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ABSTRACT - Basing on literature data and unpublished relevés from Sicily, a survey of the syntaxa belonging to the class *Rumici-Astragaletea siculi* Pignatti & Nimis 1980 em.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-Astragaletalia siculi* Pignatti & Nimis 1980, including the sole alliance *Rumici-Astragalion siculi* Poli 1965, restricted to Mount Etna, and *Erysimo-Jurinetalia bocconei* 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.

KEYWORDS - 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

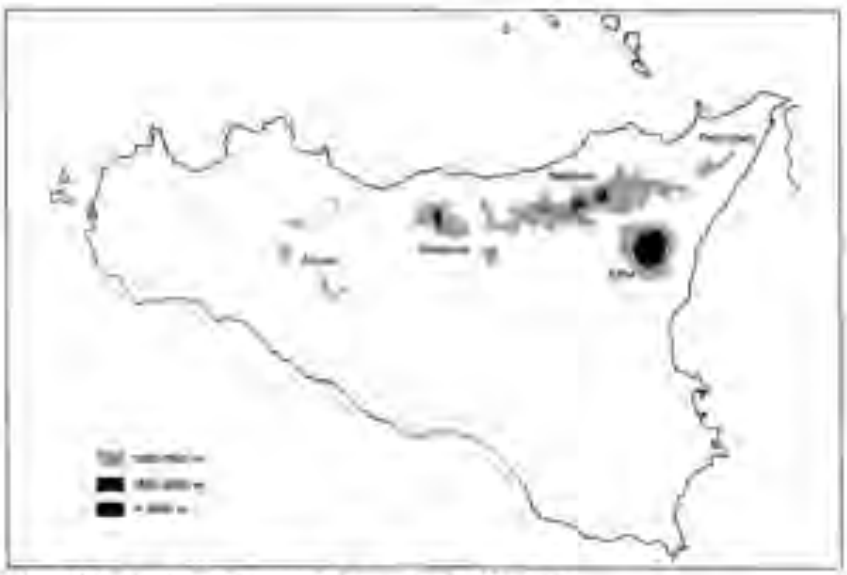

FIGURE 1 - Map of the Sicilian mountains exceeding 1000 m a.s.l.

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/m^2); 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 hemicrypto-chamaephytic 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*

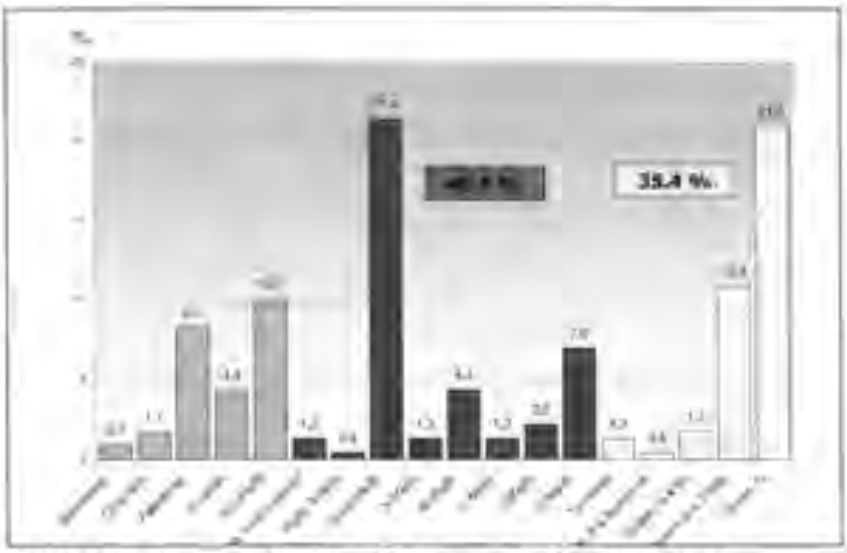

FIGURE 2 - Chorologic spectrum of the flora of the surveyed plant communities.

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

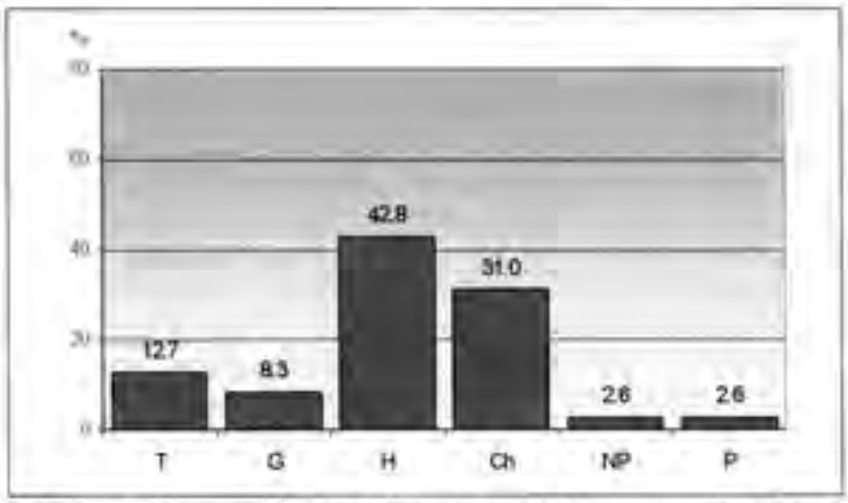

FIGURE 3 - Life-forms spectrum of the flora of the surveyed plant communities (NP: nanophanerophytes; Ch: chamaephytes; H: hemicryptophytes; G: geophytes; T: therophytes).

(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 *Astragaletalia 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 unproper 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 choosen 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-Astragaletalia siculi* with the sole alliance *Rumici-Astragalion siculi*, and one stretched over the heights of the mountains of Northern Sicily, *Erysimo-Jurinetalia bocconei*, with two alliances: one basiphilous (*Cerastio-Astragalion nebrodensis*) and one acidophilous (*Armerion nebrodensis*).

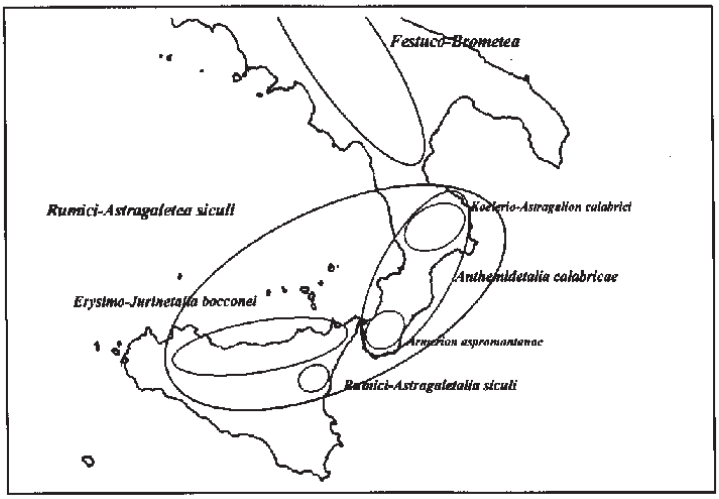

FIGURE 4 - Geographical distribution of the alliances and orders included in the class Rumici-Astragaletea siculi.

More recently, the range of this class have been enlarged up to the siliceous massifs 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

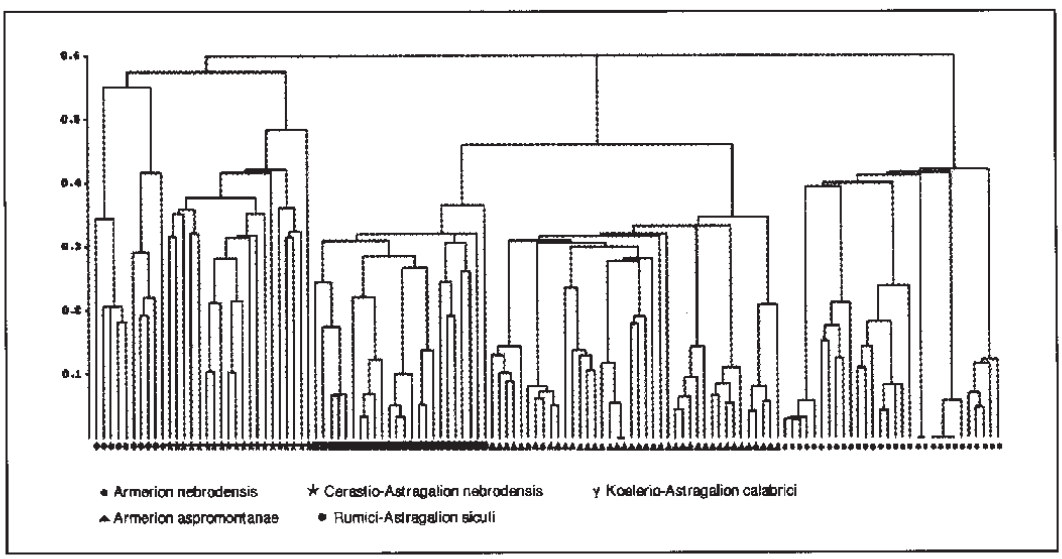

FIGURE 5 - Cluster diagram of the associations ascribed to the class Rumici-Astragaletea siculi.

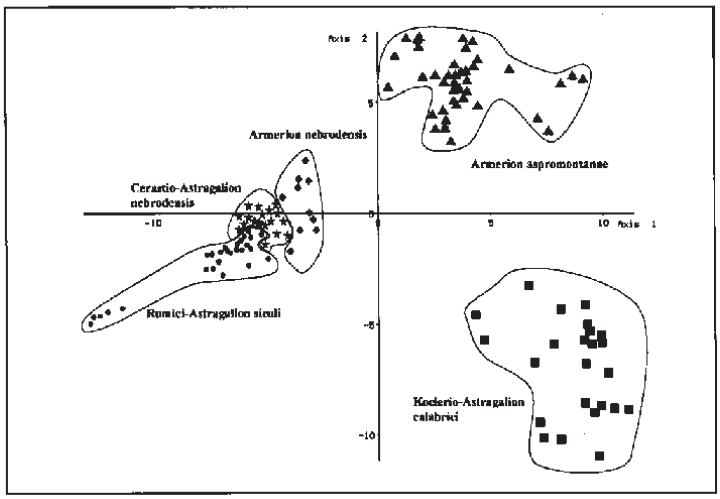

FIGURE 6 - PCA - first vs. second axis of the associations ascribed to the class Rumici-Astragaletea siculi

(they are growing under dry ombrotypes, on mineral terrains, 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.

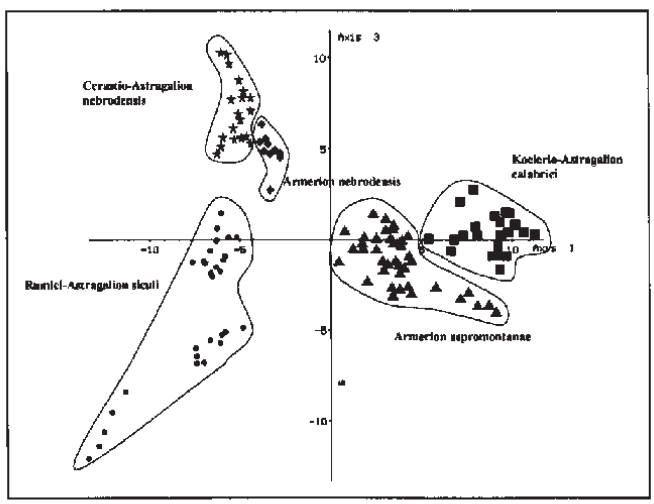

FIGURE 7 - PCA - first vs. third axis of the associations ascribed to the class Rumici-Astragaletea siculi

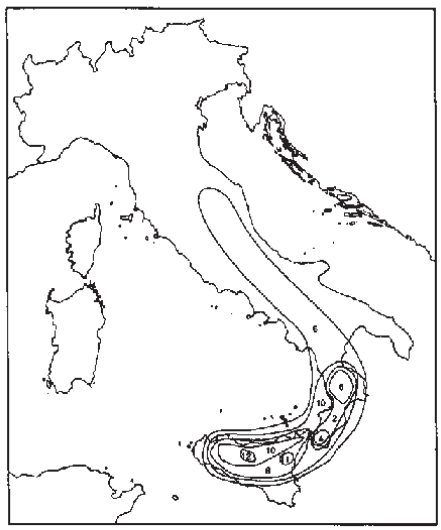

FIGURE 8 - Geographical ranges of the endemics occurring in the associations of Rumici-Astragaletea siculi. Numbers are indicating how many species do have the same range.

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-Astragaletalia siculi* Pignatti & Nimis in Pignatti *et al.* 1980.

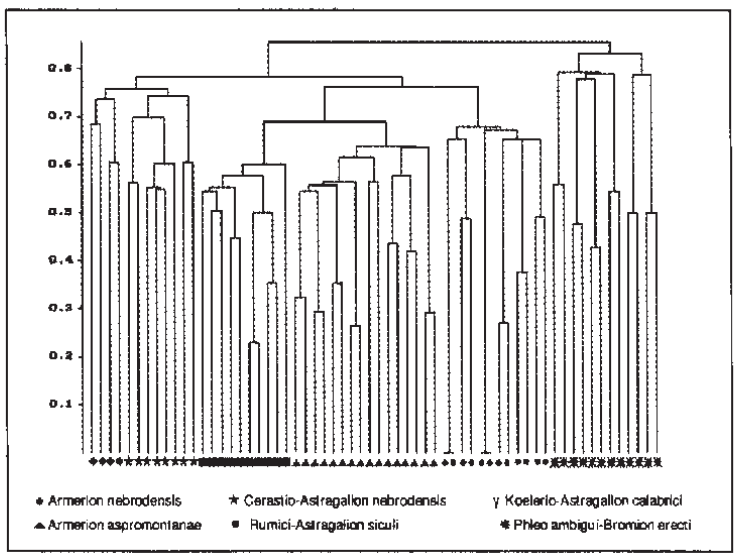

FIGURE 9 - Cluster diagram of the associations of Rumici-Astragaletea siculi, compared to some associations of Phleo ambigui-Bromion erecti (Festuco-Brometea). Two relevés, the richest in species, have been processed for each phytosociological association.

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

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 violacea*, *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*, *Bellardiochloa 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 corrected (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-Secaletum stricti Siracusa 1998, Boll. Acc. Gioenia Sci. Nat. 30 (353): 324.

HOLOTYPUS: 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-Populetum tremulae Brullo & Siracusa ass. nov. (TABLE 4).

HOLOTYPUS: TABLE 4, rel. 6, hoc loco.
CHARACTER SPECIES: *Populus tremula* f.ma *nana*.
STRUCTURE AND ECOLOGY: nanophanerophitic 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).

HOLOTYPUS: 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.

HOLOTYPUS: *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 bocconei*, *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.

HOLOTYPUS: *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).

HOLOTYPUS: 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 caracterized 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 in Bullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 383 (TABLE 7).

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

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

STRUCTURE AND ECOLOGY: vegetation dominated by chamaephytes, normally with a prostrate growh, 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).

HOLOTYPUS: 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).

HOLOTYPUS: 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 hydratation 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-Genistetea lobelii*), restricted to the carbonatic relieves of Sardinia (Arrigoni & Di Tommaso 1991).

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

HOLOTYPUS: 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 nebrodensis Brullo & Giusso ass. nova (TABLE 12).

HOLOTYPUS: 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 hydratation of the soil is fairly good up to the late summer. The association is linked to the oromediterranean 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).

HOLOTYPUS: 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).

HOLOTYPUS: TABLE 14, rel. 2, hoc loco.
CHARACTER SPECIES: *Sesleria nitida* ssp. *sicula* (dom.), *Festuca rubra* (diff.).
STRUCTURE AND ECOLOGY: vegetation dominated by caespitose hemicryptophytes, 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).

HOLOTYPUS: TABLE 15, rel. 4, hoc loco.
CHARACTER SPECIES: *Onosma canescens* (dom.), *Helichrysum italicum* (diff.), *Festuca nigrescens ssp. microphylla* (diff.).
STRUCTURE AND ECOLOGY: Hemicrypto-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 tragium* var. *glauca*, *Euphorbia myrsinites* and *Galium venustum*, tipically 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 siculae*. 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 bocconei* 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).

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

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

STRUCTURE AND ECOLOGY: Hemicrypto-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 pulvinated 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 phisiognomically 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.

HOLOTYPUS: *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).

HOLOTYPUS: 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 fee-

ble 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).

HOLOTYPUS: 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 Balcans 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 s.l.* 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 ambigui-Bromion erecti*. This alliance is grouping basiphilous herbaceo-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 phytocoenoses 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 ambigui-Secaletum stricti Siracusa 1998, Boll. Acc. Gioenia Sci. Nat. 30 (353): 324.

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

Cerastio tomentosi-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 in Brullo 1984, Boll. Acc. Gioenia Sci. Nat. 16 (322): 383.

Astragaletum 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-Asperuletum 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 CALABRICAE 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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NOTES

* Bas.: Festuca aetnensis C. Presl, Cyper. ef Gram. Sic. 35 (1820).

TABLE 1 - Astragaletum siculi (Frei 1940) Gilli 1943.

Relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Altitude (dam a.s.l.)	140	140	140	140	185	185	185	185	180	185	185	185	185	185	185	185	185	185	185	170	170	165	190	190	190	190	182	182	182	182	182	182	200	200	200	200	200	205	205	205	205	205	215	215	215	160	180	180	180	180	160	160	160	160	230	230
Cover (%)	100	100	90	90	90	90	90	90	90	70	60	80	80	60	90	90	90	100	100	100	80	80	100	90	90	100	90	90	80	90	90	100	100	100	100	50	50	50	70	70	70	100	70	70	70	100	80	80	80	50	50	50	50	50	50	50
Plot size (sq. m)	100	100	100	100	200	200	200	200	200	70	50	50	100	100	100	100	100	100	100	50	50	100	40	40	40	40	40	100	100	100	100	100	100	100	100	100	100	100	80	80	80	80	80	80	80	80	90	90	80	90	80	80	80	80	80	80
Char. association																																																									
Astragalus siculus	3	4	4	4	4	3	3	4	3	2	3	3	3	1	3	4	4	5	4	3	3	4	4	3	4	3	2	4	4	4	5	5	4	4	5	4	4	4	3	4	3	4	3	4	4	4	4	3	4	4	3	2	4	3	4	3
Cuscuta losseyi	+	.	+	+	2	+	1	1	.	.	.	.	.	.	.	+	.	.	.	.	.	+	1	2	2	1	2	1	+	+	.	3	3	4	2	3	1	1	.	.	.	1	1	.	.	+	.	+	+	.	.	.	.	.	.	.	.
Char. *Rumici-Astragalion siculi* e *Rumici-Astragaletalia siculi*																																																								
Bellardiochloa sellensis	2	1	+	1	.	1	1	2	4	3	3	3	3	3	.	2	.	.	+	+	1	+	.	.	.	.	2	3	1	+	1	+	3	3	2	3	2	1	1	.	+	+	+	+	+	5	4	3	3	4	5	4	5	4	.	.
Rumex astranca	+	.	+	+	1	+	1	1	.	+	+	+	.	+	.	+	.	+	+	.	.	+	+	+	1	1	+	.	.	.	.	.	.	+	+	1	.	+	1	1	+	+	+	+	+	.	.	.	.	+	+	+	.	.	2	1
Senecio sarracenicus	+	+	+	.	1	+	+	+	.	.	.	.	.	.	.	1	+	+	+	.	.	I	1	1	+	1	2	.	.	.	.	.	.	1	+	1	1	1	+	1	2	1	1	+	1	1	.	.	+	+	.	1	1	.	.	1	+
Viola aetnensis	.	+	+	.	1	1	+	+	+	+	.	+	+	+	1	.	.	.	.	+	.	+	+	.	1	+	.	.	.	+	.	.	1	1	+	1	1	+	+	+	.	.	.	.	.	.	+	+	.	.	+	+	.	.
Robertia taraxacoides (diff.)	.	.	.	.	+	.	+	+	.	.	.	.	.	.	.	+	.	+	.	.	+	+	.	.	.	.	.	.	.	1	2	2	.	1	1	+	.	+	+	1	1	+	.	+	+	1	2	1	1	1	+	.	.	1	+	+
Erysimum etnense	1	1	+	+	2	1	+	1	2	1	1	1	1	1	2	1	1	+	+	.	.	+	.	.	.	.	+	+	2	1	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthemis aetnensis	.	.	.	.	2	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	2	1	+	.	.	.	.	+	.	+	.	.	+	+	.	.	.	.	2	3	2	2	1	2	2	3	2	.	.
Tanacetum siculum	3	2	1	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	2	+	+	.	.	2	3	3	2	3	3	2	1	2	1	4	4	4	.	.	.	.	.	.	.	.	.	.	.	.
Senecio chrysanthemifolius	.	.	.	.	.	.	.	.	.	+	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Char. *Rumici-Astragaletea siculi*																																																								
Galium aricum	2	+	+	1	2	2	2	1	1	1	2	2	2	1	1	1	.	.	+	1	2	1	1	+	3	2	2	2	+	1	1	1	2	2	2	3	2	2	2	3	2	2	3	2	2	2	2	3	2	2	1	2	2	1	2	2
Cerastium tomentosum	.	.	.	.	1	1	1	3	1	.	.	.	.	.	.	.	.	.	.	2	2	.	2	2	.	.	.	3	2	2	2	3	3	3	3	2	2	3	3	2	1	2	1	4	4	4	2	2	3	2	2	2	3	2	2	2	2
Silene sicula	2	1	+	1	2	2	+	+	2	2	2	1	2	1	1	1	.	.	.	+	1	.	.	+	.	1	1	1	1	1	1	1	.	.	.	.	.	.	.	.	.	+	1	2	1	+	1	1	+	1	2	2	.	.	.
Petrorhagia saxifraga esp. *gasparrinii*	2	1	1	.	.	2	1	+	2	1	1	2	2	1	2	.	.	.	3	2	1	.	.	.	.	.	.	1	+	2	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Saponaria sicula	.	.	.	.	1	+	+	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	1	1	.	+	.	+	.	.	+	.	+	.	.	+	+	.	.	.	+	.	.	.	.	.	.	.	.	.	+	1
Carlina nebrodensis	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	+	+	+	.	+	+	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Phleum ambigium	2	2	2	2	.	.	.	.	.	1	2	2	2	1	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Asinos asinensis	+	.	.	+	.	+	.	.	.	1	+	+	1	+	.	.	+	.	.	.	.	+	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Herniaria mediocarpa	+	.	.	+	.	.	.	.	+	1	+	+	1	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tragopogon nebrodensis	+	+	.	.	.	.	.	.	+	.	.	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Centaurea parlatoris	.	.	.	.	.	.	.	.	1	1	+	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rumex multifidus	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Transgr. *Pino-Juniperetea*																																																								
Berberis aetnensis	.	.	.	.	.	3	+	.	.	+	+	1	+	1	1	+	.	.	.	+	+	.	.	.	.	.	1	.	.	.	.	.	.	2	3	3	2	3	1	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Juniperus hemisphaerica	1	.	1	+	.	.	.	.	.	1	1	1	.	+	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Other species																																																								
Festuca circummediterranea	1	1	+	1	3	3	3	3	3	2	2	2	2	2	2	3	2	1	2	1	+	2	2	3	3	3	3	1	2	2	2	2	3	2	2	2	2	2	1	+	.	+	+	+	+	3	2	3	3	3	2	3	3	2	3	3
Secale strictum	2	2	2	1	2	2	2	2	1	.	1	+	1	+	1	.	3	2	2	2	2	2	2	2	1	2	1	2	3	.	+	+	2	3	3	3	3	2	2	+	+	+	+	+	+	1	2	2	1	2	1	2	1	2	2	2
Festuca rubra	2	3	2	.	+	1	+	.	.	.	.	.	.	.	.	2	3	2	.	.	.	.	.	.	.	.	.	2	1	3	3	3	2	1	2	1	1	1	1	+	+	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Linaria purpurea	1	1	.	+	1	2	1	1	+	1	1	.	.	.	1	.	1	+	1	.	.	1	1	1	2	2	2	2	1	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Achillea ligurica	.	.	.	.	+	+	2	3	.	.	.	.	.	.	1	.	.	.	.	+	1	.	1	+	1	2	2	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	1	+	2	3	.	.	.	.
Jasione echinata	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	1	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	1	1	2	1	2	1	1	+
Calamagrostis epigejos	2	2	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	.	3	4	4	3	3	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Potentilla calabra	1	+	+	+	.	.	+	2	2	1	+	.	.	2	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedum tenuifolium	.	.	.	.	.	.	.	.	.	1	+	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	+	.	.	.	.
Chondrilla juncea	.	.	.	.	1	+	1	+	1	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	2	2	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Genista aetnensis	.	.	.	.	.	.	.	.	+	.	+	.	.	.	+	.	1	2	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crepis leontodontoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypochoeris hispida	.	.	.	.	.	.	.	.	.	+	.	.	+	+	2	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lactuca viminea	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Brachypodium sylvaticum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	3	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca exaltata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hypochoeris neapolitana	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Spot and date of relevés
Rel. 1-4, Monte Vetore, 15-7-1994
Rel. 5-8, Monti Calcarazzi, 11-8-1994
Rel. 9, Serra la Nave 10-8-1994
Rel. 10-15, Serra la Nave 11-8-94
Rel. 16, between Rifugio Sapienza and Serra la Nave, 14-8-1994
Rel. 17-19, downslope Rifugio Citelli, 8-7-1994
Rel. 20-23, Monte Baracca, 8-7-1994
Rel. 24-26, next to Rifugio Citelli, 8-7-1994
Rel. 27-31, Le Montagnole, 21-7-1994
Rel. 32-36, Vallone del Tripodio, 29-7-1994
Rel. 37-49, Monte Frumento della Concazza, 8-7-1995
Rel. 50-58, Scrisina dell'Asino, 12-7-1995
Rel. 59-60, Valle del Bove, 21-7-1980

TABLE 2 - Senecioni aethnensis-Anthemidetum aetnensis Frei 1940.

Relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Altitude (dam a.s.l.)	260	280	280	260	280	260	260	250	250	250	250	250	250	250	260	260	260	265	260	260	265	280	280	280	280	280	280	280	280	250	250	250	250	250	250	230	190	190	180	180	180	180	190	190	195	195	205	205	205	205	210	210	210
Cover (%)	50	70	50	50	40	50	60	60	50	60	40	40	50	40	30	40	40	30	30	40	40	30	30	30	30	30	30	30	30	60	50	36	60	40	20	50	100	200	50	50	50	50	2	2	3	2	2	1	2	3	3	2	3
Plot size (sq. m)	40	40	40	40	50	50	40	50	40	50	40	40	40	40	30	35	35	50	40	40	50	40	36	35	30	35	30	30	40	40	40	40	50	60	60	50	40	40	40	30	30	40	50	50	50	40	40	40	50	40	40	50	40
Char. association																																																					
Anthemis aetnensis	2	2	2	2	2	3	2	2	2	2	2	3	3	2	1	1	2	3	4	2	3	3	2	3	1	2	3	4	3	2	2	2	3	2	3	1	1	+	4	3	4	3	1	2	2	2	1	2	2	1	1	+	1
Scleranthus vulcanicus	1	1	1	+	1	2	1	2	2	1	1	2	2	1	+	+	+		.	.	.	.	.	.	.	.	.	.	.	1	2	1	2	3	3	+	.	.	.	.	.	.	.	.	2	3	+	.	.	+	.	.	.
Cardamine glauca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	3	4	3	1	1	1	1	4	4	4
Char. Rumici-Astragalion siculi e Rumici-Astragaletalia siculi																																																					
Rumex aetnensis	2	2	3	3	3	4	3	3	4	3	3	3	4	3	2	3	3	2	2	1	2	1	1	1	+	1	1	2	1	3	4	3	2	4	4	2	2	1	3	3	2	3	2	2	2	3	3	3	3	3	2	2	3
Senecio aetnensis	+	1	2	1	1	+	1	1	+	1	1		1	1	1	+	1	1	2	3	2	+	+	+	.	1	+	1	1	1	2	+	+	+	1	2	+	.	.	.	.	.	.	.	.	.	1	1	1	1			
Robertia taraxacoides (diff.)	.	+		1	1	1	1	1	1	-	1	1	1	1	+	+	+	.	.	.	.	3	4	3	3	2	2	1	3	1	1	+	+	+	1	1	+	+				.	.	.	.	.	.	.	.	.	.	.	.
Viola aethnensis	+	.	.	+	.	.	+	.	.	-	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bellardiochloa aetnensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	+	1	.	.	.	.	2	2	2
Astragalus siculus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Char. Rumici-Astragaletea siculi																																																					
Saponaria sicula	.	.	.	.	+	+	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	2	3	3	.	.	.	.	.	1	2	2	.	.	.	.	.	.	.
Cerastium tomentosum	.	+	.	.	+	.	.	+	.	+	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rumex multifidus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	1	2	.	.	.	.	.	.	.	.	.	.	.
Silene sicula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	2	2	1	+	.	[illegible]	.	.	.	.	.
Galium aetnicum	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Other species																																																					
Festuca circummediterranea	.	+	.	.	+	.	.	+	+	.	.	.	.	.	.	.	-	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	+	+	1	+	.	2	1	1	2	1	.	+	.	+	2	2	2
Potentilla calabra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	1	2	.	.	.	.	2	.	2
Bromus tectorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	3	+	+	.	.	.	.	.	.	.	.	.	.	.
Anthemis sphacelata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.
Scleranthus aetnensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	1	.	.	.	.	.	.	.	.	.	.	.
Secale strictum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.
Trifolium semipurpureum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Spot and date of relevés
Rel. 1-4, La Montagnola, 31-7-1990
Rel. 5-10, La Montagnola, 1-8-1995
Rel. 11-14, Piano del Lago, 1-8-1995
Rel. 15-17, La Cisternazza, 1-8-1995
Rel. 18-21, Piano delle Concazze, 1-8-1995
Rel. 22-29, Punta Lucia, 1-8-1995
Rel. 30-35, Torre del Filosofo, next to the old cableway, 1-8-1995
Rel. 36, Valle del Bove, 21-7-1980
Rel. 37, 38, Crateri Silvestri, 27-6-1994
Rel. 39-42, Rifugio Citelli, 3-8-1995
Rel. 43-53, Grotta del Gelo, 26-7-1999

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-Astragaletalia 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 parlatoris	.	.	.	.	.	.	.	.	.	.	.	.	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 data of relevés

Rel. 1-3, Timpa degli Albanelli 1-8-1995
Rel. 4-12, Schiena dell'Asino, 12-7-1995
Rel. 13-16, 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	60	60	70	70	65
Plot size (sq. m)	10	100	80	100	90	100	100	90	100	100	50
Char. association											
Populus tremula fo. nana	5	5	4	5	5	4	5	5	4	5	3
Char. *Rumici-Astragalion siculi* e *Rumici-Astragaletalia siculi*											
Astragalus siculus	1	1	2	2	1	1	1	1	1	1	+
Bellardiochloa aetnensis	1	2	2	1	1	1	2	1	1	2	.
Viola aethnensis	+	+	+	+	+	+	+	+	+	+	.
Robertia taraxacoides (diff.)	1	+	+	1	+	1	+	.	+	1	1
Tanacetum siculum	.	.	.	.	.	+	.	+	+	+	.
Rumex aetnensis	.	.	.	.	.	.	.	.	.	.	1
Senecio aetnensis	.	.	.	.	.	.	.	.	.	.	+
Anthemis aetnensis	.	.	.	.	.	.	.	.	.	.	+
Char. *Rumici-Astragaletea siculi*											
Galium aetnicum	1	+	+	1	+	1	+	+	+	+	2
Silene sicula	+	.	+	+	1	+	+	+	+	+	.
Other species											
Festuca circumediterranea	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 tomentosi-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																	
Hieracium pallidum	1	1	1	1	1	2	2	2	1	2	2	2	2	3	4	3	4
Char. *Rumici-Astragalion siculi* e *Rumici-Astragaletalia siculi*																	
Anthemis aetnensis	1	2	1	2	1	1	2	2	1	1	2	2	2	1	+	1	2
Robertia taraxacoides (diff.)	+	1	1	+	1	1	+	+	+	+	1	.	.	+	+	+	1
Bellardiochloa aetnensis	.	.	.	.	.	.	.	.	.	1	1	2	2	1	3	2	3
Rumex aetnensis	+	1	1	1	.	.	.	.	.	1	2	.	.	.	.	.	.
Senecio aetnensis	.	.	1	+	1	.	.	.	.	+	.	.	.	.	.	.	.
Char. *Rumici-Astragaletea siculi*																	
Cerastium tomentosum	2	2	1	2	2	2	2	2	2	1	1	1	1	1	2	1	2
Galium aetnicum	2	1	1	2	1	+	+	1	+	1	1	1	2	1	2	2	1
Silene sicula	.	.	.	+	1	+	.	1	+	+	1	2	2	3	2	1	2
Saponaria sicula	1	1	2	1	1	.	.	.	.	1	1	.	.	.	.	.	.
Petrorhagia saxifraga ssp.gasparrinii	.	.	.	.	.	.	.	.	.	.	.	1	2	1	1	2	1
Rumex multifidus	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
Other species																	
Festuca circummediterranea	3	3	1	2	1	1	2	2	2	1	2	2	3	2	1	2	2
Trifolium pratense ssp. semipurpureum	1	1	1	1	+	1	+	+	+	.	.	.	.	.	.	.	.
Jasione echinata	.	.	.	.	.	.	.	.	.	.	+	2	1	2	1	2	1
Asplenium septentrionale	.	.	.	.	.	.	.	.	.	.	.	+	1	1	+	1	1
Achillea ligustica	.	.	.	+	1	.	.	.	.	+	1	.	.	.	.	.	.
Festuca rubra	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	+	1
Luzula sicula	.	.	.	.	.	.	.	.	.	.	+	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				
Onosma canescens	3	1	1	+
Laserpitium siculum	.	1	1	5
Teucrium montanum	+	.	+	.
Linum punctatum	1	.	.	.
Helianthemum canum ssp. nebrodense	+	.	.	.
Char. *Cerastio-Astragalion nebrodensis*				
Sesleria nitida ssp. sicula	3	2	2	2
Astragalus nebrodensis	+	3	4	1
Avenochloa cincinnata (diff.)	1	1	1	1
Inula montana (diff.)	+	.	+	+
Alyssum nebrodense	1	+	+	.
Sideritis sicula	2	1	1	.
Pimpinella tragium var. glauca	1	.	1	1
Euphorbia myrsinites (diff.)	1	2	+	.
Char. *Erysimo-Jurinetalia bocconei*				
Asperula scabra var. incana	2	1	2	+
Koeleria splendens ssp. splendens	1	2	1	+
Galium venustum	+	+	1	+
Dianthus arrostii	+	1	2	.
Jurinea bocconei	+	+	.	+
Lomelosia crenata var. hirsuta (diff.)	.	2	1	.
Minuartia verna ssp. grandiflora	+	.	.	.
Polycarpon polycarpoides (diff.)	+	.	.	.
Dianthus siculus	.	.	.	+
Trisetum splendens (diff.)	.	.	.	+
Char. *Rumici-Astragaletea siculi*				
Centaurea parlatoris	+	+	+	+
Cerastium tomentosum	+	1	2	1
Silene sicula	1	+	+	1
Bunium petraeum	+	+	+	+
Carlina nebrodensis	+	+	+	.
Petrorhagia saxifraga ssp. gasparrinii	+	.	.	+
Arabis rosea	+	+	.	.
Valeriana tuberosa (diff.)	.	+	+	.
Phleum ambiguum (diff.)	.	.	.	2
Hieracium macranthum	1	.	.	.
Saponaria sicula	2	.	.	.
Other species				
Festuca circummediterranea	1	1	1	2
Sedum album	+	+	+	+
Micromeria juliana	1	1	2	.
Hypochoeris laevigata	.	+	+	.
Anthemis cupaniana	.	+	1	.
Allium arvense	.	+	.	+
Odontites bocconei	+	.	+	.
Matthiola fruticulosa	.	+	+	.
Poa bulbosa	+	+	.	.
Helianthemum nummularium ssp. tomentosum	.	.	+	+
Anthyllis vulneraria ssp. maura	.	.	.	+
Aethionema saxatile	.	+	.	.
Silene vulgaris	.	.	.	+
Orchis brancifortii	+	.	.	.
Aceras anthropophorum	.	.	.	+
Orobanche sp.	.	.	.	+
Opopanax chironium	+	.	.	.
Crepis leontodontoides	+	.	.	.
Allium flavum	.	+	.	.
Teucrium flavum	.	+	.	.

Spot and date of relevés
Rel. 1-3, Madonie, Mt. Quacella, 10-07-1998
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-Astragalion nebrodensis							
Avenochloa cincinnata (diff.)	3	2	2	3	2	3	2
Inula montana (diff.)	+	+	1	1	1	1	+
Helianthemum cinereum (diff.)	.	.	1	1	.	.	1
Sesleria nitida ssp. sicula	.	.	.	.	1	2	+
Astragalus nebrodensis	.	.	.	.	.	.	+
Euphorbia myrsinites (diff.)	.	.	.	.	.	.	1
Alyssum nebrodense	.	.	.	.	.	.	+
Pimpinella tragium var. glauca	.	.	.	.	.	.	2
Char. *Erysimo-Jurinetalia bocconei*							
Cianthus arcuti	+	+	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 bocconei	.	.	.	.	.	.	1
Char. *Rumici-Astragaletea 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	.	.	.	.	.	.	+
Heracleum macranthum	.	.	.	.	.	.	+
Other species							
Festuca circummediterranea	2	1	2	2	1	1	+
Dactylis glomerata	2	1	+	+	+	1	+
Sedum album	+	+	1	1	+	+	+
Iris 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
Hornungia petraea	+	+	1	+	.	.	.
Lolium perenne	.	+	+	+	.	+	.
Ranunculus millefoliatus	+	+	1	+	.	.	.
Elaeoselinum asclepium	.	.	1	+	+	1	.
Helictotrichon convolutum	.	+	1	1	.	1	.
Crepis bivoniana	1	1	1	1	.	.	.
Trifolium scabrum	1	+	1	+	.	.	.
Bonannia graeca	+	+	.	+	.	.	
Ornithogalum gussonei	+	+	.	+	.	.	
Anthyllis vulneraria ssp. maura	1	.	+	+	.	.	.
Hyoseris radiata	.	+	+	+	.	.	.
Bellis perennis	.	+	+	+	.	.	.
Rumex bucephalophorus	.	.	2	1	.	.	
Dasypirum 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 acaule	+	+	.	.	.	.	.
Orchis brancifortii	.	.	+	.	.	.	+
Medicago orbicularis	+	.	.	.	.	.	
Asphodelus ramosus ssp. ramosus	.	.	.	.	.	.	2
Anthemis cupaniana	+	.	.	.	.	+	.
Allium arvense	.	.	.	.	.	.	+
Aethionema saxatile	.	.	.	.	.	.	+
Acaras anthropophorum	.	.	.	.	.	.	+

Spot and data of relevés
Rel. 1-6, Sicani, Mt. Cammarata, 8-6-1993
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				
Astragalus nebrodensis	4	4	3	3
Dianthus siculus	1	1	1	1
Char. *Cerastio-Astragalion nebrodensis*				
Avenochloa cincinnata (diff.)	2	2	2	1
Sesleria nitida ssp. sicula	.	1	2	2
Helianthemum cinereum (diff.)	.	1	+	1
Alyssum nebrodense	.	+	1	1
Pimpinella tragium var. glauca	.	1	1	+
Cachrys ferulacea (diff.)	+	1	+	.
Inula montana (diff.)	+	+	.	.
Euphorbia myrsinites (diff.)	+	+	.	.
Linum punctatum	.	+	.	.
Char. *Erysimo-Jurinetalia bocconei*				
Koeleria splendens ssp. splendens	2	1	2	2
Galium venustum	+	1	1	1
Bunium petraeum	+	+	+	+
Asperula scabra var. incana	1	+	1	1
Trisetum splendens (difl.)	+	+	.	+
Jurinea bocconei	+	+	+	.
Lomelosia crenata var. hirsuta (diff.)	.	.	2	2
Polycarpon polycarpoides (diff.)	.	.	+	.
Erysimum bonannianum	.	.	.	+
Char. *Rumici-Astragaletea siculi*				
Phleum ambiguum (diff.)	2	2	1	2
Hieracium macranthum	+	1	+	+
Petrorhagia saxifraga ssp. gasparrinii	+	+	+	+
Centaurea parlatoris	1	2	2	1
Arabis rosea	+	+	+	+
Carlina nebrodensis	+	+	+	+
Silene sicula	.	1	2	2
Cerastium tomentosum	.	1	2	2
Tragopogon nebrodensis	+	.	.	.
Other species				
Festuca circummediterranea	1	+	1	2
Hypochoeris laevigata	.	+	+	+
Sedum album	.	+	+	+
Dactylis glomerata	2	1	+	.
Allium arvense	.	+	+	+
Teucrium chamaedrys	1	+	+	.
Helianthemum nummularium ssp. tomentosum	.	1	+	+
Orobanche sp.	+	+	+	.
Pimpinella anisoides	1	1	2	.
Anthemis cupaniana	.	.	1	1
Eryngium campestre	+	+	.	.
Aethionema saxatile	.	+	+	.
Thymus spinulosus	1	1	.	.
Bonannia graeca	+	+	.	.
Brachypodium rupestre	1	+	.	.
Carduus macrocephalus	.	.	+	+
Carex serrulata	+	+	.	.
Scabiosa maritima	+	+	.	.
Secale strictum	1	+	.	.
Asphodeline lutea	.	+	.	.
Convolvulus cantabrica	+	.	.	.
Daucus carota	+	.	.	.
Matthiola fruticulosa	.	.	.	+

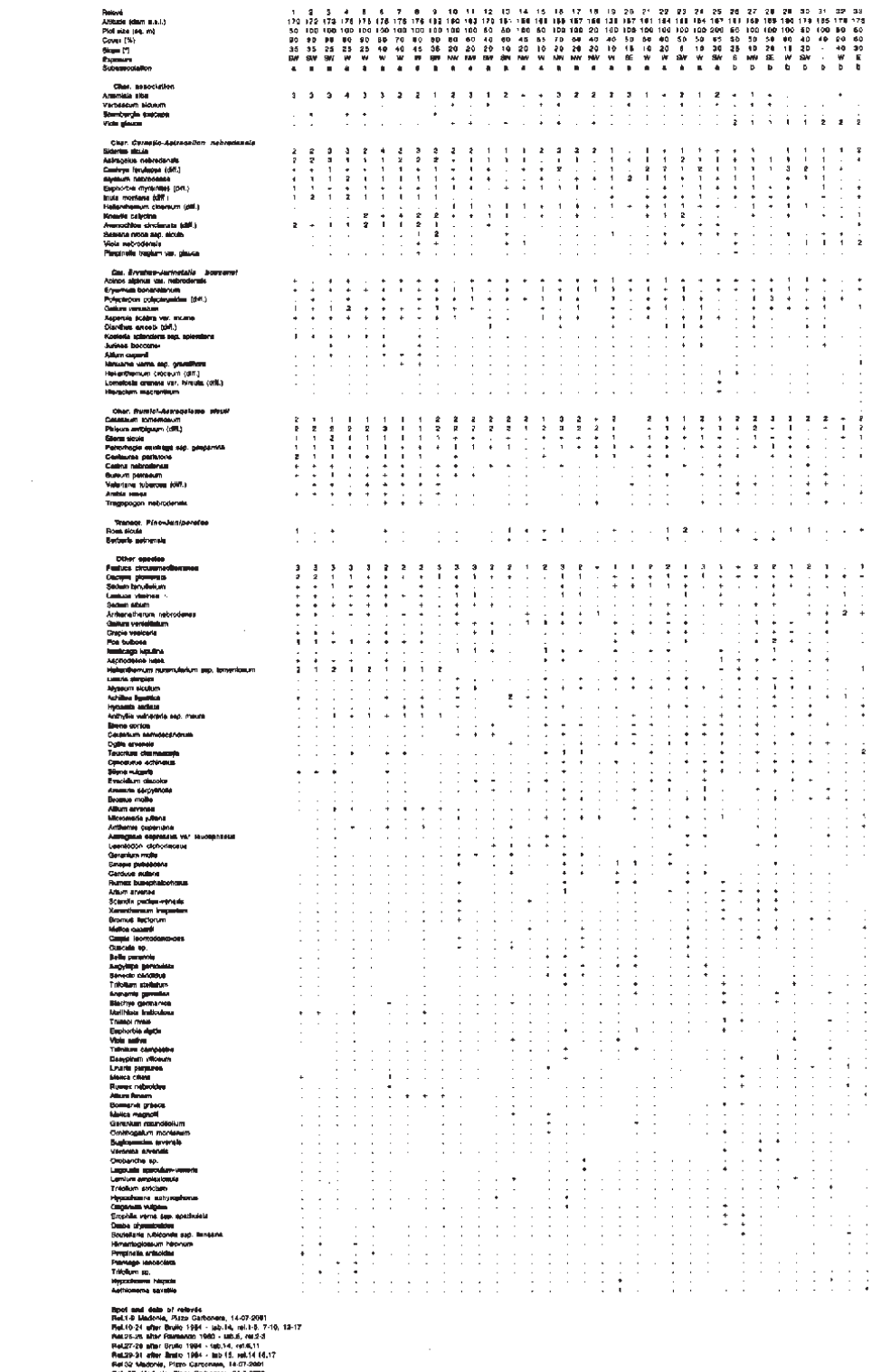
Spot and date of relevés
Rel.1-2, Madonie, Mt. Quacella, 13-07-2001
Rel.3-4, Madonie, Mt. Mufara, 13-07-2001

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.)	150	157	162	159	183	183	169	170	160	160	190	162	158	175	180	185
Rel 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	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. *Cerasio-Astragalion nebrodensis*																
Euphorbia myrsinites (diff.)	.	1	1	1	.	+	1	1	.	.	+	.	+	+	1	1
Astragalus nebrodensis	+	+				+	.	.			2	1	2	2	1	1
Inula montana (diff.)	.	.	.	.	+	.	1	+	.		+	+	.	+	+	+
Helianthemum cinereum (diff.)	.	.	.	1	.	.	.	.	+		+	.	1	+	+	+
Alyssum nebrodense	.	.	.	.	.	.	+	.	+	+	.	+	.	1	+	.
Knautia calycina	.	.	.	.	.	.	.	.	.	.	.	+	+	1	+	.
Sideritis sicula	.	.	.	.	.	+	.	.	+	.	2	.	.	.	.	3
Seseli nitida ssp. sicula	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.
Pimpinella tragium var. glauca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Viola nebrodensis	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Avenochloa cincinnata (diff.)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Char. *Eryslmo-Juriaeetalia bocconei*																
Erysimum bonannianum	+	+	+	+	.	+	+	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 verrucum	+	+	.	+	.	+	2	1	.	.	.	+	1	+	.	+
Dianthus arrostii	.	.	.	+	.	.	.	+	.	.	.	+	1	+	.	.
Trisetum splendens (diff.)	.	.	.	.	.	.	.	.	.	.	.	3	1	.	.	.
Jurinea bocconei	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+
Helianthemum croceum (diff.)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Asperula scabra var. linoeva	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Allium cupani	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Char. *Rumici-Astragaletea siculi*																
Cerastium tomentosum	.	.	+	+	1	+	1	2	2	2	+	1	+	3	1	2
Petrorhagia saxifraga ssp. gasparrinii	.	1	1	1	.	1	+	+	+	+	1	+	1	+	+	2
Centaurea parlatoris	1	+	1	1	.	1	1	+	.	.	+	2	1	+	+	1
Phleum arabigum (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 maccranthum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Transgr. *Pino-Juniperetea*																
Rosa sicula	.	.	.	.	.	.	.	.	.	.	.	1	+	.	+	.
Other species																
Bromus tectorum	+	+	+	+	1	1	+	+	.	1	+	1	+	+	+	.
Festuca circummediterranea	2	+	+	2			2	+	2	.	2	1	2	2	1	2
Alyssum alcicum	+	1	1	1	+	1	+	+	+	1	1	.	+	.	.	.
Dactylis glomerata	.	+	+	+	1	2	+	.	.	+	1	2	1	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	.	+	.	+	+	.
Evaxidium discolor	.	+	+	+	.	+	.	.	1	.	+	+	1	.	+	.
Asphodeline lutea	.	1	1	+	.	.	+	1	.	.	+	1	+	.	.	.
Poa bulbosa	+	+	.	+	.	1	+	+	+	.	.	.	+	.	.	1
Medicago lupulina	.	1	+	+	.	1	.	.	+	+	.	+	.	.	1	1
Xeranthemum inapertum	.	+	.	+	.	+	+	+	+	.	.	.	.	.	+	+
Anthemis aphacoides	+	.	+	+	1	1	+	.	.	.	+	.	.	.	.	.
Geranium rotundifolium	+	.	+	+	+	.	+	+	.	+	.	.	.	.	.	.
Veronica arvensis	+	+	.	+	.	+	+	.	.	.	.	.	+	+	.	.
Hypochoeris hispida	+	+	+	.	.	.	1	+	.	.	.	+	.	.	.	.
Silene vulgaris ssp. angustifolia	.	.	+	.	.	.	.	+	+	+	.	1	+	.	.	.
Vicia sativa	+	.	.	+	.	.	.	+	+	+	+	.	.	.	.	.
Silene conica	.	.	.	.	+	+	+	.	+	.	.	.	+	.	+	.
Ogilla arvensis	.	.	+	+	+	.	.	+	.	.	2	.	.	.	+	.
Scandix pecten-veneris	.	+	.	+	.	.	+	+	.	.	+	.	.	.	+	.
Ornithogalum monanum	+	+	+	.	.	.	+	.	.	+	.	.	.	.	+	.
Hyoseris radiata	.	.	+	.	.	.	+	1	+	+	.	.	.	.	.	.
Stachys germanica ssp. dasyanthes	.	.	.	.	.	.	.	1	+	+	+	.	.	.	+	+
Cerastium semidecandrum	+	.	.	+	.	.	.	+	.	.	+	.	+	.	.	.
Ranunculus millefoliatus	+	.	+	.	.	.	+	+	.	.	.	.	.	.	+	.
Lactuca virosa	.	.	.	.	+	.	+	+	.	.	.	.	.	.	+	1
Anthemis nebrodensis	.	.	.	.	.	.	.	+	+	+	.	1	.	.	.	.
Bellis perennis	.	.	+	+	.	.	.	+	.	.	+	.	.	.	.	.
Bupleurodes arvensis	.	+	.	.	+	+	.	.	.	.	+	.	.	.	.	.
Trifolium bivonae	.	+	+	+	.	.	+	.	.	.	.	.	.	.	.	.
Trifolium campestre	+	.	.	.	.	.	+	+	.	.	.	+	.	.	.	.
Trifolium phleoides	+	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.
Asthionema saxatile	.	.	+	.	.	.	+	+	.	.	+	.	.	.	.	.
Linaria simplex	.	+	.	.	.	+	.	.	.	.	+	.	.	.	+	.
Anthyllis vulneraria ssp. maura	.	.	.	.	.	.	.	+	.	.	.	.	+	.	+	1
Melica cupani	.	.	.	.	.	.	.	.	+	.	.	1	.	+	.	.
Thlaspi perfoliatum	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.
Achillea ligustica	.	.	.	.	.	.	.	.	2	2	.	.	+	.	.	.
Carastium glomeratum	.	.	+	.	.	.	.	+	.	+	.	.	.	.	.	.
Trifolium stridum	+	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.
Lamium amplexicaule	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.
Thlaspi rivale	.	+	.	.	.	.	+	.	.	.	.	.	.	.	1	.
Galium verticillatum	.	.	.	.	.	+	.	+	.	.	.	.	.	+	.	.
Erophila verna	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.
Carduus nutans	.	.	.	.	.	+	.	.	+	.	.	.	.	.	+	.
Legousia speculum-veneris	.	.	.	.	.	.	+	+	.	.	.	.	.	.	+	.
Euphorbia nigra	.	.	w	.	.	.	.	.	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.



Spot and data of relevés
Rel.1-8 Madonie, Pizzo Carbonara, 14-07-2001
Rel.10-24 after Brullo 1984 - tab.14, rel.1-5, 7-10, 13-17
Rel.25-26 after Raimondo 1980 - tab.6, rel.2-3
Rel.27-29 after Brullo 1984 - tab.14, rel.6,11
Rel.30-31 after Brullo 1984 - tab.15, rel.14,16,17
Rel.32 Madonie, Pizzo Carbonara, 14-07-2001
Rel. 33, Madonie, Pizzo Carbonara, 24-7-2002

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							
Melica cupanii	2	3	3	2	2	2	2
Char. *Cerastio-Astragalion nebrodensis*							
Sesleria nitida ssp. sicula	3	2	2	3	2	2	2
Sideritis sicula	2	1	3	3	3	3	3
Astragalus nebrodensis	3	3	2	1	1	1	3
Avenochloa cincinnata (diff.)	1	1	1	1	1	+	+
Cachrys ferulacea (diff.)	1	1	1	+	+	1	+
Euphorbia myrsinites (diff.)	1	1	1	+	1	1	1
Alyssum nebrodense	1	2	1	+	+	.	2
Helianthemum canum ssp. nebrodense	1	1	+	+	+	.	+
Viola nebrodensis	+	+	+	+	+	.	.
Inula montana (diff.)	.	.	1	+	+	+	+
Pimpinella tragium var. glauca	+	+	.	+	+	.	.
Helianthemum cinereum (diff.)	.	.	.	.	.	1	+
Char. *Erysimo-Jurinetalia bocconei*							
Acinos alpinus var. nebrodensis	+	+	+	+	1	1	+
Galium venustum	2	2	2	2	2	+	+
Minuartia verna ssp. grandiflora	1	+	+	+	+	.	+
Polycarpon polycarpoides (diff.)	.	.	+	+	+	+	+
Erysimum bonannianum	.	.	+	+	.	+	+
Asperula scabra var. incana	1	.	.	+	+	.	.
Allium cupani	.	.	.	.	.	+	+
Char. *Rumici-Astragaletea siculi*							
Centaurea parlatoris	+	1	+	+	+	1	+
Cerastium tomentosum	2	2	2	1	2	1	1
Petrorhagia saxifraga ssp. gasparrinii	+	+	+	+	+	2	+
Silene sicula	1	1	1	1	1	+	+
Bunium petraeum	+	+	+	+	+	+	+
Valeriana tuberosa (diff.)	+	+	+	+	+	+	+
Arabis rosea	+	+	+	+	.	+	+
Carlina nebrodensis	.	.	+	.	+	.	.
Phleum ambiguum (diff.)	.	.	.	.	.	1	+
Other species							
Anthyllis vulneraria ssp. busambarensis	1	+	1	1	1	+	+
Dactylis glomerata	+	+	+	+	1	+	+
Festuca circummediterranea	1	2	2	2	2	2	1
Helianthemum nummularium ssp. tomentosum	2	1	1	2	2	1	+
Sedum album	+	+	+	.	+	1	+
Lactuca viminea	.	.	+	+	+	1	+
Crepis vesicaria	+	+	+	+	+	.	.
Allium arvense	+	+	+	+	+	.	.
Medicago lupulina	.	.	+	+	+	2	+
Verbascum rotundifolium	.	.	1	.	+	+	+
Allium flavum	+	+	.	.	+	.	.
Poa bivonae	+	.	.	+	+	.	.
Teucrium chamaedrys	.	.	.	.	+	+	+
Petrorhagia illyrica ssp. hainaldiana	.	.	.	+	.	2	+
Anthemis cupaniana	+	+	.	.	.	.	.
Hypochoeris laevigata	.	.	+	+	.	.	.
Linaria purpurea	+	.	.	.	.	.	+
Sedum tenuifolium	.	.	.	.	.	+	+
Trifolium pratense ssp. semipurpureum	.	.	.	.	.	+	+
Xeranthemum inapertum	.	.	.	.	.	+	+
Micromeria juliana	.	.	.	.	.	1	1
Asphodeline lutea	.	.	.	+	.	.	.
Matthiola fruticulosa	.	.	+	.	.	.	.
Musacri atlanticum	+	.	.	.	.	.	.
Scutellaria rubicunda	.	.	+	.	.	.	.
Senecio siculus	.	.	+	.	.	.	.
Berberis aethnensis	.	.	.	.	.	1	.
Poa bulbosa	.	.	.	.	.	+	.

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	165	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									
Peucedanum nebrodense	3	5	3	3	4	4	4	3	4
Char. *Cerastio-Astragalion nebrodensis*									
Cachrys ferulacea (diff.)	2	1	2	1	2	2	2	2	2
Euphorbia myrsinites (diff.)	+	1	1	1	1	1	2	2	+
Astragalus nebrodensis	.	.	+	.	1	.	1	+	.
Helianthemum cinereum (diff.)	.	.	.	+	+	+	.	+	.
Char. *Erysimo-Jurinetalia bocconei*									
Allium cupani	+	+	+	.	+	+	+	+	.
Erysimum bonannianum	+	.	+	+	1	1	1	1	.
Galium venustum	.	+	1	+	1	1	+	+	.
Polycarpon polycarpoides (diff.)	.	.	+	+	1	+	+	+	.
Acinos alpinus var. nebrodensis	.	.	.	.	.	+	+	+	+
Minuartia verna ssp. grandiflora	+	+	.	.	+	.	.	+	.
Char. *Rumici-Astragaletea siculi*									
Bunium petraeum	2	1	2	2	1	2	2	1	+
Petrorrhagia saxifraga ssp. gasparrini	2	1	1	2	1	1	2	1	+
Centaurea parlatoris	1	+	2	2	2	1	2	1	1
Cerastium tomentosum	1	1	1	+	1	1	2	2	+
Herniaria microcarpa		1	+	+	+	+	.	+	.
Valeriana tuberosa (diff.)	.	.	+	+	+	+	.	+	.
Tragopogon nebrodense	.	.	+	.	+	.	.	.	.
Arabis rosea	.	.	.	.	.	.	+	+	.
Silene sicula	.	.	.	.	.	.	+	+	.
Other species									
Festuca circummediterranea	3	2	3	3	3	3	4	4	2
Dactylis glomerata	2	1	1	2	1	1	2	1	+
Hypochoeris hispida	1	2	1	+	+	2	2	1	+
Crepis vesicaria	1	+	1	+	+	+	+	+	+
Trifolium pratense ssp.semipurpureum	1	1	+	1	2	2	1	2	1
Sedum hispanicum	+	1	+	+	1	+	+	1	+
Trifolium repens	.	+	1	2	2	2	2	1	1
Malva moscata	.	.	+	+	1	1	+	+	1
Aethionema saxatile	+	.	.	+	+	+	+	+	.
Medicago lupulina	1	1	.	.	.	+	1	+	+
Anthyllis vulneraria ssp. maura	.	.	+	+	+	+	+	+	.
Anthemis sphacelata	+	+	.	+	+	.	.	+	.
Rumex nebrodes	.	.	+	+	.	.	+	1	+
Astragalus depressus var. leucophaeus	+	+	.	.	.	+	.	.	.
Cerinthe auriculata	+	.	.	.	.	.	.	.	+
Galium verum	.	.	.	.	.	.	.	+	3
Petrorrhagia illyrica ssp. hainaldiana	.	.	.	.	.	.	.	1	+
Hypochoeris laevigata	.	.	.	.	.	.	.	+	.
Chenopodium bonus-hericus	.	.	.	.	.	.	.	.	1
Lolium perenne	.	.	.	.	.	.	.	.	2

Spot and date of relevés

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

TABLE 13 - Seslerio 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															
Helictotrichon convolutum	5	5	4	4	4	3	4	5	4	4	3	2	4	5	5
Char. *Cerastio-Astragalion nebrodensis*															
Inula montana (diff.)	2	1	2	3	2	3	2	2	1	2	1	1	+	1	+
Avenochloa cincinnata (diff.)	3	2	2	1	2	2	2	1	3	2	2	2	2	+	.
Seslaria nitida ssp. sicula	.	1	2	2	2	2	2	1	2	2	4	5	3	2	2
Cachrys ferulacea (diff.)	.	.	.	1	1	+	.	1	1	+	1	.	.	1	.
Helianthemum cinereum (diff.)	.	.	.	.	+	1	1	.	1	1	.	.	.	.	.
Char. *Erysimo-Jurinetalia boccconei*															
Erysimum bonannianum	1	+	1	1	1	2	1	1	2	2	2	2	1	+	.
Dianthus arrostii	1	1	2	+	1	2	1	1	1	+	1	1	.	+	1
Allium cupani	+	+	+	+	+	.	+	+	+	+	+	.	.	+	+
Acinos alpinus var. nebrodensis	.	.	+	1	1	.	+	1	+	1	1	+	+	.	.
Galium verrucosum	1	1	1	1	1	2	2	1	2	2	.	.	.	.	.
Asperula scabra var. incana	1	2	+	2	1	1	2	1	1	+	.	.	.	.	.
Koeleria splendens ssp. splendens	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.
Trisetum splendens	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Char. Cl. *Rumici-Astragaletea siculi*															
Silene sicula	1	+	2	1	+	2	2	1	1	1	1	1	1	1	+
Centaurea peristeris	.	+	1	1	.	1	1	1	1	2	1	1	+	+	+
Arabis rosea	.	+	1	+	1	1	.	2	+	+	+	+	+	.	.
Petromagia saxifraga ssp. gasparrini	1	1	1	1	+	1	1	+	1	1	.	.	.	.	.
Valeriana tuberosa (diff.)	.	+	+	1	.	+	.	1	+	.	+	1	+	.	+
Other species															
Festuca circummediterranea	2	2	2	2	2	2	+	1	2	2	2	3	2	1	+
Poa bulbosa	+	1	1	1	+	+	1	1	+	+	+	2	+	2	+
Sedum album	1	1	1	1	1	1	+	.	+	+	+	1	+	+	+
Elaeoselinum asclepium ssp. meoides	2	1	2	1	1	+	1	1	1	1	.	+	+	+	+
Anthyllis vulneraria ssp. busambarensis	2	2	2	2	2	1	2	2	1	1	1	1	+	.	+
Scorzonera villosa	.	.	1	1	1	+	+	1	2	1	1	.	1	1	+
Thymus spinulosus	2	1	2	1	1	2	1	1	2	2	.	.	.	1	+
Eryngium campestre	1	+	+	1	+	+	.	+	1	1	.	.	.	+	+
Allium arvense	+	1	1	1	+	+	.	.	+	+	.	.	.	+	+
Thalictrum calabricum	1	2	1	1	+	1	+	+	.	.	1	.	.	.	1
Hyoseris radiata	1	1	1	+	.	+	1	+	.	.	+	.	+	.	.
Iris pseudopumila	+	+	1	.	1	1	.	.	1	+	.	.	.	+	.
Helianthemum nummularium ssp. tomentosum	.	.	1	+	1	2	1	1	1	+	.	.	.	.	.
Carex cuspidata	1	+	1	1	1	+	+	.	.	+	.	.	.	.	.
Medicago lupulina	1	1	1	1	+	1	2	1	.	.	.	.	.	.	.
Brachypodium rupestre	1	1	1	1	2	2	2	1	.	.	.	.	.	.	.
Dactylis hispanica	.	.	.	.	.	.	.	.	2	1	2	+	1	2	+
Lolium perenne	+	+	+	+	.	1	.	.	1	2	.	.	.	.	.
Origanum heracleoticum	+	1	1	+	.	.	1	+	.	.	.	.	.	.	.
Picris hieracioides	+	1	+	.	+	.	+	+	.	.	.	.	.	.	.
Galium lucidum	.	.	.	.	.	.	.	.	.	.	2	+	1	1	+
Allium sardoum	.	.	.	.	.	.	.	.	.	.	1	+	+	+	+
Asphodeline lutea	.	.	.	.	.	.	.	.	+	1	.	+	1	.	+
Crepis vesicaria	.	.	.	.	.	.	.	.	1	+	+	.	.	+	+
Pimpinella anisoides	1	+	.	.	+	+	.	.	.	+	.	.	.	.	.
Hypericum perfoliatum	+	+	+	+	.	.	.	+	.	.	.	.	.	.	.
Oopoanax chironium	.	.	.	.	.	.	.	.	.	.	.	1	1	2	+
Bonannia graeca	.	.	.	.	.	.	.	.	1	+	.	.	.	+	+
Silene vulgaris	+	.	.	1	1	.	.	+	.	.	.	.	.	.	.
Loroglossum hircinum	+	.	.	.	.	+	1	+	.	.	.	.	.	+	.
Anthemis cupaniana	.	.	.	.	.	.	.	.	.	.	2	2	.	.	+
Bellis perennis	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.
Ranunculus millefoliatus	.	.	.	.	.	.	.	.	+	.	.	+	.	+	.
Hypochoeris hispida	.	.	+	.	1	.	+	.	.	.	.	.	.	.	.
Achillea ligustica	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+
Sedum tenuifolium	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+
Ornithogalum montanum	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+
Centranthus ruber	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+
Papaver rhoeas	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Trifolium stellatum	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Trifolium campestre	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Crupina crupinastrum	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Bromus lanceolatus	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Petromagia prolifera	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
Sanguisorba minor ssp. verrucosa	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.
Convolvulus cantabrica	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.
Reichardia picroides	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.
Sinapis pubescens	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
Saxifraga bulbifera	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Trifolium speciosum	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Ixelis tinctoria	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Rumex acetosa	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Avena barbata	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Rumex nebrodes	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Bromus madritensis	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Asperula laevigata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Leopoldia comosa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Teucrium scordioides	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Bellevalia sp.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Silene coeli-rosa	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Picris aculeata	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.

Spot and date of relevé
Rel. 1-8, Sicani, Mt. Cammarata, 8-5-1993
Rel. 9-10 Sicani, Monte delle Rose 9-6-1993
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										
Sesleria nitida ssp. sicula	5	4	4	3	4	3	4	3	5	4
Festuca rubra	2	2	3	3	3	3	2	3	2	2
Char. *Cerastio-Astragalion nebrodensis*										
Avenochloa cincinnata (diff.)	1	2	1	1	+	1	1	1	2	2
Cachrys ferulacea (diff.)	1	.	1	1	2	1	1	2	.	.
Helianthemum cinereum (diff.)	.	1	.	.	.	.	.	.	2	3
Inula montana (diff.)	.	1	.	.	.	.	.	.	1	1
Char. *Erysimo-Jurinetalia bocconei*										
Galium venustum	2	2	2	2	2	1	2	2	1	2
Acinos alpinus var. nebrodensis	2	1	1	1	1	+	1	+	2	1
Erysimum bonnanianum	1	2	+	+	.	1	1	+	1	+
Dianthus arrostii	1	1	.	1	1	+	.	1	+	1
Asperula scabra var. incana	.	.	.	+	+	1	.	.	1	1
Allium cupani	+	+	.	.	.	.	.	.	+	+
Koeleria splendens ssp. splendens	.	.	.	.	.	.	.	.	2	1
Char. Cl. *Rumici-Astragaletea siculi*										
Silene sicula	2	1	1	2	1	1	2	1	1	2
Centaurea parlatoris	1	2	+	.	.	+	+	.	1	1
Arabis rosea	.	+	.	.	+	.	+	+	+	+
Petrorhagia saxifraga ssp. gasparrini	2	1	.	.	.	.	.	.	.	.
Valeriana tuberosa (diff.)	.	.	.	.	.	.	.	.	+	.
Other species										
Thymus spinulosus	.	2	+	1	1	+	+	2	2	2
Anthyllis vulneraria ssp. maura	+	1	+	1	1	+	1	.	2	2
Hypochoeris laevigata	1	+	+	+	2	1	2	1	.	.
Eleoselinum asclepium ssp. meoides	1	2	.	.	.	+	+		2	1
Festuca circummediterranea	2	2	.	.	1	.	1	1	1	2
Picris hieracioides	+	1	1	1	1	.	1	1	.	.
Silene vulgaris	.	1	1	1	2	1	1	1	.	.
Cnidium silaifolium	.	.	3	2	3	3	2	2	.	.
Opopanax chironium	.	.	2	2	1	2	1	1	.	.
Physiopermum verticillatum	.	.	1	2	1	1	2	1	.	.
Thalictrum calabricum	1	+	.	1	+	+	.	.	.	.
Eryngium campestre	+	+	.	.	+	.	.	.	1	1
Helictotrichon convolutum	2	2	.	+	1	.	.	.	.	.
Helianthemum nummularium ssp. tomentosum	+	+	.	.	.	.	.	.	1	+
Medicago luputina	1	1	.	.	.	.	+	.	.	1
Dactylis hispanica	1	+	+	.	.	.	.	.	.	.
Saxifraga bulbifera	.	.	.	.	+	+	.	+	.	.
Brachypodium rupestre	2	1	.	.	.	.	.	.	.	.
Hyoseris radiata	1	+	.	.	.	.	.	.	.	.
Allium flavum	.	.	+	.	.	.	.	+	.	.
Anthemis cupaniana	.	.	.	.	.	+	1	.	.	.
Scabiosa maritima	.	.	.	.	.	+	.	+	.	.
Poa bulbosa	.	.	.	.	.	.	.	.	1	+
Scorzonera villosa	.	.	.	.	.	.	.	.	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 italici-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											
Helichrysum italicum	+	2	2	1	1	2	3	1	1	1	2
Char. *Cerastio-Astragalion nebrodensis*											
Pimpinella tragium var. glauca	3	2	2	2	1	2	1	.	1	2	1
Euphorbia myrsinites (diff.)	2	2	2	2	1	1	.	.	1	1	2
Onosma canescens	1	2	3	4	3	2	.	.	2	1	4
Avenochloa cincinnata (diff.)	1	1	+	1	1	.	1	1	.	.	.
Char. *Erysimo-Jurinetalia bocconei*											
Acinos alpinus var. nebrodensis	.	+	+	+	+	.	+	+	1	1	1
Dianthus arrostii	+	.	.	.	+	+	1	+	1	+	+
Galium venustum	2	2	2	2	2	2	.	.	.	.	.
Lomelosia crenata var. hirsuta (diff.)	.	.	.	+	2	3	1	4	.	.	+
Minuartia verna ssp. grandiflora	+	1	+	.	+	+	.	.	.	.	.
Hellanthemum croceum (diff.)	.	.	.	.	.	.	.	+	.	.	.
Char. Cl. Rumici-Astragaletea siculi											
Cerastium tomentosum	2	1	1	1	1	2	1	.	3	2	1
Centaurea parlatoris	+	1	+	1	+	+	.	+	+	1	1
Petrorhagia saxifraga ssp. gasperrinii	+	+	+	+	1	.	.	.	+	+	+
Bunium petraeum	+	+	+	.	+	+	.	+	.	.	.
Arabis rosea	.	.	.	.	.	.	+	+	+	+	+
Silene sicula	.	.	.	.	.	.	.	+	1	+	+
Galium aetnicum	.	.	.	.	.	.	.	+	3	3	2
Other species											
Helianthemum canum ssp. canum	2	2	2	2	1	2	+	1	2	2	2
Anthyllis vulneraria ssp. busambarensis	+	+	+	+	+	+	1	1	2	+	+
Dactylis hispanica	+	1	1	2	1	+	1	1	1	1	2
Carlina hispanica ssp. globosa	1	+	1	1	+	+	+	.	+	+	1
Hyoseris radiata	1	+	+	+	1	+	.	1	1	1	1
Micromeria graeca ssp. tenuifolia	2	1	2	2	1	2	2	.	1	1	1
Origanum heracleoticum	.	+	+	1	+	+	2	1	1	+	1
Sinapis pubescens	.	+	+	+	+	+	+	1	+	+	1
Reichardia picroides	+	+	+	.	+	+	.	+	+	+	1
Festuca rubra ssp. microphylla	2	1	1	1	1	1	.	+	.	.	.
Calicotome infesta	.	1	1	1	1	.	.	.	1	1	2
Plantago lanceolata var. sphaerostachia	1	.	+	+	+	.	.	1	.	.	+
Sixalis maritima	.	+	+	+	.	+	1	+	.	.	.
Asphodelus ramosus	.	.	+	1	.	.	.	+	+	.	2
Festuca circummediterranea	.	.	.	.	.	.	+	1	3	2	2
Pallenis spinosa	.	.	.	+	.	+	.	+	+	+	.
Thymus longicaulis	.	+	1	+	.	+	.	+	.	.	.
Crupina crupinastrum	.	.	.	.	.	.	+	.	+	+	+
Teucrium flavum	.	.	.	.	.	.	1	+	2	+	.
Urospermum dalechampii	.	.	.	+	.	.	.	.	+	+	+
Orchis papilionacea ssp. grandiflora	.	.	.	.	.	.	.	.	+	+	+
Sedum album	.	.	.	.	.	.	.	.	+	1	+
Achillea ligustica	.	.	.	.	.	.	1	+	.	.	.
Allium tenuiflorum	.	.	.	+	+	.	.	.	.	.	.
Brachypodium rupestre	.	.	.	.	.	.	1	+	.	.	.
Dittrichia viscosa	.	.	.	.	.	.	1	+	.	.	.
Hypochoeris laevigata	.	.	.	.	.	.	+	+	.	.	.
Medicago lupulina	.	.	.	.	.	.	1	1	.	.	.
Ornithogalum gussonei	.	.	.	.	.	.	.	.	+	.	+
Sedum tenuifolium	.	.	.	.	.	.	.	.	+	.	1
Daphne oleoides	.	.	.	.	.	.	.	+	.	.	.
Centaurium erythraea ssp. majus	.	.	.	.	.	.	.	+	.	.	.
Linaria purpurea	.	.	.	.	.	.	.	+	.	.	.
Orchis brancifortii	.	.	.	.	.	.	.	.	+	.	.
Silene vulgaris ssp. angustifolia	.	.	.	.	.	.	.	1	.	.	.
Thapsia garganica	.	.	.	.	.	.	1	.	.	.	.
Allium arvense	.	.	.	.	.	.	.	.	.	.	+

Spot and date of relevés
Rel.1-6: Peloritani, between Punta Seddiri and Mt. Scuderi, 5-7-1997
Rel. 7: Peloritani, Mt. Scuderi, (Nexl 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	80	50	70	60	80	50	70	80	95
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																	
Asperula gussonei	3	3	2	2	2	2	1	2	2	2	3	2	.	+	.	.	.
Plantago humilis	.	2	3	3	2	1	3	3	.	.	.	.	4	3	3	3	5
Char. *Cerastio-Astragalion nebrodensis*																	
Euphorbia myrsinites (diff.)	2	1	1	.	1	+	1	1	2	2	1	3	2	2	1	1	1
Pimpinella tragium var. glauca	.	+	+	.	.	.	.	.	3	2	2	2	1	1	+	1	.
Linum punctatum	.	.	.	.	.	.	2	1	.	.	.	+	2	1	.	1	.
Avenochloa cincinnata (diff.)	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Onopsis canescens	.	.	.	.	.	.	.	1	.	.	.	.	.	+	.	.	.
Cachrys ferulacea (diff.)	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Char. *Erysimo-Jurinetalia bocconei*																	
Galium vaillantum	2	1	1	1	1	1	+	1	3	2	2	2	1	2	2	2	1
Acinos alpinus var. nebrodensis	.	+	+	.	.	1	+	+	2	2	1	1	1	1	1	+	1
Minuartia verna ssp. grandiflora	.	.	+	.	.	.	+	1	1	1	1	1	1	1	1	+	+
Lomelosia crenata var. hirsuta (diff.)	.	1	.	.	2	1	1	1	.	+	1	3	.	.	.	.	.
Dianthus arrostii	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	+	.
Char.Rumici-Astragaletea siculi																	
Cerastium tomentosum	2	3	2	1	2	3	2	2	2	3	3	2	2	2	2	3	2
Petrorhagia saxifraga ssp. gasparrinii	+	+	+	1	+	+	+	+	+	+	+	1	+	+	+	.	.
Centaurea parlatoris	1	.	+	1	1	.	1	+	1	+	1	+	+	.	2	1	1
Silene sicula	.	.	+	1	.	+	+	.	1	+	+	1	+	+	+	+	1
Bunium petraeum	1	1	+	.	+	+	+	+	.	.	.	.	.	.	.	.	.
Arabis rosea	.	.	.	.	.	.	.	.	+	+	+	+	.	.	.	.	.
Other species																	
Helianthemum canum ssp. canum	2	2	2	.	+	+	.	+	2	2	2	2	2	2	2	2	1
Thymus longicaulis	.	+	1	2	1	+	1	1	2	2	+	+	+	.	.	.	1
Festuca circummediterranea	.	.	.	.	2	1	.	1	2	3	2	3	2	2	2	2	1
Hypochoeris hispida	1	+	+	.	.	.	.	.	1	1	+	1	+	+	+	+	+
Lolium perenne	1	1	1	+	+	+	.	+	.	.	.	.	+	+	+	+	1
Anthemis arvensis ssp. sphacelata	.	1	+	1	1	1	.	+	.	.	.	.	1	2	3	1	1
Hyoseris radiata	1	+	.	.	.	.	.	.	1	2	1	1	+	+	+	+	+
Hypochoeris laevigata	.	.	.	+	+	+	+	+	.	+	+	1	.	+	+	+	.
Micromeria graeca ssp. tenuifolia	+	.	1	.	.	1	.	+	+	+	+	1	.	+	1	+	.
Dactylis hispanica	1	1	1	.	.	.	.	.	+	1	+	+	+	+	+	.	.
Plantago lanceolata	+	+	+	1	+	+	+	.	.	+	.	+	.	.	.	.	.
Festuca rubra ssp. microphylla	2	2	2	2	1	1	2	2	.	.	.	.	.	.	.	.	.
Allium tenuiflorum	+	+	.	+	+	+	+	+	.	.	.	.	.	.	.	.	.
Anthyllis vulneraria ssp. busambarensis	.	.	.	.	.	.	.	+	2	1	+	1	.	.	.	+	1
Carlina hispanica ssp. globosa	1	.	+	.	.	+	.	.	+	.	.	.	+	+	.	.	1
Sedum album	.	.	.	.	1	+	.	.	+	+	+	+	.	.	.	.	.
Sinapis pubescens	+	.	.	.	.	.	.	.	1	+	+	+	.	.	.	.	.
Poa bulbosa	.	.	.	.	.	.	.	.	.	.	.	.	2	2	2	1	+
Anthoxanthum odoratum	1	.	.	2	+	.	.	.	.	.	.	.	.	.	.	.	1
Trifolium pratense ssp. semipurpureum	1	1	1	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Sedum tenuifolium	.	.	.	.	.	.	.	.	+	1	+	1	.	.	.	.	.
Bromus sp.	.	.	.	.	.	.	.	.	1	2	1	1	.	.	.	.	.
Sideritis romana	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	+
Cynosurus cristatus	1	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.
Medicago lupulina	.	1	1	.	.	.	.	.	.	.	.	+	.	.	.	.	.
Viola messanensis	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	+
Carduus nutans	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jasione echinata	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.
Orchis papilionacea ssp. grandiflora	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.
Calicotome infesta	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.
Poa bivonae	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.
Cistus salvifolius	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
Hordeum bulbosum	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Thapsia garganica	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Teucrium flavum	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Asphodelus ramosum	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Petrorhagia illyrica ssp. haynaldiana	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Reichardia picroides	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Orchis brancifortii	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Pallenis spinosa	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Bellis perennis	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
Aceras anthropophorum	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Edraianthus siculus	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Athamanta sicula	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Colchicum bivonae	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	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				
Plantago humilis	3	4	3	4
Minuartia condensata	2	2	3	2
Scleranthus venustus	.	+	+	.
Char. *Armerion nebrodensis*				
Armeria nebrodensis	2	2	2	2
Avenella flexuosa (diff.)	+	+	+	+
Festuca pignattiorum	2	1	1	+
Genista cupanii	.	.	1	1
Char. *Erysimo-Jurinetalia bocconei*				
Polycarpon polycarpoides (diff.)	+	+	+	+
Erysimum bonannianum	1	+	+	1
Allium cupanii	1	+	+	+
Acinos alpinus var. nebrodensis	+	.	+	+
Jurinea bocconei	+	+	.	+
Asperula scabra var. incana	+	.	.	.
Char. *Rumici-Astragaletea siculi*				
Petrorhagia saxifraga ssp. gasparrinii	2	1	2	1
Herniaria microcarpa	1	+	+	1
Silene sicula	1	+	1	1
Hieracium macranthum	2	2	2	2
Valeriana tuberosa (diff.)	1	+	1	1
Arabis rosea	+	1	+	+
Bunium petraeum	+	+	1	+
Phleum ambiguum (diff.)	1	1	1	2
Centaurea parlatoris	1	+	+	1
Rumex multifidus (diff.)	+	+	+	.
Carlina nebrodensis	+	+	.	+
Cerastium tomentosum	1	1	.	1
Tragopogon nebrodensis	+	+	.	+
Other species				
Anthemis cupaniana	2	2	1	2
Festuca circummediterranea	3	3	2	2
Sedum tenuifolium	1	1	+	2
Anthoxanthum odoratum	1	+	+	+
Jasione echinata	1	+	+	1
Tolpis virgata ssp. sexaristata	+	1	1	1
Petrorhagia illyrica ssp. hainaldiana	+	+	.	.
Achillea ligustica	1	+	.	.
Plantago lanceolata	+	.	.	+

Spot and date of relevés

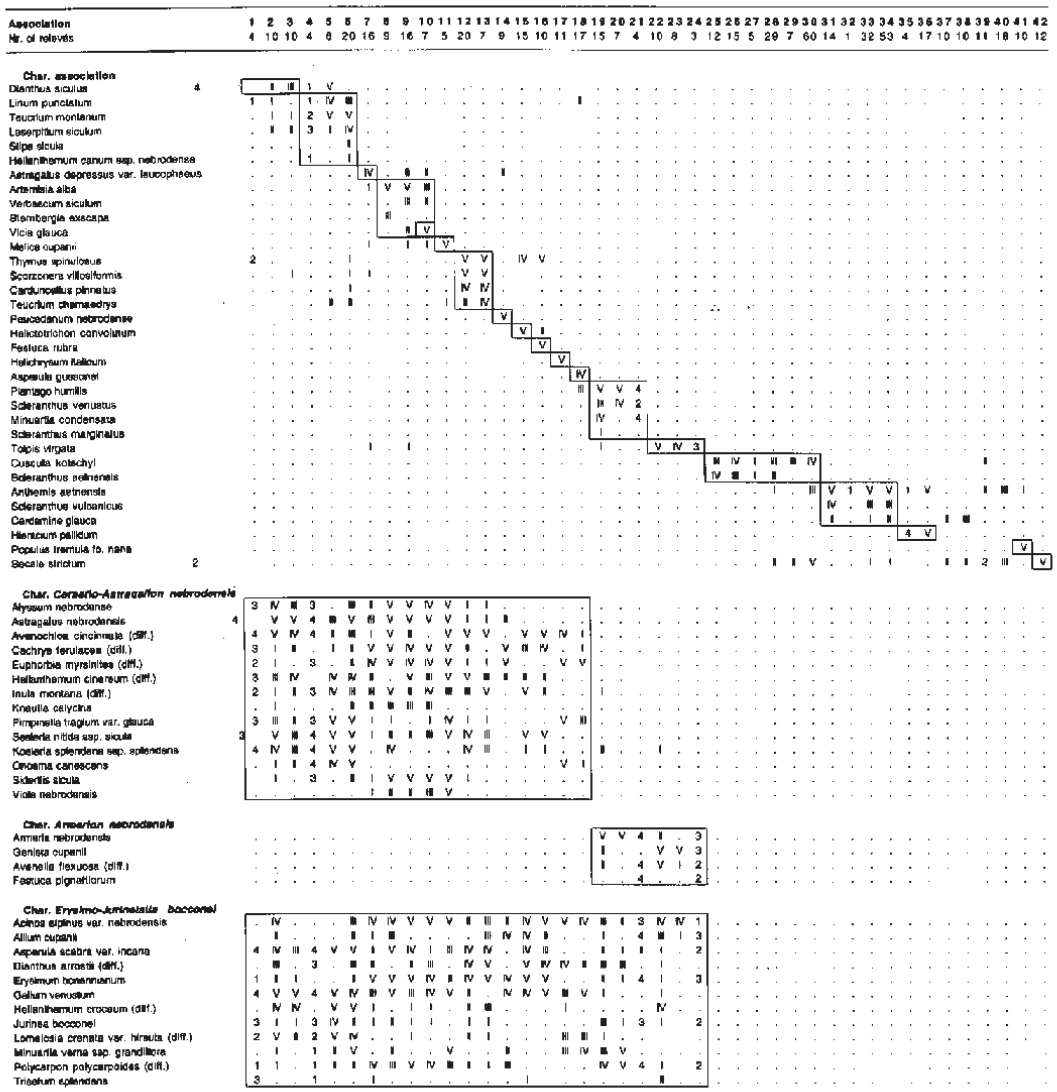
Rel. 1-4, Madonie, Vallone Madonna degli Angeli, 25-7-2002

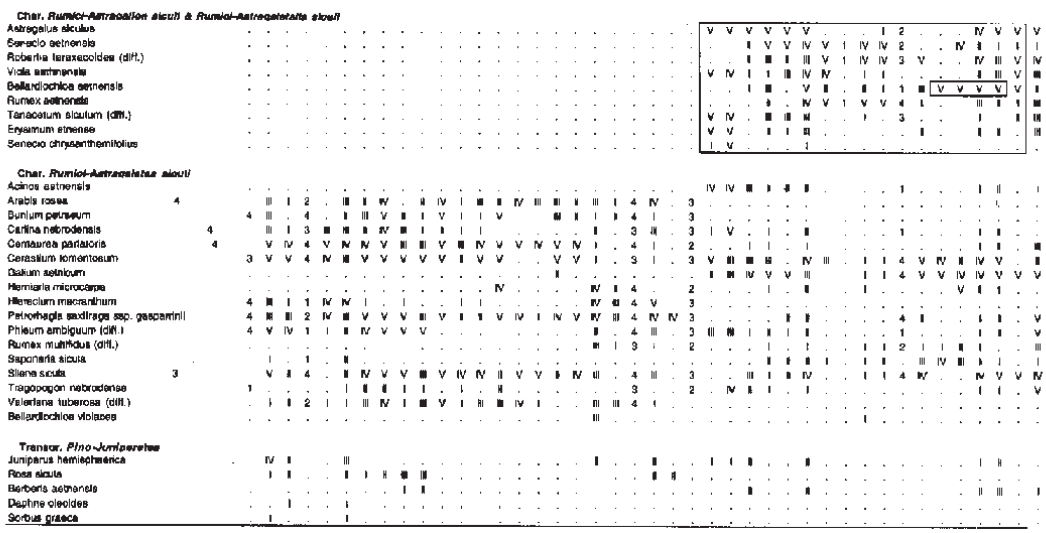
TABLE 18 - Genistetum cupanii Pignatti & Nimis in Pignatti *et al.* 1980.

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			
Genista cupanii	4	4	3
Tolpis virgata var. sexlaristata	1	+	1
Char. *Armerion nebrodensis*			
Armeria nebrodensis	2	1	1
Avenella flexuosa (diff.)	.	1	1
Festuca pignattiorum	.	+	1
Char. *Erysimo-Jurinetalia bocconei*			
Allium cupanii	+	+	+
Erysimum bonannianum	1	+	1
Polycarpon polycarpoides (diff.)	.	+	+
Asperula scabra var. incana	+	+	.
Jurinea bocconei	.	2	+
Acinos alpinus var. nebrodensis	.	+	.
Car. *Rumici-Astragaletea siculi*			
Hieracium macranthum	+	1	2
Arabis rosea	+	+	1
Bunium petraeum	1	+	1
Petrorhagia saxifraga ssp. gasparrinii	1	1	2
Carlina nebrodensis	+	+	1
Silene sicula	1	+	1
Phleum ambiguum (diff.)	2	1	2
Cerastium tomentosum	1	1	1
Centaurea parlatoris	.	1	1
Rumex multifidus (diff.)	+	.	+
Hemiaria microcarpa	.		
Tragopogon nebrodensis	+	.	.
Other species			
Anthoxanthum odoratum	1	2	2
Festuca circummediterranea	2	1	2
Sedum tenuifolium	+	+	1
Dactylis glomerata	1	1	+
Plantago cupanii	1	+	+
Jasione echinata	+	+	1
Anthemis cupaniana	+	1	1
Plantago lanceolata	2	+	+
Petrorhagia illyrica ssp. hainaldiana	.	1	1
Crepis vesicaria	+	+	.
Aira caryophyllea	.	+	.
Achillea ligustica	+	.	.
Geranium pyrenaicum	+	.	.
Potentilla calabra	+	.	.
Erodium cicutarium	+	.	.
Chondrilla juncea	+	.	.
Lactuga viminea	+	.	.
Carlina sicula	+	.	.

Spot and date of relevés
Rel. 1-3 Madonie, Contrada Canna, next to Mt. Dalno, 25-7-2002

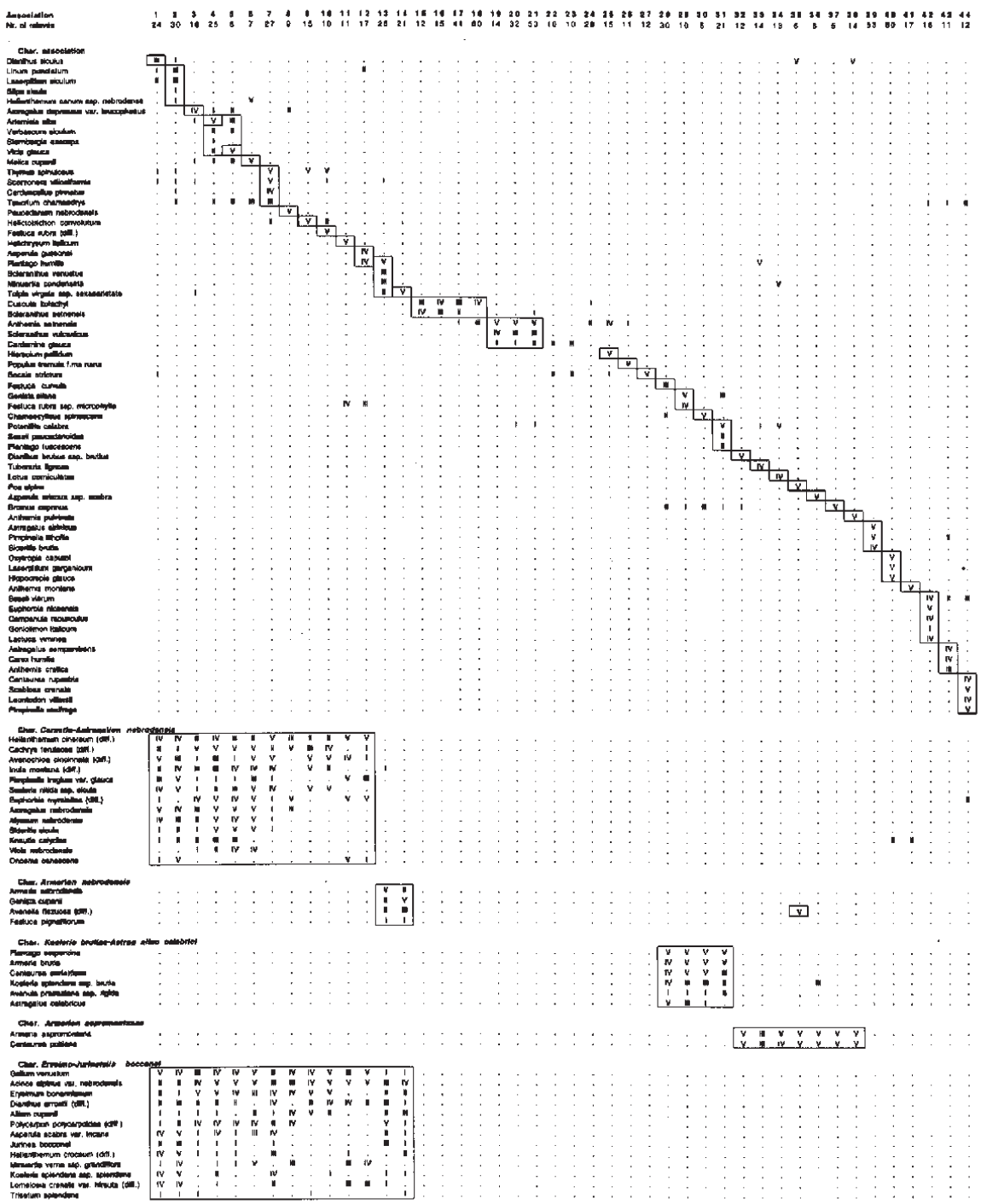
TABLE 19 - Synoptic table of the Sicilian associations of Rumici-Astragaletea siculi.

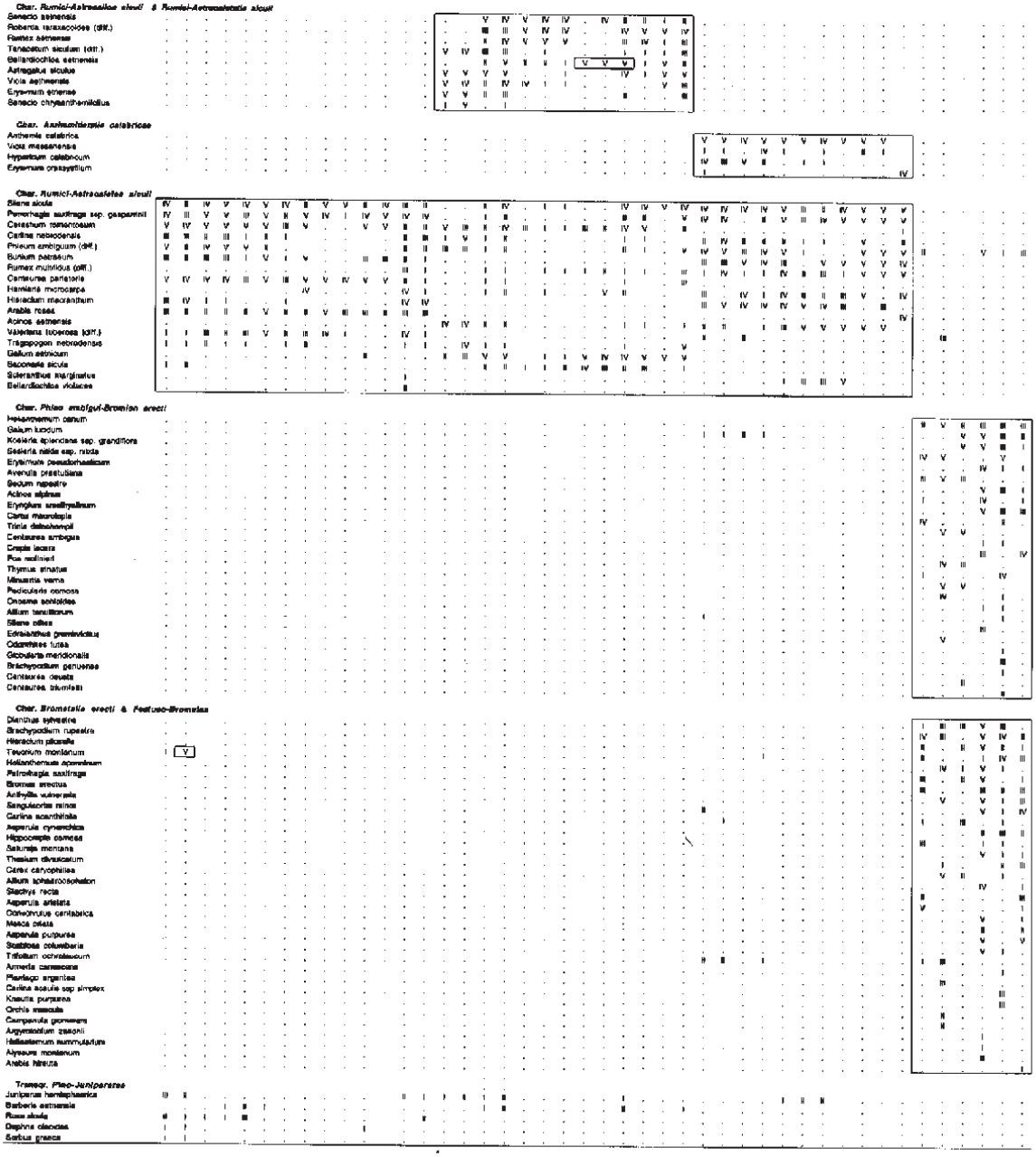




1. ***Astragaletum nebrodensis*** (tab.8)
2. ***Astragaletum nebrodensis*** (after Brullo 1984 - tab.13)
3. ***Astragaletum nebrodensis*** (after Pignatti et al. 1980 - tab.7)
4. ***Lino-Scorzoneretum siculae*** (tab. 6)
5. ***Lino-Scorzoneretum siculae*** (after Pignatti et al. 1980 - tab.8)
6. ***Lino-Scorzoneretum siculae*** (after Brullo 1984 - tab.10)
7. ***Cachrydium ferulaceae*** (tab.9)
8. ***Sideritido siculae-Artemisietum albae artemisietosum*** (tab.10 rel.1-9)
9. ***Sideritido siculae-Artemisietum albae artemisietosum*** (tab.10 rel.10-25)
10. ***Sideritido siculae-Artemisietum albae vicietosum*** (tab.10 rel. 26-33)
11. ***Sesterio siculae-Helictotrichetum cupanii*** (tab.11)
12. ***Carduncello-Thymetum spinulosi*** (after Brullo 1984 - tab.12)
13. ***Carduncello-Thymetum spinulosi*** (tab. 7)
14. ***Peucedanetum nebrodensis*** (tab. 12)
15. ***Sesterio siculae-Helictotrichetum convolut*** (tab. 13)
16. ***Festuco rubrae-Seslerietum siculae*** (tab. 14)
17. ***Helichryso italici-Crocametum canescentis*** (tab. 15)
18. ***Plantago humilis-Asperuletum gussonii*** (tab. 16)
19. ***Plantaginl-Armerietum nebrodensis*** (after Brullo 1984 - tab.16)
20. ***Plantaginl-Armerietum nebrodensis*** (after Pignatti et al. 1980 - tab.10)
21. ***Plantaginl-Armerietum nebrodensis*** (tab.17)
22. ***Genistetum cupanii*** (after Brullo 1984 - tab.18)
23. ***Genistetum cupanii*** (after Pignatti et al. 1980 - tab.11)
24. ***Genistetum cupanii*** (tab.18)
25. ***Astragaletum siculi*** (after Frei 1940 - tab.3)
26. ***Astragaletum siculi*** (after Frei 1940 - tab 3)
27. ***Astragaletum siculi*** (after Gilli 1943 - ril 3-7)
28. ***Astragaletum siculi*** (after Poli 1965 - tab.18 rel.1-4, 6-7, 9-10, 12-17, 19-21; tab.21 rel.1, 3-5, 12-13, 19, 22-24, 29-30)
29. ***Astragaletum siculi*** (after Pignatti et al. 1980 - tab12 ril.107, 110-114 115)
30. ***Astragaletum siculi*** (tab.1)
31. ***Senecioni-Anthemidetum aetnensis*** (after Frei 1940 - tab.1)
32. ***Senecioni-Anthemidetum aetnensis*** (after Gilli 1943 - pag.54 ril.9)
33. ***Senecioni-Anthemidetum aetnensis*** (after Poli 1965 - tab.14, tab. 28)
34. ***Senecioni-Anthemidetum aetnensis*** (tab. 2)
35. ***Centaurio-Hieracietum pollidi*** (after Poli 1965 - tab.34 rel.2-4, rel. pg. 144)
36. ***Centaurio-Hieracietum pollidi*** (tab.5)
37. ***Festuco circummediterranea-Saliferdiocnicetum aetnensis*** (after Frei 1940, tab. 2a)
38. ***Festuco circummediterranea-Saliferdiocnicetum aetnensis*** (after Frei 1940, tab. 2b)
39. ***Festuco circummediterranea-Saliferdiocnicetum aetnensis*** (after Poli 1965, tab. 31 -32)
40. ***Festuco circummediterranea-Saliferdiocnicetum aetnensis*** (tab. 3)
41. ***Festuco circummediterranea-Populetum tremulae*** (tab.4)
42. ***Phleo ambigui-Seslerietum strictl*** (after Siracusa 1968 - tab. 1)

TABLE 20 - Comparison of the associations of Rumici-Astragaletea siculi with some Central and Southern Apenninic associations of Festuco-Brometea.





1. *Astragaletum nebrodensis* (Tab. 6 + Brullo, 1984, tab. 10 + Pignatti *et al.*, 1980, tab. 7)
2. *Lino-Scaligerietum siculae* (Tab. 6 + Brullo, 1984, tab. 10 + Pignatti *et al.*, 1980, tab. 8)
3. *Cachrydetum laevigatae* (Tab. 9)
4. *Siderition siculae-Artemisietum alopecuroidis* (Tab. 10, rel. 1-25)
5. *Siderition siculae-Artemisietum alopecuroidis violetosum* (Tab. 10, rel. 26-33)
6. *Scolario maculae-Melicetum ramosae* (Tab. 11)
7. *Cerastio-Thymetum saturejoidis* (Tab. 7 + Brullo, 1984, tab. 12)
8. *Pseudorlayetum nebrodensis* (Tab. 12)
9. *Scolario maculae-Hedysaretum coronarii* (Tab. 13)
10. *Festuco vulpinae-Scaligerietum siculae* (Tab. 14)
11. *Helichryso italici- Onosmetum canescentis* (Tab. 15)
12. *Phagnalo rupestris-Asperuletum cupanianae* (Tab. 16)
13. *Phagnalo-Artemisietum nebrodensis* (Tab. 17 + Brullo, 1984, tab. 16 + Pignatti *et al.*, 1996, tab. 10)
14. *Genistetum cupanii* (Tab. 18 + Brullo, 1984, tab. 18 + Pignatti *et al.*, 1980, tab. 11)
15. *Astragaletum siculi* (Fiori, 1940, Tab. 36)
16. *Astragaletum siculi* (Fiori, 1940, Tab. 36)
17. *Astragaletum siculi* (Gatt. 1943, rel. 2-7 + Poli, 1966, tab. 19, 21 a,b + Pignatti *et al.*, 1980, tab. 12, a,c)
18. *Astragaletum siculi* (tab. 1)
19. *Senecionii-Anthemidetum aetnensis* (Fiori, 1940, Tab. 4)
20. *Senecionii-Anthemidetum aetnensis* (Gatt. 1943 sel. 8, pp 54 + Poli, 1965, tab. 14, 20)
21. *Senecionii-Anthemidetum aetnensis* (Tab. 2)
22. *Festuco circummediterraneae-Bellardiochloetum aetnensis* (Fiori, 1940, Tab. 2a)
23. *Festuco circummediterraneae-Seslerichloetum aetnensis* (Fiori, 1940, Tab. 2b)
24. *Festuco circummediterraneae-Seslerichloetum aetnensis* (Tab. 3 + Poli, 1965, tab. 31, 32)
25. *Cerastio-Hyparrhenietum pallidi* (Tab. 5 + Poli, 1966, tab. 34 rel. 3-4, rel. 35, 1441)
26. *Festuco circummediterraneae-Pouletum tremulii* (Tab. 4)
27. *Phleo ambigui-Seslerietum siculi* (Brullo, 1988, tab. 1)
28. *Astragaletum calabrici* (Brullo *et al.*, 2004, Tab. 2)
29. *Festuco microphyllae-Genistetum aitanae* (Brullo *et al.*, 2004, Tab. 4)
30. *Plantagini serpentinae-Chaetacmythetum sphaerantis* (Bruno *et al.*, 2004, Tab. 3)
31. *Armerio brullae-Potentilletum calabrae* (Brullo *et al.*, 2004, Tab. 5)
32. *Armerio eremonomanae-Dianthetum brullii* (Brullo *et al.*, 2001, Tab. 56)
33. *Armerio eremonomanae-Plantaginetum humilis* (Brullo *et al.*, 2001, Tab. 55)
34. *Armerio nebrodensis-Potentilletum calabrae* (Brullo *et al.*, 2001, Tab. 54)
35. *Poo siculae-Ranunculetum constantinii* (Brullo *et al.*, 2001, Tab. 57)
36. *Armerio eremonomanae-Asperuletum scabrae* (Brullo *et al.*, 2001, Tab. 58)
37. *Phleo ambigui-Brometum gussonii* (Brullo *et al.*, 2001, Tab. 60)
38. *Anthemidetum pulvinatae* (Brullo *et al.*, 2001, Tab. 59)
39. *Phagnalo-Astragaletum siculi* (Caputo, 1970, Tab. I)
40. *Calycotomietum infestae* (Conte *et al.*, 1997, Tab. 4)
41. *Ranunculo-Anthemidetum montanae* (Corbetta *et al.*, 1987, Tab. 4)
42. *Senecio viarum-Brometum erecti* (Fratianni, 1988, Tab. II)
43. *Astragalo sempervirentis-Seslerietum nitidae* (Biondi & Baldoni, 1995, Tab. 2)
44. *Centaureo rupestris-Scabiosetum cretaricae* (Biondi *et al.*, 1993, Tab. 3)

TABLE 21 - List of the endemic species characterizing the syntaxa of Rumici-Astragaletea siculi.

	Madonie	Etna	N-Sicily	Sicily	Sicily & Calabria	Aspro-monte	Sila	Calabria	Sicily & C-S-Apenn.
Acinos aetnensis					x				
Acinos alpinus var. nebrodensis			x						
Allium cupanii				x					
Alyssum nebrodense	x								
Anthemis aetnensis		x							
Anthemis calabrica								x	
Anthemis pulvinata						x			
Armeria aspromontana						x			
Armeria brutia							x		
Armeria nebrodensis	x								
Asperula guesonei			x						
Asperula scabra var. incana			x						
Astragalus calabricus							x		
Astragalus nebrodensis	x								
Astragalus siculus		x							
Avenula praetutiana ssp. rigida							x		
Bellardiochloa aetnensis		x							
Bunium petraeum									x
Carlina nebrodensis					x				
Centaurea parlatoris				x					
Centaurea pollana						x			
Centaurea sarfattiana							x		
Cerastium tomanicsum									x
Dianthus arrostii				x					
Dianthus brutius ssp. brutius						x			
Dianthus siculus					x				
Erysimum bonannianum			x						
Erysimum crassystilum									x
Erysimum etnense		x							
Festuca pignattiorum	x								
Galium aetnicum					x				
Genista cupanii	x								
Genista silana							x		
Helianthemum canum ssp. nebrodense	x								
Hieracium macranthum									x
Hieracium pallidum		x							
Hypericum calabricum								x	
Juninea bocconei	x								
Knautia calycina					x				
Koeleria splendens ssp. brutia							x		
Koeleria splendens ssp. splendens				x					
Laserpitium siculum	x								
Linum punctatum			x						
Lomelosia crenata var. hirsuta (diff.)					x				
Minuartia verna ssp. grandiflora			x						
Onosma canescens			x						
Petrorhagia saxifraga ssp. gasparrinii					x				
Peucedanum nebrodensis	x								
Phleum ambiguum									x
Pimpinella tragium var. glauca			x						
Plantago humilis					x				
Rumex aetnensis		x							
Scleranthus aetnensis		x							
Scleranthus vulcanicus		x							
Senecio aetnensis		x							
Senecio chrysanthemifolius		x							
Sesleria nitida ssp. sicula			x						
Sideritis sicula	x								
Silene sicula					x				
Stembergia exscapa	x								
Stipa sicula			x						
Tanacetum siculum				x					
Thymus spinulosus									x
Tolpis virgata ssp. sexaesristata				x					
Tragopogon nebrodensis				x					
Verbascum siculum				x					
Viola aethnensis		x							
Viola messanensis					x				
Viola nebrodensis	x								