

## The vegetal landscape of the Republic of San Marino

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### Abstract

Here we present a phytosociological study of the vegetal landscape of the territory of the Republic of San Marino, situated in the northern Apennines, where it covers 61 km<sup>2</sup>. The bioclimate belongs to the subMediterranean variant of the temperate macrobioclimate.

The vegetal landscape is here examined in relation to the characteristics of the substratum upon which it develops. On the calcareous heights, positioned on a short ridge that culminates in the peaks of Monte Titano (750 m), the forest vegetation belongs to the association of *Lamiastro-Ostryetum carpinifoliae* on the coldest aspects, and to the association *Stellario holostea-Quercetum pubescentis* on those that are warmer. We also present the substitution phytocoenoses that are in dynamic connection with the woods. In the rocky sector of the calcareous ridge, the vegetation follows the morphology and micromorphology of the substratum, forming vegetational mosaics that are particularly complex and present rare vegetal associations, among which there is the association *Crepidio titani-Brassicetum robertianae* colonising limited vertical portions of the calcareous cliffs, and the association *Teucro flavi-Ephedretum majoris*, which is found on the microterraces that alternate with the cliffs.

On the calcareous-marl conglomerate substrata and the molasses of Monte Cerreto, in part occupied by a wood that is now degraded, which is thought to be potentially referable to the association *Aceri obtusati-Quercetum cerris*. There is a particular vegetation coverage of *Erica arborea* and *Ulex europaeus* ssp. *europaeus* (this last species finds the eastern limits of its area in the location of San Marino) that is referred to the new association *Crataego monogynae-Ulicetum europaei* of the *Rhamno-Prunetea* class.

The greater part of the territory of this State is formed of clay hills that have been subjected to the phenomena of rapid erosion of the substratum that has led to the formation of badlands. The vegetation is differentiated into the pioneering vegetal communities already seen for the badlands of the nearby Marecchia Valley, with the associations: *Hainardio cylindricae-Salsoletum sodae*, *Elytrigio athericae-Artemisietum cretaceae* and *Arundinetum plinianae*. In the areas that are no longer cultivated, however, vegetation of the association *Senecio erucifolii-Inuletum viscosae* has developed. The study of the description of the vegetal landscape of San Marino Republic is completed by the analysis of the fragmentary river formations and the nitrophilic and anthropogenic formations.

Key words: northern Apennines, phytosociology, plant landscape, San Marino Republic, vegetation series.

### Riassunto

Viene presentato lo studio fitosociologico del paesaggio vegetale del territorio della Repubblica di San Marino, situato nell'Appennino settentrionale dove si estende per 61 km<sup>2</sup>. Il bioclimate appartiene alla variante submediterranea del macrobioclimate temperato.

Il paesaggio vegetale viene esaminato in rapporto con le caratteristiche del substrato sul quale si sviluppa. Sui rilievi calcarei, disposti in una breve dorsale culminante con le vette del M. Titano (750 m), la vegetazione forestale è data dall'associazione *Lamiastro-Ostryetum carpinifoliae* sui versanti più freddi e dall'associazione *Stellario holostea-Quercetum pubescentis* su quelli più caldi. Vengono inoltre presentate le fitocenosi di sostituzione che ai boschi dinamicamente si collegano. Nel settore roccioso della dorsale calcarea la vegetazione segue la morfologia e la micromorfologia del substrato, dando origine a mosaici di vegetazione particolarmente complessi e con rare associazioni vegetali tra le quali l'associazione *Crepidio titani-Brassicetum robertianae*, che colonizza limitate porzioni verticali delle pareti calcaree, e l'associazione *Teucro flavi-Ephedretum majoris*, che si rinvengono sui microterrazzi che si alternano alle pareti.

Sui substrati conglomerati calcareo-marnosi e le molasse del Monte Cerreto, in parte occupate da un bosco attualmente degradato che si ritiene potenzialmente riferibile all'associazione *Aceri obtusati-Quercetum cerris*, si rinvengono un particolare mantello di vegetazione ad *Erica arborea* ed *Ulex europaeus* ssp. *europaeus* (quest'ultima specie trova nella stazione di San Marino il limite orientale del proprio areale) riferito alla nuova associazione *Crataego monogynae-Ulicetum europaei* della classe *Rhamno-Prunetea*.

La maggior parte del territorio dello Stato è interessato da colline argillose che vanno soggette a fenomeni di erosione rapida del substrato che porta alla formazione di calanchi. La vegetazione si presenta differenziata nelle comunità vegetali pioniere, già evidenziate per i calanchi della vicina Val Marecchia, delle associazioni: *Hainardio cylindricae-Salsoletum sodae*, *Elytrigio athericae-Artemisietum cretaceae* e *Arundinetum plinianae*. Sulle aree abbandonate dalla coltivazione si sviluppa invece la vegetazione dell'associazione *Senecio erucifolii-Inuletum viscosae*. Completa lo studio la descrizione del paesaggio vegetale della Repubblica di San Marino l'analisi delle frammentarie formazioni fluviali e di quelle nitrofile ed antropogene.

Parole chiave: Appennino settentrionale, Fitosociologia, paesaggio vegetale, Repubblica di San Marino, serie di vegetazione.

### Introduction

The aim of the present study is the phytosociological description of the plant landscape of the territory of the Republic of San Marino, that covers 61 km<sup>2</sup> in the northern Apennines. This has the form of an irregular

quadrilateral (Fig.1), and is mainly hilly, with Monte Titano (750 m) at the centre, which is 10 km from the Adriatic coast as the crow flies. For its full extension, it is surrounded by two Italian regions: Emilia-Romagna to the north-east, and Marche to the south-west.



Fig. 1 - The territory of the Republic of San Marino in the northern Apennines

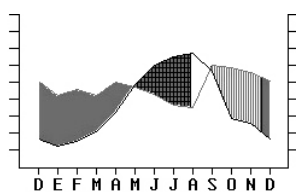
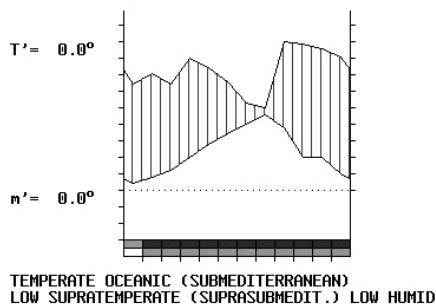
### Climate and phytoclimate

The climate of the territory is characterised by mild temperatures, with an annual average of around 11 °C. The coldest month is January, with an average temperature of 1.9 °C, and an average minimum of – 0.3 °C; July is the hottest month, with an average temperature of 20.8 °C, and an average maximum of

24.6 °C. The annual rainfall has an average of 898 mm; the driest months are July and August, with 54 mm and 51 mm, respectively, while the maximum rainfall is in the autumn period (99 mm in September and November).

From the bioclimatic point of view, the ombrothermic diagram (Fig. 2) does not show any periods of summer drought, and according to the bioclimatic classification

San Marino (Italia) 652 m  
 P= 892 44° 1'N 12°37'E 1/ 1 a  
 T= 11.7° Ic= 21.0 Tp= 1400 Tn= 0  
 n= 0.0 M= 4.0 Itc= 172 Io= 6.4



Imbibición	28	AGO.
Saturación	17	NOV.
Uso reserva	28	ABR.
Déficit	28	JUL.

Fig. 2 - Ombrothermic and water balance diagrams

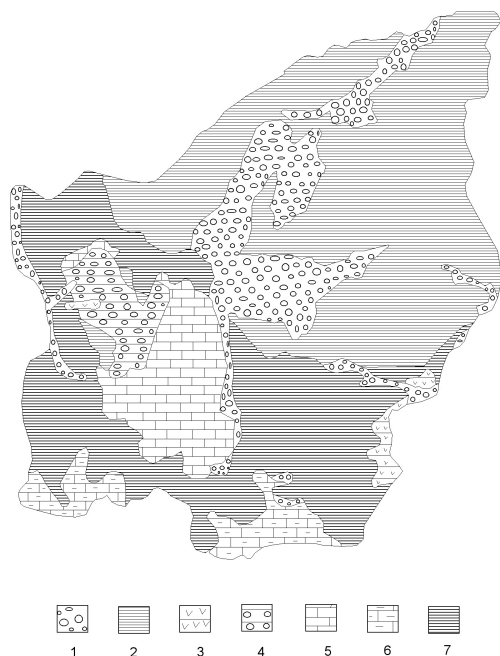


Fig. 3 - Simplified geological map (from Suzzi Valli, 1993)  
 1 - Recent and current alluvium; 2- Pliocene clays; 3 - Gypsum; 4 - Acquaviva formation; 5 - San Marino formation; 6 - Alberese; 7 - Scaled clays

of Rivas-Martinez (1995, 1996; Biondi & Baldoni, 1994), the territory belongs to the subMediterranean variant of the temperate bioclimate (oceanic bioclimate, thermotemperature thermotype, and humid ombrotype).

**Geology and soil**

In the territory of the Republic of San Marino, different geological formations are present, as summarised in Fig. 3. During the Tortorian and the Pliocene, all of the area was involved in an important tectonic movement, with the translocation by sliding of materials of sedimentary origins “colata gravitativa della Val Marecchia”. The soils exposed by this movement form the so-called gravitational mantles, which are composed of very heterogeneous materials: clay, limestone, limestone-marl, chalk and sediments of various types. Among the calcareous masses of the mantle, belonging to the “Formation of San Marino”, some have notable dimensions, such as the heights of: Monte Titano, Castellaro, Pennarosa and Monte Cucco. Along with others of lesser dimensions, these large calcareous blocks are chaotically immersed in the geological formation of the “argille scagliose” that mainly occupy the south-western areas of the territory of San Marino, while in the north-west there are autochthonous “argille plioceniche”. These clay soils often lead to erosive badlands. The “formazione di Acquaviva” emerges mainly in the area of Monte Cerreto and is formed of rounded pebbles, embedded in sand and sandstone. The soils that form on this type of substrate are red in colour, well drained, rich in organic and nitrogenous matter, but poor in usable phosphate, with a moderately basic or neutral pH. The “formazione dell’Alberese” emerges in the area of Chiesanuova, formed by a sequence of sedimentary rocks: limestone, limestone-marl, marl, and marl clays. Finally, there are two further formations: the “chalks” and the “argille di Casa I Gessi”; these last are grey marl clays that were formed in the low-depth marine environment during the Mesinian (Suzzi Valli, 1993).

**Flora**

On the basis of the floristic studies carried out by Pampanini (1930), Zangheri (1959, 1966) and Suzzi Valli (1993), in the territory of the Republic of San Marino there are 744 entities. This is a rather high number in consideration of a territory of only 61 km<sup>2</sup>,



as is shown by the index of floristic diversity that has an  $i$  value of 12.2, although this is less than that calculated for Italy, which is equivalent to 17.6 (Pignatti, 1994).

On the basis of the chorological spectra calculated by Suzzi Valli (l.c.), the flora of the Republic of San Marino is mainly made up of Eurasiatic species (35.2%), although there is also a good percentage of Mediterranean species (22.1% EuriMediterranean, 7.9% StenoMediterranean), while the boreal species are scarce (7.6%), in agreement with the climatic characteristics of the territory. Among the Italian endemic entities, which represent 1.7% of the chorological spectrum, with the exception of *Crepis lacera* Ten. var. *titani* Fiori, which is exclusive to the San Marino territory, there are the following: *Centaurea deusta* Ten., *Artemisia cretacea* (Fiori) Pign., *Erysimum pseudorhaeticum* Polatschek and *Ononis masquillierii* Bertol. Of particular biogeographical interest, there is *Ephedra major* Host., a Mediterranean-montane shrub species, which in San Marino finds its most northern location on the Italian peninsula.

## Vegetal landscape

### Vegetation of the calcareous sectors (Monte Titano)

The calcareous heights are set out in a short ridge, of about 5 km in length and in a north-north-west to south-south-east orientation, culminating in the peaks of Monte Titano (750 m) and “La Rocca” (738 m), which have very steep eastern aspects, while those of the west are lightly sloped. The heights of Monte Titano are of particular landscape and structural relevance, upon which the ancient historic centre of San Marino was built. The vegetation is distributed in the areas not built upon, with a particularly high level of diversity of phytocoenoses considering the scant area available. This is linked to the large microclimatic and geomorphological variations of the area.

The lower sector of the south-eastern aspect, in contact with the clay formations, is characterized by detritic conoids (Fig. 4), and is mainly covered by mesophilous woods of *Ostrya carpinifolia* in the north-eastern areas that are exposed to the cold winds of the bora (Fig. 5 and 6). In the southern areas there are the thermophilous oak

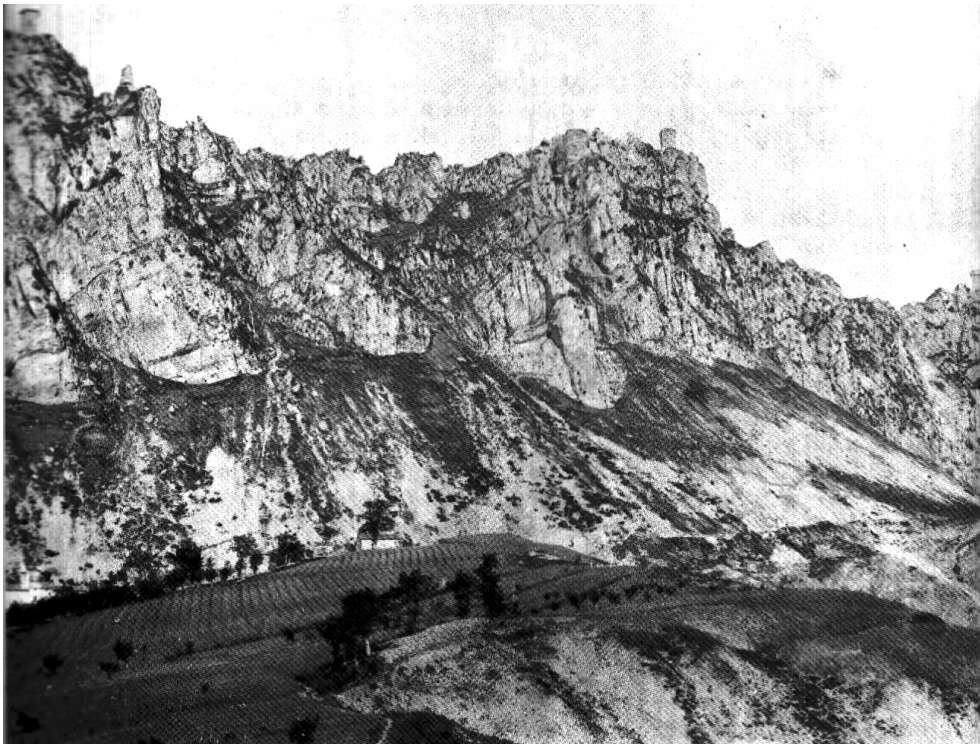


Fig. 4 - North-eastern aspect of Monte Titano in a photograph from the end of the 1800s in which the completely deforested landscape allows the detritic conoids at the base of the rocky cliffs to be seen (from Suzzi Valli, 1993)

woods of *Quercus pubescens*, although these woods are more present in the western slope.

The woods with a dominance of hop hornbeam (Tab. 1) belong to the association *Lamiastro-Ostryetum carpinifoliae*, described for the foot of mountains and for the internal Apennines of central-northern Italy (Ubaldi *et al.*, 1987). These woods are in serial contact with the mesophilous grasslands of the hilly belt of *Brachypodium rupestre* and *Bromus erectus*, widely spread in the Apennines of central-northern Italy, that are included in the association *Centaureo bracteatae-Brometum erecti* (Tab. 2).

In the rocky sector of the ridge of Monte Titano, the vegetation follows the morphology of the substratum forming vegetational mosaics that are particularly complex. On the rocky summits of the ridge, edges of the thermophilous shrubbery of *Quercus ilex* and *Fraxinus ornus* are found, referable to the alliance *Fraxino ornio-Quercion ilicis* (Biondi *et al.*, 2003) (Tab. 3). Instead, in the very steep ravines defined by the rocky outcrops, environmental conditions of notable edaphic and microclimatic humidity are found, which favour the development of mesophilous woods of *Tilia platyphyllos*

and *Ulmus glabra* (Tab. 4) of the association *Aceretum obtusati-pseudoplatani*. This association has been recently described for the central-northern Apennines (Biondi *et al.*, 2002) in order to classify the woods that are found in similar conditions in the montane and hilly bioclimatic belts.

The rocky cliffs that can be more or less steep have been colonised by the chasmophyte associations of the class *Parietarietea judaicae*. The new association *Crepidio titani-Brassicetum robertianae*, endemic of Monte Titano and found on the limited vertical portions of the calcareous cliffs that are exposed to the north-east, is referred to this class (Tab. 5, ril. type n° 1). This association is attributed to the alliance *Brassicion oleraceae*, described for the chasmophyte community of the Mediterranean to Temperate bioclimates of the Iberian peninsula (Rivas-Martinez *et al.*, 1999), and also found in Italy (Vagge I., 2000). The fresh and shady crags are instead home to phytocoenoses of *Asplenium trichomanes* and *Ceterach officinarum* (Tab. 6) of the association *Asplenietum rutae-murariae-trichomanis*, also commonly found on the walls of ancient buildings and on the low dry-stone walls. The cemented walls, particularly of the historic centre, are

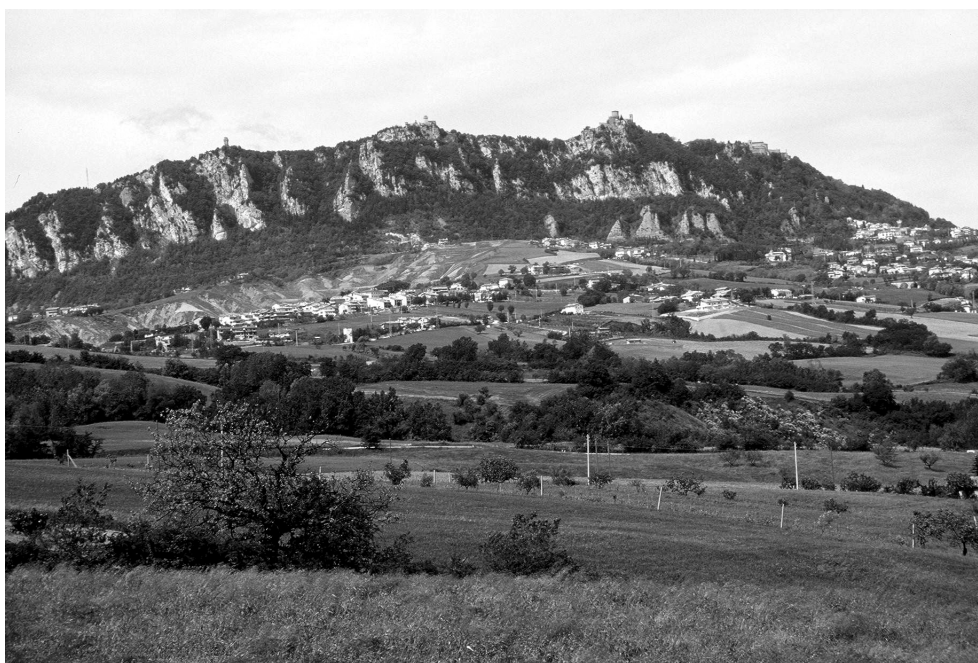


Fig. 5 - North-eastern aspect of the calcareous ridge of Monte Titano in its present situation, with the woods of *Ostrya carpinifolia* that cover the detritic conoids at the base of the calcareous cliffs



Fig. 6 - Transect of the rocky area of Monte Titano showing the distribution of the vegetation typologies found: 1. *Lamiastro-Ostryetum carpinifoliae*; 2. *Quercus ilex* and *Fraxinus ornus* community; 3. *Aceretum obtusati-pseudoplatani*. In the circle a microterrace hosting the following communities is represented: 4. *Crepido titani-Brassicetum robertianae*; 5. *Asplenietum rutaemurariae-trichomanis*; 6. *Polypodium australe* var. *cambricum* community; 7. *Centaureo deustae-Seslerietum italicae*; 8. *Teucrio flavi-Ephedretum majoris*

colonised by the more heliophytic phytocoenoses of *Cymbalaria muralis* (*Cymbalario muralis-Parietarium judaicae*, Tab. 7) or of *Erysimum cheiri* (*Cheirantho-Parietarium judaicae*, Tab. 8). On the microterraces that alternate with the more or less vertical cliffs, there are instead forms of the rocky vegetation of *Ephedra major*, for which is proposed of the new association *Teucrio flavi-Ephedretum majoris* (Tab. 9, ril. type n° 4). This is analogous to that published for some vegetations of *Ephedra major* of Morocco (Meier & Braun-Blanquet, 1934) and of the Iberian peninsula (Rivas Martinez *et al.*, 2002). On the same microterraces, limited pioneering grasslands of *Sesleria italica* and *Centaurea deusta* are found. These have a floristic combination that is repeated on a large part of the calcareous heights of the upper Montefeltro and is proposed to be included in the new association *Centaureo deustae-Seslerietum italicae* (Tab. 10, ril. type n° 1), which is definitely more thermophilic than that described for Monte Carpegna, with the association *Valeriano-Seslerietum italicae* (Ubaldi, 1974).

Moreover, on the external border of the microterraces, in humid and shady conditions, a typical chasmophyte vegetation of *Polypodium australe* var. *cambricum*, of the class *Anamodonto-Polypodieta* can be found (Tab. 11).

The southern and western aspects of the ridge of Monte Titano are in part covered by woods of *Quercus pubescens*, for which is described the new association *Stellario holostae-Quercetum pubescentis* (Tab. 12, ril. type n° 6). Even if it presents analogies with the subassociation *ruscetosum aculeati* of the association *Peucedano cervariae-Quercetum pubescentis* (Allegrezza *et al.*, 2002), it can be differentiated from this subassociation particularly by the presence of *Stellaria holostea* and *Glechoma hirsuta*. In this association, besides the thermophilic and typical aspects indicated by the new subassociation *quercetosum pubescentis*, the subassociation *anemonetosum trifoliae* can also be individuated, to which the coenosis that grow in more fresh and humid locations belong (Tab. 12, ril. type n° 4). The association *Stellario holostae-Quercetum*



*pubescentis* is included in the suballiance *Laburno anagyroidis-Ostryenion*, in analogy with what has been proposed for the woods of *Quercus pubescens* of Marche.

The wood phytocoenoses of both the *Stellario holosteae-Quercetum pubescentis* and the *Lamiastro-Ostryetum carpinifoliae* associations show a characteristic vegetation edge of *Helleborus bocconei* and *Digitalis micrantha*, of the association *Digitalidi micranthae-Helleboretum bocconei*, for which the phytosociological samplings were presented by Biondi *et al.* (2001). Sporadically, in more heliophylic conditions, a vegetation edge of *Peucedanum cervaria*, of the association *Peucedanetum cervariae*, can also be found (Biondi *et al.*, 2001).

The series of downy oak woods (*Stellario holosteae-Quercus pubescentis* sigmetum) have as substitution stages of the wood the a shrubbery of *Osyris alba* and *Asparagus acutifolius*, of the association *Asparago acutifolii-Osyridetum albae* (Tab. 13), and the shrubberies of *Spartium junceum*, of the association *Spartio juncei-Cytisetum sessilifolii* (Tab. 14), both of the alliance *Cytision sessilifolii* (Allegrezza *et al.*, 1997; Biondi *et al.*, 1988; Poldini *et al.*, 2002). The vegetation series also includes grasslands of *Bromus erectus* of the association *Asperulo purpureae-Brometum erecti* (Tab. 15), widely diffuse in the hilly belt of the calcareous heights of the central Apennines (Biondi *et al.*, 1995).

#### Vegetation of the calcareous-marl conglomerates

On the calcareous-marl conglomerates and the molasses of the “formazione di Acquaviva”, emerging particularly in the area of Monte Cerreto, the vegetation of *Stellario holosteae-Quercus pubescentis* sigmetum is found (Fig.

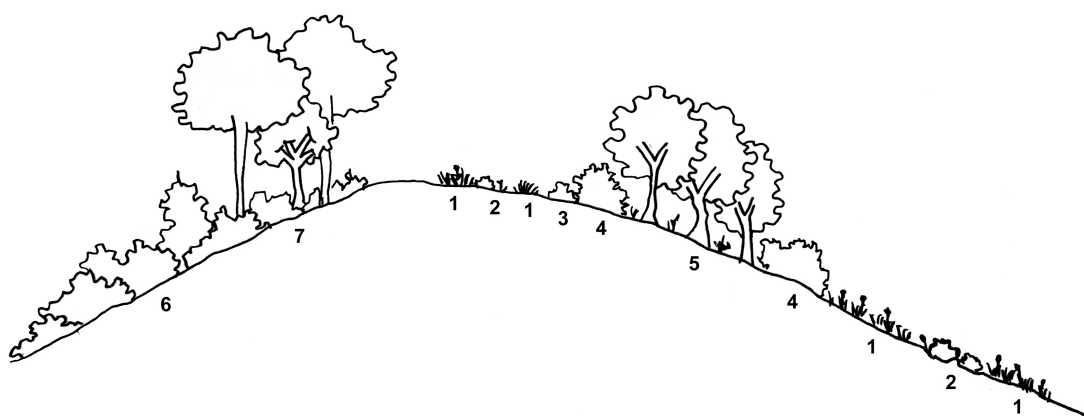


Fig. 7 - Transect of the vegetation in the area of Monte Cerreto: 1. *Asperulo purpureae-Brometum erecti*, 2. *Teucrio polii-Thymetum glabrescentis*, 3. *Asparago acutifolii-Osyridetum albae*, 4. *Spartio juncei-Cytisetum sessilifolii*, 5. *Stellario holosteae-Quercetum pubescentis*, 6. *Crataego monogynae-Ulicetum europaei*, 7. *Aceri obtusati-Quercetum cerris*

7). However, there are also garigue formations of *Teucrium polium*, of the new association *Teucro polii-Thymetum glabrescentis* (Tab. 16, ril. type n° 1) of the alliance *Artemisio albae-Saturejion montanae*, and thermophytic grasslands of *Trifolium scabrum* of the association *Trifolio scabri-Hypochoeridetum achyrophori* (Tab. 17).

The western aspect of Monte Cerreto has woods of *Castanea sativa*, *Quercus pubescens* and sometimes *Quercus cerris*, which have been greatly thickened with planted conifers (Tab. 18). These woods have a floristic cortège rich in acidophylous species, such as *Pteridium aquilinum*, *Pulicaria odora* and *Hieracium racemosum*. It is thought that these formations occupy surfaces with potential for woods of Turkey oak that are referable to the association *Aceri obtusati-Quercetum cerris* that is widely spread in this sector of the Apennines (Ubaldi *et al.*, 1987; Ubaldi, 1993).

The vegetation covering of this wood is made up of dense shrub formations of *Erica arborea* and *Ulex europaeus* ssp. *europaeus*. For the latter species, San Marino is one of the most southern locations and the most eastern location of its spread. In this situation, *Ulex europaeus* ssp. *europaeus* dominates a shrub vegetation that is referred to the new association *Crataego monogynae-Ulicetum europaei* (Tab. 19, ril. type n° 1), which has a floristic composition that allows the attribution to the class *Rhamno-Prunetea* and not to the class *Calluno-Ulicetea*, to which are typically referred the associations described for the territories of western Europe.

#### Vegetation of the clay sectors

The territory of the Republic of San Marino is for the major part made up of clay hills that have been subjected

to phenomena of rapid erosion of the substratum that has led to the formation of bedlands. The vegetation is differentiated in the pioneer vegetal communities already described for the bedlands of the nearby Val Marecchia (Allegrezza *et al.*, 1994). The sectors of the bedlands suffering from the worst erosion are home to a pioneering annual formation characterised by the presence of *Salsola soda* referable to the association *Hainardio cylindricae-Salsoletum sodae* (Tab. 20). This phytocoenosis often forms a mosaic with a pioneering perennial formation of *Artemisia cretacea*, attributed to the association *Elytrigio athericae-Artemisietum cretaceae*. (Tab. 21). On the summit areas of the hills subjected to bedlands-forming erosion, shrubberies *Spartium junceum*, of the association *Spartio juncei-Cytisetum sessilifolii*, are found (Tab. 14, ril. n° 2), while on the more fresh and humid locations develops communities of *Arundo pliniana*, of the association *Arundinetum pliniana*.

The clay-bedlands sectors have been subjected to great use by man, who has tried to wrest these lands from the erosion by modelling the hills to make them more suitable to cultivation. In the areas abandoned by cultivation, well represented in these territories, a vegetation referable to the association *Senecio erucifolii-Inuletum viscosae* grows (Tab. 22), which has been described for the pelitic-arenaceous sectors of the Ancona territory (Biondi & Allegrezza, 1996).

#### Fluvial vegetation

The Republic of San Marino does not have any large water courses in its territory; moreover, the cultivated land is often found next to the river-beds, reducing further the colonisable space of the river vegetation. Fluvial formations are nevertheless found, even if fragmentary,

along the course of the San Marino River (Fig. 8), where the vegetation largely has the characteristics already described for the nearby Marecchia River (Biondi & Baldoni, 1994b).

The sandy-pebbly deposits of the normal seasonal flood-beds of the river have an annual herbaceous vegetation that reaches its maximum expansion during the summer periods, with the minimal water course, and is referable to the association *Polygono lapathifolii-Xanthietum italici*. In the same period, in the river-bed develops sandy-muddy deposits that are colonised by annual vegetation attributable to the associations *Bidenti-Polygonetum mitis* and *Cyperetum flavescens*. In the river-bed hollows on the muddy-clay substrata, small communities of the association *Typha angustifoliae-Schoenoplectetum tabernaemontani* are found, with different *facies* in relation to the dominant species: *Typha latifolia*, *T. domingensis* or *Phragmites australis*. In contact with these formations on the sandy substrata, there are sporadic phytocoenoses of *Typha minima* of the association *Phragmiti-Typhetum minima*. Moreover, pioneer formations of bushy willows of the associations *Salicetum incano-purpureae* and *Salicetum triandrae* are present on the river-bed. At the margins of the low-water-bed on muddy substrata, the association *Salicetum albae* is sporadically found (Tab. 23).

The alluvial terraces have small woods of *Alnus glutinosa* (*Aro italici-Alnetum glutinosae*), the modest extension of which is mainly due to man's exploitation of this land. On the no-longer-cultivated lands of this area, herbaceous formations of the association *Loto tenuis-Agropyretum repentis* (Tab. 24) develop.

Along the banks of the ditches and the slopes of the alluvial terraces of the San Marino river there are woods of *Populus nigra*, *Salix alba* and *Ulmus minor* (Tab. 25),

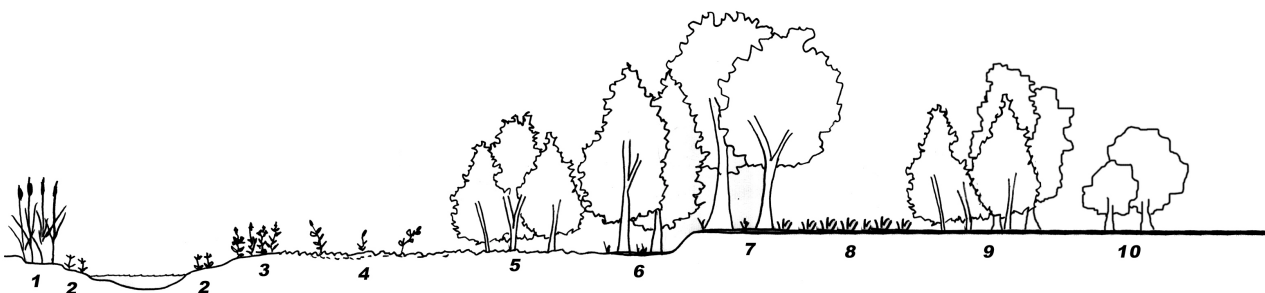


Fig. 8 - Transect of the vegetation along the San Marino river in the locality of Gualdicciolo. The associations represented are: 1. *Typha angustifoliae-Schoenoplectetum tabernaemontani*, 2. *Cyperetum flavescens*, 3. *Bidenti-Polygonetum mitis*, 4. *Polygono lapathifolii-Xanthietum italici*, 5. *Salicetum incano-purpureae* and *Salicetum triandrae*, 6. *Salicetum albae*, 7. *Aro italici-Alnetum glutinosae*, 8. *Loto tenuis-Agropyretum repentis*, 9. *Salici-Populetum nigrae*, 10. *Ulmus minoris-Salicetum apenninae*.



referable to the association *Salici-Populetum nigrae*. In some cases, these phytocoenoses are enriched with *Populus alba*, analogous to what has also been described for the Stirone River (Biondi *et al.*, 1999), differentiating the subassociation *populetosum albae*.

Along the ditches, the covering of these woods is represented by formations of *Salix appennina* (Tab. 26). The phytocoenoses of *Salix appennina* described for central Italy have been referred to two associations: *Salicetum appennine* (*Alno-Ulmion*), which includes the woods of *Salix appennina* of the montane belt of the central Apennines (Pedrotti & Gafta, 1996), and *Lonicero xylostei-Salicetum apenninae* (*Rhamno-Prunetea*), which represent the mantle of *Fraxinus excelsior* wood of the association *Fraxino excelsioris-Aceretum obtusati* (Biondi & Casavecchia, 2002).

In the case of San Marino, the shrubberies of *Salix appennina* are differentiated from the two above-mentioned associations because they represent the mantle of the woods belonging to the *Salici-Populetum nigrae*

and present a group of species that allows them to be linked to the order *Salicetalia purpureae*. Thus it is possible to ascribe them to the new association *Ulmo minoris-Salicetum apenninae* (Tab. 26 ril. type n° 1).

#### Nitrophilous vegetation

The nitrophilous vegetation of the clearings and the wood edges can be referred to the class *Galio-Urticetea*, with the association *Alliario-Chaerophylletum temuli*, of which the new subassociation *lunarietosum annuae* is described (Tab. 28, ril. type n° 4), and with the new, more shopphilous, association *Geranio robertianae-Lamiastretum galeobdoli* (Tab. 29, ril. type n° 1).

The nitrophilous and overgrowth vegetation that is more directly connected to man's actions is instead a part of the associations: *Urtico-Sambucetum ebuli* (Tab. 27), *Balloto-Melissetum romanae* (Tab. 30) and *Galio aparinaes-Smyrniyetum olusatri*, in the new subassociation *lunarietosum annuae* (Tab. 31, ril. type n° 3).

#### Syntaxonomic scheme

##### *BIDENTETEA TRIPARTITAE* Tüxen, Lohmeyer & Preising ex von Rochow 1951

*Bidentetalia tripartitae* Br.-Bl. & Tüxen ex Klika & Hadač 1944

*Bidention tripartitae* Nordhagen 1940

*Bidenti-Polygonetum mitis* (Roch. 1951) Tüxen 1979

*Chenopodion rubri* (Tüxen ex Poli & J. Tüxen 1960) Kopecký 1969

*Polygono lapathifolii-Xanthietum italici* Pirola & Rossetti 1974

##### *ISOETO-NANOIUNCETEA* Br.-Bl. & Tüxen ex Westhoff, Dijk & Passchier 1946

*Nanocyperetalia* Klika 1935

*Nanocyperion* Koch ex Libbert 1933

*Cyperetum flavescens* Koch 1926 em. Aichinger 1933

##### *PHRAGMITO-MAGNOCARICETEA* Klika in Klika & V. Novák 1941

*Phragmitetalia* Koch 1926

*Phragmition* Koch 1926

*Typho angustifoliae-Schoenoplectetum tabernaemontani* Br.-Bl. & O. Bolós 1957

*Phragmiti-Typhetum minimae* Trinajstić 1969

##### *SAGINETEA MARITIMAE* Westhoff, Van Leeuwen & Adriani 1962

*Frankenietalia pulverulenta* Rivas-Martinez ex Castroviejo & Porta 1976

*Frankenion pulverulenta* Rivas-Martinez ex Castroviejo & Porta 1976

*Hainardio cylindricae-Salsoletum sodae* Allegrezza, Biondi, Brillii-Cattarini & Gubellini 1994

##### *PARIETARIETEA* Rivas Martinez in Rivas Goday 1964

*Parietarietalia* Rivas Martinez in Rivas Goday 1964

*Cymbalario-Asplenion* Segal 1969

*Asplenietum rutae-murariae-trichomanis* Kuhn 1937

*Cymbalario muralis-Parietarium judaicae* Pignatti 1952

*Cheirantho-Parietarium judaicae* Oberdorfer 1957

*Brassicion oleraceae* Rivas Martinez, Fernandez Gonzalez & Loidi 1999

*Crepido titani-Brassicetum robertianae* ass. nova

**ANAMODONTO-POLYPODIETEA** Rivas Martinez 1975

*Anamodonto-Polypodiotalia* O. Bòlos & Vivesz in O. Bòlos 1957

*Polypodium cambrici* Br.-Bl. in Br.-Bl., Roussine & Nègre 1952

Aggr. a *Polypodium australe* var. *cambricum*

**ARTEMISIETEA VULGARIS** Lohmeyer, Preising & Tüxen ex von Rochow 1951

*Artemisietalia vulgaris* Lohmeyer in Tüxen 1947

*Inulo viscosae-Agropyron repentis* Biondi & Allegrezza 1996

*Elytrigio athericae-Artemisietum cretaceae* Ferrari & Grandi 1974 corr. Allegrezza, Biondi, Brilli-Cattarini & Gubellini 1994

*Senecio erucifolii-Inuletum viscosae* Biondi & Allegrezza 1996

*Loto tenuis-Agropyretum repentis* Biondi, Vagge, Baldoni & Taffetani 1997

**GALIO-URTICETEA** Passarge ex Kopecký 1969

*Galio aparines-Alliarietalia petiolatae* Görs & Müller 1969

*Galio-Alliarion petiolatae* Oberdorfer & Lohmeyer in Oberdorfer, Görs, Korneck, Lohmeyer, Müller, Philippi & Seibert 1967

*Urtico dioicae-Sambucetum ebuli* (Kaiser 1926) Br.-Bl. (1936) 1952

*Geranio robertianae-Lamiastretum galeobdoli* ass. nova

*Alliario-Chaerophylletum temuli* Lohmeyer 1949

*Alliario-Chaerophylletum temuli* Lohmeyer 1949 *lunarietosum annuae* subass. nova

*Galio aparines-Smyrnetum olusatri* Allegrezza, Ballelli & Biondi 1987

*Galio aparines-Smyrnetum olusatri* Allegrezza, Ballelli & Biondi 1987 *lunarietosum annuae* subass. nova

*Balloto-Conion maculati* Brullo in Brullo & Marcenò 1985

*Balloto-Melissetum romani* Brullo, Minissale, Scelsi & Spampinato 1993

**TRIFOLIO MEDII-GERANIETEA SANGUINEI** Müller 1962

*Origanetalia vulgaris* Müller 1962

*Trifolium medii* Müller 1962

*Digitali micranthae-Helleboretum bocconeii* Biondi, Carni, Vagge, Taffetani & Ballelli 2001

*Geranion sanguinei* Tüxen in Müller 1962

*Peucedanetum cervariae* Kaiser 1926

**TUBERARIETEA GUTTATAE** (Br.-Bl. in Br.-Bl., Roussine & Nègre 1952) Rivas Goday & Rivas Martinez 1963

*Brachypodiotalia distachyi* Rivas Martinez 1978

*Brachypodium distachyi* Rivas Martinez 1978

*Trifolio scabri-Hypochoeridetum achyrophori* Lapraz ex Biondi, Izco, Ballelli & Formica 1997

**FESTUCO-BROMETEA** Br.-Bl. & Tüxen ex Br.-Bl. 1949

*Brometalia erecti* Br.-Bl. 1936

*Artemisio albae-Bromenalia erecti* Biondi, Ballelli, Allegrezza & Zuccarello 1995

*Phleo ambigui-Bromion erecti* Biondi & Blasi ex Biondi, Ballelli, Allegrezza & Zuccarello 1995

*Asperulo purpureae-Brometum erecti* Biondi & Ballelli ex Biondi, Ballelli, Allegrezza & Zuccarello 1995

*Centaureo deustae-Seslerietum italicae* ass. nova

*Leucanthemo vulgaris-Bromenalia erecti* Biondi, Ballelli, Allegrezza & Zuccarello 1995

*Bromion erecti* W. Koch 1926

*Centaureo bracteatae-Brometum erecti* Biondi, Ballelli, Allegrezza, Guitian & Taffetani 1986

Aggr. a *Brachypodium rupestre* e *Lathyrus aphaca*

**ROSMARINETEA OFFICINALIS** Rivas-Martinez, T.E. Diaz, F. Prieto, Loidi & Penas 2002

*Rosmarinetalia officinalis* Br.-Bl. ex Molinier 1934

*Artemisio albae-Saturejion montanae* Allegrezza, Biondi, Formica, Ballelli 1997

*Teucro polii-Thymetum glabrescentis* ass. nova

*Teucro flavi-Ephedretum majoris* ass. nova

**RHAMNO-PRUNETEA** Rivas Goday & Borja ex Tüxen 1962

*Prunetalia spinosae* Tüxen 1952

*Cytision sessilifolii* Biondi 1988

*Asparago acutifolii-Osyridetum albae* Allegrezza, Biondi, Formica & Ballelli 1997

*Spartio juncei-Cytisetum sessilifolii* Biondi in Biondi, Allegrezza & Guitian 1988

*Berberidion vulgaris* Br.-Bl. 1950

*Fraxino orni-Berberidenion* Poldini & Vidali 1995

*Pruno-Rubion ulmifolii* O. Bolòs 1954

*Arundinetum plinianae* Biondi, Brugiapaglia, Allegrezza & Ballelli 1992

*Crataego monogynae-Ulicetum europaei* ass. nova

**SALICI PURPUREAE-POPULETEA NIGRAE** (Rivas-Martinez & Canto ex Rivas-Martinez, Bascones, T.E. Diaz, Fernandez-Gonzalez & Loidi 1991) Rivas-Martinez, T.E. Diaz, Fernandez-Gonzalez, Izco, Loidi, Lousa & Penas 2002

*Populetalia albae* Br.-Bl. ex. Tchou 1948

*Populion albae* Br.-Bl. ex. Tchou 1948

*Salici-Populetum nigrae* (Tüxen 1931) Meyer-Drees 1936

*Alnion incanae* Pawlowski in Pawlowski, Sokolowoski & Wallisch 1928

*Aro italici-Alnetum glutinosae* Gafta & Pedrotti 1995

*Salicetalia purpureae* Moor 1958

*Salicion albae* Soó 1930

*Salicetum albae* Issler 1926

*Salicetum triandrae* (Malcuit 1929) Noirfalise 1955

*Salicion eleagni* Aichinger 1933

*Salicetum incano-purpureae* Sillinger 1933

*Ulmo minoris-Salicetum apenninae* ass. nova

**QUERCETEA-ILICIS** Br.-Bl. Ex A. & O. Bolos 1950

*Quercetalia ilicis* Br.-Bl. Ex Mol. 1934 em. Rivas Martinez 1975

*Fraxino orni-Quercion ilicis* Biondi, Casavecchia & Gigante 2003

Aggr. a *Quercus ilex* e *Fraxinus ornus*

**QUERCO-FAGETEA** Br.-Bl. & Vlieger in Vlieger 1937

*Quercetalia pubescentis-petraeae* Klika 1933

*Ostryo-Carpinion orientalis* Horvat (1954) 1959

*Laburno anagyroidis-Ostryenion carpinifoliae* (Ubaldi 1981) Poldini 1990

*Lamiastro-Ostryetum carpinifoliae* (Ubaldi & Speranza 1982) Ubaldi, Zanotti, Puppi, Speranza & Corbetta 1987

*Stellario holosteae-Quercetum pubescentis* ass. nova

*Stellario holosteae-Quercetum pubescentis quercetosum pubescentis* subass. nova. (tipus)

*Stellario holosteae-Quercetum pubescentis anemonetosum trifoliae* subass. nova

*Fagetalia sylvaticae* Pawlowski in Pawlowski, Sokolowoski & Wallisch 1928

*Tilio plathyphylli-Acerion pseudoplatani* Klika 1955

*Aceretum obtusati-pseudoplatani* Biondi, Casavecchia, Pinzi, Allegrezza & Baldoni 2002



Tab. 1 - *Lamiastro-Ostryetum carpinifoliae* (Ualdi & Speranza 1982)  
Ualdi, Zanotti, Puppi, Speranza & Corbetta 1987

Rel. n.	1	2	P
Exposure	NE	NNE	P
Slope (°)	40	40	r
Area (m <sup>2</sup> )	200	300	e
Coverage (%)	100	100	s.
Tree layer (high) m	15	19	
Tree layer cov. %	85	80	
Shrub layer (high) m	3	3	
Shrub layer cov. %	75	80	
Herbs cov. %	80	90	
Charact. and diff. species of the ass.			
<i>Ostrya carpinifolia</i> Scop.	3.3	5.5	2
<i>Lamiastrum galeobdolon</i> (L.) Ehrend. et Polatschek	3.3	3.3	2
<i>Allium triquetrum</i> L.	3.3	2.2	2
Charact. and diff. species of the upper units			
<i>Carpinus betulus</i> L.	2.2	2.2	2
<i>Hedera helix</i> L.	2.2	3.3	2
<i>Acer pseudoplatanus</i> L.	2.2	2.3	2
<i>Corylus avellana</i> L.	2.2	3.3	2
<i>Acer campestre</i> L.	1.2	2.2	2
<i>Acer obtusatum</i> W. et K.	2.3	2.2	2
<i>Lonicera xylosteum</i> L.	+2	1.2	2
<i>Hepatica nobilis</i> Miller	1.2	1.2	2
<i>Melica uniflora</i> Retz.	1.2	1.2	2
<i>Corydalis cava</i> (L.) Schweigg. et Koerte	2.2	1.1	2
<i>Fraxinus ornus</i> L.	2.2	2.2	2
<i>Cornus mas</i> L.	1.2	1.2	2
<i>Helleborus bocconei</i> Ten.	1.1	1.1	2
<i>Pulmonaria apennina</i> Cristof. et Puppi	+2	+2	2
<i>Lilium bulbiferum</i> L. ssp. <i>croceum</i> (Chaix) Baker	1.1	+2	2
<i>Lathyrus venetus</i> (Miller) Wohlf.	1.2	1.1	2
<i>Salvia glutinosa</i> L.	+2	-	1
<i>Primula vulgaris</i> Hudson	+2	-	1
<i>Euonymus europaeus</i> L.	+	-	1
<i>Castanea sativa</i> Miller	1.2	-	1
<i>Daphne laureola</i> L.	-	+2	1
<i>Euonymus latifolius</i> (L.) Miller	-	+2	1
<i>Polystichum setiferum</i> (Forsskal) Woyнар	-	+2	1
<i>Viola reichenbachiana</i> Jordan ex Boreau	-	+2	1
<i>Lilium martagon</i> L.	-	+	1
<i>Paris quadrifolia</i> L.	-	+	1
Other species			
<i>Crataegus monogyna</i> Jacq.	1.2	2.2	2
<i>Tamus communis</i> L.	1.2	1.2	2
<i>Cyclamen repandum</i> S. et S.	2.2	2.2	2
<i>Arum italicum</i> Miller	1.2	+	2
<i>Polypodium vulgare</i> L.	+2	+	2
Accidental species			
	5	6	

Tab. 3 - Aggruppamento a *Quercus ilex* e *Fraxinus ornus*

Rel. n.	1	2	3	4	P
Exposure	ENE	ENE	E	ENE	r
Slope (°)	40	60	50	55	e
Area (m <sup>2</sup> )	100	200	20	50	s.
Coverage (%)	100	100	95	100	
Tree layer (high) m	9	10	11	10	
Charact. and diff. species of the upper units					
<i>Quercus ilex</i> L.	4.5	2.3	3.4	2.3	4
<i>Fraxinus ornus</i> L.	1.2	2.2	2.2	2.3	4
Charact. and diff. species of the upper units					
<i>Asparagus acutifolius</i> L.	2.2	+	1.2	1.2	4
<i>Coronilla emerus</i> L. ssp. <i>emeroides</i> (Boiss. et Spruner) Hayek	2.3	+2	1.2	1.1	4
<i>Lonicera etrusca</i> Santi	-	1.2	+	-	2
<i>Ruscus aculeatus</i> L.	3.3	-	-	-	1
Other species					
<i>Quercus pubescens</i> Willd.	2.2	4.5	+	1.1	4
<i>Arabis turrata</i> L.	1.1	+2	+	+	4
<i>Hedera helix</i> L.	+	+2	+2	1.2	4
<i>Polypodium vulgare</i> L.	2.3	+	+2	1.2	4
<i>Acer monspessulanum</i> L.	-	2.2	3.3	3.3	3
<i>Acer campestre</i> L.	-	1.2	+	-	2
<i>Clematis vitalba</i> L.	+2	1.2	+	-	3
<i>Festuca robustifolia</i> Mgf.-Dbg.	-	-	1.2	+2	2
<i>Amelanchier ovalis</i> Medicus	-	-	+	+	2
Accidental species					
	9	3	5	2	

Tab. 2 - *Centaureo bracteatae-Brometum erecti* Biondi, Ballelli, Allegrezza, Guitian & Taffetani 1986

Rel. n.	1	2	3	P
Exposure	SSW	W	W	r
Slope (°)	30	15	5	e
Area (m <sup>2</sup> )	40	50	100	s.
Coverage (%)	100	98	100	
Charact. and diff. species of the ass.				
<i>Centaurea bracteata</i> Scop.	+	+	2.3	3
<i>Galium album</i> Miller	+2	+	1.2	3
<i>Dorycnium pentaphyllum</i> Scop. ssp. <i>herbaceum</i> (Vill.) Rouy	-	-	4.4	1
Charact. and diff. species of the all. and ord.				
<i>Bromus erectus</i> Hudson	4.5	4.5	4.5	3
<i>Brachypodium rupestre</i> (Host) R. et S.	2.3	2.3	4.4	3
<i>Sanguisorba minor</i> Scop.	+	+	+	3
<i>Teucrium chamaedrys</i> L.	+2	1.2	-	2
<i>Genista tinctoria</i> L.	-	+	+	2
<i>Hippocrepis comosa</i> L.	1.2	-	-	1
<i>Arabis hirsuta</i> (L.) Scop.	+	-	-	1
<i>Onobrychis viciifolia</i> Scop.	-	+	-	1
<i>Centaurium erythraea</i> Rafn	-	-	1.1	1
<i>Polygala nicaeensis</i> Risso	+2	-	-	1
Charact. and diff. species of the class				
<i>Euphorbia cyparissias</i> L.	+	1.2	+	3
<i>Thymus glabrescens</i> Willd.	2.3	+	-	2
<i>Hieracium pilosella</i> L.	+	+	-	2
<i>Stachys recta</i> L.	+	+	-	2
<i>Odontites lutea</i> (L.) Clairv.	+	-	+	2
<i>Galium verum</i> L.	+	-	-	1
<i>Phleum ambiguum</i> Ten.	1.2	-	-	1
<i>Anthyllis vulneraria</i> L.	-	+2	-	1
<i>Galium lucidum</i> All.	-	+	-	1
<i>Arabis collina</i> Ten.	-	+	-	1
<i>Silene italica</i> (L.) Pers.	-	+	-	1
<i>Ononis pusilla</i> L.	-	+	-	1
<i>Asperula purpurea</i> (L.) Ehrend.	-	1.2	-	1
<i>Eryngium amethystinum</i> L.	-	1.1	-	1
Other species				
<i>Dactylis glomerata</i> L.	2.2	1.2	2.2	3
<i>Lotus corniculatus</i> L.	1.2	+	+2	3
<i>Helichrysum italicum</i> (Roth) Don	+	+2	-	2
<i>Helianthemum nummularium</i> (L.) Miller	+	+	-	2
<i>Lathyrus sylvestris</i> L.	1.1	1.1	-	2
<i>Clinopodium vulgare</i> L.	+	-	2.2	2
<i>Scabiosa maritima</i> L.	-	1.2	1.1	2
<i>Anthemis tinctoria</i> L.	-	+	+	2
<i>Anthoxanthum odoratum</i> L.	-	+2	1.2	2
<i>Carex flacca</i> Schreber	-	1.2	1.2	2
<i>Blackstonia perfoliata</i> (L.) Hudson	-	+	1.1	2
Accidental species				
	6	8	10	

Tab. 4 - *Aceretum obtusati-pseudoplatani* Biondi, Casavecchia, Pinzi, Allegrezza & Baldoni 2002

Rel. n.	1	2	3	P
Exposure	SE	SE	SE	r
Slope (°)	35	35	40	e
Area (m <sup>2</sup> )	300	100	300	s.
Coverage (%)	100	100	100	
Tree layer (high) m	9	12	11	
Charact. and diff. species of the ass.				
<i>Acer obtusatum</i> W. et K.	1.2	1.2	1.1	3
<i>Acer pseudoplatanus</i> L.	+2	1.1	1.2	3
<i>Ruscus aculeatus</i> L.	2.2	+2	2.3	3
<i>Glechoma hirsuta</i> W. et K.	+	3.3	(+)	3
<i>Pulmonaria apennina</i> Cristof. et Puppi	-	-	1.2	1
Charact. and diff. species of the all. and ord.				
<i>Tilia platyphyllos</i> Scop.	+	4.4	2.3	3
<i>Ulmus glabra</i> Hudson	4.5	-	-	1
<i>Melica uniflora</i> Retz.	1.2	+	+2	3
<i>Primula vulgaris</i> Hudson	+	-	1.2	2
<i>Ulmus minor</i> Miller	1.2	-	+	2
<i>Lamium galeobdolon</i> (L.) Ehrend. et Polatschek	-	+2	2.3	2
<i>Euonymus latifolius</i> (L.) Miller	2.3	-	1.1	2
<i>Mycelis muralis</i> (L.) Dumort.	+	1.1	-	2
<i>Stellaria holostea</i> L.	-	1.2	-	1
<i>Carpinus betulus</i> L.	-	-	3.3	1
<i>Viola reichenbachiana</i> Jordan ex Boreau	-	-	1.2	1
<i>Euphorbia dulcis</i> L.	-	-	1.1	1
<i>Polystichum setiferum</i> (Forsskal) Woynar	-	-	1.1	1
<i>Lilium martagon</i> L.	-	-	+	1
Charact. and diff. species of the class				
<i>Fraxinus ornus</i> L.	2.2	2.2	2.3	3
<i>Melittis melissophyllum</i> L.	+2	+2	+	3
<i>Daphne laureola</i> L.	+	+	+	3
<i>Helleborus bocconei</i> Ten.	1.2	1.1	1.1	3
<i>Acer campestre</i> L.	1.1	3.3	1.2	3
<i>Corylus avellana</i> L.	+2	2.3	2.3	3
<i>Tamus communis</i> L.	1.1	+	+	3
<i>Viola alba</i> Besser ssp. <i>dehnhardtii</i> (Ten.) W. Becker	+2	1.3	+2	3
<i>Ostrya carpinifolia</i> Scop.	2.3	+	-	2
<i>Arabis turrata</i> L.	+	1.2	-	2
<i>Hepatica nobilis</i> Miller	1.2	-	1.2	2
<i>Lilium bulbiferum</i> L. ssp. <i>croceum</i> (Chaix) Baker	1.1	-	+	2
<i>Euonymus europaeus</i> L.	+	+	-	2
<i>Campanula trachelium</i> L.	-	+	+	2
<i>Crataegus monogyna</i> Jacq.	1.2	1.1	-	2
<i>Crataegus oxyacantha</i> L.	-	+	2.2	2
<i>Mercurialis perennis</i> L.	1.2	-	-	1
<i>Corydalis cava</i> (L.) Schweigg. et Koerte	2.2	-	-	1
<i>Geranium robertianum</i> L.	-	+	-	1
<i>Sorbus torminalis</i> (L.) Crantz	-	-	1.2	1
<i>Lathyrus venetus</i> (Miller) Wohlf.	-	-	1.1	1
<i>Anemone trifolia</i> L.	-	-	1.2	1
<i>Castanea sativa</i> Miller	-	-	1.2	1
<i>Quercus cerris</i> L.	-	-	2.2	1
<i>Arum italicum</i> Miller	-	-	+	1
Other species				
<i>Hedera helix</i> L.	3.3	2.3	2.3	3
<i>Asparagus acutifolius</i> L.	+2	+2	1.2	3
<i>Geum urbanum</i> L.	-	+2	+	2
<i>Lunaria annua</i> L.	+	+	-	2
<i>Polypodium australe</i> Fée var. <i>cambricum</i> Willd.	+	+2	-	2
Accidental species				
	8	10	10	

Tab. 5 - *Crepido titani-Brassicetum robertianae* ass. nova

Rel. n.	1*	2	P
Exposure	E	NE	r
Slope (°)	85	90	e
Area (m <sup>2</sup> )	8	10	s.
Coverage (%)	70	40	
Charact. and diff. species of the ass.			
<i>Brassica oleracea</i> L. ssp. <i>robertiana</i> (Gay) Rouy et Fouc.	3.3	2.2	2
<i>Crepis lacera</i> Ten. var. <i>Titani</i> Fiori	1.1	+	2
<i>Erysimum pseudorhaeticum</i> Polatschek	2.2	+2	2
Charact. and diff. species of the upper units			
<i>Sedum dasyphyllum</i> L.	-	+2	1
<i>Erysimum cheiri</i> (L.) Crantz	-	+	1
<i>Ceterach officinarum</i> DC.	-	+	1
Sp. compagne			
<i>Galium lucidum</i> All.	1.2	1.1	2
<i>Festuca robustifolia</i> Mgf.-Dbg.	1.1	1.2	2
<i>Dianthus sylvestris</i> Wulfen	1.1	+2	2
<i>Teucrium flavum</i> L.	1.1	2.2	2
<i>Helichrysum italicum</i> (Roth) Don	1.1	+2	2
<i>Fraxinus ornus</i> L.	+	-	1
<i>Bromus erectus</i> Hudson	+2	-	1
<i>Helianthemum apenninum</i> (L.) Miller	+	-	1
<i>Centaurea deusta</i> Ten.	-	1.1	1
<i>Arabis hirsuta</i> (L.) Scop.	-	1.1	1
<i>Campanula sibirica</i> L.	-	+	1

Tab. 6 - *Asplenietum rutae-murariae-trichomanis* Kuhn 1937

Rel. n.	1	2	3	P
Exposure	NE	NNE	W	r
Slope (°)	90	90	90	e
Area (m <sup>2</sup> )	5	10	5	s.
Coverage (%)	80	90	100	
Charact. and diff. species of the ass. and all.				
<i>Asplenium trichomanes</i> L.	4.4	2.2	3.3	3
<i>Polypodium australe</i> Fée var. <i>cambricum</i> Willd.	-	-	+2	1
Charact. and diff. species of the upper units				
<i>Ceterach officinarum</i> DC.	2.3	3.3	3.3	3
<i>Sedum dasyphyllum</i> L.	-	1.2	1.1	2
<i>Parietaria judaica</i> Auct. an L.	-	1.1	+2	2
<i>Cymbalaria muralis</i> Gaertn., Mey. et Sch.	+2	-	-	1
Other species				
<i>Galium lucidum</i> All.	-	+	-	1
<i>Crepis lacera</i> Ten. var. <i>Titani</i> Fiori	-	+	-	1
<i>Arabis collina</i> Ten.	-	+	-	1

Tab. 7 - *Cymbalarium muralis-Parietarium judaicae* Pignatti 1952

Rel. n.	1	2	3	P
Exposure	E	ENE	W	r
Area (m <sup>2</sup> )	20	20	20	e
Coverage (%)	90	60	100	s.
Charact. and diff. species of the ass. and all.				
<i>Cymbalaria muralis</i> Gaertn., Mey. et Sch.	4.4	3.3	2.3	3
<i>Sedum album</i> L.	2.2	+2	+	3
<i>Asplenium trichomanes</i> L.	-	+	-	1
Charact. and diff. species of the upper units				
<i>Parietaria judaica</i> Auct. an L.	-	2.2	4.4	2
<i>Umbilicus rupestris</i> (Salisb.) Dandy	-	+	-	1
<i>Erysimum cheiri</i> (L.) Crantz	-	-	+	1
Other species				
<i>Poa bulbosa</i> L.	+	-	-	1
<i>Festuca robustifolia</i> Mgf.-Dbg.	1.1	-	-	1
<i>Galium lucidum</i> All.	+	-	-	1
<i>Anthemis tinctoria</i> L.	+	-	-	1
<i>Stellaria media</i> (L.) Vill.	-	1.2	-	1
<i>Veronica hederifolia</i> L.	-	+2	-	1
<i>Cardamine graeca</i> L.	-	1.1	-	1
<i>Poa trivialis</i> L.	-	+2	-	1
<i>Helichrysum italicum</i> (Roth) Don	-	-	+	1
<i>Reichardia picroides</i> (L.) Roth	-	-	+	1
<i>Rubus ulmifolius</i> Schott	-	-	+2	1

Tab. 8 - *Cheirantho-Parietarietum judaicae* Oberdorfer 1957

Rel. n.	1	2	3	P
Exposure	W	SSW	SSE	r
Area (m <sup>2</sup> )	50	50	30	e
Coverage (%)	60	30	40	s.
Charact. and diff. species of the ass. and all.				
<i>Erysimum cheiri</i> (L.) Crantz	1.1	4.4	3.3	3
<i>Sedum album</i> L.	2.2	1.2	-	2
<i>Asplenium trichomanes</i> L.	-	-	1.2	1
Charact. and diff. species of the upper units				
<i>Parietaria judaica</i> Auct. an L.	3.3	1.2	1.2	3
<i>Cymbalaria muralis</i> Gaertn., Mey. et Sch.	1.2	2.2	1.2	3
Other species				
<i>Poa bulbosa</i> L.	-	+	+2	2
<i>Festuca robustifolia</i> Mgf.-Dbg.	1.2	-	-	1
<i>Conyza bonariensis</i> (L.) Cronq.	+2	-	-	1
<i>Artemisia verlotorum</i> Lamotte	+	-	-	1
<i>Taraxacum officinale</i> Weber (aggregato)	+	-	-	1
<i>Sonchus asper</i> (L.) Hill	+	-	-	1
<i>Artemisia absinthium</i> L.	+	-	-	1
<i>Campanula erinus</i> L.	+	-	-	1
<i>Crepis lacera</i> Ten. var. <i>Titani Fiori</i>	+	-	-	1
<i>Galium lucidum</i> All.	-	+	-	1
<i>Dactylis glomerata</i> L.	-	-	+	1

Tab. 9 - *Teucrio flavi-Ephedretum majoris* ass. nova

Rel. n.	1	2	3	4*	5	P
Exposure	E	E	E	E	E	r
Slope (°)	90	85	90	90	85	e
Area (m <sup>2</sup> )	15	20	25	30	30	s.
Coverage (%)	50	40	30	60	60	
cop. rispetto cengie	80	60	50	75	85	
Charact. and diff. species of the ass.						
<i>Ephedra major</i> Host	3.4	3.4	2.3	4.4	4.4	5
<i>Centaurea deusta</i> Ten.	1.2	1.2	1.2	+2	-	4
<i>Teucrium flavum</i> L.	-	+	-	1.2	2.2	3
<i>Erysimum pseudorhaeticum</i> Polatschek	+2	1.2	-	-	-	2
Charact. and diff. species of the upper units						
<i>Galium corrudifolium</i> Vill.	1.2	2.2	1.1	1.2	1.2	5
<i>Dianthus sylvestris</i> Wulfen	1.2	1.2	1.2	+2	+2	5
<i>Helichrysum italicum</i> (Roth) Don	-	-	-	-	+	1
<i>Stachys recta</i> L.	-	-	-	-	+	1
<i>Osyris alba</i> L.	-	-	-	-	+	1
Compagne						
<i>Erysimum cheiri</i> (L.) Crantz	1.2	+	2.2	2.3	-	4
<i>Festuca robustifolia</i> Mgf.-Dbg.	+2	1.2	1.2	+	-	4
<i>Sedum dasyphyllum</i> L.	+2	+	+2	-	-	3
<i>Asparagus acutifolius</i> L.	-	-	+	+2	2.3	3
<i>Silene italica</i> (L.) Pers.	+	+	-	-	-	2
<i>Ficus carica</i> L.	+	-	+2	-	-	2
<i>Fraxinus ornus</i> L.	-	-	1.2	+	-	2
<i>Spartium junceum</i> L.	-	-	+	+2	-	2
<i>Allium sphaerocephalon</i> L.	-	-	+2	-	+	2
<i>Parietaria judaica</i> Auct. an L.	1.2	-	-	-	-	1
Accidental species						
	1	-	2	1	3	

Tab. 10 - *Centaureo deustae-Seslerietum italicae* ass. nova

Rel. n.	1*	2	P
Exposure	SE	S	r
Slope (°)	15	5	e
Area (m <sup>2</sup> )	20	15	s.
Coverage (%)	95	98	
Charact. and diff. species of the ass.			
<i>Sesleria italica</i> (Pamp.) Ujhelyi	5.5	5.5	2
<i>Centaurea deusta</i> Ten.	1.1	+2	2
<i>Melica transsylvanica</i> Schur	1.1	1.2	2
Charact. and diff. species of the upper units			
<i>Bromus erectus</i> Hudson	2.3	1.2	2
<i>Dianthus sylvestris</i> Wulfen	+	1.1	2
<i>Galium lucidum</i> All.	+2	1.1	2
<i>Crepis lacera</i> Ten. var. <i>Titani Fiori</i>	1.2	+2	2
<i>Erysimum pseudorhaeticum</i> Polatschek	+	+	2
<i>Festuca robustifolia</i> Mgf.-Dbg.	1.2	+	2
<i>Brachypodium rupestre</i> (Host) R. et S.	+2	-	1
<i>Allium sphaerocephalon</i> L.	+	-	1
<i>Phleum ambiguum</i> Ten.	+	-	1
<i>Silene italica</i> (L.) Pers.	+	-	1
<i>Eryngium amethystinum</i> L.	+	-	1
Other species			
<i>Dactylis glomerata</i> L.	1.2	+2	2
<i>Hypericum perforatum</i> L.	+	+	2
<i>Asparagus acutifolius</i> L.	+	+2	2
<i>Teucrium flavum</i> L.	+	+	2
<i>Stachys recta</i> L.	+	-	1
<i>Spartium junceum</i> L. (pl.)	-	+	1
<i>Acinos alpinus</i> (L.) Moench	-	+	1

Tab. 11 - Aggruppamento a *Polypodium australe* var. *cambricum*

Rel. n.	1
Exposure	NNE
Slope (°)	80
Area (m <sup>2</sup> )	2
Coverage (%)	100
<i>Polypodium australe</i> Fée var. <i>cambricum</i> Willd.	
	5.5
Other species	
<i>Ceterach officinarum</i> DC.	3.4
<i>Parietaria judaica</i> Auct. an L.	+
<i>Arabis turrata</i> L.	+
<i>Euonymus europaeus</i> L. (pl.)	+
<i>Smyrnium olusatrum</i> L.	+
<i>Dactylis glomerata</i> L.	+



Tab. 12 - *Stellario holostea*-*Quercetum pubescentis* ass. nova.  
*quercetosum pubescentis* subass. nova. (tipus)  
*anemonetosum trifoliae* subass. nova

Rel.n.	1	2	3	4**	5	6*	7	8	9	P	freq. class
Exposure	E	E	W	W	WSW	WSW	SSW	E	W	r	
Slope (°)	20	40	15	15	20	15	15	35	15	e	
Area (m <sup>2</sup> )	200	100	100	300	100	300	100	100	200	s.	
Coverage (%)	100	100	100	100	100	100	100	100	100		
Tree layer (high) m	10	7	10	11	12	15	15	12	8		
Tree layer cov. %	80	80	80	85	80	80	80	80	80		
Shrub layer (high) m	2,5	3	2	2,5	2,5	2,5	3	8	3		
Shrub layer cov. %	30	50	40	60	40	90	80	75	50		
Herbs cov. %	20	30	90	80	50	40	50	60	30		
Charact. and diff. species of the ass.											
<i>Quercus pubescens</i> Willd.	2.2	2.2	3.4	3.4	5.5	5.5	4.5	2.2	4.5	9	V
<i>Stellaria holostea</i> L.	+2	-	2.2	2.3	2.2	1.2	+2	-	-	6	IV
<i>Glechoma hirsuta</i> W. et K.	-	1.1	1.2	-	-	+2	1.2	1.2	2.2	6	IV
<i>Cyclamen repandum</i> S. et S.	1.2	2.2	1.2	1.2	-	2.2	1.2	-	-	6	IV
<i>Buglossoides purpurocaerulea</i> (L.) Johnston	-	-	-	-	-	2.2	-	2.2	-	2	II
Diff. species of the <i>anemonetosum trifoliae</i> subass.											
<i>Cornus mas</i> L.	1.2	1.2	1.2	1.2	-	-	-	-	1.2	5	III
<i>Anemone trifolia</i> L.	2.2	-	2.2	2.3	-	-	-	-	-	3	II
<i>Acer obtusatum</i> W. et K.	1.2	-	1.2	1.2	-	+	-	-	+	5	III
<i>Corylus avellana</i> L.	2.2	-	1.2	1.1	-	+2	+	-	-	5	III
<i>Carpinus betulus</i> L.	-	-	2.2	1.2	-	1.2	-	-	-	3	II
<i>Euonymus latifolius</i> (L.) Miller	2.2	1.2	-	-	-	-	-	-	-	2	II
Charact. and diff. species of the upper units											
<i>Fraxinus ornus</i> L.	4.4	2.3	2.2	1.2	2.2	2.3	4.4	4.4	2.3	9	V
<i>Hedera helix</i> L.	2.3	2.3	3.3	3.4	1.2	4.4	2.2	2.3	3.3	9	V
<i>Acer campestre</i> L.	-	1.2	+2	1.2	1.2	1.2	1.2	3.4	+2	8	V
<i>Helleborus bocconei</i> Ten.	+2	-	+2	1.1	+	1.2	1.1	1.1	1.2	8	V
<i>Euonymus europaeus</i> L.	-	+2	1.2	1.1	1.1	1.1	+	+	+	8	V
<i>Ostrya carpinifolia</i> Scop.	1.2	1.2	1.2	1.2	1.2	-	-	2.2	+	7	IV
<i>Melittis melissophyllum</i> L.	1.1	+2	1.2	1.2	+	+2	-	+	-	7	IV
<i>Sorbus torminalis</i> (L.) Crantz	2.3	2.3	-	-	+	2.2	2.3	2.2	2.2	7	IV
<i>Arabis turrita</i> L.	+2	+2	+2	+	-	+2	-	-	1.1	6	IV
<i>Ulmus minor</i> Miller	-	-	+2	-	+2	+2	+	1.2	+	6	IV
<i>Sorbus domestica</i> L.	+	-	+	-	+	+	-	+	+	5	III
<i>Lathyrus venetus</i> (Miller) Wohlf.	-	-	+	+2	-	+	-	+2	-	4	III
<i>Hepatica nobilis</i> Miller	1.2	1.2	1.2	1.2	-	-	-	-	-	4	III
<i>Prunus avium</i> L.	-	-	-	+	+	+2	-	-	-	3	II
<i>Acer monspessulanum</i> L.	+	2.3	-	-	-	-	-	-	-	2	II
<i>Laburnum anagyroides</i> Medicus	1.2	+2	-	-	-	-	-	-	-	2	II
<i>Sorbus aria</i> (L.) Crantz	1.2	1.2	-	-	-	-	-	-	-	2	II
<i>Lilium bulbiferum</i> L. ssp. <i>croceum</i> (Chaix) Baker	1.1	-	-	-	-	-	-	-	+	2	II
<i>Primula vulgaris</i> Hudson	-	+	-	+	-	-	-	-	-	2	II
<i>Euphorbia amygdaloides</i> L.	-	-	+	+2	-	-	-	-	-	2	II
<i>Lonicera xylosteum</i> L.	-	-	+	-	1.1	-	-	-	-	2	II
<i>Luzula forsteri</i> (Sm.) DC.	-	-	+2	+2	-	-	-	-	-	2	II
<i>Pulmonaria apennina</i> Cristof. et Puppi	-	-	-	-	1.1	+2	-	-	-	2	II
<i>Staphylea pinnata</i> L.	1.2	-	-	-	-	-	-	-	-	1	I
<i>Mercurialis perennis</i> L.	1.3	-	-	-	-	-	-	-	-	1	I
<i>Corydalis cava</i> (L.) Schweigg. et Koerte	-	+	-	-	-	-	-	-	-	1	I
<i>Daphne laureola</i> L.	-	-	+2	-	-	-	-	-	-	1	I
<i>Acer pseudoplatanus</i> L.	-	-	+	-	-	-	-	-	-	1	I
<i>Festuca heterophylla</i> Lam.	-	-	-	+2	-	-	-	-	-	1	I
<i>Fagus sylvatica</i> L.	-	-	-	1.2	-	-	-	-	-	1	I
<i>Melica uniflora</i> Retz.	-	-	-	+2	-	-	-	-	-	1	I
<i>Cephalanthera longifolia</i> (Hudson) Fritsch	-	-	-	-	+	-	-	-	-	1	I
<i>Castanea sativa</i> Miller	-	-	-	-	-	1.2	-	-	-	1	I
<i>Quercus cerris</i> L.	-	-	-	-	-	1.2	-	-	-	1	I
<i>Mespilus germanica</i> L.	-	-	-	-	-	+2	-	-	-	1	I
<i>Symphytum tuberosum</i> L.	-	-	-	-	-	-	+	-	-	1	I
<i>Campanula trachelium</i> L.	-	-	-	-	-	-	-	1.2	-	1	I
<i>Tilia platyphyllos</i> Scop.	-	-	-	-	-	-	-	-	1.2	1	I
<i>Brachypodium sylvaticum</i> (Hudson) Beauv.	-	-	-	-	-	-	-	-	+	1	I
Other species											
<i>Crataegus monogyna</i> Jacq.	1.1	+2	+2	+2	+	1.2	1.2	1.2	2.2	9	V
<i>Clematis vitalba</i> L.	+2	+	2.2	1.1	1.2	1.2	1.2	1.2	+	9	V
<i>Asparagus acutifolius</i> L.	+2	1.2	1.1	+	1.1	1.2	1.1	1.2	1.2	9	V
<i>Ruscus aculeatus</i> L.	1.2	2.2	+2	1.2	+2	2.2	1.2	3.3	2.3	9	V
<i>Brachypodium rupestre</i> (Host) R. et S.	+2	1.2	+2	1.2	1.2	+2	+	+2	+2	9	V
<i>Prunus spinosa</i> L.	-	+2	1.2	1.1	+	1.2	+2	+	1.1	8	V
<i>Tamus communis</i> L.	+2	-	1.2	+	1.2	1.1	1.2	2.3	-	7	IV
<i>Coronilla emerus</i> L. ssp. <i>emeroides</i> (Boiss. et Spruner) Hayek	1.2	1.2	1.2	1.1	+	-	-	1.2	1.1	7	IV
<i>Viola alba</i> Besser ssp. <i>dehnhardtii</i> (Ten.) W. Becker	+2	+2	+2	+2	+2	-	1.2	2.2	-	7	IV
<i>Silene italica</i> (L.) Pers.	1.2	1.2	+2	+2	-	+	-	+	+	7	IV
<i>Rosa</i> sp.	+2	+2	-	-	1.2	+2	+	1.2	-	6	IV
<i>Ligustrum vulgare</i> L.	-	-	+2	-	+2	1.2	1.2	+	+2	6	IV
<i>Cruciata glabra</i> (L.) Ehrend.	-	-	1.1	+2	1.1	1.2	+	-	+	6	IV
<i>Cornus sanguinea</i> L.	-	-	-	-	2.2	2.3	2.2	1.2	+	5	III
<i>Rubus ulmifolius</i> Schott	-	-	-	-	1.2	1.2	+2	1.2	+2	5	III
<i>Fragaria vesca</i> L.	-	-	2.2	1.2	1.1	+2	-	-	1.1	5	III
<i>Arum italicum</i> Miller	-	+	-	-	-	+	+	+	-	4	III
<i>Geranium robertianum</i> L.	+	1.2	+2	+	-	-	-	-	-	4	III
<i>Lonicera caprifolium</i> L.	-	-	+2	1.2	-	-	+2	-	-	3	II
<i>Teucrium chamaedrys</i> L.	-	-	-	-	+2	+	-	-	+	3	II
<i>Rosa canina</i> L. sensu Bouleng.	-	-	+2	1.2	-	-	-	-	-	2	II
<i>Viburnum lantana</i> L.	-	-	-	-	-	-	1.2	1.1	-	2	II
<i>Lonicera etrusca</i> Santi	-	-	-	-	-	+2	-	-	+2	2	II
<i>Quercus ilex</i> L.	+	1.2	-	-	-	-	-	-	-	2	II
<i>Solidago virgaurea</i> L.	1.1	-	-	+	-	-	-	-	-	2	II
<i>Carex flacca</i> Schreber	-	-	-	-	-	-	+	-	+	2	II
<i>Robinia pseudoacacia</i> L.	-	-	-	1.1	-	+	-	-	-	2	II
<i>Dactylis glomerata</i> L.	+	-	-	-	+2	-	-	-	-	2	II
Accidental species											
	-	2	2	3	2	2	2	2	5		

Tab. 13 - *Asparago acutifolii-Osyridetum albae* Allegrezza, Biondi, Formica & Ballelli 1997

Rel. n.	1	2	3	P
Exposure	S	SE	S	r
Area (m <sup>2</sup> )	10	20	20	e
Coverage (%)	95	100	100	s.
Shrub layer (high) m	0,5	0,7	0,5	
Charact. and diff. species of the ass.				
<i>Osyris alba</i> L.	5.5	5.5	5.5	3
<i>Asparagus acutifolius</i> L.	1.2	3.3	3.3	3
Charact. and diff. species of the upper units				
<i>Lonicera etrusca</i> Santi	1.2	-	+	2
<i>Coronilla emerus</i> L.	1.2	-	-	1
<i>Lonicera caprifolium</i> L.	-	1.2	-	1
<i>Prunus spinosa</i> L.	-	+	-	1
<i>Crataegus monogyna</i> Jacq.	-	+	-	1
<i>Tamus communis</i> L.	-	+	-	1
<i>Spartium junceum</i> L.	-	+	-	1
<i>Rosa canina</i> L. sensu Bouleng.	-	-	1.2	1
Other species				
<i>Brachypodium rupestre</i> (Host) R. et S.	+	-	+2	2
<i>Teucrium chamaedrys</i> L.	+2	-	+	2
<i>Quercus pubescens</i> Willd.	+	-	+	2
<i>Cornus mas</i> L.	1.2	-	-	1
<i>Sesleria italica</i> (Pamp.) Ujhelyi	1.2	-	-	1
<i>Silene italica</i> (L.) Pers.	1.1	-	-	1
<i>Peucedanum cervaria</i> (L.) Lepeyr.	-	-	1.1	1
Accidental species	6	2	5	

Tab. 14 - *Spartio juncei-Cytisetum sessilifolii* Biondi in Biondi, Allegrezza & Guitian 1988

Rel. n.	1	2	3	4	5	6	7	8	P	
Exposure	SW	SE	SW	ESE	N	N	SSE	SSE	r	
Area (m <sup>2</sup> )	50	20	80	50	50	70	10	30	e	freq.
Coverage (%)	90	95	95	100	95	95	100	95	s.	class
Shrub layer (high) m	1.8	2	2	2	1.8	2.2	2	2		
Charact. and diff. species of the ass. and all.										
<i>Spartium junceum</i> L.	5.5	5.5	4.5	3.3	2.2	4.4	2.2	4.4	8	V
<i>Coronilla emerus</i> L.	+	-	1.1	1.2	4.5	2.3	3.3	2.2	7	V
<i>Cytisus sessilifolius</i> L.	-	-	-	2.3	-	+	-	+2	3	III
<i>Lonicera etrusca</i> Santi	-	-	+	2.2	-	-	1.2	-	3	III
<i>Sorbus torminalis</i> (L.) Crantz	-	-	-	-	-	-	+	+2	2	II
Charact. and diff. species of the upper units										
<i>Clematis vitalba</i> L.	+2	+	+	1.2	2.2	2.3	-	1.2	7	V
<i>Prunus spinosa</i> L.	1.2	3.3	1.1	1.2	-	-	1.2	+	6	IV
<i>Rubus ulmifolius</i> Schott	1.2	+	2.3	+	-	-	+	+2	6	IV
<i>Crataegus monogyna</i> Jacq.	2.2	+2	+2	-	-	-	1.2	1.2	5	IV
<i>Rosa canina</i> L. sensu Bouleng.	-	+2	1.2	+	-	-	+2	+	5	IV
<i>Euonymus europaeus</i> L.	+2	-	-	-	-	+	+	-	3	III
<i>Colutea arborescens</i> L.	-	-	2.2	-	-	-	+	1.2	3	III
<i>Cornus sanguinea</i> L.	-	-	-	-	-	-	+	-	1	I
<i>Lonicera caprifolium</i> L.	-	-	-	-	-	-	1.2	-	1	I
Other species										
<i>Quercus pubescens</i> Willd.	+	1.2	+	+	-	-	1.1	+	6	IV
<i>Fraxinus ornus</i> L.	-	-	1.2	+	2.3	2.3	1.2	2.3	6	IV
<i>Asparagus acutifolius</i> L.	+2	+	-	+2	+	-	+	+	6	IV
<i>Brachypodium rupestre</i> (Host) R. et S.	+	1.2	2.2	-	-	2.3	-	-	4	III
<i>Bromus erectus</i> Hudson	1.2	+2	+	-	-	-	-	-	3	III
<i>Inula salicina</i> L.	1.2	-	+	-	-	-	-	-	2	III
<i>Ulmus minor</i> Miller	1.2	-	-	-	-	+	-	-	2	III
<i>Teucrium chamaedrys</i> L.	-	+	-	+	-	-	-	-	2	III
<i>Silene italica</i> (L.) Pers.	-	-	-	-	1.1	+	-	-	2	III
<i>Teucrium flavum</i> L.	-	-	-	-	1.1	+	-	-	2	III
Accidental species	3	4	2	-	3	2	-	-		

Tab. 15 - *Asperula purpureae*-*Brometum erecti* Biondi & Ballelli ex Biondi, Ballelli, Allegrezza & Zuccarello 1995

Rel. n.	1	2	3	4	5	P
Exposure	SW	S	W	SE	S	r
Slope (°)	20	10	10	5	5	e
Area (m <sup>2</sup> )	100	100	40	50	50	s.
Coverage (%)	95	100	98	100	100	
<hr/>						
Charact. and diff. species of the ass.						
<i>Asperula purpurea</i> (L.) Ehrend.	+	1.2	1.2	+	+2	5
<i>Eryngium amethystinum</i> L.	+	+	1.1	1.1	+	5
<i>Allium sphaerocephalon</i> L.	-	-	+	1.1	1.1	3
Charact. and diff. species of the upper units						
<i>Bromus erectus</i> Hudson	4.5	5.5	4.4	4.4	4.5	5
<i>Phleum ambiguum</i> Ten.	1.2	1.2	1.2	2.3	2.2	5
<i>Stachys recta</i> L.	2.2	1.1	1.2	1.1	2.2	5
<i>Teucrium chamaedrys</i> L.	1.2	1.2	2.3	2.3	2.3	5
<i>Melica ciliata</i> L.	1.2	+	3.3	1.1	2.2	5
<i>Brachypodium rupestre</i> (Host) R. et S.	+	1.2	-	+2	+2	4
<i>Sanguisorba minor</i> Scop.	+	+2	1.1	+	-	4
<i>Anthyllis vulneraria</i> L.	+	+	1.2	+	-	4
<i>Galium lucidum</i> All.	-	1.2	-	1.2	2.2	3
<i>Arabis collina</i> Ten.	+	+	-	+	-	3
<i>Campanula rapunculus</i> L.	+	1.2	-	+	-	3
<i>Euphorbia cyparissias</i> L.	-	+	1.2	+	-	3
<i>Dianthus sylvestris</i> Wulfen	-	-	-	1.2	1.2	2
<i>Centaurea bracteata</i> Scop.	+	+2	-	-	-	2
<i>Convolvulus cantabrica</i> L.	2.2	-	-	+	-	2
<i>Erysimum pseudorhaeticum</i> Polatschek	-	-	-	+	+	2
<i>Tragopogon pratensis</i> L. ssp. <i>pratensis</i>	-	-	-	+	+	2
<i>Thymus glabrescens</i> Willd.	-	-	-	1.2	+2	2
<i>Petrorhagia saxifraga</i> (L.) Link	+2	-	-	-	-	1
<i>Achillea collina</i> Becker	+	-	-	-	-	1
<i>Dorycnium pentaphyllum</i> Scop. ssp. <i>herbaceum</i> (Vill.) Rouy	-	+	-	-	-	1
<i>Polygala nicaeensis</i> Risso	-	+	-	-	-	1
<i>Onobrychis viciifolia</i> Scop.	-	+	-	-	-	1
<i>Hieracium pilosella</i> L.	-	+	-	-	-	1
<i>Globularia punctata</i> Lapeyr.	-	-	+2	-	-	1
<i>Silene italica</i> (L.) Pers.	-	-	-	+2	-	1
<i>Salvia pratensis</i> L.	-	-	-	+	-	1
Other species						
<i>Helichrysum italicum</i> (Roth) Don	1.2	1.2	1.2	+2	+2	5
<i>Silene vulgaris</i> (Moench) Garcke	1.1	+	+	+	1.2	5
<i>Reichardia picroides</i> (L.) Roth	+	+	+2	+	+	5
<i>Dactylis glomerata</i> L.	1.1	1.2	+	+	-	4
<i>Hypericum perforatum</i> L.	1.1	+	+	+	-	4
<i>Avena barbata</i> Potter	+	+	+	+	-	4
<i>Urospermum dalechampii</i> (L.) Schmidt	+	+	+	+	-	4
<i>Festuca glauca</i> Vill. cfr.	+2	-	+	1.2	+2	4
<i>Peucedanum cervaria</i> (L.) Lepeyr.	+	1.1	-	+	-	3
<i>Muscari atlanticum</i> Boiss. et Reuter	+	+	-	-	+	3
<i>Briza maxima</i> L.	+	+	+	-	-	3
<i>Bellardia trixago</i> (L.) All.	1.1	+	-	+	-	3
<i>Calamintha nepeta</i> (L.) Savi	+	+	-	-	1.1	3
<i>Carlina corymbosa</i> L.	-	+	+	+2	-	3
<i>Lotus corniculatus</i> L.	-	+	+	+	-	3
<i>Potentilla hirta</i> L.	-	-	+	+	+	3
<i>Anthemis tinctoria</i> L.	+2	+	-	-	-	2
<i>Inula viscosa</i> (L.) Aiton	+	1.1	-	-	-	2
<i>Picris hieracioides</i> L.	+	+	-	-	-	2
<i>Trifolium campestre</i> Schreber	1.2	1.2	-	-	-	2
<i>Securigera securidaca</i> (L.) Deg. et Dorfl.	1.1	+	-	-	-	2
<i>Cynosurus echinatus</i> L.	+	+	-	-	-	2
<i>Inula salicina</i> L.	+2	1.2	-	-	-	2
<i>Asparagus acutifolius</i> L.	+	-	-	+	-	2
<i>Pallenis spinosa</i> (L.) Cass.	1.1	-	-	+2	-	2
<i>Scabiosa maritima</i> L.	-	+	-	+	-	2
<i>Osyris alba</i> L.	-	-	+2	-	1.2	2
Accidental species	10	7	1	2	5	



Tab. 16 - *Teucrio polii-Thymetum glabrescentis* ass. nova

Rel. n.	1*	2	3	P
Exposure	S	S	S	r
Slope (°)	15	20	30	e
Area (m <sup>2</sup> )	5	20	20	s.
Coverage (%)	50	65	80	
Charact. and diff. species of the ass.				
<i>Teucrium polium</i> L.	2.3	1.2	2.2	3
<i>Thymus glabrescens</i> Willd.	1.2	2.2	1.2	4
Charact. and diff. species of the upper units				
<i>Fumana procumbens</i> (Dunal) G. et G.	3.3	3.4	3.4	3
<i>Helichrysum italicum</i> (Roth) Don	1.2	1.2	2.2	3
<i>Asperula purpurea</i> (L.) Ehrend.	2.2	+2	1.1	3
<i>Teucrium chamaedrys</i> L.	1.2	1.2	-	2
<i>Stachys recta</i> L.	1.1	1.2	-	2
<i>Helianthemum nummularium</i> (L.) Miller	1.2	-	1.1	2
<i>Galium corrudifolium</i> Vill.	-	+	1.2	2
<i>Dorycnium hirsutum</i> (L.) Ser.	+2	+2	-	2
<i>Ononis pusilla</i> L.	+2	+	-	2
<i>Convolvulus althaeoides</i> L.	-	+	+	2
<i>Linum tenuifolium</i> L.	1.2	-	-	1
<i>Carex humilis</i> Leyser	+	-	-	1
<i>Potentilla hirta</i> L.	-	+	-	1
<i>Argyrobolium zanonii</i> (Turra) P. W. Ball	-	-	1.1	1
Other species				
<i>Reichardia picroides</i> (L.) Roth	+	+	+2	3
<i>Sanguisorba minor</i> Scop.	-	+	2.2	2
<i>Globularia punctata</i> Lapeyr.	+2	+	-	2
Accidental species				
	1	5	10	

Tab. 18 - *Aceri obtusati-Quercetum cerris* Ubaldi & Speranza 1982

Rel. n.	1	2	P
Exposure	WSW	SW	r
Slope (°)	15	15	e
Area (m <sup>2</sup> )	200	150	s.
Coverage (%)	100	90	
Tree layer (high) m	10	8	
Charact. and diff. species of the ass. and all.			
<i>Quercus cerris</i> L.	2.2	2.3	2
<i>Acer obtusatum</i> W. et K.	1.2	+	2
<i>Anemone trifolia</i> L.	+	-	1
Charact. and diff. species of the upper units			
<i>Castanea sativa</i> Miller	2.2	1.2	2
<i>Viola reichenbachiana</i> Jordan ex Boreau	2.2	+	2
<i>Fraxinus ornus</i> L.	2.2	2.3	2
<i>Quercus pubescens</i> Willd.	1.2	2.3	2
<i>Quercus dalechampii</i> Ten.	1.2	+	2
<i>Sorbus torminalis</i> (L.) Crantz	2.3	2.2	2
<i>Sorbus domestica</i> L.	+	+	2
<i>Acer monspessulanum</i> L.	-	1.1	1
<i>Acer opulifolium</i> Chaix	+	-	1
<i>Corylus avellana</i> L.	1.2	-	1
<i>Prunus avium</i> L.	1.2	-	1
<i>Lonicera xylosteum</i> L.	+	-	1
<i>Serratula tinctoria</i> L.	+	-	1
Other species			
<i>Hedera helix</i> L.	1.2	1.2	2
<i>Erica arborea</i> L.	1.2	2.3	2
<i>Pulicaria odora</i> (L.) Rchb.	+2	+	2
<i>Ulex europaeus</i> L.	+2	+2	2
<i>Inula conyza</i> DC.	+	+	2
<i>Fragaria vesca</i> L.	1.2	+	2
<i>Stachys officinalis</i> (L.) Trevisan	1.2	+	2
<i>Peridium aquilinum</i> (L.) Kuhn	1.1	+	2
<i>Viola alba</i> Besser ssp. <i>dehnhardtii</i> (Ten.) W. Becker	1.2	1.2	2
<i>Clematis vitalba</i> L.	1.2	+2	2
<i>Crataegus monogyna</i> Jacq.	1.2	+	2
<i>Brachypodium rupestre</i> (Host) R. et S.	1.2	1.2	2
<i>Asparagus acutifolius</i> L.	+	+	2
Accidental species			
	11	9	

Tab. 17 - *Trifolio scabri-Hypochoeridetum achyrophori* Lapraz ex Biondi, Izco, Ballelli & Formica 1997

Area rel. m <sup>2</sup>	1	2	3	p
Tot. cov.	70	40	50	r
				e
				s.
Sp. car e diff. di ass.				
<i>Trifolium scabrum</i> L.	1.2	2.3	1.2	3
<i>Hypochoeris achyrophorus</i> L.	+	+	1.1	2
Sp. car e diff. di unità sup.				
<i>Catapodium rigidum</i> (L.) Hubbard	1.2	2.2	1.1	3
<i>Petrorhagia prolifera</i> (L.) P. W. Ball et Heywood	2.3	+	+	3
<i>Cynosurus echinatus</i> L.	+	+	+	3
<i>Xeranthemum inapertum</i> (L.) Miller	-	+	1.2	2
<i>Scorpiurus vermiculatus</i> L.	-	+	-	1
<i>Trifolium stellatum</i> L.	-	-	2.2	1
<i>Trifolium arvense</i> L.	1.2	-	-	1
<i>Erophila verna</i> (L.) Chevall.	2.3	-	-	1
<i>Trifolium dubium</i> Sibth.	2.2	-	-	1
<i>Cerastium semidecandrum</i> L.	1.1	-	-	1
Sp. compagne				
<i>Aethionema saxatile</i> (L.) R. Br.	-	1.1	2.2	2
<i>Poa annua</i> L.	-	+	+	2
<i>Bromus madritensis</i> L.	-	+	+2	2
Sp. sporadiche				
	6	1	2	

Tab. 19 - *Crataego monogynae-Ulicetum europaei* ass. nova

Rel. n.	1*	2	3	4	P
Exposure	SSE	SSE	SSW	SSW	r
Slope (°)	15	30	10	15	e
Area (m <sup>2</sup> )	80	70	80	90	s.
Coverage (%)	80	90	98	98	
Shrub layer (high) m	1,8	1,5	1,8	1,9	
<hr/>					
Charact. and diff. species of the ass.					
<i>Ulex europaeus</i> L.	4,5	2,2	2,3	2,2	4
<i>Erica arborea</i> L.	1,2	4,4	4,5	4,5	4
<i>Pulicaria odora</i> (L.) Rchb.	1,2	1,2	1,2	1,2	4
<i>Crataegus monogyna</i> Jacq.	1,2	1,1	1,2	1,2	4
<i>Osyris alba</i> L.	+	+	-	+	3
<i>Mespilus germanica</i> L.	+	1,2	-	+	3
<hr/>					
Charact. and diff. species of the upper units					
<i>Rosa canina</i> L. sensu Bouleng.	+2	-	+2	-	2
<i>Lonicera etrusca</i> Santi	+	1,1	-	-	2
<i>Rubus ulmifolius</i> Schott	-	2,2	1,2	-	2
<i>Rosa agrestis</i> Savi	-	-	1,2	1,2	2
<i>Tamus communis</i> L.	-	-	+	+	2
<i>Prunus spinosa</i> L.	-	-	+	+2	2
<i>Pyrus pyrastrer</i> Burgsd.	-	+	+2	-	2
<i>Juniperus communis</i> L.	-	-	-	+	1
<i>Clematis vitalba</i> L.	-	-	-	+	1
<i>Spartium junceum</i> L.	(+)	-	(+2)	-	2
<i>Coronilla emerus</i> L.	-	-	(+2)	-	1
<hr/>					
Other species					
<i>Quercus pubescens</i> Willd.	1,2	1,1	1,2	+	4
<i>Fraxinus ornus</i> L.	1,2	1,2	1,2	1,2	4
<i>Asparagus acutifolius</i> L.	+2	+2	+	1,1	4
<i>Brachypodium rupestre</i> (Host) R. et S.	1,2	1,2	1,2	+2	4
<i>Sorbus torminalis</i> (L.) Crantz	-	1,2	1,1	2,2	3
<i>Viola alba</i> Besser ssp. <i>dehnhardtii</i> (Ten.) W. Becker	-	+2	1,1	2,2	3
<i>Rubia peregrina</i> L.	+	-	+	-	2
<i>Teucrium chamaedrys</i> L.	-	-	+	1,2	2
<i>Lonicera caprifolium</i> L.	-	-	1,2	1,2	2
<hr/>					
Accidental species	-	1	8	2	

Tab. 20 - *Hainardia cylindrica*-*Salsoletum sodae* Allegrezza Biondi, Brilli-Cattarini & Gubellini 1994

Rel. n.	1	2	P
Exposure	S	SE	r
Slope (°)	40	30	e
Area (m <sup>2</sup> )	10	20	s.
Coverage (%)	70	75	
<hr/>			
Charact. and diff. species of the ass. and upper units			
<i>Salsola soda</i> L.	3,4	3,3	2
<i>Hainardia cylindrica</i> (Willd.) Greuter	+2	-	1
<hr/>			
Other species			
<i>Raphanus raphanistrum</i> L.	2,3	2,3	2
<i>Hedysarum coronarium</i> L.	+	+	2
<i>Artemisia cretacea</i> (Fiori) Pign. (pl.)	+2	1,1	2
<i>Agropyron pungens</i> (Pers.) R. et S. (pl.)	-	1,1	1

Tab. 21 - *Elytrigio athericae-Artemisietum cretaceae* Ferrari & Grandi 1974 corr. Allegrezza, Biondi, Brilli-Cattarini & Gubellini 1994

Rel. n.	1	2	P
Exposure	S	SE	r
Slope (°)	20	40	e
Area (m <sup>2</sup> )	40	50	s.
Coverage (%)	50	60	
<hr/>			
Charact. and diff. species of the ass. and upper units			
<i>Artemisia cretacea</i> (Fiori) Pign. (pl.)	2,3	2,3	2
<i>Agropyron pungens</i> (Pers.) R. et S. (pl.)	1,2	2,2	2
<i>Inula viscosa</i> (L.) Aiton	+	+	2
<hr/>			
Other species			
<i>Raphanus raphanistrum</i> L.	1,1	2,3	2
<i>Sonchus oleraceus</i> L.	+	-	1

Tab. 22 - *Senecio erucifolii-Inuletum viscosae* Biondi & Allegranza 1996

Rel. n.	1	2	3	4	P
Exposure	E	-	NE	NE	r
Slope (°)	15	-	3	4	e
Area (m <sup>2</sup> )	50	20	40	40	s.
Coverage (%)	100	98	100	100	
Charact. and diff. species of the ass.					
<i>Senecio erucifolius</i> L.	+	1.1	1.1	+	4
<i>Bellevalia romana</i> (L.) Sweet	1.2	1.1	1.2	1.2	4
<i>Poa trivialis</i> L.	+2	1.2	1.2	1.1	4
<i>Cerinth major</i> L.	+	-	+	+	3
<i>Centaurea nigrescens</i> Willd. subsp. <i>ramosa</i> Gugler	-	-	2.2	1.2	2
Charact. and diff. species of the all.					
<i>Inula viscosa</i> (L.) Aiton	1.1	+	+	1.2	4
<i>Daucus carota</i> L.	2.2	2.2	2.2	2.2	4
<i>Hedysarum coronarium</i> L.	+2	+	1.2	1.2	4
<i>Aster linosyris</i> (L.) Bernh.	+	-	1.2	1.2	3
<i>Arundo pliniana</i> Turra	+	-	-	+2	2
<i>Pulicaria dysenterica</i> (L.) Bernh.	+2	-	-	-	1
Charact. and diff. species of the upper units					
<i>Dactylis glomerata</i> L.	2.2	2.2	2.2	3.3	4
<i>Anthemis tinctoria</i> L.	-	+	-	+	2
<i>Medicago sativa</i> L.	+	+	+	-	3
<i>Cichorium intybus</i> L.	2.2	1.1	-	1.2	3
<i>Convolvulus arvensis</i> L.	-	+	+	-	2
<i>Potentilla reptans</i> L.	1.2	-	-	-	1
<i>Agropyron repens</i> (L.) Beauv.	+	-	-	-	1
<i>Tussilago farfara</i> L.	-	-	-	2.3	1
Other species					
<i>Galium album</i> Miller	1.2	1.2	+	+2	4
<i>Plantago lanceolata</i> L.	1.2	+	1.1	+	4
<i>Trifolium pratense</i> L.	2.3	2.3	3.3	3.4	4
<i>Ranunculus bulbosus</i> L. ssp. <i>aleae</i> (Willk.) Rouy et Fouc.	3.3	3.3	2.2	2.3	4
<i>Bromus erectus</i> Hudson	3.3	1.2	2.3	1.2	4
<i>Brachypodium rupestre</i> (Host) R. et S.	1.2	4.4	4.5	4.4	4
<i>Linum bienne</i> Miller	1.1	-	+	1.1	4
<i>Lotus corniculatus</i> L.	1.2	1.2	2.3	1.2	4
<i>Crepis vesicaria</i> L. ssp. <i>taraxacifolia</i> (Thuill.) Thell.	1.1	2.2	+	2.2	4
<i>Sherardia arvensis</i> L.	+	+	+	+	4
<i>Vicia bithynica</i> (L.) L.	1.2	2.3	1.1	+	4
<i>Medicago lupulina</i> L.	2.2	-	1.3	2.2	3
<i>Carex flacca</i> Schreber	+2	-	3.5	1.2	3
<i>Bellis perennis</i> L.	1.1	1.1	+2	-	3
<i>Plantago media</i> L.	+2	+2	-	-	2
<i>Leucanthemum vulgare</i> Lam.	1.2	-	+	-	2
<i>Galium verum</i> L.	1.2	1.1	-	-	2
<i>Taraxacum officinale</i> Weber (aggregato)	+2	+	-	-	2
<i>Ornithogalum umbellatum</i> L.	+	+	-	-	2
<i>Avena barbata</i> Potter	-	+	-	+	2
<i>Trifolium campestre</i> Schreber	-	+2	1.1	-	2
<i>Vicia incana</i> Gouan	+2	+2	-	-	2
Accidental species	12	7	3	5	

Tab. 23 - *Salicetum albae* Issl. 1926

Rel. n.	1
Exposure	-
Slope (°)	-
Area (m <sup>2</sup> )	100
Coverage (%)	100
Tree layer (high) m	10
Charact. and diff. species of the ass. and upper units	
<i>Salix alba</i> L.	4.5
<i>Populus nigra</i> L.	3.3
<i>Salix apennina</i> Skvortsov	1.2
<i>Salix eleagnos</i> Scop.	+2
<i>Salix purpurea</i> L.	+2
<i>Salix triandra</i> L.	1.2
<i>Carex pendula</i> Hudson	+2
<i>Equisetum telmateja</i> Ehrh.	2.3
Other species	
<i>Petasites hybridus</i> (L.) Gaertn., Meyer et Sch.	2.2
<i>Eupatorium cannabinum</i> L.	1.1
<i>Mentha aquatica</i> L.	1.2
<i>Robinia pseudoacacia</i> L.	1.2
<i>Cornus sanguinea</i> L.	+2
<i>Brachypodium sylvaticum</i> (Hudson) Beauv.	+2
<i>Galeopsis tetrahit</i> L.	+2
<i>Lycopus europaeus</i> L.	+2
<i>Epilobium hirsutum</i> L.	+
<i>Calystegia sepium</i> (L.) R.Br.	+
<i>Phragmites australis</i> (Cav.) Trin.	+
<i>Artemisia vulgaris</i> L.	+
<i>Polygonum mite</i> Schrank	+
<i>Helianthus tuberosus</i> L.	+
<i>Xanthium italicum</i> Moretti	+
<i>Typha angustifolia</i> L.	+
<i>Bidens tripartita</i> L.	+

Tab. 24 - *Loto tenuis-Agropyretum repentis* Biondi, Vagge, Baldoni & Taffetani 1997

Rel. n.	1	2	P
Exposure	-	-	r
Slope (°)	-	-	e
Area (m <sup>2</sup> )	60	50	s.
Coverage (%)	100	100	

## Charact. and diff. species of the ass. and all.

<i>Lotus tenuis</i> W. et K.	1.2	+	2
<i>Agrostis stolonifera</i> L.	1.2	1.2	2
<i>Inula viscosa</i> (L.) Aiton	4.4	2.4	2
<i>Daucus carota</i> L.	2.2	2.2	2
<i>Aster linosyris</i> (L.) Bernh.	1.2	+2	2
<i>Pulicaria dysenterica</i> (L.) Bernh.	2.2	1.2	2
<i>Scabiosa maritima</i> L.	+	+2	2
<i>Verbena officinalis</i> L.	+	+	2
<i>Arundo pliniana</i> Turra	+2	-	1

## Charact. and diff. species of the upper units

<i>Cynodon dactylon</i> (L.) Pers.	4.5	4.4	2
<i>Dactylis glomerata</i> L.	3.3	3.4	2
<i>Equisetum ramosissimum</i> Desf.	2.3	+2	2
<i>Senecio erucifolius</i> L.	2.2	1.2	2
<i>Cirsium arvense</i> (L.) Scop.	1.1	+2	2
<i>Cirsium vulgare</i> (Savi) Ten.	+	+	2
<i>Picris hieracioides</i> L.	1.2	+	2
<i>Artemisia vulgaris</i> L.	+	1.1	2
<i>Melilotus officinalis</i> (L.) Pallas	1.2	1.2	2
<i>Mentha longifolia</i> (L.) Hudson	+	1.2	2
<i>Anthemis tinctoria</i> L.	+	+	2
<i>Convolvulus arvensis</i> L.	1.1	1.2	2
<i>Agropyron repens</i> (L.) Beauv.	2.2	1.2	2
<i>Tussilago farfara</i> L.	+	-	1
<i>Dipsacus fullonum</i> L.	+	-	1
<i>Poa trivialis</i> L.	+	-	1
<i>Potentilla reptans</i> L.	-	+2	1
<i>Medicago sativa</i> L.	-	+	1
<i>Bellevalia romana</i> (L.) Sweet	-	+	1

## Other species

<i>Galium album</i> Miller	+2	1.2	2
<i>Centaurea nigrescens</i> Willd. subsp. <i>ramosa</i> Gugle	1.2	+	2
<i>Hypericum perforatum</i> L.	+	+	2
<i>Phleum bertolonii</i> DC.	+2	2.2	2
<i>Rumex acetosa</i> L.	+	1.2	2
<i>Odontites rubra</i> (Baumg.) Opiz	+	+	2
<i>Tanacetum corymbosum</i> (L.) Sch.-Bip.	+2	+2	2

## Accidental species

	-	2	
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Tab. 25 - *Salici-Populetum nigrae* (Tüxen 1931) Meyer-Drees 1936

Rel. n.	1	2	P
Exposure	S	-	r
Slope (°)	10	-	e
Area (m <sup>2</sup> )	200	70	s.
Coverage (%)	100	100	
Tree layer (high) m	13	10	

## Charact. and diff. species of the ass. and upper units

<i>Populus nigra</i> L.	2.3	4.5	2
<i>Salix alba</i> L.	5.5	1.2	2
<i>Fraxinus oxycarpa</i> Bieb.	3.3	+	2
<i>Ulmus minor</i> Miller	1.2	3.4	2
<i>Carex pendula</i> Hudson	-	2.3	1
<i>Equisetum telmateja</i> Ehrh.	3.3	-	1
Other species			
<i>Cornus sanguinea</i> L.	1.2	3.3	2
<i>Hedera helix</i> L.	1.2	2.2	2
<i>Rubus caesius</i> L.	2.2	3.3	2
<i>Melissa romana</i> Miller	+2	+2	2
<i>Clematis vitalba</i> L.	3.3	2.3	2
<i>Prunus spinosa</i> L.	+2	1.2	2
<i>Galium album</i> Miller	1.2	+2	2
<i>Epilobium hirsutum</i> L.	1.2	-	1
<i>Calystegia sepium</i> (L.) R.Br.	1.1	-	1
<i>Phragmites australis</i> (Cav.) Trin.	1.2	-	1
<i>Artemisia vulgaris</i> L.	+	-	1
<i>Sambucus nigra</i> L.	+2	-	1
<i>Urtica dioica</i> L.	1.2	-	1
<i>Silene alba</i> (Miller) Krause	+	-	1
<i>Senecio erucifolius</i> L.	+	-	1
<i>Brachypodium sylvaticum</i> (Hudson) Beauv.	-	3.4	1
<i>Acer campestre</i> L.	-	1.1	1
<i>Crataegus monogyna</i> Jacq.	-	1.2	1
<i>Viola reichenbachiana</i> Jordan ex Boreau	-	2.2	1
<i>Galium aparine</i> L.	-	+2	1
<i>Euonymus europaeus</i> L.	-	1.2	1
<i>Viola alba</i> Besser subsp. <i>dehnhardtii</i> (Ten.) W. Becker	-	+	1
<i>Prunus avium</i> L.	-	+	1
<i>Lamium maculatum</i> L.	-	1.2	1

Tab. 26 - *Ulmo minori-Salicetum apenninae* ass. nova

Rel. n.	1*	2	P
Exposure	W	W	r
Slope (°)	10	5	e
Area (m <sup>2</sup> )	50	30	s.
Coverage (%)	100	100	
Shrub layer (high) m	7	5	
Charact. and diff. species of the ass.			
<i>Salix apennina</i> Skvortsov	5.5	5.5	2
<i>Ulmus minor</i> Miller	2.2	1.2	2
<i>Cornus sanguinea</i> L.	3.3	2.2	2
Charact. and diff. species of the upper units			
<i>Equisetum telmateja</i> Ehrh.	1.2	+2	2
<i>Fraxinus oxycarpa</i> Bieb.	1.1	-	1
<i>Populus nigra</i> L.	1.2	-	1
<i>Salix alba</i> L.	1.2	-	1
<i>Salix purpurea</i> L.	+2	-	1
<i>Populus alba</i> L.	-	2.3	1
Other species			
<i>Rubus ulmifolius</i> Schott	2.3	2.3	2
<i>Hedera helix</i> L.	1.2	+2	2
<i>Clematis vitalba</i> L.	1.2	2.2	2
<i>Galium album</i> Miller	+2	1.2	2
<i>Prunus spinosa</i> L.	2.3	-	1
<i>Acer campestre</i> L.	1.1	-	1
<i>Melissa romana</i> Miller	+2	-	1
<i>Geum urbanum</i> L.	+	-	1
<i>Crataegus monogyna</i> Jacq.	-	+2	1
<i>Lamium maculatum</i> L.	-	+	1
<i>Viola alba</i> Besser subsp. <i>dehnhardtii</i> (Ten.) W. Becke	-	+2	1
<i>Phragmites australis</i> (Cav.) Trin.	-	+	1
<i>Artemisia vulgaris</i> L.	-	+	1
<i>Rosa canina</i> L. sensu Bouleng.	-	2.2	1
<i>Solidago virgaurea</i> L.	-	+2	1
<i>Sorbus torminalis</i> (L.) Crantz	-	+	1
<i>Arundo donax</i> L.	-	+	1
<i>Spartium junceum</i> L.	-	+2	1
<i>Brachypodium rupestre</i> (Host) R. et S.	-	+2	1
<i>Quercus pubescens</i> Willd.	-	+	1

Tab. 27 - *Urtico dioicae-Sambucetum ebuli*  
(Kaiser 1926) Br.-Bl. (1936) 1952

Rel. n.	1
Exposure	W
Slope (°)	30
Area (m <sup>2</sup> )	20
Coverage (%)	100
Charact. and diff. species of the ass. and upper units	
<i>Sambucus ebulus</i> L.	3.3
<i>Urtica dioica</i> L.	+2
<i>Galium aparine</i> L.	1.1
<i>Aegopodium podagraria</i> L.	+2
Other species	
<i>Galium album</i> Miller	1.2
<i>Clematis vitalba</i> L.	1.2
<i>Rubus ulmifolius</i> Schott	2.2
<i>Calystegia sepium</i> (L.) R.Br.	1.1
<i>Eupatorium cannabinum</i> L.	+
<i>Picris hieracioides</i> L.	+

Tab. 28 - *Alliario-Chaerophylletum temuli* Lohmeyer 1949  
*lunarietosum annuae* subass. nova

Rel. n.	1	2	3	4*	P
Exposure	E	-	E	E	r
Slope (°)	45	-	30	25	e
Area (m <sup>2</sup> )	15	30	10	20	s.
Coverage (%)	100	100	100	100	
Charact. and diff. species of the ass.					
<i>Chaerophyllum temulum</i> L.	3.3	2.3	4.4	2.3	4
<i>Alliaria petiolata</i> (Bieb.) Cavara et Grande	2.2	2.2	1.2	+	4
Diff. species of <i>lunarietosum annuae</i> subass.					
<i>Lunaria annua</i> L.	2.2	+2	3.4	4.5	4
<i>Crepis lacera</i> Ten. var. <i>Titani</i> Fiori	-	+	+	+	3
Charact. and diff. species of the upper units					
<i>Galium aparine</i> L.	1.2	+2	1.2	1.2	4
<i>Allium triquetrum</i> L.	1.1	+2	+	+	4
<i>Urtica dioica</i> L.	1.2	1.2	-	+	3
<i>Geranium robertianum</i> L.	2.2	1.2	-	-	2
Other species					
<i>Parietaria judaica</i> Auct. an L.	2.2	1.2	+2	+	4
<i>Rubus ulmifolius</i> Schott	-	+	+	1.2	3
<i>Chelidonium majus</i> L.	3.3	3.3	-	-	2
<i>Hedera helix</i> L.	+	1.2	-	-	2
<i>Bryonia dioica</i> Jacq.	+	1.2	-	-	2
<i>Arum italicum</i> Miller	1.1	+2	-	-	2
<i>Tamus communis</i> L.	1.2	+	-	-	2
<i>Stellaria media</i> (L.) Vill.	-	-	1.1	1.1	2
<i>Clematis vitalba</i> L.	-	-	+	1.2	2
<i>Silene vulgaris</i> (Moench) Garcke	-	-	+	+	2
Accidental species					
	1	4	-	4	

Tab. 29 - *Geranio robertianae-Lamiastretum galeobdoli* ass. nova

Rel. n.	1*	2	3	P
Exposure	NE	NE	N	r
Slope (°)	40	40	25	e
Area (m <sup>2</sup> )	20	40	50	s.
Coverage (%)	100	100	100	
Charact. and diff. species of the ass.				
<i>Lamiastrum galeobdolon</i> (L.) Ehrend. et Polatschek	4.5	4.5	5.5	3
<i>Geranium robertianum</i> L.	2.2	1.2	1.2	3
<i>Arum maculatum</i> L.	1.2	+	+2	3
<i>Helleborus bocconei</i> Ten.	+	1.1	+	3
Charact. and diff. species of the upper units				
<i>Chaerophyllum temulum</i> L.	2.2	2.2	1.2	3
<i>Alliaria petiolata</i> (Bieb.) Cavara et Grande	2.2	1.1	+2	3
<i>Allium triquetrum</i> L.	+	+	1.2	3
<i>Geum urbanum</i> L.	+	+	-	2
Other species				
<i>Hedera helix</i> L.	1.2	2.3	2.2	3
<i>Pulmonaria officinalis</i> L.	+2	+	+2	3
<i>Clematis vitalba</i> L.	+	+	+2	3
<i>Poa nemoralis</i> L.	-	1.2	+2	2
<i>Corylus avellana</i> L. (pl.)	-	+2	1.2	2
<i>Viola reichenbachiana</i> Jordan ex Boreau	-	+	+	2
<i>Lunaria annua</i> L.	+2	+	-	2
<i>Stellaria holostea</i> L.	+2	+	-	2
<i>Lathyrus venetus</i> (Miller) Wohlf.	+	+	-	2
<i>Campanula trachelium</i> L.	+	+	-	2
<i>Tamus communis</i> L.	1.2	-	1.2	2
<i>Stellaria media</i> (L.) Vill.	2.2	-	+2	2
<i>Corydalis cava</i> (L.) Schweigg. et Koerte	+	-	+2	2
<i>Chelidonium majus</i> L.	+2	-	-	2
Accidental species				
	3	10	9	

Tab. 30 - *Balloto-Melissetum romanae* Brullo, Minissale Scelsi & Spampinato 1993

Rel. n.	14	21	P
Exposure	-	-	r
Slope (°)	-	-	e
Area m <sup>2</sup>	10	15	s.
Coverage (%)	100	100	
Charact. and diff. species of the ass.			
Melissa romana Miller	3.4	5.5	2
Ballota nigra L. subsp. uncinata (Fiori et Bèg.) Patzak	+	1.2	2
Silene alba (Miller) Krause	+	-	1
Charact. and diff. species of the upper units			
Urtica dioica L.	-	1.2	1
Artemisia vulgaris L.	-	+	1
Other species			
Clematis vitalba L.	+2	2.3	2
Rubus ulmifolius Schott	+	2.2	2
Galium album Miller	2.2	2.2	2
Fragaria vesca L.	+2	-	1
Clinopodium vulgare L.	3.4	-	1
Geranium sanguineum L.	+	-	1
Lathyrus sylvestris L.	+	-	1
Astragalus glycyphyllos L.	+2	-	1
Agrimonia eupatoria L.	+	-	1
Euphorbia cyparissias L.	2.2	-	1
Silene vulgaris (Moench) Garcke	+	-	1
Dactylis glomerata L.	+	-	1
Fraxinus ornus L.	+	-	1
Hypericum perforatum L.	2.2	-	1
Scutellaria columnae All.	1.1	-	1
Calamintha nepeta (L.) Savi	+2	-	1
Dorycnium hirsutum (L.) Ser.	+	-	1
Anthemis tinctoria L.	+	-	1
Cirsium arvense (L.) Scop.	1.2	-	1
Potentilla reptans L.	-	+	1

Tab 31- *Galio aparines-Smyrniyetum olusatri lunarietosum annuae* subass. nova Allegrezza, Ballelli & Biondi 1987

Rel. n.	1	2	3*	P
Exposure	ENE	SSW	W	r
Slope (°)	30	5	25	e
Area (m <sup>2</sup> )	30	40	50	s.
Coverage (%)	100	100	100	
Charact. and diff. species of the ass.				
Smyrniyetum olusatrum L.	5.5	4.5	5.5	3
Galium aparine L.	3.3	1.2	1.2	3
Diff. species of <i>lunarietosum annuae</i> subass.				
Lunaria annua L.	+	1.2	1.2	3
Charact. and diff. species of the upper units				
Alliaria petiolata (Bieb.) Cavara et Grande	-	+	1.1	2
Urtica dioica L.	2.3	3.3	-	2
Geranium robertianum L.	-	-	+2	1
Lamium maculatum L.	+	-	-	1
Other species				
Chelidonium majus L.	2.2	+	1.2	3
Parietaria judaica Auct. an L.	1.2	1.2	2.2	3
Sambucus nigra L.	+	-	+	2
Hedera helix L.	1.2	-	+2	2
Clematis vitalba L.	+2	-	-	1
Rubus ulmifolius Schott	+2	-	-	1
Silene italica (L.) Pers.	+	-	-	1
Senecio vulgaris L.	+	-	-	1
Silene alba (Miller) Krause	-	+	-	1
Stellaria media (L.) Vill.	-	-	+2	1

## Addenda

Locality, date of the relevés and accidental species

Tab. 1

Rel. 1 e 2 Costa dell' Arnella 20.05.1994.

Rel. 1: *Rosa* sp. +, *Viola alba* Besser subsp. *dehnhardtii* (Ten.) W. Becker +, *Solidago virgaurea* L. +, *Robinia pseudoacacia* L. +, *Coronilla emerus* L. subsp. *emeroides* (Boiss. et Spruner) Hayek +.2; rel. 2: *Rosa* sp. 1.1, *Arum maculatum* L. 1.2, *Rubus ulmifolius* Schott +, *Ruscus aculeatus* L. +.2, *Glechoma hirsuta* W. et K. +, *Sedum maximum* (L.) Suter +.

Tab. 2

Rel. 1 M. Titano 28.04.98; rel. 2 e 3 Murata 24.07.98.

Rel. 1 *Carlina corymbosa* L. 1.1, *Asparagus acutifolius* L. +, *Medicago sativa* L. +, *Sedum sexangulare* L. +.2, *Orchis tridentata* Scop. +, *Lathyrus cicera* L. +; rel. 2 *Silene vulgaris* (Moench) Garcke 1.2, *Festuca glauca* Vill. cfr. 2.3, *Vicia incana* Gouan +, *Quercus pubescens* Willd. (pl.) +, *Dianthus balbisii* Ser. subsp. *liburnicus* (Bartl.) Pign. +, *Inula conyza* DC. 1.1, *Peucedanum cervaria* (L.) Lepeyr. 1.1, *Achillea millefolium* L. +; rel. 3 *Hypericum perforatum* L. 1.1, *Poa pratensis* L. 1.2, *Senecio erucifolius* L. +.2, *Pulicaria dysenterica* (L.) Bernh. 1.1, *Spartium junceum* L. +, *Inula viscosa* (L.) Aiton +, *Clematis vitalba* L. 1.2, *Carlina* sp. +, *Aremonia agrimonoides* (L.) DC. +, *Origanum vulgare* L. 1.3.

Tab. 3

Rel. 1 M. Titano 2.10.98; rel. 2 M. Titano (Giardino Panoramico) 20.05.94; rel. 3, 4: M. Titano 20.08.99.

Rel. 1: *Acer opulifolium* Chaix 1.2, *Ficus carica* L. 2.2, *Spartium junceum* L. 1.2, *Carex flacca* Schreber 1.2, *Teucrium chamaedrys* L. +, *Teucrium flavum* L. +, *Orobanche hederæ* Duby +, *Galium lucidum* All. +, *Crataegus monogyna* Jacq. +; rel. 2: *Rosa canina* L. sensu Bouleng. +.2, *Helleborus foetidus* L. +, *Euonymus europæus* L. +; rel. 3: *Osyris alba* L. +.2, *Ostrya carpinifolia* Scop. +, *Rhamnus catharticus* L. +, *Silene italica* (L.) Pers. +, *Bromus erectus* Hudson +; rel. 4: *Sesleria italica* (Pamp.) Ujhelyi +.2, *Ulmus minor* Miller +.

Tab. 4

Rel. 1 M. Titano (sotto il castello) 19.05.94; rel. 2 Borgo Maggiore 26.06.98; rel. 3 Monte Cerreto 26.08.98.

Rel. 1: *Cyclamen repandum* S. et S. 2.2, *Solidago virgaurea* L. 1.2, *Quercus ilex* L. +, *Allium triquetrum* L. +, *Lonicera etrusca* Santi +, *Oenanthe pimpinelloides* L. +, *Lamium purpureum* L. +, *Prunus spinosa* L. +; rel. 2: *Rubus* sp. +.2, *Silene italica* (L.) Pers. +.2, *Sedum maximum* (L.) Suter +, *Urtica dioica* L. +, *Dactylis glomerata* L. +, *Orobanche hederæ* Duby +, *Digitalis micrantha* Roth +, *Chaerophyllum temulum* L. +, *Alliaria petiolata* (Bieb.) Cavara et Grande +; rel. 3: *Rubia peregrina* L. 1.2, *Polypodium vulgare* L. +.2,



*Hypericum androsaemum* L. (+), *Asplenium adiantum-nigrum* L. (+), *Sambucus nigra* L. +, *Cruciata glabra* (L.) Ehrend. +, *Coronilla emerus* L. subsp. *emeroides* (Boiss. et Spruner) Hayek +, *Cornus sanguinea* L. +, *Clematis vitalba* L. +.2.

## Tab. 5

Rel. 1 M. Titano 28.04.98; rel. 2 Borgo Maggiore 19.05.94.

## Tab. 6

Rel. 1 M. Titano 20.05.94; rel. 2 M. Titano 28.04.98; rel. 3 Murata 24.07.98.

## Tab. 7

Rel. 1 Borgo Maggiore 28.04.1998; rel. 2 Costa dell'Arnella 20.05.1994; rel. 3 «Al Crocefisso» loc. Piagge di Sopra 20.05.1994.

## Tab. 8

Rel. 1 «Al Crocefisso» loc. Piagge di Sopra 20.05.1994; rel. 2 e 3 Mura dell'abitato del M. Titano 20.05.1994.

## Tab. 9

Rel. 1, 2, 3 M. Titano 19.05.94; rel. 4 e 5 M. Titano 26.06.98.  
Rel. 1: *Parietaria judaica* Auct. an L. 1.2; Rel. 3: *Leopoldia comosa* (L.) Parl. +, *Coronilla emerus* L. +; rel. 4: *Melica ciliata* L. +; rel. 5: *Sedum album* L. +, *Silene vulgaris* (Moench) Garcke +, *Bromus erectus* Hudson +.2.

## Tab. 10

Rel. 1 M. Titano (versante orientale) 19.08.99; rel. 2 M. Titano-Borgo Maggiore 26.06.98.

## Tab. 11

M. Titano - Borgo Maggiore 07.11.02.

## Tab. 12

Rel. 1 Borgo Maggiore 19.05.94; rel. 2 M. Titano (sotto il castello) 19.05.94; rel. 3, 4 impluvi del M. Titano 19.05.94; rel. 5, 6 Bivio per M. Cerreto (vicino Palazzo degli Studi) 20.05.94; rel. 7 sotto Palazzo degli studi 21.05.94; rel. 8 M. Cerreto strada verso Acquaviva 10.05.94; rel. 9 Murata 24.07.98.

Rel. 2: *Polypodium vulgare* L. 1.3, *Teucrium flavum* L. +; rel. 3: *Juniperus communis* L. +, *Veronica chamaedrys* L. +.2; rel. 4: *Helleborus foetidus* L. +, *Aremonia agrimonoides* (L.) DC. +, *Rhamnus catharticus* L. +; rel. 5: *Pteridium aquilinum* (L.) Kuhn 1.2, *Lathyrus sylvestris* L. +, rel. 6: *Mespilus germanica* L. +.2, *Vicia hybrida* L. +.2; rel. 7: *Calamintha nepeta* (L.) Savi +, *Geranium sanguineum* L. +; rel. 8: *Geum urbanum* L. +, *Oenanthe pimpinelloides* L. +; rel. 9: *Rubia peregrina* L. 1.2, *Stachys officinalis* (L.) Trevisan 1.1, *Vincetoxicum hirundinaria* Medicus +, *Malus sylvestris* Miller +.2, *Crataegus oxyacantha* L. 1.2.

## Tab. 13

Rel. 1 Borgo Maggiore 19.04.94; rel. 2 M. Titano 28.05.98; rel. 3 Rocca Murata 24.08.98.

Rel. 1 *Silene vulgaris* (Moench) Garcke +, *Fraxinus ornus* L. +.2, *Ruscus aculeatus* L. (+), *Viola alba* Besser ssp. *dehnhardtii* (Ten.) W. Becker +.2, *Sedum album* L. +, *Galium lucidum* All. +; rel. 2 *Celtis australis* L. +, *Arum italicum* Miller +; rel. 3 *Stachys recta* L. +, *Geranium sanguineum* L. +.2, *Dactylis glomerata* L. +, *Vincetoxicum hirundinaria* Medicus +, *Rubia peregrina* L. +.

## Tab. 14

Rel. 1 e 3 Monte Cerreto 09.05.94; rel. 2 San Giovanni 09.05.98; rel. 4, 5, 7 e 8 M. Titano 28.04.98; rel. 6: Borgo Maggiore 28.04.98.

Rel. 1 *Osyris alba* L. +, *Galium album* Miller +, *Stachys recta* L. +; rel. 2 *Lathyrus sylvestris* L. +, *Carex flacca* Schreber +, *Orchis purpurea* Hudson +, *Sorbus domestica* L. +; rel. 3 *Peucedanum cervaria* (L.) Lepeyr. 1.2, *Acer campestre* L. +; rel. 5 *Acer monspessulanum* L. (pl.) +, *Arabis turrata* L. +, *Quercus ilex* L. (pl.) +; rel. 6 *Salix apennina* Skvortsov +, *Acer pseudoplatanus* L. +.

## Tab. 15

Rel. 1 e 2 Monte Cerreto 09.06.98; rel. 3 Monte Cerreto 26.06.98; rel. 4 e 5 Borgo Maggiore 26.06.98.

Rel. 1: *Convolvulus arvensis* L. +, *Sedum album* L. +, *Sedum acre* L. 1.2, *Phleum bertolonii* DC. cfr. +, *Vicia hybrida* L. +, *Tordylium apulum* L. +, *Foeniculum vulgare* Miller +, *Salvia verbenaca* L. +, *Nigella damascena* L. +, *Arenaria leptoclados* (Rchb.) Guss. +; rel. 2: *Dorycnium hirsutum* (L.) Ser. 2.2, *Hieracium* sp. 1.1, *Trifolium angustifolium* L. +, *Trifolium arvense* L. +, *Dianthus balbisii* Ser. subsp. *liburnicus* (Bartl.) Pign. 1.1, *Anthoxanthum odoratum* L. 2.2, *Lathyrus sylvestris* L. +.2; rel. 3: *Convolvulus althaeoides* L. +; rel. 4: *Helianthemum nummularium* (L.) Miller 2.2, *Crepis lacera* Ten. var. *Titani Fiori* +; rel. 5: *Knautia purpurea* (Vill.) Borbas cfr. 1.1, *Orlaya grandiflora* (L.) Hoffm. 1.2, *Teucrium flavum* L. 1.2, *Spartium junceum* L. +.2, *Verbascum* sp. +.

## Tab. 16

Rel. 1 e 2 Monte Cerreto 26.06.98; rel. 3: Monte Cerreto 20.08.99.

Rel. 1 *Hippocrepis comosa* L. +; rel. 2 *Carlina lanata* L. +, *Crupina vulgaris* Cass. +, *Hypericum perforatum* L. +, *Bellardia trixago* (L.) All. +, *Anthyllis vulneraria* L. +; rel. 3 *Bromus erectus* Hudson +, *Sedum acre* L. +, *Melica ciliata* L. +, *Bothriochloa ischaemon* (L.) Keng 1.2, *Brachypodium rupestre* (Host) R. et S. +, *Festuca robustifolia* Mgf.-Dbg. 1.2, *Allium sphaerocephalon* L. +, *Petrorhagia prolifera* (L.) P. W. Ball et Heywood +, *Osyris alba* L. +, *Inula viscosa* (L.) Aiton +.

## Tab. 17

Rel. 1 Monte Cerreto 09.06.1994; rel. 2 e 3 Monte Titano vicino piazzale Kennedy 26.08.98.

Rel. 1 *Stachys recta* L. +, *Avena barbata* Potter +, *Sanguisorba minor* Scop. +2, *Convolvulus arvensis* L. +, *Lotus* sp. +, *Vicia hybrida* L. +; ril 2 *Medicago sativa* L. +; rel. 3 *Geranium pusillum* L. +, *Papaver* sp. +.

## Tab. 18

Rel. 1 M. Cerreto 07.11.02; rel. 2 M. Cerreto 26.06.98.

Rel. 1 *Helleborus bocconeii* Ten. +, *Solidago virgaurea* L. +, *Osyris alba* L. +, *Rubia peregrina* L. +, *Ruscus aculeatus* L. +, *Rosa sempervirens* L. +, *Mespilus germanica* L. +2, *Digitalis micrantha* Roth +, *Viburnum lantana* L. +, *Pinus pinaster* Aiton 1.2, *Hieracium racemosum* W. et K. 1.2 ; rel.2 *Tamus communis* L. +, *Rubus* sp. 1.2, *Juniperus communis* L. 1.2, *Lonicera etrusca* Santi +2, *Laurus nobilis* L. +, *Teucrium chamaedrys* L. +, *Mycelis muralis* (L.) Dumort. +, *Geranium sanguineum* L. +, *Rosa arvensis* Hudson +.

## Tab. 19

Rel. 1 e 2 Monte Cerreto 26.06.98; rel. 3 e 4 Monte Cerreto 20.08.99.

Rel. 2 *Scabiosa maritima* L. +; rel. 3 *Prunus avium* L. +, *Cephalanthera longifolia* (Hudson) Fritsch +, *Peucedanum cervaria* (L.) Lepeyr. +, *Acer pseudoplatanus* L. +, *Geranium sanguineum* L. +, *Dorycnium hirsutum* (L.) Ser. +, *Euphorbia cyparissias* L. +, *Sanguisorba minor* Scop. +, rel. 4 *Laurus nobilis* L. +, *Hieracium racemosum* W. et K. +.

## Tab. 20

Domagnano – M. Olivo 09.05.98.

## Tab. 21

Domagnano – M. Olivo 09.05.98.

## Tab. 22

Rel. 1 Monte Cerreto 28.04.98; rel. 2 San Giovanni 09.05.98; rel. 3 e 4 Domagnano – M. Olivo 09.05.98.

Rel. 1: *Hypericum perforatum* L. +2, *Festuca* sp. +2, *Muscari atlanticum* Boiss. et Reuter 1.1, *Linum catharticum* L. +2, *Tragopogon pratensis* L. ssp. *pratensis* +, *Onobrychis viciifolia* Scop. 1.1, *Sanguisorba minor* Scop. +2, *Agrostis tenuis* Sibth. 1.2, *Aristolochia rotunda* L. +, *Ajuga reptans* L. 2.2, *Cruciata laevipes* Opiz +2, *Ophrys fusca* Link +, *Solidago virgaurea* L. +, *Equisetum arvense* L. +, *Cerastium pumilum* Curtis +; *Holcus lanatus* L. +2; rel. 2 *Inula conyza* DC. +, *Securigera securidaca* (L.) Deg. et Dorfl. +, *Centaurea bracteata* Scop. +2, *Lathyrus aphaca* L. +, *Alopecurus myosuroides* Hudson +, *Bromus hordeaceus* L. +, *Myosotis arvensis* (L.) Hill +; rel. 3 *Cynodon dactylon* (L.) Pers. 1.2, *Narcissus* sp. +2, *Scorzonera* sp. +, *Vicia*

*tenuissima* (Bieb.) Sch. et Th. +, rel. 4 *Arrhenatherum elatius* (L.) Presl 2.2, *Trifolium repens* L. +, *Narcissus* sp. +, *Festuca* sp. +2, *Scorpiurus vermiculatus* L. +.

## Tab. 23

Fosso del Re 10.09.98.

## Tab. 24

Rel. 1 e 2 Torrente S. Marino Loc. Gualdicciolo 10.09.98.

Rel. 1 *Holcus lanatus* L. 1.2, *Plantago lanceolata* L. +, *Trifolium pratense* L. +, *Linum bienne* Miller +; rel. 2 *Inula salicina* L. +2, *Pastinaca sativa* L. subsp. *urens* (Req.) Celak +2, *Inula conyza* DC. +

## Tab. 25

Rel. 1 Torrente S. Marino Loc. Gualdicciolo 10.09.98, rel. 2 Fosso del Re 10.09.98

## Tab. 26

Rel. 1 e 2 Fosso del Re 10.09.98.

## Tab. 27

Fosso del Re 10.09.98.

## Tab. 28

Rel. 1 e 2 Costa dell'Arnella 20.05.94; rel. 3 e 4 strada sottomontana 19.05.94.

Rel. 1 *Melica uniflora* Retz. +2; rel. 2 *Stellaria holostea* L. 1.2, *Silene alba* (Miller) Krause 1.2, *Arctium minus* (Hill) Bernh. +2, *Salvia glutinosa* L. +; rel. 4 *Silene italica* (L.) Pers. 1.2, *Euonymus europaeus* L. +2, *Arabis turrata* L. +2, *Sonchus asper* (L.) Hill +.

## Tab. 29

Rel. 1, 2 e 3 Costa dell'Arnella 20.05.94.

Rel. 1 *Cardamine* sp. +, *Mycelis muralis* (L.) Dumort. +, *Lilium martagon* L. +; rel. 2 *Sanicula europaea* L. 1.2, *Galium odoratum* (L.) Scop. +2, *Parietaria diffusa* M. et K. +, *Arum italicum* Miller +, *Stachys sylvatica* L. +, *Scutellaria columnae* All. +, *Galanthus nivalis* L. +, *Robinia pseudoacacia* L. (pl.) +, *Acer pseudoplatanus* L. +, *Acer obtusatum* W. et K. +; rel. 3 *Cardamine* sp. +, *Sambucus nigra* L. 2.2, *Salvia glutinosa* L. 1.2, *Bryonia dioica* Jacq. +2, *Melica uniflora* Retz. +2, *Arabis turrata* L. +, *Fraxinus ornus* L. +, *Primula vulgaris* Hudson +, *Hepatica nobilis* Miller +.

## Tab. 30

Rel. 1 Monte Cerreto 26 giugno 1998; rel. 2 Monte Cerreto 24.07.98.

## Tab. 31

Rel. 1 Borgo Maggiore 19.05.94; rel. 2 Palazzo dei congressi 19.05.94; rel. 3 Costa dell'Arnella 20.05.94.

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