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Syntaxonomic revision of the Pannonian grasslands of Austria – Part I: Introduction and general overview

Syntaxonomische Revision der pannonischen Rasengesellschaften in Österreich – Teil I: Einführung und allgemeiner Überblick

Wolfgang Willner[1*], Norbert Sauberer[1], Markus Staudinger[2], Luise Schratt-Ehrendorfer[3]

[1]Vienna Institute for Nature Conservation and Analyses, Gießergasse 6/7, A-1090 Wien, Austria
[2]AVL – ARGE Vegetationsökologie & Landschaftsplanung GmbH, Theobaldgasse 16/4, A-1060 Wien, Austria
[3]Department of Systematic and Evolutionary Botany, University of Vienna, Rennweg 14, A-1030 Wien, Austria
**Corresponding author, e-mail: wolfgang.willner@vinca.at*

Abstract

The Pannonian part of Austria is a diverse landscape situated in the transition zone between the Alps, the Bohemian Massif and the Carpathian Basin. Although the grasslands of this region have been investigated in many botanical and vegetation studies, their phytosociological classification has remained confusing. With this paper, we start a series aiming at a developement of a revised, consistent system of the Austrian Pannonian grasslands. Here we present a general overview focusing on the higher syntaxonomic units.

We define grasslands as all types of meadows, pastures, fens and primary steppes. We selected all available relevés of Pannonian grasslands from the Austrian Vegetation Database. Additional unpublished data were included from the Danube National Park and the Biosphere Reserve Vienna Woods. To account for the comparatively low number of relevés from the northern part of the Pannonian region of Austria (Weinviertel), we included also data from southern Moravia (Czech Republic). This set of 3384 relevés was classified using TWINSPAN. Relevés that were considered as misclassified at the alliance level according to the summarised cover of diagnostic species were manually re-arranged, and the data-set specific fidelity of species to alliances was calculated using the phi coefficient.

The first TWINSPAN division largely corresponded to the traditional border between the classes *Festuco-Brometea* and *Molinio-Arrhenatheretea*. The conventional alliance concepts were generally well supported. As an exception, the distinction between *Diantho-Seslerion* and *Bromo-Festucion pallentis* was not reproduced at all. Therefore, we unite all rocky grasslands on calcareous soils in a single alliance *Seslerio-Festucion pallentis*. We also advocate the inclusion of all basiphilous semi-dry grasslands of the study area within a single alliance *Cirsio-Brachypodion*. Each of the corresponding TWINSPAN clusters showed a clear prevalence of *Cirsio-Brachypodion* species. Moreover, two separate alliances of semi-dry grasslands would have almost no regional character species.

Keywords: Austria, *Caricion davallianae, Festuco-Brometea, Molinio-Arrhenatheretea*, vegetation classification, *Violion caninae*

Erweiterte deutsche Zusammenfassung am Ende des Textes

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1. Introduction

The Pannonian Basin is the second largest biogeographical region of Austria after the Alps (NIKLFELD 1993, SAUBERER & WILLNER 2007). A strong gradient in annual rainfall, heterogeneous topography and a high diversity of geological bedrock make this region a very diverse landscape. The easternmost foothills of the Alps, adjacent to the Vienna Basin, have the highest vascular plant species richness in Austria at a scale of 5 × 3 geographical minutes (MOSER et al. 2005, NIKLFELD et al. 2008). As the westernmost part of the Pontic-Pannonian floristic region (JÄGER & WELK 2003), this area is also of special interest from a biogeographical point of view.

Until the 19th century, wet and dry grasslands covered a large portion of the Pannonian lowland of Austria, in some parts even exceeding the area of arable land (SAUBERER et al. 1999). Due to the dramatic changes in agriculture and land use during the 20th century, however, only small remnants of these grasslands have been preserved. Their floristic richness has attracted botanists and vegetation scientists for a long time (e.g., KERNER VON MARILAUN 1863, VIERHAPPER 1922), and all types of Pannonian grasslands have been given top priority by nature conservation (HOLZNER et al. 1986, SAUBERER et al. 1999, SUSKE et al. 2003, WIESBAUER 2008). Important contributions to the knowledge of Pannonian grasslands in Austria were provided by BOJKO (1934), WAGNER (1941, 1950), SAUBERER (1942), WENDELBERGER (1953, 1954), NIKLFELD (1964), BALÁTOVÁ-TULÁČKOVÁ & HÜBL (1974), EIJSINK et al. (1978), KUYPER et al. (1978), HUNDT & HÜBL (1983) and KARRER (1985a, b), followed by the first synoptic treatment of all Austrian grassland communities by MUCINA et al. (1993). More recent syntaxonomic contributions which at least partly concern the Pannonian grasslands of Austria were published by ELLMAUER (1994, 1995), STEINBUCH (1995), CHYTRÝ et al. (1997), TICHÝ et al. (1997), DENK (2000), SAUBERER & BUCHNER (2001), WILLNER et al. (2004), DENK (2005), ZUKRIGL (2005), ILLYES et al. (2007), DÚBRAVKOVÁ et al. (2010) and WILLNER (2011).

Despite these efforts, the phytosociological classification of the Pannonian grasslands of Austria has remained confusing. Apart from scientific problems, this situation has seriously impeded the interpretation and mapping of Natura 2000 habitat types (EUROPEAN COMMISSION 2007), which depend on unambiguously defined vegetation units. Here we present the first part of a series that aims at filling this gap. We start with a general overview, based on the numerical classification of a large data set covering all types of Pannonian grasslands, and discuss some syntaxonomic problems, especially at the level of alliances. A detailed classification at the association and subassociation level will be elaborated in the subsequent parts of the series (see WILLNER et al. 2013 in this volume). In each of these following papers we will focus on a more or less homogeneous subregion (similar to the "Wiesenregionen" approach of SUSKE et al. 2003). A synopsis for the whole study area and adjacent regions will conclude the series.

2. Study area

The Pannonian region as a whole is characterised by a subcontinental climate that is transitional between the temperate humid climate of the deciduous forest zone and the arid climate of the steppe zone (WALTER 1974). The western boundary of the Pannonian region is hard to define as there is a continuous transition towards the Central European and Alpic floristic region in the sense of MEUSEL & JÄGER (1992). The easternmost parts of the Alps are strongly influenced by the Pannonian climate and considerably drier than the other parts of the Northern Alps. This is also reflected in the classification of Forest Ecoregions of Austria where the eastern margin of the Alps is traditionally separated at the top level (MAYER 1974, KILIAN et al. 1994). Similar delimitation problems arise in the Bohemian Massif and in the northern and south-eastern foreland of the Alps (NIKLFELD 1993). Here we define our study area as the Austrian part of the Pannonian Basin and adjacent transition zones (Fig. 1). The latter include the eastern slope of the Bohemian Massif, the Vienna Woods, the eastern Gutenstein Alps and the eastern margin of the Central Alps. In the south, we draw the line along the political borders of Styria and Burgenland.

The core area of the Pannonian region of Austria is dominated by Tertiary hills (which are often covered with loess), Pleistocene gravel terraces, river floodplains and wet depressions. Some areas are covered with sand dunes and saline soils. Along the south-eastern and north-western margin of the Vienna Basin two lines of insular hills connect the Alps and the Western Carpathians like stepping stones. In these hills, various types of siliceous and calcareous rock outcrops appear. The solid slopes of the Alps and the Bohemian Massif form

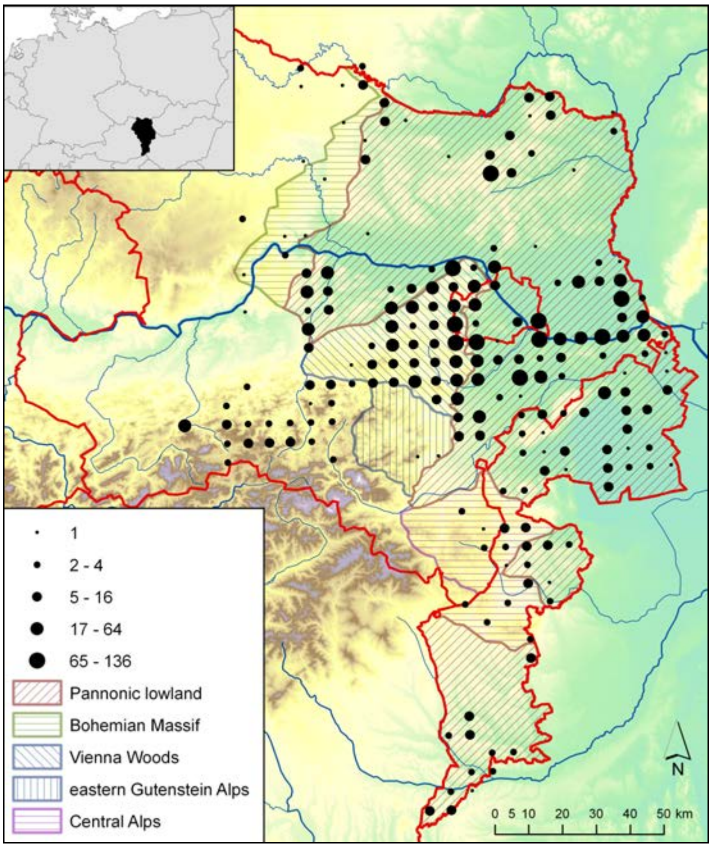

Fig. 1. Map of the study area with the location of the sample plots given in a 3’×5’ grid. The number of plots per grid cell is indicated by the size of the dot. Data from southern Moravia are not shown.

Abb. 1. Karte des Untersuchungsgebiets und räumliche Verteilung der Vegetationsaufnahmen (dargestellt in einem 3’×5’-Raster). Die Größe der Punkte gibt die Anzahl der Aufnahmen pro Rasterzelle an. Die mitklassifizierten Aufnahmen aus Süd-Mähren sind nicht dargestellt.

the natural border of the Pannonian Basin towards the west. There is a considerable gradient in mean annual rainfall within the study area, ranging from 1000 mm at the eastern margin of the Alps to 500 mm along the Austrian-Moravian border. The mean annual temperature ranges from 8 to > 10 °C, with the maximum reached at Lake Neusiedl in northern Burgenland. With 115 m a.s.l., this is also the lowest altitude of Austria.

The actual forest cover in the Austrian part of the Pannonian Basin is 16% (SAUBERER & WILLNER 2007). Large forest areas are mostly found in the insular hills and along the river Danube. Although the potential natural vegetation of Eastern Austria is usually depicted as oak forests (WAGNER 1985, BOHN & NEUHÄUSL 2000), there is no clear evidence that the Pannonian Basin has ever been completely covered by forests since the last glacial period (MAGYARI et al. 2010). Fossils of Wild Horse, European Ass and Aurochs rather suggest the presence of large open areas throughout the Holocene (BUNZEL-DRÜKE et al. 2008, SAUBERER & DULLINGER 2008). On the other hand, there is growing evidence that the so-called "forest-steppe zone" in Eastern Europe is totally capable of becoming a closed forest in the absence of grazing animals (DONIȚĂ et al. 2003). In this respect, there is no fundamental difference between the forest-steppe zone and the Pannonian region. CHYTRÝ (2012) includes southern Moravia in the forest-steppe biome. An unbroken history of non-forest vegetation seems also the most parsimonious hypothesis to explain the enormous alpha and beta diversity of the Pannonian grasslands.

3. Material and methods

3.1 Data set

As the term "grassland" is not consistently used in the literature, a more precise delimitation of our focal vegetation types has to be given. Here we define grasslands as all types of meadows, pastures and primary steppes. We also include fens as many of them are at least occasionally mown. Phytosociologically, this corresponds to the classes *Festuco-Brometea, Calluno-Ulicetea* p.p. (*Nardetalia*), *Molinio-Arrhenatheretea* (excl. *Filipendulenion*), *Artemisietea vulgaris* p.p. (*Agropyretalia*) and *Scheuchzerio-Caricetea fuscae* (syntaxonomy following GRABHERR & MUCINA 1993 and MUCINA et al. 1993). Salt meadows of the *Puccinellio-Salicornietea* could not be considered because there were no digitised data available for this vegetation type. We do not include fringe vegetation (*Trifolio-Geranietea*), tall-herb vegetation (*Filipendulenion*) and reed beds (*Phragmito-Magnocaricetea*).

In the first step, we selected all available relevés of the Pannonian grasslands from the Austrian Vegetation Database (WILLNER et al. 2012; GIVD code EU-AT-001). Most plots in this database are classified at the alliance level by expert judgement, usually but not necessarily in accordance with the original assignment by the relevé author. We selected all plots assigned to one of the above mentioned focal units. These data included most published grassland relevés from the study area as well as most data from master and doctoral theses and some unpublished studies. Additional unpublished sources were included, especially from the alluvial meadows in the Danube National Park (L. Schratt-Ehrendorfer, unpubl.) and from the Biosphere Reserve Vienna Woods (WILLNER et al. 2013). To account for the comparatively low number of relevés from the northern part of the study area (Weinviertel), additional data from southern Moravia were included. For this purpose, all relevés labeled as *Festuco-Brometea* from the area south of 49° N and east of 15° 30' E were selected from the Czech National Phytosociological Database (CHYTRÝ & RAFAJOVÁ 2003; GIVD code EU-CZ-001). For comparison, additional grassland relevés from the Northern Limestone Alps east of 15° E and up to 1400 m a.s.l. were included.

Relevés with a plot sizes > 50 m² or < 9 m² were excluded from the data set. In a few cases, plot sizes between 4 and 100 m² were accepted because few other data were available from the area. This was especially the case for the Hainburg Hills and the sandy soils of Marchfeld. In strongly oversampled areas, a manual selection was done in such a way that newer relevés and those with medium plot sizes were preferred. Finally, a set of 3384 relevés was used for the analysis (567 from southern Moravia, 2719 from the Pannonian region of Lower Austria, Vienna and Burgenland, and 98 from the Northern Limestone Alps outside of the study area). The geographical distribution of these plots is given in Figure 1.

3.2 Species taxonomy and nomenclature

The taxonomy of species follows FISCHER et al. (2008) for vascular plants, FREY et al. (1995) for bryophytes and WIRTH (1995) for lichens. The taxonomic resolution of taxa was unified prior to the analysis. We excluded taxa determined only to the genus level (except for *Alchemilla* sp.) as well as the following aggregates used in only a few relevés and including diagnostically important species: *Agrostis stolonifera* agg. (7 relevés), *Euphrasia officinalis* agg. (7 relevés), *Festuca ovina* agg. (4 relevés), *Galium pusillum* agg. (5 relevés), *Koeleria pyramidata* agg. (33 relevés), *Melampyrum nemorosum* agg. (1 relevés), *Onobrychis viciifolia* agg. (30 relevés), *Ornithogalum umbellatum* agg. (18 relevés), *Stipa pennata* agg. (30 relevés), *Thymus pannonicus* agg. (27 relevés) and *Veronica verna* agg. (9 relevés). All other taxa were merged to the highest level present in the data set. We also excluded cryptogams from the analysis because they were determined in only 40% of the relevés. The most frequent cryptogam species were included in the table again after the numerical classification.

3.3 Data analysis and table work

The set of 3384 relevés was classified using the unmodified TWINSPAN algorithm (HILL 1979). As cut levels, cover values of 0%, 2%, 5% and 25% were defined. Minimum group size was set to 5, and maximum level of divisions to 6. One very large cluster was further divided using the same parameters except for maximum level of divisions, which was set to 4. Clusters for which no ecological or geographical difference could be detected were merged. We did not apply the modified algorithm proposed by ROLEČEK et al. (2009) because we preferred a manual control of division levels. The species were grouped according to their diagnostic value for classes, orders and alliances following MUCINA et al. (1993), and the summarised cover of each diagnostic species group was calculated for all relevés (see WILLNER 2011 for details). The original values of the Braun-Blanquet scale were transformed to percentage values by taking the average cover corresponding to each value. Relevés that were considered as misclassified at the alliance level according to the summarised cover of diagnostic species were manually re-arranged to the floristically and geographically most fitting cluster of the appropriate alliance. In this way, a table with preliminary units presumably corresponding to associations or lower hierarchical levels was elaborated (not shown in the present paper). On the basis of this table, the data-set specific fidelity of species to alliances was calculated using the phi coefficient based on presence-absence data, size of all groups standardised to equal size, and significance level set to $P < 0.05$ (TICHÝ & CHYTRÝ 2006, WILLNER et al. 2009). All calculations and table manipulations were done using the JUICE 7.0 program (TICHÝ 2002).

4. Results and syntaxonomic discussion

4.1 Description of clusters

The initial TWINSPAN classification resulted in 60 clusters (Table 1 in the supplement). The first division largely corresponds to the traditional border between the classes *Festuco-Brometea* and *Molinio-Arrhenatheretea*. However, semi-dry grasslands on temporarily moist soils were grouped together with the *Molinio-Arrhenatheretea* after the first division. The classification mainly reflects a moisture gradient and, to a lesser degree, gradients in nutrient supply and soil reaction. The main groups that can be distinguished in the TWINSPAN table are rocky grasslands on calcareous soils (clusters 1–12), rocky grasslands on acidic soils (clusters 13–16), dry grasslands on deeper and/or less rocky soils (clusters 17–24), semi-dry grasslands (clusters 25–31), mesic meadows on fertile soils (clusters 32–38), alluvial meadows of the Danube floodplain (clusters 39–44), oligotrophic, periodically wet meadows (clusters 45–50) and permanently wet meadows and mires (clusters 51–60).

In the following, the individual TWINSPAN clusters or groups of merged clusters are briefly described. The original cluster hierarchy is given in the head of Table 1 in the supplement. After the working name of the group, corresponding associations and subassociations according to GRABHERR & MUCINA (1993) and MUCINA et al. (1993) are indicated in brackets. If no syntaxon is given, the group does not correspond to any of the associations therein. Authors of syntaxon names are only mentioned if the latter are not accepted names in these references.

4.1.1 Rocky grasslands on calcareous soils

Cluster 1: Fragmentary *Sesleria caerulea* grasslands on north-facing rocks in the Vienna Woods (*Drabo aizoidis-Seslerietum albicantis* p.p.).

This cluster includes only two relevés of rather species-poor *Sesleria* grasslands with *Draba aizoides* subsp. *beckeri*.

Clusters 2–4: Rocky grasslands in the Alps of western Lower Austria (*Teucrio montani-Seselietum austriaci*, *Origano-Calamagrostietum variae*).

This group comprises xeric grasslands from altitudes between 480 m and 700 m a.s.l., situated west of the study area, which are mostly dominated by *Calamagrostis varia*, more rarely also by *Carex humilis*. They are clearly differentiated from the following types of rocky grasslands by the presence of, e.g., *Calamagrostis varia, Campanula cespitosa, Carex alba, Cirsium erisithales, Digitalis grandiflora, Erica carnea* and *Pteridium aquilinum*, and by the absence of many Pannonian species.

Clusters 5–6: Dry grasslands on gravel soils in the southern Vienna Basin (*Fumano-Stipetum* p.p.).

These extremely dry grasslands are dominated by *Stipa eriocaulis* and *Festuca stricta*. They are developed on flat glacial gravel terraces in the southern Vienna Basin ("Steinfeld") which have probably never been covered by forests (SAUBERER & BUCHNER 2001). Floristically, they are very similar to the *Fumano-Stipetum* of steep south-facing dolomite slopes (see cluster 8) but differentiated from the latter by the presence of *Carex liparocarpos*, a species usually indicating sandy soils.

Cluster 7: Open pioneer grasslands and *Sesleria caerulea* grasslands on steep rocky cliffs along the eastern margin of the Alps (*Fumano-Stipetum minuartietosum setaceae, Fumano-Stipetum laserpitietosum sileris, Drabo aizoidis-Seslerietum albicantis* p.p.*, Drabo lasiocarpae-Dianthetum neilreichii*).

This cluster comprises pioneer stages of the *Fumano-Stipetum* on south-facing slopes – described as subass. *minuartietosum setaceae* by KARRER (1985a) – as well as *Sesleria caerulea* grasslands on north-facing slopes of the same area. The *Teucrio montani-Seselietum austriaci* sensu KARRER (1985b) and the *Fumano-Stipetum laserpitietosum sileris* described by NIKLFELD (1964) were also included here.

Cluster 8: Rocky grasslands from various parts of the study area (*Fumano-Stipetum* s.str., *Poo badensis-Festucetum pallentis, Festuco pallentis-Caricetum humilis, Carici humilis-Seslerietum, Seslerietum budensis, Stipo joannis-Avenastretum besseri* p.p.).

This rather heterogeneous cluster represents the core of calcareous rocky grasslands of the study area. On south-facing slopes, the herb layer is usually more open and dominated by *Festuca pallens* (in Weinviertel and the Hainburg Hills) or by *Festuca stricta* and *Stipa eriocaulis* (along the eastern margin of the Alps). On north-facing slopes, closed grasslands dominated by *Sesleria caerulea* (in Weinviertel) or *Sesleria sadleriana* (in the Hainburg Hills) can be found. *Carex humilis* can reach higher cover in all subtypes of this cluster. In three relevés from the Hainburg Hills, classified as *Stipo joannis-Avenastretum besseri* by MUCINA & KOLBEK (1993), *Helictotrichon desertorum* is the dominant species. The original diagnoses of the associations *Poo badensis-Festucetum pallentis* and *Minuartio setaceae-Seslerietum* from the Pavlov Hills (KLIKA 1931) are both included in this cluster as well as the original diagnosis of the *Fumano-Stipetum eriocaulis* (WAGNER 1941).

Clusters 9–11: *Carex humilis* grasslands on slightly deeper soils along the eastern margin of the Alps (*Polygalo majoris-Brachypodietum* p.p.).

This grassland type occurs on less steep dolomite slopes along the eastern margin of the Alps, where several species of the *Fumano-Stipetum eriocaulis* are absent or very rare (e.g., *Festuca stricta, Stipa eriocaulis, Fumana procumbens, Allium sphaerocephalon*) while species preferring deeper soils, such as *Adonis vernalis, Stipa joannis*, *Festuca rupicola* and *Prunella grandiflora*, are common. WENDELBERGER (1953) classified such stands as *Polygalo majoris-Brachypodietum*, which is an association of semi-dry grasslands (see clusters 25–28), but both the TWINSPAN result and the summarised cover of diagnostic species show that this unit is more closely related to rocky grasslands. As no previously described association can be identified with this community type, we propose it as a new association (see WILLNER et al. 2013). The most typical stands are included in cluster 10 while cluster 9 represents transitions to the *Fumano-Stipetum eriocaulis* and cluster 11 includes abandoned stages and a somewhat deviating variant on marl.

Cluster 12: *Sesleria caerulea* grasslands at higher altitudes of the Vienna Woods *(Drabo aizoidis-Seslerietum albicantis* p.p.).

In his monograph of Peilstein mountain in the southern Vienna Woods, KARRER (1985b) distinguished three types of rocky grasslands with *Sesleria caerulea* on the west-facing cliffs: *Carex brachystachys* community, *Draba aizoides-Sesleria varia* community and *Teucrio montani-Seselietum austriaci*. While the latter was included in cluster 7 (see above), the first two communities are grouped within this cluster. The relevés are rather species-poor and contain only few *Festuco-Brometea* species. This might explain their outlier position in the TWINSPAN classification.

4.1.2 Rocky grasslands on acidic soils

Clusters 13–14: Rocky grasslands with *Aurinia saxatilis* (*Alysso saxatilis-Festucetum pallentis*).

This community type is widespread in the deep river valleys of the Bohemian Massif (CHYTRÝ 2007, sub *Festuco pallentis-Aurinietum saxatilis*) but it is just tangent to the study area. It is not a Pannonian association.

Cluster 15: Dry grasslands with *Agrostis vinealis* on hard siliceous rocks.

This cluster largely corresponds to the *Potentillo arenariae-Agrostietum vinealis* described by CHYTRÝ et al. (1997). However, with one exception (Hackelsberg near Jois) it only includes relevés from the Bohemian Massif while those from Burgenland originally included in this association were grouped with grasslands on sandy soils (see cluster 22).

Cluster 16: Thermophilous rocky grasslands along the margin of the Bohemian Massif.

In contrast to clusters 13–15, this is a true Pannonian community type. It corresponds to the *Helichryso arenarii-Festucetum pallentis* described by CHYTRÝ et al. (1997). This association is only known from the south-eastern margin of the Bohemian Massif. Two relevés from Burgenland and one from sandy soils of the Morava (March) valley included in this cluster are probably miss-classified.

4.1.3 Dry grasslands on deeper and/or less rocky soils

Clusters 17–18: Dry grasslands on alluvial gravel soils (*Teucrio botryos-Andropogonetum*).

These grasslands occur on extremely dry gravel banks ("Heißländen") along the river Danube. The cover of the herb layer is rather low. The original diagnosis of the *Teucrio botryos-Andropogonetum* is included here (SAUBERER 1942).

Cluster 19: Moderately acidic grasslands with *Festuca valesiaca*.

This cluster corresponds to the *Avenulo pratensis-Festucetum valesiacae* described by CHYTRÝ et al. (1997). It is mainly distributed in two areas: the south-eastern margin of the Bohemian Massif and northern Burgenland. *Festuca valesiaca* is the dominant species, and moderately acidophilous species such as *Trifolium arvense, Veronica dillenii, Arabidopsis thaliana, Carex supina* and *Melica transsilvanica* differentiate this association from the *Festuca valesiaca* grasslands on calcareous soils (cluster 23e).

Cluster 20: Impoverished rocky grasslands (*Poo badensis-Festucetum pallentis* p.p.min., *Sempervivetum soboliferi*).

This cluster includes pioneer stages and untypical variants of calcareous rocky grasslands in the north of the study area (Weinviertel and southern Moravia). Some stands represent transitions to *Festuca valesiaca* grasslands.

Cluster 21: Dry grasslands on base-rich sandy soils (*Astragalo austriaci-Festucetum sulcatae* p.p., *Potentillo arenariae-Festucetum pseudovinae, Festucetum vaginatae*).

This cluster comprises grasslands on sandy or fine-gravelly soils with high carbonate content. The stands are mostly dominated by *Festuca rupicola*, rarely by *F. pseudovina* or *F. vaginata*. They are distributed in three areas: the sand dunes of the Marchfeld, the sand banks along the Danube and a sandy ridge along the eastern shore of Lake Neusiedl (called "Seedamm"). *Carex liparocarpos* and *Thesium ramosum* have their occurrence optimum in this group.

Cluster 22: Dry grasslands on acidic sandy soils.

These grasslands are developed on sandy soils with low carbonate content, e.g. on sand banks along the Morava (March) river. They can be identified with the *Peucedano oreoselini-Festucetum rupicolae*, which was described by CHYTRÝ et al. (1997). Most of the relevés from Burgenland originally assigned to the *Potentillo arenariae-Agrostietum vinealis* are included here as well. The dominant species is usually *Festuca rupicola*. Differential species against the grasslands on base-rich sandy soils (cluster 21) are *Rumex acetosella, Potentilla argentea, Agrostis vinealis, Carex praecox* and others.

Cluster 23: Various types of dry grasslands on loess, sand and calcareous rocks, mostly dominated by *Festuca valesiaca* and/or *F. rupicola*.

The further division of this very large and heterogeneous cluster resulted in 7 subclusters:

Clusters 23a–c: Dry grasslands with ruderal elements.

Artemisia absinthium, Convolvulus arvensis, Bromus tectorum, Elymus hispidus and other ruderal species differentiate these grasslands, which might at least partly belong to the *Artemisietea vulgaris*.

Cluster 23d: Dry grasslands on base-rich sandy soils (*Astragalo austriaci-Festucetum sulcatae* p.p.).

These grasslands, which are mostly dominated by *Festuca rupicola*, are very similar to those of cluster 21. The main floristical difference is *Stipa capillata*, which has a high constancy in this group while it is almost absent in cluster 21. Most relevés are from Marchfeld.

Cluster 23e: *Festuca valesiaca* grasslands on calcareous rocks (*Ranunculo illyrici-Festucetum valesiacae, Medicagini minimae-Festucetum valesiacae, Poo angustifoliae-Festucetum valesiacae*).

This is the calcareous counterpart to the *Festuca valesiaca* grasslands of cluster 19. It corresponds to the *Festuco valesiacae-Stipetum capillatae* Sillinger 1930 in the recent overview of DÚBRAVKOVÁ et al. (2010). The original diagnosis of the *Scabioso suaveolentis-Caricetum humilis* Klika 1931 was also included in this cluster, indicating that this unit cannot be synonymised with the *Festuco pallentis-Caricetum humilis*, as was done by MUCINA & KOLBEK (1993) and JANIŠOVÁ & DÚBRAVKOVÁ (2010), because the latter correponds to cluster 8 (see above) and is clearly a *Seslerio-Festucion pallentis* community.

Clusters 23f–g: Dry grasslands on loess (*Astragalo exscapi-Crambetum tatariae*).

Loess steppes are characterised by several specialist species such as *Crambe tataria, Taraxacum serotinum* and *Viola ambigua*. Diagnostic species with higher constancy are *Salvia nemorosa* and *Astragalus austriacus*. The stands are usually dominated by *Festuca rupicola*, more rarely by *F. valesiaca*. The numerical classification of a large supra-national data set suggested that the *Astragalo exscapi-Crambetum* and the *Salvio nemorosae-Festucetum rupicolae* Zólyomi ex Soó 1959 should be treated as separate associations (DÚBRAVKOVÁ et al. 2010). In the present TWINSPAN classification, this result was only weakly reproduced: Both *Astragalus exscapus* and *Crambe tataria* had their optimum in cluster 23g, but the relevés from the *locus classicus* of the *Astragalo exscapi-Crambetum* (Pouzdřany steppe in southern Moravia) were included in cluster 23f.

Cluster 24: *Stipa* grasslands on base-rich rocks of the Bohemian Massif.

This cluster corresponds to the associations *Genisto tinctoriae-Stipetum joannis* and *Inulo oculi-christi-Stipetum pulcherrimae*, both descibed by TICHÝ et al. (1997). The stands are mostly dominated by *Stipa joannis* and occur on steep, usually south-facing slopes in the deep river valleys of the south-eastern Bohemian Massif. The bedrocks are marble and amphibolite.

4.1.4 Semi-dry grasslands

Clusters 25–28: Semi-dry grasslands with a high proportion of xerophilous species (*Polygalo majoris-Brachypodietum pinnati* s.str., *Onobrychido arenariae-Brachypodietum pinnati*).

These grasslands are dominated by *Bromus erectus* and/or *Brachypodium pinnatum*. There is a considerable variation in the species composition within this group. However, the TWINSPAN result did not correspond to the separation between *Polygalo majoris-Brachypodietum* and *Onobrychido arenariae-Brachypodietum* as proposed by MUCINA & KOLBEK (1993). The group is widespread in Weinviertel, the molasse hills northwest of St. Pölten and in the Vienna Woods, but seems to be almost absent from Burgenland.

Cluster 29: Acidic and nutrient-poor grasslands of the Vienna Woods.

This unit does not correspond to any association previously reported from Austria. It is characterised by a large portion of *Calluno-Ulicetea* species (e.g., *Polygala vulgaris, Danthonia decumbens, Viola canina*). *Nardus stricta* occurs in 33% of the plots but is never dominant. *Agrostis capillaris, Anthoxanthum odoratum, Festuca rubra* agg. and *Bromus erectus* are the co-dominants of this community type. Among the associations listed in CHYTRÝ (2007) and JANIŠOVÁ (2007), it has the closest similarity to the *Anthoxantho-Agrostietum tenuis* Sillinger 1933 and the *Campanulo rotundifoliae-Dianthetum deltoidis* Balátová-Tuláčková 1980.

Cluster 30: *Bromus erectus* meadows on clay-rich, temporarily moist soils (*Euphorbio verrucosae-Caricetum montanae, Onobrychido-Brometum*).

This cluster includes mostly semi-dry grasslands of the Vienna Woods which are developped on soils with high clay content. These sites have a pronounced seasonal variability in moisture conditions, with short wet and longer dry phases. On nutrient-poor and moderately acidic sites, a subtype with *Carex montana, Galium boreale* and *Euphorbia verrucosa* occurs which was described as *Euphorbio verrucosae-Caricetum montanae* by KARRER (1985b).

Cluster 31: *Bromus erectus* meadows of the Danube floodplain.

These grasslands are wide-spread in the higher, non-flooded levels of the Danube floodplain. Most of them have probably developed from dry grasslands similar to those of clusters 17–18 and 21. They are floristically closely related to the meadows of cluster 30, though some species widespread in the Vienna Woods are absent (e.g. *Cirsium pannonicum*) or rare (e.g. *Filipendula vulgaris*). A peculiarity of this and other grasslands of the Danube floodplain (e.g. cluster 33) is the high constancy of *Calamagrostis epigejos*.

4.1.5 Mesic meadows on fertile soils

Cluster 32: Dry *Arrhenatherum* meadows with *Salvia pratensis* (*Ranunculo bulbosi-Arrhenatheretum*).

This is the driest type of *Arrhenatherum* meadows within the study area, which is charaterised by a large portion of *Festuco-Brometea* species. Most relevés originate from the Vienna Woods, but there were also a few relevés from the molasse hills northwest of St. Pölten and the Danube floodplain included here.

Cluster 33: Mesic meadows of the Danube floodplain.

These grasslands, which are usually dominated by *Arrhenatherum elatius*, represent the most productive ones in the Danube floodplain. Many of them have been fertilised in the past, and the stands are occasionally flooded. *Festuca arundinacea, Elymus repens, Calamagrostis epigejos* and *Cirsium arvense* differentiate these meadows from the following ones. There were also some relevés from the Vienna Woods included in this cluster which represent ruderal and frequently trampled meadows.

Cluster 34: Mesic meadows of the Vienna Woods (*Filipendulo vulgaris-Arrhenatheretum, Pastinaco-Arrhenatheretum, Ranunculo repentis-Alopecuretum pratensis*).

This cluster includes meadows with a wide range of management intensity, nutrient supply and moisture regime. A widespread type in the Vienna Woods, corresponding to the *Filipendulo vulgaris-Arrhenatheretum*, are moderately nutrient-rich *Arrhenatherum* meadows, differentiated by *Bromus erectus* and other *Festuco-Brometea* species. The soils are intermittently dry, with short wet and longer dry phases. On soils with longer wet phases, *Arrhenatherum elatius* is replaced by *Alopecurus pratensis* and several species of wet meadows occur as differential species. The latter type corresponds to the *Ranunculo repentis-Alopecuretum pratensis*.

Cluster 35: Moderately wet meadows (*Succiso-Molinietum caeruleae* p.p., *Sanguisorbo-Festucetum commutatae, Angelico-Cirsietum oleracei, Scirpo-Cirsietum cani, Cirsietum rivularis* p.p., *Valeriano-Cirsietum oleracei, Trifolio patentis-Calthetum* p.p.).

This cluster comprises various types of wet meadows, which are concentrated in three areas: the Vienna Woods, the eastern margin of the Central Alps and southern Burgenland. In comparison to clusters 45–56, which partly correspond to the same traditional associations, these grasslands have a larger proportion of mesic species. Acidic grasslands similar to those of cluster 29, but from moderately wet soils, were included in this group, too.

Cluster 36: Meadows and pastures of the Northern Limestone Alps.

These grasslands occur in the submontane and montane belt of the Northern Limestone Alps of Lower Austria adjacent to the study area (Fig. 1). Some stands correspond to the *Gymnadenio-Nardetum* and the *Festuco commutatae-Cynosuretum*, but most relevés can be identified with the *Campanulo beckianae-Agrostietum* tenuis, which was described from this region by REITER & GRABHERR (1997).

Clusters 37–38: Moist *Arrhenatherum* meadows of the Danube floodplain.

This unit is very simlar to cluster 33, but with a slightly higher portion of species indicating flooding. It is a transitional type towards the following units.

4.1.6 Alluvial meadows

Cluster 39: *Alopecurus pratensis* meadows with *Silaum silaus* of the Danube floodplain (*Silaetum pratensis*).

This cluster represents the drier end of a moisture gradient along which three types of alluvial *Alopecurus pratensis* meadows can be distinguished within the Danube floodplain. It occupies the highest levels which are only occasionally flooded.

Cluster 40: Alluvial meadows with *Cnidium dubium* along the river March (*Cnidio dubii-Violetum pumilae*).

The alluvial meadows along the Morava (March) river are only poorly represented in our data set. The presence of some eastern elements such as *Selinum venosum* (= *Cnidium dubium*) and *Clematis integrifolia* differentiate them from the meadows along the Danube. With respect to the flooding regime, this community is similar to the following one.

Clusters 41–42: *Alopecurus pratensis* meadows with *Ophioglossum vulgatum* of the Danube floodplain (*Ophioglosso-Caricetum tomentosae*).

These grasslands occupy an intermediate position along the moisture gradient. *Ophioglossum vulgatum* and *Carex tomentosa* differentiate them against the following type.

Clusters 43–44: Wet *Alopecurus pratensis* meadows with *Poa palustris* of the Danube floodplain (*Gratiolo-Caricetum suzae*).

These grasslands represent the wettest type of alluvial meadows in the data set. They are confined to depressions with high groundwater level and longer flooding.

4.1.7 Oligotrophic, periodically wet meadows

Clusters 45–48: Oligotrophic *Molinia* meadows on temporarily wet soils (*Succiso-Molinietum caeruleae* s.str.).

This group contains the core of the *Molinia* meadows within the study area, including the type relevé of the *Succiso-Molinietum*. The largest and most species rich sites can be found in the Vienna Basin. Smaller and less typical stands are scattered in the Vienna Woods.

Clusters 49–50: Wet *Molinia* meadows with *Allium schoenoprasum* (*Succiso-Molinietum caeruleae* p.p.).

This is a transitional type towards the following unit. It occurs only in the Vienna Basin.

4.1.8 Permanently wet meadows and mires

Clusters 51–52: Wet meadows with *Schoenus nigricans* of the Vienna Basin (*Junco obtusiflori-Schoenetum nigricantis*).

This is the wettest grassland type of the Vienna Basin. It is only documented from one location (Moosbrunn). Differential species against the Caricetum davallianae (clusters 57–58) are *Allium schoenoprasum, Sanguisorba officinalis* and *Tofieldia calyculata. Carex davalliana* is only a minor component of this community.

Clusters 53–54: Transitions between wet meadows and mires (*Cirsietum rivularis* p.p.).

This group includes wet meadows with *Cirsium rivulare* of the Vienna Basin and the Vienna Woods which are transitional towards the *Caricetum davallianae*.

Clusters 55–56: Wet meadows on moderately acidic soils (*Cirsietum rivularis* p.p., *Trifolio patentis-Calthetum* p.p., *Gentiano pneumonanthes-Molinietum*)

The grasslands of this group are mostly from southern Burgenland. They represent more acidic types of wet meadows with a higher portion of *Calluno-Ulicetea* species.

Clusters 57–58: Mires with *Carex davalliana* (*Caricetum davallianae*).

This unit is mainly distributed in the Vienna Woods. A few plots are from the eastern margin of the Vienna Basin (Stotzing) and Central Burgenland.

Clusters 59–60: Wet meadows with *Juncus inflexus* (*Junco inflexi-Menthetum longifoliae*).

This group includes mires and grasslands on wet and clay-rich soils in the Vienna Woods which are frequently disturbed by wild boar.

4.2 Alliances

The higher syntaxonomic units as delimited in MUCINA et al. (1993) were generally well supported by the TWINSPAN classification. As an exception, the alliances *Diantho-Seslerion* and *Bromo-Festucion pallentis* were not reproduced at all. On the contrary, most types of rocky grasslands from the Pavlov Hills, the Hainburg Hills, as well as from the eastern margin of the Alps were not even separated at the 6th level of division (cluster 8) although classified within two different alliances by MUCINA & KOLBEK (1993) and CHYTRÝ (2007). This result supports the re-unification of all rocky grasslands on calcareous soils (clusters 1–12) into a single alliance *Seslerio-Festucion pallentis*, as already suggested by WILLNER et al. (2004). Rocky grasslands on acidic soils, usually classified as alliance *Alysso-Festucion pallentis*, formed a separate group at the 4th level of division (clusters 13–16). However, as this grassland type reaches the study area only at its north-western margin, the data set did not cover the full floristic variability of this alliance.

The clusters 17–24 correspond to the alliance *Festucion valesiacae*, except for the small cluster 20, which rather represents impoverished and atypical stands of *Seslerio-Festucion pallentis* occurring on rocky outcrops in Weinviertel. Three relevés of *Festucion vaginatae* from sand dunes of Marchfeld were included in cluster 21. The *Koelerio-Phleion* sensu CHYTRÝ (2007) corresponds to the clusters 15, 19 and 22. Although a full evaluation of this alliance is beyond the scope of our paper, we see no support for such a unit in our results. At least the latter two clusters completely fit within the *Festucion valesiacae* (see also DÚBRAVKOVÁ et al. 2010).

The semi-dry grasslands (clusters 25–31) were divided by the 1st level of division (Table 1 in the supplement). Cluster 29 includes nutrient-poor meadows and pastures on acidic soils probably belonging to the *Violion caninae*. The other clusters represent two edaphic subtypes of basiphilous semi-dry grasslands: a drier one (clusters 25–28) and a temporarily moist one (clusters 30–31), which correspond to the alliances *Cirsio-Brachypodion* and *Bromion erecti*, respectively, in the classifications of MUCINA & KOLBEK (1993), CHYTRÝ (2007) and JANIŠOVÁ (2007). A comparison of the diagnostic species of these two alliances (according to DENGLER 2003: 200) showed a clear prevalence of *Cirsio-Brachypodion* species in both subtypes, provided that *Bromus erectus* is not considered as diagnostic for the *Bromion erecti* (Table 2). This assumption seems reasonable as *Bromus erectus* has a high constancy and cover in units traditionally assigned to *Cirsio-Brachypodion* (see, e.g., Table 11 in CHYTRÝ 2007). Moreover, while a joint alliance comprising all basiphilous semi-dry grasslands has five unique diagnostic species within our data set with a phi value ≥ 0.4 (Table 3), two separate alliances would have one and none, respectively. The sum of all positive phi values would drop from 30.5 for the joint alliance to 29.4 and 24.7 for the two separate alliances. Therefore, we advocate the inclusion of all basiphilous semi-dry grasslands of the study area within a single alliance *Cirsio-Brachypodion*.

The clusters 32–38 mostly represent the alliance *Arrhenatherion*. In cluster 33 and 34 also some relevés of *Cynosurion* were included. Cluster 35 comprised wet meadows (*Molinion* and *Calthion*) as well as grasslands of nutrient-poor and moderately acidic soils with a close

Table 2. Summarised percentage constancies (Const) and total covers (TC) of the diagnostic species of the *Bromion erecti* and the *Cirsio-Brachypodion* (according to DENGLER 2003, Table 29) in the semi-dry grasslands of the study area. *r*: < 0.05%.

Tabelle 2. Summen der prozentuellen Stetigkeiten (Const) und totalen Deckungen (TC) der diagnostischen Arten von *Bromion erecti* und *Cirsio-Brachypodion* (nach DENGLER 2003, Tab. 29) in den Halbtrockenrasen des Untersuchungsgebiets. *r*: < 0.05 %.

TWINSPAN cluster	25–26		27–28		30		31	
Number of relevés	323		234		212		165	
	Const	TC	Const	TC	Const	TC	Const	TC
Bromion erecti								
Bromus erectus	64	21.8	51	8.9	97	31.2	70	31.3
Festuca guestphalica	.	.	.	.	.	.	.	.
Gentianopsis ciliata	1	r	1	r	1	r	.	.
Gentianella germanica	.	.	.	.	.	.	.	.
Gymnadenia conopsea	3	r	5	0.1	4	r	.	.
Hippocrepis comosa	.	.	1	0.1	.	.	.	.
Koeleria pyramidata	9	0.2	3	0.1	20	0.6	.	.
Orchis purpurea	.	.	.	.	.	.	.	.
Ranunculus bulbosus	12	0.2	3	r	41	0.8	18	0.4
Scabiosa columbaria	1	.	1	r	1	r	.	.
Sum (incl. Bromus erectus)	90	22.2	65	9.2	164	32.6	88	31.7
Sum (excl. Bromus erectus)	26	0.4	14	0.3	67	1.4	18	0.4
Cirsio-Brachypodion								
Carex humilis	14	1.6	60	10.2	2	r	.	.
Festuca rupicola	85	12.3	75	4.0	64	5.8	79	15.7
Filipendula vulgaris	6	0.2	31	1.3	60	2.9	8	0.2
Fragaria viridis	41	2.3	23	0.4	37	1.2	45	1.7
Hieracium bauhinii	6	0.1	17	0.2	6	0.1	1	r
Hypochaeris maculata	1	r	14	0.2	8	0.1	.	.
Medicago falcata	50	1.8	41	0.7	34	1.8	4	0.2
Nonea pulla	2	r	1	r	.	.	.	.
Potentilla incana	29	0.7	35	0.6	5	0.4	10	0.1
Salvia verticillata	16	0.6	3	r	12	1.3	1	r
Thesium linophyllon	22	0.5	43	0.9	33	0.8	1	r
Trifolium montanum	15	0.6	23	0.3	77	3.6	12	0.3
Sum	287	20.7	366	18.8	338	18.0	161	18.2

relation to the *Violion caninae*. Cluster 36 included meadows with a strong tendency towards *Polygono-Trisetion*. The latter, however, were located outside the study area and do not belong to the Pannonian grasslands.

Clusters 39–44 can be classified as *Cnidion*, clusters 45–50 as *Molinion* and clusters 53–56 as *Calthion*. Mire communities of the *Caricion davallianae* are represented in clusters 51–52, 57–58 and 60. Cluster 59 belongs to the *Potentillion anserinae*.

The data-set specific diagnostic species of the alliances *Seslerio-Festucion pallentis*, *Festucion valesiacae*, *Cirsio-Brachypodion*, *Arrhenatherion*, *Cnidion*, *Molinion*, *Calthion* and *Caricion davallianae*, based on the manually re-arranged table, are given in Table 3.

Table 3. Diagnostic species of the most common grassland alliances in the Pannonian region of Austria (1: *Seslerio-Festucion pallentis*, 2: *Festucion valesiacae*, 3: *Cirsio-Brachypodion* [incl. *Bromion erecti* auct.], 4: *Arrhenatherion*, 5: *Cnidion*, 6: *Molinion*, 7: *Calthion*, 8: *Caricion davallianae*). Values are Φ values × 100, fidelity was calculated within the context of the data set, with equalised group-size and significance level set to $P < 0.05$. Alliances not sufficiently represented in the data set (*Alysso-Festucion pallentis, Festucion vaginatae, Violion caninae, Cynosurion, Potentillion anserinae*) were omitted from the calculation. For each alliance, the species with the highest Φ values are shown. Φ values > 0.4 are shaded.

Tabelle 3. Diagnostische Arten der häufigsten Grasland-Verbände im pannonischen Gebiet Österreichs (Legende siehe oben). Dargestellt ist die Datensatz-spezifische Treue, ausgedrückt als Φ-Koeffizient × 100. Nur randlich im Datensatz vertretene Verbände wurden bei der Berechnung weggelassen. Für jeden Verband sind die Arten mit dem höchsten Φ-Wert angegeben. Φ-Werte > 0.4 sind grau hinterlegt.

Alliance	1	2	3	4	5	6	7	8
Number of relevés	332	604	658	625	140	147	209	40
Seslerio-Festucion pallentis								
Teucrium montanum	79	---	---	---	---	---	---	---
Helianthemum canum	71	---	---	---	---	---	---	---
Linum tenuifolium	65	---	---	---	---	---	---	---
Carex humilis	65	---	---	---	---	---	---	---
Seseli hippomarathrum	63	---	---	---	---	---	---	---
Fumana procumbens	60	---	---	---	---	---	---	---
Sesleria caerulea	60	---	---	---	---	---	---	---
Stipa eriocaulis	60	---	---	---	---	---	---	---
Dorycnium germanicum	59	8	12	---	---	---	---	---
Scorzonera austriaca	59	---	---	---	---	---	---	---
Globularia cordifolia	58	---	---	---	---	---	---	---
Inula ensifolia	56	---	7	---	---	---	---	---
Galium lucidum	53	---	---	---	---	---	---	---
Festuca stricta	53	---	---	---	---	---	---	---
Anthericum ramosum	53	---	6	---	---	---	---	---
Thymus praecox	52	---	---	---	---	---	---	---
Genista pilosa	52	---	---	---	---	---	---	---
Scabiosa canescens	51	---	---	---	---	---	---	---
Aster linosyris	50	---	---	---	---	---	---	---
Pulsatilla grandis	49	---	7	---	---	---	---	---
Poa badensis	48	---	---	---	---	---	---	---
Festucion valesiacae								
Koeleria macrantha	---	53	---	---	---	---	---	---
Eryngium campestre	---	52	12	---	---	---	---	---
Festuca valesiaca	---	49	---	---	---	---	---	---
Veronica prostrata	---	42	---	---	---	---	---	---
Cerastium pumilum agg.	---	42	---	---	---	---	---	---
Phleum phleoides	---	42	13	---	---	---	---	---
Cirsio-Brachypodion								
Salvia pratensis	---	---	57	---	---	---	---	---
Centaurea scabiosa	21	---	47	---	---	---	---	---
Plantago media	---	---	43	---	---	---	---	---
Brachypodium pinnatum	---	---	43	---	---	---	---	---

Alliance	1	2	3	4	5	6	7	8
Number of relevés	332	604	658	625	140	147	209	40
Fragaria viridis	---	---	41	---	---	---	---	---
Bromus erectus	15	---	38	---	---	---	---	---
Arrhenatherion								
Arrhenatherum elatius	---	---	23	54	---	---	---	---
Trisetum flavescens	---	---	---	52	---	---	---	---
Galium mollugo agg.	---	---	---	44	---	---	22	---
Vicia sepium	---	---	---	41	---	---	---	---
Heracleum sphondylium	---	---	---	41	---	---	---	---
Veronica chamaedrys agg.	---	---	10	39	---	---	20	---
Cnidion								
Symphytum officinale	---	---	---	---	74	---	---	---
Alopecurus pratensis	---	---	---	11	66	---	6	---
Potentilla reptans	---	---	---	---	57	---	---	---
Elymus repens	---	---	---	11	49	---	---	---
Poa palustris	---	---	---	---	46	---	---	---
Ranunculus repens	---	---	---	---	40	3	27	8
Molinion								
Sesleria uliginosa	---	---	---	---	---	59	---	29
Serratula tinctoria	---	---	---	---	---	58	---	---
Veratrum album	---	---	---	---	---	57	---	---
Phragmites australis	---	---	---	---	---	56	---	13
Galium boreale	---	---	---	---	---	52	17	3
Salix repens	---	---	---	---	---	52	---	---
Laserpitium prutenicum	---	---	---	---	---	52	---	---
Inula salicina	---	---	---	---	---	49	---	---
Sanguisorba officinalis	---	---	---	---	---	47	23	10
Carex flacca	---	---	---	---	---	46	19	22
Succisa pratensis	---	---	---	---	---	45	13	16
Silaum silaus	---	---	---	---	2	44	8	---
Calthion								
Holcus lanatus	---	---	---	13	---	2	56	---
Lychnis flos-cuculi	---	---	---	---	---	---	55	---
Ajuga reptans	---	---	---	2	---	---	50	---
Rumex acetosa	---	---	---	26	---	---	45	---
Juncus effusus	---	---	---	---	---	---	45	13
Angelica sylvestris	---	---	---	---	---	5	45	---
Carex pallescens	---	---	---	---	---	---	45	---
Caricion davallianae								
Carex davalliana	---	---	---	---	---	8	---	58
Parnassia palustris	---	---	---	---	---	2	---	52
Schoenus × intermedius	---	---	---	---	---	1	---	52
Allium schoenoprasum	---	---	---	---	---	2	---	51
Valeriana dioica	---	---	---	---	---	9	4	50
Equisetum × litorale	---	---	---	---	---	6	---	45
Eriophorum latifolium	---	---	---	---	---	5	---	43
Carex flava agg.	---	---	---	---	---	2	4	40

Alliance	1	2	3	4	5	6	7	8
Number of relevés	332	604	658	625	140	147	209	40
Species with Φ > 0.3 in more than one alliance								
Potentilla incana (incl. pusilla)	52	42	---	---	---	---	---	---
Centaurea stoebe	34	38	---	---	---	---	---	---
Festuca rupicola	---	37	44	---	---	---	---	---
Trifolium pratense	---	---	---	34	---	---	37	---
Taraxacum officinale agg.	---	---	---	30	40	---	7	---
Lysimachia nummularia	---	---	---	---	35	---	32	---
Molinia caerulea agg.	---	---	---	---	---	62	1	42
Potentilla erecta	---	---	---	---	---	47	7	50
Cirsium rivulare	---	---	---	---	---	19	35	30
Carex panicea	---	---	---	---	---	31	31	41

5. Conclusions and outlook

The present study is intended as a starting point for the detailed regional evaluation of the Pannonian grasslands of Austria. The TWINSPAN classification proved to be a reasonable basis for this aim. However, after the determination of diagnostic species, manual rearrangement of miss-classified relevés was necessary in order to get a consistent system (see WILLNER 2011, LUTHER-MOSEBACH et al. 2012). This may not be achieved by one step but may need additional rounds of unsupervised and supervised classifications. Floristically quite homogenous units can become split between two or more branches of the TWINSPAN hierarchy and have to be reunited by hand (see, e.g., the *Sesleria caerulea* grasslands of the Vienna Woods in clusters 1, 7 and 12, or the dry grasslands on base-rich sandy soils in clusters 21 and 23d). The first division does not necessarily correspond to the highest syntaxonomic rank, as the TWINSPAN algorithm always makes the division in the centre of the strongest gradient (HILL 1979), which obviously is dependent on the data set. In our case, the mesic half of the semi-dry grasslands (clusters 30–31) were at the “wrong” side of the first division, grouped together with *Calluno-Ulicetea* and *Molinio-Arrhenatheretea* communities.

The best documented part of the study area is the Vienna Woods, which will be treated in the second part of this series (WILLNER et al. 2013). In the Danube National Park, the grassland types were mapped between 2010 and 2012 on the basis of a preliminary classification by the first author. Therefore, the grasslands of the Danube and Morava (March) floodplain will probably be the subject of part three of the series. In other parts of the Pannonian region of Austria, the data basis is less dense, and especially in the Weinviertel many grasslands have not been phytosociologically investigated at all yet. Nevertheless, new plot data are becoming available every year, partly from academic theses, partly from conservation projects. At the same time, supra-national classification studies are under preparation, which will help to improve the system from a broad-scale perspective. Thus, we are optimistic that the syntaxonomic revision of the Austrian Pannonian grasslands will be completed within reasonable time.

Erweiterte deutsche Zusammenfassung

Einleitung – Der pannonische Teil Österreichs ist eine der abwechslungsreichsten Landschaften in Mitteleuropa. Zwar wurden die Rasengesellschaften dieser Region bereits in zahlreichen botanischen und vegetationskundlichen Studien beschrieben, doch stellt sich deren pflanzensoziologische Gliederung nach wie vor recht verworren dar. Mit dieser Arbeit beginnen wir eine Publikations-Serie mit dem Ziel, ein revidiertes, konsistentes System der pannonischen Rasengesellschaften Österreichs zu erarbeiten. Basierend auf der numerischen Klassifikation eines großen Datensatzes geben wir einen groben Überblick, und diskutieren einige syntaxonomische Probleme mit Fokus auf den höheren Einheiten (Verbänden). Die detaillierte Klassifikation auf Assoziations- und Subassoziationsniveau wird in den nächsten Teilen folgen, wobei wir jeweils eine landschaftlich mehr oder weniger homogene Subregion (vergleichbar den „Wiesenregionen" nach SUSKE et al. 2003) behandeln werden. Der Teil 2 dieser Serie wird die Rasengesellschaften im Wienerwald behandeln (siehe WILLNER et al. 2013 in diesem Band). Eine Synopsis für das gesamte österreichische Pannonicum und angrenzende Gebiete soll den Schluss der Serie bilden.

Untersuchungsgebiet – Die Westgrenze der pannonischen Region ist nicht leicht zu definieren, da die östlichen Randgebiete der Alpen und der Böhmischen Masse noch starke pannonische Einflüsse zeigen. Hier fassen wir das pannonische Gebiet unter Einschluss der randlichen Übergangszonen, zu welchen auch der Wienerwald gehört, auf (Abb. 1). Die mittleren Jahresniederschläge betragen zwischen 500 mm im nördlichen Weinviertel (an der Grenze zu Mähren) und 700–1000 mm am Ostrand der Alpen. Die mittlere Jahrestemperatur liegt zwischen 8 und knapp über 10 °C, wobei die höchsten Werte im Bereich des Neusiedler Sees erreicht werden. Neben den deutlichen klimatischen Gradienten zeichnet sich das Gebiet auch durch eine große Vielfalt an geologischen Substraten aus.

Material und Methoden – Als "Rasengesellschaften" definieren wir alle Typen von Wiesen, Weiden und primären Steppenrasen. Wir schließen auch Niedermoore mit ein, da diese in der Regel zumindest unregelmäßig gemäht werden. Dies entspricht den Klassen *Festuco-Brometea, Calluno-Ulicetea* p.p. (*Nardetalia*), *Molinio-Arrhenatheretea* (exkl. *Filipendulenion*), *Artemisietea vulgaris* p.p. (*Agropyretalia*) und *Scheuchzerio-Caricetea fuscae*. Salzsteppen der *Puccinellio-Salicornietea* konnten nicht berücksichtigt werden, da keine Aufnahmen dieser Klasse digital verfügbar waren. Saumgesellschaften (*Trifolio-Geranietea*) sowie Röhrichte und Großseggenrieder (*Phragmito-Magnocaricetea*) sind nicht Gegenstand dieser Arbeit.

In einem ersten Schritt wurden alle verfügbaren Vegetationsaufnahmen von pannonischen Rasengesellschaften in der Österreichischen Vegetationsdatenbank selektiert. Diese konnten durch zahlreiche unpublizierte Daten aus dem Nationalpark Donauauen und dem Biosphärenpark Wienerwald ergänzt werden. Um die vergleichsweise dürftige Datenlage im nördlichen Teil des Untersuchungsgebiets (Weinviertel) auszugleichen, wurden außerdem Aufnahmen aus Süd-Mähren mitausgewertet. Dieser Datensatz von 3384 Aufnahmen wurde mit TWINSPAN klassifiziert. Aufnahme-Cluster, welche keine erkennbaren standörtlichen oder geographischen Unterschiede aufwiesen, wurden zusammengefasst. Anschließend wurden Aufnahmen, bei welchen die Deckungssumme der Verbands-, Ordnungs- und Klassencharakterarten eine andere Zuordnung nahelegte, per Hand umsortiert. Auf Basis dieser nachsortierten Tabelle wurden diagnostische Arten für die Verbände errechnet.

Ergebnisse und syntaxonomische Diskussion – Die erste TWINSPAN-Teilung entspricht weitgehend der traditionellen Grenze zwischen den Klassen *Festuco-Brometea* und *Molinio-Arrhenatheretea* (Tab. 1 in der Beilage). Die Klassifikation spiegelt hauptsächlich einen Feuchtegradienten, in geringerem Ausmaß auch Gradienten im Nährstoffangebot und Karbonatgehalt wider. Die Hauptgruppen, welche in der TWINSPAN-Tabelle unterschieden werden können, sind: Karbonat-Felstrockenrasen (Cluster 1–12), Silikat-Felstrockenrasen (Cluster 13–16), Rasensteppen (cluster 17–24), Halbtrockenrasen (Cluster 25–31), nährstoffreiche Frischwiesen (Cluster 32–38), Überschwemmungswiesen der Donau- und Marchauen (Cluster 39–44), Pfeifengraswiesen (Cluster 45–50) sowie Nass- und Niedermoorwiesen (Cluster 51–60).

Die übliche Konzeption der Verbände wird großteils bestätigt. Allerdings wird die Trennung zwischen den Verbänden *Diantho-Seslerion* und *Bromo-Festucion pallentis* (MUCINA & KOLBEK 1993, CHYTRÝ 2007) nicht reproduziert, sodass wir vorschlagen, alle Felstrockenrasen auf Karbonatgestein in einem einzigen Verband *Seslerio-Festucion pallentis* zu vereinen. Eine Gegenüberstellung der diagnostischen Arten von *Bromion erecti* und *Cirsio-Brachypodion* zeigt außerdem, dass alle Halbtrockenrasen des Gebiets zum Verband *Cirsio-Brachypodion* gestellt werden sollten (Tab. 2). Die Zuordnung der etwas mesophileren Halbtrockenrasen auf tonreichen Böden zum *Bromion erecti*, wie von MUCINA & KOLBEK (1993), CHYTRÝ (2007) und JANIŠOVÁ (2007) vorgeschlagen, widerspricht nicht nur der klassischen Konzeption des Verbands *Cirsio-Brachypodion* als östlicher Vikariante zum *Bromion erecti*, sondern produziert außerdem Einheiten, die kaum durch regionale Charakterarten gekennzeichnet sind. Die (datensatzspezifischen) diagnostischen Arten der häufigsten Rasen-Verbände im Untersuchungsgebiet sind in Tab. 3 dargestellt.

Schlussfolgerungen und Ausblick – Der vorliegende erste Teil unserer geplanten Publikationsserie liefert den groben Rahmen für die regionale Feingliederung, welche in den nächsten Teilen folgen soll. Die TWINSPAN-Klassifikation erwies sich dabei als gute Ausgangsbasis. Allerdings ist eine Nachsortierung der Aufnahmen anhand der diagnostischen Arten unbedingt notwendig, um eine konsistente Klassifikation zu erhalten. Eine Eigenheit von TWINSPAN ist auch, dass floristisch eng zusammengehörige Einheiten bisweilen auf hohem Niveau getrennt werden.

Die bestdokumentierten Teile des Untersuchungsgebiets sind der Wienerwald und der Nationalpark Donauauen. Gröbere Kenntnislücken gibt es dagegen noch im Weinviertel. Wir sind aber optimistisch, dass die syntaxonomische Revision der pannonischen Rasengesellschaften Österreichs in absehbarer Zeit abgeschlossen werden kann.

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Supplements and Appendices

Supplement 1. Table 1. TWINSPAN classification of the total data set.

Beilage 1. Tabelle 1. TWINSPAN-Klassifikation des Gesamtdatensatzes.

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Table 1. TWINSPAN classification of the total data set. Only divisions which are considered as syntaxonomically meaningful are shown (see chapter 3.3 for details). Values are percentage constancies. The species are grouped by their diagnostic value according to Mucina et al. (1993) and Grabherr & Mucina (1993) (C: character species, D: differential species, reg.: regional). Within groups, the species are sorted by decreasing frequency in the whole data set. Diagnostic species which do not reach a constancy of at least 20% in one column, are not shown (with a few exceptions). Other vascular plant species are only shown if they occur in more than 100 relevés. Cryptogam species which occur in more than 50 relevés are given at the end of the table. Constancy values of the latter were calculated on the basis of the subset of relevés in which these plants were recorded. The solid vertical lines separate the main groups mentioned in chapter 4.1, dashed lines refer to other alliance borders.

Tabelle 1. TWINSPAN-Klassifikation des Gesamtdatensatzes. Es sind nur die als syntaxonomisch relevant betrachteten Teilungen dargestellt (siehe Kap. 3.3). Die Werte geben die prozentuelle Stetigkeit wieder. Die Arten sind entsprechend ihrem diagnostischen Wert nach Mucina et al. (1993) und Grabherr & Mucina (1993) geordnet (C: Charakterarten, D: Differentialarten, reg.: regional). Innerhalb der Gruppen sind die Arten nach absteigender Häufigkeit geordnet. Diagnostische Arten, welche in keiner Spalte zumindest 20% Stetigkeit erreichen, sind bis auf wenige Ausnahmen weggelassen. Die weiteren Arten sind nur dargestellt, wenn sie in mehr als 100 Aufnahmen vorkommen. Kryptogamen, welche in mehr als 50 Aufnahmen vorkommen, sind am Schluss der Tabelle aufgelistet. Die Stetigkeit der Kryptogamen wurde auf Basis jener Aufnahmen berechnet, welche Kryptogamen-Angaben enthielten. Die durchgezogenen vertikalen Linien umgrenzen die in Kap. 4.1 erwähnten Hauptgruppen, die strichlierten Linien entsprechen sonstigen Verbandsgrenzen.

TWINSPAN cluster	1	2 / 4	5 / 6	7	8	9 / 10	11	12	13 / 14	15	16	17 / 18	19	20	21	22	23a / 23c	23d	23e	23f / 23g	24	25 / 26	27 / 28	29	30	31	32	33	34	35	36	37 / 38	39	40	41 / 42	43 / 44	45 / 48	49 / 50	51 / 52	53 / 54	55 / 56	57 / 58	59 / 60
Number of relevés	2	14	50	20	107	91	38	4	10	38	59	30	61	38	185	183	26	66	134	100	27	323	234	24	212	165	97	130	292	153	43	37	43	3	62	32	139	8	15	26	30	23	10
TWINSPAN hierarchy	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0
	1	0	1	1	1	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	1	1	1	0	0	1	0	0	1	1	0	0
			1	0	0	1	0	0	1	0	0	1	0	0	1	1	0	0	0	0	0	1	0	1	1	0	0	1	1	0	0	1	0	0	1	0		1	0	1	0	1	0
				1	0		1	0		1	0		1	0	1	0	1	1	1	1	0			1	0	1	0	1	0	1	0		1	0									
																	1	0	0	0																							
																		1	1	0																							
																		1	0																								
C Diantho lumnitzeri-Seslerion																																											
Festuca stricta	.	.	88	30	29	25	11	.	.	.	.	.	.	.	1	.	.	2	1	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Minuartia setacea	.	.	6	45	25	1	.	.	.	.	2	3	7	32	.	.	15	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dianthus lumnitzeri	.	.	.	5	24	.	.	.	.	.	.	.	.	3	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Seseli austriacum	100	.	2	85	.	.	.	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sesleria sadleriana	.	.	.	.	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erysimum sylvestre	.	.	.	25	1	.	.	50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cardaminopsis petraea	.	.	.	40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Draba aizoides subsp. beckeri	100	.	.	10	.	.	.	75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dianthus plumarius subsp. neilreichii	.	.	.	15	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C (reg.) Diantho lumnitzeri-Seslerion																																											
Buphthalmum salicifolium	.	100	.	.	.	3	32	.	.	.	.	.	.	.	1	.	4	.	1	.	.	22	6	.	35	1	16	.	2	.	16	.	.	.	.	.	6	.	.	.	.	.	.
Sesleria caerulea	100	86	6	100	45	60	39	100	.	.	3	.	.	5	.	.	.	.	4	.	4	3	4	.	4	.	1	1	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.
Galium lucidum	100	86	90	75	23	30	5	25	.	.	.	.	3	.	.	.	4	3	4	.	.	2	2	.	1	.	.	.	1	.	19	.	.	.	.	.	.	.	.	.	.	.	.
Globularia cordifolia	.	14	32	65	28	65	16	75	.	.	.	.	.	.	.	.	.	.	2	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leontodon incanus	.	43	4	55	14	57	16	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	1	.	.	.	.	.	1	.	7	.	.	.	.	.	.	.	.	.	.	.	.
Phyteuma orbiculare	50	.	.	25	2	10	18	50	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	4	1	1	.	4	.	12	.	.	.	.	.	5	.	.	.	.	.	.
Biscutella laevigata	.	.	4	30	3	2	.	.	.	5	3	.	.	.	.	1	.	.	1	.	.	6	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carduus defloratus s.lat.	.	79	.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	26	.	.	.	.	.	.	.	.	.	.	.	.
Polygala amara	.	.	.	.	1	3	3	25	.	.	.	.	.	.	.	.	.	.	1	.	.	1	1	.	1	.	.	.	.	1	7	.	.	.	.	.	6	.	.	.	.	.	.
Euphrasia salisburgensis	.	.	6	10	2	13	.	50	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Acinos alpinus	.	29	.	10	1	.	.	25	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga paniculata	50	.	.	15	.	.	.	50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Primula auricula	.	.	.	5	.	.	.	75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C Bromo-Festucion pallentis																																											
Seseli hippomarathrum	.	.	76	50	53	60	26	.	.	.	3	.	8	32	3	3	23	20	32	16	.	6	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Scabiosa canescens	.	.	48	15	30	68	11	.	.	11	5	.	3	.	3	4	.	9	13	3	4	6	16	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Scorzonera austriaca	.	.	28	25	64	46	61	.	.	3	3	.	15	8	.	.	.	2	8	7	.	1	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helianthemum canum	.	.	72	55	64	82	5	.	.	.	.	.	2	3	.	.	4	2	7	.	.	1	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Campanula sibirica	.	.	38	20	39	11	8	.	.	.	.	.	2	3	1	.	.	5	4	28	.	3	9	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fumana procumbens	.	.	42	35	61	38	16	.	.	.	.	.	.	.	1	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa badensis	.	.	10	20	63	10	3	.	.	.	.	.	2	47	1	.	4	2	8	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stipa pulcherrima	.	.	.	.	3	12	8	.	.	.	.	.	.	3	2	.	.	2	13	27	11	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhamnus saxatilis	.	.	2	5	16	12	29	.	.	.	.	.	3	.	.	.	.	.	1	.	.	1	5	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ononis pusilla	.	.	24	.	11	14	.	.	.	.	.	.	.	.	2	.	.	2	2	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C, D Alysso-Festucion pallentis																																											
Sedum rupestre (C)	.	.	.	.	.	2	.	.	20	16	19	3	3	.	.	1	.	.	.	1	19	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aurinia saxatilis (C reg.)	.	.	.	.	.	.	.	.	100	.	.	.	.	8	.	1	.	.	1	.	30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium arvense (D)	.	.	.	.	.	.	.	.	.	24	58	3	52	5	1	23	4	2	.	2	11	1	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica dillenii (D)	.	.	.	.	.	.	.	.	.	3	42	20	30	3	.	1	.	.	1	1	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jasione montana (D)	.	.	.	.	.	.	.	.	.	34	19	.	.	.	.	10	.	.	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C Stipo-Festucetalia pallentis																																											
Dorycnium germanicum	.	.	90	65	75	98	79	.	.	3	2	7	10	18	37	.	.	53	43	34	.	42	61	.	3	5	2	.	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.
Carex humilis	.	71	58	55	84	99	68	25	.	63	61	.	46	24	4	14	4	23	34	35	11	14	60	.	2	.	2	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.
Thymus praecox	.	14	4	75	88	27	37	.	.	61	83	3	26	74	1	5	50	3	39	14	19	20	13	.	6	1	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Teucrium montanum	.	7	82	70	86	93	53	50	.	.	.	.	2	.	8	.	.	20	18	1	.	3	9	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Pulsatilla grandis	.	.	.	20	36	85	53	.	.	32	29	.	13	.	.	2	4	.	8	4	4	12	26	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Stipa joannis	.	.	8	.	6	19	11	.	.	.	8	10	3	11	34	2	12	74	24	29	44	5	17	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Linum tenuifolium	.	.	22	45	66	85	37	.	.	.	.	.	.	5	2	.	.	3	13	5	.	7	21	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Allium flavum	.	.	.	5	39	16	29	.	20	16	31	.	16	45	.	3	31	9	31	14	44	2	21	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Genista pilosa	.	.	8	40	36	77	34	25	20	82	51	.	5	.	2	9	.	.	3	.	.	7	5	8	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Globularia punctata	.	.	80	.	51	14	45	.	.	.	.	3	5	5	5	.	.	12	16	5	.	7	24	.	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Seseli osseum	.	.	4	5	61	3	18	.	10	29	58	3	31	42	1	5	4	2	13	4	56	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jurinea mollis	.	.	14	25	56	7	34	.	.	.	.	.	2	3	1	1	.	5	7	32	.	2	24	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melica ciliata	.	.	10	55	54	11	32	.	10	.	.	17	8	37	1	1	31	3	23	11	15	1	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Silene otites s.lat.	.	.	26	.	15	2	3	.	.	47	41	.	10	11	8	11	8	11	20	16	.	2	6	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Allium senescens subsp. montanum	.	7	.	60	29	35	16	75	10	3	12	3	7	21	1	4	.	.	19	.	33	4	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca pallens (incl. csikhegyensis)	.	.	2	25	41	.	.	.	70	32	63	.	.	66	.	1	23	.	5	.	19	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stipa eriocaulis	.	.	96	15	52	26	5	.	.	.	.	.	.	.	.	.	4	3	3	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Alyssum montanum	.	.	14	10	50	4	13	.	.	3	2	.	26	39	.	3	4	3	10	.	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thalictrum minus s.lat.	.	.	.	30	11	3	8	75	.	.	.	.	.	.	.	2	.	9	7	8	.	2	24	.	2	2	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Allium sphaerocephalon	.	.	16	30	28	3	3	.	.	5	2	3	34	.	.	2	4	3	10	10	.	3	1	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jovibarba globifera s.lat.	.	14	4	75	32	8	18	.	20	3	2	.	3	32	.	.	4	.	6	.	.	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trinia glauca	.	.	32	.	8	3	13	.	.	3	.	.	13	.	3	1	.	2	6	2	.	1	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Onosma visianii	.	.	.	50	17	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C, D Koelerio-Phleetalia																																											
Avenula pratensis (C)	.	.	2	.	8	15	5	.	.	84	54	.	28	5	10	21	4	27	31	5	.	15	26	13	2	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Agrostis vinealis (C)	.	.	.	.	.	.	.	.	.	87	41	.	5	.	.	24	.	2	.	.	4	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rumex acetosella s.lat. (D)	.	.	.	.	.	.	.	.	80	66	71	3	8	.	2	42	.	2	.	3	7	1	.	4	1	6	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Arabidopsis thaliana (D)	.	.	.	.	.	.	.	.	.	.	3	3	18	.	1	21	.	6	7	5	7	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Scleranthus perennis (D)	.	.	.	.	.	.	.	.	10	18	34	.	.	3	.	3	.	.	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C Festucion valesiacae																																											
Thymus odoratissimus	.	.	80	.	13	18	24	.	.	8	7	13	46	11	44	24	4	38	38	49	4	17	33	4	8	12	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca valesiaca	.	.	2	.	9	5	16	.	.	24	54	20	97	55	10	27	38	5	76	69	15	13	18	.	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Iris pumila	.	.	.	.	21	1	26	.	.	.	12	.	34	5	4	2	4	6	16	57	4	1	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thymus kosteleckyanus	.	.	.	.	.	45	3	.	.	.	14	20	15	.	17	23	.	3	2	6	.	5	3	.	1	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salvia nemorosa	.	.	.	.	2	1	3	.	.	.	.	.	7	.	4	6	19	5	6	70	4	10	10	.	1	1	2	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Adonis vernalis	.	.	4	.	11	52	18	.	.	.	.	.	2	.	1	1	.	2	7	8	.	5	25	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Muscari neglectum	.	.	16	5	11	3	11	.	.	.	.	7	13	.	11	4	8	2	11	2	.	6	6	.	4	2	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Viola ambigua	.	.	8	.	8	.	.	.	.	.	.	.	.	.	1	.	4	3	15	37	.	3	17	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Astragalus austriacus	.	.	4	.	12	.	.	.	.	.	.	.	3	3	3	1	4	6	13	34	.	4	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Inula oculus-christi	.	.	14	.	9	.	.	.	.	.	.	.	2	11	1	.	15	5	13	34	22	1	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thesium ramosum	.	.	2	.	1	.	.	.	.	.	2	3	.	.	29	5	.	.	2	.	.	1	1	.	1	4	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.
Carex supina	.	.	.	.	.	.	.	.	.	16	24	.	16	3	1	3	.	5	5	19	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cruciata pedemontana	.	.	.	.	.	.	.	.	.	.	2	13	20	.	10	9	.	.	4	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crambe tataria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	32	.	1	7	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Taraxacum serotinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	3	1	29	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus illyricus	.	.	.	.	.	.	.	.	.	.	10	.	16	3	.	1	.	3	4	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Astragalus exscapus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	5	1	14	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Seseli pallasii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	10	.	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lactuca viminea	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	4	.	1	.	26	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C Festucetalia valesiacae																																											
Scabiosa ochroleuca	.	.	16	25	51	75	45	.	.	16	15	.	7	34	25	35	15	41	48	22	26	49	38	.	7	12	11	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.
Centaurea stoebe	.	.	30	5	55	43	34	.	40	66	66	33	49	55	31	42	54	45	69	42	63	22	20	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Inula ensifolia	.	.	6	.	44	90	89	.	.	.	.	.	.	.	1	1	.	15	16	18	.	10	56	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aster linosyris	.	.	12	5	40	77	53	.	.	.	7	.	3	3	1	4	.	11	24	31	4	7	43	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stipa capillata	.	.	28	5	35	12	24	.	10	11	29	.	43	13	4	5	15	85	43	58	19	1	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pseudolysimachion spicatum	.	.	52	.	17	1	.	.	.	66	76	.	41	13	7	28	.	33	22	22	4	2	14	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Artemisia campestris	.	.	4	.	14	1	.	.	50	45	53	.	34	42	10	22	42	21	32	29	41	3	5	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Astragalus onobrychis	.	.	8	.	16	1	.	.	.	.	.	.	8	18	8	3	19	20	29	35	.	16	21	.	1	1	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bothriochloa ischaemum	.	.	4	.	18	1	13	.	.	3	7	57	10	5	24	7	.	27	30	20	22	6	4	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Odontites luteus	.	.	4	.	16	70	18	.	.	18	12	.	3	3	1	1	.	.	8	9	.	9	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca rupicola	.	.	2	.	35	85	42	.	.	29	32	50	25	24	82	83	58	85	69	62	11	85	75	29	64	79	64	15	6	3	.	.	7	.	2	.	1	.	.	.	.	4	.
Carex liparocarpos	.	.	50	.	2	.	.	.	.	.	.	20	2	.	38	1	.	24	4	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium echioides	.	.	18	15	7	1	.	.	.	32	42	3	5	3	11	5	8	21	4	5	.	1	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pulsatilla pratensis subsp. nigricans	.	.	.	.	7	2	5	.	.	5	7	.	20	.	3	9	.	3	13	9	.	4	10	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Achillea setacea	.	.	.	.	.	.	.	.	.	18	41	.	16	3	2	11	4	2	4	20	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Verbascum phoeniceum	.	.	.	.	.	.	.	.	.	5	22	.	21	.	1	9	4	2	5	26	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C Festucetalia vaginatae																																											
Gypsophila paniculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10	3	4	20	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helichrysum arenarium	.	.	.	.	.	.	.	.	.	21	14	.	3	.	2	.	.	8	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dianthus serotinus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca vaginata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gypsophila fastigiata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C Cirsio-Brachypodion																																											
Brachypodium pinnatum	.	.	4	5	3	26	39	.	.	.	.	.	2	.	27	5	.	20	11	13	30	61	63	83	49	47	19	5	13	18	14	3	.	.	.	.	12	.	.	.	.	.	.
Ranunculus polyanthemos agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	1	.	.	17	28	8	32	60	27	15	2	6	.	5	7	.	2	.	1	.	.	.	.	.	.
Cirsium pannonicum	.	.	.	.	.	3	5	.	.	.	.	.	.	.	.	.	.	.	1	.	.	5	12	46	39	1	10	1	8	10	.	.	.	.	.	.	19	.	.	.	.	.	10
Carlina vulgaris agg.	.	14	10	.	5	7	34	.	.	.	.	.	.	.	9	8	.	14	2	4	.	20	10	.	2	3	4	.	.	.	2	.	.	.	.	.	1	.	.	.	.	.	.
Polygala major	.	.	.	.	.	4	16	.	.	.	.	.	.	.	.	.	.	.	1	3	.	13	25	.	10	1	2	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Onobrychis arenaria	.	.	.	.	.	3	3	.	.	.	.	.	.	.	5	.	.	2	3	4	.	14	24	.	4	1	2	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Scorzonera hispanica	.	.	.	.	2	2	13	.	.	.	.	.	.	.	1	.	.	.	1	6	.	2	26	.	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Hypochaeris maculata	.	.	.	.	2	11	13	.	.	5	2	.	5	.	.	2	4	.	1	1	.	1	14	8	8	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Scorzonera purpurea	.	.	10	.	2	36	3	.	.	.	.	.	.	.	2	1	.	2	1	3	.	3	8	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C Brometalia																																											
Briza media	.	14	2	.	1	52	.	.	.	3	.	.	.	.	16	10	.	5	3	2	.	35	31	96	76	54	19	6	23	45	65	.	.	.	.	.	60	25	7	27	27	70	30
Plantago media	.	.	2	.	5	66	8	.	.	13	.	.	3	.	15	11	.	9	18	26	.	56	49	38	63	40	51	5	8	3	44	.	.	.	.	.	12	.	.	.	.	4	.
Trifolium montanum	.	.	2	.	1	2	3	.	.	11	12	.	2	.	1	8	.	.	2	3	.	15	23	71	77	12	11	1	9	11	19	.	.	.	.	.	31	.	.	4	.	13	.
Ranunculus bulbosus	.	.	.	.	.	.	.	.	.	3	.	.	2	3	5	3	.	2	1	.	.	12	3	50	41	18	31	9	23	8	2	.	.	.	2	.	1	.	.	.	.	.	.
Carlina acaulis	.	14	2	.	.	37	8	.	.	21	2	.	.	.	1	4	.	2	1	.	.	17	19	50	33	4	11	1	4	3	58	.	.	.	.	.	1	.	.	.	.	.	.
Campanula glomerata	.	.	.	.	1	8	18	.	.	.	2	.	.	.	.	1	.	.	.	1	.	18	33	8	21	.	3	.	5	4	.	.	.	.	.	.	9	.	.	.	.	.	.
Prunella grandiflora	.	.	2	.	.	48	5	.	.	.	.	.	.	.	.	.	.	.	1	1	.	20	15	13	8	.	.	.	1	.	.	.	.	.	.	.	16	.	.	.	.	.	10
Bromus erectus	.	.	84	.	23	97	53	.	.	3	.	30	8	.	76	13	4	48	25	25	.	64	51	92	97	70	75	10	45	31	.	3	.	.	.	.	42	.	.	.	.	.	.
Polygala comosa	.	.	2	.	.	.	.	.	.	3	.	3	2	.	7	.	.	3	.	.	.	7	10	4	22	4	3	.	2	1	7	.	.	.	.	.	1	.	.	.	.	4	.
Carex montana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	3	8	50	20	.	2	.	2	5	14	.	.	.	.	.	3	.	.	.	.	.	10
Orchis ustulata	.	14	8	.	1	3	.	.	.	.	.	.	2	.	15	.	.	17	.	.	.	3	4	.	3	15	2	1	1	1	.	.	.	.	.	.	2	.	.	.	.	.	.
Orchis militaris	.	.	.	.	.	.	3	.	.	.	.	.	.	.	18	1	.	2	.	.	.	4	3	.	2	8	.	2	1	.	.	.	.	.	.	.	4	.	.	.	.	.	.
Euphorbia verrucosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	17	21	1	3	.	4	3	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypochaeris radicata	.	.	.	.	.	.	.	.	.	24	.	.	7	.	.	14	.	2	.	.	.	.	.	33	2	.	.	.	3	6	2	.	.	.	.	.	1	.	.	12	3	.	.
Gymnadenia conopsea	.	29	.	.	.	1	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	5	4	4	.	.	.	1	1	.	.	.	.	.	.	17	13	.	.	.	9	10
Trifolium ochroleucon	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	25	3	.	.	.	1	6	.	.	.	.	.	.	1	.	.	.	.	.	.
C Festuco-Brometea																																											
Teucrium chamaedrys	.	79	20	25	39	67	82	.	.	5	10	40	54	24	55	23	50	53	66	61	81	48	59	17	25	14	6	.	.	1	19	.	.	.	.	.	1	.	.	.	.	.	.
Centaurea scabiosa	.	14	6	50	27	65	63	.	.	3	.	.	8	8	14	9	12	27	36	27	.	86	84	4	57	10	55	2	4	.	2	.	.	.	.	.	6	.	.	.	.	.	.
Asperula cynanchica	.	.	22	70	66	85	66	.	.	82	69	33	20	58	34	30	23	30	58	48	37	47	50	.	12	1	5	1	1	1	.	.	.	.	.	.	16	.	.	.	.	.	.
Koeleria macrantha	.	.	42	.	33	10	5	.	.	47	88	23	74	74	57	60	54	52	70	72	30	20	34	.	3	35	1	2	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Eryngium campestre	.	.	46	.	15	18	16	.	.	71	58	30	67	34	59	46	69	58	57	64	19	37	29	4	6	12	6	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dianthus carthusianorum agg.	.	14	.	5	8	3	34	25	20	92	83	3	59	32	28	57	12	17	40	25	19	42	27	13	36	25	24	.	.	1	5	.	.	.	.	.	4	.	.	.	.	.	.
Hypericum perforatum	.	7	32	.	16	3	5	.	.	84	68	30	31	11	31	47	27	47	36	16	33	38	14	50	27	24	15	2	15	7	37	3	.	.	3	.	1	.	.	.	.	.	.
Medicago falcata	.	.	4	.	16	23	29	.	.	3	8	.	31	32	13	12	46	17	49	36	22	50	41	4	34	4	24	2	2	1	.	.	.	.	.	.	3	.	.	.	.	.	.
Helianthemum nummularium agg.	.	.	12	15	46	78	82	25	.	.	3	27	7	8	29	4	.	6	25	14	11	32	41	67	34	6	5	.	1	3	23	.	.	.	.	.	1	.	.	.	.	.	.
Filipendula vulgaris	.	.	.	.	1	.	.	.	.	.	.	.	2	.	2	9	.	6	7	6	.	6	31	63	60	8	19	3	43	42	.	.	5	.	2	.	32	.	.	4	.	17	20
Fragaria viridis	.	7	2	.	.	3	8	.	.	8	.	.	2	3	11	21	.	24	11	8	30	41	23	33	37	45	20	2	8	9	.	.	.	.	.	.	.	.	.	.	.	.	.
Securigera varia	.	36	2	.	5	2	5	.	.	11	5	.	5	5	21	20	19	11	27	29	7	51	15	4	20	17	24	2	2	1	5	.	.	.	.	.	.	.	.	.	.	.	.
Linum catharticum	.	14	2	.	.	43	5	.	.	.	.	7	.	.	21	2	.	2	.	.	.	24	21	75	42	24	5	5	2	12	26	.	.	.	3	.	36	.	7	8	7	39	.
Phleum phleoides	.	.	.	.	8	2	.	.	.	39	66	.	38	29	17	43	19	59	46	21	52	17	21	4	8	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthericum ramosum	.	43	12	45	62	76	89	.	.	.	7	.	3	.	1	7	4	5	9	7	33	19	52	4	3	.	.	.	1	.	5	.	.	.	.	.	9	75	.	.	.	.	.
Thesium linophyllon	.	.	2	25	22	73	50	.	.	5	5	.	5	.	1	5	.	2	9	9	.	22	43	50	33	1	3	.	1	1	.	.	.	.	.	.	2	.	.	.	.	.	.
Carex caryophyllea	.	.	.	.	4	9	5	.	.	13	2	.	.	.	31	21	.	11	6	6	15	24	9	63	34	28	7	.	1	3	.	.	.	.	.	.	7	.	.	.	.	.	.
Chamaecytisus ratisbonensis	.	.	42	.	12	78	39	.	.	.	2	.	3	3	1	7	.	21	14	12	11	26	39	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Seseli annuum	.	.	4	.	7	65	21	.	.	5	5	.	2	.	7	23	.	30	10	3	.	28	17	.	7	5	3	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Ononis spinosa	.	.	.	.	.	1	.	.	.	.	.	.	.	.	5	4	.	2	.	.	.	12	4	42	49	15	19	2	7	12	.	.	.	.	.	.	35	.	.	4	.	4	.
Senecio jacobaea	.	.	26	15	3	31	8	.	.	16	14	.	5	5	13	10	8	26	17	17	4	17	7	.	2	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cuscuta epithymum	.	.	2	5	7	13	29	.	.	5	2	.	5	.	5	1	4	2	11	2	.	5	13	.	4	1	.	.	1	11	16	.	.	.	.	.	12	.	.	8	20	.	.
Linaria genistifolia	.	.	.	10	17	1	11	.	10	42	47	.	23	13	2	13	12	9	11	12	41	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orobanche gracilis	.	.	28	.	22	26	11	.	.	3	.	.	3	.	1	2	.	3	3	2	.	6	7	33	7	.	2	1	4	4	.	.	.	.	.	.	4	.	.	.	.	.	.
Galium verum agg.	.	.	.	.	7	5	8	.	.	37	32	7	51	13	59	58	19	48	43	44	7	62	38	79	58	76	35	56	26	33	.	46	63	33	8	3	66	25	.	62	3	35	40
Hieracium bauhinii	.	.	2	5	9	2	5	.	.	3	3	.	3	.	2	7	.	.	5	4	4	6	17	33	6	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia seguieriana	.	.	6	.	23	.	.	.	.	.	2	10	3	3	29	3	.	5	3	1	.	1	6	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia cyparissias	.	79	2	55	61	57	87	25	.	8	29	47	52	47	64	49	35	55	68	37	67	42	62	58	33	31	9	2	3	6	51	3	.	.	.	.	.	.	.	.	.	.	.
Koeleria pyramidata	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	1	.	.	1	.	.	9	3	50	20	.	.	.	.	6	12	.	.	.	.	.	3	.	.	.	.	.	.
Pimpinella saxifraga s.lat.	.	.	38	5	15	73	24	.	.	74	29	3	16	11	34	49	.	24	36	17	.	67	36	58	57	54	42	9	14	11	5	.	.	.	.	.	12	.	.	.	.	.	.
Salvia pratensis	.	.	12	.	9	22	53	.	.	.	.	.	2	5	15	25	.	6	22	33	11	63	73	21	88	79	89	10	13	2	.	8	.	.	.	.	3	.	.	.	.	.	.
Euphrasia stricta	.	.	.	.	2	4	.	.	.	50	3	7	7	.	8	16	.	3	1	.	.	5	2	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Allium carinatum	.	7	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	1	1	8	8	.	.	.	4	10	19	.	.	.	2	.	22	.	.	.	.	.	20
Prunella laciniata	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	1	1	42	13	.	.	.	1	3	.	.	.	.	.	.	1	.	.	.	.	.	.
C Violion caninae																																											
Polygala vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	2	.	.	.	.	.	1	1	92	7	18	.	1	1	10	2	.	.	.	3	.	8	.	.	.	.	.	.
Galium pumilum	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	1	.	3	1	71	14	1	3	.	2	12	7	.	.	.	.	.	1	.	.	.	.	.	.
Viola canina	.	.	.	.	.	.	.	.	.	5	2	.	.	.	.	3	.	.	.	.	.	1	1	67	4	.	1	.	1	15	7	.	.	.	.	.	1	.	.	.	.	.	.
Dianthus armeria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	13	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
C Nardetalia																																											
Carex pallescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	63	5	.	.	.	16	46	7	.	.	.	.	.	6	.	.	.	53	22	10
Genista tinctoria	.	.	.	.	.	.	16	.	.	5	2	.	2	.	.	3	.	.	5	11	48	2	14	29	10	.	.	.	2	3	.	.	.	.	.	.	31	13	.	.	.	.	.
Nardus stricta	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	33	1	.	.	.	1	16	60	.	.	.	2	.	3	.	.	.	43	4	.
Hypericum maculatum agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	1	.	2	.	1	.	2	4	42	.	.	.	.	.	.	.	.	8	3	.	.
C Calluno-Ulicetea																																											
Anthoxanthum odoratum	.	.	.	.	.	.	.	.	.	47	7	.	3	.	3	26	.	2	.	.	4	2	11	92	54	12	15	2	60	71	56	3	.	.	5	.	6	.	.	23	63	39	.
Hieracium pilosella	.	.	12	.	14	15	13	.	20	71	53	3	21	13	16	27	8	9	20	3	19	20	12	42	5	3	2	.	1	2	33	.	.	.	.	.	.	.	.	.	.	.	.
Luzula campestris agg.	.	.	.	.	.	.	.	.	.	34	8	.	3	.	2	24	.	2	.	.	19	2	8	88	44	8	10	1	19	41	14	.	.	.	.	.	4	.	.	.	37	9	.
Potentilla erecta	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	79	8	.	1	1	5	35	65	.	.	.	.	.	78	100	87	31	30	83	40
Danthonia decumbens	.	.	.	.	.	.	.	.	.	16	.	.	.	.	.	9	.	.	.	.	4	1	1	71	2	.	.	.	2	10	19	.	.	.	.	.	4	.	.	.	7	9	.
C Arrhenatherion																																											
Galium mollugo agg.	.	.	.	.	1	4	3	.	.	.	.	.	2	.	2	4	8	.	6	2	19	11	4	21	46	22	59	50	82	43	58	43	33	.	.	.	16	.	.	46	37	4	.
Pimpinella major	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	29	9	4	13	43	34	32	51	30	49	.	.	.	13	.	.	23	40	13	.
Campanula patula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	2	1	46	38	13	28	10	35	20	12	3	.	.	2	.	1	.	.	.	.	4	.
Crepis biennis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	20	.	41	11	41	18	.	5	.	.	.	.	2	.	.	.	10	.	10
Pastinaca sativa	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	5	.	4	9	7	34	21	14	8	.	5	9	.	5	.	9	.	.	15	3	.	10
Arrhenatherum elatius	.	.	.	.	5	9	.	.	.	37	19	.	7	26	6	54	19	8	32	4	15	57	35	17	64	69	84	78	77	10	5	81	23	.	2	3	8	.	.	.	.	.	.
C Cynosurion																																											
Trifolium repens	.	.	.	.	.	1	.	.	.	.	.	.	2	.	1	3	.	.	1	.	.	2	.	46	26	10	36	32	56	59	67	.	23	33	11	.	2	.	.	4	3	4	30
Prunella vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	63	20	13	11	21	31	70	47	.	35	33	21	13	38	.	.	54	63	61	30
Cynosurus cristatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	63	16	.	5	2	43	55	58	.	2	.	5	.	6	.	.	8	10	22	30
Phleum pratense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	4	.	4	5	21	11	5	8	5	.	6	3	4	.	.	8	3	.	.
Bellis perennis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	2	2	6	10	19	7	16	.	5	.	2	.	3	.	.	15	3	.	.
Lolium perenne	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	1	.	.	3	.	3	11	12	8	19	5	.	.	2	.	.	.	.	.	3	.	.
Leontodon autumnalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	1	.	.	1	1	1	2	5	10	26	.	.	.	2	.	1	.	.	4	3	.	.

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Fortsetzung auf der Rückseite

TWINSPAN cluster	1	2–4	5–6	7	8	9–10	11	12	13–14	15	16	17–18	19	20	21	22	23a–23c	23d	23e	23f–23g	24	25–26	27–28	29	30	31	32	33	34	35	36	37–38	39	40	41–42	43–44	45–48	49–50	51–52	53–54	55–56	57–58	59–60
Number of relevés	2	14	50	20	107	91	38	4	10	38	59	30	61	38	185	183	26	66	134	100	27	323	234	24	212	165	97	130	292	153	43	37	43	3	62	32	139	8	15	26	30	23	10
TWINSPAN hierarchy	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0
	1	0	1	1	1	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	1	1	1	0	0	1	0	0	1	1	0	0
			1	0	0	1	0	0	1	0	0	1	0	0	1	1	0	0	0	0	0	1	0	1	1	0	0	1	1	0	0	1	0	0	1	0		1	0	1	0	1	0
				1	0		1	0		1	0		1	0	1	0	1	1	1	1	0			1	0	1	0	1	0	1	0		1	0									
																	1	0	0	0																							
																		1	1	0																							
																		1	0																								
C Arrhenatheretalia																																											
Knautia arvensis	.	.	.	.	.	1	5	.	.	.	.	.	.	.	10	13	4	17	3	4	.	42	10	42	76	23	78	12	42	24	14	8	.	.	.	.	20	.	.	8	.	.	.
Avenula pubescens	.	14	.	.	1	11	.	.	.	.	3	.	.	.	8	17	.	2	12	2	.	14	10	58	64	32	52	7	54	43	.	.	.	.	.	.	9	.	.	35	3	9	.
Rumex acetosa	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	13	.	.	.	.	4	1	7	54	43	9	40	4	82	72	26	.	9	33	6	3	11	.	40	46	83	9	.
Rhinanthus minor	.	.	.	.	.	1	.	.	.	11	.	3	2	.	24	8	.	2	3	.	.	7	3	63	48	61	42	37	35	32	.	3	12	.	13	3	25	.	.	15	.	.	.
Veronica arvensis	.	.	.	.	1	.	.	.	.	.	8	43	18	.	15	25	4	.	4	2	.	2	.	4	8	53	25	43	13	1	.	22	33	.	19	3	.	.	.	.	.	.	.
Stellaria graminea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	1	1	58	29	2	11	2	41	31	72	.	2	.	2	.	.	.	.	.	17	.	.
Vicia sepium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	4	5	4	12	16	47	5	26	16	12	.	.	.	.	.	.	.	.	4	10
Poa pratensis agg.	.	.	2	.	3	3	.	.	.	47	24	3	20	11	32	68	31	53	43	43	11	59	24	29	56	81	86	90	60	29	28	76	91	100	71	41	23	.	.	54	30	9	10
C Cnidion																																											
Allium angulosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	1	1	.	.	.	67	3	.	14	.	7	19	.	.	.
Leucojum aestivum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	16	28	.	.	.	.	.	.	.
Viola pumila	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	18	.	3	.	.	.	.	.	.
Clematis integrifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	100	2	.	1	.	.	.	.	.	.
Selinum venosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	33	2	.	.	.	.	.	.	.	.
Gratiola officinalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33	.	.	.	.	.	.	.	.	.
Lythrum virgatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33	2	.	.	.	.	.	.	.	.
C Molinion																																											
Galium boreale	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	42	19	1	3	4	18	39	.	.	.	100	2	.	76	38	.	50	13	39	10
Molinia caerulea agg.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4	25	4	1	.	1	3	17	.	.	.	.	.	.	95	100	100	65	33	57	80
Silaum silaus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	4	4	2	11	8	17	.	16	44	.	3	.	55	13	.	65	.	17	20
Inula salicina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	3	.	5	6	4	11	12	3	2	4	4	.	.	2	67	13	.	50	25	7	12	.	4	.
Serratula tinctoria	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	2	4	1	4	1	3	.	.	5	100	15	.	60	50	20	31	.	4	.
Succisa pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	1	.	.	1	.	14	2	.	.	.	.	.	55	13	.	50	53	48	10
Carex tomentosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	4	9	13	2	3	4	16	.	.	2	.	23	.	17	.	.	8	3	17	50
Scorzonera humilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	8	1	.	.	.	1	3	.	.	.	.	.	.	38	.	7	27	.	39	.
Selinum carvifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	2	.	1	14	.	.	.	.	2	.	9	.	.	12	33	4	.
Laserpitium prutenicum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	32	38	7	.	.	.	.
Dianthus superbus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	1	2	.	.	.	.	.	.	22	.	.	31	.	.	.
Ophioglossum vulgatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	4	.	2	.	1	.	.	5	.	31	3	2	.	.	.	.	.	.
Gladiolus palustris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13	63	7	.	.	.	.
C Calthion																																											
Cirsium rivulare	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	2	37	.	.	.	.	3	.	35	50	.	92	97	78	60
Cirsium canum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	2	1	1	2	7	13	.	.	5	.	2	.	37	13	.	42	10	17	30
Cirsium oleraceum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	2	15	24	7	3	2	.	.	.	9	.	.	50	23	13	10
Scirpus sylvaticus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	29	.	.	.	.	6	.	1	.	.	38	77	43	20
Caltha palustris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9	.	.	.	.	8	19	4	.	.	54	30	17	.
Myosotis palustris agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	16	.	3	.	.	.	25	.	.	.	8	50	4	.
Trifolium patens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	16	.	.	.	.	.	.	.	.	.	.	40	.	.
Trollius europaeus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	5	.	.	.	.	.	.	6	.	.	38	.	17	.
Crepis paludosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	1	.	.	27	3	30	.
C Molinietalia																																											
Betonica officinalis	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	5	.	2	1	.	.	1	13	54	30	2	10	2	22	42	.	.	.	.	2	.	33	.	.	8	33	26	.
Sanguisorba officinalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	.	.	.	.	2	.	2	1	6	26	2	.	.	100	3	.	63	100	67	73	87	4	10
Deschampsia cespitosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	4	1	1	1	5	5	26	40	.	2	33	15	6	50	75	7	69	70	17	40
Lychnis flos-cuculi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	1	2	16	56	.	.	.	.	8	13	6	.	.	35	83	22	.
Equisetum palustre	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	23	.	.	9	.	26	22	20	.	.	69	73	70	.
Lythrum salicaria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	1	12	.	.	2	33	13	9	39	.	.	38	73	17	60
Juncus effusus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	37	2	.	.	.	5	.	5	.	.	8	90	30	20
Angelica sylvestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	24	.	.	5	.	.	.	10	.	.	73	63	9	.
Cardamine pratensis agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	2	1	4	22	.	.	.	67	6	16	.	.	.	4	67	.	.
Valeriana officinalis agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	4	1	1	.	2	1	2	1	1	1	.	3	2	.	13	3	21	.	.	12	.	.	.
Senecio erraticus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	19	.	.	.	33	2	.	4	.	.	27	27	.	.
Juncus conglomeratus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	8	.	.	.	.	.	.	4	.	.	12	27	26	.
Galium uliginosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	7	.	.	.	.	2	.	6	.	.	15	33	13	.
C Potentillo-Polygonetalia																																											
Ranunculus repens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	18	16	44	7	24	58	100	68	94	30	13	.	88	93	61	30
Lysimachia nummularia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	4	1	18	16	42	.	8	56	100	45	47	8	.	.	65	50	17	30
Carex hirta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	17	.	.	.	.	.	.	.	.	1	13	2	5	10	39	.	16	9	67	27	9	4	.	.	12	17	.	20
Potentilla reptans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	13	3	5	2	15	7	12	.	8	40	100	65	66	6	.	.	15	.	4	40
Festuca arundinacea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	8	1	26	4	10	.	38	33	.	3	6	12	.	.	19	3	4	10
Agrostis stolonifera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	1	.	3	2	9	.	.	.	.	13	31	21	.	.	23	13	9	10
Rumex crispus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	2	3	.	8	5	100	11	47	.	.	.	4	3	.	.
Potentilla anserina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	1	1	5	.	.	5	.	16	16	5	.	.	4	.	.	10
Pulicaria dysenterica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	2	4	.	.	.	.	.	.	10	.	.	12	.	22	40
Juncus inflexus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	7	.	.	.	.	.	.	3	.	.	4	.	30	90
Mentha aquatica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	3	6	9	.	.	19	.	4	50
Plantago major subsp. intermedia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	2	.	10	31	.	.	.	.	.	.	.
C Molinio-Arrhenatheretea																																											
Centaurea jacea	.	.	.	.	.	4	.	.	.	5	.	.	.	.	6	9	.	3	1	.	.	23	6	88	66	56	64	43	57	65	14	16	40	100	5	.	67	75	87	65	30	52	50
Leontodon hispidus	.	.	.	.	2	24	11	.	.	5	3	.	.	.	2	13	.	5	1	.	.	24	22	100	79	47	58	22	52	54	37	3	5	.	.	.	44	.	7	42	37	35	10
Festuca pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	.	5	14	46	43	40	56	70	72	78	35	38	77	100	31	9	22	.	.	69	80	22	30
Ranunculus acris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	50	29	13	29	62	88	84	70	38	81	33	52	3	50	.	.	85	67	57	50
Leucanthemum vulgare agg.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	8	1	.	.	1	.	.	17	12	83	68	56	48	33	43	59	33	8	16	.	11	3	31	.	.	27	37	13	10
Lathyrus pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	3	1	25	43	19	55	36	71	71	30	32	74	100	37	9	24	.	.	96	77	57	40
Taraxacum officinale agg.	.	14	.	.	1	4	3	.	.	.	2	3	.	3	6	6	4	.	2	1	.	7	1	8	30	52	54	67	51	31	28	59	84	100	56	59	5	.	.	19	30	.	20
Tragopogon orientalis	.	7	2	.	.	10	5	.	.	.	.	.	.	3	6	3	.	15	1	3	.	28	8	29	61	36	65	22	48	17	14	22	7	.	.	.	4	.	.	4	.	.	.
Cerastium holosteoides	.	.	.	.	.	1	.	.	.	.	.	.	.	.	2	2	.	.	.	.	.	2	.	50	39	35	37	48	52	65	51	11	35	.	39	22	10	.	.	35	53	13	.
Trisetum flavescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	4	2	67	61	7	79	21	86	30	19	5	.	.	.	.	3	.	.	.	.	4	.
Holcus lanatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4	.	.	.	.	.	.	1	83	35	1	13	5	68	95	7	5	12	.	13	.	29	.	.	81	73	48	40
Festuca rubra agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	12	.	.	1	.	.	3	5	79	25	22	12	30	37	46	28	11	2	33	.	3	55	13	.	65	33	13	.
Alopecurus pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	5	7	5	25	40	22	.	46	91	100	85	75	6	.	.	19	40	.	.
Poa trivialis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	3	36	45	23	.	68	58	.	42	47	7	.	.	12	10	9	20
Alchemilla sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33	12	.	1	.	34	29	86	.	.	.	.	.	.	.	.	4	3	4	.
Ajuga reptans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	29	4	2	4	2	21	48	16	.	.	.	5	.	9	.	.	46	60	13	.
Heracleum sphondylium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	8	14	.	29	8	39	6	2	5	.	.	.	.	.	.	.	4	.	.	.
Dactylis glomerata	.	.	.	.	.	19	11	.	.	.	.	.	3	.	44	28	.	12	11	16	.	63	54	71	92	88	95	90	95	61	86	84	63	.	6	9	61	.	.	65	13	13	30
Plantago lanceolata	.	.	6	.	5	36	.	.	.	74	32	30	20	3	33	44	4	2	13	3	.	35	9	96	90	74	89	79	93	93	67	43	70	100	37	22	45	.	7	77	67	57	20
Carum carvi	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	4	.	6	1	22	4	40	.	.	.	3	.	.	.	.	.	.	.	.
Trifolium pratense	.	.	2	.	.	1	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	6	3	63	72	53	77	73	89	87	74	27	49	33	19	9	20	.	.	62	50	52	30
Euphrasia officinalis	.	.	.	.	.	.	.	.	.	.	.	3	.	.	1	1	.	2	.	.	.	1	1	17	5	1	.	.	2	19	33	.	.	.	.	.	10	.	.	12	20	9	.
Trifolium hybridum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	1	13	.	.	.	.	2	.	1	.	.	23	27	.	.
C Caricion davallianae																																											
Valeriana dioica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	18	.	13	38	37	70	40
Carex davalliana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	16	13	13	46	.	83	50
Schoenus nigricans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	28	75	93	.	.	4	.
Carex hostiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	21	.	.	8	.	39	.
Carex flava agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.	7	.	.	8	7	43	20
Parnassia palustris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	5	.	.	.	.	.	6	25	27	12	.	48	10
Dactylorhiza majalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	6	.	.	.	.	3	.	8	.	7	12	7	22	.
Epipactis palustris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	15	25	.	.	.	22	10
Eriophorum latifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9	.	.	19	.	52	.
Schoenus x intermedius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	25	93	.	.	.	.
Carex pulicaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	35	.
Tofieldia calyculata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	53	.	.	.	.
Triglochin palustre	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	22	.
C Scheuchzerio-Caricetea fuscae																																											
Carex panicea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13	4	1	.	2	5	58	.	.	.	.	11	.	63	38	27	73	73	100	80
Carex nigra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	9	.	.	.	.	.	.	12	13	.	54	67	13	.
Eriophorum angustifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	3	.	.	4	17	26	30
Other species																																											
Sanguisorba minor	.	14	58	10	79	88	66	.	.	8	8	63	21	53	42	12	8	30	60	14	11	61	41	4	25	5	14	1	2	1	12	.	.	.	.	.	1	.	.	.	.	4	.
Vicia cracca agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	4	.	1	3	.	23	10	17	59	25	58	45	30	22	16	43	56	100	31	16	46	25	7	58	3	13	.
Veronica chamaedrys agg.	.	.	.	.	1	1	.	.	.	8	2	.	3	.	2	7	4	.	1	1	7	17	8	29	52	22	42	19	75	39	74	5	7	.	2	.	1	.	.	8	20	.	.
Viola hirta	.	.	.	.	.	4	29	.	.	.	.	.	.	.	6	1	.	5	10	6	.	37	36	58	59	41	26	18	9	12	14	3	.	.	2	.	29	.	.	4	.	4	.
Colchicum autumnale	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12	1	.	.	.	.	.	2	1	42	28	55	35	37	48	42	2	5	35	.	60	.	42	.	.	23	.	26	10
Bupleurum falcatum	50	.	4	25	45	79	76	50	.	.	5	.	3	21	1	4	.	5	43	10	26	55	56	4	3	2	6	.	.	.	.	.	.	.	.	.	6	.	.	.	.	.	.
Anthyllis vulneraria	.	14	38	10	46	92	29	.	.	5	3	.	5	18	9	7	.	9	31	3	.	34	28	.	24	2	12	.	1	.	26	.	.	.	.	.	3	.	.	.	.	.	.
Medicago lupulina	.	.	2	.	2	.	.	.	.	.	5	.	8	13	14	9	12	5	22	2	7	16	3	21	37	35	57	33	20	12	2	.	9	.	6	.	5	.	.	19	10	9	.
Carex flacca	.	.	2	.	.	3	5	.	.	.	.	.	.	.	1	.	.	.	.	.	.	13	6	50	38	6	5	2	9	52	49	.	.	.	2	.	81	50	7	58	23	78	90
Arenaria serpyllifolia agg.	.	.	4	10	39	5	3	.	.	.	15	67	59	58	24	15	62	3	58	40	7	8	3	.	6	4	7	2	3	1	.	8	.	.	2	.	.	.	.	.	3	.	.
Calamagrostis epigejos	.	.	.	.	.	.	3	.	.	3	.	3	.	.	19	19	.	14	1	4	.	10	5	25	7	58	6	46	7	16	.	49	51	33	19	.	6	.	.	8	.	4	30
Stachys recta	.	.	4	10	30	8	34	.	.	.	10	.	13	26	4	7	35	12	35	45	59	24	40	.	6	3	5	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Crataegus monogyna	.	14	.	.	7	16	32	.	.	.	.	3	2	.	23	5	4	12	10	8	7	39	25	29	13	25	4	2	1	9	.	.	.	.	5	3	1	.	.	.	.	.	10
Daucus carota	.	7	.	.	.	.	3	.	.	.	.	.	.	.	3	8	.	3	1	1	.	19	1	25	41	19	36	12	19	22	.	.	2	.	.	.	16	.	.	38	27	.	.
Arabis hirsuta agg.	.	.	12	.	22	8	32	.	.	.	.	.	2	5	19	6	4	3	24	6	15	21	10	13	21	28	19	2	2	1	.	.	.	.	.	.	4	.	.	.	.	.	.
Echium vulgare	.	.	2	.	24	4	21	.	20	18	25	50	20	58	19	18	54	12	37	14	63	16	3	.	3	2	4	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Elymus repens	.	.	.	.	.	.	.	.	.	.	2	.	5	3	6	24	12	3	7	15	.	8	3	.	5	12	13	43	7	3	.	89	86	100	39	28	3	.	.	4	.	.	10
Cerastium pumilum agg.	.	.	6	.	25	5	3	.	.	5	19	80	52	26	48	20	8	14	19	17	4	2	6	.	1	15	2	2	1	.	.	5	2	.	.	3	.	.	.	.	.	.	.
Trifolium campestre	.	.	.	.	.	.	3	.	.	26	20	7	11	3	12	38	4	2	1	2	.	2	1	8	16	38	22	27	4	3	.	8	23	.	10	3	2	.	.	8	.	.	.
Elymus hispidus	.	.	.	.	7	.	11	.	.	.	7	.	11	13	12	15	62	6	36	65	19	9	32	.	1	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Acinos arvensis	.	.	12	.	39	3	3	.	.	3	2	47	26	55	23	9	65	6	46	24	41	9	4	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vincetoxicum hirundinaria	.	14	62	5	26	11	39	.	.	.	5	.	5	5	2	4	23	26	17	14	56	16	29	.	5	2	2	.	.	.	.	.	.	33	.	.	1	.	.	.	.	.	.
Galium glaucum	.	.	.	.	23	2	34	.	.	.	8	.	15	47	1	5	38	3	31	40	33	7	44	.	1	1	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Primula veris	.	.	.	.	.	1	18	.	.	.	.	.	.	.	1	.	.	.	1	.	4	7	18	58	57	2	21	.	16	13	2	.	.	.	.	.	3	.	.	4	.	.	.
Peucedanum cervaria	.	.	.	.	2	7	55	.	.	.	.	.	.	.	.	3	.	2	4	16	4	8	68	.	10	1	3	1	.	.	.	.	.	33	.	.	17	.	.	.	.	.	.
Veronica prostrata	.	.	.	.	5	5	.	.	.	3	15	.	25	8	34	27	31	41	28	15	.	2	3	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedum sexangulare	.	.	2	.	15	3	5	.	10	29	46	73	49	18	25	14	4	2	11	1	33	5	3	13	6	1	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia angustifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	14	23	4	.	2	.	.	4	.	8	8	39	28	21	7	2	.	19	7	.	5	3	.	.	.	.	.	.	.
Cirsium arvense	.	.	.	.	.	.	3	.	.	.	.	.	.	.	1	.	.	.	.	4	.	3	1	.	4	28	11	34	10	3	21	62	37	.	27	25	3	13	.	.	.	4	.
Falcaria vulgaris	.	.	.	.	.	.	.	.	.	.	2	.	23	8	10	22	42	20	13	34	.	18	8	.	1	1	8	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Agrostis capillaris	.	.	.	.	.	.	.	.	.	5	5	3	.	.	1	20	.	.	.	.	.	2	1	79	7	2	.	1	15	34	100	.	.	.	.	.	4	.	.	.	23	4	.
Clinopodium vulgare	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	4	.	.	1	.	.	7	2	50	29	10	11	2	18	8	51	.	.	.	.	.	4	.	.	.	.	.	10
Bromus hordeaceus	.	.	.	.	.	.	.	.	.	.	15	17	43	3	3	17	.	.	1	.	.	.	1	.	1	13	.	21	17	3	.	35	16	.	15	22	2	.	.	.	.	.	.
Silene vulgaris	.	.	2	.	1	1	5	.	.	.	.	.	2	.	6	3	4	.	2	6	11	15	5	.	16	18	29	7	6	.	2	3	.	.	.	.	5	.	.	4	.	.	.
Alyssum alyssoides	.	.	4	5	15	2	16	.	.	.	.	23	30	32	12	6	69	3	31	37	11	4	3	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Equisetum arvense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	1	.	.	4	16	2	22	9	25	.	32	21	67	31	19	8	.	7	27	10	35	40
Cruciata laevipes	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	25	17	3	12	2	35	17	35	5	2	.	.	.	.	.	.	.	.	4	.
Sesleria uliginosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	8	7	.	1	2	1	15	.	.	.	.	.	.	81	75	33	65	.	61	40
Thlaspi perfoliatum	.	.	2	.	19	4	8	.	.	.	3	20	30	13	11	4	19	2	29	13	15	8	6	.	4	4	2	1	.	1	.	.	.	.	3	.	.	.	.	.	.	.	.
Convolvulus arvensis	.	.	.	.	1	.	.	.	.	.	.	.	10	5	3	15	62	.	21	9	.	5	1	.	8	7	21	13	9	1	.	.	.	.	2	6	.	.	.	.	.	.	10
Aster amellus	.	.	.	.	1	12	39	.	.	.	.	.	.	.	1	.	.	3	5	10	19	20	35	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Achillea millefolium agg.	.	.	8	.	15	35	18	.	.	82	51	3	64	26	47	75	65	45	71	65	7	80	59	96	85	78	96	78	72	48	81	68	77	67	5	.	53	13	.	62	13	17	.
Campanula rotundifolia (incl. moravica)	100	29	.	40	2	2	21	75	10	29	7	.	.	3	.	13	.	.	1	2	4	16	14	25	8	.	4	.	2	5	2	.	.	.	.	.	.	.	.	.	.	.	.
Tanacetum corymbosum	.	.	.	.	1	3	29	.	.	.	2	.	2	.	.	1	.	2	4	2	15	16	27	.	17	1	8	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Rosa canina agg.	.	.	.	.	2	1	11	.	10	3	7	.	.	.	2	7	.	18	12	8	30	20	8	17	8	1	4	2	1	3	.	.	.	.	.	.	1	.	.	.	.	.	.
Petrorhagia saxifraga	.	.	8	.	17	14	.	.	.	.	3	60	28	5	21	6	8	39	16	3	.	3	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Symphytum officinale	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	14	2	5	.	49	86	100	81	66	12	.	.	27	3	.	.
Glechoma hederacea	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	4	6	10	5	18	19	10	.	11	53	100	10	13	5	.	.	12	7	.	10
Trifolium dubium	.	.	.	.	.	.	.	.	.	5	3	.	3	.	1	2	4	3	.	.	4	1	.	25	6	19	9	18	10	14	2	3	21	.	10	6	1	.	.	15	.	13	10
Onobrychis viciifolia	.	.	.	.	.	.	18	.	.	.	.	.	.	.	1	.	.	2	1	5	.	9	12	.	28	1	36	2	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium sanguineum	.	.	.	5	4	2	47	.	.	.	2	.	3	.	.	1	.	3	4	10	37	4	38	.	6	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedum album	.	.	.	25	56	2	3	.	10	.	2	.	10	61	.	.	42	2	23	1	67	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium alpestre	.	.	.	.	.	1	.	.	.	16	10	.	18	.	.	7	.	2	3	3	30	4	20	42	20	1	.	.	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.
Myosotis ramosissima	.	.	.	.	8	.	.	.	.	3	3	27	33	5	10	26	4	2	9	.	4	2	1	.	1	18	1	2	1	1	.	3	.	.	.	.	.	.	.	.	.	.	.
Phragmites australis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	1	1	.	1	1	.	2	1	3	.	3	9	.	16	9	66	100	33	65	3	26	10
Agrimonia eupatoria	.	.	.	.	.	1	.	.	.	3	3	.	.	.	.	4	.	12	.	3	.	21	2	8	5	19	5	2	2	7	.	.	.	.	.	.	3	.	.	.	.	.	.
Poa bulbosa	.	.	.	.	21	.	.	.	.	.	47	13	70	26	10	3	31	2	11	3	11	1	.	.	1	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Inula hirta	.	.	8	.	8	38	26	.	.	.	.	.	.	.	1	3	.	2	2	11	15	2	29	.	3	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Myosotis arvensis	.	.	.	5	5	.	8	.	.	.	.	.	5	.	8	1	4	.	1	2	4	1	.	.	8	28	19	10	8	1	.	5	.	.	2	3	1	.	.	.	.	.	.
Erophila verna agg.	.	.	.	.	7	.	.	.	.	3	17	87	43	18	17	12	.	2	10	2	4	1	1	.	1	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bromus inermis	.	.	.	.	.	.	13	.	.	.	.	3	.	3	1	1	8	2	4	25	.	8	13	.	.	4	2	12	2	.	.	51	5	.	2	6	1	.	.	.	.	.	.
Cerastium semidecandrum	.	.	4	.	21	4	.	.	.	.	15	17	41	8	19	13	4	2	13	.	4	1	1	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerastium arvense	.	.	.	.	1	.	5	.	.	11	.	.	.	3	1	15	.	2	3	3	.	18	7	.	5	1	9	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salvia verticillata	.	.	.	.	.	4	.	.	.	.	.	.	.	8	1	.	19	2	3	.	.	16	3	.	12	1	20	2	1	.	23	.	.	.	.	.	.	.	.	.	.	.	.
Melampyrum arvense	.	.	.	.	.	1	.	.	.	11	7	.	5	5	.	2	.	5	13	6	.	18	13	.	.	1	3	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Lotus corniculatus agg.	.	21	36	.	23	52	16	.	.	45	19	.	10	11	14	28	4	3	27	19	.	57	27	92	81	34	66	38	63	72	67	3	12	67	6	.	73	50	.	77	37	61	20
Sedum acre	.	.	.	.	6	.	5	.	.	.	20	.	20	37	2	10	42	3	29	2	19	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.
Thymus pulegioides	.	.	.	.	.	.	.	.	.	13	3	.	.	.	.	7	.	2	.	7	.	3	1	67	14	.	.	.	1	11	58	.	.	.	.	.	1	.	.	.	.	.	.
Peucedanum oreoselinum	.	.	2	.	15	.	.	.	.	3	2	3	2	.	12	19	.	23	4	2	.	1	6	.	1	1	4	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla heptaphylla	.	.	.	.	.	.	.	.	.	3	2	10	.	.	5	3	.	3	1	1	4	15	5	4	13	2	7	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Verbascum lychnitis	.	.	.	.	1	.	.	.	.	.	3	7	2	5	16	13	42	18	15	2	7	4	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Allium scorodoprasum	.	.	.	.	.	.	.	.	.	.	.	3	.	.	4	1	.	.	.	1	.	1	.	.	1	18	9	23	6	.	.	14	19	.	15	.	1	.	.	4	.	.	.
Euphorbia esula	.	.	18	.	1	.	.	.	.	.	.	3	.	.	2	9	4	3	1	.	.	4	1	.	5	18	5	15	1	.	.	8	7	.	2	.	1	.	.	.	.	.	.
Euphorbia virgata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	2	1	10	.	13	12	.	9	.	8	2	1	1	.	.	.	67	.	.	2	.	.	.	.	.	10
Origanum vulgare	.	57	.	5	.	.	3	.	.	.	2	.	2	8	1	1	4	2	2	3	41	9	10	.	5	1	4	.	2	1	23	.	.	.	.	.	.	.	.	.	.	.	.
Polygonatum odoratum	50	.	.	15	30	7	53	.	.	.	7	.	3	.	.	1	.	.	4	1	33	2	11	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia hirsuta	.	.	.	.	.	.	.	.	.	3	3	3	2	.	1	23	.	.	4	.	.	2	1	4	6	12	8	2	5	.	.	5	2	.	2	.	.	.	.	.	.	.	.
Peucedanum alsaticum	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	1	.	2	4	15	.	17	15	.	1	1	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla argentea	.	.	.	.	.	.	.	.	10	8	27	10	3	.	2	37	4	.	1	2	4	1	.	.	1	7	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erysimum diffusum agg.	.	.	16	.	18	1	3	.	.	.	2	.	11	8	5	5	.	12	13	23	.	1	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ligustrum vulgare	.	7	.	.	1	.	21	.	.	.	.	.	.	3	8	1	4	32	2	1	22	12	5	4	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Viola arvensis	.	.	.	.	1	.	.	.	10	5	25	3	21	3	2	9	4	5	10	21	19	1	.	.	1	1	2	1	1	.	5	3	.	.	.	.	.	.	.	.	.	.	.
Lathyrus pannonicus	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	12	.	9	.	1	.	2	4	.	.	.	.	.	.	26	.	.	15	.	17	.
Taraxacum laevigatum agg.	.	.	2	5	7	.	.	.	.	.	12	27	39	11	16	3	4	9	5	2	.	1	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Astragalus cicer	.	.	.	.	2	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	7	1	.	5	27	11	2	1	.	.	3	.	.	.	.	.	.	.	.	.	.	.
Potentilla alba	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	12	38	17	.	2	.	5	8	.	.	.	.	.	.	3	.	.	.	.	.	.
Lysimachia vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	2	2	3	.	.	7	.	47	31	22	13	.	12	23	9	40
Medicago sativa agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	1	.	.	3	1	.	14	2	29	7	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla incana (incl. pusilla)	.	.	78	65	91	86	47	.	.	79	88	47	85	84	72	33	35	58	75	64	67	29	35	4	5	10	3	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Carpinus betulus	.	.	.	.	.	.	11	.	.	.	.	.	.	.	1	.	.	.	.	.	11	2	3	63	15	2	3	2	3	5	5	.	.	.	6	.	1	.	.	.	.	4	.
Saxifraga tridactylites	.	.	4	5	10	1	3	.	.	.	.	70	20	3	15	1	4	3	13	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Berteroa incana	.	.	.	.	.	.	3	.	.	16	22	3	11	.	2	25	31	2	4	3	7	1	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Medicago minima	.	.	.	.	6	.	3	.	.	.	2	10	38	11	8	8	38	.	13	.	.	1	1	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veratrum album	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	2	1	5	16	.	.	.	.	.	47	75	.	19	.	13	10
Poa palustris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	11	2	.	24	69	1	.	.	.	10	.	.
Cryptogams																																											
Number of rel. with cryptogams recorded	2	0	5	18	78	78	7	4	10	38	52	13	58	23	54	90	12	14	81	59	24	125	132	9	80	20	35	5	26	75	0	0	0	3	3	0	86	6	11	22	29	12	1
Abietinella abietina	.	.	20	.	17	24	14	.	.	8	2	46	3	13	15	32	.	.	32	10	17	39	33	.	24	10	23	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.
Homalothecium lutescens	.	.	20	.	10	21	29	.	.	.	.	.	2	9	35	10	.	.	21	7	.	28	52	.	6	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Tortula ruralis	.	.	20	6	42	8	.	.	.	.	10	46	16	39	4	22	42	.	21	5	33	3	2	.	3	.	6	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ceratodon purpureus	.	.	.	.	3	.	.	.	40	34	65	8	14	30	.	22	.	7	6	5	33	2	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tortella tortuosa	.	.	60	28	42	26	43	50	.	.	.	.	.	17	4	.	25	.	10	2	13	.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Calliergonella cuspidata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.	.	.	4	40	.	.	.	.	33	.	20	.	36	73	66	75	.
Plagiomnium affine	.	.	.	.	.	1	.	25	.	.	.	.	.	.	.	3	.	.	.	2	.	6	15	.	31	25	40	60	19	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhytidium rugosum	.	.	.	.	3	19	57	.	10	3	2	.	.	9	.	2	.	.	12	2	25	12	9	.	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cladonia rangiformis	.	.	.	.	.	.	14	.	10	63	46	.	2	.	.	7	.	7	2	2	33	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fissidens dubius	.	.	.	.	1	3	14	.	.	.	.	.	.	.	.	.	.	7	1	.	.	11	30	.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cladonia foliacea	.	.	40	.	21	6	14	.	10	34	31	.	3	4	.	1	.	.	5	2	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Climacium dendroides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	44	.	.	.	.	.	.	.	.	.	14	59	17	.
Polytrichum piliferum	.	.	.	.	1	.	.	.	10	32	60	.	2	.	.	4	.	.	.	2	17	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Brachythecium albicans	.	.	.	.	.	.	.	.	.	8	6	8	2	.	4	30	8	.	1	2	.	6	.	.	.	25	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thuidium delicatulum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	5	.	23	.	17	.	4	12	.	.	.	.	.	.	.	.	.	.	17	8	.