

Vegetation of mesic hay meadows and pastures in the Asiago Plateau (south-eastern Prealps, Veneto, Italy)

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Key words: *Arrhenatherion*, Asiago Plateau, *Festuca rubra*-*Cynosurus cristatus* pastures, mat-grass swards, mountain hay meadows, phytosociology

Ključne besede: *Arrhenatherion*, planota Asiago, *Festuca rubra*-*Cynosurus cristatus* pastures, travišča z volkom, gorski senožetni travniki, fitosociologija

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Abstract

The vegetation of mesic mown meadows and areas under summer cattle pastures in the prealpine carbonatic Asiago Plateau was surveyed through 114 original phytosociological relevés that were collected according to the Braun-Blanquet approach. A further 12 vegetation-plots come from the literature, totalling 126 relevés analysed. Cluster analysis was first applied to local stands before being applied in a comparison of the resulting relevé groups to selected associations from the alpine range, allowing the recognition of several associations/plant communities. Mesic hay meadows belong to the associations *Holcetum lanati*, *Ranunculo repentis-Alopecuretum* subass. *anthriscetosum* and the widespread *Centaureo carniolicae-Arrhenatheretum*. Within the latter, the new meso-xeric subassociation *Centaureo carniolicae-Arrhenatheretum avenuletosum pubescentis* is described. Some examples of mountain hay meadows (*Centaureo transalpinae-Trisetetum flavescentis*) which are declining just about everywhere in the Alps were also discovered. Mat-grass grazings were classified into *Festuca stricta/sulcata-Nardus* community and *Homogyno alpinae-Nardetum*. The most common pasture type with dominating *Festuca rubra* agg. and *Cynosurus cristatus* grasses still has not an appropriate syntaxonomic classification.

Izvleček

Raziskali smo vegetacijo mezofilnih košenih travišč in površin, kjer se na predalpski karbonatni planoti Asiago poleti pase govedo, in naredili 114 originalnih vegetacijskih popisov v skladu z Braun-Blanquetovo metodo. Dodatnih 12 popisov je iz literature, tako da smo v analize vključili 126 popisov. Najprej smo naredili klastersko analizo na lokalnih sestojih, nato pa smo dobljene skupine popisov primerjali z izbranimi asociacijami iz Alp, kar nam je omogočilo prepoznavo številnih asociacij in rastlinskih združb. Mezofilna košena travišča uvrščamo v asociacije *Holcetum lanati*, *Ranunculo repentis-Alopecuretum* subass. *anthriscetosum* in široko razširjeno *Centaureo carniolicae-Arrhenatheretum*. Znotraj te smo opisali nov mezo-kserofilno subasociacijo *Centaureo carniolicae-Arrhenatheretum avenuletosum pubescentis*. Odkrili smo tudi nekatere primere gorskih košenic (*Centaureo transalpinae-Trisetetum flavescentis*), ki so povsod v Alpah v upadanju. Pašnike z volkom uvrščamo v združbo *Festuca stricta/sulcata-Nardus* in asociacijo *Homogyno alpinae-Nardetum*. Najbolj pogosti pašniki s prevladujočima travama *Festuca rubra* agg. in *Cynosurus cristatus* pa še vedno niso zadovoljivo sintaksonomsko uvrščeni.

Introduction

Anthropogenic grasslands are the result of the replacement of original forest and open woodland vegetation as consequence of human logging. These man-made ecosystems include pastures, i.e. grassland for livestock, and meadows, where grass is regularly mowed. The predominance of low-intensity land use is responsible for the establishment of semi-natural grasslands distinguishing from intensive grasslands which gain place when high-intensity land use significantly alters site conditions or the vegetation composition (Dengler et al., 2014; Dengler et al., 2020). Improvement techniques comprise artificial fertilization, a higher number of mowings or stocking rates, drainage, sown productive forage grasses. In Central Europe, pastures developed from the Neolithic up to the Iron Age, whereas there is evidence of the presence of hay meadows in the Middle Ages but they have existed on a large-scale only since the 18th century (Hejman et al., 2013). Since then, meadows have developed as an essential part of the cultural landscape of Europe through their permanent extensive management (Pott, 1995; Pärtel et al., 2005; Poschod et al., 2009). Nowadays, agriculture intensification and the abandonment of a traditional use of the land constitute a fatal mix responsible for the biodiversity decline of mesic permanent pastures (E2.1a in the EUNIS classification) and hay meadows (E2.2 and E2.3) that are classified as vulnerable habitat throughout Europe (Janssen et al., 2016).

Since the 1990s in northeastern Italy, it has been argued that mown meadows, especially those in the mountains, were destined to disappear due to ongoing socio-economic changes and, consequently, their abandonment and reversion to scrub stage (Poldini & Oriolo, 1995a). Follow-up studies on the decline of agriculture or high intensity management techniques in the mountain belt confirmed this prediction (e.g. Tasser & Tappeiner, 2002; Tasser et al., 2007; Sitzia & Trentanovi, 2011; Bonari et al., 2025), in so far as lowland and mountain hay meadows are in a poor state of preservation (Angelini et al., 2021). In the continuing debate regarding desired updates to the Habitats Directive (92/43/EEC), the inclusion of the mesic permanent pastures from the plain to the sub-montane areas of northern Italy (*Cynosurion cristati*) as a new habitat subtype within the type 6510 “Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)” has been suggested (Bonari et al., 2023).

Only few data on mesic grasslands of the Asiago Plateau are available, some deal with the fodder evaluation of the pastures (Gerola & Gerola, 1955; Da Ronch et al., 2005a), some other contributed to the phytosociological typification of *Arrhenatherum elatius* meadows along

the Venetian Pre-Alps (Buffa et al., 1995). Marchiori & Sburlino (1989) provided only descriptive phytosociological information.

This paper aims describing and classifying, from a phytosociological point of view, mesic mown meadows and pastures that occur in the Asiago Plateau as part of South-Eastern Prealps in Italy.

Materials and Methods

Study area

The Asiago Plateau extends for over 600 km² in the south-eastern Italian Prealps and ranges from about 300 m to over 2,300 m a.s.l. According to the SOIUSA classification of the Alps (Marazzi, 2006), the mountain area belongs to the Venetian Prealps and is included in the Vicenza Prealps subsection. The area is separated from the Lagorai Chain by the Valsugana to the North, it borders the Grappa Massif to the East and the Tonezza Plateau to the West (Figure 1). The stratigraphic sequence consists of carbonate rocks: outcrops of Main Dolomite, Calcarei Grigi Group, Rosso Ammonitico Veronese and Maiolica are widespread in the survey areas (Barbieri & Grandesso, 2007). The Asiago Plateau can be subdivided into four main geomorphological sub-units (Pellegrini & Sauro, 1994): mown meadows are in the southern tectonic escarpment and especially in the central basin, whereas pastures spread in the lower belt of the northern plateau. As regards mown meadows, *Aremonio-Fagion* is the reference alliance: potential natural forest vegetation includes mixed common ash-beech (cf. *Hacquetio-Fagetum*) and hop hornbeam-woods (*Quercion pubescenti-petraeae*) in the tectonic escarpment, whereas *Dentario-Fagetum* can be considered the potential vegetation in the central basin. Low altitude pastures develop where high mountain *Fagus*-woods or *Abies-Fagus* mixed forests are, while at high altitudes natural disappearance of *Fagus* is being supplanted by increasing conifers (*Picea*, *Larix*) (cf. *Homogyno sylvestris-Piceetum*).

According to the Worldwide Bioclimatic Classification System (Rivas-Martínez et al., 2011), the central basin of the Asiago Plateau belongs to the temperate-oceanic bioclimate, upper supra-temperate thermotype, lower hyperhumid ombrotype.

Data analysis

The vegetation of hay meadows and cattle summer grazing areas in the Asiago Plateau was studied according to the phytosociological method (Braun-Blanquet, 1964). This analysis included 114 original relevés, supplemented by 12 previously published relevés dealing with mown *Arrhenatherum elatius* meadows (Buffa et al., 1995). Thus,

the whole data set formed a matrix of 126 relevés by 345 taxa. Location, date and geographical coordinates of original relevés and source of the published ones are listed in Appendix 1. Appendix 3 provides a relevé we did not include in the matrix because we recorded only a single stand of the coenosis which it represents (*Rumicetum alpini*). In multivariate analyses some taxa were considered as aggregates, namely: *Achillea millefolium*, *Alchemilla vulgaris*, *Anthoxanthum odoratum* (*A. odoratum* + *A. alpinum*), *Centaurea nigrescens*, *Leucanthemum vulgare*, *Festuca rubra* (*F. rubra* + *F. nigrescens*), *Lotus corniculatus* (*L. corniculatus* + *L. alpinus*). It is likely that misidentifications led to attribute to *Luzula alpina* specimens belonging to *L. exspectata* which was not distinguished (see Bačič et al., 2019). Cover values meet the Braun-Blanquet scale but with Barkman et al.'s modification (1964) regarding 2a and 2b scores. The species scores were converted in the corresponding percentage values according to Lepš & Hadincová (1992) and Gigante et al. (2012) as concerns 2a and 2b scores; the same data transformation type was chosen for the subset of mat-grass sward matrix (38 relevés by 198 taxa) that included also 11 published relevés occurring in the study area (Giovagnoli & Tasinazzo, 2014). In both cases data were subjected to hierarchical agglomerative Q-mode clustering according to the un-

weighted pair-group method (UPGMA) on a percentage difference (Bray-Curtis) dissimilarity matrix with log-transformed values to satisfy the condition of computing in an euclidean space (Borcard et al., 2018). The synthetic tables we obtained as regards mat-grass swards, *Anthriscus sylvestris*-rich meadows and mountain to high-mountain *Festuca rubra* agg. pastures were put in comparisons with selected synthetic tables from prealpine, alpine or central European territories to reach a correct phytosociological interpretation or delimitation of found plant communities (Appendix 2). In these cases, chord distance matrices (*Nardus* swards: 21 by 540; *A. sylvestris* meadows: 6 by 204; *F. rubra* pastures: 24 by 471) underwent UPGMA clustering method, after we had aggregated some related taxa. Statistical analyses were carried out using R (R Core Team, 2025). Similarity matrices and cluster analysis were performed using the vegan R package (Oksanen et al., 2022). With few exceptions (*Campanula witasekiana* Vierh., *Carduus defloratus* subsp. *tridentinus* (Evers) Ladurner, *Phyteuma zahlbruckneri* Vest, *Rhinanthus freynii* (Sterneck) A.Kern. ex Fiori, *R. alectorolophus* (Scop.) Pollich), taxonomic nomenclature follows the online flora Euro+Med (2025). Syntaxonomic nomenclature of higher syntaxa follows the EuroVegChecklist, EVC (Mucina et al., 2016; FloraVeg.EU 2025).

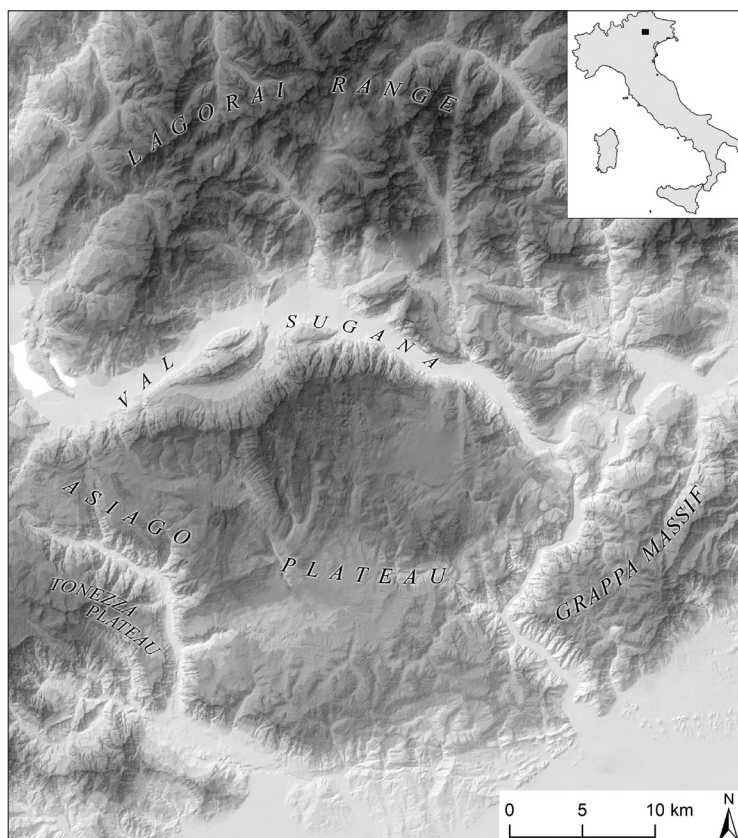


Figure 1: The Asiago Plateau within the southeastern Prealpine Chain context.

Slika 1: Planota Asiago v predelu jugovzhodnega Predalpskega gorovja.

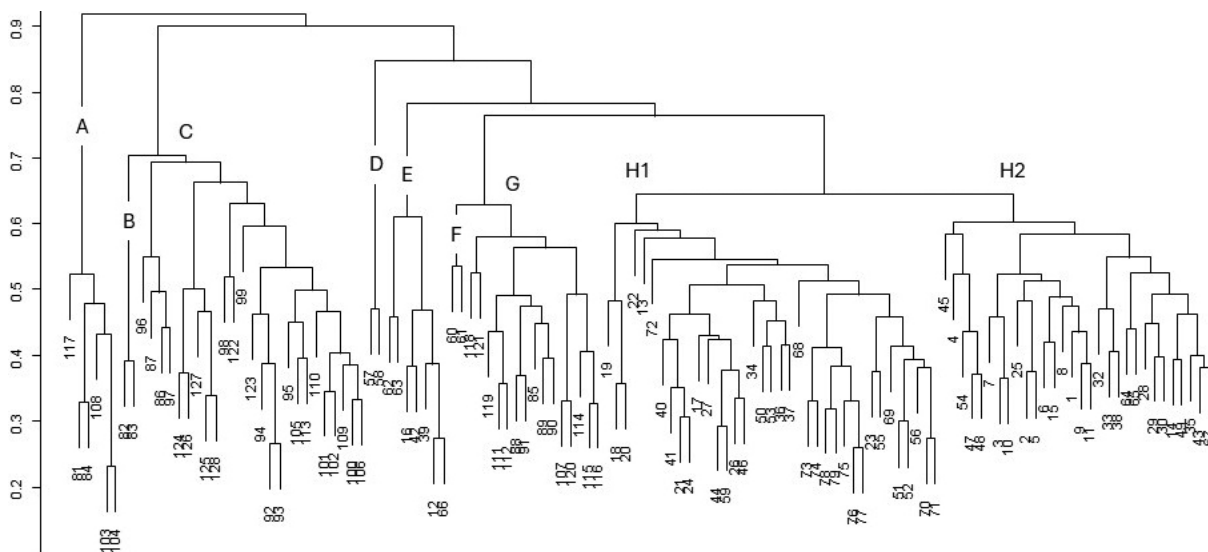


Figure 2: Classification of the hay meadows and pastures from the Asiago Plateau (log-transformed data, Bray-Curtis/UPGMA). A: *Alchemillo-Poetum*; B: *Festuca stricta/sulcata-Nardus* community; C: *Homogyno-Nardetum*; D: *Holcetum lanati*; E: *Ranunculo-Alopecuretum anthriscetosum*; F: *Centaureo-Trisetetum*; G: *Festuca rubra-Cynosurus cristatus* community; H1: *Arrhenatherum elatior*-dominating form of *Centaureo-Arrhenatheretum*; H2: *Centaureo-Arrhenatheretum avenuletosum pubescentis*.

Slika 2: Klasifikacija senožeti in pašnikov s planote Asiago (log-transformirani podatki, Bray-Curtis/UPGMA). A: *Alchemillo-Poetum*; B: združba *Festuca stricta/sulcata-Nardus*; C: *Homogyno-Nardetum*; D: *Holcetum lanati*; E: *Ranunculo-Alopecuretum anthriscetosum*; F: *Centaureo-Trisetetum*; G: združba *Festuca rubra-Cynosurus cristatus*; H1: oblika s prevladujočo vrsto *Arrhenatherum elatior* asociacije *Centaureo-Arrhenatheretum*; H2: *Centaureo-Arrhenatheretum avenuletosum pubescentis*.

Results and Discussion

The cluster analysis supported the identification of nine groups corresponding to as much plant communities which are addressed below according to the resulting order from left to right (Figure 2).

Alchemillo hybridae-Poetum supinae
Aichinger 1933 corr. Oberd. 1971

Local diagnostic species. *Ochlopoa supina*, *Veronica serpyllifolia*, *Barbarea bracteosa*, *Ochlopoa annua*.

Floristic composition. The association is characterised by the large dominance of *Ochlopoa supina* which encompasses most of stand biomass (Table 1). It looks like a dwarf-grass pasture where most of more frequent species are creeping hemicryptophytes (*Trifolium repens*, *Veronica serpyllifolia*, *Ranunculus repens*) contributing to its compact appearance. Since only few species tolerate the conditions, the species number per relevé is low (13; sd: 2.4).

Syntaxonomy. The association was first described by Aichinger (1933) with *Ochlopoa supina*, *Alchemilla hybrida* and *Veronica serpyllifolia* as character species. Apart from the correction of *Alchemilla hybrida* with *A. vulgaris* coll., the diagnostic species remained quite similar in the following contributions from various Eu-

ropean countries (Oberdorfer, 1993; Poldini & Oriolo, 1995a; Hájková et al., 2010), underlying a certain stability of the association. This is also the case of the Asiago Plateau stands which are enriched with *Barbarea bracteosa*, a Mediterranean orophyte locally occurring in vegetation typologies affected by intensive grazing nearby cattle barns. The assignment to the alliance level has been differently interpreted: Oberdorfer (1993) attributed the association to *Polygono-Coronopodium* (as *Polygonion avicularis*), which yet includes therophyte-rich vegetation, Ellmauer & Mucina (1993) assigned it to *Poion supinae*, whereas Czech authors (Chytrý, 2010) classified it in *Cynosurion* giving the absence of subalpine and alpine species in Czech stands. Despite the low presence and frequency of character species, our original stands are anyway referred to *Poion supinae* because of ecological features and in accordance with the other available sources from Alpic provenances (Ellmauer & Mucina, 1993; Poldini & Oriolo, 1995a; <https://www.e-veg.net/app/13089>). Species of *Poo alpinae-Trisetetalia* order are well-represented.

Synecology. Heavy trampling and soil compaction cause severe, selective pressure that drives the occurrence of resistant species and the development of the zoogenic coenosis. This creates small-size turfs nearby livestock shelters, especially cattle, and their watering sites, along

paths to barns, in the high mountain belt at an altitude of 1,600–1,800 m a.s.l., where flat sites promote positive water balances and organic nutrient inputs thanks to livestock excrement.

Synchorology. It spreads in all main temperate European mountain ranges (www.e-veg.net/app/13089). As regard Italy, the only published relevés come from Friuli region (Poldini & Oriolo, 1995a). The occurrence of largely prevalent number of *Salicetea herbaceae* species and the absence of those tolerant of heavily trampled soils, except *Ochlopoa supina*, as well as *Molinio-Arrhenathereta* ones suggest that relevés from Dolomites in Pignatti & Pignatti (2016) may be referred to other associations, as discussed by the authors themselves (cf. *Poo-Cerastietum*).

EU reference habitat. None.

Conservation Status, Pressures, and Threats. Because of its origin, conservation problems as well as pressures and threats are not relevant factors.

Mat-grass swards

Original mat-grass stands were first compared with already published natural, subalpine *Nardus*-rich grasslands coming from the same study area (Giovagnoli & Tasinazzo, 2014). According to the classification, original relevés do not merge with the published ones which remain well separated and form the cluster representing *Sieversio-Nardetum* (Figure 3). Based on this result as well as on ecological considerations, new data were classified into

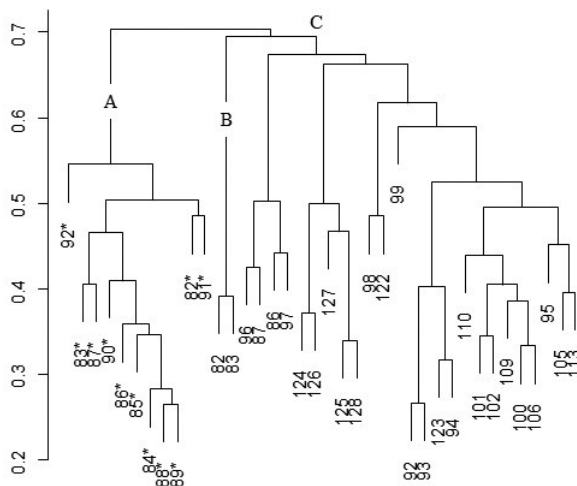
two communities we combined in Table 2: *Festuca stricta-Nardus* community (two relevés: 82, 83) and *Homogynio-Nardetum* (25 relevés).

Festuca stricta/sulcata-Nardus community

Local diagnostic species (in comparison with the other mat-grass swards). *Bromopsis erecta* subsp. *erecta*, *Festuca stricta* subsp. *sulcata*, *Thymus pulegioides*.

Floristic composition. Comparison of original and already published relevés of *Nardetum strictae* s. lat. from the study area highlights that relevés 82 and 83 are differentiated by a high proportion of thermophilous, dry grassland species of base-rich soils (*Festuco-Brometea*): *Festuca stricta/sulcata*, *Bromopsis erecta*, *Briza media* are some of the species with the highest cover values and frequencies (Table 2; Table 3). They blend with montane mat-grass pasture species (*Nardus stricta*, *Festuca nigrescens*, *Hypericum maculatum*, partly *Luzula campestris*) and mesic meadow ones (*Phlaeum rhaeticum*, *Crocus vernus/albiflorus*). Subalpine calcicolous pasture species are very sporadic, whereas species of subalpine *Nardus* communities are almost completely absent. The mean number of species per relevé is 40.5 (sd: 2.1).

Syntaxonomy. Due to the local rarity of the vegetation type, we were unable to find further sites to collect more relevés and attain a reliable syntaxonomical reference. A balanced occurrence of diagnostic species of *Nardetea strictae* and *Festuco-Brometea* characterises the two stands, as well as in *Polygalo-Nardetum* in Friuli (Poldini & Oriolo, 1997) and *Arnico-Brometum* in western Slovenia (Dakskobler, 2024). The two associations prevalently develop in the lower montane belt (from 700 to 1,250, mean 930, and from 640 to 1,130, mean 890, m a.s.l., respectively) and some relevés of *Arnico-Brometum* coming from the M. Matajur have a slightly stronger similarity with some relevés of *Polygalo-Nardetum* from the Italian side of the same mountain (Dakskobler, 2024). Comparison with the mat-grass swards from the south-eastern Alps confirms the close similarity between *Polygalo-Nardetum* and *Arnico-Brometum* (Figure 4; see also Dakskobler, 2024), despite the former is classified into *Nardetea* and the latter into *Festuco-Brometea*. The first association appears to differ from the second in the negative due to the absence of a large group of species including *Dactylorhiza sambucina*, *Luzula campestris*, *Carlina acaulis*, *Leucanthemum ircutianum*, *Ranunculus polyanthemus* s.l., *Pilosella hopenana*, *Carex pilulifera*, *Silene nutans*, *Serratula tinctoria*, and others with lower frequencies, rather than for an original combination of diagnostic species. Stands from



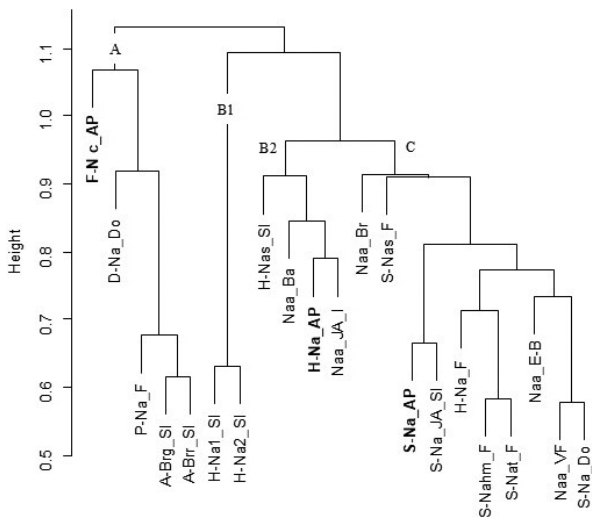


Figure 4: Classification of the synthetic tables of mat-grass swards from the Asiago Plateau (in bold) and south-eastern Alps (chord distance/UPGMA). For abbreviations see Appendix 2.

Slika 4: Klasifikacija sintetskih tabel travišč z volkom s planote Asiago (krepko) in jugovzhodnih Alp (razdalja tetive /UPGMA). Za okrajšave glej Appendix 2.

the study area are grouped with these two associations which share many frequent and diagnostic species of *Polygalo-Nardetum* or *Violion caninae* that are absent in our relevés: *Polygala vulgaris*, *Genista tinctoria*, *Festuca filiformis*, *Viola canina*, *Hypochaeris maculata*. On the contrary, mean higher elevation (1,490 m a.s.l.) characterising the stands from Asiago Plateau results in the occurrence of species that are more common in the subalpine belt, such as *Phleum rhaeticum*, *Carex ornithopoda*, *Stachys alopecurus*, *Arabis ciliata* and other. The community from the Asiago Plateau share with *Arnico-Brometum* the presence of *Dactylorhiza sambucina*, *Luzula campestris* and *Carex pilulifera*. The cluster also includes *Danthonio-Nardetum*, an association described from the Dolomites area by Pignatti & Pignatti (2014) who estimate it should be sought elsewhere in the Prealps, but Poldini & Oriolo (1997) regard it as a synonym for *Polygalo-Nardetum*. *Danthonio-Nardetum* develops in the montane belt, from (600) 1,200 to 1,500 m a.s.l. (mean 1,264) and it is classified into *Nardo-Agrostion* alliance, whereas *Polygalo-Nardetum* belongs to *Violion caninae*. With the occurrence of the only one characteristic species *Galium pumilum*, and the presence of ingressive species *Thymus pulegioides* and *Pimpinella saxifraga* from *Festuco-Brometea*, the *Violion caninae* alliance is underrepresented in our two stands. On the other hand, the *Nardo-Agrostion*, which also encompasses the swards of *Homogyno-Nardetum*, is poorly represented too (*Potentilla aurea*). Based on the above conflicting considerations and the small number

of available relevés, we prefer to classify the two relevés in the *Festuca stricta/sulcata-Nardus* community which is not assigned to any class.

Synecology. These secondary pastures develop at a mean altitude of 1,490 (sd: 28) m a.s.l. in the upper montane belt, in sites of potential beech forests (Figure 5). Despite the rock carbonatic origin, soils show well engaged acidification processes probably because of high rainfall and suboceanic climate; slopes are facing South.

Synchorology. Further data are needed.

EU reference habitat. 6230*.

Conservation Status, Pressures, and Threats. The conservation is affected by the small area occupied which is surrounded by intensive cattle and horse grazing.

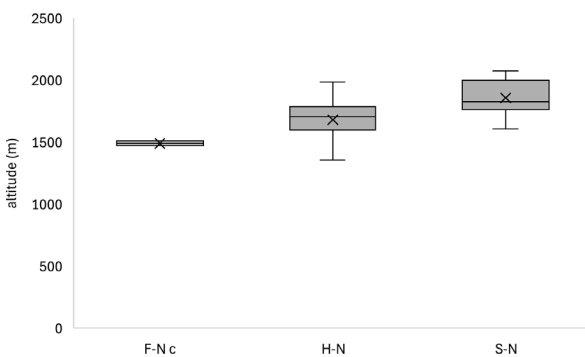


Figure 5: Box-plot of altitudinal occurrence of different *Nardus* swards in the Asiago Plateau. F-N c: *Festuca stricta/sulcata*-*Nardus* community (this study); H-N: *Homogyna-Nardetum* (this study); S-N: *Sieversio-Nardetum* (Giovagnoli & Tasinazzo, 2014).

Slika 5: Škatla z ročaji nadmorskih višin, kjer se pojavljajo različna travišča z vrsto *Nardus* na planoti Asaigo. F-N: združba *Festuca stricta/sulcata-Nardus* (ta raziskava); H-N: *Homogyno-Nardetum* (ta raziskava); S-N: *Sieversio-Nardetum* (Giovagnoli & Tasinazzo, 2014).

Homogyno alpinae-Nardetum
Mráz 1956

Local diagnostic species. *Pseudorchis albida* subsp. *albida*, *Dactylorhiza viridis* and *Ranunculus polyanthemos* subsp. *nemorosus*; *Ranunculus acris*, *Dactylorhiza fuchsii* and *Carlina acaulis* subsp. *acaulis* in comparison with the other mat-grass swards.

Floristic composition. *Nardus stricta* may reach high cover values giving the typical aspect of mat-grass sward to the pasture, but it can be also subordinate to other graminoids – such as *Anthoxanthum odoratum* agg. (*A. alpinum* p.max.p.), *Carex pilulifera*, *Agrostis capillaris*, *Festuca rubra* agg. (*F. nigrescens* p.max.p.) – and forbs (*Hypericum maculatum*, *Potentilla erecta*, *Potentilla aurea*) which share the dominance (Table 2). The latter case results in stands that are richer in species - up to 67 in semi-intensive ones around Cima Mandriolo -

than those dominated by *Nardus* which are very poor: a mean number of 45.9 (sd: 8.5) species against 31.4 (sd: 5.5). The coexistence of acidophilous and calciphilous species is responsible for the higher floristic diversity of some stands.

Syntaxonomy. Species with a prevalent submontane-montane distribution, such as *Carex caryophyllea*, *Ranunculus acris*, *Achillea millefolium*, *Hypericum maculatum*, *Carex pilulifera* and *Bistorta officinalis*, mix with sub-alpine elements (*Potentilla aurea*, *Luzula alpina*, *Geum montanum*, *Potentilla crantzii*, *Poa alpina*) highlighting the hinge role of these swards with respect to lower and upper altitude lying *Nardus* communities. This is a feature which allows us to refer these mat-grass pastures to *Homogyno-Nardetum* (Ellmauer, 1993; Poldini & Oriolo, 1997) and to include them in *Nardo-Agrostion tenuis* (Kraulec, 1985; 1990). The high incidence of *Molinio-Arrhenatheretea* species, with the important role of *Poo-Trisetetalia* (*Crocus vernus*, *Agrostis capillaris*, *Bistorta officinalis*), and *Elyno-Seslerietea* species also goes along these lines. *Ranunculus acris*, *Botrychium lunaria* (weak) and partially *Achillea millefolium* are differential species of the association shared with the neighbouring Friuli (Poldini & Oriolo, 1997). The differential species of *Homogyno-Nardetum* in Austria (Ellmauer, 1993), i.e. *Campanula scheuchzeri*, *Poa alpina*, *Phleum rhaeticum* – with the exclusion of *Crepis aurea* which is absent in the study area – are on the other hand locally in common with subalpine *Sieversio-Nardetum*. Cluster with relevés from 124 to 128 (Figure 3, Table 2) from the upper part of the Altopiano Plateau around Cima Mandriolo between 1,800 and 2,000 m a.s.l. are semi-intensive and distinguished by the occurrence of *Scorzonera aristata*, *Centaurea nervosa*, *Knautia longifolia*, *Leucanthemum heterophyllum*, *Thesium alpinum*, *Pulmonaria australis*, and *Pilosella hoppeana*. Similar ecology features and some shared floristic similarity could lead to refer our relevés to *Knautio-Trifolietum* from the Dolomites, since its character species are among the previously quoted (Pignatti & Pignatti, 2016), at least as regards to *Knautia longifolia* and *Trifolium pratense/nivale* (Pignatti & Pignatti, 2014). This controversial subspecies, also occurring in our relevés around Cima Mandriolo, is not exclusive of these stands, but also grows in stands of *Sieversio-Nardetum* (Giovagnoli & Tasinazzo, 2014). A cluster analysis that was performed ad hoc but is not reported here excluded the possibility of referring these stands to *Knautio-Trifolietum*, therefore they are treated as representative of *Homogyno-Nardetum*. Likewise, the cluster comprising relevés 86, 87, 96 and 97 (Figure 3, Table 2) with sporadic presence of *Nardus* can be regarded as a transitional form towards more natural upper pastures

due to the exclusive occurrence of *Festuca norica* and *Gentiana verna* or the high cover value of *Stachys alopecurus* (*Elyno-Seslerietea*). The attribution of the association to *Nardetalia* and *Nardetea* is assured by the presence of *Nardus stricta*, *Hypericum maculatum*, *Potentilla erecta*, *Carex pilulifera* and other less frequent species.

In the context of the southeastern Alps, stands of *Homogyno-Nardetum* from the study area show higher similarity with stands from the Italian Julian Alps which were attributed to *Nardetum alpigenum* (Lausi et al., 1981; Figure 4). Poldini & Oriolo (1997) already highlighted that the attribution of many relevés of mat-grass prairies to *Nardetum alpigenum* assumed by some Italian authors was questionable. Both synthetic tables (Table 3, Figure 4) group in cluster B2 with other *Nardus*-rich communities from the neighbouring M. Baldo but also from the Slovenian Julian Alps and the Karawanks. Synthetic tables of *Homogyno-Nardetum* from North-Eastern Slovenia group in cluster B1, whereas the synthetic tables of *Sieversio-Nardetum* and '*Nardetum alpigenum*' that develop beyond tree line assemble in cluster C. The synthetic table of *Sieversio-Nardetum* from the study area bears more resemblance to that from the Slovenian Julian Alps. The synthetic table of *Homogyno-Nardetum* from Friuli Venezia-Giulia is also in cluster C. If we consider synthetic tables in B1 and B2 as representative of *Homogyno-Nardetum*, including also that from Friuli, the species *Ranunculus acris*, *Trifolium repens*, *Luzula sylvatica* s.l., *Veronica chamaedrys*, and *Polygala alpestris* appear to distinguish this association from *Sieversio-Nardetum* (cluster C) and from coenoses with higher number of thermophilous species (cluster A). In comparison with *Sieversio-Nardetum*, to a lesser extent also *Hypericum maculatum*, *Achillea millefolium*, *Veronica chamaedrys*, *Galium pumilum*, *Carex montana*, *Luzula campestris*, and *Plantago lanceolata* contribute to differentiate *Homogyno-Nardetum*. In the subalpine-alpine belt *Sieversio-Nardetum* shows a group of species that clearly separate it from *Homogyno-Nardetum*: *Geum montanum*, *Carex sempervirens*, *Scorzonoides helvetica*, *Phyteuma hemisphaericum*, and *Helictochloa versicolor* appear as the principal diagnostic species of the association.

Synecology. These swards occur at a mean altitude of 1,680 (sd: 169) m a.s.l., a slightly higher elevation than *Festuca stricta/sulcata*-*Nardus* community. The potential natural vegetation is beech or beech-fir forests at lower altitudes with the increasing presence of spruce at higher altitudes. The sites are predominantly facing South. The *Vaccinio-Piceetea* characteristic species *Homogyne alpina* and *Luzula sylvatica/sieberi*, and *Maianthemum bifolium*, all with low frequency, are reminiscences of

acidophilous forests. In mat-swards of *Festuca stricta/sulcata*-*Nardus* community from the montane belt they are substituted by *Knautia drymeia* (*Carpino-Fagetea*).

Synchorology. The occurrence of the association was first described from the Slovakian Western Carpathians (Mráz, 1956), then it was extended to the Alps (Ellmauer, 1993). Poldini & Oriolo (1997) reported it for the first time in Italian territories, hypothesizing its presence also in other south-eastern prealpine areas through the analysis of relevés included in previous contributions that Italian authors attributed to *Nardetum alpigenum* s.l. The issue is waiting for a revision.

EU reference habitat. 6150.

Conservation Status, Pressures, and Threats. The association alternates with stands of *Festuca-Cynosurus* community, whose mat-grass swards can be regarded as an evolutionary stage toward afforestation (Pedrotti, 1963; Marchiori & Ros, 1980). Intensification of cattle grazing can affect the eutrophication and related degradation of the habitat (Galvnek & Jank, 2008). On the contrary, the most species-rich stands at higher elevation (Cima Mandriolo) are affected by the land abandonment and subsequent invasion of dwarf juniper scrub (*Juniperus communis/nana*).

Holcetum lanati Issler 1934

Local diagnostic species. *Carex nigra*, *Equisetum palustre*, *Juncus inflexus*, *Scirpus sylvaticus*, *Carex panicea*, *Taraxacum* sect. *Palustria*.

Floristic composition. *Holcus lanatus* is present as a dominant species heavily marking the structure of this hay meadow (Figure 6). Hygrophilous species distinguish this type from *Arrhenatherum*-dominated sympatric mesic meadow, where *Holcus lanatus* can be found too, but with lower cover and frequency (Table 4). Grasses and graminoids encompass more than half of the species occurring in stands. The mean number of species per relev is 31 (sd: 0).

Syntaxonomy. *Holcus lanatus* is recognised as a species with a wide ecological valence (e.g. Kovř, 1981; Stan, 2008), making it problematic to associate its abundant occurrence to a well-defined association (e.g. arni, 2001). The switch from the sometimes adopted ‘*Holcus lanatus* community’ to the described *Holcetum lanati* association is related to the occurrence of hygrophilous species belonging to wet grasslands or fens along with the typical contingent of hay meadow mesic elements. With *Carex nigra*, *C. panicea*, *Juncus articulatus*, *Taraxacum* sect. *Palustria* (*Scheuchzerio palustris*-*Caricetea fuscae*), *Eleocharis mamillata/austriaca*, *Poa palustris*, *Glyceria notata* (*Phragmito-Magnocaricetea*) and *Equi-*

setum palustre, *Scirpus sylvaticus*, *Cardamine pratensis* agg. (*Molinietalia*) the number of hygrophilous species is such that it appears plausible to refer relevs 57 and 58 (Table 4) to the association level (*Holcetum lanati*). The framing of the coenosis in the upper syntaxonomical level was differently interpreted by various authors, some including it in *Calthion* (Kovř, 1981; Blakov, 1992), others in *Deschampsion cespitosae* (Hjkov et al., 2010; Klimantov, 2017; www.e-veg.net/app/13360, as *Alopecuro pratensis*-*Holcetum lanati*) and some other in *Arrhenatherion elatioris* (Stan, 2008). This is not a simple issue; however, the last solution fits better as regards our stands. The Italian vegetation prodrome (Biondi et al., 2014) excludes from the national borders *Deschampsion cespitosae*, an alliance spreading in floodplains of (sub)continental Central and Eastern Europe (Mucina et al., 2016). In any case, the prevalent occurrence of *Arrhenatheretalia* species (*Trifolium dubium*, *Cerastium holosteoides*, *Lolium perenne* etc.)



Figure 6: Stand of *Holcetum lanati* (rel. 58, C. Vescovi-C. Valle (Asiago), Asiago Plateau)).

Slika 6: Sestoje asociacije *Holcetum lanati* (popis 58, C. Vescovi-C. Valle (Asiago), plato Asiago)).

against *Molinietalia* and ecological features relating to the moisture of soil argue in favour of the attribution of our stands to *Arrhenatherion*. It was already noticed that the reference alliance can change according to climate: under oceanic conditions, such as in the study area, the *Holcus lanatus* grasslands are close to *Arrhenatherion* vegetation (Černý, 2010). The occurrence of *Carex hirta* and the low species number might relate to the *Carex hirta*-variant Černý (2010) writes about, identifying it with the *Holcetum lanati cirsietosum cani*.

Synecology. Stands develop in slight slope sites which are moistened by water sources emerging to the surface. This results in dampen soil becoming mesic later in the season with the decreasing of surface water supply in coincidence with the lowering of the ground water. Despite its euryoecious features, *Holcus lanatus* benefits from fertile soils which are first saturated with water and then dry-up (Kovář, 1981). The association locally borders with a *Filipendula ulmaria* tall-herb stands and the *Centaureo-Arrhenatheretum* mesic meadows, depending on the greater extent of water saturation or deeper water table respectively.

Synchorology. The association probably spreads throughout temperate Europe, from France through Central Europe to the Balkan Peninsula (www.e-veg.net/app/13360), with an occurrence that can still be considered underestimated (Černý, 2010). This is the first report from Italy.

EU reference habitat. 6510

Conservation Status, Pressures, and Threats. The conservation status must be considered unfavorable due to the small areas covered by the community. Post-mowing grazing, and possible changes in the hydrological balance due to water regulating measures are among the main pressures and threats.

Ranunculo repentis-Alopecuretum pratensis Ellmauer in Ellmauer et Mucina 1993 **anthriscetosum** Ellmauer 1995

Local diagnostic species. *Anthriscus sylvestris* (dom.), *Alopecurus pratensis* (sudom.), *Lamium album*, *Rumex arifolius*, *Urtica dioica*.

Floristic composition. In this hay meadow *Anthriscus sylvestris*, in particular, and *Alopecurus pratensis* physiognomically distinguish the stands, due to their constantly high coverage values and height (Table 4). In the lower layers other species occur with high frequency: *Ranunculus acris*, *Heracleum sphondylium/sphondylium* (at the time of first mowing), *Rumex acetosa/acetosa*, *R. arifolius*, *Poa trivialis* s.l., *Lamium album*, *Taraxacum* sect. *Taraxacum*.

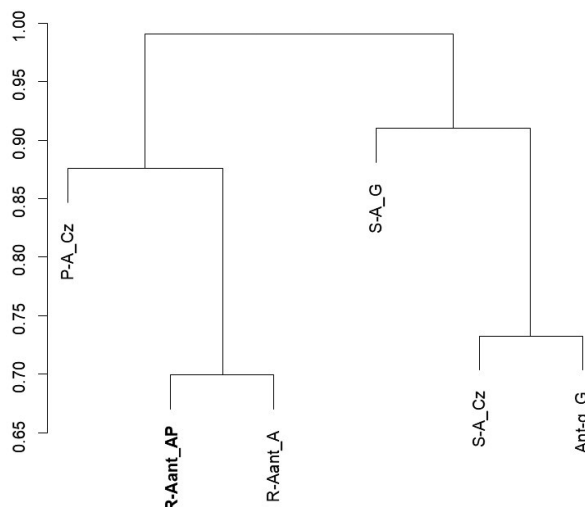


Figure 7: Classification of the synthetic tables of *Anthriscus sylvestris*-dominating meadows from the Asiago Plateau (in bold) and some European related association (chord distance/UPGMA). For abbreviations see Appendix 2.

Slika 7: Klasifikacija sintetske tabele travišč s prevladujočo vrsto *Anthriscus sylvestris* s planote Asiago (in krepko) in nekaterih sorodnih asociacij iz Evrope (razdalja tetive/UPGMA). Za okrajšave glej Appendix 2.

Syntaxonomy. The classification (Figure 2) separates the stands with abundant *Anthriscus sylvestris* and *Alopecurus pratensis* from the traditional hay meadows of *Centaureo-Arrhenatheretum* which then cannot be referred to. To discover their appropriate syntaxonomic position a synoptic table was arranged including comparable *Anthriscus sylvestris* or *Alopecurus pratensis* rich communities from Central Europe (Table 5). An *Anthriscus sylvestris*-dominating coenose was first reported by Passarge (1975) from Central Germany as a fringe community thriving along ditches and roads in an area of mesic mown meadows where some type of earthmoving occurred (*Symphyto officinalis-Anthriscetum*). A little later Hadač (1978) described *Anthriscetum sylvestris* along road ditches from Moravia, today considered as a synonym of *Symphyto-Anthriscetum* (Láníková, 2009) that belongs to *Aegopodion*. According to Figure 7, also the roadside relevés in Lower Saxony that Brandes (1988) attributed to *Arrhenatherion*, but in contact with *Aegopodion* communities, can be likely referred to this last association. The synthetic table representing relevés from the study area joins the synthetic table of hay meadows of *Ranunculo repentis-Alopecuretum pratensis anthriscetosum* from Austria (Ellmauer, 1995), which belongs to *Arrhenatherion elatioris*, and that of *Poa trivialis-Alopecuretum pratensis* (Hájková et al., 2010) with a lesser degree of similarity. Slovak and Czech authors (Uhliarová & al., 2007; Kučera, 2010) speculate that *Ranunculo-Alopecuretum* is interpretable as *Poo-Alope-*

curetum, a coenose framed inside *Deschampsion cespitosae*. The latter appears confined to regularly flooded sites (see also Stančić, 2008), resulting in the presence of several moisture-demanding species, such as *Carex acuta*, *C. vulpina*, *Cerastium dubium*, *Inula britannica*, *Phalaris arundinacea*, *Sanguisorba officinalis* ecc. These species lack in our stands that develop in an ecologic context devoid of flooding influences and related to *Arrhenatherion* alliance (*Arrhenatherum elatius*, *Crepis biennis*). Regardless of the different approach adopted by the authors mentioned above for the classification of this type of meadows, i.e. different associations or synonyms, this argues in favour of the attribution of the relevés from the Asiago Plateau to *Ranunculo-Alopecuretum anthriscetosum*.

Synecology. The association locally grows where abundant spreading of cow slurry on *Arrhenatherum elatius* montane meadows takes place. Grasslands are mainly used for hay production, but also periodical horse grazing was observed. Gently sloping or flat fields originating moist soils rich in organic matter are preferred sites. The excessive spreading of slurry affects the floristic composition allowing the high nitrate demanding species such as *Anthriscus sylvestris* and *Alopecurus pratensis* to achieve dense populations and to be predominant. Consequently, there is a clear lowering of the mean number of species per relevé (21.7, sd 6.7) with respect to the *Arrhenatherum*-rich form of the other meadow association growing in the study area (*Centaureo-Arrhenatheretum*: 36.9, sd 7.9).

Synchorology. The association is documented from Central and Eastern Europe: Austria (Ellmauer & Mucina, 1993), Slovenia (Čarni, 2001; Šilc & Čarni, 2012), Bulgaria (Velev et al., 2011), Hungary (Lengyel et al., 2016). Ellmauer (1993) included in the association also the *Arrhenatherum elatioris* subass. *Alopecurus pratensis* from Tüxen (1937), extending its occurrence to Germany. The subass. *anthriscetosum* is documented from Austria (Ellmauer, 1995). As regards Italy, the association is only reported, without vegetation data, from South Tyrol (Luth et al., 2011) and from Trentino province in a publication with application purposes (Scotton et al., 2012). A single relevé assigned to *Pastinaco-Arrhenatheretum* from Trentino province (Pignatti & Pignatti, 2016) should be included in *Ranunculo-Alopecuretum anthriscetosum* (our, unpublished numeric analysis).

EU reference habitat. None.

Conservation Status, Pressures, and Threats. The coenosis is expanding due to eutrophication of hay meadows by the practice of liquid cattle waste spreading followed by intensive grazing in late season.

***Centaureo transalpinae-Trisetetum flavescens* (Marschall 1947) Poldini et Oriolo 1995**

Local diagnostic species. *Noccaea caerulea*, *Scorzonera rosea*.

Floristic composition. The low number of relevés does not allow for a comprehensive evaluation (Table 6). The highest layer does not exceed half a metre. Various mid-high grasses (*Dactylis glomerata*, *Avenula pubescens*, *Phleum* spp.), with the significant exclusion of *Arrhenatherum elatius*, develop alongside tall herbs such as *Ranunculus acris*, *Trollius europaeus*. The ground level layer appears rich (*Trifolium repens*, *Crocus vernus*, *albiflorus*, *Viola tricolor/alpestris*, *Cerastium fontanum*, *vulgare*).

Syntaxonomy. Surveyed hay meadows with the relevés 60 and 61 (Table 6) are well separated from cluster including grasslands of *Centaureo-Arrhenatheretum*; on the contrary, they join the cluster representing the *Festuca-Cynosurus* community but at higher level than the remaining relevés (Figure 2). Strictly characteristic species of *Arrhenatherion*, i.e. *Arrhenatherum elatius* and *Crepis biennis*, are absent, and species of *Poo-Trisetetalia* prevail over *Arrhenatheretalia*. The occurrence of *Noccaea caerulea* is of particular significance because all authors agree on considering it as characteristic species of *Triseteto-Polygonion* (Marschall, 1947; Pedrotti, 1963; Hundt, 1985; Oberdorfer, 1993). In the study area it is quite rare and occurs only in this type of hay meadow. The two relevés (Table 6, 60 and 61) can be considered as representative of *Trisetetum flavescens* s.l. Independence of golden oat grasslands from southern Alps was recognised by Marschall (1947) based on the occurrence of southern species, particularly *Centaurea transalpina*. Poldini & Oriolo (1995a) upgraded this type of grasslands to *Centaureo-Trisetetum* which Marschall (1947) had framed at subassociation level: *Trisetetum flavescens insubricum* or *Trisetetum flavescens leponticum*. Stands from the Asiago Plateau and from neighbouring eastern areas share the presence of *Scorzonera rosea* which is considered as local differential species of the association in Friuli Venezia-Giulia, with some extension into Veneto (Poldini & Oriolo, 1995a). We therefore regard the two original relevés as representatives of *Centaureo-Trisetetum*, excluding the possible reference to *Trisetetum flavescens* which in Pignatti & Pignatti's opinion (2014) extends in the Dolomites range. Along the southeastern Slovenian Alps, the presence of *Trisetum flavescens* grassland belonging to *Astrantio-Trisetetum* was ascertained (Petras Sackl et al., 2012). The physi-

ogonomy of these meadows is determined by dominant *Trisetum flavescens*, *Astrantia major* and *Arrhenatherum elatius*, the latter two species are only very rarely or not at all recorded in the stands of *Centaureo-Trisetetum*. In the same way, high-frequency occurring species in *Astrantio-Trisetetum* (*Trifolium alpestre*, *Cirsium oleraceum*, *Bellis perennis*, *Centaurea jacea*/jacea, *Salvia pratensis* ecc.) are absent from *Centaureo-Trisetetum*. The large group of *Festuco-Brometea* dry grassland species which characterises the *Astrantio-Trisetetum* largely decreases in *Centaureo-Trisetetum* where very frequent species such as *Bromopsis erecta*, *Anthyllis vulneraria* and *Pimpinella saxifraga* lack at all. On the contrary, the diagnostic species of *Centaureo-Trisetetum* (*Scorzonera rosea*, *Knautia longifolia*, *Nocca caerulea*) are very rarely or not at all recorded in the stands of *Astrantio-Trisetetum*.

Synecology. Golden oat meadows replace *Arrhenatherum elatius* grasslands in high-mountain belt around 1,450–1,500 m a.s.l. They thrive on medium-rich nutrient soils which are mown once or twice a year and grazed later in the season. The soils are slightly acidic indicated by the occurrence of *Luzula campestris*, *Pilosella lactucella*, *Festuca filiformis*, *Potentilla aurea* etc. show. Where the grazing prevails over haymaking, that has been discontinued, the *Festuca-Cynosurus* community or *Nardus*-rich stages develop.

Synchorology. According to Poldini & Oriolo (1995a), *Centaureo-Trisetetum* occurs throughout the south-eastern Alps; on the Asiago Plateau, it was found only on Monte Lambara.

EU reference habitat. 6520.

Conservation Status, Pressures, and Threats. High-mountain and subalpine hay meadows are in drastic decline all over the southern Alps due to their abandonment or conversion to pastures (e.g. Tasser & Tappeiner, 2002; Sitzia & Trentanovi, 2011; Pignatti & Pignatti, 2014). The intensive management due to grazing transforms the *Trisetum flavescens* meadows into *Festuco-Cynosuretum* (Büker, 1942) or into stages of *Festuca rubra* agg.-*Agrostis capillaris*, which were reported also from the Asiago Plateau (Pedrotti, 1963) and shall be considered as the pasture type which we provisionally identified as *Festuca-Cynosurus* community. The very few remaining local mountain hayfields are at risk of disappearing because of the immediate threat of colonization by *Acer pseudoplatanus* or conversion into pasture, that is in accordance with the same fate experienced by the whole surrounding study area.

Festuca rubra-*Cynosurus cristatus* community

Local diagnostic species. *Carum carvi*, *Cynosurus cristatus*, *Rhinanthus minor*, *Koeleria pyramidata*.

Floristic composition. *Festuca rubra* agg., *Cynosurus cristatus* and *Agrostis capillaris* constitute the bulk of the biomass in the upper layer; *Festuca rubra* agg. is mostly represented by the co-occurrence of *F. rubra* s.str., which is prevailing, and *F. nigrescens* (Table 7). The development of *Agrostis capillaris* is slightly delayed with respect to the other grasses, so that it determines the late-season aspect of the pasture; for the same reason, it was not always easy to assign its cover value at the time of the survey. The forbs *Achillea millefolium*, *Carum carvi*, *Ranunculus acris* and *Stellaria graminea* frequently contribute to the constitution of this layer. In the ground-level stratum *Alchemilla vulgaris* agg., *Trifolium repens* and *T. pratense* stand out for their cover and frequency. Cattle avoidance of prickly species accounts for occurrence of *Cirsium* and *Carduus* spp. Species diversity is high considering that the mean species number per relevé is 46.1 (sd 7.5).

Syntaxonomy. In the past, many Italian authors involved in studying north-eastern Italian vegetation ascribed prealpine pastures with dominating *Festuca rubra* agg. and *Cynosurus cristatus*, occurring on base-rich soils in the mountain belt, to *Festuco commutatae*-*Cynosuretum cristati* (Gerdol & Piccoli, 1980; Ziliotto & Vettorazzo, 1985; Buffa et al., 1989; Prosser, 1997; Da Ronch et al., 2005a; Da Ronch et al., 2005b; Da Ronch & Ziliotto, 2008). The interpretation resulted from applying the German scheme (Oberdorfer, 1957 and later editions), overlooking the occurrence of species with southern distribution – such as *Carduus defloratus* subsp. *tridentinus*, *Tephrosia longifolia* subsp. *gaudinii*, *Centaurea nigrescens* s.l., *Primula intricata*, *Ranunculus venetus* – and their role in determining a possible southern coenosis replacing the *Festuco-Cynosuretum* of the Northern Prealps. By contrast, this hypothesis was proposed for pastures developing in high mountain belt (Gerdol & Piccoli, 1980; Prosser, 1997) where the presence of species such as *Poa alpina* and *Phleum rhaeticum* suggested to assign relevés to *Poion alpinae* but made it challenging to identify the association. Poldini & Oriolo (1995a) partly remedied this with the typification of *Crepido-Poetum* within *Poion alpinae* in southern alpine range in place of northern *Crepido-Festucetum*. Nevertheless, the potential extent of *Crepido-Poetum* to the prealpine chain as well as the attribution of Italian prealpine *Festuca rubra* agg.-rich pastures to *Festuco-Cynosuretum* remain to be clarified and wait for further re-

search covering wider areas and including comparisons through methods of multivariate analysis. Based on exploratory analysis, it is conceivable that a southern prealpine association could replace the northern prealpine *Festuco-Cynosuretum* like *Crepido-Poetum* replaces the northern *Crepido-Festucetum* in the inner southern Alps (Figure 8). Additional data is necessary also to clarify the reference alliance of local *Festuca rubra* agg.- and *Cynosurus cristatus*-rich pastures, especially by including more surveys from lower altitude where, however, pastures are less common. With the exclusion of the first two stands (Table 7, 118, 121), relevés are split into two subclusters, the largest in number with more frequent and more abundant *Poa alpina* and *Phleum rhaeticum*, due to the mean higher altitude where they were collected, as in relevés from M. Baldo (Gerdol & Piccoli, 1980; Prosser, 1997); the other one includes vegetation plots of mean lower elevation. It could appear reasonable to refer the former to *Poion alpinae* and the latter to *Cynosurion*, but floristic compositions are only slightly different and the distribution of *Cynosurion* characteristic species – as commonly reported in literature – does not argue in favour of this solution. The numerical comparison with ‘*Festuco-Cynosuretum*’ and *Poion alpinae* relevés from nearby prealpine areas do not disaggregate our relevés which remain well-separated in a stand-alone cluster (unpub. analyses). From an ecological perspective, our community exhibits similarities with the high mountain *Crepis aurea*-form of *Festuco-*

Cynosuretum (*Cynosurion*; Oberdorfer, 1993) and with *Crepido-Cynosuretum* (*Poion alpinae*; Ellmauer, 1993) from the northern Alps. Concerning floristic composition, *Crepido-Cynosuretum* is considered a poorly differentiated coenosis. Oberdorfer (1993) identifies it as the *Crepis aurea*-form of *Festuco-Cynosuretum*, whereas Ellmauer (1993) does not exclude its possible down-ranking to the subassociation level of *Crepido-Festucetum*.

Against this background, we consider it more appropriate, for the time being, not to classify our original relevés at either the association or alliance level.

Synecology. In the study area the *Festuca-Cynosurus* community occurs at an average altitude of 1,500 m (sd: 170) but ranging between 1,200 and over 1,700 m a.s.l., in the belt of mountain and high-mountain *Fagus*- or mixed *Fagus-Abies* forests. Stands at lower altitude lack character species of *Poion alpinae*, whereas thermophilous herbs of mountain mesic meadows such as *Centaurea transalpina*, *Colchicum autumnale*, *Rhinanthus freynii*, *Lathyrus pratensis* still occur. The only *Poion alpinae* species occurring in our relevés – *Poa alpina* and *Phleum rhaeticum* – mix with the higher-lying intensive pastures. Soils are on average deep, slightly acidic (*Luzula* sp. pl., *Carex pallescens*, *Veronica officinalis*) and gentle slope, generally located quite away from cowsheds. *Festuca rubra* and *Cynosurus cristatus* alternate in dominance in pastures, likely as consequence of different eutrophication level at small grain size: on soils less rich in nutrients *Cynosurus cristatus* is replaced by *Festuca rubra* and vice versa (Zuidhoff et al., 1995).

Synchorology. In the mountainous belt of Friuli, pastures with dominant *Festuca nigrescens* and *Agrostis capillaris* were attributed to a *Festuca nigrescens-Stellaria graminea* community (Poldini & Oriolo, 1995a). This vegetation type is ecologically comparable with the ‘*Festuco-Cynosuretum*’ sensu other Italian authors and recorded in many mountain sectors of the Venetian Prealps (Gerdol & Piccoli, 1980; Ziliotto & Vettorazzo, 1985; Prosser, 1997; Da Ronch et al., 2005a; Da Ronch et al., 2005b; Da Ronch & Ziliotto, 2008). In the high-mountain belt a community for which a classification in *Poion alpinae* was suggested was also reported (Gerdol & Piccoli, 1980; Prosser, 1997; Bertolli, 2000). Similar pastures in the southern inner Alps were hypothetically referred to *Crepido-Cynosuretum* (Lausi et al., 1981) and *Crepido-Festucetum* (Rodaro et al., 1998) or described as *Crepido-Poetum* (Poldini & Oriolo, 1995a); all are within *Poion alpinae*.

EU reference habitat. None.

Conservation Status, Pressures, and Threats. An intensification of grazing can lead to the establishment of mat-grass swards.

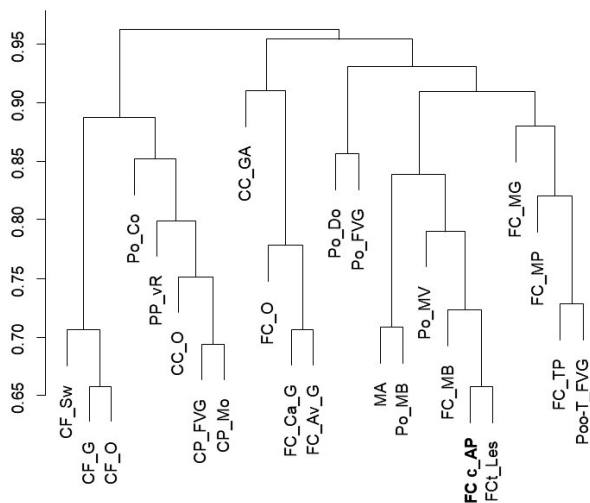


Figure 8: Classification of the synthetic tables of *Festuca rubra* agg.-rich pastures from the Asiago Plateau (in bold) and some prealpine and alpine related association (chord distance/UPGMA). For abbreviations see Appendix 2.

Figure 8: Klasifikacija sintetske tabele bogatih pašnikov s prevladujočo vrsto *Festuca rubra* agg. s planote Asiago (krepko) in nekaterih predalpskih in alpskih asociacij (razdalja tetive/UPGMA).

Centaureo carniolicae-Arrhenatheretum Oberd. 1964 corr. Poldini et Oriolo 1995

Local diagnostic species. *Arrhenatherum elatius* (dom. or subdom.), *Centaurea nigrescens*, *Salvia pratensis* subsp. *pratensis*, *Silene vulgaris* subsp. *vulgaris*, *Tragopogon pratensis* subsp. *orientalis*.

Floristic composition. It is a multilayered meadow where *Arrhenatherum elatius* or *Avenula pubescens* dominate, depending on different site conditions (Table 4). Among grasses, *Dactylis glomerata* and *Schoenodorus pratensis* occur in the upper stratum, *Trisetum flavescens*, *Anthoxanthum odoratum* and *Poa pratensis* in the mid-low layer. Constantly occurring forbes include *Ranunculus acris* and *Rumex acetosa* in the upper layer, *Trifolium pratense*, *Plantago lanceolata* and *Gallium mollugo* agg. in lower stratum or at ground level. Two groups of relevés are distinguishable; the smallest is differentiated by the large cover values of *Avenula pubescens* and shows a higher mean number of species (45.2, sd 6.9) than the second one which is dominated by *Arrhenatherum elatius* (36.9, sd 7.9).

Syntaxonomy. Oberdorfer (1964) first focused on the floristic diversity of the *Arrhenatherum elatius*-meadows in southern Alps with respect to the ecologically similar vegetation type in Central Europe. The occurrence of *Centaurea dubia* (= *C. nigrescens* subsp. *transalpina*), *Achillea roseoalba* and *Knautia transalpina* led the German author to describe the regional association *Centaureo dubiae-Arrhenatheretum*. Later Poldini & Oriolo (1995a; 1995b) proved that in the original relevés *Centaurea nigrescens* subsp. *vochinensis* (= *C. carniolica*) was confused with *C. nigrescens* subsp. *transalpina* and introduced the name *Centaureo carniolicae-Arrhenatheretum*. However, more recently Swiss authors acknowledged Oberdorfer's typification concerning a neighbouring territory of the Confederation and consider Poldini & Oriolo's (1995) correction as a synonym ([www.infoflora.ch/de/lebensraeume/phytosuisse-\(prunier-et-al.\).html](http://www.infoflora.ch/de/lebensraeume/phytosuisse-(prunier-et-al.).html)). The non-univocal interpretation of the *Centaurea nigrescens* complex (e.g. Conti et al., 2005; Greuter, 2006; Pignatti, 2018) coupled with the hard taxonomic attribution of some specimens/populations included in the *Achillea millefolium* agg. make the characterization of this association problematic. *Centaurea nigrescens* includes many infraspecific taxa and their hybridization forms: as already stated (Poldini & Oriolo, 1995a; Buffa et al., 1995), *C. nigrescens* subsp. *transalpina* prevails in the mountain belt, whereas *C. nigrescens* subsp. *nigrescens* (*C. nigrescens* subsp. *vochinensis* in the relevés carried out by the above-mentioned authors) occurs at lower altitudes, but specimens

growing at intermediate altitudes are often difficult to determine. Consequently, in Table 4 we prefer not to treat them separately but to aggregate them. Pignatti & Pignatti (2014) attribute hay meadows in the Dolomites range to Central European *Pastinaco-Arrhenatheretum* association. Considering the Prealpine context and in accordance with the studies drawn up in neighbouring territories, it is regarded as more appropriate to refer mown grasslands in the Asiago Plateau to *Centaureo carniolicae-Arrhenatheretum*. Relevés split clearly in two clusters, one representing the typical form developing on mesic soils and the other characteristic of drier sites (Figure 2). The two groups of relevés share species that are regarded as differential of *Centaureo-Arrhenatheretum*. The latter is characterised by the dominance or co-dominance of *Avenula pubescens* and the occurrence of a high number of species belonging to *Festuco-Brometea*: both can be considered as differential of this vegetation type (Table 4; Figure 9). In technical handbooks based on phytosociological relevés from Northern Italy this drier form of mown grasslands has been often and in an uncritical way referred to *Ranunculo bulbosi-Arrhenatheretum*, following the typification of Austrian hay meadows (e.g. Gusmeroli et al., 2008; Scotton et al., 2012). In fact, *Ranunculo-Arrhenatheretum* is physiognomically characterised by *Arrhenatherum* and *Avenula pubescens* and differs from mesic *Pastinaco-Arrhenatheretum* only because of the occurrence of dry grassland species, especially of *Festuco-Brometea* class (Ellmauer, 1995). In our opinion, despite evident common ecological features between *Avenula*-meadows from Southern Alps and *Ranunculo-Arrhenatheretum*, *Avenula*-rich grasslands cannot be classified into *Ranunculo-Arrhenatheretum* because of the presence of the differential species of *Centaureo-Arrhenatheretum*. For the same reasons describing a new association is not possible, but it can be assumed to recognise the subassociation level for these less intensive and drier meadows: *Centaureo-Arrhenatheretum* subass. *avenuletosum pubescentis*. The group of relevés classified into this subassociation changes depending on the asymmetrical dissimilarity measures used in the cluster analysis, therefore a clearer floristic framing needs a data collection encompassing other southern pre-Alpine areas. Interestingly, this coenose ecologically matches with *Arrhenatheretum elatioris helictotrichetosum pubescentis* (recte *Pastinaco-Arrhenatheretum avenuletosum pubescentis*) which Eggler (1959) observed on the northern side of the Alps. *Avenula pubescens* is also included among the diagnostic species of *Rhinantho freynii-Trisetum flavescens* from the lower montane belt of north-western and western Slovenia (Dakskobler & Seliškar, 2015). The coenosis encompasses meadows with dominant *Trisetum flavescens* which in our stands has only low covers. The

occurrence of *Centaurea nigrescens*, which is recognised as the diagnostic species of the association *Centaureo-Arrhenatheretum*, constitutes a further remarkable difference with respect to association *Rhinantho-Trisetetum* but also compared to the other similar Slovenian coenoses classified in *Arrhenatherion* (*Ranunculo-Arrhenatherum* and *Pastinaco-Arrhenatherum* in Čarni, 2001; *Pastinaco-Arrhenatherum* in Petras Sackl et al., 2012). The occurrence of other species such as *Myosotis sylvatica*, *Silene dioica*, *Cruciata laevipes*, *Rhinanthus alectorolophus*, *Vicia sativa*, *Geranium phaeum* and, on the contrary, the absence of *Centaurea jacea*, *Campanula patula* contribute to distinguish the hay meadows on the Asiago Plateau from the similar Slovenian associations.

Synecology. *Arrhenatherum* meadows comprise the traditional mesic hay meadows on mineral-rich soils in lowlands up to submontane territories of most of Europe. In the study area, *Arrhenatherum elatior* alternates with *Avenula pubescens* in characterising two slightly different mown grassland types. The subass. *avenuletosum pubescentis* was found on steeper slopes and consequently in drier sites than the former, at a lower mean altitude (846 m vs. 985 m). As a consequence, many xerophilous species belonging to *Festuco-Brometea* class differentiate these *Avenula*-rich meadows: *Festuca stricta/sulcata*, *Arabis hirsuta*, *Bromopsis erecta* are some of the

most frequent dry grassland species. *Avenula pubescens* itself cannot be considered strictly characteristic of *Molinio-Arrhenatheretea* class, its ecological requirements are rather halfway between grasslands belonging to *Festuco-Brometea* and *Molinio-Arrhenatheretea*. In flat or gentle slope conditions, finding that *Arrhenatherum*-rich stands diverge to *Avenula*-rich vegetation in correspondence of adjacent steeper slopes is quite common. Nowadays, the arising decrease of manuring along with the drier seasons in the vegetative period drives towards the substitution of *Arrhenatherum*-rich form with the *Avenula*-rich vegetation type. On the contrary, where excessive slurry spreading is used instead of traditional dung, such as in relevés 21, 24, 40, 41 (Table 4), the *Centaureo-Arrhenatheretum* floristically tends to change and to become similar to *Ranunculo-Alopecuretum*. Mown meadows are mostly found in the central plain of the study area around 1,000 m a.s.l., where the accompanying intensive management led to a lowering of plant species diversity. Here, species-rich haymaking grasslands are very rare and scattered, in most cases they are peripheral, far from the centre of farms. According to our data, the mean species number per relevé attains lower values than in past decades: 34 (n = 20, sd 7.9) vs. 41 (n = 10, sd 5.6) in 1986-1993 period (Buffa et al., 1995). After mowing usually twice a year, land use includes cattle grazing at the end of the season.



Figure 9: Stand of *Avenula pubescens*-rich mesic meadow (*Centaureo-Arrhenatheretum* subass. *avenuletosum pubescentis*; rel 2, Costa della Mare (Calvene), Asiago Plateau)).

Slika 9: Sestoj bogatega travnika z vrsto *Avenula pubescens* (*Centaureo-Arrhenatheretum* subass. *avenuletosum pubescentis*; popis 2, Costa della Mare (Calvene), planota Asiago)).

Synchorology. In the study area the association shows a wide altitudinal range from 300 to 1,350 m a.s.l. The co-occurrence of *Rhinanthus alectorolophus* and *R. freynii* underlines the intermediate position of the Asiago Plateau with respect to the western and eastern sectors of the distribution area of the association (see Poldini & Oriolo, 1995b). It spreads in the eastern-central Alpine and pre-Alpine sector of Northern Italy (Poldini & Oriolo, 1995a) as far as Slovenia (Šilc & Čarni, 2012).

EU reference habitat. 6510.

Conservation Status, Pressures, and Threats. Traditional hay meadows are threatened by two opposing reasons: intensification of management practices and abandonment. The former materialises in the central plateau around 1,000 m a.s.l., where sites are more suitable to haymaking and liquid cow waste spreading is done not only to guarantee an increased productivity. The extensively used hay meadows lay in areas that are peripheral to farms, the least accessible to agricultural machinery. Grasslands of the subassociation *avenuletosum pubescentis*, which occupy sites that are intrinsically less productive, are at higher risk of abandonment and consequently subject to vegetation dynamics.

Syntaxonomic scheme

Nardetea strictae Rivas Goday et Borja Carbonell in Rivas Goday et Mayor Lopez 1966

Nardetalia strictae Preising 1950

Nardo-Agrostion tenuis Sillinger 1933

Homogyno alpinae-Nardetum Mráz 1956

Molinio-Arrhenatheretea Tx. 1937

Festuca rubra-Cynosurus cristatus community

Arrhenatheretalia elatioris Tx. 1931

Arrhenatherion elatioris Koch 1926

Centaureo carniolicae-Arrhenatheretum

Oberd. 1964 corr. Poldini & Oriolo 1995

avenuletosum pubescentis subass. nov. hoc loco

Ranunculo repentis-Alopecuretum Ellmauer in Ellmauer et Mucina 1993

anthriscetosum Ellmauer 1995

Holcetum lanati Issler 1934

Poo alpinae-Trisetetalia Ellmauer et Mucina 1993

Trisetum flavescens-Polygonion bistortae Br.-Bl. et Tx. ex Marschall 1947

Centaureo transalpinae-Trisetetum flavescens Poldini et Oriolo 1995

Poion supinae Rivas-Mart. et Géhu 1978

Alchemillo hybridae-Poetum supinae Aichinger 1933 corr. Oberd. 1971

Incertae sedis

Festuca stricta/sulcata-Nardus community

Other syntaxa quoted in the text

Alchemillo-Cynosuretum Th. Mull in Oberdorfer et al 1967 p.p.

Aegopodion podagrariae Tx. 1967

Alopecuro pratensis-Holcetum lanati Julve 1994

Anthriscetum sylvestris Hadač 1978

Aremonio-Fagion (Horvat 1950) Borhidi in Török et al. 1989

Arnico montanae-Brometum erecti Verbič et al. ex Dakskobler 2024

Arrhenatheretum elatioris (Br.-Bl. 1919) Scherrer 1925 *he-lictotrichetosum pubescentis* Eggler (1933) 1958

Astrantio-Trisetetum Knapp et Knapp ex Oberd. 1957

Calthion palustris Tx. 1937

Centaureo dubiae-Arrhenatheretum Oberdorfer 1964 *nom. inept.*

Crepido-Cynosuretum Knapp ex Dietl 1972

Crepido-Festucetum rubrae Lüdi 1948

Crepido aureae-Poetum alpinae Poldini et Oriolo 1995

Cynosurion cristati Tx. 1947

Danthonio-Nardetum Pign. E. et S. 1986

Dentario pentaphylli-Fagetum Mayer et Hofmann 1969

Deschampsion cespitosae Horvatić 1930

Elyno-Seslerietea Br.-Bl. 1948

Festuco-Brometea Br.-Bl. et Tx. ex Soó 1947

Festuco commutatae-Cynosuretum cristati Tüxen in Büker 1942

Hacquetio-Fagetum Košir 1962

Holcetum lanati cirsietosum cani Kovář 1981

Homogyno sylvestris-Piceetum Exner in Poldini et Bressan 2007

Molinietalia caeruleae Koch 1926

Nardetum alpigenum Br.-Bl. 1949

Pastinaco-Arrhenatheretum Passarge 1964

Phragmito-Magnocaricetea Klika in Klika et Novák 1941

Poion alpinae Gams ex Oberd. 1950

Polygonion avicularis Br.-Bl. 1931

Polygono-Coronopodion Sissingh 1969

Poo-Cerastietum cerastioidis (Söyrinki 1954) Oberd. 1957

Poo trivialis-Alopecuretum pratensis Regel 1925

Quercion pubescenti-petraeae Br.-Bl. 1932

Ranunculo bulbosi-Arrhenatheretum Ellmauer in Ellmauer et Mucina 1993

Rhinantho freynii-Trisetetum flavescens Dakskobler et Seliškar 2015

Scheuchzerio palustris-Caricetea fuscae Tx. 1937

Sieversio montanae-Nardetum strictae Lüdi 1948

Sieversio montanae-Nardetum strictae Lüdi 1948 *vaccinietosum* Hartl 1963

Symphyto officinalis-Anthriscetum sylvestris Passarge 1975

Trisetetum flavescens Rübel 1911

Trisetetum flavescens insubricum Marschall 1947

Trisetetum flavescens leponiticum Marschall 1947

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Research data availability

The data analysed during this study are available from the corresponding author upon reasonable request.

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Appendix 1

Location, date and geographical coordinates of original relevés or source of relevés

Table 1 (*Alchemillo-Poetum*): **rel 117**: M.ga Fiaira, 06/07/2021, 45°57'29.23"N, 11°33'8.08"E; **rel 81**: M.ga Zingarella, 01/06/2020, 45°56'43.63"N, 11°30'25.88"E; **rel 84**: M.ga Lora, 13/06/2020, 45°55'13.73"N, 11°36'27.67"E; **rel 108**: M.ga Galmarara, 23/06/2021, 45°57'15.04"N, 11°29'39.65"E; **rel 103**: M.ga P. Manazzo, 21/06/2021, 45°58'31.95"N, 11°23'46.33"E; **rel 104**: M.ga P. Manazzo, 21/06/2021, 45°58'37.00"N, 11°23'45.67"E

Table 2 (*Festuca stricta/sulcata-Nardus* community and *Homogyno-Nardetum*): **rel 82**: Lambara, 07/06/2020, 45°55'47.91"N, 11°39'38.75"E; **rel 83**: Lambara, 13/06/2020, 45°56'2.92"N, 11°39'58.46"E; **rel 96**: M. Fior, 18/07/2020, 45°55'14.03"N, 11°35'36.12"E; **rel 87**: bivio C.ra Meletta, 18/06/2020, 45°54'50.39"N, 11°36'30.24"E; **rel 86**: M.ga Lora, 18/06/2020, 45°54'53.78"N, 11°36'17.94"E; **rel 97**: M. Fior, 18/07/2020, 45°55'3.44"N, 11°35'47.03"E; **rel 124**: Rif. Larici, 02/07/2020, 45°58'31.80"N, 11°24'57.61"E; **rel 126**: Bocchetta Larici, 02/07/2020, 45°58'47.48"N, 11°24'56.81"E; **rel 127**: Campo Mandriolo, 07/07/2020, 45°58'54.39"N, 11°23'7.60"E; **rel 125**: Pontarina, 02/07/2020, 45°58'49.21"N, 11°24'47.24"E; **rel 128**: Campo Mandriolo, 07/07/2020, 45°58'57.60"N, 11°22'39.30"E; **rel 98**: Longara Davanti, 18/07/2020, 45°55'2.62"N, 11°32'59.21"E; **rel 122**: M.ga Laste Manazzo, 16/07/2021, 45°57'53.84"N, 11°24'28.29"E; **rel 99**: Marcesina, 17/06/2021, 45°57'19.90"N, 11°37'21.53"E; **rel 92**: Coston-Melette, 27/06/2020, 45°54'58.97"N, 11°34'56.05"E; **rel 93**: Coston-Melette, 27/06/2020, 45°54'55.53"N, 11°34'44.37"E; **rel 123**: Melette Foza, 30/06/2022, 45°54'29.50"N, 11°36'25.57"E; **rel 94**: Coston-Melette, 27/06/2020, 45°55'9.25"N, 11°34'52.15"E; **rel 110**: M.ga Longara Dietro, 23/06/2021, 45°55'32.97"N, 11°32'37.97"E; **rel 101**: M.ga V. Bella, 17/06/2021, 45°57'21.27"N, 11°38'12.13"E; **rel 102**: M.ga V. Maron, 17/06/2021, 45°57'29.66"N, 11°38'11.94"E; **rel 109**: M.ga Longara Dietro, 23/06/2021, 45°55'39.61"N, 11°32'53.24"E; **rel 100**: M.ga V. Bella, 17/06/2021, 45°57'19.93"N, 11°38'9.45"E; **rel 106**: M.ga Dosso Sopra, 21/06/2021, 45°58'0.07"N, 11°23'59.16"E; **rel 95**: Campo Mandriolo, 07/07/2020, 45°58'44.18"N, 11°23'14.07"E; **rel 105**: M.ga Dosso Sopra, 21/06/2021, 45°58'10.30"N, 11°24'12.74"E;

rel 113: M. Spil, 29/06/2021, 45°54'39.86"N, 11°36'11.21"E

Table 4 (*Holcetum lanati*, *Ranunculo repentis-Alopecuretum anthriscetosum* and *Centaureo-Arrhenatheretum*): **rel 57**: C. Valle-Camporovere, 15/06/2018, 45°52'48.71"N, 11°29'33.76"E; **rel 58**: C. Vescovi-C. Valle, 20/06/2018, 45°52'41.56"N, 11°29'33.76"E; **rel 62**: Godenella, 02/06/2021, 45°55'24.73"N, 11°40'13.61"E; **rel 63**: Foza, 02/06/2021, 45°53'2.09"N, 11°38'3.59"E; **rel 16**: campeggio Ekar, 25/05/2015, 45°51'35.48"N, 11°33'7.08"E; **rel 42**: Stel-lar, 07/06/2017, 45°52'27.00"N, 11°32'15.82"E; **rel 39**: C. Chiomenti di sopra, 03/06/2017, 45°53'46.62"N, 11°39'10.23"E; **rel 12**: M.ga Verde-V. Lastaro, 19/05/2015, 45°48'57.97"N, 11°38'11.72"E; **rel 66**: Pennar, 10/06/2021, 45°51'14.94"N, 11°32'52.65"E; **rel 19**: Costo Basso, 29/05/2015, 45°49'54.14"N, 11°23'40.10"E; **rel 18**: M.ga Cava-Treschè, 29/05/2015, 45°49'48.33"N, 11°24'52.83"E; **rel 20**: via Belmonte-Treschè, 06/06/2015, 45°50'13.20"N, 11°25'27.16"E; **rel 22**: Camporovere, 06/06/2015, 45°53'6.95"N, 11°29'1.05"E; **rel 13**: Osteria Ristoro, 19/05/2015, 45°47'47.57"N, 11°32'47.97"E; **rel 72**: rel 26 in Buffa et al. (1995); **rel 40**: Capitello Pennar, 07/06/2017, 45°51'36.61"N, 11°32'38.26"E; **rel 41**: Leiten, 07/06/2017, 45°52'28.71"N, 11°31'32.28"E; **rel 21**: cimitero Camporovere, 06/06/2015, 45°52'35.36"N, 11°29'12.55"E; **rel 24**: ristorante Casa Rossa, 06/06/2015, 45°51'8.78"N, 11°29'39.60"E; **rel 17**: via Tilman-Bertigo, 25/05/2015, 45°52'6.35"N, 11°32'53.88"E; **rel 27**: Stalla Modello-Canove, 10/06/2015, 45°51'25.24"N, 11°27'22.40"E; **rel 44**: aeroporto, 07/06/2017, 45°53'1.08"N, 11°30'17.88"E; **rel 59**: Sacello-Gallio, 21/06/2019, 45°53'0.55"N, 11°32'36.48"E; **rel 26**: Treschè-Sculazzon, 10/06/2015, 45°50'39.90"N, 11°26'1.35"E; **rel 46**: V. Gevano, 13/06/2017, 45°49'51.84"N, 11°25'10.74"E; **rel 34**: Ecchele, 03/06/2017, 45°52'5.59"N, 11°36'36.89"E; **rel 50**: Bastianelli, 18/05/2018, 45°48'0.68"N, 11°37'57.63"E; **rel 53**: Cornetta, 21/05/2018, 45°55'43.79"N, 11°42'6.33"E; **rel 36**: Giancesini, 03/06/2017, 45°53'33.92"N, 11°35'48.52"E; **rel 37**: Campanella, 03/06/2017, 45°53'25.34"N, 11°34'51.15"E; **rel 68**: rel 9 in Buffa et al. (1995); **rel 75**: rel 30 in Buffa et al. (1995); **rel 78**: rel 33 in Buffa et al. (1995); **rel 76**: rel 31 in Buffa et al. (1995); **rel 77**: rel 32 in Buffa et al. (1995); **rel 79**: rel 34 in Buffa et al. (1995); **rel 73**: rel 27 in Buffa et al. (1995); **rel 74**: rel 28 in Buffa et al. (1995); **rel 23**: Cappella Holl-Fire, 06/06/2015, 45°53'6.61"N, 11°28'39.22"E; **rel 55**: C. Sculazzon, 02/06/2018,

45°50'39.90"N, 11°26'1.35"E; **rel 69**: rel 22 in Buffa et al. (1995); **rel 51**: C. Moscon-Enego, 21/05/2018, 45°57'2.11"N, 11°42'51.04"E; **rel 52**: Fosse di sotto, 21/05/2018, 45°56'51.83"N, 11°42'49.13"E; **rel 56**: Zaibena, 11/06/2018, 45°52'53.03"N, 11°35'58.21"E; **rel 70**: rel 23 in Buffa et al. (1995); **rel 71**: rel 24 in Buffa et al. (1995); **rel 45**: V. Gevano, 13/06/2017, 45°49'33.18"N, 11°25'27.00"E; **rel 4**: Lore, 09/05/2015, 45°46'29.71"N, 11°32'11.67"E; **rel 54**: Forni-V. d'Astico, 26/05/2018, 45°51'33.02"N, 11°21'42.94"E; **rel 47**: Basso-S. Pietro-V. d'Astico, 12/05/2018, 45°52'26.90"N, 11°21'43.19"E; **rel 48**: Settecà, 12/05/2018, 45°51'45.05"N, 11°21'50.86"E; **rel 7**: M. Alto-Tortima, 12/05/2015, 45°46'54.26"N, 11°36'54.94"E; **rel 3**: Costa della Mare, 09/05/2015, 45°47'2.10"N, 11°31'15.20"E; **rel 10**: ripetitori Rubbio, 17/05/2015, 45°48'7.32"N, 11°40'17.70"E; **rel 25**: Madonna Neve-Kaberlaba, 06/06/2015, 45°51'23.73"N, 11°29'58.26"E; **rel 2**: Costa della Mare, 09/05/2015, 45°46'59.84"N, 11°31'17.37"E; **rel 5**: cimitero Lusiana, 09/05/2015, 45°46'54.26"N, 11°35'2.75"E; **rel 6**: Piazza Campana, 12/05/2015, 45°47'20.61"N, 11°33'18.00"E; **rel 15**: Marziale, 25/05/2015, 45°47'25.89"N, 11°32'56.92"E; **rel 8**: Pradipaldo, 17/05/2015, 45°46'59.67"N, 11°39'44.53"E; **rel 1**: Caluga, 7/5/15, 45°47'25.11"N, 11°42'4.24"E; **rel 9**: Brombe, 17/05/2015, 45°47'28.36"N, 11°39'44.71"E; **rel 11**: cimitero Rubbio, 17/05/2015, 45°48'8.48"N, 11°39'6.09"E; **rel 32**: Stona, 30/05/2017, 45°53'54.25"N, 11°37'12.85"E; **rel 33**: Tottari-Foza, 30/05/2017, 45°53'42.66"N, 11°37'31.33"E; **rel 38**: Lazzaretti-Carpanedi, 03/06/2017, 45°54'10.51"N, 11°38'48.74"E; **rel 64**: Costalta, 02/06/2021, 45°53'37.26"N, 11°36'52.57"E; **rel 65**: M. del Lupo, 10/06/2021, 45°57'40.07"N, 11°39'7.18"E; **rel 28**: Cesuna, 10/06/2015, 45°50'26.04"N, 11°27'51.28"E; **rel 29**: Ori Biasia, 01/07/2015, 45°52'57.85"N, 11°38'53.36"E; **rel 30**: Godeluna, 03/07/2015, 45°54'45.39"N, 11°41'14.92"E; **rel 14**: Osteria Ristoro, 19/05/2015, 45°47'57.39"N, 11°32'59.93"E; **rel 49**: C. Oneste, 18/05/2018, 45°48'24.86"N, 11°35'52.70"E; **rel 35**: Sprunck, 03/06/2017, 45°51'55.32"N, 11°36'31.59"E; **rel 43**: via Tiiftelle, 07/06/2017, 45°53'6.48"N, 11°32'15.66"E; **rel 67**: Sambugari, 21/06/2022, 45°53'35.28"N, 11°34'9.79"E

Table 6 (*Centaureo-Trisetetum*): **rel 60**: Lambara, 07/06/2020, 45°55'47.91"N, 11°39'38.75"E; **rel 61**: Lambara, 13/06/2020, 45°56'2.92"N, 11°39'58.46"E

Table 7 (*Festuca rubra-Cynosurus cristatus* community): **rel 118**: M.ga Fiara, 06/07/2021, 45°57'28.18"N,

11°33'4.88"E; **rel 121**: M.ga Dosso Sotto, 16/07/2021, 45°57'39.40"N, 11°24'15.56"E; **rel 119**: M.ga Mandrielle, 06/07/2021, 45°57'56.80"N, 11°33'39.23"E; **rel 111**: M.ga Longara Davanti, 23/06/2021, 45°55'7.88"N, 11°33'0.86"E; **rel 112**: M.ga Montagna Nova-M.Spil, 29/06/2021, 45°54'34.61"N, 11°36'10.33"E; **rel 88**: C.ra Mandrielle, 24/06/2020, 45°56'12.90"N, 11°23'5.28"E; **rel 91**: M.ga Possellaro, 24/06/2020, 45°55'58.04"N, 11°22'24.56"E; **rel 85**: M.ga Fratte, 18/06/2020, 45°55'19.07"N, 11°38'35.59"E; **rel 89**: M.ga Camporosa, 24/06/2020, 45°56'16.56"N, 11°22'13.18"E; **rel 90**: M.ga Camporosa, 24/06/2020, 45°56'18.82"N, 11°21'58.52"E; **rel 107**: M.ga Larici, 21/06/2021, 45°57'58.52"N, 11°25'10.93"E; **rel 120**: M.ga Larici, 16/07/2021, 45°58'2.44"N, 11°24'55.15"E; **rel 114**: C.ra Melaghetto, 02/07/2021, 45°52'25.82"N, 11°35'28.90"E; **rel 115**: M.ga Montagna Nova-Lastaro, 02/07/2021, 45°50'2.15"N, 11°36'53.91"E; **rel 116**: M.ga C.dei Remi, 02/07/2021, 45°50'32.02"N, 11°38'3.73"E

Appendix 2

Acronyms and sources of data used in the comparison analyses

Figure 4

F-N c_AP (*Festuca stricta/sulcata*-*Nardus* community, Asiago Plateau): this study; D-Na_Do (*Danthonio-Nardetum*, Dolomites): Tab 8.1 in Pignatti & Pignatti (2016); P-Na_F (*Polygalo-Nardetum*, Friuli-Venezia Giulia): rel from 1 to 11 (Tab 1) in Poldini & Oriolo (1997); A-Brg_SI (*Arnica montanae-Brometum erecti* var. *Gentiana kochiana*, western Slovenia): Tab 1 in Dakskobler (2024); A-Brr_SI (*Arnica montanae-Brometum erecti* var. *Rhisanthus glacialis*, western Slovenia): Tab 2 in Dakskobler (2024); H-Na1_SI (*Homogyno alpinae-Nardetum*, north-eastern Slovenia): rel from 1 to 46 (Tab 1, part 1) in Škornik et al. (2006); H-Na2_SI (*Homogyno alpinae-Nardetum*, north-eastern Slovenia): rel from 7 to 19 (Tab 1) in Kaligarič & Škornik (2002); H-Nas_SI (*Homogyno alpinae-Nardetum scorzonoidetosum croceae*, Julian Alps, Slovenia): Tab 4 in Dakskobler et al. (2022); Naa_Ba (*Nardetum alpinum trifolietosum*, M. Baldo): Tab 5 in Gerdol & Piccoli (1980); H-Na_AP (*Homogyno alpinae-Nardetum typicum*, Asiago Plateau): this study; Naa_JA_I (*Nardetum alpinum trifolietosum*, Julian Alps, Italia): Tab 1 Lausi et al. (1981); Naa_Br (*Nardetum alpinum*, Val del Braulio): Tab 28 in Giacomini & Pignatti (1955); S-Nas_F (*Sieversio-Nardetum*, Friuli-Venezia Giulia): rel from 25 to 28 (Tab 4) in Poldini & Oriolo (1997);

S-Na_AP (*Sieversio-Nardetum*, Asiago Plateau): Tab 10 in Giovagnoli & Tasinazzo (2014); S-Na_JA_SI (*Sieversio-Nardetum vacciniotosum*, Julian Alps, Slovenia): Tab 4 in Dakskobler et al. (2022); H-Na_F (*Homogyno-Nardetum*, Friuli-Venezia Giulia): Tab 2 in Poldini & Oriolo (1997); S-Nahm_F (*Sieversio-Nardetum*, Friuli-Venezia Giulia): rel from 1 to 10 (Tab 4) in Poldini & Oriolo (1997); S-Nat_F (*Sieversio-Nardetum*, Friuli-Venezia Giulia): rel from 11 to 24 (Tab 4) in Poldini & Oriolo (1997); Naa_E-B ('Nardeti', Erera-Brendol-Campotorondo): rel from 48 to 57 in Lasen (1983); Naa_VF (*Nardetum alpi-genum*, Vette di Feltre): rel from 1 to 4 pag 46 in Pignatti & Pignatti (1983); S-Na_Do (*Sieversio-Nardetum*, Dolomites): tab 8.2 in Pignatti & Pignatti (2016).

Figure 7

R-Aant_AP (*Ranunculo-Alopecuretum anthriscetosum*, Asiago Plateau): this study; P-A_Cz (*Poo-Alopecuretum*, Czech Republic): in Hájková et al. (2010); R-Aant_A (*Ranunculo-Alopecuretum anthriscetosum*, Austria): rel from 35 to 45 (Tab 1) in Ellmauer (1995); S-A_G (*Symphyto-Anthriscetum*, C-Germany): Tab 2 in Passarge (1975); S-A_Cz (*Symphyto-Anthriscetum*, Czech Republic): in Láníková (2009); Ant-g_G (*Anthriscus sylvestris* community, Lower Saxony): rel 10-16 (Tab 2) in Brandes (1988)

Figure 8

FC_c_AP (*Festuca rubra-Cynosurus cristatus* community, Asiago Plateau): this study; MA (M. Altissimo di Nago): Tab VII in Prosser (1997); Po_MB (*Poion alpinae*, M. Baldo): Tab 6 in Gerdol & Piccoli (1980); FC_MB (*Alchemilla-Cynosuretum*, M. Baldo): Tab 7 in Gerdol & Piccoli (1980); Po_Do (*Poion alpinae*, Cortina d'Ampezzo): Tab 1 in Scotton et al. (1996); Po_MV (*Crepido-Poetum*, M. Vignola): Tab VII in Bertolli (2000); FC_TP (*Festuco-Cynosuretum*, Treviso Pre-Alps): rel 2-3-4 (Tab II), rel 54-55 (Tab VI), rel from 30 to 42 (Tab IV) in Ziliotto & Vettorazzo (1985); CP_FVG (*Crepido-Poetum*, Friuli Venezia-Giulia): Tab 8 in Poldini & Oriolo (1995); CP_Mo (*Crepido-Festucetum*, Montasio): Tab 4 in Lausi et al. (1981); Po_Co (*Poion alpinae*, Cortina d'Ampezzo): Tab 4 in Rodaro et al. (1998); Po_FVG (*Poion alpinae*, Friuli Venezia-Giulia): Tab 10 in Poldini & Oriolo (1995; rel from 1 to 5 from Lausi et al., 1981); FC_MP (*Trisetum-Polygonum*, M. Pizzoc): Tab 1 in Marchiori & Ros (1980); CC_GA (*Crepido-Cynosuretum*, Alpi Giulie): Tab 3 in Lausi et al. (1981); PP_vR (*Poo-Prunelletum*, Val Rendena): Tab 14 in Bezzi et al. (1982); FC_O (*Festuco-Cynosuretum*, Austria): rel from 107 to 110 (Tab 1) in Ellmauer (1995); CC_O (*Crepido-Cynosuretum*, Austria): rel from 26 to 29 (Tab 3) in Ellmauer (1995), rel 7-8 in Hartl (1976; see Ellmauer, 1993); CF_G (*Crepido-Festucetum*,

Germany): col 6 (Tab 234) in Oberdorfer (1993; note: according to the author's statement, some species with low frequency are not included in the table); FC_Ca_G (*Crepis aurea* form of *Festuco-Cynosuretum*, Germany): col 8a (Tab 234) in Oberdorfer (1993; note: according to the author's statement, some species with low frequency are not included in the table); FC_Av_G (*Alchemilla vulgaris* form of *Festuco-Cynosuretum*, Germany): col 8b (Tab 234) in Oberdorfer (1993; note: according to the author's statement, some species with low frequency are not included in the table); CF_Sw (*Crepido-Festucetum*, Switzerland): Tab 5 in Lüdi (1948); CF_O (*Prunella vulgaris* – *Poa alpina* – Ass., 'tipische Ausbildung', Austria): col b (Tab at pag 23-24) in Knapp (1962; note: values in frequency classes were replaced by the midpoints of the percentage cover intervals, i.e. instead of V we put 90%); Poo-T_FVG (*Poo-Trisetetalia* fitocenon, Friuli Venezia-Giulia): rel 6-13 (Tab 6) in Poldini & Oriolo (1995); FCt_Les (festuco-cinosureto tipico, Lessinia): col E (Allegato 3) in Pasut (2021); FC_MG (*Festuco-Cynosuretum*, M. Grappa): cluster 1 (Tab 1) in Da Ronch & Ziliotto (2008; note: values in frequency classes were replaced by the midpoints of the percentage cover intervals).

Appendix 3

Association with a single relevé

Rumicetum alpini Beger 1922 (*Mulgedio-Aconitetea* Hadač et Klika in Klika et Hadač 1944, *Adenostyletalia alliariae* Br.-Bl. 1930, *Rumicion alpini* Scharfetter 1938). Locality: M.ga Molina, geographical coordinates: 45°59'18.05"N - 11°32'1.00"E, date: 24-09-2024, elevation: 1725 m,

Rumex alpinus 4, *Lamium album* 2b, *Urtica dioica* 2b, *Elythrigia repens/repens* 2a, *Anthriscus sylvestris* 1, *Blitum bonus-henricus* 1, *Dactylis glomerata* 1, *Ranunculus repens* 1, *Rumex arifolius* 1, *Alchemilla vulgaris* agg. +, *Capsella bursa-pastoris* +, *Deschampsia cespitosa* +, *Ochlopoa supina* +, *Trifolium repens* +, *Veronica chamaedrys/chamaedrys* +

Table 1: *Alchemillo-Poetum supinae* from the Asiago Plateau.

Tabela 1: *Alchemillo-Poetum supinae* na planoti Asiago.

relevé number	117	81	84	108	103	104		
elevation (m)	1602	1700	1640	1620	1735	1744		
aspect	-	-	-	-	-	SE		
species number	16	9	14	14	12	13		
							pr	fr%
diff sp <i>Alchemillo-Poetum supinae</i>								
<i>Ochlopoa supina</i> (O)	4	4	5	5	5	5	6	100
<i>Veronica serpyllifolia/serpyllifolia</i> (C)	+	+	+	+	1	+	6	100
<i>Barbarea bracteosa</i>	+		+	r	+	+	5	83
<i>Ochlopoa annua</i>			2a		+	+	3	50
char sp <i>Poion supinae</i>								
<i>Blitum bonus-henricus</i>			+				1	17
char sp <i>Poo alpinae-Trisetetalia</i>								
<i>Alchemilla vulgaris</i> agg.	+	+	1	2b	2a	2a	6	100
<i>Poa alpina</i>	1		+	+			3	50
<i>Crocus vernus/albiflorus</i>		1	+				2	33
char sp <i>Molinio-Arrhenatheretea</i>								
<i>Trifolium repens</i>	1	2b	2a	+	1	+	6	100
<i>Taraxacum</i> Sect. <i>Taraxacum</i>	+	1	+		1	+	5	83
<i>Ranunculus acris/acris</i>			+	1	+	+	4	67
<i>Ranunculus repens</i>	+			+	1	2a	4	67
<i>Deschampsia cespitosa</i>	+			+		+	3	50
<i>Carum carvi</i>					+		1	17
<i>Carex hirta</i>				1			1	17
<i>Cerastium fontanum/vulgare</i>						+	1	17
<i>Poa trivialis/trivialis</i>	2b						1	17
other								
<i>Plantago major/major</i>	+	+	+	r	2a	2a	6	100
<i>Capsella bursa-pastoris</i>	2a	+	+				3	50
<i>Elytrigia repens/repens</i>	2a			1			2	33
<i>Rumex obtusifolius</i>	+			r			2	33
<i>Cirsium arvense</i>						+	1	17
<i>Gagea fragifera</i>		+					1	17
<i>Glyceria notata</i>					2a		1	17
<i>Jacobaea alpina</i>				+			1	17
<i>Lamium album</i>	+						1	17
<i>Urtica dioica</i>	+						1	17
<i>Veronica chamaedrys/chamaedrys</i>			+				1	17

Table 2: *Festuca stricta/sulcata*-*Nardus* community (Com1) and *Homogyno-Nardetum* (Ass2; *Nardo-Agrostion tenuis*) from the Asiago Plateau.

Tabela 2: *Festuca stricta/sulcata*-*Nardus* (Com1) in *Homogyno-Nardetum* (Ass2; *Nardo-Agrostion tenuis*) s planote Asiago.

relevé number	82	83	96	87	86	97	124	126	127	125	128
elevation (m)	1470	1510	1705	1750	1770	1755	1800	1855	1890	1850	1985
aspect	SSE	SSE	SW	SE	NNE	W	SW	SSW	S	SW	SSW
species number	39	42	36	39	52	40	67	55	51	52	50
local diff sp <i>Festuca stricta/sulcata</i> - <i>Nardus</i> community											
<i>Bromopsis erecta/erecta</i>	2a	+									
<i>Festuca stricta/sulcata</i>	2a	2b									
<i>Thymus pulegioides</i>	+	+									
local diff sp <i>Homogyno-Nardetum</i>											
<i>Ranunculus acris/acris</i>			+				+	+			
<i>Dactylorhiza fuchsii</i>					+	1	+	1	+	+	
<i>Pseudorchis albidal/albida</i>							+	+	1	+	1
<i>Dactylorhiza viridis</i>				+	+	+	+		+		
<i>Carlina acaulis/acaulis</i>							+			+	+
<i>Ranunculus polyanthemus/nemorosus</i>									+		
char and diff sp <i>Nardetalia</i>											
<i>Nardus stricta</i>	1	2a		+	+	+	+	1	2b	1	2a
<i>Hypericum maculatum/maculatum</i>	+	1	1	+	2a	+	+	1	+		
<i>Potentilla aurea/aurea</i>	+				2b	+	1	1	+		+
<i>Carex pallescens</i>											
<i>Arnica montana/montana</i>							+	1	+	+	1
<i>Galium pumilum/pumilum</i>	+	+							1	+	+
<i>Homogyne alpina</i>					+		+			+	+
<i>Pilosella lactucella/lactucella</i>	+			+							
<i>Botrychium lunaria</i>			+			+					
char sp <i>Nardetea strictae</i>											
<i>Potentilla erecta</i>	+	1			+	1	2a	2a	2a	2a	1
<i>Carex pilulifera/pilulifera</i>	+	+					+		+		
<i>Stellaria graminea</i>	r								+		
<i>Luzula campestris</i>	2a	2a									
<i>Luzula multiflora/multiflora</i>									+		1
<i>Pilosella officinarum/officinarum</i>							+	+		+	
<i>Antennaria dioica</i>					+				+	1	1
<i>Danthonia decumbens/decumbens</i>								+			1
char sp <i>Festuco-Brometea</i>											
<i>Carex caryophylla</i>	+	+	+	+	+		+				
<i>Cirsium acaulon/acaulon</i>	+						+		+		
<i>Plantago media</i>		+	+				+	+		r	1
<i>Dactylorhiza sambucina</i>	2a	+									
<i>Briza media</i>	1	2a								+	
<i>Euphorbia cyparissias</i>	+	1									
<i>Avenula pubescens/pubescens</i>	2a	+									
<i>Carex flacca/flacca</i>							+				
<i>Helictochloa praeusta/praeusta</i>					+	+					

98	122	99	92	93	123	94	110	101	102	109	100	106	95	105	113		
1590	1600	1390	1688	1720	1705	1700	1595	1354	1360	1632	1358	1693	1830	1665	1752		
SE	SW	W	NE	WSW	ESE	E	E	SSE	SW	ENE	NNE	SW	SW	nard	W		
54	48	55	45	40	41	44	29	41	27	39	38	37	31	34	29		
																pr.	fr. %
																com1	Ass2
																2	
																2	
																2	
+	1	1		+		+	+	1	+	+	1	+	+	+			64
		+	+	+	r	+						r			+		52
			1	+			+				+	1	+	+			48
		+	+	+	+	+									+		44
+	+	+		+	+	+	+	+		+					r		44
+			+	+	+	1	+	+		1	+						40
2b	+	1	2b	2a	1	+	4	4	4	2b	1	1	4	1	4	2	96
+	+	1	1	+	1	2a	+	2b	2a	+	2a	2b	+	+	+	2	92
+	+	2a	1	1	1	1	1	1	2a	2a	2a	2b	1	2a	2a	1	88
2a	2a	+	1	+			1	2a	1	2a	1	1	+	1	+		56
+			+	+		+		+			+	+			1		52
		1	+			+	+		+	+		1	r			2	44
			1	1							+				1	1	36
						+								+		1	12
+																	12
	+	2a	2a	2a	2a	1	2a	1	2a	2b	1	2b	2a	2a	1	2	88
2a	1	2a	2a	2a	1	+	2a	1	2a	2a	2a	2b	1	2a	2b	2	72
+	+		+	+	2b	2b	+	+	1	+		r				1	48
+	+			+	+	+	1	1	1	1		+				2	40
	+	r						1	1		+	+	+				36
+	+		+						+								28
															+	+	24
2a	1							+						1			24
+		1	+		+	+	+	+		+	+	+	+			2	60
+	2a	+			+					+		+	+			1	36
r	+	+									+					1	36
		1						+		r	+					2	16
1										r						2	12
		+							+		+					2	12
		+						+								2	8
		+															8
																	8

relevé number	82	83	96	87	86	97	124	126	127	125	128
<i>Rhinanthus freynii</i>							+				
<i>Koeleria pyramidata/pyramidata</i>	1	+									
<i>Galium verum/verum</i>		+									
<i>Hippocrepis comosa</i>		+							+		
<i>Ranunculus bulbosus/bulbosus</i>											
<i>Brachypodium rupestre</i>		+									
<i>Pimpinella saxifraga</i>	r										
char sp <i>Juncetea trifidi</i>											
<i>Anthoxanthum odoratum</i> agg. (<i>A. alpinum</i> p.max.p.)		+	+	+	2b	2b	1	1	2a	2b	2b
<i>Luzula alpina</i> agg.	+		+	1	+	1	+	+	1	1	1
<i>Geum montanum</i>			1	1	1	1	+	+			
<i>Gentiana acaulis</i>	1						1	+	+	+	1
<i>Scorzoneroidea helvetica</i>								+		r	1
<i>Centaurea nervosa</i>								+	+	+	1
<i>Hypochaeris uniflora</i>								2a	+	2a	2a
<i>Pilosella hoppeana</i>									+		1
<i>Phyteuma hemisphaericum</i>											+
<i>Helictochloa versicolor/versicolor</i>											1
char sp <i>Elyno-Seslerietea</i>											
<i>Potentilla crantzii</i>		+		2b	1	+	1	+	+		+
<i>Poa alpina</i>				1	2a	1	r				
<i>Ranunculus carinthiacus</i>			+		+		+		+	+	+
<i>Galium anisophyllum</i>			2a	1	1	1	1	1			
<i>Carex sempervirens/sempervirens</i>					+	1	2b	1	1	2b	1
<i>Stachys alopecuroides</i>	+	2a	2a	2b	2a	1	+	+	+		
<i>Gymnadenia rbellicani</i>			+	+		+	+	+	+		
<i>Anthyllis vulneraria/alpestris</i>				1	1	+	+	+		+	
<i>Leucanthemum heterophyllum</i>							+	+	+	+	+
<i>Thesium alpinum</i>							+	+	+	r	+
<i>Festuca norica</i>			+	+	1	1					
<i>Pedicularis elongata</i> s.l.								+	+	+	+
<i>Scorzonera aristata</i>							+	+		+	+
<i>Biscutella laevigata/laevigata</i>									+	+	+
<i>Polygala alpestris/alpestris</i>					+				+		
<i>Myosotis alpestris/alpestris</i>				+							
<i>Gentiana verna/verna</i>			+	+		+					
<i>Horminum pyrenaicum</i>							2a	1		+	
<i>Arabis ciliata</i>	+	+	+	+							
<i>Clinopodium alpinum/alpinum</i>			+	+							
<i>Crepis froelichiana/froelichiana</i>							+			+	
<i>Jacobaea abrotanifolia</i>										+	+
<i>Ranunculus venetus</i>			+								
<i>Bartsia alpina</i>									+		
<i>Bellidiastrum michelii</i>					r						
<i>Bupleurum ranunculoides/ranunculoides</i>										+	
<i>Festuca laevigata/laevigata</i>									+		
<i>Knautia longifolia</i>									1		
<i>Pulsatilla alpina/austroalpina</i>											+
<i>Selaginella selaginoides</i>							+				

98	122	99	92	93	123	94	110	101	102	109	100	106	95	105	113	pr.	fr. %
		2a															8
1																2	4
								+								1	4
																1	4
					+												4
																1	
																1	
+	1	2b	+	+	1	+	2a	1	1	2a	2a	2a	+	2a	2b	1	100
+		+	1	+		+		+	+		1	+	1	+	1	1	84
		+	+	2a	1	2a	+	+	2a	1	2b	1	2b	+	2a		80
+	+									r			+	+		1	40
			+	+										2a	1		28
		+															20
																	16
																	8
																	4
																	4
+	+			+	1	+			+		+		+	+	+	1	68
+			+	+	+	+	+				+	r		+			52
+		+	+	+		+		+						+			52
1	+				+							+	+		+		48
	1											2a	2a	2a			44
					1											2	32
+																	28
																	24
																	20
																	20
																	16
																	16
																	16
																	12
	+																12
	+					+											12
																	12
																2	8
																	8
																	8
								+									8
																	4
																	4
																	4
																	4
																	4
																	4
																	4

relevé number	82	83	96	87	86	97	124	126	127	125	128
char sp <i>Molinio-Arrhenatheretea</i>											
<i>Festuca rubra</i> agg. (<i>F. nigrescens</i> p.m.p.)	2a	1	4	1	+	1	2b	2a	2b	2a	2a
<i>Crocus vernus/albiflorus</i>	+	1	1	2a	2a	1	2a	1	1	1	+
<i>Lotus corniculatus</i>	+	+	+	+	1		+	+	+	+	+
<i>Trifolium pratense</i>	+	+	+	+		1	1	2a	1	+	+
<i>Phleum rhaeticum</i>	+	2a	2a	+		2b		+			
<i>Bistorta officinalis</i>	+	+	+	+	2a	1	+	2b	2b		
<i>Veronica chamaedrys/chamaedrys</i>	+	1	+	+	+		+			+	
<i>Poa pratensis/pratensis</i>	+	+					+				
<i>Trifolium repens</i>		+	+	1	1						
<i>Centaurea nigrescens/transalpina</i>		+									
<i>Agrostis capillaris/capillaris</i>			1	1	1	2b	1	+	1	1	
<i>Cerastium fontanum/vulgare</i>						+	+	r			
<i>Gymnadenia conopsea</i>					+		1	+	+	+	1
<i>Trollius europaeus/europaeus</i>				r	+	+	+	+			+
<i>Deschampsia cespitosa</i>						+		+			
<i>Carum carvi</i>			+	+				+			
<i>Galium mollugo</i> agg.			r					r			
<i>Ajuga reptans</i>					+		+				
<i>Euphrasia rostkoviana/rostkoviana</i>							+	+			+
<i>Prunella vulgaris</i>						+	+				
<i>Rumex acetosa/acetosa</i>											
<i>Dactylis glomerata</i>											
<i>Poa trivialis/trivialis</i>											
<i>Rhinanthus minor</i>											
<i>Colchicum autumnale</i>											
<i>Cynosurus cristatus</i>											
<i>Leucanthemum vulgare</i> agg.											
<i>Plantago lanceolata</i>											
<i>Ochlopoa supina</i>					+						
<i>Tephrosia longifolia/gaudinii</i>											
<i>Veronica serpyllifolia/serpyllifolia</i>											
other species											
<i>Alchemilla vulgaris</i> agg.	+	+	+	+	1	1	+	+			
<i>Carex ornithopoda</i>	2a	1	+	2a	1	+	1	2a	1	+	+
<i>Achillea millefolium</i>	+	1		+	+		+	+			
<i>Avenella flexuosa/flexuosa</i>										+	1
<i>Pedicularis verticillata</i>			r	2a	+	+					
<i>Aposeris foetida</i>					r		1	2a		r	+
<i>Cruciata laevipes</i>	+										
<i>Pimpinella alpina</i>		+	1		+	+					
<i>Carduus defloratus/tridentinus</i>			1	1	+	+	+	+			
<i>Carex montana</i>		+			+		2a	+	1	+	+
<i>Thymus praecox/polytrichus</i>				1			r		+	+	+
<i>Calluna vulgaris</i>								+	1	1	1
<i>Cerastium arvense</i> s.l.			+	+	r	+					
<i>Cruciata glabra</i>	1	1									
<i>Campanula scheuchzeri/scheuchzeri</i>									+		
<i>Galium x centroniae</i>											

98	122	99	92	93	123	94	110	101	102	109	100	106	95	105	113	pr.	fr. %
1	1	2a	2b	1	1	1	1	2a	+	+	2a	2a	+	+	1	2	100
+		2b	+	2a	1	1	+	+	1	1	1	1	+	+	+	2	96
+	+	1	+	+	+	+				+	r	+	+	+	+	2	84
1	2a	+	+	+	1	+				+		+	+	+		2	76
+	+	1	+	1	+		1	1	1	+	2a	1	+		+	2	72
	2a		2a	2a	1	1	2b			+		+	1	+	2a	2	72
+	+	2a	+		+	+	+	1	1	1	1	+				2	68
	+	+		+				+		+						2	24
+	1		2a	1	1	1	+	+		+	1	+				1	56
																1	
1	2b	1	1	1	1	1			2a	1	1	2a		2a	2a		84
	1			+	1	+		+			+	+					40
		r				+				+			r				40
		+				+											32
r			r	+				+					+				28
+		+			2a												24
+		+							+	r							24
			+	+											+		20
					+												16
+	+																16
		+						+		+	r						16
	+	1															8
	+												+				8
+						+											8
		r															4
	4																4
		+															4
		1															4
		r															4
	+																4
+	1	2a	+	1	+	+		+	+	2a	r		+			2	72
		1	+	1	+		+			+					1	2	64
+	1	1	+		+		+	+		1	1	+		+		2	60
		2a	2b			1	+	2a	2a		1		+	+	1		48
		r	+	1	+	+									+		40
		1	2a	r	+												36
+	+		+			+		+	+	+		+				1	32
+				+	+	1			+							1	32
+	+																32
												+				1	28
+	1																28
					+	+					+			1			28
		2a						2a	+	1	2a				+	2	24
+	+		+		+												20
+					+			+			+	+					20

relevé number	82	83	96	87	86	97	124	126	127	125	128
<i>Luzula sylvatica/sieberi</i>					+	+	+			+	
<i>Veronica officinalis</i>		+	+								
<i>Cirsium eriophorum</i>		+		r							
<i>Vaccinium myrtillus</i>					+						
<i>Polygala chamaebuxus</i>							+		1	+	+
<i>Daphne mezereum</i>			+		+	1					
<i>Soldanella alpina/alpina</i>					+		+				
<i>Juniperus communis/nana</i> (pl+B2)								+	+	+	
<i>Phyteuma zahlbruckneri</i>									+		
<i>Erica carnea</i>					r					+	+
<i>Maianthemum bifolium</i>											
<i>Platanthera bifolia</i>							+				
<i>Tanacetum corymbosum/corymbosum</i>								+		+	+
<i>Pulmonaria australis</i>							+	r	+		
<i>Geum rivale</i>					+	+					
<i>Knautia drymeja</i>	1	1									
<i>Laserpitium krapfii/gaudinii</i>							r			+	
<i>Sesleria caerulea/caerulea</i>						r					+
<i>Tofieldia calyculata</i>							+			+	
<i>Viola biflora</i>					+						+
<i>Galium baldense</i>											
<i>Chaerophyllum villarsii</i>							+	+			
<i>Ranunculus platanifolius</i>											
<i>Senecio cacaliaster</i>											
<i>Primula veris/veris</i>											
<i>Vaccinium vitis-idaea</i>					+						
<i>Parnassia palustris</i>											+
<i>Leontodon hispidus/hispidus</i>											
<i>Daphne cneorum/cneorum</i>										+	
<i>Elytrigia repens/repens</i>											
<i>Hieracium bifidum s.l.</i>					+						
<i>Neottia ovata</i>							+				
<i>Pinguicula leptoceras</i>											
<i>Pinguicula vulgaris/vulgaris</i>										+	
<i>Plantago major/major</i>											
<i>Rumex acetosella/acetosella</i>											
<i>Taraxacum sect. Taraxacum</i>											
<i>Bistorta vivipara</i>								+			
<i>Cyanus triumfettii/triumfettii</i>							r				
<i>Valeriana stolonifera/angustifolia</i>											
<i>Silene nutans</i>											
<i>Ranunculus breyninus</i>				+							
<i>Rumex arifolius</i>											
<i>Veratrum lobelianum</i>											
<i>Myosotis sylvatica</i>	+										

31

Table 3: Synoptic table of *Nardus* swards from the Asiago Plateau.

Tabela 3: Sinoptična tabela travnišč z vrsto *Nardus* s planote Asiago.

association	<i>Festuca-Nardus</i> comm.	<i>Homogyno-</i> <i>Nardetum</i>	<i>Sieversio-</i> <i>Nardetum</i>
number of relevés	2	25	11
diagnostic species <i>Festuca stricta/sulcata</i> - <i>Nardus</i> comm.			
<i>Bromopsis erecta/erecta</i>	2		
<i>Festuca stricta/sulcata</i>	2		
<i>Thymus pulegioides</i> (dAll1)	2		
diagnostic species <i>Homogyno-Nardetum</i>			
<i>Ranunculus acris/acris</i>		64	
<i>Dactylorhiza fuchsii</i>		52	
<i>Pseudorchis albida/albida</i> (dAll2)		48	
<i>Dactylorhiza viridis</i> (Cl1)		44	9
<i>Carlina acaulis/acaulis</i>		44	
<i>Ranunculus polyanthemus/nemorosus</i>		40	
diagnostic species <i>Sieversio-Nardetum</i>			
<i>Bistorta vivipara</i>		4	82
<i>Galium baldense</i>		8	64
<i>Jacobaea abrotanifolia</i>		8	64
<i>Parnassia palustris</i>		4	55
<i>Luzula spicata/conglomerata</i> (Cl2)			55
<i>Selaginella selaginoides</i>		4	45
<i>Trifolium badium</i>			45
diff sp <i>Violion caninae</i> (All.1)			
<i>Galium pumilum/pumilum</i>	2	44	
<i>Pimpinella saxifraga</i>	1		
diff sp <i>Nardo-Agrostion</i> (All2)			
<i>Potentilla aurea/aurea</i>	1	88	100
<i>Poa alpina</i>		52	82
<i>Achillea millefolium</i>	2	60	
<i>Homogyne alpina</i>		36	73
<i>Ajuga pyramidalis</i>			18
<i>Botrychium lunaria</i>		12	
char and diff sp <i>Nardetalia</i>			
<i>Nardus stricta</i>	2	96	100
<i>Hypericum maculatum/maculatum</i>	2	92	
<i>Pilosella lactucella/lactucella</i>	1	12	64
<i>Arnica montana/montana</i>		52	55
<i>Carex pallescens</i>		56	18
char sp <i>Nardetea strictae</i> (Cl1)			
<i>Potentilla erecta</i>	2	88	45
<i>Carex pilulifera/pilulifera</i>	2	72	18
<i>Luzula campestris</i>	2	40	
<i>Stellaria graminea</i>	1	48	9
<i>Antennaria dioica</i>		24	64
<i>Luzula multiflora/multiflora</i>		36	
<i>Pilosella officinarum/officinarum</i>		28	
<i>Danthonia decumbens/decumbens</i>		24	
char sp <i>Juncetea trifidi</i> (Cl2) and subordinate unities			
<i>Luzula alpina</i> agg.	1	84	100

association	<i>Festuca-Nardus</i> comm.	<i>Homogyno-</i> <i>Nardetum</i>	<i>Sieversio-</i> <i>Nardetum</i>
<i>Geum montanum</i>		80	100
<i>Anthoxanthum odoratum</i> agg. (<i>A. alpinum</i> p.max.p.)	1	100	91
<i>Scorzoneroidea helvetica</i>		28	36
<i>Gentiana acaulis</i>	1	40	27
<i>Phyteuma hemisphaericum</i>		4	27
<i>Hypochaeris uniflora</i>		16	18
<i>Euphrasia minima</i>			18
<i>Pulsatilla vernalis</i>			18
<i>Veronica bellidiodes</i>			18
<i>Agrostis rupestris/rupestris</i>			9
<i>Campanula barbata</i>			9
<i>Juncus jacquinii</i>			9
<i>Juncus trifidus</i>			9
<i>Ligusticum mutellinoides</i>			9
<i>Centaurea nervosa</i>		20	
<i>Pilosella hoppeana</i>		8	
<i>Helictochloa versicolor/versicolor</i>		4	
char sp <i>Festuco-Brometea</i>			
<i>Carex caryophylla</i>	2	60	18
<i>Dactylorhiza sambucina</i>	2	16	
<i>Briza media</i>	2	12	
<i>Euphorbia cyparissias</i>	2	12	
<i>Avenula pubescens/pubescens</i>	2	8	
<i>Koeleria pyramidata/pyramidata</i>	2	4	
<i>Cirsium acaulon/acaulon</i>	1	36	
<i>Plantago media</i>	1	36	
<i>Galium verum/verum</i>	1	4	
<i>Hippocrepis comosa</i>	1	4	
<i>Brachypodium rupestre</i>	1		
<i>Carex flacca/flacca</i>		8	
<i>Helictochloa praeusta/praeusta</i>		8	
<i>Rhinanthus freynii</i>		8	
<i>Ranunculus bulbosus/bulbosus</i>		4	
char sp <i>Molinio-Arrhenatheretea</i>			
<i>Crocus vernus/albiflorus</i>	2	96	73
<i>Agrostis capillaris/capillaris</i>		84	55
<i>Lotus corniculatus</i>	2	84	36
<i>Trifolium pratense</i>	2	76	55
<i>Phleum rhaeticum</i>	2	72	27
<i>Bistorta officinalis</i>	2	72	
<i>Veronica chamaedrys/chamaedrys</i>	2	68	27
<i>Trifolium repens</i>	1	56	
<i>Cerastium fontanum/vulgare</i>		40	82
<i>Gymnadenia conopsea</i>		40	
<i>Trollius europaeus/europaeus</i>		32	18
<i>Deschampsia cespitosa</i>		28	27
<i>Poa pratensis/pratensis</i>	2	24	
<i>Carum carvi</i>		24	
<i>Galium mollugo</i> agg.		24	
<i>Ajuga reptans</i>		20	
<i>Euphrasia rostkoviana/rostkoviana</i>		16	
<i>Prunella vulgaris</i>		16	
<i>Rumex acetosa/acetosa</i>		16	
<i>Dactylis glomerata</i>		8	

association	<i>Festuca-Nardus</i> comm.	<i>Homogyno-</i> <i>Nardetum</i>	<i>Sieversio-</i> <i>Nardetum</i>
<i>Poa trivialis/trivialis</i>		8	
<i>Rhinanthus minor</i>		8	
<i>Colchicum autumnale</i>		4	
<i>Cynosurus cristatus</i>		4	
<i>Leucanthemum vulgare</i> agg.		4	
<i>Plantago lanceolata</i>		4	
<i>Ochlopoa supina</i>		4	
<i>Tephrosia longifolia/audinii</i>		4	
<i>Veronica serpyllifolia/serpyllifolia</i>		4	
<i>Scorzoneroideae autumnalis/autumnalis</i>			9
<i>Centaurea nigrescens/transalpina</i>	1		
char sp <i>Elyno-Seslerietea</i>			
<i>Potentilla crantzii</i>	1	68	55
<i>Ranunculus carinthiacus</i>		52	18
<i>Galium anisophyllum</i>		48	9
<i>Carex sempervirens/sempervirens</i>		44	73
<i>Stachys alopecuroides</i>	2	32	
<i>Gymnadenia rhellicani</i>		28	27
<i>Anthyllis vulneraria/alpestris</i>		24	
<i>Leucanthemum heterophyllum</i>		20	
<i>Thesium alpinum</i>		20	
<i>Festuca norica</i>		16	18
<i>Pedicularis elongata s.l.</i>		16	
<i>Scorzonera aristata</i>		16	
<i>Biscutella laevigata/laevigata</i>		12	36
<i>Polygala alpestris/alpestris</i>		12	36
<i>Myosotis alpestris/alpestris</i>		12	9
<i>Gentiana verna/verna</i>		12	
<i>Horminum pyrenaicum</i>		12	
<i>Arabis ciliata</i>	2	8	
<i>Clinopodium alpinum/alpinum</i>		8	
<i>Crepis froelichiana/froelichiana</i>		8	
<i>Ranunculus venetus</i>		8	
<i>Bartsia alpina</i>		4	27
<i>Bellidiastrum michelii</i>		4	
<i>Bupleurum ranunculoides/ranunculoides</i>		4	
<i>Festuca laevigata/laevigata</i>		4	
<i>Knautia longifolia</i>		4	
<i>Pulsatilla alpina/austroalpina</i>		4	
<i>Dianthus superbus/alpestris</i>			9
<i>Trifolium thalii</i>			9
other species			
<i>Festuca rubra</i> agg. (<i>F. nigrescens</i> p.m.p.)	2	100	91
<i>Alchemilla vulgaris</i> agg.	2	72	55
<i>Carex ornithopoda</i>	2	64	45
<i>Campanula scheuchzeri/scheuchzeri</i>		20	82
<i>Pedicularis verticillata</i>		40	45
<i>Avenella flexuosa/flexuosa</i>		48	27
<i>Luzula sylvatica/sieberi</i>		20	55
<i>Thymus praecox/polytrichus</i>		28	45
<i>Carduus defloratus/tridentinus</i>		32	27
<i>Carex montana</i>	1	28	27
<i>Calluna vulgaris</i>		28	27
<i>Soldanella alpina/alpina</i>		12	36

association	<i>Festuca-Nardus</i> comm.	<i>Homogyno-</i> <i>Nardetum</i>	<i>Sieversio-</i> <i>Nardetum</i>
<i>Leontodon hispidus/hispidus</i>		4	36
<i>Carex atrata/atrata</i>			36
<i>Aposeris foetida</i>		36	
<i>Vaccinium vitis-idaea</i>		8	27
<i>Veronica officinalis</i>	1	16	18
<i>Vaccinium myrtillus</i>		16	18
<i>Cruciata laevipes</i>	1	32	
<i>Pimpinella alpina</i>	1	32	
<i>Cerastium arvense s.l.</i>		28	
<i>Gnaphalium sylvaticum</i>			27
<i>Pinus mugo/mugo (pl)</i>			27
<i>Salix breviserrata</i>			27
<i>Salix retusa</i>			27
<i>Cruciata glabra</i>	2	24	
<i>Juniperus communis/nana (pl+B2)</i>		12	9
<i>Phyteuma zahlbruckneri</i>		12	9
<i>Galium xcentroniae</i>		20	
<i>Cirsium spinosissimum</i>			18
<i>Vaccinium uliginosum</i>			18
<i>Cirsium eriophorum</i>	1	16	
<i>Polygala chamaebuxus</i>		16	
<i>Daphne mezereum</i>		16	
<i>Erica carnea</i>		12	
<i>Maianthemum bifolium</i>		12	
<i>Platanthera bifolia</i>		12	
<i>Tanacetum corymbosum/corymbosum</i>		12	
<i>Pulmonaria australis</i>		12	
<i>Galium boreale</i>			9
<i>Carex brunnescens</i>			9
<i>Geum rivale</i>		8	
<i>Laserpitium krapfii/gaudinii</i>		8	
<i>Sesleria caerulea/caerulea</i>		8	
<i>Tofieldia calyculata</i>		8	
<i>Viola biflora</i>		8	
<i>Chaerophyllum villarsii</i>		8	
<i>Ranunculus platanifolius</i>		8	
<i>Senecio cacaliaster</i>		8	
<i>Primula veris/veris</i>		8	
<i>Daphne cneorum/cneorum</i>		4	
<i>Elytrigia repens/repens</i>		4	
<i>Hieracium bifidum s.l.</i>		4	
<i>Neottia ovata</i>		4	
<i>Pinguicula leptoceras</i>		4	
<i>Pinguicula vulgaris/vulgaris</i>		4	
<i>Plantago major/major</i>		4	
<i>Rumex acetosella/acetosella</i>		4	
<i>Taraxacum Sect. Taraxacum</i>		4	
<i>Cyanus triumfettii/triumfettii</i>		4	
<i>Valeriana stolonifera/angustifolia</i>		4	
<i>Silene nutans</i>		4	
<i>Ranunculus breyninus</i>		4	
<i>Rumex arifolius</i>		4	
<i>Veratrum lobelianum</i>		4	
<i>Knautia drymeja</i>	2		
<i>Myosotis sylvatica</i>	1		

Table 4: *Arrhenatherion* associations from Asiago Plateau. Ass1: *Holcetum lanati*; Ass2: *Ranunculo repentis-Alopecuretum anthriscetosum*; Ass3: *Centaureo-Arrhenatheretum*; Ass3a: *Arrhenatherum elatior*-dominating form of *Centaureo-Arrhenatheretum* (rel from 19 to 71); Ass3b: *Centaureo-Arrhenatheretum avenuletosum pubescentis* (rel from 45 to 67).

relevé number	57	58	62	63	16	42	39	12	66	19	18	20	22	13	72	40	41	21	24	17	27	44	59	26	46	34	50	53	36	37	68	75	78	76	77	79
elevation (m)	1015	1005	1160	1095	1100	1075	1100	1080	1070	1150	1170	1100	1075	1080	1100	1090	1050	1000	1020	1080	950	1025	1090	1035	1140	1090	800	980	900	1020	400	1000	1000	1000	1000	1000
aspect	I	I	W	E	I	Z	Z	I	I	WNW	NW	N	NE	W	E	SW	W	I	NW	SW	E	I	WSW	NE	WSW	WNW	WSW	S	SE	NE	S	S	S	S	S	I
species number	31	31	31	27	17	29	19	15	15	44	30	34	25	53	28	23	31	37	20	29	33	27	25	45	42	30	41	43	43	38	37	46	49	48	47	36

diff. sp. *Holcetum lanati*

<i>Carex nigra</i>	1	+
<i>Carex hirta</i>	+	+
<i>Agrostis stolonifera/stolonifera</i>	1	+
<i>Equisetum palustre</i>	1	+
<i>Juncus inflexus</i>	1	+
<i>Scirpus sylvaticus</i>	+	2b

diff. sp. *Ranunculo repentis-Alopecuretum anthriscetosum*

<i>Anthriscus sylvestris/sylvestris</i> (O)	5	3	2a	2b	5	4	4	1	+	+	+	2b	+	+	r	+	r	1	+	1	2b
<i>Alopecurus pratensis/pratensis</i>	+	+	3	3	3	1	3	3		2a	2b	3	2b	2a	+	2b	2a	+	1	+	
<i>Lamium album</i>	2b	2a	r		1	1	1	1	+	+	+	+	1	+		+	1	+	+		
<i>Rumex arifolius</i>	+	1	2a	1		1						r							+		+
<i>Urtica dioica</i>	+	+		+					+							+					

diff. sp. *Centaureo-Arrhenatheretum*

<i>Arrhenatherum elatius/elatius</i> (All)	+	+																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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diff. sp. *Centaureo-Arrhenatheretum avenuletosum pubescentis*

<i>Avenula pubescens/pubescens</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Festuca stricta/sulcata</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Arabis hirsuta agg.</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Bromopsis erecta/erecta</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Luzula campestris</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Brachypodium rupestre</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Galium verum/verum</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

char sp *Arrhenatherion* (All)

<i>Crepis biennis</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Trifolium patens</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

char sp *Arrhenatheretalia* (O)

<i>Rumex acetosa/acetosa</i>	+	2a	1	1	+	1	2b	1	+	r	+	+	+	2a	2a	1	1	+	+	+	+	1	3	1	1	+	2a	+	+	+	+	+
<i>Trifolium repens</i>	1	1	2a	2a	1	+	2a	+	1	2a	+	1	+	1	1	1	1	2b	1	2a	+	2b	2a	1	1	+	+	+	+	+	+	+
<i>Lolium perenne</i>	+	1	2b	3	+	+	1	2a	2a	+	+	2a	2b	+	2a	3	+	+	2a	1	+	3	+	1	+	2b	+	+	+	1	+	+
<i>Poa pratensis/pratensis</i>	+	1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Achillea roseoalba</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Cynosurus cristatus</i>	2b	+	+	+	+	+	4	3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pimpinella major/major</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Phleum pratense/pratense</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

[illegible]

relevé number	57	58	62	63	16	42	39	12	66	19	18	20	22	13	72	40	41	21	24	17	27	44	59	26	46	34	50	53	36	37	68	75	78	76	77	79		
<i>Knautia arvensis/arvensis</i>											+																		+									
<i>Veronica serpyllifolia/serpyllifolia</i>					+			+			+													+														
<i>Bellis perennis</i>																																						
<i>Scorzoneroides autumnalis/autumnalis</i>																																	+			1		
<i>Hypochaeris radicata/radicata</i>																																						
<i>Prunella vulgaris</i>																																						
<i>Rhinanthus minor</i>		+	+																																			
char sp <i>Molinio-Arrhenatheretea</i> (C)																																						
<i>Dactylis glomerata</i>					2a	1		1	2a			2b	2a	2b	1	1	+	2b	1	1	2a	1	1	1	2b	2a	2b	1	1		+	2a	1	2b	1	3	2b	2b
<i>Trisetum flavescens/flavescens</i>					+	+		+	+			+	+	3	+	1	+	1	2a	1	+	3	1	2a	2a	2a	+	+	2a	+	+	2b	1	1	+	1	1	
<i>Trifolium pratense</i>		+	+					2a	+			+	+	+		1		r	+	+	+	1	1	1	2a	1	1		2a	2a	1	1	+	1	1	1	2b	
<i>Plantago lanceolata</i>		+										2a	+	+	r	+	+	+	+			1			+	1	+	1	+	+	+	+	+	1	1	1	1	
<i>Galium mollugo</i> agg.					1	+		+				+	+	+	+	3		+	+		+	1	+	1	+	+	1	1	1	+	+	1	1	1	+	+		
<i>Ranunculus acris/acris</i>		+	+	1	+	2a	1	1	+	+	2b	1	1		2a	+	+	+	+	+	+	+	+	1	+	+	1	2a	1	+	+	+	1	1	1	1	1	
<i>Taraxacum</i> sect. <i>Taraxacum</i>		+	+		+	2a	1	3	2a	1	+	1	1	+	+	1	2b	2a	1	+	2b	2a	2b	1	+	2a	2a	+	2a	2b	+	1	1	2b	+	1	2b	
<i>Vicia cracca</i>		r					+		+	+	+	r	+		+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	1	1	1	+	
<i>Veronica chamaedrys/chamaedrys</i>					1						+	+	+		1			+							+	+	1	+		+		+	+	1	+	1	1	
<i>Leucanthemum vulgare</i> agg. (<i>L. ircutianum</i> p.m.p)												+		+	+									+	+	+		+	+	r	+	1	2b	2b	2b	1		
<i>Schedonorus pratensis/pratensis</i>		1	2a					2b				1	1				+	+	+		+	+	+	2b	1		1	+	2a	2a		+	+	1	1	+		
<i>Poa trivialis</i> s.l. (<i>P. t./ trivialis</i> p.max.p)		+		+	2b	1	2a	4	3	3	2b	2a	2a	1	1	2a	1	3	3	2a	1	2a	1	2a	2b	2a	1	2a	1	1			+			1		
<i>Leontodon hispidus/hispidus</i>													+	r										+	+	+		1	+	1	1	1	1	1	1	1	1	
<i>Festuca rubra/rubra</i>		+				+				+	2a	+	+								+				+	+			+	1	1	1	1	1	1	2b		
<i>Colchicum autumnale</i>			+	+				+		1	+	+	+								+						+	r	+	+	+				+	1		
<i>Cerastium fontanum/vulgare</i>		1	+				1		+		+	+			+	+								+	+	+	1	1	+	1	+		+	+	+	+		
<i>Heracleum sphondylium/sphondylium</i>					2a	1	+	+	+		2b	+	r		+				2a	2b			+	+	+	+	+	+				1	+	1		+		
<i>Rhinanthus alectorolophus</i>										1	+		r	+								2a				+							+	2b	1	2b	2b	
<i>Lotus corniculatus</i>										+	+														+							+	+		1		+	
<i>Vicia sepium</i>			+	1		+		+	+		+	+	+		1	2a	1	1				+	+	+		+			1	+	1							
<i>Stellaria graminea</i>												+																+	+		+	+	+	+		1		
<i>Alchemilla vulgaris</i> agg.				1		+			+	+	1	+		+		r	+							+	+	+		+	+	+	+	+	+	+				
<i>Holcus lanatus</i>		4	4																									+	3		+							
<i>Carum carvi</i>							+			+	+																							1		1	+	
<i>Viola tricolor/alpestris</i>																+																			+			
<i>Ajuga reptans</i>																							+											+				
<i>Trifolium dubium</i>			2b	2a												+				+	+						r		+									
<i>Silene flos-cuculi</i>			1	+			+																					+	+					+				
<i>Potentilla reptans</i>																	r												+			+	+	+				
<i>Onobrychis viciifolia</i>																																						
<i>Trollius europaeus/europaeus</i>																1																	+					
<i>Bistorta officinalis</i>		+					+									1													+	+								
<i>Agrostis capillaris/capillaris</i>																									+													
<i>Crocus vernus/albiflorus</i>											+	+		+																								
<i>Tephrosieris longifolia/gaudinii</i>											+																											
<i>Geranium pratense</i>																		+																+				
<i>Linum bienne</i>																																						
<i>Arabidopsis halleri/halleri</i>															+																							
<i>Ornithogalum umbellatum</i>																																						
<i>Gymnadenia conopsea</i>																																						
<i>Ranunculus repens</i>			+		+	+		+																														
<i>Cardamine pratensis</i>		+	+			+																																
char sp <i>Festuco-Brometea+ Trifolio-Geranietea</i>																																						
<i>Rhinanthus freynii</i>				+																								+	1	2a	1							

39

40

41

relevé number	57	58	62	63	16	42	39	12	66	19	18	20	22	13	72	40	41	21	24	17	27	44	59	26	46	34	50	53	36	37	68	75	78	76	77	79	
<i>Narcissus poeticus s.l.</i>														+																							
<i>Clinopodium vulgare/vulgare</i>																														+						+	
<i>Convolvulus arvensis</i>																					+									+							
<i>Cerastium arvense s.l.</i>													+																								
<i>Carex spicata</i>			2a	+																																	
<i>Potentilla alba</i>																																					
<i>Erigeron annuus/annuus</i>																															+						
<i>Arenaria serpyllifolia</i>													+															+									
<i>Hypericum maculatum/maculatum</i>									+	+	r																										
<i>Geranium pyrenaicum</i>																+	+			+	+																
<i>Daucus carota/carota</i>																															+				+	+	
<i>Trifolium campestre</i>																																					
<i>Drabella muralis</i>												1																	+								
<i>Campanula trachelium/trachelium</i>																															+						+
<i>Stellaria media</i>				+								1	+		+																						
<i>Plantago media</i>																																					
<i>Vicia hirsuta</i>																																					
<i>Capsella bursa-pastoris</i>														+								+					+	+									
<i>Campanula glomerata</i>											+														+								+			1	
<i>Campanula scheuchzeri/scheuchzeri</i>																									+								+				+
<i>Aristolochia lutea</i>																																					
<i>Chaerophyllum aureum</i>					3																																
<i>Campanula rapunculoides</i>																																+	+	1	+		
<i>Crepis vesicaria/taraxacifolia</i>																																					
<i>Geranium molle</i>																																					
<i>Knautia persicina</i>																																					
<i>Blitum bonus-henricus</i>				+																																	
<i>Galeopsis tetrahit + pubescens</i>				+																																	
<i>Cerastium pumilum/glutinosum</i>																														+							
<i>Cirsium arvense</i>																											+					+		+			
<i>Cerastium glomeratum</i>																																					
<i>Rosa canina agg. (pl)</i>																																					
<i>Galium aparine</i>					+																																
<i>Tussilago farfara</i>				+																																	
<i>Cerastium brachypetalum/brachypetalum</i>																													+								
<i>Silene latifolia</i>																																					
<i>Petasites hybridus</i>																																					
<i>Pilosella officinarum/officinarum</i>																																					
<i>Stachys alopecuros</i>																																					
<i>Stachys officinalis</i>																																					
<i>Anisantha sterilis</i>													+																								
<i>Muscari botryoides</i>									+																												
<i>Thalictrum minus s.l.</i>																																					

43

relevé number	57	58	62	63	16	42	39	12	66	19	18	20	22	13	72	40	41	21	24	17	27	44	59	26	46	34	50	53	36	37	68	75	78	76	77	79	
<i>Geranium dissectum</i>																																					
<i>Malva sylvestris</i>																																					
<i>Ornithogalum divergens</i>																																					
<i>Petasites paradoxus</i>																																					
<i>Pimpinella alpina</i>																																					
<i>Populus nigra</i> (pl)																																					
<i>Primula veris/veris</i>																																					
<i>Sedum sexangulare</i>																																					
<i>Senecio inaequidens</i>																																					
<i>Sherardia arvensis</i>																																					
<i>Vincetoxicum hirundinaria</i>																																					
<i>Viola hirta</i>																																					
<i>Allium vineale</i>																																					+
<i>Barbarea vulgaris/vulgaris</i>																																					+
<i>Bromus arvensis</i> s.l.																																					
<i>Capsella rubella</i>																																					+
<i>Cirsium erisithales</i>																																					+
<i>Dactylorhiza fuchsii</i>																																					+
<i>Equisetum arvense</i>																																					+
<i>Lepidium campestre</i>																																					+
<i>Medicago sativa</i>																																					+
<i>Pastinaca sativa</i>																																					
<i>Plantago major/major</i>																																					
<i>Polygonatum multiflorum</i>																																					+
<i>Polygonatum verticillatum</i>																																					+
<i>Rumex crispus/crispus</i>																																					+
<i>Sisymbrium austriacum</i>																																					+
<i>Sonchus oleraceus</i>																																					+
<i>Thalictrum aquilegifolium</i>																																					r
<i>Veronica persica</i>																																					r
<i>Carex leporina</i>																																					+
<i>Carex panicea</i>																																					1
<i>Eleocharis mamillata/austriaca</i>																																					1
<i>Glyceria notata</i>																																					+
<i>Juncus articulatus</i>																																					+
<i>Poa palustris</i>																																					1
<i>Taraxacum</i> sect. <i>Palustria</i>																																					+

45

Table 5: Simplified synoptic table of *Antriscus sylvestris*- or *Alopecurus pratensis*-rich communities from the Central Europe and the Asiago Plateau. Only *Molinio-Arrhenatheretea* species or companion ones occurring in at least II frequency class in one synthetic table are included. In brackets, letters indicate which association or subassociation species are characteristic of, according to the original statements of the authors. For abbreviations see Appendix 2.

Tabela 5: Poenostavljena sinoptična tabela združb, bogatih z vrstama *Antriscus sylvestris* ali *Alopecurus pratensis* iz Srednje Evrope in planote Asiago. Prikazane so samo vrste razreda *Molinio-Arrhenatheretea* in spremljevalke, ki se pojavljajo s frekvenčnim razredom II. Črke v oklepajih nakazujejo, za katero asociacijo ali subasociacijo je vrsta značilna v skladu z izvirnimi uvrstitvami avtorjev. Za okrajšave glej Appendix 2.

coenosis	a P-A_Cz	b R-Aant_AP	c R-Aant_A	d S-A_G	e S-A_Cz	f Ant-g_G
diagnostic sp ass or subass						
<i>Alopecurus pratensis</i> (a-b-c)	100	100	100	38	15	29
<i>Anthriscus sylvestris</i> (b-c-e)	27	100	100	100	100	100
<i>Lamium album</i> (b-e)		86		15	41	71
<i>Rorippa x anceps</i> (a)	10					
<i>Cerastium dubium</i> (a)	18					
<i>Rumex arifolius</i> (b)		71				
<i>Urtica dioica</i> (b)	37	43		92	86	71
<i>Ranunculus repens</i> (c)	93	43	55	15	20	43
<i>Cardamine pratensis</i> (c)	42	14	45			
<i>Lolium perenne</i> (c)		57	9		15	
<i>Rumex obtusifolius</i> (c)	30	43	45	15	24	
<i>Glechoma hederacea</i> (c)	62		45	8	22	57
char sp <i>Molinio-Arrhenatheretea</i>						
<i>Poa trivialis/trivialis</i>	90	86	91	23	38	14
<i>Poa pratensis</i> s.l.	75	29	64	62	16	100
<i>Rumex acetosa</i>	72	86	100	46	9	
<i>Schedonorus pratensis</i>	65	14	64	8	7	
<i>Silene flos-cuculi</i>	52	14	9			
<i>Ranunculus acris</i>	50	100	100	23		
<i>Cerastium fontanum/vulgare</i>	38	29	64	23		14
<i>Dactylis glomerata</i>	32	57	100	69	50	86
<i>Trifolium repens</i>	8	57	55			
<i>Phleum pratense</i>	8			38	9	14
<i>Pimpinella major</i>	10		45	85		
<i>Trisetum flavescens</i>	5	57	82			
<i>Veronica serpyllifolia</i>	5	29	18			
<i>Bellis perennis</i>			27			
<i>Trifolium pratense</i>	12	29	82	8		
<i>Plantago lanceolata</i>	17		73	23		29
<i>Galium mollugo</i> agg.	38	43	82		14	57
<i>Taraxacum</i> Sect. <i>Taraxacum</i>	83	86	100	54	49	86
<i>Vicia cracca</i>	22	29	18	54	9	29
<i>Veronica chamaedrys</i> agg.	27	14	64	54	19	
<i>Leucanthemum vulgare</i> agg.	3		27			
<i>Leontodon hispidus</i>	2		36			
<i>Colchicum autumnale</i>	10	43				
<i>Heracleum sphondylium</i>	25	86	91	100	42	57
<i>Vicia sepium</i>		57	55		5	14
<i>Stellaria graminea</i>	8			23		
<i>Holcus lanatus</i>	35		36	92		
<i>Potentilla reptans</i>	30				14	
<i>Geranium pratense</i>	42				21	

coenosis	a	b	c	d	e	f
	P-A_Cz	R-Aant_AP	R-Aant_A	S-A_G	S-A_Cz	Ant-g_G
<i>Lysimachia nummularia</i>	73		18			
<i>Symphytum officinale</i>	72		36	100	7	
<i>Sanguisorba officinalis</i>	63		9			
<i>Deschampsia cespitosa/cespitosa</i>	43		9	54	4	
<i>Agrostis stolonifera</i>	28					
<i>Trifolium hybridum/hybridum</i>	30					
<i>Arrhenatherum elatius/elatius</i>	15	29	64	38	26	100
<i>Cirsium oleraceum</i>	18		18	69	3	
<i>Crepis biennis</i>		29	36			
<i>Tragopogon pratensis s.l.</i>			45			
<i>other</i>						
<i>Achillea millefolium agg.</i>	30	43	91	69	16	43
<i>Alchemilla vulgaris agg.</i>	22	43	27		4	
<i>Lathyrus pratensis</i>	50		36	54		
<i>Phalaroides arundinacea</i>	50			15	4	
<i>Elytrigia repens/repens</i>	45	14	9	38	57	
<i>Ranunculus auricomus agg.</i>	40					
<i>Rumex crispus</i>	38		9	8	4	
<i>Galium aparine</i>		14		8	41	100
<i>Artemisia vulgaris</i>				54	46	57
<i>Cirsium arvense</i>	25		9	54	33	29
<i>Veronica arvensis</i>	8	14	91			
<i>Aegopodium podagraria</i>	20		27	8	42	14
<i>Bromus hordeaceus s.l.</i>		57	45	8		
<i>Filipendula ulmaria</i>	18		18	62		
<i>Equisetum arvense</i>	15		18			57
<i>Galeopsis tetrahit+pubescens</i>		14		31	13	29
<i>Anthoxanthum odoratum</i>	12	43	27			
<i>Knautia drymeja</i>		43	18			
<i>Myosotis sylvatica</i>		57				
<i>Achillea ptarmica</i>				54		
<i>Tanacetum vulgare</i>				8	3	43
<i>Centaurea jacea agg.</i>	15		27	8		
<i>Pericaria amphibia</i>	8			38		
<i>Silene dioica</i>		29			1	14
<i>Geranium phaeum</i>		43				
<i>Alliaria petiolata</i>					9	29
<i>Arctium tomentosum</i>					24	14
<i>Rubus caesius</i>				23	14	
<i>Silene latifolia</i>				23		14
<i>Ballota nigra</i>					33	
<i>Carduus crispus</i>					3	29
<i>Geum urbanum</i>					31	
<i>Lotus pedunculatus</i>				31		
<i>Cruciata laevipes</i>		29				
<i>Solidago canadensis</i>				23		
<i>Sonchus asper</i>				23		
<i>Carex vulpina</i>	22					
<i>Carex acuta</i>	20					
<i>Ficaria verna s.l.</i>	20					

Table 6: *Centaureo-Trisetetum* from the Asiago Plateau.

Tabela 6: *Centaureo-Trisetetum* s planote Asiago.

relevé number	60	61		relevé number	60	61	pr
elevation (m)	1440	1445		<i>Lotus corniculatus</i>	+	+	2
aspect	SE	S		<i>Carum carvi</i>	2a	1	2
species number	33	51		<i>Poa trivialis/trivialis</i>	1	+	2
diff sp <i>Centaureo-Trisetetum</i>			pr	<i>Ranunculus acris/acris</i>	2b	2a	2
<i>Scorzonera rosea</i>		1	1	<i>Alchemilla vulgaris agg.</i>	1	1	2
<i>Nocca caerulea</i> (All)		+	1	<i>Veronica chamaedrys/chamaedrys</i>	+	+	2
char sp <i>Trisetum-Polygonum</i> (All)				<i>Trisetum flavescens/flavescens</i>	2a		1
<i>Tephrosia longifolia/audinii</i>		+	1	<i>Avenula pubescens/pubescens</i>		4	1
char sp <i>Poa alpinae-Trisetetalia</i>				<i>Schedonorus pratensis/pratensis</i>		+	1
<i>Poa alpina</i>	1	+	2	char sp <i>Festuco-Brometea</i>			
<i>Crocus vernus/albiflorus</i>	+	+	2	<i>Briza media</i>		+	1
<i>Silene dioica</i>	1	+	2	<i>Carex caryophylla</i>		+	1
<i>Bistorta officinalis</i>	+	1	2	<i>Cirsium acaulon/acaulon</i>		+	1
<i>Viola tricolor/alpestris</i>	+	+	2	<i>Dactylorhiza sambucina</i>		+	1
<i>Phleum rhaeticum</i>		2b	1	other			
<i>Trollius europaeus/europaeus</i>		2a	1	<i>Achillea millefolium</i>	1	1	2
<i>Galium pumilum/pumilum</i>		1	1	<i>Anthoxanthum odoratum</i>	2b	1	2
<i>Hypericum maculatum/maculatum</i>		1	1	<i>Knautia drymeja</i>	+	2a	2
<i>Centaurea nigrescens/transalpina</i>		+	1	<i>Myosotis sylvatica</i>	2a	2a	2
<i>Potentilla aurea/aurea</i>		+	1	<i>Phyteuma zahlbruckneri</i>	+	+	2
char sp <i>Arrhenatheretalia</i>				<i>Plantago lanceolata</i>	+	+	2
<i>Rumex acetosa/acetosa</i>	+	+	2	<i>Plantago media</i>	+	+	2
<i>Phleum pratense/pratense</i>	2b		1	<i>Taraxacum sect. Taraxacum</i>	2b	+	2
<i>Lolium perenne</i>	1		1	<i>Bromus hordeaceus s.l.</i>	+		1
<i>Cynosurus cristatus</i>	1		1	<i>Centaurea nervosa</i>		1	1
<i>Trifolium repens</i>	+		1	<i>Cirsium eriophorum</i>		+	1
char sp <i>Molinio-Arrhenatheretea</i>				<i>Cruciata glabra</i>		+	1
<i>Dactylis glomerata</i>	2b	1	2	<i>Cruciata laevipes</i>		+	1
<i>Trifolium pratense</i>	3	1	2	<i>Deschampsia cespitosa</i>		r	1
<i>Cerastium fontanum/vulgare</i>	1	1	2	<i>Festuca filiformis</i>		+	1
<i>Colchicum autumnale</i>	+	+	2	<i>Luzula campestris</i>		1	1
<i>Festuca rubra/rubra</i>	2b	+	2	<i>Orchis mascula/speciosa</i>		+	1
<i>Leucanthemum inculcivum</i>	2a	1	2	<i>Pilosella lactucella/lactucella</i>		+	1
				<i>Potentilla erecta</i>		+	1
				<i>Ranunculus bulbosus/bulbosus</i>	+		1

Table 7: *Festuca rubra*-*Cynosurus cristatus* community from the Asiago Plateau.
Tabela 7: *Festuca rubra*-*Cynosurus cristatus* s planote Asiago.

relevé number	118	121	119	111	112	88	91	85	89	90	107	120	114	115	116
elevation (m)	1606	1600	1558	1605	1738	1615	1490	1360	1450	1455	1645	1626	1186	1285	1193
aspect	SE	SE	SSE	SE	SW	S	WSW	NE	-	S	SSW	SSE	E	SW	NW
species number	55	46	55	39	30	50	35	56	40	49	47	52	46	44	47
diff. sp. <i>Festuca-Cynosurus</i> community															
<i>Carrum carvi</i>	1	+	2a	2a	1	1	1		+	+	1	1	1	+	+
<i>Cynosurus cristatus</i> (All1)			+	1		3	2b	+	+	2a	4	3	2a	4	3
<i>Rhinanthus minor</i>		+	2a	+		2a	3	+		+		+	+		9
<i>Koeleria pyramidata</i> /pyramidata	+	3	1								1	1	+	+	6
															40
char. sp. <i>Cynosurion</i> (All1)															
<i>Trifolium repens</i>	1	1	2a	2a	2a	2b	2a	+	2b	2b	2a	2a	1	+	1
<i>Prunella vulgaris</i>		+	1			1				1	2b	2a	2a		6
<i>Veronica serpyllifolia</i> /serpyllifolia						+			+	+	+	+		4	27
<i>Bellis perennis</i>										1	1	+		2	13
<i>Scorzonoides autumnalis</i> /autumnalis					+									1	7
char. sp. <i>Poion alpinae</i>															
<i>Phleum rhaeticum</i>		+	1	1	3	2a	2a	2a	+	1	+	+		11	73
<i>Poa alpina</i>	+		1	2b	3	1	1		+	+	2a			9	60
char. sp. <i>Molinio-Arrhenatheretea</i>															
<i>Festuca rubra</i> s.l. (<i>F. r. rubra</i> p.m.p.)	4	2a	3	4	3	2a	3	4	4	4	2a	+	1	2a	2a
<i>Cerastium fontanum</i> /vulgare	1	+	1	1	1	1	+	1	1	+	+	+	1	+	+
<i>Dactylis glomerata</i>	2a	+	+	+		2a	+	+	+	1	2a	2a	1	+	2a
<i>Ranunculus acris</i> /acris		1	2a	2a	+	1	2a	2b	2a	1	1	1	+	1	1
<i>Trifolium pratense</i>	2a	2a	2a	1	1	+	+	+	+	+	1	1	1	1	1
<i>Agrostis capillaris</i> /capillaris	+	2b	1	1	+	2a	1	2a	1	2b		1	2b	1	1
<i>Stellaria graminea</i>	2a	2a	1	+	+	1	1	+	2a		+	1	1	+	1
<i>Lotus corniculatus</i>	+	1	1	+	+	+	+	1	2a	1	+	1	1	+	1
<i>Poa pratensis</i> /pratensis	+	+	+	+		1	+	+	+	+	+	+	1	1	1
<i>Crocus vernus</i> /albiflorus															
<i>Leucanthemum vulgare</i> agg. (<i>L. ircutianum</i> p.m.p.)	+		+			+	+	+	+		1	+	1	+	1
<i>Schedonorus pratensis</i> /pratensis						1	+	+		+	1	2b	2a	+	1
<i>Galium mollugo</i> agg.	+		+			r	+	+	+	+	+	+	+	+	+
<i>Poa trivialis</i> s.l. (<i>P. t. trivialis</i> p.max.p.)	2a	+	+				+	+		+	2a	+		+	+
<i>Deschampsia cespitosa</i>	+	+	+	+	+		+	+		+		+			
<i>Phleum pratense</i> /pratense	+					+	+	+	2a	2a		+	1	+	+

relevé number	118	121	119	111	112	88	91	85	89	90	107	120	114	115	116	pr	fr%
<i>Rumex acetos/lacetosa</i>			r			1	+	+	+				+	+	+	8	53
<i>Plantago lanceolata</i>	+		2a			+	2b			+	1		2a	+	1	8	53
<i>Trisetum flavescens/flavescens</i>								r	+			+	2a	+	2b	7	47
<i>Euphrasia rostkoviiana/rostkoviiana</i>		r				+		+	+	1		+				6	40
<i>Ochlopoa supina</i>	+			+	1			+		+	+					6	40
<i>Ranunculus bulbosus/bulbosus</i>		+						+			+	+	+	+	+	6	40
<i>Leontodon hispidus/hispidus</i>				+				+				+	+	+	1	5	33
<i>Centaurea nigrescens s.l.</i>			r									1	1		1	3	20
<i>Alopecurus pratensis/pratensis</i>						+	+		+							3	20
<i>Colchicum autumnale</i>												+	+	+	+	3	20
<i>Ranunculus repens</i>					+					+						3	20
<i>Viola tricolor/alpestris</i>							+		+	1						3	20
<i>Bistorta officinalis</i>				+	1				+							2	13
<i>Lathyrus pratensis</i>												+			+	2	13
<i>Trollius europaeus/europaeus</i>						+		1								2	13
<i>Ajuga reptans</i>				+												1	7
<i>Anthriscus sylvestris/sylvestris</i>						r		1								1	7
<i>Gymnadenia conopsea</i>																1	7
<i>Lolium perenne</i>															+	1	7
<i>Potentilla reptans</i>													+			1	7
<i>Tephrosia longifolia/longifolia</i>			+													1	7
<i>Vicia cracca</i>								r								1	7
char sp <i>Festuco-Brometia</i>																	
<i>Plantago media</i>	+	2a		+		1	+	+	+		+	1	+	+	1	12	80
<i>Carlina acaulis/acaulis</i>	+	1	+				+		+	+	+	+	+	1		10	67
<i>Carex caryophylla</i>		+	1	+				+	+		+	+			+	8	53
<i>Briza media</i>		2b								+	2a	2a	1	1	2b	7	47
<i>Cirsium acaulon/acaulon</i>	1	1	+							+	1	+		+		7	47
<i>Brachypodium rupestre</i>	1	+											+		+	4	27
<i>Arabis hirsuta agg.</i>	+		+												+	3	20
<i>Rhinanthus freynii</i>													2b	1	1	3	20
<i>Hypericum perforatum</i>	+	1														2	13
<i>Thymus pulegioides</i>													+		+	2	13
<i>Anthyllus vulneraria/vulneraria</i>								2b		+						1	7
<i>Euphorbia cyparissias</i>																1	7
<i>Festuca stricta/sulcata</i>	+															1	7
<i>Gentiana cruciata</i>													+			1	7
<i>Neottia ovata</i>	r															1	7

relevé number	118	121	119	111	112	88	91	85	89	90	107	120	114	115	116	pr	fr%
char sp <i>Elyno-Seslerietea</i>																	
<i>Carduus defloratus/tridentinus</i>	1	1	1	+	1	+	+	+	+	+	1	1				11	73
<i>Potentilla crantzii</i>	+	1	+	+				+	+	+	+					8	53
<i>Galium anisophyllum</i>		+	+								+	+				5	33
<i>Arabis ciliata</i>	+	+	+													3	20
<i>Clinopodium alpinum/alpinum</i>	1	1	+													3	20
<i>Gentiana vernal/verna</i>		+							+		+			+		2	13
<i>Polygala alpestris/alpestris</i>												+				2	13
<i>Stachys alopecuroides</i>		2a														2	13
<i>Agrostis alpina</i>									+							1	7
<i>Anthyllis vulneraria/alpestris</i>	+															1	7
<i>Leucanthemum heterophyllum</i>	+															1	7
<i>Myosotis alpestris/alpestris</i>	+															1	7
other																	
<i>Achillea millefolium</i>	1	1	+	1	1	1	1	1	1	1	1	1	1	1	1	15	100
<i>Alchemilla vulgaris</i> agg.	1	2a	2b	2a	2b	1	2a	2a	2a	1	1	2a	+	2a	1	15	100
<i>Taraxacum</i> sect. <i>Taraxacum</i>	1		1	2a	1	+	+	+	+	+	1	+	+	+	+	13	87
<i>Cruciata laevipes</i>		+	+	+	+	+	1	1	+	+	+	+	+	+	+	13	87
<i>Veronica chamaedrys/chamaedrys</i>	1		+	+	+	+	+	+	+	+	1	+		+	+	13	87
<i>Anthoxanthum odoratum</i> agg.			1	+	+	+	1	2a	1	+			2a	1	+	10	67
<i>Carex pallescens</i>		+	+	+		+		1	1	+				+		8	53
<i>Campanula scheuchzeri/scheuchzeri</i>	+	+	1	+					+				+	+	+	8	53
<i>Luzula campestris</i>			+	+	+	r	+	+					+	+	+	7	47
<i>Myosotis sylvatica</i>	+			+		+	+	+	+	+		+				7	47
<i>Thymus praecox/polytrichus</i>	+	+	+					+	+	+	+	+	+			7	47
<i>Plantago major/major</i>	r	r		r	r	r			+			+				6	40
<i>Carex ornithopoda</i>	+	+	+		+						+	+				6	40
<i>Cirsium arvense</i>				+		+			+		1	1	+	+		6	40
<i>Dactylorhiza fuchsii</i>			r		+	+		r				+		+		6	40
<i>Galium xcentroniae</i>	+		+					+		+				1	1	6	40
<i>Luzula multiflora/multiflora</i>		+	+					+	+	+	+	+				6	40
<i>Veronica officinalis</i>	+		+						+	1	+	+		2a		5	33
<i>Cirsium eriophorum</i>		+	+					2a	+		+					5	33
<i>Hypericum maculatum/maculatum</i>	r	+	+					+			1					4	27
<i>Luzula alpina</i> agg.				+	+			+								4	27
<i>Pilosella lactucella/lactucella</i>			+	1				+			+					4	27

relevé number	118	121	119	111	112	88	91	85	89	90	107	120	114	115	116	pr	fr%
<i>Primula veris/veris</i>								+					+	+	+	4	27
<i>Avenula pubescens/pubescens</i>								r							1	3	20
<i>Medicago lupulina</i>	1											+			1	3	20
<i>Potentilla aureolaurea</i>				+	1				+							3	20
<i>Ranunculus carinthiacus</i>			+		+			+		+						3	20
<i>Veratrum lobelianum</i>							+									3	20
<i>Blitum bonus-henricus</i>	r					r										2	13
<i>Centaurea nervosa</i>						+	2a									2	13
<i>Cerastium arvense s.l.</i>					+					+						2	13
<i>Cruciata glabra</i>	+					+										2	13
<i>Galeopsis tetralix + pubescens</i>		+				+										2	13
<i>Galium pumilum/pumilum</i>				+				+								2	13
<i>Lamium album</i>	r					r										2	13
<i>Nardus stricta</i>					+					+						2	13
<i>Pedicularis verticillata</i>				+	+											2	13
<i>Pilosella officinarum/officinarum</i>		+										+				2	13
<i>Potentilla erecta</i>										+			+			2	13
<i>Urtica dioica</i>	+											+				2	13
<i>Arenaria serpyllifolia</i>	1															1	7
<i>Barbarea bracteosa</i>	+															1	7
<i>Botrychium lunaria</i>								r								1	7
<i>Campanula witasekiana</i>								r								1	7
<i>Carex leporina</i>						+										1	7
<i>Elytrigia repens/repens</i>			+													1	7
<i>Heliborus viridis/viridis</i>															1	1	7
<i>Hieracium bifidum</i>																1	7
<i>Jacobaea alpina</i>	+											+				1	7
<i>Parnassia palustris</i>								+								1	7
<i>Phyteuma zahlbruckneri</i>						+										1	7
<i>Pimpinella alpina</i>	r															1	7
<i>Primula intricata</i>										+						1	7
<i>Pseudorchis albidalbidula</i>								+								1	7
<i>Rumex arifolius</i>						+										1	7
<i>Silene dioica</i>						+										1	7
<i>Silene vulgaris/vulgaris</i>	+															1	7
<i>Tussilago farfara</i>	+															1	7
<i>Veronica arvensis</i>												+				1	7