

**A SYNTAXONOMICAL SURVEY OF
THE SICILIAN DWARF SHRUB VEGETATION BELONGING
TO THE CLASS *RUMICI-ASTRAGALETEA SICULI***

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ABSTRACT - Basing on literature data and unpublished relevés from Sicily, a survey of the syntaxa belonging to the class *Rumici-Astragaletea siculi* Pignatti & Nimis 1980 em. Mucina 1997 (= *Cerastio-Carlinetea nebrodensis* Brullo 1984) is presented. The class groups orophilous plant communities dominated by hemicryptophytes and by dwarf-shrubs, often with a pulvinate and thorny growth-form. The class is represented in Sicily by two orders: *Rumici-Astragaletea siculi* Pignatti & Nimis 1980, including the sole alliance *Rumici-Astragalion siculi* Poli 1965, restricted to Mount Etna, and *Erysimo-Jurinetalia bocconeii* Brullo 1984, including two alliances: the acidophilous *Armerion nebrodensis* Brullo 1984 and the basiphilous *Cerastio-Astragalion nebrodensis* Pignatti & Nimis ex Brullo 1984. Within the class, nineteen associations have been recognized. Nomenclature, floristic settlement, ecology and chorology are examined for each syntaxon. The floristic autonomy of the class *Rumici-Astragaletea siculi* is examined from the phytogeographic viewpoint and is confirmed by numerical analyses including not only the Sicilian phytocoenoses, but also those occurring in Sila and Aspromonte (Calabria) and ascribed to the same class by Brullo *et al.* (2001, 2004). It is, as well, highlighted that the Pollino massif represents the southernmost limit to the distribution range of the class *Festuco-Brometea*, whose southward expansion is hampered by the lack carbonatic highlands in the southernmost tip of the Italian Peninsula.

KEY WORDS - Sicily, orophilous vegetation, dwarf shrubs, phytosociology, *Rumici-Astragaletea siculi*.

INTRODUCTION

In the high mountain vegetation of Sicily, the most peculiar structural types are extensively dominated by dwarf shrubs, often with a thorny and pulvinate habit. These shrubs are particularly effective in retaining soil particles and organic matter

under their canopies, therefore providing a shelter from the harsh environmental conditions to manifold herbaceous species (geophytes, therophytes and hemicryptophytes). The vegetation at issue, in its typical aspect, forms spotted, discontinuous layers on windy slopes and rocky habitats.

The high scientific attractiveness of this vegetation is given by the high number of endemic or relict species, a real highlight for Mediterranean phytogeographers, and by the morphologic and physiologic adaptations of chief species. Several phytosociological data are available on this topic: Frei (1940) and Gilli (1943) provided the first contributions on the plant communities occurring in the summit area of Etna. Afterwards, the orophilous vegetation of Etna was re-examined by Poli (1965) and by Pignatti *et al.* (1980) who first extended the survey to the Madonie massif. In addition to the phytosociological treatment of the surveyed vegetation, the latter contribution provided a peer analysis on the ecologic adaptations, origin and chorologic features of the Central Mediterranean orophilous flora. Further contributions on the Madonie highlands were provided by Raimondo (1980) and by Brullo (1984), who proposed a new syntaxonomical survey of the Sicilian orophilous dwarf vegetation.

Since then, with the exception of a phytosociologic map of Madonie (Raimondo *et al.* 1994), no other contributions have been published on such an interesting topic, although many additional data progressively accumulated in doctoral thesis (Siracusa 1996; Guarino 1998; Giusso 2001; Cormaci 2001) and other specific studies. On such basis, a general survey on the distribution of the orophilous dwarf plant communities of Sicily is presented here, by taking into account, as well, the relationships with strictly allied communities of the siliceous massifs of Calabria.

STUDY SITES

The vegetation examined in this paper has a scattered distribution along the main elevations of Sicily, wherever the altitude exceeds 1400 m a.s.l., with exceptional descents at lower altitudes on windy, rocky ridges and summit outcrops. The surveyed plant communities have their maximum diversity on Etna and Madonie, but they have been recorded, as well, on Sicani, Nebrodi and Peloritani massifs (FIGURE 1):

- Etna is an active volcano, including the highest elevation of Sicily (currently 3314 m a.s.l.). In the summit area, the substrata are represented by volcanic scoriae, lava flows and basaltic outcrops.
- Madonie are forming the highest part of the northern range of Sicily. This massif includes several peaks higher than 1700 m a.s.l., the highest being Pizzo Carbonara (1979 m a.s.l.). Many lithotypes are here represented, including Mesozoic limestones and dolomites, quartzarenites, schists and flaky clays.
- Nebrodi are the longest part of the northern range of Sicily. The highest point is Mt. Soro (1847 m a.s.l.) and the lithotypes of the summit areas are flysch with sparse outcrops of Mesozoic limestones and siliceous metamorphic rocks.
- Peloritani are the oldest part of the northern range of Sicily, chiefly formed by siliceous rocks with different metamorphic degree. The vegetation at issue only

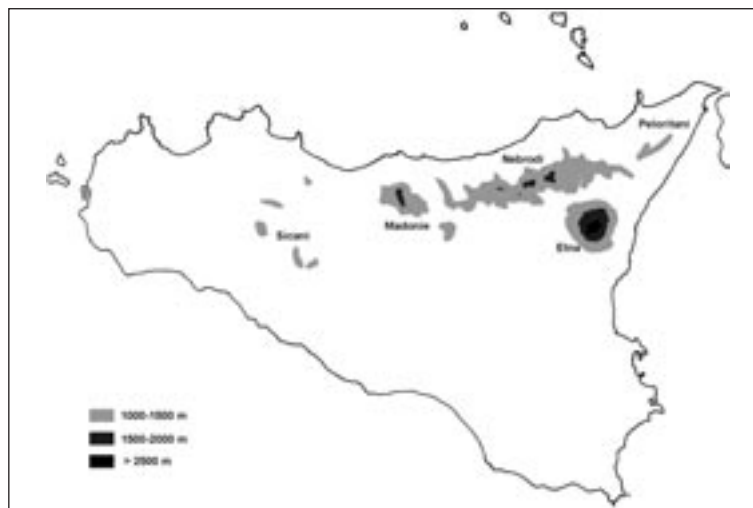


FIGURE 1 - Map of the Sicilian mountains exceeding 1000 m a.s.l..

occurs on a small outcrop of Mesozoic limestones, forming the summit plateau of Mt. Scuderi (1253 m a.s.l.).

- Sicani are the westmost massif of Sicily, quite isolated from the other high mountains of the island. The highest peaks are Mt. Cammarata (1578 m a.s.l.) and Rocca Busambra (1613 m a.s.l.), both made of Mesozoic limestones.

The surveyed plant communities grow on various substrata, with different pH and granulometry, derived from the degradation of the above mentioned lithotypes. The severe environmental conditions hamper the development of soils: the most typical habitats of the vegetation at issue look very stony, although a feeble accumulation of finer particles may occur under the shrubs. Grounds are often eroded and, being scarcely developed, they are reflecting with unusual fidelity the chemical composition of the bedrock. All surveyed sites were very windy and exposed to an intense solar radiation (Etna: Casa Cantoniera, 1882 m: 17830 kJ/m²); traces of cryoturbation were evident at more than 1.700 m a.s.l.

The average year temperature in these habitats ranges between 3° and 11° C, with average min. daily temperatures between 8° and 1.5° C and av. max. daily temperatures between 17° and 26° C. The thermic excursion of the daily temperatures averages between 13° and 25° C, while the yearly thermic excursion averages between 19° and 34° C.

Rainfalls range between 800 and 1250 mm/yr, but their distribution shows the neat gap in summer, that is typical of Mediterranean climates. The snow-deck is rather changeable, depending on altitudes, topography and wind. The only available record reports, on average, 3-4 months with snow-deck/yr (Etna, Casa Cantoniera, 1882 m a.s.l.).

Winds are rather frequent and strong, due to thermic and baric gradients. The vicinity of the sea acts as a main environmental factor, especially in summer: the

moisty air, blown upwards by the sea breeze, is responsible for abundant dew in the early morning, that partially buffers the summer drought (Pignatti *et al.* 1980).

Following the bioclimatic classification of Rivas-Martínez & Loidi Arregui (1999), the surveyed plant communities find their optimal ecological requirements within the supra- and oromediterranean thermotypes, but they are also occurring within the supra-temperate submediterranean thermotype, limited to the Nebrodi summits, and within the cryo-oromediterranean thermotype, on the top of Etna. The ombrotypes range from subhumid to humid, depending on the altitude, on the exposure and on the distance from the sea, with Nebrodi and Peloritani being the most humid sites and Sicani the driest ones (Brullo *et al.* 1996).

MATERIAL AND METHODS

The present survey is based on literature data (305 relevés) and unpublished ones (259 relevés), all from Sicily. In order to compare the vegetation at issue with allied syntaxa described for Central-Southern Italy, further 307 relevés taken from literature have been merged into synoptic tables, 56 of which from Sila Massif (Central Calabria) and 70 from Aspromonte Massif (Southern Calabria).

Particular attention was paid to the relevés from Central and Southern Calabria, because of the close affinity between the orophilous pulvinate vegetation of Sila and Aspromonte with that of Sicilian mountains.

All relevés were sampled according to the Braun-Blanquet's method (Braun-Blanquet, 1964; Westhoff & van der Maarel, 1973). To compare the similarity across the relevés, a multivariate analysis has been performed on a matrix of 213 species x 124 relevés, by means of the software package Syn-tax 5.1 (Podani, 1995).

The numerical analyses were based on presence/absence (binary) data. The matrix was made of 60 relevés from Sicily and 64 from Calabria. The processed relevés were selected across the whole data set, preferring those with the highest floristic richness. To obtain the hierarchical clustering, the Sørensen algorithm was adopted as resemblance coefficient and the single link was adopted as distance-optimizing method. A Principal Components Analysis (PCA) has been performed too, aiming to detect ecological gradients related to the data set.

Besides, a second numerical analysis was performed by the same methodology on a matrix of 62 relevés x 226 species, in order to compare the relevés of Sicily, Aspromonte and Sila with some relevés sampled in the orophilous hemicryptochamaephytic vegetation of Central and Southern Apennines. This was aimed to sound out the floristic autonomy of the issued vegetation with respect to that of the southernmost massifs of the Apenninic range.

The floristic analysis was based on the taxa listed in the phytosociological tables. The Raunkiaer's classification of the growth forms was followed in the biological spectrum and the chorologic types proposed by Brullo *et al.* (1998) were adopted in the chorological spectrum.

For the critical examination of the surveyed syntaxa, the international code of phytosociological nomenclature was followed (Weber *et al.*, 2000). The taxonomic nomenclature follows Pignatti (1982), in some cases partially updated on the basis of more recent papers: *Stipa sicula* Moraldo, *Galium venustum* Jordan, *Scleranthus*

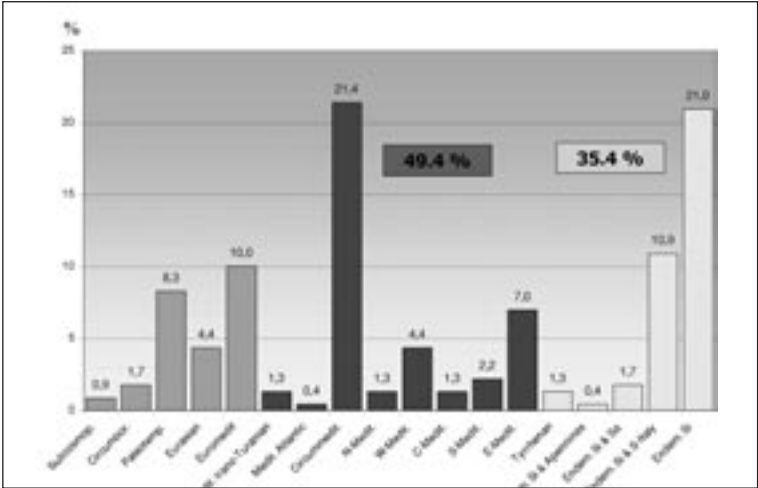


FIGURE 2 - Chorologic spectrum of the flora of the surveyed plant communities.

venustus Rchb., *Bellardiochloa violacea* (Bellardi) Chiov., *Bellardiochloa aetnensis* (C. Presl) Brullo & Siracusa, *Avenochloa cincinnata* (Ten.) Holub, *Sesleria nitida* Ten. ssp. *sicula* Brullo & Giusso, *Scabiosa crenata* Cyr. var. *hirsuta* Guss., *Pimpinella tragium* Vill. var. *glauca* (C. Presl) Lojac., *Asperula scabra* Link var. *incana* Guss., *Senecio chrysanthemifolius* Poir., *Herniaria microcarpa* C. Presl.

RESULTS

The orophilous pulvinate vegetation of Sicily is characterized by a pool of species having a remarkable phytogeographical interest. The chorologic spectrum

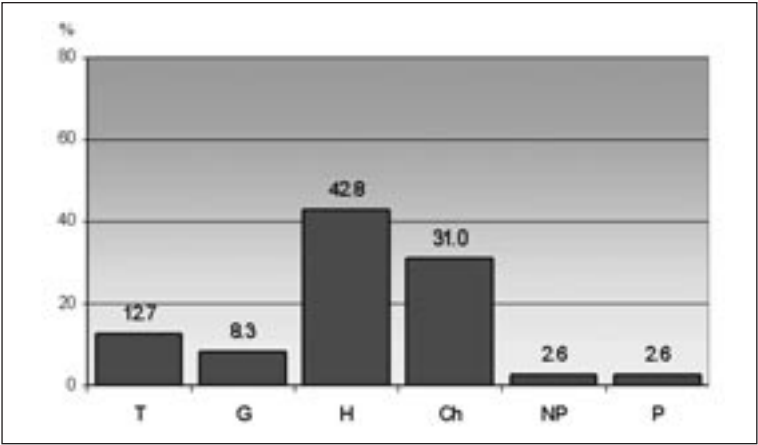


FIGURE 3 - Life-forms spectrum of the flora of the surveyed plant communities (NP: nanophanerophytes; Ch: chamaephytes; H: hemicryptophytes; G: geophytes; T: therophytes).

(FIGURE 2) highlights a 35.4% of endemic taxa, of which 21% restricted to Sicily. The Mediterranean element includes 49.4% of the sampled flora, that is chiefly represented by Circum-Mediterranean taxa (21%).

With reference to the life-forms spectrum displayed in FIGURE 3, the surveyed vegetation is clearly dominated by hemicryptophytes (42.8%) and chamaephytes (31%). These two groups are not only the richest in species, but also including the species characterizing the physiognomy of these plant communities.

The syntaxonomical treatment of this vegetation has been quite controversial, up to a recent past, probably because the whole perspective was missing, as most of the published data focussed on Etna and/or Madonie. At first, three associations from Etna have been validly published by Frei (1940), two of which revived by Gilli (1943), Lüdi (1956) and Poli (1965). The last author, in particular, was the first who highlighted how problematic was the framing of the orophilous pulvinate associations of Etna into any of the known higher syntaxa. She therefore proposed a new alliance, *Rumici-Astragalion siculi*, and postulated the occurrence of a new order, proposed by Giacomini under the provisory name of *Astragaleta siculae*.

Pignatti *et al.* (1980) proposed the new class *Rumici-Astragaletea siculi*, where the Etnean vegetation belonging to *Rumici-Astragalion siculi* was included. The same authors, who investigated, as well, the orophilous pulvinate vegetation of Madonie, ascribed them the classes *Ononido-Rosmarinetea* and *Cisto-Lavanduletea*, on the basis of a somewhat physiognomical convergence, due to the presence of very few and sporadic character species of these two classes. In particular, the recorded basiphilous communities were included in an endemic alliance, *Cerastio-Astragalion nebrodensis*, framed into the order *Erinacetalia*; while the two acidophilous association, exclusively on the basis of their ecology, were referred with some perplexities one (*Genistetum cupanii*) to the *Cisto-Lavanduletea* and the other (*Plantagini-Armerietum nebrodensis*) to the *Trifolion humilis* (*Erinacetalia*). Successively Brullo (1984), in a study about the vegetation of Madonie, emphasized the importance of a group of endemic taxa common to all the Sicilian high mountains and noted that the occurrence of these species was largely superior in number and cover abundance than the occurrence of those characterizing the two classes considered by Pignatti *et al.* (1980). He therefore proposed a new class, *Cerastio-Carlinetea nebrodensis*, including all the Sicilian hemicrypto-chamaephytic orophilous vegetation. The possibility to emend the name *Rumici-Astragaletea siculi*, by following the Art. 47 of the code, was actually considered improper by Brullo because it was explicitly excluded by Pignatti *et al.* (*l.c.*) that the Etnean class could include, as well, the communities of Madonie. Moreover, the species chosen by Pignatti for the name *Rumici-Astragaletea siculi* are endemic to Etna and therefore not really suitable for a class including all the Sicilian communities. Mucina (1997) had a different opinion: in a survey of the European phytosociological classes, he emended the *Rumici-Astragaletea siculi* and included within this class the *Cerastio-Carlinetea nebrodensis*.

Within this class, two orders can be recognized (FIGURE 4): one restricted to Etna, *Rumici-Astragaleta siculi* with the sole alliance *Rumici-Astragalion siculi*, and one stretched over the heights of the mountains of Northern Sicily, *Erysimo-Jurinetalia bocconeii*, with two alliances: one basiphilous (*Cerastio-Astragalion nebrodensis*) and one acidophilous (*Armerion nebrodensis*).

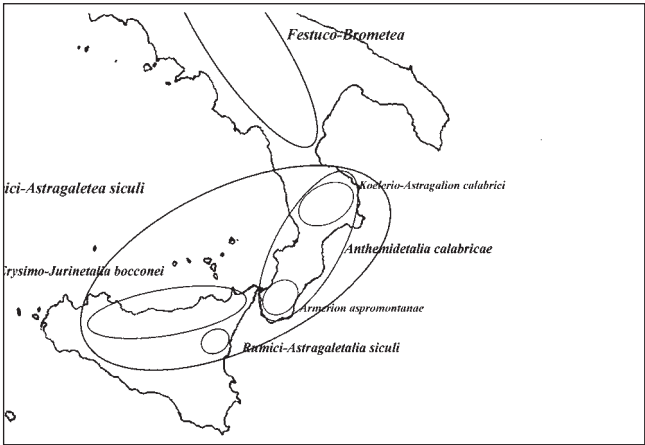


FIGURE 4 - Geographical distribution of the alliances and orders included in the class Rumici-Astragaletea siculi.

More recently, the range of this class have been enlarged up to the siliceous mas-sifs of Calabria (Brullo *et al.* 2001, 2004), where an independent order have been recognized (*Anthemidetalia calabricae*), comprising two alliances, one limited to the Aspromonte heights (*Armerion aspromontanae*) and one restricted to Sila (*Koelerio-Astragalion calabrici*).

This syntaxonomic arrangement is well supported by the cluster diagram in FIGURE 5, where the first three branches correspond to the orders and the five alliances merge at more than 0.45 dissimilarity index. The PCA (FIGURES 6-7) confirms the segregation of these groups also from the ecological viewpoint. In particular, the first axis could be related to a gradient of water availability, identifying the phytocoenoses belonging to the Aetnean alliance as the most edaphoxerophilous (they are growing under dry ombrotypes, on mineral terrains,

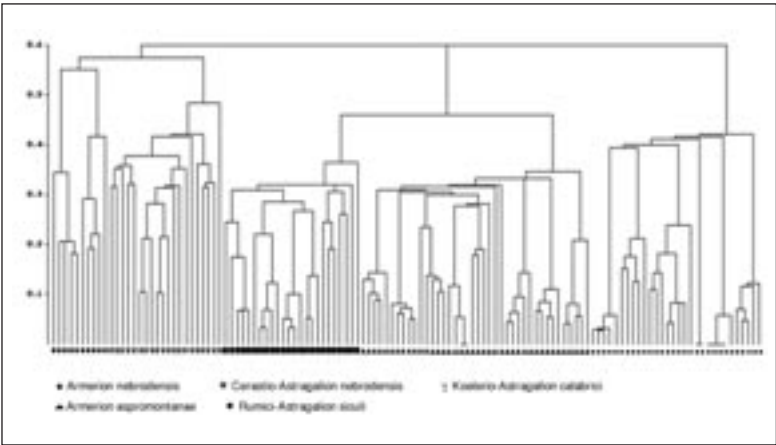


FIGURE 5 - Cluster diagram of the associations ascribed to the class Rumici-Astragaletea siculi.

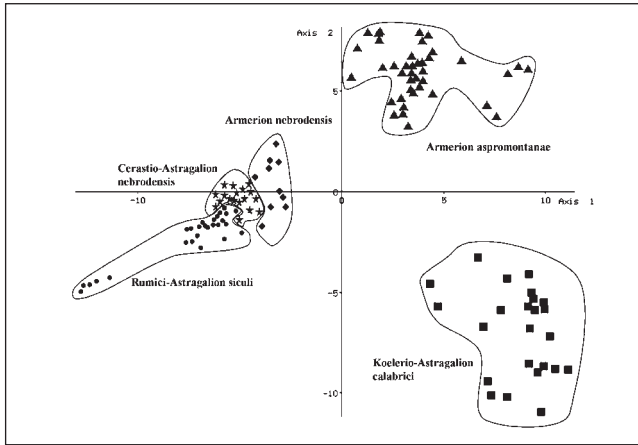


FIGURE 6 - PCA - first vs. second axis of the associations ascribed to the class *Rumici-Astragaletea siculi*

whose water capacity is very low), and those of Sila as the most edaphohygrophilous (they are growing under humid ombrotypes, on relatively deep and moisty granitic soils). The second axis could be related to the meteoric alteration of the soils, that is very low on Etna (where substrata are constantly renewed by the volcanic activity) and on Sila (where the incoherent substrata, deriving from the alteration of old granites, crumble very easily and are quickly eroded by the weathering), while it is relatively high on Aspromonte and on the siliceous tops of Madonie, where substrata are altered by very slow pedogenetic processes, acting since ancient times on the flattened plateaux that are typical of these massifs. The third axis could be related to the pH of the substrata, identifying the phytocoenoses belonging to the *Rumici-Astragalion siculi* as the most acidophilous and those belonging to *Cerastio-Astragalion nebrodensis* as the most basiphilous.

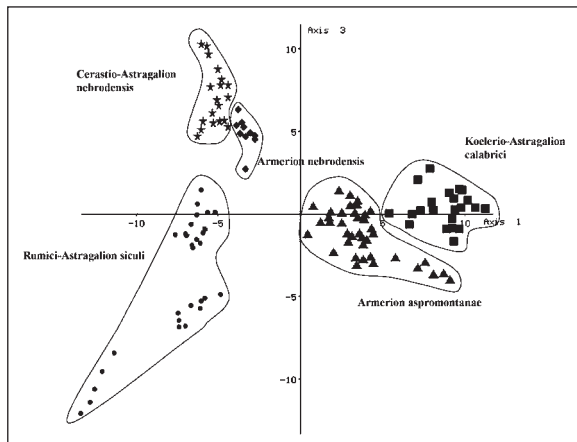


FIGURE 7 - PCA - first vs. third axis of the associations ascribed to the class *Rumici-Astragaletea siculi*



FIGURE 8 - Geographical ranges of the endemics occurring in the associations of Rumici-Astragaletea siculi. Numbers are indicating how many species do have the same range.

Aiming to outline a synthesis about the phytosociological treatment of the Sicilian representatives of these interesting plant communities, the following syntaxonomic scheme is commented:

RUMICI-ASTRAGALETEA SICULI Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 56 em. Mucina 1997.

HOLOTYPUS: *Rumici-Astragaletea siculi* Pignatti & Nimis in Pignatti *et al.* 1980.

SYN.: *Ononido-Rosmarinetea* sensu Pignatti & Nimis in Pignatti *et al.* 1980 non Br.-Bl. 1947.

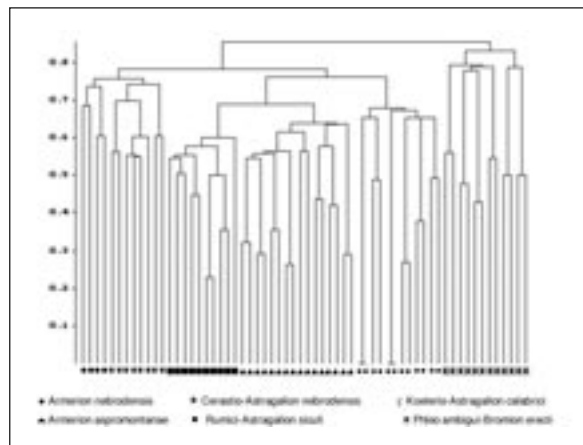


FIGURE 9 - Cluster diagram of the associations of Rumici-Astragaletea siculi, compared to some associations of Phleo ambigu-Bromion erecti (Festuco-Brometea). Two relevés, the richest in species, have been processed for each phytosociological association.

Cisto-Lavanduletea sensu Pignatti & Nimis in Pignatti *et al.* 1980 non Br.-Bl. 1940.
Cerastio-Carlinetea nebrodensis Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 377 nom. illeg. (Art. 22).

CHARACTER SPECIES: *Acinos aetnensis*, *Arabis rosea*, *Bellardichloa nebrodensis*, *Bunium petraeum*, *Carlina nebrodensis*, *Centaurea parlatoris*, *Cerastium tomentosum*, *Galium aetnicum*, *Herniaria microcarpa*, *Hieracium macranthum*, *Petrorhagia saxifraga* ssp. *gasparrinii*, *Phleum ambiguum* (diff.), *Rumex multifidus* (diff.), *Saponaria sicula*, *Scleranthus marginatus*, *Silene sicula*, *Tragopogon nebrodensis*, *Valeriana tuberosa* (diff.).

STRUCTURE AND ECOLOGY: Heliophilous vegetation dominated by hemicriptophytes, pulvinate chamaephytes and nanophanerophytes, colonizing initial soils derived from limestones, dolomites, quartzites, granites, metamorphic and volcanic rocks. The habit of the chief species let them to tolerate the strong winds and the seasonal drought stress characterizing their growing sites, represented by summit plateaux, slants and ridges. The communities of this class, even if primarily colonizing the summit extension above the timber-line, or rocky outcrops in the altitudinal belt of the orophilous woodlands, largely occur on eroded soils and debris in secondary habitat created by the human or the volcanic activity. The bioclimatic belts related to this vegetation are between the supra- and the cryo-oromediterranean.

DISTRIBUTION: High mountains of Sicily (Sicani, Madonie, Nebrodi, Etna, Peloritani), Central and Southern Calabria (Sila and Aspromonte massifs).

RUMICI-ASTRAGALETALIA SICULI Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 56.

HOLOTYPUS: *Rumici-Astragalion siculi* Poli 1965.

SYN.: *Astragaletalia siculae* Giacomini ex Poli 1965, Fl. Veg. Ital. 5: 230, nom. prov. (Art. 3b).

CHARACTER SPECIES: *Anthemis aetnensis*, *Astragalus siculus*, *Bellardichloa aetnensis*, *Erysimum etnense*, *Robertia taraxacoides* (diff.), *Rumex aetnensis*, *Senecio aetnensis*, *Senecio chrysanthemifolius*, *Tanacetum siculum*, *Viola aethnensis*.

STRUCTURE AND ECOLOGY: Order grouping herbaceo-chamaephytic orophilous communities occurring on volcanic substrata. The maximum expression of this vegetation is found in the oro- and cryo-oromediterranean bioclimatic belt, but sometimes it occurs within the supramediterranean one (altitudinal range: 1400-2900 m a.s.l.).

DISTRIBUTION: Etna (Eastern Sicily).

RUMICI-ASTRAGALION SICULI Poli 1965, Fl. Veg. Ital. 5: 59.

LECTOTYPUS: *Astragaletum siculi* (Frei 1940) Gilli 1943

CHARACTER SPECIES: see order.

STRUCTURE AND ECOLOGY: see order.

DISTRIBUTION: see order.

Astragaletum siculi (Frei 1940) Gilli 1943: Beih. Bot. Centr. 62: 66, corr. (TABLE 1).

NEOTYPUS: Rel. 5, in Gilli (1943), hoc loco.

SYN.: *Astragaletum siculum aetnense* Frei 1940, Ber. Geob. Inst. Rubel (Zurich) 1939: 90, nom. illeg. (art. 34).

Astragaletum siculae (Frei 1940) Gilli 1943: Beih. Bot. Centr. 62: 66 (art. 41 a).

Astragaletum siculi Poli 1965, Fl. Veg. Ital. 5: 61, nom. illeg. (art. 22).

CHARACTER SPECIES: *Astragalus siculus* (dom.), *Cuscuta kotschyi*, *Scleranthus etnensis*.

STRUCTURE AND ECOLOGY: pulvinate vegetation, forming a patchy layer, 30-50 cm high. The peak of the flowering time happens around the mid of June. This association is remarkably pioneer, colonizing volcanic sands, eroded soils and stony slopes in windy sites. In optimal conditions, this vegetation normally reaches very high cover values. The structure is given by the dominance of the big thorny pulvines of *Astragalus siculus*, having the maximum spread within the supra- and oromediterranean belt (altitudinal range: 1500-2200 m a.s.l.). The association can be found, however, at lower altitudes in secondary habitats.

DISTRIBUTION: Etna (Eastern Sicily).

Senecioni aetnensis-Anthemidetum aetnensis Frei 1940, Ber. Geob. Inst. Rubel (Zurich) 1939: 87 (TABLE 2).

NEOTYPUS: Rel. 8, in Gilli (1943), hoc loco.

SYN.: *Senecio aetnensis-Anthemis aetnensis* ass. Frei 1940 Ber. Geob. Inst. Rubel (Zurich) 1939:87.

Rumici-Anthemidetum aetnensis Poli 1965, Fl. Veg. Ital. 5: 61, nom. illeg. (art.22).

CHARACTER SPECIES: *Anthemis aetnensis* (dom.), *Scleranthus vulcanicus*, *Cardamine glauca*.

STRUCTURE AND ECOLOGY: hemicrypto-chamaephitic vegetation, forming a discontinuous layer, 5-15 cm high. The peak of the flowering time happens in July. The association represents the highest altitudinal record of the Sicilian vegetation: it has its optimum in the cryo-oromediterranean belt (2200-2900 m a.s.l.), where it vicariates the *Astragaletum siculi*. The association may also occur at lower altitudes, on volcanic sands, where it represents a seral stage, dynamically preceding the *Astragaletum siculi*.

DISTRIBUTION: Etna (Eastern Sicily).

Festuco circummediterraneae-Bellardiochloetum aetnensis Frei 1940, Ber. Geob. Inst. Rubel (Zurich) 1939: 88, corr. (TABLE 3).

NEOTYPUS: TABLE 32, rel. 3, in Poli (1965), hoc loco.

SYN.: *Poa aetnensis-Festuca nebrodensis* ass. Frei 1940: Ber. Geob. Inst. Rubel (Zurich) 1939: 88.

CHARACTER SPECIES: *Bellardiochloa aetnensis* (dom.).

STRUCTURE AND ECOLOGY: discontinuous vegetation dominated by caespitose hemicryptophytes, forming a patchy layer, 5-15 cm high. The peak of the flowering time happens around the mid of June. The association dwells markedly eroded soils and rocky slopes on windy ridges and at the basis of the volcanic dykes. The altitudinal range of the association is between 1700 and 2300 m a.s.l.; being the optimal aspects included in the oromediterranean belt.

DISTRIBUTION: Etna (Eastern Sicily).

NOTE: This vegetation was described first by Frei (1940) as "association with *Poa aetnensis* and *Festuca nebrodensis*". The name proposed by Frei must be correct-

ed (art. 43) because *Festuca circummediterranea* has been mistakenly determined as *F. nebrodensis*, while *Poa aetnensis*, for the unkeeled lemma and the strictly conduplicate leaves must be ascribed to the genus *Bellardiochloa* (Chrtek, 1970).

Phleo ambigui-Secaleetum stricti Siracusa 1998, Boll. Acc. Gioenia Sci. Nat. 30 (353): 324.

HOLOTYPE: TABLE 1, rel. 1, in Siracusa (1998).

CHARACTER SPECIES: *Secale strictum*.

STRUCTURE AND ECOLOGY: hemicryptophytic vegetation forming a continuous layer, 40-60 cm high. The structure is given by the dominance of two big caespitose grasses, that are particularly successful in colonizing flat or gently sloping sites, where volcanic sands and finer particles can accumulate. The peak of the flowering time happens around the mid of June. This vegetation requires hollowed sites, not very windy, relatively moist substrata. When the environmental factors become more extreme, the association is replaced by the *Astragaletum siculi*. The association occurs in the supra- and oromediterranean belts (altitudinal range: 1500- 1900 m a.s.l.) but it can also be found at lower altitudes in forest clearings.

DISTRIBUTION: Etna (Eastern Sicily).

Festuco circummediterraneae-Populeetum tremulae Brullo & Siracusa ass. nov. (TABLE 4).

HOLOTYPE: TABLE 4, rel. 6, hoc loco.

CHARACTER SPECIES: *Populus tremula* f. *nana*.

STRUCTURE AND ECOLOGY: nanophanerophytic vegetation forming a patchy layer, 30-50 cm high. The peak of the flowering time happens at the end of June. The association colonizes lavic sheers, with a sloping angle of 30°-40°, covered by a thin layer of volcanic sand, that is kept permanently humid by the water deriving from the snow-melting. The water cannot percolate through the sheers, and soaks up the sand accumulated against volcanic dykes, that shelter the slopes from the dry north-westerly wind. This microhabitat occurs in the cryo-oromediterranean belt, between 2300 and 2400 m a.s.l., and is successfully colonized by *Populus tremula*, that at these heights puts on a prostrate-pulvinate dwarf growth form.

DISTRIBUTION: restricted to a small area of the southern flank of Etna (Timpa dell'Albanello).

Cerastio tomentosi-Hieracietum pallidi Brullo & Siracusa ass. nov. (TABLE 5).

HOLOTYPE: TABLE 5, rel. 10, hoc loco.

SYN.: aggr. a *Hieracium crinitum* e *Luzula sieberi* Poli 1965, Fl. Veg. Ital. 5: 140.

CHARACTER SPECIES: *Hieracium pallidum*.

STRUCTURE AND ECOLOGY: Chasmophilous hemicrypto-chamaephytic vegetation, colonizing fractured volcanic dykes and steep rocky slopes with northerly exposures, in the supra- and oromediterranean belt (altitudinal range: 1600-2000 m a.s.l.). The peak of the flowering time happens at the end of June.

DISTRIBUTION: restricted to the southern rim of Valle del Bove, along the ridge named Schiena dell'Asino (SE flank of Etna).

ERYSIMO-JURINETALIA BOCCONEI Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 379.

HOLOTYPE: *Cerastio-Astragalion nebrodensis* Pignatti & Nimis ex Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 380.

SYN.: *Erinacetalia* sensu Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 56, non Quezel 1953.

Lavanduletalia stoechadis sensu Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 56, non Br.-Bl. 1940.

CHARACTER SPECIES: *Acinos alpinus* var. *nebrodensis*, *Allium cupanii*, *Asperula scabra* var. *incana*, *Dianthus arrostii*, *Erysimum bonannianum*, *Galium venustum*, *Helianthemum croceum* (diff.), *Jurinea bocconeii*, *Koeleria splendens* ssp. *splendens*, *Lomelosia crenata* var. *hirsuta* (diff.), *Minuartia verna* ssp. *grandiflora*, *Polycarpon polycarpoides* (diff.), *Trisetum splendens*.

STRUCTURE AND ECOLOGY: Order grouping herbaceo-chamaephytic orophilous communities occurring on eroded initial soils derived from limestones, dolomites, quartzites and metamorphic rocks (gneiss and schists). The maximum expression of this vegetation is found within the supramediterranean bioclimatic belt, but sometimes it occurs within the mesomediterranean one (altitudinal range: 980-1950 m a.s.l.).

DISTRIBUTION: High mountains of Northern Sicily (Sicani, Madonie, Nebrodi, and Peloritani).

CERASTIO-ASTRAGALION NEBRODENSIS Pignatti & Nimis ex Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 380.

HOLOTYPE: *Lino-Seslerietum siculae* Pignatti & Nimis 1980 em. Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 381.

SYN.: *Cerastio-Astragalion nebrodensis* Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: nom. illeg. (art. 5).

CHARACTER SPECIES: *Astragalus nebrodensis*, *Alyssum nebrodense*, *Avenochloa cincinnata* (diff.), *Cachrys ferulacea* (diff.), *Helianthemum cinereum*, *Inula montana* (diff.), *Euphorbia myrsinites* (diff.), *Pimpinella tragium* var. *glauca*, *Sesleria nitida* ssp. *sicula*, *Sideritis sicula*, *Knautia calycina*, *Viola nebrodensis*, *Onosma canescens*.

STRUCTURE AND ECOLOGY: This alliance includes basiphilous and neutrophilous communities occurring on limestones, dolomites, diagenized clays and flysch. The structure of the communities and the altitudinal range are the same of the order.

DISTRIBUTION: see order.

Lino punctati-Seslerietum siculae Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 59, em. Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 381, corr. (TABLE 6).

HOLOTYPE: TABLE 8, rel. 74, in Pignatti *et al.* (1980).

SYN.: *Lino-Seslerietum nitidae* Pignatti & Nimis 1980 em. Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 381.

CHARACTER SPECIES: *Onosma canescens*, *Teucrium montanum*, *Laserpitium siculum*, *Linum punctatum*, *Stipa sicula*, *Helianthemum nebrodense*.

STRUCTURE AND ECOLOGY: xerophilous association forming a discontinuous layer, 20-45 cm high. It colonizes lithosoils on rocky slopes and eroded sites. The rich floristic settlement is characterized by the codominance of hemicriptophytes and chamaephytes, normally equally distributed, although *Sesleria nitida* ssp. *sicula* may become dominant. The peak of the flowering time happens at the beginning of June. The ecological optimum is in the supramediterranean belt (altitudinal range: 1200-1800 m a.s.l.).

DISTRIBUTION: Madonie, on carbonatic outcrops.

Carduncello pinnati-Thymetum spinulosi Brullo & Marcenò 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 383 (TABLE 7).

HOLOTYPE: TABLE 8 rel. 12, in Brullo (1984).

CHARACTER SPECIES: *Carduncellus pinnatus*, *Scorzonera villosiformis*, *Teucrium chamedrys*, *Thymus spinulosus*.

STRUCTURE AND ECOLOGY: vegetation dominated by chamaephytes, normally with a prostrate growth, forming a discontinuous layer, 20-35 cm high. The peak of the flowering time happens in June. Cover values are rather changeable, depending on the intensity of the pasturage. This association colonizes debris and eroded soils derived from flaky clays, flysch, limestones and dolomites, always characterized by a relevant percentage of silt and clay. Colonized sites are often windy, gently sloping summits, in the meso- and supramediterranean belt (altitudinal range: 1100-1400 m a.s.l.).

DISTRIBUTION: Madonie (namely on Mt. Quacella); Sicani (Mt. delle Rose, Mt. Cammarata, Rocca Busambra); Nebrodi (common on eroded slopes and flysch outcrops, although floristically quite poor).

Astragaletum nebrodensis Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 58 (TABLE 8).

HOLOTYPE: TABLE 7, rel. 66, in Pignatti *et al.* (1980).

CHARACTER SPECIES: *Astragalus nebrodensis* (dom.), *Dianthus siculus*.

STRUCTURE AND ECOLOGY: Markedly pioneer association, colonizing eroded soils rich in skeleton, stony slopes and windy ridges. This vegetation forms a patchy layer, 30-70 cm high. The peak of the flowering time happens around the mid of June. The extreme environment is responsible for a relatively poor floristic settlement, and a large amount of the total biodiversity is found inside the pulvines of *Astragalus*, whose thick cushions shelter the other species from the strong wind and let a slight accumulation of organic matter. The optimal aspect of the association is in the supramediterranean belt, even if, sometimes, this vegetation can be found at lower altitudes, in secondary habitats, on steep eroded slopes. The altitudinal range is between 1400 and 1900 m a.s.l.

DISTRIBUTION: Madonie, on carbonates and flaky clays.

Cachryetum ferulaceae Raimondo 1980, CNR AQ/1/89: 21 (TABLE 9).

HOLOTYPE: TABLE 5, rel. 1, in Raimondo (1980).

SYN.: *Cerastio-Cachryetum ferulaceae* Brullo & Marcenò 1984,; Boll. Acc. Gioenia Sci. Nat. 16 (322): 385, nom. ill. (art. 22).

CHARACTER SPECIES: *Cachrys ferulacea* (dom.), *Astragalus depressus* var. *leucophaeus*.

STRUCTURE AND ECOLOGY: Among the association belonging to the *Cerastio-Astragalion nebrodensis*, this is one of the most mesophilous and nitrophilous, as it prefers north-facing gently-sloping sites, with relatively deep soils with a fairly good hydration up to the late summer, due to an intense moisture condensation and relatively frequent rains. Nevertheless, it is linked to rocky, karstic habitats, with very primitive soils. The structure is given by the dominance of *Cachrys ferulacea*, a big hemicriptophytes, that covers from 30 up to 80% of the ground. The peak of the flowering time happens around the mid of June. The altitudinal range is between 1600 and 1900 m a.s.l., in the oromediterranean belt.

DISTRIBUTION: Madonie, namely Pizzo Carbonara, Monte Mufara and Monte dei Cervi.

NOTE: in the original description, within this association, three subassociations were recognized (Raimondo, 1980): *typicum*, *artemisietosum albae* and *vicietosum glaucae*. The subassociation *typicum* is a result of the overgrazing affecting the Madonie heights, that enhances the growth of *Cachrys ferulacea*, an unpalatable, feebly nitrophilous species. The other two subassociations, both characterized by the presence of *Artemisia alba*, are growing in primary habitats, represented by steep and stony slopes. To give more emphasis to the well defined ecologic requirements of *Artemisia alba*, in Sicily extremely rare and localized, it is here preferred to attribute the rank of association to the vegetation characterized by this species.

Sideritido siculae-Artemisietum albae (Raimondo 1980) Brullo & Giusso stat. nov. (TABLE 10).

HOLOTYPUS: TABLE 5, rel. 2, in Raimondo (1980).

a) *artemisietosum albae* (Raimondo 1980) Brullo & Giusso comb. nova (= *typicum*).

HOLOTYPUS: TABLE 5, rel. 2, in Raimondo (1980).

SYN.: *Cachryetum ferulaceae artemisietosum* Raimondo 1980, CNR AQ/1/89: 22. *Cerastio-Cachryetum ferulaceae artemisietosum* Brullo & Marcenò 1984: Boll. Acc. Gioenia Sci. Nat. 16 (322): 385, nom. ill. (art. 22).

CHARACTER SPECIES: *Artemisia alba*, *Verbascum siculum*, *Sternbergia exscapa*.

STRUCTURE AND ECOLOGY: This subassociation, corresponding to the typical aspect of the association, colonizes stony carbonatic substrata, on steep and windy slopes (sloping angle up to 50°), between 1500 and 1900 m a.s.l., in the oromediterranean bioclimatic belt. This vegetation forms a discontinuous layer, 20-40 cm high, dominated by chamaephytes and caespitose hemicriptophytes. The peak of the flowering time happens at the end of June. This association turns into the previous one on less steep slopes and by the increase of the grazing pressure.

DISTRIBUTION: Madonie, namely Pizzo Carbonara.

b) *vicietosum glaucae* (Raimondo 1980) Brullo & Giusso comb. nova.

HOLOTYPUS: TABLE 5, rel. 3, in Raimondo (1980).

SYN.: *Cachryetum ferulaceae vicietosum* Raimondo 1980, CNR AQ/1/89: 22.

CHARACTER SPECIES: *Vicia glauca*.

STRUCTURE AND ECOLOGY: This vegetation type substitutes the previous one on screes and karstic crests. In this context, the plant density is lower and their height

usually does not exceed 30 cm. Hemicryptophytes are more abundant than chamaephytes and the occurrence of *Vicia glauca*, a rare orophyte restricted to the carbonatic mountains of Atlas, Sicily and Sardinia, clearly identifies this subassociation.

DISTRIBUTION: Madonie, namely Pizzo Carbonara. This subassociation can be considered a Sicilian vicariant of *Cerastio supramontani-Helianthemetum crocei*, belonging to the alliance *Polygalo sardoae-Seslerion barbaricinae* (*Carici-Genistetetea lobelii*), restricted to the carbonatic relieves of Sardinia (Arrigoni & Di Tommaso 1991).

Seslerio siculae-Melicetum cupanii Brullo & Giusso ass. nova (TABLE 11).

HOLOTYPE: TABLE 11, rel. 4, hoc loco.

CHARACTER SPECIES: *Melica cupanii*.

STRUCTURE AND ECOLOGY: discontinuous vegetation dominated by caespitose hemicryptophytes, forming a patchy layer, 10-20 cm high. The peak of the flowering time happens around the mid of June. The association dwells rocky carbonatic slopes on windy ridges, in the oromediterranean belt (altitudinal range 1800-1950 m a.s.l.). On more stony and less steep sites, this association turns into the *Sideritido siculae-Artemisietum albae*.

DISTRIBUTION: Madonie, namely Pizzo Carbonara.

Peucedanetum nebrodense Brullo & Giusso ass. nova (TABLE 12).

HOLOTYPE: TABLE 12, rel. 8, hoc loco.

CHARACTER SPECIES: *Peucedanum nebrodense*.

STRUCTURE AND ECOLOGY: This association occurs in small depressions and around the inner slopes of the dolines with northern exposure, where it forms a dense layer, interrupted only by small outcrops of rocks. This vegetation benefits of a relatively good accumulation of fine particles and organic matter. In these habitats, the snow-bed lasts for quite a long time and the hydration of the soil is fairly good up to the late summer. The association is linked to the omediterranean belt (altitudinal range: 1800-1900 m a.s.l.) and the peak of the flowering time happens at the end of July, up to the mid of August.

DISTRIBUTION: Madonie, namely Pizzo Carbonara.

Seslerio siculae-Helictotrichetum convolutae Brullo & Cormaci ass. nova (TABLE 13).

HOLOTYPE: TABLE 13, rel. 5, hoc loco.

CHARACTER SPECIES: *Helictotrichon convolutum* (dom.).

STRUCTURE AND ECOLOGY: discontinuous vegetation dominated by caespitose hemicryptophytes, forming a dense layer, 25-40 cm high. The peak of the flowering time happens at the beginning of June. The association occurs in secondary habitats, related to the irreversible degradation of woodlands, where it dwells heavily eroded soils on carbonatic slopes. The association finds its optimum in the supramediterranean belt (altitudinal range 1300-1570 m a.s.l.), although it may also occur at lower altitudes, where it merges into more thermophilous dry grasslands, dominated by *Ampelodesmos mauritanica*.

DISTRIBUTION: Sicani.

Festuco rubrae-Seslerietum siculae Brullo & Cormaci ass. nova (TABLE 14).

HOLOTYPE: TABLE 14, rel. 2, hoc loco.

CHARACTER SPECIES: *Sesleria nitida* ssp. *sicula* (dom.), *Festuca rubra* (diff.).

STRUCTURE AND ECOLOGY: vegetation dominated by caespitose hemicytrophites, forming a dense layer, 15-25 cm high. The peak of the flowering time happens around the mid of June. The association dwells rocky carbonatic slopes on windy ridges, in the supramediterranean belt (altitudinal range 1300-1570 m a.s.l.). On screes, this association shifts towards glareicolous communities belonging to the alliance *Linarion purpureae* (*Scrophulario-Helichrysetea italici*).

DISTRIBUTION: This association, for its structure and adaptative behaviour, can be seen as an ecological vicariant, on Sicani, of *Seslerio siculae-Melicetum cupanii*.

Helichryso italici-Onosmetum canescentis Brullo & Guarino ass. nova (TABLE 15).

HOLOTYPE: TABLE 15, rel. 4, hoc loco.

CHARACTER SPECIES: *Onosma canescens* (dom.), *Helichrysum italicum* (diff.), *Festuca nigrescens* ssp. *microphylla* (diff.).

STRUCTURE AND ECOLOGY: Hemicytroph-chamaephytic vegetation, forming a discontinuous layer, 20-25 cm high. The peak of the flowering time happens at the beginning of June. The habitat is constituted by carbonatic screes and steep rocky places, between 980 and 1140 m a.s.l.. The bioclimatic type is supramediterranean lower humid. Within the association, two *facies* can be recognized, one characterized by *Lomelosia crenata* ssp. *hirsuta*, that is typical of rocky habitats, and one by *Pimpinella tragi* var. *glauca*, *Euphorbia myrsinites* and *Galium venustum*, typically occurring on screes.

DISTRIBUTION: this association has been observed around the summit of Mt. Scuderi (Peloritani), and it can be considered a local vicariant of the *Lino-Seslerietum nitidae*. The lower altitude of Mt. Scuderi does not allow the growth of many of the orophytes characterising the latter association, the occurrence of *Helichrysum italicum* as differential species is a further proof of the relative xero-thermophily of the association at issue. Although the character species of *Erysimo-Jurinetalia bocconeii* are poorly represented on Mt. Scuderi, this mountain has got an high phytogeographic interest, because it represents the easternmost outpost of the distribution range of the above mentioned order, having its barycentre on Madonie, where the higher elevations better satisfy the ecological requirements of the vegetation at issue. It is likely that, during the Messinian age, the indirect uplift of the mountains enabled the vegetation belonging to this order to form a continuous belt along the mountain ranges of northern Sicily, of which the *Helichryso italici-Onosmetum canescentis* represents a last, floristically poor, fragment.

Plantagini humilis-Asperuletum gussonei Brullo & Guarino ass. nova (TABLE 16).

HOLOTYPE: TABLE 16, rel. 2, hoc loco.

CHARACTER SPECIES: *Plantago humilis*, *Asperula gussonei*.

STRUCTURE AND ECOLOGY: Hemicytroph-chamaephytic vegetation, forming quite a continuous layer, 5-15 cm high. The peak of the flowering time happens at the beginning of June. The habitat is constituted by flattened or stepped outcrops of carbonatic rocks, between 1100 and 1253 m a.s.l.. The bioclimatic type is

supramediterranean lower humid. Both the character species are rather untypical of this ecological context: *Asperula gussonei* is well known as an orophilous calciphilous chasmophyte, endemic to Northern Sicily, where it is a member of *Asplenietea trichomanis*-vegetation, while *Plantago humilis* is a calcifuge pulvinate chamaephyte, normally growing on siliceous substrata.

DISTRIBUTION: this association has been observed on the summit of Mt. Scuderi (Peloritani), and it can be considered an edaphic vicariant of the *Plantagini humilis-Armerietum nebrodensis*. Both these associations are physiognomically characterized by *Plantago humilis*, but on Mt. Scuderi the species composition is formed by a pool of calciphilous elements that are missing on the quartzarenitic outcrops of Madonie, where *Plantago humilis* finds its optimal ecological requirements. It is likely that during the Messinian Age, and, perhaps, even during some phases of the Quaternary glaciations, *Pl. humilis* was well represented along the siliceous ridge of Peloritani. This species is nowadays confined to the small carbonatic outcrop of Mt. Scuderi by the relatively low elevation of the Peloritani range, that reduces the chances of this pioneer but poorly competitive species.

ARMERION NEBRODENSIS Brullo 1984 Boll. Acc. Gioenia Sci. Nat. 16 (322): 380.

HOLOTYPE: *Plantagini-Armerietum nebrodensis* Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 60.

SYN.: *Trifolion humilis* Pignatti & Nimis in Pignatti *et al.* 1980, non Quézel 1957.

CHARACTER SPECIES: *Armeria nebrodensis*, *Genista cupanii*, *Avenella flexuosa*, *Festuca pignattiorum*.

STRUCTURE AND ECOLOGY: This alliance includes the acidophilous communities occurring on quartzites and quartzarenites. All the communities belonging to this alliance are dominated by small pulvinate plants and the altitudinal range is the same of the order.

DISTRIBUTION: Siliceous peaks of Madonie.

Plantagini-Armerietum nebrodensis Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 60 (TABLE 17).

HOLOTYPE: TABLE 10, rel. 92, in Pignatti *et al.* (1980).

CHARACTER SPECIES: *Plantago humilis* (dom.), *Bellardiochloa violacea*, *Minuartia condensata*, *Scleranthus venustus*.

STRUCTURE AND ECOLOGY: patchy vegetation dominated by small pulvinate chamaephytes and caespitose hemicriptophytes. The peak of the flowering time happens at the end of June. This phytocoenosis dwells markedly eroded soils on sunny plateaux and windy ridges. The altitudinal range of the association is between 1700 and 1900 m a.s.l., in the oromediterranean belt. The soils colonized by this vegetation are extremely leached and acid (pH: 5,4-6), often altered by cryoturbation. Owing to the aeolic erosion, the habitat looks very stony, even there is a feeble but constant accumulation of fine sediments under the surface, where a very slow pedogenesis may explain the acidity of the soil (Pignatti *et al.* 1980).

DISTRIBUTION: Siliceous peaks of Madonie, namely on Mt. San Salvatore and Vallone Madonna degli Angeli.

Genistetum cupanii Pignatti & Nimis in Pignatti et al. 1980, CNR AQ/1/79: 62 (TABLE 18).

HOLOTYPE: TABLE 11, rel. 100, in Pignatti *et al.* (1980).

CHARACTER SPECIES: *Genista cupanii* (dom.), *Tolpis virgata* var. *sexaristata*.

STRUCTURE AND ECOLOGY: This association finds its primary habitats on quartzitic sunny slopes where the pedogenesis is hindered, but nowadays it covers large areas in secondary habitats, where it plays a role in the dynamic processes linked to the degradation of orophilous woodlands. The physiognomy of the association is given by the growth-form of *Genista cupanii*, a nanophanerophyte forming dense pulvines up to 1 m in diameter and 60 cm high. This vegetation is linked to the supramediterranean bioclimatic belt, between 1100 and 1700 m a.s.l., and the peak of the flowering time happens in June.

DISTRIBUTION: Siliceous peaks of Madonie.

DISCUSSION

Rumici-Astragaletea siculi is a narrowly ranging class, having a spotted distribution on the highest mountains of Sicily, Central and Southern Calabria. The class is clearly outlined by a group of orophytes that, becoming isolated in their restricted habitats at the end of the Tertiary, originated many vicarious populations, often endemic to a sole mountain (TABLE 19). In FIGURE 8, the ranges of the most frequent species in the surveyed vegetation are displayed. These orophytes confer to the plant communities where they are dominating a strong phytogeographic connotation (TABLE 21).

As a consequence of the Messinian Age, something similar happened all around the Mediterranean basin, giving rise to an interesting system of vegetation complexes, similar in their ecological specialization, structure and physiognomy, but having such a remarkable floristic autonomy that justify the phytosociological treatment as different classes, each endemic to a well defined Mediterranean mountain district. Among these: *Carici-Genistetea lobelii* Klein 1972 em. Pignatti & Nimis 1980, endemic to Corsica and Sardinia; *Saturejetea spinosae* Zaffran 1990, endemic to Crete; *Diantho troodi-Teucrietea cyprii* Brullo, Giusso & Guarino 2005, endemic to Cyprus; *Daphno-Festucetea* Quézel 1964, endemic to the Southern Balkans and SW Anatolia; *Astragalo-Brometea* Quézel 1973, endemic to Anatolia and Lebanon.

On Etna, Madonie, Aspromonte and Sila, the vegetation of *Rumici-Astragaletea siculi* is often contiguous to *Pino-Juniperetea* communities, which can be seen as the last remains of a vegetation dominating the oro-Mediterranean belt before the Messinian Age (Brullo *et al.*, 2001). In spite of the spatial contiguity, pulvinate communities are well distinct from those dominated by conifers, both considering the structural differences and the ratio of species diversity, as already noted by some authors in other Mediterranean districts (Rivas-Martínez 1964; Barbero & Quèzel 1975; Quèzel & Barbero 1989; Stanisci 1997; Rivas-Martínez *et al.* 2001). In a recent survey on the Italian woods, Pignatti (1998) proposed to include the vegetation dominated by *Pinus laricio* in Calabria and Etna within the class *Rumici-Astragaletea siculi*. In our opinion, this syntaxonomical treatment disregards the

different history and structure of the fragmentary plots dominated by conifers and gives too much emphasis to the occurrence of species having their ecological optimum in the neighbouring vegetation, although sporadically occurring, as well, in the *Pinus laricio*-communities.

Some years ago, it was proposed by Biondi *et al.* (1995) to ascribe one of the associations treated in this paper, *Lino punctati-Seslerietum siculae*, to the alliance *Phleo ambigu-Bromion erecti*. This alliance is grouping basiphilous herbaceous-chamaephytic communities of Central and Southern Apennines, stretching up to the Pollino massif, which represents the most notable biogeographic limit for many orophilous Apenninic species.

Among the species characterising the *Festuco-Brometea* class, only *Phleum ambiguum* has a fairly good presence in the Calabrian and Sicilian communities, while few others (*Artemisia alba*, *Bromus erectus*, *Carlina acanthifolia*, *Galium lucidum* and *Teucrium montanum*) are very rare and localized (TABLE 20). The proposal of Biondi *et al.* (*l.c.*) is therefore not very sound, also on the basis of a numerical analysis, that was performed in order to compare the syntaxa of *Rumici-Astragaletea siculi* to the most representative orophilous pytocoenoses of *Festuco-Brometea*, occurring in central and southern Apennines. The cluster diagram in FIGURE 9 clearly shows how different are the relevés belonging to these two classes.

The class *Rumici-Astragaletea siculi*, like the allied endemic classes described for the other big mediterranean islands, represents a meaningful patch to understand the biogeographical history of the Mediterranean area. Its communities, nowadays extremely rare and isolated, are precious relict examples of the Tertiary Mediterranean vegetation, in Southern Europe nearly completely erased by the glacial age.

SYNTAXONOMICAL SCHEME OF THE CLASS RUMICI-ASTRAGALETEA SICULI

RUMICI-ASTRAGALETEA SICULI Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 56 em. Mucina 1997.

RUMICI-ASTRAGALETALIA SICULI Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 56.

RUMICI-ASTRAGALION SICULI Poli 1965, Fl. Veg. Ital. 5: 59.

Astragaletum siculi (Frei 1940) Gilli 1943: Beih. Bot. Centr. 62: 66, corr.

Senecioni aetnensis-Anthemidetum aetnensis Frei 1940, Ber. Geob. Inst. Rubel (Zurich) 1939: 87.

Festuco circummediterraneae-Bellardiochloetum aetnensis Frei 1940, Ber. Geob. Inst. Rubel (Zurich) 1939: 88, corr.

Phleo ambigu-Secaletum stricti Siracusa 1998, Boll. Acc. Gioenia Sci. Nat. 30 (353): 324.

Festuco circummediterraneae-Populetum tremulae Brullo & Siracusa ass. nov.

Cerastio tomentosii-Hieracietum pallidi Brullo & Siracusa ass. nov.

ERYSIMO-JURINETALIA BOCCONEI Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 379.

CERASTIO-ASTRAGALION NEBRODENSIS Pignatti & Nimis ex Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 380.

Lino punctati-Seslerietum siculae Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 59, em. Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 381, corr.

Carduncello pinnati-Thymetum spinulosi Brullo & Marcenò 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 383.

Astragaleto nebrodensis Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 58.

Cachryetum ferulaceae Raimondo 1980, CNR AQ/1/89: 21.

Sideritido siculae-Artemisietum albae (Raimondo 1980) Brullo & Giusso stat. nov.

a) *artemisietosum albae* (Raimondo 1980) Brullo & Giusso comb. nova (= typicum);

b) *vicietosum glaucae* (Raimondo 1980) Brullo & Giusso comb. nova.

Seslerio siculae-Melicetum cupanii Brullo & Giusso ass. nova.

Peucedanetum nebrodensis Brullo & Giusso ass. nova.

Seslerio siculae-Helictotrichetum convolutae Brullo & Cormaci ass. nova.

Festuco rubrae-Seslerietum siculae Brullo & Cormaci ass. nova.

Helichryso italici-Onosmetum canescentis Brullo & Guarino ass. nova.

Plantagini humilis-Asperuleto gussonei Brullo & Guarino ass. nova.

ARMERION NEBRODENSIS Brullo 1984 Boll. Acc. Gioenia Sci. Nat. 16 (322): 380.

Plantagini-Armerietum nebrodensis Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 60.

Genistetum cupanii Pignatti & Nimis in Pignatti *et al.* 1980, CNR AQ/1/79: 62.

ANTHEMIDETALIA CALABRICA Brullo, Scelsi & Spampinato, 2001 Veg. Aspromonte: 152.

ARMERION ASPROMONTANAE Brullo, Scelsi & Spampinato, 2001 Veg. Aspromonte: 152.

Armerio aspromontanae-Potentilletum calabrae Brullo, Scelsi & Spampinato, 2001 Veg. Aspromonte: 152.

Armerio aspromontanae-Plantaginetum humilis Brullo, Scelsi & Spampinato, 2001 Veg. Aspromonte: 154.

Armerio aspromontanae-Dianthetum brutii Brullo, Scelsi & Spampinato, 2001 Veg. Aspromonte: 157.

Poo alpinae-Minuartietum condensatae Brullo, Scelsi & Spampinato, 2001 Veg. Aspromonte: 158.

Armerio aspromontanae-Asperuletum scabrae Brullo, Scelsi & Spampinato, 2001 Veg. Aspromonte: 158.

Anthemidetum pulvinatae Brullo, Scelsi & Spampinato, 2001 Veg. Aspromonte: 159.

Phleo ambigui-Brometum caprini Brullo, Scelsi & Spampinato, 2001 Veg. Aspromonte: 161.

KOELERIO BRUTIAE-ASTRAGALION CALABRICI Giacomini & Gentile ex Brullo, all. nov.

HOLOTYPUS: *Astragaletum calabri* Giacomini & Gentile ex Brullo ass. nova, hoc loco.
SYN.: *Koelerio-Astragalion calabri* Giacomini & Gentile 1961, Delpinoa 3: 57, nom. inval. (art. 8).

Koelerio-Astragalion calabri Giacomini & Gentile 1966, Anthrop. Veg.: 136, nom. inval. (art. 8).

Koelerio-Astragalion calabri Giacomini & Gentile 1966 ex Pignatti 1980, CNR AQ/1/79: 66 nom. inval. (art. 5).

Koelerio-Astragalion calabri Giacomini & Gentile 1966 ex Brullo, Gangale & Uzunov, 2004, Bot. Jahrb. Syst. 125: 481 nom. inval. (art. 5).

Cirsio-Nardion Giacomini & Gentile 1961, Delpinoa 3: 58, nom. inval. (art. 8), p.p.

Cirsio-Nardion Giacomini & Gentile 1966 Anthrop. Veg.: 138, nom. inval. (art. 8), p.p.

Cytiso-Bromion caprini Barbero & Bonin 1969, Bull. Soc. Bot. Fr. 116: 237, nom. inval. (art. 8).

Cytiso-Bromion erecti Bonin 1978, These doct., Marseille: 142, nom. inval. (art. 1).

Ranunculo-Nardion Bonin 1978, These doct., Marseille: 132, nom. inval. (art. 1).

CHARACTER SPECIES, STRUCTURE AND ECOLOGY, DISTRIBUTION: see Brullo *et al.* (2004).

Astragaletum calabrici Giacomini & Gentile ex Brullo, ass. nova.

HOLOTYPUS: TABLE 2, rel. 1, in Brullo *et al.* (2004), hoc loco.

SYN.: *Astragaletum calabri* Giacomini & Gentile 1961 Delpinoa 3: 56, nom. inval. (art. 2b).

Astragaletum calabri Giacomini & Gentile 1966 Anthrop. Veg.: 136, nom. inval. (art. 2b, 7).

Astragaletum calabri Giacomini & Gentile ex. Bonin 1978, These doct., Marseille: 140, nom. inval. (art. 1).

Astragaletum calabri Giacomini & Gentile ex Pignatti 1980, CNR AQ/1/79: 66, nom. inval. (art.5).

Astragaletum calabrici Giacomini & Gentile ex Brullo, Gangale & Uzunov, 2004, Bot. Jahrb. Syst. 125: 469, nom. inval. (art.5).

CHARACTER SPECIES, STRUCTURE AND ECOLOGY, DISTRIBUTION: see Brullo *et al.* (2004).

Armerio brutiae-Potentilletum calabrae Brullo, Gangale & Uzunov, ex Brullo ass. nova

HOLOTYPUS: TABLE 5, rel. 11, in Brullo *et al.* (2004), hoc loco.

a) *potentilletosum calabrae* Brullo, Gangale & Uzunov, ex Brullo subass. nova (= *typicum*).

HOLOTYPUS: TABLE 5, rel. 11, in Brullo *et al.* (2004), hoc loco.

SYN.: *Hypochoerido-Potentilletum calabrae* Giacomini & Gentile 1961 Delpinoa 3: 56, nom. inval. (art. 2b).

Hypochoerido-Potentilletum calabrae Giacomini & Gentile 1966, Anthrop. Veg.: 136, nom. inval. (art. 2b, 7).

Armerio brutiae-Potentilletum calabrae potentilletosum calabrae Brullo, Gangale & Uzunov 2004, Bot. Jahrb. Syst. 125: 473, nom. inval. (art.5).

CHARACTER SPECIES, STRUCTURE AND ECOLOGY, DISTRIBUTION: see Brullo *et al.* (2004).

b) *seselietosum peucedanoidis* Brullo, Gangale & Uzunov, ex Brullo subass. nova.

HOLOTYPUS: TABLE 5, rel. 21, in Brullo *et al.* (2004), hoc loco.

SYN.: *Foeniculo-Festucetum spadiceae* Giacomini & Gentile 1961 Delpinoa 3: 57, nom. inval. (art. 2b).

Foeniculo-Festucetum spadiceae Giacomini & Gentile 1966, Anthrop. Veg.: 136, nom. inval. (art. 2b, 7).

Foeniculo-Festucetum spadiceae Giacomini & Gentile ex Bonin 1978, These doct., Marseille: 135, nom. inval. (art. 1).

Armerio brutiae-Potentilletum calabrae seselietosum peucedanoidis Brullo, Gangale & Uzunov 2004, Bot. Jahrb. Syst. 125: 473, nom. inval. (art.5).

CHARACTER SPECIES, STRUCTURE AND ECOLOGY, DISTRIBUTION: see Brullo *et al.* (2004).

Festuco microphyllae-Genistetum silanae Brullo, Gangale & Uzunov, ex Brullo, ass. nova.

HOLOTYPUS: TABLE 4, rel. 7, in Brullo *et al.* (2004), hoc loco.

SYN: *Festuco microphyllae-Genistetum silanae* Brullo, Gangale & Uzunov 2004, Bot. Jahrb. Syst. 125: 473, nom. inval. (art.5).

CHARACTER SPECIES, STRUCTURE AND ECOLOGY, DISTRIBUTION: see Brullo *et al.* (2004).

Plantagini serpentinae-Chamaecytisetum spinescentis Brullo, Gangale & Uzunov, ex Brullo ass. nova.

HOLOTYPUS: TABLE 3, rel. 2, in Brullo *et al.* (2004), hoc loco.

SYN: *Festuco microphyllae-Genistetum silanae* Brullo, Gangale & Uzunov 2004, Bot. Jahrb. Syst. 125: 469, nom. inval. (art.5).

CHARACTER SPECIES, STRUCTURE AND ECOLOGY, DISTRIBUTION: see Brullo *et al.* (2004).

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TABLE 3 - Festuco circummediterraneae-Bellardiochloetum aetnensis Frei 1940 corr.

Relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Altitude (dam a.s.l.)	230	230	230	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170
Cover (%)	30	30	30	30	20	20	30	30	20	10	10	70	50	50	100	100	100	100
Plot size (sq. m)	50	50	50	60	60	60	60	60	60	60	60	70	80	80	80	80	90	90
Char. association																		
Bellardiochloa aetnensis	3	4	3	5	4	4	3	4	5	4	4	4	4	3	3	3	3	3
Char. Rumici-Astragalion siculi e Rumici-Astragaletia siculi																		
Astragalus siculus	.	1	2	2	3	3	2	2	3	2	3	3	2	3	3	3	1	3
Robertia taraxacoides (diff.)	+	1	+	1	2	1	1	1	+	.	.	1	.	.	.	.	.	.
Anthemis aetnensis	.	.	.	2	3	1	2	1	2	2	2	2	.	.	.	.	.	.
Viola aethnensis	+	+	+	.	.	.	.	.	.	.	.	.	+	+	1	+	1	1
Erysimum etnense	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	2
Rumex aetnensis	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	+	.
Senecio aetnensis	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	+	.
Char. Rumici-Astragaletea siculi																		
Cerastium tomentosum	1	1	+	2	2	3	2	2	3	2	2	2	2	3	3	3	1	3
Silene sicula	1	1	1	+	1	1	1	+	1	+	+	1	2	2	1	2	1	1
Galium aetnicum	.	+	+	2	1	2	2	1	2	1	2	1	1	2	2	2	2	1
Berberis aetnensis	+	+	.	.	.	.	.	.	.	.	.	.	+	+	1	+	1	1
Herniaria microcarpa	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+	1	+	+
Phleum ambiguum (diff.)	.	.	.	.	.	.	.	.	.	.	.	.	1	2	2	2	1	1
Acinos aetnensis	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+	1	+	.
Centaurea parlitoris	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+	+	.	+
Petrorhagia saxifraga ssp.gasparrinii	.	.	.	.	.	.	.	.	.	.	.	.	2	1	1	2	2	1
Carlina nebrodensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+
Tragopogon nebrodensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+
Saponaria sicula	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Transgr. Pino-Juniperetea																		
Juniperus hemisphaerica	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	2	+
Other species																		
Festuca circummediterranea	3	2	3	3	3	2	3	3	2	2	2	2	2	2	2	2	2	2
Jasione echinata	.	.	.	1	2	1	1	2	1	2	1	1	1	1	1	.	+	1
Sedum tenuifolium	.	.	.	+	.	+	+	.	.	+	.	+	1	+	+	+	+	+
Secale strictum	.	.	.	1	2	2	1	2	1	2	1	2	.	.	.	.	.	.
Achillea ligustica	.	.	.	1	+	.	.	.	1	+	1	+	.	.	.	.	.	+
Potentilla calabra	.	.	.	.	.	.	.	.	.	.	.	.	2	1	+	.	2	1
Linaria purpurea	.	.	.	.	.	.	.	.	.	.	.	.	+	1	1	.	.	1
Trifolium pratense ssp. semipurpureum	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.
Genista aetnensis	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+
Centranthus ruber	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.

Spot and date of relevés

Rel. 1-3, Timpa degli Albanelli 1-8-1995

Rel. 4-12, Schiena dell'Asino, 12-7-1995

Rel. 13-18, Serra La Nave, 11-6-1994

TABLE 4 - *Festuco circummediterraneae*-*Populetum tremulae* Brullo & Siracusa ass. nov.

Relevé	1	2	3	4	5	6	7	8	9	10	11
Altitude (dam a.s.l.)	240	240	240	240	240	240	240	240	240	240	230
Cover (%)	50	50	70	70	60	50	80	80	80	70	65
Plot size (sq. m)	10	100	80	100	90	100	100	90	100	100	50
Char. association											
<i>Populus tremula</i> fo. <i>nana</i>	5	5	4	5	5	4	5	5	4	5	3
Char. <i>Rumici-Astragalion siculi</i> e <i>Rumici-Astragaletea siculi</i>											
<i>Astragalus sículus</i>	1	1	2	2	1	1	1	1	1	1	+
<i>Bellardiochloa aetnensis</i>	1	2	2	1	1	1	2	1	1	2	.
<i>Viola aethnensis</i>	+	+	+	+	+	+	+	+	+	+	.
<i>Robertia taraxacoides</i> (diff.)	1	+	+	1	+	1	+	.	+	1	1
<i>Tanacetum siculum</i>	.	.	.	.	.	+	.	+	+	+	.
<i>Rumex aetnensis</i>	.	.	.	.	.	.	.	.	.	.	1
<i>Senecio aetnensis</i>	.	.	.	.	.	.	.	.	.	.	+
<i>Anthemis aetnensis</i>	.	.	.	.	.	.	.	.	.	.	+
Char. <i>Rumici-Astragaletea siculi</i>											
<i>Galium aetnicum</i>	1	+	+	1	+	1	+	+	+	+	2
<i>Silene sicula</i>	+	.	+	+	1	+	+	+	+	+	.
Other species											
<i>Festuca circummediterranea</i>	2	1	1	1	1	1	1	1	1	+	2

Spot and date of relevés

Rel. 1-10, Piano degli Albanelli, 1-8-1995

Rel. 11, after Poli 1965 rel. pg. 161

TABLE 5 - *Cerastio tomentosii*-*Hieracietum pallidi* Brullo & Siracusa ass. nov.

Relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Altitude (dam a.s.l.)	200	200	200	190	190	180	180	180	190	190	180	160	160	160	160	160	160
Plot size (sq. m)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Cover (%)	40	40	40	40	40	40	40	40	40	40	50	50	50	40	50	50	50
Slope (°)	70	70	70	70	90	90	90	90	90	70	70	80	80	90	80	70	80
Exposure	N	N	N	N	N	N	NE	NE	NE	NE	NE	N	N	N	N	N	N
Char. association																	
<i>Hieracium pallidum</i>	1	1	1	1	1	2	2	2	1	2	2	2	2	3	4	3	4
Char. <i>Rumici-Astragalion siculi</i> e <i>Rumici-Astragaletea siculi</i>																	
<i>Anthemis aetnensis</i>	1	2	1	2	1	1	2	2	1	1	2	2	2	1	+	1	2
<i>Robertia taraxacoides</i> (diff.)	+	1	1	+	1	1	+	+	+	+	1	.	.	+	+	+	1
<i>Bellardiochloa aetnensis</i>	.	.	.	.	.	.	.	.	.	1	1	2	2	1	3	2	3
<i>Rumex aetnensis</i>	+	1	1	1	.	.	.	.	.	1	2	.	.	.	.	.	.
<i>Senecio aetnensis</i>	.	.	1	+	1	.	.	.	.	+	.	.	.	.	.	.	.
Char. <i>Rumici-Astragaletea siculi</i>																	
<i>Cerastium tomentosum</i>	2	2	1	2	2	2	2	2	2	1	1	1	1	1	2	1	2
<i>Galium aetnicum</i>	2	1	1	2	1	+	+	1	+	1	1	1	2	1	2	2	1
<i>Silene sicula</i>	.	.	+	1	+	.	.	1	+	+	1	2	2	3	2	1	2
<i>Saponaria sicula</i>	1	1	2	1	1	.	.	.	.	1	1	.	.	.	.	.	.
<i>Petrorhagia saxifraga</i> ssp. <i>gasparrinii</i>	.	.	.	.	.	.	.	.	.	.	.	1	2	1	1	2	1
<i>Rumex multifidus</i>	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Other species																	
<i>Festuca circummediterranea</i>	3	3	1	2	1	1	2	2	2	1	2	2	3	2	1	2	2
<i>Trifolium pratense</i> ssp. <i>semipurpureum</i>	1	1	1	1	+	1	+	+	+	.	.	.	.	.	.	.	.
<i>Jasione echinata</i>	.	.	.	.	.	.	.	.	.	.	+	2	1	2	1	2	1
<i>Asplenium septentrionale</i>	.	.	.	.	.	.	.	.	.	.	.	+	1	1	+	1	1
<i>Achillea ligustica</i>	.	.	+	1	.	.	.	.	.	+	1	.	.	.	.	.	.
<i>Festuca rubra</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	+	1
<i>Luzula sicula</i>	.	.	.	.	.	.	.	.	.	.	+	2	.	.	.	.	.

Spot and date of relevés

Rel. 1-11, Valle del Bove, 21-7-1980

Rel. 12-17, Valle del Bove, 12-7-1995

TABLE 6 - Lino punctati-Seslerietum siculae Pignatti & Nimis in Pignatti et al. 1980 corr.

Relevé	1	2	3	4
Altitude (dam a.s.l.)	137	137	131	159
Plot size (sq. m)	50	50	20	20
Cover (%)	60	60	90	100
Slope (°)	30	50	60	45
Exposure	NW	NW	NW	NW
Char. association				
<i>Onosma canescens</i>	3	1	1	+
<i>Laserpitium siculum</i>	.	1	1	5
<i>Teucrium montanum</i>	+	.	+	.
<i>Linum punctatum</i>	1	.	.	.
<i>Helianthemum canum</i> ssp. <i>nebrodense</i>	+	.	.	.
Char. <i>Cerastio-Astragalion nebrodensis</i>				
<i>Sesleria nitida</i> ssp. <i>sicula</i>	3	2	2	2
<i>Astragalus nebrodensis</i>	+	3	4	1
<i>Avenochloa cincinnata</i> (diff.)	1	1	1	1
<i>Inula montana</i> (diff.)	+	.	+	+
<i>Alyssum nebrodense</i>	1	+	+	.
<i>Sideritis sicula</i>	2	1	1	.
<i>Pimpinella tragium</i> var. <i>glauca</i>	1	.	1	1
<i>Euphorbia myrsinites</i> (diff.)	1	2	+	.
Char. <i>Erysimo-Jurinetalia bocconeii</i>				
<i>Asperula scabra</i> var. <i>incana</i>	2	1	2	+
<i>Koeleria splendens</i> ssp. <i>splendens</i>	1	2	1	+
<i>Galium venustum</i>	+	+	1	+
<i>Dianthus arrostii</i>	+	1	2	.
<i>Jurinea bocconeii</i>	+	+	.	+
<i>Lomelosia crenata</i> var. <i>hirsuta</i> (diff.)	.	2	1	.
<i>Minuartia verna</i> ssp. <i>grandiflora</i>	+	.	.	.
<i>Polycarpon polycarpoides</i> (diff.)	+	.	.	.
<i>Dianthus siculus</i>	.	.	.	+
<i>Trisetum splendens</i> (diff.)	.	.	.	+
Char. <i>Rumici-Astragaletea siculi</i>				
<i>Centaurea parlatoris</i>	+	+	+	+
<i>Cerastium tomentosum</i>	+	1	2	1
<i>Silene sicula</i>	1	+	+	1
<i>Bunium petraeum</i>	+	+	+	+
<i>Carlina nebrodensis</i>	+	+	+	.
<i>Petrorhagia saxifraga</i> ssp. <i>gasparrinii</i>	+	.	.	+
<i>Arabis rosea</i>	+	+	.	.
<i>Valeriana tuberosa</i> (diff.)	.	+	+	.
<i>Phleum ambiguum</i> (diff.)	.	.	.	2
<i>Hieracium macranthum</i>	1	.	.	.
<i>Saponaria sicula</i>	2	.	.	.
Other species				
<i>Festuca circummediterranea</i>	1	1	1	2
<i>Sedum album</i>	+	+	+	+
<i>Micromeria juliana</i>	1	1	2	.
<i>Hypochoeris laevigata</i>	.	+	+	.
<i>Anthemis cupaniana</i>	.	+	1	.
<i>Allium arvense</i>	.	+	.	+
<i>Odontites bocconeii</i>	+	.	+	.
<i>Matthiola fruticulosa</i>	.	+	+	.
<i>Poa bulbosa</i>	+	+	.	.
<i>Helianthemum nummularium</i> ssp. <i>tomentosum</i>	.	.	+	+
<i>Anthyllis vulneraria</i> ssp. <i>maura</i>	.	.	.	+
<i>Aethionema saxatile</i>	.	+	.	.
<i>Silene vulgaris</i>	.	.	.	+
<i>Orchis brancifortii</i>	+	.	.	.
<i>Aceras anthropophorum</i>	.	.	.	+
<i>Orobancha</i> sp.	.	.	.	+
<i>Opopanax chironium</i>	+	.	.	.
<i>Crepis leontodontoides</i>	+	.	.	.
<i>Allium flavum</i>	.	+	.	.
<i>Teucrium flavum</i>	.	+	.	.

Spot and date of relevés

Rel. 1-3, Madonie, Mt. Quacella, 10-07-1999

Rel. 4, Madonie, Mt. Mufara, 13-07-2001

TABLE 7 - Carduncello-Thymetum spinulosi Brullo & Marcenò in Brullo 1984.

Relevé	1	2	3	4	5	6	7
Altitude (dam a.s.l.)	125	130	133	130	150	140	127
Plot size (sq. m)	20	30	10	20	40	30	100
Cover (%)	90	80	90	90	100	100	80
Slope (°)	30	30	40	40	10	20	15
Exposure	E	E	E	E	E	E	W
Char. association							
Thymus spinulosus	4	4	3	3	4	3	3
Scorzonera villosiformis	1	+	2	1	1	1	1
Carduncellus pinnatus	2	2	+	1	.	.	1
Teucrium chamaedrys	+	+	.	+	+	+	.
Char. Cerastio-Astragalea nebrodensis							
Avenochloa cincinnata (diff.)	3	2	2	3	2	3	2
Linula montana (diff.)	+	+	.	1	1	1	+
Helianthemum cinereum (diff.)	.	.	1	1	.	.	1
Sesleria nitida ssp. sicula	.	.	.	1	2	+	.
Astragalus nebrodensis	.	.	.	.	.	.	+
Euphorbia myrsinites (diff.)	.	.	.	.	.	.	1
Alyssum nebrodense	.	.	.	.	.	.	+
Pimpinella tragus var. glauca	.	.	.	.	.	.	2
Char. Erysimo-Jurinetalia bocconeii							
Dianthus arrostii	+	+	1	+	+	1	+
Erysimum bonannianum	+	+	+	+	+	1	.
Asperula scabra var. incana	+	+	.	.	+	+	1
Koeleria splendens spp. splendens	.	.	2	2	.	1	1
Acinos alpinus var. nebrodensis	+	+	+	1	.	.	.
Helianthemum croceum (diff.)	.	.	2	2	.	+	.
Allium cupani	.	.	+	+	.	.	.
Polycarpon polycarpoides (diff.)	.	+	.	+	.	.	.
Lomelosia crenata var. hirsuta (diff.)	.	.	.	.	.	+	+
Jurinea bocconeii	.	.	.	.	.	.	1
Char. Rumici-Astragalea siculi							
Cerastium tomentosum	1	1	1	+	+	+	.
Silene sicula	1	+	1	+	.	.	+
Centaurea parlatoris	.	.	1	1	+	1	2
Arabis rosea	+	+	.	+	.	.	.
Valeriana tuberosa (diff.)	.	.	1	1	+	+	.
Petrorhagia saxifraga ssp. gasparrinii	.	.	.	.	+	+	.
Carlina nebrodensis	.	.	.	.	.	.	+
Bunium petraeum	.	.	.	.	.	.	+
Hieracium macranthum	.	.	.	.	.	.	+
Other species							
Festuca circummediterranea	2	1	2	2	1	1	+
Dactylis glomerata	2	1	+	+	+	1	+
Sedum album	+	+	1	1	+	+	+
Ins pseudopumila	1	1	+	1	1	1	.
Poa bulbosa	+	+	1	+	+	+	+
Hypochoeris laevigata	1	1	+	+	+	+	.
Cerastium semidecandrum	1	+	3	2	+	+	.
Aegilops geniculata	1	1	1	+	1	+	.
Avena barbata	1	+	1	1	.	+	.
Galium lucidum	2	1	+	+	+	+	.
Asphodeline lutea	1	+	+	+	+	+	.
Crupina crupinastrum	+	+	1	1	.	+	.
Alyssum minus	2	2	2	2	.	.	.
Filago pyramidata	.	.	1	1	+	+	.
Trigonella gladiata	+	+	1	+	.	.	.
Hypochoeris neapolitana	+	+	+	+	.	.	.
Medicago lupulina	+	+	+	+	.	.	.
Eryngium campestre	.	.	+	.	+	+	2
Homungia petraea	+	+	1	+	.	.	.
Lolium perenne	.	+	+	+	.	.	.
Ranunculus millefoliatus	+	+	1	+	.	.	.
Elaeagnus asclepium	.	.	1	+	+	1	.
Helictotrichon convolutum	.	+	1	1	.	1	.
Crepis bioniana	1	1	1	1	.	.	.
Trifolium scabrum	1	+	1	+	.	.	.
Bonania graeca	+	+	.	+	.	.	.
Ornithogalum gussonei	+	+	.	+	.	.	.
Anthyllis vulneraria ssp. maura	1	.	+	+	.	.	.
Hyoseris radiata	.	+	+	+	.	.	.
Bellis perennis	.	+	+	+	.	.	.
Rumex bucephalophorus	.	.	2	1	.	.	.
Dasygium villosum	.	.	1	1	.	.	.
Lactuga viminea	.	.	.	.	1	1	.
Leontodon tuberosus	.	.	1	+	.	.	.
Pallenis spinosa	+	+	.	.	.	.	.
Carex serrulata	.	.	+	+	.	.	.
Orchis papilionacea	.	.	+	+	.	.	.
Sedum tenuifolium	.	.	+	+	.	.	.
Salvia argentea	.	.	.	+	.	.	.
Allium sadoum	.	.	.	.	+	+	.
Crucianella angustifolia	.	.	.	.	+	+	.
Erodium acule	+	+	.	.	.	.	.
Orchis branciforti	.	.	+	.	.	.	+
Medicago orbicularis	+	.	.	.	.	.	.
Asphodelus ramosus ssp. ramosus	.	.	.	.	.	.	2
Anthemis cupaniana	.	.	.	.	.	+	.
Allium arvense	.	.	.	.	.	.	+
Aethionema saxatile	.	.	.	.	.	.	+
Aceras anthropophorum	.	.	.	.	.	.	+

Spot and date of relevés

Rel. 1-6, Sicani, Mt. Cammarata, 8-8-1993

Rel. 7, Madonie, Mt. Quacella, 10-07-1999

TABLE 8 - *Astragaletum nebrodensis* Pignatti & Nimis in Pignatti et al. 1980.

Relevé	1	2	3	4
Altitude (dam a.s.l.)	136	138	159	159
Plot size (sq. m)	50	50	100	50
Cover (%)	90	80	70	90
Slope (°)	25	10	40	45
Exposure	SW	N	NW	NW
Char. association				
<i>Astragalus nebrodensis</i>	4	4	3	3
<i>Dianthus sicalus</i>	1	1	1	1
Char. <i>Cerastio-Astragalion nebrodensis</i>				
<i>Avenochloa cincinnata</i> (diff.)	2	2	2	1
<i>Sesleria nitida</i> ssp. <i>sicala</i>	.	1	2	2
<i>Helianthemum cinereum</i> (diff.)	.	1	+	1
<i>Alyssum nebrodense</i>	.	+	1	1
<i>Pimpinella tragium</i> var. <i>glauca</i>	.	1	1	+
<i>Cachrys ferulacea</i> (diff.)	+	1	+	.
<i>Inula montana</i> (diff.)	+	+	.	.
<i>Euphorbia myrsinites</i> (diff.)	+	+	.	.
<i>Linum punctatum</i>	.	+	.	.
Char. <i>Erysimo-Jurinetalia bocconeii</i>				
<i>Koeleria splendens</i> ssp. <i>splendens</i>	2	1	2	2
<i>Galium venustum</i>	+	1	1	1
<i>Bunium petraeum</i>	+	+	+	+
<i>Asperula scabra</i> var. <i>incana</i>	1	+	1	1
<i>Trisetum splendens</i> (diff.)	+	+	.	+
<i>Jurinea bocconeii</i>	+	+	+	.
<i>Lomelosia crenata</i> var. <i>hirsuta</i> (diff.)	.	.	2	2
<i>Polycarpon polycarpoides</i> (diff.)	.	.	+	.
<i>Erysimum bonannianum</i>	.	.	.	+
Char. <i>Rumici-Astragaletea siculi</i>				
<i>Phleum ambiguum</i> (diff.)	2	2	1	2
<i>Hieracium macranthum</i>	+	1	+	+
<i>Petrorhagia saxifraga</i> ssp. <i>gasparrinii</i>	+	+	+	+
<i>Centaurea parlitoris</i>	1	2	2	1
<i>Arabis rosea</i>	+	+	+	+
<i>Carlina nebrodensis</i>	+	+	+	+
<i>Silene sicala</i>	.	1	2	2
<i>Cerastium tomentosum</i>	.	1	2	2
<i>Tragopogon nebrodensis</i>	+	.	.	.
Other species				
<i>Festuca circummediterranea</i>	1	+	1	2
<i>Hypochoeris laevigata</i>	.	+	+	+
<i>Sedum album</i>	.	+	+	+
<i>Dactylis glomerata</i>	2	1	+	.
<i>Allium arvense</i>	.	+	+	+
<i>Teucrium chamaedrys</i>	1	+	+	.
<i>Helianthemum nummularium</i> ssp. <i>tomentosum</i>	.	1	+	+
<i>Orobancha</i> sp.	+	+	+	.
<i>Pimpinella anisoides</i>	1	1	2	.
<i>Anthemis cupaniana</i>	.	.	1	1
<i>Eryngium campestre</i>	+	+	.	.
<i>Aethionema saxatile</i>	.	+	+	.
<i>Thymus spinulosus</i>	1	1	.	.
<i>Bonannia graeca</i>	+	+	.	.
<i>Brachypodium rupestre</i>	1	+	.	.
<i>Carduus macrocephalus</i>	.	.	+	+
<i>Carex serrulata</i>	+	+	.	.
<i>Scabiosa maritima</i>	+	+	.	.
<i>Secale strictum</i>	1	+	.	.
<i>Asphodeline lutea</i>	.	+	.	.
<i>Convolvulus cantabrica</i>	+	.	.	.
<i>Daucus carota</i>	+	.	.	.
<i>Matthiola fruticulosa</i>	.	.	.	+

Spot and date of relevés

Rel.1-2, Madonie, Mt. Quacella, 13-07-2001

Rel.3-4, Madonie, Mt. Mufara, 13-07-2001

TABLE 9 - Cachryetum ferulaceae Raimondo 1980.

Relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Altitude (dam a.s.l.)	160	167	162	160	183	183	165	170	160	160	190	160	158	175	180	185
Plot size (sq. m)	50	150	150	100	50	100	50	50	30	30	50	40	50	60	150	50
Cover (%)	90	90	85	90	95	80	70	50	70	40	70	70	60	75	90	
Slope (°)	-	10	10	10	5	5	-	5	10	10	10	-	25	10	20	10
Exposure	-	NE	E	NW	W	W	-	SE	NE	NE	W	-	E	W	S	SE
Char. association																
Cachrys ferulacea	5	5	5	5	5	4	3	2	2	2	2	2	3	2	3	4
Astragalus depressus var. leucophaeus	1	+	+	-	+	1	-	-	+	+	+	+	1	-	+	+
Char. Cerastio-Astragalion nebrodensis																
Euphorbia myrsinites (diff.)	-	1	1	1	-	+	1	1	-	+	-	+	+	+	1	1
Astragalus nebrodensis	+	+	-	-	+	-	-	-	-	2	1	2	2	1	1	1
Inula montana (diff.)	-	-	-	+	-	1	+	-	-	+	+	+	+	+	+	+
Helianthemum cinereum (diff.)	-	-	-	1	-	-	-	+	-	-	+	1	+	+	+	+
Alyssum nebrodense	-	-	-	-	-	-	+	+	+	+	+	+	1	+	+	+
Knautia calychna	-	-	-	-	-	-	-	-	-	-	+	+	+	1	+	+
Sideritis sicula	-	-	-	-	-	+	-	-	+	-	2	-	-	-	-	3
Sesleria nitida ssp. sicula	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-
Pimpinella tragium var. glauca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
Viola nebrodensis	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+
Avenochloa cincinnata (diff.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Char. Erysimo-Jurinetalia bocconeii																
Erysimum bonariense	+	+	+	+	-	+	+	1	1	+	-	1	+	1	1	1
Polycarpon polycarpoides (diff.)	-	+	+	+	2	1	-	+	+	+	+	1	+	1	1	+
Acinos alpinus var. nebrodensis	+	+	+	+	-	+	+	+	+	+	+	1	1	+	+	+
Valeriana tuberosa (diff.)	+	-	-	-	-	1	-	-	-	+	+	+	+	1	+	+
Galium venustum	+	+	-	+	-	2	1	-	-	-	+	+	+	+	+	+
Dianthus arostis	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Trisetum splendens (diff.)	-	-	-	-	-	-	-	-	-	-	-	3	1	-	-	-
Jurinea bocconeii	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	+
Helianthemum croceum (diff.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Asperula scabra var. incana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
Allium cupanii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
Char. Rumici-Astragaletea siculi																
Cerastium tomentosum	-	-	+	+	1	+	1	2	2	2	+	1	+	3	1	2
Petroglossis saxifraga ssp. gasparinii	-	1	1	1	-	1	+	-	-	-	+	1	+	+	+	2
Centaurea parlatioris	1	+	1	1	-	1	1	+	-	-	+	2	1	+	+	1
Phleum ambiguum (diff.)	1	-	-	-	-	1	1	2	2	1	2	2	1	1	1	3
Silene sicula	+	+	-	1	-	-	+	+	-	-	1	1	1	+	+	2
Bunium petraeum	-	-	+	-	+	1	+	+	+	-	-	-	-	+	+	+
Arabis rosea	+	+	+	-	-	-	-	-	-	-	-	-	-	+	+	+
Carlina nebrodensis	-	-	-	-	-	-	-	+	+	-	-	-	-	+	+	+
Tragopogon nebrodensis	-	-	-	-	-	-	+	+	-	-	-	-	-	+	+	+
Hieracium macranthum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
Transgr. Pino-Juniperetea																
Rosa sicula	-	-	-	-	-	-	-	-	-	-	-	1	+	-	+	-
Other species																
Bromus tectorum	+	+	+	+	+	1	+	+	-	1	+	1	+	+	+	-
Festuca circummediterranea	2	+	+	2	-	-	2	+	2	-	2	1	2	2	1	2
Alyssum sciculum	+	1	1	1	+	1	+	+	+	1	1	-	+	-	-	-
Dactylis glomerata	-	+	+	+	1	2	+	-	-	+	1	2	-	1	-	1
Sedum tenuifolium	+	1	+	1	-	-	-	-	-	-	+	1	+	+	-	-
Cynosurus echinatus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Arenaria serpyllifolia	+	+	+	+	1	+	-	-	-	+	+	+	+	+	-	-
Lolium perenne	+	+	+	+	+	+	+	+	1	1	-	-	-	+	-	-
Crepis vesicaria	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Bromus mollis	-	-	-	-	+	1	+	+	1	+	+	+	+	+	+	+
Sinapis pubescens	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Trifolium stellatum	+	-	+	+	+	+	+	+	2	+	+	+	+	+	+	+
Evacuidium discolor	-	+	+	+	+	+	-	1	-	+	+	1	-	+	-	-
Asphodeline lutea	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa bulbosa	+	+	-	+	1	+	+	+	+	+	+	+	+	+	+	1
Medicago lupulina	-	1	+	+	-	1	-	-	+	+	+	+	-	-	1	1
Xeranthemum inapertum	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Anthemis sphaeroloba	+	+	+	+	1	1	+	-	-	+	+	+	+	+	+	+
Geranium rotundifolium	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Veronica arvensis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hypochaeris hispida	+	+	+	+	-	1	+	-	-	-	+	+	+	+	+	+
Silene vulgaris ssp. angustifolia	-	+	+	+	+	+	+	+	+	+	1	+	+	+	+	+
Vicia sativa	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+
Silene conica	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
Ogilia arvensis	-	-	+	+	+	+	+	+	+	2	+	+	+	+	+	+
Scandix pecten-veneris	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Omalotheca montana	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hyoscyamus radialis	-	-	-	-	-	+	1	+	+	+	+	+	+	+	+	+
Stachys germanica ssp. dasyanthus	-	-	-	-	-	-	1	+	+	+	+	+	+	+	+	+
Cerastium semidecandrum	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ranunculus millefolius	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lactuca vinea	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	1
Arrhenatherum nebrodense	-	-	-	-	-	-	+	+	+	+	1	-	-	-	-	-
Bellis perennis	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Buglossoides arvensis	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Trifolium biconae	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Trifolium campestre	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+
Trifolium phleoides	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
Aethionema saxatile	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Linaria simplex	-	+	-	-	+	-	-	-	-	-	+	+	+	+	+	+
Anthyllus vulneraria ssp. maura	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1
Melica cupanii	-	-	-	-	-	-	-	-	-	-	1	-	+	+	+	+
Thlaspi perfoliatum	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Achillea ligustica	-	-	-	-	-	-	-	2	2	-	-	+	-	-	-	-
Cerastium glomeratum	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Trifolium strictum	+	-	-	-	-	-	-	+	1	-	-	-	-	-	-	-
Lamium amplexicaule	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Thlaspi rivale	-	+	-	-	-	+	+	+	+	+	+	+	+	+	1	-
Galium verticillatum	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
Erophila verna	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+
Carduus nutans	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+
Legousia speculum-veneris	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+
Euphorbia rigida	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-
Micromeria juliana	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+
Crepis leontodontoides	+	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+
Linaria purpurea	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+
Tolpis virgata	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-

Spot and date of relevés

Rel.1-14 after Brullo 1984 - tab.15, rel.1-13, 15

Rel.15 after Raimondo 1980 - tab. 5, rel. 1

Rel.16 Madonie, Pizzo Carbonara, 24-7-2002

TABLE 10 - *Sideritido siculae*-*Artemisietum albae* (Raimondo 1980) Brullo & Giusso stat. nov.

a) *artemisietosum albae* (Raimondo 1980) Brullo & Giusso comb. nova:

b) *vicietosum glaucae* (Raimondo 1980) Brullo & Giusso comb. nova.

[illegible]

TABLE 11 - *Sesleria siculae*-*Melicetum cupanii* Brullo & Giusso ass. nova.

Relevé	1	2	3	4	5	6	7
Altitude (dam a.s.l.)	195	195	192	192	190	185	185
Plot size (sq. m)	50	50	100	100	50	50	40
Cover (%)	70	70	70	80	70	70	80
Slope (°)	0	0	35	10	5	30	0
Exposure	-	-	E	SW	SW	SE	-
Char. association							
<i>Melica cupanii</i>	2	3	3	2	2	2	2
Char. <i>Cerastio-Astragalion nebrodensis</i>							
<i>Sesleria nitida</i> ssp. <i>sicula</i>	3	2	2	3	2	2	2
<i>Sideritis sicula</i>	2	1	3	3	3	3	3
<i>Astragalus nebrodensis</i>	3	3	2	1	1	1	3
<i>Avenochloa cincinnata</i> (diff.)	1	1	1	1	1	+	+
<i>Cachrys ferulacea</i> (diff.)	1	1	1	+	+	1	+
<i>Euphorbia myrsinites</i> (diff.)	1	1	1	+	1	1	1
<i>Alyssum nebrodense</i>	1	2	1	+	+	.	2
<i>Helianthemum canum</i> ssp. <i>nebrodense</i>	1	1	+	+	+	.	+
<i>Viola nebrodensis</i>	+	+	+	+	+	.	.
<i>Inula montana</i> (diff.)	.	.	1	+	+	+	+
<i>Pimpinella tragium</i> var. <i>glauca</i>	+	+	.	+	+	.	.
<i>Helianthemum cinereum</i> (diff.)	.	.	.	.	.	1	+
Char. <i>Erysimo-Jurinetalia bocconeii</i>							
<i>Acinos alpinus</i> var. <i>nebrodensis</i>	+	+	+	+	1	1	+
<i>Galium venustum</i>	2	2	2	2	2	+	+
<i>Minuartia verna</i> ssp. <i>grandiflora</i>	1	+	+	+	+	.	.
<i>Polycarpon polycarpoides</i> (diff.)	.	.	+	+	+	+	+
<i>Erysimum bonannianum</i>	.	.	+	+	.	+	+
<i>Asperula scabra</i> var. <i>incana</i>	1	.	.	+	+	.	.
<i>Allium cupanii</i>	.	.	.	.	.	+	+
Char. <i>Rumici-Astragaletea siculi</i>							
<i>Centaurea parlitoris</i>	+	1	+	+	+	1	+
<i>Cerastium tomentosum</i>	2	2	2	1	2	1	1
<i>Petrorhagia saxifraga</i> ssp. <i>gasparinii</i>	+	+	+	+	+	2	+
<i>Silene sicula</i>	1	1	1	1	1	+	+
<i>Bunium petraeum</i>	+	+	+	+	+	+	+
<i>Valeriana tuberosa</i> (diff.)	+	+	+	+	+	+	+
<i>Arabis rosea</i>	+	+	+	+	.	+	+
<i>Carlina nebrodensis</i>	.	.	+	.	+	.	.
<i>Phleum ambiguum</i> (diff.)	.	.	.	.	.	1	+
Other species							
<i>Anthyllis vulneraria</i> ssp. <i>busambarensis</i>	1	+	1	1	1	+	+
<i>Dactylis glomerata</i>	+	+	+	+	1	+	+
<i>Festuca circummediterranea</i>	1	2	2	2	2	1	+
<i>Helianthemum nummularium</i> ssp. <i>tomentosum</i>	2	1	1	2	2	1	+
<i>Sedum album</i>	+	+	+	.	+	1	+
<i>Lactuca viminea</i>	.	.	+	+	+	1	+
<i>Crepis vesicaria</i>	+	+	+	+	+	.	.
<i>Allium arvense</i>	+	+	+	+	+	.	.
<i>Medicago lupulina</i>	.	.	+	+	+	2	+
<i>Verbascum rotundifolium</i>	.	.	1	.	+	+	+
<i>Allium flavum</i>	+	+	.	.	+	.	.
<i>Poa bivonae</i>	+	.	.	+	+	.	.
<i>Teucrium chamaedrys</i>	.	.	.	.	+	+	+
<i>Petrorhagia illyrica</i> ssp. <i>hainaldiana</i>	.	.	.	+	.	2	+
<i>Anthemis cupaniana</i>	+	+	.	.	.	.	.
<i>Hypochoeris laevigata</i>	.	.	+	+	.	.	.
<i>Linaria purpurea</i>	+	.	.	.	.	.	+
<i>Sedum tenuifolium</i>	.	.	.	.	.	+	+
<i>Trifolium pratense</i> ssp. <i>semipurpureum</i>	.	.	.	.	.	+	+
<i>Xeranthemum inapertum</i>	.	.	.	.	.	+	+
<i>Micromeria juliana</i>	.	.	.	.	.	1	1
<i>Asphodeline lutea</i>	.	.	.	+	.	.	.
<i>Matthiola fruticulosa</i>	.	.	+	.	.	.	.
<i>Musacri atlanticum</i>	+	.	.	.	.	.	.
<i>Scutellaria rubicunda</i>	.	.	+	.	.	.	.
<i>Senecio siculus</i>	.	.	+	.	.	.	.
<i>Berberis aethnensis</i>	.	.	.	.	.	1	.
<i>Poa bulbosa</i>	.	.	.	.	.	+	.

Spot and date of relevés

Rel. 1-5 Madonie, Pizzo Carbonara, 14-07-2001

Rel. 6-7 Madonie, Pizzo Carbonara, 24-7-2002

TABLE 12 - *Peucedanetum nebrodensis* Brullo & Giusso ass. nova.

Relevé	1	2	3	4	5	6	7	8	9
Altitude (dam a.s.l.)	189	189	187	187	187	186	185	186	185
Plot size (sq. m)	10	10	20	10	50	50	50	50	50
Cover (%)	70	100	80	90	80	90	80	80	100
Slope (°)	0	0	0	0	20	20	15	25	0
Exposure	-	-	-	-	NW	NW	NW	NW	-
Char. association									
<i>Peucedanum nebrodense</i>	3	5	3	3	4	4	4	3	4
Char. <i>Cerastio-Astragalion nebrodensis</i>									
<i>Cachrys ferulacea</i> (diff.)	2	1	2	1	2	2	2	2	2
<i>Euphorbia myrsinites</i> (diff.)	+	1	1	1	1	1	2	2	+
<i>Astragalus nebrodensis</i>	.	.	+	.	1	.	1	+	.
<i>Helianthemum cinereum</i> (diff.)	.	.	.	+	+	+	.	+	.
Char. <i>Erysimo-Jurinetalia bocconeii</i>									
<i>Allium cupani</i>	+	+	+	.	+	+	+	+	.
<i>Erysimum bonannianum</i>	+	.	+	+	1	1	1	1	.
<i>Galium venustum</i>	.	+	1	+	1	1	+	+	.
<i>Polycarpon polycarpoides</i> (diff.)	.	.	+	+	1	+	+	+	.
<i>Acinos alpinus</i> var. <i>nebrodensis</i>	.	.	.	.	.	+	+	+	+
<i>Minuartia verna</i> ssp. <i>grandiflora</i>	+	+	.	.	+	.	.	+	.
Char. <i>Rumici-Astragaletea siculi</i>									
<i>Bunium petraeum</i>	2	1	2	2	1	2	2	1	+
<i>Petrorrhagia saxifraga</i> ssp. <i>gasparrini</i>	2	1	1	2	1	1	2	1	+
<i>Centaurea parlatoris</i>	1	+	2	2	2	1	2	1	1
<i>Cerastium tomentosum</i>	1	1	1	+	1	1	2	2	+
<i>Herniaria microcarpa</i>			1	+	+	+	+	.	.
<i>Valeriana tuberosa</i> (diff.)	.	.	+	+	+	+	.	+	.
<i>Tragopogon nebrodense</i>	.	.	+	.	+	.	.	.	.
<i>Arabis rosea</i>	.	.	.	.	.	.	+	+	.
<i>Silene sicula</i>	.	.	.	.	.	.	+	+	.
Other species									
<i>Festuca circummediterranea</i>	3	2	3	3	3	3	4	4	2
<i>Dactylis glomerata</i>	2	1	1	2	1	1	2	1	+
<i>Hypocheris hispida</i>	1	2	1	+	+	2	2	1	+
<i>Crepis vesicaria</i>	1	+	1	+	+	+	+	+	+
<i>Trifolium pratense</i> ssp. <i>semipurpureum</i>	1	1	+	1	2	2	1	2	1
<i>Sedum hispanicum</i>	+	1	+	+	1	+	+	1	+
<i>Trifolium repens</i>	.	+	1	2	2	2	2	1	1
<i>Malva moscata</i>	.	.	+	+	1	1	+	+	1
<i>Aethionema saxatile</i>	+	.	.	+	+	+	+	+	.
<i>Medicago lupulina</i>	1	1	.	.	.	+	1	+	+
<i>Anthyllis vulneraria</i> ssp. <i>maura</i>	.	.	+	+	+	+	+	+	.
<i>Anthemis sphacelata</i>	+	+	.	+	+	.	.	+	.
<i>Rumex nebrodes</i>	.	.	+	+	.	.	+	1	+
<i>Astragalus depressus</i> var. <i>leucophaeus</i>	+	+	.	.	.	+	.	.	.
<i>Cerinthe auriculata</i>	+	.	.	.	.	.	.	.	+
<i>Galium verum</i>	.	.	.	.	.	.	.	+	3
<i>Petrorrhagia illirica</i> ssp. <i>hainaldiana</i>	.	.	.	.	.	.	.	1	+
<i>Hypocheris laevigata</i>	.	.	.	.	.	.	.	+	.
<i>Chenopodium bonus-hericus</i>	.	.	.	.	.	.	.	.	1
<i>Lolium perenne</i>	.	.	.	.	.	.	.	.	2

Spot and date of relevés

Rel. 1-9, Madonie, Pizzo Carbonara (Fosse Gandolfo), 24-7-2002.

TABLE 13 - *Sesleria siculae*-*Helictotrichetum convoluti* Brullo & Cormaci ass. nov.

Relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Altitude (dam a.s.l.)	137	151	148	145	144	144	154	132	137	134	150	150	130	136	130
Plot size (sq. m)	50	50	100	100	50	100	100	100	100	100	50	50	50	50	50
Cover (%)	100	100	100	90	90	100	100	100	90	90	90	90	80	80	90
Slope (°)	30	30	35	40	30	25	40	35	35	20	45	15	20	20	45
Exposure	N	N	NE	SE	E	W	SW	W	N	N	NE	N	N	E	N
Char. association															
<i>Helictotrichon convolutum</i>	5	5	4	4	4	3	4	5	4	4	3	2	4	5	5
Char. <i>Cerastio-Astragalion nebrodensis</i>															
<i>Inula montana</i> (diff.)	2	1	2	3	2	3	2	2	1	2	1	1	+	1	+
<i>Avenochloa cincinnata</i> (diff.)	3	2	2	1	2	2	2	1	3	2	2	2	2	+	.
<i>Sesleria nitida</i> ssp. <i>sicula</i>	-	1	2	2	2	2	1	2	2	2	4	5	3	2	2
<i>Cachrys fenulacea</i> (diff.)	-	-	-	1	1	+	-	1	1	+	1	-	-	1	-
<i>Helianthemum cinereum</i> (diff.)	-	-	-	-	+	1	1	-	1	1	-	-	-	-	-
Char. <i>Erysimo-Jurinetalia bocconei</i>															
<i>Erysimum bonannianum</i>	1	+	1	1	1	2	1	1	2	2	2	2	1	+	.
<i>Dianthus arrostii</i>	1	1	2	+	1	2	1	1	1	+	1	1	-	+	1
<i>Allium cupani</i>	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+
<i>Acinos alpinus</i> var. <i>nebrodensis</i>	-	-	+	1	1	-	-	1	+	1	1	+	-	-	-
<i>Galium venustum</i>	1	1	1	1	1	2	2	1	2	2	-	-	-	-	-
<i>Asperula scabra</i> var. <i>incana</i>	1	2	+	2	1	1	2	1	1	+	-	-	-	-	-
<i>Koeleria splendens</i> ssp. <i>splendens</i>	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-
<i>Trisetum splendens</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Char. <i>Cl. Rumici-Astragaletea siculi</i>															
<i>Silene sicula</i>	1	+	2	1	+	2	2	1	1	1	1	1	1	1	+
<i>Centauria parlitoris</i>	-	+	1	1	-	1	1	1	1	2	1	1	1	+	+
<i>Arabis rosea</i>	-	+	1	+	1	1	-	2	+	+	+	+	+	-	-
<i>Petrorrhagia saxifraga</i> ssp. <i>gasparrini</i>	1	1	1	1	+	1	+	1	+	1	-	-	-	-	-
<i>Valeriana tuberosa</i> (diff.)	-	+	+	1	-	+	-	1	+	-	+	1	+	-	+
Other species															
<i>Festuca circummediterranea</i>	2	2	2	2	2	2	+	1	2	2	2	3	2	1	+
<i>Poa bulbosa</i>	+	1	1	1	+	+	1	1	+	+	+	2	+	2	+
<i>Sedum album</i>	1	1	1	1	1	1	+	-	+	+	+	1	+	+	+
<i>Elaeostelinum asclepium</i> ssp. <i>meoides</i>	2	1	2	1	1	+	1	1	1	1	-	+	+	+	+
<i>Anthyllis vulneraria</i> ssp. <i>busambarensis</i>	2	2	2	2	2	1	2	2	1	1	1	1	1	+	+
<i>Scorzonera villosa</i>	-	-	1	1	1	+	+	1	2	1	1	-	1	1	+
<i>Thymus spinulosus</i>	2	1	2	1	1	2	1	1	2	2	-	-	1	+	+
<i>Eryngium campestre</i>	1	+	+	1	+	+	+	1	1	+	-	-	+	+	+
<i>Allium arvense</i>	+	1	1	1	+	+	-	+	+	+	+	+	+	+	+
<i>Thalictrum calabricum</i>	1	2	1	1	+	1	+	+	-	-	1	-	-	-	1
<i>Hyoseris radiata</i>	1	1	1	+	-	1	+	-	-	-	-	-	+	-	-
<i>Iris pseudopumila</i>	+	+	1	-	1	1	-	-	1	+	-	-	-	+	-
<i>Helianthemum nummularium</i> ssp. <i>tomentosum</i>	-	-	1	+	1	2	1	1	1	+	-	-	-	-	-
<i>Carex cuspidata</i>	1	+	1	1	1	+	-	-	+	-	-	-	-	-	-
<i>Medicago lupulina</i>	1	1	1	1	+	1	2	1	-	-	-	-	-	-	-
<i>Brachypodium rupestre</i>	1	1	1	1	2	2	2	1	-	-	-	-	-	-	-
<i>Dactylis hispanica</i>	-	-	-	-	-	-	-	-	2	1	2	+	1	2	+
<i>Lolium perenne</i>	+	+	+	+	-	1	-	-	1	2	-	-	-	-	-
<i>Origanum heracleoticum</i>	+	1	1	+	-	-	1	+	-	-	-	-	-	-	-
<i>Picris hieracioides</i>	+	1	+	-	+	-	+	+	-	-	-	-	-	-	-
<i>Galium lucidum</i>	-	-	-	-	-	-	-	-	-	-	2	+	1	1	+
<i>Allium sardum</i>	-	-	-	-	-	-	-	-	-	-	1	+	+	+	+
<i>Asphodeline lutea</i>	-	-	-	-	-	-	-	-	-	-	1	+	+	1	+
<i>Crepis vesicaria</i>	-	-	-	-	-	-	-	-	1	+	+	-	-	+	+
<i>Pimpinella anisoides</i>	1	+	-	-	+	+	-	-	+	-	-	-	-	-	-
<i>Hypericum perforatum</i>	+	+	+	+	-	-	-	+	-	-	-	-	-	-	-
<i>Opopanax chironium</i>	-	-	-	-	-	-	-	-	-	-	1	1	2	+	-
<i>Bonannia graeca</i>	-	-	-	-	-	-	-	-	1	+	-	-	-	+	+
<i>Silene vulgaris</i>	+	-	-	1	1	-	-	+	-	-	-	-	-	-	-
<i>Loroglossum hircinum</i>	+	+	-	-	+	1	+	-	-	-	-	-	-	-	-
<i>Anthemis cupaniana</i>	-	-	-	-	-	-	-	-	-	-	2	2	-	-	+
<i>Bellis perennis</i>	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-
<i>Ranunculus millefoliatus</i>	-	-	-	-	-	-	-	-	+	-	+	+	+	-	-
<i>Hypochoeris hispida</i>	-	-	+	-	1	-	+	-	-	-	-	-	-	-	-
<i>Achillea ligustica</i>	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+
<i>Sedum tenuifolium</i>	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+
<i>Ornithogalum montanum</i>	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+
<i>Centranthus ruber</i>	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+
<i>Papaver rhoeas</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
<i>Trifolium stellatum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
<i>Trifolium campestre</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
<i>Crupina crupinastrum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
<i>Bromus lanceolatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
<i>Petrorrhagia prolifera</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
<i>Sanguisorba minor</i> ssp. <i>verrucosa</i>	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-
<i>Convolvulus cantabrica</i>	-	-	-	-	-	-	-	-	1	+	-	-	-	-	-
<i>Reichardia picroides</i>	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-
<i>Sinapis pubescens</i>	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
<i>Saxifraga bulbifera</i>	-	-	1	+	-	-	-	-	-	-	-	1	-	-	-
<i>Trifolium speciosum</i>	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
<i>Isatis tinctoria</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
<i>Rumex acetosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>Avena barbata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>Rumex nebroides</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>Bromus madritensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>Asperula laevigata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>Leopoldia comosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>Teucrium scordicoides</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>Bellevallia</i> sp.	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
<i>Silene coeli-rosa</i>	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
<i>Picris aculeata</i>	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-

Spot and date of relevés

Rel. 1-8, Sicani, Mt. Cammarata, 8-8-1993
 Rel. 9-10, Sicani, Monte delle Rose 9-8-1993
 Rel. 11-13, Sicani, Mt. Cammarata, 15-5-2001
 Rel. 14-15, Sicani, Mt. Cammarata, 17-6-2001

TABLE 14 - *Festuco rubrae-Seslerietum siculae* Brullo & Cormaci ass. nov.

Relevé	1	2	3	4	5	6	7	8	9	10
Altitude (dam a.s.l.)	135	155	143	138	147	155	150	148	150	139
Plot size (sq. m)	50	30	50	50	50	50	50	50	50	50
Cover (%)	100	100	100	100	100	100	100	100	100	100
Slope (°)	30	20	40	40	50	50	50	40	30	30
Exposure	NE	E	N	N	N	N	N	N	NE	E
Char. association										
<i>Sesleria nitida</i> ssp. <i>sicula</i>	5	4	4	3	4	3	4	3	5	4
<i>Festuca rubra</i>	2	2	3	3	3	3	2	3	2	2
Char. <i>Cerastio-Astragalion nebrodensis</i>										
<i>Avenochloa cincinnata</i> (diff.)	1	2	1	1	+	1	1	1	2	2
<i>Cachrys ferulacea</i> (diff.)	1	.	1	1	2	1	1	2	.	.
<i>Helianthemum cinereum</i> (diff.)	.	1	.	.	.	.	.	.	2	3
<i>Inula montana</i> (diff.)	.	1	.	.	.	.	.	.	1	1
Char. <i>Erysimo-Jurinetalia bocconeii</i>										
<i>Galium venustum</i>	2	2	2	2	2	1	2	2	1	2
<i>Acinos alpinus</i> var. <i>nebrodensis</i>	2	1	1	1	1	+	1	+	2	1
<i>Erysimum bonnanianum</i>	1	2	+	+	.	1	1	+	1	+
<i>Dianthus arrostii</i>	1	1	.	1	1	+	.	1	+	1
<i>Asperula scabra</i> var. <i>incana</i>	.	.	.	+	+	1	.	.	1	1
<i>Allium cupani</i>	+	+	.	.	.	.	.	.	+	+
<i>Koeleria splendens</i> ssp. <i>splendens</i>	.	.	.	.	.	.	.	.	2	1
Char. Cl. <i>Rumici-Astragaletea siculi</i>										
<i>Silene sicula</i>	2	1	1	2	1	1	2	1	1	2
<i>Centaurea parlatoris</i>	1	2	+	.	.	+	+	.	1	1
<i>Arabis rosea</i>	.	+	.	.	+	.	+	+	+	+
<i>Petrorhagia saxifraga</i> ssp. <i>gasparrini</i>	2	1	.	.	.	.	.	.	.	.
<i>Valeriana tuberosa</i> (diff.)	.	.	.	.	.	.	.	.	+	.
Other species										
<i>Thymus spinulosus</i>	.	2	+	1	1	+	+	2	2	2
<i>Anthyllis vulneraria</i> ssp. <i>maura</i>	+	1	+	1	1	+	1	.	2	2
<i>Hypochoeris laevigata</i>	1	+	+	+	2	1	2	1	.	.
<i>Eleoselinum asclepium</i> ssp. <i>meoides</i>	1	2	.	.	.	+	+	.	2	1
<i>Festuca circummediterranea</i>	2	2	.	.	1	.	1	1	1	2
<i>Picris hieracioides</i>	+	1	1	1	1	.	1	1	.	.
<i>Silene vulgaris</i>	.	1	1	1	2	1	1	1	.	.
<i>Cnidium silaifolium</i>	.	.	3	2	3	3	2	2	.	.
<i>Opopanax chironium</i>	.	.	2	2	1	2	1	1	.	.
<i>Physiopernum verticillatum</i>	.	.	1	2	1	1	2	1	.	.
<i>Thalictrum calabricum</i>	1	+	.	1	+	+	.	.	.	.
<i>Eryngium campestre</i>	+	+	.	.	+	.	.	.	1	1
<i>Helictotrichon convolutum</i>	2	2	.	+	1	.	.	.	.	.
<i>Helianthemum nummularium</i> ssp. <i>tomentosum</i>	+	+	.	.	.	.	.	.	1	+
<i>Medicago lupulina</i>	1	1	.	.	.	.	+	.	.	1
<i>Dactylis hispanica</i>	1	+	+	.	.	.	.	.	.	.
<i>Saxifraga bulbifera</i>	.	.	.	.	+	+	.	+	.	.
<i>Brachypodium rupestre</i>	2	1	.	.	.	.	.	.	.	.
<i>Hyoseris radiata</i>	1	+	.	.	.	.	.	.	.	.
<i>Allium flavum</i>	.	.	+	.	.	.	.	+	.	.
<i>Anthemis cupaniana</i>	.	.	.	.	.	+	1	.	.	.
<i>Scabiosa maritima</i>	.	.	.	.	.	+	.	+	.	.
<i>Poa bulbosa</i>	.	.	.	.	.	.	.	.	1	+
<i>Scorzonera villosa</i>	.	.	.	.	.	.	.	.	1	1

Spot and date of relevés

Rel. 1-8, Sicani, Mt. Cammarata, 8-8-1993

Rel. 9-10 Sicani, Monte delle Rose, 9-8-1993

TABLE 15 - *Helichryso italicici-Onosmetum canescentis* Brullo & Guarino ass. nova.

Relevé	1	2	3	4	5	6	7	8	9	10	11
Altitude (dam a.s.l.)	107	108	110	108	107	112	98	129	107	106	106
Plot size (sq. m)	20	20	20	20	20	20	40	15	10	20	50
Cover (%)	70	60	75	85	70	70	60	70	80	70	80
Slope (°)	50	45	50	50	60	50	45	50	10	30	40
Exposure	S	ESE	S	SE	E	E	ENE	SE	E	SE	SE
Char. association											
<i>Helichrysum italicum</i>	+	2	2	1	1	2	3	1	1	1	2
Char. <i>Cerastio-Astragalion nebrodensis</i>											
<i>Pimpinella tragi</i> var. <i>glauca</i>	3	2	2	2	1	2	1	.	1	2	1
<i>Euphorbia myrsinites</i> (diff.)	2	2	2	2	1	1	.	.	1	1	2
<i>Onosma canescens</i>	1	2	3	4	3	2	.	.	2	1	4
<i>Avenochloa cincinnata</i> (diff.)	1	1	+	1	1	.	1	1	.	.	.
Char. <i>Erysimo-Jurinetalia bocconeii</i>											
<i>Acinos alpinus</i> var. <i>nebrodensis</i>	.	+	+	+	+	.	+	+	1	1	1
<i>Dianthus arrostii</i>	+	.	.	.	+	+	1	+	1	+	+
<i>Galium venustum</i>	2	2	2	2	2	2	.	.	.	.	.
<i>Lomelosia crenata</i> var. <i>hirsuta</i> (diff.)	.	.	.	+	2	3	1	4	.	.	+
<i>Minuartia verna</i> ssp. <i>grandiflora</i>	+	1	+	.	+	+	.	.	.	.	.
<i>Helianthemum croceum</i> (diff.)	.	.	.	.	.	.	.	+	.	.	.
Char. Cl. <i>Rumici-Astragaletea sculi</i>											
<i>Cerastium tomentosum</i>	2	1	1	1	1	2	1	.	3	2	1
<i>Centaurea parlatoris</i>	+	1	+	1	+	+	.	+	+	1	1
<i>Petrorhagia saxifraga</i> ssp. <i>gasparinii</i>	+	+	+	+	1	.	.	.	+	+	+
<i>Bunium petraeum</i>	+	+	+	.	+	+	.	+	.	.	.
<i>Arabis rosea</i>	.	.	.	.	.	.	+	+	+	+	+
<i>Silene scicula</i>	.	.	.	.	.	.	.	+	1	+	+
<i>Galium aetnium</i>	.	.	.	.	.	.	.	+	3	3	2
Other species											
<i>Helianthemum canum</i> ssp. <i>canum</i>	2	2	2	2	1	2	+	1	2	2	2
<i>Anthyllis vulneraria</i> ssp. <i>busambarensis</i>	+	+	+	+	+	+	1	1	2	+	+
<i>Dactylis hispanica</i>	+	1	1	2	1	+	1	1	1	1	2
<i>Carlina hispanica</i> ssp. <i>globosa</i>	1	+	1	1	+	+	+	.	+	+	1
<i>Hyoseris radiata</i>	1	+	+	+	1	+	.	1	1	1	1
<i>Micromeria graeca</i> ssp. <i>tenuifolia</i>	2	1	2	2	1	2	2	1	1	1	1
<i>Origanum heracleoticum</i>	.	+	+	1	+	+	2	1	1	+	1
<i>Sinapis pubescens</i>	.	+	+	+	+	+	+	1	+	+	1
<i>Reichardia picroides</i>	+	+	+	.	+	+	.	+	+	+	1
<i>Festuca rubra</i> ssp. <i>microphylla</i>	2	1	1	1	1	1	.	+	.	.	.
<i>Calicotome infesta</i>	.	1	1	1	1	.	.	.	1	1	2
<i>Plantago lanceolata</i> var. <i>sphaerostachia</i>	1	.	+	+	+	.	.	1	.	.	+
<i>Sixalis maritima</i>	.	+	+	+	.	+	1	+	.	.	.
<i>Asphodelus ramosus</i>	.	.	+	1	.	.	.	+	+	.	2
<i>Festuca circummediterranea</i>	.	.	.	.	.	.	+	1	3	2	2
<i>Pallenis spinosa</i>	.	.	.	+	.	+	.	+	+	+	.
<i>Thymus longicaulis</i>	.	+	1	+	.	+	.	+	.	.	.
<i>Crupina crupinastrum</i>	.	.	.	.	.	.	+	.	+	+	+
<i>Teucrium flavum</i>	.	.	.	.	.	.	1	+	2	+	.
<i>Urospermum dalechampii</i>	.	.	.	+	.	.	.	.	+	+	+
<i>Orchis papilionacea</i> ssp. <i>grandiflora</i>	.	.	.	.	.	.	.	.	+	+	+
<i>Sedum album</i>	.	.	.	.	.	.	.	.	+	1	+
<i>Achillea ligustica</i>	.	.	.	.	.	.	1	+	.	.	.
<i>Allium tenuiflorum</i>	.	.	.	+	+	.	.	.	.	.	.
<i>Brachypodium rupestre</i>	.	.	.	.	.	.	1	+	.	.	.
<i>Ditrichia viscosa</i>	.	.	.	.	.	.	1	+	.	.	.
<i>Hypochoeris laevigata</i>	.	.	.	.	.	.	+	+	.	.	.
<i>Medicago lupulina</i>	.	.	.	.	.	.	1	1	.	.	.
<i>Ornithogalum gussonei</i>	.	.	.	.	.	.	.	.	+	.	+
<i>Sedum tenuifolium</i>	.	.	.	.	.	.	.	.	+	.	1
<i>Daphne oleoides</i>	.	.	.	.	.	.	.	.	+	.	.
<i>Centaureum erythraea</i> ssp. <i>majus</i>	.	.	.	.	.	.	.	+	.	.	.
<i>Linaria purpurea</i>	.	.	.	.	.	.	.	+	.	.	.
<i>Orchis brancifortii</i>	.	.	.	.	.	.	.	.	+	.	.
<i>Silene vulgaris</i> ssp. <i>angustifolia</i>	.	.	.	.	.	.	.	1	.	.	.
<i>Thapsia garganica</i>	.	.	.	.	.	.	1	.	.	.	.
<i>Allium arvense</i>	.	.	.	.	.	.	.	.	.	.	+

Spot and date of relevés

Rel.1-6: Peloritani, between Punta Seddiri and Mt. Scuderi, 5-7-1997

Rel. 7: Peloritani, Mt. Scuderi, (Next to Punta Lanzaro), 5-7-1997

Rel. 8: Peloritani, Rocca di Novara, 9-11-1997

Rel. 9-11: Peloritani, Monte Scuderi, 26-5-2003

TABLE 16 - *Plantago humilis*_Asperuletum gussonei Brullo & Guarino ass. nova.

Relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Altitude (dam a.s.l.)	120	124	125	117	124	125	123	125	112	111	120	120	124	124	125	124	124
Plot size (sq. m)	30	15	20	15	15	20	20	20	30	20	10	50	20	30	20	15	20
Cover (%)	90	95	80	100	90	85	70	100	60	50	70	60	60	50	70	60	90
Slope (°)	35	30	0	0	0	0	40	0	50	40	40	45	5	5	0	10	10
Exposure	N	N	-	-	-	-	NW	-	N	N	N	N	N	N	-	N	N
Char. association																	
<i>Asperula gussonei</i>	3	3	2	2	2	2	1	2	2	2	3	2	.	+	.	.	.
<i>Plantago humilis</i>	.	2	3	3	2	1	3	3	.	.	.	.	4	3	3	3	5
Char. <i>Cerastio-Astragalion nebrodensis</i>																	
<i>Euphorbia myrsinites</i> (diff.)	2	1	1	.	1	+	1	1	2	2	1	3	2	2	1	1	1
<i>Pimpinella tragium</i> var. <i>glauca</i>	.	+	+	.	.	.	.	.	3	2	2	2	1	1	+	1	.
<i>Linum punctatum</i>	.	.	.	.	.	2	1	.	1	.	.	.	+	2	1	.	1
<i>Avenochloa cincinnata</i> (diff.)	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Onosma canescens</i>	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	.	.
<i>Cachrys ferulacea</i> (diff.)	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Char. <i>Erysimo-Jurinetalia bocconeii</i>																	
<i>Galium verum</i>	2	1	1	1	1	1	+	1	3	2	2	2	1	2	2	2	1
<i>Acinos alpinus</i> var. <i>nebrodensis</i>	.	+	+	.	.	1	+	+	2	2	1	1	1	1	1	1	+
<i>Minuartia verna</i> ssp. <i>grandiflora</i>	.	.	+	.	.	.	+	1	1	1	1	1	1	1	1	1	+
<i>Lomelosia crenata</i> var. <i>hirsuta</i> (diff.)	.	1	.	.	2	1	1	1	.	.	+	1	3	.	.	.	.
<i>Dianthus arrostii</i>	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	+	.
Char. <i>Rumici-Astragaletea siculi</i>																	
<i>Cerastium tomentosum</i>	2	3	2	1	2	3	2	2	2	3	3	2	2	2	2	3	2
<i>Petrohragia saxifraga</i> ssp. <i>gasparinii</i>	+	+	+	1	+	+	+	+	+	+	+	+	1	+	+	+	+
<i>Centaurea parlatoris</i>	1	.	+	1	1	.	1	+	1	+	1	+	+	+	.	2	1
<i>Silene sicula</i>	.	.	+	1	.	+	+	.	1	+	+	1	+	+	+	+	1
<i>Bunium petraeum</i>	1	1	+	.	+	+	+	+	.	.	.	.	.	.	.	.	.
<i>Arabis rosea</i>	.	.	.	.	.	.	.	.	+	+	+	+	.	.	.	.	.
Other species																	
<i>Helianthemum canum</i> ssp. <i>canum</i>	2	2	2	.	+	+	.	+	2	2	2	2	2	2	2	2	1
<i>Thymus longicaulis</i>	.	+	1	2	1	+	1	1	2	2	+	+	+	.	.	.	1
<i>Festuca circummediterranea</i>	.	.	.	.	2	1	.	1	2	3	2	3	2	2	2	2	1
<i>Hypochoeris hispida</i>	1	+	+	.	.	.	.	.	1	+	1	+	+	+	+	+	+
<i>Lolium perenne</i>	1	1	1	+	+	+	.	+	.	.	.	.	.	+	+	+	+
<i>Anthemis arvensis</i> ssp. <i>sphaelata</i>	.	1	+	1	1	1	.	+	.	.	.	.	1	2	3	1	1
<i>Hyoseris radiata</i>	1	+	.	.	.	.	.	.	1	2	1	1	+	+	+	+	+
<i>Hypochoeris laevigata</i>	.	.	.	+	+	+	+	+	.	+	1	.	+	+	+	+	.
<i>Micromeria graeca</i> ssp. <i>tenuifolia</i>	+	.	1	.	.	1	.	+	+	+	+	1	.	+	1	+	.
<i>Dactylis hispanica</i>	1	1	1	.	.	.	.	.	+	1	+	+	+	+	+	+	.
<i>Plantago lanceolata</i>	+	+	+	1	+	+	+	.	.	.	.	.	.	.	.	.	.
<i>Festuca rubra</i> ssp. <i>microphylla</i>	2	2	2	2	1	1	2	2	.	.	.	.	.	.	.	.	.
<i>Allium tenuiflorum</i>	+	+	.	.	+	+	+	+	.	.	.	.	.	.	.	.	.
<i>Anthyllis vulneraria</i> ssp. <i>busambarensis</i>	.	.	.	.	.	.	.	+	2	1	+	1	.	.	.	+	1
<i>Carlinia hispanica</i> ssp. <i>globosa</i>	1	.	+	.	.	+	.	.	+	.	.	.	.	+	+	.	1
<i>Sedum album</i>	.	.	.	.	1	+	.	.	+	+	+	.	.	.	.	.	.
<i>Sinapis pubescens</i>	+	.	.	.	.	.	.	.	1	+	+	.	.	.	.	.	.
<i>Poa bulbosa</i>	.	.	.	.	.	.	.	.	.	.	.	.	2	2	2	1	+
<i>Anthoxanthum odoratum</i>	1	.	.	2	+	.	.	.	.	.	.	.	.	.	.	.	1
<i>Trifolium pratense</i> ssp. <i>sempipureum</i>	1	1	1	.	.	.	.	.	.	.	.	.	.	+	.	.	.
<i>Sedum tenuifolium</i>	.	.	.	.	.	.	.	.	+	1	+	1	.	.	.	.	.
<i>Bromus</i> sp.	.	.	.	.	.	.	.	.	1	2	1	1	.	.	.	.	.
<i>Sideritis romana</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+
<i>Cynosurus cristatus</i>	1	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.
<i>Medicago lupulina</i>	.	1	.	1	.	.	.	.	.	.	.	.	+	.	.	.	.
<i>Viola messanensis</i>	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	+
<i>Carduus nutans</i>	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Jasione echinata</i>	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.
<i>Orchis papilionacea</i> ssp. <i>grandiflora</i>	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.
<i>Calicotome infesta</i>	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
<i>Poa bivonae</i>	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.
<i>Cistus salvifolius</i>	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Hordeum bulbosum</i>	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Thapsia garganica</i>	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Teucrium flavum</i>	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
<i>Asphodelus salsum</i>	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
<i>Petrohragia illyrica</i> ssp. <i>haynaldiana</i>	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Reichardia picroides</i>	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
<i>Orchis brancifortii</i>	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
<i>Pallenia spinosa</i>	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
<i>Bellis perennis</i>	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
<i>Aceras anthropophorum</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
<i>Edraianthus siculus</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
<i>Athamanta sicula</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
<i>Colchicum bivonae</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1

Spot and date of relevés

Rel. 1-8: Peloritani, Mt. Scuderi, 5-7-1997
 Rel. 9-17: Peloritani, Mt. Scuderi, 26-5-2003

TABLE 17 - Plantagini-Armerietum nebrodenis Pignatti & Nimis in Pignatti et al. 1980.

Relevé	1	2	3	4
Altitude (dam a.s.l.)	175	176	180	180
Plot size (sq. m)	100	100	50	100
Cover (%)	70	70	70	80
Char. association				
<i>Plantago humilis</i>	3	4	3	4
<i>Minuartia condensata</i>	2	2	3	2
<i>Scleranthus venustus</i>	.	+	+	.
Char. <i>Armerion nebrodensis</i>				
<i>Armeria nebrodensis</i>	2	2	2	2
<i>Avenella flexuosa</i> (diff.)	+	+	+	+
<i>Festuca pignattiorum</i>	2	1	1	+
<i>Genista cupanii</i>	.	.	1	1
Char. <i>Erysimo-Jurinetalia bocconeii</i>				
<i>Polycarpon polycarpoides</i> (diff.)	+	+	+	+
<i>Erysimum bonannianum</i>	1	+	+	1
<i>Allium cupanii</i>	1	+	+	+
<i>Acinos alpinus</i> var. <i>nebrodensis</i>	+	.	+	+
<i>Jurinea bocconeii</i>	+	+	.	+
<i>Asperula scabra</i> var. <i>incana</i>	+	.	.	.
Char. <i>Rumici-Astragaletea siculi</i>				
<i>Petrorhagia saxifraga</i> ssp. <i>gasparrinii</i>	2	1	2	1
<i>Herniaria microcarpa</i>	1	+	+	1
<i>Silene sicula</i>	1	+	1	1
<i>Hieracium macranthum</i>	2	2	2	2
<i>Valeriana tuberosa</i> (diff.)	1	+	1	1
<i>Arabis rosea</i>	+	1	+	+
<i>Bunium petraeum</i>	+	+	1	+
<i>Phleum ambiguum</i> (diff.)	1	1	1	2
<i>Centaurea parlatoris</i>	1	+	+	1
<i>Rumex multifidus</i> (diff.)	+	+	+	.
<i>Carlina nebrodensis</i>	+	+	.	+
<i>Cerastium tomentosum</i>	1	1	.	1
<i>Tragopogon nebrodensis</i>	+	+	.	+
Other species				
<i>Anthemis cupaniana</i>	2	2	1	2
<i>Festuca circummediterranea</i>	3	3	2	2
<i>Sedum tenuifolium</i>	1	1	+	2
<i>Anthoxanthum odoratum</i>	1	+	+	+
<i>Jasione echinata</i>	1	+	+	1
<i>Tolpis virgata</i> ssp. <i>sexaristata</i>	+	1	1	1
<i>Petrorhagia illyrica</i> ssp. <i>hainaldiana</i>	+	+	.	.
<i>Achillea ligustica</i>	1	+	.	.
<i>Plantago lanceolata</i>	+	.	.	+

Spot and date of relevés

Rel. 1-4, Madonie, Vallone Madonna degli Angeli, 25-7-2002

TABLE 18 - *Genistetum cupanii* Pignatti & Nimis in Pignatti et al. 1980.

Relevé	1	2	3
Altitude (dam a.s.l.)	171	175	176
Plot size (sq. m)	50	50	30
Cover (%)	70	80	70
Slope (°)	20	35	30
Exposure	NW	SW	SW
Char. association			
<i>Genista cupanii</i>	4	4	3
<i>Tolpis virgata</i> var. <i>sexiaristata</i>	1	+	1
Char. <i>Armerion nebrodensis</i>			
<i>Armeria nebrodensis</i>	2	1	1
<i>Avenella flexuosa</i> (diff.)	.	1	1
<i>Festuca pignattiorum</i>	.	+	1
Char. <i>Erysimo-Jurinetalia bocconeii</i>			
<i>Allium cupanii</i>	+	+	+
<i>Erysimum bonannianum</i>	1	+	1
<i>Polycarpon polycarpoides</i> (diff.)	.	+	+
<i>Asperula scabra</i> var. <i>incana</i>	+	+	.
<i>Jurinea bocconeii</i>	.	2	+
<i>Acinos alpinus</i> var. <i>nebrodensis</i>	.	+	.
Car. <i>Rumici-Astragaletea siculi</i>			
<i>Hieracium macranthum</i>	+	1	2
<i>Arabis rosea</i>	+	+	1
<i>Bunium petraeum</i>	1	+	1
<i>Petrorhagia saxifraga</i> ssp. <i>gasparrinii</i>	1	1	2
<i>Carlina nebrodensis</i>	+	+	1
<i>Silene sicula</i>	1	+	1
<i>Phleum ambiguum</i> (diff.)	2	1	2
<i>Cerastium tomentosum</i>	1	1	1
<i>Centaurea parlatoris</i>	.	1	1
<i>Rumex multifidus</i> (diff.)	+	.	+
<i>Herniaria microcarpa</i>	.	.	.
<i>Tragopogon nebrodensis</i>	+	.	.
Other species			
<i>Anthoxanthum odoratum</i>	1	2	2
<i>Festuca circummediterranea</i>	2	1	2
<i>Sedum tenuifolium</i>	+	+	1
<i>Dactylis glomerata</i>	1	1	+
<i>Plantago cupanii</i>	1	+	+
<i>Jasione echinata</i>	+	+	1
<i>Anthemis cupaniana</i>	+	1	1
<i>Plantago lanceolata</i>	2	+	+
<i>Petrorhagia illyrica</i> ssp. <i>hainaldiana</i>	.	1	1
<i>Crepis vesicaria</i>	+	+	.
<i>Aira caryophyllea</i>	.	+	.
<i>Achillea ligustica</i>	+	.	.
<i>Geranium pyrenaicum</i>	+	.	.
<i>Potentilla calabra</i>	+	.	.
<i>Erodium cicutarium</i>	+	.	.
<i>Chondrilla juncea</i>	+	.	.
<i>Lactuga viminea</i>	+	.	.
<i>Carlina sicula</i>	+	.	.

Spot and date of relevés

Rel. 1-3 Madonie, Contrada Canna, next to Mt. Daino, 25-7-2002

TABLE 19 - Synoptic table of the Sicilian associations of Rumici-Astragaletea siculi.

[illegible]

Char. <i>Rumici-Astragaletea siculi</i>									
<i>Silene sicula</i>	IV	I	IV	V	IV	V	IV	V	V
<i>Petrorhagia saxifraga</i> ssp. <i>gasparrini</i>	IV	II	V	III	V	IV	IV	IV	IV
<i>Cerastium tomentosum</i>	V	IV	V	V	V	III	V	V	V
<i>Carfina nebrodensis</i>	II	II	I	I	I	I	V	I	II
<i>Phleum ambiguum</i> (det.)	V	II	IV	V	II	-	-	-	-
<i>Burium petraeum</i>	III	II	III	I	V	I	V	-	-
<i>Rumex multifidus</i> (det.)	-	-	-	-	-	-	-	-	-
<i>Centaurea parlatioris</i>	V	IV	IV	III	V	V	IV	V	II
<i>Hemanka microgyna</i>	-	-	-	-	-	-	-	-	-
<i>Heracleum macranthum</i>	III	IV	I	I	-	-	-	-	-
<i>Anabis rosea</i>	III	II	III	V	II	V	III	II	II
<i>Adonis aestivus</i>	-	-	-	-	-	-	-	-	-
<i>Valeriana tuberosa</i> (det.)	I	I	III	II	V	II	IV	I	-
<i>Tragopogon nebrodensis</i>	I	II	I	I	I	I	I	I	II
<i>Galium aestivum</i>	-	-	-	-	-	-	-	-	-
<i>Saponaria sicula</i>	I	II	-	-	-	-	-	-	-
<i>Scleranthus marginatus</i>	-	-	-	-	-	-	-	-	-
<i>Belardiochloa violacea</i>	-	-	-	-	-	-	-	-	-
Char. <i>Phleo ambigui-Bromion erecti</i>									
<i>Hellanthium canum</i>	-	-	-	-	-	-	-	-	-
<i>Galium lucidum</i>	-	-	-	-	-	-	-	-	-
<i>Keiskeia splendens</i> ssp. <i>grandiflora</i>	-	-	-	-	-	-	-	-	-
<i>Scirpus nitida</i> ssp. <i>nitida</i>	-	-	-	-	-	-	-	-	-
<i>Erysimum pseudohastatum</i>	-	-	-	-	-	-	-	-	-
<i>Arenaria pratensis</i>	-	-	-	-	-	-	-	-	-
<i>Sedum rupestre</i>	-	-	-	-	-	-	-	-	-
<i>Adonis alpinus</i>	-	-	-	-	-	-	-	-	-
<i>Eryngium amethystinum</i>	-	-	-	-	-	-	-	-	-
<i>Carex macrolepis</i>	-	-	-	-	-	-	-	-	-
<i>Tinea dactylota</i>	-	-	-	-	-	-	-	-	-
<i>Centaurea ambigua</i>	-	-	-	-	-	-	-	-	-
<i>Crepis laevis</i>	-	-	-	-	-	-	-	-	-
<i>Poa medeae</i>	-	-	-	-	-	-	-	-	-
<i>Thymus strizatus</i>	-	-	-	-	-	-	-	-	-
<i>Mimulus verna</i>	-	-	-	-	-	-	-	-	-
<i>Pedicularis comosa</i>	-	-	-	-	-	-	-	-	-
<i>Onoclea echinoides</i>	-	-	-	-	-	-	-	-	-
<i>Allium leucoleum</i>	-	-	-	-	-	-	-	-	-
<i>Silene otites</i>	-	-	-	-	-	-	-	-	-
<i>Edraianthus graminifolius</i>	-	-	-	-	-	-	-	-	-
<i>Odonthites lutea</i>	-	-	-	-	-	-	-	-	-
<i>Giboulata meridionalis</i>	-	-	-	-	-	-	-	-	-
<i>Brachypodium genovense</i>	-	-	-	-	-	-	-	-	-
<i>Centaurea deusta</i>	-	-	-	-	-	-	-	-	-
<i>Centaurea thymifolia</i>	-	-	-	-	-	-	-	-	-
Char. <i>Brometalia erecti</i> & <i>Festuco-Brometalia</i>									
<i>Dianthus sylvestris</i>	-	-	-	-	-	-	-	-	-
<i>Brachypodium rupestre</i>	-	-	-	-	-	-	-	-	-
<i>Heracleum pilosella</i>	-	-	-	-	-	-	-	-	-
<i>Tauernum montanum</i>	-	-	-	-	-	-	-	-	-
<i>Hellanthium asperum</i>	-	-	-	-	-	-	-	-	-
<i>Petrorhagia saxifraga</i>	-	-	-	-	-	-	-	-	-
<i>Bromus erectus</i>	-	-	-	-	-	-	-	-	-
<i>Anthylla vulneraria</i>	-	-	-	-	-	-	-	-	-
<i>Bergiasia minor</i>	-	-	-	-	-	-	-	-	-
<i>Carfina acanthifolia</i>	-	-	-	-	-	-	-	-	-
<i>Asperula cynanchica</i>	-	-	-	-	-	-	-	-	-
<i>Hippocrepis comosa</i>	-	-	-	-	-	-	-	-	-
<i>Sedum montana</i>	-	-	-	-	-	-	-	-	-
<i>Thesium divaricatum</i>	-	-	-	-	-	-	-	-	-
<i>Carex caryophylla</i>	-	-	-	-	-	-	-	-	-
<i>Allium sphaerocephalon</i>	-	-	-	-	-	-	-	-	-
<i>Brachy. recta</i>	-	-	-	-	-	-	-	-	-
<i>Asperula striata</i>	-	-	-	-	-	-	-	-	-
<i>Convolvulus cantabrica</i>	-	-	-	-	-	-	-	-	-
<i>Melica ciliata</i>	-	-	-	-	-	-	-	-	-
<i>Asperula purpurea</i>	-	-	-	-	-	-	-	-	-
<i>Sedolium columbiana</i>	-	-	-	-	-	-	-	-	-
<i>Trifolium ochroleucum</i>	-	-	-	-	-	-	-	-	-
<i>Armeria canescens</i>	-	-	-	-	-	-	-	-	-
<i>Plantago argentea</i>	-	-	-	-	-	-	-	-	-
<i>Carfina acialis</i> ssp. <i>simplex</i>	-	-	-	-	-	-	-	-	-
<i>Krasula purpurea</i>	-	-	-	-	-	-	-	-	-
<i>Ochis macula</i>	-	-	-	-	-	-	-	-	-
<i>Campanula glomerata</i>	-	-	-	-	-	-	-	-	-
<i>Agrostoidium zannoni</i>	-	-	-	-	-	-	-	-	-
<i>Hellanthium nutummarium</i>	-	-	-	-	-	-	-	-	-
<i>Alyssum montanum</i>	-	-	-	-	-	-	-	-	-
<i>Anabis hirsuta</i>	-	-	-	-	-	-	-	-	-
Transgr. <i>Pino-Juniperetalia</i>									
<i>Juniperus hemisphaerica</i>	III	II	-	-	-	-	-	-	-
<i>Barbarea nemoralis</i>	-	-	-	-	-	-	-	-	-
<i>Rosa sicula</i>	II	I	I	II	-	-	-	-	-
<i>Daphne oleoides</i>	I	I	I	II	-	-	-	-	-
<i>Sorbus graeca</i>	I	-	-	-	-	-	-	-	-

1. *Astragalium nebrodensis* (Tab. 6 + Brullo, 1984, tab. 13 + Pignatti et al., 1980, tab. 7)

2. *Lino-Seasterium siculae* (Tab. 6 + Brullo, 1984, tab. 10 + Pignatti et al., 1980, tab. 8)

3. *Cachryetum briddiae* (Tab. 9)

4. *Sideritis siculae-Artemisiae albae artemisioides* (Tab. 10, rel. 1-25)

5. *Sideritis siculae-Artemisiae albae violaceae* (Tab. 10, rel. 26-33)

6. *Besleria siculae-Melictum cupanii* (Tab. 11)

7. *Cardonello-Thymetum apiculata* (Tab. 7 + Brullo, 1984, tab. 12)

8. *Pseudonietum nebrodensis* (Tab. 12)

9. *Besleria siculae-Helictotrichetum convolvulae* (Tab. 13)

10. *Festuco rubrae-Beslerium siculae* (Tab. 14)

11. *Helichryso Italici-Onocetum canescens* (Tab. 15)

12. *Plantagini humilis-Asperuletum gussonei* (Tab. 16)

13. *Plantagini-Armerium nebrodensis* (Tab. 17 + Brullo, 1984, tab. 16 + Pignatti et al., 1980, tab. 10)

14. *Geranietum cupanii* (Tab. 18 + Brullo, 1984, tab. 18 + Pignatti et al., 1980, tab. 11)

15. *Astraguletum siculi* (Frisi, 1940, Tab. 36)

16. *Astraguletum siculi* (Frisi, 1940, Tab. 36)

17. *Astraguletum siculi* (GRI, 1942, rel. 2-7 + Poli, 1965, tab. 19, 21 p.p. + Pignatti et al., 1980, tab. 12, p.p.)

18. *Astraguletum siculi* (tab. 1)

19. *Senecioi-Anthemidetum aetnensis* (Frisi, 1940, Tab. 1)

20. *Senecioi-Anthemidetum aetnensis* (GRI, 1942 rel. 8, p. 54 + Poli, 1965, tab. 14, 28)

21. *Senecioi-Anthemidetum aetnensis* (Tab. 2)

22. *Festuco circummediterraneae-Bellardiochloetum aetnensis* (Frisi, 1940, Tab. 2a)
23. *Festuco circummediterraneae-Bellardiochloetum aetnensis* (Frisi, 1940, Tab. 2b)

24. *Festuco circummediterraneae-Bellardiochloetum aetnensis* (Tab. 3 + Poli, 1965, tab. 31, 32)

25. *Cerastio-Heracleetum patridi* (Tab. 5 + Poli, 1965, tab. 34 rel. 2-4, rel. pos. 144)

26. *Festuco circummediterraneae-Populetum tremuli* (Tab. 4)

27. *Phleo ambigui-Seasterium stricti* (Stracaus, 1988, tab. 1)

28. *Astraguletum calabrii* (Brullo et al., 2004, Tab. 2)

29. *Festuco microphylla-Geranietum italicum* (Brullo et al., 2004, Tab. 4)

30. *Plantago serpentinae-Chamaecristetum spinicentis* (Brullo et al., 2004, Tab. 3)

31. *Armerio brutiae-Potentilletum calabrae* (Brullo et al., 2004, Tab. 5)

32. *Armerio aspromontanae-Dianthetum bruti* (Brullo et al., 2001, Tab. 56)

33. *Armerio aspromontanae-Plantaginetum humilis* (Brullo et al., 2001, Tab. 55)

34. *Armerio aspromontanae-Potentilletum calabrae* (Brullo et al., 2001, Tab. 54)

35. *Poa alpinae-Minuartietum condensatae* (Brullo et al., 2001, Tab. 57)

36. *Armerio aspromontanae-Asperuletum scabrae* (Brullo et al., 2001, Tab. 58)

37. *Phleo ambigui-Brometum caprii* (Brullo et al., 2001, Tab. 60)

38. *Anthemidetum pulvinatae* (Brullo et al., 2001, Tab. 59)

39. *Pimpinello-Astraguletum alpidi* (Caputo, 1970, Tab. 1)

40. *Oxtriploetum capuli* (Corbetta et al., 1987, Tab. 4)

41. *Minuartio-Anthemidetum montanae* (Corbetta et al., 1987, Tab. 4)

42. *Senecio. vilarum-Brometum erecti* (Frattoni, 1959, Tab. 1)

43. *Astragalo sempervirentis-Seasterium nitidae* (Bond & Ballati, 1995, Tab. 2)

44. *Centaureo rupestris-Scleroetum crenatae* (Bond et al., 1993, Tab. 3)

