

# Aspects of vineyard vegetation in North-eastern Italy and eastern neighbouring territories: *Cerastio tenoreani-Geranium dissecti* and *Mercurialetum annuae* as archaic, disappearing coenosis

Livio Poldini<sup>1</sup> & Stefano Tasinazzo<sup>2\*</sup> 

**Key words:** *Cerastio tenoreani-Geranium dissecti*, Friuli Venezia Giulia, Italy, *Mercurialetum annuae*, phytosociology, *Stellarietetea mediae*, Slovenia, south-eastern Europe, synsystematics, Veneto.

**Ključne besede:** *Cerastio tenoreani-Geranium dissecti*, Furlanija-Juljska krajina, Italija, *Mercurialetum annuae*, fitosociologija, *Stellarietetea mediae*, Slovenija, jugovzhodna Evropa, sinsistematika, Benečija.

**Received:** 3. 9. 2018

**Revision received:** 18. 11. 2018

**Accepted:** 20. 11. 2018

## Abstract

Recent original data concerning vineyard spring vegetation from Veneto hilly belt (North-eastern Italy) highlighted once again the phytogeographic originality of south-eastern territories with respect to Central European ones, also in anthropogenic coenosis. New relevés suggested to restate the association *Cerastio tenoreani-Geranium dissecti* as vicarious vegetation of *Geranio rotundifolii-Allietum vinealis* occurring on the north side of the Alps. The comparison of autumn material from terracing vineyards of the sandy-marly Eocene flysch around Trieste coast with similar European relevés enabled to reject the not validly described *Anagallido-Mercurialetum* and to replace it with *Mercurialetum annuae*. In modern winegrowing *Cerastio-Geranium* and *Mercurialetum annuae* are vanishing due to changing of agronomic schemes, as some relevés reported in the text document.

## Izveček

Na osnovi novejših originalnih podatkov o spomladanski vegetaciji vinogradov v gričevnatem predelu Benečije (severovzhodna Italija) lahko ponovno izpostavimo fitogeografsko posebnost jugovzhodnih območij v primerjavi s Srednjo Evropo tudi, ko govorimo o antropogenih združbah. Z novimi popisi smo ponovno lahko ovrednotili asociacijo *Cerastio tenoreani-Geranium dissecti* kot vikarianto asociacije *Geranio rotundifolii-Allietum vinealis*, ki se pojavlja severno od Alp. S primerjavo jesenskih vegetacijskih popisov, narejenih na terasastih vinogradih na eocenskem flišu v okolici tržaške obale, s podobnimi popisi iz Evrope, smo lahko nadomestili nepravilno opisano asociacijo *Anagallido-Mercurialetum* z asociacijo *Mercurialetum annuae*. Zaradi modernega vinogradništva in spremenjene kmetijske politike sestoji asociacij *Cerastio-Geranium* in *Mercurialetum annuae* izginjajo, kar je razvidno iz popisnega gradiva.

1 Department of Life Sciences, University of Trieste, via L. Giorgieri 5, I-34127 Trieste, Italy.

2 Via Gioberti 6, I-36100 Vicenza, Italy. E-mail: stefano.tasinazzo@tin.it

\* Corresponding author.

## Introduction

In Europe vineyard vegetation developed over centuries under the influence of hoeing and ploughing that favoured the growth of well established archaic coenosis such as the classical *Geranio-Allietum*, gravitating in south-western Germany (Fischer 1983). Vineyard communities on base rich soils of Central and Western Europe are traditionally attribute to *Veronico-Euphorbion* within *Stellarietea mediae*. Nowadays traditional cultivation regimes gave way to minimum soil tilling techniques including superficial harrowing, mulching and herbicide applications, each one promoting different changes in basal species composition. Moderate variations in traditional agrotechnical management lead to small weed transformations leaving unchanged the *Stellarietea*-species dominance (defined ‘agroforms’), whereas strong changes, such as mulching, support the substitution with grassland communities (Wilmanns 1989). Contrary to other central European Countries, in Italy there are no historical vineyard vegetation studies that allow comparisons on changes induced by the different agricultural framework. It’s common knowledge that strips between the vine plant rows were planted with cereals or legumes (Hruby, 1935), a habit that has been able to promote the spread of the *Stellarietea* species. Italian vineyard vegetation has been little studied even in recent times, in particular in the temperate bioclimate where the only researches were conducted by Poldini (1980, 1989), Poldini et al. (1998), Baldoni et al. (2001), Andreucci et al. (2003) and Tasinazzo (2015).

The spring vegetation of vineyards from Italian and Slovenian Karst to Collio-Goriška Brda was initially classified by Poldini (1980, 1989) to *Cerastio tenoreani-Geranium dissecti*, that was interpreted as vicarious south-eastern coenosis of central European *Geranio rotundifolii-Allietum vinealis*. Later the same author (Poldini et al. 1996) questioned his own conclusions on the basis of Slovenian researchers’ contributes which attributed Vipavska valley (Seljak 1989) and Koper (Kaligarič 1992) vineyard vegetation to *Geranio-Allietum*, but at the same time remarking the strong floristic and biogeographic differences between south-eastern and central european provenances. Finally, Poldini et al. (1998) concluded that Friuli Venezia Giulia vineyards could be included in a geographical race of *Geranio-Allietum* characterised by several termophilous species such as *Alopecurus myosuroides*, *Calepina irregularis*, *Cerastium glomeratum*, *Cerastium brachypetalum/tenoreanum*, *Crepis vesicaria/taraxacifolia*, *Geranium dissectum*, *Lolium multiflorum*, *Poa sylvicola*, *Rumex crispus* and *Vicia sativa* agg. Recent, original data gathered on Veneto hill reliefs and here analytically presented, suggest once again the distinctiveness of south-eastern vineyard spring veg-

etation with respect to central European one, bringing again into question the framework of the south-eastern pre-Alpine vineyard vegetation (Tasinazzo 2015).

Another archaic coenosis potentially developing in early autumn in vineyards is *Mercurialetum annuae*. In the 80s Poldini (1980) described, but not validly published, as *Anagallido-Mercurialetum* some relevés from the Trieste coast, mainly performed on terracings of the sandy-marly Eocene flysch with *Seslerio-Quercetum pubescentis rubietosum peregrinae* as potential vegetation. The framework of these relevés are here discussed.

## Materials and Methods

As regards the vineyard spring vegetation, original data were collected according to Braun-Blanquet methodology (1964) during 2010-2016 springtime (april-may) from hilly reliefs of Veneto, except one from eastern Lombardy (North-eastern Italy; rel. 43 in Table 2). The modified quantitative scale 2a, 2b of Barkman et al. (1964) was implemented for the assessment of species covers. Relevés were preferentially performed inside predominantly traditional vineyards with typical weeds occurring despite current soil cultivation techniques. Part of investigated plots were also checked in late summer-early autumn to follow temporal changes in floristic composition.

Sixty-three relevés were hierarchically classified by means of agglomerative clustering using Jaccard index applied to presence-absence data and complete-linkage method. Presence-absence data better reflect uncertainty and variability of floristic composition due to soil treatment, weed control method and tilling technique that change among years and stands. Following this elaboration, a 8-relevé group resulted well separated in the dendrogram. These 8 relevés were identified as referring to communities of non-calcareous substrates (conglomerate) or dynamically not related to *Buglossoido purpureoaceruleae-Ostryion carpinifoliae* sensu Poldini et al. (2017); given their distinctiveness they were removed from the dataset, reducing the relevés to 55.

After removing once occurring species, a classification of the 55 stands from Veneto with available *Geranio-Allietum* s.l. analytical tables, by means of UPGMA method and Jaccard index applied to binary data, allowed recognizing homogeneity of original and literature data. At the same time, it was possible to detect disaggregating single outlier-relevés that were removed: two from Veneto and rel. 32-33-35 from Hungarian material, rel. 42 in Wilmanns & Bogenrieder’s work (1992) and rel. 3 from Seljak’s table (1989). Data arranged according to the previous cluster analysis were used to obtain synthetic

tables and consequently to compare different provenances of spring agroecophase vineyard vegetation. Further synthetic tables were also obtained from Oberdorfer (1993) and Orgis (col. 2b in Tab. 3, in Fischer (1983)), whereas other synthetic data from Germany were excluded because already computed in Oberdorfer's table and so was for Slovenian data by Šilc & Čarni (2007) realistically including Kaligarič's stands (1992). As Orgis' material (Fischer 1983) was given in frequency classes it was inserted in Table 1, but it was not in Figure 2.

As cultivation techniques in viticulture has strong influences on composition of vineyard coenoses (Wilmanns 1989, Poldini et al. 1998), were selected for the analysis only relevés of *Geranio-Allietum* which belong to the 'typical form' according to authors' assertion and excluding agroforms sensu Poldini et al. (1998) and mixed stands ("Durchdringungen") or replacing communities due to mulching practice sensu Wilmanns (1989) and Wilmanns & Bogenrieder (1991). Summer-developed species, for the most part C4, such as *Amaranthus* sp. pl., *Chamaesyce* sp. pl., *Setaria* sp. pl., *Digitaria sanguinalis*, *Portulaca oleracea*, *Galinsoga* sp. pl., *Calystegia sepium* ecc., were removed from comparison tables before undergo statistical analysis to unbiased results. Their occurring, representing the very first symptoms of transition towards the late-summer agroecophase, was reported only by some of the cited papers, according to survey times.

Thus, from literature were selected the following data:

- Fischer (1983): column 2b in Tab. 3;
- Fischer (1983): Tab. 2;
- Wilmanns (1989): Tab. 1 rel. 1-16 representing the classic association of vineyards in Kaiserstuhl (D), whereas *Poa trivialis-Lolio-Potentillion* community stands and 'penetration forms' (sensu Author) were excluded;
- Seljak (1989): Tab. 4;
- Wilmanns & Bogenrieder (1991): Tab. 19.2 rel. 1–7 representing 'old' *Geranio-Allietum* in Upper Rhine Lowland (D); mixed stands of *Geranio-Allietum* with *Agrostietea* species renamed penetrations (= Durchdringungen) by Authors were excluded from analysis;
- Wilmanns & Bogenrieder (1992): Tab. 5 rel. 1–26 and 35–44, excluding impoverished ones (rel. 27–34);
- Kaligarič (1992): Tab. 2;
- Oberdorfer (1993): Tab. 149 column 25;
- Poldini et al. (1998): Tab. 4 rel. 1–35 representing the 'typical form' of *Geranio-Allietum*, excluding relevés attributed to *Taraxacum officinale*, *Arrhenatherum elatius* and *Agrostis stolonifera* agroforms;
- Pál (2006): Tab. 1.

As regards early autumn coenosis (*Mercurialetum annuae*), partly original and published relevés gathered in Italian Karst (Poldini 1980, 1989) were compared with

*Mercurialetum annuae* stands from Holland (Kruseman & Vlieger 1939), Marche (Baldoni et al. 2001) and with big and more recent data from Germany (Oberdorfer 1993), Slovenia (Šilc & Čarni 2007) and Czech Republic (Chytrý 2009) that outlined the diagnostic species set of the association.

Statistical analysis was conducted with Syn-Tax 2000 package (Podani 2001). For syntaxonomical scheme, we refer to the vegetation prodrome of Italy (Biondi et al. 2014).

Syntaxonomical classification of vegetation data were interpreted in agreement with the International Code of Phytosociological Nomenclature (Weber et al. 2000).

The floristic nomenclature follows Bartolucci et al. (2018) and Galasso et al. (2018), Euro+Med PlantBase Med-list (<http://www.emplantbase.org>) for species that are missing in Italy.

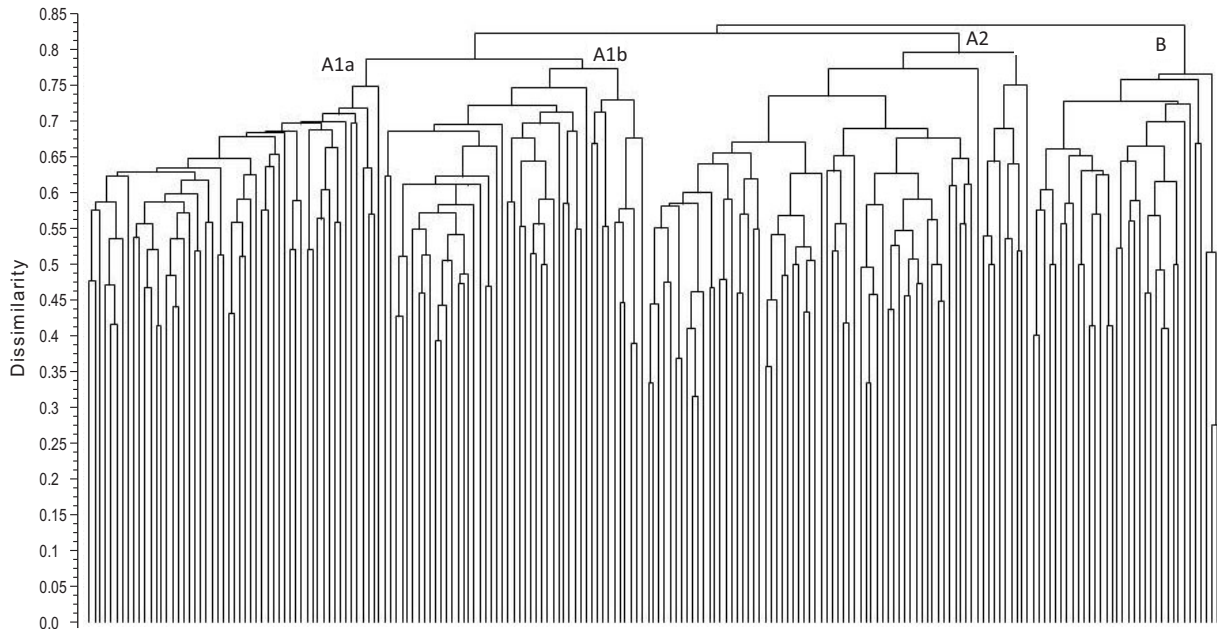
## Results and Discussion

### *Cerastio tenoreani-Geranium dissecti*

The classification of original (Veneto) and available analytical data gathers together stands from Veneto (cluster A1a in Figure 1) and those from Friuli Venezia Giulia and Slovenia (Seljak 1989, Kaligarič 1992, Poldini et al. 1998, cluster A1b) at a higher similarity level than relevés from Germany (Fischer 1983, Wilmanns 1989, Wilmanns & Bogenrieder 1991, 1992; cluster A2). Hungarian relevés separate at an even higher level (Pál 2006; cluster B) and according to author himself, they constitute an impoverished form of *Geranio-Allietum*, but maybe they could be attributed to an independent syntaxon on the basis of the occurrence of *Holosteum umbellatum*, *Viola arvensis*, *Vicia grandiflora* and *Androsace maxima*.

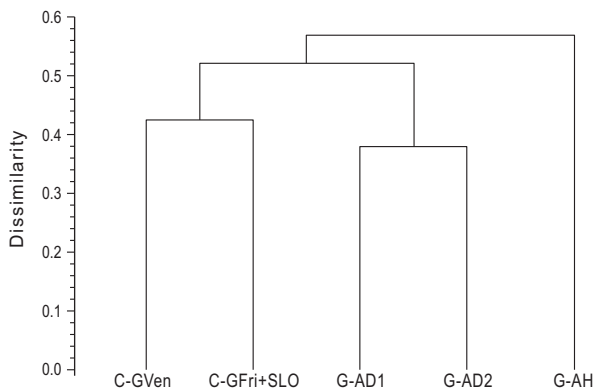
Synthetic data (Figure 2) show a higher similarity between north-eastern Italian and Slovenian than between different German provenances.

Classification of selected synthetic tables resulted in synoptic Table 1. With the addition of data from Veneto, most species above reported and mentioned by Poldini et al. (1998) confirm their role as differential species of south-eastern vineyard vegetation that it is here proposed anew as *Cerastio tenoreani-Geranium dissecti*. *Geranium dissectum*, *Cerastium glomeratum*, *Calepina irregularis*, *Poa sylvicola*, *Lolium multiflorum*, *Crepis vesicaria/taraxacifolia* and *Cerastium brachypetalum/tenoreanum* are differential species of the coenosis, the last two with *Rumex crispus*, *Alopecurus myosuroides*, *Trifolium molinerii* and *Anthemis arvensis* also distinguishing the more eastern new subsociation *typicum*. *Ornithogalum divergens* can be added to the differential species of the association; in the Medi-



**Figure 1:** Classification of south-eastern and central European vineyard relevés (UPGMA-Jaccard without once occurring species, binary data). Cluster A1a: relevés from Veneto; cluster A1b: relevés from Friuli Venezia Giulia and Slovenia; cluster A2: relevés from Germany; cluster B: relevés from Hungary.

**Slika 1:** Klasifikacija jugovzhodnih in srednjeevropskih popisov vinogradov (UPGMA-Jaccard brez vrst, ki se pojavljajo samo enkrat, binarni podatki). Klaster A1a: popisi iz Benečije; klaster A1b: popisi iz Furlanije-Juljske krajine in Slovenije; klaster A2: popisi iz Nemčije; klaster B: popisi z Madžarske.



**Figure 2:** Classification of south-eastern and central European vineyard synthetic tables (UPGMA-similarity ratio without once occurring species). C-G: *Cerastio-Geranium*; G-A: *Geranio-Allietum*; Ven: Veneto; Fri: Friuli Venezia Giulia; SLO: Slovenia; D1: cluster A2 in Figure 1; D2: Oberdorfer (1983); H: Hungary.

**Slika 2:** Klasifikacija jugovzhodnih in srednjeevropskih popisov vinogradov, urejenih v sintetski tabeli vinogradov (UPGMA-Jaccard brez vrst, ki se pojavljajo samo enkrat). C-G: *Cerastio-Geranium*; G-A: *Geranio-Allietum*; Ven: Benečija; Fri: Furlanija-Juljska krajina; SLO: Slovenija; D1: klaster A2 v Sliki 1; D2: Oberdorfer (1983); H: Madžarska.

From an ecological point of view, stands from Veneto have a distinctive feature in holding several high covering and very frequently occurring thermophilous species with a Mediterranean distribution, such as *Crepis sancta/nemausensis* and *Geranium molle* in V frequency class, *Hordeum murinum/leporinum*, *Cynodon dactylon* and *Cardamine hirsuta* in IV (Table 2). In particular, *Crepis sancta/nemausensis*, a recently and currently spreading species in Veneto, is usually so abundant to dominate the relevé (Figure 3). It was also indicated as differential species of *Calendulo arvensis-Crepidetum sanctae* a spring vineyard vegetation thriving in sub-Mediterranean variant of temperate bioclimate of Marche region in central Italy (Baldoni et al. 2001). Vineyard vegetation in Veneto is referred to the new subassociation *crepidetosum nemausensis* subass. *nova hoc loco* (*holotypus*: Table 2, rel. 3) occurring in hilly belt where it was registered from 25 to 370 m a.s.l. in territories influenced by a temperate-oceanic to temperate-continental bioclimate – often in the sub-Mediterranean variant – upper mesotemperate thermotype and prevalently upper subhumid ombrotype. Despite total lack of historical or also recent documentations on the past composition of Veneto vineyard vegetation, drastic changes in cultivation methods over last decades surely led to floristic substitutions as observed in Germany at least since the mid-80s (Wilmanns 1989, Wilmanns

terranean context it replaces *O. umbellatum* thriving in central European vineyards. At the alliance level *Veronica polita* differentiates German and Hungarian relevés as it is totally absent from south-eastern stands.



**Figure 3:** Stand of *Cerastio-Geranium* subass. *crepidetosum nemausensis* (rel. 16, Colli Berici).

**Slika 3:** Sestoj subasociacije *Cerastio-Geranium* subass. *crepidetosum nemausensis* (popis 16, Colli Berici).

& Bogenrieder 1991). Our recent relevés dating back to 2010–2016 period show evident traces of the influence of minimum soil tilling techniques that nowadays replaced anachronistic cultivation with an active soil movement. Usually only few small plots for family use continue to be cultivated with rototillers, but superficial harrowing and mulching practices tend to affect most of stands by favouring the spreading of *Cynosurion* (*Lolium perenne*, *Trifolium repens*, *Bellis perennis*) or runner emitting species. Among these, *Cynodon dactylon* emphasizes warm environmental conditions though it only sprouts in spring as its vigorous growth is only from the summer. In addition, some rosulate hemicryptophytes manage to ‘escape’ from spring mechanical control (e.g. *Rumex pulcher*).

The association can be considered as vanishing because of not only changing in cultivation systems but also due to the diffusion of permanent green cover technique in newly planted or replanted vineyard by sowing cultivar of grasses like *Lolium perenne* and *Lolium arundinaceum*. Some relevés of this kind are shown in Table 3, where differences between provenances depend on used mixtures. This approach depresses *Stellarietea* elements that remain as sporadic relics especially under vine rows where spraying of herbicides contain them.

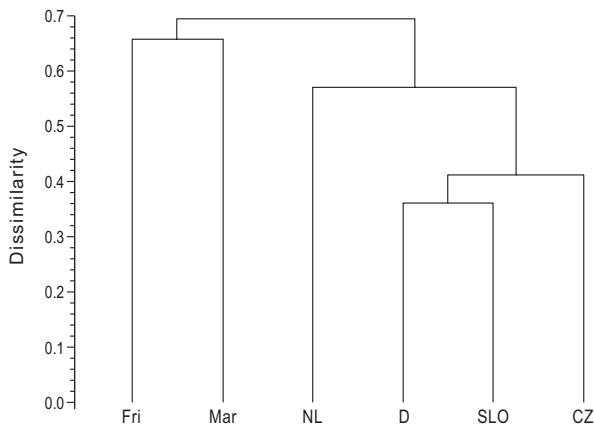
*Cerastio-Geranium* is a spring association; in late summer an autumn agroecophase develops in the same vineyards when tilling are abandoned in the harvest proximity, most of *Stellarietea* therophytes have already disappeared and there is the spreading of C4 species. Covers or frequencies of some late-spring germinating species occurring in relevés (Table 2), such as *Cynodon dactylon*, *Convolvulus arvensis*, *Polygonum aviculare* agg., *Chenopodium album* etc., increase in late season, whereas summer-sprouting weeds enter as new the vineyard habitat. Data coming from September–October surveys in 40 out of the 53 stands performed in Veneto are given in Table 4 showing only strictly autumn weeds. This species set raises the occurring rate of *Solano-Polygonetalia* character species.

#### *Mercurialetum annuae*

Synthetic data analysis and the resulting simplified synoptic table are shown in Figure 4 and Table 5, respectively. Based on the occurrence of the diagnostic species *Mercurialis annua*, *Solanum nigrum*, *Amaranthus retroflexus*, *Chenopodium album* and *Senecio vulgaris* it is possible to refer the vegetation then collected from the Trieste coast and the Italian Karst to the *Mercurialetum annuae*. Among high frequency species of higher syntaxa there are

*Convolvulus arvensis*, *Bromus sterilis*, *Anagallis arvensis*, *Allium vineale*, *Capsella bursa-pastoris*, *Cirsium arvense*, *Fumaria officinalis*.

Like *Cerastio-Geranium*, in Italian Karst *Mercurialetum annuae* is almost everywhere disappeared and the abandoned terracings rapidly evolve towards an anthropogenic steppic-grassland (*Brachypodio-Agropyretum intermedii*) and then to a *Rubus ulmifolius* scrub (*Clematido-Rubetum*).



**Figure 4:** Classification (UPGMA-similarity ratio) of *Mercurialetum annuae* synthetic tables from southern and Central Europe. Fri: Friuli Venezia Giulia (North-eastern Italy); Mar: Marche (central Italy); NL: Nederland; D: Germany; SLO: Slovenia; CZ: Czech Rep.

**Slika 4:** Klasifikacija (UPGMA-similarity ratio) sintetske tabele asociacije *Mercurialetum annuae* iz južne in Srednje Evrope.

Fri: Furlanija-Juljska krajina (severovzhodna Italija); Mar: Marche (srednja Italija); NL: Nizozemska; D: Nemčija; SLO: Slovenija; CZ: Češka.

## Conclusions

Springtime vegetation of south-eastern vineyards differ markedly from central European one by the high rate of species with Mediterranean and south-eastern distribution, whereas summer-autumn phenophases are not so much different. From the synphytosociological point of view, vineyards are the result of forest clearing belonging to very different series of vegetation in south-eastern and central Europe. As already stated by Poldini et al. (1998), in Friuli Venezia Giulia, Veneto and Slovenia xerothermophilous or xeromesophilous sub-Mediterranean *Ostrya* and *Quercus*-dominated woods are the mature stages of hilly vegetation. Despite simplifications induced by current agriculture, in south-eastern vineyard vegetation floristic peculiarities remain to highlight biogeographical differences that confirm the occurring of a vicarious coenosis of central European *Geranio-Allietum*, i.e. *Cerastio-Geranium*. The latter as well as autumn *Mercurialetum annuae* are nowadays disappearing coenosis

due to modern wine growing that resort to mowing, non-tillage floor management and seeding of perennial grasses.

## Syntaxonomical scheme

*Stellarietea mediae* Tüxen, Lohmeyer & Preising ex von Rochow 1951.

*Stellarieneae mediae*

*Solano nigri-Polygonetalia convolvuli* (Sissingh in Westhoff, Dijk, Passchier & Sissingh 1946) O. Bølls 1962.

*Veronico agrestis-Euphorbion peplus* Sissingh in Passarge 1964.

*Cerastio tenoreani-Geranium dissecti* Poldini 1980 (*Geranio-Allietum vinealis* sensu Poldini et al. 1998 non Tüxen ex von Rochow 1951).

*typicum* subass. nova hoc loco

*crepidetosum nemausensis* subass. nova hoc loco.

*Mercurialetum annuae* Kruseman et Vlieger 1939 ex Westhoff et al. 1946.

(corresponding name: *Anagallido-Mercurialetum* Poldini 1980, nom. inval. art. 5)

Other syntaxa quoted in the text:

*Brachypodio-Agropyretum intermedii* Poldini 1980

*Buglosoido purpureocaeruleae-Ostryion carpinifoliae* Poldini, Sbulrino & Vidali 2017

*Calendulo arvensis-Crepidetum sanctae* Baldoni, Biondi & Loiotile 2001

*Clematido-Rubetum* Poldini 1980

*Seslerio autumnalis-Quercetum pubescentis rubietosum peregrinae* Zupančič 1999

## Acknowledgements

We would like to thank dr. G. Seljak for giving his unpublished thesis data. We are grateful to two anonymous referees which improved the manuscript.

Stefano Tasinazzo , <https://orcid.org/0000-0002-5829-0456>

## References

- Andreucci F., Bagliani C., Berta G. & Castelli M. 2003: La vegetazione della Riserva Naturale Speciale della Val Sarmassa. Riv. Piem. St. Nat. 24: 3–65.
- Baldoni M., Biondi E. & Lioiote A. 2001: La vegetazione infestante i vigneti nelle Marche. Fitosociologia 38 (2): 63–68.
- Barkman J.J., Doing H. & Segal S. 1964: Kritische Bemerkungen und Vorschläge zur quantitativen Vegetationsanalyse. Acta Bot. Neerl. 13: 394–419.
- Bartolucci F., Peruzzi L., Galasso G., Albano A., Alessandrini A., Ardenghi N. M. G., Astuti G., Bacchetta G., Ballelli S., Banfi E., Barberis G., Bernardo L., Bouvet D., Bovio M., Cecchi L., Di Pietro R., Domina G., Fascetti S., Fenu G., Festi F., Foggi B., Gallo L., Gottschlich G., Gubellini L., Iamonic D., Iberite M., Jiménez-Mejías P., Lattanzi E., Marchetti D., Martinetto E., Masin R. R., Medagli P., Passalacqua N. G., Peccenini S., Pennesi R., Pierini B., Poldini L., Prosser F., Raimondo F. M., Roma-Marzio F., Rosati L., Santangelo A., Scoppola A., Scortegagna S., Selvaggi A., Selvi F., Soldano A., Stinca A., Wagensommer R. P., Wilhelm T., Conti F. 2018: An updated checklist of the vascular flora native to Italy. Plant Biosystems 152 (2): 179–303.
- Biondi E., Blasi C., Allegranza M., Anzellotti I., Azzella M. M., Carli E., Casavecchia S., Copiz R., Del Vico E., Facioni L., Galdenzi D., Gasparri R., Lasen C., Pesaresi S., Poldini L., Sbrulino G., Taffetani F., Vagge I., Zitti S., Zivkovic L. 2014: Plant communities of Italy: the vegetation prodrome. Plant Biosystems 148 (4): 728–814.
- Braun-Blanquet J. 1964: Pflanzensoziologie – Grundzüge der Vegetationskunde. Springer-Verlag, Wien, 865 pp.
- Chytrý M. (ed.) 2009: Vegetace České republiky 2. Ruderalní, plevelová, skalní a suťová vegetace / Vegetation of the Czech Republic 2. Ruderal, Weed, Rock and Scree vegetation. Academia, Praha, 520 pp.
- Fischer A. 1983: Wildkrautvegetation der Weinberge des Rheingaus (Hessen): Gesellschaften, Abhängigkeit von modernen Bewirtschaftungs-methoden, Aufgaben des Naturschutzes. Phytocoenologia 11 (3): 331–383.
- Galasso G., Conti F., Peruzzi L., Ardenghi N. M. G., Banfi E., Celesti-Grapow L., Albano A., Alessandrini A., Bacchetta G., Ballelli S., Bandini Mazzanti M., Barberis G., Bernardo L., Blasi C., Bouvet D., Bovio M., Cecchi L., Del Guacchio E., Domina G., Fascetti S., Gallo L., Gubellini L., Guiggi A., Iamonic D., Iberite M., Jiménez-Mejías P., Lattanzi E., Marchetti D., Martinetto E., Masin R. R., Medagli P., Passalacqua N. G., Peccenini S., Pennesi R., Pierini B., Podda L., Poldini L., Prosser F., Raimondo F. M., Roma-Marzio F., Rosati L., Santangelo A., Scoppola A., Scortegagna S., Selvaggi A., Selvi F., Soldano A., Stinca A., Wagensommer R. P., Wilhelm T., Bartolucci F. 2018: An updated checklist of the vascular flora alien to Italy. Plant Biosystems 152 (3): 556–592.
- Hruby J. 1935: La vegetazione delle colline a settentrione di Conegliano. Atti R. Ist. Ven. Sc. Lett. Arti 94: 461–483.
- Kaligarič M. 1992: Vegetacija plevelov v vinogradih Koprškega primorja. Annales, ser. hist. natur., 2: 39–52.
- Kruseman G. & Vlioger J. 1939: Akkerassociaties in Nederland. Nederlandsch Kruidkundig Archiv 49: 327–98.
- Oberdorfer E. 1993: Süddeutsche Pflanzengesellschaften. Teil III. Wirtschaftswiesen und Unkrautgesellschaften. 3. Auflage. G. Fischer Verlag, Jena.
- Orgis K. 1977: Die Weinbergunkrautgesellschaften im Gebiet des mittleren Keupers in Franken besonders im Hinblick auf die Auswirkungen der Flurbereinigung. Hoppea 36: 193–246.
- Pál R. 2006: Verbreitung und Assoziationsverhältnisse von Zwiebelgeophyten in den Weinbergen Süd-Ungarns. Journal of Plant Diseases and Protection 20: 619–626.
- Podani J. 2001: Syn-Tax 2000. Computer program for data analysis in ecology and systematics. User's manual. Scientia Publishing, Budapest.
- Poldini L. 1980: Übersicht über die Vegetation des Karstes von Triest und Görz (NO-Italien). Studia Geobotanica 1(1): 79–130.
- Poldini L. 1989: La vegetazione del Carso isontino e triestino. Lint, Trieste, 320 p.
- Poldini L., Mazzolini G. & Oriolo G. 1996: La vegetazione spontanea dei vigneti nei territori nord-est adriatici: *Geranio-rotundifolii-Allietum* R. Tx. ex von Rochow 1951 o *Cerastio-Geranietum dissecti* Poldini 1980? Giorn. Bot. Ital. 130(1): 151–152.
- Poldini L., Oriolo G. & Mazzolini G. 1998: The segetal vegetation of vineyards and crop fields in Friuli-Venezia Giulia (NE Italy). Studia Geobotanica 16: 5–32.
- Poldini L., Sbrulino G. & Vidali M. 2017: New syntaxonomic contribution to the vegetation prodrome of Italy. Plant Biosystems 151(6): 1111–1119.
- Seljak G. 1989: Plevelna vegetacija vinogradov in sadovnjakov na Goriškem in vpliv večletne rabe nekaterih herbicidov na spremembo dominantnosti plevelnih vrst. Biotehniška fakulteta v Ljubljani. (magistrsko delo). [in Slovenian].
- Šilc U. & Čarni A. 2007: Formalized classification of the weed vegetation of arable land in Slovenia. Preslia 79: 283–302.
- Tasinazzo S. 2015: Sulla vegetazione dei vigneti collinari del Veneto. In 49° Congresso S.I.S.V. “La scienza della vegetazione per la biodiversità e la sostenibilità”, Ancona 24–26 settembre 2015, abstract: 34.
- Weber H.E., Moravec J. & Theurillat J.P. 2000: International Code of Phytosociological Nomenclature. 3rd edition. Journal of Vegetation Science 11: 739–768.
- Wilmanns O. 1989: Vergesellschaftung und Strategie-Typen von Pflanzen mitteleuropäischer Rebkulturen. Phytocoenologia 18(1): 83–128.
- Wilmanns O. & Bogenrieder A. 1991: Phytosociology in vineyards – results, problems, tasks. In Esser G. & Overdieck D. (eds.), Modern ecology: basic and applied aspects: 399–441. Elsevier, Amsterdam-London-New York-Tokyo.
- Wilmanns O. & Bogenrieder A. 1992. Das *Geranio-Allietum* in der oberelsässischen Rebflur. Bauhinia 10: 99–114.

**Appendix I:** localities, dates, quadrants and geographical coordinates of relevés of Table 2 *Cerastio-Geranietum crepidetosum nemausensis*.

Rel. 1: C. Targon (Brendola-Colli Berici-VI), 29/03-14/04/2010, 0534/2 (45°27'45.71"N; 11°28'28.97"E); rel. 2: Terrossa (Roncà-M. Lessini-VR), 7/04-28/04/2010, 0533/2 (45°28'4.18"N; 11°18'58.42"E); rel. 3: Gambugliano (M. Lessini-VI), 11/04/2016, 0434/2 (45°35'31.02"N; 11°25'48.15"E); rel. 4: Perarolo (Arcugnano-Colli Berici-VI), 30/03-13/04/2010, 0534/2 (45°28'24.42"N; 11°29'46.52"E); rel. 5: Turri (Montegrotto Terme-Colli Euganei-PD), 12/04-19/05/2011, 0636/4 (45°19'4.13"N; 11°45'29.46"E); rel. 6: S. Rocco (Lavagno-M. Lessini-VR), 15/04-20/5/2011, 0433/2 (45°26'57.19"N; 11° 6'54.54"E); rel. 7: S. Valentino (Brendola-Colli Berici-VI), 14/04-25/05/2010, 0534/2 (45°28'12.55"N; 11°28'50.36"E); rel. 8: via Moschine (Baone-Colli Euganei-PD), 08/04-19/05/2011, 0736/1 (45°15'13.72"N; 11°41'46.69"E); rel. 9: Rocca di Lonigo (Colli Berici-VI), 31/03-10/05/2010, 0634/1 (45°23'39.97"N; 11°24'23.41"E); rel. 10: S. Briccio (Lavagno-M. Lessini-VR), 15/04-20/5/2011, 0532/4 (45°26'46.25"N; 11° 7'17.61"E); rel. 11: Le Acque (Lonigo-Colli Berici-VI), 31/03-10/05/2010, 0634/1 (45°23'27.84"N; 11°24'49.36"E); rel. 12: Monticello (Lonigo-Colli Berici-VI), 31/03-10/05/2010, 0634/2 (45°23'4.58"N; 11°25'24.44"E); rel. 13: Mosano (Colli Berici-VI), 05/04-18/05/2010, 0535/3 (45°24'50.14"N; 11°33'36.67"E); rel. 14: M. Santo di Lovertino (Albettone-Colli Euganei-VI), 16/04/2016, 0635/2 (45°21'6.95"N; 11°36'52.86"E); rel. 15: Monticello (Lonigo-Colli Berici-VI), 31/03-10/05/2010, 0634/2 (45°23'5.22"N; 11°25'12.56"E); rel. 16: Peraro (Lonigo-Colli Berici-VI), 06/04-12/05/2010, 0634/2 (45°23'23.50"N; 11°26'16.66"E); rel. 17: Pressi (Cazzano di Tramigna-M. Lessini-VR), 15/04-20/05/2011, 0533/1 (45°27'16.93"N; 11°13'3.39"E); rel. 18: S. Ambrogio Valpolicella (M. Lessini-VR), 05/04-20/05/2011, 0431/3 (45°31'44.28"N; 10°50'48.61"E); rel. 19: Brendola (Colli Berici-VI), 14/04-25/05/2010, 0534/2 (45°28'14.46"N; 11°27'1.52"E); rel. 20: Valcerea (Castelnuovo del Garda-morainic hills-VR), 30/03-25/05/2012, 0530/4 (45°24'55.74"N; 10°45'6.13"E); rel. 21: Carbonara (Rovolon-Colli Euganei-PD), 19/04/2016, 0635/2 (45°21'53.43"N; 11°38'35.19"E); rel. 22: S. Daniele (Lonigo-Colli Berici-VI), 31/03-10/05/2010, 0634/1 (45°23'2.55"N; 11°24'38.81"E); rel. 23: Ca Vecchie (Alonte-Colli Berici-VI), 06/04-10/05/2010, 0634/2 (45°22'33.28"N; 11°27'28.10"E); rel. 24: cimitero di Selva (Montebello Vicentino-Lessini-VI), 07/04-30/04/2010, 0534/1 (45°27'32.40"N; 11°21'23.96"E);

rel. 25: Recoaretto (Soave-M. Lessini-VR), 09/04/2010, 0533/1 (45°27'19.75"N; 11°14'4.21"E); rel. 26: C. Ronca (Villaga-Colli Berici-VI), 06/04-14/05/2010, 0635/1 (45°23'46.56"N; 11°31'34.57"E); rel. 27: C. Agriman (Barbarano Vicentino-Colli Berici-VI), 18/04/2016, 0535/3 (45°24'16.70"N; 11°32'56.78"E); rel. 28: Noseo (Barbarano Vicentino-Colli Berici-VI), 18/04/2016, 0535/3 (45°24'20.97"N; 11°31'52.73"E); rel. 29 S. Lucia (M. Rusta-Colli Euganei-PD), 29/04/2016, 0736/1 (45°16'52.87"N; 11°40'8.51"E); rel. 30: S. Silvestro (Boccon-Colli Euganei-PD), 05/05/2016, 0635/4 (45°18'41.40"N; 11°39'13.41"E); rel. 31: Marcellise (M. Lessini-VR), 06/05/2016, 0532/2 (45°27'19.30"N; 11° 5'46.68"E); rel. 32: Barbarano Vicentino (Colli Berici-VI), 05/04-18/05/2010, 0535/3 (45°24'57.74"N; 11°32'16.59"E); rel. 33: Castelcerino (Soave-M. Lessini-VR), 09/04/2010, 0533/1 (45°27'22.40"N; 11°14'48.05"E); rel. 34: Mozzarelli (Roncà-M. Lessini-VR), 09/04-21/05/2010, 0533/2 (45°29'44.30"N; 11°17'58.53"E); rel. 35: Obelisco di Sorio (Gambellara-M. Lessini-VI), 07-04-2010, 0534/3 (45°26'55.33"N; 11°21'19.81"E); rel. 36: Biancara (Gambellara-M. Lessini-VI), 28-04-2011, 0534/1 (45°27'40.97"; 11°21'11.39"E); rel. 37: Sassonegro (Arquà Petrarca-Colli Euganei-PD), 08/04-19-05-2011, 0736/1 (45°15'51.39"N; 11°42'11.85"E); rel. 38: Fontana Fredda (Lazise-morainic hills-VR), 30/03-25/05/2012, 0530/1 (45°27'44.66"N; 10°43'57.08"E); rel. 39: Mascarpina (Custoza-morainic hills-VR), 30/03-25/05/2012, 0630/2 (45°23'28.49"N; 10°48'26.11"E); rel. 40: Canzago (Marano Valpolicella-M. Lessini-VR), 05/04-20/05/2011, 0431/2 (45°33'5.07"N; 10°55'16.77"E); rel. 41: Ara (Negrar-M. Lessini-VR), 05/04-20/05/2011, 0431/4 (45°32'21.14"N; 10°57'31.63"E); rel. 42: Piazzili (Cavaion Veronese-morainic hills-VR), 28/03-25/05/2012, 0430/4 (45°30'59.91"N; 10°47'23.29"E); rel. 43: Astore (Castiglione delle Stiviere-morainic hills-MN), 07/04/2017, (45°23'40.75"N; 10°31'31.27"E); rel. 44: S. Lucia (Valeggio sul Mincio-morainic hills-VR), 30/03-25/05/2012, 0630/2 (45°23'10.59"N; 10°45'45.04"E); rel. 45: Colà (Lazise-morainic hills-VR), 30/03-25/05/2012, 0530/2 (45°28'12.78"N; 10°45'8.49"E); rel. 46: M. Cisa (Solighetto-foothills of Alps-TV), 18/04/2012, 0039/3 (45°55'16.52"N; 12°11'9.94"E); rel. 47: Carbonarola (Grancona-Colli Berici-VI), 19/04/2015, 0534/4 (45°24'6.80"N; 11°27'0.63"E); rel. 48: S. Benedetto (Marostica-foothills of Alps-VI), 21/04/2010, 0236/1 (45°45'26.56"N; 11°40'11.16"E); rel. 49: M. S. Lucia (Breganze-foothills of Alps-VI), 24/04/2016, 0235/3 (45°42'57.18"N; 11°34'0.05"E); rel. 50: Casette (Este-Colli Euganei-PD), 08/04-19/05/2011, 0736/3 (45°14'23.64"N; 11°42'31.75"E); rel. 51: Car-



bonara (Rovolon-Colli Euganei-PD), 19/04/2016, 0635/2 (45°21'58.54"N; 11°38'42.15"E); rel. 52: Cinto Euganeo (Colli Euganei-PD), 29/04/2016, 0735/2 (45°16'28.47"N; 11°39'6.28"E); rel. 53: via Morette (Maser-Colli Asolani-TV), 25/04/2016, 0137/4 (45°48'28.55"N; 11°57'46.50"E)

**Appendix II:** sporadic species of Table 2 *Cerastio-Geranietum crepidetosum nemausensis*; in parentheses relevé number with + value understood, except where otherwise stated.

*Acer campestre* (51); *Achillea millefolium* agg. (4, 27, 30, 46, 49: r); *Aegopodium podagraria* (7, 41); *Agrimonia eupatoria* (4: r; 24); *Ajuga genevensis* (3, 21, 40, 41); *Ajuga reptans* (7, 53); *Allium ampeloprasum* (37: 1; 50: 1); *Allium longispatum* (17, 50); *Ammoides pusilla* (8, 37); *Arabiopsis thaliana* (35: 1); *Aristolochia clematidis* (30); *Arrhenatherum elatius* (3: r; 46, 49); *Asparagus acutifolius* (6, 8, 39, 52); *Brachypodium rupestre* (5, 23, 46); *Carex divulsa* (15, 19, 31, 43); *Carex pairae* (4, 7, 15, 19, 26); *Carex spicata* (19, 44, 45, 46); *Centaurea nigrescens/nigrescens* (4: 2a; 6, 8, 9, 40, 41, 45, 46, 47); *Cerastium glutinosum* (15, 16, 18, 22, 23, 36, 42: r); *Cerastium semidecandrum* (20, 44: 1; 45: 1); *Chondrilla juncea* (22: 1; 27, 50); *Cichorium intybus* (21, 28, 29: r; 31, 39); *Cirsium vulgare* (24, 29, 31, 51: r); *Clematis vitalba* (6, 7, 10, 20, 24, 29, 47: r; 52); *Cornus sanguinea* (pl) (3); *Dactylis glomerata* (4, 7, 24, 32, 48); *Daucus carota* (7, 8, 48, 50); *Draba verna* s.l. (24, 39: 1); *Erigeron canadensis* (18, 20, 37, 38, 39: 2a); *Euphorbia cyparissias* (8, 50); *Ficaria verna* s.l. (1, 2, 8); *Galium album* agg. (4, 8, 26, 40, 45, 46: 1); *Galium verum* (18, 30); *Glechoma hederacea* (4: 1; 6, 7, 10, 19: 2a; 26: 2b; 32, 40); *Hedera helix* (2, 3, 6: 1; 7, 10, 34, 47); *Holosteum umbellatum/umbellatum* (12: 1; 33); *Hypochaeris radicata* (49: r; 53); *Lamium maculatum* (26); *Leontodon hispidus* (20, 40: r; 53); *Linaria vulgaris* (8, 30); *Lotus corniculatus* (16, 41, 48); *Medicago minima* (11, 15: 2a; 16, 17, 22, 23, 38, 50, 51: 1; 52); *Medicago sativa* (19, 22); *Mentha longifolia* (1, 3, 6, 18: 1; 40, 46); *Mentha suaveolens* (20); *Microthlaspi perfoliatum* (32, 48); *Muscari comosum* (8: 1; 23, 27: r; 32, 34, 45); *Myosotis ramosissima* (23: 1; 33, 34: 1; 36, 48, 49: r; 53); *Parietaria officinalis* (10: 2a; 19, 25, 39, 45); *Picris hieracioides* (36, 51); *Plantago media* (4, 10, 41, 42: r); *Poa angustifolia* (16: 1; 23: 2b; 26: 1; 31, 48: 1); *Poa bulbosa* (18: 1; 35); *Poa pratensis* (4: 2a; 6: 1; 7: 1; 8, 15, 17, 24: 1; 25, 33: 1; 48: 2a); *Polygonum aviculare* agg. (10, 11, 12, 13, 16, 24, 25, 38, 42, 53: r); *Potentilla argentea* (33, 48: 1); *Potentilla recta* (22, 23); *Poterium sanguisorba* (23, 49, 50); *Quercus pubescens* (pl) (29: r; 30: r; 47); *Ranunculus acris* (7: 1); *Ranunculus repens* (7; 53);

*Rosa canina* s.l. (pl) (23, 24); *Rumex crispus* (4, 5, 6, 18, 51); *Rumex obtusifolius* (4, 7, 8, 9, 19: 1; 46); *Salvia pratensis* (23, 40, 41, 44, 46); *Silene latifolia* (12, 44, 46: 1); *Silene vulgaris/vulgaris* (3: r; 8, 22, 27, 40, 41, 48, 49, 51); *Tragopogon dubius* (17, 26, 27, 28, 32, 35: r; 37, 38, 39, 50); *Trifolium campestre* (23, 30: 1; 34, 39: 1); *Trifolium scabrum* (18, 39); *Ulmus minor* (pl) (21, 27: r, 28: r; 29, 31: r); *Urtica dioica* (26, 44, 45, 46); *Valerianella carinata* (1: r; 3: r; 34: 1); *Verbena officinalis* (8, 13, 17: 1; 19; 31, 37, 38, 41); *Vicia cracca* (32: 2a; 33: 1); *Vicia lathyroides* (24, 35, 36, 48).

**Appendix III:** localities, dates, quadrants of relevés of Table 3.

Rel. 1: M. Paolina (Sarego-Colli Berici-VI), 02/04/2012, 0534/4; rel. 2: Grumale (Villaga-Colli Berici-VI), 04/04/2012, 0635/1; rel. 3: M. Paolina (Sarego-Colli Berici-VI), 02/04/2012, 0534/4; rel. 4: Sarego (Colli Berici-VI), 02/04/2012, 0534/3; rel. 5: Busa Geretta (Sarego-Colli Berici-VI), 04/04/2012, 0534/4; rel. 6: Preval (Collio Goriziano), 04/05/2012, 0047/1; rel. 7: Preval (Collio Goriziano), 11/05/2012, 0047/1; rel. 8: Preval (Collio Goriziano), 11/05/2012, 0047/1; rel. 9: Preval (Collio Goriziano), 15/06/2012, 0047/1; rel. 10: Preval (Collio Goriziano), 15/06/2012, 0047/1; rel. 11: Preval (Collio Goriziano), 15/06/2012, 0047/1; rel. 12: Preval (Collio Goriziano), 15/06/2012, 0047/1; rel. 13: Preval (Collio Goriziano), 15/06/2012, 0047/1; rel. 14: Preval (Collio Goriziano), 15/06/2012, 0047/1.

**Appendix IV:** sporadic species of Table 3; in parentheses relevé number with + value understood, except where otherwise stated.

*Agrostis stolonifera* (11); *Ajuga reptans* (13); *Artemisia verlotiorum* (2: r); *Arrhenatherum elatius* (6, 11); *Bromus erectus* (6); *Calepina irregularis* (5); *Centaurea nigrescens/nigrescens* (9, 10); *Cerastium brachypetalum/brachypetalum* (3, 5); *Dactylis glomerata* (9); *Galium mollugo* s.l. (6); *Hypochaeris radicata* (1); *Leucanthemum vulgare* (5: r); *Linaria vulgaris* (14); *Lychnis flos-cuculi* (7); *Lythrum salicaria* (13); *Microthlaspi perfoliatum* (2: r); *Muscari neglectum* (3: r); *Poterium sanguisorba* (5); *Quercus robur* (pl) (12, 14); *Ranunculus acris* (8, 9); *Ranunculus bulbosus* (5); *Rorippa sylvestris* (9); *Stachys palustris* (13, 14); *Trifolium campestre* (11); *Verbena officinalis* (1: r; 13); *Veronica chamaedrys* (4).

**Table 1:** Synoptic table of vineyard relevés from South-eastern (Ven: Veneto; Fri: Friuli Venezia Giulia; SLO: Slovenia) and Central (D: Germany; H: Hungary) Europe. D2: Oberdorfer (1983); D3: Orgis (1977). Included are companion species occurring at least once in  $\geq$  II frequency class.

**Tabella 1:** Sinoptična tabela popisov vinogradov iz jugovzhodne (Ven: Benečija; Fri: Furlanija-Juljska krajina; SLO: Slovenija) in Srednje Evrope (D: Nemčija; H: Madžarska). D2: Oberdorfer (1983); D3: Orgis (1977). Prikazane so spremljevalne vrste, ki se pojavljajo enkrat, in z razredom frekvence  $\geq$  II.

geographical area	Ven	Fri+SLO	D1	D2	D3	H
cluster (Figure 1)	A1a	A1b	A2	-	-	B
relevés (n°)	53	47	69	183	18	34
sp. of <i>Cerastio-Geranium</i>						
<i>Geranium dissectum</i> (Cl)	57	60	3	17	I	.
<i>Cerastium glomeratum</i> (Cl)	51	51	1	4	.	9
<i>Ornithogalum divergens</i> (Cl)	62	32	.	.	.	.
<i>Calepina irregularis</i>	60	47	.	.	.	18
<i>Crepis vesicaria/taraxacifolia</i> (Cl; d subass. <i>typicum</i> )	23	66	.	.	.	.
<i>Poa sylvicola</i>	45	43	.	.	.	.
<i>Cerastium brachypetalum/tenoreanum</i> (d subass. <i>typicum</i> )	13	57	.	.	.	.
<i>Lolium multiflorum</i>	23	40	.	.	.	.
sp. of <i>Cerastio-Geranium</i> subass. <i>crepidetosum nemausensis</i>						
<i>Crepis sancta/nemausensis</i> (Cl)	92	.	.	.	.	.
<i>Geranium molle</i> (Cl)	89	13	3	.	.	.
<i>Hordeum murinum</i> s.l. (Cl)	72	2	4	.	.	.
<i>Cynodon dactylon</i> (O)	70	17	1	.	.	3
<i>Cardamine hirsuta</i> (Cl)	62	17	9	.	.	.
<i>Rumex pulcher/pulcher</i>	55	.	.	.	.	.
<i>Malva sylvestris</i>	47	2	.	.	.	3
<i>Torilis nodosa/nodosa</i> (Cl)	38	.	.	.	.	.
<i>Avena barbata</i> (Cl)	34	.	.	.	.	.
<i>Lactuca saligna</i> (Cl)	26	.	.	.	.	3
<i>Ranunculus parviflorus</i> (Cl)	25	2	.	.	.	.
sp. of <i>Cerastio-Geranium</i> subass. <i>typicum</i>						
<i>Rumex crispus</i>	9	40	4	.	.	.
<i>Alopecurus myosuroides</i> (Cl)	.	34	.	.	.	.
<i>Trifolium incarnatum/molinerii</i>	.	19	.	.	.	.
<i>Anthemis arvensis</i> (Cl)	.	17	.	.	.	.
sp. of <i>Geranio-Allietum</i>						
<i>Allium vineale</i> (Cl; p.max.p.) + <i>A. oleraceum</i> (Cl)	45	47	81	84	IV	6
<i>Muscari neglectum</i>	64	43	45	51	II	38
<i>Ornithogalum umbellatum</i>	.	.	67	23	.	65
<i>Gagea villosa</i> (O)	9	.	32	16	II	24
<i>Geranium rotundifolium</i> (O)	49	13	46	21	.	.
<i>Valerianella carinata</i>	6	9	52	2	.	.
<i>Ficaria verna</i>	6	4	26	.	.	.
<i>Tulipa sylvestris</i> (Cl)	.	.	14	11	III	.
<i>Allium scorodoprasum</i>	.	.	3	.	.	18
<i>Ornithogalum nutans</i> (Cl)	.	.	4	.	III	.
<i>Allium rotundum</i>	.	.	29	.	.	.
<i>Corydalis cava</i>	.	.	9	.	.	.

geographical area	Ven	Fri+SLO	D1	D2	D3	H
<i>Calendula arvensis</i> (all)	.	.	4	.	.	.
<i>Allium nigrum</i> (Cl)	.	.	3	.	.	.
sp. of cluster B						
<i>Holosteum umbellatum</i>	4	.	3	.	II	62
<i>Viola arvensis</i> (Cl)	8	6	.	4	.	41
<i>Vicia grandiflora</i>	.	.	.	.	.	38
<i>Androsace maxima</i> (Cl)	.	.	.	.	.	18
sp. of Veronico-Euphorbion						
<i>Euphorbia helioscopia</i>	89	79	32	78	II	15
<i>Fumaria officinalis</i>	45	23	29	54	III	12
<i>Mercurialis annua</i>	26	28	43	52	.	.
<i>Veronica polita</i>	.	.	28	58	.	62
<i>Thlaspi arvense</i>	.	4	.	6	.	.
<i>Euphorbia peplus</i>	.	.	.	33	.	.
sp. of Solano-Polygonetalia						
<i>Lamium purpureum</i>	64	30	78	89	II	74
<i>Sonchus oleraceus</i>	60	45	29	91	I	6
<i>Lamium amplexicaule</i>	57	21	10	30	I	74
<i>Sonchus asper</i>	45	34	28	81	I	.
<i>Erodium cicutarium</i>	19	38	14	29	.	44
<i>Fallopia convolvulus</i>	2	21	7	3	II	.
<i>Chenopodium album</i>	9	9	12	.	II	.
<i>Persicaria maculosa</i>	.	4	1	.	.	.
sp. of Stellarietea mediae						
<i>Stellaria media/media</i>	94	98	74	80	IV	85
<i>Veronica persica</i>	98	98	72	64	I	50
<i>Convolvulus arvensis</i>	87	70	84	41	V	47
<i>Senecio vulgaris</i>	79	81	33	84	II	38
<i>Capsella bursa-pastoris</i>	81	74	23	25	I	74
<i>Veronica hederifolia</i>	30	34	84	50	II	56
<i>Cirsium arvense</i>	34	68	36	56	II	3
<i>Anisantha sterilis</i>	57	45	70	20	.	38
<i>Veronica arvensis</i>	62	23	20	13	.	47
<i>Geranium pusillum</i>	28	2	10	11	.	68
<i>Malva neglecta</i>	15	4	23	17	I	.
<i>Vicia sativa</i> agg.	43	72	32	.	.	35
<i>Papaver rhoeas</i>	21	23	10	9	.	.
<i>Anagallis arvensis</i>	2	17	3	16	.	.
<i>Sinapis arvensis</i>	.	4	6	20	I	.
<i>Ervilia hirsuta</i>	4	4	13	.	.	6
<i>Lepidium draba</i>	.	6	1	.	I	12
<i>Sisymbrium officinale</i>	2	4	1	1	.	.
<i>Valerianella locusta</i>	23	11	.	.	.	35
<i>Geranium columbinum</i>	4	17	.	15	.	.
<i>Crepis pulchra</i>	4	.	10	.	.	6
<i>Myosotis arvensis</i>	6	11	.	3	.	.
<i>Sherardia arvensis</i>	6	2	.	2	.	.
<i>Senecio leucanthemifolius/vernalis</i>	.	.	49	.	.	9

geographical area	Ven	Fri+SLO	D1	D2	D3	H
<i>Diploaxis muralis</i>	4	23	.	.	.	.
<i>Anisantha madritensis</i>	17	2	.	.	.	.
<i>Papaver dubium</i>	17	.	1	.	.	.
<i>Buglossoides arvensis</i>	8	.	.	.	.	6
<i>Erodium ciconium</i>	8	.	3	.	.	.
<i>Delphinium consolida</i>	.	4	.	.	.	6
<i>Scandix pecten-veneris/pecten-veneris</i>	8	.	1	.	.	.
<i>Ranunculus arvensis</i>	.	6	.	.	I	.
<i>Aphanes arvensis</i>	4	2	.	.	.	.
<i>Capsella rubella</i>	4	2	.	.	.	.
<i>Malva setigera</i>	.	4	1	.	.	.
<i>Urtica urens</i>	.	.	3	2	.	.
<i>Oxalis stricta</i>	2	2	.	.	.	.
<i>Erigeron sumatrensis</i>	23	.	.	.	.	.
<i>Torilis arvensis</i>	.	.	19	.	.	.
<i>Diploaxis tenuifolia</i>	15	.	.	.	.	.
<i>Sorghum halepense</i>	13	.	.	.	.	.
<i>Crepis vesicular/vesicaria</i>	13	.	.	.	.	.
<i>Raphanus raphanistrum</i>	.	13	.	.	.	.
<i>Oxalis dillenii</i>	11	.	.	.	.	.
<i>Vicia hybrida</i>	9	.	.	.	.	.
<i>Crepis foetida</i>	.	9	.	.	.	.
<i>Avena fatua/fatua</i>	8	.	.	.	.	.
<i>Legousia hybrida</i>	8	.	.	.	.	.
<i>Loncomelos brevistylus</i>	8	.	.	.	.	.
<i>Medicago orbicularis</i>	8	.	.	.	.	.
<i>Veronica triphyllos</i>	.	.	7	.	.	.
<i>Euphorbia exigua</i>	.	.	.	7	.	.
<i>Legousia speculum-veneris</i>	.	6	.	.	.	.
<i>Chaenorhinum minus/minus</i>	.	.	.	6	.	.
<i>Papaver dubium/confine</i>	.	.	.	.	.	6
<i>Medicago arabica</i>	6	.	.	.	.	.
<i>Bromus arvensis</i>	4	.	.	.	.	.
<i>Anisantha diandra</i>	4	.	.	.	.	.
<i>Medicago polymorpha</i>	4	.	.	.	.	.
<i>Oxalis corniculata</i>	4	.	.	.	.	.
<i>Papaver argemone</i>	4	.	.	.	.	.
<i>Aethusa cynapium</i>	.	.	.	3	.	.
<i>Trifolium arvense</i>	.	.	.	.	.	3
<i>Lathyrus sphaericus</i>	2	.	.	.	.	.
<i>Fumaria vaillantii</i>	.	.	.	.	III	.
<i>Adonis aestivalis</i>	.	.	.	.	I	.
<i>Veronica agrestis</i>	.	.	.	.	I	.
sp. of <i>Artemisietea vulgaris</i>						
<i>Elymus repens</i>	43	38	28	41	II	3
<i>Sonchus arvensis</i>	.	4	3	15	II	.
<i>Erigeron annuus</i>	70	28	.	.	.	35
<i>Rumex obtusifolius</i> s.l.	11	30	3	.	.	.
<i>Artemisia verlotiorum</i>	26	.	.	.	.	.

geographical area	Ven	Fri+SLO	D1	D2	D3	H
sp. of <i>Cynosurion cristati</i> or with stolons						
<i>Lolium perenne</i> (Cy)	79	2	33	4	.	3
<i>Trifolium repens</i> (Cy)	70	11	1	.	.	6
<i>Potentilla reptans</i>	28	13	3	.	.	.
<i>Bellis perennis</i> (Cy)	60	2	.	.	.	.
other sp. of <i>Molinio-Arrhenatheretea</i>						
<i>Taraxacum</i> sect. <i>Ruderalia</i>	92	72	87	91	IV	74
<i>Ranunculus repens</i>	4	9	7	26	.	.
<i>Plantago lanceolata</i>	64	15	.	.	.	.
<i>Trifolium pratense/pratense</i>	32	9	.	.	.	.
<i>Tragopogon pratensis</i>	.	2	.	.	.	32
other						
<i>Lactuca sativa/serriola</i>	79	51	58	22	I	38
<i>Poa annua</i>	34	32	48	22	I	12
<i>Galium aparine</i>	21	6	59	10	I	18
<i>Medicago lupulina</i>	21	2	3	8	.	3
<i>Arenaria serpyllifolia</i>	42	17	.	15	.	50
<i>Polygonum aviculare</i> agg.	19	2	26	.	I	.
<i>Bromus hordeaceus</i> s.l.	21	6	1	.	.	3
<i>Microthlaspi perfoliatum</i>	4	.	1	.	III	15
<i>Urtica dioica</i>	8	2	23	.	.	.
<i>Plantago major</i>	21	2	3	.	.	.
<i>Cerastium brachypetalum/brachypetalum</i>	49	.	.	.	.	24
<i>Ranunculus bulbosus</i>	32	26	.	.	.	.
<i>Hedera helix</i>	13	.	25	.	.	.
<i>Mentha longifolia</i>	13	21	.	.	.	.

**Table 2:** Analytical table of vineyard vegetation from Veneto (North-eastern Italy). C.A.: Colli Asolani; C.B.: Colli Berici; C.E.: Colli Euganei; G.m.: Garda moraines; L.: Monti Lessini; P.: Prealps. Included are companion species occurring in ≥ II frequency class.

relevé n°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
elevation a.s.l. (m)	50	70	275	260	60	130	80	75	105	230	145	140	70	100	120	170	90	230	65	110	60	90	175
number of species	33	31	45	46	41	43	47	54	38	44	33	36	29	45	45	44	53	46	41	39	38	50	
geographical area	C <sup>ri</sup>	L	L	C <sup>ri</sup>	C <sup>ri</sup>	L	C <sup>ri</sup>	C <sup>ri</sup>	C <sup>ri</sup>	L	C <sup>ri</sup>	C <sup>ri</sup>	C <sup>ri</sup>	C <sup>ri</sup>	C <sup>ri</sup>	C <sup>ri</sup>	L	L	C <sup>ri</sup>	G <sup>m</sup>	C <sup>ri</sup>	C <sup>ri</sup>	C <sup>ri</sup>
sp. of <i>Cerastio-Geranietum</i>																							
<i>Ornithogalum divergens</i>	1	+	r	+	.	+	.	+	+	+	.	2a	+	.	+	1	1	1	+	r	r	+	+
<i>Calepina irregularis</i>	+	3	+	+	+	1	2b	+	2a	+	.	.	+	+	.	.	.	+	.	+	+	.	2a
<i>Geranium dissectum</i>	+	.	+	2a	3	1	2a	.	+	+	r	.	+	+	.	.	.	.	.	+	2b	+	2a
<i>Cerastium glomeratum</i>	.	.	+	+	.	.	.	.	+	+	+	1	+	+	+	+	+	1	+	.	2a	.	.
<i>Poa sylvicola</i>	.	+	.	.	1	1	1	+	2a	1	.	.	.	.	.	.	+	+	2a	+	.	.	.
<i>Crepis vesicaria/taraxacifolia</i>	.	.	.	.	2a	.	+	+	.	.	.	.	.	.	.	+	+	.	.	.	.	+	2a
<i>Lolium multiflorum</i>	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	+	1	2a	.	.
<i>Cerastium brachypetalum/tenoreanum</i>	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	1
sp. of <i>Cerastio-Geranietum</i> subass <i>crepidetosum nemausensis</i>																							
<i>Crepis sancta/nemausensis</i>	+	2a	3	+	2b	2a	+	+	+	2a	+	2a	2b	4	2b	2b	2b	2b	3	2a	2a	2b	2a
<i>Geranium molle</i>	2a	1	1	2a	1	2a	2b	2b	2a	.	r	3	3	2a	2a	1	+	+	1	.	.	2b	1
<i>Hordeum murinum/leporinum</i>	.	2a	+	.	1	+	2a	.	2a	2b	2a	.	2a	2a	2a	+	1	2a	2a	+	.	2a	+
<i>Cynodon dactylon</i>	+	.	+	1	1	1	1	.	.	.	.	+	+	+	2a	1	+	+	1	2a	1	2a	.
<i>Cardamine hirsuta</i>	+	+	+	+	.	+	1	+	1	+	+	1	2a	+	.	+	.	.	+	1	+	+	+
<i>Rumex pulcher/pulcher</i>	.	+	.	.	+	.	+	.	+	+	+	+	.	+	+	+	1	+	1	.	+	1	+
<i>Malva sylvestris</i>	.	+	+	+	+	.	.	.	.	.	.	.	.	1	2a	+	+	.	1	+	.	1	.
<i>Torilis nodosa/nodosa</i>	.	.	.	.	.	+	+	+	.	.	+	+	.	+	+	+	+	2b	.	.	.	+	1
<i>Avena barbata</i>	.	.	.	.	.	.	.	.	1	.	+	+	+	+	+	.	+	.	.	.	.	1	.
<i>Lactuca saligna</i>	.	.	1	.	.	1	.	.	.	.	1	+	+	.	.	r	+	+	2a	.	.	.	.
<i>Ranunculus parviflorus</i>	2b	2a	.	.	.	.	2b	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.
sp. of <i>Veronico-Euphorbion</i>																							
<i>Euphorbia helioscopia</i>	+	1	+	+	+	+	1	1	+	+	+	+	1	2a	+	+	.	1	2a	+	1	+	+
<i>Fumaria officinalis</i> s.l.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	+	+	1	1	.	.	.	.
<i>Mercurialis annua</i>	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	+	.	.	+	r	.
sp. of <i>Solano-Polygonetalia</i>																							
<i>Lamium purpureum</i>	2b	1	1	2a	+	+	2a	+	+	+	2a	+	2a	+	.	+	+	.	2a	+	+	+	+
<i>Sonchus oleraceus</i>	.	.	.	+	+	+	+	.	+	+	2a	+	+	+	r	+	+	+	1	r	.	.	.
<i>Lamium amplexicaule</i>	.	.	+	+	.	.	.	1	.	+	1	+	+	+	+	+	1	+	.	+	r	1	r
<i>Geranium rotundifolium</i>	.	+	2a	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	2a	.	.	.	+
<i>Sonchus asper</i>	+	+	+	+	+	+	+	+	+	+	.	.	.	.	.	.	.	.	+	.	.	1	+
<i>Erodium cicutarium</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2a	3	2a	.	.	2a	.	2b	.
<i>Gagea villosa</i>	1	.	.	+	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.
<i>Chenopodium album</i> (pl)	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.
<i>Fallopia convolvulus</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
sp. of <i>Stellarietea mediae</i>																							
<i>Veronica persica</i>	+	2a	1	3	2a	+	2b	2a	+	+	3	1	1	2a	2a	1	1	1	2a	2a	3	2b	2a
<i>Stellaria media</i>	2b	2b	+	2b	2a	2a	2b	3	1	2a	3	2a	2b	1	2a	2b	2b	2a	2a	2a	+	1	1
<i>Convolvulus arvensis</i>	.	+	+	+	1	+	1	1	+	+	1	+	+	1	+	+	+	+	+	+	+	1	+
<i>Capsella bursa-pastoris</i>	+	+	+	+	+	+	+	+	+	+	+	1	1	+	2b	+	+	+	+	2a	.	1	.
<i>Senecio vulgaris</i>	+	+	+	1	+	+	2a	+	.	+	1	1	+	+	1	+	+	+	2a	.	+	1	+
<i>Veronica arvensis</i>	+	.	+	+	.	+	1	+	1	+	+	+	+	.	+	1	+	+	.	.	+	.	1
<i>Anisantha sterilis</i>	2b	+	+	1	+	2a	2b	+	2b	+	.	.	.	.	+	.	.	.	2b	.	.	.	+
<i>Allium vineale</i>	+	1	.	+	+	.	+	.	+	.	r	+	+	.	.	.	.	+	r	.	.	+	2a
<i>Vicia sativa</i> agg. ( <i>V.angustifolia</i> p.max.p)	.	.	1	+	.	.	.	.	+	+	.	.	.	+	.	.	.	.	+	.	.	.	1
<i>Cirsium arvense</i>	+	+	+	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	1	+	.	.	+
<i>Veronica hederifolia</i>	+	+	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	+	.
<i>Geranium pusillum</i>	.	.	.	.	.	.	.	1	.	+	.	.	1	.	.	1	2a	.	.	.	2a	.	.
<i>Erigeron sumatrensis</i>	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.
<i>Valerianella locusta</i>	.	+	.	.	1	.	2a	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
<i>Papaver rhoeas</i>	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	+	.	.	.	.	.

**Tabela 2:** Analitična tabela vegetacije vinogradov v Benečiji (severovzhodna Italija). C.A.: Colli Asolani; C.B.: Colli Berici; C.E.: Colli Euganei; G.m.: morena Garda; L.: Monti Lessini; P.: Predalpe. Prikazane so spremljevalne vrste, ki se pojavljajo enkrat, in z razredom frekvence ≥ II.

24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	pr.	fr.	
80	210	25	60	110	100	125	220	230	300	370	90	130	40	100	100	280	300	170	125	140	120	80	110	250	210	25	70	50	180			
37	33	50	52	42	37	46	44	46	31	48	31	33	39	35	35	31	43	37	32	36	35	40	35	47	30	41	45	38	29			
L.	L.	C.B.	C.B.	C.B.	C.E.	C.E.	L.	C.B.	L.	L.	L.	L.	C.E.	G.m.	G.m.	L.	L.	G.m.	G.m.	G.m.	G.m.	P.	C.B.	P.	P.	C.E.	C.E.	C.E.	C.A.			
.	+	+	+	.	+	.	.	.	.	.	.	+	+	.	.	+	+	1	+	1	.	.	r	.	.	2a	1	.	.	33	62	
1	2a	1	+	.	+	+	.	.	.	3	+	.	.	2a	.	.	.	+	.	.	+	+	+	+	+	+	+	.	.	32	60	
+	1	1	.	+	2b	+	.	.	.	1	.	+	1	.	.	.	.	r	2a	.	.	.	+	+	+	.	r	.	2b	30	57	
.	.	+	1	+	2a	+	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	2a	.	1	+	+	2b	27	51	
1	.	+	+	.	.	.	.	.	.	.	.	.	+	1	.	.	2a	+	1	.	+	+	+	+	+	.	.	.	2a	24	45	
+	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	r	.	.	.	12	23	
.	.	.	.	.	.	1	.	.	.	+	.	.	.	.	.	.	.	.	2b	.	2a	+	+	.	.	.	.	+	.	+	12	23
.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	13
3	2a	2a	3	3	2b	2b	3	2a	3	2a	2b	2a	+	2b	1	2b	2b	2a	1	+	2a	.	1	.	.	2b	3	2b	.	49	92	
3	3	2b	1	.	2b	2a	+	2a	2b	+	+	3	3	1	2b	2b	3	3	+	2b	2a	2a	+	2b	+	.	.	2a	47	89		
.	.	2b	+	+	1	1	1	2a	1	+	+	2b	1	2b	.	+	1	2a	.	2b	.	2b	.	+	+	+	+	+	.	38	72	
.	.	1	+	1	1	2b	1	2a	1	.	.	.	2a	+	2b	.	.	.	+	1	.	.	1	1	2a	1	2a	1	.	37	70	
+	.	+	+	1	.	.	+	1	1	+	1	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	1	+	+	33	62	
.	2b	+	+	+	r	.	.	.	.	.	+	+	.	.	.	.	.	r	+	+	.	.	2a	+	.	+	.	.	.	29	55	
.	.	+	.	.	.	+	+	1	1	2b	.	2a	.	+	.	.	+	2a	+	+	.	.	+	+	.	.	.	.	.	25	47	
.	.	.	.	+	2a	+	2b	+	.	.	.	.	.	.	r	+	.	.	.	.	.	.	.	1	.	.	+	1	.	20	38	
.	.	1	+	1	1	+	1	2a	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	+	.	+	.	18	34	
.	.	.	.	+	.	.	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	14	26	
.	.	.	.	1	1	+	.	.	.	1	.	2a	.	.	.	.	.	.	.	1	.	.	.	2a	.	.	.	+	.	13	25	
1	+	+	+	+	+	1	1	1	+	+	.	.	+	.	.	+	+	r	+	2a	1	1	.	1	1	+	+	+	1	47	89	
+	+	1	+	+	.	2a	+	1	+	.	+	.	+	.	+	.	+	+	r	+	.	.	.	.	.	.	+	1	.	24	45	
.	.	+	r	r	.	+	+	2a	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	14	26	
.	.	1	+	+	.	+	.	+	.	+	.	.	+	.	.	.	.	+	+	.	.	.	+	+	+	.	.	.	.	34	64	
+	1	+	+	.	.	.	1	+	.	+	.	+	+	+	+	+	+	.	.	.	.	.	r	+	.	.	+	+	.	32	60	
.	+	.	.	.	.	.	1	+	.	r	.	+	+	+	+	+	+	2a	+	+	+	.	.	+	.	.	.	.	.	30	57	
+	+	1	+	2a	2a	.	+	+	+	2b	.	+	+	.	.	.	.	.	.	.	.	.	.	1	2b	2b	2a	2a	.	26	49	
.	.	.	+	1	+	+	.	+	+	+	+	+	+	+	+	+	.	.	.	.	.	.	+	.	1	1	.	.	.	24	45	
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	2b	3	.	.	.	.	.	.	.	.	10	19	
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	+	.	.	.	.	.	.	.	.	.	5	9	
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	9	
.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	
+	1	1	+	+	1	1	1	2a	2a	2a	1	2a	1	3	+	1	+	1	1	2b	+	1	+	2a	+	2a	+	.	+	52	98	
2a	2a	3	1	2a	+	1	1	2b	.	2a	.	2b	2b	2a	+	2a	2a	2a	+	.	+	+	+	2a	+	+	+	+	+	50	94	
+	+	+	1	+	2a	1	1	2a	+	.	+	2a	+	1	.	+	.	+	1	+	1	.	1	1	1	2a	1	.	+	46	87	
1	1	+	+	.	+	+	+	+	2a	+	+	+	+	+	+	+	+	.	.	1	.	.	.	+	1	+	+	+	+	43	81	
2a	1	+	.	+	+	+	+	+	+	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	42	79
+	+	+	1	1	+	.	+	.	.	.	1	.	.	.	.	.	.	1	.	2a	+	.	1	+	.	.	+	+	+	33	62	
2a	+	+	+	.	1	+	+	+	.	1	+	2b	.	.	.	.	.	.	1	+	.	.	.	.	.	+	+	+	.	30	57	
.	+	.	+	+	.	.	1	.	+	r	.	.	.	.	.	.	.	.	.	.	.	r	+	.	.	+	.	.	.	24	45	
.	.	.	.	+	2a	+	r	.	.	1	.	.	.	.	+	.	+	+	.	.	.	.	.	.	+	1	+	+	.	23	43	
.	1	.	1	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	18	34	
+	.	+	+	.	.	.	.	.	.	2a	+	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	16	30	
.	.	+	.	.	.	2a	.	.	.	1	+	2b	+	2a	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15	28	
.	.	.	+	+	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12	23	
.	.	.	.	.	.	.	+	.	.	1	.	.	.	.	.	.	.	.	.	2a	.	.	+	.	+	.	+	.	+	12	23	
.	.	+	+	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	11	21

relevé n°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
<i>Anisantha madritensis</i>	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	+	+	+	.	.	.	.	.		
<i>Papaver dubium</i>	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Diptotaxis tenuifolia</i>	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	+	+	.	.	
<i>Malva neglecta</i>	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	
<i>Crepis vesicaria/vesicaria</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	
<i>Sorghum halepense</i>	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	
<i>Oxalis dilleii</i>	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	
<i>Vicia hybrida</i>	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Avena fatua/fatua</i>	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	
<i>Buglossoides arvensis</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	
<i>Erodium ciconium</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Legousia hybrida</i>	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Loncomelos brevistylus</i>	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Medicago orbicularis</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	
<i>Scandix pecten-veneris/pecten-veneris</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Viola arvensis</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Medicago arabica</i>	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	
<i>Myosotis arvensis</i>	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Sherardia arvensis</i>	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	
<i>Aphanes arvensis</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Bromus arvensis</i>	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	
<i>Anisantha diandra</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Capsella rubella</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Crepis pulchra</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	
<i>Diptotaxis muralis</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Geranium columbinum</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Medicago polymorpha</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Oxalis corniculata</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Papaver argemone</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Valerianella turgida</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Ervilia hirsuta</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Lathyrus sphaericus</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Anagallis arvensis</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Oxalis stricta</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
<i>Sisymbrium officinale</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
sp. of <i>Artemisia</i> <i>vulgaris</i>																									
<i>Erigeron annuus</i>	.	.	.	.	2a	+	.	+	+	+	.	+	+	.	+	+	+	+	+	1	r	2a	.	+	
<i>Elymus repens</i>	2a	.	+	+	+	+	2b	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	
<i>Artemisia verlotiorum</i>	.	.	+	2b	.	.	.	.	2a	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	
sp. of <i>Cynosurion cristati</i> or with stolons																									
<i>Lolium perenne</i> (Cy)	1	1	+	1	2a	2a	2a	2b	.	2a	+	2b	+	2a	+	+	+	1	2a	1	+	.	.	.	
<i>Trifolium repens</i> (Cy)	.	.	+	+	1	1	.	1	+	.	.	.	+	1	+	+	+	2a	1	1	+	.	.	1	
<i>Bellis perennis</i> (Cy)	1	.	+	+	2a	2a	.	+	2b	+	.	+	3	+	+	2a	.	2a	+	2b	+	+	+	+	
<i>Potentilla reptans</i>	.	.	+	.	.	.	2b	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.
other sp. of <i>Molinio-Arrhenatheretea</i>																									
<i>Taraxacum sect. Ruderalia</i>	2a	+	+	+	1	+	2a	1	1	+	+	+	+	+	r	+	+	+	+	+	+	2a	+	+	
<i>Plantago lanceolata</i>	.	.	.	1	+	1	.	1	+	+	.	.	r	1	+	1	.	+	+	+	2b	+	+	+	
<i>Trifolium pratense/pratense</i>	.	.	+	1	+	1	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	
others																									
<i>Lactuca sativa/serriola</i>	+	+	+	1	+	+	+	.	+	+	1	+	+	+	+	+	1	.	+	r	+	+	+	+	
<i>Muscari neglectum</i>	+	+	.	1	+	+	+	+	1	.	1	1	.	.	2a	2a	+	+	.	1	+	2a	2b	.	
<i>Cerastium brachypetalum/brachypetalum</i>	+	.	.	.	.	.	.	+	.	.	.	+	+	.	.	+	.	1	.	1	+	.	1	.	
<i>Arenaria serpyllifolia</i>	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	+	+	+	1	+	+	+	+	
<i>Poa annua</i>	.	+	.	.	.	.	.	.	.	3	.	+	.	.	.	+	.	1	+	+	+	r	.	.	
<i>Ranunculus bulbosus</i>	+	.	.	+	1	1	2a	3	.	+	.	.	.	.	.	+	.	.	.	+	+	.	.	+	
<i>Bromus hordeaceus</i> s.l.	.	.	+	+	+	2a	.	.	.	.	+	.	.	1	.	+	.	.	1	.	.	.	.	+	
<i>Galium aparine</i>	.	.	r	.	.	.	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	
<i>Medicago lupulina</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	+	.	
<i>Plantago major</i>	.	.	.	+	.	.	1	.	.	.	.	.	.	+	.	.	.	+	+	.	.	.	.	+	





**Table 3:** Analytical table of vineyards from North-eastern Italy sown with grasses. Included are companion species occurring at least once in  $\geq$  II frequency class. For abbreviations see Table 1.

**Tabela 3:** Analitična tabela vegetacije vinogradov iz severnovzhodne Italije s sejanimi travami. . Prikazane so spremljevalne vrste, ki se pojavljajo enkrat, in z razredom frekvence  $\geq$  II. Okrajšave so prikazane v Tabeli 1.

relevé n°	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
number of species	19	17	24	21	26	20	21	18	30	21	19	19	26	20		
geographical area	Ven	Ven	Ven	Ven	Ven	Fri	Fri	Fri	Fri	Fri	Fri	Fri	Fri	Fri		
															pr.	fr.
sowed species																
<i>Lolium perenne</i>	.	.	+	4	2b	+	2	1	3	2	+	1	3	1	12	86
<i>Lolium arundinaceum</i> cv.	3	4	3	.	4	.	.	.	+	.	.	.	.	.	5	36
sp. of <i>Veronico-Euphorbion</i>																
<i>Euphorbia helioscopia</i>	.	+	.	1	+	.	+	.	.	.	.	.	.	.	4	29
<i>Fumaria officinalis</i> s.l.	.	.	r	r	.	.	.	.	.	.	.	.	+	.	3	21
sp. of <i>Solano-Polygonetalia</i>																
<i>Sonchus asper</i>	1	.	.	r	.	+	+	1	.	.	.	.	.	.	5	36
<i>Sonchus oleraceus</i>	.	.	.	.	r	.	.	.	+	+	.	.	+	+	5	36
<i>Chenopodium album</i> (pl)	1	.	.	+	.	.	.	.	.	.	.	.	+	+	4	29
<i>Lamium purpureum</i>	.	.	r	+	r	.	.	.	.	.	.	.	.	.	3	21
<i>Cynodon dactylon</i>	.	+	.	.	.	.	.	.	+	.	.	.	.	.	2	14
<i>Geranium rotundifolium</i>	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	7
sp. of <i>Stellarietea mediae</i>																
<i>Veronica persica</i>	1	.	1	1	+	+	+	+	+	+	+	+	+	+	13	93
<i>Convolvulus arvensis</i>	.	1	r	+	.	1	+	1	+	+	+	+	+	+	12	86
<i>Stellaria media/media</i>	2a	+	1	1	+	+	+	+	.	+	+	+	.	+	12	86
<i>Capsella bursa-pastoris</i>	2a	r	2b	1	.	.	.	.	+	+	+	.	.	+	8	57
<i>Cerastium glomeratum</i>	.	.	r	.	.	+	+	+	+	+	+	.	+	.	8	57
<i>Crepis vesicaria</i> s.l.	.	.	+	.	.	.	+	+	+	.	+	+	.	.	6	43
<i>Geranium dissectum</i>	.	.	+	.	+	.	+	+	+	+	.	.	.	.	6	43
<i>Veronica arvensis</i>	.	.	.	.	+	+	.	+	+	.	.	+	.	.	5	36
<i>Crepis sancta/nemausensis</i>	2a	+	3	+	+	.	.	.	.	.	.	.	.	.	5	36
<i>Senecio vulgaris</i>	+	1	+	+	.	.	.	.	.	.	.	.	.	.	4	29
<i>Cardamine hirsuta</i>	.	.	+	+	+	.	.	.	.	.	.	.	+	.	4	29
<i>Anagallis arvensis</i>	.	.	.	.	.	.	.	.	+	+	.	+	.	.	3	21
<i>Cirsium arvense</i>	+	.	r	+	.	.	.	.	.	.	.	.	.	.	3	21
<i>Sorghum halepense</i>	.	.	.	.	.	.	.	.	.	.	.	+	+	3	3	21
<i>Veronica hederifolia</i>	.	+	.	+	1	.	.	.	.	.	.	.	.	.	3	21
<i>Vicia sativa</i> agg.	+	.	.	+	+	.	.	.	.	.	.	.	.	.	3	21
<i>Avena fatua</i>	.	.	.	.	.	.	.	.	.	.	+	+	.	.	2	14
<i>Geranium molle</i>	.	r	+	.	.	.	.	.	.	.	.	.	.	.	2	14
<i>Hordeum leporinum</i>	+	.	.	.	.	.	.	.	.	.	+	.	.	.	2	14
<i>Persicaria maculosa</i>	.	.	.	.	.	.	.	.	.	.	.	+	+	.	2	14
<i>Anisantha sterilis</i>	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1	7
<i>Diplotaxis tenuifolia</i>	r	.	.	.	.	.	.	.	.	.	.	.	.	.	1	7
<i>Oxalis stricta</i>	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	7
<i>Papaver rhoeas</i>	.	.	.	2a	.	.	.	.	.	.	.	.	.	.	1	7
<i>Ranunculus parviflorus</i>	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	7
<i>Ornithogalum divergens</i>	.	.	.	+	.	.	.	.	.	.	.	.	.	.	1	7

relevé n°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	pr.	fr.
<i>Chenopodium polyspermum</i>	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	7
<i>Helminthotheca echioides</i>	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	7
other sp. of <i>Molinio-Arrhenatheretea</i>																
<i>Taraxacum</i> sect. <i>Ruderalia</i>	1	+	+	r	r	3	1	+	+	+	3	1	+	+	14	100
<i>Trifolium repens</i>	+	+	+	.	1	1	1	+	1	1	+	2	1	1	13	93
<i>Plantago lanceolata</i>	.	+	.	.	r	.	+	+	1	+	+	+	+	1	10	71
<i>Lolium pratense</i>	.	.	+	.	.	3	1	+	+	+	.	.	+	.	7	50
<i>Poa sylvicola</i>	.	.	.	.	.	1	+	1	+	.	.	.	+	.	5	36
<i>Rumex crispus</i>	.	.	+	.	.	.	+	.	+	+	.	.	1	.	5	36
<i>Lotus corniculatus</i>	.	.	.	.	+	.	.	.	+	+	.	.	+	1	5	36
<i>Bellis perennis</i>	.	.	.	.	.	+	+	+	+	.	.	.	.	.	4	29
<i>Vicia cracca</i>	.	.	.	.	.	.	.	.	.	+	+	1	.	+	4	29
<i>Trifolium pratense/pratense</i>	.	.	.	.	.	2	1	.	+	.	.	.	.	.	3	21
<i>Ranunculus repens</i>	.	.	.	.	.	1	1	.	.	.	.	.	1	.	3	21
others																
<i>Erigeron annuus</i>	+	.	.	.	.	+	1	2	+	.	+	+	+	+	9	64
<i>Polygonum aviculare</i> agg.	+	+	+	.	.	.	.	.	.	+	.	.	+	+	6	43
<i>Medicago lupulina</i>	.	.	.	.	.	+	+	.	+	+	.	1	.	.	5	36
<i>Lactuca sativa/serriola</i>	+	r	.	.	+	.	.	.	+	.	.	.	.	.	4	29
<i>Plantago major</i>	.	.	.	.	.	.	.	.	+	.	.	+	+	+	4	29
<i>Bromus hordeaceus</i> s.l.	.	.	.	.	r	.	.	.	.	.	+	+	.	.	3	21
<i>Equisetum arvense</i>	.	.	.	.	.	+	.	+	.	.	.	.	.	+	3	21
<i>Cichorium intybus</i>	.	.	.	.	.	.	.	.	+	+	+	.	.	.	3	21

**Table 4:** Cover range, frequency and percentage frequency of species occurring in 40 relevés from Veneto in summer-autumn phenophase and absent or little represented in spring one. Included are companion species occurring in  $\geq$ II frequency class.

**Tabella 4:** Razpon pokrovnosti, frekvenca in frekvenca vrst v odstotkih v 40 popisih poletno - jesenske fenofaze iz Benečije in vrste, ki so odsotne ali redke v spomladanski fenofazi. Prikazane so s spremljevalne vrste, ki se pojavljajo enkrat, in z razredom frekvence  $\geq$ II.

	cover range	pr.	fr.		cover range	pr.	fr.
sp. of <i>Solano-Polygonetalia</i>				sp. of <i>Stellarietea mediae</i>			
<i>Setaria viridis</i>	+ - 2a	35	88	<i>Digitaria sanguinalis</i>	+ - 3	29	73
<i>Chenopodium album</i>	r - 2a	26	65	<i>Erigeron sumatrensis</i>	r - 1	26	65
<i>Solanum nigrum</i>	r - 1	19	48	<i>Erigeron canadensis</i>	+ - 2a	21	53
<i>Amaranthus retroflexus</i>	r - 2b	19	48	<i>Bidens bipinnata</i>	r - 2b	11	28
<i>Amaranthus hybridus</i> agg.	r - 2a	15	38	<i>Eleusine indica</i>	+ - 2a	6	15
<i>Portulaca oleracea</i>	r - 2a	13	33	<i>Tragus racemosus</i>	+ - 1	2	5
<i>Sorghum halepense</i>	+	4	10	<i>Chamaesyce nutans</i>	r - +	2	5
<i>Eragrostis cilianensis</i>	+	3	8	<i>Helminthotheca echioides</i>	r - +	2	5
<i>Amaranthus graecizans</i>	r - +	3	8	<i>Artemisia annua</i>	+	1	3
<i>Setaria pumila</i>	+	3	8	<i>Abutilon theophrasti</i>	r	1	3
<i>Setaria verticillata</i>	+	2	5	other			
<i>Tribulus terrestris</i>	+	1	3	<i>Chamaesyce prostrata</i>	+ - 1	25	63
<i>Heliotropium europaeum</i>	+	1	3	<i>Polygonum aviculare</i> agg.	+ - 3	24	60
<i>Solanum villosum</i>	+	1	3	<i>Verbena officinalis</i>	+ - 1	14	35
<i>Galinsoga quadriradiata</i>	+	1	3	<i>Clinopodium nepeta</i> s.l.	+ - 1	8	20
<i>Echinochloa crus-galli</i>	r	1	3				

**Table 5:** Synoptic table of *Mercurialetum annuae* from Southern and Central Europe. For abbreviations see Figure 4.

**Tabela 5:** Sinoptična tabela asociacije *Mercurialetum annuae* iz južne in Srednje Evrope. Okrajšave kot pri Sliki 4.

geographical area	Fri	Mar	NL	D	SLO	CZ	geographical area	Fri	Mar	NL	D	SLO	CZ
total relevés (n°)	10	7	5	401	41	180	<i>Vicia sativa</i> agg.	40	.	20	.	5	.
diagnostic species of <i>Mercurialetum annuae</i>							<i>Geranium dissectum</i>	.	29	.	11	20	3
<i>Mercurialis annua</i> (O)	90	100	100	100	68	17	<i>Helminthoteca echioides</i>	.	57	.	.	.	.
<i>Chenopodium album</i> (O)	40	57	100	89	71	89	<i>Crepis setosa</i>	50	.	.	.	.	.
<i>Amaranthus retroflexus</i> (O)	50	100	.	.	78	89	<i>Diploaxis muralis</i>	10	.	.	11	27	.
<i>Senecio vulgaris</i> (C)	30	57	100	65	44	.	<i>Calendula arvensis</i>	.	43	.	.	.	.
<i>Solanum nigrum</i> (O)	90	57	.	37	54	48	<i>Allium vineale</i>	40	.	.	.	2	.
<i>Echinochloa crus-galli</i> (O)	.	43	.	27	24	50	<i>Raphanus raphanistrum</i>	.	.	20	11	2	7
<i>Galinsoga parviflora</i> (C)	.	.	20	23	24	38	<i>Avena fatua</i>	.	29	.	.	.	11
<i>Amaranthus hybridus</i> agg. (O)	.	.	.	.	22	46	<i>Misopates orontium</i>	10	29	.	1	.	.
<i>Chenopodium hybridum</i> (O)	.	.	.	15	.	46	<i>Myosotis arvensis</i>	.	.	.	23	2	7
sp. of <i>Veronico-Euphorbia</i>							<i>Anchusa arvensis</i>	.	.	.	1	29	.
<i>Euphorbia helioscopia</i>	30	.	80	70	51	37	<i>Avena barbata</i>	30	.	.	.	.	.
<i>Fumaria officinalis</i>	40	.	80	30	17	4	<i>Senecio vulgaris</i>	30	.	.	.	.	.
<i>Euphorbia pepus</i>	30	.	40	22	.	.	sp. of <i>Artemisietea vulgaris</i>						
<i>Thlaspi arvense</i>	10	.	.	21	.	24	<i>Elymus repens</i>	50	.	80	46	29	47
sp. of <i>Solano-Polygonetalia</i>							<i>Daucus carota</i>	70	57	.	8	.	6
<i>Sonchus asper</i>	40	86	80	75	24	32	<i>Linaria vulgaris</i>	60	43	.	.	.	3
<i>Sonchus oleraceus</i>	80	.	60	62	39	39	<i>Picris hieracioides</i>	60	29	.	.	.	.
<i>Fallopia convolvulus</i>	.	.	100	36	27	25	<i>Artemisia vulgaris</i>	30	.	20	3	.	31
<i>Setaria viridis</i>	50	100	.	.	20	18	<i>Lapsana communis</i>	.	.	40	11	.	5
<i>Lamium purpureum</i>	.	.	60	45	17	24	<i>Rumex pulcher</i>	.	29	.	.	.	.
<i>Setaria pumila</i>	.	.	.	15	41	16	sp. of <i>Molinio-Arrhenatheretea</i>						
<i>Lamium amplexicaule</i>	.	.	20	19	10	17	<i>Taraxacum</i> sect. <i>Ruderalia</i>	.	.	20	35	46	52
<i>Erodium cicutarium</i>	.	.	20	13	15	10	<i>Rumex crispus</i>	80	.	.	.	17	8
<i>Heliotropium europaeum</i>	.	43	.	.	.	.	<i>Pastinaca sativa</i>	40	43	.	.	.	.
sp. of <i>Stellarietea mediae</i>							<i>Ranunculus repens</i>	20	.	.	25	10	6
<i>Convolvulus arvensis</i>	100	86	60	81	61	47	<i>Poa sylvicola</i>	50	.	.	.	2	.
<i>Veronica persica</i>	70	100	20	76	80	39	<i>Lolium multiflorum</i>	.	43	.	.	.	.
<i>Cirsium arvense</i>	80	71	80	59	39	49	<i>Geranium molle</i>	40	.	.	.	.	.
<i>Stellaria media</i>	50	.	100	68	76	47	<i>Potentilla anserina</i>	.	.	40	.	.	.
<i>Capsella bursa-pastoris</i>	50	.	80	68	46	52	<i>Lolium perenne</i>	30	.	.	5	.	.
<i>Persicaria maculosa</i>	10	.	80	60	49	11	others						
<i>Anagallis arvensis</i>	50	57	.	46	.	31	<i>Polygonum aviculare</i> agg.	50	43	.	50	29	43
<i>Sinapis arvensis</i>	10	.	40	44	12	21	<i>Poa annua</i>	50	.	80	17	15	20
<i>Atriplex patula</i>	.	.	60	26	10	22	<i>Equisetum arvense</i>	20	.	80	34	10	9
<i>Veronica agrestis</i>	.	.	100	1	.	.	<i>Calystegia sepium</i>	60	.	40	.	44	.
<i>Mentha arvensis</i>	.	.	80	15	.	5	<i>Galium aparine</i>	.	.	40	44	.	29
<i>Veronica polita</i>	.	.	20	49	2	24	<i>Persicaria amphibia</i>	.	.	80	.	.	.
<i>Anisantha sterilis</i>	80	.	.	7	.	.	<i>Lactuca serriola</i>	20	43	.	.	.	17
<i>Diploaxis erucoides</i>	.	86	.	.	.	.	<i>Chenopodium polyspermum</i>	.	14	.	22	17	21
<i>Digitaria sanguinalis</i>	40	29	.	17	.	.	<i>Plantago major</i>	.	.	.	38	10	26
<i>Matricaria inodora</i>	.	.	20	9	.	51	<i>Erysimum cheiranthoides</i>	.	.	60	6	.	7
<i>Viola arvensis</i>	.	.	40	10	5	24	<i>Persicaria lapathifolia</i>	.	.	.	23	12	27
<i>Portulaca oleracea</i>	20	57	.	1	.	.	<i>Stachys palustris</i>	.	.	40	.	5	5
<i>Papaver rhoeas</i>	.	.	40	15	5	13	<i>Cichorium intybus</i>	.	43	.	.	.	3
<i>Aristolochia clematitis</i>	50	.	.	.	17	.	<i>Medicago lupulina</i>	.	.	.	9	20	11
							<i>Medicago sativa</i>	30	.	.	.	.	.