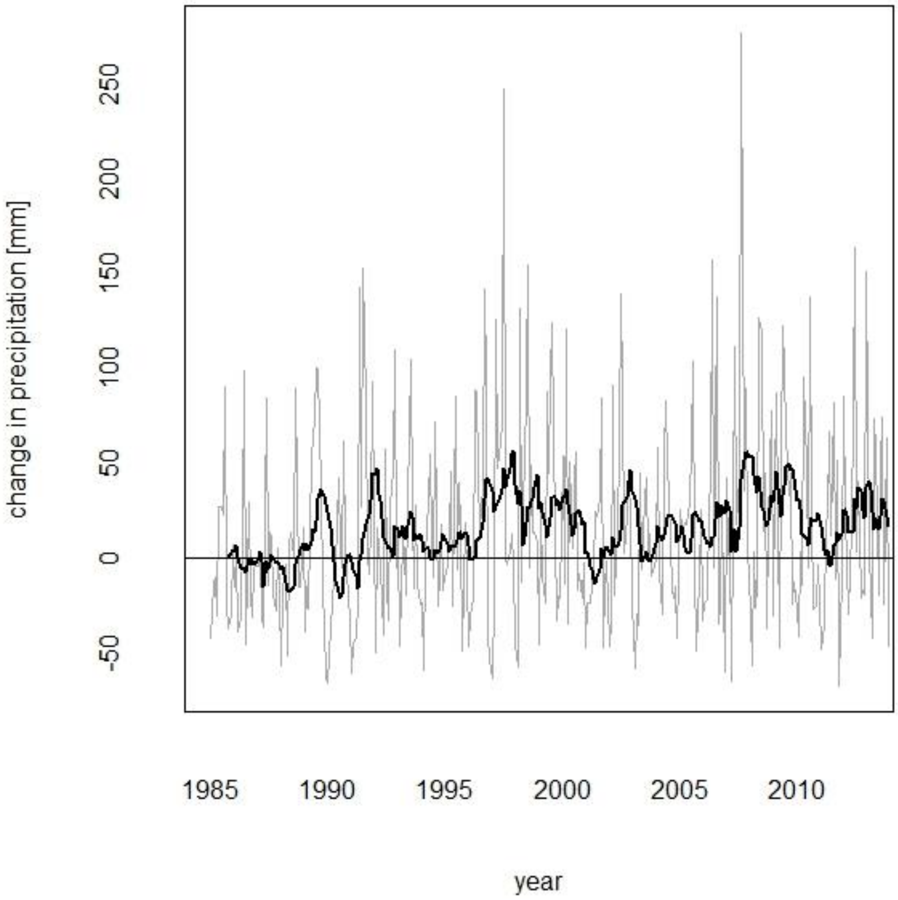

Figure 2: Monthly sums of precipitation recorded at the weather station Reichenau/Rax, illustrated as deviation from the mean monthly sums of the period 1961 to 1990 (grayish line) and the moving average over a period of 10 years (black line). (data: www.zamg.ac.at/histalp)

Original sampling

During the second half of the 1990ies, the vegetation of the study area had been mapped (Dirnböck et al. 1999; Dirnböck & Greimler 1999; Dullinger et al. 2001). Mapping was based on a classification of the regional vegetation types derived from their species composition (cf. Grabherr & Mucina 1993). For defining the respective mapping units a set of vegetation samples was collected in the years 1995 – 1999 following standard syntaxonomical techniques (Braun-Blanquet 1964): sample location was determined subjectively regarding homogeneity of the vegetation structure and species composition and representation of all habitats in the area. Sample size was variable, but mostly ~25 m² for grasslands, rock, scree and snowbeds. Within the plots, all plant species present were recorded and abundance was estimated using an ordinal scale according to Braun-Blanquet (1964). The position of all relevés was either marked on an Infrared (IR) or Black and White (BW) orthophoto (scale 1:5000 – 1.10000) or registered by a GPS (GARMIN E-TREX[c], mean Root Mean Square Error: 7.5 m). Subsequently, all relevés were syntaxonomically classified according to Mucina & Grabherr (1993 a), Grabherr & Mucina (1993)and Mucina & Grabherr (1993 b) and stored in a database as well as in a GIS point file.

Re-sampling strategy

We focused resampling on the two predominant grassland types of the area, i.e. grasslands of *Carex firma* Horst (*Caricetum firmae* Rübel 1911, henceforth: CF) and *Carex sempervirens* Vill. (*Seslerio-Caricetum sempervirentis* Br.-Bl. in Br.-Bl. et Jenny 1926, CS), and the most widespread snowbed community (*Campanulo pullae-Achilleetum clusianae* Englisch 1993, CA). CF and CS are important types of calcareous alpine grasslands throughout the European Alps with CF covering wind-swept ridges and plateaus as well as steep north facing slopes, while CS is commonly found on south-facing slopes which are protected by snow in winter but are warm and sunny during the vegetation period, with occasional drought stress in late summer (Dirnböck et al. 1999). By contrast, CA is restricted to the northeastern Calcareous Alps of Austria (because the dominant species, *Campanula pulla* L. and *Achillea clusiana* Tausch are regional endemics) and is a typical element of calcareous scree covered by snow until early summer (~ end of June). From these communities we randomly selected 60 (for CF and CS) and 40 (for CA) original relevés from the database. During summer 2013, we tried to resample all the selected relevés, but accessibility and time constraints limited the actual number of resamples to 41, 28 and 22 for CF, CS and CA, respectively

Defining the location of re-sampling plots was a two-step process. First, the approximate position was determined based on the geographical coordinates associated with the relevé. Second, the exact position was defined such that, as in the original sample, a homogeneous area of the same vegetation type was selected as close to the coordinate location as possible. We are aware that the restriction of re-sampling to homogeneous areas of the original vegetation type is a conservative approach in the sense that more profound changes to community structure, and in particular to the dominance of the prevalent species, must go undetected. However, as the time between sampling and re-sampling was relatively short, we considered such more profound changes unlikely and, indeed, we found the respective vegetation types close to all coordinates. Moreover, we were particularly interested in changes within these communities.

The selected plot area had the same same size as the original relevé and was recorded using the same methods (Braun-Blanquet 1964). The coordinates of the re-sampling plots were stored in a GIS and a photograph of the plot was taken in addition.

Analysis

Original samples and re-samples were compared with respect to their α-, β- and γ- diversity, their mean indicator values of temperature, moisture, pH, and nutrient supply, as well as on one important functional trait, namely the mean height of the constituent species.

We defined α-diversity as species richness, i.e. as the number of vascular plants within each plot and compared original and re-samples by means of paired t-tests or Kruskal-Wallis rank-sum tests, if requirements of homogenous variances and normality were not met. β-diversity was calculated by means of a pairwise compositional dissimilarity index, actually a complement of the Simpson index:

$$\Delta c_{jk} = 1 - \frac{a_{jk}}{a_{jk} + \min(b_j, c_k)}, \quad (1)$$

with a_{jk} the number of species shared by plot *j* and *k*, b_j the number of species unique in plot *j*, and c_k the number of species unique in plot *k*. We calculated this index for each possible pair of relevés from one community (CF, CS, CA) for either the original or the re-sampled plots and subsequently averaged the values for each relevé, i.e. the β-diversity of relevé *j* was defined as its mean compositional dissimilarity with all other relevés of the same community in the original or re-sampled relevé-pool, respectively. Finally, original and re-samples were compared with respect to β-diversity by t-tests or Kruskal-Wallis tests again. Besides we used the function beta.temp (R package betapart) to examine whether the changes between the years were driven by species turnover or nestedness.

γ-diversity was actually defined as the habitat-specific realized species pool which was calculated by accumulation curves for each community and sampling campaign. Subsequently, estimated true overall species richness and its .95 confidence intervals were calculated based on a bootstrapping approach (Oksanen 2011).

Indicator values for each relevé were calculated as unweighted means of species-specific Landolt indicator values derived from the Flora Vegetativa (Landolt 2010). Moreover, we assigned each species a mean height value based on traits data in (Fischer et al. 2008) and calculated the mean height of all the species within a relevé. As mean height of species normally decreases with temperature along the elevation gradient, we assumed that under a warming climate this value should have increased. Indicator and height values of original and re-sampled datasets were finally compared by t-tests and Kruskal-Wallis tests, as in the case of α- and β-diversity.

Results

Alpha Diversity

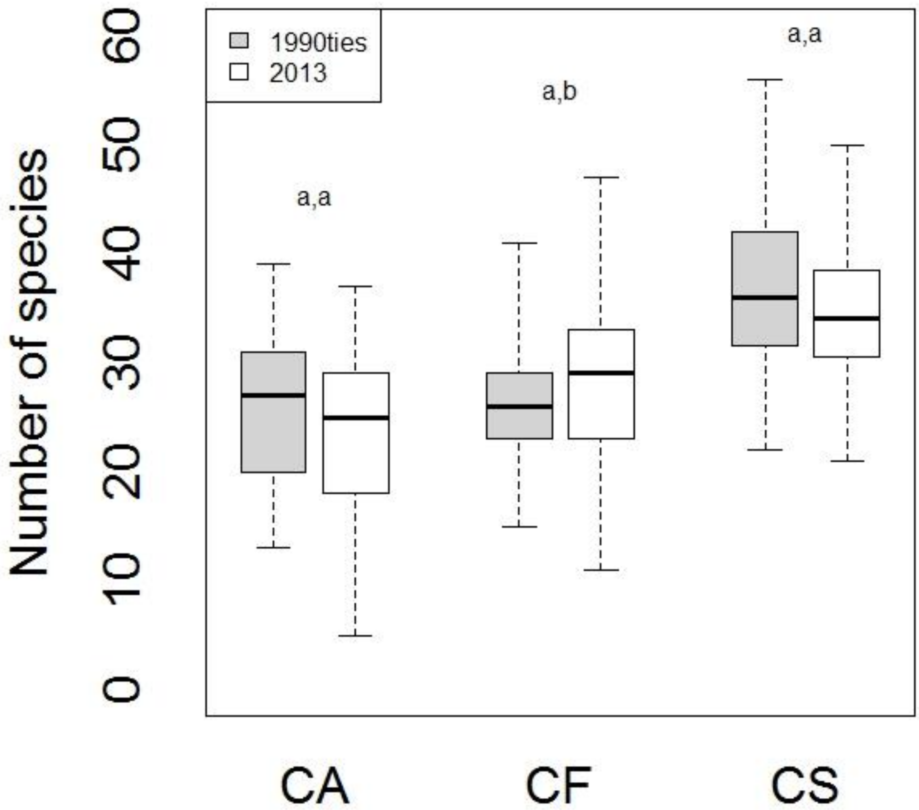

Figure 3: Comparison of the mean number of species between the original plots collected in the late 1990ies (grey boxes) and re- samples from 2013 (white boxes) of the target communities; CA – *Campanulo pullae-Achilleetum clusianae,* CF – *Caricetum firmae,* CS – *Seslerio-Caricetum sempervirentis*.

Changes in α- diversity between the 1990ties and 2013 differed among communities (Figure 3): the mean number of species of CA (X^2= 0.72, p=0.39) and CS (X^2= 1.72, p=0.13) decreased, but the trends were not statistically significant. By contrast, average species richness of CF samples increased significantly (t=-2.4, p=0.01) from 26 (1990) to 29 (2013).

Beta Diversity

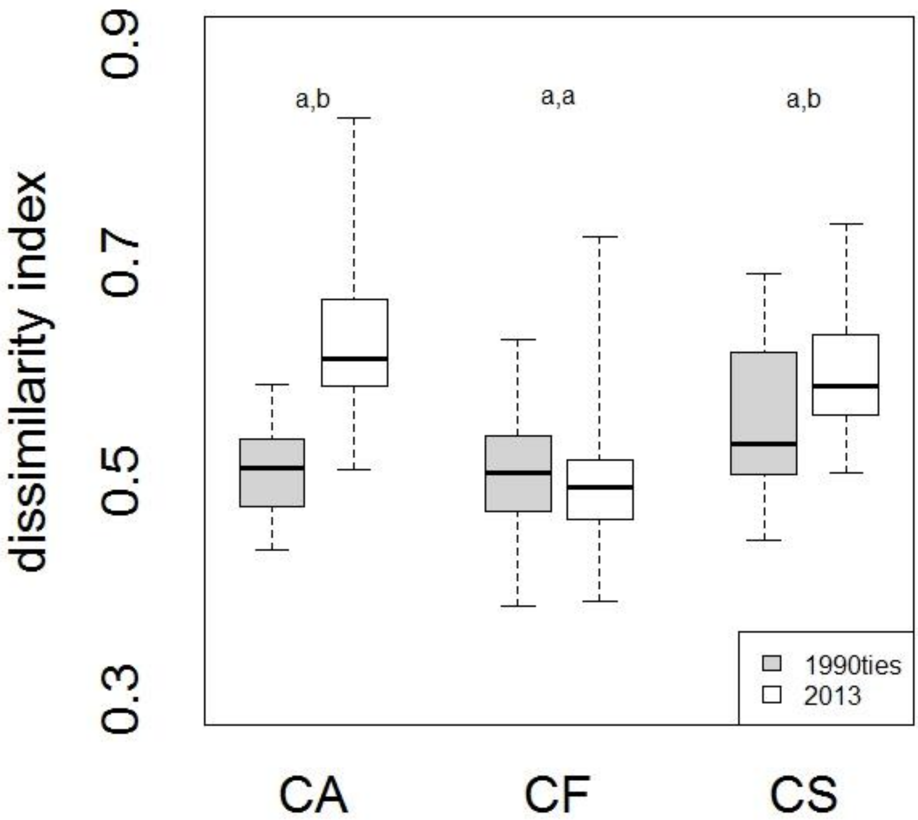

Figure 4: Comparison of the means of the pairwise compositional dissimilarity index between the original plots (grey boxes) and the re- sampling plots (white boxes) of the target communities (CA – *Campanulo pullae-Achilleetum clusianae,* CF – *Caricetum firmae,* CS – *Seslerio-Caricetum sempervirentis*).

For CA (from 0.51 in1990 to 0.61 in 2013, t=-7.18, p<0.01) and CS (0.53 to 0.60, X^2=6.79, p<0.01) mean dissimilarity in species composition increased significantly while there was no trend detectable for CF (Figures 4: X^2=0.59, p=0.44). Disentangling the turnover and nestedness components indicated that changes in species composition between sampling campaigns were nearly exclusively driven by turnover (Table 1).

Table 1: Sorenson-, Simpson dissimilarity index and the nestedness of *Campanulo pullae-Achilleetum clusianae* (CA), *Caricetum firmae* (CF) and *Seslerio-Caricetum sempervirentis* (CS).

	CA	CF	CS
Sorenson	0.59	0.47	0.52
Simpson	0.55	0.41	0.45
Nestedness	0.04	0.06	0.03

Gamma Diversity

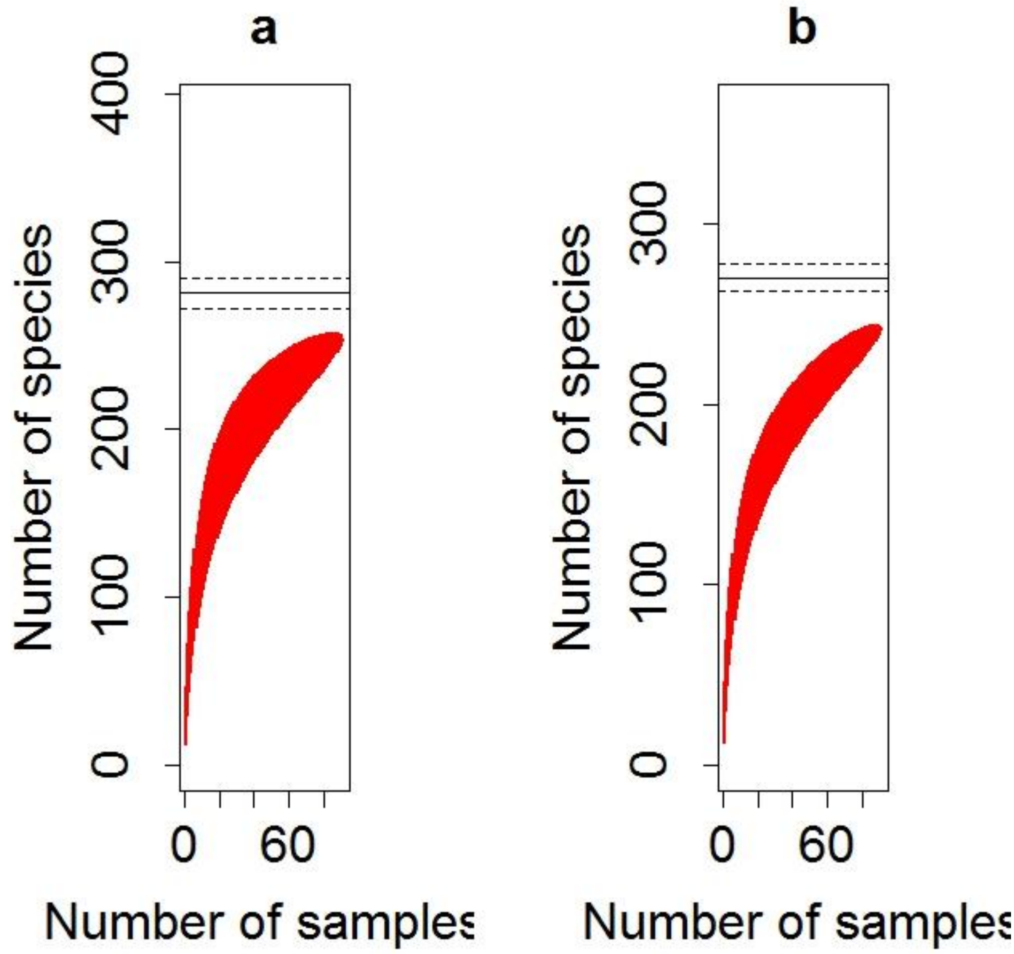

Figure 5: Accumulation curves and estimated total number of species across the whole dataset, grouped by the sampling year: (a) original sites of the late 1990ies, (b) re- sampling sites 2013. The total number of species was assessed by the bootstrap estimator.

The number of species recorded across all vegetation types was slightly lower in 2013 (242 sp.) than in 1990 (254 sp.) (Figure 5). True realized species pools were estimated as 281±9 for 1990 270±8 for 2013 respectively and were hence not significantly different.

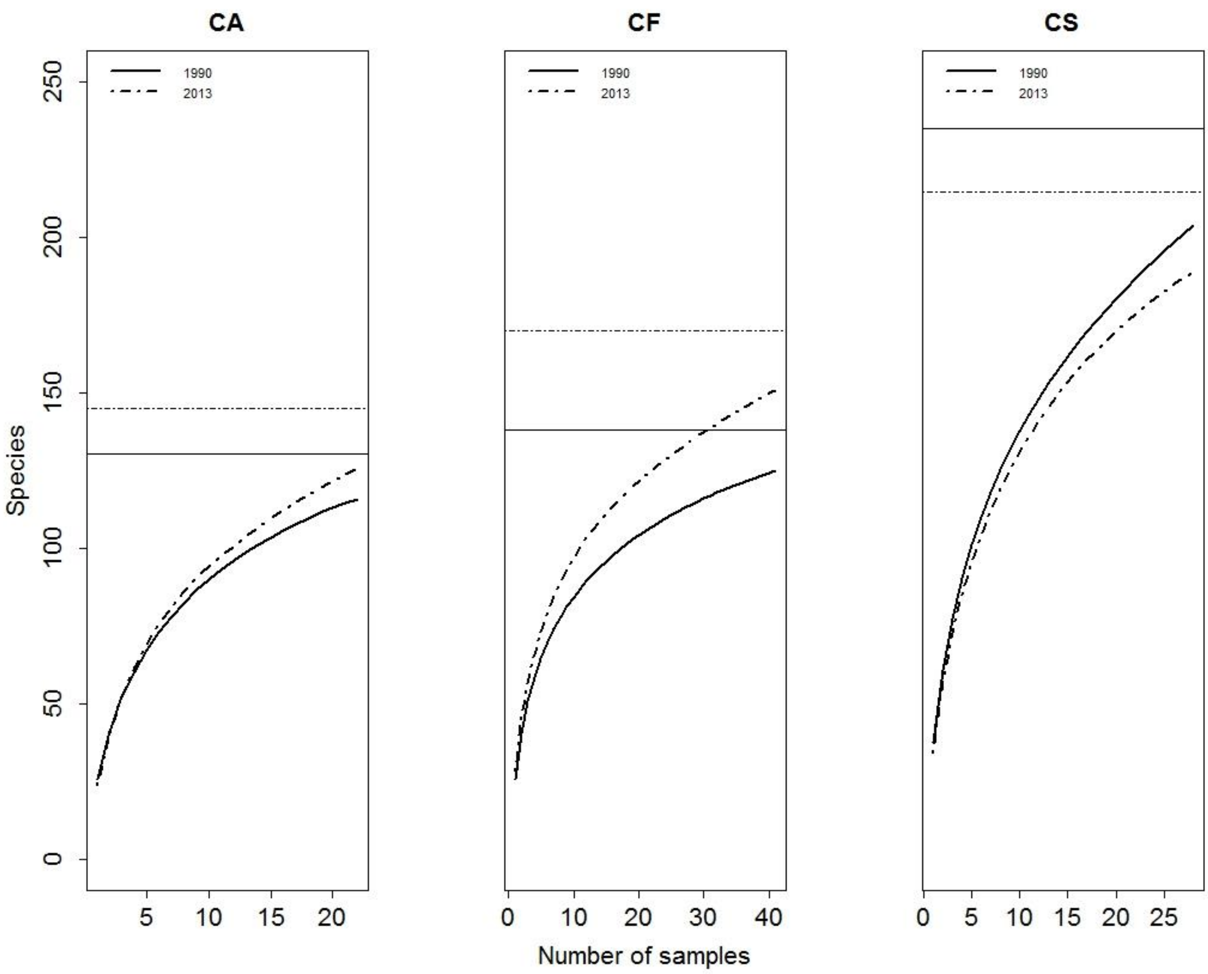

Figure 6: Accumulation curves and estimated total number of species, in the studied plant communities: CA – *Campanulo pullae-Achilleetum clusianae,* CF – *Caricetum firmae,* CS – *Seslerio-Caricetum sempervirentis.* The total number of species was assessed by the bootstrap estimator.

Recorded species numbers were lowest in *snowbeds* (116 (1990) vs. 126 (2013)) followed by *Caricetum firmae* (125 in 1990 and 151 in 2013) and *Seslerio-Caricetum sempervirentis* (204 (1990) and 189 (2013)). For the respective realized species pool estimates were 131±5 (1990) and 145±6 (2013) for snowbeds, 138±5 (1990) and 170±8 (2013) for *Caricetum firmae* and 235±10 (1990) and 214±8 (2013) for *Seslerio-Caricetum sempervirentis* (Figure 6). For all three communities realized species pools hence differed significantly among years with an increase in case of CA and CF, and a decrease in case of CS.

Indicator values

Temperature

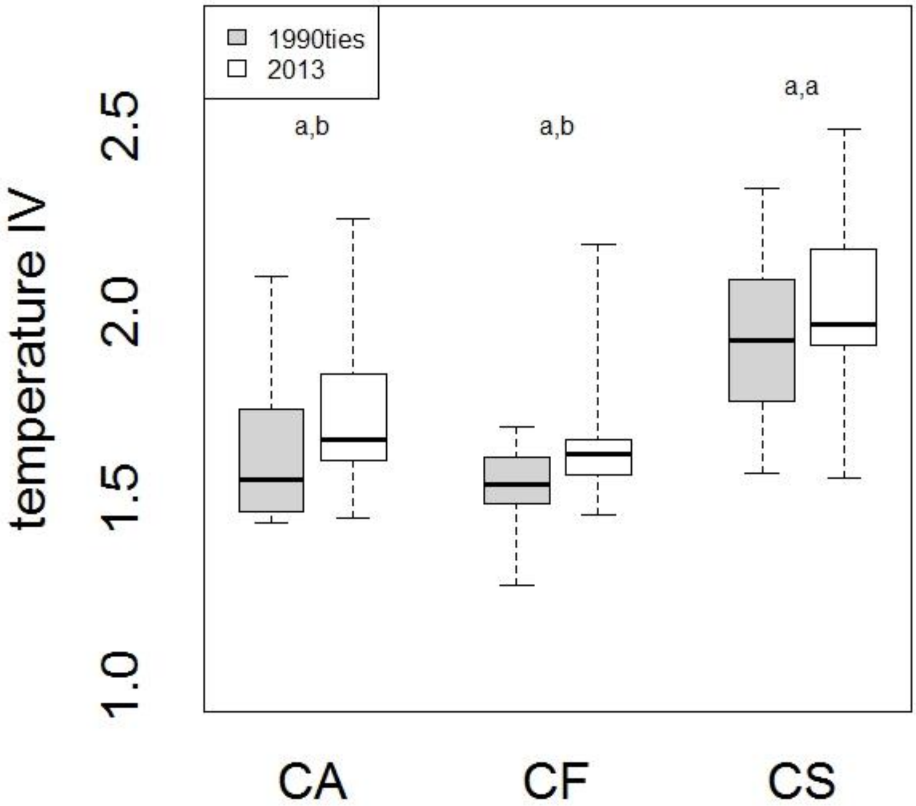

Figure 7: Averaged temperature indicator values of the species assembled in the original (grey boxes) and re-sampled (white boxes) plots of the three target community types. CA – *Campanulo pullae-Achilleetum clusianae,* CF – *Caricetum firmae,* CS – *Seslerio-Caricetum sempervirentis*.

Moisture

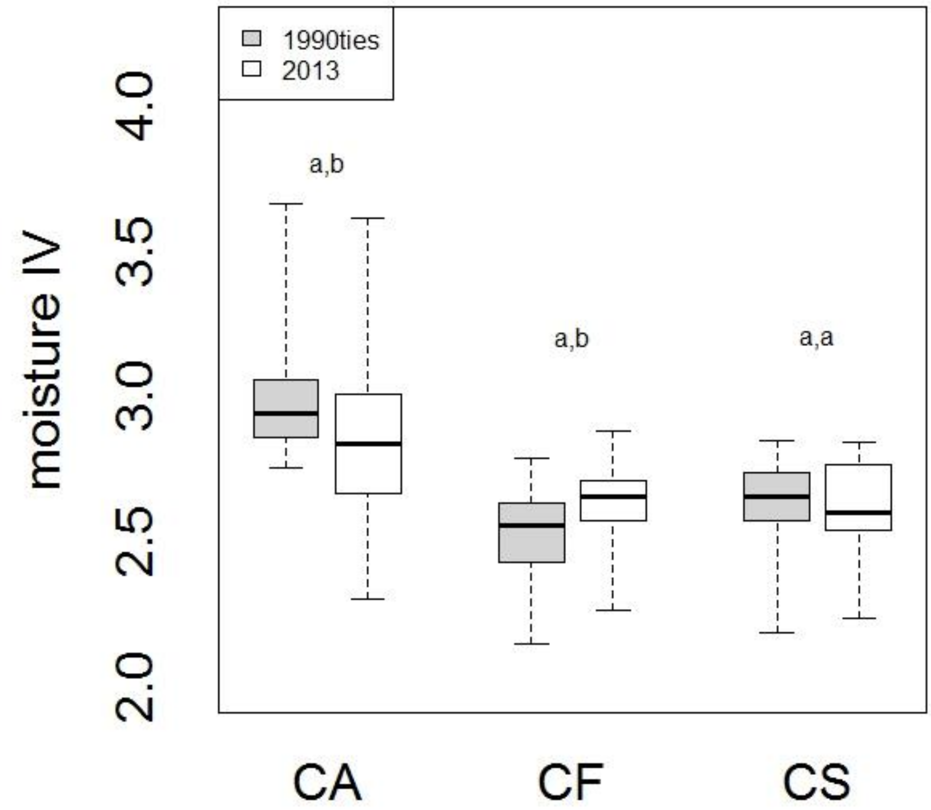

Figure 8: Averaged moisture indicator values of the species assembled in the original (grey boxes) and re-sampled (white boxes) plots of the three target community types. CA – *Campanulo pullae-Achilleetum clusianae,* CF – *Caricetum firmae,* CS – *Seslerio-Caricetum sempervirentis*.

With respect to indicator values, we found consistent trends only for temperature: T- values increased for all three communities between the mid 1990ies and 2013 (Figure 7) even if that increase was only significant for CA (X^2=4.57, p=0.03) and CF (t=-5.06, p<0.01), but not for CS (X^2=1.07, p= 0.3). . By contrast, divergent trends were detected in case of moisture indicator values (Figure 8) which increased in CF (X^2=8.6, p<0.01) but decreased in CA (X^2=4.45, p=0.03) and did not change significantly in case of CS (X^2=0.62, p=0.43). Finally, nutrient values increased in case of CF(X^2=6.67, p=0.01) and soil acidity values in case of CACA, X^2=10.98, p<0.01).

Mean height

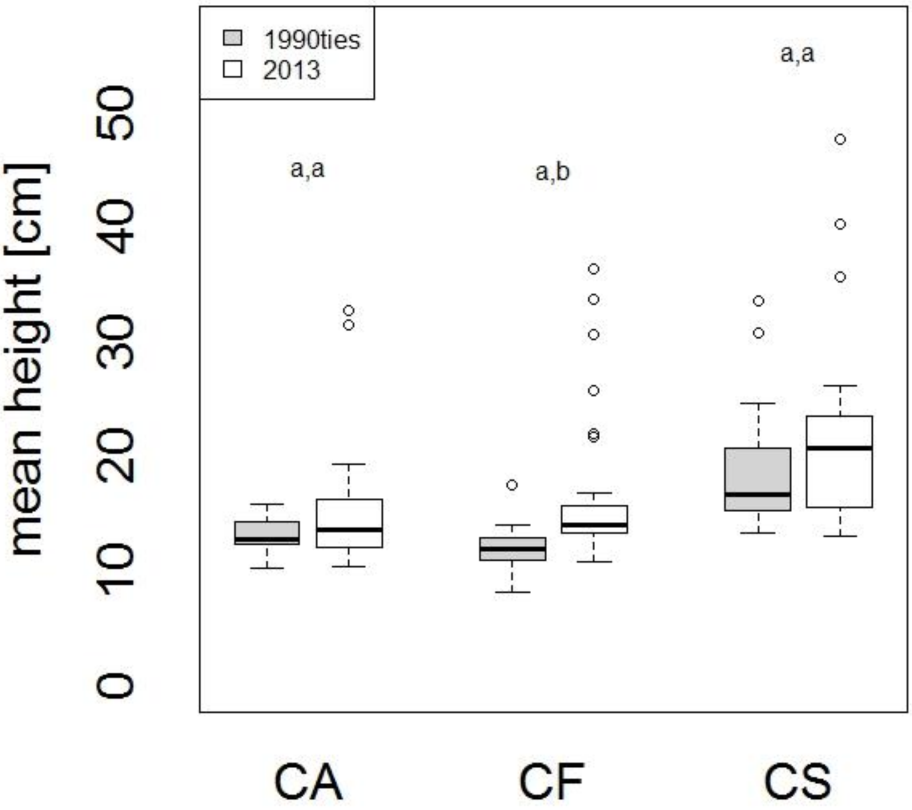

Figure 9: Average mean height of the species assembled in the originally sampled (grey boxes) and the re-sampled (white boxes) plots of the three target communities,. The outliers represent plots with tree species. CA – *Campanulo pullae-Achilleetum clusianae,* CF – *Caricetum firmae,* CS – *Seslerio-Caricetum sempervirentis*.

The mean (potential) height (Figure 9) of the plant species found within the samples increased significantly from 11.9 to 14.1 cm ($t=-4.52$, $p<0.01$) in case of CF, but did not change for the other two communities.

Discussion

Taken together, our results indicate that recent changes to temperate high mountain plant communities are less consistent as the relatively unambiguous patterns found in re-surveys of mountain top floras (e.g. Gottfried et al. 2012; Pauli et al. 2012) might suggest. None of the analyzed attributes showed trends that are uniform across all studied communities.

The changes we found are rather unambiguously interpretable in case of the *Carex firma* grasslands: species richness, the average T, M, and N-value, γ-diversity, and the mean (potential) plant height all have increased. The mean number of species has increased by 3 (11.5%) and the resultant rate of 8,8% new species per decade is comparable to and thus confirm the rates published in other studies (Cannone (2014): 6.48%, Holzinger (2008): 3 species/decade, Pauli (2007): 10,6%). These trends in CF are consistent with the interpretation that taller growing species adapted to warmer conditions are colonizing this community from areas at lower elevations while a possible simultaneous loss of cold-adapted species was not able to outweigh the species increase. The concomitant rise of moisture and nutrient indicator values might be a consequence of increased winter precipitation as deeper snow cover has been shown to improve nutrient and water supply, at least during the early growing season (Rumpf et al. 2014).

We recall that, among those communities analyzed, the *Caricetum firmae* is most constrained by cold temperatures since it is bound to wind exposed sites with a short or even a lack of protective snow cover. The prevalent growth form of *Carex firma* grasslands are cushions – even the sedge *Carex firma* itself has a cushion-like growth – or tiny herbs that may exploit more favorable microclimatic conditions near the ground, between and within cushions (Grabherr & Mucina 1993; Butterfield et al. 2013). We assume that warmer winters significantly ameliorated the harsh conditions at these wind-swept sites and hence allowed less cold-resistant species to invade. In line with such an interpretation, though more anecdotal, the increase of tree recruits in these grasslands was conspicuous. There were only two records of a tree species (*Pinus mugo* Turra) in this community in the mid 90-ies, but eleven such records of already three different species (6 *Pinus mugo*, 3 *Picea abies* H.Karst. and 2 *Larix decidua* Mill.) in 2013. We also note that the abiotic conditions under which this community commonly grows is most similar to those of mountain summits and that our results hence support the body of mountain-top resurveys that have reported increasing species numbers on temporal and boreal summits during the recent decades (Grabherr et al. 1994; Klanderud & Birks 2003; Kudernatsch 2005; Pauli et al. 2007; Odland et al. 2010; Gottfried et al. 2012; Pauli et al. 2012; Cannone & Pignatti 2014).

For the two other communities the trends we found are less consistent with expected effects of climate alterations. In case of *Carex sempervirens* grassland, neither mean number of species, nor one of the indicator values changed in a statistically significant way, but differences in species composition among plots increased and overall species pool size decreased. We hypothesize that the apparently higher resistance against immigration of new species might be due to more intense competition in this community. Actually, the *Seslerio-Caricetum sempervirentis* prefers south facing slopes and is the community thriving under the most favorable climatic conditions among those analyzed, with a protective snow cover during most of the winter season and a maximum of solar radiation input during the growing season. According to the stress-gradient hypothesis (Brooker & Callaghan 1998), which has largely been corroborated in alpine environments (Choler et al. 2001; Callaway et al. 2002; Dullinger et al. 2007), the intensity of competition should increase under such more benign conditions. Moreover, the (potential) plant height is higher in this grassland type than in the *Caricetum firmae* and the snowbeds, also indicating that competition, for light in particular, might be more pronounced in this community. Finally, original species numbers were highest in the *Carex sempervirens* grasslands and Olsen & Klanderud (2014) have recently demonstrated that the resistance of alpine grassland communities to colonization by new species is strongly linked to initial species richness. In their study, the more species in the community the less susceptible the community was against new invaders and this relationship became even stronger under (experimental) warming, probably because growth and vigor of resident species increased.

The decreased size of the realized species pool in CS, on the other hand, suggests that some species have actually been lost from the community, and the slight, though not significant increase in temperature and decrease in moisture indicator values suggest that the lost species are primarily those adapted to cooler and moister conditions (e.g. *Lotus alpinus* Ser*, Silene pusilla* Waldst. & Kit*, Valeriana montana* L*)*. In summary, the trends for CS suggest that a warming climate had some effect, but that this community is much more resistant against changes in species composition, and in particular against colonization by new species, than CF (and CA).

By contrast to *Carex sempervirens* grasslands, species numbers and vegetation cover are usually low in snowbed communities and biotic resistance to invasion of new colonizers should hence also be lower (Vittoz et al. 2009). One might hence expect snowbed sites to show particularly strong increases in α-diversity (Spasojevic et al. 2013; Grytnes et al. 2014). In our study, however, the mean species number of snowbed sites has not changed significantly during the last two decades, while the overall size of the species pool as well as the compositional dissimilarity among plots have increased. Put it another way, there are more species occurring in snowbed sites in 2013 than in the 1900ies but, nevertheless, the mean number of species per plot remained constant. As suggested by increasing temperature indicator values the new colonizers were coming from below or from warmer sites in the neighborhood indicating that the warming climate was at least one driver of the observed trends. Why this enrichment of the overall species pool did not result into higher mean α-diversity is less obvious. It might be that some parallel loss of species has been triggered by earlier snowmelt which potentially exposed sensitive snowbed species to spring or early summer (night) frosts they are not adapted to (e.g. Inouye 2008; Wipf et al. 2009) or which reduced water availability during the vegetation period (Ostler et al. 1982; Rumpf et al. 2014). In line with the latter assumption, the mean moisture indicator value of the re-sampled plots has actually decreased. In addition, most of the snowbed communities in the study area are thriving on steep debris slopes which offer a quite unstable substrate characterized by frequent small-scale slides and rock falls. These disturbance events probably trigger random species loss and turnover that might have contributed to keep mean α-diversity constant.

Besides Landolt T-values and mean potential plant height, β-diversity was an index that changed relatively consistently across communities: it was constant in *Caricetum firmae* and increased in *Carex sempervirens* grasslands and snowbeds. These findings suggest that the species composition of typical plant communities of the area, and the Northern Calcareous Alps as a whole, tend to become less homogeneous. Such a result differs from studies that rather found trends towards biological homogenization during the recent decades, e.g. in Scottish upland vegetation (Ross et al. 2012). However, this homogenization was apparently driven by acidification and intensive grazing at least as much as by a warming climate, two trends, which are unimportant in our study area as grazing intensity is generally low and has not changed much during the last two decades and Ellenberg values do not provide any indication of acidification. With climate as the main driver, and under the generally assumed individualistic movement of single species under climate warming (e.g. Thuiller et al. 2005; Pauli et al. 2007; Parolo & Rossi 2008; Engler et al. 2011; Dullinger et al. 2012; Garamvölgyi & Hufnagel 2013) we would actually expect increasing dissimilarity among individual realizations of community types, at least transiently, because local turnover depends on variable local propagule availability and priority effects. Put it another way, in a phase of transient disequilibrium between vegetation and climate (Svenning & Sandel 2013) ‘random’ or dispersal driven assembly processes will probably increase in importance as opposed to niche-based, ‘deterministic’ assembly. Such randomness in species composition of particular habitats might actually decrease again, though with species combinations different from today, if climatic conditions eventually stabilize (Theurillat et al. 1998).

In summary, our results suggest that there has been some dynamics in the high mountain grassland and snowbed vegetation of the study area during the last two decades and that climate warming is a likely driver of these dynamics. However, biodiversity metrics of the studied communities showed trends that were less uniform than expected. A combination of various factors including differential exposition to temperature extremes, varied biotic resistance against invasion of new species and differences in natural disturbance frequencies and associated species turnover might combine in driving these divergent, community-specific trends. Whatever the precise reasons, a more comprehensive look on recent changes in high mountain vegetation suggests that these changes may be highly heterogeneous even across communities of one single mountain range. The trends dominating on temperate and boreal mountain tops can hence not easily be extrapolated to all the vegetation of the respective mountain ranges.

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Figures and Tables

Appendix

Appendix 1: German Abstract (Zusammenfassung)

Aktuelle Forschungen zeigen, dass sich die Flora der europäischen Gebirgsregionen im Wandel befindet, die Klimaerwärmung wird oft als Hauptfaktor für die Veränderungen genannt. Gipfelregionen wurden besonders häufig untersucht, allerdings lassen sich die beobachteten Trends scheinbar nicht auf die alpine Vegetation übertragen. In dieser Arbeit untersuchte ich die Entwicklung von drei, für die nördlichen Kalkalpen typische, Pflanzengesellschaften, dem *Campanulo pullae-Achilleetum clusianae* Englisch, dem *Caricetum firmae* Rübel und dem *Seslerio-Caricetum sempervirentis* Br.-Bl.. Im Zuge einer Vegetationskartierung von dem Hochschwab, der Rax, dem Schneeberg und der Schneealpe wurden zwischen 1995 und 1999 die Ausgangsdaten für meine Untersuchung aufgenommen, im Sommer 2013 wiederholte ich 91 Aufnahmen. Ich untersuchte die Daten auf Veränderungen der α-, β-, γ- Diversität, ökologischen Zeigerwerte (Landolt) und der durchschnittlichen natürlichen Wuchshöhen. In den untersuchten Gesellschaften sind die β- Diversität, die Temperatur Zeigerwerte und die Wuchshöhe zumeist angestiegen. Diese Trends lassen vermuten, dass der Temperaturanstieg, neben anderen gerichteten und zufälligen Faktoren, wesentlich für zunehmende Heterogenität innerhalb der Gesellschaften verantwortlich ist. Die α- und γ- Diversität, sowie die anderen Zeigerwerte zeigen deutliche Unterschiede zwischen den Gesellschaften, welche sich durch unterschiedliche Resistenz erklären lassen, sowohl gegenüber neuen, eindringenden Arten als auch gegenüber den natürlichen Störungen. In den letzten zwei Dekaden veränderten sich die alpinen Rasen- und Schneebodengesellschaften im Untersuchungsgebiet, ein wesentlicher Faktor für die Veränderungen ist der Anstieg der Temperatur. Die Diversitätsindices, der jeweiligen Gesellschaften, zeigen allerdings uneinheitlichere Ergebnisse als man erwarten durfte. Daraus schließe ich, dass Trends, welche auf temperaten und borealen Berggipfel beobachtet werden, nicht auf die die gesamte Vegetation der entsprechenden Gebirgsregion übertragen werden kann.

Appendix 2: Abstract

Recent research has highlighted pronounced changes to the flora of European mountain tops and ongoing climate warming has been hypothesized to be a main driver of these changes. Mountain tops, however, represent a particular habitat type in high mountain landscapes and the observed trends might hence differ in other parts of alpine vegetation. In this study, I analyzed recent changes in three typical alpine plant communities of the Northern Calcareous Alps, namely the *Campanulo pullae-Achilleetum clusianae* Englisch, the *Caricetum firmae* Rübel and the *Seslerio-Caricetum sempervirentis* Br.-Bl.. The original data was collected between 1995 and 1999 on Mt. Hochschwab, Mt. Rax, Mt. Schneealpe and Mt. Schneeberg. In summer 2013, I resampled 91 of these plots and analyzed the data for changes in α-, β-, γ- diversity, as well as in ecological indicator values (Landolt) and in potential mean plant height. I found relatively consistent trends in β-diversity, temperature indicator values and potential plant height, which mostly increased in all three plant communities suggesting that the warming climate drives a species turnover that, among other factors, depends on priority effects and random dispersal processes and hence increases compositional dissimilarity among communities. By contrast, α- and γ-diversity, as well as the other indicator values, showed marked differences among the three studied communities which might be due to differences in biotic resistance against colonization by new species as well as in natural disturbance regimes. In summary, there has been some dynamics in the high mountain grassland and snowbed vegetation of the study area during the last two decades and climate warming is a likely driver of these dynamics. However, biodiversity metrics of the studied communities showed trends that were less uniform than expected. I conclude that the trends dominating on temperate and boreal mountain tops cannot easily be extrapolated to all the vegetation of the respective mountain ranges.

Appendix 3: Indicator values

Table 2: Comparison of the mean indicator values and the mean height between the two sampling years. T…temperature, M…Moisture, N…nitrogen, R…reaction, h…mean height.

	CA				**CF**				**CS**			
		p	1990	2013		p	1990	2013		p	1990	2013
T	X^2=4.57	0.03	1.55	1.66	t=-5.06	<0.01	1.54	1.62	X^2=1.07	0.3	1.92	1.97
M	X^2=4.45	0.03	2.94	2.84	X^2=8.6	<0.01	2.55	2.65	X^2=0.62	0.43	2.65	2.60
N	X^2=2.46	0.12	2.22	2.1o	X^2=6.67	0.01	1.83	1.88	X^2=0.24	0.63	2.10	2.13
R	X^2=10.98	<0.01	3.80	4.06	X^2=0	0.99	4.16	4.17	X^2=0.47	0.49	3.89	3.94
h	t=-1.76	0.09	12.84	13.63	t=-4.52	<0.01	11.90	14.10	X^2=1.20	0.27	16.76	20.69

Appendix 4: List of all recorded plots and species lists

Table 3: List of all recorded Plots with their descriptive parameters (coordinates, altitude, exposition, slope, size and vegetation cover)

Location	Plot	Community	Coordinates N	Coordinates E	Altitude	Exposition	Slope	Size	Cover	Remark
Hochschwab	4128	CF	47.62212	15.14366	2105	338	28	20	98	Gschröderer Kar, Nordhang
Hochschwab	4134	CA	47.62761	15.14232	1935	270	2	15	45	nordöstlich Tremmel
Hochschwab	4155	CS	47.62068	15.15009	2140	0	0	50	100	Verebnung vor dem Schiestelhaus
Hochschwab	4159	CF	47.61417	15.12839	2170	360	10	50	85	nordöstlich Zagelkogel
Hochschwab	4166	CF	47.62149	15.14569	2085	30	25	30	95	Bei Wegkreuz Gschrödererkar- Weg zur Biwagschachtel
Hochschwab	4172	CF	47.62779	15.14545	1965	360	15	40	85	am Tremmel, nördlich Schönhaltereck
Hochschwab	4175	CS	47.62148	15.15228	2070	210	25	50	75	am Weg Schiestelhaus- Ochsenkar
Hochschwab	4413	CA	47.62136	15.16661	1950	113	30	50	15	südwestlich Wetterkogel
Hochschwab	4416	CA	47.62017	15.16414	1995	90	25	25	35	Westlich Wetterkogel
Hochschwab	4420	CF	47.61356	15.11749	2100	293	20	30	90	östlich Hochwart
Hochschwab	4421	CA	47.61492	15.11886	2110	0	0	5	75	
Hochschwab	5008	CA	47.60203	15.02550	1925	315	12	20	30	1. Schuttfeld w Sattel
Hochschwab	5016	CA	47.60337	15.02918	1985	203	30	20	25	Ebenstein Südhang
Hochschwab	5028	CA	47.60344	15.03036	1960	180	30	12	40	Mitte des Großen Ebenstein Südhang
Hochschwab	5036	CF	47.60372	15.02858	1975	203	20	20	95	Ebenstein Südhang, unten, 20m östlich vom Weg
Hochschwab	5037	CF	47.60406	15.02922	2010	225	30	20	96	Ebenstein Südhang, 50m neben Weg
Hochschwab	5051	CS	47.59785	15.02188	1805	203	40	25	90	östlich über Zumach
Hochschwab	5052	CF	47.59780	15.02341	1795	210	5	18	80	100m östlich Weg beim Zumach
Hochschwab	5058	CF	47.59652	15.02369	1820	90	5	12	75	beim "3. Gipfel"
Hochschwab	5064	CF	47.60383	15.02822	1965	225	25	20	95	Ebenstein Südhang, westlicher vom Weg nach 1. Kehre
Hochschwab	5069	CA	47.59613	15.02160	1745	360	80	9	40	östlich Zumach, an Latschengrenze
Hochschwab	5074	CA	47.60235	15.02579	1950	23	35	25	35	westlich Sattel, 2. Schuttfeld
Hochschwab	5075	CA	47.60297	15.02667	1940	0	0	6	50	westlicher Sattel, 2. Schuttfeld, Grund
Hochschwab	5077	CA	47.60297	15.02642	1950	23	20	25	40	2. Schuttfeld westlicher Sattel, oben
Hochschwab	7452	CS	47.62732	15.14615	1969	90	43	30	98	
Hochschwab	7562	CS	47.62447	15.14321	1895	250	21	30	95	
Hochschwab	7571	CS	47.62324	15.14384	1916	300	29	30	85	
Hochschwab	7722	CS	47.62797	15.14742	1956	40	30	30	90	
Rax	2202	CF	47.70245	15.73459	1745	90	25	6	70	Kante zur Preinerwand, 20m oberhalb des Weges
Rax	2208	CF	47.70646	15.74530	1755	293	5	10	85	100m südlich des Weißenkogelgipfels
Rax	2212	CS	47.68387	15.70366	1715	150	25	25	80	Gretchensteig, 100m vor Wandfuß
Rax	2214	CS	47.69777	15.71398	1830	135	25	25	100	Weggabelung "Alter Mann"- Bismarcksteig, linke untere Ecke ist die Tafel
Rax	2215	CS	47.69694	15.71334	1820	45	30	25	100	orographisch re Hang des "Langen Mann", 40m unter Bismarksteig
Rax	2220	CS	47.70161	15.72003	1760	135	30	25	100	Bismarksteig, 20m unter Steig
Rax	2222	CF	47.70227	15.71663	1880	180	15	20	100	Weg Trinksteinsattel- Bißkogel
Rax	2225	CS	47.68638	15.69041	1820	225	30	65	90	Fuchslochsteig- Raxmäuer, 40m vor Engstelle
Rax	2227	CS	47.70759	15.70500	1715	203	35	60	100	Bärenlochgraben, re Hang
Rax	2230	CF	47.69609	15.71278	1830	113	15	25	85	oberer Waxriegelkamm bei Weggabelung Bismarcksteig
Rax	2231	CS	47.69588	15.71253	1810	180	30	80	80	Bismarksteig östlicher Teil
Rax	2232	CS	47.68625	15.70617	1700	113	45	100	99	Martinsteig
Rax	2233	CS	47.69665	15.71258	1830	90	20	100	99	Predigstuhl, Osthang
Rax	2310	CA	47.70271	15.72211	1735	135	45	6	20	Bismarksteig, 10m unter dem Weg im Grabenzentrum
Rax	2311	CA	47.70202	15.72034	1760	135	35	3	50	Bismarksteig,5m unter Steig
Rax	2312	CA	47.70161	15.72065	1735	135	20	10	50	Bismarcksteig, 40m unter Steig
Rax	2316	CA	47.68717	15.69302	1885	90	50	6	30	Doline am Steilhang der Heukuppe
Rax	2317	CA	47.68759	15.69242	1910	135	25	30	70	oberer Eingang zur Doline am Heukuppen- Südhang
Rax	2664	CF	47.70573	15.70762	1724	315	26	30	80	Graben SW Dreimarkstein unterhalb Karrenweg zum Habsburghaus
Rax	2665	CF	47.70597	15.70824	1731	320	45	25	60	Graben SW Dreimarkstein oberhalb Karrenweg, grusreicher Felsrasen
Rax	2670	CS	47.70378	15.69761	1616	158	37	30	90	Krummtalgraben, geschlossener Schutthangrasen
Rax	2675	CF	47.69228	15.70195	1727	23	28	30	98	

Location	Plot	Community	Coordinates N	Coordinates E	Altitude	Exposition	Slope	Size	Cover	Remark
Rax	2677	CF	47.69214	15.70194	1734	23	30	30	95	geschlossener Polsterseggenrasen randlich zu Latschengebüsch
Rax	2685	CS	47.69077	15.70716	1659	158	34	30	80	Rasenfragment zwischen wegbedingter Erisionsstellen und Latschengebüsch
Rax	2688	CF	47.69538	15.70526	1832	248	30	30	90	Westhang des Predigstuhls
Rax	7142	CF	47.69020	15.70520	1789	120	15	30	100	
Rax	7151	CS	47.69913	15.70949	1897	40	35	30	70	
Schneealpe	6044	CF	47.69371	15.60764	1730	30	25	30	60	SW Schneealpenhaus
Schneealpe	6046	CF	47.69403	15.60470	1780	338	15	25	70	Kuppel südlich Michlbauerhütte
Schneealpe	6047	CS	47.69283	15.60536	1765	158	35	40	90	
Schneealpe	6051	CS	47.68737	15.60445	1660	180	30	30	95	erste Karstmulde an der Straße zum Schneealpenhaus
Schneealpe	6067	CA	47.71414	15.63845	1740	90	30	25	80	
Schneealpe	6072	CF	47.70569	15.60965	1785	0	0	40	95	Nördlich Michlbaueralm, über Dietlerschlucht
Schneealpe	6076	CF	47.70445	15.61492	1735	45	5	30	80	ca. 800m nördlich Alpenvereinshaus
Schneealpe	6095	CF	47.70648	15.61849	1665	180	15	40	70	oberhalb Nolltal
Schneealpe	6124	CA	47.71706	15.58968	1755	23	15	6	70	Kleinbodengraben orog. re Hang
Schneealpe	6126	CF	47.71716	15.58942	1830	338	30	20	100	
Schneealpe	6134	CA	47.70326	15.57851	1780	158	30	10	60	östlich Schönaltereck
Schneealpe	6136	CA	47.70633	15.57555	1800	110	70	5	40	Nördlich Sonnleitstein
Schneealpe	6150	CA	47.71303	15.63478	1720	90	20	25	75	
Schneealpe	7371	CF	47.71103	15.59544	1786	250	36	30	95	10m über Weg
Schneealpe	7521	CS	47.71570	15.63127	1705	70	27	30	100	
Schneealpe	7541	CS	47.71414	15.63064	1750		20	30	100	
Schneeberg	1118	CA	47.76917	15.80588	2065	90	20	5	40	Klosterwappen, ca. 100m NNO vom Gipfel
Schneeberg	1201	CF	47.76407	15.80146	1910	270	15	30	100	Schöneben, W Steig
Schneeberg	1202	CF	47.75901	15.83127	1830	180	20	30	50	Waxriegel Südseite
Schneeberg	1203	CF	47.76012	15.83023	1880	180	15	15	99	Waxriegel, S Gipfel
Schneeberg	1204	CF	47.76519	15.80539	1993	158	25	15	100	SO Gipfel, Kante gegen Bockgrube
Schneeberg	1206	CF	47.76001	15.83025	1880	180	20	50	70	Waxriegel, S Gipfel
Schneeberg	1207	CF	47.77489	15.80844	2010	293	25	30	100	Kaiserstein, über östliche Schneegrube
Schneeberg	1210	CF	47.75671	15.81722	1845	180	30	5	70	Bockgrubenriegel, orogr. li d Kante
Schneeberg	1218	CF	47.76018	15.81003	1755	225	20	30	40	Bockgrube
Schneeberg	1227	CS	47.76153	15.81122	1880	248	30	30	100	Bockgrube, untere Kante
Schneeberg	1231	CS	47.77397	15.80182	1889	225	35	50	75	Wurzengraben, N Hang
Schneeberg	1233	CS	47.76931	15.80862	1980	90	20	20	98	Unter Gipfelgrat gegen Ochsenboden
Schneeberg	1236	CS	47.75709	15.80023	1730	135	40	100	90	SO Schönleitenschneid, über Grafensteig
Schneeberg	1603	CF	47.77985	15.80600	1832	315	10	30	95	Hang W Festenkogel, großflächiger geschlossener Rasen zw. Felsköpfen und Latschengruppen
Schneeberg	1604	CF	47.77902	15.81268	1927	360	20	30	100	Festenkogel, großflächig geschlossener Rasen
Schneeberg	1605	CF	47.77237	15.80706	2000	315	29	30	100	Schneeberg, westlich Fischerhütte
Schneeberg	7141	CF	47.77673	15.81059	1982	320	30	30	95	Fadensteig ri Edelweißhütte, Oberhalb Weg knapp unterhalb der Kante
Schneeberg	7181	CF	47.77978	15.80685	1846	330	10	30	100	Graben SW Beginn der Latschengruppe
Schneeberg	7191	CF	47.77806	15.80668	1888	270	22	30	95	Nordöstlich vom Schneeloch, Rasen zwischen Latschen
Schneeberg	7231	CS	47.75761	15.80043		125	41	30	85	

Table 4: Species list of *Campanulo pullae-Achilleetum clusianae* of both investigation periods. a…1990, b…2013

Plot number	1118		2310		2311		2312		2316		2317		4134		4413		4416		4421		5008		5016		5028		5069		5074		5075		5077		6067		6124		6134		6136		6150	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Achillea atrata	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	+	.	+	1	1	.	1	.	.	.	.	.	1	1	.	3	1	1	.	.	.	.	.	.	.	.	.	.
Achillea clavennae	.	.	.	.	.	1	.	r	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	2	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Achillea clusiana	3	.	1	+	3	.	2	.	4	.	3	.	1	1	1	1	3	2	2	.	+	+	1	.	2	.	2	2	.	.	4	.	.	.	1	1	3	.	1	2	.	2	3	.
Achillea sp.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aconitum napellus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Agrostis alpina	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Agrostis rupestris	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Alchemilla sp.	+	.	+	.	.	.	.	.	.	r	.	.	.	.	.	.	+	r	.	.	1	1	2	.	1	1	+	1	.	+	+	+	.	r	+	+	+	.	.	.	.	.	.	.
Androsace chamaejasme	.	+	.	.	.	+	.	r	.	+	+	+	.	r	+	r	.	r	.	.	.	.	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Androsace lactea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anemone narcissiflora	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Anthyllis vulneraria ssp. alpicola	.	r	.	.	.	1	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	.	1
Arabis alpina ssp. alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	+	r	.	r	.	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	r	.	.
Arabis bellidifolia	.	.	.	.	.	.	1	.	.	.	.	r	+	+	+	+	.	+	.	+	+	.	.	.	.	.	+	r	.	+	r	.	.	r	+	.	.	.	.	.	.	.	.	.
Arabis caerulea	.	r	.	.	.	.	.	.	+	.	.	.	+	+	.	r	.	+	.	+	.	+	.	.	.	.	.	.	.	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.
Arabis stellulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.
Arenaria ciliata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Armeria alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	r	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Aster alpinus	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aster bellidiastrum	.	1	+	.	.	.	+	.	.	.	.	r	.	.	.	.	.	.	.	.	+	.	1	.	1	+	+	.	.	.	+	.	.	.	.	.	+	.	+	.	+	r	.	.
Athamanta cretensis	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bartsia alpina	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+
Betonica alopecuros	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Biscutella laevigata	.	r	.	.	.	+	.	1	.	.	.	r	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	r	.	r	.	r	.	+	.	.	+	.	.	.	.	+
Calamintha acinos	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Calamintha alpinum	.	.	.	.	.	+	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Campanula alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Campanula cochleariifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	r	+	r	.	r	.	.	.	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Campanula pulla	2	.	1	.	1	.	2	r	1	.	1	.	2	.	2	.	2	.	3	.	1	+	1	1	+	+	2	1	.	+	1	r	.	.	+	.	2	.	2	r	+	1	1	.
Campanula scheuchzeri	.	.	1	.	1	.	+	+	.	.	.	r	.	.	.	.	+	r	+	.	.	.	1	.	.	.	+	+	.	r	.	.	.	r	.	+	.	.	+	+	.	+	+	+
Carduus defloratus	.	.	1	.	.	1	.	1	.	.	.	.	.	.	+	r	.	r	-	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Carex atrata	.	r	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	+	.	r	.	.
Carex capillaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	r
Carex ferruginea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	1	.	r	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1
Carex firma	.	2	.	.	.	.	.	.	.	.	.	.	1	r	+	r	.	.	.	+	+	.	.	1	.	1	.	.	r	+	.	.	1	1	1	1	+	4	+	.	+	.	.	2
Carex ornithopoda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Carex parviflora	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	+	+	1	1	1	1	1	.	.	.	+	.	r	1	.	.	1	+	+	.	.	.	.	.	.	.	+	.
Carex sempervirens	.	+	+	.	.	2	.	2	.	.	+	2	.	.	+	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.
Carlina acaulis	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerastium arvense	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
Cerastium carinthiacum	.	.	.	.	.	.	.	r	.	.	.	.	1	1	.	.	-	.	.	.	.	+	.	.	.	.	1	1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.

Plot number	1118		2310		2311		2312		2316		2317		4134		4413		4416		4421		5008		5016		5028		5069		5074		5075		5077		6067		6124		6134		6136		6150	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Cirsium erisithales	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crepis aurea	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	1	.	.	.	2	.	2	.	+	.	.	.	+	.
Crepis jacquinii	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cyclamen purpurascens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Deschampsia cespitosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Dianthus alpinus	.	r	.	.	.	r	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	r	.	.	.	.	.	.	.	r	.	r	.	.	.	.	.	r	.	+
Doronicum calcareum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	r	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Draba aizoides	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	+	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.
Dryas octopetala	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	r
Epilobium alsinifolium	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Epilobium angustifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia officinalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia salisburgensis	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	r	1	r	+	1	.	r	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.
Festuca nigrescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Festuca pumila	.	.	.	.	.	.	+	.	.	.	1	r	+	.	+	.	+	.	.	+	.	r	1	r	.	r	+	.	.	.	.	.	1	.	2	2	.	.	3	.	1	r	+	2
Festuca rupicaprina	.	.	3	.	+	.	+	r	+	.	.	+	.	.	.	+	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	r	1	.	.	r	.	.	1	.
Festuca versicolor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium anisophyllon	.	.	1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	.	1	+	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.
Galium noricum	.	.	.	.	1	1	1	+	.	.	+	r	+	+	+	.	+	1	+	1	1	+	1	r	.	.	.	.	.	r	+	r	+	r	+	1	.	.	2	+	.	+	+	+
Gentiana bavarica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana clusii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	.	1
Gentiana pumila	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1	.	+	.	+	.	r	.	.	.	+	r	+	+	+	.	.	.	.	.	.	.	.	.	.
Gentiana verna	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	+	+
Gentianella austriaca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentianella germanica	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	+	.	.	.	.	.	.	.	+	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gnaphalium hoppeanum	.	.	+	.	.	.	.	.	+	.	1	.	+	.	.	+	.	1	.	.	.	.	.	.	+	.	r	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	1	.
Gnaphalium supinum	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helianthemum alpestre	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	r	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Helianthemum nummularium agg.	.	.	.	.	.	r	.	1	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	1	1
Helictotrichon parlatorei	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Hieracium bifidum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Hieracium pilosum	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Homogyne discolor	.	r	+	.	.	.	.	.	.	.	.	r	+	r	.	.	.	r	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	2	+	.	.	.	r	.	.	+	+
Jovibarba hirta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Juncus monanthos	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	r	+	+	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.
Kernera saxatilis	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Knautia arvensis	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Larix decidua	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Leontodon hispidus	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Leontodon montaniformis	.	.	1	.	-	.	1	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leontopodium alpinum	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
Leucanthemum atratum	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ligusticum mutellina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	+	.

Plot number	1118		2310		2311		2312		2316		2317		4134		4413		4416		4421		5008		5016		5028		5069		5074		5075		5077		6067		6124		6134		6136		6150	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Linaria alpina	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lotus corniculatus	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+
Luzula glabrata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Meum athamanticum	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Minuartia austriaca	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Minuartia gerardii	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	+	+	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Minuartia sedoides	.	r	.	.	.	.	.	.	.	.	.	.	1	.	.	.	-	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Moehringia bavarica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Moehringia ciliata	1	.	.	.	.	.	2	.	+	.	1	.	1	r	+	.	1	.	.	+	1	+	1	.	+	.	.	.	1	+	.	+	+	+	+	.	.	.	1	.	.	.	+	.
Myosotis alpestris	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	r	.	.	+	+	1	.	+	r	+	.	+	r	+	r	+	r	.	.	.	.	.	.	.	.	.	.
Noccaea caerulescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Noccaea crantzii	.	r	1	.	+	.	+	.	.	.	.	r	.	.	.	+	+	+	.	.	1	+	.	.	.	r	.	.	.	.	+	.	.	.	+	.	.	.	+	r	+	1	.	.
Noccaea rotundifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
Oxytropis montana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Parnassia palustris	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Pedicularis rostratocapitata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.
Pedicularis verticillata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	1	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Persicaria vivipara	.	.	+	.	1	.	+	.	.	.	.	r	1	r	+	r	+	r	1	+	1	+	1	+	+	+	+	r	.	.	+	.	+	+	+	.	+	.	1	+	+	.	1	r
Phyteuma orbiculare	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	r	.	.
Picea abies	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Pinguicula alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Poa alpina	+	.	1	.	.	.	1	.	1	r	2	1	+	1	+	+	+	1	1	2	.	+	1	+	+	+	.	+	+	1	+	1	+	1	+	1	1	.	2	1	+	+	1	1
Poa minor	.	r	+	.	+	.	+	.	.	.	.	.	+	.	+	.	1	.	.	.	1	.	.	.	.	.	.	.	1	.	1	.	+	.	+	.	.	.	.	.	.	.	.	.
Poa supina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Polygala amara ssp. amara	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla aurea	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla brauneana	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	r	.	.	1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	.	2	.	+	.	.	.	+	.
Potentilla clusiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	r	+	r	.	.
Potentilla crantzii	.	.	.	.	-	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Primula auricula	.	.	.	.	.	1	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	r	.	r	.	r	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	1
Primula clusiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	+	.	.	.
Primula elatior	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pritzelago alpina	.	.	.	.	.	.	.	.	1	+	1	r	1	1	1	r	+	r	.	r	1	+	1	.	.	.	+	+	+	+	+	+	+	+	.	.	1	.	1	r	+	+	2	.
Pulsatilla alpina agg.	.	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus alpestris	.	.	.	r	.	.	.	.	+	+	1	r	2	r	+	+	+	1	+	+	2	+	1	r	+	r	1	1	1	1	+	1	2	+	2	+	2	.	2	+	.	r	2	r
Ranunculus hybridus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	-	.	.	.	.	.	.	.	.	.
Ranunculus montanus agg.	.	.	1	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.	+	.	.	.	.	.	+	.	.	.	.	.	+	.	+	r	.	.	.	.
Rhodiola rosea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rumex alpestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.
Rumex nivalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	+	3	.	.	.	.	.	.	.	.	.	.	.	.	.
Sagina saginoides	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salix alpina	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	+	.	+	.	.	1	+	.	.	.	r	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.
Salix reticulata	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	+	.	.	.	.	1	.	.	.	r	.	.	.	.	.	.	+	+	.	.	.	1	.	.	.	.	.	.

Plot number	1118		2310		2311		2312		2316		2317		4134		4413		4416		4421		5008		5016		5028		5069		5074		5075		5077		6067		6124		6134		6136		6150	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Salix retusa	.	.	.	.	.	.	+	.	.	.	+	.	.	+	+	.	.	.	2	3	.	.	1	.	.	.	+	.	.	+	+	.	+	.	.	.	.	.	.	.	.	.	4	.
Saxifraga aizoides	+	.	.	.	.	.	.	.	.	.	2	.	.	.	.	+	.	+	.	.	.	+	.	+	+	1	+	+	.	r	.	.	+	+	.	.	.	.	.	.	.	+	.	.
Saxifraga androsacea	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	+	.	+	.	+	.	.	.	.	.	.	.	1	+	+	.	+	.	.	.	.	.	.	.	+	.	+	.
Saxifraga caesia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	r	r	.	.	.	.	.	.	+	+	.	r	.	.	.	.	.	.
Saxifraga moschata	2	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	1	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga paniculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	2	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga sedoides	.	.	.	.	.	.	.	.	.	.	.	+	+	.	2	.	+	.	.	.	1	.	.	.	.	.	2	+	3	1	+	+	1	+	.	.	.	.	.	.	.	.	.	.
Saxifraga stellaris	+	.	.	.	.	.	1	.	+	1	.	.	+	r	+	.	+	.	.	.	1	+	1	.	.	.	+	.	1	+	+	+	+	+	.	.	.	.	+	.	+	.	.	.
Sedum atratum	+	.	+	.	+	.	.	.	+	r	+	r	+	.	+	+	.	+	.	.	+	+	+	+	+	.	.	.	.	.	+	.	+	r	.	.	.	.	+	r	.	r	.	r
Selaginella selaginoides	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
Sesleria albicans	.	2	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	1
Sesleria ovata	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Silene acaulis	.	.	.	.	.	.	+	.	.	.	+	2	.	+	+	.	.	+	+	1	2	1	.	1	.	1	.	r	.	+	.	.	2	2	.	.	.	1	+	.	.	.	.	+
Silene alpestris	.	.	.	.	.	+	.	r	.	.	.	.	.	r	.	r	.	r	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Silene pusilla	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	1	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	1	.	2	.	.	.
Soldanella alpina	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Soldanella austriaca	.	.	1	.	.	.	+	.	.	+	1	.	+	1	+	.	+	+	.	+	1	+	.	.	.	r	.	.	+	1	1	.	+	+	2	.	+	.	.	+	2	r	1	r
Taraxacum sp.	+	.	.	.	+	.	+	.	1	.	.	.	1	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	+	r	.	r	.	.	.	+	1	.	.	.	.	.	.	.
Thymus praecox	.	.	+	.	.	1	.	r	.	.	.	r	.	+	.	.	.	.	.	.	.	+	1	+	1	+	+	.	.	.	.	.	.	.	.	r	.	.	.	.	.	r	+	r
Tofieldia calyculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.
Trifolium pratense	.	.	+	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
Vaccinium vitis-idaea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Valeriana elongata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	2	.	.	.
Valeriana sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica alpina	+	.	1	.	1	.	+	.	3	.	1	.	1	r	.	r	.	+	1	+	1	.	1	.	+	.	+	.	.	r	1	+	.	r	.	.	1	.	1	.	.	r	.	.
Veronica aphylla	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Veronica fruticans	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
Viola alpina	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Viola biflora	1	+	1	1	+	.	.	.	.	.	.	.	+	+	.	r	1	r	.	.	.	.	+	.	+	.	+	+	.	.	.	.	.	.	.	.	1	.	2	+	.	r	.	.

Table 5: Species list of *Caricetum firmae* of both investigation periods. a…1990, b…2013

Plot number	1201		1202		1203		1204		1206		1207		1210		1218		1603		1604		1605		2202		2208		2222		2230		2664		2665		2675		2677		2688		4128		4159	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Achillea clavennae	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.
Achillea sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Agrostis alpina	1	1	2	+	+	.	2	1	+	1	.	.	.	r	2	2	2	3	.	.	.	.	+	2	1	.	3	3	+	1	.	1	.	+	.	1	+	.	.	2	.	.	.	.
Agrostis rupestris	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	r	.	.	1	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Alchemilla sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Androsace chamaejasme	+	+	1	r	1	r	2	r	1	+	+	r	+	+	1	r	1	+	1	1	1	+	1	+	1	1	1	+	1	+	+	+	.	+	+	+	1	1	1	1	.	.	+	r
Androsace lactea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Anemone narcissiflora	.	+	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	r	.	.	.	.	.	.	.	r	.	.
Anthoxanthum alpinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthyllis vulneraria ssp. alpicola	+	1	1	2	1	+	.	.	+	1	.	.	+	+	+	+	.	.	.	.	.	.	.	+	.	.	.	1	1	1	1	1	.	1	.	+	.	.	2	1	.	.	.	.
Arabis stellulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Arctostaphylos alpinus	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.
Arenaria ciliata	+	r	+	.	.	.	+	r	.	.	+	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	r	.	+	.	.	.	+	.	+	.	+	+	.	.	.
Arenaria grandiflora	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Armeria alpina	+	r	.	.	.	.	+	r	.	.	1	+	.	.	.	.	1	r	1	r	1	+	.	.	.	.	.	.	.	.	+	+	+	.	+	+	+	r	+	r	+	+	+	r
Asperula neilreichii	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aster alpinus	.	.	2	+	1	r	.	.	+	+	.	.	1	r	.	.	.	.	.	.	.	.	+	.	.	r	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aster bellidiastrum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.
Astragalus alpinus	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Astragalus frigidus	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Astragalus sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Athamanta cretensis	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bartsia alpina	+	r	.	r	+	.	+	r	.	.	.	.	.	.	.	.	1	+	.	.	.	.	+	r	.	.	+	r	.	.	1	+	.	+	.	+	.	+	+	+	+	r	+	.
Biscutella laevigata	1	+	+	r	+	.	.	r	+	r	+	r	.	r	+	r	1	+	+	+	1	+	.	+	.	.	+	r	.	+	.	+	.	+	1	+	+	+	.	r	.	.	.	.
Calamintha acinos	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.
Campanula alpina	.	r	.	r	+	r	.	.	.	r	+	r	.	.	.	.	+	.	+	.	+	.	.	r	.	.	+	r	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.
Campanula cochleariifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Campanula pulla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Campanula scheuchzeri	+	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	1	r	1	+	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	+	.	.	.	.	.
Carduus defloratus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carex atrata	+	r	.	r	+	r	+	r	.	r	1	1	.	.	.	.	1	1	+	r	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	5	1	.
Carex capillaris	+	.	.	.	+	r	1	.	.	.	.	.	.	.	.	.	2	r	2	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Carex ferruginea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carex firma	4	3	3	4	5	5	5	4	4	5	5	5	4	4	2	3	3	4	4	5	5	5	3	3	3	3	5	2	4	3	3	3	3	4	4	4	4	4	4	5	3	3	4	5
Carex fuliginosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
Carex parviflora	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Carex rupestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carex sempervirens	+	1	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Cerastium carinthiacum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.
Chamorchis alpina	.	r	.	.	+	.	+	r	+	.	.	.	.	r	+	.	.	r	.	.	.	.	.	.	.	.	.	r	1	.	.	+	.	+	.	+	.	+	.	.	.	.	.	.
Coeloglossum viride	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	r	.	+	.	r	.	.	.	.
Crepis aurea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crepis jacquinii	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crepis terglouensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Dianthus alpinus	+	+	+	r	.	.	+	r	.	+	.	.	.	.	.	r	.	r	.	r	.	.	+	+	.	.	+	+	.	r	.	+	.	r	1	+	+	+	.	r	.	.	.	.
Doronicum calcareum	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	+	.	.	.	.	.	.	.	.	.	.	1	.	1	.	r	.	2	.	1	.	.	.	5
Doronicum glaciale	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Draba aizoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Draba sauteri	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Dryas octopetala	3	2	.	3	2	.	2	2	1	+	3	3	1	2	.	.	3	2	2	3	2	2	4	4	2	4	+	2	2	.	2	.	.	3	2	3	3	3	1	.	3	.	.	4
Empetrum hermaphroditum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Empetrum nigrum agg.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erica carnea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Plot number	1201		1202		1203		1204		1206		1207		1210		1218		1603		1604		1605		2202		2208		2222		2230		2664		2665		2675		2677		2688		4128		4159	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Erigeron glabratus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia officinalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia salisburgensis	.	.	+	.	+	.	+	.	.	.	.	.	+	.	+	.	.	.	+	.	.	.	.	.	.	.	+	.	+	.	1	.	.	.	+	.	1	.	+	.	.	.	.	.
Festuca nigrescens	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca pulchella	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	r	.	.	.	.	.	.
Festuca pumila	.	.	1	.	.	.	1	.	.	1	2	.	.	.	.	.	.	.	3	.	1	.	.	.	.	.	.	.	.	.	2	.	2	.	.	r	.	.	.	.	2	+	1	.
Festuca rupicaprina	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca versicolor	2	.	2	.	+	1	2	1	1	.	.	2	+	2	3	.	1	.	1	.	+	.	+	.	+	.	1	.	1	.	.	.	1	.	2	.	2	.	2	.	.	.	.	.
Galium anisophyllon	1	+	+	r	.	.	.	.	.	.	.	.	.	.	1	.	.	.	+	r	.	.	+	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Galium noricum	.	.	.	.	.	.	+	+	.	r	.	.	.	.	+	r	+	r	.	.	1	r	.	.	.	.	.	.	.	.	.	r	.	r	.	.	.	r	+	+	+	r	+	.
Genista pilosa	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana bavarica	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	r	.	.	.	+	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana clusii	.	.	.	+	+	.	.	.	+	r	.	.	+	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Gentiana nivalis	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana orbicularis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Gentiana pumila	+	.	.	.	.	.	+	r	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.
Gentiana verna	.	.	.	.	.	r	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	r	.	.	.	+
Gentianella austriaca	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Gentianella germanica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gymnadenia conopsea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hedysarum hedysaroides	.	.	.	.	+	.	1	.	+	r	.	.	.	.	.	.	1	.	+	r	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Helianthemum alpestre	1	+	1	.	1	.	1	r	1	+	+	+	1	r	1	r	1	+	1	+	.	+	1	+	+	.	1	1	1	+	1	+	.	1	+	1	1	1	1	1	+	r	+	.
Helianthemum nummularium agg.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helictotrichon parlatorei	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	1	.	.	.	r	.	r	.	r	.	.	.	.	.	.	.	.	.	.
Heracleum austriacum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium alpinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium glaucum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium hoppeanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium pallescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium pilosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Homogyne discolor	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.
Huperzia selago	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jovibarba hirta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Juncus monanthos	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Knautia maxima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Kobresia simpliciuscula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Larix decidua	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leontopodium alpinum	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leucanthemum atratum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ligusticum mutellinoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linum alpinum	+	+	+	r	.	.	1	r	.	.	.	.	1	r	1	+	.	.	.	.	.	.	+	r	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Loiseleuria procumbens	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	r	.	+	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lotus corniculatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Luzula glabrata	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Luzula sylvatica ssp. sylvatica	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	r	.	1	.	.	.	.	.	.
Meum athamanticum	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Minuartia austriaca	.	r	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	+	.	.	.	.	.	.	r	.	.	.	.	.	.
Minuartia cherlerioides	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Minuartia gerardii	1	r	+	.	.	.	+	r	+	.	1	r	.	r	+	.	.	r	+	.	.	r	.	.	.	.	+	+	.	.	1	r	.	r	.	r	.	r	.	+	+	r	1	.
Minuartia sedoides	3	1	+	r	1	r	+	.	+	1	1	+	.	.	+	+	3	1	2	2	+	.	.	.	.	.	1	+	.	.	.	r	1	.	1	.	1	r	1	.	+	r	+	+
Moehringia ciliata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Myosotis alpestris	.	r	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	1	.
Nigritella nigra	+	r	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	r	.	r	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Plot number	1201		1202		1203		1204		1206		1207		1210		1218		1603		1604		1605		2202		2208		2222		2230		2664		2665		2675		2677		2688		4128		4159	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Noccaea crantzii	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	+	.	1	r	.	r	.	.	+	.	+	.	.	.
Oxytropis montana	.	.	+	+	.	r	.	r	+	r	.	.	+	.	+	+	.	.	.	.	.	.	.	1	1	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Parnassia palustris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Pedicularis portenschlagii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pedicularis rosea	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Pedicularis rostratocapitata	1	r	+	1	1	r	1	r	1	r	.	.	+	r	+	r	.	r	.	r	.	.	.	.	.	+	1	+	+	+	.	r	.	.	+	r	1	r	1	1	.	+	.	+
Pedicularis rostratospicata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pedicularis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pedicularis verticillata	.	+	.	.	.	.	.	r	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	+	.	+	.
Persicaria vivipara	+	+	.	r	+	r	1	r	+	r	1	2	.	.	.	.	.	.	.	r	1	r	.	r	.	.	+	r	.	.	.	.	.	r	.	r	1	r	.	r	1	+	+	r
Petrocallis pyrenaica	.	.	+	r	1	.	.	.	1	.	.	3	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Phyteuma orbiculare	.	.	.	r	.	.	.	r	.	r	.	.	.	.	+	.	+	.	.	.	.	.	.	+	.	.	1	r	+	r	.	.	.	.	.	.	.	.	+	+	.	.	.	.
Picea abies	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella alpina	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella saxifraga	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pinguicula alpina	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	+	+	+	.	.	.	.	.	r	.	r	.	.	.	.	.	.
Pinus mugo	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	-	1	.	.	.	.	.	.	.	r	.	+	.	.	.	+	.	r	.	.	.	.
Poa alpina	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.	+	.	.	.	+	+	1	.
Poa compressa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa supina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala amara	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla aurea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla clusiana	.	.	+	2	+	1	.	.	2	.	.	.	+	2	.	+	.	.	.	.	.	.	1	1	.	2	.	.	2	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Potentilla crantzii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Primula auricula	.	+	.	+	.	r	.	r	.	r	.	.	.	+	1	.	.	.	.	r	.	r	.	+	.	r	.	1	1	1	+	1	.	1	.	1	.	2	.	r	.	.	+	.
Primula clusiana	2	.	.	.	2	.	1	.	1	.	+	.	.	.	.	.	.	.	.	.	+	.	1	.	3	.	3	.	1	.	+	.	1	.	1	.	2	.	2	.	.	.	.	.
Primula elatior	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Primula minima	1	+	.	.	2	2	1	1	.	+	1	.	.	.	.	.	1	.	2	2	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pritzelago alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Pseudorchis albida	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus alpestris	+	.	.	.	.	.	+	r	.	.	+	r	.	.	.	.	1	r	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	+	+	+
Ranunculus hybridus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus montanus agg.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus nemorosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhinanthus glacialis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhododendron hirsutum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.	.	.	.	.	.	.	.	.	+	.	1	2	3	1	1	.	.	.	.	.	.
Rhodothamnus chamaecistus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salix alpina	.	+	.	.	+	.	.	r	.	.	1	r	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	r	.	.	+	+	.	+	1	+	.	1	.	.	+	.	1	.
Salix reticulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	r	.	r	.	.	1	.	+	1
Salix retusa	.	1	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	+
Saussurea pygmaea	.	.	.	.	+	+	.	.	.	+	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga aizoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+
Saxifraga androsacea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga aphylla	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga caesia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.	.	+	1	.	.	.	.	.	.	+
Saxifraga exarata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga moschata	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga paniculata	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	+	r	.	.	+	.	.	.	.	+	+	+	+	1	.	.	1	.	.	1
Saxifraga sedoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Saxifraga stellaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga tridactylites	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Selaginella selaginoides	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	+	.
Sesleria albicans	+	4	1	2	2	1	1	1	.	2	.	.	.	.	.	1	.	.	1	2	1	1	+	.	1	.	1	3	+	.	2	1	.	1	1	1	.	1	1	3	.	r	.	r
Sesleria ovata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.

Plot number	1201		1202		1203		1204		1206		1207		1210		1218		1603		1604		1605		2202		2208		2222		2230		2664		2665		2675		2677		2688		4128		4159	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Silene acaulis	1	.	1	1	.	+	1	+	1	1	2	2	1	.	1	2	2	+	2	1	2	+	+	.	.	2	1	.	.	+	2	2	2	1	1	2	2	2	1	2	1	1	3	2
Silene alpestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	+	.	.	.	+	+	.	.	.	.	.
Silene pusilla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Soldanella alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Soldanella austriaca	.	r	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	+	.	r	.	.	.	.	.	.	.	.	.	.	1	r	1	r	.	r	.	.	.	+	.	.	.	.
Taraxacum sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Thymus praecox	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tofieldia calyculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	+	.	+	.	1	.	.	.	.	.	.
Tofieldia pusilla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.
Trifolium pratense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trisetum alpestre	.	.	1	.	.	.	.	.	1	.	.	.	+	.	1	.	.	.	.	.	.	.	1	.	+	.	.	.	1	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.
Trollius europaeus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vaccinium gaultherioides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vaccinium vitis-idaea	.	r	.	.	.	.	.	.	.	.	1	+	.	.	.	.	1	2	.	1	+	+	.	2	.	.	.	r	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Valeriana celtica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
Valeriana montana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Valeriana saxatilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica aphylla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.
Viola alpina	1	.	1	.	.	.	1	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Viola biflora	1	1	.	.	.	.	+	1	+	1	.	.	.	.	.	r	.	r	.	r	.	.	.	.	.	.	+	+	.	.	.	.	.	r	.	.	.	r	.	+	.	.	.	.

Plot number	4166		4172		4420		5036		5037		5052		5058		5064		6044		6046		6072		6076		6095		6126		7141		7142		7181		7191		7371	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Achillea clavennae	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Achillea sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Agrostis alpina	.	.	.	r	.	.	2	.	.	r	1	r	+	1	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	1	2	+	1	+	.
Agrostis rupestris	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	.	.	.	.
Alchemilla sp.	.	.	.	.	.	.	.	.	.	1	.	.	.	r	.	.	.	.	.	.	.	r	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Androsace chamaejasme	.	r	+	r	.	.	1	+	+	+	+	1	+	1	1	1	.	.	.	.	+	r	+	1	1	+	.	.	+	+	+	.	1	+	1	+	.	+
Androsace lactea	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Anemone narcissiflora	.	.	.	.	.	.	.	.	.	r	.	r	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Anthoxanthum alpinum	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthyllis vulneraria ssp. alpicola	.	.	+	+	.	.	.	.	.	.	+	.	.	+	.	.	+	+	.	.	1	+	+	2	.	1	.	.	.	.	.	1	.	.	.	.	1	1
Arabis stellulata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arctostaphylos alpinus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Arenaria ciliata	+	.	.	.	1	.	+	.	1	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	+	.	.	.
Arenaria grandiflora	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Armeria alpina	+	+	.	.	+	+	1	+	.	1	.	r	.	.	+	+	.	.	.	r	.	+	.	.	.	.	.	.	+	r	.	.	+	.	.	1	+	.
Asperula neilreichii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aster alpinus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Aster bellidiastrum	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Astragalus alpinus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Astragalus frigidus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Astragalus sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Athamanta cretensis	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bartsia alpina	1	+	1	r	+	r	.	+	+	+	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	+	r	.	+	.	r	+	+	.	.	.	.
Biscutella laevigata	.	.	.	.	.	r	1	.	.	.	.	.	.	.	1	.	.	.	.	.	+	.	.	.	.	+	.	.	.	1	+	+	+	1	+	+	1	r
Calamintha acinos	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Campanula alpina	.	.	.	r	.	.	1	+	.	+	.	.	.	.	1	.	+	.	.	r	.	.	.	.	.	.	+	.	1	r	+	.	+	.	+	r	.	.
Campanula cochleariifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Campanula pulla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Campanula scheuchzeri	.	.	.	.	.	.	1	+	.	r	.	.	.	r	.	.	.	.	.	r	.	.	.	.	.	.	.	r	.	.	.	r	.	r	.	.	+	+
Carduus defloratus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Carex atrata	.	.	+	.	.	.	1	.	.	1	.	2	.	+	.	.	.	.	+	1	+	1	.	r	.	.	.	+	1	+	+	.	1	+	+	1	.	.
Carex capillaris	.	.	.	.	.	.	1	.	.	+	+	r	1	+	+	.	.	.	+	.	1	+	.	r	.	.	+	+	.	.	+	.	.	.	.	.	.	.
Carex ferruginea	.	.	.	.	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Carex firma	5	5	5	5	5	5	3	4	5	2	4	4	3	3	5	5	3	3	3	3	5	4	3	2	2	3	4	5	5	5	3	2	4	2	5	5	5	5
Carex fuliginosa	.	.	1	r	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carex parviflora	+	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carex rupestris	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carex sempervirens	+	.	+	.	.	.	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	3	.	1	.	+	.	.
Cerastium carinthiacum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Chamorchis alpina	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
Coeloglossum viride	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	.	.	r	.	+	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	+
Crepis aurea	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crepis jacquinii	.	.	.	.	.	.	.	.	.	.	1	.	+	1	.	.	.	.	.	r	.	.	+	.	+	r	.	.	.	.	.	.	.	.	.	.	.	r
Crepis terglouensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dianthus alpinus	+	+	.	.	.	.	.	+	+	r	.	.	.	.	.	+	.	.	.	.	+	.	+	r	.	.	+	.	.	.	.	+	+	.	.	r	+	.
Doronicum calcareum	.	.	.	.	.	+	+	1	+	1	r	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	+	+	.	r	.	.	.	+	.	+	.	.
Doronicum glaciale	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Draba aizoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Draba sauteri	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dryas octopetala	2	3	2	3	2	3	1	1	2	2	.	1	1	2	2	2	2	2	2	4	3	2	2	5	3	3	3	4	3	4	2	.	2	4	.	1	3	2
Empetrum hermaphroditum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Empetrum nigrum agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.
Erica carnea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.

Plot number	4166		4172		4420		5036		5037		5052		5058		5064		6044		6046		6072		6076		6095		6126		7141		7142		7181		7191		7371	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Erigeron glabratus	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia officinalis	.	.	.	.	.	.	+	.	1	.	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia salisburgensis	.	.	.	.	.	.	.	r	.	r	+	.	.	.	.	.	.	r	.	.	+	r	.	.	.	r	+	r	.	.	1	.	.	.	.	.	+	.
Festuca nigrescens	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	r	.	.
Festuca pulchella	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	.	.	.	.	.
Festuca pumila	1	r	+	r	+	+	2	.	+	1	.	2	.	+	1	.	2	.	1	+	2	1	1	.	+	1	.	.	2	.	2	.	2	.	2	.	1	.
Festuca rupicaprina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca versicolor	.	.	+	+	.	.	1	1	+	1	2	+	+	+	2	.	+	1	.	.	.	.	1	2	+	1	.	.	1	.	1	.	2	.	1	.	1	+
Galium anisophyllon	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	r	.	.	1	.	.	.	+	r	+	r	+	r	.	.
Galium noricum	+	r	+	.	.	.	1	r	+	r	.	r	.	r	+	.	+	+	.	.	.	+	.	r	.	.	+	r	+	r	.	.	.	.	.	.	.	.
Genista pilosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana bavarica	.	+	.	.	.	.	.	r	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	r	.	.	.	.
Gentiana clusii	.	.	.	+	.	.	+	+	1	+	1	+	+	1	+	.	.	.	.	.	.	1	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana nivalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.
Gentiana orbicularis	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana pumila	+	.	+	.	.	.	r	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	-	.	.	.	.	.
Gentiana verna	.	.	.	.	.	r	.	+	.	.	.	1	.	.	.	.	+	+	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Gentianella austriaca	.	.	.	r	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	+	.
Gentianella germanica	.	.	.	1	.	.	.	+	+	1	+	.	r	.	+	.	.	r	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.
Gymnadenia conopsea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Hedysarum hedysaroides	+	r	.	.	.	r	.	1	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.	.	.	.
Helianthemum alpestre	1	+	+	.	1	1	1	+	1	+	1	1	+	1	1	+	1	1	+	r	.	+	+	+	+	+	.	1	+	+	.	.	1	r	2	1	1	.
Helianthemum nummularium agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	1	.	.	.	.	.	.
Helictotrichon parlatorei	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	r	.	.	.	r	.	.	.	.	.	.	.	.	.	.
Heracleum austriacum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Hieracium alpinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Hieracium glaucum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium hoppeanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium pallescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.
Hieracium pilosum	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Homogyne discolor	.	.	+	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	1	.	.	.	.
Huperzia selago	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	+	.	+	.	.	.
Jovibarba hirta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Juncus monanthos	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.
Knautia maxima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Kobresia simpliciuscula	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Larix decidua	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	+	.	.	.	.	.	.	.	.	.	.
Leontopodium alpinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leucanthemum atratum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.
Ligusticum mutellinoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linum alpinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Loiseleuria procumbens	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	+	.	.	+	r	.	.	.	.
Lotus corniculatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Luzula glabrata	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Luzula sylvatica ssp. sylvatica	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	1	.	.	.	.	.	.
Meum athamanticum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Minuartia austriaca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Minuartia cherlerioides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Minuartia gerardii	+	+	+	.	+	r	+	1	+	.	+	r	.	.	+	.	.	.	.	+	.	.	+	r	.	.	+	.	+	r	+	.	.	.	.	r	+	.
Minuartia sedoides	+	+	+	1	2	+	1	+	1	1	.	+	+	+	1	+	+	+	+	+	.	.	1	1	.	+	1	1	1	1	2	.	1	+	+	+	2	1
Moehringia ciliata	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Myosotis alpestris	+	+	.	.	+	.	.	.	r	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Nigritella nigra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	r	.	r	.	.

Plot number	4166		4172		4420		5036		5037		5052		5058		5064		6044		6046		6072		6076		6095		6126		7141		7142		7181		7191		7371	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Noccaea crantzii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	r	.	.	.	.
Oxytropis montana	.	.	.	.	.	.	.	+	1	.	1	.	.	.	.	1	.	.	.	.	.	.	2	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Parnassia palustris	.	.	.	.	.	.	.	r	.	1	.	.	.	r	.	.	.	.	+	.	.	.	+	.	.	.	.	+	.	.	.	+	.	.	.	.	.	+
Pedicularis portenschlagii	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pedicularis rosea	.	.	.	.	+	.	.	.	+	.	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Pedicularis rostratocapitata	+	.	.	r	.	+	1	+	1	+	1	+	+	+	1	+	.	.	.	.	.	.	1	1	+	+	+	.	.	.	.	.	+	.	.	r	+	r
Pedicularis rostratospicata	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Pedicularis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pedicularis verticillata	+	+	+	.	.	.	+	r	+	+	.	.	.	.	.	.	+	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Persicaria vivipara	1	+	+	r	+	r	1	1	1	1	+	1	+	+	1	+	+	r	+	r	1	1	+	r	+	.	1	r	1	.	+	+	+	r	+	.	.	r
Petrocallis pyrenaica	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phyteuma orbiculare	.	.	.	.	.	.	+	+	.	.	.	.	.	+	.	.	.	.	.	.	.	r	.	+	+	r	.	.	.	.	+	+	.	.	.	.	+	.
Picea abies	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella saxifraga	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pinguicula alpina	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	+	r	.	.	.	.	+	.	.	.	+	.
Pinus mugo	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa alpina	+	1	.	.	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	+	+	.	r	.	.	+	.	1	.	+	.	+	.	.	.	+	.
Poa compressa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa supina	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala amara	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Potentilla aurea	.	.	.	.	.	r	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
Potentilla clusiana	.	.	.	+	.	.	.	.	.	+	2	2	2	1	.	+	.	+	.	.	.	+	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.
Potentilla crantzii	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Primula auricula	.	.	.	1	.	r	2	+	+	+	1	1	+	1	1	+	.	.	.	+	.	+	.	r	.	1	.	+	.	.	+	r	.	1	.	1	.	1
Primula clusiana	.	.	2	.	+	.	+	.	+	.	.	.	.	.	+	.	+	.	+	.	1	.	+	.	1	.	1	.	.	.	+	.	+	.	+	.	2	.
Primula elatior	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Primula minima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	4	.	.	2	3	1	1	.	.
Pritzelago alpina	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pseudorchis albida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus alpestris	2	r	.	.	1	r	+	.	+	+	1	1	+	+	+	+	.	.	.	r	.	.	+	+	.	.	+	+	+	r	1	.	.	r	.	.	.	.
Ranunculus hybridus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Ranunculus montanus agg.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Ranunculus nemorosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhinanthus glacialis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Rhododendron hirsutum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	2	.	+	.	.	.	.
Rhodothamnus chamaecistus	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salix alpina	.	r	.	.	.	.	.	+	+	+	+	.	+	.	+	+	1	+	1	.	+	.	.	1	.	.	+	.	.	+	.	1	.	.	+	1	.	.
Salix reticulata	+	1	+	+	+	1	.	.	+	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	1	.	.	.	.	.	.	.
Salix retusa	1	r	.	.	1	+	+	.	+	1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	2	1	1	.	.	+	.	.	.	.
Saussurea pygmaea	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	1	+	+	+	.	.	+	+	.	r	+	+	.	.	.	.	.	.	.	.	.	.
Saxifraga aizoides	+	+	.	.	.	r	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.
Saxifraga androsacea	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga aphylla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga caesia	.	.	+	+	+	1	.	.	.	.	+	+	+	r	.	.	.	.	.	.	.	.	1	.	+	+	.	.	.	.	+	.	.	.	.	.	.	1
Saxifraga exarata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga moschata	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga paniculata	+	1	.	.	.	r	.	.	+	.	+	.	.	.	.	+	+	r	+	1	.	.	+	r	.	.	.	+	.	.	.	.	+	.	.	.	.	.
Saxifraga sedoides	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga stellaris	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga tridactylites	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Selaginella selaginoides	+	.	+	.	.	.	+	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.
Sesleria albicans	1	r	1	r	.	1	+	r	.	r	.	.	.	.	.	.	.	.	.	.	1	+	+	2	.	+	.	.	.	+	.	2	.	1	+	2	.	.
Sesleria ovata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Plot number	4166		4172		4420		5036		5037		5052		5058		5064		6044		6046		6072		6076		6095		6126		7141		7142		7181		7191		7371	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Silene acaulis	2	1	1	+	2	2	1	2	1	1	2	1	1	1	1	1	1	2	2	2	1	.	1	1	.	+	2	2	1	1	2	.	1	1	2	1	2	+
Silene alpestris	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Silene pusilla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Soldanella alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Soldanella austriaca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	r	.	.
Taraxacum sp.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thymus praecox	.	.	.	.	.	.	1	r	.	2	.	+	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tofieldia calyculata	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	+	.	.	.	.	.	r
Tofieldia pusilla	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.
Trifolium pratense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Trisetum alpestre	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	1	.	.	.	.	.	+	.	1	.	+	.	.	.	+	.	.	.	.	.	+	.
Trollius europaeus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Vaccinium gaultherioides	.	.	.	+	.	.	+	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vaccinium vitis-idaea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	1	.	.	+	1	1	+	.	.	+	1	.	.	.	.
Valeriana celtica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Valeriana montana	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Valeriana saxatilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica aphylla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Viola alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	1	.	+	.	.	.
Viola biflora	.	.	.	.	.	.	+	.	.	.	.	.	.	r	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	r	+	.	+	r	+	r	.	r

Table 6: Species list of *Seslerio-Caricetum sempervirentis* of both investigation periods. a…1990, b…2013

Plot number	1227		1231		1233		1236		2212		2214		2215		2220		2225		2227		2231		2232		2233		2670		2685		4155		4175		5051		6047		6051	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Achillea atrata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.
Achillea clavennae	.	.	.	.	.	.	.	.	+	1	+	1	.	+	.	r	.	.	.	.	1	1	.	.	1	r	.	.	.	.	.	.	.	.	+	+	.	.	.	.
Achillea clusiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	r
Aconitum lycoctonum ssp. vulparia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aconitum napellus	.	.	.	.	.	.	1	r	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Adenostyles glabra	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Agrostis alpina	.	r	.	.	1	.	.	.	.	.	1	+	.	1	.	.	.	2	.	.	+	.	.	.	2	.	.	.	.	.	.	r	+	+	2	1	.	.	.	.
Agrostis capillaris	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Agrostis rupestris	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	+
Ajuga pyramidalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Alchemilla sp.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	r	1	1	.	.
Androsace chamaejasme	+	+	+	+	.	+	.	.	+	.	.	.	+	.	.	.	1	1	.	.	.	.	.	.	+	.	.	.	.	.	+	+	+	+	1	1	.	.	.	.
Androsace lactea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
Anemone narcissiflora	1	.	1	1	1	r	.	.	.	.	2	1	1	+	1	1	+	+	1	2	1	+	1	.	1	1	.	.	.	+	+	r	+	r	+	+	1	r	+	.
Anthoxanthum alpinum	.	.	+	.	.	.	.	.	.	.	.	+	1	r	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	+	.	2	r	.	.
Anthyllis vulneraria ssp. alpicola	+	1	1	1	1	1	.	.	+	+	2	1	1	+	+	.	+	.	1	r	1	+	1	.	1	+	2	r	+	1	.	.	.	+	2	+	1	2	1	1
Arabis alpina ssp. alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arabis bellidifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	r
Arabis ciliata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arabis hirsuta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arctostaphylos alpinus	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arenaria ciliata	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	r	.	.	.	.
Arenaria serpyllifolia	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Armeria alpina	.	r	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	1	.	.	.	.	.	.	.
Arrhenatherum elatius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asperula neilreichii	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aster alpinus	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aster bellidiastrum	.	.	+	1	1	+	.	.	.	.	+	.	1	.	2	.	2	r	+	.	.	.	.	r	1	.	.	.	+	.	.	.	1	.	+	.	+	.	2	.
Astragalus frigidus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Astrantia major	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Athamanta cretensis	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bartsia alpina	2	r	.	r	1	.	.	.	.	.	+	r	+	+	+	r	+	.	+	.	+	r	+	.	1	+	.	.	.	.	.	r	+	+	+	+	+	+	+	.
Betonica alopecuros	.	.	.	.	.	.	1	.	+	r	.	.	.	.	1	2	.	.	2	2	1	.	2	2	.	.	2	2	2	2	.	.	.	.	.	.	.	.	1	.
Biscutella laevigata	+	r	+	+	+	r	.	.	1	r	+	r	1	r	+	r	.	r	.	.	1	r	+	.	1	+	.	.	.	r	.	.	.	.	.	.	.	.	.	.
Botrychium lunaria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.
Briza media	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	+
Buphthalmum salicifolium	.	.	.	.	.	.	2	.	+	.	.	.	.	.	.	.	.	.	.	.	1	.	1	r	.	.	1	2	.	+	.	.	.	.	.	.	.	.	.	.
Calamagrostis varia	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Calamintha acinos	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	r	.	+	.	r	.	.	.	r	.	r	.	.	.	.	.	.	.	.	.	.
Calamintha alpinum	.	.	.	.	.	.	2	r	.	.	.	.	.	.	.	r	.	.	1	.	1	.	1	.	.	.	1	.	+	.	.	.	.	.	+	.	1	+	.	+
Callianthemum anemonoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Campanula alpina	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Campanula cespitosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Campanula cochleariifolia	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Plot number	1227		1231		1233		1236		2212		2214		2215		2220		2225		2227		2231		2232		2233		2670		2685		4155		4175		5051		6047		6051	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Campanula pulla	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.
Campanula scheuchzeri	+	.	+	.	+	.	1	.	.	.	+	.	.	.	1	r	.	r	1	r	.	r	.	r	.	r	.	r	1	+	+	r	.	+	+	+	.	.	.	r
Carduus defloratus	.	.	.	.	.	.	1	.	1	1	.	+	.	.	1	+	+	.	1	+	1	1	1	+	.	.	1	+	2	r	.	.	+	.	+	.	+	r	2	+
Carex atrata	.	.	.	.	+	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	1	.	+	r	.	.
Carex capillaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	r	.	r	.	+	.	.	.	.
Carex ferruginea	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	2	.	.	.	.	.	.	1	.	.	.	.	+	.
Carex firma	.	5	+	3	1	.	.	.	+	.	.	.	+	.	.	.	.	3	.	.	.	.	.	.	.	.	1	.	.	.	+	+	+	+	+	3	.	.	.	.
Carex ornithopoda	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	2	.
Carex sempervirens	3	r	5	1	3	+	4	5	3	2	3	3	4	4	4	4	4	2	4	4	4	4	4	4	4	4	+	5	3	4	2	+	3	1	.	+	4	2	4	3
Carlina acaulis	.	.	.	.	.	.	+	.	1	1	.	.	.	.	.	+	.	.	.	.	1	.	1	1	.	.	.	.	+	1	.	.	.	.	.	.	.	.	+	1
Centaurea montana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerastium alpinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerastium arvense	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	+	.	+	+	+	.
Cerastium carinthiacum	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Cerastium holosteoides	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chaerophyllum villarsii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Chamorchis alpina	.	.	.	r	.	r	.	.	.	r	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cirsium erisithales	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	2	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Cirsium spinosissimum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Coeloglossum viride	+	.	.	.	+	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	r	-	.	.	.
Crepis aurea	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.
Crepis jacquinii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cynosurus cristatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Dactylorhiza maculata	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daphne mezereum	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Deschampsia cespitosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Dianthus alpinus	1	r	+	+	1	.	.	r	+	+	+	.	+	r	.	r	1	+	1	r	1	+	+	.	1	+	.	r	.	.	.	.	.	.	+	+	.	.	.	r
Doronicum calcareum	.	+	.	+	.	.	.	.	.	.	.	.	+	r	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Doronicum glaciale	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Draba aizoides	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Dryas octopetala	.	.	.	1	1	1	.	.	.	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	+	.	1	.	.
Epilobium alsinifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Erica carnea	.	.	.	.	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.	2	.	+	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.
Erigeron glabratus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia nemorosa	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia officinalis	.	.	.	.	.	.	.	.	.	.	.	r	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	.	+	.	.	+
Euphrasia salisburgensis	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	r	+	r	.	.	.	.
Euphrasia stricta	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca nigrescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	+	.
Festuca pulchella	.	r	.	.	.	r	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca pumila	.	r	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	+	2	2	.	.	.
Festuca rupicaprina	.	.	.	.	.	.	.	.	.	.	1	+	.	1	.	r	+	.	+	.	.	.	.	.	+	1	1	.	.	.	.	.	.	.	+	.	.	r	.	.
Festuca sp.	.	.	.	2	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca versicolor	2	r	+	.	.	+	+	+	1	2	2	.	.	.	.	.	2	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.
Galium anisophyllon	+	.	1	r	1	+	1	1	+	.	+	1	+	1	.	r	+	+	.	r	1	r	1	r	1	r	.	.	+	.	.	.	.	.	1	+	+	.	+	r

Plot number	1227		1231		1233		1236		2212		2214		2215		2220		2225		2227		2231		2232		2233		2670		2685		4155		4175		5051		6047		6051	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Galium lucidum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium meliodorum	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium noricum	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	r	.	.	+	+	.	.
Gentiana bavarica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	+	.	.	.	.	.	.
Gentiana clusii	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.
Gentiana nivalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Gentiana pannonica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana pumila	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Gentiana sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Gentiana verna	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	r	.	.	+	.	.	.	+	r	.	r	.	.
Gentianella austriaca	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	+	.	.	.	+	.	1	.	+	.	.	r	.	.	.	.	.	.	.	.
Gentianella germanica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	+	.	.	.	.
Gentianopsis ciliata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Geranium sylvaticum	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Geum rivale	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Globularia nudicaulis	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Gymnadenia conopsea	.	.	.	r	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Hedysarum hedysaroides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	r	1	.	.	+	.	.	.	.	.	.
Helianthemum alpestre	+	+	1	1	+	+	.	.	.	2	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	+	1	.	r	.	.
Helianthemum nummularium agg.	1	.	+	r	+	+	+	.	+	.	2	2	+	+	1	2	1	1	2	1	2	2	2	+	2	1	1	1	2	1	.	.	.	+	1	.	3	1	2	1
Helictotrichon parlatorei	.	r	.	.	.	.	.	.	+	.	.	.	.	.	.	r	.	.	.	.	3	2	4	.	.	.	.	1	1	3	.	.	.	.	.	.	.	.	.	r
Heracleum austriacum	.	.	.	.	.	.	+	.	1	.	.	.	.	.	1	.	.	.	2	2	2	.	2	+	.	+	+	1	+	2	.	.	.	.	.	.	.	.	2	+
Heracleum sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Heracleum sphondylium ssp. elegans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Hieracium alpinum	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium bifidum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium glabratum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium glanduliferum	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Hieracium glaucum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Hieracium hoppeanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium nigrescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium oxyodon	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium pilosella	.	.	.	.	.	.	.	r	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium pilosum	.	.	.	.	.	.	.	.	.	.	1	+	.	+	+	r	.	.	+	r	+	r	.	+	+	.	.	r	.	.	.	.	.	.	.	.	+	+	+	+
Hieracium sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	+	.
Hippocrepis comosa	.	.	.	.	.	.	+	1	+	.	.	.	.	.	.	.	.	.	1	r	.	.	+	.	.	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.
Homogyne discolor	.	.	.	+	1	1	.	.	.	.	1	.	+	1	+	r	+	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	+	+	.	.	1	2	.	+
Hypericum maculatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jovibarba hirta	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Juncus monanthos	.	.	.	+	.	r	+	1	.	.	.	+	+	.	.	+	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	r	.	r
Kernera saxatilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Knautia arvensis	.	.	.	.	.	+	.	.	.	+	.	r	.	.	.	1	.	r	.	1	.	.	.	+	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	1
Knautia maxima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	+	1	.	1	.	r	1	.	.	.	.	.	.	.	.	.	.	.
Kobresia simpliciuscula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Larix decidua	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Plot number	1227		1231		1233		1236		2212		2214		2215		2220		2225		2227		2231		2232		2233		2670		2685		4155		4175		5051		6047		6051	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Laserpitium latifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leontodon hispidus	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	1	.	2	.	.	.	.	.	.	.	.	.	.	.	+	.	2	.
Leucanthemum atratum	.	.	+	.	+	.	.	.	.	.	+	r	.	r	.	+	.	.	1	r	+	1	+	1	+	1	.	+	+	1	.	.	.	+	.	.	.	.	.	r
Ligusticum mutellina	.	.	.	.	+	.	.	.	.	.	.	.	+	1	+	.	.	.	.	.	.	.	.	.	+	2	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Lilium martagon	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linum alpinum	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	r	.	.
Linum catharticum	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	r
Loiseleuria procumbens	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lotus alpinus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.
Lotus corniculatus	.	.	.	.	.	.	1	+	1	+	.	+	.	+	1	+	1	r	+	+	+	r	+	+	+	1	.	+	.	2	.	.	.	r	2	r	2	+	1	+
Luzula glabrata	3	.	+	.	+	.	.	+	.	.	+	.	2	+	+	.	.	.	.	.	.	.	+	+	+	1	.	.	.	.	.	.	.	.	+	.	.	r	.	.
Luzula luzuloides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Luzula sylvatica ssp. sylvatica	.	.	.	1	.	+	.	.	.	.	.	.	.	1	.	.	.	+	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Mercurialis perennis	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Meum athamanticum	.	.	.	.	.	r	.	.	.	r	.	+	.	.	.	.	.	.	3	2	1	+	1	+	.	+	.	.	+	+	.	.	.	r	.	.	.	.	.	+
Minuartia austriaca	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.
Minuartia cherlerioides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Minuartia gerardii	+	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	r	.	.	+	r	.	.	.	.	.	.	.	.	.	r	.	.	+	r	.	.	.	.
Minuartia sedoides	.	+	.	.	.	.	.	.	.	.	+	+	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	.	.	.	.
Moehringia muscosa	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Myosotis alpestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.
Noccaea crantzii	1	r	+	r	+	r	.	.	.	.	.	r	+	.	+	.	1	+	.	.	+	.	.	.	.	.	.	.	+	.	.	.	+	r	1	+	.	r	.	.
Orchidaceae	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	+	.	.	.	.	.	.	.	.	.	.
Oreochloa disticha	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
Origanum vulgare	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Oxytropis montana	+	r	.	r	1	r	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	+	.	.	.	.	.	.	.	.	.	+	.	r	.	+	.	.	.	.
Parnassia palustris	1	.	+	.	+	.	.	.	.	.	.	r	.	+	.	.	+	.	.	r	.	.	.	.	+	+	.	.	.	.	.	r	.	+	+	r	.	+	.	r
Pedicularis foliosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pedicularis palustris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Pedicularis rostratocapitata	.	+	.	+	+	r	.	.	1	r	+	.	.	.	.	.	+	+	+	.	+	.	.	.	1	r	.	.	.	.	.	r	+	+	+	+	.	.	.	.
Pedicularis rostratospicata	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Pedicularis sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Pedicularis verticillata	.	.	.	r	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	+	.	.	.	.	+	r	.	.	.	.	1	.	+	+	1	.	.	r	.	.
Persicaria vivipara	1	r	+	+	2	r	.	.	.	.	+	r	.	r	+	.	1	+	+	r	+	.	+	.	+	r	.	.	.	.	2	1	1	+	1	1	.	r	.	.
Phleum hirsutum	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	r	.	.	1	+	+	.	1	+	.	.	1	r	+	+	.	.	.	.	.	.	.	.	+	.
Phleum rhaeticum	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Phyteuma orbiculare	+	.	.	r	+	r	.	.	+	r	1	r	+	r	+	r	+	r	+	r	1	r	1	.	1	r	.	+	+	r	.	r	.	.	+	+	+	r	+	.
Picea abies	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	r	.	.	.	.	.	.	.	.	.	.
Pimpinella alpina	+	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	1	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella major	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella saxifraga	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Pinguicula alpina	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pinus mugo	.	.	.	.	.	.	.	.	-	2	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	1	.	.	+	r	.	.	.	.	.	.	.	.	+	r
Poa alpina	1	.	.	.	.	.	+	1	.	.	1	+	1	+	+	.	.	.	1	.	.	.	.	.	.	r	.	+	.	.	+	r	.	1	.	.	1	r	.	2
Poa cenisia	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Plot number	1227		1231		1233		1236		2212		2214		2215		2220		2225		2227		2231		2232		2233		2670		2685		4155		4175		5051		6047		6051	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Poa minor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Poa pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala amara	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	r	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Polygonatum verticillatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla aurea	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	+	1	.	.	.	+	.	.	.	+	+	.	+	r	.	.
Potentilla brauneana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Potentilla clusiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
Potentilla crantzii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	+	.	.	.	.	.
Potentilla sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Prenanthes purpurea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Primula auricula	+	.	+	+	.	r	+	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	r	.	r	.	.	.	r	.	r	1	1	.	1	.	.
Primula clusiana	+	.	+	.	+	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	+	.	.	.	1	.	.	.	.	.	.	.	+	.	.	.	.	r	.	.
Primula elatior	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.
Primula minima	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pritzelago alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Pseudorchis albida	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pulsatilla alpina agg.	.	.	.	.	.	.	.	.	1	.	+	1	.	.	+	.	.	.	+	1	2	+	1	r	.	.	.	1	1	.	.	.	.	.	.	.	.	r	1	.
Ranunculus alpestris	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	1	r	.	.	.	.	.	.
Ranunculus bulbosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus hybridus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	+	r	+	.	.	.	.	.	.	.	.	.	.	.
Ranunculus montanus agg.	1	.	+	+	1	r	+	.	1	1	1	.	+	+	1	.	1	+	+	.	1	+	1	.	1	+	1	.	.	.	1	.	+	.	+	r	1	.	1	.
Ranunculus nemorosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.
Ranunculus repens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Rhinanthus glacialis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	+	+	.	.	1	1	.	+	1	.	.	.	.	.	.	.	.	+	+
Rhododendron hirsutum	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhodothamnus chamaecistus	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rumex alpestris	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sagina saginoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Salix alpina	1	.	+	+	.	.	.	.	.	.	.	2	+	+	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	+	.	.	1	.	.
Salix appendiculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Salix reticulata	.	.	.	.	.	.	.	.	.	.	.	.	3	1	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	+	+	.	.	.	.	.	.	.	.
Salix retusa	.	.	.	.	1	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1	r	.	.	.	.	+	.	2	.	.	.	.	.	.	.
Saussurea discolor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saussurea pygmaea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
Saxifraga aizoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	r	.	.	.	.	.	.
Saxifraga caesia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga moschata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga paniculata	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	+	.	.	.	r	.	.
Scabiosa lucida	.	.	1	.	.	.	1	.	1	.	1	.	.	.	.	.	1	.	1	.	1	.	1	.	+	.	1	.	1	.	.	.	+	.	2	.	1	.	+	.
Sedum album	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedum atratum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Selaginella selaginoides	.	.	.	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	+	.	+	.	.	.	.	r	.	.
Senecio abrotanifolius	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Sesleria albicans	2	4	2	3	4	3	2	.	2	1	2	2	1	2	3	3	3	4	2	1	+	2	1	1	3	2	2	2	2	+	3	5	1	4	.	+	.	.	1	.
Silene acaulis	.	1	.	+	1	+	.	.	.	.	+	.	+	r	.	.	+	1	.	.	.	.	.	.	+	+	.	.	.	.	3	r	+	+	2	2	.	+	.	.

Plot number	1227		1231		1233		1236		2212		2214		2215		2220		2225		2227		2231		2232		2233		2670		2685		4155		4175		5051		6047		6051	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Silene alpestris	.	.	.	.	.	.	.	r	.	.	.	.	.	r	.	.	.	.	+	r	1	+	.	.	.	.	.	r	.	.	.	.	.	+	.	.	.	.	.	.
Silene pusilla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.
Silene vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.
Soldanella alpina	+	.	.	r	.	.	.	.	.	.	+	.	1	.	1	.	.	.	+	.	.	.	1	.	1	.	+	.	+	.	+	.	.	.	.	.	1	.	1	.
Soldanella austriaca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	r
Solidago virgaurea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Spergula arvensis	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Taraxacum sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Thesium alpinum	.	.	.	+	.	.	+	.	+	.	.	+	.	.	.	.	.	.	.	.	+	.	+	.	+	+	.	r	.	r	.	.	.	.	.	.	.	+	.	.
Thymus praecox	.	.	.	r	.	r	2	r	+	r	+	.	.	.	+	.	1	r	.	.	+	.	.	.	+	.	.	.	.	r	.	.	.	.	2	r	1	r	.	.
Tofieldia calyculata	.	r	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Tofieldia pusilla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Traunsteinera globosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium pallescens	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium pratense	.	.	.	.	.	.	1	+	.	.	1	+	+	1	.	.	+	.	+	r	.	.	1	r	.	+	.	+	.	1	.	.	.	.	.	.	.	r	1	r
Trifolium repens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trisetum alpestre	.	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
Trollius europaeus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	+	2	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Vaccinium gaultherioides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vaccinium myrtillus	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	2	.	.
Vaccinium vitis-idaea	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Valeriana celtica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
Valeriana montana	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	+	.
Valeriana saxatilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Valeriana tripteris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
Veratrum album ssp. album	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica alpina	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Veronica chamaedrys	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Viola alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Viola biflora	.	.	+	2	.	1	+	1	.	.	.	+	.	r	1	r	+	r	.	.	1	.	1	.	1	.	.	.	.	r	+	r	1	r	+	.	.	.	.	.

Plot number	7151		7231		7452		7521		7541		7562		7571		7722	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Achillea atrata	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.
Achillea clavennae	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Achillea clusiana	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Aconitum lycoctonum ssp. vulparia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aconitum napellus	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.
Adenostyles glabra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Agrostis alpina	+	.	1	+	+	.	.	.	.	.	+	.	.	+	.	r
Agrostis capillaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Agrostis rupestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ajuga pyramidalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Alchemilla sp.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Androsace chamaejasme	.	+	+	.	.	.	.	.	.	+	-	+	.	r	+	+
Androsace lactea	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.
Anemone narcissiflora	+	1	+	.	.	r	.	r	.	.	.	1	.	+	.	.
Anthoxanthum alpinum	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Anthyllis vulneraria ssp. alpicola	1	1	.	.	.	r	1	+	1	+	+	1	.	.	1	.
Arabis alpina ssp. alpina	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Arabis bellidifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arabis ciliata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arabis hirsuta	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Arctostaphylos alpinus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arenaria ciliata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arenaria serpyllifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Armeria alpina	.	.	.	.	.	.	.	+	.	.	.	.	+	r	.	r
Arrhenatherum elatius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asperula neilreichii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aster alpinus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aster bellidiastrum	.	.	.	.	+	.	.	.	+	.	1	.	+	.	+	.
Astragalus frigidus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Astrantia major	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Athamanta cretensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bartsia alpina	.	+	.	.	+	r	+	.	+	+	.	+	+	+	.	r
Betonica alopecuros	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Biscutella laevigata	+	.	.	.	.	1	.	+	.	+	+	1	1	+	1	r
Botrychium lunaria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Briza media	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Buphthalmum salicifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Calamagrostis varia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Calamintha acinos	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Calamintha alpinum	.	.	1	.	.	.	+	.	+	.	.	.	.	.	.	.
Callianthemum anemonoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Campanula alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Campanula cespitosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Campanula cochleariifolia	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Plot number	7151		7231		7452		7521		7541		7562		7571		7722	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Campanula pulla	.	.	+	.	.	.	.	.	.	.	-	.	.	.	.	.
Campanula scheuchzeri	+	.	+	.	+	r	1	r	+	.	+	+	+	r	+	r
Carduus defloratus	.	+	1	.	+	.	.	.	1	.	.	.	.	.	.	.
Carex atrata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carex capillaris	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Carex ferruginea	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Carex firma	.	.	+	.	+	2	.	1	.	5	+	4	+	3	4	+
Carex ornithopoda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carex sempervirens	4	4	3	5	4	1	3	1	4	+	3	1	4	1	2	2
Carlina acaulis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Centaurea montana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerastium alpinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerastium arvense	+	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.
Cerastium carinthiacum	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.
Cerastium holosteoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chaerophyllum villarsii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chamorchis alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cirsium erisithales	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Cirsium spinosissimum	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Coeloglossum viride	.	r	.	.	.	.	.	.	.	.	.	.	+	r	.	.
Crepis aurea	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Crepis jacquinii	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Cynosurus cristatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dactylorhiza maculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daphne mezereum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Deschampsia cespitosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dianthus alpinus	+	.	+	+	.	.	.	r	.	.	+	r	+	r	+	.
Doronicum calcareum	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.
Doronicum glaciale	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Draba aizoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dryas octopetala	.	.	.	.	+	1	2	1	.	1	2	3	+	2	2	1
Epilobium alsinifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erica carnea	.	.	.	.	-	.	.	.	.	.	.	.	.	.	.	.
Erigeron glabratus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia nemorosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia officinalis	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Euphrasia salisburgensis	.	.	1	.	+	.	+	.	.	.	+	r	.	.	+	.
Euphrasia stricta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca nigrescens	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Festuca pulchella	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Festuca pumila	+	.	3	.	2	.	.	.	.	2	2	2	1	2	1	+
Festuca rupicaprina	2	.	.	.	.	.	+	.	.	.	1	.	1	.	.	.
Festuca sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca versicolor	.	.	1	.	+	r	2	2	.	+	.	+	.	.	.	.
Galium anisophyllon	1	r	1	1	+	.	+	.	+	.	.	.	+	1	.	.

Plot number	7151		7231		7452		7521		7541		7562		7571		7722	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Galium lucidum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium meliodorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium noricum	.	.	.	.	.	.	.	.	.	.	.	r	.	.	+	.
Gentiana bavarica	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	r
Gentiana clusii	.	r	.	.	.	.	.	+	.	.	.	+	.	.	+	.
Gentiana nivalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana pannonica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana pumila	.	.	.	.	.	.	.	.	.	.	.	r	.	r	+	.
Gentiana sp.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
Gentiana verna	+	.	+	.	.	.	.	r	.	.	.	r	.	.	.	r
Gentianella austriaca	.	.	+	.	.	+	+	.	.	.	.	r	.	.	.	+
Gentianella germanica	.	.	.	.	+	.	.	+	.	.	+	+	+	1	+	.
Gentianopsis ciliata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium sylvaticum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geum rivale	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Globularia nudicaulis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gymnadenia conopsea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hedysarum hedysaroides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helianthemum alpestre	.	.	+	.	+	1	.	r	.	+	.	+	.	.	1	.
Helianthemum nummularium agg.	2	1	.	.	2	+	3	1	2	1	.	1	1	.	.	.
Helictotrichon parlatorei	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.
Heracleum austriacum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Heracleum sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Heracleum sphondylium ssp. elegans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium alpinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium bifidum	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Hieracium glabratum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium glanduliferum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium glaucum	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Hieracium hoppeanum	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium nigrescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium oxyodon	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium pilosella	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium pilosum	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Hieracium sp.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Hippocrepis comosa	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.
Homogyne discolor	+	r	.	.	.	+	+	+	.	.	1	+	+	r	+	+
Hypericum maculatum	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Jovibarba hirta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Juncus monanthos	+	+	1	+	-	+	.	.	.	+	+	.	1	.	+	+
Kernera saxatilis	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Knautia arvensis	.	r	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Knautia maxima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Kobresia simpliciuscula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Larix decidua	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.

Plot number	7151		7231		7452		7521		7541		7562		7571		7722	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Laserpitium latifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leontodon hispidus	.	.	.	.	.	.	2	.	.	.	+	.	+	.	.	.
Leucanthemum atratum	.	1	+	.	+	1	+	+	.	.	.	.	.	.	+	1
Ligusticum mutellina	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Lilium martagon	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linum alpinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linum catharticum	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Loiseleuria procumbens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lotus alpinus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lotus corniculatus	+	.	1	.	.	.	+	.	+	.	.	.	.	.	.	.
Luzula glabrata	+	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Luzula luzuloides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Luzula sylvatica ssp. sylvatica	.	+	.	.	.	r	.	.	.	.	.	.	.	+	.	.
Mercurialis perennis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Meum athamanticum	+	.	.	.	+	.	.	.	.	.	.	+	.	.	.	1
Minuartia austriaca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Minuartia cherlerioides	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Minuartia gerardii	.	r	+	.	.	.	.	.	.	r	.	.	.	.	+	.
Minuartia sedoides	.	.	.	.	.	+	.	.	.	+	.	+	.	+	.	.
Moehringia muscosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Myosotis alpestris	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Noccaea crantzii	.	+	.	.	+	.	.	.	.	.	.	.	+	r	.	.
Orchidaceae	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Oreochloa disticha	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Origanum vulgare	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Oxytropis montana	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Parnassia palustris	.	r	.	.	+	.	.	r	+	r	1	r	1	.	+	r
Pedicularis foliosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pedicularis palustris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pedicularis rostratocapitata	.	.	.	.	.	.	.	+	.	.	.	.	.	r	.	.
Pedicularis rostratospicata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pedicularis sp.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Pedicularis verticillata	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.
Persicaria vivipara	+	r	+	r	+	.	.	r	.	.	+	+	1	+	+	+
Phleum hirsutum	.	.	.	+	.	.	.	.	1	.	.	.	.	.	.	.
Phleum rhaeticum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phyteuma orbiculare	.	.	.	.	+	.	.	r	+	+	.	.	.	.	+	.
Picea abies	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Pimpinella alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella major	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella saxifraga	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Pinguicula alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	r	+	.
Pinus mugo	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.
Poa alpina	.	1	1	1	+	.	1	.	1	.	1	2	1	.	.	1
Poa cenisia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Plot number	7151		7231		7452		7521		7541		7562		7571		7722	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Poa minor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala amara	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygonatum verticillatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla aurea	+	+	+	.	.	.	+	.	.	.	-	.	.	+	.	.
Potentilla brauneana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla clusiana	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Potentilla crantzii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla sp.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
Prenanthes purpurea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Primula auricula	.	+	+	.	.	+	.	1	.	1	.	+	.	1	.	+
Primula clusiana	.	.	.	.	+	.	1	.	.	.	-	.	+	.	+	.
Primula elatior	.	.	+	r	.	.	.	.	.	.	.	.	+	.	.	.
Primula minima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pritzelago alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pseudorchis albida	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Pulsatilla alpina agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus alpestris	.	r	.	.	.	+	.	.	.	.	.	.	.	+	+	+
Ranunculus bulbosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus hybridus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus montanus agg.	1	.	.	r	1	.	1	.	1	.	1	.	1	.	.	.
Ranunculus nemorosus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus repens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhinanthus glacialis	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhododendron hirsutum	.	.	.	.	-	.	.	.	.	.	.	.	.	.	.	.
Rhodothamnus chamaecistus	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	1
Rumex alpestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sagina saginoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salix alpina	+	+	.	.	.	.	.	.	.	.	+	.	.	.	.	+
Salix appendiculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salix reticulata	.	+	.	.	.	+	.	.	.	.	+	.	+	+	+	+
Salix retusa	.	.	.	.	.	.	.	.	.	.	2	.	2	+	1	1
Saussurea discolor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saussurea pygmaea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga aizoides	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
Saxifraga caesia	.	.	.	.	.	.	.	.	.	r	.	.	.	.	+	+
Saxifraga moschata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga paniculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Scabiosa lucida	1	.	+	.	1	.	.	.	1	.	.	.	1	.	.	.
Sedum album	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedum atratum	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Selaginella selaginoides	+	.	.	.	+	.	+	.	.	.	+	.	+	.	+	.
Senecio abrotanifolius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sesleria albicans	3	1	.	.	1	3	3	5	2	2	3	3	3	3	1	2
Silene acaulis	.	+	.	.	.	+	.	r	+	1	1	+	+	+	1	r

Plot number	7151		7231		7452		7521		7541		7562		7571		7722	
year	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Silene alpestris	+	.	+	+	.	r	+	.	.	r	+	.	.	r	.	.
Silene pusilla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Silene vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Soldanella alpina	1	.	.	r	+	.	+	.	.	.	+	.	+	.	.	.
Soldanella austriaca	.	.	.	.	.	r	.	.	.	.	.	.	.	r	.	r
Solidago virgaurea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Spergula arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Taraxacum sp.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Thesium alpinum	.	.	.	.	+	.	+	.	+	r	.	.	.	.	.	.
Thymus praecox	+	.	2	r	+	r	1	r	.	r	.	1	.	.	.	r
Tofieldia calyculata	.	.	.	.	.	.	.	+	.	.	+	.	.	.	+	.
Tofieldia pusilla	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.
Traunsteinera globosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium pallescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium pratense	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium repens	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Trisetum alpestre	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Trollius europaeus	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Vaccinium gaultherioides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vaccinium myrtillus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vaccinium vitis-idaea	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Valeriana celtica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Valeriana montana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Valeriana saxatilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Valeriana tripteris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veratrum album ssp. album	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica chamaedrys	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Viola alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Viola biflora	.	+	+	r	+	.	.	r	.	.	1	.	2	+	.	r

Appendix 5: Curriculum Vitae (Lebenslauf)

	Persönliches
Alexander Gritsch alexander.gritsch@gmail.com	
	Ausbildung
Volks- und Hauptschule der Dominikanerinnen	Sept 1991- Jun 1999
Höhere technische Bundeslehr- und Versuchsanstalt Technologisches Gewerbemuseum (TGM)	Sept 1999- Jun 2004
Reife- und Diplomprüfung	9. Juni 2004
Technische Universität Wien Studienrichtung: Verfahrenstechnik	Okt 2004- Apr 2007
Universität Wien Studienrichtung: Biologie	seit Oktober 2007
Verleihung: Ingenieur	9. Oktober 2008
Abschluss: Bachelor of Science	18. August 2011
	Zivildienst
Rettungs- und Krankentransportwesen Rotes Kreuz Bezirksstelle Purkersdorf-Gablitz	Feb 2005- Jan 2006
	Berufserfahrung
Kaufmännischer Angestellter IBM Austria	Juli 2001
Ferialpraktikant Heinrich Musil GmbH	Juli 2002 und Juli 2003
Labormitarbeiter Staatliche Versuchsanstalt TGM	Jul 2004- Jan 2005; Feb 2006- Sept 2009
Rettungs- und Krankentransportdienst Rotes Kreuz Bezirksstelle Purkersdorf-Gablitz	seit Juli 2009
	Engagements
Ehrenamtlicher Mitarbeiter Rotes Kreuz Bezirksstelle Purkersdorf-Gablitz	seit Februar 2006
Biosphere Volunteer Biosphärenpark Wienerwald	diverse Pflegetermine
	Zusatzqualifikationen
A, B	Führerschein
Auto CAD, ArcGIS, MS Office, Pro Engineer, R	EDV
Englisch	Sprachen