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Contribution to the phytosociological characterization of the forest vegetation of the Sicani Mountains (inland of north-western Sicily)

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Abstract
The results of a phytosociological survey on the main forest vegetation aspects of the Sicani Mountains (inland of north-western Sicily), in turn included in the homonymous Regional Park recently established, are presented. This expansive territory (43,687 hectares), located between the Agrigento and Palermo provinces, is mainly composed by carbonate and silico-carbonate formations of the Sicani Units, whose highest peaks are represented by Mount Cammarata (1578 m a.s.l.), Mount delle Rose (1436 m), Pizzo Cangialoso (1420 m) and Mount Pernice (1393 m). Under the bioclimatic aspect, the area falls within the thermo- and supramediterranean belts, with ombrotype ranging from upper dry (annual average rainfall of about 550 mm) in the southern and western slopes, to upper subhumid (annual average rainfall of 800-1000 mm) – sometimes tending towards the wet – in the cacuminal part of the aforecited elevations. Many plant communities were identified and surveyed, several of which are described as new syntaxa; in particular they are some maquis associations [1) *Rhamno alaterni-Euphorbietum dendroidis* Géhu & Biondi 1997, with the subassociations *typicum*, *phlomidetosum fruticosae* (Brullo & Marcenò 1985) comb. nov., *rhamnetosum oleoidis* (Brullo & Marcenò 1985) comb. nov., *celtidetosum aetnensis* (Brullo & Marcenò 1985) comb. nov., *euphorbietosum bivonae* (Gianguzzi, Ilardi & Raimondo 1996) comb. nov.; 2) *Ampelodesmo mauritanici-Juniperetum turbinatae* Gianguzzi *et al*. 2012, with the subass. *cistetosum cretici* Gianguzzi *et al*. 2012; 3) *Asparago albi-Artemisietum arborescentis* ass. nova; 4) *Euphorbio characiae-Anagyridetum phoetidis* ass. nova, with the subass. *asparagetosum albae* subass. nova and *loniceretosum implexae* subass. nova; 5) *Pistacio terebinthi-Celtidetum aetnensis* Gianguzzi, Cusimano & Romano 2014, subass. *typicum* and *phlomidetosum fruticosae* Gianguzzi, Cusimano & Romano 2014)], a laurel oak community [*Acantho mollis-Lauretum nobilis* Gianguzzi, D'Amico & Romano 2010], some holm oak communities [7) *Ampelodesmo mauritanici-Quercetum ilicis* ass. nova *hoc loco*, with the subass. *typicum* subass. nova and *viburnetosum tini* subass. nova); 8) *Sorbo torminalis-Quercetum ilicis* ass. nova], some deciduous oak communities with *Quercus virgiliana* [9) *Oleo oleaster-Quercetum virgilianae* Brullo 1984; 10) *Sorbo torminalis-Quercetum virgilianae* Brullo, Minissale, Signorello & Spampinato 1996], a maple community with *Acer pseudoplatanus* [11) *Sorbo graecae-Aceretum pseudoplatani* Gianguzzi & La Mantia 2004], a riparian community with *Salix* sp. pl. [12) *Salicetum albo-pedicellatae* Brullo & Spampinato 1990] and some shrubby mantles [13) *Hyperico majoris-Rubetum ulmifolii* ass. nova; 14) *Roso corymbiferae-Rubetum ulmifolii* ass. nova; 15) *Euphorbio characiae-Prunetum spinosae* ass. nova; 16) *Roso siculae-Prunetum spinosae* ass. nova; 17) *Crataegetum laciniatae* Brullo & Marcenò in Brullo 1984]. A new alliance with a Tyrrhenian centre of gravitation (*Asparago acutifolii-Laurion nobilis*, in turn ascribed to the class *Quercetea ilicis* and to the order *Quercetalia ilicis*), within which the *Laurus nobilis* microwoods gravitating in the Italo-Tyrrhenian biogeographical Province are framed, is also proposed.

Key words: Plant landscape, phytosociology, Sicani Mountains Regional Park, Sicily, syntaxonomy.

Introduction

The Sicani Mountains are located in the inland of north-western Sicily, whose plant landscape is largely dominated by arable lands and extensive crops; natural woody and shrubby aspects are mainly confined to marginal surfaces, often embedded within artificial forest plantations, dominated by non-native conifers (genera *Pinus*, *Cedrus*, *Cupressus*, etc.) or by *Eucalyptus* species (*Eucalyptus camaldulensis*, *E. globulus*, etc.). This is the result of a millennial anthropogenic exploitation, to which an intense policy of "reforestation", made since the second world postwar of the last century in order to recover – unsuccessfully – the native woody communities, tried to remedy. These coenoses are often structurally and floristically depleted, denoting sometimes also an evident risk status, as they are exposed to the destructive effects of fires, cutting, overgrazing, etc. Therefore, this survey was aimed at their phytosociological characterization, as climactic, edapho-climactic or also secondary communities, but with a much more extensive potentiality in the island inland.

The study made reference to the perimeter of the Sicani Regional Natural Park, recently setting up in Sicily ([1]), for a total area of 43,687 hectares (Fig. 1); the protected area includes – in addition to four pre-existing nature reserves, then suppressed by decree contextually to the establishment of the Park (Tab. 1) – 13 Sites of Community Interest (Tab. 2) and part of a Special Protection Area (ITA020048: "Monti Sicani, Rocca Busambra e Bosco della Ficuzza"). Therefore,

[1] The Sicani Regional Natural Park is the fifth regional park of Sicily – after those of Etna, Madonie, Nebrodi and Alcantara – definitively established for the third time on the 19th of December 2014 with two decrees of the Regional Department of the Environment Office of the Sicily Region, after the cancellation of the first establishing decree in 2010 and the second one in 2013 (with a judgment of the Regional Administrative Court for Sicily).

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this survey may also have useful implications in land-use planning, for aspects relating both to the nature conservation (e.g. phytocoenoses with endemic, relict or particularly rare species) and to the environmental requalification according to the criteria of natural forestry.

Study area

The Sicani Mts. – topographically included within the sheets in 1:50,000 scale (published by the Italian Military Geographical Institute) nn° 619 "Santa Margherita Belice", 620 "Lercara Friddi", 621 "Alia", 628 "Sciacca" and 629 "Aragona" – are located between the Agrigento and Palermo provinces. The territory extends at altitudes between 200 m above sea level (gorges of the middle-terminal stretch of the Sosio River) and the summit of Mount Cammarata (1578 m). The highest elevations include Mount delle Rose (1436 m), Pizzo Cangialoso (1420 m), Mount Pernice (1393 m), Pizzo San Filippo (1352 m), Mount Scuro (1309 m), Pizzo della Rondine (1246 m), Pizzo Gallinaro (1220 m), Serra della Moneta (1188 m), Mount Colomba (1197 m), Mount Carcaci (1196 m), Cozzo Catera (1192 m), Mount Genuardo (1160 m), etc., which are characterized by narrow alluvial valley floors, in turn crossed by several rivers, such as the Sosio (with the Gammauta, Prizzi and Pian del Leone lakes), the Platani (with the Fanaco Lake) and the Magazzolo (with the Castello Lake).

Under the geological aspect, the Sicani Mts. are part of the Meso-Cenozoic Apennine-Maghrebian chain (Di Stefano & Vitale, 1992), whose evolution – tied to a combination of a multi-stage compression with variable directions – originated overlapping tectonic scales, covered in discordance by clayey and arenaceous sequences of Oligo-Miocene age (Sabatino, 2011). Carbonate and silico-carbonate formations of the Sicani Units, as well as glauconitic calcarenites aged between Upper Triassic and Lower Miocene, prevail (Mascle, 1979). An exception is Mount Genuardo, which is affected by carbonate-silico-clastic sediments attributable to the escarpment unit between the Imerese-Sicano and the Hyblean-Pelagian domains, in turn surrounded by Miocenic flyschoid sequences, as well as by the Messinian evaporites and by the Pliocene and Quaternary terrigenous sequences (Di Stefano & Gullo, 1987).

Climate data reported in Tab. 3 and 4 refer to the main thermo-pluviometric stations represented in the territory (Ministero dei LL. PP., 1926-85; Duro *et al.*, 1996). The average rainfalls denote higher values along the central-western sector (Palazzo Adriano: 870 mm and 83 rainy days), with the lowest peaks next to 600 mm, recorded in the valley floors and in the south-western part of the district, and the highest ones on the highest mountaintops – Mount Cammarata and Mount delle Rose –, where, though data are missing, it is likely that rainfalls can reach and even exceed 1000 mm.

On the basis of the climatic indices of Rivas-Martínez (1987, 1994, 1996), applied to the data represented in the Climatological Atlas of Sicily (Drago, 2005), the study area falls within the following bioclimatic belts:

- thermomediterranean (annual average temperatures of 18-16 °C), with ombrotype ranging from the upper dry (annual average rainfall of 450-600 mm) – on the most xeric southern and western slopes – to the lower subhumid (annual average rainfall of 600-800 mm), the latter in the valley floors up to about 450-550 m a.s.l.;
- mesomediterranean (annual average temperatures of 16-13 °C), with ombrotype ranging from the lower subhumid (annual average rainfall of 600-800 mm) – at altitudes between 550 m and 1000 m a.s.l. – to the

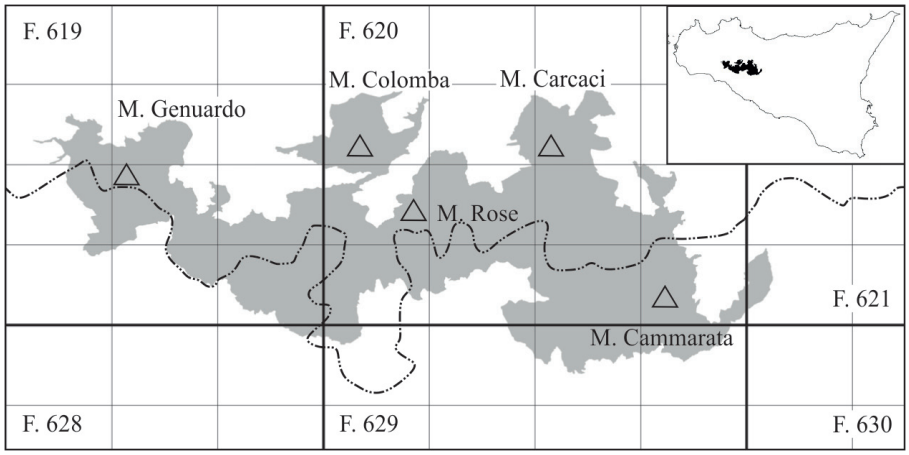

Fig. 1 - Location of the study area, which makes reference to the perimeter of the Sicani Regional Natural Park, recently setting up in Sicily. The Sicani Mts. – located between the Agrigento and Palermo provinces – are topographically included within the sheets in 1:50,000 scale (published by the Italian Military Geographical Institute) nn° 619-621 and 628-629.

Tab. 1 - List and respective extent of the nature reserves present in the area of study.

N°	Denomination	Area (ha)
1	R.N.O. Monte Genuardo e Santa Maria del Bosco	2,534.24
2	R.N.O. Monti di Palazzo Adriano e Valle del Sosio	5,893.87
3	R.N.O. Monte Carcaci	1,417.72
4	R.N.O. Monte Cammarata	2,044.54

Tab. 2 - List and respective extent of the SCIs represented in the surveyed territory.

N°	Code	Denomination	Area (ha)
1	ITA020011	Rocche di Castronovo, Pizzo Lupo, Gurghi di S. Andrea	1,735.53
2	ITA020022	Calanchi, lembi boschivi e praterie di Riena	754.16
3	ITA020025	Bosco di S. Adriano	6,800.78
4	ITA020028	Serra del Leone e Monte Stagnataro	3,750.43
5	ITA020029	Monte Rose e Monte Pernice	2,529.51
6	ITA020031	Monte d'Indisi, Monte dei Cavalli, Pizzo Potorno e Pian del Leone	2,344.04
7	ITA020034	Monte Carcaci, Pizzo Colobria e ambienti umidi	1,725.60
8	ITA020035	Monte Genuardo e Santa Maria del Bosco	2,629.72
9	ITA020036	Monte Triona e Monte Colomba	3,313.15
10	ITA020037	Monti Barracù, Cardellia, Pizzo Cangialosi e Gole del Torrente Corleone	5,319.78
11	ITA040005	Monte Cammarata - Contrada Salaci	2,106.81
12	ITA040007	Pizzo della Rondine, Bosco di S. Stefano Quisquina	3,078.24
13	ITA040011	La Montagnola e Acqua Fitusa	310.57

upper subhumid (annual average rainfall of 800-1000 mm), the latter represented on the highest mountains, above 1000 m;

- supramediterranean (annual average temperatures of 13-8 °C), with upper subhumid ombrotype (annual average rainfall of 800-1000 mm), localized in the cacuminal part of Mount Cammarata, Mount delle Rose, Mount Carcaci, Mount Genuardo), sometimes tending towards the wet ombrotype.

Based on the biogeographical classification of Rivas-Martínez *et al*. (2011), the territory lies in the Mediterranean Region, western Mediterranean Subregion, Italo-Tyrrhenian Province and Sicilian Sector, within which – according to Brullo *et al*. (1995) – it is included in the western Subsector and in the drepano-panormitano District.

Materials and Methods

The ecological framework of the territory was carried out by consulting contributions related to the geolithological (Mascle, 1974; Di Stefano & Vitale, 1992), climatic (Drago, 2005) and bioclimatic aspects (Brullo *et al*., 1996b; Gianguzzi, 1999; Gianguzzi *et al*., 2014a, b).

The study of the plant communities was performed on the basis of 125 unpublished phytosociological relevés – grouped in 14 phytosociological tables, in addition to two synoptic tables – carried out according to the Zurich-Montpellier School methodology, adopting the abundance-dominance indices proposed by Braun-Blanquet (1964). For the determination of the plant species, reference was made to the main floristic works (Fiori, 1923-29; Pignatti, 1982; Tutin *et al*., 1964-1980, 1993), whereas the taxonomical nomenclature mainly followed Giardina *et al*. (2007). The exsiccata collected during the field research are kept at the Department of Agricultural and Forest Sciences of the University of Palermo.

The analysis and the description of the coenoses take account of the latest methodological acquisitions (Géhu & Rivas-Martínez, 1981; Biondi, 1994, 2011; Biondi *et al*., 2004, 2011; Rivas-Martínez, 2005; Blasi & Frondoni, 2011; Pott, 2011), in accordance with the International Code of Phytosociological Nomenclature (Weber *et al*., 2000).

With regard to the holm oak communities, on the basis of the set of phytosociological relevés carried out, a 36 relevés × 90 species matrix was obtained. Another matrix (39 relevés × 83 species) was realized starting from the phytosociological relevés concerning the shrubby aspects. Both matrices were subjected to cluster analysis (UPGMA) based on Euclidean distance measures performed with the software Syntax 2000 (Podani, 2001).

The phytosociological framing of the described syntaxa mainly followed the Prodromo della vegetazione d'Italia (Biondi *et al*., 2014), whereas the synecologi-

cal analysis was carried out according to the methodological principles of the Synphytosociology (Géhu & Rivas-Martínez, 1981). The references to the sigmeta also refer to the Carta delle serie di vegetazione d'Italia (Blasi ed., 2010), with a few exceptions whose references are reported in the text.

Results

Maquis

Climactic and paraclimactic vegetation with thermophilous Mediterranean shrubby-arboreal species, dominated by: a) *Euphorbia dendroides* [1) *Rhamno alaterni-Euphorbietum dendroidis* Géhu & Biondi 1997, with the subassociations: 1a) *typicum*; 1b) *phlomidetosum fruticosae* (Brullo & Marcenò 1985) comb. nov.; 1c) *rhamnetosum oleoidis* (Brullo & Marcenò 1985) comb. nov.; 1d) *celtidetosum aetnensis* (Brullo & Marcenò 1985) comb. nov.; 1e) *euphorbietosum bivonae* (Gianguzzi, Ilardi & Raimondo 1996) comb. nov.]; b) *Juniperus turbinata* [2) *Ampelodesmo mauritanici-Juniperetum turbinatae* Gianguzzi *et al*. 2012, with the subass. *cistetosum cretici* Gianguzzi *et al*. 2012]; c) *Artemisia arborescens* [3) *Asparago albi-Artemisietum arborescentis* ass. nova]; d) *Anagyris phoetida* [4) *Euphorbio characiae-Anagyridetum phoetidis* ass. nova, with the subassociations: 4a) *asparagetosum albae* subass. nova *hoc loco*; 4b) *loniceretosum implexae* subass. nova *hoc loco*]; e) *Celtis tournefortii* subsp. *aetnensis* [5) *Pistacio terebinthi-Celtidetum aetnensis*

Tab. 3 - Monthly and annual average rainfall and number of rainy days recorded at the stations located in the study area (records by Ministero dei LL. PP., 1926-85; data processed by Duro *et al*., 1996).

Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Burgio	mm	106	92.3	80	50	30.7	9.7	3.5	12.8	36.7	81.5	96.4	120	710.3
(317 m a.s.l.)	r.d.	11	10	8	6	3	1	0	2	3	7	8	11	70
Sambuca di Sicilia	mm	96.5	83.7	71.1	44.4	30.1	10.6	3.4	10.6	37.1	89.7	98	113	688
(369 m a.s.l.)	r.d.	11	9	8	6	4	1	0	1	3	8	9	12	72
Bivona	mm	132	107	87.8	54.2	35.4	13.6	4.2	14.3	44.2	92	108	134	826.4
(503 m a.s.l.)	r.d.	12	10	9	7	4	2	1	1	4	8	10	12	80
Contessa Entellina	mm	116	99.3	86.1	51.9	39.7	19.5	3	14.2	49.6	100	118	138	836.1
(571 m a.s.l.)	r.d.	11	9	8	5	4	2	1	1	4	7	9	12	85
Corleone	mm	114	92.2	80.1	55.8	38.2	11.9	6.6	15.3	43.1	79.9	98.6	112	747.2
(594 m a.s.l.)	r.d.	13	11	10	7	5	2	1	2	5	8	10	13	87
Chiusa Sclafani	mm	134	107	86.5	59.3	36.7	15	9.6	14	41.3	93.7	116	137	851.1
(614 m a.s.l.)	r.d.	13	10	10	7	5	2	1	2	4	8	10	13	85
Lercara Friddi	mm	89.9	74	69.7	46.2	28	9.2	6.8	14.8	31.4	73.3	79.9	89	612.2
(658 m a.s.l.)	r.d.	12	10	9	6	4	2	1	2	4	8	9	12	79
Castronovo Sicilia	mm	115	90.4	83	54.5	31.5	12.9	6.8	20.2	36.9	83.5	101	122	757.2
(682 m a.s.l.)	r.d.	13	10	10	7	5	2	1	2	4	8	9	13	84
Palazzo Adriano	mm	132	112	87.1	58.9	36	12.1	5.6	16.6	46.2	94.2	118	151	870.1
(696 m a.s.l.)	r.d.	12	11	9	7	5	2	1	2	4	8	10	12	83
S. Stefano Quisquina	mm	142	104	91.1	51.1	34.7	12.1	4.2	15.6	50.3	91.6	118	136	851.9
(712 m a.s.l.)	r.d.	13	10	10	6	4	2	1	1	4	8	10	13	82
Giuliana	mm	109	83.6	74.1	41.1	31.8	11.9	4.2	16.7	43.4	90.1	118	127	751.1
(734 m a.s.l.)	r.d.	12	10	8	5	4	1	1	2	4	8	9	12	76
Piano del Leone	mm	140	92.9	90.1	62.2	30	11.7	9.3	17.8	33.6	91	114	134	826.7
(831 m a.s.l.)	r.d.	13	11	10	8	4	2	1	2	4	8	10	13	86
Carcaciotto	mm	93	76	78.9	60.7	31.5	12.1	12.3	21	37.1	81	81.9	107	692
(930 m a.s.l.)	r.d.	13	10	11	9	4	2	1	2	4	8	10	13	87
Prizzi	mm	109	91.9	74.4	54.9	37.4	10.7	9.6	18.6	46.1	84.7	100	120	758.2
(1.035 m a.s.l.)	r.d.	11	10	8	6	4	2	1	2	4	7	8	11	74

Tab. 4 - Monthly and annual average maximum and minimum temperatures (in °C), daily average and range, absolute maximum and minimum temperatures, recorded at the stations of Bivona, Corleone, Lercara Friddi and Piano del Leone (records by Ministero dei LL. PP., 1926-85; data processed by Duro *et al*., 1996).

Station	Height (m a.s.l.)	Average maximum	Average minimum	Daily average	Daily range	Absolute maximum	Absolute minimum
Bivona	503	21	12.6	16.8	8.4	42.3	-5.6
Corleone	594	20.9	10.7	15.8	10.1	45	-6.8
Lercara Friddi	658	20	9.9	14.9	10.1	40.6	-7.0
Piano del Leone	831	17.9	8.8	13.4	9.1	39.6	-8.5

Gianguzzi, Cusimano & Romano 2014, with the subassociations: 5a) *typicum*; 5b) *phlomidetosum fruticosae* Gianguzzi, Cusimano & Romano 2014].

1a) *RHAMNO ALATERNI-EUPHORBIETUM DENDROIDIS* Géhu & Biondi 1997 subass. *TYPICUM*, Fitosociologia 32: 154.

Synonyms – *Oleo-Euphorbietum dendroidis sensu* Brullo & Marcenò (1984) non Trinajstic 1974, Ekologija 8 (2): 284; Euphorbietum dendroidis sensu Brullo *et al*. (2008) non Guinochet in Guinochet & Drounieau 1944: 26.

Table – 5 (relevés 1-4).

Holotypus – Relevé 9 in Table 12 [in Caneva *et al*. (1981), designated in Géhu & Biondi (1997)].

Characteristic/Differential species – *Euphorbia dendroides* (dom.), *Rhamnus alaternus*, *Asparagus albus* and *Chamaerops humilis*.

Structure and ecology – Thermo-xerophilous maquis dominated by *Euphorbia dendroides*, 2-4 m high, with woody layer characterized by *Olea europaea* var. *sylvestris* and other sclerophytes of the order *Pistacio-Rhamnetalia alaterni*. The herbaceous layer has an average coverage of less than or close to 50%, predominantly determined by *Ampelodesmos mauritanicus*. The coenosis is tied to rupicolous and sub-rupicolous stations, where it establishes on more or less eroded lithosols of carbonate nature (Brullo & Marcenò, 1985; Brullo *et al*., 2009).

Bioclimate – Thermomediterranean with ombrotype ranging from upper dry to lower subhumid.

Syndynamism – It takes part in a calcicolous edapho-xerophilous series located in the climacic belt of the woods of the class *Quercetea ilicis*, in catenal contact with the microgeosigmetum of the cliffs.

Synchorology – Community quite common on the Sicani Mts., already reported by several authors [sub *Oleo-Euphorbietum dendroidis* Trinajstic (1973) 1984 subass. *typicum*], in general manner (Brullo & Marcenò, 1985; Brullo *et al*., 2009) or referred to specific localities: Bivona in Contrada Chiesa (Gianguzzi *et al*., 2001), Santo Stefano Quisquina and SCI "La Montagnola e Acqua Fitusa" (Marino *et al*., 2005), Mount Genuardo in Contrada Castagnola and Mount delle Rose on the southern slope of Pizzo Catera (Brullo *et al*., 2009, sub *Euphorbietum dendroidis* Guinochet in Guinochet & Drounieau 1944 subass. *typicum*). During this survey, the coenosis was also found at Coste Sibilia, Pizzo S. Matteo, Serra S. Benedetto, Mount Gristia and Mount Adranone. Besides the subass. *typicum*, the vegetation aspects present in the area are ascribable to the following other subassociations:

1b) *PHLOMIDETOSUM FRUTICOSAE* (Brullo & Marcenò 1985) comb. nov.

Synonyms – *Oleo-Euphorbietum dendroidis* Trinajstic 1973 (1984) subass. *phlomidetosum fruticosae* Brullo & Marcenò 1985, Notiziario Fitosociologico 19 (1): 210; *Euphorbietum dendroidis* Guinochet in Guinochet & Drounieau 1944 subass. *phlomidetosum fruticosae* (Brullo & Marcenò 1985) Brullo, Gianguzzi, La Mantia & Siracusa 2009, Bollettino Accademia Gioenia Scienze Naturali 369 [2008]: 19.

Table – 5 (relevés 5-6).

Holotypus – Relevé 2 in Table 20 (in Brullo & Marcenò, 1985).

Characteristic/Differential species – *Euphorbia dendroides* (dom.), *Phlomis fruticosa*.

Structure and ecology – The coenosis is differentiated by the presence of *Phlomis fruticosa*, species with an eastern-Mediterranean centre of gravitation, in Sicily located in the central-eastern sector, with rather rare and fragmentary distribution (Brullo & Marcenò, 1985; Brullo *et al*., 2009).

Bioclimate – Upper thermomediterranean with dry-lower subhumid ombrotype, with small penetrations in the mesomediterranean.

Syndynamism – It takes part in an edapho-xerophilous calcicolous series in the climacic belt of the woods of the class *Quercetea ilicis*, in catenal contact with the microgeosigmetum of the cliffs.

Synchorology – The coenosis, already reported for some elevations of the Agrigento area (Brullo & Marcenò, 1985; Brullo *et al*., 2009), was also found along the ridge of Pizzo Telegrafo.

1c) *RHAMNETOSUM OLEOIDIS* (Brullo & Marcenò 1985) comb. nov.

Synonyms – *Euphorbietum dendroidis* Trinajstic 1973 (1984) subass. *rhamnetosum oleoidis* Brullo & Marcenò 1985, Notiziario Fitosociologico 19 (1): 210; *Euphorbietum dendroidis* Guinochet in Guinochet & Drounieau 1944 subass. *rhamnetosum oleoidis* (Brullo & Marcenò 1985) Brullo, Gianguzzi, La Mantia & Siracusa 2009, Bollettino Accademia Gioenia Scienze Naturali 369 [2008]: 19.

Table – 5 (relevés 7-8).

Holotypus – Relevé 7 in Table 20 (in Brullo & Marcenò, 1985).

Characteristic/Differential species – *Euphorbia dendroides* (dom.), *Rhamnus oleoides*.

Structure and ecology – The coenosis is differentiated by the presence of *Rhamnus oleoides*, southern-Mediterranean species with a western centre of gravitation, in Sicily located on the sub-coastal slopes of the western sector, as well as in the Aegadian Islands (Marettimo, Levanzo and Favignana). The coenosis replaces the *typus* on calcareous-marly substrates, with calcarenites interbedded, in xeric stations at low altitude (Brullo & Marcenò, 1985; Brullo *et al*., 2009).

Bioclimate – Thermomediterranean with upper dry ombrotype.

Tab. 5 - *Rhamno alaterni-Euphorbietum dendroidis* subass. *typicum* (rels. 1–4), subass. *phlomidetosum fruticosae* (rels. 5–6), subass. *rhamnetosum oleoidis* (rels. 7–8), subass. *celtidetosum aetnensis* (rels. 9–10), subass. *euphorbietosum bivonae* (rels. 11–14).

Relevé (n°)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Altitude (m a.s.l.)	633	687	692	725	450	540	580	740	460	480	589	590	633	711	
Slope (%)	30	40	30	10	25	30	40	25	30	40	30	45	10	30	
Exposure	SW	S	SW	E	E	E	W	E	S	S	W	SW	S	SW	
Area (m^2)	100	200	100	100	100	100	80	100	100	80	100	80	100	100	
Total coverage (%)	70	100	80	80	85	85	80	80	85	90	50	85	75	90	
Average height (m)	2	3	1.5	1.5	1.8	1.8	1.8	1.8	2.0	2.0	1	2	2	1.5	
Number of species	18	18	23	20	28	22	18	24	24	23	17	22	12	17	Presences
Characteristics of association and subassociation															
Euphorbia dendroides L.	3	4	3	4	4	5	4	4	4	4	3	3	3	4	14
Asparagus albus L.	.	1	+	.	+	1	1	.	+		.	1	.	+	8
Chamaerops humilis L.	1	.	.	.	1	1	.	.	.	.	.	1	.	.	4
Rhamnus alaternus L.	.	.	.	+	.	.	.	1	.	.	.	.	.	.	2
Phlomis fruticosa L.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	2
Rhamnus lycioides L. subsp. oleoides (L.) Jahand. & Maire	.	.	.	.	.	.	2	1	.	.	.	.	.	.	2
Celtis tournefortii Lam. subsp. aetnensis (Tornab.) Raimondo & Schicchi	.	.	.	.	.	.	.	.	2	1	.	.	.	.	2
Euphorbia bivonae Steud.	.	.	.	.	.	.	.	.	.	.	2	2	1	2	4
Characteristics of the alliance *Oleo-Ceratonion siliquae* and of the order *Pistacio-Rhamnetalia alaterni*															
Prasium majus L.	+	+	1	1	1	1	1	+	+	1	1	1	+	1	14
Olea europaea L. var. sylvestris (Mill.) Lehr	1	2	2	2	1	1	1	2	.	.	.	2	1	2	11
Osyris alba L.	+	.	1	1	1	+	1	+	.	+	.	.	+	1	10
Teucrium flavum L.	.	.	1	1	+	+	.	1	1	1	.	.	+	.	8
Artemisia arborescens (Vaill.) L.	.	2	1	.	.	+	.	.	.	.	+	+	.	1	6
Anagyris foetida L.	.	1	.	1	1	.	.	+	.	.	.		.	.	4
Teucrium fruticans L.	.	.	.	.	.	.	.	+	.	.	+	1	.	.	3
Characteristics of the class *Quercetea ilicis*															
Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz.	2	3	2	2	2	2	1	3	1	2	2	+	2	+	14
Asparagus acutifolius L.	+	1	1	1	+	+	1	+	1	1	+	+	1	1	14
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	1	+	1	+	+	+	+	.	+	.	+	.	1	+	11
Ruta chalepensis L.	.	.	+	+	+	1	+	+	1	+	.	+	.	+	10
Allium subhirsutum L.	.	+	2	.	1	1	1	.	1	1	.	1	.	.	8
Smilax aspera L.	.	.	+	.	+	+	.	+	.	1	+	.	.	.	6
Pistacia terebinthus L.	+	.	1	.	1	.	.	.	.	.	.	1	.	1	5
Tamus communis L.	.	.	+	+	+	.	.	.	.	.	+	.	.	+	5

Euphorbia characias L.	.	.	.	.	+	.	+	.	1	.	.	.	.	.	3
Emerus major Mill. subsp. emeroides (Boiss. & Spruner) Soldano & F. Conti	.	.	.	.	.	.	1		.	.	1	.	.	.	2
Clematis cirrhosa L.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	2
Ruscus aculeatus L.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	2
Pistacia lentiscus L.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Cyclamen hederifolium Aiton subsp. hederifolium	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1
Other species															
Charybdis pancration (Steinh.) Speta	+	.	+	+	+	1	+	+	1	1	+	.	.	.	10
Arisarum vulgare Targ.-Tozz.	+	.	+	.	1	+	.	+	1	1	+	.	.	.	8
Carlina sicula Ten. s.l.	+	1	+	.	+	.	.	.	1	+	.	.	+	+	8
Foeniculum vulgare Mill. subsp. vulgare	+	+	+	+	+	+	.	.	1	+	.	.	.	.	8
Sedum sediforme (Jacq.) Pau	.	.	1	.	+	.	+	1	.	+	.	1	.	1	7
Dactylis glomerata L. subsp. hispanica (Roth) Nyman	+	+	+	.	+	+	.	.	+	.	1	.	.	.	7
Rubus ulmifolius Schotts	+	1	1	.	.	.	.	.	.	+	.	.	+	1	6
Piptatherum miliaceum (L.) Coss. subsp. miliaceum	+	1	.	+	.	.	.	.	+	.	+	.	.	.	5
Reichardia picroides (L.) Roth	.	.	.	+	+	+	.	+	.	1	.	.	.	.	5
Asphodelus ramosus L.	.	.	.	.	1	+	+	.	+	+	.	.	.	.	5
Erica multiflora L. subsp. multiflora	.	.	+	+		+	.	.	.	.	1	.	.	.	4
Asphodeline lutea (L.) Rchb.	.	.	.	.	+	.	.	+	+	+	.	.	.	.	4
Micromeria graeca (L.) Rchb. subsp. graeca	.	+	.	.	+	.	.	.	.	+	.	.	.	.	3
Dasypyrum villosum (L.) P. Candargy	.	+	.	.	.	.	.	.	.	.	+	1	.	.	3
Centranthus ruber (L.) DC.	.	.	.	+	.	.	.	.	+		.	.	.	+	3
Smyrmium olusatrum L.	.	.	.	1	.	.	.	+	.	.	.	.	.	.	2
Rosa canina L.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	2
Hyparrhenia hirta (L.) Stapf	.	+	.	.	.	.	.	.	.	.	+	.	.	.	2
Bituminaria bituminosa (L.) E. H. Stirton	.	.	.	.	.	.	.	.	+	.	.	+	.	.	2
Brassica villosa Biv. subsp. bivonana (Mazzola & Raimondo) Raimondo & Mazzola	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1
Ferula communis L. subsp. communis	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Galium aetnicum Biv.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1
Melica ciliata L. subsp. ciliata	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1
Ballota hispanica (L.) Benth.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1
Allium ampeloprasum L.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1
Lobularia maritima (L.) Desv. subsp. maritima	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1
Iris planifolia (Mill.) Fiori & Paoletti	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1
Coridothymus capitatus (L.) Rchb. f.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1
Kundmannia sicula (L.) DC.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Avenula cincinnata (Ten.) Holub	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Lathyrus clymenum L.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Scrophularia canina L. subsp. bicolor (Sm.) Greuter	.	.	.	.	.	.	.	.	+		.	.	.	.	1
Arum italicum Mill.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1

Syndynamism – It takes part in a calcicolous edaphoxerophilous series, in catenal contact with the microgeosigmetum of the cliffs, in the climactic belt of the woods of the class *Quercetea ilicis*.

Synchorology – The coenosis, already reported for the calcareous outcrops of the Agrigento area, Trapani area and Aegadian Islands (Brullo & Marcenò, 1985; Brullo *et al*., 2009), was also found in the foothills of Pizzo Telegrafo, near the Arancio Lake.

1d) *CELTIDETOSUM AETNENSIS* (Brullo & Marcenò 1985) comb. nov.

Synonyms – Oleo-Euphorbietum dendroidis Trinajstic 1973 (1984) subass. *celtidetosum tournefortii* Marcenò, Ottonello & Romano 2002, Fitosociologia 39 (1): 111; *Euphorbietum dendroidis* Guinochet in Guinochet & Drounieau 1944 subass. *celtidetosum aetnensis* (Brullo & Marcenò 1985) Brullo, Gianguzzi, La Mantia & Siracusa 2009, Bollettino Accademia Gioenia Scienze Naturali 369 [2008]: 21.

Table – 5 (relevés 9-10).

Holotypus – Relevé 16 in Table 1 (in Marcenò *et al*., 2002).

Characteristic/Differential species – Euphorbia dendroides (dom.), *Celtis tournefortii* subsp. *aetnensis*.

Structure and ecology – Maquis dominated by *Euphorbia dendroides*, differentiated by the presence of *Celtis tournefortii* subsp. *aetnensis* (in Giardina *et al*., 2007), Sicilian endemic (Mount Etna, Nebrodi and Sicani Mts.) vicariant of *Celtis tournefortii* subsp. *tournefortii*, whose range goes from the Aegean area to the Caucasian Region (Jalas & Suominen, 1976). The coenosis is tied to xeric rocky ridges, on marly-calcareous elevations (Gianguzzi *et al*., 2014a, b).

Bioclimate – Upper mesomediterranean with lower subhumid ombrotype.

Syndynamism – It takes part in a calcicolous edaphoxerophilous series, in catenal contact with the microgeosigmetum of the cliffs, in the climactic belt of the woods of the class *Quercetea ilicis*.

Synchorology – Community reported for the Caltabellotta territory (Agrigento province), along the southern slopes of Pizzo Telegrafo (Marcenò *et al*., 2002).

Notes – On the Sicani Mts. *Celtis tournefortii* subsp. *aetnensis* also constitutes interesting microwoods – which will be discussed later (see *Pistacio terebinthi-Celtidetum aetnensis* subass. *phlomidetosum fruticosae*) – in which the entity is physiognomically dominant, typical of screes and detrital coverages (Gianguzzi *et al*., 2014a, b).

1e) *EUPHORBIETOSUM BIVONAE* (Gianguzzi, Ilardi & Raimondo 1996) comb. nov.

Synonyms – Oleo-Euphorbietum dendroidis Trinajstic (1973) 1984 subass. *euphorbietosum bivonae* Gianguzzi, Ilardi & Raimondo 1996; *Euphorbietum dendroidis* Guinochet in Guinochet & Drounieau 1944 subass. *euphorbietosum bivonae* (Gianguzzi, Ilardi & Raimondo 1996) Brullo, Gianguzzi, La Mantia & Siracusa 2009, Bollettino Accademia Gioenia Scienze Naturali 369 [2008]: 19.

Table – 5 (relevés 11-14).

Holotypus – Relevé 5 in Table 9 (in Gianguzzi *et al*., 1996).

Characteristic/Differential species – Euphorbia dendroides (dom.), *Euphorbia bivonae*.

Structure and ecology – Maquis with *Euphorbia dendroides*, differentiated by the frequency of *Euphorbia bivonae*, other summer-deciduous element with a southern-Mediterranean distribution, whose presence in Sicily is confined to the Mesozoic carbonate promontories of the sub-coastal area between the Palermo and Trapani areas, as well as between Sciacca and the elevations south of the Sicani Mts. (Raimondo *et al*., 1994). The coenosis is typical of rupestrian ledges and xeric rocky ridges, where it makes contact with chasmophilous communities of the alliance *Dianthion rupicolae*.

Bioclimate – Thermomediterranean with dry-subhumid ombrotype.

Syndynamism – It takes part in a calcicolous edaphoxerophilous series, in catenal contact with the microgeosigmetum of the cliffs, in the climacic belt of the woods of the class *Quercetea ilicis*.

Synchorology – The coenosis – already reported for the area between Cefalù and Trapani (Gianguzzi *et al*., 1996), Serre di Ciminna and Mount S. Calogero at Sciacca (Brullo *et al*., 2009) – was also observed in the following localities of the Sicani Mts.: southern slopes of Mount Gristia (Fig. 4), Cozzo Danesi, Serra S. Benedetto and Mount Genuardo, in the S. Giacomo and Il Corvo districts.

2) *AMPELODESMO MAURITANICI-JUNIPERETUM TURBINATAE* subass. *CISTETOSUM CRETICI* Gianguzzi, Ilardi, Caldarella, Cusimano, Cuttonaro & Romano 2012, Plant Sociology 49 (2): 20.

Table – 7 (Gianguzzi *et al*., 2012).

Holotypus – Relevé 6 in Table 7 (in Gianguzzi *et al*., 2012).

Characteristic/Differential species – Association: *Juniperus turbinata* (dom.), *Ampelodemos mauritanicus*, *Erica multiflora*; subass. *cistetosum cretici*: *Cistus creticus* subsp. *creticus*, *Micromeria graeca* subsp. *graeca*, *Fumana laevipes*.

Structure and ecology – Maquis-thicket dominated by *Juniperus turbinata*, with open structure and average height varying between 2.5 and 3.5 (4) m, located on rocky ridges, calcareous pinnacles and more or less eroded lithosols. The woody layer includes several sclerophytes with a more or less sparse presence (*Phillyrea latifolia*, *Rhamnus alaternus*, *Pistacia lentiscus*,

Olea europaea var. *sylvestris*, *Prasium majus*, etc.), as well as *Erica multiflora*, *Cistus creticus* subsp. *creticus* and *Ampelodesmos mauritanicus*, typical elements of garrigues and secondary grasslands that find in the coenosis a habitat-refuge of relict nature, tied to the particular geomorphology and to the steepness of the stations (Gianguzzi *et al*., 2012). Other hemicryptophytes and chamaephytes include *Charybdis pancration*, *Asphodelus ramosus* subsp. *ramosus*, *Micromeria graeca* subsp. *graeca*, *Fumana laevipes*, etc.

Bioclimate – Thermomediterranean with subhumid ombrotype.

Syndynamism – It constitutes the most structured aspect of an edapho-xerophilous series, in catenal contact with pioneer aspects of the microgeosigmetum of rupicolous environments.

Synchorology – The coenosis is located in a restricted area, among the gorges of the Sosio River (Gianguzzi *et al*., 2007a, 2012); a similar phytocoenotic aspect is reported for the coastal strip between the Sorrentino-Amalfitana Peninsula (Cancellieri, 2008) and Maratea (Caneva *et al*., 2004), in turn described as *Ampelodesmo mauritanici-Juniperetum turbinatae* subass. *myrtetosum communis* (Gianguzzi *et al*., 2012), differentiated by the presence of *Myrtus communis* and *Clematis flammula*.

3) *ASPARAGO ALBI-ARTEMISIETUM ARBORESCENTIS* ass. nova *hoc loco*

Table – 6.

Holotypus – Relevé 2 in Table 6.

Characteristic/Differential species – *Artemisia arborescens* (dom.), *Asparagus albus*.

Floristic-phytosociological notes – Coenosis physiognomically similar to the *Coronillo valentinae-Artemisietum arborescentis* (Brullo *et al*., 2013), association described for the clayey substrates of the "Gessoso-Solfifera" Formation of the Sicilian inland, in turn framed in the class *Pegano-Salsoletea*, due to the presence of characteristic subhalophilous elements (*Salsola oppositifolia*, *Atriplex halimus*, etc.), completely absent in the community at issue.

Structure and ecology – Sub-nitrophilous maquis with a clear dominance of *Artemisia arborescens*, 1-1.5 m high, with a more or less closed structure (plant coverage around 90%); it is a coenosis poor in species, with sporadic presence of woody elements of the alliance *Oleo-Ceratonion* and of the order *Pistacio-Rhamnetalia alaterni* (*Asparagus albus*, *Euphorbia dendroides*, *Ruta chalepensis*, *Prasium maius*, etc.), and with a rather sparse herbaceous layer. The coenosis is tied to quite xeric stations (south/southwest predominant exposure), affected by ancient human settlements; in fact, it is found at the top of rocky outcrops (calcareous, marly-silty and calcarenitic) and in their underlying slopes with accumulation of loose soils and detrital materials.

Bioclimate – Thermo-mesomediterranean with dry-subhumid ombrotype.

Syndynamism – It plays a pioneer role in the climactic belt of the class *Quercetea ilicis*, in catenal contact with microgeoseries of xeric rocky ridges.

Synchorology – The association, found on the southern slopes of Contrada Gristìa, at Mount Genuardo and at the Rocche di Entella, is also present – based on our unpublished data – in other areas of the central-southern sector of Sicily.

4) *EUPHORBIO CHARACIAE-ANAGYRIDETUM PHOETIDIS* ass. nova *hoc loco* [4a) *ASPARAGETOSUM ALBAE* subass. nova *hoc loco*; 4b) *LONICERETOSUM IMPLEXAE* subass. nova *hoc loco*]

Table – 7.

Holotypus – *Euphorbio characiae-Anagyridetum phoetidis* ass. nova *hoc loco*: relevé 2 in Table 7; *asparagetosum albae* subass. nova *hoc loco*: relevé 2 in Table 7; *loniceretosum implexae* subass. nova *hoc loco*: relevé 9 in Table 7.

Characteristic/Differential species – Association and subass. *asparagetosum albae*: *Anagyris phoetida* (dom.), *Euphorbia characias*, *Asparagus albus* and *Phlomis fruticosa*; subass. *loniceretosum implexae*: *Lonicera implexa* and *Melica ciliata* subsp. *ciliata*.

Structure and ecology – Maquis poor in species with *Anagyris phoetida*, 2-2.5 m high, with a closed structure (plant coverage around 90-100%) and a generally sparse herbaceous layer, to which *Euphorbia characias* frequently is associated. The coenosis is tied to subnitrophilous and sunny stations with south/southwest exposure, placed close to carbonate outcrops, where it colonizes the pockets of clayey soil, sometimes mixed with red soil and detrital materials. Two variants are distinguished, in turn ascribed to distinct subassociations: a) the subass. *asparagetosum albae*, with *Asparagus albus* and sometimes *Phlomis fruticosa*, as typical aspect within the thermo- and mesomediterranean lower subhumid bioclimatic belts; b) the subass. *loniceretosum implexae*, with *Lonicera implexa* and *Melica ciliata* subsp. *ciliata*, which constitutes an azonal aspect above 800 m a.s.l., where the aforecited most thermophilous species of the alliance *Oleo-Ceratonion* become very rare.

Bioclimate – Thermo-mesomediterranean with dry-subhumid ombrotype.

Syndynamism – It represents the most structured aspect of an edapho-xerophilous calcicolous vegetation series, in catenal contact with the climatophilous series dominated by the oak wood of the *Sorbo torminalis-Quercetum ilicis*.

Synchorology – The subass. *asparagetosum albae* was found along the canyons of the northern part of Pizzo Telegrafo (Contrada S. Biagio) and on the sou-

Tab. 6 - *Asparago albi-Artemisietum arborescentis* ass. nova *hoc loco*.

Relevé (n°)	1	2	3	4	5	6	7	8	
Altitude (m a.s.l.)	300	310	325	340	370	380	390	560	
Slope (%)	35	25	20	30	30	60	60	70	
Exposure	SW	W	W	W	SW	S	NE	S	
Area (m^2)	80	80	100	100	150	100	100	100	
Total coverage (%)	95	90	90	90	90	90	90	95	
Average height (m)	1.2	1.2	1.3	1.3	1.4	1.5	1.5	1.5	
Number of species	9	9	16	10	16	15	17	16	Presences
Differentials of association									
Artemisia arborescens (Vaill.) L.	5	5	4	4	4	4	4	4	8
Asparagus albus L.	1	1	1	1	1	3	3	3	8
Characteristics of the alliance *Oleo-Ceratonion siliquae* and of the upper units									
Euphorbia dendroides L.	2	.	1	+	.	2	1	+	6
Ruta chalepensis L.	.	+	.	+	+	1	.	1	5
Prasium majus L.	+	.	1	.	.	1	+	.	4
Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz.	.	.	.	.	.	3	1	1	3
Asparagus acutifolius L.	.	.	1	.	+	.	.	1	3
Osyris alba L.	.	.	.	.	.	1	1	+	3
Melica ciliata L. subsp. ciliata	.	.	.	.	.	2	1	.	2
Chamaerops humilis L.	.	.	.	.	.	2	.	.	1
Anagyris foetida L.	.	.	.	.	.	1	.	.	1
Rosa sempervirens L.	.	.	.	.	.	.	.	1	1
Celtis australis L.	.	.	.	.	.	.	.	1	1
Clematis cirrhosa L.	.	.	.	.	.	.	.	1	1
Euphorbia bivonae Steud.	.	.	.	.	.	+	.	.	1
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	.	.	.	.	.	.	.	+	1
Other species									
Piptatherum miliaceum (L.) Coss. subsp. miliaceum	+	2	2	+	3	.	+	1	7
Bituminaria bituminosa (L.) E. H. Stirton	.	.	2	1	2	+	2	2	6
Foeniculum vulgare Mill. subsp. vulgare	1	1	1	+	+	.	.	1	6
Mercurialis annua L.	1	+	+	1	+	.	+	.	6
Asphodelus ramosus L.	1	1	1	1	+	.	.	.	5
Ferula communis L. subsp. communis	1	1	+	+	2	.	.	.	5
Dactylis glomerata L. subsp. hispanica (Roth) Nyman	.	.	1	.	1	+	+	.	4
Lobularia maritima (L.) Desv. subsp. maritima	.	+	+	.	+	.	+	.	4
Micromeria graeca (L.) Rchb. subsp. graeca	.	.	+	.	+	+	+	.	4
Acanthus mollis L.	.	.	.	1	1	.	.	2	3
Pallenis spinosa (L.) Cass.	.	.	+	.	1	.	+	.	3
Sedum sediforme (Jacq.) Pau	.	.	.	.	.	2	1	.	2
Charybdis pancration (Steinh.) Speta	.	.	1	.	+	.	.	.	2
Hyparrenia hirta (L.) Stapf	.	.	.	.	.	.	1	.	1
Opopanax chironium (L.) W. D. J. Koch	.	.	.	.	.	.	+	.	1
Rubus ulmifolius Schott	.	.	.	.	.	.	.	+	1

thern slopes of Mount Genuardo (Case Menta), whereas the subass. *loniceretosum implexae* on Mount Cardellìa.

Floristic-phytosociological notes – A similar coenosis is the *Euphorbio dendroidis-Anagyridetum foetidae* (Biondi & Mossa, 1992), described in Sardinia for the carbonate substrates at Cagliari (north side of St. Elia Cape), differentiated by the frequency of *Euphorbia dendroides*.

Celtis tournefortii *subsp.* aetnensis *microwoods*

These are small nuclei of forest vegetation with *Celtis tournefortii* subsp. *aetnensis* – interesting endemic to the Sicilian inland, where it vicariates the subass. *typicum* of the Aegean area –, typical of screes and detrital coverages, ascribed to the following association.

5) *PISTACIO TEREBINTHI-CELTIDETUM AETNENSIS* [5a) subass. *TYPICUM*; 5b) subass. *PHLOMIDETOSUM FRUTICOSAE* Gianguzzi, Cusimano & Romano 2014] Gianguzzi, Cusimano & Romano 2014, Plant Sociology 51 (2): 21.

Table – 2 (Gianguzzi *et al.*, 2014a).

Holotypus – Relevé 2 in Table 2 (in Gianguzzi *et al.*,

2014a).

Characteristic/Differential species – *Celtis tournefortii* subsp. *aetnensis* (dom.), *Pistacia terebinthus*; a) subass. *typicum*: *Ruta chalepensis*, *Smyrnium olusatrum*, *Prunus spinosa*; b) subass. *phlomidetosum fruticosae*: *Phlomis fruticosa*.

Structure and ecology – Microwoody community, 3-5 (8) m high, dominated by *Celtis tournefortii* subsp. *aetnensis*, to which *Pistacia terebinthus* – other winter deciduous species which characterizes the physiognomy of the coenosis –, as well as some thermophilous sclerophytes (*Asparagus albus*, *Euphorbia characias*, *Ruta chalepensis*, *Olea europaea* var. *sylvestris*, etc.) and other lianous elements of the Mediterranean maquis (*Clematis cirrhosa*, *Rubia peregrina* subsp. *longifolia*, *Smilax aspera*, *Asparagus acutifolius*, *Lonicera etrusca*), are associated. These vegetation aspects – characterized by a generally linear growth – establish on screes located on slopes or depressions, on lithosols of various nature, at altitudes between 380 m (Sicani Mts., Pizzo Telegrafo) and over 1000 m a.s.l. (Rocca Busambra, Rocca Rapiti, Rocca Nadore, Mount Etna).

Bioclimate – Upper mesomediterranean lower subhumid.

Syndynamism – The coenosis constitutes the most structured aspect of a pioneer series located on the sidelines of screes, in catenal contact with the following other vegetation series: a) *Oleo sylvestris-Euphorbio dendroidis* sigmetum (on xerophilous rocky outcrops); b) *Ampelodesmo mauritanici-Querco ilicis* sigmetum (on more fresh and shady rocky outcrops).

Synchorology – The association has recently been described for some areas of the Sicilian inland (Gianguzzi *et al*., 2014a) with more subassociations, two of which referred to the Sicani Mts. area: 1) subass. *typicum* (on calcareous-dolomite substrates, located on rocky ridges, screes or on heaps of stones piled in the time by the man on the sidelines of the fields), reported for Bisacquino (northern slopes of Pizzo Telegrafo, in Contrada S. Biagio) and S. Stefano Quisquina (Pizzo Castelluzzo), as well as for Corleone (southern slopes of Rocca Busambra) and Gangi (Cozzo Ficilino); 2) subass. *phlomidetosum fruticosae* (with *Phlomis fruticosa*, tied to detrital cones placed close to shady and xeric cliffs of carbonate nature), widespread on the southern slopes of Pizzo Telegrafo, in catenal contact with the *Euphorbia dendroides* community of the rocky ridges, previously ascribed to the *Oleo-Euphorbietum dendroidis phlomidetosum fruticosae*.

Laurus nobilis *microwoods*

Other microwoody nuclei dominated by *Laurus nobilis*, already reported for the Sicani Mts. (Gianguzzi *et al*., 2007b, 2010) and typical of fresh stations of valley floor, are ascribed to the following association.

6) *ACANTHO MOLLIS-LAURETUM NOBILIS* Gianguzzi, D'Amico & Romano 2010, Lazaroa 31: 72.

Tables – 3 (in Gianguzzi *et al*., 2010) and synoptic table 8 (column 1).

Holotypus – Relevé 14 in Table 3 (in Gianguzzi *et al*., 2010).

Pseudonym – *Hedero helicis-Lauretum nobilis* Bueno & Prieto 1991 *sensu* Brullo *et al*., 2001a.

Characteristic/Differential species – *Laurus nobilis* (dom.), *Acanthus mollis*, *Hedera helix* subsp. *helix*, *Cyclamen hederifolium*, *Pistacia terebinthus*, *Orobanche hederae*.

Structure and ecology – Microwoods dominated by *Laurus nobilis*, to which some other lauriphylls (*Hedera helix* subsp. *helix*, *Rhamnus alaternus*, *Ruscus aculeatus*, *Smilax aspera* and, sometimes, also *Viburnum tinus*), lianas (*Rubia peregrina* subsp. *longifolia*, *Asparagus acutifolius*, *Tamus communis*, *Clematis vitalba*, *Calystegia sylvatica* and *Rubus ulmifolius*) and herbaceous species with wide leaf blade very frequent in the undergrowth, such as *Cyclamen hederifolium* and *Acanthus mollis* (Gianguzzi *et al*., 2010), are associated. The coenosis is represented in fresh stations of valley floor (wet depressions, banks of streams and environments of gorge), with clayey-calcareous matrix, where, however, it is rare and fragmentary.

Bioclimate – Mesomediterranean with subhumid ombrotype.

Syndynamism – It constitutes the series head of the *Acantho mollis-Lauro nobilis* sigmetum (Gianguzzi *et al*., 2010), located within the climactic belt of the class *Quercetea ilicis*, on the Sicani Mts. in catenal contact with the woody series of the *Oleo-Querco virgilianae* sigmetum.

Synchorology – Association with a relict character described for isolated stations in Sicily, as vicariant of other Mediterranean coenoses (Gianguzzi *et al*., 2010), reported also for the Sicani Mts., where it is known for Sambuca di Sicilia (Arancio and Menta districts), Bivona (Alba Torrent), Palazzo Adriano (Migliotta and Musica districts), Bisacquino (Alvano and Gallinaro districts) and Castronovo di Sicilia (Ponte Morello).

Phytosociological notes – The *Laurus nobilis* vegetation aspects reported by various authors for the Italo-Tyrrhenian biogeographical Province (Brullo *et al*., 2001; Bianco *et al*., 2002; Bacchetta *et al*., 2007; Gianguzzi *et al*., 2010; Biondi *et al*., 2009; Marino *et al*., 2014) have been framed hitherto in the alliances *Arbuto-Laurion nobilis* [syntaxon however described for the Iberian Peninsula and indicated for different biogeographical contexts (Rivas-Martínez *et al*., 2001, 2002)] and *Fraxino orni-Quercion ilicis* [which frames the wood vegetation with sclerophyllous and Mediterranean deciduous species of the Italian Peninsula and the large islands (Biondi, 2003; Biondi *et al*., 2014)]. These *Laurus nobilis* communities, though characteri-

zed by a rather depleted floristic cortege – in relation to the recognised relictuality of the vegetation –, denote an own physiognomic-structural peculiarity which allows, in the same way as the Iberian aspects, the framework in a specific alliance with a Tyrrhenian gravitation (in turn referred to the class *Quercetea ilicis* and to the order *Quercetalia ilicis*), proposed below.

ASPARAGO ACUTIFOLII-LAURION NOBILIS all. nova

Holotypus – *Acantho mollis-Lauretum nobilis* Gianguzzi, D'Amico & Romano 2010 (in Gianguzzi *et al*., 2010, Table 3).

Table – 8 (synoptic table).

Characteristic species – *Laurus nobilis* (dom.).

Territorial differential species – *Ficus carica*, *Celtis australis*, *Asparagus acutifolius*, *Clematis vitalba*, *Cyclamen hederifolium*, *Ulmus minor*, *Orobanche hederae*.

Structure and ecology – Microwoods dominated by *Laurus nobilis*, located in circumscribed thermo-hygrophilous stations in the sub-coastal, plain and hilly belts, on substrates of various nature, humiferous and generally rich in rocky matrix, often at the edge of sources or in areas with shallow groundwater.

Bioclimate – Thermo-mesomediterranean, with dry-subhumid ombrotype.

Syndynamism – Forest aspects that tend to characterize hygrophilous edaphoseries, in catenal contact with climactic communities of the class *Quercetea ilicis*.

Distribution – The alliance gravitates in the Italo-Tyrrhenian biogeographical Province, within which *Laurus nobilis* aspects ascribable to the syntaxon at issue are reported for several localities in Sicily (Brullo *et al*., 2001; Gianguzzi *et al*., 2010; Marino *et al*., 2014), as well as in Sardinia (Bacchetta *et al*., 2007; Biondi *et al*., 2009) and along the coastal belt of Lazio (Bianco *et al*., 2002).

Holm oak woods

Multivariate analysis performed on the matrix of the phytosociological relevés related to the holm oak communities, allowed to obtain the dendrogram reported in Fig. 2, as well as to ascribe the *Quercus ilex* woods found in the Sicani Mts. to the following coenoses: 7) *Ampelodesmo mauritanici-Quercetum ilicis* ass. nova *hoc loco*, with two distinct aspects in turn described as new subassociations (*typicum* and *viburnetosum tini*); 8) *Sorbo torminalis-Quercetum ilicis* ass. nova *hoc loco*.

7a) *AMPELODESMO MAURITANICI-QUERCETUM ILICIS* ass. nova *hoc loco* subass. *TYPICUM*

Table – 9 (relevés 1-8).

Holotypus – Relevé 4 in Table 9.

Characteristic/Differential species – *Quercus ilex* (dom.), *Ampelodesmos mauritanicus*, *Emerus major* subsp. *emeroides*, *Arbutus unedo*.

Structure, ecology and floristic-phytosociological notes – *Quercus ilex* woody community, 6-10 m high, with a closed structure (coverage of around 95-100%), which also includes *Quercus virgiliana* and *Fraxinus ornus* in the arboreal layer. Based on a floristic-phytosociological and ecological-structural analysis of the coenosis in relation to other holm oak communities hitherto known for Sicily, it is proposed as a new association, whose characteristic specific combination also includes the following species: – *Ampelodesmos mauritanicus*, which in Sicily dominates extensive secondary grasslands ascribed to a specific alliance of the class *Lygeo-Stipetea* (Minissale, 1994; Brullo *et al*., 2010), however frequent in the undergrowth of this coenosis (Gianguzzi *et al*., 2012); – *Arbutus unedo*, which in Sicily is indicated among the differential entities of acidophilous communities of the alliance *Erico-Quercion ilicis* (Brullo & Marcenò, 1985; Brullo *et al*., 2009), quite widespread also in this other coenosis tied to substrates of carbonate nature; – *Emerus major* subsp. *emeroides* and *Lonicera implexa*, which are almost constant in the floristic cortege. The association at issue (with the subass. *typicum*) is widespread in the hilly and sub-mountain belt, at altitudes between 450 m and around 1000 m a.s.l., where it prefers shady and humid steep slopes, with north/northwest predominant exposure and soils rich in detrital material, originated by erosion and landslides.

Bioclimate – Upper mesomediterranean upper subhumid.

Syndynamism – It constitutes the most structured aspect of a vegetation series which also includes *Pru-*

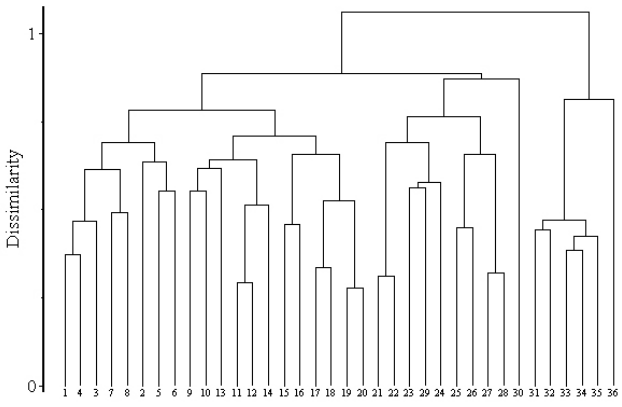

Fig. 2 - Dendrogram obtained through the synoptic comparison among the holm oak communities surveyed (cluster analysis, UPGMA). *Ampelodesmo mauritanici-Quercetum ilicis* ass. nova subass. *typicum* (branches 1-8; Tab. 9, rel. 1-8) and *viburnetosum tini* subass. nova (branches 9-20; Tab. 9, rel. 9-20); *Sorbo torminalis-Quercetum ilicis* ass. nova (branches 21-30; Tab. 10, rel. 1-10); *Aceri campestris-Quercetum ilicis* (branches 31-36; Tab. 11, column 1).

Tab. 7 - *Euphorbio characiae-Anagyridetum foetidis* ass. nova *hoc loco asparagetosum albae* subass. nova *hoc loco* (rels. 1–7) and *loniceretosum implexae* subass. nova *hoc loco* (rels. 8–10).

Relevé (n°)	1	2	3	4	5	6	7	8	9	10	
Altitude (m a.s.l.)	450	460	570	637	642	645	649	830	840	850	
Slope (%)	10	12	40	60	20	25	50	15	15	20	
Exposure	E	E	SE	NE	S	SE	N	S	S	S	
Area (m^2)	80	80	100	80	80	80	70	80	80	80	
Total coverage (%)	100	100	90	95	90	90	90	100	100	100	
Herbaceous layer coverage (%)	20	20	25	22	20	22	25	20	20	18	
Number of species	17	15	12	17	18	17	21	12	12	12	Presences
Differentials of association											
Anagyris foetida L.	5	5	5	5	5	5	5	5	5	5	10
Euphorbia characias L.	+	1	2	1	+	1	+	3	2	2	10
Characteristics of the subassociations *asparagetosum albae* and *loniceretosum implexae*											
Asparagus albus L.	1	1	1	1	2	1	+	.	.	.	7
Rosa sempervirens L.	2	1	+	+	.	1	.	.	.	.	5
Phlomis fruticosa L.	1	1	.	.	2	.	.	.	.	.	3
Melica ciliata L. subsp. ciliata	.	.	.	.	.	.	.	1	2	1	3
Lonicera implexa Aiton	.	.	.	.	.	.	.	+	1	+	3
Characteristics of the alliance *Oleo-Ceratonion siliquae* and of the upper units											
Asparagus acutifolius L.	1	+	1	+	+	+	1	1	1	1	10
Arisarum vulgare Targ.-Tozz.	+	+	2	1	2	2	1	+	.	+	9
Allium subhirsutum L.	1	1	+	1	+	.	1	.	+	+	8
Ruta chalepensis L.	2	1	+	1	.	+	1	1	.	.	7
Rhamnus alaternus L.	+	1	.	+	1	1	2	.	.	+	7
Rubia peregrina L. subsp. longifolia	+	+	.	.	2	+	.	+	+	.	6
Osyris alba L.	1	.	1	.	1	2	.	1	.	.	5
Prasium majus L.	1	+	.	+	+	.	1	.	.	.	5
Smilax aspera L.	+	+	.	.	.	+	.	.	.	.	3
Cyclamen hederifolium Aiton subsp. hederifolium	.	.	.	1	.	.	1	.	.	.	2
Ruscus aculeatus L.	1	+	.	.	.	.	.	.	.	.	2
Chamaerops humilis L.	.	1	.	.	.	.	.	.	.	.	1
Pyrus spinosa Forssk.	.	.	.	.	.	.	1	.	.	.	1
Pistacia terebinthus L.	.	.	.	.	.	.	1	.	.	.	1
Olea europaea L. var. sylvestris (Mill.) Lehr	+	.	.	.	.	.	.	.	.	.	1
Other species											
Asphodelus ramosus L.	+	.	+	+	1	+	+	1	1	1	9
Foeniculum vulgare Mill. subsp. vulgare	.	.	1	1	2	1	1	.	.	+	6
Ferula communis L. subsp. communis	.	.	3	+	+	+	.	.	.	.	4
Calamintha nepeta (L.) Savi subsp. nepeta	.	.	.	.	.	.	.	1	1	1	3
Piptatherum miliaceum (L.) Coss. subsp. miliaceum	.	.	.	.	1	+	+	.	.	.	3
Prunus spinosa L.	.	.	.	.	.	.	.	.	2	2	2
Reseda alba L.	.	.	.	1	.	.	+	.	.	.	2
Ballota hispanica (L.) Benth.	.	.	.	.	1	+	.	.	.	.	2
Asphodeline lutea (L.) Rchb.	.	.	.	.	+	.	1	.	.	.	2
Daucus carota L.	.	.	.	.	+	.	1	.	.	.	2
Scolymus grandiflorus Desf.	.	.	.	.	.	.	.	1	+	.	2
Rhus coriaria L.	.	.	.	2	.	.	.	.	.	.	1
Smyrnium olusatrum L.	.	.	.	.	.	.	1	.	.	.	1
Carlina sicula Ten. s.l.	.	.	.	.	.	.	.	.	1	.	1
Micromeria graeca (L.) Rchb. subsp. graeca	.	.	.	+	.	.	.	.	.	.	1
Bituminaria bituminosa (L.) E. H. Stirton	.	.	.	.	.	+	.	.	.	.	1
Thalyctrum calabricum Spreng.	.	.	.	.	.	.	+	.	.	.	1
Origanum vulgare L. subsp. vulgare	.	.	.	.	.	.	+	.	.	.	1

Tab. 8 - Simplified synoptic table (sporadic species were eliminated) among the *Laurus nobilis* communities in the South-Tyrrhenian area (columns 1–3, referred to the *Asparago acutifolii-Laurion nobilis* all. nova) and in the Iberian Peninsula (columns 4–12, ascribed to the alliance *Arbuto unedonis-Laurion nobilis* Rivas-Martínez, Fernández-González & Loidi 1999): 1 - *Acantho mollis-Lauretum nobilis* Gianguzzi, D'Amico & Romano 2010 (Gianguzzi *et al*., 2010; Table 3); 2 - *Acantho mollis-Lauretum nobilis* Gianguzzi, D'Amico & Romano 2010 (Brullo *et al*., 2001a; Table 1); 3 - *Celtido australis-Lauretum nobilis* (Bacchetta *et al*., 2007; Table 1, rel. 1–15); 4 - *Hedero helicis-Lauretum nobilis* (Bueno Sanchez & Fernandez Prieto, 1991; Table 3); 5 - *Calluno vulgaris-Lauretum nobilis* (Díaz González & Fernández Prieto, 1994; rel. type); 6 - *Calluno vulgaris-Lauretum nobilis* (Álvarez Arbesú, 2005); 7 - *Calluno vulgaris-Lauretum nobilis* (Rodríguez Guitián *et al*., 2007; Table 3, rel. 1–27); 8 - *Tamo communis-Lauretum nobilis* (Bueno Sanchez & Fernandez Prieto, 1991; sub *Hedero helicis-Lauretum nobilis* subass. *euphorbietoum amygdaloidis*); 9 - *Tamo communis-Lauretum nobilis* (Álvarez Arbesú, 2005; sub *Hedero helicis-Lauretum nobilis*); 10 - *Tamo communis-Lauretum nobilis* (Rodríguez Guitián *et al*., 2007; Table 5, rel. 1–19); 11 - *Omphalodo nitidae-Lauretum nobilis* (Honrado *et al*., 2003); 12 - *Holco mollis-Lauretum nobilis* (Rodríguez Guitián *et al*., 2007; Table 5, rel. 22–30).

Association	1	2	3	4	5	6	7	8	9	10	11	12
Number of relevés	18	10	15	7	1	41	27	4	19	21	9	9
Guide species												
Laurus nobilis L.	V	V	V	V	4	V	V	4	V	V	V	V
Characteristics and differentials of associations and of the alliance *Asparago acutifolii-Laurion nobilis*												
Asparagus acutifolius L.	V	III	IV	.	.	.	.	.	.	.	.	.
Cyclamen hederifolium Aiton	V	V	.	.	.	.	.	.	.	.	.	.
Acanthus mollis L.	V	V	I	.	.	.	.	.	.	.	.	.
Orobanche hederae Duby	II	I	I	.	.	.	.	.	.	.	.	.
Pistacia terebinthus L.	III	II	.	.	.	.	.	.	.	.	.	.
Celtis australis L.	I	III	III	.	.	.	.	.	.	.	.	.
Ficus carica L. var. caprificus (Risso) Tschirch & Ravasini	II	II	III	.	.	.	.	.	.	.	.	.
Cyclamen repandum S. et S.	.	.	II	.	.	.	.	.	.	.	.	.
Characteristics and differentials of association												
Genista occidentalis (Rouy) H.J. Coste	.	.	.	IV	.	.	.	.	.	.	.	.
Lithodora diffusa (Lag.) I.M. Johnst.	.	.	.	IV	.	.	.	.	.	.	.	.
Silene divaricata Laq.	.	.	.	III	.	.	.	.	.	.	.	.
Vincetoxicum hirundinaria Medik.	.	.	.	II	.	.	.	.	.	.	.	.
Carduus argemone Lam.	.	.	.	II	.	.	.	.	.	.	.	.
Scabiosa columbaria L.	.	.	.	II	.	.	.	.	.	.	.	.
Daucus gummifer Lam.	.	.	.	II	.	.	I	.	.	.	.	.
Rumex biformis Lange	.	.	.	II	.	.	.	.	.	.	.	.
Leucanthemum crassifolium (Lange) Lange	.	.	.	II	.	.	.	.	.	.	.	.
Rumex acetosa L. subsp. biformis (Lange) Valdés	.	.	.	.	+	I	II	.	.	.	.	.
Silene uniflora Roth	.	.	.	.	+	I	II	.	.	.	.	.
Leucanthemum pluriflorum Pau	.	.	.	.	+	I	II	.	.	.	.	.
Crithmum maritimum L.	.	.	.	I	.	.	III	.	.	.	.	.
Festuca rubra L. subsp. pruinosa (Hack.) Piper	.	.	.	.	1	.	III	.	.	.	.	.
Calluna vulgaris (L.) Hull	.	.	.	.	3	.	.	.	.	.	.	.
Cornus sanguinea L.				III	.	.	.	3	.	II	.	.
Mercurialis perennis L.	.	.	.	II	.	I	I	2	II	I	.	II
Iris foetidissima L.	.	.	.	II	.	.	III	1	II	III	.	.
Primula acaulis (L.) L.	.	.	.	.	.	I	II	.	.	I	.	I
Hypericum androsaemum L.	.	.	.	.	.	.	I	.	I	I	I	.
Ilex aquifolium L.	.	.	.	.	.	.	I	.	.	II	.	I
Fraxinus excelsior L.	.	.	.	.	.	.	.	.	.	III	.	.
Omphalodes nitida (Willd.) Hoffmanns. & Link	.	.	.	.	+	I	I	.	.	.	III	II
Athyrium filix-foemina (L.) Roth	.	.	.	.	.	I	I	.	.	I	IV	I
Salix atrocinerea Brot.	.	.	.	.	.	I	.	.	.	.	III	I
Osmunda regalis L.	.	.	.	.	.	.	I	.	.	.	IV	.
Acer pseudoplatanus L.	.	.	.	.	.	.	.	.	.	I	II	.
Blechnum spicant (L.) Roth	.	.	.	.	.	.	.	.	.	.	III	I
Hedera hibernica (G.Kirchn.) Bean	.	.	.	.	.	.	.	.	.	.	V	.
Woodwardia radicans (L.) Sm.	.	.	.	.	.	.	.	.	.	.	III	.
Frangula alnus Mill.	.	.	.	.	.	.	.	.	.	.	II	.
Fraxinus angustifolia Vahl	.	.	.	.	.	.	.	.	.	.	II	.
Saxifraga spathularis Brot.	.	.	.	.	.	.	.	.	.	I	II	III
Crepis lampsanoides (Gouan) Tausch	.	.	.	.	.	.	.	.	.	I	I	II
Dryopteris affinis (Lowe) Fraser-Jenk.	.	.	.	.	.	.	.	.	.	.	III	III
Holcus mollis L.	.	.	.	.	.	.	II	.	.	.	.	IV
Oxalis acetosella L.	.	.	.	.	.	.	.	.	.	I	.	II

Rumex acetosa L.	.	.	.	.	.	.	.	.	.	.	.	II
Dryopteris dilatata (Hoffm.) A. Gray	.	.	.	.	.	.	.	.	.	.	.	II
Characteristics and differentials of the alliance *Arbuto unedonis-Laurion nobilis*												
Lonicera periclymenum L. (diff.)	.	.	.	II	1	.	.	1	II	II	III	IV
Quercus robur L. (diff.)	.	.	.	.	.	I	II	.	.	II	IV	III
Viola riviniana Rchb. (diff.)	.	.	.	.	.	.	I	.	I	II	II	III
Phyllitis scolopendrium (L.) Newman	.	.	.	.	.	I	II	.	II	III	.	I
Asplenium adiantum-nigrum L. (diff.)	.	.	.	.	1	.	III	.	I	II	.	.
Erica arborea L.	.	.	.	.	.	I	I	.	.	.	II	I
Arbutus unedo L.	.	.	.	.	.	.	I	.	.	.	III	I
Characteristics and differentials of the class *Quercetea ilicis*												
Rubia peregrina L.	V	IV	II	V	1	IV	V	4	IV	IV	II	II
Hedera helix L.	V	V	V	V	3	V	V	4	V	V	.	V
Smilax aspera L.	IV	III	IV	V	2	IV	III	4	V	V	.	II
Ruscus aculeatus L.	I	V	IV	IV	+	III	IV	4	IV	IV	V	III
Tamus communis L.	IV	I	V	IV	.	III	IV	4	II	V	II	IV
Asplenium onopteris L.	.	I	IV	II	.	V	IV	.	III	III	V	III
Rosa sempervirens L.	II	IV	II	I	.	.	I	1	.	I	.	.
Rhamnus alaternus L.	III	V	II	III	.	.	I	3	III	III	.	.
Osyris alba L.	III	III	.	II	.	.	.	.	I	I	I	.
Arisarum vulgare Targ.-Tozz.	I	.	III	.	.	.	.	.	.	I	.	.
Carex distachya Desf.	III	.	I	.	.	.	.	.	.	.	.	.
Anagyris foetida L.	I	I	.	.	.	.	.	.	.	.	.	.
Clematis cirrhosa L.	.	II	I	.	.	.	.	.	.	.	.	.
Quercus ilex L.	.	I	.	.	.	.	.	.	I	.	.	.
Phillyrea latifolia L.	.	.	III	.	.	.	.	.	.	.	.	I
Euphorbia characias L.	II	.	.	.	.	.	.	.	.	.	.	.
Quercus virgiliana (Ten.) Ten.	I	.	.	.	.	.	.	.	.	.	.	.
Viburnum tinus L.	I	.	.	.	.	.	.	.	.	.	.	.
Viola alba Besser subsp. dehnhardtii (Ten.) W. Becker	.	I	.	.	.	.	.	.	.	.	.	.
Fraxinus ornus L.	.	.	.	.	.	.	.	.	.	.	.	.
Asparagus albus L.	.	.	.	.	.	.	.	.	.	.	.	.
Quercus suber L.	.	.	.	.	.	.	I	.	.	.	.	.
Daphne gnidium L.	.	.	.	.	.	.	I	.	.	.	.	.
Transgressive species of the class *Salici-Populetea*												
Arum italicum Mill.	IV	IV	II	II	.	I	II	1	III	III	.	.
Sambucus nigra L.	I	I	I	.	.	II	I	.	I	II	.	I
Polystichum setiferum (Forssk.) T. Moore ex Woynar	.	.	I	.	.	III	III	.	I	II	.	III
Brachypodium sylvaticum (Huds.) P. Beauv.	II	IV	.	.	.	.	.	.	.	.	II	III
Ulmus minor Mill.	II	III	.	.	.	.	.	.	.	.	.	.
Salix pedicellata Desf.	II	I	.	.	.	.	.	.	.	.	.	.
Hypericum hircinum L.	.	I	I	.	.	.	.	.	.	.	.	.
Solanum dulcamara L.	.	.	.	I	.	.	.	1	.	.	.	.
Populus nigra L.	II	.	.	.	.	.	.	.	.	.	.	.
Vitis vinifera L. subsp. sylvestris (C. C. Gmel.) Hegi	.	.	II	.	.	.	.	.	.	.	.	.
Salix alba L.	.	.	I	.	.	.	.	.	.	.	.	.
Populus alba L.	.	.	I	.	.	.	.	.	.	.	.	.
Salix purpurea L.	.	.	.	.	.	.	.	.	.	.	.	.
Transgressive species of the class *Rhamno-Prunetea*												
Rubus gr. ulmifolius Schott (incl. Rubus sp., columns 6-8)	III	V	IV	V	+	V	IV	4	IV	V	IV	V
Crataegus monogyna Jacq.	II	I	I	.	.	I	III	.	.	II	.	III
Prunus spinosa L.	III	I	I	III	.	I	II	2	.	III	.	I
Clematis vitalba L.	IV	II	II	.	.	.	.	.	.	I	.	I
Other species												
Polypodium cambricum L.	I	.	II	IV	+	.	I	3	.	II	I	I
Geranium robertianum L.	I	.	.	III	.	I	II	3	II	I	.	III
Brachypodium rupestre (Host) Roem. & Schult.	.	.	.	V	.	I	V	4	IV	III	.	II
Parietaria judaica L.	II	II	.	III	.	I	IV	2	.	.	.	.
Umbilicus rupestris (Salisb.) Dandy	1	.	1	.	.	I	III	.	.	II	.	IV
Asplenium trichomanes L.	.	.	II	I	.	.	.	1	I	II	.	III
Pteridium aquilinum (L.) Kuhn	.	.	.	.	1	III	III	.	II	II	.	III
Teucrium scorodonia L.	.	.	I	.	1	III	III	.	.	I	.	IV
Corylus avellana L.	.	.	.	.	.	.	I	.	I	I	II	II
Ulex europaeus L.	.	.	.	.	1	I	II	.	.	I	.	.
Castanea sativa Mill.	.	.	.	.	.	.	I	.	.	II	.	II

nus spinosa shrubby aspects (*Euphorbio characiae-Prunetum spinosae* ass. nova) and the *Ampelodesmos mauritanicus* secondary grassland (*Helictotricho convoluti-Ampelodesmetum mauritanici* Minissale 1994). In the territory this series is in catenal contact with the following other sigmeta: a) *Sorbo torminalis-Querco ilicis* sigmetum (calcareous rocky slopes of the meso-supramediterranean subhumid-humid bioclimatic belt); b) *Sorbo torminalis-Querco virgilianae* sigmetum (deep soils of the meso-supramediterranean subhumid-humid bioclimatic belt); c) microgeoseries of water courses; d) microgeoseries of calcareous cliffs.

Synchorology – Coenosis with an edapho-climactic character, widely distributed in the Sicani Mts. area, tied to lithosols of carbonate nature.

7b) *AMPELODESMO MAURITANICI-QUERCETUM ILICIS VIBURNETOSUM TINI* subass. nova *hoc loco*

Table – 9 (relevés 9-20).

Holotypus – Relevé 12 in Table 9.

Characteristic/Differential species – *Quercus ilex* (dom.), *Ampelodesmos mauritanicus*, *Emerus major* subsp. *emeroides*, *Viburnum tinus*, *Lonicera implexa*.

Structure and ecology – *Quercus ilex* woody community, 6-10 m high, located among S. Maria del Bosco, Coste di Sibilla, Cozzo Danesi and the Bosco S. Adriano; compared to the previous coenosis ascribed to the *Ampelodesmo mauritanici-Quercetum ilicis* subass. *typicum*, it is differentiated by the constant presence of *Viburnum tinus*. This latter species is a Mediterranean element with a fragmentary and relict distribution (Pignatti, 1982; Karlsson *et al*., 2005), quite rare also in Sicily (Gianguzzi *et al*., 2010), where it is known only for this area of the Sicani Mts., as well as for the Palermo Plain (Brullo & Marcenò, 1985; Gianguzzi *et al*., 1996) and for other punctual localities of the Etna (Siracusa, 1998; Brullo *et al*., 2009). Therefore, this holm oak community of the Sicani Mts. is proposed as a new subassociation (*viburnetosum tini*) of the *Ampelodesmo mauritanici-Quercetum ilicis*; it is tied to carbonate substrates of the hilly and sub-mountain belt, at altitudes between 480 m and 820 m a.s.l., where it prefers shady and humid steep slopes, with north/northwest predominant exposure and soils rich in detrital material, originated by erosion and landslides.

Bioclimate – Upper mesomediterranean upper subhumid.

Syndynamism – It constitutes the series head of an ombrophilous vegetation series, which also includes the aforecited shrubby aspects of the *Pruno-Rubion* (see *Roso corymbiferae-Rubetum ulmifolii* ass. nova) and the *Ampelodesmos mauritanicus* secondary grassland (*Helictotricho convoluti-Ampelodesmetum mauritanici* Minissale 1994). The series is in catenal contact with the following other sigmeta: a) *Sorbo torminalis-Querco ilicis* sigmetum (calcareous rocky slopes of the meso-supramediterranean subhumid-humid bioclimatic belt); b) *Sorbo torminalis-Querco virgilianae* sigmetum (deep soils of the meso-supramediterranean subhumid-humid bioclimatic belt); c) microgeoseries of water courses; d) microgeoseries of calcareous cliffs.

Synchorology – Coenosis with an evident relict character, with distribution limited to the following localities of the Sicani Mts.: Santa Maria del Bosco (Gianguzzi *et al*., 1995, 2007c), Coste di Sibilla (Bazan *et al*., 2007), Cozzo Danesi, Bosco S. Adriano (Fig. 5) and northern slope of Mount Gristia.

8) *SORBO TORMINALIS-QUERCETUM ILICIS* ass. nova *hoc loco*

Pseudonym – *Aceri campestris-Quercetum ilicis* (Gianguzzi *et al*., 1995, 2001; Marino *et al*., 2005).

Tables – 10 and 11 (column 2).

Holotypus – Relevé 4 in Table 10.

Characteristic/Differential species – *Quercus ilex* (dom.), *Sorbus torminalis*, *Fraxinus ornus*, *Quercus virgiliana*, *Euphorbia meuselii*, *Drymochloa drymeia* subsp. *exaltata*, *Asparagus acutifolius*.

Floristic-phytosociological notes – The frequency of *Acer campestre* in the holm oak community leads one to refer the coenosis to the *Aceri campestris-Quercetum ilicis*, association already described for the High Madonie Mts. (Brullo, 1984), furthermore indicated also for the Sicani Mts. area (Gianguzzi *et al*., 1995, 2001; Marino *et al*., 2005; Brullo *et al*., 2009; etc.). However, based on the synoptic comparison reported in Tab. 11, putting together the relevés published by Brullo (1984) for the Madonie Mts. area and those carried out by us on the territory at issue (see Tab. 10), it is possible to point out substantial floristic differences among the two coenoses. In fact, the floristic cortege of the Madonie community includes several woody species (*Acer monspessulanum*, *Ulmus glabra*, *Sorbus graeca*, *Ilex aquifolium*, *Malus sylvestris*, *Quercus leptobalana*, etc.) and nemoral elements (*Chamaerophyllum temulum*, *Milium effusum*, *Pteridium aquilinum*, *Rubus canescens*, *Trifolium pratense*, *Origanum vulgare*, etc.), totally lacking in the orophilous holm oak community of the Sicani Mts.; conversely other species (*Sorbus torminalis*, *Quercus virgiliana*, *Euphorbia meuselii*, *Drymochloa drymeia* subsp. *exaltata* and *Asparagus acutifolius*) are absent or sporadic (*Fraxinus ornus*). On this basis the coenosis of the Sicani Mts. is proposed as a new association named *Sorbo torminalis-Quercetum ilicis*.

Structure and ecology – Woody community clearly dominated by *Quercus ilex*, 6-10 m high, with a closed structure (coverage of around 95-100%), differentiated by a floristic cortege much more mesophilous than the *Ampelodesmo-Quercetum ilicis* with the subass. *typi-*

Tab. 9 - *Ampelodesmo mauritanici-Quercetum ilicis* ass. nova *hoc loco* subass. *typicum* (rel. 1–8) and *viburnetosum tini* subass. nova *hoc loco* (rel. 9–20).

Relevé (n°)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Altitude (m a.s.l.)	470	500	500	522	550	610	780	800	350	450	460	470	480	500	607	624	663	721	799	819	
Slope (%)	25	45	25	20	20	30	40	35	40	15	10	10	30	15	10	10	40	70	10	45	
Exposure	NW	N	NW	NW	N	N	NE	N	N	NW	NW	NW	N	N	N	N	NE	SE	N	E	
Area (m^2)	100	150	100	100	150	100	100	100	150	100	100	100	150	100	100	100	100	100	100	100	
Total coverage (%)	100	95	100	100	100	100	100	100	100	95	100	100	95	100	100	100	100	100	100	100	
Average height (m)	5	8	8	6	7	6	7	8	6	6	6	6	7	7	10	10	7	8	8	8	
Number of species	23	24	18	28	21	19	24	23	21	23	21	22	26	23	22	21	26	24	26	24	Presences
Characteristics and differentials of association and subassociation																					
Quercus ilex L.	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	20
Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz.	1	1	+	1	1	+	2	1	1	1	2	2	1	2	2	2	1	1	2	2	20
Emerus major Mill. subsp. emeroides (Boiss. & Spruner) Soldano & F. Conti	1	2	1	1	1	2	+	+	+	1	1	1	1	1	+	.	1	1	1	1	19
Arbutus unedo L.	1	2	+	1	1	3	1	1	.	1	1	2	.	1	.	.	.	.	1	2	16
Lonicera implexa Aiton	1	1	2	1	1	1	1	+	+	.	1	1	1	.	.	.	.	.	.	.	12
Viburnum tinus L.	.	.	.	.	.	.	.	.	1	2	3	2	2	3	3	3	3	3	2	3	12
Characteristics of the alliance *Fraxino-Quercion ilicis* and of the upper units																					
Smilax aspera L.	2	+	3	3	1	2	1	2	1	2	2	2	1	1	+	+	2	2	1	+	20
Asparagus acutifolius L.	1	1	1	1	1	2	2	1	+	2	1	1	+	1	+	+	1	+	+	+	20
Quercus virgiliana (Ten.) Ten.	1	1	1	2	2	2	.	1	1	2	1	2	.	2	1	1	2	2	1	1	18
Cyclamen hederifolium Aiton	+	1	1	1	2	2	.	.	+	+	2	2	+	1	1	+	+	+	+	+	18
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	1	1	1	+	1	1	1	+	+	+	+	1	1	1	.	.	1	1	1	1	18
Allium subhirsutum L.	+	.	+	1	+	+	1	1	+	1	+	+	1	.	1	+	+	+	1	1	18
Tamus communis L.	.	.	.	+	+	+	+	+	+	.	+	1	+	1	+	+	+	+	+	+	16
Ruscus aculeatus L.	1	1	1	+	4	3	+	.	.	1	.	.	.	1	2	2	2	2	2	1	15
Fraxinus ornus L.	1	1	+	1	.	.	1	1	1	2	.	.	1	1	.	.	1	.	2	2	13
Drymochloa drymeia (Mertens & W. D. J. Koch) Holub subsp. exaltata (C. Presl) Foggi & Signorini	.	.	.	.	.	.	+	+	.	1	1	1	+	+	1	1	1	1	+	+	13
Rosa sempervirens L.	+	.	.	1	.	.	1	1	.	+	.	+	1	+	+	+	.	.	.	.	10
Cyclamen repandum S. et S.	.	.	.	.	.	.	+	+	+	.	1	+	.	.	1	.	+	.	+	+	9
Paeonia mascula (L.) Mill. subsp. russoi (Biv.) Cullen & Heywood	.	.	.	.	.	.	.	+	+	.	.	.	1	+	.	+	+	+	+	+	9
Pistacia terebinthus L.	.	+	.	1	.	.	.	.	1	1	1	1	+	1	.	.	.	.	.	.	8
Teucrium flavum L.	.	.	.	+	+	.	.	+	.	+	.	.	.	.	.	.	1	+	1	1	8
Pistacia lentiscus L.	1	.	.	1	1	.	.	.	1	1	.	+	+	.	.	.	.	.	.	.	7
Osyris alba L.	.	.	.	1	.	.	.	+	.	.	.	.	.	.	.	.	1	+	1	1	6
Euphorbia characias L.	+	.	+	1	.	.	1	.	+	+	.	.	.	.	.	.	.	.	.	.	6
Chamaerops humilis L.	1	+	.	1	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5
Pulicaria odora (L.) Rchb.	.	1	.	.	1	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	5
Lonicera etrusca Santi	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	+	+	+	+	5
Carex distachya Desf.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	1	.	.	.	.	.	4
Prasium majus L.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Cistus creticus L. subsp. creticus	.	+	.	+	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	4
Cephalanthera longifolia (L.) Fritsch	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	3
Arisarum vulgare Targ.-Tozz.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Daphne gnidium L.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Myrtus communis L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1
Viola alba Besser subsp. dehnhardtii (Ten.) W. Becker	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1
Polystichum setiferum (Forssk.) Woynar	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1
Other species																					
Hedera helix L. subsp. helix	+	1	+	+	3	.	2	1	+	.	.	.	+	1	+	.	1	1	1	1	15
Brachypodium sylvaticum (Huds.) P. Beauv.	+	1	1	1	1	+	1	1	.	.	.	.	+	.	+	+	2	1	1	+	15
Crataegus monogyna Jacq. var. monogyna	+	.	.	+	1	+	+	.	+	+	1	2	1	1	1	.	+	1	+	.	15
Clematis vitalba L.	1	.	1	+	.	.	+	1	.	.	+	1	.	.	.	.	1	1	1	2	11
Erica multiflora L. subsp. multiflora	+	1	.	1	+	.	.	.	.	+	2	2	+	2	.	.	.	.	.	.	9
Acanthus mollis L.	.	+	.	.	.	.	.	.	+	+	.	.	.	.	.	+	+	2	.	.	6
Rubus ulmifolius Schott	.	.	.	.	.	.	+		.	.	.	.	+	.	+	+	.	.	+	+	6
Prunus spinosa L.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	+	+	1	.	.	5
Rosa canina L.	.	+	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	3
Arum italicum Mill.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	+	.	.	.	.	3
Clinopodium vulgare L. subsp. orientale Bothmer	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	+	.	.	3
Euphorbia meuselii Raimondo & Mazzola	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	3
Picris hieracioides L.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Reichardia picroides (L.) Roth	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Anthyllis vulneraria L. subsp. busambarensis (Lojac.) Pignatti	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Orobanche sp.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1

Tab. 10 - *Sorbo torminalis-Quercetum ilicis* ass. nova *hoc loco*.

Relevé (n°)	1	2	3	4	5	6	7	8	9	10	
Altitude (m a.s.l.)	844	901	991	1002	1010	1020	1100	1110	1132	1182	
Slope (%)	20	30	45	20	10	25	70	70	30	10	
Exposure	N	N	S	NW	N	NW	N	N	N	NW	
Area (m^2)	100	100	100	100	100	150	100	100	100	100	
Total coverage (%)	100	100	100	100	100	100	100	100	100	100	Presences
Average height (m)	7	8	8	8	10	10	10	10	8	6	
Number of species	26	25	24	29	25	30	21	22	28	28	
Characteristics of association											
Quercus ilex L.	5	5	5	5	5	5	5	5	5	5	10
Acer campestre L.	1	2	1	1	1	+	2	2	2	1	10
Euphorbia meuselii Raimondo & Mazzola	+	.	+	+	+	1	1	+	+	+	9
Sorbus torminalis (L.) Crantz	1	+	.	1	.	+	1	2	+	3	8
Brachypodium sylvaticum (Huds.) P. Beauv.	1	+	1	+	+	.	.	.	1	1	7
Daphne laureola L.	.	.	.	+	+	1	1	1	.	.	5
Characteristics of the alliance *Fraxino-Quercion ilicis* and of the upper units											
Fraxinus ornus L.	2	1	+	1	2	3	1	2	1	1	10
Ruscus aculeatus L.	1	1	1	1	2	3	+	1	2	1	10
Asparagus acutifolius L.	1	2	1	1	1	+	+	1	+	.	9
Lonicera etrusca Santi	1	1	+	+	1	+	2	1	.	+	9
Tamus communis L.	1	+	1	+	1	1	1	+	+	.	9
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	+	1	+	+	+	+	+	+	+	.	9
Cyclamen repandum Sm.	+	+	.	+	2	1	2	2	1	.	8
Allium subhirsutum L.	1	+	1	+	+	1	.	.	+	1	8
Quercus virgiliana (Ten.) Ten.	.	.	1	2	2	2	2	2	1	.	7
Drymochloa drymeia (Mertens & W. D. J. Koch) Holub subsp. exaltata (C. Presl) Foggi & Signorini	.	.	.	+	1	+	2	3	.	2	6
Ampelodesmos mauritanicus (Poir.) T. Dur. & Schinz.	1	1	+	1	.	.	.	.	1	.	5
Cistus creticus L. subsp. creticus	1	1	1	+	.	.	.	.	+	.	5
Smilax aspera L.	2	2	+	+	.	.	.	.	+	.	5
Paeonia mascula (L.) Mill. subsp. russoi (Biv.) Cullen & Heywood	.	.	.	.	+	+	1	+	+	.	5
Teucrium flavum L.	1	1	.	.	.	.	.	+	.	.	3
Rosa sempervirens L.	1	1	.	.	.	.	.	.	+	.	3
Cyclamen hederifolium Aiton subsp. hederifolium	.	.	+	.	.	.	.	.	+	1	3
Osyris alba L.	+	.	+	.	.	.	.	.	+	.	3
Euphorbia characias L.	.	.	+	+	+	.	.	.	.	.	3
Carex distachya Desf.	.	.	.	+	+	+	.	.	.	.	3
Arbutus unedo L.	1	+	.	.	.	.	.	.	.	.	2
Arisarum vulgare Targ.-Tozz.	.	.	+	+	.	.	.	.	.	.	2
Asplenium onopteris L.	.	.	.	.	.	+	.	.	.	.	1
Prasium majus L.	.	.	.	.	.	.	.	.	+	.	1
Other species											
Hedera helix L. subsp. helix	2	1	1	1	2	1	2	1	+	2	10
Crataegus monogyna Jacq.	.	.	+	1	+	+	1	+	+	1	8
Clematis vitalba L.	1	1	.	.	.	+	2	1	.	2	6
Prunus spinosa L.	.	.	1	.	+	.	1	+	+	1	6
Rubus ulmifolius Schott	1	+	.	+	.	1	.	.	+	.	5
Geranium lucidum L.	+	+	.	+	.	+	.	.	.	+	5
Anthriscus nemorosa (M. Bieb.) Spreng.	.	.	.	+	+	1	.	.	.	2	4
Arum italicum Mill.	+	+	.	.	.	+	.	.	.	+	4
Thalictrum calabricum Spreng.	.	.	.	.	2	3	.	.	1	.	3
Rosa canina L.	.	.	.	+	.	.	.	.	+	1	3
Erica multiflora L. subsp. multiflora	1	1	.	.	.	.	.	.	.	.	2
Opopanax chironium (L.) W. D. J. Koch	.	.	+	.	.	.	.	.	.	3	2
Rubus canescens DC.	.	.	.	.	.	.	1	+	.	.	2
Geum urbanum L.	.	.	.	+	.	+	.	.	.	.	2
Rosa corymbifera Borckh.	.	.	.	.	.	.	.	.	+	.	1

cum and *viburnetosum tini* (Tab. 9), in which stands out the presence of the aforecited elements (Tab. 10). It is typical of lithosols of carbonate nature, more or less eroded and leached, widespread at altitudes between 750-800 m a.s.l. and the cacuminal part of the elevations, with annual average rainfall of 750-1000 mm.

Bioclimate – Upper mesomediterranean upper subhumid.

Syndynamism – The coenosis constitutes the series head of a specific sigmetum, which also includes the margin shrubby community hereinafter described as *Roso siculae-Prunetum spinosae* ass. nova and the *Avenula cincinnata* secondary grassland (*Stipo barbatae-Avenuletum cincinnatae* Brullo, Giusso & Scuderi 2010). The series is in catenal contact with the following other sigmeta: a) *Ampelodesmo mauritanici-Querco ilicis* sigmetum; b) *Sorbo torminalis-Querco virgilianae* sigmetum.

Synchorology – The aspects already reported (sub *Aceri campestris-Quercetum ilicis*) for Mount Carcaci (Gianguzzi *et al*., 1995), Mount Rose (Gianguzzi *et al*., 2001), Mount Cammarata, Pizzo dell'Apa, Serra Quisquina, Pizzo della Rondine, Gargiuffè and Cozzo Tre Monaci (Marino *et al*., 2005), are to be referred to this coenosis; other nuclei were found at Mount San Genuardo, Mount Colomba, Mount Gebbia, Pizzo Mondello, Bosco S. Adriano and Cozzo Stagnataro.

Deciduous oaks communities

The *Quercus virgiliana* deciduous woods represented in the Sicani Mts. territory are ascribed to the following coenoses: 9) *Oleo oleaster-Quercetum virgilianae* Brullo 1984; 10) *Sorbo torminalis-Quercetum virgilianae* Brullo, Minissale, Signorello & Spampinato 1996.

9) *OLEO OLEASTER-QUERCETUM VIRGILIANAE* Brullo 1984, Bollettino Accademia Gioenia Scienze Naturali Catania 17 (323): 398.

Table – 12.

Holotypus – Relevé 3 in Table 24 (in Brullo, 1984).

Characteristic/Differential species – *Quercus virgiliana* (dom.), *Olea europaea* var. *oleaster*, *Pistacia lentiscus*, *Teucrium fruticans*, *Prasium majus*, *Asparagus albus*.

Floristic-phytosociological notes – The association *Oleo oleaster-Quercetum virgilianae* – described initially for the Madonie Mts. (Brullo, 1984) – was subsequently reported by various authors and on a large scale in Sicily (Brullo & Marcenò, 1985; Furnari & Scelsi, 1993; Raimondo *et al*., 1994; Siracusa, 1996; Guarino, 1998; Gianguzzi, 1999; Gianguzzi *et al*., 2000, 2001; Costanzo *et al*., 2005; Minissale *et al*., 2005, 2007; Zimmitti *et al*., 2008; Brullo *et al*., 1998, 2009) and in the coastal areas of Calabria (Brullo *et al*., 1999, 2001b). On this basis a potentially quite wide range was attributed to it, moreover extended from the coast up to 1000-1100 m a.s.l. (Bazan *et al*., 2010), though in the nature the *Quercus virgiliana* woods were almost completely destroyed by anthropogenic deforestation of the past in order to provide land for farming (Brullo & Marcenò, 1985; Gianguzzi, 2004; Gianguzzi & La Mantia, 2004; Brullo *et al*., 2009). However, these are limited residual nuclei or thickets of recovery established on former cultivated lands, with a floristic cortege often depleted of the most typical nemoral elements and polluted of species with an anthropogenic character, such as precisely *Olea europaea* var. *oleaster*. Though it is indicated among the differential species of the association (Brullo, 1984), in the coenosis the wild-Olive is often originated from the offshoots of the old Olive stumps, in which it serves as ancient rootstock of this emblematic culture of the Mediterranean landscape; the entity emerges as a result of the cultural abandonment, fostered by the passage of fire and the desiccation of the foliage. Moreover, it is a notoriously lithophilous element that prefers in nature subrupicolous environments and rocky ridges, escaping instead clays and pedotypes of valley floor, in which the coenosis at issue establishes. The vegetation aspects found on the Sicani Mts. denote a floristically depleted coenosis, in which several elements indicated among the characteristic species, such as *Olea europaea* var. *oleaster*, *Pistacia lentiscus*, *Teucrium fruticans* and *Asparagus albus*, are absent.

Structure and ecology – Wood with a clear dominance of *Quercus virgiliana*, 6-10 m high, with a more or less closed structure, which includes in its woody layer *Quercus ilex* and *Fraxinus ornus*, and in the shrubby and herbaceous undergrowth some thermophilous elements, in turn indicated as differential species of the characteristic specific combination. The coenosis is tied to clayey-flyschoid substrates (sometimes with rocky matrix originated from limestones, dolomites, marls, basalts, gypsum, calcarenites), in stations with a certain environmental xericity (annual average rainfall from 500 mm to 800 mm).

Bioclimate – Thermo-mesomediterranean from upper dry to lower subhumid.

Syndynamism – It constitutes the most structured aspect of a climactic series (Blasi, 2010), in catenal contact with various edaphic microgeoseries (water courses, rocky outcrops, etc.) and other sigmeta: a) *Sorbo torminalis-Querco virgilianae* sigmetum; b) *Pistacio-Querco ilicis* sigmetum; c) *Ampelodesmo mauritanici-Querco ilicis* sigmetum.

Synchorology – The deciduous woody aspects represented on the slopes and the valley floors with a carbonate matrix, already indicated for Mount Carcaci (Gianguzzi *et al*., 2007c), Mount Cammarata, Pizzo dell'Apa, Salaci and Bosco districts (Marino *et al*., 2005), are attributed to the *Oleo oleaster-Quercetum*

Tab. 11 - Simplified synoptic table (sporadic species were eliminated) among the holm oak communities of the Madonie Mts. ascribed to the *Aceri campestris-Quercetum ilicis* (column 1; from Brullo, 1984) and the coenosis that we surveyed in the sub-mountain belt of the Sicani Mts. (see Table 10), referred to the *Sorbo torminalis-Quercetum ilicis*.

Association	1	2
Number of relevés	6	10
Characteristics and differentials of association		
Quercus ilex L.	V	V
Acer monspessulanum L.	V	.
Malus sylvestris Mill.	V	.
Ilex aquifolium L.	V	.
Viola alba Besser subsp. dehnhardtii (Ten.) W. Becker	V	.
Sorbus graeca (Spach) Schauer	II	.
Fraxinus ornus L.	.	V
Euphorbia meuselii Raimondo & Mazzola	.	V
Asparagus acutifolius L.	.	V
Quercus virgiliana (Ten.) Ten.	.	IV
Sorbus torminalis (L.) Crantz	.	IV
Characteristics of the alliance *Fraxino-Quercion ilicis* and of the upper units		
Acer campestre L.	V	V
Ruscus aculeatus L.	V	V
Paeonia mascula (L.) Mill. subsp. russoi (Biv.) Cullen & Heywood	V	V
Cyclamen repandum S. et S.	V	IV
Clematis vitalba L.	V	III
Carex distachya Desf.	V	III
Daphne laureola L.	V	III
Euphorbia characias L.	V	II
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	IV	V
Lonicera etrusca Santi	III	V
Tamus communis L.	III	V
Allium subhirsutum L.	II	IV
Asplenium onopteris L.	IV	I
Drymochloa drymeia (Mertens & W. D. J. Koch) Holub subsp. exaltata (C. Presl) Foggi & Signorini	.	III
Cyclamen hederifolium Aiton	.	III
Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz.	.	III
Rosa sempervirens L.	.	II
Osyris alba L.	.	II
Teucrium flavum L.	.	II
Arbutus unedo L.	.	I
Prasium majus L.	.	I
Arisarum vulgare Targ.-Tozz.	.	I
Other species		
Hedera helix L. subsp. helix	V	V
Crataegus monogyna Jacq. var. monogyna	V	IV
Brachypodium sylvaticum (Huds.) P. Beauv.	V	IV
Rubus canescens DC.	V	I
Thalictrum calabricum Spreng.	V	II
Prunus spinosa L.	V	III
Rosa canina L.	V	II
Geum urbanum L.	III	I
Lamium flexuosum Ten.	V	.
Bellis perennis L.	V	.
Calamintha nepeta (L.) Savi subsp. nepeta	V	.
Poa sylvicola Guss.	V	.
Stachys germanica L.	V	.
Trifolium pratense L. subsp. pratense	V	.
Orobanche sp.	V	.
Silene italica subsp. sicula (Ucria) Jeanm.	V	.
Origanum vulgare L. subsp. vulgare	V	.
Agrimonia eupatoria L.	IV	.
Pteridium aquilinum (L.) Kuhn subsp. aquilinum	IV	.
Crepis leontodontoides All.	IV	.
Milium effusum L.	IV	.
Chaerophyllum temulentum L.	IV	.
Crataegus laevigata (Poir.) DC.	IV	.
Cistus creticus L. subsp. creticus	.	III
Rubus ulmifolius Schott	.	III
Geranium lucidum L.	.	III

Tab. 12 - *Oleo sylvestris-Quercetum virgilianae* Brullo 1984.

Relevé (n°)	1	2	
Altitude (m a.s.l.)	730	765	
Slope (%)	5	20	
Exposure	NNW	N	
Area (m^2)	100	100	
Total coverage (%)	100	100	Presences
Average height (m)	8	6	
Number of species	23	22	
Characteristics of association			
Quercus virgiliana (Ten.) Ten.	5	4	2
Prasium majus L.	.	+	1
Characteristics of the alliance *Fraxino-Quercion ilicis* and of the upper units			
Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz.	2	3	2
Smilax aspera L.	2	2	2
Ruscus aculeatus L.	2	1	2
Osyris alba L.	1	2	2
Cyclamen repandum Sm.	1	1	2
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	1	1	2
Quercus ilex L.	+	1	2
Lonicera etrusca Santi	+	1	2
Clinopodium vulgare L. subsp. orientale Bothmer	+	+	2
Cistus creticus L. subsp. creticus	+	2	2
Sorbus domestica L.	2	.	1
Emerus major Mill. subsp. emeroides (Boiss. & Spruner) Soldano & F. Conti	.	2	1
Asparagus acutifolius L.	1	.	1
Calicotome infesta (C. Presl) Guss. subsp. infesta	1	.	1
Fraxinus ornus L.	.	1	1
Teucrium flavum L.	.	1	1
Rosa sempervirens L.	+	.	1
Other species			
Hedera helix L. subsp. helix	3	1	2
Rosa canina L.	1	2	2
Crataegus monogyna Jacq.	+	2	2
Rubus ulmifolius Schott	+	2	2
Acanthus mollis L.	1	+	2
Clematis vitalba L.	.	1	1
Prunus spinosa L.	+	.	1
Buglossoides purpurocaerulea (L.) I. M. Johnst.	+	.	1
Agrimonia eupatoria L.	+	.	1
Leontodon siculus (Guss.) Nyman	.	+	1

virgilianae; other nuclei were found at Contrada Finocchiara between Cammarata and Castronovo di Sicilia.

10) *SORBO TORMINALIS-QUERCETUM VIRGILIANAE* Brullo, Minissale, Signorello & Spampinato 1996, Colloques Phytosociologiques 24: 638.

Table – 13.

Holotypus – Relevé 6 in Table 3 (in Brullo *et al*., 1996a).

Characteristic/Differential species – *Quercus virgiliana* (dom.), *Sorbus torminalis*, *Physospermum verticillatum*, *Huetia cynapioides*.

Structure and ecology – Woody community with a clear dominance of *Quercus virgiliana*, 7-12 m high, with a closed structure (coverage of around 95-100%), which includes in its woody layer *Quercus ilex* and *Fraxinus ornus*, with frequency in the undergrowth of *Sorbus torminalis*. It is characterized by a rich herbaceous contingent, which includes the umbellifers *Physospermum verticillatum* and *Geocaryum cynapioides* (= *Huetia c*.), as well as *Euphorbia meuselii*, *Daphne laureola*, etc. It is a markedly mesophilous and orophilous coenosis, tied to deep soils of calcareous nature, at altitudes between 900 m and 1400 m a.s.l.

Bioclimate – Meso-supramediterranean upper subhumid.

Syndynamism – It constitutes the series head of the

Tab. 13 - *Sorbo torminalis-Quercetum virgilianae* Brullo, Minissale, Signorello & Spampinato 1996.

Relevé (n°)	1	2	3	4	5	6	7	8	9	
Altitude (m a.s.l.)	841	850	850	875	1003	1270	1296	1332	1340	
Slope (%)	30	20	5	15	10	50	40	45	50	
Exposure	NW	N	N	N	N	E	N	N	N	
Area (m^2)	100	150	100	100	100	100	100	100	100	
Total coverage (%)	100	100	100	100	100	100	100	100	100	
Average height (m)	9	8	7	8	7	8	7	8	7	
Number of species	27	23	27	26	29	21	15	21	12	Presences
Characteristics of association										
Quercus virgiliana (Ten.) Ten.	5	5	5	4	4	5	4	4	4	9
Sorbus torminalis (L.) Crantz	2	1	1	2	2	2	1	1	2	9
Characteristics of the alliance *Fraxino-Quercion ilicis* and of the upper units										
Ruscus aculeatus L.	3	4	2	1	2	1	+	.	.	7
Lonicera etrusca Santi	2	+	+	1	1	+	.	+	.	7
Quercus ilex L.	1	2	.	2	2	1	.	.	1	6
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	1	+	1	2	1	.	.	+	.	6
Asparagus acutifolius L.	1	1	1	1	+	.	.	+	.	6
Tamus communis L.	1	+	+	+	1	1	.	.	.	6
Drymochloa drymeia (Mertens & W. D. J. Koch) Holub subsp. exaltata (C. Presl) Foggi & Signorini	.	+	+	.	+	.	1	+	2	6
Cyclamen hederifolium Aiton subsp. hederifolium	+	1	+	+	+	.	+	.	.	6
Paeonia mascula (L.) Mill. subsp. russoi (Biv.) Cullen & Heywood	+	.	1	+	+	+	+	.	.	6
Allium subhirsutum L.	+	+	+	.	+	+	.	+	.	6
Rosa sempervirens L.	1	2	+	1	.	.	.	.	.	4
Cyclamen repandum Sm.	.	1	+	.	.	1	.	+	.	4
Fraxinus ornus L.	.	.	1	.	.	1	.	1	.	3
Smilax aspera L.	+	.	.	1	1	.	.	.	.	3
Ampelodesmos mauritanicus (Poir.) T. Dur. & Schinz.	+	.	1	+	.	.	.	.	.	3
Carex distachya Desf.	.	.	.	.	+	.	.	+	1	3
Cistus creticus L. subsp. creticus	+	+	+	.	.	.	.	.	.	3
Anthriscus nemorosa (M. Bieb.) Spreng.	.	.	.	1	1	.	.	.	.	2
Arisarum vulgare Targ.-Tozz.	.	.	+	+	.	.	.	.	.	2
Viburnum tinus L.	.	.	.	1	.	.	.	.	.	1
Quercus amplifolia Guss.	.	.	.	.	.	.	1	.	.	1
Pulicaria odora (L.) Rchb.	.	+	.	.	.	.	.	.	.	1
Other species										
Brachypodium sylvaticum (Huds.) P. Beauv.	1	1	2	1	1	+	+	+	+	9
Euphorbia meuselii Raimondo & Mazzola	1	1	+	1	1	+	+	+	.	8
Daphne laureola L.	2	1	1	2	2	1	1	.	.	7
Hedera helix L. subsp. helix	2	.	2	2	2	2	+	.	.	6
Rubus ulmifolius Schott	2	2	1	1	1	1	.	.	.	6
Crataegus monogyna Jacq.	1	2	1	1	2	.	.	.	.	5
Rosa canina L.	1	1	.	1	1	.	.	.	.	4
Rubus canescens DC.	.	.	1	.	.	.	+	+	1	4
Ostrya carpinifolia Scop.	.	.	.	.	.	.	1	1	3	3
Prunus spinosa L.	1	.	.	+	1	.	.	.	.	3
Acer campestre L.	.	.	+	.	.	1	.	.	1	3
Achillea ligustica All.	+	.	.	.	+	+	.	.	.	3
Geranium robertianum L. subsp. purpureum (Vill.) Nyman	+	.	.	.	+	.	.	+	.	3
Sorbus graeca (Spach) Schauer	.	.	.	.	.	.	.	2	2	2
Malus sylvestris Mill.	1	.	.	.	1	.	.	.	.	2
Euonymus europaeus L.	.	.	.	1	1	.	.	.	.	2
Thalictrum calabricum Spreng.	.	.	.	.	1	.	.	.	+	2
Rosa sicula Tratt.	.	.	.	.	.	.	+	1	.	2
Cytisus villosus Pourr.	1	.	.	.	.	.	.	.	.	1
Mespilus germanica L.	.	.	.	+	.	.	.	.	.	1
Clematis vitalba L.	.	.	.	.	+	.	.	.	.	1

Sorbo-Querco virgilianae sigmetum, climatophilous unit in catenal contact with the following other sigmeta: a) *Oleo-Querco virgilianae* sigmetum; b) *Ampelodesmo mauritanici-Querco ilicis* sigmetum; c) *Aceri campestris-Querco ilicis sorbo torminalis* sigmetum.

Synchorology – Mount delle Rose and S. Stefano della Quisquina sanctuary (Brullo *et al*., 1996a; Gianguzzi *et al*., 2001), Mount Carcaci (Gianguzzi *et al*., 2007c), Mount Cammarata, Serre Quisquina (Marino *et al*., 2005); it was also found at Mount Genuardo, Santa Maria del Bosco, Piano Inzitati and in the Bosco S. Adriano.

Acer pseudoplatanus *community*

These are microwoody nuclei located on some screes of the submountain part of Mount Cammarata, ascribed to the following association.

11) *SORBO GRAECAE-ACERETUM PSEUDOPLATANI* Gianguzzi & La Mantia 2004, Il Naturalista Siciliano n.s., 28 (1): 302-305.

Table – 14.

Holotypus – Relevé 4 in Table 3 (in Gianguzzi & La Mantia, 2004).

Characteristic/Differential species – Acer pseudoplatanus (dom.), *Sorbus graeca*.

Structure and ecology – Glareicolous and orophilous residual microwoods, markedly mesophilous, with a clear dominance of *Acer pseudoplatanus*, 5-12 m high, with a closed structure (coverage of around 95-100%), which includes in its woody layer *Acer campestre* and *Fraxinus ornus*, and in the undergrowth *Sorbus graeca*, *Hedera helix* subsp. *helix*, *Clematis vitalba*, *Lamium flexuosum*, *Scilla bifolia*, *Clinopodium vulgare* subsp. *arundanum*, etc. Compared to the coenosis already reported for the Madonie Mts. and Rocca Busambra (Gianguzzi & La Mantia, 2004), the relevés carried out along the northern slope of Mount Cammarata denote the presence of floristically depleted aspects, where the endemics *Agropyron panormitanum* and

Tab. 14 - *Sorbo graecae-Aceretum pseudoplatani* Gianguzzi & La Mantia 2004.

Relevé (n°)	1	2	3	
Altitude (m a.s.l.)	841	850	850	
Slope (%)	30	20	5	
Exposure	NW	N	N	
Area (m^2)	100	150	100	
Total coverage (%)	100	100	100	Presences
Average height (m)	9	8	7	
Number of species	27	23	27	
Characteristics of association				
Acer pseudoplatanus L.	5	5	5	3
Sorbus graeca (Spach) Schauer	1	.	2	2
Characteristics of the class *Querco-Fagetea*				
Lamium flexuosum Ten.	3	4	4	3
Hedera helix L. subsp. helix	3	1	1	3
Acer campestre L.	2	1	1	3
Scilla bifolia L.	1	2	1	3
Fraxinus ornus L.	1	1	1	3
Clematis vitalba L.	.	+	1	2
Clinopodium vulgare L. subsp. orientale Bothmer	.	.	+	1
Other species				
Rubus ulmifolius Schott	2	3	1	3
Opopanax chironium (L.) W. D. J. Koch	1	1	2	3
Sesleria nitida Ten. subsp. sicula Brullo & Giusso	2	+	1	3
Prunus spinosa L.	1	1	+	3
Galium aparine L.	+	1	+	3
Arrhenatherum elatius (L.) J. & C. Presl subsp. nebrodense (Brullo, P. Minissale & Spamp.) Giardina & Raimondo	.	1	1	2
Crataegus rhipidophylla Gand.	.	1	1	2
Festuca circummediterranea Patzke	1	+	.	2
Poa bulbosa L.	.	1	+	2
Chaerophyllum temulentum L.	.	2	.	1
Arum italicum Mill.	.	+	.	1
Senecio squalidus L. subsp. rupestris (Waldst. & Kit.) Greuter	.	+	.	1
Allium flavum L.	.	+	.	1
Cymbalaria pubescens (C. Presl) Cufod.	.	+	.	1
Hypochoeris laevigata (L.) Ces.	.	.	+	1

Prunus cupaniana, already considered among the characteristic species, are absent. The community colonizes the most stable part of detrital cones and areas of accumulation of loose material, typical of steep slopes with a calcareous-dolomite matrix, at altitudes between 900 m and 1400 m a.s.l.

Bioclimate – Meso-supramediterranean subhumid-humid.

Syndynamism – It constitutes the most evolved aspect of an edapho-xerofilous and glareicolous series, in catenal contact with microgeoseries of carbonate cliffs and the following other sigmeta: a) *Ampelodesmo mauritanici-Querco ilicis* sigmetum; b) *Sorbo torminalis-Querco ilicis* sigmetum.

Synchorology – The association, already reported for the northern slope of Rocca Busambra, and Mount Carbonara and Mount Cervi at the Madonie Mts. (Gianguzzi & La Mantia, 2004), was found along a scree of the northern slope of Mount Cammarata.

Riparian thickets

The hygrophilous thickets present along the banks of the water courses represented in the territory are primarily attributable to the following coenoses.

12) *SALICETUM ALBO-PEDICELLATAE* Brullo & Spampinato 1990, Bollettino Accademia Gioenia Scienze Naturali Catania 23 (336): 175.

Table – 15.

Holotypus – Relevé 5 in Table 6 (in Brullo & Spampinato, 1990).

Characteristic/Differential species – *Salix pedicellata* (dom.) and *Salix alba* subsp. *alba*.

Structure and ecology – Mesophilous riparian community with a clear dominance of *Salix pedicellata* and *S. alba* subsp. *alba*, of variable height (6-15 m), with a more or less closed structure (coverage of 80-100%) and undergrowth consisting of a herbaceous layer with a hygrophilous character. The coenosis is found mainly along the intermediate stretches of rivers or torrents, on more or less cool and wet alluvial soils even in summer.

Bioclimate – Thermo- and mesomediterranean subhumid.

Tab. 15 - *Salicetum albo-pedicellatae* Brullo & Spampinato 1990.

Relevé (n°)	1	2	3	4	5	6	7	8	9	10	
Altitude (m a.s.l.)	370	399	480	500	530	547	578	600	603	789	
Slope (%)	5	5	5	20	5	5	5	10	5	10	
Exposure	S	S	NW	NW	N	NE	NW	W	SE	NW	
Area (m^2)	100	100	100	100	100	100	100	100	100	100	
Total coverage (%)	85	90	100	90	100	90	100	100	80	100	
Average height (m)	10	10	15	6	12	8	13	8	6	6	
Number of species	19	20	38	22	31	18	28	16	19	24	Presences
Characteristics of association											
Salix pedicellata Desf.	4	4	3	2	3	4	4	3	4	4	10
Salix alba L. subsp. alba	1	2	3	4	3	1	2	2	1	1	10
Characteristics and hygrophilous differentials of the alliance *Populion albae* and upper units											
Carex pendula Huds.	+	+	2	.	2	+	3	1	2	+	9
Brachypodium sylvaticum (Huds.) P. Beauv.	.	+	1	+	1	1	1	.	2	+	8
Populus nigra L.	.	.	2	1	1	2	2	2	.	1	7
Equisetum telmateja Ehrh.	+	+	1	2	+	+	1	.	.	.	7
Dorycnium rectum (L.) Ser.	+	.	1	+	+	.	1	1	.	+	7
Fraxinus angustifolia Vahl	2	1	1	.	1	.	.	.	.	1	5
Mentha aquatica L.	+	+	+	.	+		1	.	.	.	5
Nerium oleander L.	1	1	.	.	.	.	.	2	1	.	4
Ulmus minor Mill.	.	.	+	.	.	.	1	.	1	1	4
Hypericum hircinum L. subsp. majus (Aiton) N. Robson	.	+	.	.	.	1	.	+	1	.	4
Solanum dulcamara L.	.	.	+	.	1	.	2	.	.	.	3
Salix purpurea L. subsp. lambertiana (Sm.) Macreight	1	.	.	+	.	.	.	.	1	.	3
Salix alba L. subsp. vitellina (L.) Arcang.	.	.	.	+	1	.	.	.	1	.	3
Mentha suaveolens Ehrh.	.	.	+	.	.	+	+	.	.	.	3
Popolus alba L.	.	2	.	.	.	.	1	.	.	.	2
Tamarix africana Poir. var. africana	.	+	.	1	.	.	.	.	.	.	2
Carex hispida Willd.	.	.	1	.	.	.	.	.	.	.	1
Cirsium creticum (Lam.) Dum.-Urville subsp. triumfettii (Lacaita) Werner	.	.	+	.	.	.	.	.	.	.	1
Sambucus nigra L.	.	.	+	.	.	.	.	.	.	.	1

Transgressive species of the class *Quercetea ilicis*											
Asparagus acutifolius L.	+	+	+	.	1	+	1	1	.	1	8
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	+	.	+	.	1	+	+	+	+	+	8
Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz.	+	+	.	.	+	1	.	1	1	+	7
Rosa sempervirens L.	1	+	.	.	.	.	+	.	+	1	5
Euphorbia characias L.	.	+	.	.	.	.	1	.	+	+	4
Quercus virgiliana (Ten.) Ten.	.	.	.	.	1	1	.	+	.	.	3
Tamus communis L.	.	.	.	.	1	.	1	.	.	+	3
Viola alba Besser subsp. dehnhardtii (Ten.) W. Becker	.	.	.	.	.	.	+	+	.	+	3
Osyris alba L.	.	+	.	.	.	.	.	.	.	1	2
Ruscus aculeatus L.	.	.	.	.	.	.	.	+	.	1	2
Smilax aspera L.	.	.	.	.	.	.	.	.	+	.	1
Allium subhirsutum L.	.	.	.	.	.	.	.	.	.	+	1
Other species											
Rubus ulmifolius Schott	+	+	2	2	2	1	+	1	1	+	10
Hedera helix L. subsp. helix	.	+	.	.	1	1	+	1	2	2	7
Clematis vitalba L.	+	.	.	1	1	+	1	.	1	+	7
Arundo collina Ten.	+	1	+	.	+	+	+	2	.	.	7
Rosa canina L.	+	1	.	.	1	1	.	.	+	.	5
Acanthus mollis L.	+	.	.	.	1	.	1	.	.	1	4
Euphorbia ceratocarpa Ten.	+	.	.	.	1	.	.	.	1	+	4
Euphorbia meuselii Raimondo & Mazzola	.	.	.	.	1	+	.	.	.	+	3
Urtica dioica L.	.	.	2	.	.	.	+	.	.	.	2
Eupatorium cannabinum L.	.	.	+	1	.	.	.	.	.	.	2
Oryzopsis miliacea L.	.	.	1	.	+	.	.	.	.	.	2
Arum italicum Mill.	.	.	+	.	.	.	1	.	.	.	2
Smyrnium olusatrum L.	.	.	1	.	.	.	+	.	.	.	2
Phragmites australis (Cav.) Steud subsp. australis	.	.	.	1	+	.	.	.	.	.	2
Prunus spinosa L.	.	.	+	.	.	.	+	.	.	.	2
Iris foetidissima L.	.	.	+	.	.	.	+	.	.	.	2
Inula viscosa L.	.	.	.	+	+	.	.	.	.	.	2
Mentha spicata L.	.	.	.	+	+	.	.	.	.	.	2
Rumex crispus L.	.	.	1	.	.	.	.	.	.	.	1
Apium nodiflorum (L.) Lag	.	.	1	.	.	.	.	.	.	.	1
Iris pseudacorus L.	.	.	1	.	.	.	.	.	.	.	1
Scirpoides holoschoenus subsp. australis (Murray) Soják	.	.	.	1	.	.	.	.	.	.	1
Festuca arundinacea Schreb	.	.	.	1	.	.	.	.	.	.	1
Juncus acutus L.	.	.	.	1	.	.	.	.	.	.	1
Juncus articulatus L.	.	.	.	.	1	.	.	.	.	.	1
Daphne laureola L.	.	.	+			.	.	.	.	.	1
Polygonum amphibium L.	.	.	+	.	.	.	.	.	.	.	1
Galium aparine L.	.	.	+	.	.	.	.	.	.	.	1
Epilobium hirsutum L.	.	.	+	.	.	.	.	.	.	.	1
Trifolium repens L.	.	.	+	.	.	.	.	.	.	.	1
Agrostis stolonifera L.	.	.	+	.	.	.	.	.	.	.	1
Cyperus longus L.	.	.	+	.	.	.	.	.	.	.	1
Paspalum distichum L.	.	.	+	.	.	.	.	.	.	.	1
Brassica nigra (L.) W. D. J. Koch	.	.	+	.	.	.	.	.	.	.	1
Carex acutiformis Ehrh.	.	.	.	+	.	.	.	.	.	.	1
Oenanthe fistulosa L.	.	.	.	+	.	.	.	.	.	.	1
Agrimonia eupatoria L.	.	.	.	+	.	.	.	.	.	.	1
Tussilago farfara L.	.	.	.	+	.	.	.	.	.	.	1
Equisetum ramosissimum Desf.	.	.	.	.	+	.	.	.	.	.	1
Crataegus monogyna Jacq.	.	.	.	.	+	.	.	.	.	.	1

Syndynamism – It takes part in an edapho-hygrophilous series located in the climactic belt of the *Quercetea ilicis* communities, where it occupies the banks of the torrents, in catenal contact with migrogeoserial aspects of riverbed.

Synchorology – The coenosis gravitates in the central-western part of Sicily, where it was also reported for the Sicani Mts. area, particularly in the Sosio River (Brullo & Spampinato, 1990); it was also found in various other water courses at Riena, Contessa Entellina (Contrada Gurgo), Palazzo Adriano (Manca Torrent), Prizzi (San Antonio Torrent), Bivona (Acque Bianche Torrent), Chiusa Sclafani (Santa Venera Torrent), Platani River, Magazzolo River, Montescuro Torrent.

Premantles

Multivariate analysis performed on the matrix of the phytosociological relevés related to the shrubby aspects, allowed to obtain the dendrogram reported in Fig. 3, where they are clustered in the following coenoses: 13) *Hyperico majoris-Rubetum ulmifolii* ass. nova; 14) *Roso corymbiferae-Rubetum ulmifolii* ass. nova; 15) *Euphorbio characiae-Prunetum spinosae* ass. nova; 16) *Roso siculae-Prunetum spinosae* ass. nova; 17) *Crataegetum laciniatae* Brullo & Marcenò in Brullo 1984.

13) *HYPERICO MAJORIS-RUBETUM ULMIFOLII* ass. nova *hoc loco*

Table – 16.

Holotypus – Relevé 2 in Table 16.

Characteristic/Differential species – Rubus ulmifolius (dom.), *Clematis vitalba* (dom.), *Hypericum hircinum* subsp. *majus*, *Calystegia sylvatica*.

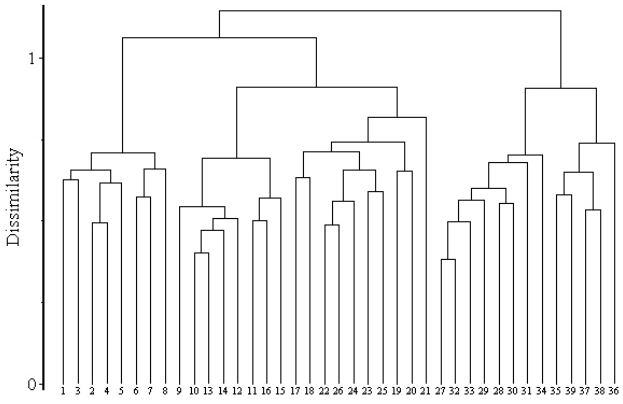

Fig. 3 - Dendrogram obtained through the synoptic comparison among the shrubby coenoses surveyed in the Sicani Mts. area (cluster analysis, UPGMA). *Hyperico majoris-Rubetum ulmifolii* ass. nova (branches 1-8; Tab. 16, rel. 1-8); *Roso corymbiferae-Rubetum ulmifolii* ass. nova (branches 9-16; Tab. 17, rel. 1-8); *Euphorbio characiae-Prunetum spinosae* ass. nova (branches 17-26; Tab. 18, rel. 1-10); *Roso siculae-Prunetum spinosae* ass. nova (branches 27-34; Tab. 19, rel. 1-8); *Crataegetum laciniatae* (branches 35-39; Tab. 20, rel. 1-5).

Structure and ecology – High-shrubby community co-dominated by *Rubus ulmifolius* and *Clematis vitalba*, which are associated with various other lianas (*Hedera helix* subsp. *helix*, *Rubia peregrina* subsp. *longifolia*, *Calystegia sylvatica*, *Tamus communis*, *Asparagus acutifolius*, *Rosa sempervirens*, etc.), as well as *Sambucus nigra*, *Ulmus minor*, *Ficus carica*, *Euphorbia characias*, *Rosa canina*, *Prunus spinosa*, *Crataegus monogyna*, etc.). The coenosis has a quite dense, intricate and impenetrable structure (cover around 100%) and it is tied to more or less deep and evolved soils, typical of impluvi, hygrophilous slopes, fresh and nitrophilous glades, at altitudes between 600 m and 1100 m a.s.l.; it is proposed as a new association and framed within the alliance *Lauro nobilis-Sambucion nigrae* (order *Lauro nobilis-Sambucetalia nigrae*).

Bioclimate – Mesomediterranean subhumid.

Syndynamism – Community tied to hygrophilous and ombrophilous series, in the climactic belt of the class *Quercetea ilicis*.

Synchorology – Coenosis found along impluvi and banks of torrents, in particular between the ridge of Mount Genuardo (Palazzo Adriano) and the Prizzi territory.

14) *ROSO CORYMBIFERAE-RUBETUM ULMIFOLII* ass. nova

Table – 17.

Holotypus – Relevé 3 in Table 17.

Characteristic/Differential species – Rubus ulmifolius and *Crataegus monogyna* (codom.), *Rosa corymbifera*, *Euphorbia meuselii*, *Paeonia mascula* subsp. *russoi*.

Structure and ecology – Shrubby community of forest margin dominated by *Rosaceae* species (*Crataegus monogyna*, *Rubus ulmifolius*, *Rosa canina*, *R. corymbifera*, *Prunus spinosa*, *Pyrus spinosa*, etc.), which are associated with several lianas (*Clematis vitalba*, *Asparagus acutifolius*, *Tamus communis*, *Lonicera etrusca*, *Rubia peregrina* subsp. *longifolia*, ecc.), whereas the herbaceous species – such as *Brachypodium sylvaticum*, *Paeonia mascula* subsp. *russoi* and *Ampelodesmos mauritanicus* – are more or less sporadic. The coenosis, typical of clayey slopes, has a structure basically closed (coverage variable between 90% and 100%); it is proposed as a new association of the class *Rhamno-Prunetea*, framed within the order *Prunetalia spinosae* (alliance *Pruno spinosae-Rubion ulmifolii*).

Bioclimate – Mesomediterranean subhumid-humid.

Syndynamism – It constitutes secondary aspects of vegetation series belonging to deciduous woods.

Synchorology – The coenosis is widespread in the hilly-submountainous belt of the Sicani Mts.: Mount D'Indisi, Mount Genuardo, Mount Rose, Bosco S. Adriano, Bosco Rifesi, Mount Cammarata, etc.

Tab. 16 - *Hyperico majoris-Rubetum ulmifolii* ass. nova.

Relevé (n°)	1	2	3	4	5	6	7	8	
Altitude (m a.s.l.)	695	700	710	720	950	980	997	1010	
Slope (%)	10	15	15	12	8	15	5	20	
Exposure	NW	N	N	NW	NE	SW	NE	SW	
Area (m^2)	100	80	100	100	150	100	100	100	
Total coverage (%)	100	100	100	100	100	100	100	100	
Average height (m)	1.2	1.5	1.5	1.5	1.5	1.5	1.5	1.6	
Number of species	20	24	18	21	20	20	17	14	Presences
Characteristics of association									
Rubus ulmifolius Schott	4	5	5	4	4	4	4	4	8
Clematis vitalba L.	2	3	1	2	3	2	2	3	8
Hypericum hircinum L. subsp. majus (Aiton) N. Robson	1	1	+	1	.	1	1	+	7
Calystegia sylvatica (Kit.) Griseb.	.	.	+	1	1	+	+	1	6
Characteristics and differentials of the alliance *Lauro-Sambucion nigrae* and the order *Lauro-Sambucetalia nigrae*									
Hedera helix L. subsp. helix	+	2	1	1	2	2	2	2	8
Sambucus nigra L.	1	1	1	2	1	1	1	.	7
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	+	1	1	.	1	1	+	+	7
Ulmus minor Mill.	1	2	.	1	1	2	1	.	6
Ficus carica L.	1	2	1	1	1	.	.	.	5
Laurus nobilis L.	1	1	2	.	.	.	.	.	3
Characteristics and differentials of the class *Rhamno-Prunetea*									
Euphorbia characias L.	2	2	1	1	2	1	+	1	8
Asparagus acutifolius L.	+	1	+	1	.	1	1	1	7
Tamus communis L.	1	+	+	1	1	1	+	.	7
Rosa canina L.	.	+	1	1	1	.	1	+	6
Prunus spinosa L.	+	.	.		1	1	.	1	4
Crataegus monogyna Jacq.	.	1	.	1	1	.	.	.	3
Lonicera etrusca Santi	.	.	.	.	1	1	.	.	2
Rosa corymbifera Borckh.	.	.	.	.	.	1	1	.	2
Rosa sempervirens L.	.	+	.	.	.	.	+	.	2
Other species									
Acanthus mollis L.	1	1	+	1	.	1	+	.	6
Allium triquetrum L.	+	1	1	1	+	.	.	.	5
Arum italicum Mill.	+	+	1	1	.	1	.	.	5
Urtica dioica L.	.	+	1	+	.	1	.	+	5
Allium subhirsutum L.	.	.	1	1	+	+	+	.	5
Smilax aspera L.	.	1	.	1	1	.	.	.	3
Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz.	.	1	.	+	+	.	.	.	3
Brachypodium sylvaticum (Huds.) P. Beauv.	.	+	.	+	.	1	.	.	3
Ballota nigra L. subsp. uncinata (Bég.) Patzak	.	.	+	.	.	1	.	+	3
Arundo collina Ten.	.	1	.	1	.	.	.	.	2
Artemisia arborescens (Vaill.) L.	1	.	.	.	+	.	.	.	2
Dactylis glomerata L. subsp. hispanica (Roth) Nyman	+	.	.	.	+	.	.	.	2
Foeniculum vulgare Mill. subsp. vulgare	+	.	.	.	.	.	.	+	2
Picris hieracioides L.	.	+	.	.	.	.	.	+	2
Ruscus aculeatus L.	.	.	.	1	.	.	.	.	1
Orchis italica Poir.	+	.	.	.	.	.	.	.	1
Vicia villosa Roth subsp. varia (Host) Corb.	.	.	.	.	.	.	+	.	1
Rhus coriaria L.	.	.	.	.	.	.	+	.	1

Tab. 17 - *Roso corymbiferae-Rubetum ulmifolii* ass. nova.

Relevé (n°)	1	2	3	4	5	6	7	8	
Altitude (m a.s.l.)	900	930	966	992	1001	1011	1014	1032	
Slope (%)	8	10	10	10	5	10	5	10	
Exposure	NE	NE	N	N	N	N	W	NW	
Area (m^2)	100	100	100	100	100	100	100	100	
Total coverage (%)	95	100	100	100	100	100	100	100	
Average height (m)	1.5	1.2	1.2	2	2	2	1.5	1.2	
Number of species	21	20	22	15	19	17	18	22	Presences
Characteristics of association									
Rubus ulmifolius Schott	3	3	3	3	4	3	4	3	8
Crataegus monogyna Jacq.	3	2	3	3	3	3	2	3	8
Rosa corymbifera Borckh.	1	+	1	1	1	+	+	+	8
Euphorbia meuselii Raimondo & Mazzola	1	+	+	+	+	1	.	+	7
Paeonia mascula (L.) Mill. subsp. russoi (Biv.) Cullen & Heywood	1	+	.	+	+	+	.	+	6
Characteristics and differentials of the alliance *Pruno-Rubion ulmifolii* and of the upper units									
Rosa canina L.	2	2	2	2	1	1	1	2	8
Prunus spinosa L.	2	1	1	1	2	1	1	.	8
Pyrus spinosa Forssk.	.	1	1	2	2	1	2	1	7
Asparagus acutifolius L.	2	1	1	3	1	1	1	.	7
Hedera helix L. subsp. helix	1	+	2	+	+	.	1	2	7
Tamus communis L.	1	1	1	.	+	+	+	1	7
Ruscus aculeatus L.	1	+	.	1	+	+	1	1	7
Lonicera etrusca Santi	.	+	1	1	1	1	.	1	6
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	+	+	2	+	.	.	+	2	6
Smilax aspera L.	1	+	.	.	+	+	.	+	5
Daphne laureola L.	.	.	2	+	.	.	2	2	4
Rosa micrantha Sm.	.	.	1	.	.	.	.	1	2
Crataegus rhipidophylla Gand.	.	.	+	.	.	.	+	.	2
Rosa sempervirens L.	.	.	+	.	.	.	.	.	1
Rosa balsamica Besser	.	.	.	.	.	+	.	.	1
Other species									
Brachypodium sylvaticum (Huds.) P. Beauv.	+	+	1	1	1	1	1	1	8
Achillea ligustica All.	+	.	+	.	+	.	+	+	5
Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz.	+	1	.	.	+	+	.	.	4
Picris hieracioides L.	+	.	+	.	.	.	+	+	4
Anthriscus nemorosa (M. Bieb.) Spreng.	.	.	1	.	.	+	.	+	3
Cyclamen hederifolium Aiton subsp. hederifolium	+	.	.	.	.	+	.	+	3
Clinopodium vulgare L. subsp. orientale Bothmer	.	.	+	.	.	.	+	+	3
Arum italicum Mill.	+	+	.	.	.	.	.	.	2
Asphodeline lutea (L.) Rchb.	+	+	.	.	.	.	.	.	2
Smyrnium rotundifolium Mill.	+	.	+	.	.	.	.	.	2
Vicia villosa Roth subsp. varia (Host) Corb.	.	+	.	.	+	.	.	.	2
Pteridium aquilinum (L.) Kuhn subsp. aquilinum	.	.	.	.	.	.	.	2	1
Euphorbia ceratocarpa Ten.	.	.	.	.	.	+	.	.	1
Oryzopsis miliacea L.	.	.	.	.	.	+	.	.	1

15) *EUPHORBIO CHARACIAE-PRUNETUM SPINOSAE* ass. nova

Table – 18.

Holotypus – Relevé 3 in Table 18.

Characteristic/Differential species – Prunus spinosa (dom.), *Euphorbia characias*, *Rosa corymbifera*.

Structure and ecology – Shrub community with *Prunus spinosa*, to which various other *Rosaceae* species (*Rosa canina*, *R. corymbifera*, *Rubus ulmifolius*, *Crataegus monogyna*, *Pyrus spinosa*, etc.) and thorny-lianous entities (*Clematis vitalba*, *Asparagus acutifolius*, *Tamus communis*, *Lonicera etrusca*, *Rubia peregrina* subsp. *longifolia*, etc.) are associated, whereas the herbaceous species of undergrowth (*Arisarum vulgare*, *Brachypodium sylvaticum*, *Ampelodesmos mauritanicus*, *Allium subhirsutum*, etc.) are sporadic. The coenosis, spread on more or less eroded slopes of carbonate elevations, is proposed as a new association with the name of *Euphorbio characiae-Prunetum spinosae*; typical entities of the characteristic combination are considered *Prunus spinosa* (dominant element), as well as *Euphorbia characias* and *Rosa corymbifera*, these latter absent in a further community tied to the mountain belt which will be discussed later, whose floristic cortege is characterized by some orophytes ascribed to the alliance *Berberido aetnensis-Crataegion laciniatae* (Gianguzzi *et al*., 2011). The coenosis at issue, more thermophilous, is instead framed within the alliance *Pruno spinosae-Rubion ulmifolii*.

Bioclimate – Mesomediterranean subhumid-humid.

Syndynamism – It takes part in series with an edaphoclimactic character belonging to *Quercus ilex* woody communities (*Ampelodesmo mauritanici-Quercetum ilicis* subass. *typicum* and *viburnetosum tini*, *Sorbo torminalis-Quercetum ilicis*).

Synchorology – The coenosis was found in more or less rocky and steep stations at Mount D'Indisi, Mount Genuardo, Mount Rose, Bosco S. Adriano, Bosco Rifesi and Mount Cammarata.

16) *ROSO SICULAE-PRUNETUM SPINOSAE* ass. nova

Table – 19.

Holotypus – Relevé 3 in Table 19.

Characteristic/Differential species – Prunus spinosa (dom.), *Rosa sicula*, *Rosa glutinosa*.

Structure and ecology – Shrubby community of forest margin with an orophilous and edapho-xerophilous character, distinctly dominated by *Prunus spinosa* and in which some mesophilous entities of the alliance *Berberido aetnensis-Crataegion laciniatae* (Gianguzzi *et al*., 2011) assume a certain value; this is the case of *Rosa sicula* and *R. glutinosa* – included in the characteristic combination of a new coenosis, proposed as *Roso siculae-Prunetum spinosae* –, as well as of *Crataegus rhipidophylla* (= *C. laciniata*), *Daphne laureola*, *Rubus canescens*, etc. It is frequent in the clearings of the holm oak community referred to the new association of the *Sorbo torminalis-Quercetum ilicis*, typical of more or less eroded carbonate lithosols, where it forms vegetation nuclei with closed and impenetrable structure (coverage variable between 80% and 100%), and therefore with low participation of herbaceous species, usually reduced to sporadic presence of elements of the contiguous grasslands.

Bioclimate – Meso-Supramediterranean subhumid-humid.

Syndynamic – The coenosis represents a preforest aspect in the *Sorbo torminalis-Querco ilicis* sigmetum.

Synchorology – The community is known for the cacuminal part of the elevations of Mount Carcaci, Mount delle Rose, Santa Maria del Bosco, Montescuro, Mount Cammarata, Palazzo Adriano, Pizzo Gallinaro, Mount Genuardo and Mount Triona.

17) *CRATAEGETUM LACINIATAE* Brullo & Marcenò in Brullo 1984, Bollettino Accademia Gioenia Scienze Naturali Catania 17 (323): 391.

Table – 20.

Holotypus – Relevé 5 in Table 20 (in Brullo, 1984).

Characteristic/Differential species – Crataegus laciniata (dom.).

Structure and ecology – Compared to the previous shrubby community, the coenosis at issue has a different appearance, being characterized by a clear dominance of *Crataegus laciniata*, and it is more typical of stations characterized by a greater pedological evolution. There are also present here some entities of the genus *Rosa* (*R. sicula*, *R. glutinosa*, *R. rubiginosa*), as well as *Daphne laureola*, *Rubus canescens*, etc. The coenosis has a basically closed structure (coverage 80-100%) and it was found in orophilous stations (altitudes above 900-1000 m a.s.l.), on more or less deep soil pockets on lithotypes of carbonate nature, where it prefers northern exposures. These aspects are referred to the *Crataegetum laciniatae*, association described for the Madonie Mts. (Brullo & Marcenò in Brullo 1984), indicated also for the cacuminal part of the Nebrodi Mts., Mount dei Cani, Rocca Busambra (Gianguzzi & La Mantia, 2004), as well as of the Sicani Mts., particularly at Mount delle Rose (Gianguzzi *et al*., 2001) and Mount Carcaci (Gianguzzi *et al*., 2007c). Compared to the tables already published for the Madonie Mts. (Brullo, 1984; Gianguzzi *et al*., 2011), the aspects found in the surveyed territory are floristically depleted of the differential elements of the alliance *Berberido aetnensis-Crataegion laciniatae*, to which the coenosis is ascribed; this is due to the fact that the sintaxon reaches on these elevations of the Sicani Mts. its southern limit of the Tyrrhenian range (Gianguzzi *et al*., 2011), where it vicariates the *Berberidion vulgaris* of the Euro-Siberian Region (Bergmeier, 1990; Biondi

Tab. 18 - *Euphorbio characiae-Prunetum spinosae* ass. nova.

Relevé (n°)	1	2	3	4	5	6	7	8	9	10	
Altitude (m a.s.l.)	620	630	650	753	900	900	903	990	1012	1025	
Slope (%)	10	15	10	10	8	5	25	5	10	5	
Exposure	N	N	N	NW	N	NW	N	N	N	N	
Area (m^2)	100	100	100	100	100	100	100	100	100	100	
Total coverage (%)	100	100	100	100	100	100	100	100	100	100	
Average height (m)	2.5	2.5	2	2	2	1	2	1.5	1	1	
Number of species	19	17	16	14	17	15	16	17	15	12	Presences
Characteristics of association											
Prunus spinosa L.	5	4	4	4	4	5	5	5	4	5	10
Euphorbia characias L.	1	1	1	+	1	1	1	3	1	2	10
Rosa corymbifera Borckh.	.	1	2	1	.	1	.	1	1	2	7
Characteristics and differentials of the alliance *Pruno-Rubion ulmifolii* and of the upper units											
Rosa canina L.	3	3	1	1	1	1	2	1	1	1	10
Rubus ulmifolius Schott	+	.	2	+	2	2	1	1	1	1	9
Crataegus monogyna Jacq.	1	1	2	1	.	1	+	+	1	1	9
Asparagus acutifolius L.	1	1	1	.	1	1	1	2	.	1	8
Pyrus spinosa Forssk.	1	1	.	1	+	1	1	.	1	1	8
Ruscus aculeatus L.	.	1	1	.	+	1	1	.	1	+	7
Rubia peregrina L. subsp. longifolia (Poir.) O. Bolòs	1	1	.	.	1	+	+	.	+	+	7
Hedera helix L. subsp. helix	+	.	+	1	.	+	.	1	1	+	7
Lonicera etrusca Santi	.	.	1	1	3	.	.	.	.	+	4
Rosa sempervirens L.	.	.	.	+	2	1	.	+	.	.	4
Osyris alba L.	.	.	1	1	.	.	+	.	.	.	3
Crataegus laevigata (Poir.) DC.	1	.	1	.	.	.	.	.	.	.	2
Daphne laureola L.	.	.	.	.	.	.	+	.	1	.	2
Clematis vitalba L.	.	.	.	.	.	.	.	+	.	1	2
Tamus communis L.	.	.	.	.	.	.	+	.	+	.	2
Rhamnus alaternus L.	1	.	.	.	.	.	.	.	.	.	1
Ulmus minor Mill.	.	.	.	1	.	.	.	.	.	.	1
Euphorbia meuselii Raimondo & Mazz.	.	.	.	.	.	.	.	.	+	.	1
Smilax aspera L.	.	.	.	.	.	.	.	.	+	.	1
Other species											
Arisarum vulgare Targ.-Tozz.	1	+	+	.	1	+	.	+	.	1	7
Brachypodium sylvaticum (Huds.) P. Beauv.	1	.	.	.	1	1	1	1	1	1	6
Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz.	.	1	1	1	1	+	1	.	.	.	6
Allium subhirsutum L.	1	+	+	.	.	.	+	.	+	1	6
Vicia villosa Roth subsp. varia (Host) Corb.	+	+	.	.	+	.	.	+	.	.	4
Euphorbia ceratocarpa Ten.	1	.	1	.	+	.	.	.	.	.	3
Hyoseris radiata L.	+	1	.	.	.	.	.	+	.	.	3
Asphodeline lutea (L.) Rchb.	.	1	.	+	.	.	.	+	.	.	3
Piptatherum miliaceum (L.) Coss.	+	+	.	.	.	.	.	.	.	.	2
Galium aparine L.	.	.	.	.	.	.	+	.	+	.	2
Leontodon siculus (Guss.) Nyman	.	.	.	.	.	.	.	+	.	+	2
Quercus ilex L.	.	.	.	.	.	.	.	+	1	.	2
Anagyris foetida L.	.	1	.	.	.	.	.	.	.	.	1
Schedonorus arundinaceus (Schreb.) Dumort. subsp. fenas (Lag.) H. Scholz	.	.	.	.	1	.	.	.	.	.	1
Arum italicum Mill.	+	.	.	.	.	.	.	.	.	.	1
Rumex thyrsoides Desf.	.	.	.	.	+	.	.	.	.	.	1
Opopanax chironium (L.) W.D.J. Koch	.	.	.	.	.	.	.	.	+	.	1

Tab. 19 - *Roso siculae-Prunetum spinosae* ass. nova.

Relevé (n°)	1	2	3	4	5	6	7	8	
Altitude (m a.s.l.)	1100	1200	1220	1287	1300	1325	1320	1410	
Slope (%)	5	5	5	5	5	5	15	35	
Exposure	N	N	NE	N	N	W	N	N	
Area (m^2)	100	100	100	100	100	100	100	100	
Total coverage (%)	95	100	100	100	90	100	100	80	
Average height (m)	1.5	2	1	2	2	2	1	3	
Number of species	15	14	15	14	11	13	13	17	Presences
Characteristics and differentials of association									
Prunus spinosa L.	5	5	5	4	4	5	5	4	8
Rosa sicula Tratt.	3	2	1	2	2	2	1	1	8
Rosa glutinosa Sm.	+	1	1	.	+	1	1	1	7
Characteristics and differentials of the alliance *Berberido aetnensis-Crataegion laciniatae*									
Daphne laureola L.	2	2	3	2	1	3	1	2	8
Crataegus rhipidophylla Gand.	+	1	+	2	2	2	1	1	8
Rubus canescens DC.	1	.	+	.	+	+	.	.	4
Lamium flexuosum Ten.	.	+	+	.	.	.	.	.	2
Characteristics and differentials of the order *Prunetalia* and of the class *Rhamno-Prunetea*									
Rosa canina L.	1	+	+	1	.	2	1	+	7
Rubus ulmifolius Schott	+	+	+	+	.	.	+	1	6
Pyrus spinosa Forssk.	+	.	.	1	1	1	+	.	5
Clematis vitalba L.	1	.	1	.	.	1	.	1	4
Asparagus acutifolius L.	.	+	.	1	+	.	.	+	4
Hedera helix L. subsp. helix	.	.	.	.	.	+	+	1	3
Lonicera etrusca Santi	.	.	.	1	.	.	.	.	1
Other species									
Brachypodium sylvaticum (Huds.) P. Beauv.	1	+	+	1	.	1	+	1	7
Opopanax chironium (L.) W. D. J. Koch	1	.	.	.	.	1	1	2	4
Leontodon siculus (Guss.) Nyman	1	1	.	+	.	+	.	.	4
Arrhenatherum elatius (L.) J. & C. Presl subsp. bulbosum (Willd.) Schübler & G. Martens	.	+	.	+	.	.	.	1	3
Euphorbia meuselii Raimondo & Mazzola	+	.	+	.	.	.	+	.	3
Paeonia mascula (L.) Mill. subsp. russoi (Biv.) Cullen & Heywood	.	1	.	.	.	.	+	.	2
Calamintha nepeta (L.) Savi subsp. nepeta	.	+	+	.	.	.	.	.	2
Galium aparine L.	.	.	.	.	1	.	.	.	1
Fraxinus ornus L.	.	.	.	.	.	.	.	1	1
Acer campestre L.	.	.	.	.	.	.	.	1	1
Malus sylvestris Mill.	.	.	.	.	.	.	.	1	1
Senecio siculus All.	.	.	.	.	.	.	.	1	1
Salvia argentea	.	.	+	.	.	.	.	.	1
Thalictrum calabricum Spreng.	.	.	+	.	.	.	.	.	1
Agropyron panormitanum Parl.	.	.	.	+	.	.	.	.	1
Achillea ligustica All.	.	.	.	+	.	.	.	.	1
Silene vulgaris (Moench) Garcke	.	.	.	.	+	.	.	.	1
Sanguisorba minor Scop	.	.	.	.	+	.	.	.	1

et al., 1990; Stanisci, 1997; Molina Abril, 1994; Theurillat *et al*., 1994).

Bioclimate – Meso-Supramediterranean with subhumid-humid ombrotype.

Syndynamism – It constitutes a preforest aspect of the deciduous wood of the *Sorbo torminalis-Querco virgilianae* sigmetum, to which the *Avenula cincinnata* grassland ascribed to the association *Stipo barbatae-Avenuletum cincinnatae* Brullo, Giusso & Scuderi 2010 (Brullo *et al*., 2010) also takes part.

Synchorology – The coenosis is reported for the Madonie Mts. (Brullo & Marcenò in Brullo 1984; Gianguzzi *et al*., 2011), as well as for the cacuminal part of the Nebrodi Mts., Mount dei Cani, Rocca Busambra (Gianguzzi & La Mantia, 2004) and on the Sicani Mts., particularly at Mount delle Rose (Gianguzzi *et al*., 2001) and Mount Carcaci (Gianguzzi *et al*., 2007c). During this survey it was sporadically found also in orophilous stations of Mount Barracù, Mount Cammarata, Mount Genuardo (Fig. 6), Pizzo Gallina-

Tab. 20 - *Crataegetum laciniatae* Brullo & Marcenò in Brullo 1984.

Relevé (n°)	1	2	3	4	5	
Altitude (m a.s.l.)	1096	1103	1268	1346	1360	
Slope (%)	5	10	10	5	5	
Exposure	NW	W	N	W	NW	
Area (m^2)	100	100	100	100	100	
Total coverage (%)	80	80	85	100	90	
Average height (m)	2	2	3	3	4	
Number of species	15	15	15	16	14	Presences
Characteristics of association						
Crataegus rhipidophylla Gand.	4	4	4	5	4	5
Characteristics and differentials of the alliance *Berberido aetnensis-Crataegion laciniatae*						
Daphne laureola L.	1	+	2	3	2	5
Rosa sicula Tratt.	+	+	1	2	2	5
Lamium flexuosum Ten.	.	.	1	1	.	2
Rosa glutinosa Sm.	.	.	1	+	.	2
Rubus canescens DC.	+	.	.	.	+	2
Crataegus monogyna Jacq. subsp. azarella (Griseb.) Franco	.	.	.	1	.	1
Characteristics and differentials of the order *Prunetalia* and of the class *Rhamno-Prunetea*						
Pyrus spinosa Forssk.	2	2	2	3	2	5
Prunus spinosa L.	+	.	1	2	2	4
Rosa corymbifera Borckh.	1	1	1	.	.	3
Rosa canina L.	.	.	+	2	.	2
Asparagus acutifolius L.	+	.	.	.	1	2
Lonicera etrusca Santi	+	.	.	.	1	2
Rubus ulmifolius Schott	.	1	.	.	.	1
Clematis vitalba L.	.	.	.	1	.	1
Crataegus monogyna Jacq.	+	.	.	.	.	1
Ingressive species of the class *Querco-Fagetea*						
Brachypodium sylvaticum (Huds.) P. Beauv.	+	1	1	1	1	5
Hedera helix L.	.	1	.	1	.	2
Viola alba Besser subsp. dehnhardtii (Ten.) W. Becker	+	+	.	.	.	2
Euphorbia meuselii Raimondo & Mazzola	.	+	+	.	.	2
Tamus communis L.	.	+	.	.	+	2
Acer campestre L.	.	.	.	.	1	1
Ruscus aculeatus L.	+	.	.	.	.	1
Other species						
Achillea ligustica All.	+	.	+	+	+	4
Paeonia mascula (L.) Mill. subsp. russoi (Biv.) Cullen & Heywood	.	+	+	.	.	2
Allium subhirsutum L.	.	+	+	.	.	2
Elymus panormitanus (Parl.) Tzvelev	.	.	.	+	+	2
Leontodon siculus (Guss.) Nyman	.	.	.	+	+	2
Cyclamen hederifolium Aiton	+	.	.	.	.	1
Thalictrum calabricum Spreng.	+	.	.	.	.	1
Opopanax chironium (L.) W. D. J. Koch	.	+	.	.	.	1
Anthriscus nemorosa (M. Bieb.) Spreng.	.	.	.	+	.	1

ro, Valle Grande, Mount Gebbia, Mount Colomba and Mount D'Indisi.

Concluding remarks

As shown in the following syntaxonomical scheme, the woody communities of the Sicani Mts. subject of this survey are referred to four different vegetation classes (*Quercetea ilicis*, *Querco-Fagetea sylvaticae*, *Salici-Populetea nigrae*, *Rhamno-Prunetea*), and attributed to 25 distinct coenoses (17 associations and 8 subassociations). In most cases, these syntaxa are already known in the literature (for several of which phytosociological data and new stations for the entire area of the Sicani Mts. are provided), whereas other ones concern unpublished plant communities, partly described as new.

Syntaxonomic scheme

QUERCETEA ILICIS Br.-Bl. in Br.-Bl., Roussine & Nègre 1952
PISTACIO-RHAMNETALIA ALATERNI Rivas-Martínez 1975
Oleo sylvestris-Ceratonion siliquae Br.-Bl. 1936 ex Guinochet & Drouineau em. Rivas-Martínez 1975
Rhamno alaterni-Euphorbietum dendroidis Géhu & Biondi 1997
typicum
phlomidetosum fruticosae (Brullo & Marcenò 1985) comb. nov.
rhamnetosum oleoidis (Brullo & Marcenò 1985) comb. nov.
celtidetosum aetnensis (Brullo & Marcenò 1985) comb. nov.
euphorbietosum bivonae (Gianguzzi, Ilardi & Raimondo 1996) comb. nov.
Ampelodesmo mauritanici-Juniperetum turbinatae Gianguzzi, Ilardi, Caldarella, Cusimano, Cuttonaro & Romano 2012
cistetosum cretici Gianguzzi, Ilardi, Caldarella, Cusimano, Cuttonaro & Romano 2012
Asparago albi-Artemisietum arborescentis ass. nova
Euphorbio characiae-Anagyridetum phoetidis ass. nova
asparagetosum albae subass. nova *hoc loco*
loniceretosum implexae subass. nova *hoc loco*
Pistacio terebinthi-Celtidetum aetnensis Gianguzzi, Cusimano & Romano 2014
typicum
phlomidetosum fruticosae Gianguzzi, Cusimano & Romano 2014
QUERCETALIA ILICIS Br.-Bl. 1936 em. Rivas-Martínez 1975
Fraxino orni-Quercion ilicis Biondi, Casavecchia & Gigante ex Biondi, Casavecchia & Gigante in Biondi, Allegrezza, Casavecchia, Galdenzi, Gigante & Pesaresi 2013
Ampelodesmo mauritanici-Quercetum ilicis ass. nova *hoc loco*
typicum
viburnetosum tini subass. nova *hoc loco*
Sorbo torminalis-Quercetum ilicis ass. nova *hoc loco*
Oleo oleaster-Quercetum virgilianae Brullo 1984
Sorbo torminalis-Quercetum virgilianae Brullo, Minissale, Signorello & Spampinato 1996
Asparago acutifolii-Laurion nobilis all. nova
Acantho mollis-Lauretum nobilis Gianguzzi, D'Amico & Romano 2010

QUERCO-FAGETEA Br.-Bl. 1937 & Vlieger in Vlieger 1937
QUERCETALIA PUBESCENTI-PETRAEAE Klika 1933
Pino calabricae-Quercion congestae Brullo, Scelsi, Siracusa & Spampinato 1999 em. Blasi, Di Pietro, Filesi 2004
Sorbo graecae-Aceretum pseudoplatani Gianguzzi & La Mantia 2004

SALICETEA NIGRAE Moor 1958
SALICETALIA PURPUREAE Moor 1958
Salicion pedicellatae (Ubaldi 2003) Poldini & Vidali in Poldini, Vidali & Ganis 2011
Salicetum albo-pedicellatae Brullo & Spampinato 1990

RHAMNO-PRUNETEA SPINOSAE Rivas Goday & Borja ex Tüxen 1962
LAURO NOBILIS-SAMBUCETALIA NIGRAE Biondi, Blasi, Casavecchia, Galdenzi & Gasparri 2014

Lauro nobilis-Sambucion nigrae Biondi, Blasi, Casavecchia, Galdenzi & Gasparri 2014
Hyperico majoris-Rubetum ulmifolii ass. nova
PRUNETALIA SPINOSAE Tüxen 1952
Pruno spinosae-Rubion ulmifolii O. Bolòs 1954
Roso corymbiferae-Rubetum ulmifolii ass. nova
Euphorbio characiae-Prunetum spinosae ass. nova
Berberido aetnensis-Crataegion laciniatae Gianguzzi, Caldarella, Cusimano & Romano 2011
Roso siculae-Prunetum spinosae ass. nova
Crataegetum laciniatae Brullo & Marcenò in Brullo 1984

Fig. 4 - Aspects of the *Euphorbia dendroides* and *Olea europaea* var. *sylvestris* maquis (*Rhamno alaterni-Euphorbietum dendroides*), typical of the xeric limestone ridges.

Fig. 5 - View of the Sosio River Valley (Sicani Mts.), dominated by *Quercus ilex* woods (*Ampelodesmo mauritanici-Quercetum ilicis* subass. *typicum* and *viburnetosum tini*).

Fig. 6 - Plant landscape in the territory of Sambuca di Sicilia (Sicani Mts.); in the background, Mount Genuardo (1160 m).

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Appendix I: Location and data of relevés

Tab. 5 - *Rhamno alaterni-Euphorbietum dendroidis* subass. *typicum* (Rels. 1-4): Rel. 1, Serra S. Benedetto, 24.3.2011; Rel. 2, Pizzo S. Matteo, 22.9.2010; Rel. 3, Mount Adranone, 25.4.2010; Rel. 4, Pizzo Catera, 22.9.2010; subass. *phlomidetosum fruticosae* (Rels. 5-6): Mount Telegrafo at Contrada S. Biagio, 9.1.2014; subass. *rhamnetosum oleoidis* (Rels. 7-8): Mount Telegrafo at the Arancio Lake, 30.6.2005; subass. *celtidetosum aetnensis* (Rels. 9-10): Mount Telegrafo at Caltabellotta, 11.6.2010; subass. *euphorbietosum bivonae* (Rels. 11-14): Rel. 11, Cozzo Danesi, 20.3.2010; Rel. 12, Mount Gristia, 20.5.2011; Rel. 13, Serra S. Benedetto, 24.3.2011; Rel. 14, Mount Genuardo at Contrada Il Corvo, 1.9.2009.

Tab. 6 - *Asparago albi-Artemisietum arborescentis*: Rels. 1-5, Rocche di Entella, 30.5.2006; Rels. 6-7, Mount Gristia, 20.5.2011; Rel. 8, Cozzo Severino at Corleone, 8.10.2008.

Tab. 7 - *Euphorbio characiae-Anagyridetum foetidis* subass. *asparagetosum albae* (Rels. 1-7): Rels. 1-2, Pizzo Telegrafo at Contrada S. Biagio, 9.1.2014; Rels. 3-7, Mount Genuardo at Case Menta, 5.12.2006; subass. *loniceretosum implexae* (Rels. 8-10): Mount Cardellìa, on the ridge above the small lake, 8.7.2013.

Tab. 9 - *Ampelodesmo mauritanici-Quercetum ilicis* subass. *typicum* (Rels. 1-8): Rels. 1-5, Bosco S. Adriano, 30.5.2010; Rel. 6, Valle Vite, 17.3.2009; Rels. 7-8, Torcitore, 2001; subass. *viburnetosum tini* (Rels. 9-20): Rels. 9-12, Bosco S. Adriano at Contrada Carrubbazzo (20.05.2011); Rels. 13-14, Bosco S. Adriano, 23.5.2010; Rels. 15-16, Cozzo Danesi, 22.10.2011; Rels. 17-18, Mount Genuardo at Contrada Serradamo, 11.07.2009; Rels. 19-20, Mount Genuardo at Contrada Rocca Rossa, 11.7.2009.

Tab. 10 - *Sorbo torminalis-Quercetum ilicis*: Rels. 1-2, Pizzo Mondello, 5.6.2010; Rel. 3, Mount Carcaci, 23.9.2010; Rel. 4, Cozzo Stagnataro, 23.9.2010; Rels. 5-6, Mount Colomba, 28.5.2009; Rels. 7-8, Mount Gebbia, 20.5.2011; Rel. 9, Mount delle Rose, 5.6.2010; Rel. 10, Pizzo della Rondine, 28.05.2010.

Tab. 12 - *Oleo sylvestris-Quercetum virgilianae*: Rels. 1-2, Contrada Finocchiara, between Cammarata and Castronovo di Sicilia, 23.9.2010.

Tab. 13 - *Sorbo torminalis-Quercetum virgilianae*: Rel. 1, Mount Genuardo, 27.9.2010; Rel. 2, Santa Maria del Bosco, 10.5.2002; Rel. 3, Piano Inzitati, 30.5.2010; Rel. 4, Santa Maria del Bosco, 27.9.2010; Rel. 5, Mount Genuardo, 27.9.2010; Rel. 6, Mount delle Rose, 6.6.2008; Rels. 7-9, Mount delle Rose, 22.9.2010.

Tab. 14 - *Sorbo graecae-Aceretum pseudoplatani*: Mount Cammarata, 28.5.2010.

Tab. 15 - *Salicetum albo-pedicellatae*: Rels. 1-2, Sosio River at San Carlo, 19.5.2010; Rel. 3, Sosio River, 26.10.2002; Rel. 4, Riena, 6.5.2006; Rels. 5-7, Sosio River at Palazzo Adriano, 26.6.2010; Rel. 6, Platani River at Castronovo di Sicilia, 23.9.2010; Rel. 8, S. Calogero Torrent, 26.10.2002; Rel. 9, Acque Bianche Torrent, 22.9.2010; Rel. 10, S. Antonio Torrent, 13.6.2010.

Tab. 16 - *Hyperico majoris-Rubetum ulmifolii*: Rel. 1, Palazzo Adriano at Cozzo Briglia, 3.8.2011; Rel. 2, Mount Genuardo, 10.7.2011; Rel. 3, Prizzi at Contrada Martino, 13.6.2010; Rel. 4, Mount Genuardo, 30.5.2010; Rels. 5-8, Mount Genuardo, 8.6.2014.

Tabl. 17 - *Roso corymbiferae-Rubetum ulmifolii*: Rel. 1, Mount Carcaci, 26.8.2010; Rels. 2 and 6-7, Mount Genuardo, 30.5.2010; Rel. 3, Palazzo Adriano at Contrada San Benedetto, 12.4.2009; Rels. 4-5, Mount delle Rose, 16.9.2010.

Tab. 18 - *Euphorbio characiae-Prunetum spinosae*: Rels. 1-2, Palazzo Adriano at Contrada San Calogero, 26.10.2002; Rel. 5, Santa Maria del Bosco, 10.5.2002; Rel. 3, Palazzo Adriano at Pietra dei Saraceni, 25.5.2000; Rel. 4, Mount Scuro, 22.6.2010; Rels. 7 and 9, Mount Carcaci, 17.5.2010; Rels. 6, 8 and 10, Mount delle Rose, 18.10.2014.

Tab. 19 - *Roso siculae-Prunetum spinosae*: Rels. 1-3 and 7, Mount delle Rose, 18.10.2014; Rels. 4 and 6, Mount delle Rose, 21.9.2010; Rel. 5, Mount delle Rose, 22.5.2000; Rel. 8, Mount Cammarata, 28.05.2010.

Tab. 20 - *Crataegetum laciniatae*: Rel. 1, Mount Gebbia, 2.6.2011; Rel. 2, Mount Barracù, 18.6.2011; Rel. 3, Mount delle Rose, 12.8.2011; Rels. 4-5, Mount delle Rose, 21.9.2010.