HACQUETIA 10/2 • 2011, 183–231

DOI: 10.2478/v10028-011-0011-9

NEW DRY GRASSLAND ASSOCIATIONS FROM THE AUSONI-AURUNCI MOUNTAINS (CENTRAL ITALY) – SYNTAXONOMICAL UPDATING AND DISCUSSION ON THE HIGHER RANK SYNTAXA

Romeo DI PIETRO*

Abstract

A phytosociological study on the most extensive dry grassland communities of the coastal limestone massif of the Ausoni-Aurunci mountains (southern Latium, central Italy) is here presented. *Violo pseudogracilis-Koelerietum splendentis* ass. nova is restricted to the montane belt of the Aurunci mountains where it is dynamically related to the mesophilous *Ostrya carpinifolia* or *Fagus sylvatica* woodlands. *Helichryso italici-Brometum erecti* ass. nova is found within the upper hilly and submontane belt of both the Ausoni mountains (typical aspect) and the Aurunci mountains (subassociation *saturejetosum montanae*), where it is dynamically related with termophilous *Ostrya carpinifolia* woods and mesophilous *Quercus ilex* woods. *Helichryso-Brometum* is differentiated from *Violo-Koelerietum* in that it has a higher incidence of the steno-Mediterranean therophytic component. As far as the higher rank syntaxa are concerned, in this study the following changes were made in accordance with the rules of ICPN: the name *Phleo ambigui-Bromion erecti* Biondi et al. 1995 was considered invalid due to the invalidity of its nomenclatural type *Asperulo purpureae-Brometum erecti*. In contrast, the validity of the old name *Cytiso spinescentis-Bromion erecti* Bonin 1978 was demonstrated and its nomenclatural type, *Lavandulo-Asphodelinetum luteae* Bonin 1978, was lectotypified. Thus *Cytiso spinescenti-Bromion erecti* Bonin 1978 henceforth substitutes *Phleo ambigui-Bromion erecti* (nom. inval.) as the syntaxonomical reference for the endemic alliance of the hilly and montane limestone dry grasslands of the central and southern Apennines. *Cytiso-Bromion* is here divided into two suballiances: *Sideritidenion italicae* Biondi et al. 1995, *Phleo ambigui-Bromenion erecti* Biondi et al. ex Di Pietro suball. nov. *Cytiso-Bromion* belong to the new suborder *Festuco circummediterraneae-Seslerienalia nitidae* (Ubaldi 2003) stat. nov. and to the order *Artemisio albae-Brometalia erecti* Ubaldi ex Mucina & Dengler 2009. New and updated packages of characteristic and differential species for both *Cytiso spinescenti-Bromion erecti* and its related suballiances are proposed. Furthermore the validity of the name *Astragaletum calabrici* Giacomini & Gentile ex Bonin 1978, was proved and the association lectotypified. This association, which was previously included in *Cytiso-Bromion erecti,* is moved into *Koelerio brutiae-Astragalion calabrici.* Finally some interesting coenological and syndynamical similarities with *Scorzonero-Chrysopogonetalia* western Dalmatia submediterranean dry pastures are discussed.
Key words: Apennines, chorology, ICPN, nomenclatural types, phytosociology, syntaxonomy.

Izvleček

Fitocenološka raziskava predstavlja najbolj razširjene združbe suhih travišč obalnega masiva pogorja Ausoni-Aurunci (južni Lazio, osrednja Italija). *Violo pseudogracilis-Koelerietum splendentis* ass. nova je razširjena samo v montanskem pasu gorovja Aurunci, kjer je v dinamični povezavi z mezofilnimi gozdovi črnega gabra (*Ostrya carpinifolia*) in gozdovi bukve (*Fagus sylvatica*). *Helichryso italici-Brometum erecti* ass. nova najdemo na zgornjem delu gričevnatega in v podgorskem pasu tako gorovja Ausoni (tipični aspekt) in gorovja Aurunci (subasociacija *saturejetosum montanae*), kjer se dinamično navezuje na termofilne gozdove črnega gabra in mezofilne gozdove črničevja (*Quercus ilex*). Večji delež stenomediteranskega terofitskega elementa razlikuje asociacijo *Helichryso-Brometum* od asociacije *Violo-Koelerietum*. Glede višjih sintaksonov, smo v tem prispevku naredili naslednje spremembe v skladu z mednarodnim kodeksom fitocenološke nomenklature; poimenovanje *Phleo ambugui-Bromion erecti* Biondi et al. 1995 obravnavamo kot neveljavno, ker je neveljaven nomenklatorni tip *Asperulo purpureae-Brometum erecti*. Za razliko pa je prikazana veljavnost starega poimenovanja *Cytiso spinescentis-Bromion erecti* Bo-

* Department DATA, Sapienza University of Rome, Via Flaminia 72, I-00196 Rome, E-mail: romeo.dipietro@uniroma1.it

nin 1978, izbran je tudi nomenklaturni tip in sicer *Lavandulo-Asphodeletum luteae* Bonin 1978 kot lektotip. Tako poimenovanje *Cytiso spinescentis-Bromion erecti* Bonin 1979 od sedaj zamenjuje *Phleo ambigui-Bromion erecti* (nom. inval.) kot sintaksonomska oznaka za endemično zvezo suhih travišč na apnencu, ki se pojavlja v gričevnatem in gorskem pasu v osrednjih in južnih Apeninih. Zveza *Cytiso-Bromion* je razdeljena v dve podzvezi: *Sideritidenion italicae* Biondi et al. 1995 *in Phleo ambigui-Bromenion erecti* Biondi et al. ex Di Pietro suball. nova. Zvezo *Cytiso-Bromenion* uvrščamo v nov podred *Festuco-Seslerienalia nitidae* Ubaldi 2003 statt. nov. in red *Artemisio albae-Brometalia erecti* Ubaldi ex Mucina & Dengler 2009. Nove in posodobljene so tudi skupine značilnih in razlikovalnih vrst tako za zvezo *Cytiso spinescenti-Bromion erecti* in podrejeni podzvezi. Poleg tega pa se je poimenovanje asociacije *Astragaletum calabrici* Giacomini & Gentile ex Bonin 1978 izkazalo za pravilno in je bila asociacija lektotipificirana. Ta asociacija, ki je bila vključena v zvezo *Cytiso-Bromion erecti*, je bila premeščena v *Koelerio brutiae-Astragalion calabrici*. Na koncu smo obravnavali nekateri zanimive cenološke in sindinamske podobnosti z redom *Scorzonero-Chrysopogonetalia*, kamor uvrščamo suhe submediteranske pašnike v zahodni Dalmaciji.
Ključne besede: Apenini, horologija, ICPN, nomenklaturni tipi, fitocenologija, sintaksonomija.

1. INTRODUCTION

Owing to their floristic richness and coenological diversity, the Central Apennines are globally recognized as one of the most important European centres of plant speciation and floristic richness (Blasi et al. 2005; 2010). A significant part of this biodiversity is concentrated in grassland environments, and in particular in the secondary *Festuco-Brometea* dry montane grasslands, where several endemic and rare plant species occur. Indeed the Italian Interpretation Manual of the 92/43/EEC Directive Habitats (Biondi et al. 2009) enlarged the ecological space of Habitat 6210* precisely to maintain such an important coenological and floristic heritage. From a phytosociological viewpoint the first studies on central Apennines dry grasslands were carried out at the end of the 1960s (Bruno & Covarelli 1968) and were significantly intensified in the period straddling 1970 and 1990 (Avena & Bruno 1975; Hruska-Dell'Uomo 1976; Ballelli et al. 1977; Bonin 1978; Avena & Blasi 1979; 1980; Biondi & Ballelli 1981; 1982; Ballelli & Biondi 1982; Biondi & Blasi 1982; Hruska 1982; Biondi et al., 1986; Biondi 1988; Biondi et al. 1988; Frattaroli 1988; Blasi et al. 1990). These studies led to the proposal of the endemic alliance *Crepido lacerae-Phleion ambigui*, (subsequently changed to *Phleo ambigui-Bromion erecti* in Biondi et al. 1995; 2005) as the Apennine vicariant of the European *Xerobromion*. During the 1990s and the first decade of the 2000s, several other studies focused on the dry grasslands of central Italy and several new associations were proposed (Biondi et al. 1992; Castelli 1995; Blasi et al. 1998; Venanzoni & Gigante 1999; Castelli et al. 2001; Allegrezza 2003; Biondi et al. 2004; Ciaschetti et al. 2006; Catorci et al. 2007). Most of these studies dealt with geographical areas located in the core of the central Apennines or on the Adriatic side of the Italian Peninsula. In contrast, very few (Lucchese & Pignatti 1990; Lucchese et al. 1995; Scoppola & Pelosi 1995; Di Pietro & Blasi 2002; Angiolini et al. 2003) phytosociological studies have ever been carried out on the perennial dry grasslands occurring in the coastal mountainous chains of the western side of the Italian Peninsula, which is separated from the true Apennines by large alluvial valleys furrowed by major rivers such as the Tiber, Sacco, Liri and Garigliano. This geographical discontinuity from the rest of the Apennines, together with the vicinity of the coast, are factors which have led to the development on these coastal massifs of a vegetation characterised by a greater influence of the Mediterranean floristic component in comparison to the vegetation found both in the core of the Apennines and on the Adriatic side of the peninsula. The present paper focuses on the most extensive *Festuco-Brometea* dry grasslands of the Ausoni-Aurunci range, for which neither a phytosociological study nor a syntaxonomical analysis had ever previously been carried out. In addition a coenological, syntaxonomical and nomenclatural analysis of the most important syntaxa related to the dry grasslands of the Ausoni-Aurunci mountains is also performed here.

2. STUDY AREA

The Ausoni-Aurunci Mountains are a limestone mountain range of southern Lazio, in central Italy (Figure 1) which are bounded northwestward by the Lepini mountains, northward by the Liri river, southeastward by the Garigliano river and southward by the Tyrrhenian sea. Altitudes

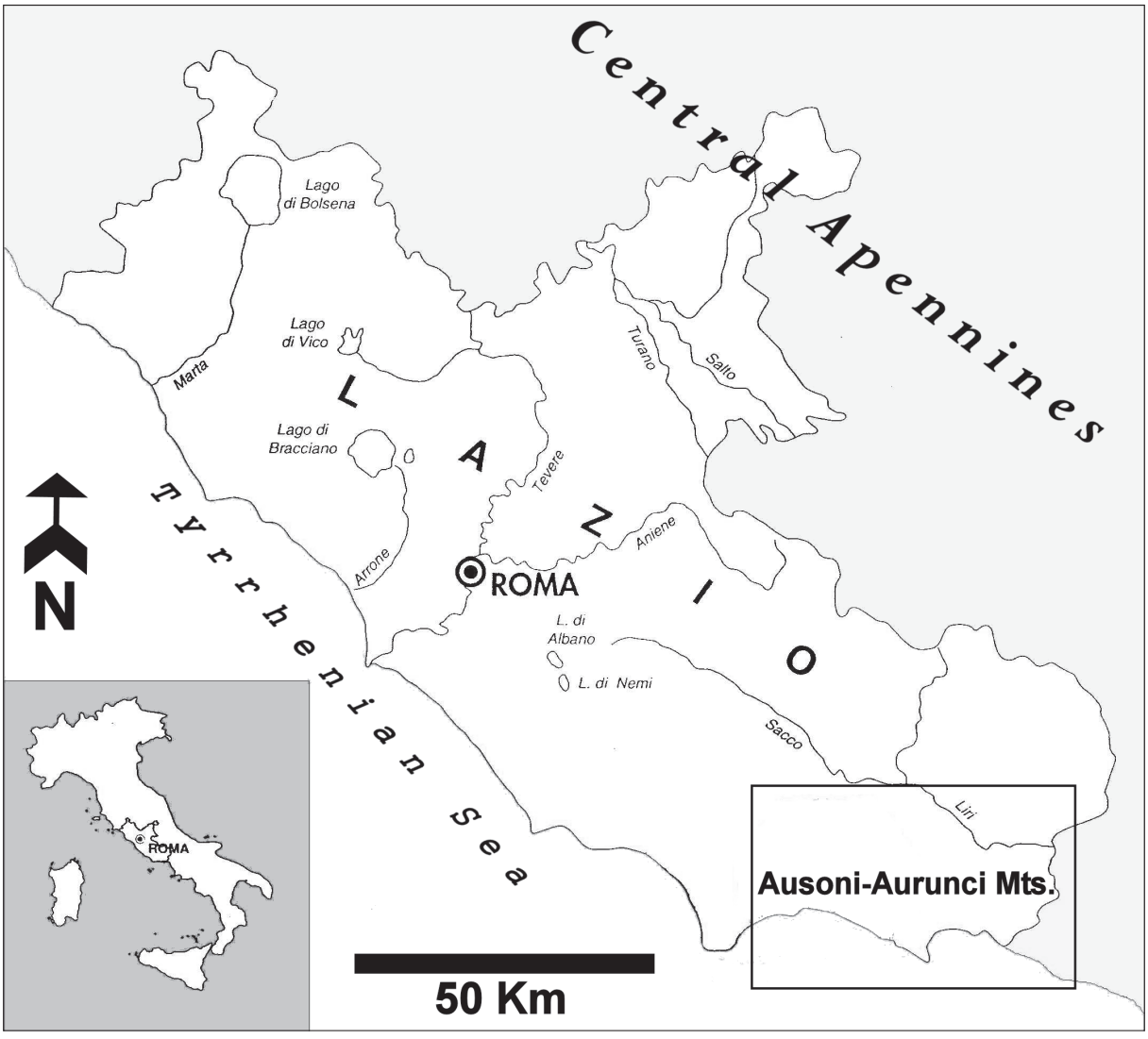


Figure 1: Ausoni-Aurunci Mts. study area.
Slika 1: Raziskovano območje v hribovju Ausoni-Aurunci.

vary from 0 (Promontory of Gaeta and Sperlonga) to the 1,533 m a.s.l. of Mount Petrella. Main peaks include also Mount Redentore (1,252 m), Mount Sant'Angelo (1,402 m) and Mount Ruazzo (1,322 m). The Ausoni-Aurunci mountains mainly consist of friable cretaceous and paleocenic limestone (Figure 2) but the degree of faulting and cracking is so high that the mountains retain no rainfall. The stream beds are dry except for vernal pools. From a bioclimatic point of view the Aurunci mountains are located at the boundary between the Mediterranean and the Temperate regions (Figure 3). Mean annual rainfalls are quite abundant in the whole area, ranging from about 1000 mm at sea level to over 1600 mm in the montane belt (Blasi 2006). Mean annual temperature ranges between 18 °C and 10 °C moving from the coastal areas to the top of the mountains. The altitudinal zonation of the potential vegetation provides primary Mediterranean maquis in the coastal promontory *Quercus ilex* woods on the south facing slopes of the hilly and submontane belts. *Quercus pubescens* woodlands prevail on the footslopes whereas *Quercus cerris* woodlands are located at the bottom of the intra-montane karst plateaus where a higher content of clay occurs. The north facing slopes are dominated by *Carpinus orientalis* woods (hilly belt) and *Ostrya carpinifolia* woods (submontane-montane belt). *Fagus sylvatica* woods characterise the upper part of the inner part of the range.

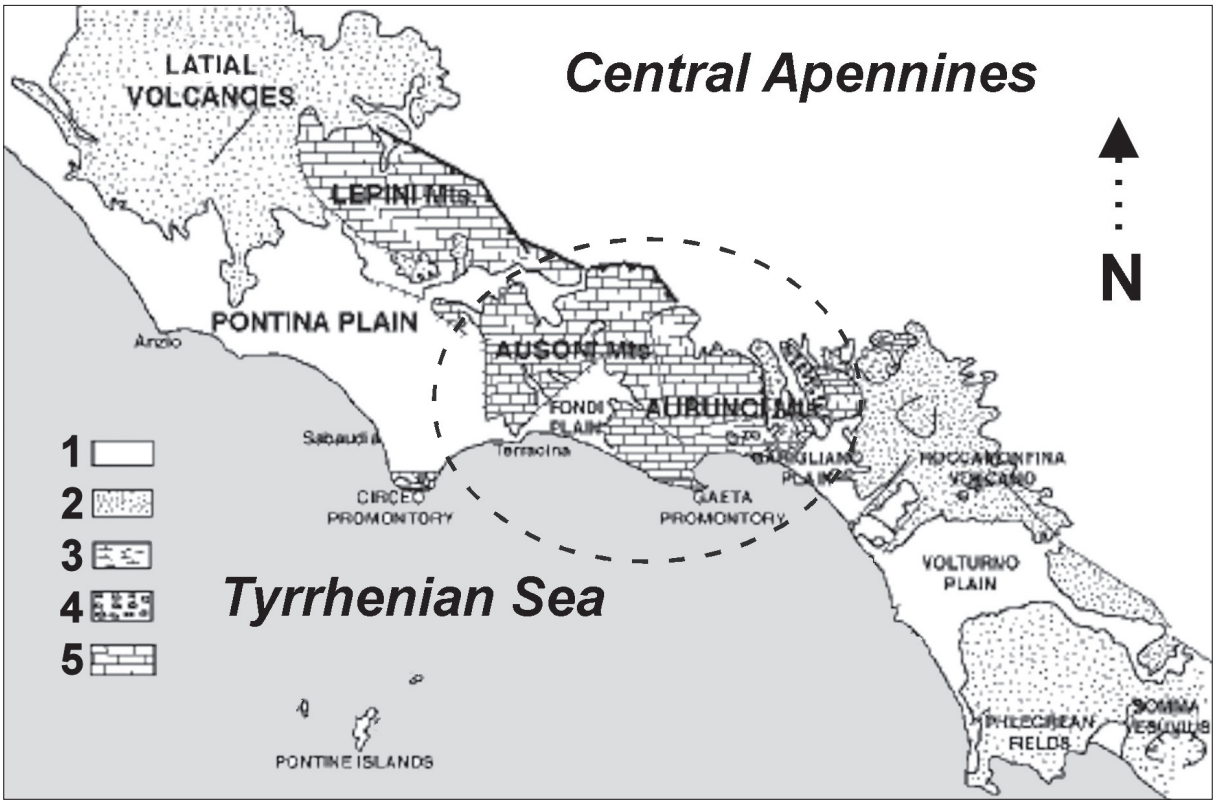


Figure 2: Geological features of tyrrhenian district of southern Latium and adjacent Campania region. 1: Continental and marine deposits (Holocene, late Pleistocene); 2: Volcanic deposits (Quaternary); 3: Arenaceous-clayey turbidites (Tortonian-Messinian); 4) Shallow water organogenic Limestone (Langhian-Serravallian); 5: shallow water limestone (Jurassic-Creataceous-Paleocenic).

Slika 2: Geološke lastnosti tirenskega distrikta južnega dela regije Lazio in sosednje Campanije. 1: celinske in morske usedline (Holocen, pozni Pleistocen); 2: vulkanske usedline (Kvartar); 3: arenitno-glinene turbiditne usedline (Tortonian-Messinian); 4) plitvi vodni organogeni apnenec (Langhian-Serravallian); 5: plitvi vodni apnenec (Jura-Kreda-Paleocen).

3. MATERIAL AND METHODS

In all, 49 phytosociological relevés were made following the phytosociological methods of the Zurich-Montpellier school (Braun-Blanquet 1964). The cluster analysis was performed by means of the software SYNTAX 2000 (Podani 2001), using UPGMA and a similarity ratio coefficient on the phytosociological data converted according to the ordinal scale proposed by van der Maarel (1979).

The ordination diagram was obtained through PCA procedure. The Life form and chorological spectra (based on presence, frequency and specific cover index) were calculated for each community type and reference was made to Pignatti et al. (2005). Following the chorotype and the life form names, a sequence of three values (%) appears in the tables (Figures 8, 9, 10), corresponding, respectively, to the simple presence (Pres.), the frequency (Frq.) and the specific cover index (Cov.) of a given chorotype/life form in each phytosociological table (Braun-Blanquet 1964). The "specific cover index" was obtained by summing up each species' cover-abundance central values (e.g. 5 = 87.5; 4 = 62.5 ...) and multiplying this sum by the ratio 100/numbers of relevés. UPGMA and similarity ratio coefficient were also used for the cluster analysis of the synoptic table (Table 3), which includes all the Peninsular Italy dry grassland associations exhibiting a high degree of floristic and coenological similarity to the Ausoni-Aurunci communities.

The plants collected in the field were determined using Tutin et al. (1968–1980; 1993) and Pignatti (1982), while species nomenclature was updated according to Conti et al. (2005). The rank of subspecies was specified only when it did not coincide with that of the nominal subspe-

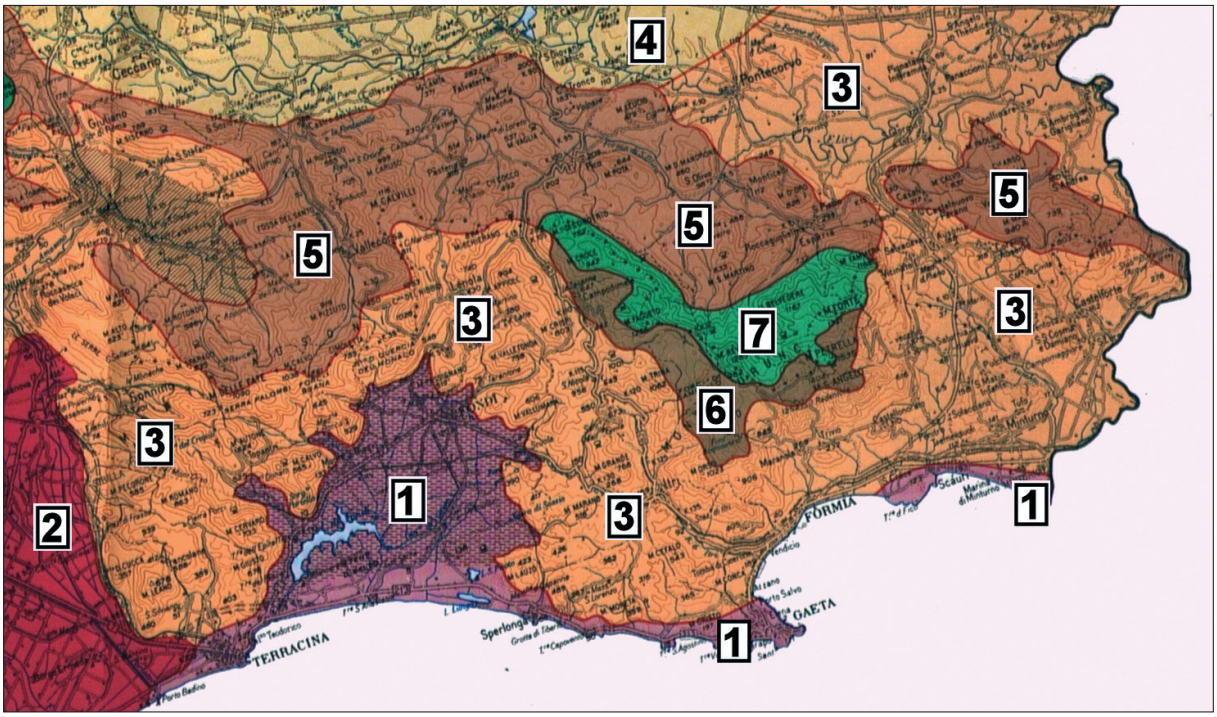


Figure 3: Phytoclimatic map of the Ausoni-Aurunci Mts. (From Blasi, 1994). Tt = Thermotype; Ut = Umbrotype. 1: Medit. Region, thermo-Medit. Tt. - lower humid/upper subhumid Ut.; 2: Medit. Region, lower meso-Medit. Tt. - upper subhumid Ut.; 3: Medit./Temp. transiction Region, upper meso-Medit. Tt. - lower humid Ut.; 4: Medit./Temp. transiction Region, lower hilly Tt. - lower humid Ut.; 5: Temp. Region, upper hilly Tt. - upper humid/lower hyperhumid Ut.; 6: Temp. Region, submontane Tt. - lower hyperhumid Ut.; 7: Temp. Region, lower montane Tt. - upper humid/lower iperhumid Ut.

Slika 3: Fitoklimatska karta hribovja Ausoni-Aurunci (Blasi 1994). Tt = termotip; Ut = ombrotip. 1: sredozemska regija, termo-sredozem. Tt. – spodnji humidni/zgornji subhumidni Ut.; 2: sredozemska regija, spodnji mezzo-sredozem. Tt. – zgornji subhumidni Ut.; 3: sredozem./zmerna prehodna regija, zgornji mezzo-sredozem. Tt. – spodnji humidni Ut.; 4: sredozem./zmerna prehodna regija, spodnji gričevnati Tt. – spodnji humidni Ut.; 5: zmerna regija, zgornji gričevnati Tt. – zgornji humidni/spodnji hiperhumidni Ut.; 6: zmerna regija, submontanski Tt. – spodnji hiperhumidni Ut.; 7: zmerna regija,spodnji montanski Tt. – zgornji humidni/spodnji hiperhumidni Ut.

cies. Owing to the wide time range over which the relevés composing the synoptic table were performed (more than 40 years) and the impossibility of doing a taxonomical check on the older specimens, the reference to the collective group is given for all those taxa which could give rise to taxonomical uncertainity or which have only recently been split into different species and/or subspecies (e.g. *Koeleria lobata/K. splendens*[1], *Bromus erectus/B. caprinus, Armeria canescens/A. majellensis, Potentilla pedata/P. hirta, Centaurea*

[1] As far as Genus *Koeleria* is concerned, the use of the diagnostic-key proposed recently in Brullo et al. (2009) for identifying Ausoni-Aurunci grasslands specimens resulted in the identification of three or four different taxa (species and/or subspecies) belonging to *Koeleria splendens* collective complex as occurring in the same grassland type. Similar problems were encountered in identifying *Koeleria* specimens during the two excursions of the Floristic Group of the Italian Society of Botany (see Peruzzi et al. 2011; Conti et al. in prep.). The checklist of the Italian Flora (Conti et al. 2005) reports only *Koeleria lobata* (M. Bieb.) Roemer & Schult. as reference taxon for the Italian Peninsula. This hypothesis, however, is considered wrong by Quintanar et al. (2009) who consider *K. splendens* to be a different taxon from *K. lobata,* which is the correct name of some other species (e.g. *K. brevis* Steven or *K. degenii* Domin). For this reason we have preferred to make reference to the collective form of the taxon *Koeleria splendens*. The *Koeleria* specimens coming from Sila mountains (Calabria region) were reported as *K. spendens* Presl by Bonin (1978), and as *K. splendens* C. Presl subsp. *brutia* Brullo, Gangale et Uzunov by Brullo et al. (2004). This fact has a direct consequence on the name of the alliance *Koelerio-Astragalion,* which in Brullo et al. (2005) is reported as *Koelerio brutiae-Astragalion calabrici* (see Syntaxonomic scheme). Obviously a correction of this name according to the Art. 43 of ICPN will be necessary if the subspecies *Koeleria splendens* subsp. *brutia* is definitively reported as synonym in the future by the main Floras and Checklists.

deusta (ssp. pl.), *Acinos alpinus* (ssp. pl.), *Festuca laevigata* (ssp. pl.) (etc). The collected and exsiccated samples are deposited in the Herbarium Flaminio (Faculty of Architecture of the University of Rome).

The syntaxa here described as new have been named according to the International Code of Phytosociological Nomenclature (ICPN, Weber et al. 2000). Species which occur only once were excluded from both the phytosociological tables and the synoptic table, and are mentioned in Appendix 1. Place and date of relevés are listed in Appendix 2. The list of associations included in the synoptic table is reported in Appendix 4.

The lists of characteristic species of the higher rank syntaxa that are critically analysed in the paragraph "syntaxonomical discussion" are shown at the end of the paper after the "syntaxonomical scheme". The "characteristic species" of alliance and suballiances are reported in the phytosociological tables according to the following categories of species (Poldini & Sburlino 2005):

"characteristic" (c): strongly related to the ecology and chorology of a given syntaxon.

"regional characteristic" (rc): having a distribution area wider than that of the syntaxon to which it is ecologically related.

"partial characteristic" (pc): having a distribution area smaller than that of the syntaxon to which it is ecologically related.

"transgressive" (t): species which, although considered as characteristic of a high-rank syntaxon, exhibit their ecological optimum in a lower rank syntaxon included in that high-rank syntaxon.

"insgressive" (i): Species which, although considered as characteristic of a syntaxon of a different class, may occur frequently in a syntaxon of another class.

In agreement with Mucina et al. (2009), the characteristic species of the order *Artemisio-Brometalia* was reported as "provisional", since a wider classification that also takes into account the grassland communities of central and the south-eastern Europe is necessary to select a package of species which is ecologically and geographically consistent with the rank of order. The packages of characteristic species of the various associations making up the synoptic table are here reported acritically from the original papers. Critical comments are given in the "Discussion" paragraph.

4. RESULTS

4.a Multivariate analysis (restricted to Ausoni-Aurunci releves)

The dendrogram (Figure 4) shows two main clusters (A and B). Cluster A includes the grasslands developed within the lower montane belt and dominated by the *Koeleria splendens-Carex humilis-Helianthemum incanum* species group. Cluster B includes the *Bromus erectus* and *Helichrysum italicum* dry grasslands developed within the hilly and submontane belts of the Ausoni Mts. (B2) and Aurunci Mts. (B1) respectively. The PCA diagram on the first two axes (cumulative variance 18%) calculated on presence/absence data (Figure 5) confirms the cluster analysis separation showing a clear division between clusters A and B. This distribution of the clusters along the first PCA axis is correlated to an increasing altitudinal gradient, moving left to right.

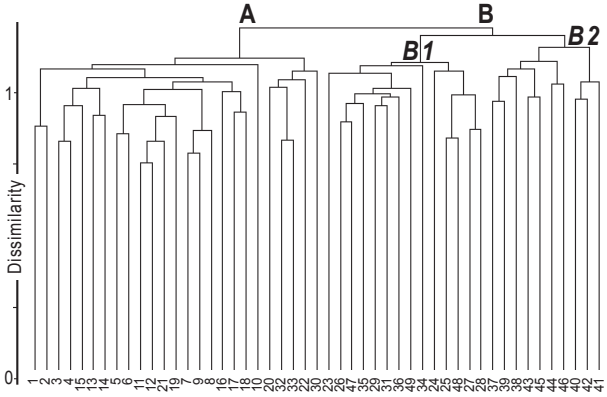


Figure 4: Cluster analysis dendrogram of Ausoni-Aurunci dry grasslands: cluster "A" = *Violo-Koelerietum*; cluster "B" = *Helichryso-Brometum* ("B1": subass. *saturejetosum*; "B2": subass. *typicum*).

Slika 4: Dendrogram klastrske analize suhih travišč hribovja Ausoni-Aurunci: klaster "A" = *Violo-Koelerietum*; klaster "B" = *Helichryso-Brometum* ("B1": subass. *saturejetosum*; "B2": subass. *typicum*).

4.b Vegetation

The two clusters of relevés identified through the multivariate analysis are referred to two new associations named respectively *Violo pseudogracilis-Koelerietum splendentis* ass. nov. (cluster A) and *Helichryso italici-Brometum erecti* ass. nov. (cluster B).

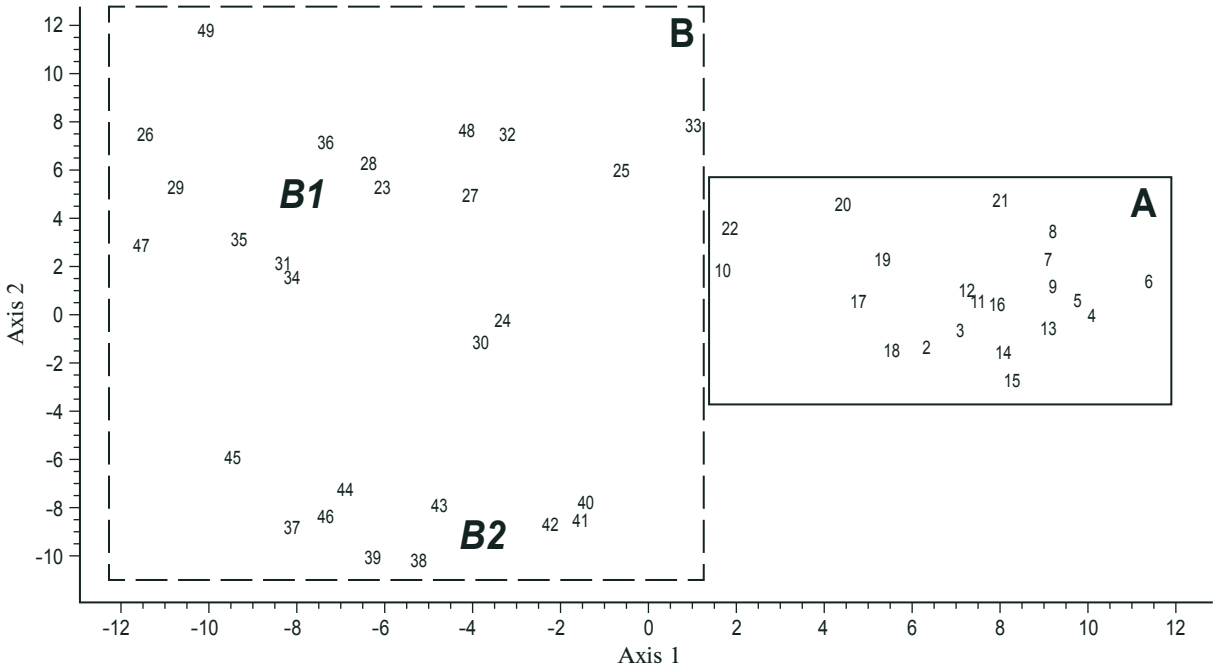


Figure 5: Ordination diagram (PCA) of Ausoni-Aurunci dry grasslands: cluster "A" = *Violo-Koelerietum*; cluster "B" = *Helichryso-Brometum* (B1: subass. *saturejetosum*; B2: subass. *typicum*).

Slika 5: Ordinacijski diagram (PCA) suhih travišč hribovja Ausoni-Aurunci: klaster "A" = *Violo-Koelerietum*; klaster "B" = *Helichryso-Brometum* (B1: subass. *saturejetosum*; B2: subass. *typicum*).

4.b1 *Violo pseudogracilis-Koelerietum splendentis* ass. nov. hoc loco
(Holotypus Table 1 rél. 2)

CHARACTERISTIC SPECIES: *Carex humilis, Festuca stricta* subsp. *trachyphylla, Viola pseudogracilis* subsp. *pseudogracilis, Seseli montanum, Thymus striatus*.

DIAGNOSIS: *Violo-Koelerietum* is found to range in altitude between about 1000 m and the summit of the Aurunci mountains (Mt. Petrella 1,534 m a.s.l.) where it occurs on limestone south-facing slopes in the form of a secondary open dry grassland (Figure 6). On the basis of the phytoclimatic map of the Latium region (Blasi 1993) this grassland community is developed within the lower montane/upper submontane thermotypes and the humid/hyperhumid umbrotype (units 6 and 7 in Figure 3) in the Temperate Region. The soil is shallow, pure in humus and nutrients, while stonyness and rockyness are considerable. Because of the specific characteristics of limestone for infiltration of rain water the surface remains dry, and this is the reason for the presence of xerothermic Mediterranean species even at higher altitude. Although the floristic richness which leads one to observe a high number of coloured flowering plants in spring, the sward is scarce and almost completely dried out in the summer. There is not a single species which clearly dominates the community, although *Koeleria splendens* is the species showing the highest specific cover index. This species is constantly joined by other high frequency/abundance species such as *Carex humilis*, *Heliathemum oelandicum* subsp. *incanum*, *Festuca stricta* subsp. *trachyphylla, Festuca inops* and *Thymus striatus*. Of biogeographical interest is the abundance of *Viola pseudogracilis*, a rare species which exhibits a whole distribution area restricted to the southern part of the Tyrrhenian district of central and southern Italy. A variant with *Sesleria juncifolia* and *Edrajanthus graminifolius* is described for those sites which exhibit a higher degree of rockyness (Table 1 rél. 15–22).

CHOROLOGY AND STRUCTURE: Almost 50% of *Violo-Koelerietum* cover is due to the sum of the SE-European (s.s.) species and the SE-European orophytes ones (Table 5). On the contrary, very scarce is the role of the western chorotypes (here identified by the "Atlantic"

Figure 6: *Violo pseudogracilis-Koelerietum splendentis* in the Mount Revole (1100 m).
Slika 6: *Violo pseudogracilis-Koelerietum splendentis* na hribu Revole (1100 m).

component), although the biogeographic map of Europe (Rivas-Martínez et al. 2002) reports the Aurunci mountains as included in the Italo-Tyrrhenian Province together with the rest of western southern Italy, Sardinia, Corsica, Balearic Islands and Catalonia). The contributions of the Eurasiatics, European-Caucasians and Italian endemics are also important, whereas the percentages of the Mediterranean chorotypes (Eurimedit. + Stenomedit.) are relatively low and sharply decreasing, passing from the normal to the cover spectrum. Cosmopolitans are poorly represented since the few synanthropic species occurring in *Violo-Koelerietum* belong to the Steno/Euri Mediterranean therophytic component. As far as the life form spectrum is concerned (Table 4), *Violo-Koelerietum* is mainly characterised by the hemicryptophytes, which are approached by chamaephytes observing frequency and cover values only. As expected, the contribution of the phanerophytes is negligible as well as that of the therophytes, which are about 20% of the overall species composition but which cover for 2% only.

Table 4: Life form spectra of *Violo-Koelerietum* and *Helichryso-Brometum.*

Table 4: Spekter življenskih oblik asociacij *Violo-Koelerietum* in *Helichryso-Brometum.*

	Violo-Koelerietum	*Violo-Koelerietum*	*Violo-Koelerietum*	*Heli-Brometum typ.*	*Heli-Brometum typ.*	*Heli-Brometum typ.*	*Heli-Brometum sat.*	*Heli-Brometum sat.*	*Heli-Brometum sat.*
	Pres.	Frq.	**Cov.**	Pres.	Frq.	**Cov.**	Pres.	Frq.	**Cov.**
Ch	20	32	37	9,1	15	31	14	19	26
G	9,3	6,6	3,3	13	8	6,9	8,2	4,8	3,7
H	45	52	58	40	38	53	39	47	56
P	2,5	1,4	0,3	9,8	9,6	2,5	9,6	4,7	3,9
T	23	8,3	2,1	29	30	7,5	29	25	11

DYNAMISM: From a syndynamical point of view *Violo-Koelerietum* is related to thermophilous beech forests of *Geranio versicoloris-Fagion* at higher altitudes and mesophilous *Ostrya capinifolia* woods (*Laburno-Ostryenion*) at lower altitudes.

DISTRIBUTION: The Italian distribution of *Violo-Koelerietum* is restricted to the Aurunci mountains at present. However it is possible that similar communities could be found within the other coastal limestone massifs occurring southwards of the Aurunci mountains (Lattari Mts. and Castellamare Mts. in Campania Region) which exhibit quite similar physiographic and bioclimatic features.

4.b2 *Helichryso italici-Brometum erecti* ass. nov. hoc loco
(Holotypus Table 2 rel. 6)

Helichryso italici-Brometum erecti typicum subass. nov. hoc loco
Helichryso italici-Brometum erecti saturejetosum montanae subass. nov. hoc loco
(Holotypus Table 2 rel. 14)

CHARACTERISTIC SPECIES: *Centaurea deusta, Centaurium erythraea, Helichrysum italicum, Melica transsylvanica, Micromeria graeca, Sedum sexangulare*.

DIAGNOSIS: *Helichryso-Brometum erecti* (Figure 7) is a secondary dry grassland which is widespread in the upper part of the hilly belt and in the submontane belt (in some cases it can even exceed 1000 m as is the case of Mt. delle Fate, Mt. Cervello and Mt. Fammera). *Helichryso-Brometum* finds its optimum in the meso-Mediterranean and upper hilly thermotypes with an upper subhumid umbrotype. From a coenological point of view *Helichriso-Brometum erecti* is characterised by the dominance of *Bromus erectus*, which is joined by other *Brometalia erecti* xerophilous grasses such as *Koeleria splendens, Phleum hirsutum* subsp. *ambiguum, Festuca circummediterranea* and *F. stricta* subsp. *trachyphylla*. Very frequent are also some micro-chamaephytes such as *Thymus longicaulis, Teucrium chamaedrys, Helianthemum nummularium* subsp. *obscurum,* and *Helichrysum italicum* (this latter, together with *Erica multiflora*, acts as a trait-d'union with the Steno-Mediterranean garrigues of the lower bioclimatic belts). In addition to the typical aspect (subass. *typicum*), a new subassociation named *saturejetosum montanae* is described to express the geographical separation between the Aurunci and Ausoni massifs. The characteristic species of this subassociation are selected in *Satureja montana, Euphorbia spinosa* subsp. *spinosa*, *Linum tenuifolium*. In particular *Satureja montana* and *Linum tenuifolium* are abundant in the Aurunci mountains (even at relatively low altitudes), whereas they are extremely rare in the Ausoni mountains where they are restricted to a few boundary areas only (Moraldo et al. 1990; Lucchese & Lattanzi 2000). Of biogeographic relevance is the presence of *Asphodeline liburnica*, which although being a common species in southern Italy, finds its Tyrrhenian northernmost limit precisely in the Aurunci mountains.

Figure 7: *Helichryso italici-Brometum erecti saturejetosum montanae* in the south facing slopes of Mount Fusco (650 m).
Slika 7: *Helichryso italici-Brometum erecti saturejetosum montanae* na južnih pobočjih hriba Fusco (650 m).

CHOROLOGY AND STRUCTURE: Both chorological and life form spectra are very different from those of *Violo-Koelerietum*. Indeed, the Mediterranean chorological component (Eurimedit. + Stenomedit.) is significantly stronger, reaching about 50% in the three spectra. In particular the Stenomediterranean is the dominant chorotype (Table 5). Hemicryptophytes and Chamaephytes (52–55% and 30–25% on the cover spectrum, respectively) still play a major role in the structure of the community but the contribution of therophytes is significantly higher than in *Violo-Koelerietum*, being about 30% of the whole specific composition and about 10% of the total cover.

DYNAMISM: On the north facing slopes *Helichryso-Brometum* is dynamically linked to thermophilous aspects of *Melitto-Ostryetum* or with *Lonicero-Carpinetum orientalis* woods. The mesophilous *Quercus pubescens* or *Quercus ilex*

woods (*Ostryo-Quercetum ilicis*) are the potential vegetation types of the southern facing slopes.

DISTRIBUTION: In addition to the Ausoni-Aurunci mountains, *Helichryso-Brometum* can also be found in other areas such as the limestone massifs surrounding the Rome area (Prenestini, Tiburtini, Cornicolani, Sabini, Lucretili), and in the hilly belt of inner massifs such as the Affilani, Simbruini-Ernici or Reatini mountains).

Table 5: Chorological spectra of *Violo-Koelerietum* and *Helichryso-Brometum.*

Table 5: Horološki spekter asociacij *Violo-Koelerietum* in *Helichryso-Brometum.*

	Violo-Koelerietum			*Heli-Brometum typ.*			*Heli-Brometum sat.*		
	Pres.	Frq.	**Cov.**	Pres.	Frq.	**Cov.**	Pres.	Frq.	**Cov.**
Atlantic	2,5	1	**1**	2,6	2	**0,6**	1,2	0,5	**0,1**
Boreal	0,6	0,1	**0,1**	1,8	0,8	**0,2**	1,2	0,5	**0,1**
Endemic	7,4	9,1	**11,1**	4,8	3,8	**4,5**	4,9	4,1	**10,2**
Eurasiat	14,2	16,3	**20,8**	13,2	14,4	**22,3**	15,4	20,2	**30,1**
Europ-Caucas	9,2	8,1	**10,4**	6,6	4,2	**3**	6,2	6,2	**2,7**
Oroph. S-Europ.	21,6	23,6	**27,8**	10,2	14	**18,1**	9,2	9,1	**9,9**
SE-Europ	14,2	18	**20,2**	9,7	11,8	**8**	9,2	9,3	**3**
Euri-Medit.	20,4	15,5	**6,4**	27,8	27,5	**16,4**	31	30,5	**36,2**
Steno-Medit.	8,02	7,6	**2,2**	21,7	20,6	**26,6**	20,4	18,2	**7,3**
Subcosmop.	1,85	0,5	**0,08**	1,3	0,6	**0,2**	1,2	1,2	**0,3**

4.c Multivariate analysis (synoptic table)

The synoptic table dendrogram (Figure 8) shows four main clusters. (A+B): communities of the Tyrrhenian side of central Italy (Latium + Tuscany) with (A) *Violo-Koelerietum* (montane belt) clearly separated by (B)the more termophilous communities (hilly belt). (C): *Bromus erectus* hilly dry grasslands of the Adriatic side of central Italy mainly identifiable in *Asperulo purpureae-Brometum, Potentillo cinereae-Brometum* and *Trigonello-Sideridetum*. (D): *Fumano procumbentis-Stipetum appenninicolae*. (E): Montane dry grasslands of the continental sector of the central Apennines (Mount Velino) described through the associations *Saturejo montanae-Brometum erecti*, *Onobrychido albae-Seslerietum nitidae* together with Pollino's *Lavandulo-Asphodelinetum*. (F) dry grasslands and micro-garrigue of the montane belt of the central Apennines which are enriched in *Elyno-Seslerietea* companion species, and which are identifiable in *Polygalo majoris-Brometum erecti, Koelerio splendentis-Brometum erecti* and *Plantago holostei-Helianthemetum cani*. (G) Dry grasslands of the montane belt of the Umbrian-Marches Apennines (*Seslerio nitidae-Brometum erecti*).

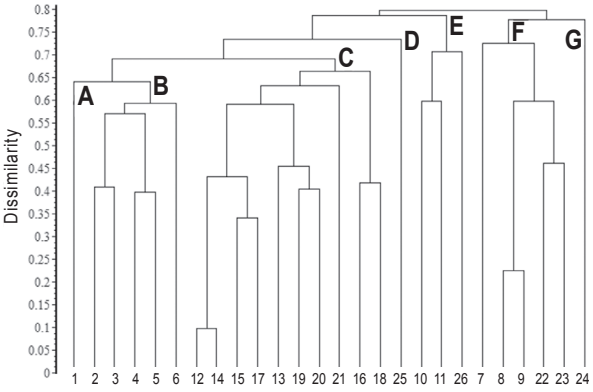


Figure 8: Cluster analysis dendrogram of the synoptic columns of the central Apennines main types of dry grasslands. A: *Violo-Koelerietum*; B: *Helichryso-Brometum + Cerastio-Brometum*; C: *Asperulo purpureae-Brometum + Potentillo cinereae-Brometum* group. D: *Fumano-Stipetum*; E: *Saturejo-Brometum + Onobrychido-Brometum + Lavandulo-Asphodelinetum*; F: *Plantago-Heliantemetum + Koelerio splendentis-Brometum + Polygalo majoris-Brometum*. G: *Seslerio nitidae-Brometum*.

Slika 8: Dendrogram klastrske analize sinoptične tabele glavnih tipov suhih travišč v srednjih Apeninih. A: *Violo-Koelerietum*; B: *Helichryso-Brometum + Cerastio-Brometum*; C: *Asperulo purpureae-Brometum + Potentillo cinereae-Brometum* group. D: *Fumano-Stipetum*; E: *Saturejo-Brometum + Onobrychido-Brometum + Lavandulo-Asphodelinetum*; F: *Plantago--Heliantemetum + Koelerio splendentis-Brometum + Polygalo majoris-Brometum*. G: *Seslerio nitidae-Brometum*.

5. SYNTAXONOMICAL DISCUSSION

5a Comparison between the Ausoni-Aurunci new associations and similar associations occurring in Peninsular Italy.

The most important result of this paper is that two new dry grassland associations have been identified for Peninsular Italy. According to Biondi et al. (2005) the coenological group of the

Apennines dry grasslands already includes 37 associations (counting solely those included in the endemic alliance *Phleo-Bromion*). Actually, to propose yet further types and names to be inserted in a syntaxonomical box which probably already contains too much, may appear somewhat paradoxical. Nevertheless, it is the opinion of the author that these new associations have the appropriate floristic, coenological and nomenclatural requirements to enable them to "carve out" an ecological space for themselves in the Italian dry grasslands syntaxonomical framework – despite the fact that they display similarities to some other central Apennines dry grasslands types.

Violo pseudogracilis-Koelerietum splendentis exhibits physiognomical similarities to the association *Plantago holostei-Helianthemetum cani*, described for the stony pastures of Campo Imperatore (Gran Sasso range) at altitudes ranging between 1560 m and 1740 m (Biondi et al. 1992; 1999). High altitudes and geographical location make *Plantago-Helianthemetum* rich in species (*Carex kitaibeliana, Iberis saxatilis, Brachypodium genuense, Draba aizoides, Centaurea ambigua, Sedum atratum, Anthemis cretica* ecc.) which are common in the subalpine belt of the Apennines, but absent in the coastal mountains. For the same reason *Plantago-Helianthemetum* lacks the entire characteristic component of *Violo-Koelerietum* with the sole exception of *Carex humilis*.

Both *Violo-Koelerietum* and *Helichryso-Brometum* exhibit some similarities with *Saturejo montanae-Brometum erecti* Avena & Blasi 1979. *Saturejo-Brometum* was one of the first associations to be described for the central Apennines, and, as a consequence, it was taken as the reference for several other central and southern Apennine areas (Avena & Blasi 1980; Abbate et al. 1984; Biondi & Blasi 1984; Francalancia & Orsomando 1981; Corbetta 1984; Corbetta et al. 1984; Petriccione 1993; Lucchese et al. 1995; Tammaro 1995; Blasi et al. 1998, Maiorca & Spampinato 1999). In Lucchese et al. (1995) *Saturejo-Brometum erecti* was considered practically the only perennial dry grassland association of the Latium region, distributed from the core of the central Apennines to the coastal mountains (therefore including the Ausoni-Aurunci mountains too). According to these authors *Saturejo-Brometum* was divided into two distinct subassociations: *S-B medicaginetosum*, (thermophilous and occurring at altitudes ranging between 300 and 700 m) and *S-B leontodontidetosum* (occurring at higher altitudes up to 1400 m). This diagnosis, however does not correspond to the original diagnosis of *Saturejo-Brometum* made by Avena & Blasi (1979), which described a rich-in-chamaephytes dry pasture restricted to the montane belt of Mount Velino (the most "continental" massif of the central Apennines). Indeed the specific component of *Saturejo-Brometum* included several taxa (*Sideritis italica, Plantago sempervirens, Cerastium tomentosum, Euphorbia myrsinites, Asperula cynanchica, Arctostaphylos uva-ursi*) which, although common in that area, were absent or extremely rare in the warmer and suboceanic mountains of the Tyrrhenian coastal district. In fact, the Tyrrhenian district is very rich in Mediterranean thermophilous perennial and annual species (*Helichrysum italicum, Micromeria graeca, Convolvulus cantabrica, Medicago minima*, *Carlina corymbosa, Urospermum dalechampii, Bupleurum baldense, Trifolium scabrum, Coronilla scorpioides, Trachynia distachya, Crupina vulgaris*, etc.) which are extremely rare in the core of the Apennines. As a consequence, the two "hilly-submontane tyrrhenian" subassociations of *Saturejo-Brometum* hypothesized by Lucchese et al. (1995) for the Ausoni-Aurunci mountains are quite unlikely. The synoptic table dendrogram (Figure 8) shows that both *Saturejo-Brometum leontodontetosum* and *Saturejo-Brometum medicaginetosum* (coll. 4 and 5 respectively) are floristically closer to *Helichryso-Brometum* (coll. 2 and 3) than to *Saturejo-Brometum* sensu Avena & Blasi 1979 (col. 10). Hence, it is probable that *Saturejo-Brometum medicaginetosum* and *Saturejo-Brometum leontodontetosum* p.p. should be included in *Helichryso-Brometum,* while only those few relevés of the subass. *leontodontetosum* performed in the core of the central Apennines, could possibly be included in the true *Saturejo-Brometum*.

An association which shows similarities to *Helichryso-Brometum* is *Cerastio etrusci-Brometum erecti*, which was described in central and southern Tuscany (Angiolini et al. 2005). On the basis of the distribution of *Cerastium arvense* var. *etruscum* (according to Angiolini et al. 2005 this entity is restricted to the limestone massifs of central and southern Tuscany), and of the presence of some other species which are absent or rare in *Helichryso-Brometum* (*Santolina etrusca, Marrubium incanum, Erysimum pseudorhaeticum, Eryngium campestre*, *Melica ciliata*, *Alyssum minus*), this association behaves as a northern Tyrrhenian vicariant of *Helichryso-Brometum*. Observing the

rest of the characteristic species of *Cerastio-Brometum* (*Carlina corymbosa, Festuca inops, Convolvulus cantabrica*) and the whole syndistribution of the association (Tyrrhenian district of central Italy) there is a possibility that *Cerastio-Brometum* and *Helichryso-Brometum* might be considered as syntaxonomical synonyms in the future, especially if the taxonomical dubiousness surrounding the taxon *Cerastium arvense* var. *etruscum* is ever resolved (both Pignatti (1982) and Conti et al. (2005) refer this entity to *Cerastium scarani* Ten., while Barberis et al. (1995), Miceli et al. (1997), and Bechi (1998) refer *C. arvense* var. *etruscum* to the group of *Cerastium arvense* subsp. *arvense*).

Another association widely used in the phytosociological literature to describe thermophilous dry grasslands of the central Apennines is *Asperulo purpureae-Brometum erecti*. This association was originarily proposed to descibe the hilly belt dry pastures of Mount Catria (northern Marches Apennines) but subsequently was extended to the whole of the Umbrian-Marches Apennines and surrounding areas (Biondi & Ballelli 1981; Ballelli & Biondi 1982; Biondi & Ballelli 1982; Biondi et al. 1995). The characteristic species were selected to be *Asperula purpurea, Eryngium amethystinum, Allium sphaerocephalon, Crepis lacera* and *Dianthus ciliatus*. The first four species are rather common in most of the central Apennines dry grasslands communities occurring on limestone, whereas *Dianthus ciliatus* exhibits a higher diagnostic role since it is an amphi-adriatic element restricted to the eastern side of the central Apennines (from the Marches to Apulia) and completely absent from the Tyrrhenian district. The presence of *Dianthus ciliatus* in *Asperulo-Brometum*, together with that of other species which are absent from the Ausoni-Aurunci mountains (*Asperula cynanchica, Trinia glauca, Poa alpina, Artemisia alba, Centaurea ambigua, Avenula pratensis* s.l.), prevent *Asperulo-Brometum* from being used as syntaxonomical reference for the Ausoni-Aurunci communities (this is also confirmed by the cluster analysis of Figure 8).

As far as the higher rank syntaxa are concerned the first dilemma is to choose between the classes *Festuco-Brometea* and *Rosmarinetea/Cisto-Micromerietea* which are closely related to each other in the central Apennines both in floristic and coenological terms (Biondi et al. 2005). It is known that the structural parameters of communities deduced by the life forms spectra can provide useful elements to be added to the coenological diagnosis (Blasi et al. 2005; Di Pietro et al. 2008). As mentioned previously, *Violo-Koelerietum splendentis* and *Helichryso-Brometum erecti* are composed of a mixture of hemicryptophytes and chamaephytes, so their syntaxonomical position in the Apennines' context can be considered as intermediate between *Phleo-Bromion* (*Festuco-Brometea*) and *Artemisio-Saturejion* (*Cisto-Micromeriet-*

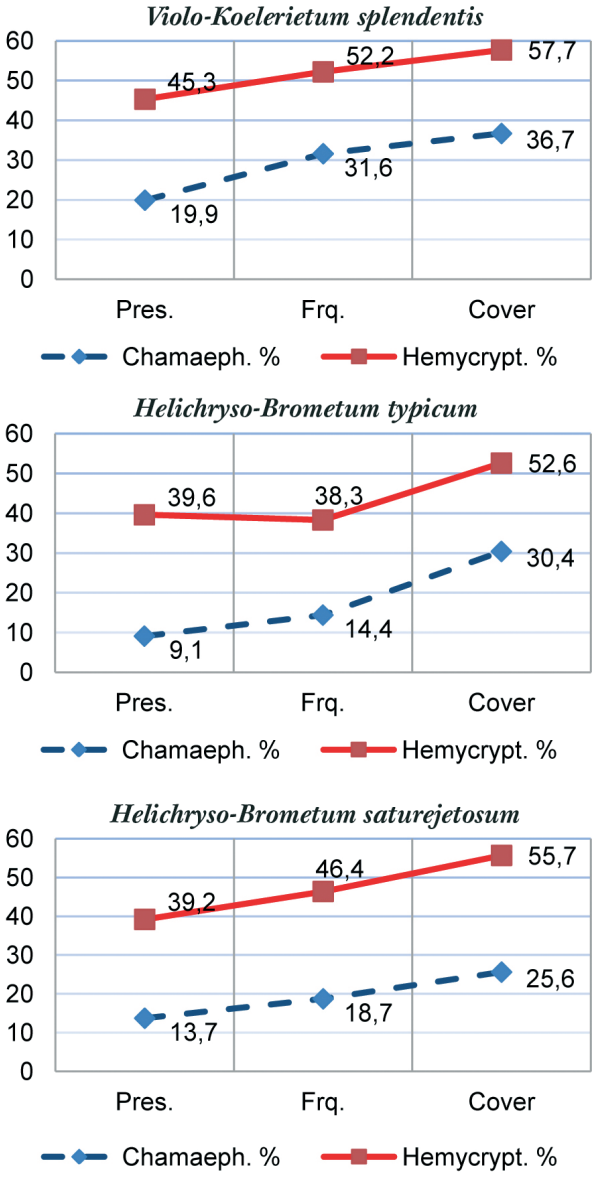


Figure 9: Life form graphics showing a comparison between the Hemycryptophytic and Chamaephytic component in the three types of spectra in both *Violo-Koelerietum* and *Helichryso-Brometum.*

Slika 9: Primerjava deleža hemikriptofitov in hamefitov v treh spektrih v asociacijah *Violo-Koelerietum* in *Helichryso-Brometum.*

ea). The physiognomical and structural distinction between these two alliances is not evident because their communities tend to be developed in similar environments and share a large number of micro-chamaephytes (*Teucrium montanum, T. chamaedrys, T. capitatum, Dorycnium hirsutum, Micromeria graeca, Thymus striatus, T. longicaulis, Plantago holosteum, Helianthemum nummularium* s.l., *Helianthemum oelandicum* s.l. *Fumana procumbens, Euphorbia spinosa, Aethionema saxatile, Satureja montana* etc.) which may exhibit similar frequency/cover indexes passing from *Phleo-Bromion* communities to *Artemisio-Saturejion* ones. In the specific case of *Violo-Koelerietum* and *Helichryso-Brometum*, the reference to *Festuco-Brometea* appears to be the most appropriate. In fact, in both communities a grass species which shows the highest specific cover index (*Koeleria splendens* and *Bromus erectus* resp.). Furthermore, in the structural diagrams (Figure 9) the curve related to the presence, frequency and cover degree of the hemicryptophitic component is above the parallel curve of chamaephytes and never intersects it.

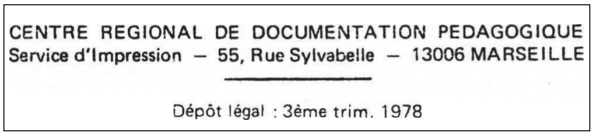
5b Nomenclatural issues

The name *Saturejo montanae-Brometum erecti* was invalidly described in Avena & Blasi 1979 (Art. 5). A further lectotypification of this name was provided in Biondi et al. (1995), identifying rel. 3 of Table 3 in Avena & Blasi 1979 as the lectotype. Although this lectotypification was formally not in accordance with the rules of the Code (since *Saturejo-Brometum* was published after 1/1/1979) it can nevertheless be used to validate the name (Art. 6) since the lectotypus provided in Biondi et al. 1995 is the true holotypus of *Saturejo montanae-Brometum erecti* Avena & Blasi ex Biondi, Ballelli, Allegrezza & Zuccarello 1995. The two subassociations (*Saturejo-Brometum medicaginetosum* and *Saturejo-Brometum leontodontetosum*), proposed in the same issue (Fitosociologia 30, 1995) by Lucchese et al. (1995), and all the new subassociations described – subsequently making reference to the name *Saturejo-Brometum* Avena & Blasi 1979 – are to be considered invalid (Art. 4 a).

The name *Asperulo purpureae-Brometum erecti* was proposed invalidly in Ballelli & Biondi (1981) due the lack of the nomenclatural type (Art. 5). The nomenclatural type was subsequently provided in Biondi et al. (1995), but unfortunately still invalidly (Art. 2), because it made reference to rel. 6 in Table 3 in Biondi & Ballelli (1982), even though this table was composed of a single synoptic column only. The reference to Ballelli & Biondi made in the synoptic table's footnote and in the bibliographic list is not in accordance with the ICPN note 3 of Art. 2. The proposal of the new subassociation *Asperulo purpureae-Brometum erecti asperuletosum purpureae* as a typical subassociation of *Asperulo purpureae-Brometum* made in Allegrezza (2003) is also to be considered as invalid, since it makes reference to the same wrong type-relevé provided in Biondi et al. (1995). This nomenclatural deficiency of *Asperulo-Brometum* was already pointed out in Catorci et al. (2007), but these authors did not to provide the necessary corrections. Moreover, this is not the only nomenclatural problem affecting *Asperulo-Brometum*. In fact, this name was proposed as new in Biondi et al. (1995), with the addition of two new subassociations: *teucrietosum montani* and *sideridetosum syriacae*. This latter was obtained by lowering the rank of the association *Trigonello-Sideritidetum syriacae* Hruska 1982 (indeed the type-relevée designed for *Asperulo-Brometum sideritidetosum* subass. nov. was the same as that provided originally for *Trigonello-Sideritidetum* in Hruska 1982). In this way a union of syntaxa of the same rank (*Trigonello-Sideritidetum* Hruska 1982 and *Asperulo-Brometum* Biondi et al. 1995) was established with nomenclatural priority being assigned to *Trigonello-Sideridetum* (Art. 25, 26). Summarizing, despite the common use of *Asperulo purpureae-Brometum* as a syntaxonomical reference for the Marches-Umbrian Apennines dry grasslands, it is at present to be considered both a *nomen invalidum* (Art. 5) and a *nomen illegitimum* (Art. 29c).

Biondi et al. (1995) designated *Asperulo purpureae-Brometum erecti* Biondi et al. 1995 as the nomenclatural type of the alliance *Phleo ambigui-Bromion erecti*. The ascertained invalidity of *Asperulo-Brometum* has direct repercussions on the alliance *Phleo-Bromion*, which is, likewise, to be considered invalid (Art. 5, 17). As a consequence it is necessary to find the prior valid published name, which can be used in place of *Phleo-Bromion*. On the basis of the nomenclatural and coenological features of *Phleo-Bromion* the most suitable name turns out to be *Cytiso-Bromion erecti* Bonin 1978 (... which is older than *Phleo-Bromion* and thus is even suitable to be used as a prior syntaxonomical synonym). The Italian phytosocio-

logical literature has not treated this alliance in a uniform manner. In some cases (Biondi et al. 1995; 2005) it has been relegated to the Calabrian Apennines (in spite of the original diagnosis which explicitly designated the whole central-southern apennines as syndistribution area of the alliance), while in other cases it has merely been considered as not validly published (Brullo et al. 2004). The need for shedding light on this topic can be explained as follows: *Cytiso-Bromion erecti* was proposed in Barbero & Bonin 1969 (sub *Cytiso-Bromion caprini*) as including the montane dry grasslands of central and southern Italy. In that paper the authors stated that *Cytiso-Bromion caprini* was identical (although with a wider distribution area) to *Koelerio-Astragalion* Giacomini & Gentile 1966, an alliance which described the dry grasslands and garrigiues developed on the siliceous substrates of Sila plateau in Calabria region (Giacomini & Gentile 1961; 1966). However, this first proposal of *Cytiso-Bromion caprini* was invalid (Art. 3, 5) since no reference to a valid lower-rank syntaxon was provided. It was only in Bonin (1978) that a list of eight grassland and/or garrigue associations belonging to *Cytso-Bromion erecti* (new name) and the list of characteristic species were presented, together with a more complete and emended diagnosis of the alliance. Amongst the associations included in *Cytiso-Bromion*, only one (*Astragaletum calabri*) was related to siliceous, poor-in-carbonates, substrates, while the remainder (*Lavandulo-Asphodelinetum luteae, Paronichyo-Astragaletum sempervirentis, Onobrychido-Seslerietum nitidae, Eryngio amethystini-Polygaletum majoris, Jurineo mollis-Crepidetum rubrae, Cisto incani-Phlomidetum herba-venti, Helichryso italici-Teucrietum montani*) were communities developed on the limestone substrates of the central and southern Apennines (in truth, in the same paper the alliance *Cytiso-Bromion* was also used to include some aspects of woody vegetation such as *Genisto sericeae-Pinetum nigrae* (nom. illeg. Art. 29 b) which are difficult to refer to grassland syntaxa). According to Brullo et al. (2004) both *Koelerio-Astragalion* Giacomini & Gentile 1966 and *Cytiso-Bromion erecti* Bonin 1978 were to be considered as invalid (resp. Art. 8 and Art. 1). *Koelerio-Astragalion* is effectively invalid (Art. 8), since neither of the two names proposed as new by Giacomini & Gentile (1966), which were suitable to be used as nomenclatural type of *Koelerio-Astragalion* (*Astragaletum calabrici* and *Foenicolo-Festucetum spadiceae*), was validly published (Art. 7). However, the question concerning *Cytiso-Bromion caprini*, which was proposed invalidly (Art. 3b, 8) in Barbero & Bonin (1969), but further emended and validly proposed as *Cytiso-Bromion erecti* ten years later (Bonin, 1978), is somewhat different. The fact that this name was published in a Ph.D. thesis does not lead to its automatic invalidation. In fact, Bonin's Ph.D. thesis is to be considered as perfectly in accordance with art. 1 of ICPN, seeing that it was a printed book (not a photocopy) which was formally and legally deposited (Figure 10) in libraries accessible to botanists (e.g. it is regularly quoted in the bibliography of Avena & Blasi, 1979 where the new association *Saturejo-Brometum erecti* was proposed). Because *Cytiso-Bromion* was published before 1.1.1979 it is suitable to be lectotypified. The lectotypus of the alliance *Cytiso spinescentis-Bromion erecti* was designed in Ubaldi (2011) using the association *Lavandulo-Asphodelinetum luteae* Bonin 1978. (Bonin (1978) pages: 146; (complete description pp. 148–153). The lectotypus of *Lavandulo-Asphodelinetum luteae* Bonin 1978 is selected hoc loco in rel. 509 of Table 21 in Bonin (1978), whose taxonomically updated version (based on the Italian checklist of Conti et al. 2005) is reported in Appendix 5. The characteristic species of *Lavandulo-Asphodelinetum luteae* originally defined by the author were *Lavandula angustifolia, Asphodeline lutea, Leontodon crispus* and *Satureja montana*.


CENTRE REGIONAL DE DOCUMENTATION PEDAGOGIQUE
Service d'Impression — 55, Rue Sylvabelle — 13006 MARSEILLE

Dépôt légal : 3ème trim. 1978

Figure 10: Title page (tables and figures) of Bonin's PhD Thesis with the reference to the publisher office and to the legal date of publishing.

Slika 10: Naslovnica (tabele in slike) doktorske naloge Bonina z oznako založnika in datumom izdaje.

The lectotypification of *Cytiso-Bromion erecti* means that most of the dry grassland associations previously included in *Phleo ambigui-Bromion erecti* Biondi et al. 1995 (nom. inval.) can easily be included in *Cityso-Bromion erecti* Bonin 1978, which thus assumes the role of reference alliance for the hilly and montane grasslands endemic to the central-southern Apennines. According to Bonin 1978, *Cytiso-Bromion erecti* included all the montane dry grasslands and micro-chamaephitic garrigues of the central and southern Apennines on both siliceous and limestone substrates. The

geographical and ecological range of *Cytiso-Bromion*, as conceived by Bonin (1978), definitely appears too wide for a single alliance. The biogeographical boundary which runs between the Pollino-Orsomarso massif (limestone) and Sila massif (granites and gneiss) separates two geographical districts which are different not only in respect of geological and edapho-morphological features, but also in respect of paleogeographic and paleobotanic vicissitudes which have led to clear floristic and coenological differences. On the one hand, there are several calcicolous species whose southernmost limit in Peninsular Italy corresponds to the Pollino limestone massif (*Sesleria nitida, Carex macrolepis*, *Sideritis italica*, *Euphorbia myrsinites, Globularia meridionalis* etc.), while on the other hand there is a group of acidophilous species which are endemics of the siliceous massifs of southern Calabria (Sila, Serre calabre and Aspromonte), or which are simply absent from the calcareous sector of the Apennines (*Astragalus parnassi* subsp. *calabrus*, *Armeria brutia*, *A. aspromontana, Avenula praetutiana* subsp. *rigida, Anthemis cretica* subsp. *calabrica*, *Hypericum calabricum, Genista silana, Centaurea sarfattiana*). For this reason the distribution area of *Cytiso-Bromion erecti* is restricted to the central-southern Apennines from the northern Marches to northern Calabria (Orsomarso mountains). On the basis of this new coenological and synchorological diagnosis of *Cytiso-Bromion erecti*, the central Apennines endemic alliance *Seslerio-Caricion macrolepidis* proposed in Ubaldi (1997) is to be considered a syntaxonomical synonym, together with (at least partially) *Botriochloo-Bromion erecti*, which was proposed as new in the same paper. At the same time, to be considered syntaxonomical synonyms of *Cytiso-Bromion* (see the syntaxonomical scheme) are the following alliances: *Knautio calycinae-Bromion caprini* Ubaldi 2011, *Sideritidion italicae* (Biondi et al. 1995) Ubaldi 2011, proposed subsequently in Ubaldi (2011) and *Violo pseudogracilis-Bromopsion caprinae* Terzi 2011 (Terzi 2011).

The dry grasslands and garrigues occurring in the mountain ranges of the Calabrian Arc (especially Sila plateau) and developed on a great variety of siliceous substrates, belong to a different alliance. According to Brullo et al. (2005) this alliance is *Koelerio-Astragalion* Giacomini & Gentile ex Brullo et al. 2005. The nomenclatural type of *Koelerio-Astragalion* was designated as *Astragaletum calabrici* Giacomini & Gentile ex Brullo in Brullo et al. 2005. On the basis of ICPN, however, *Astragaletum calabrici* Giacomini & Gentile ex Brullo in Brullo et al. 2005 is an illegitimate and superfluous name (Art. 29b, 29c) beside being a heterotypic later homonym (Art. 31) of the name *Astragaletum calabrici* Giacomini & Gentile ex Bonin 1978 (which is mentioned as synonym in Brullo et al. 2005). According to ICPN, however, this fact do not invalidate the name of the alliance (Art. 17). As regards the name *Astragaletum calabrici* it was proposed invalidly by Giacomini & Gentile (1966) but subsequently validated by Bonin (1978) through a complete description of the association (pag. 140–145), including a phytosociological table composed of 10 relévés and the list of characteristic species. For this reason the association *Astragaletum calabrici* Giacomini & Gentile ex Bonin 1978 (which lectotypus is selected hoc loco in rel. 628 of Table 16 in Bonin 1978 and which taxonomically updated version,

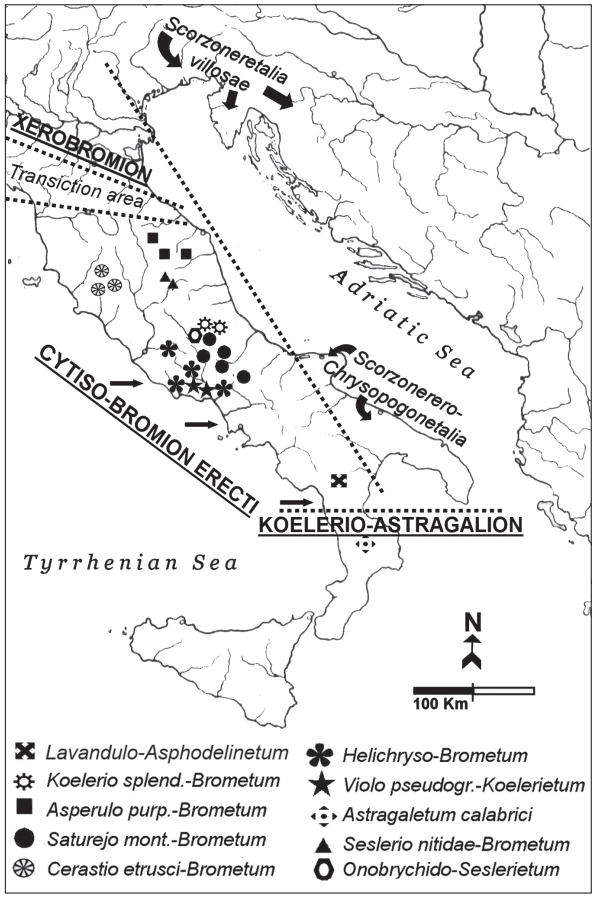


Figure 11: Distribution of the main alliances of dry grasslands in Peninsular Italy.
Slika 11: Razširjenost glavnih zvez suhih travišč Italijanskega polotoka.

based on the Italian checklist of Conti et al. 2005, is reported in Appendix 5) take the role of nomenclatural Typus of the alliance *Koelerio-Astragalion*. The choice of *Astragaletum calabrici* Giacomini & Gentile ex Bonin 1978 as type-association of *Koelerio-Astragalion* leaves open the problem of the choice of class in which to include this alliance. According to Barbero & Bonin (1969) this alliance had to be referred to *Seslerietalia tenuifoliae*, while Bonin (1978) included it in *Scorzonero-Chrysopogonetalia*, Brullo et al. (2004; 2005) in *Rumici-Astragaletea siculi* and Ubaldi (2011) in *Cerastio-Carlinetea nebrodensis*. As mentioned previously, the floristic-coenological boundary between a chamaephytic class (*Rosmarinetea* or *Rumici-Astragaletea*) and an hemicryptophytic one (*Festuco-Brometea*) is almost indistinguishable, especially in the Apennine montane dry grasslands or micro-garrigues. The phytosociological table of *Astragaletum calabrici* as reported in Bonin (1978) would suggest the inclusion of *Koelerio-Astragalion* in a chamaephytic class, since all the species showing the highest frequency and cover degree (*Astragalus parnassi* subsp. *calabricus, Cytisus spinescens, Plantago serpentina, Thymus longicaulis* and *Helianthemum nummularium*) are chamaephytes. At any rate, it is likely that only a wider-scale study able to merge the floristic and coenological data with ecological, paleobotanical and paleogeographical considerations could provide a plausible solution to this intricate question. (Figure 11 reports the map distribution of the main perennial dry grassland syntaxa in Peninsular Italy).

5c Coenological and syntaxonomical framework of Cytiso spinescenti-Bromion erecti

According to Bonin (1978) *Cytiso-Bromion erecti* was restricted to the montane dry grasslands of the central and southern Apennines. Ubaldi (1997) referred *Cytiso-Bromion* to the montane dry grasslands of the southern Apennines, leaving those of the central Apennines to *Seslerio-Caricion macrolepidis* (montane belt) and *Phleo-Bromion* (hilly belt). According to Biondi et al. (1995), *Cytiso-Bromion* was restricted to southern Italy, too, but the dry grasslands of the central Apennines were all included in the single alliance *Phleo-Bromion*. It is also my opinion that the central-southern Apennine dry grasslands on limestone cannot be divided at alliance level. In fact, the geographical location of the Apennine range, slicing as it does right through to the middle of the Mediterranean Sea, is responsible for a marked upward shift of *Lygeo-Stipetea* and *Cisto-Micromerietea* Mediterranean steppe-like grasslands and garrigues merged with *Tuberarietea guttatae* grasslands, which in some cases are widespread up to the lower montane belt (especially on the Tyrrhenian coastal side of Peninsular Italy). This upward altitudinal shift of Mediterranean species and communities strongly reduces the coenological space for the *Festuco-Brometea* perennial dry grasslands which, moreover, also find themselves effectively competed with by *Seslerietalia tenuifoliae* communities in the upper montane belt and by *Cynosurion* communities in the intramontane plateaus. The different ecological and geographical enlargement of *Cytiso-Bromion erecti* (with respect to Bonin's 1978 proposal) requires a consequent enlargement in the list of the characteristic species of the alliance, which were selected by Bonin as comprised solely of *Bromus erectus*, *Cytisus spinescens*, *Phleum hirsutum* subsp. *ambiguum* and *Centaurea deusta* (Bonin 1978: 142), although other species, *Thymus striatus, Sideritis italica, Asperula purpurea, Centaurea ambigua, Polygala major, Globularia meridionalis, Onobrychis alba* were added as differentials in the various phytosociological tables. The new list (which is provided at the end of this paper and which only partially corresponds to the list proposed in Biondi et al. 1995 for *Phleo ambigui-Bromion erecti*) is composed of a core of endemic central-southern apennine species (testifying to a clear separation from the CS-European *Xerobromion*) and of a group of xerophitic species having a largely southeastern-European distribution.

As for the rank of suballiance, it has been necessary (for ecological and nomenclatural reasons) to dissect and reassemble what was proposed in previous papers, trying, where possible, to maintain the use of the old syntaxon names rather than propose new ones.

The phytosociological literature reports only a single suballiance for *Cytiso-Bromion*, namely, *Plantaginenion serpentinae* Bonin 1978. This suballiance was typified by *Astragaletum calabrici* and was restricted to those communities developed on siliceous substrates which were subsequently included in *Koelerio-Astragalion*. Instead, the following three suballiances were proposed in Bi-

ondi et al. (2005) for *Phleo-Bromion erecti*: *Phleo-Bromenion* (hilly belt of the Marches-Umbrian Apennines), *Brachypodenion genuensis* (upper montane belt of central Apennines), *Sideridenion italicae* (recte: *Sideritidenion italicae*) (montane belt of southern Apennines). As mentioned previously, *Phleo-Bromenion* is to be considered invalid (Art. 17), while *Brachypodenion genuensis* and *Sideritidenion italicae* are validly described. Although *Sideritidenion italicae* was proposed as centered in the southern Apennines, its nomenclatural type (*Saturejo montanae-Brometum erecti*) is located in the central Apennines (Mount Velino, Abruzzo region). The nomenclatural type of *Brachypodenion genuensis* (*Koelerio splendentis-Brometum erecti*) is also located in the central Apennines (Gran Sasso massif), being less than 50 km distant from *Saturejo-Brometum*. *Saturejo-Brometum*, *Koelerio-Brometum* are floristically, ecologically and coenologically very similar to each other, and it would be at the very least peculiar if they did not share the same suballiance. Since *Sideritidenion italicae* and *Brachypodenion genuensis* were described in the same paper it is necessary to choose one of these names as reference name for the suballiance. This name is here designated as *Sideritidenion italicae* Biondi, Ballelli, Allegrezza & Zuccarello 1995. *Lavandulo-Asphodelinetum luteae* (type-association of *Cytiso-Bromion*) is also included in *Sideritidenion italicae*. As a consequence *Sideritidenion italicae* Biondi et al. 1995 is to be considered the type-suballiance of the alliance *Cytiso spinescentis-Bromion erecti* Bonin 1978. This suballiance includes all the associatons developed on the montane belt of the central and southern Apennines on limestone substrate and has its nomenclatural type in the association *Saturejo montanae-Brometum erecti* Avena & Blasi ex Biondi et al. 1995 (the type-relevè floristically updated to Conti et al. 2005 is reported in Appendix 5). The choice of *Saturejo-Brometum* as association-type of *Sideritidenion italicae* leads this suballiance to be centered in the central Apennines, while the presence of a high number of dry grassland species widespread throughout the entire central-southern Apennines (e.g. *Sesleria nitida, Stipa dasyvaginata, Carex macrolepis, Sideritis italica, Pimpinella tragium*, *Crepis lacera*, *Globularia meridionalis*, *Lomelosia crenata* subsp. *crenata, Onobrichis alba* subsp. *alba, Euphorbia myrsinites, Helianthemum oelandicum* subsp. *incanum, Cytisus spinescens, Ranunculus illyricus, Cerastium tomentosum, Carex kitaibeliana*) justifies its widening to the southern Apennines[2]. Nevertheless, the southern Apennines also host a group of dry grassland species which have an Italian distribution restricted to this area (e.g. *Crepis rubra, Orchis collina, Orchys quadripunctata, Armeria macropoda, Seseli peucedanoides, Onobrychis alba* subsp. *pentelica, Viola aethnensis* subsp. *splendida*, *Achillea lucana, Sesleria calabrica, Festuca jeanpertii* subsp. *campana*, *Thymus thracicus, Ptilostemon stellatus*), or which are known also, as sporadics, for the central Apennines (e.g. *Ophrys lacaitae, Ophrys lutea, Asphodeline liburnica, Viola pseudogracilis*) which, although often showing a scattered presence in phytosociological and/or synoptic tables, could leave open the possibilities for alternative syntaxonomical schemes, such as the definition of an endemic suballiance only for southern Italy (in fact Art. 28a of ICPN would provide for the description of a new suballiance, named *Cytiso spinescentis-Bromenion erecti*, containing the nomenclatural type of the alliance).

Owing to the mountainous distribution of the suballiance *Sideritidenion italicae*, a different suballiance is required to include the dry grassland communities of the hilly and submontane belts of Peninsular Italy. Biondi et al. (2005) proposed (invalidly) the suballiance *Phleo ambigui-Bromenion erecti* selecting *Silene otites, Hieracium piloselloides, Stachys recta, Leontodon villarsii* and *Reichardia picroides* as characteristic species. In our opinion this group of species does not have any particular biogeographical and/or ecological differential role. Actually, the only real difference between *Phleo-Bromenion* and *Sideritidenion italicae* would seem to be that in the former some common dry grasslands species which do not extend their distribution area to the upper part of the Marches Apennine are absent (e.g. *Sideritis italica, Euphorbia myrsinites, Pimpinella lithophila, Cytisus spinescens*, *Hypochoeris cretensis*), whereas a few others (*Sesleria apennina, S. pichiana, S. italica*) which could be considered somewhat N-C-Apennines endemics (see Trombetta et al. 2005; Foggi et al. 2006; Di Pietro 2007) are sporadically present. In a certain sense *Phleo-Bromenion* behaves as a sort of impoverished variant of *Sideritidenion italicae* (also geographically, if

[2] Very few are those dry grassland species which characterise the hilly and montane belt of the central Apennines and which do not occur also in the southern Apennines. Among these taxa, those belonging to the *Centaurea ambigua* s.l. and *Centaurea rupestris* s.l. collective groups are probably the most relevant.

the syn-distribution areas of these two alliances – N-Marches Apennine vs. C-S Apennines – is compared). With the double aim of maintaining (partially) the proposal of Biondi et al. 2005 on the one hand, and to avoid the proliferation of new names on the other hand, the suballiance *Phleo ambigui-Bromenion erecti* Biondi, Allegrezza & Zuccarello ex Di Pietro suball. nov. is here re-proposed hoc loco. The association *Asperulo purpureae-Brometum erecti* proposed invalidly in Biondi & Ballelli (1981) is reproposed here as a new association and it is designated as holotypus of the new suballiance *Phleo-Bromenion* Biondi, Allegrezza & Zuccarello ex Di Pietro suball. nov. The holotypus of *Asperulo purpureae-Brometum erecti* Biondi & Ballelli ex Di Pietro ass. nov. is designated hoc loco in rel. 21 of Table 3 in Ballelli & Biondi (1982). The new group of characteristic species of *Asperulo purpureae-Brometum erecti* is composed of the following taxa: *Asperula purpurea, Erisymum pseudorhaeticum, Coronilla minima, Stachys recta* subsp. *recta*, *Artemisia alba, Dianthus ciliatus*. The floristically updated version of the type-relevé of *Asperulo purpureae-Brometum erecti* is reported in Appendix 5. The definition of a new type-relevé for *Asperulo-Brometum* underlines the thermophilous character of this association, enabling it to be more clearly distinguishable from similar associations occurring in the submontane and lower montane belt of the Umbrian-Marches Apennines, such as *Potentillo cinereae-Brometum*, *Trigonello-Sideridetum* (etc.). In particular, the differences between *Asperulo-Brometum* and *Trigonello-Sideridetum* appear to be more evident, and this allows a syntaxonomical separation to be hypothesised. The suballiance *Phleo ambigui-Bromenion erecti* includes the dry grassland communities, which are developed within the hilly and the submontane belts of the central and southern Apennines and which are strongly characterised by a Mediterranean floristic component. It should be noted that, in contrast to the montane suballiance *Sideritidenion italicae*, which is characterised by a high number of endemic species such as *Avenula praetutiana, Brachypodium genuense, Centaurea ambigua, Rhinanthus wettsteinii*, *Dianthus brachycalyx, Senecio tenorei,* (etc.) and by the transgressive supply of some other endemic species of *Cytiso-Bromion* (*Sesleria nitida, Carex macrolepis, Stipa dasyvaginata* subsp. *appenninicola*), the hilly suballiance *Phleo-Bromenion* does not possess an endemic component of its own. Nevertheless, the presence of a high Mediterranean therophitic component and the lack of ingressive species from the upper montane and subalpine belts of the Apennines, allow *Phleo-Bromenion* to be clearly distinguished both from *Sideritidenion italicae* and from the thermophilous aspects of central-European *Xerobromion*. As a consequence, in addition to the characteristic species for *Phleo-Bromenion*, a group of differential species drawn from *Lygeo-Stipetea*, *Tuberarietea guttatae* and *Cisto-Micromerietea*, has been selected with the role of ingressives (Figure 12 reports the map of distribution of *Cytiso-Bromion* suballiances in Peninsular Italy).

Applying this syntaxonomical framework to the specific case of the Aurunci mountains it can

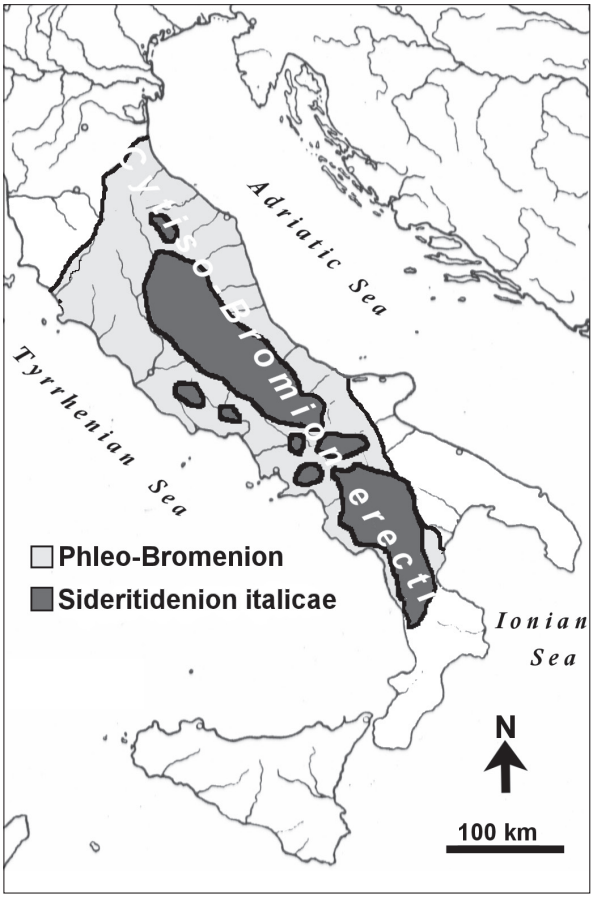


Figure 12: Distribution area of the two suballiances of *Cytiso-Bromion erecti* (To note that inside the *Sideritidenion italicae* boundaries drawn on this map also the *Phleo-Bromenion* communities which are developed within the hilly belt of the main mountainous massifs are included).

Slika 12: Razširjenost dveh podzvez zveze *Cytiso-Bromion erecti* (znotraj mej podzveze *Sideritidenion italicae* prikazanih na karti so vključene tudi združbe podzveze *Phleo-Bromenion*, ki jih najdemo v hribovitem pasu glavnega masiva).

be hypothesised that the montane *Violo-Koelerietum* is to be included in *Sideritidenion italicae* suballiance, whereas the hilly-submontane thermophilous *Helichryso-Brometum* is to be included in *Phleo-Bromenion*. The presence (in both associations) of a group of relevés occurring in the upper submontane belt and having intermediate floristic features between the two suballiances is due to the fact that *Violo-Koelerietum* and *Helichryso-Brometum* are distributed along an altitudinal gradient, and as a consequence give rise to stands of unclear syntaxonomical assignment in the contact areas.

On the basis of Mucina et al. (2009), the alliance *Cytiso-Bromion caprini* sensu Biondi et al. 1995 (supposedly including *Cytiso-Bromion erecti* Bonin 1978) is to be included in *Artemisio-Brometalia* (an order which replaces the nomen dubium *Brometalia erecti*). Differently, Ubaldi (2011) includes *Cytiso-Bromion erecti* in the new order *Asphodelino liburnicae-Bromion erecti* (nom. inval. art. 2). However, through different papers published between 1997 and 2011, Ubaldi proposed several new orders in which he included the dry grasslands associations described for the central and southern Apennines (see syntaxonomical scheme). Among these orders there is *Festuco-Seslerietalia nitidae* Ubaldi 2003, which, according to the author, includes only the calcicolous dry pastures of the central Apennines. The syn-distribution of *Festuco-Seslerietalia nitidae,* restricted to the central Apennines, makes it to cover just a minor part of the geographical range of *Artemisio-Brometalia* Ubaldi ex Mucina & Dengler 2009. For this reason a new suborder, named *Festuco circummediterraneae-Seslerienalia nitidae* subord. nov. (= *Festuco-Seslerietalia nitidae* Ubaldi 2003 stat. nov. hoc loco) is proposed in the present paper[3]. This suborder exhibits the same distributional range as that of *Cytiso-Bromion erecti*, and, as a consequence, it shares with it the same specific characteristic component[4]. Likewise *Cytiso-Bromion* also *Festuco-Seslerienalia nitidae* is distinguishable from the other (possible) sub-orders which are already known, or which are still to be defined for *Artemisio-Brometalia*, by the presence of a high number of both Apennine endemics and amphi-Adriatic species.

5d Similarities between the Tyrrhenian dry grasslands and W-Balkans ones

According to Mucina et al. (2009) the two alliances, since they both have an Apennine distribution, *Cytiso-Bromion* (sub: *Phleo-Bromion*) and *Artemisio-Saturejion*, are included in the same order *Artemisio-Brometalia*, although they had previously usually been placed in separate classes (*Festuco-Brometea* and *Rosmarinetea/Cisto-Micromerietea*, respectively) (Allegrezza et al. 1997; Pirone & Tammaro 1997; Biondi et al. 2005). The hypothesis of the one single order, which excludes (at least for the Apennines) the possibility of using different syntaxonomical classes to distinguish

[3] On the basis of Recommendation 10 B and 10 C of ICPN the specific epithet has been added to the first generic name (*Festuca*) of the new suborder. Since Ubaldi (2003) did not included any species of *Festuca* in the original characteristic component of *Festuco-Seslerietalia nitidae*, the taxon *Festuca circummediterranea* Patzke has been selected hoc loco for the new suborder *Festuco (circummediterraneae)-Seslerienalia nitidae.*

[4] The specific characteristic component of *Festuco-Seslerietalia* as proposed in the original paper of Ubaldi (2003) as diagnostic for the central Apennines was composed of *Trifolium montanum, Centaurea ambigua, Potentilla crantzii, Sedum rupestre, Astragalus sempervirens and Seseli viarum*. Amongst these species, only *Trifolium montanum* subsp. *rupestre* was maintained in the characteristic component of *Festuco-Seslerietalia* in Ubaldi's subsequent revision (Ubaldi 2011), whereas several other species (defined without distinction characteristic/differential) were added (*Cerastium arvense* subsp. *suffruticosum*, *Knautia purpurea* subsp. *calabrica*, *Cyanus triumfetti, Alyssum montanum, Primula veris, Carum flexuosum, Myosotis ramosissima, Bellis perennis, Stachys officinalis*, *Narcissus poeticus, Viola eugeniae, Rumex acetosella, Potentilla cinerea, Linum catharticum*). Such a peculiar characteristic component, which groups species having such different chorological and ecological/coenological features, is probably related to the fact that the author included in the same order a mesophilous sub-acidophilous alliance (*Filipendulo vulgaris-Bromion erecti*) and a xerophilous strictly calcicolous one (*Seslerio-Caricion macrolepidis*). Nevertheless, neither a biogeographical Apennine identity nor ecological/coenological homogeneous information would seem to be distinguishable by analysing this pool of species. In would seem more reasonable to include the mesophilous alliance *Filipendulo-Bromion* in a different order than *Festuco-Seslerietalia nitidae* (and than *Artemisio-Brometalia* as well), being the xerophilous alliance *Seslerio nitidae-Caricion* (nom. type: *Seslerio nitidae-Brometum erecti*) the nomenclatural type of the order. The enlargement of the geographical range of the new sub-order *Festuco-Seslerienalia,* with the inclusion of the whole southern Apennines, leads this new range to be more or less completely overlapping that of the alliance *Cytiso-Bromion erecti* with the logical consequence of having a characteristic component shared by the alliance and the suborder.

perennial dry grasslands rich in chamaephytes and montane micro-garrigue rich in hemicryptophytes, finds strong similarities with the syntaxonomical scheme proposed by several authors for the W-Balkans (Horvatić 1958a; 1958b; Horvatić 1973; Horvat et al. 1974; Horvatić 1975; Feoli-Chiapella & Poldini 1993) where there is a single order *Scorzoneretalia villosae* (or *Scorzonero-Chrysopogonetalia*) which includes both chamaephytic alliances (e.g. *Saturejion subspicatae*) and hemicryptophytic ones (e.g. *Scorzonerion villosae*). It is likely, and not by chance, that it is precisely the Dalmatian dry grasslands – of all those occurring outside the Italian boundaries – which exhibit the highest degree of similarity to those of the Aurunci Mts. According to Horvat et al. (1974), the calcicolous and thermophilous dry grasslands of the western Dinarids are to be included in two major alliances: *Saturejion subspicatae* (*Scorzoneretalia villosae*) and *Chrysopogono-Koelerion splendentis*. According to Horvatić (1975), this latter alliance belonged to *Thero-Brachypodietea* through the order *Koeleretalia splendentis*. This theory was not followed by subsequent authors, who included *Koelerietalia splendentis* in *Festuco-Brometea* (Royer 1991; Trinajstić 1992; Redžić 2010). Finally Terzi (2011), included *Koelerietalia splendentis* in *Scorzonero-Chrysopogonetalia* as a syntaxonomical synonym. Actually, it is not easy to trace an ecological-biogeographical boundary between *Scorzonero-Chrysopogonetalia* and *Koeleretalia splendentis*, as well as between these two orders themselves and *Artemisio-Brometalia*. In fact, there are several species (e.g. *Koeleria splendens, Plantago holosteum, Carex humilis, Thymus longicaulis, Teucrium montanum, Inula hirta, Convolvulus cantabrica, Euphorbia spinosa, Satureja montana, Hippocrepis comosa, Asperula aristata* etc.) which are considered "characteristic" of one or the other syntaxon, depending on the author who is taken as reference (Horvat et al. 1974; Horvatić 1975, Oberdorfer 1992; Royer 1991, Theurillat et al. 1995; Biondi et al. 1995; Poldini 1995; Mucina et al. 2009). Typical *Scorzoneretalia villosae* dry grasslands occur in Italy in the Friulian Carso, where they behave as the westernmost fringe of the Croatian and Slovenian steppe-like grasslands (Feoli-Chiapella & Poldini, 1993; Poldini 1995). Physiognomically similar dry grasslands with *Stipa austroitalica* and *Scorzonera villosa* subsp. *columnae* as dominant species and *Bromus erectus* relegated to a secondary role were found in southeastern Italy (Apulia, Basilicata and Molise regions) and were referred to *Scorzonero-Chrysopogonetalia* (Fanelli et al. 2001; Forte et al. 2005; Biondi & Guerra 2008; Di Pietro & Wagensommer 2008; Terzi et al. 2010). As far as the central Apennines are concerned, strong floristic and coenological similarities to the SE-European *Scorzonero-Chrysopogonetalia* grasslands were already found by previous authors. Bonin (1978) included the alliance *Cytiso-Bromion erecti* in *Scorzonero-Chrysopogonetalia*, while Royer (1991), in his European synthesis of *Festuco-Brometea*, included the central Apennine dry grasslands in the order *Brometalia erecti* on the basis of a favourable floristic balance in the comparison *Brometalia erecti* vs. *Scorzonero-Chrysopogonetalia*. Royer's scheme is partially followed in the present paper, where all the central Apennine dry grasslands and most of the southern Apennine ones are included in the order *Artemisio-Brometalia erecti*. Nevertheless, it is not possible to ignore the floristic similarities between the Aurunci Mountain *Violo-Koelerietum* and the Dalmatian *Koelerio-Festucetum illyricae* Horvatić 1963 corr Trinajstić 1993 (= *Festuco-Koelerietum* sensu Horvatić 1963), especially if we consider this latter in the form of subass. *globularietosum cordifoliae* (Trinajstić 1986; 1992). *Violo-Koelerietum* and *Koelerio-Festucetum* are similar not only as far as their floristic composition is concerned, but also in respect of the coenological mosaic in which they are included, as well as their syndynamical trends. Both *Violo-Koelerietum* and *Koelerio-Festucetum globularietosum* exhibit a spatial contact with *Salvia officinalis* garrigues and are dynamically related to *Ostrya carpinifolia* and *Sesleria autumnalis* woodlands (actually, the *Koelerio-Festucetum* ecological amplitude is significantly higher than that of *Violo-Koelerietum*, if it is true that *Koelerio-Festucetum brachypodietosum retusi* can be dynamically related to evergreen woods and shrubs such as *Oleo-Juniperetum phoeniceae, Querco-Pinetum halepensis* and *Myrto-Quercetum ilicis*, as reported by Kamenjarin & Pavletić (2003) for Čiovo island). However, both *Violo-Koelerietum* and *Helichryso-Brometum* lack species such as *Festuca illyrica* (according to Alegro & Šoštarić (2006) the records of *F. illyrica* of the Dalmatian area are to be reported to *F. rupicola* or *F. valesiaca*), *Festuca valesiaca, F. dalmatica, Koeleria macrantha, Centaurea tommasinii, C. spinoso-ciliata, Salvia bertolonii, Globularia cordifolia, Satureja cuneifolia*, which are considered biogeographically and physiognomically diagnostic in

Koelerio-Festucetum. In fact, the floristic context of the Aurunci mountains, and more in general of the whole Tyrrhenian district of central Italy, is clearly different from the context that currently exists in the Friulian Karst and Apulia. This is mainly due to the absence of some important diagnostic species. For example, *Scorzonera villosa* is absent, *Chrysopogon gryllus* is extremely rare, and amongst the *Stipa pennata* complex species solely *Stipa dasyvaginata* subsp. *appenninicola* occurs and always with the role of low-frequency companion. For this reason, the attractive hypothesis of using the same syntaxonomical reference (association) for grasslands communities in the western coastal side of both the Balkan and Italian peninsulas (as already happens for evergreen woodlands) is to be excluded (although the in-progress taxonomical revisions on the amphiadriatic groups of genus *Festuca* could change in part some previous syntaxonomical assumptions). It is somewhat strange, however, that associations which exhibit such floristic, coenological and syndynamical similarities could not share the same high-rank syntaxon. Therefore it will be necessary in the future to evaluate whether the degree of floristic autonomy between *Scorzonero-Chrysopogonetalia* and *Artemisio-Brometalia* throughout the Balkan-Apennine biogeographical province (sensu Rivas-Martínez et al. 2002) can be considered as sufficient to maintain these syntaxa as distinct, or, instead to hypothesize a single amphiadriatic order distinguishable both from the easternmost fringe of *Scorzoneretalia villosae* and from the central and western fringe of *Artemisio-Brometalia erecti*.

6. CONCLUSIONS

This phytosociological research has focussed on the dry grasslands of Ausoni-Aurunci mountains and has resulted in the establishment of two new associations for the Tyrrhenian side of Peninsular Italy: *Violo-Koelerietum splendentis* and *Helichryso-Brometum erecti*. The former occurs at altitudes from 900 to 1500 m and belongs mainly to the *Fagus sylvatica* dynamical series, while the latter occurs from 400 to 900 m and belongs to mesophilous *Quercus ilex* woods and *Ostrya carpinifolia* woods. The syntaxonomical and nomenclatural analysis of the dry grasslands of the whole of the central Apennines has led to significant changes to the old syntaxonomical schemes, which can be summarized as follows: the new suborder *Festuco circummediterraneae-Seslerienalia nitidae* is proposed; the invalid name *Phleo ambigui-Bromion erecti* Biondi et al. 1995 has been substituted with the valid name *Cytiso spinescentis-Bromion erecti* as representative of Peninsular Italy hilly, submontane and montane grasslands on limestone. This latter has been divided into two suballiances: *Sideritidenion italicae* (montane belt) and *Phleo ambigui-Bromenion erecti* (hilly and submontane belts). The syndistribution area of *Cytiso spinescenti-Bromion erecti* ranges from the northern Marches to northern Calabria (Pollino-Orsomarso mountains). Moving south *Cytiso-Bromion* is vicaried by *Koelerio-Astragalion*, which includes the montane dry grasslands and garrigues developed on siliceous substrates. The syntaxonomical framework, the nomenclatural types of alliance and suballiances and the list of characteristic species have been reported in the subparagraphs below.

7. SYNTAXONOMICAL SCHEME

(Cl.) *Festuco-Brometea* Br.-Bl. & Tüxen ex Br.-Bl. 1949

(or.) *Artemisio albae-Brometalia erecti* Ubaldi ex Mucina & Dengler 2009
[*Artemisio albae-Brometalia erecti* (Biondi, Ballelli, Allegrezza & Zuccarello 1995) Ubaldi 1997 nom. inval. Art. 5; *Artemisio albae-Brometalia erecti* (Biondi, Ballelli, Allegrezza & Zuccarello 1995) Ubaldi 2003 nom. inval. Art. 5; *Brometalia caprini* Ubaldi 1997 nom. inval. Art. 5; *Euphorbietalia myrsinitetis* Ubaldi 2011 Synt. synon.; *Asphodelino liburnicae-Brometalia erecti* Ubaldi 2011 nom. inval. Art. 2. *Seslerio nitidae-Caricion macrolepidis* Ubaldi 1997 Synt. synon; *Botriochloo ischaemoni-Bromion erecti* Ubaldi 1997 Synt. synon. p.p. *Violo pseudogracilis-Bromopsion caprinae* Terzi 2011 Synt. synon. p.p.]

(s-or.) *Festuco circummediterraneae-Seslerienalia nitidae* (Ubaldi 2003) stat. nov. hoc loco
[Original form: *Festuco-Seslerietalia nitidae* Ubaldi 2003]
Suborder typus: *Seslerio nitidae-Caricion macrolepidis* Ubaldi 1997 (Ubaldi, 2003: 247, 300)

(all.) *Cytiso spinescentis-Bromion erecti* Bonin 1978
[Original form: *Cytiso-Bromion erecti* Bonin 1978; *Cytiso-Bromion caprini* Barbero & Bonin 1969 p.p. nom. inval. Art. 3; *Crepido lacerae-Phleion ambigui* Biondi & Blasi 1982 nom. inval. Art. 3, 5; *Phleo ambigui-Bromion erecti* Biondi, Ballelli, Allegrezza & Zuccarello 1995: nom. inval. Art. 2, 5; *Seslerio nitidae-Caricion macrolepidis* Ubaldi 1997 Synt. synon; *Botriochloo ischaemoni-Bromion erecti* Ubaldi 1997 Synt. synon. p.p.; *Siderition italicae* Ubaldi 2011 Synt. synon.; *Knautio calycinae-Bromion caprini* Ubaldi 2011 Synt. synon.; *Violo pseudogracilis-Bromopsion caprinae* Terzi 2011 Synt. synon. p.p.]
Alliance typus: *Lavandulo angustifoliae-Asphodelinetum luteae* Bonin 1978

(suball.) *Sideritidenion italicae* Biondi, Ballelli, Allegrezza & Zuccarello 1995 corr. Biondi, Allegrezza, Zuccarello 2005
[Original form: *Sideridenion syriacae* Biondi, Ballelli, Allegrezza & Zuccarello 1995. *Seslerio-Xerobromion apenninum* Bruno & Covarelli 1968 nom. illeg. Art. 34; *Brachypodenion genuensis* Biondi, Ballelli, Allegrezza & Zuccarello 1995: Synt. synon.)]
suballiance typus: *Saturejo montanae-Brometum erecti* Avena & Blasi ex Biondi, Ballelli, Allegrezza & Zuccarello 1995
- *Lavandulo angustifoliae-Asphodelinetum luteae* Bonin 1978
- *Saturejo montanae-Brometum erecti* Avena & Blasi ex Biondi, Ballelli, Allegrezza & Zuccarello 1995
- *Violo pseudogracilis-Koelerietum splendentis* ass. nov.

(suball.) *Phleo ambigui-Bromenion erecti* Biondi, Allegrezza & Zuccarello 1995 ex Di Pietro suball.nov.
[*Phleo ambigui-Bromenion erecti* Biondi, Allegrezza & Zuccarello 2005 (nom. inval. Art. 3, 5).]
suballiance typus: *Asperulo purpureae-Brometum erecti* Biondi & Ballelli ex Di Pietro ass. nov.
- *Asperulo purpureae-Brometum erecti* Biondi & Ballelli ex Di Pietro ass. nov.
- *Helichryso italici-Brometum erecti* ass. nov.
  [incl. *Saturejo montanae-Brometum erecti* Avena & Blasi 1979 *medicaginetosum* Lucchese et al. 1995 nom. inval. Art. 4; *Saturejo montanae-Brometum erecti* Avena & Blasi 1979 *leontodontetosum* Lucchese et al. 1995 nom. inval. Art. 4 p.p.]

(Cl.) *Rumici-Astragaletea siculi* Pignatti & Nimis in Pignatti E., Pignatti S., Nimis & Avanzini 1980

(s-or.) *Anthemidetalia calabricae* Brullo, Scelsi & Spampinato 2001

(all.) *Koelerio brutiae-Astragalion calabrici* Giacomini & Gentile ex Brullo, in Brullo, Cormaci, Giusso del Galdo, Guarino, Minissale, Siracusa, Spampinato 2005.
[*Koelerio-Astragalion calabri* Giacomini & Gentile 1961 nom. inval. Art. 8; *Koelerio-Astragalion calabri* Giacomini & Gentile 1966 nom. inval. Art. 8; *Koelerio-Astragalion calabrici* Giacomini & Gentile ex Brullo, Gangale & Uzunov 2004 nom. inval. Art. 5]
Alliance typus: *Astragaletum calabrici* Giacomini & Gentile ex Bonin 1978

LIST OF THE CHARACTERISTIC SPECIES OF ORDER, SUBORDER, ALLIANCE, AND SUBALLIANCES

***Artemisio albae-Brometalia erecti* Ubaldi ex Mucina & Dengler 2007**

Characteristic species (provisional): *Aethionema saxatile, Allium sphaerocephalon, Alyssum montanum, Anthericum liliago, Anthyllis vulneraria* subsp. *rubriflora, Anthyllis vulneraria* subsp. *weldeniana, Arabis collina, Arabis sagittata, Artemisia alba, Asperula aristata, Asperula purpurea, Asperula cynanchica, Astragalus monspessulanus, Biscutella laevigata, Brachypodium rupestre, Bunium bulbocastanum, Carlina acaulis* subsp. *caulescens, Cota tinctoria, Cyanus triumfetti, Dianthus sylvestris, Dorycnium penthaphyllum, Echinops ritro, Eryngium amethystinum, Festuca circummediterranea, Galium lucidum, Globularia bisnagarica, Helianthemum apenninum, Helianthemum nummularium* subsp. *obscurum*, *Hieracium piloselloides, Hippocrepis comosa, Inula hirta, Inula montana, Knautia purpurea, Koeleria cristata, Koeleria splendens, Koeleria vallesiana, Leontodon crispus, Linum tenuifolium, Melica ciliata, Muscari neglectum, Narcissus poeticus, Ononis spinosa, Ophrys apifera, Ophrys holoserica, Orchis antropophora, Orchis tridentata, Petrorhagia prolifera*, *Plantago sempervirens, Polygala major, Polygala nicaeensis* (subsp. pl.)*, Potentilla hirta, Potentilla tabernaemontani, Pseudolysimachion barrelieri, Satureja montana*, *Scabiosa columbaria, Seseli montanum, Silene otites, Stachys recta* (subsp. pl.)*, Teucrium chamaedrys, Teucrium montanum, Thesium humifusum, Trinia glauca*.

***Festuco circummediterraneae-Seslerienalia nitidae* (Ubaldi 2003) stat. nov.**

Characteristic species: (the same as for the alliance *Cytiso-Bromion erecti*)

***Cytiso spinescentis-Bromion erecti* Bonin 1978**

Characteristic species: *Asphodeline lutea, Carex macrolepis, Centaurea ambigua, Centaurea deusta* subsp. *deusta, Centaurea rupestris* subsp. *ceratophylla, Crepis lacera, Elaeoselinum asclepium, Erysimum pseudorhaeticum, Festuca inops, Hypochoeris cretensis, Laserpitium siler* subsp. *siculum, Phleum hirsutum* subsp. *ambiguum, Polygala flavescens, Potentilla detommasii, Stipa dasyvaginata* subsp. *apenninicola, Sideritis italica, Leontodon cichoraceous, Thymus striatus, Scabiosa holosericea, Sesleria nitida*.

Regional characteristic species: *Alyssum diffusum, Argyrolobium zanonii, Euphorbia myrsinites, Helianthemum apenninum, Minuartia verna* subsp. *collina, Orchis pauciflora, Pimpinella tragium, Potentilla pedata, Ranunculus monspeliacus, Ranunculus illyricus, Ruta graveolens, Seseli palasii, Thlaspi praecox, Tragopogon samaritani*.

Partial Characteristic species ("S": Restricted to southern and eventually central Apennines; "N": Restricted to central/northern Apennines). *Armeria macropoda* (S), *Asphodeline liburnica* (S), *Ophrys tenthredinifera* (S)*, Ophrys lacaitae* (S) *Ophrys lutea* (S), *Orchis quadripunctata* (S), *Ornithogalum etruscum, Ornithogalum exscapum, Trifolium brutium* (S), *Festuca robustifolia* (N), *Sesleria apennina* (N), *Festuca stricta* subsp. *sulcata* (N).

Transgressive species: (CM/R = shared with *Cisto-Micromerietea/Rosmarinetea*): *Aethionema saxatile, Asperula aristata, Festuca stricta* subsp. *trachyphylla, Galium corrudifolium, Globularia bisnagarica, Plantago holosteum, Ranunculus millefoliatus,* Insgressive species: *Cytisus spinescens* (CM/R), *Euphorbia spinosa* (CM/R), *Onosma echioides* (CM/R)

***Sideritidenion italicae* (Biondi, Ballelli, Allegrezza & Zuccarello 1995) Biondi, Allegrezza & Zuccarello 2005**

Characteristic species: *Acinos alpinus* subsp. *meridionalis*, *Anthemis cretica* subsp. *columnae, Avenula praetutiana, Brachypodium genuense, Dianthus brachycalyx, Onobrychis alba* subsp. *alba, Potentilla rigoana, Rhinanthus wettsteinii, Senecio tenorei, Silene notarisii, Trinia dalechampii, Veronica orsiniana*.

Regional characteristic species: *Allium flavum, Carex humilis, Plantago argentea* subsp. *argentea*, *Potentilla incana, Gymnadenia conopsea, Acinos alpinus* subsp. *meridionalis, Valeriana tuberosa, Armeria canescens* s.l.

Partial Characteristic species: *Viola pseudogracilis*

Transgressive species: *Sesleria nitida, Carex macrolepis, Cerastium arvense* subsp. *suffruticosum,*.

Ingressive species: *Lomelosia crenata* subsp. *crenata* (CM/R)*, Helianthemum oelandicum* subsp. *incanum* (CM/R), *Globularia meridionalis* (CM/R), + species from *Seslerion apenninae, Seslerietalia tenuifoliae*, *Elyno-Seslerietea* (*Anthyllis montana* subsp. *jaquinii, Cerastium tomentosum, Edrajanthus graminifolius, Festuca laevigata*

(ssp. pl).*, Sesleria juncifolia, Paronichya kapela, Draba aizoides, Thymus praecox* subsp. *polytrichus*, etc.).

***Phleo ambigui-Bromenion erecti* Biondi, Allegrezza & Zuccarello ex Di Pietro suball. nov.**

Characteristic species: *Allium tenuiflorum*, *Carex flacca* subsp. *serrulata*, *Centaurium erythraea, Cephalaria leucantha*, *Convolvulus cantabrica, Coronilla minima, Crepis neglecta, Crupina vulgaris, Dianthus ciliatus, Hieracium cymosum, Linum bienne, Marrubium incanum, Melica transsylvanica, Melica ciliata, Muscari comosum*, *Ononis pusilla, Silene gallica, Silene paradoxa, Trifolium strictum*.

Regional characteristic species: (most of the characteristic species).

Partial Characteristic species: *Klasea flavescens, Lomelosia crenata* subsp. *pseudisetensis*.

Transgressive species: *Eryngium campestre, Elaeoselinum asclepium, Erysimum pseudorhaeticum*.

Ingressive species: *Helichrysum italicum* (CM/R), *Teucrium capitatum* (CM/R), *Micromeria graeca* (CM/R), + species from *Lygeo-Stipetea* and *Trachynetalia distachyae* (*Avena barbata, Briza maxima*, *Brachypodium retusum, Bupleurum baldense, Cynosurus echinatus, Linum strictum* (ssp. pl.)*, Medicago minima, Ononis reclinata, Petrorhagia saxifraga, Reichardia picroides, Sideritis romana Trigonella gladiata, Trigonella monspeliaca, Triticum ovatum, Urospermum dalechampii*)

ACKNOWLEDGEMENTS

This paper is dedicated to Giovanna Abbate, Marina Allegrezza, Giancarlo Avena, Sandro Ballelli, Edoardo Biondi, Carlo Blasi, Gilles Bonin, Franco Bruno, Francesco Corbetta, Krunica Hruska and Gianfranco Pirone, whose pioneering studies shed the first light upon the floristic and coenological originality of the central Apennines dry grasslands. Thanks also to the younger phytosociologists who subsequently contributed to enlarging the phytosociological knowledge of this peculiar environment. Sincere thanks are given to Jean-Paul Theurillat, for his precious help in sorting out the intricate nomenclatural questions, and to Massimo Terzi for the preliminary revision of the manuscript. Thanks also to the anonymous reviewers for their useful suggestions and comments. The present research was partially supported by a financial (and logistical) contribution from Monti Aurunci Regional Park. The present research was partially suported by a financial (and logistical) contribution from Monti Aurunci Regional Park, where a special mention is dedicated to all the members of the Parkguards corp.

REFERENCES

Abbate, G. & Avena, G.C., Blasi, C. & Fascetti, S. 1984: Pastures with *Bromus erectus* Hudson at the Mula, Muletta and Cozzo del Pellegrino Mountains (Western Calabria – Southern Italy). Annali di Botanica (Roma) 42: 67–74.

Alegro, A. & Šoštarić, R. 2006: Morphometric characteristics within *Festuca valesiaca* agg. (Poaceae -Poeae) in Istria and the status of the *F. illyrica* Markgr.-Dann. Phyton (Horn) 46: 113–28.

Allegrezza, M. 2003: Vegetazione e paesaggio vegetale della dorsale del Monte San Vicino (Appennino centrale). Fitosociologia 40(1) Suppl. 1: 3–118.

Allegrezza, M., Biondi, E., Formica, E. & Ballelli, S. 1997: La vegetazione dei settori rupestri calcarei dell'Italia centrale. Fitosociologia 32: 91–120.

Angiolini, C., Riccucci, C. & De Dominicis, V.: 2003. Grasslands of the order *Brometalia erecti* Br.-Bl. 1936 on Antiapennine calcareous massifs in central-southern Tuscany (central Italy). Lazaroa 24: 61–85.

Avena, G. C. & Blasi, C. 1979: *Saturejo montanae-Brometum erecti* ass. nova dei settori pedemontani dell'Appennino calcareo centrale. Archivio Botanico e Biogeografico Italiano 55: 34–43.

Avena, G. C., & Blasi, C. 1980: Carta della vegetazione del Massiccio del Monte Velino. Appennino Abruzzese, P.F. "Promozione della qualità dell'ambiente", C.N.R., Roma, AQ/1/35: 1–18.

Avena, G. C. & Bruno, F. 1975: Lineamenti della vegetazione del massiccio del Pollino, Appennino calabro-lucano. Notiziario Fitosociologico 10: 131–153.

Ballelli, S. & Biondi, E. 1982: Carta della vegetazione del Foglio Pergola, 1:50.000. P.F. "Promozione della qualità dell'ambiente", C.N.R., Roma, AQ/1/86: 1–33.

Ballelli, S., Biondi, E., Cortini-Pedrotti, C., Dell' Uomo, A., Francalancia, C., Hruska Dell'Uomo, K., Orsomando, E., Paganelli, A., Pedrotti, F. & Sensi, M. 1977: Escursione sociale sull'Appennino Umbro-Marchigiano, Camerino 4–7 luglio 1977. Informatore Botanico Italiano 9 (3): 217–241.

Barberis, G., Bechi, N. & Miceli P. 1995: Indagini biosistematiche e tassonomiche sul gruppo di *Cerastium scaranii* sensu Buschmann (*Caryophyllaceae*): problematiche relative. Bollettino della Società Sarda di Scienze Naturali 30: 517–529.

Barbero, M. & Bonin, G. 1969: Signification biogéographique et phytosociologique des pelouses écorchées des massifs méditerranéens nord-occidentaux, des Apennins et des Balkans septentrionaux (*Festuco-Seslerietea*). Bulletin de la Société Botanique de France 116: 227–246.

Bechi, N. 1998: Ricerche citogeografiche in *Cerastium arvense* L. s.l. (*Caryophyllaceae*) in Italia. Webbia 53 (1): 1–12.

Biondi, E., 1988: Paturages et dynamisme de la vegetation dans l'apennin centro-septentrional. Colloques Phytosociologiques 16: 293–306.

Biondi, E., Allegrezza, M., Ballelli, S., Calandra, R., Crescente, M. F., Frattaroli, A. R., Gratani, L., Rossi, A., Taffetani, F. 1992: Indagini per una cartografia fitoecologica dell'altipiano di Campo Imperatore (Gran Sasso d'Italia). Bollettino dell'Associazione Italiana di Cartografia 86: 85–98.

Biondi, E., Allegrezza, M. & Frattaroli A. R. 1992: Inquadramento fitosociologico di alcune formazioni pascolive dell'Appennino Abruzzese-Molisano. Documents Phytosociologiques N.S. 14: 195–210.

Biondi, E., Allegrezza, M. & Zuccarello, V. 2005: Syntaxonomic revision of the Apennine grasslands belonging to *Brometalia erecti*, and an analysis of their relationships with the xerophilous vegetation of *Rosmarinetea officinalis* (Italy). Phytocoenologia 35 (1): 129–164.

Biondi, E. & Ballelli, S., 1981: Su una nuova associazione di pascolo arido nell'Appennino centrale. Congresso Nazionale Società Botanica Italiana, Camerino, 26–29 ottobre 1981: 18.

Biondi, E., Ballelli, S. 1982: La vegetation du Massif du Catria (Apennin central) avec carte phytosociologique 1: 15.000. In: Pedrotti, F. (ed.): Guide-Itinéraire – Excursion Internationale de Phytosociologie en Italie centrale: 211–236.

Biondi, E. & Ballelli, S. 1995: Le praterie del Monte Coscerno e Monte di Civitella (Appennino Umbro-Marchigiano – Italia centrale). Fitosociologia 30: 91–121.

Biondi, E., Ballelli, S., Allegrezza, M. & Zuccarello, V. 1995: La vegetazione dell'ordine *Brometalia erecti* Br.-Bl. 1936 nell'Appennino (Italia). Fitosociologia 30: 3–45.

Biondi, E., Ballelli, S., Allegrezza, M., Guitian, J. & Taffetani, F., 1986. *Centaureo bracteatae-Brometum erecti* ass. nova dei settori marnoso-arenacei dell'Appennino centrale. Documents Phytosociologiques N.S. 10 (2): 117–126. Camerino.

Biondi, E., Ballelli, S., Allegrezza, M., Taffetani, F., Frattaroli, A. R., Guitan J., Zuccarello V., 1999: La vegetazione di Campo Imperatore (Gran Sasso d'Italia). Braun-Blanquetia 16: 33–53.

Biondi, E. & Blasi C. 1982: *Crepido lacerae-Phleion ambigui* nouvelle alliance pour les paturages arides a *Bromus erectus* de l'Apennin calcaire central et meridional. Documents Phytosociologiques 7: 435–442. Camerino.

Biondi, E. & Blasi, C. 1984: Les pelouses seches calcaires a *Bromus erectus* de l'Apennin central et meridional (Italie). Colloques Phytosociologiques 11: 195–200.

Biondi, E., Blasi, C., Burrascano, S., Casavecchia, S., Copiz, R., Del Vico, E., Galdenzi, D., Gigante, D., Lasen, C., Spampinato, G., Venanzoni, R. & Zivkovic, L. 2009: Manuale Italiano di interpretazione degli habitat della Direttiva 92/43/CEE. Società Botanica Italiana. Ministero dell'Ambiente e della tutela del territorio e del mare, D.P.N.

Biondi, E. & Guerra, V. 2008: Vegetazione e paesaggio vegetale delle gravine dell'arco jonico. Fitosociologia 45 (1) Suppl. 1: 57–125.

Biondi, E., Guitian, J., Allegrezza, M. & Ballelli, S. 1988: Su alcuni pascoli a *Sesleria apennina* Ujhelyi nell'Appennino centrale. Documents Phytosociologiques N.S. 11: 417–422. Camerino.

Biondi, E., Pinzi, M. & Gubellini, L. 2004: Vegetazione e paesaggio vegetale del Massiccio del Monte Cucco (Appennino centrale, Dorsale Umbro-Marchigiana). Fitosociologia 41(2): 1–81.

Blasi, C. 1993: Carta del Fitoclima del Lazio. Regionalizzazione e caratterizzazione climatica. Regione Lazio, Assessorato Agricoltura e Foreste, Caccia e Pesca, Usi civivi. Università La Sapienza, Dip.to Biologia Vegetale, Roma.

Blasi, C. 2006: Il Fitoclima d'Italia. In: Blasi, C. (ed), Completamento delle Conoscenze Naturalistiche di base, GIS Natura. Direzione per la protezione della Natura, Ministero dell'Ambiente e della Tutela del Territorio.

Blasi, C., Boitani, L., La Posta, S., Manes, F. & Marchetti, M. 2005. Biodiversity in Italy. Palombi Editore, Roma.

Blasi, C., Capotorti, G. & Fortini, P. 1998: On the vegetation series in the northern sector of the Simbruini mountains (Central Apennines). Fitosociologia 35: 85–102.

Blasi, C., Di Pietro, R. & Pelino, G. 2005: The vegetation and landscape of alpine belt karsttectonic basin in the Majella mountain (central Apennines). Plant Biosystems 139 (3): 357–385.

Blasi, C., Marignani, M., Copiz, R., Fipaldini, M. & Del Vico, E. 2010. Le Aree Importanti per le piante nelle regioni d'Italia. Il presente e il futuro della conservazione del nostro patrimonio botanico. Progetto Artiser, Roma. 224 pp.

Blasi, C., Tilia, A. & Abbate, G. 1990: Le praterie aride dei M.ti Ruffi (Lazio – Italia centrale). Annali Botanica (Roma) Studi sul Territorio 48 (7): 17–32.

Bonin, G. 1978: Contribution à la connaissance de la végétation des montagnes de l'Apennin centro-meridional. Thèse Univ. Marseille, Centre Regional de Documentation Pedagogique, Marseille, France. 318 pp.

Braun-Blanquet, J. 1964: Pflanzensoziologie. Grundzüge der Vegetationskunde. Springer Verlag Wien: 865 pp.

Brullo, S., Cormaci, A., Giusso Del Galdo, G., Guarino, R., Minissale, P., Siracusa G. & Spampinato, G. 2005. A syntaxonomical survey of the Sicilian dwarf shrub vegetation belonging to the class *Rumici-Astragaletea siculi*. Annali di Botanica (Roma) n.s. 5: 103–149.

Brullo, S., Gangale C. & Uzunov, D. 2004: The orophilous cushion-like vegetation of the Sila. Massif (S Italy). Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie 125(4): 453–488.

Brullo, S., Giusso del Galdo, G.P. & Minissale, P. 2009: Taxonomic revision of the *Koeleria splendens* C. Presl group (*Poaceae*) in Italy based on morphological characters. Plant Biosystems 143: 140–161.

Bruno, F. & Covarelli, G. 1968: I pascoli e i pratipascoli della Valsorda (Appennino Umbro). Notiziario Fitosociologico 5: 47–64.

Castelli, M. 1995: Brometi del versante padano dell'Appennino Ligure-Piemontese (Italia). Fitosociologia 30: 51–90

Castelli, M., Biondi, E. & Ballelli, S. 2001: La vegetazione erbacea, arbustiva e preforestale del piano montano dell'Appennino piemontese (Valli Borbera e Curone – Italia). Fitosociologia 38(1): 125–151.

Catorci, A., Gatti, R. & Ballelli, S. 2007: Studio fitosociologico della vegetazione delle praterie montane dell'Appennino maceratese (Italia centrale). Braun-Blanquetia 42: 101–143.

Ciaschetti, G., Pirone, G., Frattaroli, A. R. & Corbetta, F., 2006: La vegetazione del Piano di Pezza (Parco Naturale Regionale "Sirente-Velino", Italia Centrale). Fitosociologia 43 (1): 67–84.

Conti, F., Abbate, G., Alessandrini, A. & Blasi, C. 2005: An Annotated Checklist of the Italian Vascular Flora. Palombi Editore, Roma.

Corbetta, F. 1984: Lineamenti vegetazionali dell'Appennino meridionale. Biogeographia N.S. 10: 141–159.

Corbetta, F., Ubaldi, D. & Puppi, G. 1984: Tipologia fitosolciologica delle praterie altomontane del Monte Volturino e del Monte della Madonna di Viggiano (Appennino lucano). Biogeographia N.S. 10: 207–236.

Di Pietro, R. 2007: Taxonomical features of *Sesleria calabrica* stat. nov. (*Poaceae*), a neglected species from southern Italy. Folia Geobotanica 42: 289–313.

Di Pietro, R. & Blasi, C., 2002: A phytosociological analysis of abandoned olive groves grasslands of Ausoni mountains (Tyrrhenian district of Central Italy). Lazaroa 23: 79–93.

Di Pietro, R., Pelino, G., Stanisci, A. & Blasi C. 2008: Phytosociological Features of *Adonis distorta* and *Trifolium noricum* subsp. *praetutianum,* two endemics of the Apennines (Peninsular Italy). Acta Botanica Croatica 67(2): 175–200.

Di Pietro, R. & Wagensommer, R. P. 2008: Analisi fitosociologica su alcune specie rare o minacciate del Parco Nazionale del Gargano (Italia centro-meridionale) e considerazioni sintassonomiche sulle comunità casmofitiche della Puglia. Fitosociologia 45 (1): 177–200.

Fanelli, G., Lucchese, F. & Paura B. 2001. Le praterie a *Stipa austroitalica* di due settori adriatici meridionali (basso Molise e Gargano). Fitosociologia 38(2): 25–36.

Feoli-Chiapella & Poldini, L. 1993: Prati e pascoli del Friuli (NE Italia) su substrati basici. Studia Geobotanica 13: 3–140.

Foggi, B., Rossi, G. & Pignotti, L: 2007: *Sesleria pichiana* (*Poaceae*): a new species from North-West Italian peninsula. Webbia 62(1): 1–10

Forte, L., Perrino, E. V. & Terzi, M., 2005: Le praterie a *Stipa austroitalica* Martinovsky ssp. *austroitalica* dell'Alta Murgia (Puglia) e della Murgia Materana (Basilicata). Fitosociologia 42 (2): 83–103.

Francalancia, C. & Orsomando, E. 1981: Carta della vegetazione del Foglio Spoleto, 1980, 1:50.000. P.F. "Promozione della qualità dell'ambiente", C.N.R., Roma, AQ/1/87.

Frattaroli, A. R. 1988: La vegetazione della dolina "Fossa Raganesca" (Appennino centrale – Italia). Documents Phytosociologiques 11: 491–503.

Giacomini, V. & Gentile, S. 1961: Observations synthétiques sur la végétation anthropogène montagnarde de la Calabre (Italie meridionale). Delpinoa 3: 55–67.

Giacomini, V. & Gentile, S. 1966: Observations synthétiques sur la végétation anthropogène montagnarde de la Calabre (Italie meridionale). Anthropogene Vegetation: 135–145.

Horvat, I., Glavač, V. & Ellenberg, H. 1974: Vegetation Sudosteuropas. Fischer Verlag. Stuttgart. 768 pp.

Horvatić, S. 1958a: Typologische gliederung der garrigues und kieferwälder-vegetation des ostradriatischen küstenlandes. Ebenda 17: 1–98.

Horvatić S. 1958b: Geographisch-typologische Gliederung der Niederungs-Wiesen und Weiden Kroatiens. Pflanzengeographischen Gebiete Kroatiens. Angewandte Pflanzensoziologie 15: 63–73.

Horvatić, S. 1973: Syntaxonomic analysis of the vegetation of dry grassland and stony meadows in Eastern Adriatic coastal Karst district based on the latest phytocoenological research. Fragmenta Herbologica Jugoslavica 32: 1–15.

Horvatić, S. 1975: Neuer Beitrag zur Kenntnis der Syntaxonomie der Trocken-Rasen und Steintriften-Gesellschaften des ostadriatischen Karstgebietes. In: Jordanov D., Bondev I., Kozuharov S., Kuzmanov B., Palamarev E. & Velcev V. (ed.): Problems of Balkan Flora and Vegetation. Bulgarian Academy of Science, Sofia: 300–310.

Hruska-Dell'Uomo K. 1976: Contributo alla conoscenza dei pascoli aridi dell'Appennino marchigiano. Notiziario Fitosociologico 12: 19–30.

Hruska, K. 1982: Les paturages de Collelongo. In: Pedrotti F. (ed.): Guide-Itinéraire – Excursion Internationale de Phytosociologie en Italie centrale: 211–236.

Kamenjarin, J. & Pavletić, Z. 2003: Analiza vegetacije na otoku Čiovu. Hladnikia 15–16: 23–41.

Lucchese, F. & Lattanzi, E. 2000: Atlante della flora dei Monti Ausoni. Regione Lazio. New Publ. House, Roma. 461 pp.

Lucchese, F., Persia, G. & Pignatti, S. 1995: I prati a *Bromus erectus* Hudson dell'Appennino Laziale. Fitosociologia 30: 145–180.

Lucchese, F. & Pignatti, S. 1990: *Cynaro-Cichorietum pumili*, un example de diversité floristique exceptionelle dans les environs de Rome (Italie). Ecologia Mediterranea 16:279–290.

Maiorca, G. & Spampinato, G. 1999: La vegetazione della riserva naturale orientata "Valle del fiume Argentino" (Calabria nord-occidentale). Fitosociologia 36 (2): 15–60.

Miceli, P., Bechi, N. & Barberis G. 1997: Biosystematic investigation on perennial *Cerastium* (*Caryophyllaceae*) populations from Tuscany (N-W Italy). Lagascalia 19 (1–2): 819–829.

Moraldo, B., Minutillo, F. & Rossi, W. 1990: Flora del Lazio Meridionale. Quaderni dell'Accademia Nazionale dei Lincei 264: 219–292.

Mucina, L., Dengler, J., Bergmeier, E., Čarni, A., Dimopoulos, P., Jahn, R. & Matevski, V. 2009: New and validated high-rank syntaxa from Europe. Lazaroa 30: 267–276 (2009).

Oberdorfer, E. 1992: Suddeutsche Pflanzengelleschaften. Teil 2: 86–180 Aufl. Gustav Fischer, Jena.

Peruzzi, L. Barbo, M. Bartolucci, F. Bovio, M. Carta, A. Ciccarelli, D. Conti, F., Costalonga, S. Di Pietro, R. Galasso, G. Gestri, G. Lattanzi, E. Lavezzo, P. Marsili, S. Peccenini, S. Pierini, B. Tardella, F.M. Terzo, V. Turrisi, R.E. & Bedini G. 2009: Contributo alla conoscenza floristica delle Colline Pisane: resoconto dell'escursione del Gruppo di Floristica (S.B.I.) nel 2009. Informatore Botanico Italiano 43(1): 3–27.

Petriccione, B. 1993: Flora e vegetazione del Massiccio del Monte Velino. Ministero delle Risorse Agricole e Forestali, Collana verde 92: 261 pp.

Pignatti S. 1982: Flora d'Italia. Edagricole, Bologna.

Pignatti, S., Menegoni, P., Pietrosanti, S., 2005: Bioindicazione attraverso le piante vascolari.

Valori di indicazione secondo Ellenberg (Zeigerwerte) per le specie delle Flora d'Italia. Braun-Blanquetia 39: 1–97.

Pirone G., Tammaro, F. 1997: The hilly calciophilous garigues in Abruzzo (central Apennines-Italy). Fitosociologia 32: 73–90.

Podani, J. 2001: SYN-TAX 2000. Computer Programs for Data Analysis in Ecology and Systematics. User's manual. Scientia Publishing, Budapest, Hungary.

Poldini, L. 1995: La classe *Festuco-Brometea* nell'Italia nordorientale. Fitosociologia 30: 47–50.

Poldini, L. & Sburlino, G. 2005: Terminologia fitosociologica essenziale. Fitosociologia 42 (1): 57–69.

Quintanar, A., Glazkova, E. & Castroviejo, S. 2009: On the identity and typification of *Koeleria lobata* (M. Bieb.) Roem. & Schult. (*Pooideae, Gramineae*). Taxon 58 (2): 617–620.

Redžić, S. 2010: The origin, syndynamics and syntaxonomy of thermophilous vegetation of class *Festuco-Brometea* Br.-Bl. et R.Tx in Br.-Bl. 1943 at the Dinaric Alps (W. Balkan). 10th Symposium on the Flora of Southeastern Serbia and Neighbouring regions, Vlasina 17 to 20 June 2010. Abstract: 31

Rivas-Martínez, S., Penas, A., & Diaz, T. 2002: Biogeographic Map of Europe. Serv. Publ. Universidad de Leon. Leon.

Royer, J. M. 1991: Synthèse eurosibérienne, phytosociologique et phytogéographique de la classe des *Festuco-Brometea*. Dissertationes Botanicae 178: 1–296.

Scoppola, A. & Pelosi, M. 1995: I pascoli della Riserva Naturale di Monte Rufeno (Viterbo, Italia centrale). Fitosociologia 30: 123–144.

Tammaro, F., 1995: Lineamenti floristici e vegetazionali del Gran Sasso meridionale. Bollettino del Museo Civico di Storia Naturale di Verona 19: 1–256.

Terzi, M., 2011: Nomenclatural revision of the order *Scorzonero-Chrysopogonetalia*. Folia Geobotanica & Phytotaxonomica, DOI 10.1007/s12224-011-9100-2.

Terzi, M., Di Pietro, R., & D'Amico, F.S. 2010: Analisi delle specie indicatrici applicata alle comunità a *Stipa austroitalica* Martinovsky e relative problematiche sin tassonomiche. Fitosociologia 47(1): 3–28.

Theurillat, J-P., Aeschimann, D., Küpfer, P., Spichiger, R. (1994) 1995: The higher vegetation units of the Alps. Colloques Phytosociologiques 23: 189–239.

Trinajstić, I. 1986: Grassland vegetation of the island of Unija (Adriatic sea, Yugoslavia). Poljoprivredna znanstvena smotra 74: 275–285.

Trinajstić, I. 1992: Sintaksonomska analiza pasnjacke zajednice *Festuco-Koelerietum splendentis* H-ic 1963. Acta Botanica Croatica 51: 103–112.

Trombetta, B., Granati, A., D'Amato, G., Sabina, R., Martelli, G. & Di Pietro, R., 2005: Un approccio integrato (tassonomico, biosistematico e fitosociologico) allo studio del genere *Sesleria* Scop. nell'Appennino. Informatore Botanico Italiano 37(1): 58–59.

Tutin, T.G., Burges, N.A., Chater, A.O., Edmondon, J.R., Heywood, V.H., Moore, D.M., Valentine, D.H., Walters, S.M. & Webb, D.A., 1993: Flora Europaea, I (2nd ed). Cambridge University Press, Cambridge.

Tutin, T.G., Heywood, V.H., Burges, N.A., Moore, D.M., Valentine, D.H., Walters, S.M. & Webb, D.A., 1968–1980: Flora Europaea, II-V, Cambridge University Press, Cambridge.

van der Maarel, E. 1979: Trasformation of cover-abundance values in phytosociology and its effects on community similarity. Vegetatio 39: 97–144.

Ubaldi, D. 1997: Geobotanica e Fitosociologia. Clueb, Bologna: 360 pp.

Ubaldi D. 2003: Flora, fitocenosi e ambiente. Elementi di Geobotanica e Fitosociologia. Clueb, Bologna: 334 pp.

Ubaldi D. 2011: Le vegetazioni erbacee e gli arbusteti italiani. Aracne, Roma (2008): 361 pp.

Venanzoni, R. & Gigante, D. 1999: I pascoli sommitali di Monte Tezio (Perugia, Italia). Fitosociologia 36 (1): 157–174.

Weber, H.E., Moravec, J., & Theurillat J. P. 2000: International Code of Phytosociological Nomenclature. 3rd. edition. Journal of Vegetation Science 11: 739–768.

Received 18. 5. 2011
Revision received 8. 10. 2011
Accepted 12. 10. 2011

APPENDIX 1
Sporadic species

Phytosociological Table 1
Rel. 3: *Minuartia mediterranea* +, *Geranium columbinum* +, *Orlaya daucoides* 1; Rel. 4: *Romulea bulbocodium* +; Rel. 5: *Alyssum alyssoides* +; Rel. 7: *Ornithogalum exscapum* +; Rel. 9: *Acinos arvensis* subsp. *arvensis* +; Rel. 10: *Poa alpina* subsp. *alpina* 1; Rel. 12: *Rhamnus saxatilis* subsp. *infectoria* +, Rel. 13: *Hieracium racemosum* +; Rel. 14: *Medicago minima* +, *Trifolium angustifolium angustifolium* +, *Trifolium scabrum scabrum* 1, *Trifolium stellatum* +, *Vulpia ciliata* 1, *Aira caryophyllea* +, *Sedum sexangulare* 1, *Acer opalus* subsp. *obtusatum* +, *Gastridium ventricosum* +, *Potentilla micrantha* +, *Sedum dasyphyllum* 1, *Sherardia arvensis* +, *Trifolium arvense* +; Rel. 19: *Silene vulgaris* subsp. *vulgaris* +; Rel. 22: *Vulpia myuros* +; Rel. 25: *Cynosurus echinatus* +.

Phytosociological Table 2
Rel. 1: *Myosotis ramosissima* +; Rel. 2: *Acer monspessulanum* +, *Acer opalus* subsp. *obtusatum* +, *Biarum tenuifolium* +; Rel. 3: *Trifolium nigrescens* 1, *Arenaria leptoclados* +, *Crocus suaveolens* +, *Fragaria vesca* +, *Geranium rotundifolium* +, *Hypericum perfoliatum* +, *Hypochaeris glabra* +, *Veronica arvensis* +; Rel. 4: *Rosa agrestis* +, *Geranium sanguineum* +; Rel. 5: *Euphorbia characias* 1; Rel. 6: *Cornus mas* +, *Rosa deseglisei* +, *Hedypnois rhagadioloides* +; Rel. 7: *Carex distachya* +; Rel. 8: *Hypericum montanum* +; Rel. 10: *Bellis perennis* +, *Taraxacum fulvum* +, *Cerastium pumilum* +, *Cerastium arvense* subsp. *strictum* 1; Rel. 12: *Anthoxanthum odoratum* +, *Allium amethystinum* +, *Asphodelus albus* subsp. *delphinensis* +, *Centaurium pulchellum* +; Rel. 13: *Asparagus acutifolius* +, *Silene italica* +; Rel. 17: *Polygala monspeliaca*; Rel. 18: *Trifolium pratense* +, *Rosa spinosissima* 1, *Lathyrus sylvestris* 1, *Vulpia ligustica* 1; Rel. 19: *Pallenis spinosa* +, *Silene gallica* +; Rel. 20: *Trifolium striatum* +, *Erophila verna* +, *Pyrus pyraster* +, *Orlaya daucoides* +, *Trifolium infamia-ponertii* +, *Trigonella monspeliaca* +; Rel. 21: *Allium vineale* +; Rel. 22: *Daphne gnidium* +, *Phillyrea latifolia* +, *Linaria purpurea* +, *Pulicaria odora* 1, *Serapias vomeracea* +; Rel. 23: *Erica arborea* 2, *Iberis umbellata* 1; Rel. 24: *Clematis flammula* +, *Quercus cerris* +, *Ceterach officinarum* +; Rel. 27: *Centaurea calcitrapa* 1, *Crepis capillaris* +.

Synoptic Table 3
COL. 1 – *Helianthemum nummulatium* subsp. *glabrum*: 1, *Daphne oleoides*: 1, *Sorbus aria*: 1, *Cuscuta epithymum* subsp. *kotschyi*: 1, *Hieracium racemosum*: 1, *Iris relicta*: 1, *Orobanche gracilis*: 1, *Potentilla micrantha*: 1; COL. 2 – *Calicotome villosa*: 2, *Carex distachya*: 1, *Euphorbia characias*: 1, *Acer monspessulanum*: 1, *Clematis vitalba*: 2, *Cornus mas*: 1, *Rosa agrestis*: 1, *Rosa deseglisei*: 1, *Anemone hortensis*: 2, *Biarum tenuifolium*: 1, *Crepis capillaris*: 1, *Crocus suaveolens*: 1, *Fragaria vesca*: 1, *Hedypnois rhagadioloides*: 1, *Hypericum montanum*: 1, *Hypericum perfoliatum*: 1, *Hypochaeris glabra*: 1, *Myosotis ramosissima*: 1, *Viola pseudogracilis* subsp. *cassinensis*: 2; COL. 3 – *Iberis umbellata*: 1, *Clematis flammula*: 1, *Daphne gnidium*: 1, *Pistacia lentiscus*: 1, *Erica arborea*: 1, *Pyrus pyraster*: 1, *Quercus cerris*: 1, *Allium amethystinum*: 1, *Biscutella didyma*: 1, *Centaurium pulchellum*: 1, *Gladiolus italicus*: 1, *Ophrys lacaitae*: 1, *Polygala monspeliaca*: 1, *Pulicaria odora*: 1, *Serapias vomeracea*: 1, *Silene gallica*: 1, *Trifolium infamia-ponertii*: 1, *Vulpia ligustica*: 1; COL. 4 – *Juniperus oxycedrus*: 1, *Ononis minutissima*: 1; COL. 5 – *Kengia serotina*: 2, *Thlaspi perfoliatum*: 1; COL. 6 – *Andryala integrifolia*: 1, *Armeria denticulata*:1, *Astragalus hamosus*: 1, *Bromus sterilis*: 1, *Carduus pycnocephalus*: 1, *Centaurea aplolepa*: 1, *Convolvulus arvensis*: 1, *Crepis vesicaria*: 1, *Crepis zacintha*: 1, *Echinops ritro* subsp. *siculus*: 1, *Echium italicum*: 1, *Hordeum leporinum*: 1, *Lactuca virosa*: 1, *Muscari comosum*: 1, *Orlaya grandiflora*: 3, *Orobanche caryophyllea*: 1, *Papaver rhoeas*: 1, *Petrorhagia velutina*: 1, *Santolina etrusca*: 2, *Scabiosa uniseta*: 1, *Sedum rubens*: 1, *Trifolium cherleri*: 1, *Trifolium ligusticum*: 1, *Verbascum lychnitis*: 1, *Vicia cracca*: 1, *Vicia disperma*: 1, *Vicia lutea*: 1, *Xeranthemum cylindraceum*: 2; COL. 7 – *Iberis saxatilis*: 4, *Tolpis staticifolia*: 1; COL. 9 – *Saxifraga granulata*: 1, *Klasea nudicaulis*: 4, *Senecio apenninus*: 2, *Tulipa australis*: 2; COL. 10 – *Marrubium vulgare*: 2, *Rumex acetosa*: 1, *Salvia sclarea*: 1; COL. 11 – *Allium paniculatum*: 1, *Bunium petraeum*: 1, *Corylus avellana*: 1, *Filago arvensis*: 1, *Helleborus foetidus*: 2, *Hieracium bifidum*: 2, *Juniperus alpina*: 2, *Pedicularis petiolaris*: 1, *Pimpinella anisoides*: 1, *Ranunculus garganicus*: 1, *Saxifraga granulata*: 1, *Sedum hispanicum*: 1, *Trifolium squarrosum*: 1, *Vincetoxicum hirundinaria*: 1; COL. 13 – *Bupleurum falcatum* subsp. *cernuum*: 1, *Cytisophyllon sessilifolius*: 1, *Primula veris*: 1, *Senecio doronicum*: 2, *Trifolium rubens*: 1, *Vicia onobrychioides*: 1, *Vicia tenuifolia*: 1;COL. 17 – *Reseda lutea*: 2; COL. 18 – *Arenaria grandiflora*: 1, *Crepis pulchra*: 2, *Gnaphalium uliginosum*: 3, *Lactuca saligna*: 1, *Orobanche alba*: 1, *Polygala vulgaris*: 1, *Trifolium tomentosum*: 3; COL. 19 – *Allium carinatum*: 1, *Alyssum campestre*: 2, *Cerastium semidecandrum*: 1, *Myosotis arvensis* subsp. *arvensis*: 1, *Ophrys fuciflora*: 2, *Senecio provincialis*:1; COL. 20 – *Thy-*

mus oenipontanus: 1, *Thymus pannonicus*: 1, *Ferulago campestris*: 1, *Inula spiraeifolia*: 1, *Stachys sylvatica*: 1; COL. 25 – *Osyris alba*: 1, *Teucrium flavum*: 1; COL. 26 – *Senecio doronicum*: 3, *Helianthemum nummularium* subsp. *grandiflorum*: 3, *Orlaya grandiflora*: 2, *Hypochaeris cretensis*: 1, *Solenanthus apenninus*: 1, *Allium carinatum*: 1, *Cytisus sessilifolius*: 1, *Potentilla calabra*:1, *Anchusa azurea*: 1, *Lamium maculatum*: 1, *Geranium robertianum*: 1, *Pinus leucodermis*: 1, *Sorbus aucuparia*: 1.

APPENDIX 2
Place and date of the relevés

Phytosociological Table 1
Rel. 1–2: M. Redentore, 16/06/2000, Rel. 3–5: M. Revole, 01/06/2010; Rel. 6–16, 19–20: M. Petrella, 18/06/1997; Rel. 7–8: M. Redentore, 23/06/1997; Rel. 9: M. Faggeto, 28/06/1997; Rel. 10–11, 22: M. Ruazzo, 27/06/1997; Rel. 12: M. Forte, 24/07/2002; Rel. 13: M. Altino, 02/07/1996; Rel. 14: M. Faggeto, 02/07/1996; Rel. 15: M. S. Angelo, Rel. 17–18: M. Redentore, 16/06/2000; Rel. 21: M. Redentore, 22/06/1997.

Phytosociological Table 2
Rel. 1–2: Serra Palombi (Monti Ausoni), 14/05/1997, Rel. 3: M. delle Fate (Monti Ausoni), 14/05/1997; Rel. 4: Forcella Buana (Monti Ausoni), 16/05/1997; Rel. 5: Limatella (Monti Ausoni), 16/05/1997; Rel. 6: M. Caruso (Monti Ausoni), 29/05/1997; Rel. 7: Valle Case Nuove (Monti Ausoni), 07/05/1997; Rel. 8–9–10: M. delle Fate (Monti Ausoni), 14/05/1997; Rel. 11: Polleca (M.ti Aurunci), 14/06/2010; Rel. 12: M. Maio (M.ti Aurunci orient.), 04/07/1997; Rel. 13: M. Fammera (M.ti Aurunci), 07/07/1996; Rel. 14–15–16: M. Fusco (M.ti Aurunci), 06/07/1996; Rel. 17: Monte Le Pezze (M.ti Aurunci), 24/06/1996; Rel. 18: Felitto-Acquaviva (M.ti Aurunci), 24/06/1996; Rel. 19: Sella tra M.te Le Pezze e M.te Cervello (M.ti Aurunci), 24/06/1996; Rel. 19: Sella tra M.te Le Pezze e M.te Cervello (M.ti Aurunci), 24/06/1996; Rel. 20: M.te Cervello (M.ti Aurunci), 24/06/1996; Rel. 21: M.te Trino (M.ti Aurunci), 24/06/1996; Rel. 22: Pendici M.te Le Pezze (M.ti Aurunci), 23/06/1996; Rel. 23: Santuario della Civita (M.ti Aurunci), 23/06/1996; Rel. 24: Forcella di Fammera (M.ti Aurunci), 03/07/1996; Rel. 25: Monte Doro (M.ti Aurunci), 21/07/1996; Rel. 26: Monte Fammera (M.ti Aurunci), 07/07/1996; Rel. 27: Monte Vele (M.ti Aurunci), 23/06/1996.

APPENDIX 3

List of the syntaxa quoted in the text
Artemisio albae-Brometalia erecti Ubaldi ex Mucina & Dengler 2009; *Artemisio albae-Satureion montanae* Allegrezza, Biondi, Formica & Ballelli 1997; *Artemisio-Brometalia* Ubaldi ex Dengler & Mucina 2009; *Asperulo purpureae-Brometum erecti* Biondi & Ballelli ex Biondi, Ballelli, Allegrezza & Zuccarello 1995; *Asperulo purpureae-Brometum erecti sideridetosum syriacae* (Hruska, 1982) Biondi, Ballelli, Allegrezza & Zuccarello 1995; *Botriochloo-Bromion erecti* Ubaldi 1997; *Brometalia erecti* Koch 1926; *Cerastio-Carlinetea nebrodensis* Brullo 1984; *Chrysopogono-Koelerion splendentis* Horvatić 1975; *Cisto cretici-Micromerietea julianae* Oberdorfer 1954; *Cynosurion cristati* Tüxen 1947; *Euphorbietalia myrsinitides* Ubaldi 2011; *Festuco-Brometea* Br.-Bl. & Tüxen *ex* Br.-Bl. 1949; *Festuco-Koelerietum* Horvatić 1963; *Festuco circummediterraneae-Seslerienalia nitidae* (Ubaldi 2003) stat. nov. hoc loco; *Festuco-Seslerietalia nitidae* Ubaldi 2003; *Filipendulo vulgaris-Bromion erecti* Ubaldi 2011; *Helichryso italici-Brometum erecti* ass. nov.; *Helichryso italici-Brometum erecti euphorbietosum spinosae* subass. nov.; *Koelerio-Astragalion calabrici* Giacomini & Gentile ex Bonin 1978; *Koelerio-Astragalion calabrici* Giacomini & Gentile ex Brullo, Gangale & Uzunov 2004 nom. inval.; *Koelerio brutiae-Astragalion calabrici* Giacomini & Gentile ex Brullo, in Brullo, Cormaci, Giusso del Galdo, Guarino, Minissale, Siracusa, Spampinato 2005; *Koeleretalia splendentis* Horvatić 1975; *Koelerio splendentis-Festucetum illyricae brachypodietosum retusi* Trinajstić 1992; *Knautio calycinae-Bromion caprini* Ubaldi 2011; *Koelerio splendentis-Festucetum illyricae globularietosum cordifoliae* Trinajstić 1992; *Koelerio-Festucetum illyricae* Trinajstić 1992; *Lavandulo angustifoliae-Asphodelinetum luteae* Bonin 1978; *Lonicero etruscae-Carpinetum orientalis* Blasi, Di Pietro, Filesi & Fortini 2001; *Myrto-Quercetum ilicis*, Horvatić ex Trinajstić 1983; *Oleo-Juniperetum phoeniceae,* Arrigoni, Bruno, De Marco, Veri in De Marco, Dinelli, Caneva 1985; *Ostryo-Quercetum ilicis* Trinajstić (1965) 1974; *Phleo ambigui-Bromenion erecti* Biondi, Allegrezza & Zuccarello 2005; *Phleo ambigui-Bromion erecti* Biondi & Blasi ex Biondi, Ballelli, Allegrezza & Zuccarello 1995; *Plantago holostei-Helianthemetum cani*, (Biondi, Ballelli, Allegrezza, Frattaroli & Taffetani 1992) Biondi & Ballelli in Biondi, Ballelli, Allegrezza & Zuccarello 1995; *Querco-Pinetum halepensis* Loisel 1971; *Rosmarinetea officinalis* Rivas-Martinez, Diaz, Prieto, Loidi & Penas 1991; *Rumici-Astragaletea*

siculi Pignatti & Nimis in Pignatti, Pignatti Nimis & Avanzini 1980; *Saturejion subspicatae* (Horvat 1974) Horvatić 1975; *Saturejo montanae-Brometum erecti* Avena & Blasi 1979; *Saturejo montanae-Brometum erecti leontodontetosum* Lucchese, Persia & Pignatti 1995; *Saturejo montanae-Brometum erecti medicaginetosum minimae* Lucchese, Persia & Pignatti 1995; *Scorzoneretalia villosae* Horvatić 1973; *Scorzonerion villosae* Horvatić 1963; *Scorzonero villosae-Chrysopogonetalia grilli* Horvatić & Horvat in Horvatić 1963; *Seslerietalia tenuifoliae* Horvat 1930; *Sideritidenion italicae* Biondi, Ballelli, Allegrezza & Zuccarello 1995 corr. Biondi, Allegrezza & Zuccarello; *Siderition italicae* (Biondi, Ballelli, Allegrezza & Zuccarello 1995) Ubaldi 2011; *Thero-Brachypodietea* Br.-Bl. ex O. Bolòs 1950 em. Rivas-Mart.1978; *Trigonello monspeliacae-Sideritidetum syriacae* Hruska (1982); *Violo pseudogracilis-Bromopsion caprinae* Terzi 2011; *Violo pseudogracilis-Koelerietum splendentis* ass. nov.; *Xerobromion* (Br.-Bl. & Moor 1938) Moravec et al. 1967.

APPENDIX 4

List of the plant communities referred to the columns of the synoptic table

- COL. 1: *Violo pseudogracilis-Koelerietum splendentis* ass. nov. (Aurunci Mts, southern Latium)
- COL. 2: *Helichryso italici-Brometum erecti typicum* subass. nov. (Aurunci Mts, southern Latium)
- COL. 3: *Helichryso italici-Brometum erecti saturejetosum montani* subass. nov. (Aurunci Mts, southern Latium)
- COL. 4: *Saturejo montanae-Brometum erecti leontodontetosum* Lucchese et al., 1995 (from Table 4 in Lucchese et al. 1995 Fitosociologia, 30); (Latium region mountains)
- COL. 5 *Saturejo montanae-Brometum erecti medicaginetosum* Lucchese et al. 1995 (from Table 4 in Lucchese et al., 1995, Fitosociologia, 30); (Latium region mountains)
- COL. 6: *Cerastio etrusci-Brometum erecti* Angiolini et al., 2003 (from Table 3 in Angiolini et al. 2003, Lazaroa, 24); (Tyrrhenian southern Tuscany mountains)
- COL. 7: *Plantago holostei-Helianthemetum cani* (Biondi et al., 1992) Biondi & Ballelli 1995 (from Table 16 in Biondi et al. 1999, Braun-Blanquetia, 16); (Campo Imperatore, Gran Sasso massif)
- COL. 8: *Plantago holostei-Helianthemetum cani* (Biondi et al., 1992) Biondi & Ballelli 1995 (from COL. 33 in Biondi et al. 2005, Phytocoenologia, 35(1); (central Apennines)
- COL. 9: *Plantago holostei-Helianthemetum cani* (Biondi et al., 1992) Biondi & Ballelli 1995 (from Table 3 in Biondi & Ballelli 1995, Fitosociologia 30); (Umbrian-Marches Apennines)
- COL. 10: *Saturejo montanae-Brometum erecti* Avena & Blasi 1979 (from Table 3 in Avena & Blasi 1979, Arch Bot. Biogeogr. Ital., 55); (Mount Velino massif, Abruzzo)
- COL. 11: *Onobrychido albae-Seslerietum nitidae* Bonin 1978 (from Table 18 in Bonin 1978, Thèse Univ. Marseille; Mount Velino, Abruzzo Apennines).
- COL. 12: *Asperulo purpureae-Brometum erecti* Biondi & Ballelli ex Biondi et al. 1995 (from COL. 8 in Biondi et al. 2005, Phytocoenologia, 35(1); (Umbrian-Marches Apennines)
- COL. 13: *Asperulo purpureae-Brometum erecti* Biondi & Ballelli ex Biondi et al. 1995 (from Table 9 in Catorci et al. 2007, Braun-Blanquetia, 42); (Umbrian-Marches Apennines)
- COL. 14: *Asperulo purpureae-Brometum erecti* Biondi & Ballelli ex Biondi et al. 1995 (from COL. 19 Table 2 in Biondi et al. 1995, Fitosociologia 30); (Umbrian-Marches Apennines)
- COL. 15: *Asperulo purpureae-Brometum erecti teucrietosum montani* Biondi & Ballelli ex Biondi et al. 1995 (from COL. 20 Table 2 in Biondi et al. 1995, Fitosociologia 30); (Umbrian-Marches Apennines)
- COL. 16: *Asperulo purpureae-Brometum erecti sideridetosum syriacae* (Hruska 1982) Biondi et al. 1995 (from COL. 22 Table 2 in Biondi et al. 1995, Fitosociologia 30); (Umbrian-Marches Apennines)
- COL. 17: *Asperulo purpureae-Brometum erecti* Biondi & Ballelli ex Biondi et al. 1995 (from Table 3 in Ballelli & Biondi 1982, CNR AQ/1/130); (Mount Catria, Marches)
- COL. 18: *Trigonello monspeliacae-Sideridetum syriacae* Hruska 1982 (From COL. 30 Table 1 in Hruska, 1982, Guide-Itineraire – Excursion Int. de Phytosoc. en Italie centrale); (Collelongo, Umbria)
- COL. 19: *Potentillo cinereae-Brometum erecti* Biondi et al. 2004 (from Table 10 in Catorci et al. 2007, Braun-Blanquetia, 42); (Umbrian-Marches Apennines)
- COL. 20: *Potentillo cinereae-Brometum erecti* Biondi et al. 2004 (from Table 18 in Biondi et al.

2004, Fitosociologia, 41(2) suppl. 1; (Mount Cucco, Umbrian-Marhes Apennines)
- COL. 21: *Seselio viarum-Brometum erecti* Biondi et al.1992 (from COL. 7 in Biondi et al. 2005, Phytocoenologia 35(1); (Abruzzo National Park)
- COL. 22: *Koelerio splendentis-Brometum erecti* Biondi et al.1992 (from COL. 1 in Biondi et al. 2005, Phytocoenologia 35(1); (Gran Sasso massif)
- COL. 23: *Polygalo majoris-Brometum erecti* Biondi et al.1995 (from COL. 3 in Biondi et al. 2005, Phytocoenologia 35(1); (Gran Sasso Massif)
- COL. 24: *Seslerio nitidae-Brometum erecti* Bruno in Bruno & Covarelli 1968 (from COL. 5 in Biondi et al. 2005, Phytocoenologia 35(1); (Monte Catria, Marches Apennines)
- COL. 25: *Fumano procumbentis-Stipetum appenninicolae* Taffetani et al. 2004 (from Table 27 in Taffetani et al. 2004, Fitosociologia 41(2) suppl. 1; (I Cingoli range, Marches-Apennines).
- COL. 26: *Lavandulo angustifoliae-Asphodelinetum luteae* Bonin 1978 (from Table 21 in Bonin 1978, Thèse Univ. Marseille; Pollino range, southern Apennines).

APPENDIX 5:

Type relevé of *Lavandulo angustifoliae-Asphodelinetum luteae* Bonin 1978. Rel. 509 of Table 21 in: Bonin 1978. Site: Pollino range southern slopes, 1967. author: G. Bonin C. Altitude: 1570 m, Aspect: S, Slope 40%, Cover 50%, Area: 100 m^2. List of species: *Lavandula angustifolia* 1, *Asphodeline lutea* 1, *Leontodon crispus* 1, *Satureja montana* +, *Festuca circummediterranea* 2, *Sideritis italica* 2, *Centaurea deusta* +, *Cytisus spinescens* 1, *Phleum hirsutum* subsp. *ambiguum* 1, *Acinos alpinus* 1, *Polygala alpestris* 1, *Trifolium pratense 1*, *Thymus longicaulis* +, *Anthoxantum odoratum* +, *Allium carinatum* +, *Koeleria splendens* 2, *Bromus erectus* 2, *Festuca rubra* +, *Sanguisorba minor* 1, *Medicago lupulina* 1, *Lotus corniculatus* 1, *Anthyllis vulneraria* subsp. *rubriflora* +, *Senecio doronicum* +, *Poa alpina* 1, *Bunium bulbocastanum* 1, *Arabis collina* +, *Potentilla detommasii* +, *Linaria purpurea* +, *Solenanthus apenninus* +, *Scabiosa holosericea* +

Type relevé of *Saturejo montanae-Brometum erecti* Avena & Blasi ex Biondi, Ballelli, Allegrezza & Zuccarello 1995. Rel. 3 of Table 3 in: Avena & Blasi 1979 (Arch. Bot. Biogeogr. Ital., 55). Site: Petrella Salto, 15.7.1972. authors Avena G.C. & Blasi C. Altitude: 1000 m., Aspect: S, Slope 20%, Cover 45%, Bedrock cover: 15%, Area: 200 m^2. List of species: *Satureja montana* 2, *Sideritis italica* 2, *Plantago sempervirens* 2, *Cytisus spinescens* 1, *Globularia punctata* +, *Globularia meridionalis* 1, *Helianthemum oelandicum* subsp. *incanum* 1, *Cerastium tomentosum* 1, *Thymus pulegioides* +, *Euphorbia myrsinites* 2, *Bromus erectus* 1, *Sanguisorba minor* subsp. *balearica* +, *Carlina vulgaris* subsp. *vulgaris* +, *Allium sphaerocephalon* +, *Helianthemum apenninum* 1, *Alyssum alyssoides* +, *Teucrium chamaedrys* +, *Cerastium arvense* subsp. *arvense* +, *Armeria canescens* +, *Geranium pyrenaicum* 1, *Digitalis lutea* subsp. *australis* +, *Verbascum pulverulentum* +, *Cruciata laevipes* +, *Bunium bulbocastanum* +, *Erysimum pseudorhaeticum* 1, *Hornungia alpina* +, *Centaurea calcitrapa* 1, *Marrubium vulgare* 1.

Type relevé of *Astragaletum calabrici* Giacomini & Gentile ex Bonin 1978. Rel. 623 of Table 16 in: Bonin 1978 (in Bonin G. 1978. – Thèse Univ. Marseille 1–318.). Site: Sila Plateau, Fossiata, 1975. author: G. Bonin. Altitude: 1070 m., Aspect: N, Slope 35%, Cover 60%, Area: 100 m^2. List of species: *Astragalus parnassi* subsp. *calabricus* 2, *Jasione montana* +, *Anthemis cretica* subsp. *calabrica* 1, *Bromus erectus* +, *Phleum hirsutum* subsp. *ambiguum* 1, *Plantago maritima* subsp. *serpentina* 2, *Aira caryophyllea* 1, *Koeleria splendens* subsp. *brutia* 1, *Petrorhagia saxifraga* subsp. *gasparrinii* 1, *Hypericum calabricum* 1, *Anthoxantum odoratum* +, *Viola aethnensis* subsp. *messanensis* +, *Luzula multiflora* +, *Helianthemum nummularium* subsp. *tomentosum* 1, *Thymus longicaulis* 2, *Armeria brutia* 1, *Festuca circummediterranea* 1, *Sedum amplexicaule* subsp. *tenuifolium* +, *Anthyllis vulneraria* subsp. *maura* +, *Avenula praetutiana* subsp. *rigida* 1, *Bunium bulbocastanum* +, *Hieracium pilosella* +, *Clinopodium vulgare* +, *Pinus nigra* subsp. *calabrica* +, *Thesium humifusum* +, *Genista silana* 1, *Helichrysum italicum* +, *Scrophularia scopolii* +, *Lotus corniculatus* +.

Type relevé of *Asperulo purpureae-Brometum erecti* Biondi & Ballelli ex Di Pietro ass. nov. Rel. 3 of Table 3 in: Ballelli & Biondi 1982 (*Carta della vegetazione del Foglio Pergola,* 1:50.000. P.F. "Promozione della qualità dell'ambiente", C.N.R., Roma, 1982, AQ/1/86, 1–33). Site: Colle Aiale, 31.7.1981. authors Ballelli S. & Biondi E. Altitude: 278 m, Aspect: SE, Slope 45°, Cover

95%, Area: 100 m². List of species: *Asperula purpurea* 1, *Eryngium amethystinum* 1, *Crepis lacera* +, *Satureja montana* 2, *Stachys recta* subsp. *recta* +, *Petrorhagia saxifraga* +, *Reichardia picroides* +, *Globularia punctata* +, *Teucrium capitatum* 1, *Pimpinella saxifraga* +, *Cephalaria leucantha* +, *Phleum hirsutum* subsp. *ambiguum* 1, *Hippocrepis comosa* 1, *Bromus erectus* 2, *Teucrium chamaedrys* 1, *Artemisia alba* 1, *Dianthus sylvestris* s.l. +, *Linum tenuifolium* +, *Sanguisorba minor* subsp. *balearica* +, *Convolvulus cantabrica* +, *Spartium junceum* +, *Orchis purpurea* +, *Brachypodium rupestre* 2, *Allium tenuiflorum* 1, *Thymus longicaulis* +, *Hieracium pilosella* +, *Lactuca perennis* +, *Helichrysum italicum* 1, *Galium lucidum* +, *Knautia arvensis* +, *Sedum acre* +, *Silene vulgaris* +, *Erysimum pseudorhaeticum* +, *Dactylis glomerata* +, *Carlina acanthifolia* subsp. *acanthifolia* +, *Cuscuta epithymum* subsp. *epithymum* +, *Lotus corniculatus* +, *Hypericum perforatum* 1, *Leontodon hispidus* +, *Sedum album* +, *Linum bienne* +, *Inula montana* +, *Echium vulgare* +, *Avena barbata* +, *Asparagus acutifolius* +.

Table 1 (Tabela 1): *Violo pseudogracilis-Koelerietum splendentis* ass. nov.

	Relevè nr.	1	2(T)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	Altitude (m)	1160	1220	1190	1220	1281	1390	1055	1070	1230	1310	1230	1265	1100	1100	1455	1510	1355	1320	1500	1365	1115	1315
	Aspect	ne	ene	s	s	.	sw	w	wsw	.	ssw	ssw	se	w	nnw	nne	ese	s	n	se	wnw	w	sw
	Slope °	15	20	10	5	.	25	5	5	.	5	25	25	25	20	5	10	5	5	35	40	15	10
	Area (m²)	20	30	50	60	70	40	20	20	30	30	40	80	70	50	50	40	30	30	50	40	20	40
	Cover (%)	65	75	60	65	70	70	80	80	70	90	80	85	90	80	80	60	70	75	60	90	80	80
	Number of species per relevé	37	40	39	36	52	48	25	32	35	34	24	41	52	60	36	33	26	19	37	51	23	37
	Violo pseudogracilis-Koelerietum splendentis																						
	Viola pseudogracilis	2	1	+	+	+	1	.	+	+	.	+	1	1	1	2	.	+	.	1	1	.	+
	Thymus striatus	2	2	2	2	2	1	2	1	1	2	2	+	2	+	2	2	1	2	1	1	2	2
	Carex humilis	3	3	2	2	2	3	3	2	2	1	3	2	2	2	2	2	3	3	.	2	2	2
	Festuca stricta subsp. *trachyphylla*	.	1	2	2	1	3	+	1	+	3	1	+	2	1	1	.	.	.	2	2	.	2
	Seseli montanum	+	+	+	+	.	+	.	.	1	+	.	.	+	.	1	+	+	.	.	+	1	+
	variant with																						
	Sesleria juncifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	+	+	1	+	1	1
	Edraianthus graminifolius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	+	.	+	1	.	+
	Sideritidenion italicae																						
i	*Helianthemum oelandicum*	3	3	3	3	4	2	2	2	1	1	1	2	2	.	2	2	.	2	.	2	2	1
t	*Sesleria nitida*	.	+	1	+	1	2	.	.	.	.	+	.	2	.	.	.	+	.	3	2	.	.
c	*Avenula praetutiana*	1	+	1	.	1	1	.	.	.	.	+	.	3	.	.	.	.	.	.	1	.	.
i	*Globularia meridionalis*	.	.	.	.	.	2	.	.	1	.	.	.	1	.	.	2	1	.	.	1	+	.
c	*Acinos alpinus*	.	.	2	.	1	+	.	1	.	.	.	.	.	2	.	.	.	.	.	.	.	.
rc	*Allium flavum*	.	.	.	.	.	.	.	.	2	.	+	2	.	.	.	.	.	.	.	.	.	+
t	*Carex macrolepis*	.	+	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	.	1	.	.
c	*Trinia dalechampii*	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.
rc	*Potentilla incana*	1	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
t	*Anthyllis montana*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.
i	*Festuca laevigata*	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.
rc	*Cerastium arvense*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
i	*Paronychia kapela*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
	Phleo ambigui-Bromenion erecti																						
c	*Petrorhagia saxifraga*	+	.	+	+	.	.	.	.	1	+	.	.	.	1	.	.	.	.	.	.	.	.
c	*Centaurium erythraea*	+	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
c	*Allium tenuiflorum*	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c	*Melica transsilvanica*	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.
	Cytiso spinescenti-Bromion erecti / Festuco-Seslerienalia nitidae																						
t	*Globularia bisnagarica*	1	2	1	2	2	+	+	1	+	+	1	1	1	1	.	.	1	2	+	1	.	.
i	*Cytisus spinescens*	1	+	+	1	1	+	.	.	.	+	+	.	+	.	+	+	1	1	+	+	.	1
t	*Plantago holosteum*	+	3	3	3	+	1	3	3	4	.	.	.	2	+	+	.	2	3	.	.	3	.	

	Relevè nr.	1	2(T)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
c	*Festuca inops*	1	2	.	.	3	.	2	2	1	1	.	.	.	2	2	.	2	1	.	1	2	3
t	*Galium corrudifolium*	1	+	.	.	.	1	1	1	.	+	1	.	1	.	1	.	1	+	+	1	1	.
rc	*Potentilla pedata*	+	.	1	1	+	.	.	1	+	1	.	+	+	1	.	.	.	+	.	+	+	+
i	*Onosma echioides*	.	1	1	+	+	+	.	+	.	.	+	.	1	.	.	+	+	+	1	.	.	+
rc	*Thlaspi praecox*	+	+	.	.	+	+	.	.	.	.	+	+	+	+	.	+	.	.	.	+	.	.
t	*Asperula aristata*	+	.	.	.	.	+	.	.	+	.	+	2	.	.	.	+	.	.	+	+	.	+
i	*Euphorbia spinosa*	.	.	.	+	.	.	.	.	.	+	1	+	1	.	.	.	+	.	+	.	.	1
c	*Crepis lacera*	.	.	.	.	+	+	.	.	+	+	.	+	+	+	.	.	.	.	.	.	.	.
c	*Ornithogalum gussonei*	+	+	.	.	+	.	.	+	+	.	.	.	.	.	+	+	.	.	.	.	.	.
c	*Laserpitium siler*	.	.	.	.	+	+	.	.	.	.	.	.	.	.	+	+	.	.	2	.	.	+
c	*Centaurea deusta*	.	.	.	.	.	.	+	.	.	.	.	.	.	1	.	+	+	.	1	.	.	.
c	*Phleum hirsutum*	.	.	.	.	.	1	.	.	.	.	.	1	1	1	.	.	.	.	1	.	.	.
t	*Aethionema saxatile*	.	.	1	1	1	.	.	.	.	.	.	+	.	.	.	.	.	.	1	.	.	.
rc	*Orchis pauciflora*	.	.	.	+	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	+	.	+
rc	*Scabiosa holosericea*	1	+	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.
rc	*Helianthemum apenninum*	.	.	.	.	.	.	.	.	2	.	.	.	.	1	.	.	1	+	.	.	.	.
c	*Stipa dasyvaginata*	.	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
rc	*Alyssum diffusum*	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
	Artemisio albae-Brometalia erecti																						
	Koeleria splendens	3	3	2	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3
	Anthyllis vulneraria	+	+	+	1	1	+	.	.	+	1	.	+	1	1	+	1	1	+	1	+	+	.
	Teucrium montanum	2	1	.	.	1	1	1	1	2	1	1	2	1	1	+	.	+	2	.	+	+	+
	Asperula purpurea	.	2	1	1	1	+	+	+	.	+	+	.	2	.	.	.	1	1	+	1	.	.
	Satureja montana	.	+	+	1	2	.	.	.	1	+	1	2	2	2	.	.	.	+	.	1	.	.
	Thesium humifusum	.	1	+	.	.	1	1	.	+	+	+	.	1	.	.	1	+	.	1	1	.	.
	Teucrium chamaedrys	.	1	+	.	2	1	.	.	1	.	1	2	1	1	.	+	.	.	+	.	.	.
	Leontodon crispus	+	.	1	.	1	1	+	.	+	.	.	.	.	+	.	.	.	.	+	+	.	1
	Helianthemum nummularium	.	.	2	1	1	1	.	+	.	.	.	1	1	.	.	.	.	.	.	1	+	.
	Allium sphaerocephalon	.	.	.	.	+	.	+	.	+	1	.	1	.	1	+	.	.	.	+	.	.	1
	Muscari neglectum	+	.	+	+	1	.	.	.	.	1	.	.	.	1	+	+	.	+	.	.	.	.
	Eryngium amethystinum	+	.	.	+	.	+	+	.	+	.	.	1	+	1	.	.	.	.	.	.	+	.
	Festuca circummediterranea	.	.	.	.	.	1	.	.	.	+	.	+	2	.	.	+	.	.	1	1	.	+
	Knautia purpurea	.	.	.	.	.	+	+	1	+	+	+	.	+	.	.	.	.	.	.	1	.	.
	Hippocrepis comosa	.	+	.	+	+	.	.	+	.	.	.	+	1	.	.	.	.	.	.	1	.	.
	Biscutella laevigata	.	.	.	.	.	+	.	.	+	.	.	.	.	.	1	1	+	.	.	+	.	+
	Inula hirta	+	1	.	+	.	.	+	+	.	.	.	.	1	.	.	.	.	.	.	.	.	.
	Linum tenuifolium	.	1	.	.	.	1	.	.	.	.	.	1	+	.	.	.	+	.	1	.	.	.
	Polygala major	.	1	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	2	.	+
	Cyanus triumfetti	.	+	.	.	+	+	.	.	.	.	.	.	1	.	.	.	.	.	1	+	.	.
	Narcissus poeticus	.	.	.	.	.	1	.	.	.	.	.	.	.	.	+	+	.	.	.	+	.	.
	Galium lucidum	.	.	.	.	+	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.
	Dianthus sylvestris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+
	Pseudolysimachion barrelieri	.	+	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Hieracium piloselloides	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
	Bunium bulbocastanum	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	+	.	.
	Orchis tridentata	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Inula montana	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Stachys recta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
	Brachypodium rupestre	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.
	Scabiosa columbaria	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
	Festuco-Brometea																						
	Bromus erectus	.	1	1	2	1	3	.	.	.	2	2	1	2	2	1	+	.	.	2	2	.	2
	Cerastium arvense	.	.	+	1	1	+	.	.	+	+	.	+	1	+	.	.	.	.	.	.	+	+
	Thymus longicaulis	.	.	.	.	.	1	.	+	.	+	.	.	1	.	+	+	1	+	.	+	+	+
	Herniaria glabra	+	.	1	1	+	.	.	+	.	+	.	+	.	1	+	.	.	.	.	.	.	.

Relevè nr.	1	2(T)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Sanguisorba minor	1	1	.	.	.	+	.	1	.	.	.	.	1	.	.	.	+	.	+	.	+	.
Cerastium ligusticum	.	.	+	+	1	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.
Plantago argentea	.	.	.	.	+	1	.	.	.	.	.	.	.	.	+	.	.	.	.	2	.	.
Euphorbia cyparissias	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	+	+	.	.
Lotus corniculatus	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Gymnadenia conopsea	.	.	.	.	.	1	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.
Euphrasia salisburgensis	.	.	.	.	.	.	1	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.
Carex caryophyllea	1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Euphrasia stricta	+	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Medicago lupulina	.	.	.	.	1	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Trifolium campestre	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Carduus micropterus	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+
Rhinanthus alectorolophus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	+
Hieracium pilosella	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linum catharticum	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium strictum	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Prunella laciniata	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carduus nutans	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.
Trifolium ochroleucum	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Anthemis arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Bromus hordeaceus	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Plantago lanceolata	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Knautia arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Geranium pyrenaicum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Arabis sagittata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+
Helianthemum nummularium	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Other species																						
Sedum rupestre	+	.	1	1	.	+	+	+	.	+	.	1	+	+	1	+	.	.	.	+	+	1
Genista tinctoria	+	1	.	.	.	.	.	+	.	.	.	+	1	.	.	.	.	.	.	+	+	.
Rosa spinosissima	+	+	.	.	+	+	.	.	.	.	.	.	1	.	.	.	.	.	+	+	.	.
Sedum album	.	.	1	+	1	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	1
Thalictrum minus	.	+	.	.	+	.	.	.	.	.	.	.	.	+	+	.	.	.	.	+	.	.
Bombycilaena erecta	.	.	.	1	.	.	.	.	+	+	.	.	.	+	.	.	.	.	.	.	.	.
Poa bulbosa	.	.	1	.	1	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.
Bupleurum baldense	.	.	.	.	.	.	+	.	.	.	.	.	+	1	.	.	.	.	.	.	.	.
Asphodelus albus	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Salvia officinalis	.	.	.	.	+	.	.	1	.	.	.	.	2	.	.	.	.	.	.	.	.	.
Fumana procumbens	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	+	.
Genista januensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	+	.	.	.
Orobanche teucrii	+	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Sorbus aria	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Arenaria serpyllifolia	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga tridactylites	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crepis neglecta	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Geranium sanguineum	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Orobanche gracilis	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Polygala alpestris	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Catapodium rigidum	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.
Poa molinerii	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	2
Cuscuta epithymum	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.
Iris relicta	.	.	.	.	.	.	.	.	.	.	.	3	.	2	.	.	.	.	.	.	.	.
Sempervivum tectorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.
Daphne oleoides	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.

CAPTION: c: characteristic; rc: regional character.; pc: partial character., t: transgressive; i: ingressive

Table 2 (Tabela 2): *Helichryso italici-Brometum erecti* ass. nov.

	Relevè nr.	1	2	3	4	5	6 (T)	7	8	9	10	11	12	13	14 (t)	15	16	17	18	19	20	21	22	23	24	25	26	27
	Altitude (m)	735	755	775	755	485	675	630	1060	1070	975	735	935	985	660	780	760	655	720	795	850	1055	450	650	840	650	870	780
	Aspect	e	e	sw	se	wnw	sw	sw	nw	wsw	wnw	s	ssw	ssw	e	.	n	sw	nw	sw	nw	ene	ese	.	ese	wsw	sw	s
	Slope (°)	25	35	25	20	30	25	5	20	15	25	35	25	35	20	.	10	30	15	20	30	10	20	2	30	25	25	10
	Area (m	30	50	70	60	50	50	40	40	40	50	50	50	40	30	30	30	40	30	40	40	40	30	35	70	50	40	50
	Cover (%)	70	75	65	90	80	90	90	85	80	80	80	80	70	80	60	70	80	95	90	90	85	85	90	80	80	70	80
	Number of species per relevé	46	50	52	74	45	78	28	33	32	47	44	50	49	75	34	36	55	60	69	64	60	55	52	72	54	66	74
	Helichryso italici-Brometum erecti																											
	Helichrysum italicum	3	3	3	2	2	2	2	1	2	2	+	1	1	1	+	+	.	.	+	.	.	.	.	1	3	3	+
	Centaurea deusta	+	1	+	+	1	+	+	+	.	1	2	.	.	1	+	2	3	1	+	1	.	.	1	.	+	+	3
	Melica transsilvanica	1	+	+	+	+	1	1	.	.	.	.	.	.	2	+	1	1	.	+	.	.	1	1	1	.	2	2
	Centaurium erythraea	.	+	+	+	.	1	+	.	.	+	.	.	+	+	+	+	.	1	+	.	.	1	+	.	.	+	.
	Sedum sexangulare	1	.	+	+	+	+	1	.	+	.	+	.	.	+	.	.	.	+	+	1	+	.	3	.	1	.	.
	Micromeria graeca	+	+	+	1	1	1	2	+	.	.	.	.	.	1	.	1	+	+	.	+	.	1	+	+	+	.	1
	subass.																											
	Satureja montana	.	.	.	.	.	.	.	.	.	.	1	1	2	1	3	2	+	+	1	3	3	.	+	2	1	3	2
	Euphorbia spinosa	.	.	.	.	.	.	.	.	.	.	3	.	2	2	2	1	2	.	2	3	2	.	1	1	3	2	3
	Linum tenuifolium	.	.	.	.	.	.	.	.	.	.	1	1	.	+	.	.	.	1	.	.	+	+	+	.	1	1	+
	Phleo ambigui-Bromenion erecti																											
i	*Bupleurum baldense*	+	+	+	+	+	+	+	.	.	.	+	+	.	+	.	.	+	+	1	+	+	+	+	+	1	+	+
c	*Convolvulus cantabrica*	+	1	1	+	+	1	+	.	.	.	1	.	.	1	.	.	+	.	+	.	.	.	1	+	1	.	1
rc	*Elaeoselinum asclepium*	+	.	+	.	.	.	.	.	+	.	+	.	.	+	+	1	1	.	.	.	.	1	1	+	+	+	2
i	*Reichardia picroides*	.	+	.	+	1	1	+	.	.	.	.	.	.	+	.	.	+	.	1	.	.	1	.	1	1	+	1
i	*Linum strictum*	.	.	.	+	+	+	.	.	.	.	.	+	+	+	+	.	1	.	.	+	+	.	+	.	.	+	1
c	*Cephalaria leucantha*	1	.	.	+	.	.	1	.	.	.	.	.	1	+	1	2	1	.	.	.	.	1	.	.	1	1	1
i	*Brachypodium retusum*	.	+	.	+	1	+	.	.	.	.	.	.	.	3	2	3	1	.	.	.	.	1	.	3	.	2	+
i	*Urospermum dalechampii*	.	+	.	+	.	+	.	.	.	.	.	.	.	+	+	.	.	+	+	.	.	.	1	1	+	+	1
i	*Carlina corymbosa*	+	.	+	+	+	1	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	+	.	1	+
i	*Cynosurus echinatus*	.	.	.	.	+	+	.	.	.	.	.	+	.	1	.	.	.	.	.	+	.	+	1	1	1	.	+
c	*Carex flacca*	.	+	.	+	1	1	2	.	.	.	.	+	.	.	.	.	2	.	.	.	.	+	.	+	.	.	.
c	*Crupina vulgaris*	.	.	.	+	1	.	.	.	.	.	.	+	1	1	.	1	1	.	.	.	.	.	.	1	.	1	.
c	*Ononis pusilla*	.	+	+	+	+	+	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	1	+	.
i	*Linum strictum*	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	1	.	1	.	.	.	1	1	1	.	.
i	*Petrorhagia saxifraga*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	1	1	.	+
c	*Crepis neglecta*	.	.	.	+	.	+	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	1	.	.	.
i	*Sideritis romana*	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	+	.	.	.	+	.	.	.	1
i	*Medicago minima*	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	1
i	*Avena barbata*	.	.	.	+	.	.	.	.	.	.	1	.	.	.	.	.	+	.	2	.	.	.	.	.	.	.	1
pc	*Asphodeline liburnica*	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	3	.	.	.	.	.	.	2	.	.	.	.
i	*Ononis reclinata*	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	.	.	+	.
i	*Fumana thymifolia*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	2	1	.	.	.	.
c	*Hieracium cymosum*	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c	*Trifolium strictum*	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c	*Dasypyrum villosum*	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c	*Linum bienne*	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.
c	*Silene gallica*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
c	*Allium tenuiflorum*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
i	*Trigonella monspeliaca*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
i	*Teucrium capitatum*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+

	Relevè nr.	1	2	3	4	5	6 (T)	7	8	9	10	11	12	13	14 (t)	15	16	17	18	19	20	21	22	23	24	25	26	27
	Sideritidenion italicae																											
t	*Acinos alpinus*	.	.	.	+	.	.	.	1	.	.	.	1	2	1	.	+	.	1	.	1	+	.	.	2	.	1	+
pc	*Viola pseudogracilis*	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	.	.	+	.	1	+
t	*Sesleria nitida*	.	.	.	.	.	.	.	+	1	+	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
t	*Carex macrolepis*	.	.	.	.	.	.	.	1	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
t	*Carex humilis*	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	3	.	.	.	.	2	.
t	*Avenula praetutiana*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.
	Cytiso spinescenti-Bromion erecti / Festuco-Seslerienalia nitidae																											
t	*Galium corrudifolium*	.	+	1	1	1	1	1	+	.	+	.	1	1	+	.	1	1	+	1	+	+	1	.	2	.	1	1
rc	*Potentilla pedata*	+	1	.	1	+	1	.	1	+	+	1	+	.	1	.	.	+	2	+	1	1	.	1	+	1	+	.
t	*Festuca stricta*	.	2	+	.	.	2	.	1	1	2	2	3	3	2	1	1	.	2	2	2	2	.	.	2	.	2	.
t	*Globularia bisnagarica*	.	.	.	.	.	.	.	.	.	.	1	1	1	.	+	.	+	+	.	+	+	1	+	1	.	1	1
t	*Aethionema saxatile*	.	.	.	.	.	.	.	.	.	.	+	+	1	.	.	1	+	.	+	+	1	.	.	+	.	1	+
c	*Festuca inops*	.	3	1	2	.	.	.	3	3	3	.	2	1	.	1	.	.	.	.	.	.	.	.	.	.	2	.
c	*Crepis lacera*	1	.	.	+	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	1	+	.	.	+	.	1	+
rc	*Thlaspi praecox*	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	+	.	+	+	.	.	.	.	+	+
rc	*Orchis pauciflora*	.	.	.	.	.	.	.	+	1	+	.	+	.	.	.	.	+	.	+	.	.	.	+	.	.	.	.
i	*Cytisus spinescens*	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	+	.	+	+	.	.	.	2	.	2	.
c	*Phleum hirsutum*	.	.	.	.	.	.	.	.	.	.	2	2	.	2	.	.	1	.	.	.	.	.	1	1	.	.	.
c	*Thymus striatus*	.	.	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	+	1	+	+	.	.	.	.	.	.
t	*Asperula aristata*	.	.	.	.	.	.	.	.	.	+	.	+	+	.	+	+	.	.	.	.	.	.	.	.	.	.	1
c	*Ornithogalum gussonei*	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	+	.	.	.
c	*Polygala flavescens*	.	.	.	+	.	1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c	*Laserpitium siler*	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
c	*Scabiosa holosericea*	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
c	*Festuca robustifolia*	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	+	.
rc	*Helianthemum apenninum*	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1	.
rc	*Ruta graveolens*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.
t	*Ranunculus millefoliatus*	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
i	*Onosma echioides*	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	1	.
c	*Stipa dasyvaginata*	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
rc	*Argyrolobium zanonii*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.
pc	*Ophrys lacaitae*	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Artemisio albae-Brometalia erecti																											
	Teucrium chamaedrys	1	1	2	2	1	2	.	2	1	1	1	1	2	1	.	1	1	1	1	2	1	1	.	2	+	2	1
	Koeleria splendens	.	.	.	2	1	1	.	2	2	1	3	2	1	2	1	1	1	2	2	3	1	1	1	2	2	1	2
	Helianthemum nummularium	+	1	+	1	+	1	.	+	1	+	.	+	2	1	.	1	.	1	+	+	1	.	.	1	1	1	.
	Eryngium amethystinum	.	.	+	+	+	+	.	.	.	+	.	+	+	+	+	+	+	1	+	.	+	+	.	1	+	1	+
	Stachys recta	.	.	.	.	.	.	.	.	.	.	1	+	2	+	1	1	.	1	+	+	+	1	+	.	+	+	1
	Anthyllis vulneraria	.	.	.	.	.	+	.	.	.	.	1	1	1	.	+	1	.	+	1	1	1	+	+	+	.	1	1
	Teucrium montanum	.	.	.	+	.	+	.	.	1	.	.	1	1	+	.	1	.	1	+	1	1	.	.	+	.	2	+
	Festuca circummediterranea	2	+	.	1	.	2	.	.	1	1	.	1	1	.	.	.	.	.	.	1	+	.	1	.	.	2	1
	Thesium humifusum	.	.	.	+	.	.	.	.	.	.	1	.	.	+	+	2	1	+	.	1	1	+	.	.	1	.	1
	Dianthus sylvestris	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	+	.	.	.	+	+	+	+	.	+	1
	Scabiosa columbaria	+	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	1	+	.	.	1	.	+	1	.	2
	Knautia purpurea	.	.	.	1	.	2	.	+	.	+	.	.	.	.	.	.	.	2	+	+	.	.	.	1	.	.	.
	Leontodon crispus	+	.	+	.	.	.	.	.	.	+	1	1	.	.	.	.	.	+	.	.	.	+	.	.	.	1	.
	Hippocrepis comosa	.	+	+	.	.	.	.	.	.	1	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	1	.
	Galium lucidum	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	.	.
	Muscari neglectum	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.
	Asperula purpurea	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	2	.	.	1	.	1	.
	Arabis collina	+	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
	Narcissus poeticus	.	.	.	.	.	.	.	1	+	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Cyanus triumfetti	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.

Relevè nr.	1	2	3	4	5	6 (T)	7	8	9	10	11	12	13	14 (t)	15	16	17	18	19	20	21	22	23	24	25	26	27
Allium sphaerocephalon	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Brachypodium rupestre	.	.	.	.	.	+	.	.	.	.	.	.	1	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Seseli montanum	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Arabis sagittata	.	.	.	+	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Orchis anthropophora	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthericum liliago	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Biscutella laevigata	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Asphodeline lutea	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium piloselloides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.
Bunium bulbocastanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Ophrys holosericea	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuco-Brometea																											
Bromus erectus	3	2	3	3	3	3	3	2	2	3	3	3	2	3	1	1	3	3	3	4	3	3	2	1	2	3	3
Plantago lanceolata	+	.	+	+	1	+	+	.	.	+	+	+	.	1	+	1	1	+	1	+	+	+	.	+	1	.	+
Sanguisorba minor	+	.	1	+	1	1	1	1	.	1	1	.	.	.	.	.	+	1	+	1	+	.	.	1	1	+	.
Dactylis glomerata	+	+	+	1	1	1	1	.	.	.	2	1	.	1	.	.	1	2	1	.	.	.	1	1	2	.	.
Thymus longicaulis	2	2	2	1	2	2	3	2	3	1	.	.	.	+	.	.	.	2	1	.	.	.	.	.	.	.	.
Carduus nutans	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	+	1	+	.	+	1	+	+	+
Trifolium campestre	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	+	+	+	+	+	1	1	1	.
Medicago lupulina	1	1	+	+	1	+	.	.	.	.	.	+	.	.	.	.	.	1	+	.	.	.	.	.	+	.	.
Lotus corniculatus	1	1	+	+	.	+	.	+	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	+	.	.	.
Carex caryophyllea	.	.	.	2	.	1	.	+	.	2	.	.	.	1	.	.	.	.	.	.	.	1	.	1	.	.	.
Cerastium ligusticum	+	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	1	.	.	.
Cerastium arvense	.	1	.	1	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Prunella laciniata	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	1	.	+	.	+	.	.	.	.	.
Hieracium pilosella	.	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Geranium pyrenaicum	.	.	+	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tanacetum corymbosum	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.
Trifolium ochroleucum	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1	.	+	.	.	.	.	.	.	.
Euphrasia stricta	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.
Anthemis arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	1
Leontodon hispidus	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Ranunculus bulbosus	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bromus hordeaceus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+
Herniaria glabra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.
Crocus biflorus	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ophrys apifera	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daucus carota	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Filipendula vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.
Euphrasia salisburgensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Lygeo-Stipetea + Tuberarietea																											
Catapodium rigidum	+	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	+	.	+	+	+	.	.	1	+	+	+
Hypochaeris achyrophorus	.	+	.	.	.	+	.	.	.	.	1	.	.	1	.	.	1	.	1	.	.	.	1	+	1	+	1
Trifolium scabrum	.	.	.	.	.	.	.	.	.	.	+	.	.	1	.	.	.	+	+	+	+	.	+	1	+	+	1
Ampelodesmos mauritanicus	.	.	.	.	.	+	.	.	.	.	.	.	2	1	.	+	3	.	.	.	.	1	2	.	+	.	+
Trachynia distachya	.	.	.	.	.	+	.	.	.	.	.	+	.	1	.	.	2	.	1	.	.	2	2	.	2	+	.
Hippocrepis biflora	+	1	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+
Coronilla scorpioides	.	+	.	.	.	.	+	.	.	.	+	.	.	+	.	.	.	+	.	+	.	+	.	.	.	.	.
Blackstonia perfoliata	.	.	.	.	+	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	+	.	+	.	+
Briza maxima	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	1	.	+	.	.	+	.	.	1	.	1
Trifolium stellatum	+	+	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	1
Bromus madritensis	1	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Linum trigynum	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.
Euphorbia exigua	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.

Relevè nr.	1	2	3	4	5	6 (T)	7	8	9	10	11	12	13	14 (t)	15	16	17	18	19	20	21	22	23	24	25	26	27
Asphodelus ramosus	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.
Vulpia myuros	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	1	.	.	.
Trifolium angustifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	1	.	.	.
Scorpiurus muricatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	+	.	.	.	.	.
Euphorbia falcata	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vulpia ciliata	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crupina crupinastrum	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
Sonchus tenerrimus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.
Lotus ornithopodioides	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Convolvulus althaeoides	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia peplus	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arisarum vulgare	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sixalix atropurpurea	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melilotus sulcata	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dactylis glomerata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
Other species																											
Hypericum perforatum	.	.	.	.	+	+	.	.	.	+	+	.	+	1	+	+	+	1	+	.	.	.	+	1	1	+	.
Sedum rupestre	.	+	.	+	.	+	.	.	1	.	.	.	+	1	1	+	+	.	.	1	+	.	.	+	+	.	1
Quercus ilex	1	+	+	1	.	.	.	.	.	+	.	.	+	1	.	.	.	+	.	.	.	+	.	.	+	.	.
Acinos arvensis	1	1	.	.	.	2	.	.	.	+	.	.	.	+	.	.	1	.	1	.	.	1	1	.	2	.	.
Crataegus monogyna	1	+	+	+	.	1	.	+	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Fumana procumbens	.	.	.	1	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	1	1	+
Romulea bulbocodium	+	.	.	.	.	.	1	+	.	+	.	.	.	.	.	.	.	.	+	+	.	.	+	.	.	.	.
Carex halleriana	+	1	.	.	.	.	1	.	.	.	.	.	.	.	+	.	.	2	.	.	.	.	.	2	.	.	.
Poa bulbosa	+	.	2	1	.	.	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ostrya carpinifolia	.	1	.	+	.	+	.	+	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Fraxinus ornus	.	.	.	+	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	1	.	.	.	+	.
Triticum ovatum	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	+	.	2	+	.	.	.	.	.	.	1
Filago pyramidata	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	+	+	.	+	+	.	.	.
Genista tinctoria	.	.	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	1	.	.	.	.	+
Sherardia arvensis	+	+	1	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orobanche teucrii	+	.	.	.	+	1	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedum amplexicaule	.	.	+	.	.	.	.	.	1	+	.	.	.	.	.	.	+	.	.	.	.	.	2	.	.	.	.
Geranium columbinum	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	+	.	+	.
Dorycnium hirsutum	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	1	2	.	.	.	.
Cistus creticus	.	.	.	.	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	2	.	3	.	.
Erica multiflora	.	.	.	.	.	.	.	.	.	.	.	.	.	3	+	.	.	.	.	.	.	2	.	.	.	.	1
Crepis sancta	1	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Euphorbia helioscopia	.	+	+	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tordylium apulum	.	.	.	.	.	+	.	.	.	.	1	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	.
Plantago lagopus	.	.	.	.	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	2
Nigella damascena	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	+
Picris hieracioides	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.	.	.	.	.	.	+	.	.
Silene paradoxa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	+	+	1
Echium vulgare	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	.	.	.	.	.	+	.	.	1
Gastridium ventricosum	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	1	.	+	.
Orobanche minor	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Sesleria autumnalis	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.
Minuartia mediterranea	.	.	+	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Quercus pubescens	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Anacamptis pyramidalis	.	.	.	+	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Onopordum acanthium	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Salvia verbenaca	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Pistacia terebinthus	.	.	.	.	+	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	+	.	.	.

Relevè nr.	1	2	3	4	5	6 (T)	7	8	9	10	11	12	13	14 (t)	15	16	17	18	19	20	21	22	23	24	25	26	27
Gladiolus italicus	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	+	.	.	.	.
Galactites elegans	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	+	.	.	.	.	.
Althaea hirsuta	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	.	.	.	.	.	.	.	.	.	+
Rhamnus saxatilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	.	+	.
Bombycilaena erecta	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	+
Salvia officinalis	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.
Cistus salviifolius	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Fumana arabica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1
Cerastium luridum	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Clematis vitalba	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crocus vernus albiflorus	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Viola pseudogracilis	.	+	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anemone hortensis	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anagallis arvensis	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Allium subhirsutum	.	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rosa canina	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Calicotome villosa	.	.	.	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga tridactylites	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thalictrum minus	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Stachys officinalis	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium lappaceum	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.
Arenaria serpyllifolia	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Lolium perenne	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.
Pistacia lentiscus	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.
Spartium junceum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.
Silene vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+
Centaurea solstitialis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1
Cerastium brachypetalum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.
Geranium dissectum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.
Biscutella didyma	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.
Genista januensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.

CAPTION: c: characteristic; rc: regional character.; pc: partial character., t: transgressive; i: ingressive

Table 3: Synoptic table of the main dry grassland associations of Peninsular Italy.
Tabela 3: Sinoptična tabela glavnih asociacij suhih travišč Italijanskega polotoka.

	Associations (List in Appendix 4)	Vi-Koel	Hel-Br typ.	Hel-Br sat.	Sa-Br leo	Sa-Br me	Cera-Br.	Pla-Hel	Pla-Hel	Pla-Hel	Satu-Br	On-Sesl	Aspe-Br	Aspe-Br	Aspe-Br	Aspe-Br t	Aspe-Br s	Aspe-Br	Tri-Sid	Pot-Br	Pot-Br	Sese-Br	Koel-Br	Poly-Br	Sesl-Br	Fu-Stip	La-Asph
	Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	Violo-Koelerietum splendentis																										
Spc	*Viola pseudogracilis*	4	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBt	*Festuca stricta*	4	4	4	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	2	.	.	.	.	.	.
Src	*Carex humilis*	5	.	1	.	.	.	2	5	5	.	1	.	.	.	.	.	.	.	2	.	.	2	.	1	.	.
AB	*Seseli montanum*	3	1	1	3	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.
CBc	*Thymus striatus*	5	2	2	3	.	.	.	1	1	.	3	5	.	5	1	.	.	.	.	.	.	.	.	.	.	3
	Helichryso-Brometum erecti																										
PBi	*Helichrysum italicum*	.	5	4	3	5	5	.	.	.	.	.	.	.	.	.	.	5	4	2	2	.	.	.	.	4	.
CBc	*Centaurea deusta*	2	5	4	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	1	4
PBc	*Centaurium erythraea*	1	4	3	2	.	1	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	1	.
PBc	*Melica transsilvanica*	1	4	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PBi	*Micromeria graeca*	.	5	3	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.
	Sedum sexangulare	1	4	3	2	2	2	1	3	3	.	.	.	2	.	.	.	.	2	.	2	1	.	.	.	5	.
	Cerastio etrusci-Brometum erecti																										
	Cerastium arvense	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Marrubium incanum	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Alyssum minus	.	.	.	.	.	3	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Carlina corymbosa	.	4	2	2	4	4	.	.	.	.	.	.	2	.	.	.	2	.	.	.	.	.	.	.	2	.
	Plantago holostei-Helianthemetum cani																										
CBt	*Plantago holosteum*	4	.	.	.	.	.	5	5	5	.	.	.	.	.	.	.	.	.	4	.	.	1	.	.	.	.
St	*Helianthemum oelandicum*	5	.	.	3	1	.	5	5	5	5	5	3	2	3	5	2	4	2	5	4	1	5	5	1	.	.
	Saturejo montanae-Brometum erecti																										
AB	*Satureja montana*	3	.	5	3	3	.	.	.	.	5	3	4	.	4	5	5	5	.	.	2	.	.	.	1	.	3
AB	*Plantago sempervirens*	.	.	.	2	2	.	.	.	.	5	2	1	.	1	3	.	3	.	.	1	.	.	.	.	.	.
CBi	*Cytisus spinescens*	4	.	3	2	1	.	.	.	.	5	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5
CBc	*Sideritis italica*	.	.	.	1	.	.	.	.	.	5	.	.	.	.	.	5	.	5	.	.	5	.	.	.	.	5
CBt	*Globularia bisnagarica*	5	.	4	3	2	1	.	2	.	3	1	2	2	2	2	3	3	3	2	.	.	.	.	.	5	.
	Onobrychido albae-Seslerietum nitidae																										
Sc	*Onobrychis alba*	.	.	.	.	.	.	.	1	1	.	3	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1
CBc	*Centaurea ambigua*	.	.	.	1	1	1	2	2	2	.	4	1	4	1	5	.	2	.	3	4	1	2	2	.	.	.
CBc	*Sesleria nitida*	3	2	1	1	.	.	.	1	1	2	3	.	.	.	.	.	.	.	.	.	.	.	5	5	.	.
	Asperulo purpureae-Brometum erecti																										
AB	*Asperula purpurea*	4	.	2	3	.	.	.	1	1	.	3	5	4	5	5	3	5	.	3	4	4	3	.	1	.	.
CBc	*Erysimum pseudorhaeticum*	.	.	.	2	4	4	.	.	.	2	1	3	3	3	5	.	4	.	2	4	4	3	2	3	.	2
PBc	*Coronilla minima*	.	.	.	.	2	.	.	.	.	.	.	4	.	4	3	2	5	1	3	2	.	1	1	.	.	.
AB	*Artemisia alba*	.	.	.	.	2	.	.	.	.	.	1	4	.	4	5	3	5	4	2	2	2	.	.	.	5	.
	Stachys recta	1	.	5	2	1	1	.	.	.	.	.	4	2	4	.	1	3	1	3	1	1	.	3	.	4	.
PBc	*Dianthus ciliatus*	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.
	Trigonello monspeliacae-Sideritidetum syriacae																										
PBt	*Trigonella gladiata*	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.
PBt	*Trigonella monspeliaca*	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.
PBt	*Ononis reclinata*	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.
	Potentillo cinereae-Brometum erecti																										
Src	*Potentilla incana*	1	.	.	.	.	.	.	.	.	.	.	.	2	.	.	4	.	4	5	3	.	.	.	.	1	.
AB	*Alyssum montanum*	.	.	.	.	.	.	.	5	5	.	.	.	.	.	5	.	3	.	.	4	.	2	1	3	.	.
AB	*Cyanus triumfetti*	2	2	1	.	.	.	.	.	2	.	.	.	2	.	5	.	3	.	2	3	.	.	.	.	.	1
CBrc	*Minuartia verna*	.	.	.	3	.	.	3	.	5	1	1	.	1	.	.	.	.	.	3	3	.	.	.	.	.	.

	Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	Seseli viarii-Brometum erecti																										
CBrc	*Seseli pallasii*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	3	.	.	4	.	.	.	.	.
	Euphorbia nicaeensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	.	.	.	.
	Koelerio splendentis-Brometum erecti																										
Src	*Valeriana tuberosa*	.	.	.	.	.	.	.	4	4	.	.	.	.	.	.	.	.	.	3	1	3	.	.	.	.	1
	Pedicularis comosa	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.	.	.	.
	Gentianella columnae	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.
	Trifolium alpestre	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.
	Polygalo majoris-Brometum erecti																										
AB	*Biscutella laevigata*	2	.	1	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.
CBc	*Laserpitium siler*	2	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.
	Seslerio nitidae-Brometum erecti																										
CBc	*Carex macrolepis*	1	2	.	.	.	.	.	2	2	1	1	.	1	.	.	.	.	.	1	1	.	.	4	3	.	.
Si	*Festuca laevigata*	1	.	.	2	.	.	.	5	5	2	3	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.
	Cytisus hirsutus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	3	.	.
	Fumano procumbentis-Stipetum appenninicolae																										
CBc	*Stipa dasyvaginata*	1	.	1	1	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	4	3
	Fumana procumbens	1	2	2	3	2	1	.	.	.	.	2	4	.	4	2	2	4	2	.	.	.	.	.	.	4	.
	Lavandulo angustifoliae-Asphodelinetum luteae																										
CBc	*Asphodeline lutea*	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	5
	Lavandula angustifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5
	Leontodon crispus	3	2	2	5	1	.	.	.	3	.	1	.	3	.	5	2	3	2	3	2	.	.	.	.	2	5
	suballiance: Phleo ambigui-Bromenion erecti																										
PBc	*Ononis pusilla*	.	3	2	1	1	1	.	.	.	.	.	.	3	.	.	2	3	2	.	1	.	.	.	.	1	.
PBc	*Crupina vulgaris*	.	2	3	1	1	1	.	.	.	.	.	.	2	.	.	2	.	2	2	2	.	.	.	.	3	.
PBc	*Melica ciliata*	.	.	.	.	2	2	.	.	.	.	.	2	.	2	1	1	1	1	.	1	.	.	.	.	.	.
PBc	*Cephalaria leucantha*	.	1	3	1	1	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	2	.
PBc	*Crepis neglecta*	1	2	1	.	2	3	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
PBc	*Hieracium cymosum*	.	.	1	.	.	.	.	4	4	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.
PBc	*Linum bienne*	.	.	1	.	.	.	.	.	.	.	.	.	2	.	.	.	2	.	4	2	.	.	.	.	.	1
PBc	*Allium tenuiflorum*	1	.	1	.	.	1	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.
PBc	*Silene paradoxa*	.	.	2	1	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PBc	*Trifolium strictum*	1	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.
PBc	*Carex flacca*	.	3	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PBc	*Convolvulus cantabrica*	.	4	3	2	4	3	.	.	.	.	.	2	.	2	.	3	2	3	2	.	2	.	.	.	5	.
PBt	*Petrorhagia saxifraga*	2	.	2	3	4	1	.	.	.	4	2	4	1	4	.	.	2	1	2	2	4	.	.	.	5	1
PBt	*Bupleurum baldense*	1	4	5	2	3	4	.	.	.	.	.	.	3	.	.	4	.	4	4	2	.	.	.	.	4	.
PBt	*Reichardia picroides*	.	3	3	1	4	2	.	.	.	.	.	3	.	.	.	.	2	1	.	.	1	.	.	.	4	.
PBt	*Eryngium campestre*	.	.	.	1	2	4	.	.	.	3	1	1	.	1	1	.	1	.	.	.	1	.	.	.	2	.
PBt	*Cynosurus echinatus*	1	2	3	.	.	4	.	.	.	1	1	.	2	.	.	.	.	1	3	2	.	.	.	.	1	.
PBt	*Urospermum dalechampii*	.	2	3	1	3	1	.	.	.	.	.	.	2	.	.	.	1	1	.	.	.	.	.	.	.	.
PBt	*Linum strictum*	.	2	3	.	1	.	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.	1	.
PBt	*Medicago minima*	1	2	1	2	4	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PBt	*Avena barbata*	.	1	2	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
PBt	*Sideritis romana*	.	.	2	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
PBt	*Brachypodium retusum*	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PBt	*Briza maxima*	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PBi	*Teucrium capitatum*	.	.	1	1	2	1	.	.	.	.	1	.	.	.	.	.	1	2	1	.	.	.	.	.	4	.
PBi	*Triticum ovatum*	.	2	2	.	2	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.
	suballiance: Sideritidenion italicae																										
Sc	*Avenula praetutiana*	2	.	1	3	.	.	2	4	4	.	5	.	3	.	.	.	.	.	3	.	.	5	2	.	.	.
Sc	*Potentilla rigoana*	.	.	.	.	.	.	.	4	.	1	.	.	1	.	4	.	.	.	2	2	.	4	1	.	.	.
Sc	*Trinia dalechampii*	1	.	.	2	1	.	.	.	.	.	1	.	.	1	.	3	.	.	.	3	.	.	.	.	.	.
Sc	*Brachypodium genuense*	.	.	.	.	.	.	3	2	2	.	.	.	.	.	.	.	.	.	.	.	.	5	5	.	.	.

	Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Sc	*Veronica orsiniana*	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	1	1	.	.	.	.	.	.	.
Sc	*Anthemis cretica*	.	.	.	.	.	.	.	5	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sc	*Allium flavum*	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sc	*Rhinanthus wettsteinii*	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Src	*Armeria canescens*	.	.	.	1	1	1	.	1	2	2	2	.	2	.	.	.	.	.	2	2	.	5	1	.	.	3
Src	*Gymnadenia conopsea*	1	.	.	.	.	.	.	1	2	.	.	.	2	.	.	.	.	.	1	.	.	1	2	.	.	.
Src	*Plantago argentea*	1	.	.	.	.	.	.	4	4	.	1	.	.	.	.	.	.	1	.	.	.	3	.	.	.	.
St	*Cerastium arvense*	1	1	.	2	2	.	2	3	3	.	.	1	4	.	.	.	3	.	4	4	2	3	4	4	.	.
Si	*Acinos alpinus*	2	2	3	4	3	1	.	5	5	.	1	2	.	2	3	2	4	1	2	2	3	4	2	1	.	2
Si	*Globularia meridionalis*	2	.	.	2	1	.	2	5	5	5	3	.	.	.	.	.	.	.	1	.	.	5	2	.	.	.
Si	*Anthyllis montana*	1	.	.	.	.	.	1	5	5	.	2	.	.	.	.	.	.	.	1	.	.	4	4	.	.	.
Si	*Paronychia kapela*	1	.	.	1	.	.	1	5	5	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.
Si	*Draba aizoides*	.	.	.	.	.	.	3	2	2	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.
Si	*Sesleria juncifolia*	2	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Si	*Thymus praecox*	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	4	2	.	.	.	.	.	.
Si	*Edraianthus graminifolius*	2	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Si	*Lomelosia crenata*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
Si	*Cerastium tomentosum*	.	.	.	.	.	.	.	.	.	4	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
	alliance: Cytiso spinescentis-Bromion erecti; suborder: Festuco-Seslerienalia nitidae																										
CBc	*Phleum hirsutum*	2	.	2	3	4	5	.	4	4	2	2	3	5	3	5	3	3	3	4	3	5	2	2	.	1	4
CBc	*Crepis lacera*	2	2	3	2	1	1	.	.	.	.	.	3	4	3	4	1	5	1	2	4	4	.	1	.	.	.
CBc	*Festuca inops*	4	4	2	.	.	5	.	.	.	1	.	.	1	.	.	.	2	5	1	2	.	.	.	1	1	.
CBc	*Leontodon cichoraceus*	.	.	.	.	.	1	.	4	4	.	.	.	1	.	.	.	.	.	3	1	.	1	.	.	.	.
CBc	*Polygala flavescens*	.	2	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
CBc	*Centaurea rupestris*	.	.	.	.	.	1	.	.	.	.	1	.	.	.	4	.	3	.	5	3	.	.	.	.	.	.
CBc	*Scabiosa holosericea*	1	.	1	2	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
CBc	*Elaeoselinum asclepium*	.	2	4	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBc	*Potentilla detommasii*	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
CBi	*Onosma echioides*	3	.	1	.	.	.	.	.	.	.	.	1	.	1	2	.	1	.	.	1	.	.	.	.	.	.
CBi	*Euphorbia spinosa*	2	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBpc	*Ornithogalum etruscum*	2	1	2	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBpc	*Festuca stricta*	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	3	.	.	.	.	.	.	.
CBpc	*Asphodeline liburnica*	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBpc	*Ornithogalum exscapum*	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBpc	*Sesleria apennina*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
CBrc	*Helianthemum apenninum*	1	.	1	2	.	1	.	1	1	1	1	2	.	2	.	4	.	4	3	2	.	.	.	.	.	1
CBrc	*Argyrolobium zanonii*	.	.	1	2	1	1	.	.	.	.	.	.	.	1	3	1	3	1	.	1	.	.	.	.	5	.
CBrc	*Thlaspi praecox*	3	1	2	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBrc	*Orchis pauciflora*	2	2	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBrc	*Tragopogon samaritani*	.	.	.	1	2	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1
CBrc	*Ranunculus illyricus*	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.
CBrc	*Ruta graveolens*	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBrc	*Euphorbia myrsinites*	.	.	.	.	.	.	.	.	.	5	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5
CBrc	*Alyssum diffusum*	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBrc	*Potentilla pedata*	4	5	4	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.
CBrc	*Pimpinella tragium*	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	.	.	.	2
CBt	*Galium corrudifolium*	4	5	4	.	1	5	.	.	.	.	4	.	5	.	.	.	.	.	5	.	.	.	.	.	5	1
CBt	*Aethionema saxatile*	2	.	4	3	3	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	2	.
CBt	*Asperula aristata*	3	1	2	4	2	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CBt	*Ranunculus millefoliatus*	.	2	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.
	Order: Artemisio albae-Brometalia erecti																										
	Koeleria splendens	5	4	5	4	2	3	2	5	5	3	4	3	4	3	4	.	4	3	5	5	5	4	4	4	1	4
	Hippocrepis comosa	2	2	2	3	1	1	3	1	3	1	2	5	4	4	3	1	4	1	1	2	4	1	2	2	.	1
	Teucrium chamaedrys	3	5	5	4	4	4	.	5	2	3	2	2	5	5	5	3	5	3	4	5	5	5	3	.	4	.

Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Muscari neglectum	3	2	1	2	1	.	.	4	4	2	.	1	3	1	2	3	1	3	5	4	3	2	.	.	1	1
Dianthus sylvestris	1	.	3	2	1	3	.	5	5	.	1	3	2	3	5	2	4	2	2	4	4	3	2	.	.	.
Brachypodium rupestre	1	1	1	2	2	2	.	.	.	3	1	5	4	5	5	2	5	2	2	3	1	.	.	4	1	.
Allium sphaerocephalon	2	1	1	1	2	4	.	.	.	3	.	3	1	3	5	1	3	1	3	3	1	.	2	3	.	.
Eryngium amethystinum	3	3	5	3	4	2	.	5	5	3	1	5	5	5	5	3	5	3	5	5	4	1	.	.	.	.
Helianthemum nummularium	3	5	4	3	3	1	.	.	.	1	1	1	4	1	3	.	1	1	2	3	.	1	2	.	5	.
Festuca circummediterranea	2	4	3	5	3	.	4	4	4	2	3	.	3	.	.	.	.	.	3	3	3	2	2	.	2	4
Asperula cynanchica	.	.	.	.	.	.	2	2	2	2	.	2	2	2	4	.	2	1	3	4	3	1	3	3	.	.
Silene otites	.	.	.	2	1	1	.	1	1	.	.	2	3	2	2	1	2	1	3	3	3	1	.	.	.	.
Knautia purpurea	2	3	2	.	.	2	.	2	2	.	.	4	4	4	5	2	.	.	4	4	.	3	.	2	.	.
Galium lucidum	1	2	1	4	3	.	.	4	4	2	.	.	.	.	.	.	3	5	.	4	4	5	5	5	.	.
Linum tenuifolium	2	.	3	3	1	1	.	.	.	.	1	2	2	2	3	3	3	3	.	1	.	.	.	.	2	.
Thesium humifusum	3	1	4	3	1	2	.	.	.	.	1	4	2	4	1	1	3	1	1	1	.	.	.	.	.	.
Teucrium montanum	5	2	4	3	1	.	4	3	3	.	.	.	2	.	5	.	3	.	1	2	.	2	1	.	.	.
Anthyllis vulneraria	5	1	5	4	2	3	.	.	.	.	2	2	2	.	.	.	.	.	1	2	5	5	3	.	.	.
Anthyllis vulneraria	.	.	.	.	.	.	2	5	4	.	.	.	3	2	1	3	2	3	1	3	.	.	.	.	4	4
Arabis collina	.	2	1	.	.	1	.	.	1	.	.	.	2	.	.	.	.	.	1	1	1	1	1	1	.	3
Bunium bulbocastanum	1	.	1	1	1	1	.	.	.	1	1	.	3	.	.	.	.	.	2	2	.	2	2	.	.	3
Scabiosa columbaria	1	2	3	.	.	.	.	.	.	.	1	2	2	2	.	1	2	1	.	.	2	.	2	.	.	.
Trinia glauca	.	.	.	.	.	1	.	5	5	.	.	1	4	.	.	.	.	3	5	.	.	3	1	.	.	.
Inula montana	1	.	.	2	2	2	.	.	.	.	1	.	2	.	.	.	.	.	2	1	.	.	.	.	.	.
Carlina acaulis	.	.	.	1	.	.	2	.	.	.	.	.	2	.	.	.	.	.	2	2	.	2	2	.	.	1
Hieracium piloselloides	1	.	1	.	.	2	.	.	.	.	.	.	2	.	.	2	.	2	.	.	.	.	.	.	.	.
Polygala major	2	.	.	.	.	.	.	1	1	.	2	.	.	.	.	.	.	.	.	.	.	3	4	1	.	1
Cota tinctoria	1	.	.	1	1	2	.	.	.	2	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.
Arabis sagittata	1	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	.
Ophrys apifera	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	1	.	.	.	.	.	.	.	.
Petrorhagia prolifera	.	.	.	.	.	3	.	.	1	.	.	.	.	.	.	.	.	.	1	3	.	.	.	.	.	.
Ononis spinosa	.	.	.	.	.	1	.	.	.	.	.	.	2	.	.	1	.	1	.	.	.	.	.	.	.	.
Orchis tridentata	1	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pseudolysimachion barrelieri	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Inula hirta	2	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Narcissus poeticus	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orchis anthropophora	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Koeleria cristata	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.
Ophrys holoserica	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthyllis vulneraria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.
Anthericum liliago	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Echinops ritro	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Polygala niceensis	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.
Dorycnium pentaphyllum	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Astragalus monspessulanum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
Class: Festuco-Brometea																										
Bromus erectus	4	5	5	5	5	5	3	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Thymus longicaulis	3	5	1	3	4	5	5	2	2	.	1	4	5	4	5	5	4	5	4	4	3	5	3	2	5	1
Hieracium pilosella	1	2	1	5	2	1	4	3	3	3	.	4	5	4	5	.	5	1	5	4	.	5	4	3	3	.
Lotus corniculatus	1	4	1	3	1	2	.	1	1	2	2	2	5	2	5	2	5	2	3	4	2	3	4	1	.	2
Sanguisorba minor	2	5	3	5	5	5	.	3	.	3	4	3	4	3	5	4	5	4	5	5	4	2	2	.	4	2
Medicago lupulina	1	4	2	3	2	1	2	1	1	.	.	1	2	1	.	2	1	2	1	.	3	2	1	.	.	1
Carex caryophyllea	1	3	1	3	1	1	.	4	4	.	.	2	1	2	4	1	4	1	3	3	.	5	.	.	.	.
Dactylis glomerata	.	4	3	2	5	5	.	1	.	2	.	4	2	4	2	3	4	2	.	1	2	.	.	.	.	2
Trifolium campestre	1	.	4	2	3	2	.	2	2	.	1	.	2	.	.	3	.	3	2	1	.	1	.	.	.	.
Arabis hirsuta	.	.	.	2	1	1	.	1	1	1	.	3	.	3	2	1	2	1	.	1	.	1	.	.	.	.
Plantago lanceolata	1	4	5	1	3	4	.	.	2	2	.	.	2	.	.	.	.	.	2	1	4	.	.	.	3	1

Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Euphrasia stricta	1	.	1	2	1	.	.	1	2	.	2	.	.	.	.	1	.	1	2	1	.	2	1	.	.	.
Euphorbia cyparissias	1	.	.	3	.	.	2	.	.	2	1	.	3	.	1	.	1	.	.	.	.	4	4	2	.	.
Ranunculus bulbosus	.	2	.	1	1	1	.	.	.	2	.	.	1	.	.	1	.	1	1	1	.	.	.	.	.	.
Orchis morio	.	.	.	1	2	.	.	.	.	.	1	.	3	.	1	2	1	1	2	1	.	.	.	.	.	.
Trifolium ochroleucum	1	1	1	.	.	1	.	.	.	.	.	.	4	.	.	.	1	1	.	2	.	1	.	.	.	.
Onobrychis viciifolia	.	.	.	.	.	1	.	.	.	.	.	.	5	2	.	2	1	2	1	1	.	.	.	.	.	.
Knautia arvensis	1	.	.	2	1	.	.	.	.	1	1	.	.	.	.	.	4	1	.	2	.	.	.	.	.	.
Tanacetum corymbosum	.	1	1	.	.	1	.	.	.	.	.	.	2	.	.	.	3	.	1	2	.	.	.	.	.	.
Leontodon hispidus	.	1	1	.	.	.	.	2	.	.	1	.	.	.	.	.	1	.	1	1	.	3	.	.	.	.
Trifolium montanum	.	.	.	.	.	.	.	4	4	.	.	.	2	.	.	.	.	.	1	.	.	5	2	.	.	.
Carduus nutans	1	.	4	1	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1
Linum catharticum	1	.	.	.	.	.	1	.	.	.	.	.	2	.	.	.	.	.	2	2	.	2	.	.	.	.
Campanula glomerata	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	.	2	.	.	.	.	3	1	.	.	.
Centaurea jacea	.	.	.	1	1	.	.	.	.	.	1	.	2	.	.	.	.	.	1	1	.	.	.	.	2	.
Cerastium arvense	3	3	1	.	.	.	.	.	.	.	.	.	.	1	4	.	.	1	.	.	.	.	.	.	.	.
Cerastium ligusticum	2	2	1	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Herniaria glabra	3	.	1	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.
Anacamptis pyramidalis	.	2	1	.	.	.	.	.	.	.	.	.	3	.	.	1	.	1	.	.	.	.	.	.	.	.
Achillea millefolium	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	.	3	.	1	1	.	.	.	.	.	.
Bromus hordeaceus	1	.	1	.	.	2	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Prunella laciniata	1	.	2	1	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthemis arvensis	1	.	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Avenula pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	3	.	.	2	.	.	.	5	.	.
Achillea collina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	2	.	1	.
Geranium pyrenaicum	1	2	1	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dactylorhiza sambucina	.	.	.	.	.	.	.	2	2	.	.	.	2	.	.	.	.	.	1	.	.	.	.	.	.	.
Potentilla tabernaemontani	.	.	.	.	.	.	.	.	4	.	1	.	.	.	.	.	2	.	.	2	.	.	.	.	.	.
Potentilla recta	.	.	.	3	2	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Dianthus carthusianorum	.	.	.	.	.	2	.	.	.	.	.	.	3	.	.	.	.	.	2	.	.	.	.	.	.	.
Pimpinella saxifraga	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	4	.	.	.	.	.
Salvia pratensis	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	3	.	.	.	.	.	.
Crocus vernus	.	2	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rhinanthus alectorolophus	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.
Filipendula vulgaris	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.
Stachys germanica	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Briza media	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	1	.	.	.	.
Campanula rapunculus	.	.	.	.	.	3	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Plantago media	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	2	.	.	.	.
Leucanthemum vulgare	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	2
Crocus biflorus	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daucus carota	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphrasia salisburgensis	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orchis mascula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.
Linum viscosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.
Thymus pulegioides	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sanguisorba minor	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Parentucellia viscosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.
Parentucellia latifolia	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Achillea setacea	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Orchis purpurea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Thesium linophyllon	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Jasione montana	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orchis coriophora	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phleum bertolonii	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Cisto-Micromerietea / Rosmarinetea																										
Cistus creticus	.	1	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.
Genista januensis	1	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Genista tinctoria	2	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dorycnium hirsutum	.	.	2	1	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Erica multiflora	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cistus salviifolius	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fumana arabica	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salvia officinalis	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fumana thymifolia	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Elyno-Seslerietea / Nardetea / Thlaspietea rot.																										
Carlina acanthifolia	.	.	.	2	.	1	.	.	.	.	1	3	.	3	5	1	4	.	.	.	.	1	1	2	.	.
Poa alpina	1	.	.	1	.	.	3	5	5	1	1	.	1	.	.	.	.	.	.	.	.	3	.	2	.	5
Astragalus depressus	.	.	.	2	1	.	.	.	3	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.
Minuartia verna	.	.	.	1	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.	.	.
Carum flexuosum	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	3	.	.
Myosotis alpestris	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Poa molinerii	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	2	.	.	.	.	.	.	.
Ranunculus oreophilus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	4	.	.
Anthyllis vulneraria	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Cardus carlinaefolius	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.
Alchemilla glaucescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
Androsace villosa	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Carex kitaibeliana	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Festuca trichophylla	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Galium magellense	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana lutea	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Gentiana utriculosa	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gentiana verna	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.
Hutchinsia alpina	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leontodon montanus	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pedicularis elegans	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygala alpestris	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Robertia taraxacoides	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedum atratum	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arctostaphylos uva-ursi	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lygeo-Stipetea/Thero-Brachypodietea																										
Ampelodesmos mauritanicus	.	1	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asphodelus ramosus	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sixalix atropurpurea	.	1	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arisarum vulgare	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Convolvulus althaeoides	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dactylis glomerata	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Allium subhirsutum	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Molinio-Arrhenatheretea s.l.																										
Festuca rubra	.	.	.	.	.	.	.	.	.	.	1	1	.	1	5	.	3	.	.	2	.	2	1	1	.	2
Anthoxanthum odoratum	.	.	1	.	.	1	.	2	.	.	1	.	1	.	.	.	.	.	2	2	.	1	.	.	1	1
Taraxacum fulvum	.	1	.	.	1	.	.	.	1	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.
Cynosurus cristatus	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	2	.	.
Bellis perennis	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.
Rhinanthus minor	.	.	.	.	.	1	.	.	.	.	.	.	2	.	.	.	.	.	1	.	.	.	.	.	.	.
Trifolium incarnatum	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.
Trifolium repens	.	.	.	1	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium striatum	.	.	1	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.

Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Galium verum	.	.	.	.	1	.	.	.	.	.	1	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.
Viola eugeniae	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
Luzula campestris	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Agrostis capillaris	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Carex flacca	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Colchicum lusitanum	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Lolium perenne	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lathyrus pratensis	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Rumex acetosella	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Trifolium nigrescens	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium pratense	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Arrhenatherum elatior	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cruciata laevipes	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Taraxacum officinale	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tragopogon pratensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Holcus lanatus	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phleum pratense	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poa compressa	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tragopogon porrifolius	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Tuberarietea / Sedo-Scleranthetea																										
Sedum rupestre	4	3	3	4	2	2	.	5	5	.	.	3	.	3	4	2	.	.	4	4	2	2	2	.	.	.
Sedum acre	.	.	.	2	1	.	.	2	2	1	1	3	1	3	5	.	4	.	1	2	5	1	1	.	.	.
Trifolium scabrum	1	.	3	2	2	3	.	.	.	.	.	.	1	.	.	.	.	.	2	2	.	.	.	.	1	.
Arenaria serpyllifolia	1	.	1	1	1	2	.	.	.	1	1	.	1	.	.	.	.	.	3	2	.	.	.	.	.	.
Sedum album	2	.	.	1	1	3	.	.	.	.	1	.	.	1	3	.	1	.	.	1	.	.	.	.	3	.
Catapodium rigidum	1	2	3	1	3	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.
Coronilla scorpioides	.	2	2	.	3	1	.	.	.	.	.	.	1	.	.	.	.	2	1	.	.	.	.	.	1	.
Trifolium stellatum	1	3	1	.	2	3	.	.	.	.	.	.	1	.	.	.	.	2	.	.	.	.	.	.	1	.
Bombycilaena erecta	1	.	1	1	1	2	.	.	.	.	.	.	1	.	.	.	.	.	4	.	.	.	.	.	.	.
Alyssum alyssoides	1	.	.	2	2	.	.	.	.	.	.	.	.	.	.	1	.	1	2	1	.	.	.	.	.	.
Sherardia arvensis	1	3	.	.	3	2	.	.	.	3	.	1	.	.	.	.	.	.	1	1	.	.	.	.	.	.
Euphorbia exigua	.	2	1	1	2	1	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.
Acinos arvensis	1	3	2	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga tridactylites	1	2	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.
Hypochaeris achyrophorus	.	2	3	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.
Linum trigynum	.	.	1	.	.	.	.	.	.	.	.	.	2	.	.	.	.	3	2	.	.	.	.	.	.	.
Trachynia distachya	.	1	3	.	3	1	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.
Vulpia ciliata	1	1	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Cerastium glutinosum	.	1	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	1	.	2	.	.	.	.	.	.
Linum strictum	.	1	2	.	.	3	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Vulpia myuros	1	1	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aira caryophyllea	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4	2	.	.	.	.	.	.
Anagallis arvensis	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.
Erophila verna	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.
Hornungia petraea	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.
Trifolium arvense	1	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.
Xeranthemum inapertum	.	.	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	2	2	.	.	.	.	.	.	.
Crupina crupinastrum	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.
Trifolium angustifolium	1	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Althaea hirsuta	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Arenaria leptoclados	.	1	.	2	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedum reflexum	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	3	1	.	1	.	.	.	.	.	1
Blackstonia perfoliata	.	2	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Hippocrepis biflora	.	3	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Medicago rigidula	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Scorpiurus muricatus	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sonchus tenerrimus	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerastium brachypetalum	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Filago pyramidata	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Minuartia mediterranea	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedum amplexicaule	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Filago vulgaris	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.
Plantago lagopus	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asterolinon linum-stellatum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Bromus madritensis	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia falcata	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Euphorbia peplus	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lotus ornithopodioides	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Melilotus sulcata	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Urospermum picroides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Galium parisiense	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linaria simplex	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Silene conica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1
Trifolium lappaceum	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tuberaria guttata	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Onobrychis caput-galli	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Other species																										
Hypericum perforatum	.	2	4	3	4	3	.	.	.	.	1	.	.	.	.	.	3	.	.	.	3	2	.	.	1	1
Lactuca perennis	.	.	.	1	1	.	.	.	.	.	.	.	2	2	.	1	2	1	.	.	.	.	.	.	3	.
Carex halleriana	.	2	1	2	2	.	.	.	.	.	.	.	1	.	.	.	.	.	3	.	.	.	.	.	1	.
Spartium junceum	.	.	1	1	2	1	.	.	.	.	.	.	.	2	.	.	1	.	.	.	.	.	.	.	1	.
Geranium columbinum	1	1	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	2	2	.	.	.	.	.	.
Astragalus sempervirens	.	.	.	.	.	.	.	2	2	3	2	.	1	.	.	.	.	.	.	.	.	3	2	.	.	.
Echium vulgare	.	.	2	.	1	2	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	2	1
Poa bulbosa	1	4	.	2	2	3	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Silene vulgaris	1	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	4	.	.	1	.	.	.	.	.	.
Digitalis lutea	.	.	.	.	.	.	.	.	.	3	1	.	.	1	4	.	3	.	.	1	.	.	.	.	.	.
Quercus pubescens	.	2	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Allium vineale	1	.	1	.	.	1	.	.	.	.	.	.	2	.	.	.	.	.	1	.	.	.	.	.	.	.
Euphorbia helioscopia	.	3	.	1	2	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Odontites lutea	.	.	.	2	1	1	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.
Picris hieracioides	.	.	2	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Romulea bulbocodium	1	3	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.
Veronica arvensis	.	1	.	1	1	.	.	.	.	.	.	.	2	.	.	.	.	.	2	.	.	.	.	.	.	.
Ornithogalum comosum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	5	3	.	.	.	.	4	.
Cuscuta epithymum	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.
Gastridium ventricosum	1	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orobanche minor	.	2	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Scrophularia canina	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.
Medicago prostrata	.	.	.	.	.	.	.	4	4	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
Carlina vulgaris	.	.	.	.	.	.	.	.	.	4	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Asparagus acutifolius	.	.	1	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Quercus ilex	.	3	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Rhamnus saxatilis	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asphodelus albus	1	.	1	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Centaurea solstitialis	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ceterach officinarum	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crepis sancta	.	2	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Galactites elegans	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Lathyrus sylvestris	.	.	1	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Leontodon villarsii	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.
Minuartia hybrida	.	.	.	.	2	1	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Orobanche purpurea	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	2	.	.	.	.	.	.	.	.	.
Orobanche teucrii	1	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salvia verbenaca	.	2	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saxifraga bulbifera	.	.	.	.	.	.	.	.	2	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.
Scilla autumnalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	5	.	1	.	.	.	.	.	.
Sedum dasyphyllum	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Silene italica	.	.	1	.	.	1	.	.	.	.	1	.	2	.	.	.	.	.	.	.	.	.	.	.	.	1
Stachys officinalis	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	.	.
Thalictrum minus	2	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tordylium apulum	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Verbascum longifolium	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.
Carduus micropterus	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dasypyrum villosum	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ophrys bertolonii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.
Phillyrea latifolia	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Acer opalus obtusatum	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crataegus monogyna	.	4	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fraxinus ornus	.	2	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ostrya carpinifolia	.	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rosa canina	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rosa spinosissima	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sesleria autumnalis	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Helianthemum oelandicum	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.
Astragalus sirinicus	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Buxus sempervirens	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Calamintha nepeta	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Centaurea calcitrapa	.	1	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Echium plantagineum	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium dissectum	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium rotundifolium	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium sanguineum	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hieracium sabinum	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Leontodon rosani	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	2	.	.	.	.	.	.	.	.	.
Linaria purpurea	.	.	1	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Nigella damascena	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Onopordum acanthium	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Orlaya daucoides	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pallenis spinosa	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pistacia terebinthus	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ranunculus gramineus	.	.	.	.	.	.	.	4	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Scabiosa gramuntia	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sempervivum tectorum	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Carthamus lanatus	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Muscari comosum	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1

Legend of the abbreviations in the synoptic table:

AB = *Artemisio-Brometalia*; **PBc** = char. species of *Phleo-Bromenion*; **PBt** = transgr. species in *Phleo-Bromenion*; **PBi** = insgr. species in *Phleo-Bromenion*; **CBc** = char. species of *Cytiso-Bromion*; **CBrc** = regional char. species of *Cytiso-Bromion*; **CBpc** = partial char. species of *Cytiso-Bromion*; **CBt** = transgr. species in *Cytiso-Bromion*; **CBi** = insgr. species in *Cytiso-Bromion*; **Sc** = char. species of *Sideritidenion italicae*; **Src** = regional char. species of *Sideritidenion*; **Spc** = partial char. species of *Sideritidenion*; **St** = transgr. species in *Sideritidenion*; **Si** = insgr. species in *Sideritidenion*.