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Crepido mollis-Agrostietum ass. nova and *Poo-Trisetetum* KNAPP ex OBERD. 1957 - grassland associations in the NE part of the Nízke Tatry Mts. and their present species composition as the consequence of changes in grassland utilization

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Abstract: Especially terraces were characteristics for the surroundings of Liptovská Teplička (village). Grasslands occurred mainly in the alluvium of streams and on remote mountain ridges. They mostly were typical grasslands with little timber barns. As the consequence of collectivization of agricultural production the management on grasslands totally changed after 1975. Mountain meadows have been changed to intensive pastures, after recultivation a part of terrace fields changed to intensive grasslands, a part of them has been grassed. Grasslands on grassed fields and recultivated areas belong to the association *Poo-Trisetetum*, for the rest of semi-natural grasslands was described a new association *Crepido mollis-Agrostietum* with two subassociations. It is a species-rich association endangered especially by a stop in utilization. Long-term extensively grazed or unutilized grasslands here belong to alliances *Polygalo-Cynosurenion, Nardo-Agrostion tenuis* and *Poion alpinae*.

Keywords: *Polygono−Trisetion*, mountain grasslands, management impacts on species composition.

Introduction

Grasslands utilization and their species compositions has gone in Slovakia (and not only here) through such great changes during the last forty years, that the classification of presently occurring plant associations into the used Central-European vegetation system (created for traditionally semi-intensively utilized grassland communities) is often problematic. If in certain areas are original stands, they cannot be understand as fully original: because of some component of traditional way of their utilization is missing (absence of fertilization, less mowing, etc.). For this reason their species composition is in change – often in a certain stage of succession towards fallow land. These stages are sometimes very species rich – but they are always only temporary. It is questionable how to evaluate these different stages, mainly if we have no data about their structure in the past, when they were utilized in traditional way. These problems appeared also in grasslands classification in the study area. The current semi-natural meadows represent mostly only the fragments of former large meadows with changed species composition.

Study area

The village Liptovská Teplička is situated in the E part of the Nízke Tatry Mts. under its lateral ridge from the Veľká Vápenica hill. It lies in altitudinal range from 846 m (alluvium of the Čierny Váh river) to 1429 m a.s.l. (Panská hoľa). It is one of the highest located agricultural villages in Slovakia.

The relief of the territory can be classified as fluvially cutted upland to highland, formed by differently steep slopes, plateaus and valleys of watercourses. From geological viewpoint the area is built by two tectonic units: Hronicum (conglomerates, sandstones, slates, basalts and andesites), and complex of Mesozoic rocks (dolomites, limestones, slates and sandstones). Soils are represented by rendzinas, cambisols and fluvisols. The area belongs to the cold climatic zone with average annual precipitation 800−1000 mm, and maximally 10 summer days (with temperature higher than 25°C). Average temperature in July is 12−16°C, in January -6°C. The area has extreme relief-climatic conditions for agriculture. It lies in the zones of beech-fir forests, but spruce is currently predominant species.

Methodology

Phytosociologial material was obtained during the fieldwork carried out in the years 1982, 1992, 1993, and 1995 and was elaborated using the methods of the Zürich-Montpellier school. Nomenclature follows MARHOLD & HINDÁK (1998).

Impact of economic activity of man on meadow and pasture vegetation

The village Liptovská Teplička arose in the 17th century in the period of „goral“ colonization (DOBROVODSKÁ & ŠTEFUNKOVÁ 1996). The colonists grubbed the forests and changed them to fields and grasslands. Fields have been formed nearer to

the village by terracing and scavenge of stones mainly from hardly accessible sites; grasslands on farer ridges and waterlogged alluvium of brooks. From management viewpoint they were very important, besides silviculture the main means of subsistence of inhabitants was animal production.

The way of grassland utilization and their extent is relatively good documented mainly from the years 1894−96, when the dispersed plots of agricultural soil were joined (ŽIGRAI 1971). Then have been created the typical hay-barn meadows on the mountain ridges above the village. Under this term we comprehend the regularly managed meadows with little timber chalet-hayloft barns, where hay was temporarily stored. It was done for spatial reasons and because of risk reduction of potential fires that can be dangerous for the village with wooden houses. Hay was transported to the village on sleighs during winter or in spring.

Perfect and well considered system of management of the hay-barn meadows above Liptovská Teplička has been worked. They were mowed simultaneously and mowing was a great social event. This fact is underlines the significance of meadows in the system of agricultural production. Not only the time of common mowing was planned but also the mood and rotation of fertilization. They were fertilized by lairage by sheep during whole year or only in spring and then after mowing gradually on meadows of individual owners. Even in 1970, 854 ha of meadows and 105 ha of pastures (MICHÁLEK 1973) were managed in this way. In this period can be found here 527 barns (topographic maps 1:10.000 from 1968, mapped in 1962). This area together with the Veľká Fatra Mts. and Važecké lúky grasslands belonged to the three largest hay-barn areas of the region Liptov and Slovakia, too. Not only large meadows situated on the ridge were managed, but also smaller isolated areas on lateral ridges (here were hay-barns, too), on terraces and higher alluvia of the Čierny Váh river and its tributaries, on the slopes above them and also in arable land. Temporary meadows had represent part of crop rotation on arable land. Also less stony, muddy slopes of field terraces, sometimes to 6 m high (RUŽIČKOVÁ et al.1999) were mown as permanent meadows. Only certain parts of the cadastre were permanently grazed: periphery of hayloft grasslands and for along time unmanaged terrace fields. Because there were not enough pastures, the village rented them from neighbouring villages.

After establishment of the cooperative farm in 1975 (ŠVORC 1988), animal production was changed – the number of sheep increased and the number of cattle significantly decreased. It required changes in grassland management. The whole area of hay-barns meadows was converted into pastures, in some parts of the ridge radical restoration was applied: ploughing and sowing of grass and clover species. Only small part of these reclaimed areas was utilized as meadows. Hay-barns were destroyed, only few of them have been maintained up to now. Unreclaimed parts of hayloft meadows are utilized for extensive grazing or they lie fallow. Their species composition was completely changed. At present hay is produced mainly on the reclaimed areas where balks and terraces could be removed as well as on self-grassed terrace fields. It is a frequent way of utilization of former fields and it is necessary to stress, that this way is more suitable than grazing having considerable degradation effect on terraced areas (erosion). Original meadows remained only on smaller, isolated areas where

intensification and grazing with larger stocks was not effective, on forest meadows mown by hunters and foresters and around gamekeeper's cottages, where livestock and horse are breeded for forestry. One part of them is regularly utilized and fertilized, other part is utilized irregularly or their utilization is ceased.

Plant communities of meadows and pastures of the study area – present state

There are no data about the vegetation of meadows and pastures of this area. SILLINGER (1933) in his paper on the vegetation of the Nízke Tatry Mts describes only fen grasslands (RUŽIČKOVÁ 2000). In description of the new association *Anthoxantho-Agrostietum* he did not use any phytosociological relevés from this territory. This association is not widespread in the area currently and similar situation was probably in the past, as well. Its nearest occurrence is in the Kozie chrbty Mts. (Zemská) opened to the warmer Liptovská kotlina basin. Sufficient precipitation and nutriments (fertilization by lairage and later also by farmyard manure) conditioned the occurrence of nutrient-rich, mesophile meadows of alliances *Polygono-Trisetion* and *Arrhenatherion* in the surroundings of the village (Tab. 1). Communities of poor meadows and pastures of alliances *Polygalo-Cynosurenion* and *Nardo-Agrostion tenuis* were distributed in the place of more nutritive grasslands when their mowing was stopped and they were extensively grazed or their utilization ceased 25-30 years ago (earlier on formerly abandoned terrace fields). The species of richer mesophile meadows declined and species of poorer sites like *Nardus stricta, Avenella flexuosa, Luzula luzuloides, Ranunculus polyanthemos* etc. began dominate in communities. The species of mountain grasslands (*Crepis mollis, Silene dioica, Primula elatior*) declined together with species of more nutrient-rich sites, only *Cardaminopsis halleri* and sporadically also other species remained (Tab. 1/4, 5).

On former hay-barn meadows, ploughed and sowed by cultivars of grasses and clovers and intensively fertilized after the year 1975, a part of original plant species gradually appeared but many species totally disappeared. The species with high nutrient requirements are dominant and the species of poor and warm sites (indicators of extensive management) are absent (Tab. 1/2, records 1−7). Average species number decreased from 50 to 34 species. Pastures established after reclamation can be ranged into alliance *Polygalo-Cynosurenion* and association *Festuco-Cynosuretum*, meadows to alliance *Arrhenatherion* and association *Poo-Trisetetum*. The grasslands on former self-grassed fields can be classified to this association as well (Tab. 1/2, records 8−13). In our mountain areas the process of grassing lasts 10−15 years. Regular mowing and occasional grazing form a closed, species stabilized grass stand of semi-intensive character with relatively high yield and hay of good quality. Its species richness 10−15 species lower than that of semi-natural grasslands, species composition is differentiated rather negatively. Some species do not return to the grassed fields nor in the situation where the source of seed is available within close range. It is true especially for diagnostic species of mountain meadows. Nevertheless, the utilization of former terrace fields can be considered as the optimal way of conservation of the permanent fertility of these areas.

Pastures belonging to alliance *Poion alpinae* (Tab. 1/3) appeared besides of the above mentioned plant communities of grasslands and pastures in Liptovská Teplička, in the area of Panská hoľa hill in the altitude of 1330−1430 m a.s.l. on Ramsau dolomites. Even in 1969 they were mown (ŽIGRAI 1971). Despite of grazing, in this naturally fertile site grow many species of montain meadows than *Crepis mollis, Cardaminopsis halleri, Trifolium spadiceum*, many species of mesophilous grasslands, but the species of mountain mat grass pastures are absent. The following group of species, restricted only to this site, is occurring in these stands: *Gentiana nivalis, Polygala amara, Galium austriacum, Thymus alpestris.* It seems that due to the substratum, mountain meadows reached the highest altitude there. In comparable altitudes the other extensively utilized pastures belong to alliance *Nardo-Agrostion tenuis.*

We classified the regularly mown and occasionally fertilized or recently abandoned mountain meadows into the new association *Crepido mollis, Agrostietum*. This association has a medium position between the association *Alchemillo crinitae-Geranietum sylvatici* HADAČ 1969 (HADAČ et al. 1969, KLIMENT 1994, RUŽIČKOVÁ 1997) widespread in wetter, more humid areas with longer lasting snow cover and the association *Campanulo glomeratae-Geranietum sylvatici* RUŽIČKOVÁ 2002 occurring on drier substrata and in the area with lower humidity of climate. Many thermophile and calciphile species have very significant role in their species composition. The new association is the Carpathian vicariant of the association *Cardaminopsidi-Agrostietum* MORAVEC 1965. In the Šumava Mts., it was described as a substitutional association for acid fir-beech forests up to 1120 m a.s.l. In the Western Carpathians, *Crepis mollis* is the much better diagnostic species of mountain meadows *Cardaminopsis halleri*, which remains in stands also after introduction of permanent grazing. It can be found also on reclaimed grasslands. Grasslands described in the Šumava Mts are regularly fertilized, at absence of fertilization they rapidly change to mountain mat grass stands (MORAVEC 1965). This process is not so quick on limestones, the species that in the Šumava Mts. indicate fertilization (e.g. *Ranunculus acris, Taraxacum officinale, Trifolium repens, Cardaminopsis halleri)* remain for a long time in extensively grazed or fallow meadows. Based on our present knowledge (RUŽIČKOVÁ unpubl.), the association *Crepido mollis-Agrostietum* occurs also in other mountains, e.g. in many limestone sinks of the Muránska planina plateau (an altitude of 900−1200 m a.s.l.), in the southern part of the Slovenský raj Mts. (surroundings of Dobšiná, an altitude of 800−980 m a.s.l.), in the northern part of the Veľká Fatra Mts. (an altitude of 750−1200 m a.s.l.), in the Levočské vrchy Mts. (an altitude of 950−1180 m a.s.l.) and in some places also in the Poľana Mts. (an altitude of 875−1075 m a.s.l., UHLIAROVÁ & UJHÁZY unpubl.). The species *Trollius altissimus* indicate wetter sites, while in the study area it is the species *Alopecurus pratensis*. These two species occur together only seldom in the same stand. In the near valleys of the Nízke Tatry Mts., above the water reservoir on the Čierny Váh river, *Trollius altissimus* (SILLINGER 1933, VARTÍKOVÁ 1975) is the indicator of humidity, too.

Synopsis and description of the plant communities

Polygono-Trisetion Br.-Bl. et Tx. ex Marschall 1947

***Crepido mollis-Agrostietum capillaris* ass. nova hoc loco**
Nomenclatural type: Tab. 1/1, rel. No. 11, holotypus
The diagnostic species of the association: *Crepis mollis, Agrostis capillaris, Cardaminopsis halleri*

Species-rich community of mountain grasslands (average species number is 50, range 40−65 species on the area of 25 m^2). In the cadastre of the village Liptovská Teplička it is distributed in altitude of 850 - 1050 m a.s.l. on fluvial sediments of the alluvium and terraces of the upper flow of the Čierny Váh river and Ždiarsky potok brook, on Quaternary deluvia on dolomite substratum and gleyic and marl slates on nutrient-rich, non-desiccated rendzina-cambisols and fluvisols. Traditionally or occasionally utilized grasslands of this plant community can be found only around the gamekeeper's cottages, chalets and resting places and on smaller areas of lateral ridges, where the process of intensification was not carried out. The larger areas of this association occurred on hay-barns meadows on the ridge of Panská hoľa – Smrečiny, Doštianka - Zlomené. The smaller part of them was changed to intensive meadows by reclamations (*Poo-Trisetetum*), larger part to intensive, laired pastures (*Polygalo-Cynosurenion, Poion alpinae, Rumicion alpinae*). Abandoned former meadows belong to the alliance *Nardo-Agrostion tenuis.*

Species of mesophile meadows of the class *Molinio-Arrhenatheretea,* order *Arrhenatheretalia* significantly prevail in the plant association *Crepido mollis-Agrostietum.* Group of grasses represent mainly the medium high grasses of medium fodder quality (*Agrostis capillaris, Festuca rubra* a *Anthoxanthum odoratum).* Only on the wettest and most nutrient-rich sites appear the grasses of higher fodder quality like *Alopecurus pratensis, Festuca pratensis* and *Trisetum flavescens* together with clovers *Trifolium pratense* a *T. repens.* From mesophile grassland species of high constancy and dominance mainly the species utilizing sufficient light in lower stands - *Ranunculus acris, Rhinanthus minor, Leucanthemum vulgare, Alchemilla crinita, A. monticola, A. subcrenata, A. vulgaris,* etc. are present.

The following significant species of mountain meadows of alliance *Polygono – Trisetion* can be found with high constancy: *Crepis mollis, Phyteuma spicatum, Cardaminopsis halleri* and *Trifolium spadiceum* (loc.). Lower constancy have the species *Geranium sylvaticum, Bistorta major, Pimpinella major, Senecio subalpinus, Primula elatior, Alchemilla crinita* and *Viola tricolor.*

Further species of this community are the species of warm and poor sites - indicators of extensive management: *Hypericum maculatum, Luzula campestris, Thymus pulegioides, Trifolium montanum* and species restricted to higher altitude - *Viola sudetica* and *Potentilla aurea.* These species are absent in wetter and more nutritive sites. Just these site characteristics divide the association into two sub-associations: *typicum* and *alopecuretosum pratensis*.

***Crepido mollis-Agrostietum alopecuretosum pratensis* subass. nova hoc loco**

Nomenclatoric type: Tab. 1, rel. No. 2 holotypus
Differential species: *Alopecurus pratensis, Cirsium rivulare, Lychnis flos-cuculi, Myosotis nemorosa.*

On the alluvium and terraces of the Čierny Váh river and its tributary Ždiarsky potok brook are lush and high-yielding meadows of high quality. They have many common species with the meadows of the alliance *Calthion*. The species *Crepis mollis* itself is a permanent species of wet as well as mountain grasslands. Their water regime is well balanced, partly influenced by underground water. It is probable, that a part of drier, fallow meadows with *Cirsium rivulare* (Ružičková 2000) changed to the described subassociation due to local drainage (small ditches) and regular mowing. Stands of transitional character are common in the region − in natural depressions meadows are more of wet character, in elevated places more of mountain meadow character. Grasses are represented mainly by the species of high fodder quality like *Alopecurus pratensis*, *Festuca pratensis* and *Trisetum flavescens*, but grasses of the typical subassociation (*Agrostis capillaris* and *Anthoxanthum odoratum*) are also abundant. Vegetation is formed mainly by the species of mesophile grasslands, species of acid and warm sites are almost totally absent. Therefore the species number is lower than in the typical subassociation (average number is 44). The species of poorer sites appear only in higher sites (altitude higher than 1000 m a.s.l., relevés 7, 8).

***Crepido mollis-Agrostietum typicum* subass. nova hoc loco**

Nomenclatoric type: identical with the type of the association.

The typical subassociation occurs on higher situated terraces of streams, neighbouring slopes and ridges. The species of mesophile grasslands dominate in its stands. Grasses are represented by species of lower fodder value and lower growth - *Agrostis capillaris, Festuca rubra, Briza media,* only seldom *Trisetum flavescens* and *Festuca pratensis*. Together with the decrease of utilization intensity also clovers (*Trifolium pratense, T. repens*) decrease and the species of poor meadows and pastures appear, especially in variant with *Avenella flexuosa* (relevés 17–21). Therefore the average species number increased to 55. The extensive way of management and lower natural fertility resulted in the presence of the warm sites species like *Trifolium montanum, Thymus pulegioides, Plantago media.*

***Arrhenatherion elatioris* Koch 1926**

***Poo-Trisetetum* Knapp ex Oberd. 1957**
Tab. 1/2
Diagnostic species of association: *Trisetum flavescens, Poa pratensis (P. trivialis), Anthriscus sylvestris*

It is the association of submontane and montane zone located on the boundary between alliances *Arrhenatherion* and *Polygono-Trisetion.* The species *Arrhenatherum elatius* (in the study area it appears only on warm slopes of field terraces) is absent and the species of mountain meadows are missing as well.

ELLMAUER T. & MUCINA L. (1993) created for the grasslands of temporary character a new vegetation alliance *Phyteumo - Trisetion*, distributed mainly in the eastern periphery of the Alps that includes also the association *Poo - Triseteum.* In the study area, this community was created mainly as the product of human activity during the last 20 years by two ways: by reclamations and new sowing on former hayloft meadows and fields after terraces removal (Tab. 1/2, relevés 1−6) and by self-grassing of former arable land on fertilized and machinely mown terrace fields (Tab. 1/2, relevés 7−12). Also the long-term mown grasslands on loamy slopes of field terraces belong to this association (RUŽIČKOVÁ et al. 1999). However they are more species-rich than the recently established meadows with many thermophilous species (*Libanotis pyrenaica, Campanula glomerata, Bupleurum falcatum* etc.).

The species composition of the newly established grasslands was influenced mainly by the way of their formation, utilization in the past and altitude. In the soil of reclaimed meadows situated mainly in the sites of original meadows remained the diaspores of grassland species. A part of them took root again in new stands (*Cardaminopsis halleri, Viola sudetica, Potentilla aurea*), but on former fields these species cannot be found. But on former fields regularly occur certain nitrophile species (*Anthriscus sylvestris, Heracleum sphondyllium*) and the species of warm sites (fields are in lower altitudes). The grass *Trisetum flavescens* dominates on former fields, on reclaimed areas just the grasses present in sown grass mixtures and remained on site (*Alopecurus pratensis, Poa trivialis, Phleum pratense*), indicate the secondary character of meadow. The non-sowed grasses e.g. *Agrostis capillaris* are also abundant, they appeared in stands mainly after the decrease of fertilization intensity. Average species number is 35, on self-grassed fields more species can be found.

Discussion

Comparing the long-term traditionally utilized grasslands with those ones where man significantly intervenes or which were formed only some years ago, we can see the group of meadow species which can settle these new sites in a short time despite of the fact that they were not sown by man and the group of species which cannot be found in these plots although in the area they occur frequently. The first group includes the species like e.g. *Carum carvi, Rhinanthus minor, Campanula patula, Leucanthemum vulgare, Veronica chamaedrys, Galium mollugo, Heracleum sphondyllium, Ranunculus acris, Anthoxanthum odoratum, Acetosa pratensis* etc., in the second group are the species missing in such meadows although it seems, nothing hinder their occurrence. They are e.g. *Crepis mollis, Primula elatior, Alchemilla crinita, Aquilegia vulgaris, Lychnis flos-cuculi, Colchicum autumnale, Avenula pubescens*. They are mainly good indicator species of original mountain meadows of the alliance *Polygono-Trisetion.* They helped us to identify the new association *Crepido mollis-Agrostietum.* In this community the species of poor sites like *Nardus stricta, Luzula luzuloides, Carex pilulifera* etc. are less abundant because of lower competitive ability in comparison with the species profiting from nitrogen sufficiency. Therefore these species can be found on unfertilized and unlaired

pastures and fallows arising on former mountain meadows and fields (Tab.1/4). If we are not able to find the way how to ensure the traditional utilization of at least selected part of mountain meadows, they will be changed to fallow land as well.

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Localities of relevés:

Tab. 1/1, *Crepido mollis - Agrostietum*

1. Čierny Váh, behind the gamekeeper's lodge Kolesárky. 870 m, exp. NE, slope 7°. 21. 6. 1983.

2. Čierny Váh, in front of the gamekeeper's lodge Kolesárky. Large areas of homogenous stands. 850 m, exp. W, slope 7°. 23. 6. 1995.
3. Čierny Váh, the gamekeeper's lodge Kolesárky. 860 m, exp. NE, slope 2°. 28. 6. 1993.
4. Čierny Váh, SW foot of Čertovica on the river terrace. 990 m, exp. SW, slope 3°. 12. 7. 1992.
5. Liptovská Teplička, slopes above the road before the village. 980 m, exp. NE, slope 7°. 8. 7. 1992.
6. Čierny Váh, under the gamekeeper's lodge Rovienky. 930 m, exp.-, slope 0°. 2. 7. 1993.
7. Ždiarsky potok brook, N of the gamekeeper's lodge Staníkov, Ivanovo. 1050 m, exp. NE, slope 3°. 10. 7. 1992
8. Čierny Váh, SE from the confluence with the Ždiarsky potok brook. 950 m, exp. E, slope 6°. 7. 7. 1982.
9. Liptovská Teplička, Zlomené. 1015 m, exp. NE, slope 15°. 8. 7. 1992.
10. Lipt. Teplička, Veľký Brunov. Hayloft grasslands mown by foresters. 1100 m, exp. NE, slope 12°. 12. 7. 1992.
11. Čierny Váh, behind the turn-off for the gamekeeper's lodge Zatračno. 975 m, exp. E, slope 20°. 8. 7. 1984.
12. Čierny Váh, under the gamekeeper's lodge Rovienky, river terrace. 950 m, exp.-, slope 0°. 23. 6. 1995.
13. Ždiarsky potok brook, under Opálené, upper brook terrace. 940 m, exp.-, slope 0°. 29. 6. 1993.
14. Čierny Váh, under Črchľa. Alternately mown and grazed meadows. 980 m, exp. NW, slope 15°. 23. 6. 1995.
15. Čierny Váh, under Prašivek. Large complex of irregularly utilized meadows with feeding places. 1200 m, exp. E, slope 15°. 12. 7. 1992.
16. Lipt. Teplička, by the road to the gamekeeper's lodge Kremeniny. At present fallow hayloft meadows (destroyed haylofts). 1150 m, exp. NW, slope 35°. 16. 7. 1992.
17. Lipt. Teplička, Veľký Brunov, lower part of meadows, irregularly mown. 1050 m, exp. NW, slope 12°. 12. 7. 1992
18. Gamekeeper's lodge Zatračno, terrace of the tributary of Ždiarsky potok brook. 1035 m, exp. 0, slope 0. 10. 7. 1992.
19. Ždiarsky potok brook, 600 m before the gamekeeper's lodge Staníkov, terrace of the brook. 1050 m, exp.-, slope 0°. 29. 6. 1993.
20. Lipt. Teplička, S, Podholica, near the hunter's lodge. 1100 m, exp. NE, slope 3°. 10. 7. 1992.
21. Ždiarsky potok brook, near the gamekeeper's lodge Staníkov. 1105 m, exp. SW, slope 7°. 10.7.1992.

Tab.1/2, *Poo - Trisetetum*

22. Liptovská Teplička, Doščanka. Reclaimed hayloft meadows. 1150 m, exp. NE, slope 3°. 12. 7. 1992.
23. Lipt. Teplička, above the spring Tepličky, under the ski tow. Reclaimed former meadows. 1030 m, exp. N, slope 12°. 26.6.1995.
24. Lipt. Teplička, saddle under Doščanka. 1160 m, exp. SW, slope 2°. 16.7.1992.
25. Lipt. Teplička, Doščanka, W part of the ridge. 1170 m, exp. SW, slope 5°. 8.7.1982.
26. Lipt. Teplička, the back under Zlomené. 1010 m, exp. SW, slope 3°. 12.7.1992.
27. Čierny Váh, sown meadow in Rovienky. 930 m, exp. NE, slope 3°. 9.7.1992.
28. Lipt. Teplička, before the village. Reclaimed meadows as private plots. 930 m, exp. NE, slope 7°. 10.7.1992.
29. Lipt. Teplička, Kufajky. Self-grassed field. 1000 m, exp. NW, slope 2°. 10.7.1992.

30. Lipt. Teplička, Starý Diel. Regularly mown grassed fields on the terrace, terrace slopes of thermophile fringe vegetation. 1030 m, exp. SW, slope 2°. 9.7.1982.
31. Lipt. Teplička, slopes opposite to Vikartovský mill. 950, exp. N, slope 3°. 9.7.1982.
32. Lipt. Teplička, E slopes of Starý Diel.930 m, exp. E, slope 18°. 7.7.1982.
33. Lipt. Teplička, W from the village. 975 m, exp. NE, slope 2°. 10.7.1992.
34. Lipt. Teplička, S from the village. 950 m, exp. E, slope 2°. 7.7.1982.

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Table 1. 1. *Crepido mollis-Agrostietum* ass. nova, 1a. subass. *C.-A. alopecuretosum pratensis*, 1b. subbas. *C.-A. typicum*, 2. P*oo-Trisetetum* Knapp ex Oberdorfer 1957, 3. *Poion alpinae* Oberdorfer 1950 (4 relevés), 4. *Polygalo - Cynosurenion* Jurko 1974 (8 relevés), 5. *Nardo - Agrostion* tenuis Sill.1933 (13 relevés).

Ass.,Subass.		**1a**											**1b**																**2**								**3**	**4**	**5**
Relevé No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**C**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**C**	**C**	**C**	**C**
Diagnostic species																																							
Crepis mollis	2	+	2	1	.	2	1	+	2	1	1	+	+	1	2	1	1	+	1	2	1	V	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	I	.
Agrostis capillaris	1	3	3	2	3	2	3	1	2	2	2	2	3	2	3	2	2	3	2	3	3	V	3	3	2	2	1	+	.	.	.	1	.	.	.	III	3	V	III
Cardaminopsis halleri	.	.	.	2	.	1	1	+	2	1	1	1	2	+	2	1	2	1	2	1	1	V	+	1	1	1	1	.	.	+	.	.	.	.	.	III	4	V	II
Alopecurus pratensis	2	3	1	2	1	1	1	.	.	.	.	1	.	.	.	+	.	1	.	1	1	III	1	+	2	+	2	1	.	.	.	.	.	.	.	III	.	.	.
Cirsium rivulare	2	+	2	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Myosotis nemorosa	1	+	1	1	1	.	1	.	.	.	.	.	1	.	.	.	.	.	.	1	.	II	.	.	.	.	.	+	.	.	.	.	.	.	.	I	.	.	.
Trisetum flavescens	+	.	+	2	1	2	.	3	1	.	.	.	.	.	.	.	.	.	.	.	.	II	2	1	.	+	1	+	2	3	3	2	3	3	1	V	.	.	.
Luzula luzuloides	.	.	.	.	.	+	.	.	.	.	.	.	.	+	+	2	1	+	1	+	+	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	V	V
Avenella flexuosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	2	1	1	1	+	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	V
Molinio-Arrhenatheretea																																							
Festuca rubra	+	+	1	+	3	+	1	+	1	2	2	1	1	1	1	1	2	3	3	2	1	V	+	2	1	1	2	1	1	.	1	1	.	.	2	IV	4	V	V
Alchemilla sp. div.	2	1	2	2	1	1	1	2	2	2	3	1	3	3	.	3	2	+	.	1	1	V	2	3	1	4	2	2	1	2	2	.	.	2	.	IV	4	V	III
Leucanthemum vulgare	+	.	+	1	1	+	1	+	1	+	+	2	+	+	+	+	+	+	+	+	.	V	+	+	.	.	+	.	.	1	2	.	+	+	+	IV	3	V	.
Campanula patula	+	+	+	1	1	+	1	1	1	1	1	+	1	+	1	.	+	1	1	1	1	V	.	+	+	+	1	.	+	+	.	+	+	.	+	IV	.	IV	.
Carum carvi	+	+	+	1	2	+	2	+	2	1	1	+	1	+	1	.	1	2	+	1	1	V	1	+	.	1	1	.	1	1	+	+	.	1	+	IV	3	II	.
Rhinanthus minor	+	1	2	1	2	2	1	1	2	2	2	1	1	+	1	+	1	.	+	1	1	V	3	+	.	+	1	1	2	.	2	2	1	+	2	V	3	III	.
Veronica chamaedrys	2	+	1	1	+	1	2	1	1	+	+	1	+	.	1	+	+	2	2	+	1	V	1	+	+	1	+	1	+	2	1	+	+	1	1	V	3	III	II

Ass.,Subass.		1a											1b																	2							3	4	5
Poa pratensis	+	1	1	1	+	1	1	1	1	2	1	1	1	1	1	.	.	1	+	1	1	V	1	1	1	1	2	3	.	1	.	.	.	.	2	IV	2	II	.
Ranunculus acris	2	1	2	1	1	1	1	1	2	1	+	1	1	+	1	+	1	1	1	1	+	V	+	1	1	+	1	+	1	1	1	.	.	.	+	IV	4	IV	IV
Trifolium pratense	1	+	3	2	3	.	1	2	2	2	2	3	2	.	.	+	.	+	.	.	+	IV	1	2	.	+	+	1	2	3	+	2	2	1	+	V	4	V	II
Trifolium repens	2	+	2	1	2	.	.	1	1	.	.	+	1	.	.	+	+	+	1	.	.	IV	2	1	1	2	2	3	2	2	+	3	1	+	3	V	4	V	II
Festuca pratensis	2	+	2	2	2	1	2	1	1	2	2	.	1	+	1	.	1	.	.	+	.	IV	.	+	.	+	.	2	2	2	1	1	.	2	3	IV	.	III	.
Vicia cracca	.	+	+	+	1	+	+	1	2	+	+	+	+	1	.	.	.	1	+	1	.	IV	.	+	+	+	.	+	.	2	1	+	+	+	1	IV	1	II	.
Acetosa pratensis	1	1	1	+	+	2	.	+	+	+	+	1	1	+	.	.	+	1	.	1	.	IV	+	1	1	1	1	1	+	.	.	+	+	.	.	IV	.	IV	II
Taraxacum officinale agg.	.	+	.	1	1	1	+	2	1	.	+	1	1	1	1	+	+	.	.	1	.	IV	+	1	+	1	1	2	+	.	.	+	+	.	.	IV	1	I	.
Cerastium holosteoides	+	+	+	1	2	1	.	.	2	.	+	.	+	.	+	+	+	+	.	1	+	IV	.	+	+	+	+	1	2	2	.	.	.	1	+	IV	2	III	.
Galium mollugo agg.	.	.	.	+	+	.	+	+	+	+	+	.	.	1	1	+	+	+	+	.	.	IV	+	1	+	.	+	.	.	2	+	+	+	1	+	IV	.	III	.
Leontodon danubialis*	.	.	.	.	2	2	.	+	2	1	2	.	2	1	1	1	.	.	.	.	.	III	.	1	.	1	.	.	.	2	.	1	1	1	1	III	.	III	.
Achillea millefolium	.	.	.	+	2	.	.	.	2	+	.	1	+	.	1	1	.	2	1	1	+	III	.	+	+	.	.	2	.	1	1	1	.	1	+	IV	2	V	.
Lotus corniculatus	.	+	+	.	.	.	+	+	1	+	.	+	.	.	+	.	+	.	+	.	.	III	+	.	.	.	.	.	.	1	1	.	+	+	1	III	3	IV	I
Stellaria graminea	.	+	.	1	.	1	+	.	+	2	.	.	.	.	1	1	.	1	.	+	+	III	.	+	1	.	+	.	.	1	.	.	.	.	.	II	1	III	IV
Colchicum autumnale	.	.	.	.	.	+	+	1	+	+	2	+	+	+	1	.	.	.	.	.	.	III	.	+	.	+	.	.	.	.	.	.	.	.	.	I	.	.	.
Tragopogon orientalis	.	+	.	.	.	.	+	1	1	+	+	1	.	1	+	.	+	.	.	.	.	III	.	+	.	.	.	.	.	+	.	+	.	.	+	II	.	.	.
Jacea pseudophrygia	.	.	+	.	+	+	.	+	+	+	+	+	1	.	1	.	.	.	+	+	.	III	.	.	.	.	+	.	.	.	+	+	+	+	.	II	.	.	.
Leontodon hispidus*	.	.	.	.	.	2	1	.	.	+	+	2	2	2	1	.	.	.	+	+	.	III	.	.	.	.	.	.	.	1	1	+	1	.	.	II	.	.	.
Lathyrus pratensis	1	+	1	+	+	+	.	.	1	.	+	+	.	+	.	.	.	.	.	.	.	III	.	.	.	.	.	+	+	1	.	.	.	.	.	II	.	.	.
Ranunculus auricomus	2	+	+	+	1	1	.	1	.	.	1	1	+	1	.	.	.	.	.	.	.	III	.	.	.	.	.	.	.	.	.	+	.	.	.	I	.	.	.
Dactylis glomerata	.	.	+	1	.	+	+	+	+	.	+	.	+	1	+	.	.	.	+	.	.	III	1	+	.	.	1	+	2	.	1	.	1	.	+	III	.	III	.
Phleum pratense	.	+	+	.	1	.	.	+	1	.	.	.	1	.	.	+	.	+	.	+	.	III	2	1	.	+	2	1	1	.	.	.	+	.	+	III	.	II	.

Ass.,Subass.	1a												1b																	2								3	4	5
Poa trivialis	1	+	+	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II	1	.	3	3	2	.	1	.	.	.	.	.	.	II	.	.	.
Lychnis flos-cuculi	+	1	2	+	+	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia sepium	+	+	+	.	.	+	.	.	.	.	+	+	.	+	.	.	+	.	.	.	.	II	.	.	.	.	.	+	.	1	+	.	.	.	.	II	.	.	.
Plantago lanceolata	.	.	.	.	+	.	.	+	1	1	1	1	+	1	.	.	.	.	.	.	.	II	.	+	.	.	.	.	.	.	.	1	.	.	+	I	.	I	.
Prunella vulgaris	.	.	.	.	.	.	+	+	+	.	+	.	+	.	.	.	.	.	1	.	.	II	.	.	.	.	.	.	+	+	.	.	.	+	.	II	.	.	.
Anthriscus sylvestris	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	1	.	.	.	+	+	1	+	+	+	+	1	1	IV	.	II	.
Heracleum sphondylium	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	1	1	+	+	2	+	III	.	I	.
Polygono-Trisetion																																							
Trifolium spadiceum	+	+	1	+	1	+	1	.	2	2	+	+	.	.	.	.	.	+	+	1	.	IV	.	.	.	+	.	.	.	.	.	.	.	.	.	I	3	III	.
Phyteuma spicatum	.	.	.	1	1	1	+	+	+	.	+	.	+	+	+	+	+	+	+	+	.	IV	.	+	.	.	.	.	.	.	.	.	.	.	.	I	1	III	.
Viola tricolor	.	.	.	.	1	+	.	+	+	1	1	1	+	.	.	.	.	.	.	.	+	III	1	+	.	+	.	.	.	.	.	.	.	.	.	II	.	III	.
Primula elatior	.	.	1	.	.	1	.	+	1	.	2	+	+	2	.	+	.	.	+	.	.	III	.	.	.	.	.	.	.	.	.	.	.	.	+	I	.	II	.
Alchemilla crinita	1	1	1	1	1	3	2	.	.	.	.	2	.	1	.	.	.	1	2	1	2	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Silene dioica	.	.	.	.	.	.	+	.	.	.	+	.	r	+	.	.	.	+	+	.	2	II	.	+	.	.	.	.	.	.	.	.	.	.	.	I	.	.	.
Pimpinella major	+	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.	1	.	+	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Senecio subalpina	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	1	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cirsium erisithales	.	.	.	.	.	.	.	.	r	r	.	.	.	+	.	.	+	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium sylvaticum	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	2	.	.	.	2	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	I	.
Bistorta major	+	2	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nardo-Callunetea																																							
Luzula campestris	.	+	+	.	.	+	+	+	1	+	+	+	1	+	1	.	1	+	1	1	+	V	.	.	.	.	.	.	.	.	+	1	.	.	.	I	II	IV	V
Hypericum maculatum	.	+	+	.	+	.	.	+	1	1	+	+	1	+	+	1	1	2	2	1	+	V	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1	IV	IV

Ass.,Subass.		1a											1b																2								3	4	5
Potentila aurea	.	.	.	+	.	.	+	.	2	1	1	2	1	+	.	1	2	.	2	2	1	IV	.	+	.	1	1	.	.	.	.	.	.	.	.	II	4	V	V
Viola sudetica*	.	.	.	.	.	.	.	.	.	2	+	1	2	.	1	1	1	2	1	1	2	III	+	.	+	1	1	.	.	.	.	.	.	.	.	II	4	V	V
Campanula serrata	.	.	.	.	+	.	1	.	.	.	.	.	.	+	+	1	+	+	.	.	1	II	1	+	.	1	+	.	.	.	.	.	.	.	.	II	2	IV	IV
Poa chaixii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	1	2	2	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	II
Potentilla erecta	.	.	.	.	.	+	.	.	.	.	.	.	1	.	2	.	2	.	+	2	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	II
Carex pallescens	+	.	+	.	.	.	.	.	.	+	.	.	+	2	.	.	+	.	+	.	+	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.
Trommsdorfia uniflora	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	1	.	.	+	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	V
Nardus stricta	.	.	.	.	1	.	.	.	.	.	.	1	+	.	.	+	.	.	.	.	+	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	V	V
Gymnadenia conopsea	.	.	.	.	.	.	.	.	+	.	+	.	.	.	+	.	+	.	+	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	I
Polygala vulgaris	.	.	.	.	.	.	.	+	+	.	+	.	.	1	+	.	.	.	+	.	.	II	.	+	.	.	.	.	.	.	1	.	.	+	.	II	1	III	.
Gentianella lutescens	.	.	.	.	.	.	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	II	.
Veronica officinalis	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	+	+	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV	II
Carex ovalis	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus polyanthemos	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	1	.	.	.	.	I	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	III	.
Pilosella officinarum	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	III	I
Crepis conyzifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.
Hieracum lachenalli	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	II
Carex pilulifera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	IV
Antenaria dioica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	IV
Homogyne alpine	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	I	IV
Vaccinium myrtillus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	IV
Vaccinium vitis-idaea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	IV

Ass.,Subass.	1a											1b																	2							3	4	5
Oreogeum montanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II
Festuco-Brometea																																							
Thymus pulegioides	.	.	.	.	+	.	.	+	1	1	+	1	+	2	1	+	1	.	2	+	.	IV	.	+	.	+	.	.	.	.	.	+	.	+	.	II	.	IV	.
Plantago media	.	.	.	.	.	.	.	+	1	1	.	+	+	1	+	.	1	+	+	.	.	III	.	.	.	.	.	.	.	+	1	+	.	1	1	II	4	III	.
Trifolium montanum	.	.	.	.	.	.	.	+	+	1	r	+	+	+	1	.	1	.	.	.	.	III	.	.	.	.	.	.	.	.	.	.	+	.	.	I	.	II	.
Pimpinella saxifraga	.	.	.	.	.	.	.	.	+	.	.	+	1	+	.	+	.	.	.	+	.	II	.	.	+	.	.	+	.	1	+	1	1	1	.	III	1	V	II
Carlina acaulis	.	.	.	.	.	.	.	+	r	.	+	.	r	+	+	+	1	.	.	.	.	II	.	.	.	.	.	.	.	.	.	.	+	.	.	I	.	V	II
Aquilegia vulgaris	.	.	.	.	.	.	.	.	+	.	+	.	.	1	+	.	2	.	.	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthylis vulneraria	.	.	.	.	.	.	.	+	+	.	.	.	+	1	+	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	+	.	+	.	+	II	.	II	.
Silene nutans	.	.	.	.	.	.	.	.	+	+	+	.	+	.	.	.	.	.	.	.	.	I	.	+	.	.	.	.	.	.	.	.	+	.	+	I	1	III	.
Steris viscaria	.	.	.	.	+	.	.	.	.	.	.	1	+	.	.	+	.	1	.	.	.	I	.	+	.	.	.	.	.	+	.	+	.	.	.	II	.	III	.
Colymbada scabiosa	.	.	.	.	.	.	.	+	.	+	.	.	.	.	+	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	+	.	.	+	+	II	.	.	.
Gentiana cruciata	.	.	.	.	.	.	.	.	.	+	.	.	r	.	.	.	.	.	.	.	.	I	.	.	.	+	.	.	.	+	+	.	.	+	+	II	.	.	.
Medicago lupulina	.	.	.	.	.	.	.	1	1	+	+	.	.	.	.	.	.	.	.	.	.	I	.	.	.	.	.	1	.	.	+	.	.	.	+	II	.	.	.
Dianthus carthusianorum	.	.	.	.	+	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	I	.	+	.	.	+	.	.	+	.	+	.	1	+	III	.	I	.
Campanula rapunculoides	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	1	.	.	.	+	I	.	.	.
Campanula persicifolia	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ostatné druhy																																							
Cruciata glabra	2	1	1	2	2	2	2	1	2	2	1	1	1	2	1	2	2	2	2	2	1	V	2	+	+	1	1	1	.	2	2	.	.	1	.	IV	4	V	IV
Anthoxanthum odoratum	1	1	2	2	2	2	1	.	2	1	1	2	1	1	+	1	1	2	.	2	1	V	1	1	.	2	+	.	.	2	2	3	2	3	.	IV	4	V	V
Deschampsia cespitosa	+	+	+	1	+	1	+	.	.	+	.	2	+	1	+	+	+	1	+	1	+	V	1	+	1	.	2	.	.	.	.	.	.	.	.	II	3	IV	II
Briza media	1	.	.	.	.	+	+	1	2	1	1	+	.	1	1	.	+	.	1	1	.	IV	.	.	.	.	.	.	.	.	.	.	.	2	1	I	4	III	.

Ass.,Subass.		1a											1b																	2								3	4	5
Avenula pubescens	.	.	.	+	.	+	1	.	+	1	+	2	+	1	.	.	.	1	.	1	.	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geum rivale	+	+	1	.	.	1	.	.	.	.	+	+	.	+	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bistorta vivipara	.	2	.	.	.	.	+	.	1	.	+	.	.	.	.	.	+	.	.	.	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crocus discolor	.	.	.	.	.	2	+	.	.	.	.	.	1	.	.	.	2	.	1	1	.	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	III	IV
Linum catharticum	.	.	.	.	.	.	.	+	1	.	.	.	.	1	.	.	.	.	+	.	.	I	.	.	.	.	.	.	.	1	.	.	.	.	.	I	.	.	.
Thlaspi caerulescens	.	.	.	.	.	+	.	.	.	.	+	.	+	+	.	.	.	.	.	.	.	I	.	+	.	+	+	.	.	.	.	.	.	.	.	II	.	.	.
Lilium martagon	.	.	.	.	.	.	.	.	r	.	r	.	.	+	.	.	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Acetosa arifolia	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	+	.	.	.	.	1	I	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phleum rhaeticum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	+	2	I	+	.	.	+	+	.	.	.	.	.	.	.	.	II	3	IV	IV
Fragaria vesca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	III	.
Thymus alpestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	I	IV
Poa alpina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	I
Gentiana nivalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.
Galium austriacum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.
Polygala amara	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.
Trisetum alpestre	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	II
Pyrethrum clusii	.	.	.	.	1	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	I	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Species appearing in 1-2 records: *Trifolium hybridum 1 (1), Filipendula ulmaria + (1), Valeriana simplicifolia + (1), Caltha palustris + (2), Scorzonera humilis + (2), Carex nigra + (3), Cardamine pratensis + (3), Arrhenatherum elatius + (4),Gladiolus imbricatus + (5), Campanula rapunculoides + (8),*

Euphrasia rostkoviana 2 (10), Listera ovata + (10), Crepis praemorsa + (11), Phyteuma orbiculare + (11), Ajuga reptans + (11),
Jacea macroptilon + (2), Equisetum arvense + (13),
Omalotheca sylvatica + (13), Equisetum sylvaticum + (13), Carex panicea 1 (14), Carex caryophyllea + (14),
Angelica sylvestris + (14), Parnasia palustris + (14), Sanguisorba minor + (15), Gentiana asclepiadea + (15),Scabiosa lucida + (15),
Cirsium eriophorum + (16), Pilosella aurantiaca + (16), Botrychium lunaria + (16),Galium verum + (17), Chaerophyllum hirsutum + (16),
+' (19), Rhinanthus serotinus + (21).

2. *Capsella bursa-pastoris + (1), Silene vulgaris + (1), Cirsium arvense + (3), Veronica agrestis + (3), Galeopsis tetrahit +(3),*
Ranunculus repens + (6), Potentilla anserina + (6), Elytrigia repens + (6), Lolium perenne 1 (7), Bromus hordeaceus 1 (8),
Jacea pratensis + (8), Medicago falcata + (9), Arabis hirsuta + (9), Libanotis pyrenaica + (9), Bupleurum falcatum + (9), + (12),
Pyrethrum corymbosum + (11), Echium vulgare r (11), Clinopodium vulgare + (11), Pilosella bauhinii + (11), Viola canina + (12),
Campanula glomerata + (13), Gladiolus imbricatus + (12)
Alchemilla sp.div: A. monticola, A. subcrenata, A.vulgaris, A. xanthochlora