Tuexenia 38: 419–444. Göttingen 2018.
doi: 10.14471/2018.38.023, available online at www.zobodat.at

Vegetation of limestone outcrops in Western and Central Podillia (Ukraine)

Vegetation von Kalksteinausbissen in West- und Mittelpodolien (Ukraine)

Yakiv P. Didukh[1] & Yulia A. Vasheniak[2, *]

[1]*M.G. Kholodny Insitute of Botany of National Academy of Sciences of Ukraine, Tereshchenkivska Str. 2, MSP-1, 01601 Kyiv, Ukraine;*
[2]*Khmelnytsky Institute of Interregional Academy of Personnel Management, Prospect Myru Str. 101A, 29015 Khmelnytsky, Ukraine*
[*]*Corresponding author, e-mail: arrhenatherum@gmail.com*

Abstract

This article characterises limestone outcrop vegetation. Such communities grow on limestone, chalk, gypsum and other kinds of rocks of the Devon and Paleogene period dispersed throughout Western and Central Podillia. The relief, geological structure, soil, distribution factors caused by climate, specificity and diversity of the communities and their particular floristic qualities are highlighted. The history of phytocoenological investigations of limestone outcrop communities in Ukraine is also shown. Syntaxonomical and ecological assessments with critical analyses and evaluations of 118 relevés, including bryophytes and lichens, were conducted based on scientific papers. Research activity involved the formation of a database with the help of TURBOVEG, processing the data with JUICE and creating clusters with the help of the Modified TWINSPAN algorithm and OptimClass. The resulting communities were assigned to two classes: the class *Festuco-Brometea* (order *Brachypodietalia pinnati*, alliance *Cirsio-Brachypodion pinnati* [*Orchido militaris-Seslerietum heufleranae*, *Ranunculo zapalowiczi-Helictotrichetum desertori*] and order *Stipo pulcherrimae-Festucetalia pallentis*, alliance *Galio campanulati-Poion versicoloris* [*Schivereckio podolicae-Seselietum libanotidis*, *Poetum versicoloris*]) and the class *Sedo-Scleranthetea* (order *Alysso-Sedetalia*, alliance *Alysso-Sedion* [*Bryo argentei-Ajugetum chiae*, *Aurinio saxatilis-Allietum podolici*]). Characteristics of the syntaxa are given, especially in case of newly described syntaxa. Syntaxonomical assignments were based on our preliminary results and need to be integrated into the comprehensive analyses of data from different countries. Based on the ECODID database (DIDUKH 2011), we considered 12 environmental factors to justify the position and assessment of syntaxa along environmental scales. Finally, some disputable questions regarding the syntaxonomical position of limestone outcrop communities are discussed.

Keywords: dry grassland, *Festuco-Brometea*, *Sedo-Scleranthetea*, vegetation classification, Ukraine

Erweiterte deutsche Zusammenfassung am Ende des Artikels

1. Introduction

In Ukraine syntaxonomy began to develop on the basis of floristic data in the 1980s (late 20th century) and was mainly dedicated to the zonal types of vegetation and to vegetation with developed coenotic structure. These types were classified based on the rich geobotanical data of Ukraine. Petrophytic communitites were omitted by Ukrainian geobotanists

Manuscript received 11 June 2017, accepted 29 June 2018
Co-ordinating Editor: Thomas Becker

because the dominants were not clear in the coenotic structure of the communities. Moreover, the cryptogam layer was ignored in such communitites. However, these original communities have various coenotic structures, which have developed from specific floristic compositions of different genesis. For this reason, these types of communities have attracted a substantial amount of attention from Western Europe and are the cause of heated discussions.

Since the beginning of the 20th century, the classification of the dry grassland of Podillia, as well as the genesis of this vegetation and flora, has raised great interest amongst botanists. KLEOPOV (1928), KOCZWARA (1931), GAJEWSKI (1937), ZAVERUKHA (1986) and DIDUKH et al. (1982) distinguished Pontic, Sarmatian and Illyrian mountain elements, which together determine the complex mosaic of communities and their specificity, which complicates their syntaxonomy. In particular, the communities contain eastern varieties of species from the southwestern Balkan (*Astragalus monspessulanus*, *Festuca pallens*), which have genetic connections with Siberian-Altaic (*Helictotrichon desertorum*, *Allium obliquum*), southern Pontic (*Ephedra distachya*, *Caragana frutex*), Sarmatian (*Carex humilis*, *Adonis vernalis*) or Mediterranean (*Helianthemum canum*, *Sedum hispanicum*) elements, among which endemic species (*Schivereckia podolica*, *Poa versicolor*, *Thymus moldavicus)* were described. Some of them are dominant, others are rare, and all this together determines the originality and specificity of vegetative communities, which causes controversial debates about their syntaxonomic affiliation. Therefore, the syntaxonomic system and the placement of individual syntaxa are constantly being revised.

The first works on the classification of xerothermic slope vegetation of Western Podillia were those of KOCZWARA (1931), who described the communities of *Seslerietum heufleranae*, *Caricetum montanae* and *Avenetum desertorum*. In the Soviet period from 1939 to 1991, the classification was carried out on the dominant principles, and since 1992 scientists have been working on an ecologic-floristic basis using the Braun-Blanquet approach.

KUKOVYTSIA et al. (1992) described the alliance *Galio campanulati-Poion versicoloris*, in which they included the three associations *Poetum versicoloris*, *Adonido vernalis-Stipetum tirsae* and *Ranunculo zapalowiczi-Helictotrichetum desertori*, which, however, differ significantly in species composition and ecology and can thus not be considered within the framework of one alliance.

ONYSHCHENKO (2001) described two new associations, *Minuartio auctae-Festucetum pallentis* and *Aurinio saxatilis-Allietum podolici*, and included them in the alliance *Alysso-Sedetalia* of the order *Alysso-Sedion*. ABDULOIEVA (2002) included the associations *Stipetum pulcherrimae*, *Poetum versicoloris* and *Aurinio saxatilis-Allietum podolici* in the class *Sedo-Scleranthetea* (alliance *Alysso-Sedion*, which was presented as a synonym for *Alysso-Festucion pallentis*) and the association *Minuartio auctae-Festucetum pallentis* in the alliance *Helinthemo cani-Festucion pallentis*. KOROTCHENKO (2004) suggested that the association with the dominance of *Poa versicolor* does not belong to the alliance *Galio campanulati-Poion versicoloris* and pointed out that such communities grow on eroded, well-washed slopes and should therefore be included in the alliance *Artemisio marschalliani-Elytrigion intermediae* within the order *Festucetalia valesiacae*.

DIDUKH & VASHENIAK (2012), who characterised the steppe vegetation of Central Podillia, assigned the communities of the association *Poetum versicoloris* to the alliance *Bromo-Festucion pallentis* (order *Stipo pulcherrimae-Festucetalia pallentis*), which was further confirmed by the research of WILLNER et al. (2017). KUZEMKO et al. (2014) carried out a critical revision of the syntaxa of carbonate deposits and crystalline rocks and concluded

that these syntaxa belong to the communities of the class *Koelerio-Corynephoretea*, orders *Sedo-Scleranthetalia* and *Alysso-Sedetalia*. Apart from that, the community *Allium podolicum-Sedum acre* was outlined as a synonym of the association *Aurinio saxatilis-Allietum podolici*, which occurs on outcrops of crystalline rocks; thus, these acidophilic communities were included in the alliance *Sedo albi-Veronicion dillenii*, order *Sedo-Scleranthetalia*.

In many of these works (excluding the latest), the relevés made in previous decades, which were carried out in large areas (10 m × 10 m) and could be very heterogeneous in structure, did not include bryophytes and lichens and were not critically analysed with respect to syntaxa of neighbouring regions, especially the relevés of types that had not been described at that time. For the interpretation of the selected syntaxa, the Polish syntaxonomic scheme (MATUSZKIEWICZ 2001) generally considered xerophytic herbal communities to be part of the alliance *Cirsio-Brachypodion*, but the order *Stipo pulcherrimae-Festucetalia pallentis* was not mentioned in most scientific papers. In recent years the revision of the volume of orders (*Brachypodietalia pinnati*, *Stipo pulcherrimae-Festucetalia pallentis*, *Alysso-Sedetalia*) and their limits (JANIŠOVÁ 2010, DENGLER et al. 2012, JANIŠOVÁ et al. 2014, MUCINA et al. 2016) significantly changed the picture of the placement of syntaxa of subordinate ranks (alliances, associations); therefore, the obtained material is important for the further improvement of the ecologic-floristic classification of carbonate outcrop communities. Such material will form the basis that in the future, in the framework of international cooperation based on a comparative analysis of the data of neighbouring countries (Romania, Hungary, Slovakia, the Czech Republic, Poland, Moldova), will allow an assessment of the positions of the corresponding syntaxa in the higher category system and to distinguish them from the former system.

2. Study area

The Podillia Upland is characterised by a relatively dissected relief and adjoins the Carpathian Mountains on the Southwest and the Polissia flatland on the North. The Podilska Upland occupies the western and partly central region of Ukraine and can be seen as the analogue of the Malopoliska Upland, which adjoins the Eastern Carpathian and the Tatra Mountains. In administrative terms the territory belongs to the regions Lviv, Ivano-Frankivsk, Ternopil, Khmelnytsky and Vinnitsa and borders Moldova on the South (Fig. 1). The upland forms a wide strip of 580 km in length and 180 km in width, with an altitude from 180 to 400 m above sea level (the highest point at Kamula Town is 471 m). In the North and West, it looks like steep hilly strands (Holohory, Voroniaky, Kremenets Mountains) with an elevation of 200 m in relation to the nearby plains. In the Southwest it is separated by the valley of the Dnister River from the raised part of the Precarpathian Mountains, to the East it gradually tapers into the Dnieper Canyon, and to the Southeast it extends to the Black Sea Lowland. In geostructural terms it represents a monocline, which is basically filled with carbonate sediments of different ages (from the Silurian Devonian to the Paleogene) and of various structures (limestone, marl, chalk and gypsum) (BONDARCHUK 1959). These deposits are cut through by river valleys with meandering channels and canyon-like banks, all of which form a wide variety of petrophyte communities. Depending on the exposure, the surrounding steppe, structure of the substrate and accumulation of soil, various types of petrophytic communities have formed.

Fig. 1. Location of the study area and the study sites (dots) in western Ukraine.

Abb. 1. Lage des Untersuchungsgebiets und der Untersuchungsflächen (Punkte) in der West-Ukraine.

Such a geographical position generates discussions about the zonation of the territory as part of the Pontic-Pannonian province. DIDUKH & SHELYAG-SOSONKO (2003) put the boundary for this territory on the Tovtry Ridge, between the Central European forest, where the steppes are conditioned by edaphic factors, and the Ukrainian forest-steppe, where the steppes are conditioned by climatic-zonal features. The territory is limited to the Central Podillian geobotanical districts of Pokutsko-Medoborskyi and Pivnichno-Podilskyi.

The climate of Central and Western Podillia is moderately continental with mild winters and a relatively warm, wet summer (the average annual temperature is 7.1 °C (Kremenets Town) to 8.1 °C (Kamyanets-Podilsky Town), average for July is 18 °C (Lviv City) to 19.8 °C (Kamyanets-Podilsky Town), the average temperature for January is -4 °C (Lviv City) to -5.2 °C (Kremenets Town), and the range in annual precipitation is from 600 to 750 mm. The hydrothermal coefficient of Selyaninov for this region is 1 (1.3–2.1), which indicates a sufficient level of atmospheric humidification (LIPINSKY et al. 2003).

The Dniester Canyon deserves special attention: The average annual temperature is raised to 7.3 °C, and the "subtropical effect" is observed. In geobotanical terms it manifests itself by the fact that many southern (even Crimean) species appear far to the North.

The largest area is occupied by grey podzolised soils, which are formed in forests under hornbeam-oak and hornbeam forests, but under the grass-meadow steppes and oak forests with a rich grass cover, podzolised and typical black earth soils are formed, and on limestone and marls, rendzinas occur, which are washed-off outcrops and pass into lithosols. Rendzinas are characterised by a high content of carbonates of 90–93%, which decreases in the forests to 42–53%. The pH in the soil profile rises from 7.2–7.6 in the upper horizons to 7.7–7.9 in the lower horizons, whereas the humus content decreases from 12–15% to 2.8–3.5%. The ratio of Cg: Cf is 2.16–3.26 (HARBAR 2016).

3. Methods

3.1 Vegetation data sampling

The field sampling was carried out in Western and Central Podillia at different periods of time (1977, 2008–2011, 2015–2016). The main part of the data (84 relevés) was sampled in the years 2015–2016 on normal plots of 10 m² using the sampling approach of the EDGG expeditions (DENGLER et al. 2016) by recording vascular plants, bryophytes and lichens to obtain complete relevés. These relevés have been positioned randomly in the region. We collected header data using "GARMIN eTrex H", compass and portable inclinometer to measure longitude and latitude, altitude, slope and exposition. Maps (1 : 400 000) of the distribution of the syntaxa were created using ArcGIS 10. Moreover, we added published relevés (six relevés with plot sizes of 10 m²) from Central Podillia (KUZEMKO et al. 2014) and unpublished relevés (28 relevés with plot sizes of approximately 10–20 m²) of Y.P. Didukh, Y. Vasheniak and Y. Rozenblit to complete the data of vegetation of limestone outcrops in Western and Central Podillia. The taxonomy of vascular plants followed the checklist of MOSYAKIN & FEDORONCHUK (1999), for bryophytes we used the checklist of BOIKO (2008) and for lichens the checklist of KONDRATYUK (1998). All data sampled in the years 2015–2016 were stored in the Ukrainian Grassland Database (UGD) (KUZEMKO 2012) as EU-UA-001 in GIVD and in the European Vegetation Archive (EVA) (CHYTRÝ et al. 2016). For the article a total of 118 relevés were used, and a database was developed using TURBOVEG (HENNEKENS 2009). We used the most typical 90 relevés representing the syntaxa of the vegetation of limestone outcrops in the phytocoenological tables (Supplements S2–S3).

3.2 Vegetation data analysis

Data processing was carried out using JUICE (TICHÝ 2002), applying the Modified TWINSPAN algorithm for the formation of clusters (minimum number of groups: 2, pseudospecies cut levels: 0, 5 and 25%; Simpson coefficient) (ROLEČEK et al. 2009). To distinguish individual ecological clusters, we used OptimClass (TICHÝ & CHYTRÝ 2009). Diagnostic species were determined using the *phi* fidelity coefficient (CHYTRÝ et al. 2002). Species with $0.25 \leq phi < 0.50$ (shaded in light grey in the synoptic table) were considered as diagnostic, species with $phi \geq 0.50$ (shaded in dark grey in the synoptic table) as highly diagnostic. Fisher's exact test was used at $p > 0.05$ to exclude statistically insignificant values. In addition, constant and dominant species were defined in the JUICE program. Species with a frequency of 25% or more, but less than 50% (shaded in light grey in the synoptic table) were considered as constant, species with a frequency of more than 50% (shaded in dark grey in the synoptic table) as highly constant. Species with a total coverage of more than 25% in the herb layer were considered as dominant. The correlation coefficient was calculated in Microsoft Excel, based on the formula for determining the Pearson correlation coefficient. Correlation coefficients of more than 0.5, which indicates a medium to high positive correlation between environmetal factors, are highlighted in bold in Table 1. To compare environmental factors and their interdependence, we built a dendrogram based on the averaged indexes of 12 environmental factors (Didukh's scales) calculated for each cluster using STATISTICA 10.0. Isolated syntaxa were identified using the critical analyses from publications of national and foreign researchers (KUKOVYTSIA 1971, 1973, ROYER 1991, KOROTCHENKO & DIDUKH 1997, ABDULOIEVA & DIDUKH 1999, ABDULOIEVA 2002, KOROTCHENKO 2004, DENGLER & LÖBEL 2006, SOLOMAKHA 2008, JANIŠOVÁ 2010, KOROTCHENKO et al. 2009a, b, KUZEMKO 2009, 2011, DENGLER et al. 2012, DIDUKH & VASHENIAK 2012, JANIŠOVÁ et al. 2014, KUZEMKO et al. 2014, WILLNER et al. 2017). For

clarification we used the protologues of associations, alliances and orders (KLIKA 1931, ZÓLYOMI 1936, SOÓ 1959, 1962, MORAVEC 1967, POP 1968, 1991, KUKOVYTSIA et al., 1992, 1994, KOROTCHENKO & DIDUKH 1997, ONYSCHENKO 2001).

New associations and subassociations were described in accordance with the International Code of Phytosociological Nomenclature (WEBER et al. 2000). The ecological analysis of the communities included an assessment of their leading environmental factors, based on the methodology of synphytoindication using the ECODID database. Phytoindication scales of Y. Didukh (DIDUKH 2011), which are comparable to the Ellenberg scales and reflect amplitude indexes of the species, were used. They are characterised by the following dimensions: soil humidity (Hd – 23 grades), variability of damping (fH – 11 grades), soil acidity (Rc – 15 grades), total salt regime (Sl – 19 grades), carbonate content (Ca – 13 grades), nitrogen content (Nt – 11 grades), aeration of the soil (Ae – 15 grades), thermoregime of the climate (Tm – 17 grades), humidity of the climate (Om – 23 grades), continentality of the climate (Kn – 17 grades), cryoregime of the climate (Cr – 15 grades) and lightness in the community (Lc – 9 grades).

A detrended correspondence analysis (DCA) (HILL 1980) was carried out with R (R CORE TEAM 2016, cf. DALGAARD 2008), which made it possible to reveal the features of the distribution of syntaxa along ecological scales (DIDUKH & PLYTA 1994).

4. Vegetation classification

4.1 Cluster analysis and syntaxonomy of the communities

Data from those relevés that represent vegetation on outcrops of carbonate rocks were processed by cluster analysis. To determine the optimal number of clusters, we used the Modified TWINSPAN algorithm and Optimclass. As can be seen from Figure 2, there are two cluster groups at the highest level (the second group is divided into two subgroups) corresponding to the syntaxa at the level of alliances, with the first cluster group being slightly remote from the rest (Supplement S4). The first cluster group can be provisionally identified as communities that occur in moist, shaded ecotopes with low lighting. The analysis of diagnostic species (*Bupleurum falcatum*, *Sesleria heuflerana*, *Ranunculus zapalowiczii*, *Inula ensifolia*, *Anemone sylvestris*, *Thesium linophyllon*, *Linum catharticum* and others) and ecological conditions of the communities indicate that they belong to the alliance *Cirsio-Brachypodion pinnati* (order *Brachypodietalia pinnati*, class *Festuco-Brometea*). The second and third cluster subgroups represent vegetation of dry, well-warmed and lightened ecotopes.

The second cluster subgroup corresponds to the alliance *Galio campanulati-Poion* versicoloris of the order *Stipo pucherrimae-Festucetalia pallentis* and is represented by the diagnostic species *Sempervivum ruthenicum*, *Schivereckia podolica*, *Cleistogenes serotina*, *Gypsophila thyraica*, *Astragalus monspessulanus* and others.

The third cluster subgroup corresponds to the alliance *Alysso allysoidis-Sedion* (order *Alysso-Sedetalia*, class *Sedo-Scleranthetea*) and is represented by the diagnostic species *Alyssum calycinum*, *Tortula ruralis*, *Arenaria serpyllifolia*, *Sedum acre*, *Sedum sexangulare*, *Festuca ovina* and others. Thus, according to the structure of the species composition, the mesophytic communities of the order *Brachopodietalia pinnati* are significantly different from the xerophytic communities of the orders *Stipo pulcherrimae-Festucetalia pallentis* and *Alysso-Sedetalia*, which belong to different classes.

At the next level, six clusters are distingushed corresponding to associations, and the following and last level reflects the level of subassociations (Fig. 2). Based on this division, as well as taking into account the range and the ecological features of the distribution in the relief, a syntaxonomic scheme was set up.

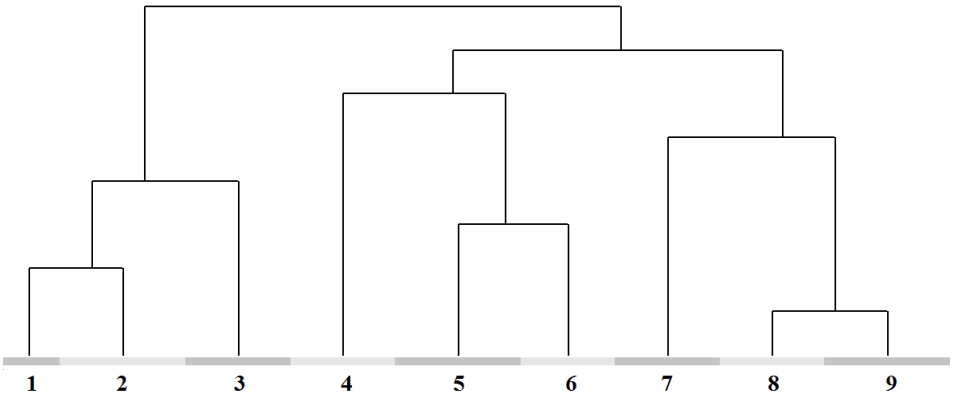


Fig. 2. Results of the Modified TWINSPAN analysis with the allocation of nine clusters: 1 – *Orchido militaris-Seslerietum heufleranae campanuletosum rotundofoliae*, 2 – *Orchido militaris-Seslerietum heufleranae typicum*, 3 – *Ranunculo zapalowiczi-Helictrotrichetum desertori*, 4 – *Schivereckio podolicae-Seselietum libanotidis*, 5 – *Poetum versicoloris typicum*, 6 – *Poetum versicoloris thymetosum moldavicae*, 7 – *Bryo argentei-Ajugetum chiae*, 8 – *Aurinio saxatilis-Allietum podolici typicum*, 9 – *Aurinio saxatilis-Allietum podolici xanthorietosum elegantis*.

Abb. 2. Ergebnisse der modifizierten TWINSPAN-Analyse. Die neun Gruppen repräsentieren die in der englischen Abbildungsunterschrift genannten Syntaxa.

4.2 Proposed syntaxonomic scheme

Based on the cluster analysis results, we created a preliminary syntaxonomic scheme. Within the complete dataset, the following limestone outcrop communities were distinguished. New syntaxa are presented, and non-valid syntaxa were validated.

Cl. 1: *Festuco-Brometea* Br.-Bl. & Tüxen ex Br.-Bl. 1949
- Ord. *Brachypodietalia pinnati* Korneck 1974
  - All. 1.1: *Cirsio-Brachypodion pinnati* Hadač & Klika in Klika & Hadač 1944
    - Ass. 1.1.1: *Orchido militaris-Seslerietum heufleranae* Schneider ex Dengler et al. 2012
      - Subass. 1.1.1a: *Orchido militaris-Seslerietum heufleranae campanuletosum rotundifoliae* Didukh & Vasheniak 2017 [Cluster 1]
      - Subass 1.1.1b: *Orchido militaris-Seslerietum heufleranae* typicum Schneider ex Dengler et al. 2012 [Cluster 2]
    - Ass 1.1.2: *Ranunculo zapalowiczi-Helictotrichetum desertori* Kukovitsia & al. 1994 ex Didukh & Vasheniak 2017 [Cluster 3]
- Ord. *Stipo pulcherrimae-Festucetalia pallentis* Pop 1968
  - All. 1.2: *Galio campanulati-Poion versicoloris* Kukovitsa & al. 1997 ex Didukh & Vasheniak 2017
    - Ass. 1.2.1: *Schivereckio podolicae-Seselietum libanotidis* Didukh & Vasheniak 2017 [Cluster 4]
    - Ass. 1.2.2: *Poetum versicoloris* Kukovitsa et al. 1998
      - Subass. 1.2.2a: *Poetum versicoloris typicum* Kukovitsa et al. 1998 [Cluster 5]
      - Subass. 1.2.2b: *Poetum versicoloris thymetosum moldavici* Didukh & Vasheniak 2017 [Cluster 6]

Cl. 2: *Sedo-Scleranthetea* Br.-Bl. 1955
Ord. *Alysso-Sedetalia* Moravec 1967
All. 2.1: *Alysso-Sedion* Oberdofer & Müller in Müller 1961
Ass. 2.1.1: *Bryo argentei-Ajugetum chiae* Didukh & Vasheniak 2017 [Cluster 7]
Ass. 2.1.2: *Aurinio saxatilis-Allietum podolici* Onyshchenko 2001
Subass. 2.1.2a: *Aurinio saxatilis-Allietum podolici* typicum Onyshchenko 2001 [Cluster 8]
Subass. 2.1.2b: *Aurinio saxatilis-Allietum podolici xanthorietosum elegantis* Didukh & Vasheniak 2017 [Cluster 9]

4.3 Description of the distinguished syntaxa

Association 1.1.1: *Orchido militaris-Seslerietum heufleranae* (Fig. 3a, Supplement S1–S2 and Supplement E1a)

Characterisation: Species-rich association including 30 diagnostic species, among which are *Agrimonia eupatoria*, *Knautia arvensis*, *Sesleria heuflerana*, *Eryngium planum Xanthoria elegans*, *Candelariella vitellina*, *Abietinella abietina* and *Brachythecium albicans*. The constant species *Sesleria heuflerana*, *Brachythecium albicans*, *Abietinella abietina*, *Teucrium chamaedrys*, *Inula ensifolia*, *Onobrychis arenaria* and *Leontodon hispidus* indicate that they belong to the alliance *Cirsio-Brachypodion* (order *Brachypodietalia pinnati*, according to WILLNER et al. [2017]). The total coverage of species is 60–90%, the coverage of vascular plants 60–80% (which is quite significant) and the coverage of bryophytes and lichens 10–15%. Among bryophytes and lichens there are *Abietinella abietina*, *Tortula ruralis*, *Weissia longifolia*, *Candelariella vitellina*, *Peltigera didactyla*, *Cladonia pyxidata*, *Schistidium atrofuscum*, *Camplotecium lutescens*, *Hypnum vaucheri*, *Campylium chrysophylum* and *Didymodon acutus*.

Distribution: The communities are distributed in the middle part of the Dnister River valley and its tributaries within Western Podillia (Ivano-Frankivsk, Khmelnytsky, Chernivtsi and Ternopil regions).

Ecological characteristics: The communities are formed on limestone deposits (tertiary limestone, gypsum and loose marls) of slopes (15–45°) up to 50 m high, with a smooth microrelief of predominantly less-warmed northern and northwestern exposure, in more humid conditions on well-developed soddy carbonate soils (rendzinas) with a high content of carbonates and humus.

Subassociation 1.1.1a: *Orchido militaris-Seslerietum heufleranae campanuletosum rotundifoliae* subass. nova (Fig. 6a, Supplement S1–S2, Supplement E1b)

Characterisation: Species-rich subassociation including 23 diagnostic species, among which are *Campanula rotundifolia*, *Thesium linophyllon*, *Poterium sanguisorba* and *Arabis hirsuta*, and constant species like *Sesleria heuflerana*, *Campanula glomerata*, *Teucrium chamaedrys*, *Thesium linophyllon*, *Galium glaucum* and *Anthericum ramosum*. The total coverage of the species is 50–95%, coverage of vascular plants is 40–80% and coverage of bryophytes and lichens 10–20%. The cryptogam layer includes *Abietinella abietina*, *Hypnum vaucheri*, *Ceratodon purpureus* and *Xanthoria sp*. The vegetation height reaches 40 cm.

The nomenclature relevé 1 (Supplement S2) was recorded by Y. A. Vasheniak on August 4, 2016, near the village Shibalyn in the Berezhansky district, Ternopil region (N 49.4393°, E 24.9879°, precision is 3 m), on the middle part of the northwestern slope with an inclina-

tion of 28º at an altitude of 251 m a.s.l. A total number of 44 species was found on 10 m². The total coverage of all species is 80%, the herb layer coverage 70% and the coverage of the cryptogam layer 20%. The maximum height of the herb layer is 41 cm, the minimum 5 cm. In addition to herbaceous species, there are the shrubs *Chamaecytisus blockianus* and *C. albus*; however, they do not dominate in these communities and do not grow taller than the herb layer.

Distribution: The communities are distributed in the middle part of the Dnister River valley and its tributaries within Western Podillia (Ivano-Frankivsk, Khmelnytsky, Chernivtsi and Ternopil regions).

Ecological characteristics: The communities occupy limestone outcrops (limestone, gypsum and friable marls) more often in the lower sections of slopes of predominantly northern and northwestern exposition with a moderate inclination (25–45°). They are formed in meso-xerophytic conditions on eroded, loose substrates consisting of poorly developed, often washed-out soddy carbonate soils (rendzinas) with an increased content of carbonates, which occur as inclusions.

Subassociation 1.1.1b: *Orchido militaris-Seslerietum heufleranae typicum*

Nomenclature typus. Characterisation and diagnostic species of the subassociation are similar to the typus of the association *Orchido militaris-Seslerietum heufleranae*.

Association 1.1.2: *Ranunculo zapalowiczi-Helictotrichetum desertori*
(Fig. 3b, Supplement S1–S2 and Supplement E1c)

This association was described earlier by KUKOVYTSIA et al. (1994), but it must be validated in accordance with Art. 5, 15, 16 of the Code (WEBER et al. 2000). In this article we present a neotype of the association.

Neotype: The nomenclature relevé 29 (Supplement S2) was recorded by Y.P. Didukh on June 2, 1977, between the villages Gerasimov and Zhabokruki in the Tlumatsky district, Ivano-Frankivsk region (N 49.5762°, E 25.5633°) in the upper part of the precipitous northern slope (up to 300 m above sea level) of Lysa hill. Miocene gypsum outcrops are eroded and form shelves up to 40 cm wide, on which soil accumulates in the cracks. The thickness of the rendzinas is between a few and up to 20 cm. Due to the accumulation of humus, soils are dark and cloddy. Limestone outcrop communities are generally sparse (coverage 50–80%), but the dominating grass *Helictotrichon desertorum* forms dense sods. 51 species have been found in the relevé. *Helictotrichon desertorum* is dominant, *Carex humilis* co-dominant (coverage 5–20%); small blocks are formed by *Allium senescens* subsp. *montanum* (5%) and *Thalictrum uncinatum* (1–5%); few (up to 1–3%) are *Filipendula vulgaris*, *Galatella linosyris*, *Euphorbia cyparissias*, *Stipa capillata*, *Galium glaucum*, *Gypsophila fastigiata*, *Inula ensifolia*, *Anemone sylvestris*, *Poa versicolor*, *Thymus pannonicus*, *Ranunculus zapalowiczii*, *Festuca rupicola*, *Anthyllis vulneraria*, *Teucrium chamaedrys* and *T. montanum* and rare (1%) *Astragalus cicer*, *Pulsatilla latifolia*, *Eremogone procera* subsp. *procera*, *Campanula sibirica*, *Erysimum pannonicum*, *Hyacinthella leucophaea*, *Hieracium cymanthum*, *Jurinea arachnoidea*, *Minuartia setacea*, *Onobrychis arenaria*, *Polygonatum odoratum*, *Scabiosa ochroleuca*, *Senecio czerniaevii* and *Trifolium lupinaster*.

Characterisation: In general, there are 23–51 species in the communities of the association, of which *Helictotrichon desertorum*, *Astragalus austriacus*, *Euphrasia stricta*, *Inula ensifolia*, *Jurinea molissima*, *Gypsophila fastigiata* and *Helianthemum nummularium* are diagnostic. Constant species belong to the syntaxa of the order *Brachypodietalia pinnati*,

Fig. 3. a) *Orchido militaris-Seslerietum heufleranae* in the Dniester Canyon near the village Gorodok in the Zalishchyky district, Ternopil region (Photo: Y. Vasheniak, 21.07.2016). **b)** *Ranunculo zapalowiczi-Helictotrichetum desertori* on limestone outcrops near the village Gerasymiv in the Tlumatsk district, Ivano-Frankivsk region (Photo: Y. Didukh, 08.06.2014). **c)** *Schivereckio podolicae-Seselietum libanotidis* on limestone outcrops near the village Nagoriany in the Kelmentsi district, Chernivtsi region (Photo: Y. Vasheniak, 09.07.2017). **d)** *Aurinio saxatilis-Allietum podolici* on limestone outcrops near the village Vrublivka in the Kamyanets-Podilskyi district, Khemelnytskyi region (Photo: Y. Vasheniak, 03.06.2017).

Abb. 3. a) *Orchido militaris-Seslerietum heufleranae* im Dniester-Schluchttal nahe der Ortschaft Gorodok im Bezirk Zalishchyky, Ternopil-Region (Foto: Y. Vasheniak, 21.07.2016). **b)** *Ranunculo zapalowiczi-Helictotrichetum desertori* auf Kalksteinfelsen nahe der Ortschaft Gerasymiv im Bezirk Tlumatsk, Ivano-Frankivsk-Region (Foto: Y. Didukh, 08.06.2014). **c)** *Schivereckio podolicae-Seselietum libanotidis* auf Kalksteinfelsen nahe der Ortschaft Nagoriany im Bezirk Kelmentsi, Chernivtsi-Region (Foto: Y. Vasheniak, 09.07.2017). **d)** *Aurinio saxatilis-Allietum podolici* auf Kalksteinfelsen nahe der Ortschaft Vrublivka im Bezirk Kamyanets-Podilskyi, Khemelnytskyi-Region (Foto: Y. Vasheniak, 03.06.2017).

alliance *Cirsio-Brachypodion pinnati*: *Lembotropis nigricans*, *Bupleurum falcatum*, *Briza media*, *Anemone sylvestris*, *Leucanthemum vulgare*, *Trifolium montanum* and others. The total coverage of the species is 50–95%, and the herb layer covers 40–90%. Among the different species, *Helictotrichon desertorum*, *Carex humilis*, *Poa versicolor*, *Sesleria heuflerana*, *Inula ensifolia*, *Festuca valesiaca*, *Anthericum ramosum*, *Poa angustifolia*, *Lembotropis nigricans* and *Elytrigia intermedia* dominate.

Distribution: Communities are distributed in Pokuttia, Opillia and Gologoro-Kremenets Ridge (Ternopil and Ivano-Frankivsk regions).

Ecological characteristics: They occupy the upper and middle parts of the steep (25–70°) gypsum-containing slopes, up to 70 m high, predominantly of northern and northwestern exposure. The microrelief in form of ledges forms shelves of up to several square metres in area, on which dark soddy carbonate soils (rendzinas) accumulate. A high content (up to 20%) of humus is typical. They are more humid than the previous ones and characterised by a very high content of carbonates and a high pH of 7.2–7.5.

Many communities of the association include rare species listed in the Red Book of Ukraine (DIDUKH 2009), the European Red List, the Bern Convention and regional lists of rare species.

Association 1.2.1: *Schivereckio podolicae-Seselietum libanotidis* ass. nova (Fig. 3c, Supplement S1, S3 and Supplement E1d)

Characterisation: These multispecies communities (16–34 species) are distributed in northern, northwestern, northeastern, eastern and southwestern slopes with an average inclination of 25–45°. The association is characterised by the following diagnostic taxa: *Allium senescens* subsp. *montanum*, *Astragalus onobrychis*, *Erysimum odoratum*, *Gypsophila thyraica*, *Melampyrum arvense*, *Schivereckia podolica*, *Seseli libanotis* subsp. *intermedia* and *Vincetoxicum hirundinaria.* Constant species are: *Asperula cynanchica*, *Euphorbia cyparissias*, *Leonotodon hispidus*, *Potentilla incana*, *Sedum acre*, *Thymus marschallianus* and *Centaurea stoebe*. The total coverage of the species is 50–95% and that of the herb layer 50–90%. The height of the grass stand is quite considerable and reaches 32 cm. The cryptogam layer (*Hypnum cupressiforme*, *Abietinella abietina*) is well developed and forms in some communities a coverage of approximately 80%.

The nomenclature relevé 1 (Supplement S3) was recorded by Y.A. Vasheniak on July 15, 2015, near the village Nagoryany in the Kelmenetsky district, Chernivtsi region (N 48.5415°, E 26.7678°), on the top of the southwestern slope with an inclination of 45° at an altitude of 249 m above sea level. In the relevé there are 21 species of vascular plants and cryptogams (e.g., *Schivereckia podolica*, *Seseli libanotis* subsp. *intermedia*, *Amblystegium serpens* and *Brachythecium velutinum*). The total coverage is 95%, the grass layer covers 90% and the bryophyte-lichen layer 50%. The average height of the herbaceous vegetation is 30 cm. The shrub *Chamaecytisus blockianus* grows here.

Distribution: Communities are noted in the middle of the Dnister River valley (Ternopil, Ivano-Frankivsk, Khmelnytsky, Chernivtsi regions).

Ecological characteristics: The communities occupy outcrops of limestone, on which dry, soddy-carbonate rendzinas rich in humus are formed. By the indicators of temperature and cryoregime, they occupy cooler ecotopes, which is the reason why they occur mainly on the shaded northern, northwestern and northeastern slopes.

Association 1.2.2: *Poetum versicoloris* (Fig. 6b, Supplement S1, S3 and Supplement E1e)

The new syntaxon published by KUKOVYTSIA et al. (1992) does not have the nomenclature type of the association and is therefore, according to Articles 5, 15 and 16 of the Code (WEBER et al. 2000), not valid. We provide the neotype of the association to validate it.

Neotype: Relevé No. 17 was recorded by Y.P. Didukh on June 18, 2015, near the village Vrublivtsi in the Kamyanets-Podilsky district, Khemelnytsky region (N 48.6054°, E 26.7754°), in the upper part of the southern slope with an inclination of 45° at an elevation of 220 m a.s.l. There is a total number of 24 species in the relevé. The total coverage of species is 90%, the herb layer coverage is 40%, and the bryophyte-lichen coverage is 50%.

Fig. 6. a) *Orchido militaris-Seslerietum heufleranae campanuletosum rotundifoliae* near the village Shybalyn in the Berezhany district, Ternopil region (Photo: Y. Vasheniak, 06.08.2016). **b)** *Poetum versicoloris* near the village Voronovytsia in the Kelmentsi district, Chernivtsi region (Photo: Y. Didukh, 08.08.2014). **c)** *Poetum versicoloris thymetosum moldavicae* near the village Goraivka in the Kamyanets-Podilskyi district, Khmelnytskyi region (Photo: Y. Didukh, 08.06.2014). **d)** *Bryo argentei-Ajugetum chiae* near the village Nagoriany in the Kelmentsi district, Chernivtsi region (Photo: Y. Didukh, 12.06.2014). **e)** *Aurinio saxatilis-Allietum podolici xanthorietosum elegantis* near the village Yaruga in the Kamyanets-Podilskyi district, Khmelnytskyi region (Photo: Y. Vasheniak, 18.07.2016).

Abb. 6. a) *Orchido militaris-Seslerietum heufleranae campanuletosum rotundifoliae* nahe der Ortschaft Shybalyn im Bezirk Berezhany, Ternopil-Region. **b)** *Poetum versicoloris* nahe der Ortschaft Voronovytsia im Bezirk Kelmentsi, Chernivtsi-Region. **c)** *Poetum versicoloris thymetosum moldavicae* nahe der Ortschaft Goraivka im Bezirk Kamyanets-Podilskyi, Khmelnytskyi-Region. **d)** *Bryo argentei-Ajugetum chiae* nahe der Ortschaft Nagoriany im Bezirk Kelmentsi, Chernivtsi-Region. **e)** *Aurinio saxatilis-Allietum podolici xanthorietosum elegantis* nahe der Ortschaft Yaruga im Bezirk Kamyanets-Podilskyi, Khmelnytskyi-Region.

Characterisation: As a rule, communities are sparse (coverage 50–80%), with 19–41 species in the relevé. The association has 29 diagnostic species, amongst them herbal xerophytes, which develop under conditions of increased erosion. In these communities the endemic species *Poa versicolor* predominates, along with other species (> 50% *Botriochloa ischaemum*, *Melica transsilvanica*, *Nonea pulla*, *Cleistogenes serotina*, *Sedum acre* and *Teucrium montanum*). Species with sizable constancy in the communities are *Euphorbia cyparissias*, *Elytrigia intermedia*, *Teucrium chamaedrys*, *Segurigera varia*, *Echium vulgare*, *Centaurea stoebe* and *Salvia verticillata*.

Distribution: The communities are limited to Western and Central Podillia (the Dnister River valley and its tributaries); administratively, these are the territories of Ivano-Frankivsk, Ternopil, Khmelnytsky and Vinnitsa regions.

Ecological characteristics: Communities occupy the steep (25–60°) slopes, generally of southern, southeastern or eastern exposure, on shelves and ledges that look like strips formed as a result of stratification of limestone deposits of various ages (from Tertiary to Devonian). Soils are dry, low-humus, poorly developed, washed-away, gravelly, skeletal lithosols and sometimes mobile screes, which form on outcrops of limestone.

Subassociation 1.2.2a: *Poetum versicoloris typicum*

Nomenclature typus. Characterisation and diagnostic species of the subassociation are similar to the typus of the association ***Poetum versicoloris***.

Subassociation 1.2.2b: *Poetum versicoloris thymetosum moldavici* subass. nova (Fig. 6c, Supplement S1, S3 and Supplement E1f)

Characterisation: Communities are quite rich (32–43 species) in floristic composition. Diagnostic taxa include *Stipa pulcherrima*, *Thymus moldavicus*, *Jurinea calcarea*, *Weissia longifolia*, *Astragalus monspessulanus* and others. *Euphorbia cyparissias*, *Elytrigia intermedia*, *Teucrium chamaedrys*, *T. montanum*, *Galium glaucum* and others are found in high constancy. The total coverage of the species is 60–95%, and that of the herb layer 50–85%. The bryophyte-lichen layer is well developed with a coverage of 50–80%.

The nomenclature relevé 21 was recorded by Y.A. Vasheniak on July 8, 2015, near the village Sokil in the Kamyanets-Podilsky district, Khmelnytsky region (N 48.5394°, E 26.6387°), on the upper part of the northeastern slope at an altitude of 135 m a.s.l. Overall, there are 40 species in a relevé of 10 m². The total coverage is 80%, the grass coverage is 70%, and the bryophyte-lichen layer covers 60%. The maximum hight of the grass is 50 cm.

Distribution: Communities are noted in the valley of the Dnister River at the intersection of the Tovtry Ridge (near the village Sokil in the Kamyanets-Podilsky district, Khmelnytsky region, and the village Nahoryany in the Kelmenytsky district, Chernivtsi region).

Ecological characteristics: Communities are distributed in the upper and middle parts of slopes of northeastern, eastern, western and southwestern exposure, occupying the slopes of medium steepness. The soils are fairly dry, short-profile, washed-off, crushed, alkaline, rich in carbonate and poor in humus rendzinas, which are formed on Devonian layered limestones.

Association 2.1.1: *Bryo argentei-Ajugetum chiae* ass. nova (Fig. 6d, Supplement S1, S3 and Supplement E1g)

Characterisation: Communities are quite rich in floral composition (14–52 species of vascular plants and cryptogams). KUZEMKO et al. (2014) describe the community *Ajuga chamaepytis-Sedum acre* with a similar species composition, but we propose to separate

associations in which the diagnostic species are *Ajuga chia*, *Xanthoria* sp., *Bryum argenteum*, *Pilosella praealta* and others. In the herbage, the constant species are *Sedum acre*, *Acinos arvensis* and others. The cryptogam layer (50–70%) consists mainly of *Tortula ruralis*, with the participation of *Abietinella abietina*, *Bryum argenteum*, *B. capillare*, *Schistidium atrofuscum*, *Cladonia pocillum* and *Hedwigia ciliata*. The total coverage of the species (height up to 20 cm) is only 50–70%, the coverage of the herb layer 40–50%.

The nomenclature relevé 38 was recorded by Y.A. Vasheniak on June 12, 2011, near the village Khrebtiiv in the Novoushitsky district, Khmelnytsky region (N 48.6432°, E 27.2317°), on the middle part of the southern slope at an altitude of 250 m a.s.l. The total number of species is 23 species per 10 m². Total coverage is 90%, grass coverage is 40%, and bryophyte-lichen coverage is 50%.

Distribution: The communities occur along the middle reaches of the Dnister River. KUZEMKO et al. (2014) report relevés from the vicinity of the village Dmytrashivka, Bolgan, Yampol Town, Vinnytsa region. We noted such communities in the vicinity of the villages Kurazhin and Khrebtiv in the Novoushitsky district of the Khmelnytsky region and of the village Makarovka in the Kelmenets district of the Chernivtsi region.

Ecological characteristics: The communities, as a rule, occupy the shelves and rocky protrusions of limestone and sandstone of the steep banks of the Dnister River valley, predominantly on southern, southwestern and southeastern slopes. They are formed in dry conditions, mainly on underdeveloped, shallow soils (lithomes) with low humus and high carbonate content.

Association 2.1.2: *Aurinio saxatilis-Allietum podolici* (Fig. 3d, Supplement S1, S3 and Supplement E1h)

Characterisation: Multispecies communities (32–42 species). Among the diagnostic species are *Allium podolicum*, *Festuca ovina*, *Chelidonium majus*, *Encalypta vulgaris*, *Homalothecium lutescens* and others. The total coverage of the species is 50–90%; the coverage of the herb layer is 40–80%. With approximately 40 cm, the height of the grass stand is quite considerable. The bryophyte-lichen layer is well developed and reaches a coverage of 25–80%.

Distribution: The communities of this association are quite common in Western Podillia and are reported from the valleys of the Dnister River and its tributaries and from the Kremenets Mountains. The communities occur on limestone outcrops, humps, rocks and shelves (Chernivtsi, Khmelnytsky, Ternopil, Vinnytsia and Ivano-Frankivsk regions).

Ecological characteristics: The communities occupy protrusions of limestone deposits, where underdeveloped, shallow crushed-stone lithosols are formed, allowing carbonate-rich species (*Schivereckia podolica*, *Seseli hippomarathrum*) to grow. Soils are fairly dry, with a high content of carbonates.

Subassociation 2.1.2a: *Aurinio saxatilis-Allietum podolici typicum*

Characterisation and diagnostic species of the subassociation are similar to the typus of the association ***Aurinio saxatilis-Allietum podolici***.

Subassociation 2.1.2b: *Aurinio saxatilis-Allietum podolici xanthorietosum elegantis* subass. nova (Fig. 6e, Supplement S1, S3 and Supplement E1i)

Characterisation: The communities are rich in species (11–49 species), and diagnostic species include *Xanthoria elegans*, *Berteroa incana*, *Arabidopsis thaliana* and others. Constant species are *Allium podolicum*, *Sedum acre*, *Centaurea stoebe*, *Arenaria*

serpyllifolia, *Festuca rupicola*, *F. valesiaca*, *Abietinella abietina*, *Tortula ruralis* and others. The total coverage of the groups is 50–90%. The coverage of the herb layer is small and amounts to 20–50%. The hight of the grass stand is 20–50 cm. The bryophyte-lichen layer is well developed and has a coverage of 50–80%. *Sedum sexangulare* and *S. acre* dominate in the communities.

The nomenclature relevé 58 of this subassociation was recorded by Y.A. Vasheniak on July 29, 2016, near the village Gorodok in the Zalishchyky district, Ternopil region (N 48.64350°, E 25.7495°), in the upper part of the southern slope of limestone deposits at an altitude of 206 m a.s.l. There are 38 species of vascular plants and cryptogams (e.g., *Poa angustifolia*, *Xanthoria elegans*, *X. polycarpa*, *Arabidopsis thaliana*, *Asplenium ruta-muraria*, *Hypnum cupressiforme*, *Cladonia furcata*, *Hedwigia ciliata*). The total coverage of species is 65%, the herb layer coverage is 40% and the cryptogam layer coverage is 50%.

Ecological characteristics: The communities occupy limestone humps and shelves at the bottom of southern slopes. They develop under conditions of high insolation. Unlike the previous association, soils are dry, light, sandy, loamy and poor in nutrients, so they form on dense cemented tertiary limestone.

Distribution: The communities are common in the Dnister River valley in the Khmelnytsky and Chernivtsi regions and likely widespread within Central Podillia.

5. Environmental characteristics of distinguished syntaxa

In order to assess the differentiation of selected syntaxa with respect to the effect of various environmental factors, a scoring system on the scale of DIDUKH (2011) for syntaxa was calculated on the basis of the synphytoindication method. The nature of their correlation is shown in Table 1.

As can be seen from Table 1, medium to high correlation (coefficients > 0.50, indicated in bold) is observed between soil humidity (Hd) and aeration of soil (Ae), lightness in the community (Lc), humidity (Om) and thermoregime (Tm), between variability of damping (fH) and carbonate content (Ca), between acidity (Rc) and carbonate content (Ca), between total salt regime (Sl) and humidity (Om), between aeration of soil (Ae) and lightness in the community (Lc), between thermoregime (Tm) and humidity (Om) and between humidity (Om) and continentality (Kn). In general, unlike steppe black earth soil or meadow alluvial soils, soil factors have significantly less influence on the distribution of communities developing on limestone sediments than the degree of humidity. This is due to soil structure (rendzinas, lithosols), which are generally undeveloped, with shallow soil profiles.

The distribution of the syntaxa with respect to the total environmental factors is shown in the ordination diagram (Fig. 4) based on the DCA.

ll communities are confined to dry conditions with moderate soaking of the root-forming layer of the soil by sediments and melted water; therefore, the variability of damping is fluctuating (fH = 6.1–6.8). The association *Orchido militaris-Seslerietum heufleranae* corresponds to most humid conditions, the association *Bryo argentei-Ajugetum chiae* to the driest. The communities are characterised by subaerophytic conditions and grow on relatively aerated soils with inclusions of gravelly rocks (55–80%). The highest degree of aeration is characteristic for the associations *Bryo argentei-Ajugetum chiae* and *Schivereckio podolicae-Seselietum lilanotidis* and the lowest for the association *Orchido militaris-Seslerietum*

Table 1. Correlation coefficients between various environmental factors after DIDUKH (2011). Hd – soil humidity, fH – variability of damping, Rc – soil acidity, Sl – total salt regime, Ca – carbonate content, Nt – nitrogen content, Ae – aeration of soil, Tm – thermoregime of climate, Om – humidity of climate, Kn – continentality of climate, Cr – cryoregime of climate and Lc – lightness in the community. Coefficients > 0.5 indicating medium to high correlation are highlighted in bold.

Tabelle 1. Korrelationskoeffizienten der Beziehungen verschiedener Umweltfaktoren nach DIDUKH (2011). Hd – Bodenfeuchtigkeit, fH – Variabilität der Bodenfeuchteigkeit, Rc – Bodenreaktion, Sl – Gesamt-Salzgehalt, Ca – Carbonatgehalt, Nt – Stickstoffgehalt, Ae – Durchlüftung des Bodens, Tm – Temperaturregime (Strahlungsbilanz), Om – Luftfeuchtigkeit, Kn – Kontinentalität, Cr – Kälteregime, und Lc – Helligkeit in der Gesellschaft. Koeffizienten > 0,5; die auf eine mittlere bis hohe Korrelation hinweisen, sind durch Fettdruck hervorgehoben.

	Hd	fH	Rc	Sl	Ca	Nt	Ae	Tm	Om	Kn	Cr	Lc
Degree	23	11	13	19	13	11	15	17	23	17	15	9
Hd	–	–	–	–	–	–	–	–	–	–	–	–
fH	-0.01	–	–	–	–	–	–	–	–	–	–	–
Rc	-0.24	-0.47	–	–	–	–	–	–	–	–	–	–
Sl	-0.29	0.14	0.49	–	–	–	–	–	–	–	–	–
Ca	-0.08	**-0.72**	**0.67**	0.14	–	–	–	–	–	–	–	–
Nt	0.43	0.01	0.11	0.31	-0.14	–	–	–	–	–	–	–
Ae	**0.59**	-0.35	0.32	0.25	0.42	0.46	–	–	–	–	–	–
Tm	**-0.55**	-0.16	0.29	0.48	0.26	0.01	-0.02	–	–	–	–	–
Om	**0.51**	-0.07	-0.26	**-0.60**	0.07	-0.30	0.18	**-0.66**	–	–	–	–
Kn	-0.34	-0.12	0.29	0.49	0.19	0.24	0.10	0.49	**-0.74**	–	–	–
Cr	-0.28	0.21	-0.06	0.22	-0.18	-0.04	-0.21	0.49	-0.24	-0.23	–	–
Lc	**-0.71**	0.45	0.08	0.43	-0.25	-0.25	**-0.53**	0.29	-0.47	0.28	0.23	–

heufleranae. Soils of all groups are characterised by a low nitrogen content (Nt = 4.3–5.0); the highest index belongs to the association *Orchido militaris-Seslerietum heufleranae*, the lowest to the association *Schivereckio podolicae-Seselietum lilanotidis*.

Analyses of soil indicators have shown that the communities develop in neutral to basic conditions (Rc = 8.3–8.8, fH = 6.7–7.3) rich in carbonates (Sl = 7.7–8.3, Ca = 8.1–9.1). The highest values of carbonates (Ca) correspond to the subassociations *Orchido militaris-Seslerietum heufleranae campanuletosum rotundofliae*, which forms on loose substrates, and *Ranunculo zapalowiczi-Helictotrichetum desertori*, which forms on dense gypsum. Both are obligatorily carbonatophilic coenoses. The lowest Ca values belong to the subassociations *Aurinio saxatilis-Allietum podolici typicum* and *Aurinio saxatilis-Allietum podolici xanthorietosum elegantis*, which are formed not only on carbonates, but also on sandstones and granites (KUZEMKO et al. 2014).

The indicators of the climatic factors are quite close to zonal. The communities exist in a narrow range of the thermoregime (Tm = 8.8–9.3), characterising sub-mesothermal conditions with an annual radiation balance of 1885 MJ/m², (according to HARBAR (2016) 1650–1820 MJ/m² for the Tovtry Ridge). The warmest places are occupied by the communities of the subassociations *Poetum versicoloris typicum* and *Poetum versicoloris thymetosum moldavici*, which are formed on steep southern slopes (inclination up to 45°). The remaining communities are formed in cooler conditions.

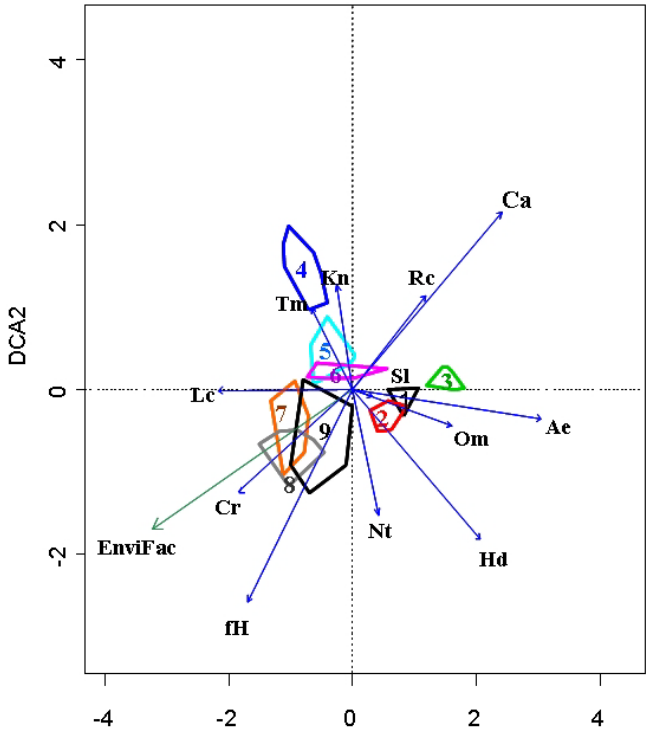


Fig. 4. DCA ordination of the distinguished syntaxa in relation to 12 indicators of environmental factors. Syntaxa are: 1 – *Orchido militaris-Seslerietum heufleranae campanuletosum rotundofoliae*, 2 – *Orchido militaris-Seslerietum heufleranae typicum*, 3 – *Ranunculo zapalowiczi-Helictrotrichetum desertori*, 4 – *Schivereckio podolicae-Seselietum libanotidis*, 5 – *Poetum versicoloris typicum*, 6 – *Poetum versicoloris thymetosum moldavicae*, 7 – *Bryo argentei-Ajugetum chiae*, 8 – *Aurinio saxatilis-Allietum podolici typicum*, 9 – *Aurinio saxatilis-Allietum podolici xanthorietosum elegantis*. Indicators of environmental factors: see Table 1.

Abb. 4. DCA-Ordination der Syntaxa in Beziehung zu den Indikatoren von 12 wichtigen Umweltfaktoren. Syntaxa: siehe englische Abbildungsunterschrift. Indikatoren der Umweltfaktoren: siehe Tabelle 1.

These data correlate to the Cr (cryoregime of climate) figures, where the highest values are typical for the *Poetum versicoloris* occurring on southern slopes and the lowest for the *Ranunculo zapalowiczi-Helictotichetum desertori*, which occurs on steep northern slopes. Accordingly, for these communities, as for Podillia in general, hemicontinental conditions are typical (Cr = 8.8–9.3). The highest Cr figures are also found for the association *Schivereckio podolicae-Seselietum libanotidis*, and the lowest for groups dominated by *Sesleria heuflerana* (*Orchido militaris-Seslerietum heufleranae campanuletosum rotundo-foliae*).

Finally, the humidity index substantiates subaridophytic conditions (Om = 11.0–11.9), which are characterised by a moisture deficit of -100 to -300 mm. The largest deficit is characteristic for the communities of the association *Bryo argentei-Ajugetum chiae*, which occupies limestone rocks, and the smallest for the subassociation *Orchido militaris-Seslerietum heufleranae campanuletosum rotundofoliae*, which is confined to the lowest part of the northern slopes.

From the ordination diagram (Fig. 4) is can bee seen that for associations related to the alliance *Cirsio-Brachypodion pinnati* (located on the right side of the matrix axis), the leading factors of differentiation are moisture content, aeration and carbonate content. For the others, which relate to the alliance *Alysso-Sedion* (located on the left side of the axis of the matrix), the leading factors of differentiation are carbonate content, aeration and variability of humidification. In this case, a separate *Ranunculo zapalowiczi-Helictro-trichetum desertori* association is more specific.

In order to assess the interdependencies and the impact of the environmental factors on the distribution of communities, a dendrogram was developed (Fig. 5).

The analysis of the dendrogram shows that the twelve factors are divided into two groups. The first group shows a close interdependence between the indicators of the thermoregime and the continentality of the climate, the latter of which is most closely associated with the salt regime of the soil, and between the indicators of the variability of damping and the cryoregime of the climate, the latter of which is closely associated with the lightness in the community. In the second group there are factors directly or indirectly related to soil moisture and climate. According to the dendogram, the soil humidity is closely related to the humidity of the climate. The nitrogen content is associated with the aeration of the soil, and the soil acidity is associated with the carbonate content. We have noted that these dependencies differ from those observed under hydrophilic conditions, where the aeration of the soil, soil humidity, total salt regime and soil acidity have a close connection.

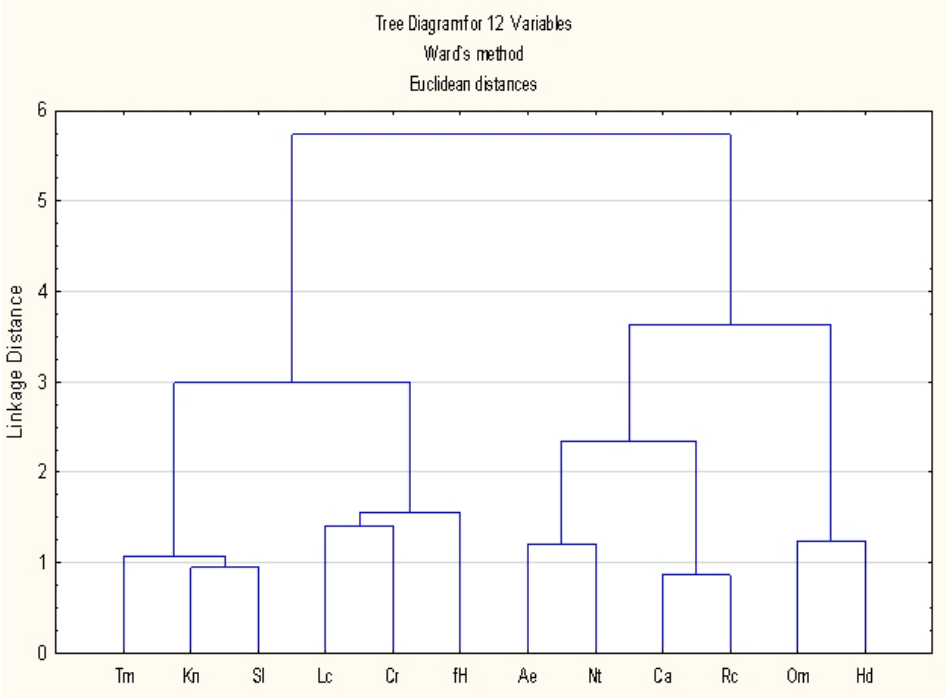


Fig. 5. Interdependence between 12 indicators of environmental factors based on Euclidian distances (Ward´s method). Indicators of environmental factors: see Table 2.

Abb. 5. Wechselbeziehungen zwischen 12 Indikatoren wichtiger Umweltfaktoren auf Basis von euklidischen Distanzen (Ward-Methode). Indikatoren der Umweltfaktoren: siehe Tabelle 2.

6. General discussion

Podillia communities of limestone outcrops characterised by the presence of endemic species (*Schivereckia podolica* and *Poa versicolor*) have generated discussions about the syntaxonomic affiliation of floristic elements depending on the view of the principles of classification regarding the class *Festuco-Brometea.*

In former times the class *Festuco-Brometea* was divided into orders depending on the climatic and geographic features of the region from oceanic (*Brachypodietalia pinnati*) to continental (*Festucetalia valesiacae* Br.-Bl. et Tx 1943). Each of these turned out to be quite heterogeneous, and at the same time, their individual alliances were similar, depending on the leading edaphic factor, e.g., the carbonate content. Therefore, it was logical to move away from geographical positions and to use soil characteristics to assign petrophytic groups to the order *Stipo pulcherrimae-Festucetalia pallentis*, which included the alliances *Alysso-Festucion pallentis* (MORAVEC 1967), *Asplenio septentrionalis-Festucion pallentis* (ZOLYOMI 1936) and *Seslerio-Festucion glaucae* (KLIKA 1931), which were considered by SOÓ (1959) within the order *Festucetalia valesiacae*. At the same time, a problem regarding the separation of the order *Stipo pulcherrimae-Festucetalia pallentis* from the class *Sedo-Scleranthetea* (especially the alliance *Alysso-Sedion*) as well as the volume and distribution of other syntaxonomic categories occurred. The alliance *Cirsio-Brachypodion*, e.g., was previously placed in the order *Brachypodietalia pinnati*, which included the carbonatophilic communities on rendzinas.

Instead, many syntaxa of limestone outcrops of the alliance *Alysso-Sedion* were transferred to the order *Stipo pulcherrimae-Festucetalia pallentis* (JANIŠOVÁ et al. 2014). According to our analysis, we propose to differentiate between the orders *Stipo pulcherrimae-Festucetalia pallentis* and *Alysso-Sedetalia* on the basis of the presence of grasses (i.e., turf-type plants) in the former and their absence and the presence of terophytes, succulents and leafy lichens and bryophytes in the latter. The order *Alysso-Sedetalia* is characterised by the presence of the following lichens and bryophytes: *Bryum caespiticum*, *B. capillare*, *B. argenteum*, *Schistidium atrofuscum*, *Hedwigia ciliata*, *Cladonia pocillum* and *C. pyxidata*; for the order *Stipo pulcherrimae-Festucetalia pallentis*, taxa like *Amblystegium serpens*, *Barbula unguiculata*, *Brachythecium glareosum*, *B. velutinum*, *Tortella tortuosa*, *T. inclinata*, *Leucodon sciuroides*, *Politrichum piliferum* and *Porella platylylla* are typical. As indicated by DENGLER & LÖBEL (2006), the communities of the order *Alysso-Sedetalia* are rich in terophytes, succulents, lichens and bryophytes and distributed throughout Europe, mainly in mountainous areas. Furthermore, they are known as vegetation deposits and described by many authors (MORAVEC 1967, ONYSCHENKO 2001). However, most of the syntaxa described in Central Europe, particularly in Romania, the Czech Republic and Slovakia, are now in the order *Stipo pulcherrimae-Festucetalia pallentis*, in particular the associations *Sedo allbi-Allietum montani*, *Alyssetum murale* and others (JANIŠOVÁ et al. 2014). It is interesting to note that for the Podilsky communities, there are no diagnostic types of the alliance *Alysso-Sedion* (*Sedum album*, *Seseli osseum*, *Teucrium botrys*, *Erophila spatulata*); instead, the species occurred in Podillia (*Sedum acre*, *S. sexangulare*, *Seseli hippomarahtrum*). Hence one may assume an eastern vicariant of the alliance *Alysso-Sedion*.

Within the order *Brachypodietalia pinnati*, the alliance *Cirsio-Brachypodion pinnate* represents the communities that develop in mesoxerophilous conditions on rendzinas formed on the limestone deposits with a considerable depth of occurrence. As noted by DENGLER et al. (2012) and KUZEMKO et al. (2014), this is an alliance of mesoxerophytic communitites developing on rich, loamy soils. MUCINA et al. (2016) introduced an expanded ecology of

such communities and gave a characterisation of this alliance as such, which unites communication on the limestone substratum. We agree with the last statement and refer to this syntaxon as the alliance of *Orchido militaris-Seslerietum heufleranae* and *Ranunculo zapalowiczi-Helicotrichetum desertori*. The alliance *Galio campanulati-Poion versicoloris* occurs only in Western and Central Podillia and is endemic to this region.

As to its composition, the authors have included three associations: *Poetum versicoloris*, *Adonido vernalis-Stipetum tirsae* and *Ranunculo zapalowiczi-Helictotrichetum desertori*, which are both ecologically and coenotically different, and their relevés are invalid according to Art. 7 of the Code (WEBER et al. 2000).

Particularly, the publication in which this alliance is described contains only the synoptic table of associations, from which it is clear that to select the association *Adonido vernalis-Stipetum tirsae*, 19 relevés were used, and 30 relevés for the association *Ranunculo zapalowiczi-Helictotrichetum desertori* (KUKOVYTSIA et al. 1994), but neither relevés nor nomenclature types are given; therefore, according to Art. 5, 15, 16 of the Code (WEBER et al. 2000), the association data are not valid.

For the alliance *Galio campanulati-Poion versicoloris*, the typus selected was the association *Poetum versicoloris*; however, such disclosure is not valid in accordance with Art. 8, 9 and 16 of the Code (WEBER et al. 2000).

The analysis showed that the association *Ranunculo zapalowiczi-Helictotrichetum desertori* occupies a separate position in relation to others in this alliance, which is explained by the presence of specific carbonatophilic species (*Helictotrichon desertorum*, *Thalictrum uncinatum*, *Viola jooi)*, which are relics closely related to Siberian-Altaic species. Since these communities are formed on northern slopes, i.e., in mesophytic conditions, we have excluded the association *Ranunculo zapalowiczi-Helictotrichetum desertori* from this alliance and included it in the alliance *Cirsio-Brachypodion pinnati* instead. However, this decision is inconclusive and requires a broader comparison. It is likely that these associations with the dominance of *Sesleria heuflerana* and *Helictotrichon desertorum* must be assigned to a new alliance.

The placement of the association *Poetum versicoloris*, the communities of which are often of limited species, which greatly complicates their classification, is rather controversial. The authors who described it included them in the alliance *Galio campanulati-Poion versicoloris*, which they considered as part of the order *Stipo pulcherrimae-Festucetalia pallentis*. We agree with the first statement and refer such groups to the alliance *Galio campanulati-Poion versicoloris*, order *Stipo pulcherrimae-Festucetalia pallentis*. It should be noted that MUCINA et al. (2016) consider the alliance *Galio campanulati-Poion versicoloris* as a synonym of the alliance *Bromo pannonici-Festucion csikhegyensis*. However, analysis shows that most of the diagnostic species belong to the alliance *Festucion valesiacae* (*Festuca valesiaca*, *Melica transsilvanica*, *Botriochloa ischaemum*, *Centaurea stoebe*) but that the existing endemic species of Western and Central Podillia (*Poa versicolor*, *Gypsophila thyraica*, *Schivereckia podolica*) distinguishes the *Bromo pannonici-Festucion csikhegyensis* from this alliance. We have observed diagnostic species of the alliance *Bromo pannonici-Festucion csikhegyensis* (*Fumana procumbens*, *Festuca pallens*, *Jovibarba globifera*) and concluded that there is another alliance within the order *Stipo pulcherrimae-Festucetalia pallentis*. We assume that the alliance *Galio campanulati-Poion versicoloris* is an eastern vicariant of the alliance *Bromo pannonici-Festucion csikhegyensis*, which passes into the *Festucion valeasiacae* and is endemic to Western and Central Podillia.

The class *Sedo-Scleranthetea* (order *Alysso-Sedetalia*, alliance *Alysso-Sedion*) differs from the previous alliance by the presence of a rich cryptogam block and the depletion of vascular plants with a coverage of less than 50%, so dominants do not appear. Moreover, *Poaceae* do not play an appreciable role in the formation of the species composition in such communities. Instead, a significant percentage of juvenile hemicryptophytes and terophytes occur.

The alliance *Alysso-Sedion* is not widely spread in Ukraine, and it is substituted by the communities of the order *Stipo pulcherrimae-Festucetalia pallentis* on the deposits of limestone outcrops. In general, this alliance has 45 diagnostic species, about 20 of which are cryptogams (Supplement S2).

7. Conclusions

Our analysis is based on the processing of 118 geobotanical relevés of Western and Central Podillia and a preliminary comparison with relevés of neighbouring regions. We have assumed that most of the communities developing on limestone outcrops belong to the class *Sedo-Scleranthetea*, order *Alysso-Sedetalia*, alliance *Alysso-Sedion*, and that the communities dominated by *Sesleria heuflerana* and *Helictotrichon desertorum* belong to the order *Stipo pulcherrimae-Festucetalia pallentis*. However, we have obtained slightly different results. In the final analysis, the communities on the northern slopes dominated by *Sesleria heuflerana* and *Helictotrichon desertorum* occur together with mesoxerophytic species, so we assigned them to the order *Brachypodietalia pinnati*, alliance *Cirsio-Brachypodion pinnati*. But the question remains open, as these syntaxa need to be compared with those located on the territory of Hungary, Slovakia and Romania. The communities with *Poa versicolor* are rare and contain endemic species of Western and Central Podillia; therefore, we assigned them to the separate alliance *Galio campanulati-Poion versicoloris*, which is placed within the order *Stipo pulcherrimae-Festucetalia pallentis*, noting that this alliance is a Podillia vicariant of the alliance *Bromo pannonici-Festucion csikhegyensis*. As part of the association described earlier, we have identified the subassociation *Poëtum versicoloris thymetosum moldavici* and described a new association, *Schivereckio podolicae-Seselietum libanotidis*. Furthermore, we have concluded that, despite our expectations, the communities of the class *Sedo-Scleranthetea* correspond quite well to the alliance *Alysso-Sedion*, but belong to two endemic associations: *Bryo argentei-Ajugetum chiae* and *Aurinio saxatilis-Allietum podolici* (subassociation *Aurinio saxatilis-Allietum podolici typicum* subassociation and newly described subassociation *Aurinio saxatilis-Allietum podolici xanthorietosum elegantis*). Surely, the obtained data serve as important factual material for a broader comparative analysis involving material from Eastern and Central Europe, which we set as our goal for further research.

Erweiterte deutsche Zusammenfassung

Einleitung – Die Klassifikation der xerophytischen Krautvegetation Podoliens stößt seit Beginn des 20. Jahrhunderts auf ein großes Interesse. Bildeten noch bis Ende der 1980er Jahre Dominanzprinzipien die Basis der Klassifikation, so wird die Vegetation seit den 1990er Jahren zunehmend auf der Grundlage ökologisch-floristischer Kriterien gegliedert. In dieser Zeit wurde auch der für Podolien endemische Verband *Galio campanulati-Poion versicoloris* mit verschiedenen Assoziationen beschrieben (KUKOVYTSIA et al. 1992, ONYSCHENKO 2001). In den folgenden Untersuchungen (ABDULOEVA 2002, KOROTCHENKO 2004, KUZEMKO 2009, DIDUKH & VASHENIAK 2012, KUZEMKO et al. 2014) wurde

v. a. die Notwendigkeit bestimmter Syntaxa aus den Klassen *Sedo-Scleranthetea* und *Festuco-Brometea* diskutiert. Neuere supranationale Klassifikationen (MUCINA et al. 2016, WILLNER et al. 2017) erfordern nun in unserem Untersuchungsgebiet eine Neubewertung der Syntaxa niederen Rangs aus den Ordnungen *Brachypodietalia*, *Stipo pulcherrimae-Festucetalia* und *Alysso-Sedetalia*. Auf der Grundlage dieser neuen Untersuchungen sowie neu erhobener Daten, die Kryptogamen einschließen, starteten wir daher mit der Validierung bzw. Neudefinition der Grenzen zwischen den Klassen *Sedo-Scleranthetea* und *Festuco-Brometea*, insbesondere auf der Ebene der Ordnungen *Alysso-Sedetalia* und *Stipo pulcherrimae-Festucetalia pallentis*, und klärten die syntaxonomische Stellung der Assoziationen *Poetum versicoloris*, *Ranunculo zapalowiczi-Helictotrichetum desetrori* und *Aurinio saxatilis-Allietum podolici.*

Untersuchungsgebiet – Das Untersuchungsgebiet liegt nordöstlich der Karpaten in Richtung des Flusses Dnieper und umfasst West- und Mittelpodolien. Das Gebiet besteht aus einer stärker unterbrochenen Hügellandschaft und liegt in 180–400 m Meereshöhe. Im Norden und Westen ist es durch steile Hügelketten des Hologor, Voronyaky und der Kremenets-Berge begrenzt, während es im Südwesten durch den Fluss Dniester von den Karpaten getrennt ist. Im Osten reicht es bis zur Dnieper-Mulde und im Südosten bis zum Tiefland des Schwarzen Meeres. Der geologische Untergrund der Hügel wird von mächtigen Kalkablagerungen aus dem Silur bis zum Paläogen gebildet; stellenweise beißt dieser Kalkstein aus. Die Böden der Ausbisse sind als Stadien der Rendzina-Serie entwickelt. Das Klima des Gebietes ist als gemäßigt-kontinental zu bezeichnen. Das Jahresmittel der Temperatur liegt zwischen 7,1 und 8,1 °C, das Julimittel zwischen 18,0 und 19,8 °C und das Januarmittel zwischen -4,0 und -5,2 °C. Der Jahresniederschlag beträgt 600–750 mm. Im schluchtartig eingeschnittenen Tal des Dniester liegt die Jahresmitteltemperatur etwas höher als in den umliegenden Gebieten, was einen gewissen subtropischen Effekt bewirkt. Insgesamt liegt in West- und Mittelpodolien die geobotanische Grenze zwischen zentraleuropäischen Wäldern und der ukrainischen Waldsteppenzone (DIDUKH & SHELYAG-SOSONKO 2003).

Material und Methoden – Zur Klassifikation der Vegetation der Kalksteinausbisse dienten insgesamt 108 Aufnahmen, die wir im Zeitraum 1997–2016 angefertigt haben; zusätzlich wurden verfügbare Daten aus der Literatur ausgewertet. Die meisten Aufnahmen wurden nach der Standardmethode der *Eurasian Dry Grasland Group* erstellt, d. h. auf 10 m² großen Flächen und unter Berücksichtigung von Kryptogamen. Die Daten wurden mit TWINSPAN gegliedert. Die ökologischen Merkmale der Syntaxa wurden mit der Synphyto-Indikationsmethode nach DIDUKH (2011) herausgearbeitet. Zur Visualisierung der Verteilung der Syntaxa entlang wichtiger ökologischer Gradienten diente ArcGIS 10.0 mit Fixierung der Koordinaten im WGS-1984-System.

Ergebnisse – Entsprechend der TWINSPAN-Analyse wurden neun Cluster als Assoziationen oder Subassoziationen der Klassen *Sedo-Scleranthetea* und *Festuco-Brometea* identifiziert (Abb. 2, Beilage S1). Das *Schivereckio podolicae-Seselietum libanotidis* und das *Bryo argentei-Ajugetum chiae* wurden neu beschrieben. Die syntaxonomische Position der Assoziationen *Orchido militaris -Seslerietum heufleranae* und *Ranunculo zapalowiczi-Helictotrichonetum desertori* innerhalb der Ordnung *Stipo pulcherrimae-Festucetalia pallentis* wurden dem Verband *Cirsio-Brachypodion pinnati* bzw. der Ordnung *Brachypodietalia pinnati* zugeordnet. In Übereinstimmung mit dem pflanzensoziologischen Code (WEBER et al. 2000) wurde das *Galio campanulati-Poion versicoloris* als eine östliche (Podolien-) Vikariante des *Poetum versicoloris* innerhalb des *Bromo pannonici-Festucion pallentis* validiert. Zusätzlich werden Informationen zur Ordnung *Alysso-Sedetalia* gegeben; jeweils zwei Assoziationen und Subassoziationen wurden erstmalig für die Ukraine beschrieben. Die Syntaxa wurden auf Basis der ökologischen Zeigerwerte von DIDUKH (2011) evaluiert (Abb. 2), und ihre Verteilung entlang der Umweltgradienten wurde beleuchtet. Dabei wurde festgestellt, dass die *Brachypodietalia pinnati* weiter vom *Stipo pulcherrimae-Festucetalia pallentis* entfernt waren als die Gesellschaften der *Alysso-Sedetalia*.

Diskussion und Schlussfolgerungen – Die meisten Gesellschaften der Kalksteinausbisse Podoliens gehören zu den Ordnungen *Alysso-Sedetalia* und *Stipo-Festucetalia pallentis*. Dagegen bleibt die synsystematische Stellung der von *Sesleria heuflerana* und *Helictotrichon desertorum* aufgebauten Gesellschaften offen – diese Frage benötigt einen größeren Betrachtungsraum. Unsere Aufnahmen bilden wichtiges Material zur Weiterentwicklung der Klassifikation der Vegetation der Ukraine im Kontext einer großräumig-europäischen Gesamtklassifikation.

Acknowledgements

We are sincerely thankful to Anna Kuzemko and Monika Janišová for their inspirational research activities, which motivated us to write this paper. We are grateful to Iuliia Rozenblit for helping to organise most of the expeditions and to Dmytro Vasheniak for his support during the entire expedition period. We express our gratitude to Vitalii Virchenko and Serhiy Kondratiuk for identifying bryophytes and lichens and to Milan Chytrý, Jürgen Dengler and Wolfgang Willner for their assistance with rare scientific papers. We would like to thank Thomas Becker for handling this paper and for writing the *Erweiterte deutsche Zusammenfassung*. Furthermore we are very grateful to three anonymous referees for their valuable comments on a former draft of the paper. Aiko Huckauf and Gabrielle Oke improved the English of the paper very much: many thanks. We thank the EDGG and FlorSoz for the opportunity to publish our research in Tuexenia. Finally, we genuinely appreciate the financial support of our investigation provided by the trustees of the Rufford Small Grant Fund, which enabled us to organise expeditions to precarious sections of the Dniester River and its tributaries and to prepare this article.

Supplements

Supplement S1. Synoptic table of the vegetation occurring on limestone outcrops in Western and Central Podillia.

Beilage S1. Übersichtstabelle der Vegetation von Kalksteinausbissen in West- und Mittelpodolien.

Supplement S2. Relevés of the *Cirsio-Brachypodion pinnati* (*Brachypodietalia pinnati*) in Western and Central Podillia.

Beilage S2. Aufnahmen des *Cirsio-Brachypodion pinnati* (*Brachypodietalia pinnati*) in West- und Mittelpodolien.

Supplement S3. Relevés of the *Stipo pulcherrimae-Festucetalia pallentis* and *Alysso-Sedetalia* in Western and Central Podillia.

Beilage S3. Aufnahmen des *Stipo pulcherrimae-Festucetalia pallentis* und *Alysso-Sedetalia* in West- und Mittelpodolien.

Supplement S4. Synoptic table of the alliances with *phi* fidelity coefficients. Alliances are: 1 – *Cirsio-Brachypodion pinnati*, 2 – *Galio campanulati-Poion versicoloris*, 3 – *Alysso-Sedion*.

Beilage S4. Übersichtstabelle der Verbände mit Gesellschaftstreuekoeffizienten *phi*. Die Verbände sind: 1 – *Cirsio-Brachypodion pinnati*, 2 – *Galio campanulati-Poion versicoloris*, 3 – *Alysso-Sedion*.

Additional supporting information may be found in the online version of this article.

Zusätzliche unterstützende Information ist in der Online-Version dieses Artikels zu finden.

Supplement E1. Distribution maps of the distinguished syntaxa.

Anhang E1. Verbreitungskarten der untersuchten Syntaxa.

References

ABDULOIEVA, O.S. (2002): Do syntaxonomii kserophitnoi trav'yanystoi roslynnosti Zakhidnogo Lisostepu (Prydnistrovs'ke Podillya, Tovtrovyy kryazh, Kremenetsli hory) (On the syntaxonomy of xerophytic herbaceous vegetation of the Western Forest-Steppe [Near-Dnister Podillya, Tovtry reef, Kremenetski hills]) [in Ukrainian, with English summary]. – Ukr. Phytosociol. Collect. Ser. A 1: 124–144.

ABDULOIEVA, O.S & DIDUKH, Y.P. (1999): Luchno-stepova roslynnist' erodovalykh skhyliv Prydnistrov'ya (natsional'nyy pryrodnyy park "Podilski Tovtry") v aspekti ii okhorony (Meadow steppe vegetation of the eroded slopes in Prydnistrovia [National Natural Park "Podilski Tovtry"] in the aspect of protection) [in Ukrainian, with English summary]. – Ukr. Phytosociol. Collect. Ser. A 3: 10–36.

BOIKO, M. (2008): Checklist mochopodipnych Ukrainy (Checklist of bryophytes in Ukraine) [in Ukrainian]. – Ailant Kharkiv: 232 pp.

BONDARCHUK, V.H. (1959): Heomorfolohiya Ukrainy (Geomorphology of Ukraine) [in Ukrainian]. – Publishing House of USSR Academy of Sciense, Kiev: 832 pp.

CHYTRÝ, M., HENNEKENS, S.M., JIMÉNEZ-ALFARO, B. et al. (2016): European Vegetation Archive (EVA): an integrated database of European vegetation plots. – Appl. Veg. Sci. 19: 173–180.

CHYTRÝ, M., TICHÝ, L., HOLT, J. & BOTTA-DUKÁT, Z. (2002): Determination of diagnostic species with statistical fidelity measures. – J. Veg. Sci. 13: 79–90.

DALGAARD, P. (2008): Introductory Statistics with R. – Springer: 364 pp.

DENGLER, J., BECKER, T., RUPRECHT, E. et al. (2012): *Festuco-Brometea* communities of the Transylvanian Plateau (Romania) – a preliminary overview on syntaxonomy, ecology, and biodiversity. – Tuexenia 32: 319–359.

DENGLER, J., BOCH, S., FILIBECK, G. et al. (2016): Assessing plant diversity and composition in grasslands across spatial scales: the standartised EDGG sampling methodology. – Bull. Eurasian Grassl. Gr. 32: 13–30.

DENGLER, J. & LÖBEL, S. (2006): The basiphilous dry grasslands of shallow, skeletal soils (*Alysso-Sedetalia*) on the island of Öland (Sweden), in the context of North and Central Europe. – Tuexenia 26: 159–190.

DIDUKH, Y.P. (2011): The ecological scales for the species of Ukrainian flora and their use in synphytoindication. – Phytosociocentre, Kyiv: 176 pp.

DIDUKH, Y.P. (Ed.) (2009): Chervona knyga Ukrainy. Roslynnyj svit (Red Data Book of Ukraine. Plant kingdom) [in Ukrainian]. – Kiev, Globalkonsalting: 900 pp.

DIDUKH, Y.P., KAMELIN, R.V. & KUKOVYTSIA, G.S. (1982): *Allium obliquum* (*Alliaceae*) – novy vyd floru Ukrainy (*Allium obliquum* (*Alliaceae*) – new species of Ukrainian flora) [in Russian]. – Bot. J. 67: 547–549.

DIDUKH, Y.P. & PLYUTA, P.G. (1994): Fitoindykatsiia ekolohichnykh faktoriv (Phytoindication of environmental factors) [in Ukrainian]. – Naukova dumka, Kyiv: 280 pp.

DIDUKH, Y.P. & SHELYAG-SOSONKO, Y.R. (2003): Geobotanichne rayonuvannia Ukrainy ta sumizhnykh terytoriy (Geobotanic zoning of Ukraine and adjacent areas) [in Ukrainian, with English summary]. – Ukr. Bot. J. 60: 6–17.

DIDUKH, Y.P. & VASHENIAK, Y.A. (2012): Stepova roslynnist Tsentralnogo Podillia (Steppe vegetation of Central Podillia) [in Ukrainian, with English summary]. – Ukr. Bot. J. 69: 789–817.

GAJEWSKI, W. (1937): Elementy flory Polskiego Podola. Planta Polonica, Vol. 5. – Nakladem Towarzystwa Naukowego Warszawskiego: 210 pp.

HARBAR, V.V. (2016): Rendzyny Podil's'kych Tovtr: geneza, poshyrennya, vykorystannya ta okhorona (Rendzinas of Podilski Tovtry: genesis, using and protection) [in Ukrainian, with English summary]. – Unpubl. PhD diss., Lviv Nat. Univer., Lviv: 232 pp.

HENNEKENS, S.M. (2009): TURBOVEG for Windows. Version 2. — Inst. voor Bos en Natuur, Wageningen: 84 pp.

HILL, M.O. (1980): Detrended correspondence analysis, an improved ordination technique. – Vegetatio 42: 47–58.

JANIŠOVÁ, M. (2010): Formalized classification of rocky Pannonian grasslands and dealpine *Sesleria*-dominated grasslands in Slovakia using a hierarchical expert system. – Phytocoenologia 40: 267–291.

JANIŠOVÁ, M., BAUER, N., BOTTA-DUKÁT, Z. et al. (2014): Rocky grassland vegetation (*Stipo-Festucetalia*) of the Pannonian Basin and the Carpathian Mts – biogeographical patterns revealed by semi-supervised classification. – Oral presentation at the 23rd Workshop of European Vegetatin Survey Ljublana, Slovenia.

KLEOPOV, Y.D. (1928): Novishi vidomosti pro floru Podillia (New data of Podillian flora) [in Ukrainian]. – Ukr. Bot. J. 4: 24–33.

KLIKA, J. (1931): Studien über die xerotherme Vegetation Mitteleuropas. I. Die Pollauer Berge im südlichen Mähren. – Beih. Bot. Centralbl. 47: 343–398.

KOCZWARA, M. (1931): Zespoły stepowe Podola Pokuckiego (Dry grasslands communities of Pokutske Podillia) [in Polish]. – Pr. Geogr. Romera 12: 35–78.

KONDRATYUK, S. (1998): The second checklist of lichen–forming, lichenicolous and allied fungi of Ukraine. – Phytosociocentre, Kyiv: 180 pp.

KOROTCHENKO, I.A. (2004): Stepova roslynnist' pivdennoi chastyny Natsional'nogo pryrodnogo parku "Podil'ski Tovtry" (Steppe vegetation of the southern part of the National Park "Podils'ki Tovtry" [in Ukrainian, with English summary]. – Sci. Bull. Chernivtsi Univ., Biology 223: 197–221.

KOROCHENKO, I.A. & DIDUKH, Y.P. (1997): Stepova roslynnist pivdennoi chastyny Livoberezhnoho Lisostepu Ukrainy. II. Klas *Festuco-Brometea* (The steppe vegetation of the southern part of the Left-Bank Forest-Steppe of the Ukraine. II. Class *Festuco-Brometea*) [in Ukrainian, with English summary]. – Ukr. Phytosociol. Collect. Ser. A, 1: 20–39.

KOROTCHENKO, I.A., MALA, Y.I. & FITSAILO, T.V. (2009a): Syntaksonomia stepovoi roslynnosti kraynioi pivnochi Pravoberezhnogo stepu Ukrainy (Syntaxonomy of steppe vegetation of the extreme north of Steppe of Right-Bank Dnieper Region of Ukraine) [in Ukrainian, with English summary]. – Biol. Syst. (Chernivtsi) 1: 73–84.

KOROTCHENKO, I.A., MALA, Y.I. & FITSAILO, T.V. (2009b): Syntaksonomia stepovoi roslynnosti krainioho pivdnia Pravoberezhnogo Lisostepu Ukrainy (Syntaxonomy of steppe vegetation of the extreme south of Right Bank Dnieper Forest-Steppe of Ukraine [in Ukrainian, with English summary]. – Sci. Proc. Nat. Univ. Kyiv-Mohyla Acad., Biodiv. Ecol. 93: 54–69.

KUKOVYTSIA, H.S. (1971): Reliktova formatsiia vivsiuntsia pustelnoho na Podilli (Relic formation of desert bluegrass in Podillia) [in Ukrainian]. – Ukr. Bot. J. 6: 772–773.

KUKOVYTSIA, H.S. (1973): Stepova roslynnist Dnistrovskoho kanionu ta Tovtrovoho kriazhu na Podilli (Steppe vegetation of Dniester Canyon and Tovtry Ringe) [in Ukrainian]. – Ukr. Bot. J. 2: 156–163

KUKOVYTSIA, H.S., MOVCHAN, Y.I., SOLOMAKHA, V.A. & SHELYAG-SOSONKO, Y.R. (1992): Novyi syntakson *Poetum versicoloris* ass. nova stepiv Zakhidnoho Podillya [in Ukrainian, with English summary]. – Ukr.bot. J. 49: 27–30.

KUKOVYTSIA, H.S., MOVCHAN, Y.I., SOLOMAKHA, V.A. & SHELYAG-SOSONKO, Y.R. (1994): Syntaksonomiya luchnykh stepiv Zakhidnogo Podillya (The meadow-steppe syntaxonomy of the western Podillya) [in Ukrainian, with English summary]. – Ukr. Bot. J. 51: 35–48.

KUZEMKO, A.A. (2009): Dry grasslands on sandy soils in the forest and forest-steppe zones of the plains part of Ukraine: present state of syntaxonomy. – Tuexenia 29: 369–390.

KUZEMKO, A.A. (2011): Stepova ta luchna roslynnist dolyny richky Hirskyy Tikych (Steppe and meadow vegetation of the Hyrskyy Tikych River valley). – Visnyk Donetskogo Natsionalnogo Univ., Ser. A, 1: 141–150.

KUZEMKO, A.A. (2012): Ukrainian Grassland Database. – Biodivers. Ecol. 4: 430–430.

KUZEMKO, A.A., BECKER, T., DIDUKH, Y.P. et al. (2014): Dry grassland vegetation of Central Podolia (Ukraine) – a preliminary overview on syntaxonomy, ecology and biodiversity. – Tuexenia 34: 391–430.

LIPINSKY, V.M., DIACHUK, V.A. & BABICHENKO, V.M. (Eds.) (2003): Klimat Ukrainy (Climate of Ukraine) [in Ukrainian]. – Vyd-vo Rayevs'kogo, Kyiv: 343 pp.

MATUSZKIEWICZ, W. (2001): Przewodnik do oznaczania zborowisk roślinnych Polski (Guide to plant communities identification) [in Polish]. – Wyd-wo Naukove PWN, Warsawa: 540 pp.

MORAVEC J. (1967): Zu den azidophilen Trockenrasengesellschaften Südwestböhmens und Bemerkungen zur Syntaxonomie der Klasse *Sedo-Scleranthetea*. – Folia Geobot. Phytotax. 2: 137–178.

MOSYAKIN, S.L. & FEDORONCHUK, M.M. (1999): Vascular plants of Ukraine. A nomenclatural checklist – Publishing House of the NAS of Ukraine, Kiev: 346 pp.

MUCINA, L., BÜLTMANN, H., DIERßEN, K. et al. (2016): Vegetation of Europe: Hierarchical floristic classification system of vascular plant, bryophyte, lichen, and algal communities. – Appl. Veg. Sci. 19: 3–264.

ONYSCHENKO, V.A. (2001): Roslynnist' karbonatnykh vidslonen' pryrodnogo zapovidnyka "Medobory" (Calcareous rock vegetation of the Medobory zapovednik) [in Ukrainian, with English summary]. – Ukr. Phytosociol. Collect. Ser. A 1: 86–104.

POP, I. (1968): Conspectul associstiilor ierboase de pe masivele calcaroase din cuprinsul Carpatilor Romaneşti. – Contrib. Bot. Cluj. 12: 267–273.

POP, I. (1991): Consideratii generale asupra ordinului *Stipo eriocalis-Festucetalia pallentis* Pop (1968) emend. 1989. – Studia Univ. Babeş-Bolyai 36: 3–23.

R CORE TEAM (2016): R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. – URL http://www.R-project.org/.

ROLEČEK, J., TICHÝ, L., ZELENÝ, D. & CHYTRÝ, M. (2009): Modified TWINSPAN classification in which the hierarchy represents cluster heterogeneity. – J. Veg. Sci. 20: 596–602.

ROYER, J.-M. (1991): Synthèse eurosibérienne, phytosociologique et phytogéographique de la classe des *Festuco-Brometea* (Eurosiberian synthesis, phytosociology and phytogeography of the class *Festuco-Brometea*) [in French]. – Diss. Bot. 178: 1–296.

SOLOMAKHA, V.A. (2008): Syntaksonomia rosnynnosti Ukrainy. Tretie nablyzhennia (The syntaxonomy of vegetation of the Ukraine. The third approximation) [in Ukrainian, with English summary]. – Phytosociocentre, Kyiv: 296 pp.

SOÓ, R. (1959): Systematische Übersicht der pannonischen Pfl anzengesellschaften II. – Acta Bot. Acad. Sci. Hung. 5: 473–500.

SOÓ, R. (1962): Systematische Übersicht der pannonischen Pflanzengesellschaften IV. Die Gebirgswälder. – Acta Bot. Hung. 8: 335–366.

TICHÝ, L. (2002): JUICE, software for vegetation classification. – J. Veg. Sci. 13: 451–453.

TICHÝ, L. & CHYTRÝ, M. (2009): OptimClass: Using species-to-cluster fidelity to determine the optimal partition in classification of ecological communities. – J. Veg. Sci. 21: 287–299.

WEBER, H.E., MORAVEC, J. & THEURILLAT, J.-P. (2000): International code of phytosociological nomenclature, 3. ed. – J. Veg. Sci. 11: 739–768.

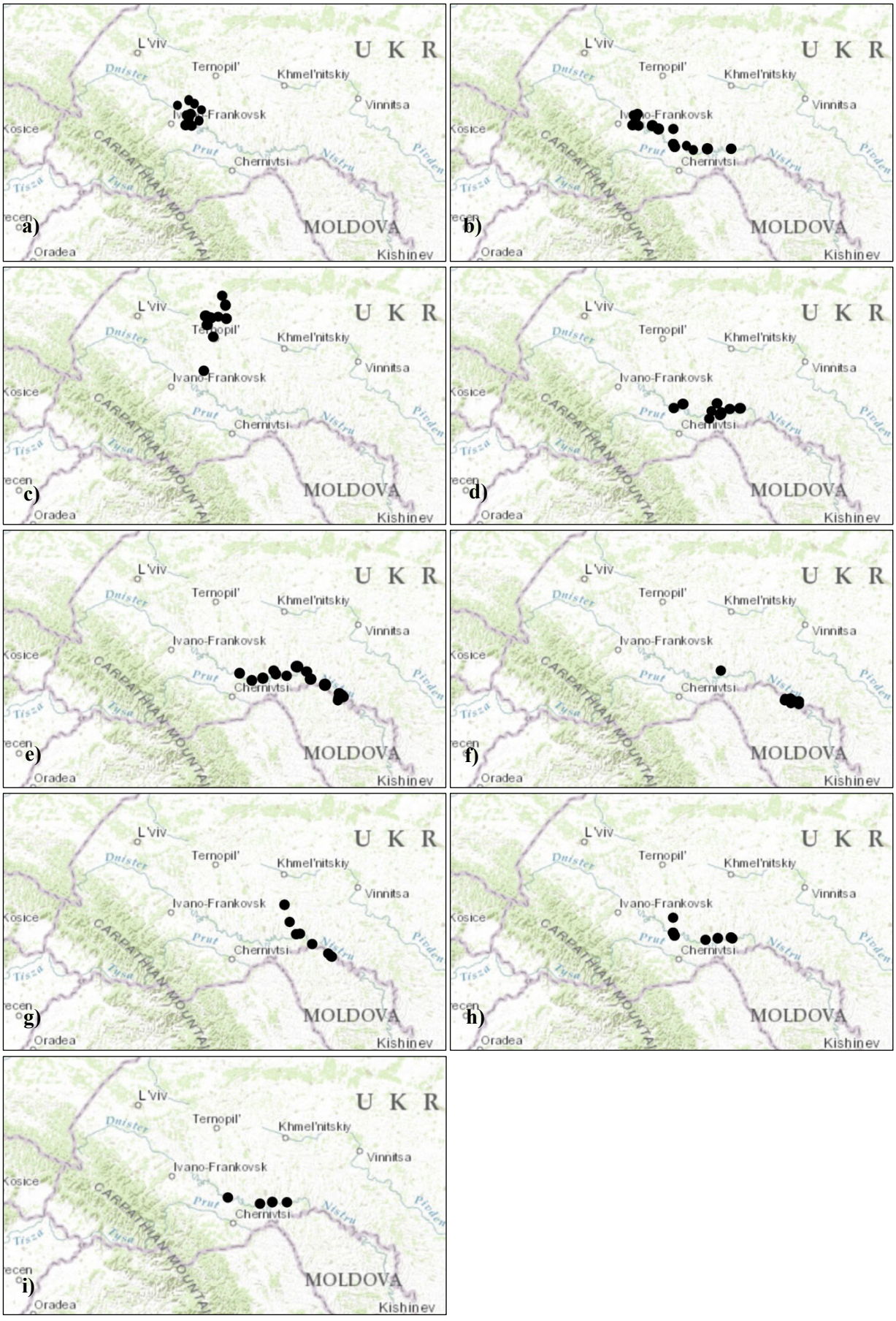
WILLNER, W., KUZEMKO, A., DENGLER, J. et al. (2017): A high-level classification of the Pannonian and western Pontic steppe grasslands (Central and Eastern Europe). – Appl. Veg. Sci. 20: 143–158.

ZAVERUCHA, B. (1986): Flora Volyino-Podolii i ee genezis (Volyno-Podolian Flora and its genesis) [in Russian]. – Naukova dumka, Kyiv: 192 pp.

ZÓLYOMI, B. (1936): Übersicht der Felsenvegetation in der Pannonischen Florenprovinz und dem nordwestlich angrenzenden Gebiet. – Ann. Mus. Natl. Hung. 30: 136–174.

Supplement E1. Distribution maps of the distinguished syntaxa.

Anhang E1. Verbreitungskarten der untersuchten Syntaxa.



Supplement S1. Synoptic table of the vegetation occurring on limestone outcrops in Western and Central Podillia with percentage frequencies and phi fidelity indices (Φ × 100) in upper case. DS = diagnostic species. Frequencies of more than 25%, but less than 50% (constant species) and fidelity indices of $0.25 \leq phi < 0.50$ (diagnostic species) are shaded in light grey, frequencies of 50% or more (highly constant species) and fidelity indices of $phi \geq 0.50$ (highly diagnostic species) in dark grey.

Beilage S1. Übersichtstabelle der Vegetation von Kalksteinausbissen in West- und Mittelpodolien mit relativer Häufigkeit (in Prozent) und Gesellschaftstreueindex phi (Φ × 100, hochgestellte Werte). DS = Diagnostische Arten. Häufigkeiten ab 25 %, aber unter 50 % (konstante Arten) und Treueindizes mit $0.25 \leq phi < 0.50$ (diagnostische Arten) sind hellgrau, Häufigkeiten ≥ 50 % (hochkonstante Arten) und Treueindizes mit $phi \geq 0.50$ (hochdiagnostische Arten) dunkelgrau unterlegt.

	Festuco-Brometea						*Sedo-Scleranthetea*		
	Brachypodietalia			*Stipo-Festucetalia*			*Alysso-Sedetalia*		
	Cirsio-Brachypodion			*Galio-Poion versicoloris*			*Alysso-Sedion*		
Code of the syntaxa	1.1.1a	1.1.1b	1.1.2	1.2.1	1.2.2a	1.2.2b	2.1.1	2.1.2a	2.1.2b
Cluster numbers	1	2	3	4	5	6	7	8	9
No. of releves	10	22	11	10	25	10	10	10	10
DS *Orchido militaris-Seslerietum heufleranae campanuletosum rotundofoliae*									
Campanula glomerata	80 77.5	20	.	.	.	.	.	.	.
Campanula rotundifolia	70 75.9	10	.	.	.	.	.	.	.
Chamaecytisus blockianus	60 75.6	.	.	.	.	.	.	.	.
Thesium linophyllon	60 75.6	.	.	.	.	.	.	.	.
Poterium sanguisorba	70 62.4	20	.	.	.	.	10	.	10
Euphorbia volhynica	30 52.5	.	.	.	.	.	.	.	.
Arabis hirsuta	30 43.8	10	.	.	.	.	.	.	.
Lotus corniculatus	30 43.8	10	.	.	.	.	.	.	.
Thymus pulegioides	60 43.4	30	.	.	.	10	.	20	20
Primula macrocalyx	20 42.6	.	.	.	.	.	.	.	.
Valeriana stolonifera	20 42.6	.	.	.	.	.	.	.	.
Pulsatilla pratensis	20 42.6	.	.	.	.	.	.	.	.
Origanum vulgare	20 42.6	.	.	.	.	.	.	.	.
Pyrethrum corymbosum	20 42.6	.	.	.	.	.	.	.	.
Chamaecytisus albus	20 32.8	10	.	.	.	.	.	.	.
DS *Orchido militaris-Seslerietum heufleranae typicum*									
Agrimonia eupatoria	.	100 90.1	.	.	.	10	10	.	.
Knautia arvensis	.	60 75.6	.	.	.	.	.	.	.
Brachythecium albicans	.	90 69.6	.	.	.	10	.	10	40
Ranunculus polyanthemos	10	40 53.2	.	.	.	.	.	.	.
Malus praecox	.	30 52.5	.	.	.	.	.	.	.
Fragaria viridis	10	60 51.6	.	.	.	10	10	.	20
Achillea millefolium	.	90 44.1	18	20	8	20	10	60 21.4	60 21.4
Hypericum elegans	.	20 42.6	.	.	.	.	.	.	.
Candelariella vitellina	.	20 42.6	.	.	.	.	.	.	.
Primula veris	.	20 42.6	.	.	.	.	.	.	.
Elytrigia repens	10	50 36.5	.	.	17	.	10	20	20
Daucus carota	20	50 35.8	.	.	.	.	10	30	20
Prunus spinosa	.	30 33.1	.	10	.	.	.	.	20
Carlina vulgaris	10	20 32.8	.	.	.	.	.	.	.
Rosa canina	10	40 30.8	.	.	17	10	10	.	20
Pilosella officinarum	20	50 30.1	.	.	8	10	30	20	20
Medicago lupulina	10	30 29.3	.	.	.	.	20	.	10
Galium mollugo	40	70 29.3	.	40	33	30	.	50	20
Thymus marschallianus	20	70 28.2	64 23.4	.	50	20	10	10	50
Abietinella abietina	40	90 27.8	27	10	8	80 20.8	50	70	80 20.8
DS *Ranunculo zapalowiczi-Helictrotrichetum desertori*									
Helictotrichon desertorum	.	.	100 100	.	.	.	.	.	.
Astragalus austriacus	.	.	82 89.4	.	.	.	.	.	.
Euphrasia stricta	.	.	82 89.4	.	.	.	.	.	.
Gypsophila fastigiata	.	.	73 83.9	.	.	.	.	.	.
Jurinea mollissima	.	.	82 78.7	20	.	.	.	.	.
Helianthemum nummularium	.	.	64 78	.	.	.	.	.	.
Anemone sylvestris	10	.	64 71.5	.	.	.	.	.	.
Filipendula vulgaris	.	10	64 71.5	.	.	.	.	.	.
Chamaecytisus ruthenicus	.	20	64 66.2	.	.	.	.	.	.
Briza media	10	10	64 66.2	.	.	.	.	.	.
Carex humilis	30	20	91 60.3	20	.	30	.	.	.
Linum catharticum	.	.	55 59.3	10	.	.	.	.	10
Peucedanum cervaria	.	.	36 58	.	.	.	.	.	.
Leucanthemum vulgare	10	.	45 57.8	.	.	.	.	.	.
Inula ensifolia	30	40	82 55.3	.	25	.	.	.	.
Adonis vernalis	20	10	64 51.2	.	.	.	.	20	10
Onobrychis arenaria	10	30	55 50.8	.	.	.	.	.	.
Lembotropis nigricans	30	30	82 50.7	.	8	50 23.6	.	.	.
Trifolium montanum	.	.	27 50	.	.	.	.	.	.
Centaurea sp.	.	.	27 50	.	.	.	.	.	.
Serratula tinctoria	.	.	27 50	.	.	.	.	.	.
Echium russicum	.	.	27 50	.	.	.	.	.	.
Iris hungarica	.	.	27 50	.	.	.	.	.	.
Thesium arvense	.	.	27 50	.	.	.	.	.	.
Trifolium medium	.	10	36 49.9	.	.	.	.	.	.
Stipa capillata	.	.	55 49	10	25	10	.	.	.
Cirsium pannonicum	.	.	18 40.6	.	.	.	.	.	.
Euphorbia seguieriana	.	.	18 40.6	.	.	.	.	.	.
Allium senescens montanum	30	.	73 40.1	40	25	10	.	20	20
Linum flavum	20	.	36 33.7	.	25	.	.	.	.
Centaurea marschalliana	.	10	18 30.6	.	.	.	.	.	.
Hypericum perforatum	20	.	27 26.6	.	.	.	.	10	10
Centaurea scabiosa	20	10	36 25	.	8	20	10	10	.
DS *Schivereckio podolicae-Seselietum libanotidis*									
Schivereckia podolica	.	.	.	90 88.8	.	10	.	.	.
Gypsophila thyraica	.	.	.	60 75.6	.	.	.	.	.
Seseli libanotis intermedium	.	10	.	70 66.2	.	10	.	10	.
Veronica prostrata	.	.	.	40 61	.	.	.	.	.
Galium exoletum	.	.	.	40 61	.	.	.	.	.
Melampyrum arvense	.	10	.	60 58.9	.	10	10	.	.
Astragalus onobrychis	10	.	27	60 49.8	8	.	10	.	.
Festuca rubra	.	.	.	20 42.6	.	.	.	.	.
Cerastium arvense	.	.	.	20 42.6	.	.	.	.	.
Potentilla intermedia	.	.	.	20 42.6	.	.	.	.	.
Vincetoxicum hirundinaria	20	.	27	50 41.6	.	.	.	.	10
Thymus pannonicus	.	.	.	60 39	.	30	10	40	20
Rosa species	.	.	.	30 37.7	.	.	20	.	.
Hylotelephium maximum	.	.	.	50 36.1	8	30	20	.	20
Erysimum odoratum	.	.	.	40 35.4	.	20	.	20	10
Rhamnus cathartica	10	20	.	40 35.4	.	10	.	.	10
Linaria vulgaris	.	10	.	20 32.8	.	.	.	.	.
DS *Poetum versicoloris typicum*									
Nonea pulla	10	.	.	.	67 73.6	.	.	.	.
Poa versicolor	.	10	36	10	92 68.9	30	.	.	.
Botriochloa ischaemum	10	.	9	.	83 48	50	30	20	20
Reseda lutea	.	.	.	.	25 47.8	.	.	.	.
Consolida regalis	.	.	.	.	25 47.8	.	.	.	.
Stipa pennata	.	.	.	.	25 47.8	.	.	.	.
Asparagus polyphyllus	.	.	.	.	25 47.8	.	.	.	.
Salvia nemorosa	10	.	.	.	50 47.1	20	10	.	.
Eryngium campestre	20	.	9	.	50 44	10	.	.	10
Pyrus communis	.	20	.	.	33 41	.	.	.	.
Tortella inclinata	.	.	.	.	17 38.9	.	.	.	.
Cotinus coggygria	.	.	.	.	17 38.9	.	.	.	.
Barbula unguiculata	.	.	.	.	17 38.9	.	.	.	.
Linaria angustissima	.	.	.	.	17 38.9	.	.	.	.
Camelina microcarpa	10	.	.	.	25 38.6	.	.	.	.
Melica transsilvanica	.	10	.	50 24.1	67 38.3	50 24.1	.	10	10
Taraxacum officinale	.	.	18	.	25 33.4	.	.	.	.
Alyssum desertorum	20	.	.	.	25 32.4	.	.	.	.
Jurinea arachnoidea	10	.	.	.	17 28.6	.	.	.	.
Thymus serpyllum	.	.	.	.	25 27.9	.	.	20	10
Echium vulgare	50	10	18	10	67 27.7	.	40	30	50
DS *Poetum versicoloris thymetosum moldavici*									
Dianthus carthusianorum	.	.	.	.	.	40 61	.	.	.
Chamaecytisus podolicus	.	.	.	.	.	40 61	.	.	.
Cerasus fruticosa	.	.	.	.	17	50 57.5	.	.	.
Thymus moldavicus	.	.	.	.	.	50 55.7	.	.	20
Bryum caespiticium	.	.	.	.	17	70 54	40 24.4	10	.
Stipa pulcherrima	10	.	.	.	.	40 53.2	.	.	.
Anthemis tinctoria subtinctoria	10	.	.	.	17	50 52.5	.	.	.
Weissia longifolia	10	30	.	.	.	60 48.5	.	20	.
Asparagus officinalis	.	.	.	.	.	30 43.8	.	10	.
Jurinea calcarea	.	.	.	.	.	30 43.8	10	.	.
Rosa corymbifera	.	.	.	.	.	30 43.8	.	10	.
Nonea rossica	.	.	.	.	.	20 42.6	.	.	.
Allium oleraceum	.	.	.	.	.	20 42.6	.	.	.
Spergula arvensis	.	.	.	.	.	20 42.6	.	.	.
Chamaecytisus austriacus	.	.	9	.	25	40 40.9	.	.	.
Salvia pratensis	20	40	9	.	.	60 39.2	.	.	30
Seseli hippomarathrum	10	10	.	.	42	60 33.4	.	30	40
Campanula rapunculoides	.	10	.	.	.	20 32.8	.	.	.
Bromopsis inermis	.	.	.	.	.	20 32.8	.	.	10
Tortella tortuosa	20	30	27	10	.	50 28.6	.	10	20
Pilosella echioides	10	20	9	.	.	40 27.9	.	10	30

Fortsetzung auf der Rückseite
Continued on back page

	Festuco-Brometea						*Sedo-Sclerantheta*		
	Brachypodietalia			*Stipo-Festucetalia*			*Alysso-Sedetalia*		
	Cirsio-Brachypodion			*Galio-Poion versicoloris*			*Alysso-Sedion*		
Code of the syntaxa	1.1.1a	1.1.1b	1.1.2	1.2.1	1.2.2a	1.2.2b	2.1.1	2.1.2a	2.1.2b
Cluster numbers	1	2	3	4	5	6	7	8	9
No. of releves	10	22	11	10	25	10	10	10	10
DS *Bryo argentei-Ajugetum chiae*									
Ajuga chia	.	.	.	.	.	.	80 88.3	.	.
Xanthoria sp.	10	.	.	.	.	.	70 75.9	.	.
Pilosella praealta	.	.	.	.	.	.	50 68.6	.	.
Bryum argenteum	.	.	.	.	25	.	90 68.1	30	10
Lappula squarrosa	.	.	.	.	8	10	60 64.3	.	.
Centaurea diffusa	.	.	.	.	.	.	40 61	.	.
Lactuca serriola	.	.	.	.	17	.	60 56.2	20	.
Poa bulbosa	.	.	.	.	.	.	40 53.2	.	10
Polycnemum arvense	.	.	.	.	.	.	30 52.5	.	.
Schistidium atrofuscum	30	30	.	.	.	.	60 48.5	.	.
Euphorbia stepposa	.	10	.	.	.	.	30 43.8	.	.
Galium humifusum	.	.	.	.	.	.	20 42.6	.	.
Allium flavescens	.	.	.	.	.	.	20 42.6	.	.
Potentilla canescens	.	.	.	.	.	.	20 42.6	.	.
Setaria viridis	.	.	.	.	.	.	20 42.6	.	.
Thymus sp.	.	.	.	.	.	.	20 42.6	.	.
Hieracium umbellatum	.	.	.	.	.	.	20 42.6	.	.
Anisantha tectorum	.	.	.	.	.	.	20 42.6	.	.
Melilotus officinalis	.	10	.	10	8	10	40 39.3	.	.
Sideritis montana	.	.	.	.	.	.	30 33.1	20	10
Achillea setacea	.	.	.	10	.	.	20 32.8	.	.
DS *Aurinio saxatilis-Allietum podolici typicum*									
Allium podolicum	.	.	.	20	.	.	.	90 79.7	30
Festuca ovina	.	.	.	.	.	.	20	80 73.2	10
Encalypta vulgaris	.	20	.	.	.	30	.	70 58.9	.
Chelidonium majus	.	.	.	.	.	.	.	40 53.2	10
Homalothecium lutescens	50	50	.	.	.	30	30	100 51.3	30
Veronica incana	10	.	.	.	.	.	.	30 43.8	.
Galium tinctorium	.	.	.	.	.	.	.	20 42.6	.
Cladonia pocillum	.	.	.	.	.	.	.	20 32.8	10
Aurinia saxatilis	.	.	.	80 55.2	.	.	20	70 46.2	30
Koeleria cristata	10	20	36	.	.	30	10	60 29.8	50
DS *Aurinio saxatilis-Allietum podolici xanthorietosum elegantis*									
Xanthoria elegans	.	.	.	.	.	.	.	10	80 82.5
Arabidopsis thaliana	.	.	.	.	.	.	.	.	60 75.6
Berteroa incana	.	10	.	.	.	.	20	.	70 66.2
Hypnum cupressiforme	30	40	.	.	.	.	10	10	70 48.3
Crataegus laevigata	.	.	.	.	.	.	.	.	20 42.6
Tragopogon orientalis	.	.	.	.	.	.	.	.	20 42.6
Xanthoria polycarpa	.	.	.	.	.	10	10	.	30 37.7
Cichorium intybus	20	20	.	.	.	.	.	.	30 29.3
DS *Cirsio-Brachypodion pinnati* and *Brachypodietalia pinnati*									
Sesleria heuflerana	70 39.6	100 64.8	36	.	.	.	.	.	.
Pimpinella saxifraga	60 35.8	60 35.8	27	.	.	.	.	10	20
Bupleurum falcatum	90 41.6	80 34.1	73 28.7	.	25	30	.	.	10
Securigera varia	70 30.3	70 30.3	18	10	67 27.7	10	.	20	10
Anthyllis vulneraria	40 31.6	.	64 57.7	.	.	.	.	.	.
Ranunculus zapalowiczii	40 29.1	10	64 54.3	.	.	.	.	.	.
Anthericum ramosum	60 26.7	20	91 51.5	.	8	20	20	10	10
Crataegus monogyna	20	70 39.5	.	.	67 36.7	.	.	20	30
Plantago media	20	50 32.7	55 37.1	.	.	.	.	10	10
Poa angustifolia	.	50 25.3	.	.	8	20	30	50 25.3	30
Viola ambigua	40 24.8	30	36	.	8	10	10	.	.
DS *Galio campanulati-Poion versicoloris* and *Stipo pulcherrimae-Festucetalia pallentis*									
Galium glaucum	50	40	18	.	25	80 40.8	20	.	20
Sempervivum ruthenicum	.	.	.	60 47.1	25	40 26.7	.	.	.
Cephalaria uralensis	.	.	.	50 32.9	33	60 42.6	.	.	.
Otites eugeniae	10	.	.	50 28.1	.	60 37.1	.	10	40
Cleistogenes serotina	.	.	9	.	58 34.3	60 35.8	20	10	20
Falcaria vulgaris	.	.	.	10	33 29.4	40 37.5	.	.	.
Astragalus monspessulanus	10	20	.	.	42 27	60 45.4	.	.	.
Teucrium montanum	40	.	.	.	58 26.8	70 36.3	30	20	10
Linaria genistifolia	10	.	.	.	25	60 32.9	70 41.5	20	10
DS *Festuco-Brometea*									
Artemisia campestris	.	.	55 21.4	30	33	70 33.6	30	30	.
Campanula sibirica	40	40	73 33	30	17	20	20	30	.
Asperula cynanchica	50	80	100 30.7	30	33	70	60	60	30
Salvia verticillata	80 26.6	80 26.6	36	20	58	20	50	20	20
Eryngium planum	.	70 53.1	.	.	.	50 33.6	.	10	10
Centaurea stoebe	10	20	9	80 26.4	58	60	20	70	60
Festuca valesiaca	30	40	.	60	58	90 36.2	40	.	40
Veronica spicata	30	10	91 52.8	80 44	.	.	.	20	.
Thalictrum minus	40	.	64 30.6	20	8	10	.	60 27.7	30
Stachys recta	20	10	9	40	42	40	20	20	20
Leontodon hispidus	40	40	18	.	33	40	.	.	.
DS *Alysso-Sedion* and *Alysso-Sedetalia*									
Sedum acre	.	10	.	80 21.3	58	50	90 28.4	80 21.3	80 21.3
Arenaria serpyllifolia	30	10	.	.	.	10	60 33.7	30	50 25
Acinos arvensis	.	.	27	50	8	10	60 28.5	10	60 28.5
Tortula ruralis	10	10	.	20	.	60	40	80 35	80 35
Sedum sexangulare	.	.	.	.	.	40	.	50 26.5	90 61.9
Alyssum calycinum	10	.	.	.	.	40	50	50	80 44.1
Asplenium ruta-muraria	.	.	.	10	.	.	10	40 23.8	80 62.9
Other vascular species									
Elytrigia intermedia	.	40	64	50	75 27.3	80 30.9	.	20	10
Allium albidum	.	.	.	.	.	10	10	.	.
Artemisia absinthium	.	.	.	20	8	.	30	20	10
Artemisia austriaca	.	.	.	.	50 29.8	.	30	20	60 39
Aster amellus	20	10	27	.	.	20	10	10	.
Ballota nigra	.	.	.	30 29.3	.	.	30 29.3	10	.
Bromus squarrosus	.	.	.	.	.	.	10	.	10
Cardaminopsis arenosa	.	10	.	.	.	.	10	10	.
Carduus acanthoides	.	.	.	.	.	.	20	.	20
Carex montana	20	.	.	20	.	10	.	.	10
Cerasus avium	.	20	.	.	8	.	.	20	10
Chaenorrhinum minus	.	.	.	.	.	.	10	.	10
Convolvulus arvensis	.	40 44.8	.	.	25 24.3	.	.	.	.
Cuscuta approximata	10	10	.	.	.	.	.	.	.
Cynoglossum officinale	.	.	.	.	.	10	.	.	10
Euphorbia cyparissias	60	90	82	50	83	100 23.4	50	50	60
Festuca pratensis	.	10	18	.	.	.	.	20	20
Festuca rupicola	10	50	64 24.4	.	.	50	10	40	60 21.7
Galium verum	20	30	9	.	.	40	10	10	40
Helichrysum arenarium	.	.	9	.	8	30	.	20	20
Hieracium virosum	20	10	.	.	.	.	20	.	20
Leontodon autumnalis	.	10	9	.	8	.	.	.	.
Medicago falcata	40	70	55	50	33	50	10	20	50
Minuartia setacea	.	.	.	.	.	10	10	.	.
Phalacroloma annuum	.	.	.	.	.	.	.	10	10
Pilosella bauhinii	20	20	.	.	.	10	.	10	.
Plantago lanceolata	10	20	18	.	.	10	10	.	.
Poa compressa	30	20	.	10	.	.	40	20	30
Polygala comosa	10	.	.	.	.	.	.	.	.
Polygala sibirica	.	10	.	.	8	20	20	.	.
Potentilla argentea	.	.	.	.	25	10	.	30	20
Potentilla incana	60	40	82	70	42	90 22.8	50	20	70
Scabiosa ochroleuca	60	30	64 23.4	20	.	50	10	50	10
Swida sanguinea	.	20	.	.	8	.	.	.	20
Teucrium chamaedrys	90	80	82	30	67	80	50	30	50
Verbascum lychnitis	10	.	.	40	.	40	20	20	20
Verbascum phlomoides	.	10	.	.	.	10	10	20	10
Veronica austriaca	10	.	9	.	.	.	10	10	10
Viola hirta	.	10	.	.	.	10	.	10	.
Cryprogam species									
Brachythecium glareosum	.	10	.	.	.	.	.	.	.
Bryum capillare	.	20	.	.	8	.	20	.	10
Camplothecium lutescens	.	10	.	.	.	.	.	.	.
Campylium chrysophyllum	.	10	.	.	.	.	.	.	.
Ceratodon purpureus	10	10	.	.	.	20	20	20	.
Cladonia fimbriata	.	10	.	.	.	.	.	.	.
Cladonia foliacea	10	10	.	.	.	.	.	.	.
Cladonia pyxidata	10	30	27	.	8	10	10	10	30
Cladonia sp.	.	10	.	.	8	10	10	.	10
Collema sp.	20	10	27	.	.	30	20	10	10
Ditrichum flexicaule	.	.	.	.	.	.	.	.	10
Fulgensia sp.	.	.	.	.	.	.	20	20	.
Homalothecium sericeum	.	.	.	10	.	10	.	.	10
Hypnum vaucheri	10	10	.	.	.	.	.	.	.
Orthotrichum anomalum	.	.	.	.	8	.	.	.	.
Peltigera didactyla	.	25	.	.	.	.	.	.	.
Peucedanum carvifolia	10	.	.	.	.	.	.	.	.
Plagiomnium affine	.	10	.	.	.	10	.	.	10
Pterygoneurum subsessile	.	.	.	.	8	.	.	.	.
Schistidium apocarpum	.	.	.	10	.	.	.	10	.

Supplement S2. Relevés of the *Cirsio-Brachypodion pinnati* (*Brachypodietalia pinnati*) in Western and Central Podillia. Coordinates of relevés marked by an asterisk (*) have been determined (approximately) with the help of Google Maps.

Beilage S2. Aufnahmen des *Cirsio-Brachypodion pinnati* (*Brachypodietalia pinnati*) in West- und Mittelpodolien. Koordinaten von Aufnahmen mit Sternen (*) wurden (grob) mit Hilfe von Google Maps ermittelt.

Relevé no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21 *	22 *	23 *	24 *	25 *	26 *	27 *	28 *	29 *	30 *
Longitude	24.9879	24.9874	25.0677	25.0649	25.1165	24.618	24.6188	24.6175	25.4991	24.9882	25.5126	26.8307	26.8305	26.8298	26.8297	26.7298	26.7292	26.7337	25.4643	25.4661	25.371	25.3709	25.3707	25.4516	25.4485	25.4318	25.5645	25.5633	25.5633	25.7399
Latitude	49.4393	49.4387	49.4446	49.4452	49.0645	49.3519	49.3518	49.3522	50.0678	49.4386	50.0712	48.6009	48.6003	48.6032	48.6055	48.5737	48.5741	48.5723	50.0724	50.0731	49.1283	49.1279	49.1268	49.7256	49.7253	49.7267	49.5711	49.5723	49.5762	50.1076
Date	42586	42586	42586	42586	42587	42587	42587	42587	42586	42586	42586	42543	42543	42543	42543	42550	42550	42550	42586	42586	28278	28278	28278	28279	28279	28279	28278	28279	28279	28280
Author	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Didukh	I. Didukh	I. Rozenblit	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Rozenblit	I. Rozenblit	I. Didukh	I. Didukh	I. Didukh	I. Didukh	I. Didukh	I. Didukh	I. Didukh	I. Didukh	I. Didukh	I. Didukh
Aspect (º)	345	318	309	250	250	240	-	-	180	-	290	310	330	320	310	320	90	15	330	30	180	10	10	315	45	10	315	10	45	270
Inclination (º)	28	45	43	18	15	18	40	45	40	-	28	15	22	18	30	25	30	31	15	10	65	50	55	25	25	45	60	45	25	70
Plot size (m2)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20	20	20	20	20
Total vegetation cover (%)	80	95	50	70	80	80	60	60	50	-	80	70	85	90	80	80	60	90	60	70	55	50	50	80	50	95	50	50	80	70
Cover of herb layer (%)	70	70	40	60	70	60	-	-	-	90	70	60	70	80	70	70	50	80	50	65	40	40	45	70	70	90	40	50	40	50
Cover of cryptogam layer (%)	20	20	40	10	10	20	-	-	-	-	10	10	15	10	10	10	10	20	15	10	-	-	-	-	-	-	-	-	-	-
Maximum height of herbs (cm)	41	53	41	80	70	80	-	-	-	-	73	73	74	58	71	85	51	43	85	56	85	80	110	100	80	120	120	105	120	100
Minimum height of herbs (cm)	5	1	1	2	2	2	-	-	-	-	2	5	1	2	1	1	2	1	1	3	2	4,5	5	5	8	5	2	1	4	5
Number of species	44	46	34	36	32	21	32	20	24	30	49	36	34	34	43	37	29	39	41	52	23	39	37	35	37	34	34	38	51	42
Number of releves in TURBOVEG Database	661	620	621	681	667	671	67	70	69	71	555	552	584	675	572	559	573	551	586	591	1	5	10	4	8	9	2	3	6	7
Code of the syntaxa	1.1.1a										1.1.1b										1.1.2									
Cluster	1										2										3									
Ass Orchido militaris-Seslerietum heufleranae																														
Subass. Orchido militaris-Seslerietum heufleranae campanuletosum rotundifoliae																														
Chamaecytisus blockianus	1	1	+	1	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thesium linophyllon	1	1	1	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Campanula glomerata	.	1	1	1	1	1	1	1	.	1	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Campanula rotundifolia	1	.	.	1	1	.	1	1	2	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poterium sanguisorba	.	1	+	1	.	1	1	+	1	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.
Teucrium montanum	1	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia volhynica	.	.	.	1	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thymus pulegioides	.	.	.	1	2	.	1	1	1	1	.	1	.	1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Echium vulgare	1	1	.	.	.	.	1	.	1	1	.	.	.	.	.	.	.	.	.	+	1	1	.	.	.	.	.	.	.	.	.
Subass. Orchido militaris-Seslerietum heufleranae typicum																														
Agrimonia eupatoria	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	1	1	1	1	1	.	.	.	.	.	.	.	.	.	.
Brachythecium albicans	.	.	.	.	.	.	.	.	.	.	1	.	1	1	1	1	1	1	1	1	.	.	.	.	.	.	.	.	.	.
Achillea millefolium	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	1	1	.	1	1	.	.	.	.	1	.	.	1	.	.
Eryngium planum	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	1	1	1	1	+	.	.	.	.	.	.	.	.	.	.
Knautia arvensis	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa angustifolia	.	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	1	.	.	+	.	.	.	.	.	.	.	.	.	.
Fragaria viridis	.	.	.	.	.	.	1	.	.	.	1	1	1	1	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Convolvulus arvensis	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.
Elytrigia repens	.	1	.	.	.	.	.	.	.	.	1	.	.	1	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium mollugo	.	1	+	.	.	+	1	.	.	.	1	.	1	1	1	.	1	1	.	+	.	.	.	.	.	.	.	.	.	.	.
Prunus spinosa	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Malus praecox	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Daucus carota	.	.	.	.	.	+	.	.	.	1	1	1	1	1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Pilosella officinarum	.	.	.	1	1	.	.	.	.	.	1	.	1	1	.	.	.	+	.	2	.	.	.	.	.	.	.	.	.	.	.
Ranunculus polyanthemos	.	1	.	.	.	.	.	.	.	.	1	+	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Ass. Ranunculo zapalowiczi-Helictrotrichetum desertori																														
Helictotrichon desertorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	5	5	5	1	5	4	3	5	5
Euphrasia stricta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	1	1	1
Astragalus austriacus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	.	1	1	.	1	1
Jurinea mollissima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	1	1	.	.	1
Gypsophila fastigiata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	1	1	1
Helianthemum nummularium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	1	.	3	5	.
Linum catharticum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	1	.	.	.	1
Stipa capillata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	.	.	1
Artemisia campestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	1	1	1	.
Filipendula vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	1	1	.	1	.	.	1	1
Anemone sylvestris	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	1	1	1
Chamaecytisus ruthenicus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	1	.	1	.	.	1	1	1	1
Briza media	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	1	1	1	.	1	1
Peucedanum cervaria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	1	.
Adonis vernalis	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	1	1	.	.	.	1	1	1
Leucanthemum vulgare	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	1	.	1	.	1
Iris hungarica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1
Acinos arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	.	.
Trifolium medium	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1
Poa versicolor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	1	.	3	.	.	1	.
All. Cirsio pannonici-Brachypodion pinnati																														
Ord. Brachypodietalia pinnati																														
Sesleria heuflerana	1	3	+	2	3	3	.	1	.	.	3	2	3	3	5	4	4	1	3	2	.	.	.	.	.	.	2	4	5	.
Abietinella abietina	1	2	2	.	.	3	.	.	.	.	1	.	1	2	2	1	1	1	1	2	2	.	.	.	4	.	2	.	.	.
Lembotropis nigricans	.	.	.	1	1	.	.	.	.	1	1	.	.	.	3	1	.	.	.	.	1	1	1	.	1	.	1	1	1	1
Veronica spicata	.	.	.	.	1	.	.	1	.	+	.	.	.	.	.	.	.	.	1	.	.	1	1	1	1	1	1	1	1	1
Carex humilis	.	1	.	2	.	.	.	.	3	.	.	.	.	.	.	.	.	3	2	.	5	4	4	4	5	.	5	3	1	4
Ranunculus zapalowiczii	.	.	.	1	+	.	1	1	.	.	.	.	.	1	.	.	.	.	.	.	.	1	1	.	1	1	.	1	1	.
Allium senescens subsp. montanum	.	.	.	1	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	1	.	1	1
Viola ambigua	.	1	.	1	1	.	.	.	.	1	.	.	1	.	1	.	.	1	.	.	1	1	.	.	1	.	.	.	.	1
Aster amellus	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	1	.	1
Galium campanulatum	1	1	.	1	1	.	.	.	.	1	1	.	1	.	1	1	.	.	.	.	.	.	.	.	.	1	.	.	1	.
Linum flavum	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1
Anthericum ramosum	1	1	2	1	1	.	.	.	.	3	.	.	.	.	.	.	.	1	1	.	1	3	1	1	1	1	2	1	.	4
Cl. Festuco-Brometea																														
Festuca valesiaca	1	.	.	+	.	.	.	2	.	.	.	.	.	.	.	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.
Teucrium chamaedrys	1	1	1	1	1	1	1	.	1	1	2	.	1	1	1	.	1	1	1	+	1	2	1	1	1	.	1	1	.	1
Scabiosa ochroleuca	+	.	.	1	1	.	1	.	1	1	.	.	.	.	.	1	.	.	+	1	.	.	.	1	1	1	.	1	1	1
Asperula cynanchica	.	.	.	1	.	1	.	1	1	1	1	1	+	+	+	1	+	.	+	.	1	1	1	1	1	1	1	1	1	1
Festuca rupicola	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	1	+	1	.	.	1	1	1	1	.	.	1	1
Inula ensifolia	1	1	1	.	.	.	.	.	.	.	1	.	1	.	2	.	.	1	.	.	.	1	1	1	1	1	1	.	1	1
Anthyllis vulneraria	.	.	.	1	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	1	.	1	1	.
Elytrigia intermedia	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	1	.	+	1	1	1	.	.	1	1	1	.	1
Thalictrum minus	1	1	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	1	1	1	.	1
Poa compressa	.	.	+	.	.	.	.	1	1	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Salvia verticillata	+	1	1	1	1	1	1	.	.	1	1	1	1	1	1	1	.	1	+	.	.	1	.	.	.	.	1	.	.	1
Potentilla incana	1	1	.	1	1	.	1	.	.	1	1	.	.	.	1	.	.	1	1	.	1	1	1	1	1	.	.	1	1	1
Euphorbia cyparissias	+	+	.	1	.	.	2	1	1	.	1	1	1	1	1	1	1	.	+	+	1	1	1	1	1	1	1	1	1	.
Securigera varia	1	+	1	.	1	1	1	.	1	.	1	.	1	1	1	.	1	.	+	+	1	.	.	.	.	.	.	.	.	.
Plantago lanceolata	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	+	.	1	.	1	.	.	.	.	.	.
Bupleurum falcatum	.	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	.	+	.	.	1	1	1	1	.	1	.	1	1
Leontodon hispidus	1	.	1	.	.	.	1	1	.	.	.	.	1	1	.	.	.	.	+	+	.	.	.	.	1	.	.	.	.	1
Galium verum	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1	1	+	1	.	.	.	.	.	.	.	.	.
Medicago falcata ag.	+	1	+	.	.	.	1	.	.	.	1	.	1	.	1	1	1	1	.	+	.	1	.	1	1	1	.	1	.	1
Arenaria serpyllifolia	1	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.
Other vascular plants																														
Hieracium virosum	.	.	1	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Stachys recta	1	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Centaurea stoebe	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	1	.	.	.	.	.	.	.	.	.
Astragalus onobrychis	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	1	.	.	.	.
Rhamnus cathartica	.	.	1	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vincetoxicum hirundinaria	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1
Taraxacum officinale	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Salvia pratensis	.	1	.	.	1	.	.	.	.	.	1	.	.	.	1	1	.	1	.	.	.	.	.	.	.	.	.	1	.	.
Pyrus communis	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
Eryngium campestre	.	1	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
Arabis hirsuta	.	.	1	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Chamaecytisus albus	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carlina vulgaris	.	1	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Medicago lupulina	.	.	.	.	.	.	.	.	.	1	.	.	.	.	+	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.
Thymus marschallianus	1	+	.	.	.	.	.	.	.	.	1	.	1	.	1	1	+	1	.	+	.	.	1	1	1	.	.	1	1	1
Onobrychis arenaria	.	1	.	.	.	.	.	.	.	.	1	.	.	.	1	1	.	.	.	.	1	1	.	.	.	1	1	1	1	.
Campanula sibirica	.	.	.	1	1	1	.	.	1	.	1	.	1	.	1	1	.	.	.	.	1	1	1	1	1	1	.	.	1	1
Centaurea scabiosa	.	.	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	1	.	1	.	.	.	.	1	1
Hypericum perforatum	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.
Berteroa incana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
Koeleria cristata	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	.	.	.	1	1	.	.	1	.	1	.	.	.	1
Festuca pseudodalmatica	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pimpinella saxifraga	.	.	1	.	1	1	2	.	1	+	1	1	1	.	+	.	.	.	1	+	.	1	.	1	1	.	.	.	.	.
Astragalus monspessulanus	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.
Plantago media	.	1	.	.	.	.	1	.	.	.	1	.	1	.	1	1	.	.	+	.	.	.	1	.	1	1	1	1	.	.
Linaria genistifolia	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pilosella bauhinii	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.
Pilosella echioides	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.
Cichorium intybus	1	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.
Cryptogam species																														
Tortula ruralis	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.
Cladonia pyxidata	1	.	.	.	.	.	.	.	.	.	.	+	.	.	1	.	.	.	.	+	.	.	1	.	.	2	3	.	.	.
Collema species	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	.	.	2	.	.	3	.
Homalothecium lutescens	1	1	1	3	2	.	.	.	.	.	.	1	.	.	.	.	1	2	1	1	.	.	.	.	.	.	.	.	.	.
Weissia longifolia	1	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypnum cupressiforme	1	1	1	.	.	.	.	.	.	.	1	.	.	.	.	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.
Schistidium atrofuscum	+	.	1	.	.	.	.	.	1	.	1	+	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tortella tortuosa	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	.	.	2	2	.	.	.	.	.	1
Shrubs																														
Crataegus monogyna	.	1	1	.	.	.	.	.	.	.	1	.	1	.	1	1	1	1	.	+	.	.	.	.	.	.	.	.	.	.
Rosa canina	.	.	.	.	.	1	.	.	.	.	.	+	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Other vascular plants: Acer tataricum (26:1), Agrostis vinealis (14:+), Alyssum calycinum (1:1), A. desertorum (1:1, 3:1), Anthemis tinctoria subsp. subtinctoria (9:1), Asyneuma canescens (16:1), Botriochloa ischaemum (2:1, 21:3), Berberis vulgaris (24:1), Berteroa incana (20:1), Brachypodium pinnatum (15:+), Camelina microcarpa (1:1), Campanula rapunculoides (19:1), Cardaminopsis arenosa (20:1), Carex michelii (7:1), C. montana (1:1, 7:1), Carlina biebirsteinii (7:1), Carlina spec. (12:+), Centaurea jacea (14:1), Centaurea marschalliana (19:1, 27:1, 29:1) Centaurea spec. (22:1, 23:1, 30:1), Cerasus avium (13:1,16:1), Chamaecytisus austriacus (21:1), Cirsium pannonicum (27:1, 30:1), Cleistogenes serotina (21:1), Clematis integrifolia (10:1), C. recta (12:+), Cotoneaster melanocarpus (11:1), Cruciata glabra (10:1), Cuscuta approximata (5:1, 14:1), C. europaea (18:1), Echium russicum (27:1, 30:1, 31:1), Equisetum arvense (12:1), Erysimum canescens (15:+), E. odoratum (11:1), Euphorbia seguieriana (28:1, 29:1), E. stepposa (18:1), Euphrasia hirtella (6:1), Fraxinus excelsior (19:1), Galatella linosyris (12:+), Galium tinctorium (12:+), Geranium sanguineum (10:+), Helichrysum arenarium (21:1), Hieracium umbellatum (29:1), Hypericum elegans (15:1, 20:1), Jurinea arachnoidea (2:r), Jurinea spec. (31:+), Laser trilobium (26:1), Leontodon autumnalis (14:1, 21:1), Linaria vulgaris (14:1), Lotus corniculatus (8:1, 9:1, 10:1, 17:1), Malus praecox (13:1, 16:1, 19:r), Melampyrum arvense (18:1), Melica transsilvanica (19:1), Melilotus officinalis (19:r), Minuartia setacea agg. (15:+), Nonea pulla (1:1), Origanum vulgare (6:1, 10:1), Otites densiflora (7:1), O. eugeniae (1:1), Oxytropis pilosa (29:1), Peucedanum carvifolia (6:1), Peucedanum spec. (6:1), Phlomis tuberosa (24:1), Picris hieracioides (13:1), Polygala comosa (1:r), P. sibirica (18:1), P. vulgaris (12:+), Primula macrocalyx (7:1, 8:1), P. veris (11:1, 14:1), Prunella vulgaris (11:1), Pulmonaria mollis (12:1), Pyrethrum corymbosum (4:1, 10:1), Rosa caryophyllacea (24:1), R. rubiginosa (18:1), R. spinosissima (5:1), Salvia nemorosa (2:1), Sanguisorba officinalis (12:+), Saxifraga tridactylites (1:1), Sedum acre (20:1), Senecio jacobaea (7:1), Serratula tinctoria (28:1, 30:1, 31:1), Seseli hippomarathrum (3:r, 18:1), Seseli libanotis subsp. intermedium (12:1), Silene tanaitica (7:1), Silene spec. (7:1), Silene viridifolia (29:+), Stachys germanica (20:r), Stipa pulcherrima (1:1), Swida sanguinea (12:1, 20:1), Teucrium polium (24:1), Thesium arvense (25:1, 30:1, 31:1), Thymus moldavicus (26:1), Trifolium montanum (27:1, 28:1, 29:1), Trinia glauca (11:+), Turritis glabra (17:r), Valeriana stolonifera (2:1, 3:r), Verbascum lychnitis (1:1), V. phlomoides (20:r), Veronica austriaca (2:r, 31:1), V. incana (1:1), V. teucrium (12:1), Vicia tetrasperma (17:r), Viola hirta (20:1), V. matutina (25:1). **Other bryophytes and lichens:** Brachythecium glareosum (20:r), Camplothecium lutescens (12:1), Campylium chrysophyllum (11:1), Candellariella vitelina (11:r, 12:r), Ceratodon purpureus (4:1, 11:1), Cladonia fimbriata (20:r), C. foliacea (4:1, 15:1), C. spec. (20:r), Encalypta vulgaris (29:1, 33:r), Hypnum vaucheri (4:1, 16:r), Peltigera didactyla (20:r), Plagiomnium affine (20:2), Xanthoria spec. (3:r).

Supplement S3. Relevés of the *Stipo pulcherrimae-Festucetalia pallentis* and *Alysso-Sedetalia* in Western and Central Podillia. Coordinates of relevés marked by an asterisk (*) have been determined (approximately) with the help of Google Maps.

Beilage S3. Aufnahmen des *Stipo pulcherrimae-Festucetalia pallentis* und *Alysso-Sedetalia* in West- und Mittelpodolien. Koordinaten von Aufnahmen mit Sternen (*) wurden (grob) mit Hilfe von Google Maps ermittelt.

	Class Festuco-Brometea																														Class Sedo-Scleranthetea																													
	Order Stipo pulcherrimae-Festucetalia pallentis																														Order Alysso-Sedetalia																													
	Alliance Galio campanulati-Poion versicoloris																														Alliance Alysso-Sedion																													
Relevé no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
											*	*	*	*	*	*	*	*	*	*																			*	*																				
Longitude	26.7678	26.7657	26.7979	26.7924	26.7967	25.839	25.8391	25.8388	26.7911	26.7915	26.6387	26.7455	26.7458	26.7482	26.7754	26.7809	26.6106	26.6104	26.8039	26.8065	26.6387	26.6377	26.7442	26.7505	26.6369	26.9164	26.9179	26.7938	26.7832	26.7824	28.7543	28.7962	28.785	28.7867	28.5699	27.2361	27.2352	27.2317	27.2794	27.2565	26.7289	26.7007	27.0295	27.0276	26.4853	26.4855	26.7285	26.7289	25.84	25.8402	26.8844	26.8869	26.6859	26.6854	26.6879	25.7492	25.7497	25.7495	25.8372	25.8377
Latitude	48.5415	48.5432	48.5596	48.5486	48.5796	48.6365	48.6366	48.637	48.551	48.5515	48.5062	48.5854	48.5852	48.5845	48.6054	48.6041	48.5088	48.5084	48.6128	48.6131	48.5394	48.5395	48.5856	48.5825	48.5397	48.584	48.583	48.5475	48.6043	48.6044	48.1504	48.2094	48.2031	48.2046	48.3395	48.6444	48.6445	48.6432	48.6295	48.6302	48.5744	46.5509	48.5727	48.5728	48.5524	48.5521	48.5748	48.5744	48.6353	48.6351	48.6038	48.6028	48.5179	48.5181	48.5168	48.6439	48.6447	48.6435	48.6415	48.64
Date	42200	42200	42180	42180	42180	42568	42568	42568	42203	42203	42172	42172	42172	42172	42173	42173	42172	42172	42172	42172	42193	42193	42568	42568	42193	42577	42577	42199	42178	42178	40369	40369	40369	40369	40371	40673	40673	40706	39606	39606	42572	42181	42536	42536	42519	42519	42573	42573	42580	42580	42179	42179	42192	42558	42558	42528	42528	42528	42580	42580
Author	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Rozenblit	I. Rozenblit	I. Rozenblit	I. Rozenblit	I. Didukh	I. Didukh	I. Rozenblit	I. Rozenblit	I. Rozenblit	I. Rozenblit	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	Kuzemko et al.	Kuzemko et al.	Kuzemko et al.	Kuzemko et al.	Kuzemko et al.	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Didukh	I. Didukh	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak	I. Vasheniak
Aspect (º)	225	315	20	20	315	20	90	45	315	225	90	90	180	180	180	90	180	180	180	180	225	45	20	45	45	90	90	90	270	270	140	220	74	125	220	220	215	220	220	220	225	200	20	20	225	225	100	100	100	135	10	10	315	100	200	225	225	220	10	10
Inclination (º)	45	25	45	45	45	45	25	45	25	45	55	50	25	25	45	45	60	55	35	50	4	3	25	32	31	40	28	30	15	18	48	12	22	12	18	-	48	-	45	45	15	25	15	15	27	13	-	-	-	-	15	15	27	30	40	15	40	30	45	90
Plot size (m2)	10	10	10	10	10	10	10	10	10	10	10	15	10	20	10	15	20	15	20	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total vegetation cover (%)	80	80	95	50	95	95	95	50	80	70	70	50	70	70	90	50	80	70	60	80	80	90	90	95	90	80	90	90	70	60	60	50	70	50	70	60	60	90	80	80	50	50	70	50	80	90	90	70	50	70	60	90	80	70	70	50	60	65	80	80
Cover of herb layer (%)	50	50	90	50	50	50	90	50	90	50	-	-	66	-	40	-	-	-	80	72	70	85	80	85	80	60	88	88	60	55	40	45	50	40	45	20	40	40	50	50	40	40	50	40	50	80	20	20	20	60	40	50	50	20	20	40	50	40	40	40
Cover of cryptogam layer (%)	80	80	5	-	-	-	-	-	-	-	-	-	5	-	50	-	-	-	-	8	60	50	70	70	70	50	80	80	10	5	60	50	50	60	25	50	50	50	30	30	50	50	25	80	80	10	50	50	60	50	80	75	80	80	70	50	60	50	50	60
Maximum height of herbs (cm)	30	15	30	-	-	-	-	-	-	-	-	60	-	-	-	-	110	-	130	-	50	10	15	30	30	30	21	21	35	58	40	35	30	35	30	50	40	40	32	43	10	5	15	15	12	80	50	60	30	50	18	10	12	20	5	10	30	25	35	34
Minimum height of herbs (cm)	50	45	50	-	-	-	-	-	-	-	-	3	-	-	-	-	4	-	9	-	-	30	50	85	50	50	65	65	1	0,5	15	15	10	12	15	0,5	1	1	0,5	1	20	15	50	30	51		1	1	0,5	5	51	48	51	30	25	20	15	10	3	1
Number of releves in TURBOVEG Database	69	89	91	90	84	88	87	125	126	128	13	12	26	25	1082	1083	23	19	21	22	96	95	101	107	111	93	94	131	150	151	113	114	115	116	117	937	621	6	164	1081	82	81	109	75	76	99	132	133	134	135	110	105	106	103	100	102	78	83	1083	1084
Number of species	21	34	21	16	33	21	20	31	19	16	29	41	36	29	24	23	22	19	22	26	40	37	43	39	39	39	30	36	36	32	42	46	29	52	52	20	19	23	16	14	40	29	26	28	32	18	22	28	26	22	44	49	28	34	42	14	31	38	13	11
Code of the syntaxa	1.2.1										1.2.2a										1.2.2b										2.1.1										2.1.2a										2.1.2b									
Number of clusters	Cluster 4										Cluster 5										Cluster 6										Cluster 7										Cluste+ 8										Cluster 9									
Ass. Schivereckio podolicae-Seselietum libanotidis																																																												
Schivereckia podolica	1	1	1	1	1	4	1	1	.	4	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica spicata	1	1	1	1	1	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.
Gypsophila thyraica	+	.	1	.	.	.	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Seseli libanotis s. intermedium	1	1	.	1	1	1	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Astragalus onobrychis	.	1	1	.	.	1	1	1	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melampyrum arvense	.	1	.	1	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium exoletum	1	.	.	.	.	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica prostrata	.	.	.	.	1	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vincetoxicum hirundinaria	1	.	.	1	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Jurinea mollissima	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rosa species	.	.	.	.	.	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erysimum odoratum	.	1	.	.	1	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	+	.	.
Hylotelephium maximum	1	1	1	.	.	.	1	1	.	.	.	.	.	.	.	1	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1
Ass. Poetum versicoloris																																																												
Subass. Poetum versicoloris typicum																																																												
Poa versicolor	.	.	.	.	.	.	.	.	.	1	1	1	1	1	2	3	1	1	1	4	.	.	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nonea pulla	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eryngium campestre	.	.	.	.	.	.	.	.	.	.	1	1	1	1	.	1	.	1	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Securigera varia	.	1	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	3	3	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Salvia nemorosa	.	.	.	.	.	.	.	.	.	.	.	2	3	2	1	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Botriochloa ischaemum	.	.	.	.	.	.	.	.	.	.	1	3	2	2	2	.	3	1	3	1	.	.	+	.	+	2	.	2	+	.	.	+	+	.	1	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	+	.	.	.	1	.	.	.
Asparagus polyphyllus	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stipa pennata	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	3	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Alyssum desertorum	.	.	.	.	.	.	.	.	.	.	1	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Inula ensifolia	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linum flavum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jurinea arachnoidea	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linaria angustissima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stipa capillata	.	.	.	.	1	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Subass. Poetum versicoloris thymetosum moldavici																																																												
Weissia longifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	+	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.
Lembotropis nigricans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	2	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stipa pulcherrima	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	+	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chamaecytisus podolicus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dianthus carthusianorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galium glaucum	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	+	+	+	+	+	+	.	+	1	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.
Salvia pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	+	.	.
Anthemis tinctoria s. subtinctoria	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	+	+	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Eryngium planum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Thymus moldavicus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	+	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.
Bryum caespiticium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	+	+	+	+	.	.	+	+	1	.	1	1	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
Tortella tortuosa	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	+	.	2	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	2	1	.	.	.	.	.	.	.	.
Asparagus officinalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rosa corymbifera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jurinea calcarea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carex humilis	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
All. Galio campanulati-Poion versicoloris																																																												
Ord. Stipo pulcherrimae-Festucetalia pallentis																																																												
Sempervivum ruthenicum	.	.	1	.	1	1	1	1	1	.	1	1	.	.	.	.	.	.	.	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Seseli hippomarathrum	.	.	.	.	.	.	.	.	.	.	1	1	1	2	.	.	.	.	.	.	+	+	+	+	1	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	2	.	+	.	+	.	.	.	.	.	+	+	.	.	.	.	+	+	.	.
Teucrium montanum	.	.	.	.	.	.	.	.	.	.	2	.	1	1	.	.	3	.	3	3	.	+	.	+	2	2	.	1	1	1	1	1	.	+	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Cleistogenes serotina	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	1	1	1	1	.	.	.	.	+	+	1	+	1	1	.	1	.	.	2	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.
Allium senescens s. montanum	.	.	1	.	1	.	.	.	1	1	1	.	1	1	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	+	2	.	.	.	.	.	.	.	.
Otites eugeniae	.	1	.	1	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	+	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	+	.	.	+	+	.	.
Cl. Festuco-Brometea																																																												
Astragalus monspessulanus	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	1	.	1	1	.	1	+	+	+	.	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leontodon hispidus	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	1	1	.	.	+	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cephalaria uralensis	.	1	.	.	1	1	.	1	1	.	.	1	.	.	.	.	1	.	.	.	+	.	+	+	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Falcaria vulgaris	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	1	.	.	.	.	.	.	+	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melica transsilvanica	1	1	.	.	1	1	.	1	.	.	1	.	1	.	1	.	2	1	1	1	.	+	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Chamaecytisus austriacus	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	1	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca valesiaca	.	2	2	1	2	.	.	.	1	2	3	4	1	1	1	.	.	1	.	1	2	1	.	+	+	1	+	+	+	+	+	1	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	+	.	.	.	2	.	.
Ass. Bryo argentei-Ajugetum chiae																																																												
Ajuga chia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	+	1	2	1	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Xanthoria species	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	2	2	4	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Schistidium atrofuscum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	+	2	1	.	1	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pilosella praealta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bryum argenteum	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	2	1	1	1	2	1	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Lappula squarrosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	+	+	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Centaurea diffusa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lactuca serriola	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	1	1	.	1	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.
Euphorbia stepposa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa bulbosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Thymus species	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Setaria viridis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melilotus officinalis	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	+	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sideritis montana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	+	.	.	.	1	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	+	.	.	.
Poa compressa	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	+	+	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	3	3
Ass. Aurinio saxatilis-Allietum podolici																																																												
Subass. Aurinio saxatili-Allietum podolici typicum																																																												
Aurinia saxatilis	1	1	.	1	1	1	1	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	1	2	+	2	1	1	1	.	.	.	.	.	.	.	.	.	.	.
Allium podolicum	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	2	1	1	1	1	1	.	.	.	.	.	.	.	+	.	.
Festuca ovina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	+	+	+	2	1	.	.	1	1	1	.	.	+	.	.	.	.	.	+	.
Encalypta vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	2	2	2	1	1	.	.	.	.	.	.	.	.	.	.	.	.
Chelidonium majus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	1	.
Thalictrum minus	1	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	.	.	1	1	.	.	.	+	+	.	.	+	.	.	.	.
Koeleria cristata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	+	+	.	+	+	.	1	1	.	.	+	+	+	+	+	.	.	.	.	.
Daucus carota	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	.	+	.	+	.	.	.	.	.	.
Poa angustifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	+	.	.	.	.	.	.	+	.	.	+	.	.	+	.	.	.	1	.	.	+	.	+	.	.	.	.	1	1	1	+	.	.	.	+	.	+	.	.	.
Subass. Aurinio saxatilis-Allietum podolici xanthorietosum polycarpae																																																												
Xanthoria polycarpa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	2	1	2	+	2	.	2	.	1	1
Arabidopsis thaliana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.	+	4	4
Berteroa incana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	.	+	.	2	1
Hypnum cupressiforme	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	.	2	.	.	2	2	1	4	2
Asplenium ruta-muraria	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	+	.	.	2	.	1	.	.	+	+	+	+	.	1	.	1	1	1
Sedum sexangulare	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	1	+	.	.	1	.	.	+	1	1	2	2	1	+	1	+	.
Brachythecium albicans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	.	.	2	.	1	.	.
Xanthoria elegans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	.
Festuca rupicola	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	+	+	.	.	2	.	.	.	.	.	2	.	.	.	.	.	.	.	.	+	.	.	.	1	1	1	.	+	+	.	+	.	.	+	+	.	+
Artemisia austriaca	.	.	.	.	.	.	.	.	.	.	1	.	1	1	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	1	.	.	.	.	+	.	.	1	.	.	1	+	.	.	+	+	+	.	.	1
All. Alysso-Sedion																																																												
Ord. Alysso-Sedetalia																																																												
Cl. Sedo-Scleranthetea																																																												
Veronica austriaca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Arenaria serpyllifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	2	+	.	1	2	.	.	1	.	1	.	.	.	.	+	.	.	.	1	1	+	+	+	+	+	.	.	.	.	.
Verbascum phlomoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Alyssum calycinum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	+	1	.	.	.	.	2	1	1	1	1	.	.	.	.	+	+	.	1	1	1	.	+	+	+	+	+	+	+	+	.	.
Cladonia pyxidata	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	2	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	2	2	.	2	.	.	.	.	.
Ceratodon purpureus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	2	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
Fulgensia species	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Collema species	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	+	+	.	+	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Homalothecium lutescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	2	.	.	.	.	.	.	.	.	2	2	.	+	.	.	.	.	.	1	2	1	2	2	1	1	1	3	1	2	2	2	.	.	.	.	.	.	.
Rhizocarpon geographicum	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	3	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tortula ruralis	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+	+	1	.	2	.	.	2	.	1	3	3	.	.	.	.	.	2	1	2	2	2	2	.	1	.	1	1	2	1	3	2	2	2	2	.	.
Bryum capillare	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Pilosella officinarum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	+	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.
Other vascular species																																																												
Teucrium chamaedrys	2	1	.	.	.	1	.	.	.	.	.	3	2	2	1	.	.	1	.	2	+	2	2	.	1	2	2	+	1	.	+	.	.	.	.	1	2	2	2	.	1	+	.	.	.	+	.	.	.	.	1	.	+	+	+	.	1	.	.	.
Centaurea stoebe	1	1	1	1	1	1	1	1	.	.	.	1	1	1	.	1	1	.	1	1	.	+	.	+	+	+	.	+	1	.	.	.	.	.	.	.	.	2	.	3	+	.	.	+	+	.	1	1	1	1	1	.	+	.	+	+	+	+	.	.
Asperula cynanchica	.	.	.	.	1	.	.	1	1	.	.	1	.	.	.	.	.	.	1	1	+	.	.	+	.	+	+	+	+	1	+	.	+	+	2	.	.	1	.	1	+	+	+	+	.	.	.	.	1	1	+	+	.	.	.	.	.	+	.	.
Medicago falcata	.	.	1	.	1	.	1	1	.	1	.	2	1	.	.	1	.	.	.	.	+	+	.	+	.	.	+	+	.	.	.	.	.	.	.	1	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	+	.	+	+	.	+	+	.	.
Echium vulgare	.	1	.	.	.	.	.	.	.	.	1	1	1	1	.	1	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	+	.	1	+	1	.	.	.	.	+	.	.	+	+	.	.	.	.	.	.	+	+	+	+	.	.	.	1	.
Salvia verticillata	.	1	1	.	.	.	.	.	.	.	.	.	1	1	.	1	2	.	1	1	.	.	.	.	.	.	.	.	1	1	1	2	.	.	1	2	.	1	.	.	.	.	.	.	+	.	.	.	1	.	.	+	.	+	.	.	.	.	.	.
Artemisia campestris	.	.	1	1	.	.	.	1	.	.	3	1	.	.	.	.	1	.	.	.	+	.	+	2	+	+	1	.	+	.	.	.	.	.	.	1	1	2	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia cyparissias	1	1	1	.	.	1	1	.	.	.	.	1	1	1	1	1	2	1	1	1	+	+	+	+	+	+	+	+	+	+	.	.	.	.	.	1	1	2	1	3	+	.	+	+	+	.	.	.	1	.	+	+	.	+	+	.	+	+	.	.
Potentilla incana	.	1	1	.	1	.	1	1	1	2	1	2	1	1	.	.	.	.	.	.	+	+	1	2	2	.	2	2	+	1	2	1	+	.	.	.	.	1	2	.	.	+	.	.	+	.	.	.	.	.	+	+	1	+	+	+	+	.	.	.
Elytrigia intermedia	1	1	1	.	.	2	.	1	.	.	2	4	1	2	.	1	.	1	.	1	2	2	2	.	1	1	2	.	1	1	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Linaria genistifolia	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	+	+	.	+	+	.	1	1	+	+	1	.	.	1	3	.	1	1	.	.	.	+	.	.	.	1	.	.	.	.	.	.	.	.	.	+	.	.
Acinos arvensis	.	1	.	.	1	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	+	2	+	+	.	.	1	.	.	.	.	+	.	.	.	.	.	.	.	+	+	.	+	+	+	.	+	.	.
Sedum acre	.	1	1	.	1	1	1	1	2	1	3	1	1	1	2	2	.	.	.	.	+	1	1	2	.	.	.	+	.	.	2	2	2	3	+	3	4	4	3	.	.	+	+	1	+	2	1	1	.	1	1	+	2	1	1	2	1	+	.	.
Scabiosa ochroleuca	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	1	1	.	1	.	.	.	.	.	.	.	.	+	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Galium verum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	+	.	+	.	.	2	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	2	.	+	+	+	.	.	.	.
Carex montana	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Pilosella echioides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	+	.	.	.	1	+	.	.
Aster amellus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Achillea millefolium	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	+	.	.	.	.	.	+	+	+	.	+	.	.	1	1	.	+	.	+	+	.	.	+	+	1	.
Bromopsis inermis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Campanula sibirica	.	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	1	2	.	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thymus marschallianus	1	1	.	.	1	1	.	1	1	.	.	.	.	.	1	1	2	1	1	3	.	+	3	+	.	.	.	3	.	.	.	.	.	.	.	.	1	2	.	.	+	+	.	2	+	.	.	.	1	.	+	+	.	.	2	.	+	+	.	+
Thymus serpyllum	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Elytrigia repens	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.	+	.	+	.	.	.	.	.	.
Polygala sibirica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Artemisia absinthium	.	1	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	+	.	.
Verbascum lychnitis	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	.	.	+	.	2	.	.	.	.	.	.	1	.	.	.	+	.	+	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.
Carduus acanthoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.
Viola ambigua	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rosa canina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.
Malva sylvestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla argentea	.	.	.	.	.	.	.	.	.	.	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	.	+	+	.	.	.	.	.
Galium mollugo	.	.	.	.	.	1	1	1	.	1	.	.	2	2	.	1	.	1	.	.	.	.	.	+	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	+	1	.
Centaurea scabiosa	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Thymus pulegioides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	.	.	.	+	.	.	.	1	.	.	.
Fragaria viridis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.
Hieracium virosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.
Bupleurum falcatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	1	.	.	.	.	.	+	+	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Festuca pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	+	+	.	.	.	.	.	.	.	.
Anthericum ramosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	1	1	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Helichrysum arenarium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	.	.	.	.	+	.	.	.	+	.	.
Stachys recta	1	.	1	.	.	.	.	1	1	.	.	1	1	1	1	.	.	.	.	1	.	.	.	.	+	+	+	.	+	.	.	+	.	.	.	1	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.
Ballota nigra	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Cryptogam species																																																												
Abietinella abietina	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	2	2	+	2	2	2	2	2	.	.	.	2	.	1	2	5	.	.	.	1	1	1	.	2	.	.	5	4	2	2	2	2	2	2	2	3	2	2	.	.
Cladonia species	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.
Shrubs																																																												
Viburnum lantana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerasus avium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Swida sanguinea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	+	.	.	.	.	.	.	.	.
Cotinus coggygria	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhamnus cathartica	.	.	.	.	1	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Pyrus communis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crataegus monogyna	.	.	.	.	.	.	.	.	.	.	1	1	1	1	2	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	.	+	.	.	+	+	.	.	.	.	.
Cerasus fruticosa	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	+	2	1	.	2	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Other vascular plants: Acer negundo (34:r), Achillea setacea (1:r, 34:r, 35:1), Agropyron pectinatum (16:1), Adonis vernalis (41:r, 43:r, 52:r), Agrimonia eupatoria (28:r, 35:r), A. procera (51:r), Agropyron pectinatum (9:+, 10:+, 33:1), Ailantus altissima (32:+), Ajuga genevensis (56:r), Allium albidum (23:r, 31:1), A. flavescens (32:r, 34:1), A. oleraceum (23:r, 25:r), A. sphaerocephalon (25r, 46:1), Amaranthus spec. (34:r), Ambrosia artemisifolia (34:r), Anagalis arvensis (33:r), Anisantha tectorum (34:r, 35:1), Arabidopsis thaliana (19:1), Armeniaca vulgaris (32:1), Arrhenatherum elatius (29:+, 46:1, 58:+), Galatella linosyris (50:+), Bromopsis inermis (26:r, 29:1, 54:r), B. squarrosus (34:r, 58:r), Camelina microcarpa (12:1, 16:+), Campanula rapunculoides (21:r, 26:r), Cardaminopsis arenosa (31:r, 46:r), Carex michelii (38:1), Centaurea orientalis (38:1), Cerastium arvense (8:1, 10:1), Chaenorrhinum minus (33:r, 55:r), Chamaecytisus ruthenicus (45:+), Chenopodium album (34:r), Cichorium intybus (51:r, 53:r, 55:r), Consolida regalis (13:+, 14:1, 16:3), Convolvulus arvensis (13:r, 14:+: 16: 1), Crataegus fallacina (36:1), C. laevigata (52:r, 55:r), Crepis foetida (35:r), Cuscuta approximata (10:1), C. europaea (51:r), Cynoglossum officinale (26:r, 55:r), Dianthus membranaceus (2:r), Dictamnus albus (41:+), Echinops sphaerocephalus (28:r), Eragrostis minor (35:+), Erigeron annuus (45:+), Erodium cicutarium (35:2), Erophila verna (22:1, 49:r, 51:r), Erysimum diffusum (32:r), Euonymus verrucosa (20:1), Euphorbia klokovii (13:1), Fallopia convolvulus (35:r), Festuca pseudovina (48:2), F. rubra (6:1, 7:1), Fumaria vailantii (57:1), Galium humifusum (34:2, 35:r), Galium tinctorium (44:r, 45:r), Geranium pussilum (34:r), Hieracium umbellatum (38:1, 39:1), Hypericum elegans (31:1), H. perforatum (50:1, 52:r), Juniperus communis (5:1), Lappula semicinta (28:r), Leopoldia tenuiflora (7:r), Lepidium spec. (35:1), Linaria vulgaris (2:1, 4:1), Linum catharticum (2:1, 58:r), L. flavum (9:1), L. tenuifolium (31:r), Lotus corniculatus (40:+), Lychnis viscaria (60:1), Malva sylvetsris (16:r), Medicago lupulina (34:2, 35:r, 51:r), M. minima (34:r), Melandrium album (38:1), Melica spec. (31:+), Melilotus albus (53:r), Minuartia setacea (29:1, 36:1), Nigella arvensis (28:r), N. rossica (23:r, 24:r), Oberna behen (34:r), O. comutata (1:r), Onobrychis arenaria (44:1), Onosma rigida (18:1), Otites densiflora (15:+), O. donetzicus (31:r), Oxytropis pilosa (5:r, 31:1), Papaver rhoeas (4:r), Peucedanum cervaria (41:+), Phalachroloma annuum (41:r, 55:r), Phlomis tuberosus (57:+, 58:1), Picris hieracioides (23:r), Pilosella bauhinii (25:r, 45:r), P. glaucescens (14:1), Pimpinella saxifraga (49:1, 52:r, 53:r), Plantago lanceolata (28:r, 35:r), P. media (41:r, 51:r), Poa nemoralis (57:+), Polycnemum arvense (31:r, 33:r, 35:r), Polygala comosa (41:r), Polygonatum odoratum (41:+), Polygonum aviculare (34:r), Potentilla canescens (32:r, 35:r), P. intermedia (1:1, 3:1), P. pilosa (22:r, 59:+), P. recta (34:+), Poterium sanguisorba (31:1, 52:r), Prunus spinosa (1:1, 55:r, 58:r), Pulsatilla pratensis subsp. nigricans (26:r), Reseda lutea (11:r, 17:+, 19:1), R. rubiginosa (23:r, 57:r), Seseli annuum (51:r), Setaria spec. (31:r), S. viridis (34:r, 35:r), Silene nutans (26:r), S. viscosa (42:+), Spergula arvensis (23:r, 28:r), Stachys germanica (23:r), Taraxacum officinale (13:1, 14:1, 18:1), Taraxacum spec. (34:r), Thlaspi perfoliatum (9:+), Thymus spec. (31:r, 35:r), Torilis japonica (59:+), Tragopogon orientalis (54:r, 55:r), Tragopogon spec. (35:r), Ulmus laevis (55:+), Urtica dioca (52:r), Valeriana stolonifera (42:+, 43:r), Veratrum nigrum (25:r), Verbascum densiflorum (34:r), V. incana (42:r, 43:r, 45:r), V. persica (35:r), V. prostrata (45:1), V. verna (60:+), Viola arvensis (34:r), V. hirta (26:r, 41:r), V. matutina (58:+, 60:+). **Other bryophytes and lichens:** Amblystegium serpens (1:r), Anomodon viticulosus (52:r), Barbula unguiculata (13:1), Barbula spec. (26:1), Brachythecium glareosum (3:+), B. velutinum (1:+), Cladonia furcata (60:+), C. pocillum (41:1, 42:r, 48:1, 54:1), Ditrichum flexicaule (51:r), Encalypta streptocarpa (35:1), Endocarpon pussilum (35:r), Hedwigia ciliata (60:1), Homalothecium sericeum (5:1, 26:1, 51:r), Leucodon sciuroides (24:r), Mannia fragrans (32:r), Peltigera degenii (52:r), Plagiomnium affine (21:r, 52:2), Polytrichum piliferum (2:+), Porella platyphylla (21:r), Pottia truncata (32:r), Pterygoneurum subsessile (41:1), Schistidium apocarpum (8:1, 41:1), Toninia sedifolia (32:r), Tortella inclinata (12:1, 13:1), Tortula intermedia (52:+), Weissia spec. (32:r).

Supplement S4. Synoptic table of the alliances with phi fidelity coefficients. Alliances are: 1 – *Cirsio-Brachypodion pinnati* , 2 – *Galio campanulati-Poion versicoloris* , 3 – *Alysso-Sedion* .

Beilage S4. Übersichtstabelle der Verbände mit Gesellschaftstreuekoeffizienten *phi*. Die Verbände sind: 1 – *Cirsio-Brachypodion pinnati* , 2 – *Galio campanulati-Poion versicoloris* , 3 – *Alysso-Sedion* .

Alliance	1	2	3
Number of relevés	43	43	32
Bupleurum falcatum	76.1	–	–
Sesleria heuflerana	70.8	–	–
Ranunculus zapalowiczii	57.7	–	–
Anthyllis vulneraria	54.9	–	–
Plantago media	53.7	–	–
Inula ensifolia	53.6	–	–
Campanula glomerata	52.0	–	–
Pimpinella saxifraga	50.8	–	–
Briza media	49.0	–	–
Euphrasia stricta	49.0	–	–
Chamaecytisus ruthenicus	49.0	–	–
Helictotrichon desertorum	47.8	–	–
Filipendula vulgaris	45.9	–	–
Gypsophila fastigiata	45.9	–	–
Anemone sylvestris	45.9	–	–
Carex humilis	45.1	–	–
Anthericum ramosum	44.8	–	–
Onobrychis arenaria	44.6	–	–
Helianthemum nummularium	42.6	–	–
Lembotropis nigricans	42.6	–	–
Astragalus austriacus	41.3	–	–
Leucanthemum vulgare	39.2	–	–
Knautia arvensis	39.2	–	–
Campanula rotundifolia	37.9	–	–
Viola ambigua	37.5	–	–
Agrimonia eupatoria	37.5	–	–
Veronica spicata	35.9	–	–
Trifolium medium	35.6	–	–
Ranunculus polyanthemos	35.6	–	–
Adonis vernalis	34.3	–	–
Poterium sanguisorba	33.9	–	–
Jurinea mollissima	33.5	–	–
Campanula sibirica	33.4	–	–
Asperula cynanchica	33.2	–	–
Salvia verticillata	32.7	–	–
Arabis hirsuta	31.6	–	–
Peucedanum cervaria	31.6	–	–
Lotus corniculatus	31.6	–	–
Chamaecytisus blockianus	30.1	–	–
Thesium linophyllon	30.1	–	–
Linum catharticum	29.7	–	–
Centaurea species	27.2	–	–
Serratula tinctoria	27.2	–	–
Carlina vulgaris	27.2	–	–
Iris hungarica	27.2	–	–
Trifolium montanum	27.2	–	–
Centaurea marschalliana	27.2	–	–
Euphorbia volhynica	27.2	–	–
Thesium arvense	27.2	–	–
Echium russicum	27.2	–	–
Malus praecox	27.2	–	–
Fragaria viridis	26.6	–	–
Teucrium chamaedrys	26.1	–	–
Linum flavum	25.7	–	–
Hypericum perforatum	25.5	–	–
Thymus pulegioides	24.7	–	–
Thymus marschallianus	24.7	–	–
Scabiosa ochroleuca	24.6	–	–
Centaurea scabiosa	23.4	–	–
Aster amellus	22.4	–	–
Brachythecium albicans	22.1	–	–
Allium senescens s. montanum	21.7	–	–
Securigera varia	21.0	–	–

Fortsetzung auf der Rückseite
Continued on back page

Alliance	1	2	3
Number of relevés	43	43	32
Melica transsilvanica	–	54.5	–
Sempervivum ruthenicum	–	50.6	–
Elytrigia intermedia	–	50.0	–
Cephalaria uralensis	–	49.8	–
Schivereckia podolica	–	49.1	–
Chamaecytisus austriacus	–	43.4	–
Cerasus fruticosa	–	40.3	–
Poa versicolor	–	38.9	–
Nonea pulla	–	38.7	–
Falcaria vulgaris	–	38.7	–
Cleistogenes serotina	–	38.2	–
Gypsophila thyraica	–	37.1	–
Botriochloa ischaemum	–	36.8	–
Festuca valesiaca	–	35.2	–
Hylotelephium maximum	–	34.3	–
Seseli libanotis s. intermedium	–	34.1	–
Salvia nemorosa	–	34.1	–
Astragalus monspessulanus	–	33.1	–
Centaurea stoebe	–	31.1	–
Melampyrum arvense	–	30.6	–
Veronica prostrata	–	30.0	–
Chamaecytisus podolicus	–	30.0	–
Galium exoletum	–	30.0	–
Stachys recta	–	28.0	–
Anthemis tinctoria s. subtinctoria	–	26.8	–
Astragalus onobrychis	–	26.3	–
Otites eugeniae	–	26.1	–
Consolida regalis	–	25.8	–
Melica ciliata	–	25.8	–
Asparagus polyphyllus	–	25.8	–
Reseda lutea	–	25.8	–
Stipa pennata	–	25.8	–
Stipa pulcherrima	–	23.8	–
Eryngium campestre	–	23.0	–
Artemisia campestris	–	21.2	–
Teucrium montanum	–	20.8	–
Alyssum calycinum	–	–	63.6
Tortula ruralis	–	–	61.3
Arenaria serpyllifolia	–	–	58.3
Sedum acre	–	–	55.1
Sedum sexangulare	–	–	53.8
Festuca ovina	–	–	50.9
Asplenium ruta-muraria	–	–	46.6
Bryum argenteum	–	–	45.2
Berteroa incana	–	–	42.6
Ajuga chia	–	–	42.6
Allium podolicum	–	–	39.9
Xanthoria polycarpa	–	–	39.7
Koeleria cristata	–	–	38.5
Homalothecium lutescens	–	–	37.7
Sideritis montana	–	–	36.5
Poa angustifolia	–	–	35.4
Abietinella abietina	–	–	35.1
Xanthoria species	–	–	34.0
Lactuca serriola	–	–	33.5
Poa bulbosa	–	–	33.1
Pilosella praealta	–	–	33.1
Encalypta vulgaris	–	–	32.7
Arabidopsis thaliana	–	–	29.5
Carduus acanthoides	–	–	29.5
Fulgensia species	–	–	29.5
Centaurea diffusa	–	–	29.5
Chelidonium majus	–	–	29.5
Veronica incana	–	–	29.5
Linaria genistifolia	–	–	28.4
Verbascum phlomoides	–	–	27.2
Artemisia austriaca	–	–	27.2
Lappula squarrosa	–	–	26.4
Acinos arvensis	–	–	26.2
Cardaminopsis arenosa	–	–	25.4
Polycnemum arvense	–	–	25.4
Cladonia pocillum	–	–	25.4
Artemisia absinthium	–	–	22.4
Cichorium intybus	–	–	21.5
Achillea millefolium	–	–	19.9