Landscape and floristic features of Sicily*

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Introduction

Sicily, including its surrounding islets, is the largest Italian region with an area of 25,707 Km^2. For its geo-morphologic, pedologic and climatic features, it is one of the most heterogeneous and differentiated territories in the Mediterranean region. Therefore, it offers an extraordinary environmental and biological richness. Not by chance, it is among the territories that boast highest biological diversity and has one of the most elevated percentage of endemics.

Its vascular flora consists of about 3,000 specific and infraspecific taxa that, compared to the region's extension, makes it one of the floristically richest territories in the whole Mediterranean region. Its high biodiversity, therefore, is to be connected with the great variety of substrata, with the marked orography, with a rather contrasting geo-morphology and the particular geographic position in the center of the Mediterranean Sea.

In Sicily, fauna too is significant. The region's faunal diversity, in fact, consists of a high number of species, mostly sedentary. The seasonal component is meaningful as regards birds that, massively, have found in our region proper places for stops or shelter. Not by chance, main Mediterranean migratory routes intercept Sicily.

Besides extinct species, the number of species of vertebrates living on or visiting the island is about 700. In particular, taking into account also subspecies, we count 5 species of amphibians, 47 of mammals, 30 of fresh water fish, 36 of reptiles and about 430 of birds, out of which one third breeding.

As for invertebrate fauna, the region's contribution is even higher. Indeed, its territory holds nearly 500 endemic insect species.

From postwar period till today, Sicily has been witnessing the destruction of its own environmental heritage, reaching thus a very different and contrasting landscape that little resembles the one belonging to last century's first decades. Nevertheless, its territory is still rich of significant expressions of a nature that has been moulded by plurimillenarian activities of several civilizations.

If the flora-faunal structure can be considered still quite integral, the vegetal landscape has undergone through more radical changes because of the ancient presence of man. The

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vegetative frame is, in fact, characterized by secondary formations connected with man's activities. Here, natural and subnatural vegetative aspects are to be found mostly in less accessible mountain areas and on small islands.

Particularly, those systems with higher proportion of naturalness mainly concern rocky habitats of major reliefs hosting specialized vegetal communities with rare and, at times, exclusive species. They spread out in a fragmentary way throughout the region's territory. Yet, there is a higher concentration in the provinces of Catania, Palermo, Messina and Agrigento.

Vegetal communities with structures and features comparable with those found in natural environments are those with forest formations in the mountain and hilly zones. Among these there are prevailingly ilex and termophile deciduous oak woods, durmast and holly wood, beeches, frutices and high altitude meadows, as well as coastal formations of cliffs. Subnatural ecosystems are mainly included in more or less large areas, recently under environmental protection.

Substituting phytocoenoses are prevailing in the region's territory: scrubs, shrubbery and garigues, badlands formations, hygrophilous vegetation along streams, psammophilous vegetation, as well as artificial forest formations and populations, including prevailingly chestnut and cork-oak woods whose preservation is supported by man. This secondary, thus seminatural, vegetation is mostly included within the hilly and mountain territories of Messina, Palermo, Catania and Enna and involves about one fourth of the regional surface.

Just about half of the Sicilian territory is affected by agroecosystems where a traditional agriculture is carried out. Such systems, part of the rural environment, prove to be common in the hilly inlands and low mountains of the provinces of Caltanissetta, Enna, Palermo, Ragusa, Agrigento and Siracusa.

They come out as arboreous and herbaceous cultivations, which are as well extensive and low environmental impact cultivations, characterizing vast areas of the agrarian landscape, as olive groves, almond groves, ash groves, pistachio groves, hazel groves, dry sowable lands, meadows and grass, etc. Inside them one can notice aspects of spontaneous vegetation mainly herbaceous, some of which of remarkable chromatic effect for their massive blooms.

Therefore the landscape, despite progressive destruction of its natural aspects, particularly heavy during the last century, still shows an extraordinary richness and diversity.

In order to contrast the progressive transformation and the destruction of relevant environments, the Sicilian Region, thanks to its autonomous constitution, has enacted a legislation for the preservation of both accentuated and diffused naturalness areas, by means of LL. RR. 98/1981 and 14/1988 on protected areas and L.R. 15/1991 that acknowledges national legislation as regards landscape protection.

Thanks to such legislative interventions, Sicily can boast four natural parks, including the newly designated Parco dell'Alcantara, and some ninety wild life reserves, that altogether grant protection and controlled fruition for ca. 250,000 hectares of surface, that is over 10% of its territory.

This is an undoubtedly significant datum if compared to the density of population, but it surely does not include the entire naturalistic and environmental heritage of the region. As a matter of fact, other areas deserve consideration within the protected areas systems. Among these, some of the sites mentioned in the itinerary of this volume are particularly representative.

Present vegetal landscape

Within the Sicilian territory, the richness of habitats, due to the diversity of geological substrata, to the contrasting orography and to the millenarian anthropic activities, together with favourable climatic conditions, define a great number of environments that as a whole produce a remarkable biodiversity.

From the floristic point of view, the island, because of its location in the center of the Mediterranean Sea, shows very significant phytogeographic correlations that clearly match to the paleogeographic developments of the territory from Miocene onward. The island's flora is, as a matter of fact, characterized by a rich endemic proportion, which marks its geographic isolation, and by entities which are quite rare or with relict meaning and shared with neighbouring territories. This grants an outstanding peculiarity, and at times uniqueness, to the vegetal communities at present observable on the island, highlighting nature and landscape values.

Except for wood formations that discontinuously mantle the highest reliefs of the island, the present vegetal landscape, because of its ancient anthropic effects, shows agricultural systems both in use and neglected, ranging from more or less shrubby meadowlands to irregular Mediterranean maquis and vast areas covered by artificial forest settlements, especially with exotic species that cannot be assimilated to local forest formations.

What is left of natural wood in some mountain ranges as Etna, Peloritani, Nebrodi, Madonie, Sicani and Iblei – at times of remarkable development, or both fragmented and articulated – allows to reconstruct the continuity of forest features in Sicily.

The most significant features and contexts of the Sicilian forest vegetation, more or less natural, are described – referring to Raimondo (1992) – in wood typologies as follows:
Prevailingly ilex and cork-oak woods – Ilex groves and cork plantations make up formations only partially well-preserved. Because of their original coastal, hilly and submontane location, these woods have undergone a substantial reduction. Thus, the potential space attributable to such formations is the one involving man's intensive activities and agriculture. Moreover, there are some open cork-oak formations damaged by fire, and ilex groves that have lost their distributive continuity due to the practice of cutting firewood and are today being recovered since no longer in use. Such woods are well-preserved in some areas of the north-eastern coast and in the inland, especially on Etna, on the northern side of Peloritani, of Nebrodi, of Madonie, of Sicani Mountains and in the area of Siracusa. From a phytogeographic point of view, remarkable offsprings are present in the area of Trapani, as in Erice, Calatafimi, Buseto Palizzolo, the Islands of Salina, Marettimo and Pantelleria. Particularly, magnificent ilex groves can be found on Mt. Minardo (Etna), on the whole northern side of the low Madonie as in Sempria, Vicaretto, Piano Zucchi, Montaspro and Volpignano. Ilex formations clinging to the westernside of Mt. Carbonara are of great environment and landscape interest. Even more interesting are the ilex formations on the southern side of Mt. Quacella where this evergreen forest typology comes into contact with the beechwood, extraordinary fact, almost unique, throughout the areale both for beech-wood and ilexes. Something alike happens on Nebrodi, in San Fratello. In these stations – where the evergreen oak wood reaches its altimetrical peak of 1,750 m – the representative elements of two different ecologic and geographic contexts come into contact through the most significant biologic manifestations represented indeed by the ilex and the beech, the

former symbol of Mediterranean forest vegetation, the latter of the central European one. From a structural point of view, Sicilian ilex groves are usually coppice, at times very dense and with a complete stratification. The arboreous stratum consists exclusively of ilex with sporadic presences of other evergreen elements; on the Madonie, in some stations, the ilex contributes creating the arboreous stratum together with the cork-oak and, on more humid areas, with the holly. There are also some combinations with conifers, as in Pantelleria, where ilex and cork-oak mix with *Pinus pinaster*, or on Etna where *Pinus laricio* seeps into the ilex wood. Anyway, in such environments, these pine trees occupy their own individual space, outside the evergreen hard wood forest and set up forest coenosis with distinct characters. Moreover, the ilex can even be artificially combined with other conifers, as on the Peloritani where, after reforestation with *Pinus pinea*, the constitution of an ilex grove became possible, reaching at the same time a semi natural structure of great environment and landscape interest. Yet, in the wooden layer, the combination of ilex and at times even cork oak with deciduous elements as *Fraxinus ornus*, *Pyrus amygdaliformis*, *Acer campestre*, *Acer monspessulanum*, and *Ostrya carpinifolia* (this last one present only on Sicani, Nebrodi, Iblei and Peloritani) is more frequent.

Mixed with ilex or cork oak there are very frequent deciduous elements belonging to the durmast group, as *Quercus amplifolia*, *Quercus congesta*, *Quercus dalechampii*, *Quercus leptobalana* and *Quercus virgiliana*. Not common, but present in the ilex wood of Etna, Madonie and Nebrodi is *Acer obtusatum* while in the cork plantations of the Messina area, *Celtis australis* at times displays peculiar features. The shrubby stratum of these formations, besides the same elements of the arboreous stratum, consists of numerous species among which we more frequently find *Cytisus villosus*, *Euphorbia characias*, *Crataegus monogyna*, *Asparagus acutifolius*, *Clematis vitalba*, *Ruscus aculeatus*, *Lonicera etrusca* and *L. implexa*, *Teucrium siculum*, *Rosa sempervirens* and in warmer areas *Phillyrea latifolia*, *Clematis cirrhosa*, *Smilax aspera*, *Rubia peregrina*, *Osyris alba*, *Rhamnus alaternus*, *Pistacia lentiscus*, *Daphne gnidium*, *Teline monspessulana* and also in the silicious substrata *Myrtus communis*, *Arbutus unedo* and *Erica arborea*. In more mesophyle conditions *Euphorbia amygdaloides* subsp. *arbuscula*, *Daphne laureola* and *Ilex aquifolium* can be found. In some specific areas *Laurus nobilis* and some endemic species as *Genista cupani*, Nebrodi's *Genista aristata*, *Helleborus bocconei* and the very rare *Rhamnus lojaconoi* are found. Intrusive plants as *Rubus ulmifolius* s.l., *Calicotome infesta* subsp. *intermedia* and some species of *Cistus incanus*, *C. creticus*, *C. salvifolius* are present: all expressions of degradation of the evergreen Mediterranean wood.

The herbaceous stratum is floristically quite differentiated: in it, we most frequently notice *Carex distachya*, *Thalictrum calabricum*, *Cyclamen repandum*, *Cyclamen hederifolium*, *Asplenium onopteris*, *Asplenium trichomanes*, *Polystichum setiferum*, *Asperula laevigata*, *Luzula forsteri*, *Melittis albida*, *Silene viridiflora*, *Paeonia mascula, Symphytum gussonei*, *Nectaroscordum siculum*, *Poa sylvicola*, *Echinops siculus*, *Festuca drymeia*, *Clinopodium vulgare*, the unusual *Ambrosinia bassii* and, particularly in the cork plantation, *Melica arrecta* and *Pulicaria odora*. In the acidophilic substrata *Pteridium aquilinum* is often infestant. Remarkable are the epiphytic, epilytic and terricolous cryptogamic compounds.

Pinus halepensis woods – This formations run along the hilly slopes that coast the Ippari River in the area of Ragusa (Vittoria). Such formations make up the rest of an extensive for-

est known to the Romans as "*Saltus camarinensis"*. It is discontinuous and shows an arboreous stratum consisting of only *Pinus halepensis* with 10 m high trees. It occupies a surface of a couple of thousands of hectares and it is the only natural *Pinus halepensis* formation existing in Sicily. The shrubby stratum, thanks to the reduced arboreous covering of the pinetree grows with continuity even under the pine leafage; with it we find *Olea europaea* var. *sylvestris*, lentisk, *Phillyrea latifolia*, lye, *Lonicera implexa*, *Juniperus oxycedrus* subsp. *macrocarpa* and ilex too. In more open areas it is made of a dense interlacing of low shrubs as *Rosmarinus officinalis*, *Thymus capitatus*, *Globularia alypium*, prickling asparagus, *Erica multiflora*, *Teucrium fruticans*, *Prasium majus*, *Rosa sempervirens*, *Calicotome infesta*, *Quercus calliprinos*, *Juniperus phoenicea*, *Arbutus unedo*, *Daphne gnidium*, *Chamaerops humilis*, *Ephedra fragilis* and some species of Cistus as the very rare *Cistus clusii* whose habitus is similar to *Rosmarinus officinalis* present in Sicily only in this formation. The herbaceous covering is not too significant. It consists of *Ampelodesmos mauritanicus*, of some *Fumana thymifolia*, *F. laevipes*, *Arisarum vulgare*, *Asphodelus microcarpus*, *Urginea maritima* and of some terricolous orchidaceous as *Ophris bertolonii* and *Serapias vomeracea*. Very common in spring is the expressive *Cytinus hypocistis*.

Pinaster woods – Another typology of natural pine grove is the pinaster one in Pantelleria. On this island this species is found in various evergreen forest expressions. Yet, it carries out the most significant role within an autonomous formation that at times is similar to garigue-bush. In such context besides the dominant pinaster we notice even the ilex and, near the coast, *Pinus halepensis* (introduced). The shrubby covering consists of various sclerophylls among which two heathers, as *Erica multiflora* and *E. arborea*, *Lavandula stoechas*, *Rosmarinus officinalis*, *Pistacia lentiscus*, *Arbutus unedo*, *Myrtus communis*, *Daphne gnidium*, *Lonicera etrusca and L. implexa*, *Calicotome infesta*, *Genista aspalathoides* endemic of Pantelleria and various species of cistus, as *Cistus monspeliensis*, *C. creticus* and *C. salvifolius*. The herbaceous stratum of this formation consists of few species among which the rare *Carex illegitima* and the uncommon *Dorycnium hirsutum*. The cryptogamic compound expressed by fungi, lichens, bryophytes and few species of fern is here remarkable too.

Prevailingly deciduous oak woods – Among oak woods we first mention the fragmentary forest expressions featured by the various entities of durmast present in Sicily. In different cases they are not well characterized both under the floristic and the structural point of view and they look like open formations with big isolated arboreous exemplars. Analogous oak woods are frequently found on the Peloritani, in some slopes of Etna, in the area of Enna, on the Sicani and rarely on the Madonie. Greater remark is given, within oak woods, by the formation of Turkey oak, as *Quercus cerris* and *Quercus gussonei*. Even if present on the major mountain ranges of the Island, they represent spread expressions of great forest and landscape interest only on the Nebrodi Mountains. Authentic Turkey oak woods are found especially along the basin of Flascio, in the territories of Randazzo and Capizzi, and furthermore in the areas of Cesarò, San Fratello, Caronia and Mistretta. They seep up siliceous, clayey and compact grounds, and they are coppice, at present exploited. Moreover, there are some expressions of coppice, particularly in the area of Randazzo. Structure and floristic composition itself vary according to their governing form. The

arboreous stratum consists almost exclusively of Turkey oak, at times of *Malus sylvestris,* and of maple. The shrubby stratum, besides *Prunus spinosa*, consists of *Euphorbia characias*, *Ruscus aculeatus*, *Crataegus monogyna, Daphne laureola* and at times *Ilex aquifolium*. The herbaceous stratum is of very different qualities and includes, besides *Anemone apennina*, present also in beechwoods, *Allium pendulinum*, *Viola reichembachiana* and *Viola alba* subsp. *dehnhardtii*, *Cyclamen hederifolium*, *Cyclamen repandum, Geranium striatum*, *Luzula campestris*, *Ranunculus lanuginosus*, *Ranunculus velutinus*, *Anchusa cretica*, etc. A significant presence is represented by some orchids as *Dactylorhiza romana* and *Orchis sambucina* and also by Nebrodi's endemic *Genista aristata*. Remarkable is the epiphytism, especially of lichens, and the presence of macromycetes.

Prevailingly chestnut woods – Among deciduous formations chestnut woods are to be mentioned. In Sicily this species spreads in woody formation in the hilly and submontane areas of Etna, Peloritani, Caronie and Madonie. Yet, more or less substantial nuclei can be found where environmental conditions allow their settlement as in the area of Enna, of Caltanissetta and in the northern slopes of the Sicani, in Ficuzza, starting from 600 m of altitude. We're dealing with populations still economically important even though largely suffering of two harmful phytopathies that are threatening their existence. Generally their presence is located in the altimetrical space occupied by mesophyle ilex groves and by decidous oak groves. The floristic retinue is due to the abovementioned formations. On Etna, the arboreous stratum of the famous chestnut woods of the San Giacomo valley, near Zafferana Etnea, presents *Quercus pubescens*, Turkey oak, maple and *Ostrya carpinifolia*; the shrubby component is of poor incidence. Yet, worth of mention are the arboreous heather, *Euphorbia characias*, villous cistus, *Fraxinus ornus* and *Quercus ilex*, *Prunus spinosa*, *Crataegus oxyacantha*, *Rosa canina*, *Sorbus domestica*, *Osyris alba*, *Daphne laureola*, *Pyrus amygdaliformis* and at times *Mespilus germanica*. Lianas are quite frequent and among these C*lematis vitalba*, *Tamus communis*, *Hedera helix* and *Lonicera etrusca*.

The same takes place on the Peloritani and Nebrodi. On the contrary, on the Madonie the chestnut wood in the arboreous stratum welcomes also the ilex, manna ash and at times even cork trees. The herbaceous stratum presents a remarkable qualitative differentiation; as a matter of fact, on the Madonie alone, more than 120 species have been catalogued. Very frequent are *Brachypodium sylvaticum*, *silky fern, Geum urbanum*, viola, *Sanguisorba minor*, *Calamintha nepeta*, *Geranium robertianum*, *Tamus communis*, Mediterraneum sedge, moniliform bluegrass, *Vinca major*, *Silene vulgaris* subsp. *vulgaris*, *Achillea ligustica*, *Inula conyza*, *Anemone hortensis*, velvety ranunculus, *Agrimonia eupatoria*, and so on. Here too the cryptogamic component plays a very relevant role: about it, we can refer to macromycetes that are usually found throughout the chestnut wood, but especially to the intrusion of some pteridophytes as *Pteridium aquilinum*.

Durmast and holly woods – Among mixed submontane woods, an exclusive aspect of the Madonie is the formation characterized by *Quercus petraea* subsp. *austrotyrrhenica* and holly. It is a peculiar forest today located only in the area of Bosco Pomieri, Piano Farina and Piano Costantino, in the territory of Petralia Sottana. We are dealing with a phytocoenosis showing facies alternately dominated by durmast and holly, according to its utilization. Notwithstanding its original extension, today largely interrupted, on the basis of

existing remains, it is possible to re-establish the ancient area of influence that would involve a large part of the oriental portion of the Madonie, only in the altitudinal space frequently covered by fog (1,100-1,500 m. above sea level), and particularly the quartzarenite lands of the territories of Castelbuono, Petralie and Geraci Siculo. Remarkable forest expression, besides the ones already mentioned, are the copse of Stretto Canna and the northern slopes of Mt. Antenna Piccola where durmast is replaced by Scotch elm and in which we discover an important presence of *Crataegus laciniata* and *Acer pseudoplatanus*. This present context, at last, includes also the population of monumental holly of Piano Pomo. The arboreous stratum of this formation welcomes, besides the above-mentioned species, other elements as, not commonly, even the ilex and the beech itself, but the most faithful are *Sorbus torminalis*, crab apple, *Acer campestre* and *Rhamnus catharticus*. Closer to this formation, more than to the beechwood, is *Abies nebrodensis*, for whose population the potential space allotted to durmast and holly wood should be particularly considered.

The shrubby stratum houses young specimens of arboreous species and various other elements as P*runus spinosa*, *Euphorbia amygdaloides* subsp. *arbuscula*), *Ruscus aculeatus*, *Crataegus oxyacantha* and some species of *Rosa*; luxuriant is *Daphne laureola*. The herbaceous and the mossy contingent of the coppice wood is rich. To the first belong *Primula acaulis*, *Aquilegia vulgaris*, *Ranunculus lanuginosus*, *Allium pendulinum*, *Gussone's bugle*, *Geranium striatum* and, here too, *Dactylorhiza romana*, *Orchis sambucina*; very frequent are lianas, especially *Clematis vitalba* and *Hedera helix*.

Among bryophytes there are sphagna, mosses of acidophilic humid places, not present in large tracts of the Mediterranean Sea and in Sicily, and present only through this expression of vegetation of the Madonie Mountains.

Holly mosaics joined by other evergreen elements as *Taxus baccata*, *Daphne laureola*, *Ruscus aculeatus* and ivy, common on Nebrodi, inside formations of deciduous montane broad-leaves, have a relict character witnessing the presence of such forest formations on Mediterranean mountains during Pleistocene.

Beechwoods – This formations exclusively refer to the montane deciduous wood. It is known that this species in Sicily occupies rather southern stations for the central-european feature of its distribution range. Being a demanding species from a climatic point of view, it is natural for it to occupy a mountain area ranging from 1,100 to 2,200 m. Thus, it is found on major mountain systems of the Island and particularly on Nebrodi, Madonie, Etna, in Bosco di Malabotta (Peloritani), in Bosco della Giumenta and on Mt. Sambughetti (Enna).

In order to explain the phytocoenosis characters of this deciduous wood, we must specify that the ancient continuity of its populations is today largely interrupted if we compare it to last century's situation and this is due to the irrational use during the years preceding the First World War. Yet, their highest expression and diffusion take place in the territory of the Nebrodi mountains, where the most appropriate edaphic and climatic conditions together with a greater vocation for the area and a deeper forest tradition of populations give them, still today, a leading position in the general picture of the region's forest covering. Nebrodi's beechwood, but few exceptions, develop on siliceous-argillaceous substrata, quite cool and with great capacity of water retention which, especially in summertime is, in Sicily, the strongest limit to beech survival. They occupy about 12,000 hectares, that is 80% of the relevant Region's surface. Their most frequent character is decidous, with a dense arboreous

cover made up, almost exclusively, of beech-wood. With it, fragmentarily, appear maple and even yew trees and holly. The latest, together with laurel and at times yew and *Sorbus aria*, is most frequently found in the shrubby stratum. Coppice wood includes also a herbaceous stratum and, only in exceptional circumstances, a moss stratum since the soil usually covered with a thick bedstead does not allow bryophytes to have a firm support; they, together with lichens, find better shelter in tree stumps and on tree trunks. The herbaceous stratum, except for open woods with sparse trees, is generally made up of few species. Besides *Galium odoratum*, *Ranunculus lanuginosus*, *Lamium flexuosum*, *Myosotis sylvatica* subsp. *elongata*, *Corydalis solida* and anemone, there are *Scilla bifolia*, *Poa nemoralis* and, in nitriphilous conditions, *Milium vernale*, *Anthriscus sylvestris*, *Smyrnium perfoliatum*, *Allium ursinum* and *Doronicum orientale*. *Quercus cerris*, too, participates in the setting of Nebrodi's beechwoods, in the lower and more thermophile horizon, and it sometimes settles into the beechwood by means of proper nuclei, thus breaking continuity.

Bosco Mangialaviti, located in the territory of Longi, according to literature used to welcome also *Acer platanoides*, today disappeared among Sicilian forest flora.

On the Madonie Mountains beechwood distribution is more fragmented. Beechwoods cover about 2,000 hectares and settle, most of all, on calcareous substrata since more permeable; their altitudinal range extends from 1,400 m to 2,000 m. From a floristic point of view, the situation resembles Nebrodi's beechwoods one, even though more degraded. In the formations of the Madonie, the herbaceous stratum includes *Orthilia secunda*, *Monotropa hypopitys*) and *Neottia nidus-avis*. In some silicious stations, as on the slopes of Mt. San Salvatore, the arboreous stratum sees the participation of durmast and, in rather atypical conditions, of Nebrodi's relict fir. These are exclusively coppice that, but few exceptions, present wide interruptions.

On Mt. Etna the beechwood covers a rather modest surface compared to the one altogether occupied in Sicily. It is obviously a different condition from other beechwoods due to the uniformity of substratum which is solely volcanic. In such conditions, not too frequent for the species and almost exclusive in all its range, beechwods of Etna represent a remarkable ecologic importance. The floristic composition of these formations, as for the others, is undoubtedly less various. In the arboreous stratum is, at time, also *Pinus nigra,* which generally occupies autonomous space, and in some spaces even the endemic *Betula aetnensis*. The Peloritani too host beech-wood but in a rather confined way. The only consortium of such species is located in the Bosco di Malabotta, territory of Montalbano Elicona.

Pinus nigra woods – Natural woods of *Pinus nigra* subsp. *calabrica* are found solely on Etna, in altitudes ranging from 1,000 to 1,800 m. The greatest expressions are those forming the forest of Linguaglossa. This wood presents a reduced floristic diversity and seems often a simple population of pinetrees with almost inexistent shrubby and herbaceous strata. Yet, there are cases in which the arboreous stratum of the pinetree is associated with *Quercus pubescens* s. l., with beech, with *Populus tremula,* or the endemic *Betula aetnensis*. Sometimes the shrubby stratum presents Etna's local *Genista aetnensis* or *Adenocarpus complicatus* subsp. *complicatus* and, at higher altitudes, the endemic *Astracantha sicula*.

Vegetation of streams – Natural types of forest vegetation include, at last, woody expressions due to the presence of high humidity rate in soil and not to climate. They are located

by watercourses and particularly along riversides or on adjacent flat spaces invaded by water during floods. These are the so-called "ripisilve" actually confined to thin belts discontinuously growing along the shores. This special type of forest vegetation is best expressed by some species as *Salix alba*, *S. purpurea*, *S. pedicellata*, *S. gussonei*, *Populus alba*, *P. canescens*, *P. nigra* and in eastern Sicily also of *Platanus orientalis*. The picture is completed by some arboreous species as *Ulmus canescens* and other hybridforms of the same genre, *Fraxinus angustifolia* subsp. *angustifolia*, *Tamarix* sp. pl. and *Alnus cordata*. Among other shrubs, especially along rivers, there is *Nerium oleander*. Brambles and lianas as *Tamus communis, Clematis vitalba* and *Hedera helix*. Moreover, remarkable is the herbaceous component that counts besides *Carex pendula*, also *Mentha aquatica*, *M. suaveolens*, *M. longifolia*, *Apium nodiflorum*, *Eupatorium cannabinum*, *Pulicaria dysenterica*, *Plantago major*, reeds, some aquatic species of *Ranunculus* and *Polygonum*, S*olanum dulcamara*, *Saponaria officinalis*, canes, *Iris pseudacorus* and once maybe even *Cyperus papyrus*.

Floristic features

Within the Mediterranean floristic Region, Sicily lies in the Ligurian Tyrrhenian Province (Fenaroli & Giacomini 1958). The Sicilian District includes the islets and the major isle territory and is divided into two sectors: the Sicilian (Sicily isle, Ustica islet, the Aeolian Isles to the North and the Egadi Isles to the West) and the Pelagic-Maltese ones (Pantelleria, the Pelagie Isles and .the Maltese Isles). (1) In the Mediterranean basin, its whole territory and flora are among the best surveyed in the world (Raimondo 1988). Since the XVIII century, the Sicilian plant patrimony has indeed been investigated by eminent botanists such as B. d'Ucria, A. Bivona-Bernardi, C. S. Rafinesque, C. Presl, F. Parlatore, G. Gussone, G. Strobl and M. Lojacono Pojero.

Compared to its latitude, comprised between 35° and 39° North, the flora's biological spectrum shows similar characteristics to milder regions. The percentages of Therophytes and hemicryptophytes are below 38% and around 29% (Di Martino & Raimondo 1979), respectively. Phanerophytes and chamephytes are in sequence around 10 and 9 %, therefore reaching considerable figures.

A widespread orography, sometimes above 1000 m a.s.l and even rising to over 3000 m altitude (Etna Mount), can be at the basis of such vegetation data.

From the bio-geographic point of view, the Mediterranean, the Palaeo-temperate and the Iranian-Turanian contingents have a marked effect on the flora; while the northern chorologic components, resulting from both the Mediterranean glacial expansion, dating back to the Early Quaternary, and the mountainous habitat incidence, which influences the present phyto-climatic diversity, are significant.

With a percentage exceeding 10%, endemic occurrence concentrates both along the Sicilian coasts and in the islets, as well as on the volcanic and carbonaceous mountain systems stretching in the eastern and western sectors of the Isle. Among the endemics, there are also included taxa with a dotted distribution and, occasionally, some entities whose occur-

1) Brullo & al.(1995) propose a different phyto-geographic partition of the Sicilian floristic territory, which is raised to "dominion". Such unity includes a series of districts, gathered in sub-sectors referred in turn to two sectors: the Eusiculian and the pelagic ones.

rence in Sicily is recorded either by eighteenth century literature or herbarium data. This is the weakest part of the regional plant patrimony. Being sometimes scanty, the populations of some species are under the threat of a marked reduction and, even, at extinction risk. On the basis of herbarium, literature and field data over 25% of the vascular flora is considered at risk, being the relevant habitats strongly reduced under the increasing anthropic pressure. The threatened taxa, which are mostly endemic, belong to more than 350 genera included in about 100 families. Among them, the most represented are: Asteraceae, Fabaceae, Plumbaginaceae, Liliaceae, Brassicaceae, Gramineae and Caryophyllaceae. The following species are considered at risk: *Abies nebrodensis, Allium agrigentinum, Anthemis ismelia, Astragalus raphaelis, Barbarea sicula, Brassica macrocarpa, Buglossoides minima, Carex panormitana, Cytisus aeolicus, Diplotaxis scaposa, Erica sicula, Galium litorale, Hieracium cophanense, Hieracium lucidum, Limonium intermedium, Limonium todaroanum, Petagnaea gussonei, Peucedanum nebrodense, Plantago peloritana, Pseudoscabiosa limonifolia, Rhamnus lojaconoi, Scilla cupanii, S. dimartinoi, S. sicula, S. hughii, Sedum aetnense, Silene hicesiae, Stipa sicula, Suaeda pelagica* e *Verbascum siculum* (2).

Taking into account the aims of the present contribution, all the circum-Sicilian islets are remarkable from the floristic point of view; in the major isle, both the northern coast, comprised between Cefalù and Trapani, and the southern coastline, between Licata (Agrigento Province) and Taormina (Messina Province) are highly interesting. The major mountainous systems, particularly the Etna, the Madonie, the Nebrodi and the Sicani, are not less interesting. These territories are therefore comprised into the protected areas system (reserves and nature parks) instituted by Sicily Region.

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2)Other taxa should be included in this list. Among them the following ones are worthy mentioning: *Campanula marcenoi*, *Genista madoniensis, G. demarcoi, Limonium optimae, Viola tineorum, Viola ucriana* e *Zelkova sicula*, as well as the new taxa described in this volume.