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The vascular flora of Conero Regional Nature Park (Marche, Central Italy)

To Aldo J. B. Brilli-Cattarini, eminent botanist and expert researcher on the Marche region flora and par- ticularly on the Conero flora. He was the founder of the "Centro Ricerche Floristiche Marche" of Pesaro and Urbino Province. He has been a master for all of us even in the preparation of this work, with great gene rosity, he offered us his unique experience with enthusiasm.

Abstract

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It is presented the vascular flora of Conero Regional Park. The paper starts with a brief presentation of the park territory (geography, geomorphology and bioclimate) that arises in the central Adriatic side of the Italian peninsula. The vegetation is briefly described thanks to the detailed phytosociological analysis carried out in the territory and to detailed maps on different scales. The description of vegetation allows indicating, for most of the species listed, their participation in the plant communities present in the area.
The floristic list comprises 1169 entities, of specific and sub specific levels, that belong to 101 families and 507 genera. It also includes 64 species currently disappeared or not recently found in the study area, indicated by NP acronym (not present). The life form spectrum of the flora highlines the prevalence of terophytes (37.8%) and hemicryptophytes (31.10%). These are followed by geophytes (11.9%) and phanerophytes (10.6%). The chorological spectrum highlines the prevalence of Mediterranenan species among which the Eurimediterranean are very frequent (26%) but also the Stenomediterraneans form a considerable contingent (13%), confirming that the area is on the northern limit of diffusion of Mediterranenan macrobioclime in the Italian Adriatic side. The total value of Euroasiatic species is very high (29%) and they are linked to the paleogeographyc history of Italian peninsula flora. Moreover, the presence of a large number of species having a wide diffusion is significant (12%) because they testify the high anthropization of Park areas where there are towns, touristic structures and large cultivated zones. The elevate presence of non-native species (9,5%) is linked to this condition of strong anthropization even if they are represented by a percentage value that is lower than in the rest of Marche (12,57%) and of Italy (13,4%).
In the territory of the Park, Natura 2000 network includes three Sites of Community Importance (SCI) and one Special Protected Area (SPA); overall 18 habitats of Community interest have been recognized, 7 of which are "priority". The only species indicated in Annex II of Habitats Directive and present in Conero Park is *Himantoglossum adriaticum* that currently is known only in one locality for Conero Park while as regards Annex V, the only species included is *Ruscus aculeatus*, common in the forests of the area.

Finally, a survey of the threatened species having a high extinction risk at the regional level, mainly because of the transformations of habitats such as psammophilous and hygrophilous species, is carried out.

Key words: Plant biodiversity, Geobotany, Central Italy, Exotic plants, Vegetation, Conservation.

Introduction

The aim of the paper is to present and comment up on the list of the vascular entities found in the area belonging to the Regional Nature Park of Conero. The protected area is situated in the central-eastern part of the Italian peninsula where it covers an area of about 6,000 hectares (Fig. 1). The protected area extends in a north-south direction for a distance of about 20 kilometres, reaching a maximum width corresponding to Conero Mountain (about 7 kilometres) and narrowing towards its northern extremity.

The wide floristic and biocoenotic diversity which characterises the area is determined by its central position with respect to the basin of the Adriatic Sea, by the height of the Conero promontory (Fig. 1), which with its height of 572 metres greatly surpasses the average of the Italian Adriatic coast, and by the diversity of the geological, geomorphological and climatic conditions of the territory enclosed by the Nature Park (Brilli-Cattarini 1967; Biondi 1986).

The agricultural, timbering and shepherding activities that were very developed in the past have contributed in part to the increase in the biodiversity of the territory, determining a high diversification of the plant landscape and favouring the development of ecotonal areas. The abandonment of the agricultural activities in large areas that followed, and of the timbering and shepherding activities in almost all of the territory, has determined the development of the natural dynamic processes of the recovery of vegetation.

Geology and geomorphology

Structurally, the area is composed of a dome-shaped anticline, with numerous faults of Appenine-antiAppenine orientation, attributable to different tectonic phases (the Pliocene, Pliopleistocene, Pleistocene phases). The outcrops belong to the Umbria/Marche series Formations from the Cretaceous to the Pliocene (Coltorti & al. 1991; Coccioni & al. 1994). For the Park's territory a detailed geo-lithological map on a scale of 1:20,000 has been carried out (Coccioni & al. 1997).

In the Park area, four main geographical/morphological zones can be individuated (Cello & Coppola 1983; Montanari & Sandroni 1995) (Fig. 2).

The first of these is represented by the coastal belt that appears very indented with little bays, and is composed of various lithological and structural typologies. In particular, between Ancona and Portonovo and between Sirolo and Numana the coastal cliffs are of the marly-arenaceous type, of the formations of Schlier, while between Portonovo and the Sassi Neri they are calcareous with the lithotypes of Maiolica and of the Scaglia Bianca and Rosata. South of Numana, the coast is instead low-lying, of the sedimentary type.

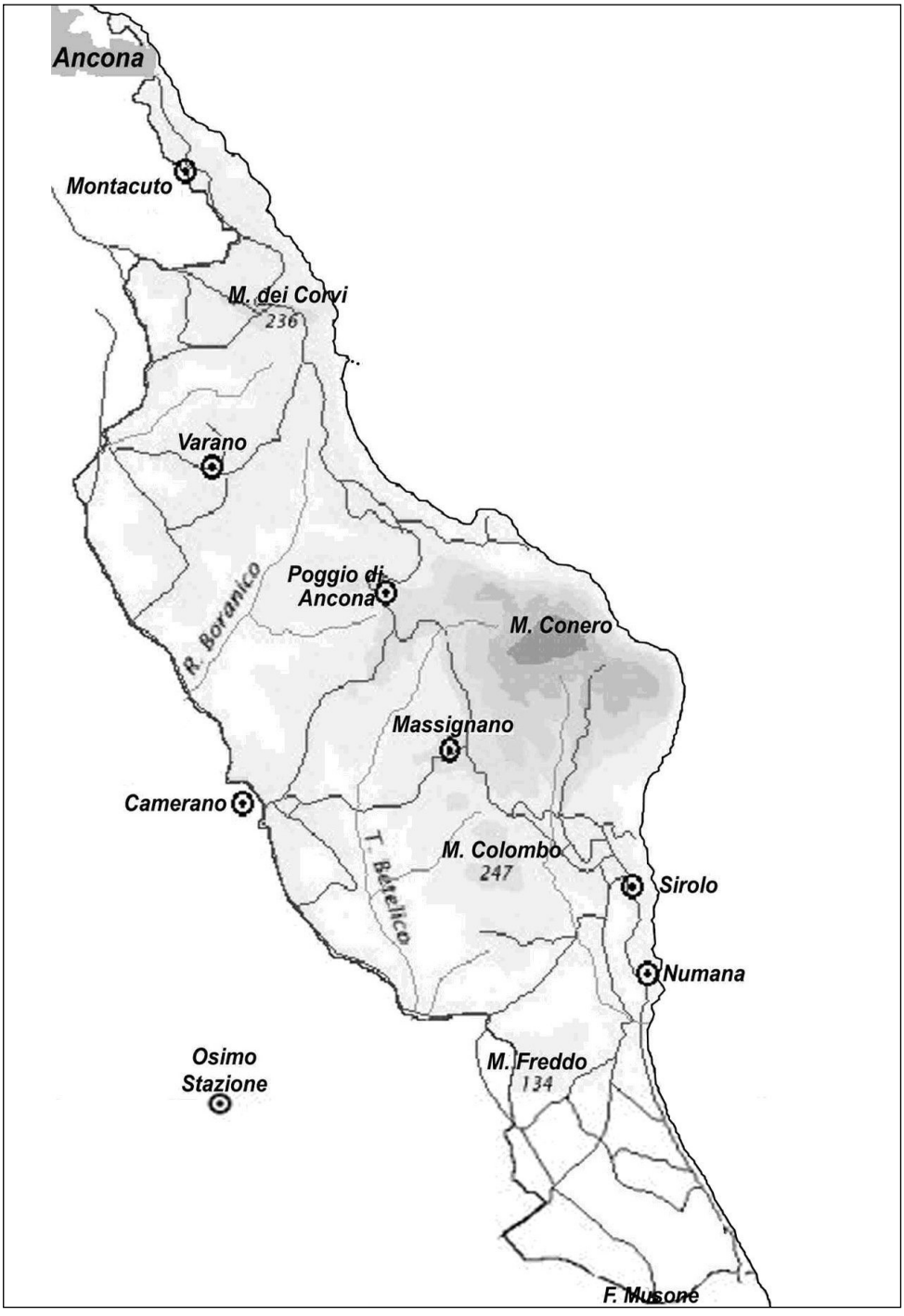

Fig. 1. Map of Conero Nature Park with the main resorts of the protected area and of neighboring zones.

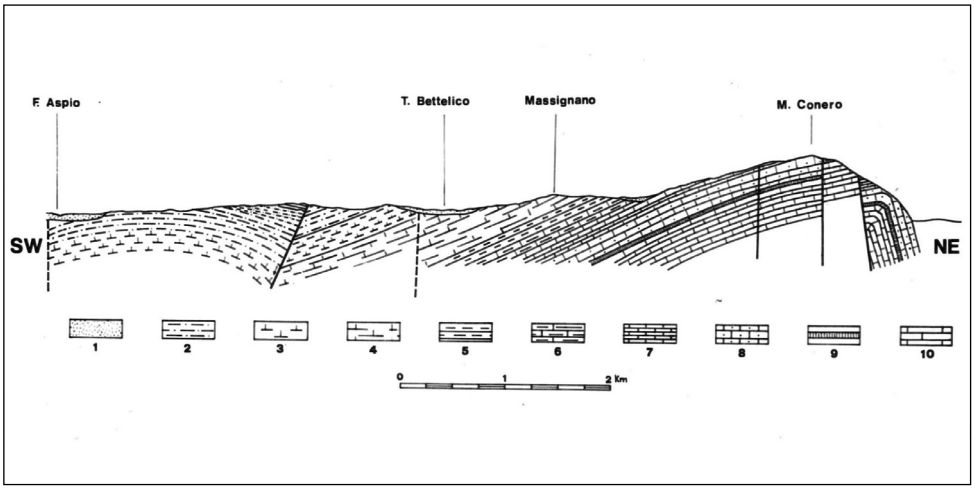

Fig. 2. Geological cross-section of the Conero Mountain area: (redrawn from Cello & Coppola 1983). 1: Alluvium, 2: Marl and sand, 3: Colombacci marl, 4: Schlier, 5: Bisciaro, 6: Scaglia Cinerea, 7: Scaglia Rosata, 8: Scaglia Bianca, 9: Fucoid marls, 10: Maiolica.

The second zone consists of a hilly inland area where the pelitic-arenaceous and marly deposits from the Miocene-Pliocene age are exposed. The lithological substratum of the hills mainly comprises very fine deposits: pelites of the plio-Pleistocene rich in argillaceous minerals interspersed with pelitic-arenaceous, arenaceous-pelitic and sandy-conglomerate bodies. The main peaks are: Massignano (268 metres), Mount Zoia (262 metres), Mount Larciano (236 metres) and Mount Colombo (253 metres).

The third zone comprises Conero Mountain, characterised by calcareous rocks with a complex pattern of folds and fractures. This massif is of a large ellipsoid shape, with an asymmetric structure: indeed, the sea aspects are very steep, almost vertical, while on the western side they are rounded.

Finally, the fourth zone comprises the plains constituted by pebble and pebble-sand alluvial deposits, and by lenticular formations of various extents of fine silt-sand and silt-clay deposits of a few metres in depth (Nanni 1997; Calandra & Leccese 2007).

In the Park territory there are few water courses, which are mainly seasonal in character. Other hydrographic elements of relevant environmental interest are “Lago Grande” (Big Lake) and “Lago Profondo” (Deep Lake), two small brackish waters in the Portonovo area.

Bioclimatology

On the basis of the bioclimatic indices of Rivas-Martinez & al. (1999), the Conero territory belongs to the Mediterranean macrobioclimate, with an oceanic pluviseasonal bioclimate, upper mesoMediterranean thermotype, the low subhumid ombrotype (Fig. 3). It is anyway evident that the vegetation is influenced above all by meso and micro climatic conditions, linked to the geomorphological characteristics of the locations.

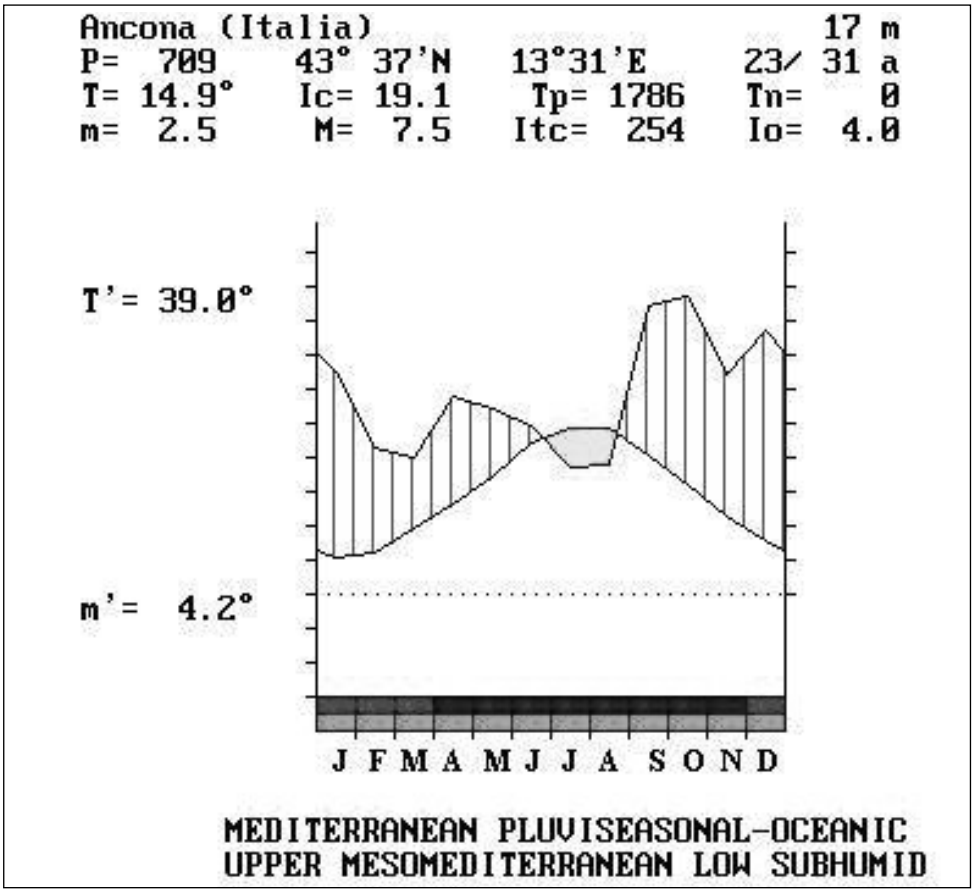

Fig. 3. Bioclimatic diagram and classification.

Vegetation chraracteristics of the Conero Nature Park

The Regional Nature Park of Conero has been object of various vegetational researches on the phytosociological point of view following the syndynamic and geosyndynamic method (Allegrezza & al. 1997; Biondi 1986, 1989, 2008; Biondi & al. 2001, 2002a, 2002b; Pesaresi & al. 2007; Biondi 2011; Pott 2011; Lancioni & Taffetani 2012). Moreover, a phytosociological map on a scale of 1:10,000 has been realized; it is available in digital form on the website of Marche Region (www.regione.marche.it) and of the Botanic Garden of Marche Polytechnic University one (www.ortobotanico.univpm.it/cartografia).

On the basis of the results of these researches, a brief list of the plant communities found (associations) is presented. For each association the basic characteristics are indicated with the addition of a reference acronym that is also associated to the most significant or rarest species, in order to make a correlation with those communities to which these species are mainly linked.

Woodlands

Holm oak woods

Cyclamino hederifolii-Quercetum ilicis Biondi, Casavecchia & Gigante 2003 subass. *cyclaminetosum hederifolii* Biondi, Casavecchia & Gigante 2003 (Ch-Qi)

It concerns a thermophilous holm oak wood, with prevalence of evergreen species, mainly distributed in the Adriatic coast of the Italian peninsula. In the Conero Park area, the association is largely distributed in the warm south-exposed side of the mountain and in less steep zones of the northern side, in localities protected by cold bora winds. In the tree layer, besides *Quercus ilex, Fraxinus ornus, Phillyrea media* and *Arbutus unedo* can be found.

Cephalanthero longifoliae-Quercetum ilicis Biondi & Venanzoni ex Biondi, Gigante, Pignatelli & Venanzoni 2002 subass. *lathyretosum veneti* Biondi, Casavecchia & Gigante 2003 (Cl-Qi)

The association deals with dense, mesophilous holm oak woods, mixed with evergreen sclerophyllous plants and decidous plants mainly represented by *Ostrya carpinifolia*, *Acer opalus* subsp. *obtusatum* and *Fraxinus ornus*.

These woodlands develop along the northern sides of Mount Conero, exposed to the sea, reaching the area where it changes rapidly the exposition. Some patches of these woodlands are present in the south exposed side too, in cool conditions, within narrow valleys. In the same association it has been identified a *Laurus nobilis* variant, present in the area beneath the ancient San Pietro Monastery, that is considered as corresponding to an hygrophilous aspect of the wood particularly linked to the humidity of the area.

White Oak woods

Roso sempervirentis-Quercetum virgilianae Biondi 1986 corr. Biondi & al. 2010 subass. *quercetosum virgilianae* (Rs-Qv) (=*Roso sempervirentis-Quercetum pubescentis* Biondi 1986 subass. *quercetosum pubescentis* Allegrezza & al. 2002; Biondi & al. 2010).

Roso sempervirentis-Quercetum virgilianae association is referred to thermophilous woodlands of *Quercus virgiliana* rich in Mediterranean underwood species, largely distributed in the central part of the Italian peninsula, both on the Adriatic and Thyrrenian coasts. In the Park territory, the main patches of this wood are localized on eastern and south-easterns sides of narrow valleys. In inner hilly areas and along the slopes of Mount Conero they are present as linear formations, following the stream course where they occupy higher and more drained parts.

European hop Hornbean woods

Asparago acutifolii-Ostryetum carpinifoliae Biondi 1986 (Aa-Oc)

This is a mixed thermophilous wood, dominated by *Ostrya carpinifolia* where *Fraxinus ornus* and *Acer opalus* subsp. *obtusatum* are frequent, sometimes with *Quercus ilex*.

In the Conero Park territory, European hop hornbean woods develop both along hilly sides of the Schlier formation, where are reduced in little patches, sometimes in narrow valleys along the northern side and along the steeper sides of Mounts Larciano and Colombo that are not used for agricultural cultivations. Two important patches of relevant extension are present along the sides of the calcareous massif of Conero.

Scutellario columnae-Ostryetum carpinifoliae Pedrotti, Ballelli & Biondi ex Pedrotti, Ballelli, Biondi, Cortini & Orsomando 1980 subass. *violetosum reichenbachianae* Allegrezza 2003 (Sc-Oc)
Mesophilous European hop hornbean woods with *Quercus pubescens*, *Fraxinus ornus* and *Acer opalus* subsp. *obtusatum* distributed in the Apennine areas. The little mesophilous *Ostrya carpinifolia* wood located in the most elevated area of Mount Conero, exposed to north-east, belongs to this syntaxon. It is characterized by the presence of mesophilous species such as: *Sorbus aria, Ilex aquifolium, Scilla bifolia*, *Mercurialis perennis*, *Ruscus hypoglossum*, *Crataegus laevigata* and *Lonicera etrusca*.

English Elm woods
Symphyto bulbosi-Ulmetum minoris Biondi & Allegrezza 1996 (Sb-Um)
The association is referred to meso-hygrophilous wood patches, well structured, dominated by English Elm and sometimes laurel, limited to small areas localized in impluvium zones of the northern part of the Park that open as a funnel toward the cliff. These are also present in the southern part of the Park, in the alluvian plain of River Musone, where they remain flooded for most part of winter until the following spring.

Raywood ash and Reno reed woods
Rubio peregrinae-Fraxinetum oxycarpae (Pedrotti & Gafta 1992) Biondi & Allegrezza 2004 var. with *Arundo pliniana* (Rp-Fo)
Mesohygrophilous woods characterized by the contemporary presence of mesophilous species as *Carex pendula*, *Symphytum tuberosum*, *Fraxinus oxycarpa*, *Ranunculus ficaria* and species typical of Mediterranean woods as *Rosa sempervirens*, *Ruscus aculeatus*, *Asparagus acutifolius*, *Rubia peregrina*, *Rhamnus alaternus*, *Viburnum tinus* and *Quercus ilex*.
These coenoses develop on higher alluvial terraces, not reached by esondation waters, a part in extraordinary cases, with a very superficial water table.
In the Park territory the association is represented by a small and well conserved wood in a canyon along the cliff of San Michele between Sassi Neri and San Michele.

Riparian woods
Riparian woods form a mosaic of communities that distributed, mainly with a linear structure, in relation to the distance from the water course and the river water flow. Riparian woods are seriously threatened by the expansion of *Robinia pseudacacia*, a northAmerican plant highly invasive.

Rubo ulmifolii-Salicetum albae Allegrezza, Biondi & Felici 2006 (Ru-Sa) Mediterranean and hygrophilous woods of white willow with a linear development localised in areas near the water flow, with soils flooded for the most part of the year. These are found in the south-western areas of the Park.

Salici albae-Populetum nigrae (Tx. 1931) Meyer-Drees 1936 (Sa-Pn)
Black poplar woods, with a linear structure too, developing on terraces slightly more elevated in comparison to the ones where willows are present, and only occasionally they are

reached by river flood. Fragments of these woods are found along ditches on the various sides of Mount Conero and on the surrounding hills.

Populetum albae Br.-Bl. 1931 (Pa)
Linear woods formations developing on higher alluvial terraces along water flows sometimes reached by river flood, characterized by *Populus alba* and *Populus nigra* in the tree layer and by several species linked to humid areas in the shrub and herb layers.

Thickets, wood mantles and shrublands

Euphorbia dendroides and *Emerus major subsp. emeroides* thicket with *Ampelodesmos mauritanicus Coronillo emeroidis-Euphorbietum dendroidis* Géhu & Biondi 1977 subass. *ampelodesdetosum mauritanici* Biondi & al. 2002 (Ce-Ed)
Thermophilous thicket developing on steep sides, formed by rocks and compact calcareous debris, in areas near the sea. It was found only in Valle delle Vellare close to Due Sorelle rocks.

Shrub vegetation with *Ampelodesmos mauritanicus* and *Coronilla valentina*
Coronillo valentinae-Ampelodesmetum mauritanici Biondi 1986 (Cv-Am)
It deals with thermophilous bushes in which *Ampelodesmos mauritanicus* and *Coronilla valentina* are dominant and develop on almost compact screes. In Mount Conero, two variants of this association can be found, these represent the transition toward more mature formations: the *Spartium junceum* variant develops in areas with deep soils whereas *Juniperus oxycedrus* variant occupies more superficial soils. The described shrublands are present along the eastern side of Mount Conero, beneath the coastal belt directly in touch with the sea aerosol.

Mixed shrublands with *Rhamnus alaternus* and *Emerus major* subsp. *emeroides*
Coronillo emeroidis-Rhamnetum alaterni Biondi, Bagella, Casavecchia & Pinzi 2002 (CeRa)
Mixed and dense shrublands dominated by *Rhamnus alaternus, Emerus major* subsp. *emeroides* and other bushes typical of the Mediterranean maquis. The association described for the Conero cliff (Biondi & al. 2002b) shows two different aspects with different ecology that are referred to two sub-associations:
loniceretosum etruscae Biondi, Bagella, Casavecchia & Pinzi 2002: it represents the meso-hygrophilous aspect of the association and develops on sandstone soils in the marly-arenaceous cliff. Because of this frequent and substantial erosive process occouring in this area of the cliff, these coenoses are not allowed to grow toward more mature formations.
viburnetosum tini Biondi, Bagella, Casavecchia & Pinzi 2002: it describes the more schiaphilous and meso-xerophilous aspects of the association developing on partially consolidated crees of the calcareous cliff along the south-eastern side of Mount Conero. In this association a *Fraxinus ornus* variant was also identified that represents a more advanced dynamic stadium that leads up to a thermophilous holm oak wood and forms the pre-woodland phase of *Cyclamino hederifolii-Quercetum ilicis* association.

Broom bushes
Spartio juncei-Cytisetum sessilifolii Biondi, Allegrezza & Guitain 1988 (Sj-Cs)
Bush formations of *Spartium junceum, Colutea arborescens* and *Osyris alba* that can constitute a forest mantle in touch with oak woods. *Spartio juncei-Cytisetum sessilifolii* shows two variants: the *Juniperus oxycedrus* xerophilous variant developing in compact and not deep soil whereas the *Spartium junceum* variant colonizes ex-cultivated areas occupying deeper and well structured soils. The association is largely distributed in hilly zones of the Park in the western side of Mount Conero.

Shrublands and wood mantles with *Cornus sanguinea*
Lonicero etruscae-Cornetum sanguineae Biondi, Bagella, Casavecchia & Pinzi 2002 (Le-Cs)
The association refers to thick shrublands developing in impluvium areas on clay substrates of the marly-arenaceous cliff of the northern coastal zones of the park, often in touch with remnant patches of elm woods of which they form mantles, at altitudes between 50 and 200 m a.s.l., on scarcely developed soils. It is present both in the hilly part of the Park and in the northern coastal part of Mount Conero and along the cliff north of Sirolo. The association also has a *Spartium junceum* variant that represents the development of the mantle forming the shrubland.

Reno reed shrublands
Arundinetum plinianae Biondi, Brugiapaglia, Allegrezza & Ballelli 1992 (Ap)
These are monospecific, thick formations dominated by *Arundo collina* that develop on marly-arenaceous substrates and on clays where often landslide slip occurs (Biondi & al. 1992). On areas characterized by a major stability, especially in large zones at the higher edge of the cliff, where there are suitable conditions for shrubs penetration, this plant community enriches in broom, creating predominantly shrub coenoses referred to the *Spartium junceum* variant. The association is largely diffused, especially in the coastal zone in the northern side of Mount Conero, but also along the south-eastern edges of the Park, along the Sassi Neri cliff.

Clematis vitalba and *Rubus ulmifolius* shrublands
Clematido-Rubetum ulmifolii Poldini 1980 (Cv-Ru)
These are shrublands particularly thick and often bramble monospecific or in association with Old man's beard (*Clematis vitalba*) that develop in small escarpments or along ditches that limit cultivated areas and that are inclined to invade abandoned fields. Actually, *Rubus ulmifolius* has a high colonizing ability and is inclined to create an obstacle to the normal vegetation dynamic. These are found in small patches in the hilly areas of the Park.

Giant cane and Old man's beard vegetation
Clematido vitalbae-Arundinetum donacis Biondi & Allegrezza 2004 (Cv-Ad)
This is a community dominated by the giant cane (*Arundo donax*), an exotic species having central-asian origin, that has been hugely cutivated in the area. Afterward, it is spreaded in the territory near streams where it forms vegetation structures that sometimes characterize the rural landscape of flat areas.

Garigue vegetation
Asperulo aristatae-Fumanetum thymifoliae Allegrezza, Biondi, Formica & Ballelli 1997 (Aa-Ft)
Garigues belonging to this association can be found in rocky areas of Mount Conero. The specific characteristic combination is formed by *Micromeria graeca*, *Fumana thymifolia, Pinus halepensis*, *Asperula aristata* subsp. *longiflora* and *Bituminaria bituminosa*.

Cephalaria leucantha and *Galium corrudifolium* community (C&G comm.)
Pioneer vegetation dominated by chamaephytes that colonises calcareous screes forming conoids under rocky walls in Valle delle Vellare.

Rocky vegetation
Halo-rupicolous vegetation
Crithmum maritimum and *Reichardia picroides* var. *maritima* Community (C&R comm.)
Vegetation of emerged cliffs, reached directly by marine aerosol and sometimes directly by waves.

Reichardio maritimae-Brassicetum robertianae Biondi 1982 (Rm-Br)
This kind of community is better structured than the former one; it deveops in rocky crevices of lightly more elevated calcareous walls, reached directly by marine aerosol and occasionally by waves.

Rocky vegetation not halophilous
Brassica montana and *Matthiola incana* Community (B&M comm.)
Chasmophytic vegetation characterized by *Brassica montana* (*B. oleracea* subsp. *robertiana*) and *Matthiola incana* that colonizes the most elevated sectors of rocky walls, reached by winds with low salt concentration. It is present both in the marly-arenaceous cliff and in the most elevated stretch of the calcareous cliff.

Grasslands
Convolvulo elegantissimi-Brometum erecti Biondi 1986 (Ce-Be)
Xeric grasslands characterized by the presence of a considerable mediterranean group of plants localized along the western side of Mount Conero and in the surrounding hills in areas where Scaglia substrates emerge.

Centaureo bracteatae-Brometum erecti Biondi, Ballelli, Allegrezza, Guitian & Taffetani 1986 (Cb-Be)
Grassland community dominated by *Bromopsis erecta* that takes origin by renaturation of abandoned fields and therefore it develops on quite deep soil. The association is a little diffused in the park territory, the unique patch relevant in size is localized in Pian dei Raggetti on Mount Conero.

Dauco carotae-Tussilaginetum farfarae Biondi, Brugiapaglia, Allegrezza & Ballelli 1992 (Dc-Tf) Pioneer vegetation that colonizes the marly-arenaceous cliff, in areas recently detached by landslides.

Senecio erucifolii-Inuletum viscosae Biondi & Allegrezza 1996 (Se-Iv)
Brachypodium rupestre variant
Post-tillage grassland dominated by *Brachypodium rupestre* that develops after the abandonment of agricultural activities.

Loto tenuis-Agropyretum repentis Biondi, Vagge, Baldoni & Taffetani 1997 (Lt-Ar)
Hygrophilous grasslands colonizing flat or lightly low areas near the sea. The dominant species are: *Elymus repens*, *Lotus tenuis*, and, for some aspects, *Phalaris coerulescens*. It is found only in the southern part of the Park, in the area surrounding the River Musone mouth.

Loto tenuis-Paspaletum paspaloidis Biondi, Casavecchia & Radetic 2002 (Lt-Pp)
Paucispecific coenose with an elevated coverage that develops in low and wet areas after the drying. It has been described for artificial wet areas locally called "guazzi" that are present south to River Musone mouth some kilometers far (Biondi & al. 2002c) and it has been found also in the park territory in an abandoned "guazzo".

Beaches vegetation
Salsolo kali-Cakiletum maritimae Costa & Mansanet 1981 (Sk-Cm)
Annual vegetation colonizing discontinous gravel-sand bars, behind the aphytoic zone. It is a paucispecific community highly specialized and dominated by *Cakile maritima* and *Salsola tragus* subsp. *pontica* (=*Salsola kali*) distributed on all the Mediterranean coasts and in the most part of eastern Europe.

Raphano maritimi-Glaucetum flavi Biondi & al. 1992 (Rm-Gf)
Vegetation that develops on the most elevated area of gravel dunes near the River Musone mouth.

Pholiuro-Spergularietum Pignatti 1953 (Pi-Sm)
Ephemeral coenose formed by small therophytes that develops on silty-marly substrates near the sea close to the Due Sorelle rocks (Biondi 1986). They are referred to this association described in the Venetian Lagoon (Pignatti 1953), even if these are quite impoverished in comparison to typical ones. The moss *Bryum bicolor* is very abundant and in some areas forms almost continuos coverings.

Marsh and lake vegetation
Scirpo-Phragmitetum W. Kock 1926 (Sm-Pc)
Marsh vegetation that surrounds ponds and sometimes river edges, it is formed mainly by Common reed (*Phragmites australis*) and by Sea clubrush (*Bolboschoenus maritimus*). It forms thick riverside populations that are almost monospecific in Portonovo ponds and in the final part of River Musone, at the southern limit of the Park.

Soncho maritimi-Cladietum marisci (Br.-Bl. & Bolos 1957) Cirujano 1980 (Sm-Cm)
Extremely rare association in the Marche Region, indeed it is known only in the Lago Grande of Portonovo whereas in the past it also colonized the neighboring Lago Profondo.

Potametum pectinati Cartensen 1955 (Pp)
Hydrophytic vegetation rooting in the bottom of backwaters, some centimeters to few metres deep. It tolerates quite elevated eutrophization levels and is present in both ponds of Portonovo, especially in Lago Profondo.

Charetum hispidae Corillion 1957 (Ch)
Submerged vegetation of shallow backwaters, dominated by *Chara hispida*, a green alga that develops near marsh vegetation, in high eutrophitic waters.

Ranunculetum baudotii Br.-Bl. in Br.-Bl., Roussine & Nègre 1952 (Rb)
Paucispecific community with a spring cycle, characterized by *Ranunculus peltatus* subsp. *baudotii*, with *Chara hispida*, *Typha latifolia* and *Alisma lanceolatum.*
The association develops in small artificial ponds or in ditches with backwaters or lighly fluent waters, in flat zones of the low course of River Musone and at its mouth (Biondi & al. 2002c).

Eleocharitetum palustris Schenn. 1919 (Ep)
Communities dominated by *Eleocharis palustris* form thick populations that colonize areas that, because of the high variability of water level, can not be invaded by big helophytic coenoses which require a major water availability all over the year.
The association is present in low zones and in channels and ditches edges, in the flat sector of the low course of River Musone.

Apietum nodiflori Br.-Bl. 1952 (An)
The association occupies the streams and ditches beds, in flat areas, with clear and well aerated waters. *Helosciadium nodiflorum* (*Apium nodiflorum*) is inclined to form thick populations that occupy the major part of water course. Just a few other species are found in these populations as *Veronica anagallis-aquatica, Ranunculus repens* and *Scirpoides holoschoenus*.

Junco-Caricetum extensae Br.-Bl. & Del. 1936 (Jm-Ce)
The coenose dominated by *Juncus maritimus* develops only on Lago Grande banks, near small dips often found in the area occupied by the association *Soncho-Cladietum marisci*.

Juncetum maritimi-acuti H-ic 1934 (Jm)
The coenoses referred to this association are only present in Lago Grande, in drier and more salted environments than the ones occupied by the coenoses previously described (Biondi 1986).

Weed vegetation
Biforo testiculatae-Adonidetum cupanianae Kropác 1982 (Bt-Ac)
This association is present in the fields of marly and marly-arenaceous hilly areas, in particular in autumn-spring sawn. It appears here very fragmented and impoverished because of massive herbicide treatments.

Aphano arvensis-Matricarietum chamomillae Tx. 1937 (Aa-Mc)
subass. *alopecuretosum myosuroidis* Oberd. 1957
This type of weed vegetation can be found in the fields of alluvial areas, on cool, silty, silty-clay rich in carbonates soils with a moderate to high alkaline reaction with high water table, in the River Musone alluvian plain.

Aveno barbatae-Brometum diandri Biondi & Baldoni 1991 (Ab-Bd)
Terophitic vegetation dominated by *Avena barbata* and *Bromus diandrus* with *Bromus madritensis* and *Hordeum murinum* subsp. *leporinum.* It is found along edges of farm and urban paths where the soil is disturbed and vegetation is periodically cut for the routine road maintenance.

Sinapietum albae Allegrezza, Ballelli & Biondi 1987 (Sa)
The coenoses attributed to this association are diffused near farms, along road edges and near organic depots; they are dominated by *Sinapis alba* subsp. *alba*, *Galium aparine* and other ruderal species.

Galio aparines-Smyrnietum olusatri Allegrezza, Ballelli & Biondi 1987 (Ga-So)
Sciaphilous and nitrophilous vegetation, present particularly in the underbrush and at the edges of artificial coniferous formations and on the top of the marly-arenaceous cliff.

The plant landscape of Conero Nature Park

The study of plant communities and of the dynamic relationsheeps between these allows the reconstitution of the vegetation series. From their integration, in relation to lithologic and bioclimatic characteristics, the environmental elements (or geosygmeta *sensu* Biondi (2011)) found in Conero Nature Park are described (Fig. 4). The plant landscape varies in relation to meso and microclimatic conditions, to geolithologic and pedologic nature of the substrate and to slopes morphology and micromorphology, that in a limited area like this one, interact on a complex way, causing the presence of highly differentiated environments. Based on these logics, which are used in the classification of the biogeographical regions (Rivas-Martinez 2005; Rivas-Martinez & al. 2004), the biogeographical classification of the entire Marche region was carried out. According to it, the Conero Park territory is part of the Mediterranean Region, Eastern Mediterranean Sub-region, Adriatic Province, Apulian Sub-province, Marche Sector (from Conero to River Tronto), Ancona subsector, coastal district, and mainly in the biogeographical jurisdiction defined as Monte Conero (Casavecchia & al. 2007).

The main vegetation series found in Conero Nature Park are listed below and classified according to bioclimatic belts (Biondi & al. 2010). Among these, it has been included the upper Thermomediterranean bioclimatic belt, which has not be detected through the bioclimate study but inferred on the basis of a particular community found in Valle delle Vellare consisting in the association *Coronillo emeroidis-Euphorbietum dendroidis ampelodesmetosum mauritanici*, characterized by *Euphorbia dendroides* thickets. Indeed, it is a mesobioclimate feature not found in real terms because of the limited area and

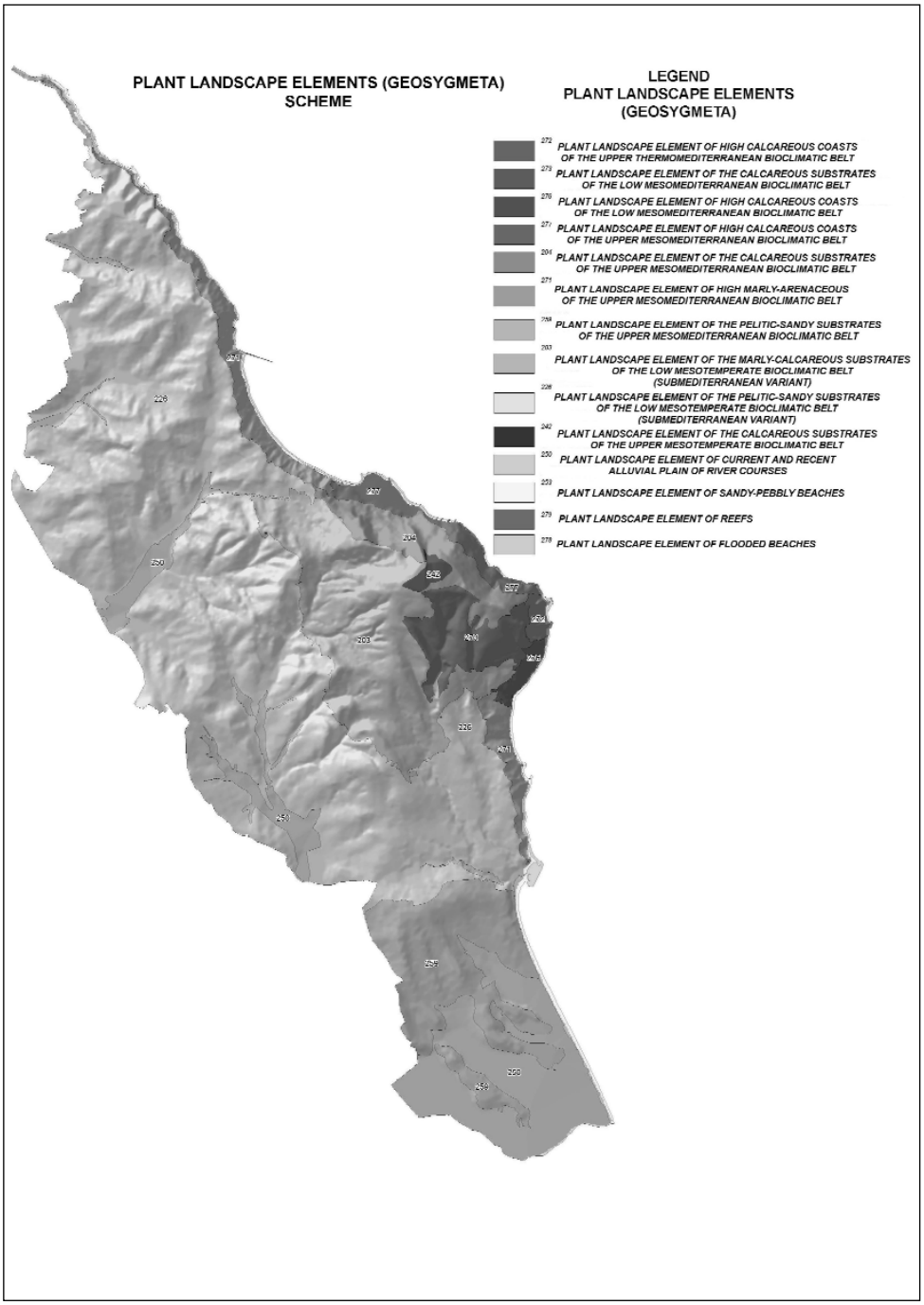

Fig. 4. Map of plant landscape elements of the Conero Nature Park. In total 14 plant landscape elements have been identified (www.regione.marche.it).

because of the lack of precise climate data for the area. It is therefore conceivable that the particular configuration of the valley and its exposure to south determined optimal conditions for the development of this vegetation that in this area reachs the northern limit of the distribution range for the Italian Adriatic coast, as it is for the Mediterranean macrobioclimate.

Both thermophilous and mesophilous holm oak woods, on the other hand, belong to the mesomediterranean bioclimatic belt: the first one to the lower bioclimatic horizont and the second to the upper one. Deciduous woods of the continental area of Mount Conero, represented by white oak woods and by European hop Hornbean oak woods, instead, belong to temperate macrobioclimate, even if in the submediterranean variant and in the lower mesotemperate bioclimatic belt. Turkey oak woods belong to the lower mesotemperate bioclimatic belt too, this typology of wood is not present in the Park area but, in analogy to data collected in the neighboring Selva di Castelfidardo, can be considered as potential on fields, currently used for agriculture.

The European hop Hornbean oak wood of the summit part of Mount Conero, starting from 300 m a.s.l. of the northern side exposed to the sea is referred to the association *Scutellario columnae-Ostryetum carpinifoliae* typical of Apennines, and belongs to the upper mesotemperate bioclimatic belt. This vegetation typology is connected to an edaphic and bioclimatic condition that, on the basis of its northern exposition, represents an enclave of authentic Apennine vegetation on the coast. Furthermore, the elm series is widely distributed in the Conero Nature Park, as the potentiality for elm woods regards the most part of the marly-arenaceous cliffs as well as the wet zones near ditches, whereas alluvial soils are referred to poplar and white willow wood series.
The symbol Σ means sygmetum.

Thermomediterranean bioclimatic belt
Coronillo emeroidis-Euphorbio dendroidis Σ *ampelodesmetosum mauritanici*
Mesomediterranean bioclimatic belt
Neutral basophilous series of holm oak: *Cyclamino hederifolii-Querco ilicis* Σ
Neutral basophilous series of holm oak: *Cephalanthero longifoliae-Querco ilicis* Σ
Mesotemperate bioclimatic belt submediterranean variant
Neutral basophilous series of European hop hornbean: *Asparago acutifolii-Ostryo carpinifoliae* Σ
Neutral basophilous series of white oak: *Roso sempervirentis-Querco virgilianae* Σ
Neutrophilous series of Turkey oak: *Lonicero xylostei-Querco cerris* Σ
Neutrophilous series of English elm: *Symphyto bulbosi-Ulmo minoris* Σ
Black poplar series: *Salici albae-Populo nigrae* Σ
Raywood ash series: *Rubio peregrinae-Fraxino oxycarpae* Σ
Mesotemperate bioclimatic belt
Neutral basophilous series of European hop hornbeam: *Scutellario columnae-Ostryo carpinifoliae* Σ

On the basis of the distribution range of the vegetation series of the Conero area, 14 plant landscape elements have been identified, of which the listed series represent the climatophilous aspects.

Floristic and geobotanical investigations of Conero Nature Park territory

The floristic investigation of Mount Conero probably begun in the X century with Camaldolesi monks who lived in the San Pietro Monastery; they were the first who collected plants of this area, but nothing remained of these ancient surveys. The first certain data back to the XIX century or the early XX century tanks to several botanists, among these Paolo Spadoni, author of "*Xilologia picena applicata alle arti*" (1826-1828), in this work, several trees and shrubs found in Mount Conero are indicated as, for example, Jupiter'sbeard (*Anthyllis barba-jovis*) that is not more present spontaneous in the area, whereas in the past it developed "*...sulle balze dei monti, e più ancora sulle ripe sassose prossime al mare*" where Spadoni himself asserted to found it in 1808 in "*quelle poste di mezzo tra Sirolo ed Ancona*". Regarding its presence in the Conero, there is an extraordinary proof at the Central Herbarium of the University of Florence, where a sample collected "*sul monte di Ancona, nel versante di levante*" by Filippo Narducci is conserved. Narducci himself reported to Antonio Bertoloni other important entities of the Conero flora as a contribution to "*Flora italica*" (1833-1854). The scientist that more than others devoted his studies to Mount Conero, in all its naturalistic aspects such as, animal populations, plant populations and fossils, was Luigi Paolucci, author of "*Flora marchigiana*" (1890-91). In this work and in the two following notes (Paolucci & Cardinali 1895, 1900) several species found on Mount Conero are indicated. In 1849 the German botanist Rabenhorst gave his contribution to musks and likens knowledge of the same area, and afterwards Béguinot (1905) studied in deep the Conero flora highlining its connections with the Gargano promontory one.

The floristic investigation of Conero restarted at about the half of the XX century thank to Aldo J.B. Brilli-Cattarini, founder of the Centro Ricerche Floristiche Marche (Floristic Research Center of Marche) in Pesaro; he published a number of contributions regarding flora, biogeography and nature conservation of the promontory (1945-46, 1953, 1965, 1967, 1968, 1976; Brilli-Cattarini & Ballelli 1979; Brilli-Cattarini & Biondi 1976). Among the most significant entities found by this botanist we can remember: *Euphorbia dendroides*, *Crucianella latifolia*, *Asphodeline liburnica* and *Fumana arabica.* The vascular flora of Mount Conero, on the basis of his personal data, was at that time (Brilli-Cattarini 1976) constituted by 850 entities, as species and subspecies, and that could be more than thousand including varieties. The researches that followed made by Edoardo Biondi (1981a, 1981b, 1983, 1986, 1989, 1990, 1991) led to the identification of other entities highly significant by the phytogeographical point of view as *Euphorbia characias* ssp. *wulfenii* (*Euphorbia veneta*) and *Juniperus oxycedrus* ssp. *macrocarpa* and to the description of several vegetational aspects of Conero massif and its neighboring areas (Biondi 1986; Biondi & Allegrezza 1996; Allegrezza & al. 1997; Biondi & al. 1999, 2000, 2001, 2002a, 2002b, 2002c).

The vascular Flora of the Conero Nature Park

The floristic researches that allowed the creation of the check-list showed and commented as follows, have been carried out within more than 100 years, considering that a

good part of the information used to edit the floristic list comes from herbarium and bibliographic data. Nevertheless, with the institution of Conero Nature Park (1987) the floristic researches have been clearly focused to produce a complete list of the administrative territory of the Park. In addition to various herborizations carried out during all the seasons of the year, over more then ten years, the following herbaria have been consulted:

Herbarium of the Centro Ricerche Floristiche Marche of Pesaro and Urbino Province (PESA), rich in samples collected from the '40s of the last century; Herbarium of the Università Politecnica delle Marche (ANC), constituted more recently and that consists of several samples collected in the Park area from the '70s of the last century; Paolucci's Herbarium (*Herbarium Picenum*) recently revised by botanists of the Centro Interdipartimentale dell'Orto Botanico dell'Università Politecnica delle Marche and that includes 1645 entities collected in several areas of the Marche region, many of them were collected in localities belonging now to the Conero Park's territory. Some of these entities are currently extinct in these territories (precisely 64 entities). Therefore, *Herbarium Picenum* represents an important data source to explain flora and environmental changes that occurred over time in this territory (Biondi & Paradisi 2006, 2012).

In the check list, cultivated and ornamental species from horts and gardens have not been included apart from wood essences used for reforestations that occupy several and large zones of the Park, some of these are also reproducing spontaneously. Moreover, some spontaneous species of the Italian flora used as ornamental plants and that could reproduce by themselves over the years determining a kind of biological pollution have been considered in a separate list.

Materials and Methods

Taxa are listed in systematic order according to the following levels: subclasses, orders and families. Genera, species and infraspecific taxa are arranged in alphabetical order; hybrid taxa are queued to their genera or to their families.

The systematic order used at the level of subclass, orders and families are the ones proposed by *Angiosperm Phylogeny Group* (APG 1998, 2003, 2009) and Haston & al. (2007, 2009), recently reproposed by Peruzzi (2010). The classification of *Pteridophyta* is in accordance with Smith & al. (2006), for *Gramineae* Valdés & Scholz (2006), for *Scilla* and *Ornithogalum* orders Pfosser & Speta (1999, 2004) and Speta (2001), for *Orchidaceae* we have followed Bateman & al. (1997), Bateman & al. (2003) and Giros (2009). For the nomenclature of taxa we have followed Conti & al. (2005, 2007) with the exception of *Asteraceae* for which we have followed Greuter (2008).

For each taxon, it has been added the following information: chorotype (Pignatti 1982), life form (Pignatti 1982) and species's habitat. With regard to the frequency, we have used the following abbreviations: NP = not recently recovered, RR = very rare; R = rare; NC = uncommon, C = common, CC = very common. For very rare species we have added a note with the records' localities and date of discovery, as well as the abbreviation of herbaria where the samples are conserved. The terminology "*in verbis*" has been used for all the cases in which the record about the presence of a taxon does not derive from a bibliographic or herbarium data but by a verbal indication.

On the basis of the research carried out, the flora of the Park includes 1169 entities.

Floristic list

EQUISETACEAE

Equisetum arvense L. subsp. *arvense* – G rhiz – Circumboreal – Uncropped fields, rivers, cultivated fields; C.

Equisetum ramosissimum Desf. – G rhiz – Circumboreal – Ruderal environments; NC. *Equisetum palustre* L.– G rhiz – Circumboreal – Uncropped wet areas, rivers (PESA); R. *Equisetum telmateia* Ehrh. – G rhiz – Circumboreal – Ruderal environments; CC.

DENNSTAEDTIACEAE

Pteridium aquilinum (L.) Kuhn subsp. *aquilinum* – G rhiz – Cosmopolitan Forest edges, shrublands, ruderal enviroments; C.

PTERIDACEAE

Adiantum capillus-veneris L. – G rhiz –Pantropical – Dripping walls of the ditches between M. Colombo and M. Larciano (ANC); Villa Marchetti and Acqua Puzza, S. Benedetto's cave and ancient San Pietro's Monastery (PESA), recently (2007) a new population has been found in Mezzavalle; R.

ASPLENIACEAE

Asplenium adiantum-nigrum L. subsp. *adiantum-nigrum* – H ros/G rhiz – PaleotemperateSubtropical-Eurasian – Mount Conero (Biondi, 1986), NE side between the ancient San Pietro's Monastery and Frane Rosse, 350-475 m a.s.l.; SE side between San Benedetto's cave and the ancient San Pietro's Monastery (1968, Brilli-Cattarini *in litteris*); R.

Asplenium ceterach L. *s.l.* – H ros – Eurasian-Temperate – Forests, screes and old walls; R. *Asplenium onopteris* L. – H ros – Subtropical Islands Mesophilous holm oak woods; NC.

Asplenium ruta-muraria L. subsp. *ruta-muraria* – H ros – Circumboreal – Woods, Villa Marchetti, ancient San Pietro's Monastery, Passo del Lupo, Frane Rosse, Cava di Portonovo, Valle delle Vellare, Grotta degli Schiavi (Brilli-Cattarini *in verbis*); R.

Asplenium scolopendrium L. subsp. *scolopendrium* – H ros – Circumboreal – Temperate mesophilous forests at Belvedere, Villa Marchetti, well of the Monastery (Brilli-Cattarini *in verbis*); RR.

Asplenium trichomanes L. subsp. *quadrivalens* D. E. Mey. – H ros – CosmopolitanTemperate – Rocky walls of Mount Conero; NC.

POLYPODIACEAE

Polypodium cambricum L. – H ros/G rhiz – Eurasian – Woods by the ancient San Pietro's Monastery, low part of Fosso del Mortarolo next to Fonte d'Olio (PESA); R.

Polypodium interjectum Shivas – H ros/G rhiz – Paleotropical – Mesophilous woods dominated by hop hornbeam on the eastern slope of Mount Conero (ANC); NC.

CUPRESSACEAE

Cupressus sempervirens L. – P scap – E-Eurimediterranean – Reforestations; C.

Cupressus arizonica Green – P scap – Cultivated – Reforestations; NC.
Cupressus macrocarpa Hartweg – P scap – Cultivated – Reforestations; R.
Juniperus communis L. subsp. *communis* – P caesp – Circumboreal – Shrublands, mesophilous holm oak woods; R.
Juniperus oxycedrus L. subsp. *macrocarpa* (Sibth. & Sm.) Neilr. – P caesp – Stenomediterranean – Entity with mediterranean range present along the Italian Adriatic coast just south of the Gargano and at Mount Conero, the northern limit of its range of distribution. It is found just in one locality, with very few samples, located in the Valle delle Vellare, above the beach of Due Sorelle (Biondi, 1986; ANC). According to the Regional Red List this falls into the category CR due to the low number of individuals that constitute the population, which is the only one present throughout the territory of the Marche region; RR.
Juniperus oxycedrus L. subsp. *oxycedrus* – P caesp – Eurimediterranean – Forests, shrublands; C.

Taxaceae
Taxus baccata L. – P scap – Paleotemperate – Cultivated in private gardens; R.

Pinaceae
Cedrus deodara (D. Don) G. Don fil. – P scap – Cultivated – Reforestations; NC.
Cedrus libani A. Richard subsp. *atlantica* (Endl.) Batt. & Trabut – P scap – Cultivated – reforestations; NC.
Pinus halepensis Mill. – P scap – Stenomediterranean – Species with strictly mediterranean distribution, widely used for reforestations in the Park's territory. The population living in the upper part of the Valle delle Vellare, almost certainly autochthonous, represents the northernmost one. Indeed, Mount Conero represents the northern limit of the range of distribution along the Adriatic coast of the Italian peninsula of the species (Brilli-Cattarini 1965); otherwise, Aleppo Pine is widely distribuited in large quantity in the Park's territory because it was greatly used for the large number of reforestations made in different periods; R.
Pinus nigra J. F. Arnold subsp. *laricio* Maire – P scap – Endemic – Reforestations; according to historical records (Ciacci, 1965) 10,000 seedlings have been planted; R.
Pinus nigra J. F. Arnold subsp. *nigra* – P scap – Illirian – Reforestations; NC.
Pinus pinaster Aiton – P scap – W-Stenomediterranean – Reforestations, many plants are into decline as it is an acidophilous species; NC.
Pinus pinea L. – P scap – Eurimediterranean – Reforestations; NC.
Pinus canariensis Sweet – P scap – Macaronesian – Reforestations; according to Ciacci (1965, in Biondi 1986) 2 kgs of seeds of this species have been used for the reforestation of the inner side of Mount Conero carried out in the period 1931-1955 (Reggiani 1932), furthermore, Mannozzi-Torini (1962) reported that the species reproduced by suckers on the stem base; RR.

Aristolochiaceae
Aristolochia clematitis L. – G rooting – Submediterranean – On the right bank of the River Musone, near the mouth, it forms a rich population into the *Tamarix africana* formation (ANC); R.
Aristolochia rotunda L. subsp. *rotunda* – G bulb – Eurimediterranean – Ruderal environments, forest edges; NC.

Lauraceae

Laurus nobilis L. – P caesp – Stenomediterranean – Mesophilous woods. The species resulting from cultivation is widespread in the territory of the Park in mesophilous holm oak woods as well as in hygrophilous elm woods; C.

Araceae

Arum italicum Mill. subsp. *italicum* – G rhiz –Stenomediterranean – Woods, wetlands, uncropped fields, ruderal environments; C.

Lemna gibba L. – Hyd floating – Subcosmopolitan – Fresh water. Observed in Portonovo's ponds, at the mouth of the River Musone and by Fosso Betelico and Fosso Porchereccia (Brilli-Cattarini *in verbis*); R.

Lemna minor L. – Hyd floating – Subcosmopolitan Ponds, fresh stagnant water or slowly flowing fresh water; NC.

Alismataceae

Alisma lanceolatum With. – Hyd rooting – Subcosmopolitan – Fresh water. Waterways near the mouth of River Musone, (ANC), Fosso Betelico (PESA); R.

Alisma plantago-aquatica L. – Hyd rooting – Subcosmopolitan Fresh water. Waterways near the mouth of River Musone (*in verbis*); R.

Zosteraceae

Zostera marina L. – Hyd rooting Eurasian – Sea. Observed in Numana Harbour (ANC). For the harbour of Ancona it was also recorded the presence of *Z. noltii* Hornem. (Paolucci 1890-91, sub *Z. nana* Roth); R.

Potamogetonaceae

Potamogeton pectinatus L. – Hyd rooting Subcosmopolitan – Portonovo's ponds (PESA; Béguinot 1905; Biondi 1986); R (Pp).

Zannichellia palustris L. subsp. *pedicellata* (Wahlenb. & Rosén) Arcang. – Hyd rooting Cosmopolitan – Fresh water. Observed in Portonovo's ponds (Biondi 1986) and in the "guazzo" next to the lower way of Fosso Betelico; R.

Dioscoreaceae

Tamus communis L. – G rooting – Eurimediterranean – Woods, shrublands, forest mantles; C.

Colchicaceae

Colchicum lusitanum Brot. – G bulb – W-Mediterranean – Montane Grasslands, woods and uncropped fields; observed in Pian Grande, Montacuto, Fosso Betelico and Camerano; R.

Smilacaceae

Smilax aspera L. – NP – Subtropical – Woods, shrublands and vegetation mantles; C.

Liliaceae

Gagea villosa (M. Bieb.) Sweet – G bulb – Eurasian – Cultivated fields and uncropped

fields; the species was very common during XIX century (Paolucci 1890-91: "*ovunque presso Ancona*") but afterwards it became rare and was observed in Coppo, Sirolo, Cassette di Poggio, Camerano and Gradina (Brilli-Cattarini *in verbis*); R.

Tulipa agenensis DC. – G bulb – Adventive – Cultivated fields and uncropped fields; observed in Mount Conero (Paolucci 1890-91 sub *T. oculus-solis* St. Amans.; Béguinot 1905), in Pietralacroce near Ancona (Brilli-Cattarini 1956 sub *T. oculus-solis* St. Am. var. *typica* Fiori); R.

Tulipa clusiana DC. – G bulb – Adventive – Cultivated fields and uncropped fields. Observed in Pietralacroce (Brilli-Cattarini 1956); R.

Tulipa raddii Reboul – G bulb – Adventive naturalized – Cultivated and uncropped fields; observed near Ancona (Paolucci 1890-91); R.

Orchidaceae

Anacamptis pyramidalis (L.) Rich. – G bulb – Eurimediterranean – Grasslands and xeric uncropped fields; C.

Cephalanthera damasonium (Mill.) Druce – G rhiz – Eurimediterranean Woods; NC. *Cephalanthera longifolia* (L.) Fritsch – G rhiz – Eurasian – Woods and shrublands; NC. *Cephalanthera rubra* (L.) Rich. – G rhiz – Eurasian – Woods and shrublands; NC. *Dactylorhiza fuchsii* (Druce) Soó subsp. *fuchsii* – G bulb – Paleotemperate – Woods and grasslands; NC.

Epipactis helleborine (L.) Crantz subsp. *helleborine* – G rhiz –Paleotemperate Woods; NC.

Epipactis microphylla (Ehrh.) Sw. – G rhiz — European-Caucasian – Woods; observed on the western side of Mount Conero above Fosso di San Antonio (PESA), at Trave and other localities of Mount Conero (Paolucci 1890-91; Béguinot 1905); R.

Gymnadenia conopsea (L.) R. Br. – G bulb – Eurasian – Grasslands and uncropped fields; NC. *Himantoglossum adriaticum* H. Baumann – G bulb – Mediterranean-Atlantic – Observed on the roadside along the main road of Mount Conero at the crossroad for Portonovo where it was found in a single specimen by Mr. Sergio Santarello in 2008; RR.

Limodorum abortivum (L.) Sw. – G rhiz –Eurimediterranean – Woods. Observed in the eastern side of Mount Conero between Case Giardini and Passo della Croce, along Fosso di San Lorenzo, next to the ancient Monastery; on the southern side and near San Benedetto's cave (PESA). It is also present in the shrublands and in the reforestation in the western side of the promontory. Mount Conero (Paolucci 1890-91; Béguinot 1905); R.

Listera ovata (L.) R. Br. – G rhiz –Eurasian – Woods and shrublands in the SE side of Mount Conero near the Marine Barracks (Brilli-Cattarini *in verbis*); R.

Neotinea maculata (Desf.) Stearn – G bulb – Stenomediterranean – Glades; observed in the NW side of Mount Conero above Portonovo's quarries (Brilli-Cattarini & Ballelli 1979 sub *N. intacta* (Link) Reichenb. fil.); R.

Ophrys apifera Huds. – G bulb – Eurimediterranean – Grasslands and uncropped fields; NC.

Ophrys bertolonii Moretti – G bulb – W-Stenomediterranean – Grasslands and garigues; C.

Ophrys bombyliflora Link – G bulb – W-Stenomediterranean – Xeric grasslands above the village of Cassette di Poggio (ANC). Also observed in Pietralacroce (Paolucci 1890-91, sub *O. bombylifera* Link.) and on Mount Conero (Biondi 1986); R.

Ophrys crabronifera Mauri – G bulb – Mediterranean – Grasslands, observed in Pian Grande. "Sul M. Conero. Specie di nuova registrazione per le Marche, da poco comparsa in detta località e divenutavi tosto comune" (Paolucci & Cardinali 1900; Herbarium Picenum), Mount Conero (Béguinot 1905); R.

Ophrys fuciflora (F. W. Schmidt) Moench subsp. *fuciflora* – G bulb – Eurimediterranean – Grasslands, uncropped fields, garigues. Probably most of the specimens of *O. fuciflora* should be attributed to *O. dinarica* Kranycev et P. Delforge (Klaver, *in verbis*). The revision of the specimen present in the *Herbarium Picenum* allowed attributing it to this entity that was called *Ophrys holoserica* (Burm. fil.) W. Greuter subsp. *holoserica* by Paolucci (1890-91) who collected it in the hills, in uncropped fields, of Pietralacroce at Ancona as he reported "*nei colli incolti di Pietralacroce presso Ancona*"; NC.

Ophrys fusca Link subsp. *fusca* – G bulb – Stenomediterranean – Grasslands; NC.

Ophrys incubacea Bianca ex Tod. – G bulb – N-Stenomediterranean – Grasslands; observed in Pian Grande and in Pietralacroce (Paolucci 1890-91, sub *O. aranifera* Huds var. *atrata* Lindl.); R.

Ophrys sphegodes Mill. subsp. *sphegodes* – G bulb – Eurasian – Grasslands, shrublands, garigues; C.

Orchis anthropophora (L.) All. – G bulb – Stenomediterranean-Atlantic – Grasslands; NC.

Orchis coriophora L. – G bulb – Eurimediterranean – Grasslands and uncropped fields; NC.

Orchis laxiflora Lam. – G bulb – Eurimediterranean – Wet meadows; observed around Sirolo, next to Coppo and next to Villa Fiume-Mare (PESA); R.

Orchis morio L. – G bulb – European-Caucasian – Grasslands and garigues; C.

Orchis pauciflora Ten. – G bulb – Stenomediterranean – Grasslands; the presence of the species is reported for Mount Conero by Paolucci (1890-91); R.

Orchis purpurea Huds. – G bulb – Eurasian – Woods, grasslands and uncropped fields; NC.

Orchis simia Lam. – G bulb – Eurimediterranean – Grasslands and ruderal environments; observed in Pietralacroce (Paolucci 1890-91, sub *Orchis tephrosanthos* Vill.); Mount Conero (Paolucci & Cardinali 1900 sub *Orchis tephrosanthos* Vill.); R.

Orchis tridentata Scop. – G bulb – Eurimediterranean – Grasslands and shrublands; NC.

Serapias lingua – G bulb – Stenomediterranean – The species was observed by Paolucci in Gallina cliff near Ancona (1890-91) "*In contrada Gallina presso Ancona* ...", but no more found; NP.

Serapias parviflora Parl. – G bulb – Eurimediterranean – Xeric grasslands; it has been observed on the SE slope of Mount Conero and along Fosso del Mortarolo; Ancona "*presso Ancona*" (Paolucci & Cardinali, 1900); RR.

Serapias vomeracea (Burm. f.) Briq. subsp. *vomeracea* – G bulb – Eurimediterranean – Xeric grasslands; observed near Ancona (Paolucci & Cardinali 1900 sub *Serapias longipetala* Polin.); NP.

Spiranthes spiralis (L.) Chevall. – G rhiz — European-Caucasian – Xeric grasslands in Pian dei Raggetti and Pian Grande (Brilli-Cattarini *in verbis*), Trave (Paolucci, 1890-91, sub *S. autumnalis* C. L. Rich.); Mount Conero (Béguinot 1905 sub *S. autumnalis* Rich.); R.

xOrchiaceras bergonii (De Nant.) E. G. Camus – G bulb – Mount Conero (Paolucci & Cardinali 1900); NP.

Iridaceae

Gladiolus communis L. subsp. *communis* – G bulb – S-European-S-Sibiric – In the *Herbarium Picenum* of L. Paolucci a sample collected in Valle Miano (locality in the north-west of the park) is present which has been determined as *Gladiolus palustris* Gaud. but it has to be referred to *G. communis*; NP.

Gladiolus italicus Mill. – G bulb – Eurimediterranean – Uncropped fields, shrublands and occasionally in woods; NC.

Hermodactylus tuberosus (L.) Mill. – G rhiz – N-Stenomediterranean – Spontaneous in uncropped fields and ruderal environments; R.

Iris florentina L. – G rhiz –Adventive naturalized – Spontaneous in uncropped fields and ruderal environments. According to Colasante (*in verbis*) *I. florentina* has not to be considered as a separate species but as an albino form of *I. germanica*; R.

Iris foetidissima L. – G rhiz –Eurimediterranean – Spontaneous in the holm-oak woods of Portonovo and near Poggio; NC.

Iris germanica L. – G rhiz –Adventive naturalized – Spontaneous in uncropped fields and ruderal environments; NC.

Iris xiphium L. – G bulb – W-Stenomediterranean – Spontaneous in uncropped fields. Observed in Mount Conero next to the Monastery (Paolucci & Cardinali 1900 sub *Xiphion vulgare* Parl.) and other localities (Brilli-Cattarini 1967) and near the prison of Montacuto; R.

Romulea columnae Sebast. & Mauri – G bulb – Stenomediterranean – Backdunes along the coast of Marcelli di Numana (ANC, PESA), between Case Marcelli and the mouth of River Musone and in Pian Grande (Brilli-Cattarini & Ballelli 1979) and Pian dei Raggetti; R.

Romulea ramiflora Ten. subsp. *ramiflora* – G bulb – Stenomediterranean-Macaronesian – The species is reported in Italy in the following regions: Liguria, Tuscany, Latium, Molise, Apulia, Calabria, Sicily and Sardinia (Conti & al. 2005). In 2001 the plant has been found in the backdune of Marcelli di Numana (ANC, PESA); this locality is currently the only one known for the region and the northernmost one of the Adriatic coast (Gubellini & Pinzi 2010a); RR.

Xanthorrhoeaceae

Asphodeline liburnica (Scop.) Rchb. – G rhiz — NE-Stenomediterranean – Forest edges and grasslands. It has been observed in Valle delle Vellare (Brilli-Cattarini 1967; 1968) and in the marly-arenaceous cliff along the path of "Sardella" (ANC, PESA). North of Conero, it is present only in Istria but not in Italian territory; R.

Asphodelus fistulosus L. – H scap – Paleo-Subtropical – The species is expanding rapidly, currently present in territories close to the borders of the territory of the Park; R.

Amaryllidaceae

Allium ampeloprasum L. – G bulb – Eurimediterranean – Shrublands, grasslands, ruderal environments; C.

Allium chamaemoly L. subsp. *chamaemoly* – G bulb – W-Stenomediterranean – Annual meadows; observed in Pian Grande at the top of the cliff above Portonovo in a clearing of the maquis (ANC), Pian dei Raggetti (ANC) and on the backdunes of Marcelli di Numana (ANC, PESA); R (Ac).

Allium commutatum Guss. – G bulb – E-Stenomediterranean – Garigues and rocky walls; observed next to the Scoglio delle Due Sorelle and the Scoglio della Vela (ANC, PESA); RR.

Allium dentiferum Webb & Berthel. – G bulb – Paleotemperate – Uncropped fields and ruderal environments; NC.

Allium neapolitanum Cirillo – G bulb – Stenomediterranean – Uncropped fields, ruderal environments, forest edges; C.

Allium nigrum L. – G bulb – Stenomediterranean – Uncropped fields, ruderal environments; NC.

Allium pallens L. – G bulb – Stenomediterranean – Uncropped fields, ruderal environments; NC.

Allium roseum L. – G bulb – Stenomediterranean – Uncropped fields, ruderal environments; C.

Allium sphaerocephalon L. – G bulb – Paleotemperate – Grasslands and garigues; NC.

Allium vineale L. – G bulb – Eurimediterranean Uncropped fields and woods; NC.

Narcissus medioluteus Mill. – G bulb – W-European – Reported as spontaneous next to the Monastery (Paolucci & Cardinali 1900 sub *N. biflorus* Curt.); NP.

Narcissus pseudonarcissus L. – G bulb – W-European (Atlantic) – Spontaneous in the roadsides at Coppo (ANC) and in the northern slope of Mount Baldino and in Monteacuto; R.

Narcissus tazetta L. subsp. *tazetta* – G bulb – Stenomediterranean – Spontaneous in the roadside at the crossroad for Massignano and near Montacuto (ANC); R.

Asparagaceae

Asparagus acutifolius L. – G rhiz/NP Stenomediterranean – Woods, shrublands and forest mantles; C.

Bellevalia trifoliata (Ten.) Kunth – G bulb – C-Stenomediterranean – Trave (Paolucci, 1887 and 1890-91, sub B. dubia R. et Sch.); Mount Conero (Brilli-Cattarini 1967; Biondi 1986; Biondi & Baldoni 1996, all sub *B. dubia*). The review of the samples conserved in the *Herbarium Picenum* of L. Paolucci, determined as *B. dubia*, allowed to verify that the plants collected by the author in two localities near Ancona ("... *all'Angelo e al Trave*") have to be referred to *Bellevalia trifoliata* (Ten.) Kunth (Gubellini & Pinzi 2010a), entity common in the central Mediterranean region and in Eastern Europe and known in Italy for Veneto, Liguria, Latium and Apulia (Pignatti 1982); NP.

Bellevalia romana (L.) Sweet – G bulb – C-Eurimediterranean – Woods, grasslands, uncropped fields, ruderal environments; C.

Honorius nutans S. F. Gray – G bulb – Adventive naturalized – Spontaneous in uncropped fields next to Varano (ANC); R.

Hyacinthoides hispanica (Mill.) Rothm. – G bulb – W-Mediterranean – Mount Conero (Paolucci & Cardinali 1900, sub *Scilla campanulata* Ait. Kew.), Mount Conero (Béguinot 1905, sub *Scilla hispanica* Miller) and Mount Conero (Brilli-Cattarini 1967 sub *Endymion campanulatus* (Ait.) Parl); NP.

Hyacinthus orientalis L. – G bulb – E-Mediterranean – Spontaneous in uncropped fields and ruderal environments near Angeli, Numana, Sirolo and Camerano; R.

Loncomelos brevistylus (Wolfn.) Dostál – G bulb – W-Asian – Uncropped fields. The reports of *Ornithogalum narbonense* L. (Paolucci 1890-91) must be referred to this species; NC.

Loncomelos pyrenaicus (L.) Hrouda ex Holub subsp. *sphaerocarpus* (A. Kern.) Holub – G bulb – SE-European – Woods, shrublands, uncropped fields; NC.

Muscari botryoides (L.) Mill. subsp. *botryoides* – G bulb – Submediterranean – The species, reported by Paolucci (1890-91): "*Ovunque presso Ancona*" and by BrilliCattarini (*in verbis*) in Villa Angiolani, is now desappeared; NP.

Muscari comosum (L.) Mill. – G bulb – Eurimediterranean – Uncropped fields, shrublands, ruderal environments; C.

Muscari neglectum Guss. ex Ten. – G bulb – Eurimediterranean – Grasslands, uncropped fields, ruderal environments; C.

Ornithogalum divergens Boreau – G bulb – N-Eurimediterranean – Uncropped fields, cultivated fields, ruderal environments. It should be referred to this species *O. umbellatum* L. that has been observed by Paolucci (1890-91) "*...in tutta la zona litoranea e dei colli. Dovunque presso Ancona.*"; C.

Ornithogalum etruscum Parl. – G bulb – Endemic – Grasslands and uncropped fields; NC.

Propero autumnale (L.) Speta subsp. *autumnale* – G bulb – Eurimediterranean – Grasslands; Mount Conero (*Herbarium Picenum*; Béguinot 1905); also recorded for the neighbouring Selva di Castelfidardo (Ballelli & al. 2001); RR.

Ruscus aculeatus L. – G rhiz/Ch frut Eurimediterranean – Woods and shrublands; C.

Ruscus hypoglossum L. – G rhiz/Ch frut – Eurimediterranean – In mesophilous holm oak woods; NC (Cl-Qi).

Scilla bifolia L. – G bulb – European-Caucasian – Woods. It has been observed in the hop hornbeam mesophilous wood on the north-east slope of Mount Conero (ANC, PESA); RR.

Yucca gloriosa L. – P caesp – Adventive (North America) – Subspontaneous in ruderal environments next to Marcelli di Numana; R.

Arecaceae

Chamaerops humilis L. – NP – W-Stenomediterranean – Spontaneous on the cliff near houses, in the maquis of Portonovo and next to Lago Profondo; R.

Typhaceae

Sparganium erectum L. subsp. *neglectum* (Beeby) Schinz. & Thell. – Hyd rooting Eurasian – Stagnant or slowly flowing fresh water next to the Camping "Numana Blu" at the mouth of River Musone; it has also been observed in Portonovo's ponds and into a ditch in Camerano (Brilli-Cattarini *in verbis*) and also recorded for the neighbouring Selva di Castelfidardo (Ballelli & al. 2001); R.

Typha domingensis (Pers.) Steud. – G rhiz –Circumboreal – Stagnant or slowly flowing fresh water, ponds; NC.

Typha latifolia L. – G rhiz –Cosmopolitan – Stagnant or slowly flowing fresh water, ponds; NC.

Juncaceae

Juncus acutus L. subsp. *acutus* H caesp Eurimediterranean – Stagnant or slowly flowing fresh water, ponds. Portonovo's ponds (ANC, PESA; Paolucci 1890-91; Biondi & Baldoni 1996), Mount Conero (Béguinot 1905); R.

Juncus articulatus L. – G rhiz – Circumboreal – Ponds, stagnant or slowly flowing fresh water, wetlands; NC.

Juncus bufonius L – T caesp – Cosmopolitan – Annual meadows, wet uncropped fields; NC.

Juncus effusus L. subsp. *effusus* – H caesp – Cosmopolitan – Wetlands; observed in Portonovo (Paolucci 1890-91); R.

Juncus hybridus Brot. – T caesp – Mediterranean-Atlantic – Wetlands; observed behind the dunes between Case Marcelli and the mouth of River Musone (Brilli-Cattarini *in verbis*); RR.

Juncus inflexus L. – H caesp – Paleotemperate – Ponds and wetlands; Portonovo (Paolucci 1890-91, sub *J. glaucus* Ehrh.); R.

Juncus maritimus Lam. – G rhiz –Subcosmopolitan – Wetlands and ponds near the sea. It has been observed in Portonovo's ponds (Biondi 1986; Biondi & Baldoni 1996); R.

Luzula forsteri (Sm.) DC. – H caesp – Eurimediterranean – Woods. It has been obesrved on Mount Conero in hop hornbeam woods (Biondi 1986); R.

Luzula sylvatica (Huds.) Gaudin subsp. *sylvatica* – H caesp – Orophyte S-E-European – Hop hornbeam woods on Mount Conero (Biondi 1986); R.

Cyperaceae

Bolboschoenus maritimus (L.) Palla – G rhiz –Cosmopolitan – Stagnant or slowly flowing fresh water, ponds, wetlands, ruderal environments; NC.

Carex digitata L. – H caesp – Eurasian – Mesophilous woods dominated by hop hornbeam in the north-east side of Mount Conero (ANC), SE side between the San Benedetto's cave and the ancient Monastery of San Pietro (PESA), N slope 300-500 m a.s.l. (1968, Brilli-Cattarini *in litteris*); R.

Carex distans L. – H caesp – Eurimediterranean – Wetlands in Portonovo; NC.

Carex divisa Huds. – G rhiz — Eurimediterranean-Atlantic – Wet grasslands in Portonovo (PESA); along the coast between Case Marcelli and next to the mouth of River Musone (ANC); R.

Carex divulsa Stokes – H caesp – Eurimediterranean – Woodlands, hedges, uncropped fields; NC.

Carex extensa Gooden. H caesp Eurimediterranean-Subatlantic – Wetlands in Portonovo (ANC, PESA). Portonovo (Brilli-Cattarini 1968; Biondi 1986); R.

Carex flacca Schreb. subsp. *flacca* – G rhiz –European – Woods, shrublands, grasslands, uncropped fields, ruderal environments; C.

Carex flacca Schreb. subsp. *serrulata* (Biv.) Greuter – G rhiz — Eurasian-N African – Grasslands; NC/R.

Carex grioletii Roem. – G rhiz – NE-Stenomediterranean – Holm oak woods and hop hornbeam woods in the south-eastern slope of Mount Conero under the ancient Monastery of San Pietro and between San Benedetto's cave and the ancient Monastery (PESA; Brilli-Cattarini & Ballelli 1979). Also recorded for the neighbouring Selva di Castelfidardo (Ballelli & al. 2001); R.

Carex halleriana Asso – H caesp – Eurimediterranean – Holm oak woods, shrublands, dry uncropped fields; C.

Carex hirta L. – G rhiz – European-Caucasian – Wetlands, along the rivers; NC.

Carex liparocarpos Gaudin subsp. *liparocarpos* – G rhiz – SE-European – Observed along

the coast between Case Marcelli and the mouth of River Musone (Brilli-Cattarini 1965, sub *Carex nitida* Host). Also recorded for the neighbouring Selva di Castelfidardo (Ballelli & al. 2001); RR.

Carex otrubae Podp. – H caesp – Eurimediterranean-Atlantic – Wetlands; NC.

Carex pendula Huds. – H caesp – Eurasian – Along watercourses; NC.

Carex sylvatica Hudson – H caesp – European-W-Asian – Woods. It has been collected on the NE side between the ancient Monastery of San Pietro and Frane Rosse, 350-475 m a.s.l. (1968, Brilli-Cattarini *in litteris*); NC.

Cladium mariscus (L.) Pohl – G rhiz – Subcosmopolitan – Lago Grande of Portonovo (ANC, PESA; Paolucci 1890-91; Béguinot 1905; Brilli-Cattarini 1968; Biondi 1986); R (Sm-Cm). Note: the record for Lago Grande of Portonovo is nowadays the sole for the Park territory and for the whole region. In the past (Biondi 1986), the species was largely present also in Lago Profondo, where unfortunately is now extint probably because of increasing of salinity of the water. Moreover, in 2010 the reintroduction of *Cladium mariscus* was tried in Lago Profondo, the activity was sponsored by the Conero Nature Park and carried out by the Botanic Garden of the Marche Polytechnic University through rhizomes transplantation and direct sowing of seeds collected in Lago Profondo. This activity does not appear to be successful for the moment.

Cyperus fuscus L. – T caesp – Paleotemperate – Wetlands, water courses (Brilli-Cattarini *in verbis*); R.

Cyperus glomeratus L. – He – Paleosubtropical – It has been observed in the wetlands near the mouth of Fosso di Numana (ANC; PESA); R.

Cyperus longus L. subsp. *badius* (Desf.) Asch. & Gr. – He – Stenomediterranean – Wetlands and ruderal environments at the mouth of River Musone (ANC, PESA); R.

Cyperus rotundus L. – G rhiz –Subcosmopolitan – Uncropped fields next to Numana; R.

Eleocharis palustris (L.) Roem. & Schult. subsp. *palustris* – G rhiz – Subcosmopolitan – It has been observed in wet grasslands and in a little smoothleaf elm wood on the left side of the river next to the mouth of River Musone (ANC); in the past it was also recorded in Portonovo (Paolucci 1890-91); R (Ep).

Schoenoplectus tabernaemontani (C. C. Gmel.) Palla – He – Eurosibiric – Portonovo's ponds (Biondi 1986); R.

Schoenus nigricans L. – H caesp – Subcosmopolitan – Portonovo's ponds (ANC, PESA; Biondi 1986); NW side of Mount Conero above Villa Cingolani (PESA); R.

Scirpoides holoschoenus (L.) Soják – G rhiz –Eurimediterranean – Wet grasslands next to the mouth of River Musone and in Portonovo (ANC, PESA); Mount Conero (Béguinot 1905 sub *Scirpus holoschoenus* L. var. *australis* (Murr.); Portonovo (Paolucci 1890-91 sub *Scirpus holoschoenus* L.). More recently it has been found in uncropped fields along the path to Mezza Valle; NC.

Poaceae

Achnatherum bromoides (L.) P. Beauv. – H caesp – Stenomediterranean – Garigues and shrublands. On the eastern side of Mount Conero, between San Benedetto's cave and the ancient Monastery of San Pietro (ANC, PESA) and along the path of Passo del Lupo (Brilli-Cattarini *in verbis*); R.

Agrostis stolonifera L. – H rept – Circumboreal – Wetlands, along watercourses, in ruder-

al environments; C.

Alopecurus myosuroides Huds. – T scap – Subcosmopolitan Cultivated fields, uncropped fields, ruderal environments, wetlands; C.

Alopecurus rendlei Eig – T scap – Eurimediterranean "*...ai prati della Ranocchia presso Ancona*" (Paolucci 1890-91); NP.

Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz – H caesp – SW-Stenomediterranean – Shrublands, forest mantles; C (Cv-Am).

Anthoxanthum odoratum L. subsp. *odoratum* – H caesp – Eurasian Grasslands; NC.

Arrhenatherum elatius (L.) Beauv. ex J. & C. Presl subsp. *elatius* – H caesp Paleotemperate – Grasslands, ruderal environments near the village of Poggio (ANC); SE side of Mount Conero between San Benedetto's cave and the ancient Monastery of San Pietro (1968, Brilli-Cattarini *in litteris*); R.

Arundo collina Ten. – G rhiz – E-Stenomediterranean – Shrublands, wood edges and road edges. Very common on sea side, on pelitic rocks; C.

The taxonomic revision of the complex of *Arundo plinii* s.l. (Danin 2004) has allowed to attribute to this entity the most part of the populations that develop in the territory of the park. More precisely, the dense populations that widely occupy marly-arenaceous substrates, cliffs and the scattered populations are attributed to *A. collina*. In Conero Park, the ecology of the species fits with the indications for central Italy (Danin & al. 2005). The populations present around the ponds of Portonovo are attributed instead to *A. plinii*.

Arundo donax L. – G rhiz – Subcosmopolitan – Spontaneous along watercourses, in shrublands and in ruderal environments; C.

Arundo plinii Turra – G rhiz – Stenomediterranean – Lago Grande of Portonovo; NC.

Avena barbata Pott ex Link – T scap – Eurimediterranean – Grasslands, uncropped fields, ruderal environments; C.

Avena fatua L. – T scap – Eurasian – Uncropped and cultivated fields. "*Dovunque nei dintorni di Ancona*" (Paolucci 1890-91), Mount Conero (Biondi 1986). Probably, it has been in part confused with related species; NC.

Avena sativa L. subsp. *sativa* – T scap – Adventive naturalized – Spontaneous in cultivated fields and in abandoned fields, in the south-western middle side of Mount Conero (PESA); R.

Avena sterilis L. subsp. *sterilis* – T scap – Eurimediterranean – Grasslands, uncropped fields, ruderal environments; C.

Bothriochloa ischaemum (L.) Keng H caesp – Thermo-Cosmopolitan – Uncropped fields, ruderal environments; NC.

Brachypodium rupestre (Host) Roem. & Schult. – H caesp – Subatlantic Grasslands, uncropped fields, forest edges. The indication of *B. pinnatum* P. et B. recorded by Paolucci (1890-91) "*Ovunque presso Ancona*" should be reported to this species; CC.

Brachypodium sylvaticum (Huds.) P. Beauv. subsp. *sylvaticum* – H caesp – Paleotemperate Woods; NC.

Briza maxima L. – T scap – Paleo-Subtropical – Grasslands. Once it was very common in the coast between Case Marcelli and the mouth of the River Musone (Brilli-Cattarini, *in verbis*), nowadays it is present along the Fosso di San Lorenzo, in Portonovo, in the eastern side of Mount Conero between Case Giardini and Case Balducci, at Pian Grande (PESA) and in Marcelli di Numana; R.

Briza media L. – H caesp – Eurosibiric – Grasslands (ANC, PESA); R.

Bromopsis erecta (Huds.) Fourr. – H caesp – Paleotemperate – Grasslands, uncropped fields, ruderal environments; CC.

Bromopsis ramosa (Huds.) Holub H caesp Eurasian Woods, forest mantles; NC.

Bromus arvensis L. subsp. *arvensis* – T scap – Eurosibiric Cultivated fields, ruderal environments; NC.

Bromus commutatus Schrad. subsp. *commutatus* – T scap – European – Wet uncropped fields next to the mouth of River Musone, along Fosso Porchereccia and the lower part of Fosso Betelico; in the past it has been found in Prati della Ranocchia next to Ancona (Paolucci 1890-91, sub *Serrafalcus commutatus* Bab.); R.

Bromus diandrus Roth subsp. *diandrus* – T scap – Eurimediterranean – Annual meadows, ruderal environments; CC (Ab-Bd).

Bromus hordeaceus L. subsp. *hordeaceus* – T scap – Subcosmopolitan – Grasslands, annual meadows, uncropped fields; CC.

Bromus japonicus Thunb. ex Murray subsp. *japonicus* – T scap – Paleotemperate– Uncropped fields, on the NW side of Mount Conero, in Pian Grande (PESA), Mount Conero (Paolucci & Cardinali 1895, sub *Serrafalcus patulus* Parl.; Béguinot 1905); R.

Bromus madritensis L. – T scap – Eurimediterranean – Uncropped fields, ruderal environments; C.

Bromus racemosus L. – T scap – European-Caucasian – Wetlands; NC.

Bromus rigidus Roth – T scap – Subtropical – Pietralacroce, Trave (Paolucci 1890-91, sub *B. maximus* Desf.). The indications deserve a confirmation; NP.

Bromus sterilis L. – T scap – Eurimediterranean – Grasslands, uncropped fields, ruderal environments; CC.

Catapodium balearicum (Willk.) H. Scholz – T scap – Eurimediterranean-Subatlantic – Annual meadows near Marcelli di Numana (ANC); R.

Catapodium rigidum (L.) C.E. Hubb. ex Dony subsp. *rigidum* – T scap – Eurimediterranean – Annual meadows, uncropped fields, ruderal environments; CC.

Ceratochloa cathartica (Vahl) Herter – H caesp Cultivated – Spontaneous in uncropped fields and ruderal environments near the mouth of River Musone (Brilli-Cattarini *in verbis*); R.

Crypsis schoenoides (L.) Lam. – T scap – Subtropical v Around Numana in artificial ponds and along Fosso della Porchereccia (PESA); R.

Cynodon dactylon (L.) Pers. – G rhiz – Cosmopolitan – Uncropped fields, ruderal environments; CC.

Cynosurus cristatus L. H caesp – European-Caucasian – Mount Conero (Béguinot 1905), next to Trave (Paolucci 1890-91); NP.

Cynosurus echinatus L. – T scap – Eurimediterranean – Annual meadows, uncropped fields, ruderal environments; C.

Dactylis glomerata L. subsp. *glomerata* – H caesp – Paleotemperate Shrublands, grasslands, uncropped fields, ruderal environments, forest edges; CC.

Dactylis glomerata L. subsp. *hispanica* (Roth) Nyman – H caesp – Stenomediterranean Xeric grasslands; NC.

Dasypirum villosum (L.) P. Candargy – T scap – Eurimediterranean-Turanian – Ruderal environments, uncropped fields; NC.

Digitaria ischaemum (Schreb. ex Schweigg.) Schreb. ex Muhl. – T scap – Subcosmopolitan – Ruderal environments and uncropped fields, next to the mouth of

River Musone and along Fosso Betelico (Brilli-Cattarini *in verbis*); R.

Digitaria sanguinalis (L.) Scop. subsp *sanguinalis* – T scap – Cosmopolitan – Cultivated fields, uncropped fields; C.

Echinaria capitata (L.) Desf. – T scap – Stenomediterranean – Grasslands. Mount Conero (Paolucci 1890-91; Béguinot 1905); R.

Echinochloa crus-galli (L.) P. Beauv. – T scap – Subcosmopolitan – Uncropped fields, ruderal environments; C.

Elymus athericus (Link) Kerguélen – G rhiz – Eurimediterranean – Cliffs, backdunes; NC.

Elymus farctus (Viv.) Runemark ex Melderis subsp. *farctus* – G rhiz – Eurimediterranean – Beaches (Brilli-Cattarini *in verbis*); NP.

Elymus repens (L.) Gould subsp. *repens* – G rhiz – Circumboreal – Grasslands, wetlands, uncropped fields, shrublands, ruderal environments; C.

Eragrostis cilianensis (All.) Vignolo ex Janch. – T scap – Cosmopolitan – Uncropped fields, ruderal environments, cultivated fields; NC.

Eragrostis minor Host – T scap – Subcosmopolitan – Uncropped fields, ruderal environments; NC.

Festuca circummediterranea Patzke – H caesp – Endemic E-Alpine – Grasslands (ANC); R.

Festuca heterophylla Lam. H caesp – European-Caucasian – Woods; NC.

Festuca inops De Not. – H caesp – Endemic – Grasslands, garigues (ANC). Paolucci (1890-91) recorded this species for the park territory as *F. duriuscula* Bert. specifying that he has found the "var. b *F. tenuifolia* Sibth." in Pietralacroce and next to Trave. The examination of the sample stored into the *Herbarium Picenum* allowed to attribute it to *F. inops* De Not. The report of Béguinot (1905) sub *F. ovina* for Mount Conero is probably to be referred to *F. inops* or to *F. circummediterranea*; R.

Festuca rubra L. subsp. *rubra* – H caesp – Circumboreal – Wetlands at the mouth of River Musone (PESA); R.

Gastridium ventricosum (Gouan) Schinz & Thell. – T scap – Stenomediterranean-Atlantic – Southern, Eastern, Northern and South-western sides of Mount Conero (PESA), next to the abandoned quarry of Portonovo, next to Trave (Paolucci 1890-91 sub *G. lendigerum* Gaud.); in the SE side between San Benedetto's cave and the ancient Monastery of San Pietro (1968, Brilli-Cattarini *in litteris*); R.

Gaudinia fragilis (L.) P. Beauv. – T scap – Eurimediterranean – Grasslands, uncropped fields; in the NW side of Mount Conero: Pian Grande, Pian dei Raggetti, Monte dei Corvi (PESA); Sirolo (Paolucci 1890-91); R.

Holcus lanatus L. – H caesp – Circumboreal – Grasslands, uncropped fields, forest edges; NC.

Hordeum bulbosum L. – H caesp – Subtropical – Uncropped fields next to Coppo and along Fosso Betelico (Brilli-Cattarini *in verbis*); R.

Hordeum marinum Huds. subsp. *marinum* – T scap – W-Eurimediterranean – Beach between Marcelli and the mouth of River Musone (Brilli-Cattarini *in verbis*); R.

Hordeum murinum L. subsp. *leporinum* (Link) Arcang. – T scap – Eurimediterranean – Annual meadows, uncropped fields, ruderal environments; CC.

Kengia serotina (L.) Packer – H caesp – S-European-S-Sibiric – Xeric grasslands in Marcelli di Numana; R.

Lagurus ovatus L. subsp. *ovatus* – T scap – Eurimediterranean – Annual meadows, beaches, backdunes; NC.

Lolium multiflorum Lam. subsp. *gaudini* (Parl.) Schinz & Thell. – T scap – Eurimediterranean – Grasslands, uncropped fields; C.

Lolium multiflorum Lam. subsp. *multiflorum* – T scap – Eurimediterranean – Cultivated fields next to Sirolo (ANC), in the surroundings of Ancona (Paolucci 1890-91 sub *L. italicum* A. Br.); R.

Lolium perenne L. – H caesp – Circumboreal – Grasslands, uncropped fields, ruderal environments; C.

Lolium remotum Schrank – T scap – Paleotemperate – Montacuto's hill at the western boundary of the investigated area (Paolucci 1890-91 sub *L. linicola* Sond); NP.

Lolium rigidum Gaudin subsp. *lepturoides* (Boiss.) Sennen & Mauricio – T scap – Stenomediterranean – Dune at the mouth of River Musone, in Mount Conero (Brilli Cattarini 1967; Biondi 1986; Biondi & Baldoni 1996); RR.

Lolium temulentum L. subsp. *temulentum* – T scap – Subcosmopolitan – Uncropped fields in the SW medium slope of Mount Conero, along the road to the ancient Monastery of San Pietro (PESA); R.

Melica ciliata L. subsp. *ciliata* – H caesp – Eurimediterranean – Xeric grasslands in Valle delle Vellare and in Portonovo (ANC), Mount Conero, shrublands above the beach of Due Sorelle (Biondi 1986); Mount Conero (Paolucci 1890-91); R.

Melica ciliata L. subsp. *magnolii* (Gren. & Godr.) Husn. – H caesp Stenomediterranean-Turanian – Arid grasslands. Reported for Mount Conero (Béguinot 1905 sub *M. ciliata* L. var. *magnolii* Gren *et* Godr.); NP.

Melica minuta L. – H caesp – Stenomediterranean – Thermophilous holm oak woods and shrublands in the south-eastern slope of Mount Conero under the ancient Monastery of San Pietro, in the southern slope at the upper valley of Fosso di San Lorenzo and under the Marine Barracks, along the SE side of Fosso Mortarolo, N and NE slopes next to San Benedetto's cave, between the ancient Monastery and Acqua Puzza, between Due Sorelle and Scoglio della Vela, between Punta dei Libri and Passo del Lupo (Valle delle Vellare and Valle Ombrosa) (ANC, PESA). "….*nel monte di Ancona*…." (Parlatore 1848 sub *M. major* Sibth.), Mount Conero (Paolucci 1890-91 sub *M. major* Sibth; Béguinot 1905, sub *M. pyramidalis* Lam., Brilli-Cattarini 1967). The localities on the promontory are marking the northern limit of the species's distribution along the Italian Adriatic coast; R.

Melica transsilvanica Schur subsp. *transsilvanica* – H caesp – S-European-S-Sibiric Xeric grasslands; NC.

Melica uniflora Retz. H caesp Paleotemperate Woods and shrublands; NC.

Monerma cylindrica (Willd.) Cosson et Durieu – T scap – Eurimediterranean Annual meadows, uncropped fields, areas behind dunes; NC.

Ochlopoa annua (L.) H. Scholz T caesp Cosmopolitan – Annual meadows, ruderal environments; C.

Ochlopoa infirma (Kunth) H. Scholz T caesp Eurimediterranean Annual meadows, ruderal environments, uncropped fields; C.

Panicum capillare L. – T scap – Adventive Ruderal environments, wet areas; NC. *Panicum miliaceum* L. – T scap – Adventive Ruderal environments, uncropped fields; NC. *Parapholis incurva* (L.) C. E. Hubb. – T scap – Stenomediterranean-Atlantic Annual meadows, seasands; NC.

Parapholis strigosa (Dumort.) C. E. Hubb. – T scap – Mediterranean-Atlantic – Wet and sub-humid backdune's depressions between Case Marcelli and the mouth of River Musone (Brilli-Cattarini *in verbis*); NP.

Paspalum dilatatum Poir. – H caesp – Adventive (S-America) – Spontaneous in ruderal environments in the S slope of Mount Conero near Fonte d'Olio (ANC); R.

Paspalum distichum L. – G rhiz – Subcosmopolitan – Ruderal environments, wetlands; NC.

Phalaris aquatica L. – H caesp – Stenomediterranean – Uncropped fields, ruderal environments. Recorded next to the mouth of River Musone; R.

Phalaris brachystachys Link – T scap – Stenomediterranean – Uncropped fields, cultivated fields, ruderal environments; NC.

Phalaris canariensis L. – T scap – Eurimediterranean – Spontaneous in wetlands, ruderal environments, cultivated fields; R.

Phalaris caerulescens Desf. – H caesp – Stenomediterranean – Wetlands near the mouth of River Musone (ANC; PESA), lower part of Fosso Betelico (PESA); Sirolo (Paolucci 1890-91); R.

Phalaris minor Retz. – T scap – Subtropical – Uncropped fields, cultivated fields, ruderal environments; C.

Phalaris paradoxa L. – T scap – Stenomediterranean – Cultivated fields, uncropped fields, ruderal environments; C.

Phalaris truncata Guss. H caesp – S-Eurimediterranean – Ruderal environments. Path of La Vedova, Monti del Trave, Monte dei Corvi (Brilli-Cattarini *in verbis*); Trave (Paolucci 1890-91); R.

Phleum arenarium L. subsp. *caesium* H. Scholz – T scap – Stenomediterranean-Atlantic – Annual meadows, beaches, dunes, backdunes. It has been observed between Case Marcelli and the mouth of River Musone near the sea; R.

Phleum bertolonii DC. – H caesp – Eurimediterranean – Grasslands, uncropped fields; NC.

Phleum paniculatum Huds. – T scap – Eurimediterranean – Grasslands. It has been observed in the SE side of Mount Conero next to San Benedetto's cave (PESA); R.

Phleum subulatum (Savi) Asch. & Graebn. – T scap – Stenomediterranean – Uncropped fields next to Pian dei Raggetti (Brilli-Cattarini *in verbis*); R/NP.

Phragmites australis (Cav.) Trin. ex Steud. subsp. *australis* – G rhiz – Subcosmopolitan – Wetlands, ruderal environments, ponds and waterways; C.

Piptaterum miliaceum (L.) Coss. subsp. *thomasii* (Duby) Freitag – H caesp – Stenomediterranean – Uncropped fields and roadsides near Sirolo (along the road to San Michele's beach) and near Poggio (ANC); Portonovo, frequent near Lago Profondo and the abandoned quarry; NC.

Piptatherum miliaceum (L.) Coss. subsp. *miliaceum* – H caesp – Stenomediterranean – Uncropped fields, shrublands and ruderal environments. It has been observed on Mount Conero (ANC). It is not possible to decide to which entities the Paolucci's indication for Trave and Pietralacroce sub *Piptatherum multiflorum* (Cav.) P. Beauv. has to be referred to (1890-91); R.

Piptatherum virescens (Trin.) Boiss. – H caesp – S-European–S-Sibiric – Woods, shrublands. The species has been found in the E and SE sides of Mount Conero between the San Benedetto's cave and the ancient Monastery of San Pietro (PESA); R.

Poa angustifolia L. H caesp Eurasian – Big quarry of Portonovo; Coppo, next to Sirolo (PESA); NC.

Poa bulbosa L. – H caesp – Paleotemperate Grasslands, ruderal environments; NC.

Poa compressa L. – H caesp – Circumboreal – Uncropped fields. It has been found on Mount Conero (Béguinot 1905; Paolucci 1890-91), in the SE slope between San Benedetto's cave and the ancient Monastery of San Pietro (1968, Brilli-Cattarini *in litteris*); R.

Poa nemoralis L. subsp. *nemoralis* – H caesp – Circumboreal – Woods, shrublands; NC.

Poa pratensis L. – H caesp – Circumboreal – Grasslands, uncropped fields; NC.

Poa sylvicola Guss. – H caesp – Eurimediterranean – Grasslands, uncropped fields, ruderal environments, wetlands; C.

Poa trivialis L. – H caesp – Eurimediterranean – Grasslands, uncropped fields, ruderal environments, wetlands; NC.

Polypogon monspeliensis (L.) Desf. – T scap – Subtropical – Grasslands and uncropped fields; NC.

Polypogon viridis (Gouan) Breistr. – H caesp – Subtropical – Wet uncropped fields; NC.

Psilurus incurvus (Gouan) Schinz & Thell. – T scap – Eurimediterranean – Uncropped fields between Case Marcelli and the mouth of River Musone (PESA) and next to the Due Sorelle beach (Biondi 1986); R.

Rostraria cristata (L.) Tzvelev subsp. *cristata* – T scap – Subcosmopolitan – Uncropped fields, ruderal environments; C.

Rostraria litorea (All.) Holub – T scap – Stenomediterranean – Annual meadows, beaches; NC.

Schedonorus arundinaceus (Schreb.) Dumort. subsp. *arundinaceus* – H caesp – Paleotemperate – Wetlands; NC.

Sclerochloa dura (L.) P. Beauv. – T scap – Eurimediterranean – Ruderal and trampled meadows; NC.

Setaria gussonei Kerguélen (*Setaria ambigua* (Guss.) Guss.) – T scap – Cosmopolitan – Uncropped fields, cultivated fields, ruderal environments; C.

Setaria pumila (Poir.) Roem. & Schult. – T scap – Subcosmopolitan – Uncropped fields, ruderal environments, cultivated fields; C.

Setaria verticillata (L.) P. Beauv. – T scap – Subtropical – Uncropped fields, ruderal environments, cultivated fields; C.

Setaria viridis (L.) P. Beauv. subsp. *viridis* – T scap – Subcosmopolitan – Uncropped fields, ruderal environments, cultivated fields; C.

Sorghum bicolor (L.) Moench – G rhiz – Cosmopolitan – Cultivated fields, uncropped fields, ruderal environments; C.

Trachynia distachya (L.) Link – T scap – Stenomediterranean – Annual meadows. The species has been observed next to Trave and in Pietralacroce (Paolucci 1890-91), in the SE side between San Benedetto's cave and the ancient Monastery of San Pietro (1968, Brilli-Cattarini *in litteris*) and recently observed in the abandoned quarry of Portonovo; R.

Tragus racemosus (L.) All. – T scap – Cosmopolitan – Uncropped fields, backdune areas at Portonovo and between Case Marcelli and the mouth of River Musone, not recently observed; R.

Trisetaria panicea (Lam.) Maire – T scap – W-Stenomediterranean – Uncropped fields, ruderal environments; NC.

Triticum ovatum (L.) Raspail. (*Aegylops geniculata* Roth) – T scap – StenomediterraneanTuranian Annual meadows, uncropped fields, ruderal environments; C.

Vulpia ciliata Dumort. – T caesp – Eurimediterranean – Annual meadows, ruderal environments; NC.

Vulpia fasciculata (Forssk.) Fritsch – T caesp – Mediterranean-Atlantic – Beaches. The species has been found in Marcelli di Numana, Portonovo, Sirolo (PESA); Paolucci (1890-91) reported the species in Portonovo and Sirolo sub *V. uniglumis* Reich.; R.

Vulpia ligustica (All.) Link – T caesp – Stenomediterranean – Annual meadows, ruderal environments; C.

Vulpia myuros (L.) C. C. Gmel. – T caesp – Subcosmopolitan – Annual meadows, uncropped fields, ruderal environments; C.

Papaveraceae

Chelidonium majus L. – H scap – Circumboreal – Forest edges, ruderal environments; NC.

Fumaria barnolae Sennen & Pau subsp. *barnolae* – T rept – Mediterranean – Xeric uncropped fields and ruderal environments in Portonovo, Poggio and Casette di Poggio (PESA); R.

Fumaria capreolata L. subsp. *capreolata* – T rept – Eurasian – Uncropped xeric fields and ruderal environments; C.

Fumaria officinalis L. subsp. *officinalis* – T scap – Subcosmopolitan – Cultivated fields, uncropped fields, ruderal environments; C.

Fumaria parviflora Lam. – T scap – Eurimediterranean-Turanian – Cultivated fields; NC.

Glaucium flavum Crantz – H scap – Eurimediterranean – Portonovo (Paolucci 1890-91 sub *G. luteum* Scop.), dunes in Marcelli di Numana (ANC); R.

Papaver argemone L. subsp. *argemone* – T scap – Eurimediterranean-Turanian Mount Conero (Paolucci 1890-91); NP.

Papaver hybridum L. – T scap – Eurimediterranean-Turanian Annual meadows, cultivated fields, uncropped fields; NC.

Papaver rhoeas L. subsp. *rhoeas* – T scap – E-Mediterranean Annual meadows, cultivated fields, uncropped fields, ruderal environments; C.

Ranunculaceae

Adonis aestivalis L. s. l. – T scap – "*Fra le biade a Monte Conero ....*" (Paolucci 1890-91); NP. *Adonis annua* L. – T scap – Eurasian-N African Cultivated fields, uncropped fields; NC. *Anemone coronaria* L. – G bulb – Stenomediterranean Pietralacroce, Trave (Paolucci 1890-91). Once widespread in cultivated fields in almost all areas of the Park, now almost disappeared as a result of the agriculture abandonment. Present between Pietralacroce and Trave until the late '80s; NP.

Anemone hortensis L. subsp. *hortensis* – G bulb – C-N Mediterranean Cultivated fields, uncropped fields, ruderal environments, grasslands; C.

Clematis flammula L. – P lian – Eurimediterranean Woods, shrublands; C.

Clematis vitalba L. – P lian – European-Caucasian Woods, shrublands, forest mantles, forest edges; CC.

Clematis viticella L. – P lian – N-Mediterranean – Woods and forest edges at the mouth of Musone River and along Fosso Porchereccia; R.

Consolida regalis Gray subsp. *regalis* – T scap – Eurimediterranean – Cultivated fields; NC.

Delphinium halteratum Sm. subsp. *halteratum* – T scap – Stenomediterranean – Xeric uncropped fields near Massignano on the hills SE of the cemetery (PESA); R.

Eranthis hyemalis (L.) Salisb. – G rhiz – N-European – Woods; NC.

Helleborus foetidus L. subsp. *foetidus* – Ch suffr – Subatlantic – Woods; NC.

Hepatica nobilis Schreb. – G rhiz – Circumboreal – Hop hornbeam forests, mesophilous holm oak woods; C.

Nigella damascena L. – T scap – Eurimediterranean – Uncropped fields, cultivated fields; NC.

Ranunculus arvensis L. – T scap – Paleotemperate – Cultivated and uncropped fields; NC.

Ranunculus bulbosus L. subsp. *aleae* (Willk.) Rouy et Fouc. – H scap – Mediterranean-Atlantic Wetlands, uncropped fields; C.

Ranunculus ficaria L. subsp. *ficaria* – G bulb – W-European – Grasslands, wetlands, uncropped fields, woods; CC.

Ranunculus lanuginosus L. – H scap – European – Woods, forest edges; NC.

Ranunculus muricatus L. – T scap – Eurimediterranean – Wet and uncropped fields, ruderal environments. In Portonovo (Paolucci 1890-91). The presence of the species in areas next to the southern sector of the park (Scossicci, Piana dell'Aspio and Selva di Castelfidardo) suggests a wider diffusion in the park; R.

Ranunculus ophioglossifolius Vill. – T scap – Eurasian – Wet uncropped fields, waterways between Case Marcelli and the mouth of River Musone and along the lower course of Fosso Betelico (PESA); R.

Ranunculus parviflorus L. – T scap – Mediterranean-Atlantic – Near the mouth of River Musone, in Marcelli di Numana (ANC); R.

Ranunculus peltatus Schrank subsp. *baudotii* (Godr.) C.D.K. Cook – Hyd rooting – Mediterranean-Atlantic – The species diffused in coastal and subcoastal areas, is progressively becoming rare. It was found in stagnant waters at the mouth of the River Musone and along Fosso Betelico. Paolucci (1890-91) indicates the species as *R. aquatilis* in Portonovo; R (Rb).

Ranunculus repens L. – H rept – Subcosmopolitan – Wetlands, stagnant or slowly flowing fresh water, forest edges; C.

Ranunculus sardous Crantz s. l. – T scap – Eurimediterranean – Not common in wet grasslands but locally frequent in grasslands next to the River Musone; NC.

Ranunculus trichophyllus Chaix subsp. *trichophyllus* – Hyd rooting – European Species of slow and stagnant water found all over in Italy. In the area of the Park it can be found in the plain near the mouth of the River Musone, in Marcelli di Numana, in small channels and in areas inundated by water; in Fosso Porchereccia near Numana and along Fosso Betelico (ANC, PESA); R.

Ranunculus velutinus Ten. – H scap – N-Mediterranean – Wet grasslands, wet uncropped fields predominantly in the southern sector of the Park. Near Camerano, along Fosso Betelico at the affluence into Aspio River (PESA); NC.

Thalictrum lucidum L. – H scap – SE-European – Wetlands, forest edges. The reports of *Thalictrum flavum "...lenti corsi d'acqua ...in tutta la regione ma non molto comune... a Varano...ecc.*" (Paolucci 1890-91) are to be referred to this entity; NC.

Saxifragaceae

Saxifraga rotundifolia L. subsp. *rotundifolia* – H scap – Orophyte S-European-Caucasian – Woods, Fosso di S. Antonio (Brilli-Cattarini *in verbis*); R/RR.

Saxifraga tridactylites L. – T scap – Eurimediterranean – Grasslands; NC.

Crassulaceae

Sedum acre L. – Ch succ – Eurasian Rocky walls, walls, ruderal environments; NC.

Sedum album L. – Ch succ – Eurimediterranean Cliffs; NC.

Sedum boloniense Loisel. (= *S. sexangulare* auct., not L.) – Ch succ – C-European Rocky walls, ruderal environments, old walls; NC.

Sedum dasyphyllum L. – Ch succ – Eurimediterranean Rocky walls in the southern slope of Mount Conero: Scoglio del Libro, Passo del Lupo, in the upper part of Valle delle Vellare, between Punta dei Libri and Grotta degli Schiavi, at the tower of Portonovo, Villa Marchetti (PESA) and the Monastery of Mount Conero (PESA; Paolucci 1890-91); R.

Sedum rupestre L. subsp. *rupestre* – Ch succ W-C-European – In the upper part of Valle delle Vellare on rocky and xeric soil; NC.

Sedum sediforme (Jacq.) Pau – Ch succ – Stenomediterranean – Rocky walls, ruderal environments, old walls; NC.

Sempervivum tectorum L. – Ch succ – S-European Orophyte-NW African – Ruderal environments in Pietralacroce (Paolucci 1890-91); spontaneous in Pietralacroce, Poggio, Massignano, Sirolo and Numana on old walls or in arid environments close to houses; R. *Umbilicus horizontalis* (Guss.) DC. – G bulb – Stenomediterranean Spontaneous on road embankments at Svarchi (ANC), Angeli, Pietralacroce and Massignano; R.

Vitaceae

Vitis berlandieri Planchon x *V. riparia* Michx. – P lian – Adventive naturalized – Cultivated and uncropped fields; NC.

Vitis riparia Michx. – P lian – Adventive Ruderal environments; NC.

Vitis rupestris Scheele – P lian – Adventive – Riparian vegetation along the final part of River Musone, next to the mouth (ANC); NC.

Vitis vinifera L. subsp. *sylvestris* (C. C. Gmelin) Hegi – P lian – European Ruderal environments, wet grasslands; NC.

Zygophyllaceae

Tribulus terrestris L. – T rept – Cosmopolitan – Ruderal environments; NC.

Fabaceae

Amorpha fruticosa L. – P caesp – North America – Ruderal environments in the SW slope of Mount Conero, 400-450 m a. s.l. (Brilli-Cattarini *in litteris*); R.

Anthyllis barba-jovis L. – P caesp – W-Stenomediterranean – Species with strictly Mediterranean distribution, currently present along the western Adriatic coast only on the Gargano Peninsula and in Tremiti Islands. In XIX century its presence was observed on the limestone cliffs of the southern slopes of Mount Conero (Spadoni 1826-28). A specimen collected in 1808 by Filippo Narducci is preserved in the Herbarium of Florence (FI). It has not been found again despite the accurate researches conducted by many

botanists. According to the Regional Red List it falls into the category EW. Recently (September 2010) the species has been reintroduced through a project supported by Conero Nature Park and carried out by the Botanic Garden of the Politechnic University of Marche with the collaboration of the Jardí Botanic of the University of Valencia, using genetic material (seeds, cuttings, etc.) coming from the Gargano National Park precisely from San Menaio, the nearest locality of the Italian Adriatic side, where the species is abundant on limestone cliffs in similar ecologic conditions (Morbidoni & al. 2008; Biondi & Morbidoni 2010; Biondi 2012). Two years after the reintroduction, the seedlings have developed considerably and are already in the reproductive phase, there is also the presence of some seedlings grown spontaneously from seeds; R.

Anthyllis vulneraria L. subsp. *polyphylla* (DC.) Nyman – H scap – SE-European – Grasslands, garigues (ANC). Mount Conero (Béguinot 1905, sub *A. rubra*); R.

Anthyllis vulneraria L. subsp. *rubriflora* (DC.) Arcang. – H scap – Eurimediterranean – Mount Conero (Paolucci 1890-91); R.

Anthyllis vulneraria L. subsp. *weldeniana* (Rchb.) Cullen – H scap – SE-European – Grasslands, garigues (PESA); R.

Argyrolobium zanonii (Turra) P.W. Ball subsp. *zanonii* – Ch suffr – W-Mediterranean–Western – Mediterranean species having a fragmentary range. It is present in the xeric grasslands rich in chamaephytes on rocky soils by Massignano, in Pian Grande and in some localities of the calcareous massive of Mount Conero and on marly-arenaceous cliffs (ANC, PESA); R.

Astragalus glycyphyllos L. – H rept – S-European-S-Sibiric – Shrublands, forest edges; NC.

Astragalus hamosus L.– T scap – Eurimediterranean-Turanian – Grasslands, arid uncropped fields near Massignano, on the NW slope of Mount Conero at Pian Grande, on the south side along the road to the ancient Monastery, on the SW and SE slopes and above Passo del Lupo (PESA). The species was also recorded in the neighbouring Selva di Castelfidardo (Ballelli & al. 2001); R.

Astragalus monspessulanus L. subsp. *monspessulanus* – H ros – Eurimediterranean – Grasslands; NC.

Astragalus sesameus L. – T scap – Stenomediterranean – Species having a strictly Mediterranean distribution range, widespread in the western Adriatic coast from Ravenna to Apulia, where it underwent a gradual depletion in recent decades due to deterioration and sometimes to the disappearence of preferential environments. On the territory of the Park it was found in xeric grasslands in Pian dei Raggetti (ANC, PESA). It has been also observed in Pian Grande, in the area around Massignano (BrilliCattarini 1967; 1969) and in the neighbouring Selva di Castelfidardo (Ballelli & al. 2001); R.

Bituminaria bituminosa (L.) C. H. Stirt. – H scap – Eurimediterranean – Grasslands, garigues, uncropped fields, ruderal environments; CC.

Cercis siliquastrum L. subsp. *siliquastrum* – P scap – S-European–W-Asian – Ruderal environments in Mount Conero (Béguinot 1905); in Portonovo (Paolucci 1890-91). BrilliCattarini (1967) considered the species as native in the shrublands on the promontory; R.

Colutea arborescens L. – P caesp – Eurimediterranean Shrublands, woods of Mount Conero (Béguinot 1905; PESA); NC.

Coronilla minima L. subsp. *minima* – Ch suffr – W-Stenomediterranean – Grasslands; NC.

Coronilla scorpioides (L.) W. D. J. Koch – T scap – Eurimediterranean – Cultivated fields, uncropped fields; C.

Coronilla valentina L. – NP – SW-Stenomediterranean – Species having a western Mediterranean gravitation, the distribution of which regards mainly the Italian Tyrrhenian side, while in the Adriatic is discontinuous and finds on Conero its northern limit. In the Marche region, in addition to Mount Conero, it is known for some localities on the cliffs of the southern coast and in some inland localities on the mesotemperate belt of the calcareous Apennines. On Mount Conero it is present in many localities: Portonovo, Pian Grande, Valle delle Vellare, Fosso del Mortarolo, Valle Ombrosa, Passo della Croce, Passo del Lupo, along the cliff between Sirolo and Sassi Neri, in xeric and rocky places, on the rocks, in shrublands, in maquis, in *Ampelodesmos mauritanicus* shrublands and in garigues along the slopes facing the sea; NC (Cv-Am).

Cytisophyllum sessilifolium (L.) O. Lang – P caesp – SW-European – Woods, shrublands, wood mantles; NC.

Cytisus scoparius (L.) Link subsp. *scoparius* – P caesp – European – In Montacuto (Paolucci 1890-91 sub *Sarothamnus vulgaris* Wimm. (Spad.)); NP.

Dorycnium herbaceum Vill. – H scap – S-European-S-Sibiric – Grasslands, edges, uncropped fields; C.

Dorycnium hirsutum (L.) Ser. – Ch suffr – Eurimediterranean – Shrublands, garigues, grasslands; C.

Emerus major Mill. subsp. *emeroides* (Boiss. & Spruner) Soldano & F. Conti – NP – E European– It seems that it replaces completely or almost the subsp. *emerus* on Mount Conero and in much of the Conero Promontory. The intermediate forms between the two subspecies are not rare (Brilli-Cattarini 1969); C.

Galega officinalis L. – H scap – E-European-Pontic – Ruderal environments, forest edges; NC.

Genista tinctoria L. – Ch suffr – Eurasian – wood mantles; NC.

Gleditsia triacanthos L. – P caesp – N-American – Next to Camerano (Paolucci 1890-91), in San Germano, Massignano and Pietralacroce (Brilli-Cattarini *in verbis*); RR.

Hippocrepis biflora Sprengel – T scap – Eurimediterranean – Grasslands, annual meadows; NC.

Hippocrepis ciliata Willd. – T scap – Stenomediterranean – Species having a Mediterranean distribution, present throughout the Tyrrhenian coasts up to Liguria and along the Adriatic south-central coasts. On Mount Conero it is found in dry and rocky grasslands, in shrublands, in *Ampelodesmos mauritanicus* formations, at Portonovo, Pian Grande, Massignano and Pian dei Raggetti (PESA); NC.

Hippocrepis comosa L. subsp. *comosa* – H caesp – S-E-C-European – Grasslands; NC.

Lathyrus annuus L. – T scap – Eurimediterranean – Uncropped fields; NC.

Lathyrus aphaca L. subsp. *aphaca* – T scap – Eurimediterranean – Wetlands, cultivated fields, ruderal environments; NC.

Lathyrus cicera L. – T scap – Eurimediterranean – Cultivated fields, uncropped fields, ruderal environments; C/CC.

Lathyrus latifolius L. H scandent– S-European – Forest edges and ruderal environments. It should be reported to this species the citation of Paolucci (1890-91) of *L. sylvestris* L. "*Nei luoghi erbosi e boschivi, sparsa in tutta la regione... a Monte Conero e al Trave presso Ancona, ove l'ho raccolta*"; NC.

Lathyrus ochrus (L.) DC. – T scap – Stenomediterranean – Cultivated fields, uncropped fields. "*...presso Ancona*" (Paolucci 1890-91); R.

Lathyrus pratensis L. subsp. *pratensis* – H scap – Paleotemperate Grasslands, edges; NC.

Lathyrus sphaericus Retz. – T scap – Eurimediterranean – Woods, shrublands, uncropped fields; NC.

Lathyrus venetus (Mill.) Wohlf. – G rhiz – Pontic – On Mount Conero on the NW side underneath Pian Grande, in the NE side between the ancient Monastery of San Pietro and Frane Rosse (PESA). On Mount Conero (Paolucci 1890-91, sub *L. variegatus* Gr. *et* Godr.); next to Camerano and along Fosso Betelico; R.

Lathyrus vernus (L.) Bernh. – G rhiz – Eurasian – N side of Mount Conero, 300-500 m a.s.l.; (Brilli-Cattarini 1968; PESA); RR (Sc-Oc).

Lotus corniculatus L. subsp. *corniculatus* – H scap – Paleotemperate – Grasslands, uncropped fields, ruderal environments; CC.

Lotus edulis L. – T scap – Stenomediterranean – Backdunes of Marcelli di Numana (ANC, PESA), between Case Marcelli and the mouth of River Musone (Brilli-Cattarini 1969); R.

Lotus ornithopodioides L. – T scap – Stenomediterranean – Ruderal environments, backdunes, uncropped fields; C.

Lotus tenuis Waldst. & Kit ex Willd. – H scap – Paleotemperate – Wetlands; NC.

Medicago arabica (L.) Huds. – T scap – Eurimediterranean – Annual meadows, backdunes, cultivated fields, ruderal environments; C.

Medicago falcata L. subsp. *falcata* – H scap – Eurasian – Uncropped fields. At Trave (Paolucci 1890-91) and Massignano; R.

Medicago intertexta (L.) Mill. – T scap – W-Mediterranean-Macaronesian – Uncropped fields in the southern sector of the park. The species reaches in Ancona's territory the northern limit of its distribution range in the Adriatic side of the Italian Peninsula; R.

Medicago littoralis Loisel. – T scap – Eurimediterranean – Backdunes near Marcelli di Numana (ANC), Mount Conero, in Portonovo by Torre De Bosis (PESA); NC.

Medicago lupulina L. – T scap – Paleotemperate – Grasslands, annual meadows, uncropped fields, ruderal environments; CC.

Medicago marina L. Ch rept Eurimediterranean – Species widely distributed on the Mediterranean coastal sand dunes. It was found on the beach of Marcelli di Numana, next to the mouth of River Musone. According to the Regional Red List it falls into the category VU; RR.

Medicago minima (L.) L. – T scap – Eurimediterranean – Annual meadows, uncropped fields, ruderal environments; CC.

Medicago orbicularis (L.) Bartal. – T scap – Eurimediterranean – Cultivated fields, uncropped fields, ruderal environments; C.

Medicago polymorpha L. – T scap – Subcosmopolitan – Cultivated fields, uncropped fields, ruderal environments; C.

Medicago rigidula (L.) All. – T scap – Eurimediterranean – Ruderal environments; NC.

Medicago sativa L. – H scap – Eurasian – Spontaneous in uncropped fields; NC.

Medicago scutellata (L.) Mill. – T scap – Eurimediterranean – Cultivated and uncropped fields; NC.

Medicago truncatula Gaertn. – T scap – Stenomediterranean – Cultivated and uncropped fields; NC.

Melilotus albus Medik. – T scap – Subcosmopolitan – Wetlands, edges; NC.

Melilotus altissimus Thuill. – G rhiz – Eurosibiric – Wetlands, forest edges, ruderal environments; NC.

Melilotus indicus (L.) All. – T scap – Subcosmopolitan – Annual meadows; NC.

Melilotus officinalis (L.) Pall. – H biennial – Subcosmopolitan – Uncropped fields, ruderal environments; C.

Melilotus sulcatus Desf. – T scap – S-Stenomediterranean – Cultivated and uncropped fields; NC.

Onobrychis arenaria (Kit) DC. subsp. *arenaria* – H scap – S-European-S-Sibiric Uncropped fields in Pian Grande (PESA); R.

Onobrychis arenaria (Kit) DC. subsp. *tommasinii* (Jord.) Asch. & Graebn. – H scap – Amphi-Adriatic – Uncropped fields along the downhill to Portonovo and on the NW side of Mount Conero (PESA); RR.

Onobrychis viciifolia Scop. – H scap – Mediterranean-Montane – Spontaneous in garigues and grasslands; NC.

Ononis pusilla L. subsp. *pusilla* – H scap – Eurimediterranean – Garigues; NC.

Ononis reclinata L. – T scap – S-Mediterranean-Turanian – Mount Conero in Portonovo on the SE side next to Passo della Croce, on the lower W side next to Casa S. Antonio, on the NW side in Pian Grande, on the medium SW and S side (PESA); now the species seems to be disappeared; NP.

Ononis spinosa L. subsp. *spinosa* – Ch suffr – Eurimediterranean – Grasslands; NC.

Ononis viscosa L. subsp. *breviflora* (DC.) Nyman – T scap – W-Mediterranean – Next to La Gradina, on the lower E side of Mount Conero next to Casa Giardini, on the SE side along Fosso del Mortarolo (PESA). Probably the report of Paolucci (1890-91) of *O. viscosa* L. "*...le falde del Monte Conero Sirolo...*" is to be referred to this entity; R.

Pisum sativum L. subsp. *biflorum* (Raf.) Soldano – T scandent – Mediterranean – Next to the Monastery of Mount Conero (Paolucci 1890-91 sub *Pisum elatius* M.B.); in woods and shrublands along the SE slope between Belvedere and Fosso del Mortarolo (BrilliCattarini *in verbis*); R.

Pisum sativum L. subsp. *sativum* – T scandent– Cultivated – Uncropped fields. Varano (Paolucci 1890-91 sub *P. arvense* L.); NP.

Robinia pseudacacia L. – P scap – Cultivated (North America) – Woods, ruderal environments; C.

Scorpiurus muricatus L. – T scap – Eurimediterranean – Grasslands, annual meadows, dunes, backdunes, uncropped fields; C.

Paolucci (1890-91) reported for Pian Grande *Scorpiurus vermiculatus* L. The samples stored in the *Herbarium Picenum* of L. Paolucci that are probably the reason of the report of the species in the Marche Region, are small in size and in full anthesis so the diagnosis is rather difficult (the most important diagnostic character is related to the morphology of the legume). The presence of a single flower is the only thing that approaches the samples to *S. vermiculatus*, but the small size of the flowers and a lack of shaggy hairiness, which are typical diagnostic characters of *S. muricatus*, suggest that it is the latter entity. The presence of a single flower is attributable to the reduced development of the plant. The failure of finding *S. ver-*

miculatus by other researchers who, in the years following the investigations of Paolucci, have explored the territory of the park, is further evidence that the species in fact has never been present on Mount Conero.

Securigera cretica (L.) Lassen – T scap – S-European-S-Sibiric – Uncropped fields on the NW side of Mount Conero in Pian Grande (PESA), Varano (Paolucci 1890-91 sub *Coronilla cretica* L.), in the ancient quarry near the village of Poggio (ANC); R.

Securigera securidaca (L.) Degen & Dörfl. – T scap – Eurimediterranean – Grasslands, annual meadows, uncropped fields; C.

Securigera varia (L.) Lassen – H scap – S-European-S-Sibiric – Uncropped fields, ruderal environments; NC.

Spartium junceum L. – P caesp – Eurimediterranean – Woods, shrublands, grasslands; CC (Sj-Cs).

Sulla capitata (Desf.) B. H. Choi & H. Ohashi – T scap – W-Stenomediterranean – Species with western Mediterranean gravitation that finds on Mount Conero its northern limit of distribution along the Adriatic coast. It is found in dry and rocky places exposed to the sea in several places (PESA): Portonovo, Pian Grande, Passo del Lupo, Fosso di San Lorenzo, around Numana and between Case Marcelli and at the mouth of River Musone; R.

Sulla coronaria (L.) Medik. – H scap – W-Stenomediterranean – Garigues, grasslands, uncropped fields; CC.

Tetragonolobus maritimus (L.) Roth – H scap – Eurimediterranean-Pontic – Wetlands in Portonovo (ANC, PESA); R.

Trifolium angustifolium L. subsp. *angustifolium* – T scap – Eurimediterranean – Grasslands; C.

Trifolium arvense L. subsp. *arvense* – T scap – Paleotemperate – Vineyards in the south-western side of the Park (ANC); R.

Trifolium campestre Schreb. – T scap – Paleotemperate – Annual meadows, cultivated and uncropped fields; CC.

Trifolium dubium Sibth. – T scap – European-Caucasian – Wet uncropped fields along the River Musone and the lower course of Fosso Betelico (PESA); NC.

Trifolium echinatum M. Bieb. – T scap – S-European-S-Sibiric – At Trave (Paolucci 1890-91, sub *T. supinum* Savi.); seashore between Case Marcelli and the mouth of River Musone, in Varano and along the lower course of Fosso Betelico (PESA); NP.

Trifolium fragiferum L. subsp. *fragiferum* – H rept – Paleotemperate – Wetlands, ruderal environments; NC.

Trifolium incarnatum L. subsp. *incarnatum* – T scap – Eurimediterranean – Spontaneous in cultivated fields and uncropped fields; NC.

Trifolium lappaceum L. – T scap – Eurimediterranean – Annual meadows in the ancient quarry of Portonovo; R.

Trifolium nigrescens Viv. subsp. *nigrescens* – T scap – Eurimediterranean – Backdunes, ruderal environments; NC.

Trifolium pratense L. subsp. *pratense* – H scap – Eurosibiric – Uncropped fields, ruderal environments; C.

Trifolium repens L. subsp. *repens* – H rept – Paleotemperate – Grasslands, uncropped fields, forest edges and ruderal environments; C.

Trifolium resupinatum L. – T rept – Paleotemperate – Backdunes, ruderal environments; NC.
Trifolium scabrum L. subsp. *scabrum* – T rept – Eurimediterranean – Annual meadows in the back dune; C.
Trifolium squarrosum L. – T scap – Eurimediterranean In the abandoned "guazzo" and along Fosso Porchereccia at the mouth of River Musone (ANC, PESA); R.
Trifolium stellatum L. – T scap – Eurimediterranean Grasslands, annual meadows; C.
Trifolium suffocatum L. – T scap – Stenomediterranean Species with strictly Mediterranean distribution, rare in the Marche Region as well as along the Adriatic coast of the Peninsula, where it has a discontinuous distribution from Salento to northern Marche. It is found in dry grasslands and trampled backdune environments of Marcelli di Numana (ANC, PESA). According to the Regional Red List it falls into the category LR; R.
Trifolium tomentosum L. – T rept – Paleotemperate Xeric grasslands in Pian Grande (PESA). The species is rare in central and northern Italy; R.
Trigonella gladiata M. Bieb. – T scap – Stenomediterranean Mount Conero (BrilliCattarini 1967); NP.
Trigonella monspeliaca L. – T scap – Eurimediterranean – Species having a mainly Tyrrhenian distribution, present along the western Adriatic coast in Apulia, on Mount Conero and southern Istria. In the territory of the Park it has been reported by BrilliCattarini (1967) for Pian Grande; NP.
Vicia bithynica (L.) L. – T scap – Eurimediterranean – Uncropped fields, ruderal environments; C.
Vicia cracca L. subsp. *incana* (Gouan) Rouy – H scap – EurimediterraneanWAsian Grasslands, ruderal environments, uncropped fields; C.
Vicia dalmatica A. Kern. – H scap – Eurasian Ruderal environments next to the cemetery of Sirolo (ANC, PESA); R.
Vicia grandiflora Scop. – T scap – Eurasian Present in the neighborhoods of Castelfidardo in the western sector of Selva di Castelfidardo (PESA), observed in woods and shrublands in the NW side of Mount Conero in Pian Grande (Brilli-Cattarini *in verbis*); R.
Vicia hirsuta (L.) Gray – T scap – Subcosmopolitan Uncropped fields, ruderal environments; NC.
Vicia hybrida L. – T scap – Eurimediterranean Uncropped fields; NC.
Vicia loiseleurii (M. Bieb.) Litv. – T scap – Eurasian Uncropped fields and shrublands in the NW side of Mount Conero at Pian Grande (Brilli-Cattarini *in verbis*); RR.
Vicia lutea L. – T scap – Eurimediterranean Uncropped fields; NC.
Vicia parviflora Cav. – T scap – W-Mediterranean Uncropped fields; NC.
Vicia peregrina L. – T scap – Eurimediterranean-Turanian Uncropped fields and ruderal environments in the NW side of Mount Conero and in Pian Grande (PESA); R.
Vicia sativa L. subsp. *macrocarpa* (Moris) Arcang. – T scap – Eurimediterranean-Turanian – Backdunes and uncropped fields; C.
Vicia sativa L. subsp. *nigra* (L.) Ehrh. T Scandent Eurasian Cultivated fields, uncropped fields, backdunes environments; C.
Vicia sativa L. subsp. *sativa* – T scap – Eurimediterranean-Turanian – Spontaneous in grasslands, wetlands, cultivated fields and uncropped fields, ruderal environments; C.
Vicia sepium L. – H scap – Eurosibiric Forest edges, woodlands; NC.
Vicia tetrasperma (L.) Schreb. – T scap – Eurasian Uncropped fields and shrublands in the southern side of Mount Conero next to the Marine Barracks (Brilli-Cattarini *in verbis*); R.

Vicia villosa Roth subsp. *varia* (Host) Corb. – T scap – Eurimediterranean Cultivated and uncropped fields, ruderal environments; C.

Polygalaceae

Polygala monspeliaca L. – T scap – Mediterranean – Grasslands and uncropped fields in Pian Grande, Pian dei Raggetti (PESA) and other localities on Mount Conero (BrilliCattarini 1967); R.

Polygala nicaeensis Risso ex W. D. J. Koch subsp. *mediterranea* Chodat – H scap – Eurimediterranean Grasslands; NC.

Rosaceae

Agrimonia eupatoria L. subsp. *eupatoria* – H scap – Subcosmopolitan Wetlands, forest edges, ruderal environments; NC.

Aphanes arvensis L. – T scap – Subcosmopolitan Cultivated fields, uncropped fields, ruderal environments on the S side of Mount Conero near the road to the ancient Monastery and on the low part of the eastern side between Casa Giardini and Casa Baldacci (PESA); R.

Crataegus laevigata (Poir.) DC. – P caesp – C-European Mount Conero on the W side over the Fosso di S. Antonio (PESA); R.

Crataegus monogyna Jacq. – P caesp – Paleotemperate Woods, shrublands, forest mantles; C.

Fragaria moschata Duchesne – H rept – C-European Mount Conero on the lower part of the western side over Poggio (PESA); R.

Fragaria vesca L. subsp. *vesca* H rept – Cosmopolitan Woods, shrublands, wood mantles; C.

Fragaria viridis Duchesne subsp. *viridis* H rept Eurosibiric Woods, shrublands, wood mantles; NC.

Geum urbanum L. – H scap – Eurasian – Hop Hornbeam woods in the southern slope of Mount Conero between the Marine Barracks and Pian dei Raggetti (Brilli-Cattarini *in verbis*); RR.

Malus domestica (Borkh.) Borkh. – P scap – Adventive naturalized (SE-Europe) Shrublands, areas of recolonization; R.

Malus sylvestris (L.) Mill. – P scap – C-Europ.-Caucas. Mount Conero in the SE side under the ancient San Pietro's Monastery (PESA); R.

Mespilus germanica L. – P caesp – S-European-Pontic – Shrublands and areas of recolonization. The species was also recorded for the neighbouring Selva di Castelfidardo (Ballelli & al. 2001); R.

Potentilla hirta L. – H scap – S-E European Shrublands, grasslands; NC.

Potentilla recta L. subsp. *recta* – H scap – S-European-S-Sibiric Xeric grasslands in the south-eastern side of Mount Conero (ANC); R.

Potentilla reptans L. – H ros – Subcosmopolitan Grasslands and wet uncropped fields, wet ruderal environments; C.

Prunus avium L. subsp. *avium* – P scap – Pontic Spontaneous in woods and in shrublands; C.

Prunus cerasifera Ehrh. [including var. *pissardii* (Carrière) L.H. Bailey] P caesp/P scap – Cultivated and spontaneous (W-Asian) – The species is considered naturalized in Italy (Celesti & al. 2009, 2010), while in the Marche region is considered to be accidental. In the Park territory is spontaneous in wet elm woods in the alluvial plain of River Musone (ANC); NC.

Prunus cerasus L. – P scap – Pontic – Spontaneous in shrublands and areas of re-colonization in the cliff between Sirolo and Sassi Neri (ANC) and on the medium S side of Mount Conero (upper the western branch of the valley of San Lorenzo), (PESA); R.

Prunus domestica L. s.l. – P scap – Cultivated – Spontaneous in ruderal environments; R.

Prunus spinosa L. subsp. *spinosa* – P caesp – European-Caucasian – Forests, shrublands, wood mantles; C.

Pyracantha coccinea M. Roem. – P caesp – Stenomediterranean – Mount Conero (Béguinot 1905 sub *Crataegus pyracantha*; Brilli-Cattarini 1967); Mount Conero, Trave, Varano (Paolucci 1890-91 sub *Crataegus pyracantha*); NP.

Pyrus pyraster Burgsd. – P scap – Eurasian – In shrublands and woods of the N and NW side of Mount Conero (ANC); R.

Pyrus spinosa Forssk. – P caesp – Stenomediterranean – Woods of Mount Conero in the NW side around Pian Grande (PESA); R.

Rosa agrestis Savi – NP – Eurimediterranean – Shrublands near the mouth of River Musone and near the ancient San Pietro's Monastery (ANC); R.

Rosa arvensis Huds. – NP – S-Stenomediterranean – Woods of Mount Conero (Brilli-Cattarini 1968); R.

Rosa canina L. s. l. – NP – Paleotemperate – The record refers to old reports, which are probably related, in large part, to the similar *R. squarrosa*; NC.

Rosa corymbifera Borkh. – NP – Paleotemperate – Shrublands and wood mantles; NC.

Rosa multiflora Thunb. – NP – E-Asian – Spontaneous next to the mouth of the River Musone (ANC). It is a new record for the species in the Marche region; R.

Rosa pouzinii Tratt. – NP – W-Mediterranean-Montane – Shrublands and grasslands (ANC); NC.

Rosa sempervirens L. – NP – Stenomediterranean – Woods, shrublands, wood mantles; C (Rs-Qv).

Rosa squarrosa (A. Rau) Boreau – NP – C-European – Shrublands and grasslands; C.

Rubus caesius L. – NP – Eurasian – Shrublands, ruderal environments, forests; C.

Rubus ulmifolius Schott – NP – Eurimediterranean – Shrublands, uncropped fields, ruderal environments. The Paolucci's report (1890-91) of *R. discolor* Weih. et Nees "*Dovunque presso Ancona...*" are almost certainly to be referred to this species; C.

Sanguisorba minor Scop. subsp. *balearica* (Bourg. ex Nyman) Muñoz Garm. & C. Navarro – H scap – Subcosmopolitan – Woods, shrublands, garigues and grasslands; C.

Sorbus aria (L.) Crantz subsp. *aria* – P caesp – Paleotemperate – Hop Hornbeam woods. Already indicated by Brilli-Cattarini (1969) as a species very rare in the area: "*... sul Conero è pianta rarissima, e la sua presenza è fatto del tutto eccezionale, costituente a nostro avviso un prezioso documento ai fini della ricostruzione delle vicende evolutive del manto vegetale di questa località*"; R (Sc-Oc).

Sorbus domestica L. – P scap – Eurimediterranean Mesophilous holm oak woods and shrublands; NC.

Sorbus torminalis (L.) Crantz – P caesp – Paleotemperate Mesophilous holm oak woods; NC.

ELAEAGNACEAE

Elaeagnus angustifolia L. – P scap – Adventive naturalized – Spontaneous in shrublands between San Michele and Sassi Neri; NC.

Rhamnaceae

Paliurus spina-christi Mill. – P caesp – SE-European – Shrublands and ruderal environments; C.

Rhamnus alaternus L. subsp. *alaternus* – P caesp – Eurimediterranean – Woods, shrublands, wood mantles; NC (Ce-Ra).

Ulmaceae

Ulmus minor Mill. subsp. *minor* – P scap – European-Caucasian – Woods, shrublands, wood mantles, forest edges; C (Sb-Um).

Ulmus glabra Hudson – P scap – European-Caucasian – Woods. The species has been found in Mancinforte wood in Camerano (ANC); RR.

Ulmus x hollandica Mill. – P scap – Cultivated – Naturalised on hedges; NC.

Cannabaceae

Humulus lupulus L. – P lian – European-Caucasian – Fosso Betelico, River Musone, between Casa Serenelli and Casa Tavoloni, along the Fosso Porchereccia and Rio Boranico (Brilli-Cattarini *in verbis*); R.

Moraceae

Broussonetia papyrifera (L.) Vent. – P caesp – Adventive-Naturalized (East Asia) – Ruderal environments. Around Camerano, along Fosso Betelico at the confluence with Aspio (PESA); NC.

Ficus carica L. – P scap – Eurimediterranean-Turanian – Ruderal environments, probably largely spontaneous; Brilli-Cattarini (1967) signalized for the cliffs of Mount Conero the var. *caprificus* Risso (PESA); NC.

Maclura pomifera (Raf.) C. K. Schneid. – P scap – Adventive-Naturalized (North America) – Ruderal environments near the mouth of River Musone, near Montacuto, Massignano and Casette di Poggio (Brilli-Cattarini *in verbis*); R.

Morus alba L. – P scap – Adventive-Naturalized (East Asia) – Ruderal environments; NC.

Urticaceae

Parietaria judaica L. – H scap – Eurimediterranean-Macaronesian – Ruderal environments; C.

Parietaria officinalis L. – H scap – C-European-W-Asian – Mesophilous forests, wood edges and screes; NC.

Urtica dioica L. subsp. *dioica* – H scap – Subcosmopolitan – Wood mantles, ruderal environments, forest edges; C.

Urtica pilulifera L. – T scap – S-Stenomediterranean – Ruderal environments; R.

Urtica urens L. – T scap – Subcosmopolitan – Ruderal environments (ANC), between Case Marcelli and the mouth of River Musone, near Camerano next to Casa Sergentoni (PESA). The species was also recorded for the neighbouring Selva di Castelfidardo (Ballelli & al. 2001); R.

Fagaceae

Quercus cerris L. – P scap – N-Eurimediterranean – Mesophilous woods on the cliff near Sirolo; R.

Quercus crenata Lam. – P scap – S-European – Mesophilous woods on the cliff near Sirolo; RR.
Quercus dalechampii Ten. – P scap – SE-European – Mesophilous woods on the cliff near Sirolo; R.
Quercus ilex L. subsp. *ilex* – P scap – Stenomediterranean – Woods of Mount Conero; C (Ch-Qi and Fo-Qi).
Quercus petraea (Matt.) Liebl. subsp. *petraea* – P scap – European (Sub-Atlantic) Reforestations; Ciacci (1965) erroneously recorded it as *Quercus rubra* (Biondi 1986); R.
Quercus pubescens Willd. subsp. *pubescens* – P caesp – SE-European – Woods, shrublands; C.
Quercus suber L. – P scap – W-Mediterranean – Portonovo (Paolucci 1890-91); NP.
Quercus trojana Webb subsp. *trojana* – P scap – NE-Mediterranean– Reforestations. According to Ciacci (1965), 970 kg of seeds have been planted; R.
Quercus virgiliana (Ten.) Ten. – P scap – SE-European (Pontic) – Woods; C.

Juglandaceae
Juglans regia L. – P scap – SE-European-SW-Asian – Cultivated and spontaneously reproduced in wet environments; NC.

Betulaceae
Alnus cordata (Loisel.) Desf. – P scap – Endemic – Reforestations; R.
Carpinus betulus L. – P scap – C-European-Caucasian – Mesophilous forests of Mount Conero (Paolucci 1890-91 "Spad.!"), Camerano, Montacuto valley, Monte Colombo and between Varano and Villa Ferretti. The species is also present in Selva di Castelfidardo (Ballelli & al. 2001) where it forms little and well-structured woods; R (Aa-Oc).
Corylus avellana L. – P caesp – European-Caucasian – Mesophilous forests; NC.
Ostrya carpinifolia Scop. – P caesp – Eurasian – Mesophilous forests; C.

Cucurbitaceae
Bryonia dioica Jacq. – G rhiz – Eurimediterranean – Shrublands and wetlands; NC.
Ecballium elaterium (L.) A. Rich. – G bulb – Eurimediterranean – Ruderal environments; NC.

Celastraceae
Euonymus europaeus L. – P caesp – Eurasian – Woods and mantles; C.
Euonymus latifolius (L.) Mill. – P caesp – Mediterranean-Montane Mesophilous woods and wood mantles at Pian Grande (Brilli-Cattarini *in verbis*) in Mount Conero (Paolucci 1890-91; Béguinot 1905); R.

Oxalidaceae
Oxalis articulata Savigny – G rhiz – Adventive (South America) – Spontaneous in ruderal environments; C.
Oxalis corniculata L. – H rept – Eurimediterranean – Ruderal environments; C.
Oxalis pes-caprae L. – G bulb – Adventive naturalized – Spontaneous in ruderal environments near Numana (ANC); R.

EUPHORBIACEAE

Chamaesyce canescens (L.) Prokh. subsp. *massiliensis* (DC.) Soják – T rept – Eurimediterranean – Uncropped fields, ruderal environments, around Numana and along Fosso della Porchereccia (PESA). The first record for Marche region of this species was done for the neighboring Selva di Castelfidardo (Ballelli & al. 2001); R.

Chamaesyce maculata (L.) Small – T scap – Adventive naturalized – Ruderal environments and uncropped fields; NC.

Chamaesyce peplis (L.) Prokh. – T rept – Eurimediterranean – Portonovo (Biondi 1986), dunes in the area of Marcelli di Numana (ANC, PESA); R.

Chamaesyce prostrata (Aiton) Small T rept – Adventive naturalized – Ruderal environments in the territories bordering the park, near the station of Ancona and in Porto Recanati (PESA); R.

Chrozophora tinctoria (L.) Raf. – T scap – Eurimediterranean-Turanian – Uncropped fields next to Fosso Betelico and Porchereccia (PESA); Massignano (Paolucci & Cardinali 1900); Mount Conero (Béguinot 1905); R.

Euphorbia amygdaloides L. subsp. *amygdaloides* – Ch suffr – European-Caucasian – Woods, forest edges; NC.

Euphorbia cyparissias L. – H scap – Central Europe – Uncropped fields, ruderal environments; CC.

Euphorbia dendroides L. – NP – Stenomediterranean – Shrublands on the eastern side of Mount Conero (Brilli-Cattrini 1967, 1968, 1976): "*Monte Conero: fruticeti, macereti, luoghi rocciosi e rupestri del versante orientale.*" Valle delle Vellare, over the Due Sorelle beach, within thick rocky population in Passo del Lupo, also in Spiaggia dei Gabbiani together with *E. veneta* (Biondi 1986). A new locality was recently found near Massignano (ANC). The localities on Mount Conero are the only ones known in the Marche region and in all the Adriatic side of the Italian peninsula north of Gargano; RR (Ce-Ed).

Euphorbia exigua L. subsp. *exigua* – T scap – Eurimediterranean – Ruderal environments, uncropped fields; C.

Euphorbia falcata L. subsp. *falcata* – T scap – Eurimediterranean – Uncropped fields and ruderal environments; C.

Euphorbia helioscopia L. subsp. *helioscopia* – T scap – Cosmopolitan – Cultivated fields, grasslands and ruderal environments; CC.

Euphorbia lathyris L. – H biennial – Eurimediterranean-Turanian – Spontaneous in ruderal environments; NC.

Euphorbia paralias L. – Ch frut – Eurimediterranean – Dunes of Marcelli di Numana (ANC, PESA). All along the Marche coast: "*Fra le ghiaie e le arene, accanto alle acque del mare lungo tutto il littorale, comune. Presso….Portonovo…*" (Paolucci 1890-91); Mount Conero (Béguinot 1905); RR.

Euphorbia peplus L. – T scap – Eurosibiric – Cultivated and uncropped fields, ruderal environments; C.

Euphorbia platyphyllos L. subsp. *platyphyllos* – T scap – Eurimediterranean – Uncropped fields, ruderal environments; NC.

Euphorbia terracina L. – T scap – Stenomediterranean – Between Case Marcelli and the mouth of River Musone (Brilli-Cattarini *in verbis*); NP.

Euphorbia veneta Willd. – NP – Illirian – Species widespread along the coasts of the Balkan peninsula whose presence in Italy is limited to Trieste and Conero. The record about the presence of this species along the coast between Nice and Ventimiglia (Biondi 1986) has not been confirmed. On Mount Conero, the species was found by Biondi (1981a, 1981b) sub. *Euphorbia characias* L. ssp. *wulfenii*. It is present only in the bottom of the cliff of Cala dei Gabbiani, on heaps of landslide debris which could be removed by winter storms (ANC, PESA). In any case, the plant has been recorded this year 2012, in the same place; RR.

Mercurialis annua L. – T scap – Paleotemperate – Ruderal environments; CC.

Mercurialis perennis L. – G rhiz – European-Caucasian – Woods; NC.

Phyllanthaceae

Andrachne telephioides L. – Ch suffr – Eurimediterranean – Grasslands and uncropped fields; NC.

Salicaceae

Populus alba L. – P scap – Paleotemperate Watercourses on marly-sandstone cliff. At Trave (Paolucci 1890-91); NC.

Populus canadensis Moench – P scap – Cultivated – Watercourses, ruderal environments; NC.

Populus deltoides Marshall – P scap – Cultivated – Along the River Musone; R. *Populus nigra* L. – P scap – Paleotemperate – Watercourses, ruderal environments; C.

Salix alba L. subsp. *alba* – P scap – Paleotemperate – Watercourses; C.

Salix alba L. subsp. *vitellina* (L.) Arcang. – P scap – Cultivated – Watercourses; NC.

Salix apennina A. K. Skvortsov – NP – Endemic – Watercourses; R.

Salix purpurea L. subsp. *purpurea* – P scap – Eurasian – Watercourses; NC.

Salix triandra L. subsp. *amygdalina* (L.) Schübl. & G. Martens – P caesp – Eurosibiric By the S. Antonio ditch (ANC) and along the River Musone; R.

Violaceae

Viola alba Besser subsp. *dehnhardtii* (Ten.) W. Becker – H ros – Eurimediterranean – Woods and shrublands; C.

Viola arvensis Murray subsp. *arvensis* – T scap – Eurasian – Cultivated fields, ruderal environments; C.

Viola odorata L. – H ros – Eurimediterranean – Spontaneous in hedges and ruderal environments; NC.

Viola reichembachiana Jord. ex Boreau – H scap – Eurosibiric – Woods; NC.

Linaceae

Linum bienne Mill. – H biennial – Eurimediterranean – Grasslands, ruderal environments; C.

Linum corymbulosum Rchb. – T scap – Stenomediterranean – Grasslands; C.

Linum strictum L. subsp. *spicatum* (Pers.) Nyman – T scap – Stenomediterranean – Dry uncropped fields and garigues; NC.

Linum strictum L. subsp. *strictum* – T scap – W-Mediterranean – Grasslands, uncropped fields, ruderal environments; NC.

Linum tenuifolium L. – Ch suffr– S-European-S-Sibiric – Grasslands; NC.
Linum trigynum L. – T scap – Eurimediterranean – Grasslands next to Trave (Paolucci 1890-91, sub *L. gallicum* L.); R.
Linum usitatissimum L. – T scap – Cultivated "*Si coltiva il lino in tutta la zona litorale e dei colli e cresce spesso inselvatichitio nel limite dei campi e dei prati*" (Paolucci 1890-91); NP.
Linum viscosum L. – H scap – Orophyte S-European – Grasslands; NC.

Hypericaceae
Hypericum perforatum L. subsp. *veronense* (Schrank) A. Fröhli – H scap – Paleotemperate – Grasslans, uncropped fields, ruderal environments; C.

Geraniaceae
Erodium ciconium (L.) L'Hér. – T scap – Eurimediterranean-Pontic – Ruderal environments, grasslands; C.
Erodium cicutarium (L.) L'Hér. – T scap – Subcosmopolitan – Ruderal environments, grasslands; C.
Erodium laciniatum (Cav.) Willd. subsp. *laciniatum* – T scap – Stenomediterranean – Sandy beaches between Numana and the mouth of River Musone (Brilli-Cattarini *in verbis*). Until 50-60 years ago the species was distributed along the Marche's coast from Pesaro to the mouth of River Tronto; currently it seems to be completely disappeared because of marine erosion and destruction of preferential environments due to human actions; NP.
Erodium malacoides (L.) L'Hér. subsp. *malacoides* – T scap – Stenomediterranean – Ruderal environments; C.
Geranium columbinum L. – T scap – S-European-S-Sibiric – Uncropped fields in the NW side of Mount Conero at Pian Grande (PESA); Mount Conero (Paolucci 1890-91); R.
Geranium dissectum L. – T scap – Eurasian – Cultivated fields, grasslands, ruderal environments; CC.
Geranium lucidum L. – T scap – Eurimediterranean – Forest edges; NC.
Geranium molle L. – T scap – Eurasian – Ruderal environments; CC.
Geranium purpureum Vill. – T scap – Eurimediterranean – Grasslands; NC.
Geranium robertianum L. – T scap – Subcosmopolitan – Forest edges; C.
Geranium rotundifolium L. – T scap – Paleotemperate – Ruderal environments; C.
Geranium sanguineum L. – H scap – European-Caucasian – Forest edges; NC.
Geranium tuberosum L. subsp. *tuberosum* – G rhiz – S-European-S-Sibiric Uncropped fields between Marcelli di Numana and the mouth of River Musone and near Poggio (PESA). "*...alle falde del Monte Conero*" (Paolucci 1890-91); R.

Lythraceae
Lythrum hyssopifolia L. – T scap – Subcosmopolitan Wetlands; NC.
Lythrum salicaria L. – H scap – Subcosmopolitan – Wetlands, watercourses; NC.
Lythrum tribracteatum Spreng. – T scap – Eurimediterranean – Wetlands at the mouth of River Musone (ANC), surroundings of Numana along Fosso Porchereccia and surroundings of Camerano along Fosso Betelico at the turnout into the River Aspio (PESA); R.

Onagraceae

Epilobium hirsutum L. – H scap – Paleotemperate – Wetlands, watercourses; C.

Epilobium parviflorum Schreb. – H scap – Paleotemperate – Wetlands at the mouth of River Musone, lower part of Fosso Betelico, Portonovo, Fosso della Porchereccia, along the coast between Case Marcelli and the mouth of River Musone (Brilli-Cattarini *in verbis*), ponds of Portonovo (Béguinot 1905); R.

Epilobium tetragonum L. subsp. *lamyi* (F. W. Schultz) Nyman – H scap – Mediterranean – Wetlands and along rivers; NC.

Epilobium tetragonum L. subsp. *tetragonum* – H scap – Paleotemperate – Wetlands and along rivers; NC.

Epilobium tetragonum L. subsp. *tournefortii* (Michalet) H. Lév. – H scap – Paleotemperate – Wetlands and along the watercourses; R/NC.

Anacardiaceae

Cotinus coggygria Scop. – NP – S-European-S-Sibiric – Shrublands at the beginning of the downhill to Portonovo (ANC, PESA); at Passo di Portonovo, above Frane Rosse and on the rocky slopes above the coast between Due Sorelle and Grotta degli Schiavi (PESA); R.

Pistacia lentiscus L. – P caesp – S-Stenomediterranean – Shrublands and woods; C.

Pistacia terebinthus L. subsp. *terebinthus* – P caesp – Eurimediterranean – Shrublands; NC.

Pistacia x saportae Burnat – P caesp – Stenomediterranean – Shrublands; R.

Rhus typhina L. – P scap – Adventive "*Monte Conero nel versante presso Massignano. E' singolare la presenza di questa specie americana nella indicata località, ove cresce insieme ad* Ailanthus glandulosa *Desf., inselvatichita, ne si sa donde uscita e da quanto resasi spontanea*" (Paolucci & Cardinali 1900 sub *R. typhinum* L.); Mount Conero (Béguinot 1905). It is still present a small population in Massignano; RR.

Sapindaceae

Acer campestre L. – P scap – European-Caucasian – Woods, shrublands; C.

Acer monspessulanum L. subsp. *monspessulanum* – P caesp – Eurimediterranean Mesophilous woods in Mount Conero (Béguinot 1905; Brilli-Cattarini 1967; 1968); R.

Acer negundo L. – P scap – Adventive naturalized – Woods, ruderal environments; NC.

Acer opalus Mill. subsp. *obtusatum* (Waldst. & Kit ex Willd.) Gams – P scap – SE-European – Mesophilous woods; NC.

Rutaceae

Ruta chalepensis L. – Ch suffr – S-Stenomediterranean – Uncropped fields in the cliff north of Sirolo, along the road from Sirolo to the beach of Sassi Neri, along the road to the Monastery of Mount Conero, southern slope above Fosso di San Lorenzo (PESA). "*Ex radicibus montis Anconitani ad mare*" (Bertoloni 1833-1854). Paolucci (1890-91 sub *R. bracteosa* DC.): "*non mi fu dato rinvenire più la* R. bracteosa *DC. spontanea al Monte Conero, ove l'avrebbe già raccolta Narducci*". Béguinot (1905 sub *R. bracteosa* DC.). Recently it has been observed next to the cemetery of Sirolo; R.

Ruta graveolens L. – Ch suffr – S-European-S-Sibiric – Uncropped fields at Poggio (Brilli-Cattarini *in verbis*); NP.

Simaroubacaee

Ailanthus altissima (Mill.) Swingle – P scap – Adventive naturalized – Woods, ruderal environments, waterways; C.

Malvaceae

Abutilon theophrasti Medicus – T scap – Europe-Temperate Asia – Currently, the species is considered as invasive in the whole Italian territory and also in the Marche region where it is rapidly spreading. In the Park territory it was recently observed in cultivated fields in the southern sectors; NC.

Althaea cannabina L. – H scap – S-European-S-Sibiric – Wetlands; NC.

Althaea hirsuta L. – T scap – Eurimediterranean – Annual meadows and ruderal environments; NC.

Althaea officinalis L. – H scap – SE-European – Wetlands, uncropped fields; NC.

Malope malacoides L. – T scap – E-Stenomediterranean – "*Nei luoghi argillosi del littorale, rara… presso Ancona (Barb., Parl.) .. ove l'ho raccolta*" (Paolucci 1890-91); "*Paolucci…cita…i dintorni di Ancona (ex Barbieri et Parlatore, e dove la raccolse egli stesso)*" (Brilli-Cattarini 1957); NP.

Malva multiflora (Cav.) Soldano, Banfi & Galasso – T scap – Stenomediterranean – Mount Conero in the big quarry of Portonovo (PESA); R.

Malva neglecta Wallr. – T scap – Paleotemperate – Ruderal environments; NC.

Malva sylvestris L. subsp. *sylvestris* – H scap – Eurosibiric – Ruderal environments; C.

Malva veneta (Mill.) Soldano, Banfi & Galasso – H biennial – Stenomediterranean – Spontaneous in roadsides and ruderal environments; NC.

Thymelaeaceae

Daphne laureola L. – P caesp – Subatlantic – Woods; NC.

Cistaceae

Cistus creticus L. subsp. *eriocephalus* (Viv.) Greuter & Burdet – NP – W-Stenomediterranean – Garigues; NC.

Cistus salviifolius L. – NP – Stenomediterranean – Shrublands and *Ampelodesmos mauritanicus* communities in the surrounding of Massignano near the cemetery (BrilliCattarini, 1969); R.

Fumana arabica (L.) Spach – Ch suffr – S-Stenomediterranean – Garigues in Portonovo. This locality marks the northern limit of distribution of this species along the Italian Adriatic coast. In the region it is a very rare species known, until now, for Mount Conero and for a few localities in the hinterland of San Benedetto (PESA). Mount Conero (Brilli-Cattarini 1967, 1968, 1969, 1976; Biondi & Baldoni 1996); R. (Aa-Ft).

Fumana ericifolia Wallr. – Ch suffr – Stenomediterranean – Garigues, shrublands; NC.

Fumana laevis (Cav.) Pau – Ch suffr – Stenomediterranean – Garigues and shrublands of Mount Conero (ANC, PESA); R (Aa-Ft).

Fumana procumbens (Dunal) Gren. & Godr. – Ch suffr – Eurimediterranean-Pontic – Garigues, shrublands; NC.

Fumana thymifolia (L.) Spach ex Webb – Ch suffr – Stenomediterranean – Garigues, shrublands; NC.

Helianthemum nummularium (L.) Mill. subsp. *obscurum* (Celak.) Holub – Ch suffr – European-Caucasian – Garigues, grasslands and uncropped fields; NC.
Helianthemum salicifolium (L.) Mill. – T scap – Eurimediterranean – Garigues, grasslands; NC.

Resedaceae
Reseda alba L. subsp. *alba* – T scap – Stenomediterranean – Annual meadows, dunes, backdunes, cultivated fields, uncropped fields; C.
Reseda lutea L. subsp. *lutea* – H scap – European – Annual meadows, backdunes, uncropped fields; C.
Reseda luteola L. – H scap – Eurasian – Uncropped fields in Portonovo (PESA), SE side of Mount Conero between San Benedetto's cave and the ancient San Pietro's Monastery (Brilli-Cattarini *in litteris* 1968). On Mount Conero and at Trave (Paolucci 1890-91); R.
Reseda phyteuma L. subsp. *phyteuma* – T scap – Eurimediterranean – Annual meadows and grasslands on Mount Colombo (ANC, PESA) and at Trave (Paolucci 1890-91); R/NC.

Capparaceae
Capparis spinosa L. subsp. *rupestris* (SM.) Nyman – NP – Eurasian (Subtropical) – Spontaneous on the walls due to ornithocory seed dispersal; R.

Brassicaceae
Alliaria petiolata (M. Bieb.) Cavara & Grande – H biennial – Paleotemperate – Forest edges, ruderal environments; C.
Alyssum campestre (L.) L. subsp. *campestre* – T scap – Eurimediterranean-Turanian – Annual meadows in the surroundings of Numana, along the seashore between Case Marcelli and the mouth of River Musone (PESA); R.
Arabidopsis thaliana (L.) Heynh. – T scap – Cosmopolitan – Cultivated fields, uncropped fields, ruderal environments; NC.
Arabis collina Ten. subsp. *collina* – H scap – Mediterranean – Montane Grasslands; NC.
Arabis sagittata (Bertol.) DC. – H biennial – SE-European – Shrublands and grasslands. In the territory of the Park an entity was found with intermediate characteristics between *Arabis hirsuta* and *A. sagittata* that deserves to be more studied; NC.
Arabis turrita L. – H biennial – S-European – Grasslands, forest edges; NC.
Barbarea vulgaris R. Br subsp. *vulgaris* – H scap – Cosmopolitan – Uncropped fields at the mouth of River Musone; R.
Brassica montana Pourr. – Ch suffr – W-SW-European – Shrublands, garigues, rocky walls, ruderal environments on limestone and marly-arenaceous cliffs. In Italy it presents a fragmentary range of distribution having a relic origin. The plant was always referred to *Brassica oleracea* L. subsp. *robertiana* (Gay) Rouy et Fouc. considered a synonym of *Brassica montana* by Snogerup & al. (1990); C (Rm-Br and B&M comm).
Brassica napus L. subsp. *napus* – T scap – / – H scap – Hybrid cultivated – Uncropped fields next to Aspio (Viegi & al. 2003); R.
Brassica rapa L. s. l. – T scap – / – H scap – Eurimediterranean – Uncropped fields on the north side of Mount Baldino next to Montacuto (PESA); NC.
Bunias erucago L. – T scap – N-Eurimediterranean – Ruderal environments; NC.
Cakile maritima Scop. subsp. *maritima* – T scap – Eurimediterranean – Beaches; NC (Sk-Cm).

Calepina irregularis (Asso) Thell. – T scap – Eurimediterranean-Turanian – Ruderal environments; NC.

Capsella bursa-pastoris (L.) Medik. subsp. *bursa-pastoris* – H biennial – Cosmopolitan – Backdunes, cultivated fields, ruderal environments; NC.

Capsella rubella Reut. – T scap – Eurimediterranean – Cultivated fields, ruderal environments; C.

Cardamine hirsuta L. – T scap – Cosmopolitan – Ruderal environments; C.

Cardamine impatiens L. subsp. *impatiens* – T scap – Eurasian – Forest clearings and shrublands in the SE side of Mount Conero by the San Benedetto's cave (PESA); R.

Diplotaxis erucoides (L.) DC. subsp. *erucoides* – T scap – W-Stenomediterranean – Cultivated fields, uncropped fields, ruderal environments; CC.

Diplotaxis muralis (L.) DC. – T scap – N-Mediterranean-Subatlantic – Cultivated fields, uncropped fields, ruderal environments; R.

Diplotaxis tenuifolia (L.) DC. – H scap – Submediterranean-Subatlantic – Garigues, uncropped fields, ruderal environments; C.

Draba muralis L. – T scap – Circumboreal – Ruderal environments; NC.

Erophila verna (L.) DC. subsp. *praecox* (Steven) Walp. – T scap – Eurasian – Ruderal environments, xeric grasslands; C.

Erophila verna (L.) Chevall. subsp. *verna* – T scap – Circumboreal – Forests, shrublands, wet uncropped fields; NC.

Eruca vesicaria (L.) Cav. – T scap – Mediterranean-Turanian – Spontaneous in ruderal environments on the eastern slope of Mount Conero next to Due Sorelle rocks (PESA); R.

Erysimum cheiri (L.) Crantz – Ch suffr – Eurimediterranean – Rocks and walls; NC.

Lepidium campestre (L.) R. Br. – T scap – European-Caucasian – Ruderal environments; NC.

Lepidium coronopus (L.) Al-Shehbaz – T rept – Subcosmopolitan – Ruderal environments; NC.

Lepidium didymus L. – T rept – Adventive naturalized Ruderal environments, uncropped fields; R/NC.

Lepidium draba L. subsp. *draba* – H scap – Eurimediterranean-Turanian – Grasslands, ruderal environments; C.

Lepidium graminifolium L. subsp. *graminifolium* – H scap – Eurimediterranean – Ruderal environments; NC.

Lunaria annua L. subsp. *annua* – H scap – SE-European – Spontaneous in wood edges, shrublands, roadsides; NC.

Lunaria annua L. subsp. *pachyrhiza* (Borbas) Hayek – H scap – SE-European – Shrublands and dry uncropped fields. SE side of Mount Conero between San Benedetto's cave and the ancient Monastery of San Pietro (PESA); R.

Matthiola incana (L.) R. Br. subsp. *incana* – Ch suffr – Stenomediterranean – Garigues and rocky walls; NC.

Myagrum perfoliatum L. – T scap – Adventive naturalized (SW Asian) – Mount Conero (Paolucci 1890-91), Pian Grande, Pian dei Raggetti, Mount of Trave, Fonte d'Olio, Coppo, Montacuto and Pietralacroce (Brilli-Cattarini *in verbis*); R.

Nasturtium officinale R. Br. subsp. *officinale* – H scap – Cosmopolitan – Slow-floating waters; NC.

Neslia paniculata (L.) Desv. subsp. *thracica* (Velen.) Bornm. – T scap – EurimediterraneanTuranian – Pietralacroce (Paolucci 1890-91); Trave hills next to Villa Vinanti (PESA); R.

Raphanus raphanistrum L. subsp. *landra* (DC.) Bonnier & Layens – T scap – Mediterranean-Atlantic – Pebbly dunes next to the mouth of River Musone, ruderal environments, uncropped fields, grasslands; NC.

Raphanus raphanistrum L. subsp. *raphanistrum* – T scap – European-W-Asian Grasslands, cultivated fields, uncropped fields, ruderal environments; C.

Raphanus sativus L. – T scap – Adventive naturalized – Ruderal environments (ANC); R.

Rapistrum rugosum (L.) Arcang. subsp. *linneanum* Rouy et Fouc. – T scap – C-W-Mediterranean – Grasslands of the NW side of Mount Conero, at Pian Grande and next to the ponds of Portonovo (PESA); R.

Rapistrum rugosum (L.) Arcang. subsp. *rugosum* – T scap – Eurimediterranean – Uncropped fileds, annual meadows; C.

Sinapis alba L. subsp. *alba* – T scap – E-Mediterranean – Ruderal environments, forest edges; CC.

Sinapis arvensis L. subsp. *arvensis* – T scap – Stenomediterranean – Uncropped fields; NC.

Sisymbrium irio L. – T scap – Paleotemperate – Uncropped fields, ruderal environments between Case Marcelli and the mouth of River Musone and at Angeli (Brilli-Cattarini *in verbis*); R.

Sisymbrium officinale (L.) Scop. – T scap – Paleotemperate – Uncropped fields, ruderal environments; NC.

Sisymbrium orientale L. subsp. *orientale* – T scap – Eurasian – Uncropped fields, ruderal environments next to Numana and Sirolo (Brilli-Cattarini *in verbis*); R.

Sisymbrium polyceratium L. – T scap – Eurimediterranean – Ruderal environments. In Numana (Paolucci 1890-91); R.

Thlaspi alliaceum L. – T scap – Mediterranean-Atlantic (Eurimediterranean) – Uncropped fields and ruderal environments; NC.

Thlaspi perfoliatum L. subsp. *perfoliatum* – T scap – Paleotemperate – Annual meadows, ruderal environments; C.

Santalaceae

Osyris alba L. – NP – Eurimediterranean – Woods, shrublands, wood mantles, garigues, grasslands, forest edges; C.

Thesium humifusum DC. – H scap – Eurimediterranean – Xeric grasslands and garigues; NC.

Viscum album L. subsp. *album* – P ep – Eurasian – Next to Trave (Paolucci 1890-91). In Montacuto, Angeli, Massignano, Pian dei Raggetti, in the lower part of Fosso Betelico and next to Varano (Brilli-Cattarini *in verbis*), not rcently recorded; NP.

Tamaricaceae

Tamarix africana Poir. – P caesp – W-Stenomediterranean – Shrublands; NC.

Tamarix chinensis Lour. – P caesp – E Asian (China and Korea) – Shrublands; NC.

Polygonaceae

Fallopia baldschuanica (Regel) Holub – P lian – C-Asian – Ruderal environments near

Numana, Pietralacroce, Poggio di Ancona, Montacuto, Angeli, Coppo and Varano; NC.

Fallopia convolvulus (L.) Á. Love – T scap – Circumboreal – Ruderal environments, uncropped fields; NC.

Fallopia dumetorum (L.) Holub – T scap – Eurosibiric – Woods, shrublands, ruderal environments. At the Fosso di Numana (ANC), between Pian dei Raggetti and Pian Grande, along Fosso di S. Antonio, Fosso Betelico, La Gradina (Brilli-Cattarini *in verbis*); R.

Persicaria amphibia (L.) Delarbre – G rhiz – Subcosmopolitan –Water courses (Biondi 1986); R.

Persicaria hydropiper (L.) Delarbre – T scap – Circumboreal – Ruderal environments, wet environments; NC.

Persicaria lapathifolia (L.) Delarbre subsp. *lapathifolia* – T scap – Cosmopolitan – Wet ruderal environments; NC.

Persicaria lapathifolia (L.) Delarbre subsp. *pallida* (With.) S. Ekman & Knutsson – T scap – CSE-European – Ruderal environments. In Pietralacroce and Poggio (Brilli-Cattarini *in verbis*); surrounding of Porto Recanati (PESA); R.

Persicaria orientalis (L.) Spach – T scap – Cultivated – Ruderal environments at the mouth of River Musone, Camerano, Pietralacroce, Villa del Trave, Montacuto, Varano, Massignano, Villa Fiume-Mare and Sirolo (Brilli-Cattarini *in verbis*); R.

Persicaria maculosa (L.) Gray – T scap – Subcosmopolitan – Wet ruderal environments; NC.

Persicaria dubia (Stein.) Fourr. – T scap – European-Caucasian Wetlands near the ditch of Numana; NC.

Polygonum arenastrum Boreau subsp. *arenastrum* – T rept – Subcosmopolitan – Uncropped fields, ruderal environments; NC.

Polygonum aviculare L. subsp. *aviculare* – T rept – Cosmopolitan – Cultivated fields, uncropped fields, ruderal environments; C.

Polygonum bellardii All. – T scap – Eurasian – Cultivated fields, uncropped fields, ruderal environments; NC.

Polygonum maritimum L. – H rept – Subcosmopolitan – Species of marine's dunes and of pebbly beaches, rare throughout the whole regional territory. It was reported for areas next to the Park along the coast between the mouth of River Musone and Porto Recanati (PESA; Raffaelli 1982). According to the Red Regional List this species falls into the category VU; R.

Rumex acetosella L. subsp. *pyrenaicus* (Pourr. ex Lapeyr.) Akeroyd – H scap – Subcosmopolitan – Uncropped fields. Along Fosso Porchereccia (Brilli-Cattarini *in verbis*). This species is known in the park only in the locality above mentioned, observed in the '60s. Probably, it deals with a relic from a much larger distribution now consisting of a small population of males that reproduce asexually; RR.

Rumex conglomeratus Murray – H scap – C-W Eurasian – Wet grasslands, rivers, ruderal environments; C.

Rumex crispus L. – H scap – Subcosmopolitan – Grasslands, uncropped fields, ruderal environments, forest edges; C.

Rumex obtusifolius L. subsp. *obtusifolius* – H scap – Subcosmopolitan Wet uncropped fields along River Musone (Brilli-Cattarini *in verbis*); R.

Rumex palustris Sm. – T scap – Eurasian – Backdune marshy depressions between Case Marcelli and the mouth of River Musone (Brilli-Cattarini *in verbis*); NP.

Rumex pulcher L. subsp. *pulcher* – H scap – Eurimediterranean – Ruderal environments; C.
Rumex pulcher L. subsp. *woodsii* (De Not.) Arcang. – H scap – Eurimediterranean – Ruderal environments near Massignano on the hills SE of the Cemetery (PESA); R.
Rumex sanguineus L. – H scap – Eurasian – Woods, wet uncropped lands. It is known in the Park for a single specimen located in a wooded strip along Rio Pecorara west of M. Colombo (Brilli-Cattarini *in verbis*) but to be researched in other areas of the Park; RR.

Caryophyllaceae
Agrostemma githago L. – T scap – European-Caucasian – In Montedago, Varano, S. Margherita etc. near Ancona (Paolucci 1890-91, sub *Lychnis githago*). Today it is no longer present in the territory probably because of changes in agricultural practices; NP.
Arenaria leptoclados (Rchb.) Guss. – T scap – Paleotemperate – Backdune environments, dry uncropped fields and garigues; NC.
Arenaria serpyllifolia L. subsp. *serpyllifolia* – T scap – Subcosmopolitan – Uncropped fields, ruderal environments; NC.
Cerastium arvense L. subsp. *suffruticosum* (L.) Ces. – H scap – CS European – Garigues, grasslands (Paolucci 1890-91); NP.
Cerastium brachypetalum Desp. ex Pers. subsp. *brachypetalum* – T scap – European – Annual meadows; NC.
Cerastium brachypetalum Desp. ex Pers. subsp. *tenoreanum* (Ser) Soo & Jav. – T scap – Mediterranean – Grasslands, garigues, annual meadows in the W slope of Mount Conero, in Sirolo and Pietralacroce (Brilli-Cattarini *in verbis*); R.
Cerastium diffusum Pers. subsp. *diffusum* – T scap – Stenomediterranean-Atlantic – Backdune environments; NC.
Cerastium glomeratum Thuill. – T scap – Subcosmopolitan – Cultivated fields, ruderal environments; NC.
Cerastium glutinosum Fr. – T scap – Eurimediterranean – Annual meadows, coastal steppes, xeric grasslands between Poggio and Massignano (PESA). Next to Trave (Paolucci 1890-91); R.
Cerastium holosteoides Fr. – H scap – Cosmopolitan – Cultivated fields, uncropped fields, ruderal environments; NC.
Cerastium semidecandrum L. – T scap – Cosmopolitan – Annual meadows, xeric grasslands, backdune environments; NC.
Cerastium siculum Guss. – T scap – Stenomediterranean – Xeric grasslands near the seashore in Numana and between Case Marcelli and the mouth of River Musone, by the coast of Portonovo at the Napoleonic Fort and Torre De Bosis, near the large quarry of Portonovo (PESA); R.
Herniaria glabra L. subsp. *glabra* – T scap – Paleotemperate – Backdunes environments between Numana and the mouth of River Musone (ANC, PESA); C.
Herniaria hirsuta L. subsp. *hirsuta* – T scap – Paleotemperate – Uncropped xeric fields; NC.
Minuartia hybrida (Vill.) Shischk. subsp. *hybrida* – T scap – Paleotemperate – Uncropped xeric fields; NC.
Minuartia mediterranea (Link) K. Malý – T scap – NW-Mediterranean – Uncropped xeric fields; NC.
Moehringia pentandra Gay – T scap – Eurimediterranean – Woods and shrublands in the

SE slope of Mount Conero next to San Benedetto's cave (PESA); R.

Petrorhagia prolifera (L.) P.W. Ball et Heywood – T scap – Eurimediterranean – Grasslands, uncropped fields; NC.

Petrorhagia saxifraga (L.) Link subsp. *saxifraga* – H caesp – Eurimediterranean Grasslands; NC.

Polycarpon tetraphyllum (L.) L. subsp. *alsinifolium* (Biv.) Ball – T scap – SStenomediterranean – Once widespread throughout the coast from Pesaro to the mouth of the River Tronto, it has rarefied following the disappearance of preferential environments determined by sea erosion and the human action (Brilli-Cattarini & Ballelli 1979); NP.

Polycarpon tetraphyllum (L.) L. subsp. *tetraphyllum* – T scap – Eurimediterranean – Ruderal environments; NC.

Sagina apetala Ard. subsp. *apetala* – T scap – Eurimediterranean – Ruderal environments; NC.

Sagina maritima G. Don – T scap – Stenomediterranean-Atlantic – Backdune environments; NC.

Sagina micropetala Rauschert – T scap – Eurimediterranean – Mount Conero in the NW side and in the large quarry of Portonovo; R.

Saponaria officinalis L. – H scap – Eurosibiric, currently – Subcosmopolitan – Ruderal environments, uncropped fields; R.

Silene canescens Ten. – T scap – Stenomediterranean – Mount Conero (Paolucci & Cardinali 1900); "*... comune nelle sabbie del litorale di tutta la regione...*" sub *S. serica* All. var. *canescens* (Ten..) Fiori (Brilli-Cattarini 1956); Portonovo, Due Sorelle valley, beaches between Sirolo and Numana and between Case Marcelli and the mouth of River Musone (PESA). In recent years it was no longer found and probably it is now disappeared due to the degradation of preferential environments; NP.

Silene cretica L. – T scap – E-Stenomediterranean – Next to Trave (Paolucci 1890-91); NP.

Silene gallica L. – T scap – Subcosmopolitan – Cultivated fields, grasslands, uncropped fields; R.

Silene italica (L.) Pers. subsp. *italica* – H ros – Eurimediterranean – Grasslands, uncropped fields, ruderal environments; C.

Silene latifolia Poir. subsp. *alba* (Mill.) Greuter & Burdet – H biennial – PaleotemperateEurasian – Forest edges, ruderal environments; C.

Silene muscipula L. subsp. *muscipula* – T scap – W-Mediterranean – Mount Conero (Béguinot 1905); NP.

Silene nemoralis Waldst. et Kit – H ros – SW-Mediterranean-Montane – Sparse bushes and rocky and xeric grasslands in the NE slope of Mount Conero at the "Frane Rosse" (PESA); R.

Silene nocturna L. – T scap – S-Mediterranean-Macaronesian – At Trave (Paolucci 1890-91); backdunes in Marcelli di Numana beach; cultivated fields and uncropped fields in the surroundings of Massignano, on the SE hills of the cemetery, in the medium SW slope of Mount Conero and on the SE side next to San Benedetto's cave (PESA); recently observed at the ancient quarry of Portonovo and in Sirolo; also recorded for the neighbouring Selva di Castelfidardo (Ballelli & al. 2001); R.

Silene otites (L.) Wibel subsp. *otites* – H ros – Eurasian – Grasslands; R.

Silene viridiflora L. – H ros – S-European-C-Asian – Xeric and stony grasslands in the SE slope of Mount Conero, next to San Benedetto's cave (PESA); R.

Silene vulgaris (Moench) Garcke subsp. *tenoreana* (Colla) Soldano & F. Conti – H caesp E-Mediterranean – Grasslands, retrodunal pebbly garigues altered by human activities (ANC), uncropped fields, forest edges; R.

Silene vulgaris (Moench) Garcke subsp. *vulgaris* – H scap – Subcosmopolitan – Grasslands, uncropped fields, forest edges; C.

Spergularia bocconei (Scheele) Graebn. – T scap – Subcosmopolitan – Arid uncropped fields, along the coast near the mouth of River Musone (ANC, PESA); R.

Spergularia salina J. & C. Presl – T scap – Subcosmopolitan – Xeric uncropped fields at the foot of the NE slope of Mount Conero, in the eastern slope next to Due Sorelle rocks, near the seashore of the lower NE side between Due Sorelle and Grotta degli Schiavi, Marcelli di Numana seashore (ANC, PESA); R.

Stellaria media (L.) Vill. subsp. *media* – T rept – Cosmopolitan – Ruderal environments, cultivated fields, uncropped fields, forest edges; C.

Stellaria neglecta Weihe – T scap – Paleotemperate – Uncropped fields; NC.

Stellaria pallida (Dumort.) Crép. – T scap – Paleotemperate – Ruderal environments, uncropped fields, cultivated fields; R.

Vaccaria hispanica (Mill.) Rauschert – T scap – W-Asian – Next to Trave (Paolucci 1890-91); in Massignano, Coppo, Trave, Montacuto (Brilli-Cattarini *in verbis*); NP.

AMARANTHACEAE

Amaranthus albus L. – T scap – Adventive naturalized (North America) – Cultivated fields, uncropped fields, ruderal environments; NC.

Amaranthus blitoides S. Watson – T scap – Adventive naturalized – Ruderal environments; NC.

Amaranthus blitum L. subsp. *blitum* – T scap – Eurimediterranean – Cultivated fields, uncropped fields in Numana (Paolucci 1890-91); R.

Amaranthus cruentus L. – T scap – Adventive naturalized – Ruderal environments; NC.

Amaranthus deflexus L. – T scap – Adventive naturalized (South America) – Cultivated fields, uncropped fields, ruderal environments; C.

Amaranthus graecizans L. – T scap – Paleosubtropical – Cultivated fields, uncropped fields, ruderal environments; NC.

Amaranthus retroflexus L. – T scap – Cosmopolitan – Cultivated fields, uncropped fields, ruderal environments; C.

Atriplex halimus L. – P caesp – Subcosmopolitan – Species with a main Tyrrhenian distribution, it is present along the Adriatic coast only sporadically. In the territory of the Park it has been found, as naturalised species, in uncropped fields by the sea and along the paths of the marly-arenaceous cliffs where it can build small hedges; R.

Atriplex patula L. subsp. *patula* – T scap – Circumboreal – Cultivated fields, ruderal environments; NC.

Atriplex portulacoides L. – Ch frutt – Circumboreal – Creek of Due Sorelle; NP.

Atriplex prostrata Boucher ex DC. – T scap – Circumboreal – Numana's harbor, cliff ofNumana, dunes and backdunes in Marcelli di Numana (ANC); NC.

Bassia laniflora (S. G. Gmel.) A. J. Scott – T scap – Eurasian Coastal plains between Case Marcelli and the mouth of River Musone (Brilli-Cattarini *in verbis*). The species was present until the end of the '60s, currently it can be considered extinct in the Marche region; NP.

Bassia scoparia (L.) A. J. Scott subsp. *scoparia* – T scap – Adventive Spontaneous in ruderal environments; R.

Beta vulgaris L. subsp. *maritima* (L.) Arcang. – H scap – Eurimediterranean Backdunes; NC.

Beta vulgaris L. subsp. *vulgaris* – H biennial – Eurimediterranean – Uncropped fields, ruderal environments; NC.

Chenopodium album L. subsp. *album* – T scap – Subcosmopolitan – Cultivated fields, ruderal environments; C.

Chenopodium ambrosioides L. – T scap – Cosmopolitan – Ruderal environments; C.

Chenopodium murale L. – T scap – Subcosmopolitan Ruderal environments; NC.

Chenopodium opulifolium Schrad. ex W. D. J. Koch & Ziz – T scap – Paleotemperate – Cultivated fields, ruderal environments; NC.

Chenopodium polyspermum L. – T scap – Circumboreal Cultivated fields, uncropped fields, ruderal environments; NC.

Chenopodium urbicum L. – T scap – Subcosmopolitan – Cultivated fields, uncropped fields, ruderal environments; NC.

Chenopodium vulvaria L. – T scap – Eurimediterranean – Cultivated fields, uncropped fields, ruderal environments; NC.

Polycnemum arvense L. – T scap – Eurasian – Dry uncropped fields in Fonte d'Olio (BrilliCattarini *in verbis*); R.

Salicornia patula Duval-Jouve – T succ – Stenomediterranean Up to end of the '60s this species was present in the ponds of Portonovo. Currently, the species has disappeared in the Park; NP.

Salsola tragus L. subsp. *pontica* (Pall.) Rilke – T scap – Paleotemperate Dunes in Marcelli di Numana (ANC). "*Nelle arene marittime di quasi tutto il litorale…a Portonovo…*"(Paolucci 1890-91). The species has became very rare due to a strong alteration and destruction of coastal habitats in which it lives; R. (Sk-Cm).

Salsola soda L. – T scap – Paleotemperate – Dunes in Marcelli di Numana (ANC); coastal gravels of Portonovo, no longer found after the '70s (PESA), recently found in Mezzavalle gravel dunes; R.

Suaeda maritima (L.) Dumort. – T scap – Cosmopolitan Present until the late '60s in the backdune wet depressions between Case Marcelli and the mouth of River Musone (Brilli-Cattarini *in verbis*), now extinct; NP.

Aizoaceae

Carpobrotus acinaciformis (L.) L. Bolus – Ch suffr – Adventive naturalized – Spontaneous on the seashore in Portonovo area; R.

Carpobrotus edulis (L.) N.E. Br. – Ch suffr – Adventive naturalized Spontaneous on the cliffs of Ancona (cliffs of Gallina) (Viegi & al. 2003); R.

Phytolaccaceae

Phytolacca americana L. – G rhiz – Adventive naturalized (North America) – Uncropped fields, ruderal environments; R.

Portulacaceae

Portulaca oleracea L. s. l. – T succ – Subcosmopolitan – Ruderal environments; C.

Cactaceae

Opuntia ficus-indica (L.) Miller P succ – Adventive naturalized Spontaneous in rocky areas near Casette di Poggio; R.

Cornaceae

Cornus mas L. – P caesp – SE European-Pontic – Woods, N slope of Mount Conero above Pian Grande, 425-450 m a.s.l.; S slope in the upper west branch of Vallone di S. Lorenzo, 325-350 m a.s.l.; R.

Cornus sanguinea L. subsp. *hungarica* (Kárpáti) Soo – P caesp – Amphi-Adriatic Shrublands, wood mantles; C.

Primulaceae

Anagallis arvensis L. subsp. *arvensis* – T rept Eurimediterranean – Cultivated fields, uncropped fields, ruderal environments; C.

Anagallis foemina Mill. – T rept – Subcosmopolitan – Cultivated fields, uncropped fields, ruderal environments; NC.

Asterolinon linum-stellatum (L.) Duby – T scap – Stenomediterranean – Annual meadows in the beach between Case Marcelli and the mouth of River Musone; in Pian dei Raggetti and in Pian Grande (PESA); R.

Cyclamen hederifolium Aiton subsp. *hederifolium* – G bulb – N-Stenomediterranean – Woods; C.

Cyclamen repandum Sm. subsp. *repandum* – G bulb – NW-Stenomediterranean – Woods; NC.

Lysimachia nummularia L. – H scap – European-Caucasian – Wetlands; NC.

Lysimachia punctata L. – H scap – SE-European – Wetlands at the mouth of River Musone, at Villa Fiume Mare, Fosso Porchereccia, lower course of Fosso Betelico (ANC, PESA); R.

Primula vulgaris Huds. subsp. *vulgaris* – H ros – European-Caucasian – Woods; NC.

Samolus valerandi L. – H scap – Cosmopolitan Wetlands, "*.. a Portonovo e a Santa Margherita ove l'ho raccolta presso Ancona*" (Paolucci 1890-91); between Case Marcelli and the mouth of River Musone (PESA); recently two plants have been observed along the path of Mezzavalle in a small wet puddle; R.

Ericaceae

Arbutus unedo L. – P caesp – Stenomediterranean – Woods, shrublands, wood mantles; C.

Erica arborea L. – P caesp – Stenomediterranean – Woods and shrublands in the W slope of Mount Conero over Fosso di S. Antonio, in the high S slope (head of Valle del Mortarolo), between 350 and 400 m a.s.l. (PESA); R.

Rubiaceae

Asperula aristata L. f. subsp. *longiflora* (Waldst. & Kit) Hayek – H scap – Eurimediterranean – Garigues and *Ampelodesmos mauritanicus* formations; NC (Aa-Ft).

Asperula arvensis L. – T scap – Eurimediterranean – This plant was common in the past, now is sporadic in cultivated and uncropped fields; it has been observed along the road to the ancient Monastery of San Pietro (PESA); R.

Asperula laevigata L. – H scap – W-Stenomediterranean – Garigues, grasslands, "*... sul Monte Conero ove l'ho raccolta*." (Paolucci 1890-91), Mount Conero (Béguinot 1905);

woods on the high southern side next to the head of the Valle del Mortarolo (PESA); R.

Asperula purpurea (L.) Ehrend. subsp. *purpurea* – Ch suffr – Orophyte SE-European – Garigues, xeric grasslands; NC.

Crucianella latifolia L. – T scap – Stenomediterranean – Slope facing the sea of Mount Conero (Béguinot 1905); Mount Conero (Brilli-Cattarini 1967), "*Monte Conero: fruticeti e luoghi erbosi e sassosi presso il litorale di Portonovo, circa 5 m ...*" (BrilliCattarini 1971; PESA); the species is now extinct in the Park territory due to environmental transformation of native zones (Biondi & Paradisi 2006); NP.

Cruciata glabra (L.) Ehrend. subsp. *glabra* – H scap – Eurasian – Grasslands, ruderal environments, forest edges; NC.

Cruciata laevipes Opiz – H scap – Eurasian – Grasslands, ruderal environments; C.

Galium aparine L. – T scap – Eurasian – Cultivated fields, grasslands, uncropped fields, ruderal environments; C.

Galium corrudifolium Vill. – H scap – Stenomediterranean – Garigues and xeric grasslands; NC.

Galium debile Desv. – H scap – Eurimediterranean – Wet ruderal environments near the mouth of River Musone (ANC), Lago Grande of Portonovo (ANC) where it wasn't recently recorded; R.

Galium lucidum All. subsp. *lucidum* – H scap – Eurimediterranean – Garigues, grasslands (Biondi 1986; Baiocco & al. 1996). This record needs a confirmation, probably it has to be referred to *G. corrudifolium* Vill; R.

Galium mollugo L. subsp. *erectum* Syme – H scap – Eurasian – Wetlands, ruderal environments; NC.

Galium mollugo L. subsp. *mollugo* – H scap – Eurimediterranean – Wetlands, ruderal environments; C.

Galium murale (L.) All. – T scap – Stenomediterranean – Annual meadows, ruderal environments near Numana and next to the quarry of Portonovo (ANC, PESA); R.

Galium palustre L. subsp. *palustre* – H scap – European-Caucasian – Wetlands, in the abandoned "guazzo" next to the mouth of River Musone; R.

Galium parisiense L. – T scap – Eurimediterranean – Xeric grasslands and garigues in Pian Grande, between Numana and the mouth of River Musone (BrilliCattarini *in verbis*); RR.

Galium tricornutum Dandy – T scap – Eurimediterranean – Cultivated fields, uncropped fields, ruderal environments; NC.

Galium verrucosum Huds. subsp. *verrucosum* – T scap – Stenomediterranean – Garigues, grasslands "*Dintorni di Ancona: luoghi sterili, sassosi presso Poggio di Ancona 150-175 m*" (Brilli-Cattarini & Sialm 1973; PESA). Mount Conero is the only locality in the Marche region where the species lives; R.

Galium verum L. subsp. *verum* – T scap – European-Caucasian – Uncropped fields, ruderal environments; NC.

Rubia peregrina L. subsp. *peregrina* – P lian – Stenomediterranean – Woods, shrublands, wood mantles, ruderal environments; CC. It is a differential species of the association *Rubio peregrinae-Fraxinetum oxycarpae* (Rp-Fo).

Sherardia arvensis L. – T scap – Eurimediterranean – Cultivated fields, uncropped fields, ruderal environments; C.

Theligonum cynocrambe L. – T scap – Stenomediterranean – Ruderal environments, cultivated fields; C.

Valantia muralis L. – T scap – Stenomediterranean – Backdunes in Marcelli di Numana (ANC, PESA), Sirolo, Portonovo (Brilli-Cattarini *in verbis*); R.

Gentianaceae

Blackstonia acuminata (W. D. J. Koch & Ziz) Domin subsp. *acuminata* – T scap – Eurimediterranean – Garigues, grasslands, uncropped fields, ruderal environments; NC.

Blackstonia perfoliata (L.) Huds. subsp. *perfoliata* – T scap – Eurimediterranean – Garigues, grasslands, uncropped fields, ruderal environments; C.

Centaurium erythraea Rafn subsp. *erythraea* – H biennial – Paleotemperate – Garigues, grasslands, uncropped fields, ruderal environments; C.

Centaurium pulchellum (Sw.) Druce subsp. *pulchellum* – T scap – Paleotemperate – Grasslands and uncropped fields; NC.

Centaurium spicatum (L.) Fritsch – T scap – Eurimediterranean – Backdune environments between Case Marcelli and the mouth of River Musone and between Villa Fiume Mare and the left bank of the River Musone (Brilli-Cattarini *in verbis*), Scossicci in Porto Recanati (PESA). Recently the species has not been recorded; NP.

Apocynaceae

Araujia sericifera Brott – P caesp – SE-South America – Reforestations (ANC); R.

Vinca major L. subsp. *major* – Ch rept – Eurimediterranean – Spontaneous in the woods and in ruderal environments; NC.

Vinca minor L. Ch rept – European-Caucasian – Mesophilous hop hornbeam woods in the south-eastern side of Mount Conero under the ancient Monastery of San Pietro (ANC, PESA); in Pian Grande, Fosso del Mortarolo between San Benedetto's cave and Acqua Puzza and the Fosso di S. Antonio (PESA); R. (Cl-Qi).

Boraginaceae

Anchusa azurea Mill. – H scap – Eurimediterranean – Uncropped fields, ruderal environments (ANC); NC.

Anchusa undulata L. subsp. *hybrida* (Ten.) Bég. – H scap – Stenomediterranean Present near Offagna (PESA), it was also observed in ruderal environments next to Numana (Brilli-Cattarini *in verbis*); RR.

Borago officinalis L. – T scap – Eurimediterranean Uncropped fields, ruderal environments; NC.

Buglossoides arvensis (L.) I. M. Johnst. subsp. *arvensis* – T scap – Eurimediterranean Xeric grasslands, ruderal environments; NC.

Buglossoides purpurocaerulea (L.) I. M. Johnst. – H scap – Pontic Woods, forest edges; NC.

Cerinthe major L. subsp. *major* – T scap – Stenomediterranean – Uncropped fields, ruderal environments; NC.

Cynoglossum creticum Mill. – H biennial – Eurimediterranean Uncropped fields, ruderal environments: "*... al Trave, attorno alle mura ecc... presso Ancona, dove l'ho raccolta.*" (Paolucci 1890-91, sub *Cynoglossum pictum* Ait.); on the high southern slope of Mount Conero (head of the Valle del Mortarolo), in the south eastern slope near San Benedetto's cave and next to the ancient Monastery of San Pietro (PESA). It has been observed next to Marcelli di Numana in the grasslands near the lotting of Lido Azzurro (ANC); R.

Echium italicum L. subsp. *italicum* – H biennial – Eurimediterranean Grasslands, uncropped fields, ruderal environments; NC.

Echium plantagineum L. – T scap – Eurimediterranean – Uncropped fields, ruderal environments; NC.

Echium vulgare L. subsp. *vulgare* – H biennial – European – Uncropped fields, ruderal environments; C.

Heliotropium europaeum L. – T scap – Eurimediterranean – Cultivated fields and wet ruderal environments near the mouth of River Musone (ANC). "*Fra i sassi, negli orti, lungo le strade, comune in tutta la regione. Dovunque nei dintorni di Ancona.*" (Paolucci 1890-91); NC.

Lycopsis arvensis L. – T scap – Eurasiat. – The records of *Lycopsis arvensis* for Mount Conero reported by Paolucci (1890-91) "*Fra i campi, accanto alle siepi, nella zona littorale, ma non dovunque. A Pietralacroce, al Trave, a Montedago, ai Prati ecc. presso Ancona*" are probably to be referred to *Anchusa azurea*. This fact is evidenced from an examination of the only sample of *Lycopsis arvensis* that is present in the *Herbarium Picenum* of L. Paolucci and collected at Trave that is to be assigned to *A. azurea* and from the research of Selvi and Bigazzi (1998) in which it is reported that the species is non native in almost part of the Italian peninsula and the islands and that it is not present in the Marche region; NP.

Lithospermum officinale L. – H scap – Eurosibiric – Shrublands on the SE slope of Mount Conero along the Fosso del Mortarolo (PESA); R.

Myosotis arvensis (L.) Hill subsp. *arvensis* – T scap – European-Caucasian – Uncropped fields, ruderal environments; NC.

Myosotis ramosissima Rochel ex Schult. subsp. *ramosissima* – T scap – EuropeanCaucasian – Annual meadows; NC.

Symphytum bulbosum K. F. Schimp. – G rhiz – SE-European – Woods, ruderal environments, wet uncropped fields; NC (Sb-Um).

Symphytum tuberosum L. subsp. *angustifolium* (A. Kern.) Nyman – G rhiz – SE-European – Woods; NC.

Convolvulaceae

Calystegia sepium (L.) R. Br. subsp. *sepium* – H Scandent – Paleotemperate – Wetlands, reedbeds, shrublands; C.

Calystegia sylvatica (Kit) Griseb. H Scandent– SE-European – Ruderal environments; NC.

Calystegia soldanella (L.) Roem. & Schult. – G rhiz – Cosmopolitan – Dunes near Marcelli di Numana; R.

Convolvulus arvensis L. – G rhiz – Paleotemperate – Grasslands, cultivated fields, uncropped fields, ruderal environments; C.

Convolvulus cantabrica L. – H scap – Eurimediterranean – Garigues, arid grasslands; NC.

Convolvulus elegantissimus Mill. H Scandent– E-Stenomediterranean – Grasslands, garigues. Grasslands hosting this species were once scarcely present on Conero and now are rapidly reducing because of the natural process of vegetation recoverage; R (Ce-Be).

Cuscuta campestris Yunck. – T par – Adventive naturalized – Wetlands in the nearby of Camerano along Fosso Betelico at the turnout into the River Aspio (PESA); R.

Cuscuta cesatiana Bertol. – T par – Adventive naturalized – Dunes; R.

Cuscuta epithymum (L.) L. subsp. *epithymum* – T par Eurasian – Cultivated fields, ruderal environments, uncropped fields; NC.

Cuscuta epithymum (L.) L. subsp. *kotschyi* (Des Moul.) Arcang. – T par – Stenomediterranean – Uncropped fields, SW side of Mount Conero above Fonte d'Olio (PESA); R.

Cuscuta europaea L. – T par – Eurasian – Fosso Betelico (Brilli-Cattarini *in verbis*); RR.

Ipomoea purpurea Roth – T scap – Adventive (Neotropical) Numana, feral in marginal areas near private houses (ANC); R.

Solanaceae

Atropa bella-donna L. – H scap – Orophyte S-European – Hop hornbeam woods in the NE side of Mount Conero (Brilli-Cattarini 1971), SE slope between Grotta del Grano and the ancient Monastery of San Pietro (Brilli Cattarini 1968, *in litteris*); R.

Datura innoxia Mill. – T scap – Adventive naturalized – Ruderal environments next to Numana (ANC); R.

Datura stramonium L. subsp. *stramonium* – T scap – Adventive naturalized Ruderal environments near Marcelli di Numana (PESA), Pietralacroce (Paolucci 1890-91); R.

Datura stramonium L. var. *tatula* (L.) Torrey – T scap – Adventive naturalized Ruderal environments near the mouth of River Musone (ANC); R.

Hyoscyamus albus L. – T scap – Eurimediterranean – Ruderal environments and walls; R.

Lycium europaeum L. – NP – Eurimediterranean – Spontaneous along the path of Sardella (ANC) and along S. Michele Street in Sirolo on the cliff and in gardens. Paolucci (1890-91) reported it on the surroundings of Ancona; NC.

Physalis alkekengi L. – H scap – Eurasian – Massignano, along a small road westernly of the village. A few plants in a roadside at the edge of an abandoned field, probably escaped from cultivations; R.

Solanum dulcamara L. – NP – Paleotemperate – Along watercourses and in the ponds of Portonovo (Biondi 1986); R.

Solanum nigrum L. – T scap – Cosmopolitan – Uncropped fields, ruderal environments; C.

Solanum villosum Mill. subsp. *alatum* (Moench) Edmonds – T scap – Eurimediterranean Ruderal environments; NC.

Oleaceae

Fraxinus angustifolia Vahl subsp. *oxycarpa* (M. Bieb. ex Willd.) Franco & Rocha Afonso P scap – S-European-S-Sibiric – In the woods on the cliff next to Sirolo (ANC). It is also present in the plain south to Conero Park in Porto Potenza Picena (Biondi & al. 2002c) and in Selva di Gallignano (Biondi & al. 2003; Biondi & Allegrezza 2004) where it constitues a well structured wood; R (Rp-Fo).

Fraxinus excelsior L. subsp. *excelsior* – P scap – European-Caucasian – Mesophilous woods, cultivated for reforestation and sometimes spontaneous (Ciacci 1965); R.

Fraxinus ornus L. subsp. *ornus* – P scap – S-European-S-Sibiric – Woods, shrublands; C.

Ligustrum vulgare L. – NP – European-Caucasian – Woods, shrublands, wood mantles; C.

Onobrychis caput-galli (L.) Lam. – P caesp – Stenomediterranean – Subspontaneous in environments of recolonization and cultivations; R.

Olea europaea L. subsp. *europaea* – P caesp – Stenomediterranean – Cultivated and sometimes spontaneous; R

Phillyrea latifolia L. – P caesp – Stenomediterranean – Shrublands; NC.

Phillyrea media L. – P caesp – Stenomediterranean – Woods, shrublands, wood mantles, garigues; NC.

Plantaginaceae

Antirrhinum majus L. subsp. *majus* – Ch frut – W-Stenomediterranean – Garigues, rocky environments; NC.

Antirrhinum majus L. subsp. *tortuosum* (Bosc. ex Lam.) Rouy – Ch frut – Steno-WMediterranean – Garigues and rocky environments, spontaneous on old walls; C.

Callitriche palustris L. – Hydrophyte rad – Circumboreal – Portonovo (Paolucci 1890-91 sub *C. verna* Kütz.), Lago Grande (Brilli-Cattarini *in verbis*); NP.

Chaenorhinum litorale (Willd.) Fritsch – T scap – Amphi-Adriatic – Backdune environments, uncropped fields between Case Marcelli and the mouth of River Musone, in Portonovo and Fosso Betelico (Brilli-Cattarini *in verbis*); R.

Chaenorhinum minus (L.) Lange subsp. *minus* – T scap – Eurimediterranean Cultivated fields, uncropped fields and ruderal environments; C.

Cymbalaria muralis G. Gaertn., B. Mey. & Scherb. subsp. *muralis* – T scap – NEurimediterranean – Rocks and walls; NC.

Digitalis lutea L. subsp. *australis* (Ten.) Arcang. – H scap – Endemic – Woods, forest edges, Mount Conero (Béguinot 1905; Biondi 1986) on the SE side next to San Benedetto's cave and the ancient Monastery of San Pietro (PESA); R.

Globularia bisnagarica L. – H scap – S-European-S-Siberic – Xeric grasslands; NC.

Kickxia commutata (Bernh. ex Rchb.) Fritsch subsp. *commutata* – H rept – Stenomediterranean – Grasslands and uncropped fields in the E slope of Mount Conero and above Sirolo, NW side of Mount Conero in Pian Grande (ANC, PESA; BrilliCattarini 1971), next to Trave (Paolucci 1890-91, sub *Linaria commutata* Bernh.); R.

Kickxia elatine (L.) Dumort. subsp. *elatine* – T scap – Eurimediterranean – Cultivated fields, uncropped fields; C.

Kickxia spuria (L.) Dumort. subsp. *spuria* – T scap – Eurasian – Grasslands and uncropped fields, C.

Linaria chalepensis (L.) Mill. – T scap – E-Stenomediterranean – Arid grasslands in the lower eastern side of Mount Conero above Sirolo, 200-225 m a.s.l. (PESA; BrilliCattarini 1971); NC.

Linaria vulgaris Mill. subsp. *vulgaris* – H scap – Eurasian – Grasslands, uncropped fields, ruderal environments; C.

Misopates orontium (L.) Raf. subsp. *orontium* – T scap – Eurimediterranean – Cultivated fields, uncropped fields, ruderal environments; NC.

Plantago afra L. subsp. *afra* – T scap – Stenomediterranean – Along the eastern side of Mount Conero between Case Giardini and Case Baldacci, on the southern side along the road between Sirolo and the ancient Monastery of San Pietro (PESA). Mount Conero (Paolucci 1890-91, sub *P. psyllium* L.); R.

Plantago arenaria Waldst. & Kit – T scap – SE-European – Dunes at the mouth of the River Mursone; R.

Plantago bellardii All. – T scap – S-Stenomediterranean – Beaches next to Case Marcelli (PESA). The plant, collected in May 1963, was no longer observed; RR.

Plantago coronopus L. subsp. *coronopus* – T scap – Eurimediterranean – Beaches, uncropped fields, ruderal environments; NC.

Plantago lagopus L. – T scap – Stenomediterranean – Dunes and backdunes in Marcelli di Numana (ANC, PESA); R.

Plantago lanceolata L. – H ros – Eurasian – Grasslands, uncropped fields, ruderal environments; CC.

Plantago major L. subsp. *major* – H ros – Eurasian – Uncropped fields, ruderal environments, grasslands; NC.

Plantago serraria L. – H ros – Stenomediterranean – Dry uncropped fields by the beach near Numana (Brilli-Cattarini 1971), stony and sandy uncropped fields near Massignano (PESA). Mount Conero (Brilli-Cattarini 1967); RR.

Plantago weldenii Rchb. – T scap – Eurimediterranean – Beaches, arid uncropped fields next to the quarry and the ponds of Portonovo and between Case Marcelli and the mouth of River Musone (PESA), Mount Conero (Béguinot 1905) sub *P. coronopus* L. var. *commutata* Guss; R.

Veronica anagallis-aquatica L. subsp. *anagallis-aquatica* – H scap – Cosmopolitan – Stagnant or slowly flowing fresh water; NC.

Veronica arvensis L. – T scap – Paleotemperate – Cultivated fields, uncropped fields, grasslands, ruderal environments; C.

Veronica beccabunga L. – H rept – Eurasian – Stagnant or slowly flowing fresh water; C.

Veronica hederifolia L. subsp. *hederifolia* – T scap – Eurasian – Cultivated fields, uncropped fields, ruderal environments; C.

Veronica persica Poir. – T scap – Adventive naturalized – Cultivated fields, uncropped fields, ruderal environments; CC.

Veronica polita Fr. – T scap – Paleotemperate – Cultivated fields, uncropped fields, ruderal environments. The record of Paolucci (1890-91) of *V. agrestis* L. is certainly to be referred to this entity (based on bibliographic references of Caruel in Parlatore 1848-1896); C.

Veronica prostrata L. subsp. *prostrata* – H caesp – Eurasian – Arid grasslands in the NW side of Mount Conero in Pian Grande and Pian dei Raggetti (PESA), Mount Conero (Paolucci 1890-91); R.

Veronica serpyllifolia L. subsp. *serpyllifolia* – H rept – Eurasian – Wetlands near Numana (PESA), R.

Scrophulariaceae

Scrophularia auriculata L. subsp. *auriculata* – H scap – Subatlantic – Wetlands and along watercourses (ANC). The species was recorded also for Selva di Castelfidardo (Ballelli & al. 2001); R.

Scrophularia canina L. subsp. *bicolor* (Sibth. & Sm.) Greuter – H scap – Eurimediterranean – Uncropped fields at the mouth of River Musone (ANC), shrublands and rocky uncropped fields in Pian Grande (PESA); R.

Scrophularia canina L. subsp. *canina* – H scap – Stenomediterranean – Mount Conero (Paolucci 1890-91), ruderal environments in Marcelli di Numana (ANC); R.

Scrophularia nodosa L. – H scap – Eurasian – Present near Offagna (PESA), it was also observed in the wood of Camerano (Brilli-Cattarini *in verbis*); RR.

Scrophularia peregrina L. – T scap – Stenomediterranean – Uncropped fields, ruderal environments, woods on the NE side next to the ancient Monastery of San Pietro, Pietralacroce (PESA), Mount Conero (Paolucci 1890-91); R.

Verbascum blattaria L. – H biennial – Paleotemperate – Ruderal environments, uncropped fields; NC.

Verbascum lychnitis L. – H biennial – European-Caucasian – Grasslands, ruderal environments, uncropped fields; R.

Verbascum niveum Ten. subsp. *garganicum* (Ten.) Murb. – H biennial – Endemic – Grasslands; R.

Verbascum sinuatum L. – H biennial – Eurimediterranean – Grasslands, ruderal environments, uncropped fields; NC.

Verbascum thapsus L. subsp. *thapsus* – H biennial – European-Caucasian – Ruderal environments, uncropped fields; NC.

Lamiaceae

Acinos alpinus (L.) Moench subsp. *alpinus* – Ch suffr – Orophyte S-European – Grasslands; NC.

Acinos arvensis (Lam.) Dandy s. l. – T scap – Eurimediterranean – Grasslands; NC.

Ajuga chamaepitys (L.) Schreb. subsp. *chamaepitys* – T scap – Eurimediterranean – Cultivated fields, uncropped fields, ruderal environments; NC.

Ajuga reptans L. H rept – European-Caucasian – Woods, wet ruderal environments; NC.

Ballota nigra L. subsp. *meridionalis* (Bég.) Bég. – H scap – Submediterranean Subatlantic – Ruderal environments, forest edges; C.

Calamintha nepeta (L.) Savi subsp. *nepeta* – H scap – Orophyte S-European – Ruderal environments, forest edges; C.

Calamintha nepeta (L.) Savi subsp. *sylvatica* (Bromf.) R. Morales – H scap – EuropeanCaucasian – Forest edges, woodlands and shrublands; NC.

Clinopodium vulgare L. subsp. *vulgare* – H scap – Circumboreal – Ruderal environments, forest edges, grasslands; C.

Galeopsis angustifolia Hoffm. subsp. *angustifolia* – T scap – N-Eurimediterranean – Grasslands, ruderal environments; NC.

Glechoma hirsuta Waldst. & Kit H rept – SE-European – Wet ruderal environments, forest edges. "*Comune tra le siepi, nel limite delle macchie, in tutta la regione. Dovunque presso Ancona*" sub. *Nepeta glechoma* Benth (Paolucci 1890-91); NC/C.

Lamium amplexicaule L. – T scap – Paleotemperate – Cultivated fields, uncropped fields; C.

Lamium bifidum Cirillo subsp. *bifidum* – T scap – Stenomediterranean – Woods, forest edges next to the ancient Monastery of San Pietro (ANC); R.

Lamium maculatum L. – H scap – Eurasian – Wet ruderal environments, forest edges; C.

Lamium purpureum L. – T scap – Eurasian – Ruderal environments, uncropped fields; C.

Lycopus europaeus L. subsp. *europaeus* – H scap – Paleotemperate – Wetlands, along the rivers; NC.

Marrubium vulgare L. – H scap – S-European-S-Sibiric – Ruderal environments and xeric grasslands; NC.

Melissa officinalis L. subsp. *altissima* (Sm.) Arcang. – H scap – Stenomediterranean – Ruderal environments, forest edges; C.

Melittis melissophyllum L. subsp. *melissophyllum* – H scap – C-European – Woods; NC.

Mentha aquatica L. subsp. *aquatica* – H scap – Paleotemperate – Wetlands, along the rivers; NC.

Mentha pulegium L. subsp. *pulegium* – H scap – Eurimediterranean – Wetlands, wet ruderal environments in the south area of the River Musone; NC.

Mentha spicata L. – H scap – Paleotemperate – Wet ruderal environments; R/NC.

Mentha suaveolens Ehrh. subsp. *suaveolens* – H scap – Eurimediterranean – Ruderal environments, uncropped fields; C.

Micromeria graeca (L.) Benth. ex Rchb. subsp. *graeca* – Ch suffr – Stenomediterranean – Garigues, arid grasslands; NC.

Origanum vulgare L. subsp. *vulgare* – H scap – Eurasian Uncropped fields; C. *Prunella laciniata* (L.) L. – H scap – Eurimediterranean – Wood edges; C. *Prunella vulgaris* L. subsp. *vulgaris* – H scap – Circumboreal Forest edges; C.

Salvia clandestina L. – H scap – SE-European – Backdune environments between Marcelli and the mouth of River Musone, NW side of Pian Grande (PESA); also recorded for the neighbouring Selva di Castelfidardo (Ballelli & al. 2001); R.

Salvia verbenaca L. – H scap – Stenomediterranean-Atlantic Grasslands, uncropped fields, ruderal environments; C.

Scutellaria columnae All. subsp. *columnae* – H scap – NE-Mediterranean-Montane Mesophilous woods dominated by hop hornbeam between the Marine Barracks and Pian dei Raggetti, along the southern slope of Mount Conero between 400 and 450 m a.s.l. (ANC, PESA) and the SE slope between S. Benedetto's cave and the ancient Monastery of San Pietro (1968, Brilli-Cattarini *in litteris*); R (Sc–Oc).

Scutellaria hastifolia L. – G rhiz – SE-European Wetlands in the abandoned "guazzo" and at the mouth of River Musone (ANC, PESA). The species has been reported in the past, for Pesaro and Mount San Vicino (Paolucci 1887; 1890-91), some time later BrilliCattarini (1971) has found it along the Fosso di Selva Grossa and along the ditches on the main street to Urbino near Case Bruciate (PU), therefore the locality in the Conero Park is in addition to the few others known for the region; R.

Sideritis romana L. subsp. *romana* – T scap – Stenomediterranean Grasslands, uncropped fields; NC.

Stachys annua (L.) L. subsp. *annua* – T scap – Eurimediterranean Cultivated fields, ruderal environments; C.

Stachys cretica L. subsp. *salviifolia* (Ten.) Rech. fil. – H scap – Eurimediterranean Grasslands; NC.

Stachys germanica L. subsp. *germanica* – H scap – Eurimediterranean Grasslands; NC.

Stachys maritima Gouan – H scap – Stenomediterranean – Dunes in Marcelli di Numana (PESA); R.

Stachys ocymastrum (L.) Briq. – T scap – W-Stenomediterranean Uncropped fields, "*nei luoghi incolti e lungo le vie, non comune dovunque. L'ho raccolta al Trave, a Pietralacroce ....*" (Paolucci 1890-91 sub *S. hirta*). Around Ancona, along the road from Pietralacroce to Trave (PESA); R.

Stachys officinalis (L.) Trevis. – H scap – European-Caucasian Woods, forest edges; NC.

Stachys recta L. subsp. *subcrenata* (Viss.) Briq. – H scap – N-Mediterranean-Montane – Grasslands; C.

Stachys sylvatica L. – H scap – Eurosibiric Forest edges; NC.

Teucrium capitatum L. subsp. *capitatum* – Ch suffr – Stenomediterranean – Grasslands and garigues. Paolucci (1890-91, sub *T. polium*) reported it in Pietralacroce, Trave and Mount Conero; NC.

Teucrium chamaedrys L. subsp. *chamaedrys* – Ch suffr – Eurimediterranean – Grasslands, garigues; NC.

Teucrium flavum L. subsp. *flavum* – Ch frut – Stenomediterranean – Garigues, rocky environments; C.

Teucrium scordium L. subsp. *scordioides* (Schreb.) Arcang. – H scap – EuropeanCaucasian Indicated for Trave (Paolucci 1890-91) and the ponds of Portonovo (Béguinot 1905); it is also present next to the mouth of River Musone and in Portonovo (Brilli-Cattarini *in verbis*); RR.

Teucrium siculum (Raf.) Guss. subsp. *siculum* – H scap – Endemic Indicated for Mount Conero by Béguinot (1905), this information was taken in consideration by other authors (Brilli-Cattarini 1967; Biondi & Baldoni 1996) without any confirmation of the presence of the plant in the area; NP.

Thymus longicaulis C. Presl subsp. *longicaulis* – Ch rept – Eurimediterranean – Grasslands, garigues; C.

Vitex agnus-castus L. – P caesp – Mediterranean-Turanian – Sirolo and Portonovo (Spadoni 1826-28); Paolucci (1890-91) wrote that he has never found it in those localities. Béguinot (1905) indicated it as a species introduced and subsequently naturalized; NP.

Orobanchaceae

Bartsia trixago L. – T scap – Eurimediterranean – Grasslands, uncropped fields; C.

Euphrasia stricta D. Wolff ex J. F. Lehm. – T scap – Central Europe Grasslands in Pian dei Raggetti (Brilli-Cattarini *in verbis*), Mount Conero (Paolucci 1890-91, sub *E. officinalis* L.); R.

Melampyrum arvense L. subsp. *arvense* – T scap – Eurasian – Uncropped fields and grasslands; NC.

Melampyrum barbatum Waldst. & Kit ex Willd. subsp. *carstiense* Ronniger – T scap – SE-European – Woods and shrublands in the NW side of Mount Conero (Brilli-Cattarini *in verbis*). Next to Trave and in Pietralacroce (Paolucci 1890-91, sub *M. barbatum* W. et K.). Not recently recorded; R.

Odontites luteus (L.) Clairv. – T scap – Eurimediterranean – Xeric grasslands, uncropped fields, ruderal environments; C.

Odontites vulgaris Moench subsp. *vulgaris* – T scap – Eurasian – Xeric grasslands, ruderal environments; C.

Orobanche alba Stephan ex Willd. – T par – Eurasian – In Ancona sub *O. epithymum* DC. (Paolucci 1890-91); NP.

Orobanche caryophyllacea Sm. – T par – Subatlantic – Garigues, uncropped fields; NC.

Orobanche crenata Forssk. – T par – Eurimediterranean-Turanian – Cultivated fields, uncropped fields, ruderal environments; NC.

Orobanche gracilis Sm. – T par – European-Caucasian – Shrublands, grasslands, uncropped fields; C.

Orobanche hederae Duby – T par – Eurimediterranean – Woods, shrublands; C.

Orobanche minor Sm. – T scap – Paleotemperate Shrublands, grasslands, on the E side of Mount Conero between Punta dei Libri and Passo della Croce (PESA), Mount Conero (Paolucci 1890-91); R.

Orobanche picridis F. W. Schultz ex Koch – T par – Eurimediterranean – Ruderal environments, uncropped fields; NC.

Orobanche ramosa L. – T par – Paleotemperate Mount Conero (Paolucci 1890-91, sub *Phelipaea ramosa* C. A. Mey); NP.

Parentucellia latifolia (L.) Caruel – T scap – Eurimediterranean Backdune in Marcelli di Numana, grasslands in Pian dei Raggetti and Pian Grande (PESA); R.

Parentucellia viscosa (L.) Caruel – T scap – Mediterranean-Atlantic – In the fortifications of Ancona in areas bordering the Park (Paolucci 1890-91, sub *Bartsia viscosa* L.); NP.

ACANTHACEAE

Acanthus mollis L. subsp. *mollis* – H scap – W-Stenomediterranean – Spontaneous in ruderal environments; PC.

VERBENACEAE

Verbena officinalis L. – H scap – Subcosmopolitan – Ruderal environments, uncropped fields, cultivated fields; C.

AQUIFOLIACEAE

Ilex aquifolium L. – P caesp – Eurimediterranean – Mesophilous woods. Mount Conero (Brilli-Cattarini 1956 sub. *I. aquifolium* var. *typica* Fiori). Mount Conero (Biondi 1986); North-East side of Mount Conero over the sea (Biondi & Baldoni 1996); R (Sc-Oc and Cl-Qi).

CAMPANULACEAE

Campanula erinus L. – T scap – Stenomediterranean – Arid grasslands, garigues and rocky walls, observed in Pietralacroce, Poggio di Ancona, Massignano, Sirolo, Numana (PESA); Pietralacroce (Paolucci 1890-91); R.

Campanula rapunculus L. – H biennial – Paleotemperate – Uncropped fields, ruderal environments, forest edges; C.

Campanula trachelium L. subsp. *trachelium* – H scap – Paleotemperate – Mesophilous hop hornbeam woods and wood edges, along the western slope above Fosso di San Antonio (PESA); R.

Legousia hybrida (L.) Delarbre – T scap – Eurimediterranean-Subatlantic – Cultivated and uncropped fields; NC.

Legousia speculum-veneris (L.) Chaix – T scap – Eurimediterranean – Cultivated fields; NC.

ASTERACEAE

Achillea ageratum L. – H scap – W-Stenomediterranean – Next to Trave (Paolucci 1890- 91); NP.

Achillea maritima (L.) Ehrend. & Y. P. Guo subsp. *maritima* – Ch suffr – Stenomediterranean-Atlantic – Dunes near the mouth of River Musone (Biondi & Baldoni 1996). Recently the species has not been found because of the destruction of the dune environments where it had been found in the past; NP.

Achillea millefolium L. subsp. *millefolium* – H scap – Eurosibiric – Grasslands, ruderal environments; C.

Achillea setacea Waldst. & Kit subsp. *setacea* – H scap – SE-European – In Cardeto near Ancona (Paolucci 1890-91) sub *A. millefolium* L. var. *setacea* W. & K.; NP.

Achillea stricta (W. D. J. Koch) Schleich. ex Gremli – H scap – Stenomediterranean – Grasslands and uncropped fields at the mouth of River Musone (ANC, PESA); R.

Anacyclus clavatus (Desf.) Pers. – T scap – Stenomediterranean – Ruderal environments. Sirolo (Paolucci 1890-91, sub *A. tomentosum* DC.), between Numana and the mouth of River Musone (Brilli-Cattarini *in verbis*); R.

Anthemis arvensis L. subsp. *arvensis* – T scap – Stenomediterranean – Cultivated fields, uncropped fields, ruderal environments; NC.

Anthemis arvensis L. subsp. *incrassata* (Loisel.) Nyman – T scap – Mediterranean – Collected in Porto Recanati (PESA), it was observed in uncropped fields and in the ruderal environments along the coast between the mouth of the River Musone and Numana (Brilli-Cattarini *in verbis*); R.

Anthemis cotula L. – Ch suffr – Eurimediterranean – Cultivated fields; NC.

Arctium minus (Hill) Bernh. – H biennial – Eurimediterranean – Ruderal environments, forest edges; C.

Artemisia absinthium L. – Ch suffr – Eurasian – Spontaneous in uncropped fields and ruderal environments; NC.

Artemisia alba Turra – Ch suffr – N-Eurimediterranean – Grasslands, garigues; C.

Artemisia verlotiorum Lamotte – H scap – Adventive naturalized – Ruderal environments, uncropped fields; NC.

Artemisia vulgaris L. – H scap – Circumboreal – Uncropped fields, ruderal environments; C.

Bellis perennis L. – H ros – European-Caucasian – Grasslands, uncropped fields, ruderal environments; CC.

Bellis sylvestris Cirillo – H ros – Stenomediterranean – Grasslands, forest edges; NC.

Bidens frondosa L. – T scap – Adventive naturalized – Wetlands, watercourses; NC.

Bidens tripartita L. subsp. *tripartita* – T scap – Eurasian – Wetlands at the mouth of River Musone (ANC); R.

Bombycilaena erecta (L.) Smoljan. – T scap – S-European-S-Sibiric – Arid grasslands, garigues; NC.

Calendula arvensis (Vaill.) L. – T scap – Eurimediterranean – Ruderal environments, uncropped fields; C.

Calendula officinalis L. – T scap – Eurimediterranean – Spontaneous over the ruderal environments; R.

Calendula suffruticosa Vahl subsp. *fulgida* (Raf.) Guadagno – Ch suffr – SW-Mediterranean – Montane Grasslands, uncropped fields, ruderal environments; C.

Carduus acicularis Bertol. – T scap – N-Mediterranean – Montane Grasslands, ruderal environments; in Mount Conero above Fonte d'Olio (PESA, Brilli-Cattarini & Sialm 1973); R.

Carduus nutans L. subsp. *nutans* – H biennial – W-European (Atlantic) – Grasslands, ruderal environments; Mount Conero (ANC), Trave (Paolucci 1890-91); R.

Carduus pycnocephalus L. subsp. *pycnocephalus* – H biennial – Eurimediterranean-Turanian – Uncropped fields, ruderal environments; C.

Carlina corymbosa L. – H scap – Stenomediterranean – Grasslands and uncropped fields; C.

Carlina vulgaris L. subsp. *vulgaris* – H scap – Eurosibiric – Grasslands and uncropped fields; NC.

Carthamus lanatus L. subsp. *lanatus* – T scap – Eurimediterranean – Garigues, arid grasslands, ruderal environments; NC.

Centaurea calcitrapa L. – H biennial – Eurimediterranean – "*Incolti, dintorni di Ancona*" (Paolucci 1890-91), Massignano, Camerano, Trave, Varano and between Case Marcelli and the mouth of River Musone (Brilli-Cattarini *in verbis*); R.

Centaurea debeauxii Gren. & Godr. subsp. *thuilleri* Dostál – H scap – Endemic – Uncropped fields, ruderal environments, forest edges; C.

Centaurea deusta Ten. – T scap – Cosmopolitan – Garigues, grasslands; NC.

Centaurea jacea L. subsp. *angustifolia* Gremli – H scap – S-E European – Grasslands, uncropped fields. Previously mentioned sub *Centaurea bracteata*; C.

Centaurea solstitialis L. subsp. *solstitialis* – H biennial – Stenomediterranean – Uncropped fields, ruderal environments; NC.

Chondrilla juncea L. – H scap – S-European-S-Sibiric – Uncropped fields, ruderal environments; NC.

Cichorium intybus L. – H scap – Paleotemperate – Uncropped fields, ruderal environments; C.

Cirsium arvense (L.) Scop. G rooting Eurasian – Uncropped fields, ruderal environments, cultivated fields; C.

Cirsium creticum (Lam.) D'Urv. subsp. *triumfetti* (Lacaita) K. Werner – H biennial – NE-Mediterranean-Montane – Along the waterways near Camerano, Fosso Betelico and Porchereccia, recently observed next to Varano; R.

Cirsium tenoreanum Petr. – H biennial – Endemic – Uncropped fields and grasslands. Next to Trave (sub *C. lobelii* Ten., Paolucci 1890-91) and Pian Grande (Brilli-Cattarini *in verbis*); NP.

Cirsium vulgare (Savi) Ten. – H biennial – Paleotemperate – Uncropped fields, ruderal environments; C.

Cota altissima (L.) J. Gay – T scap – S-European-Sud-Sibiric – Cultivated fields, uncropped fields, ruderal environments; C.

Cota tinctoria (L.) J. Gay subsp. *australis* (R. Fern.) Oberpr. & Greuter – H biennial – C-European – Grasslands, uncropped fields, ruderal environments; C.

Crepis foetida L. – T scap – Eurimediterranean – Uncropped fields. Observed in Numana (Paolucci 1890-91), Poggio di Ancona, Massignano, near Case Marcelli (Brilli-Cattarini *in verbis*); R.

Crepis leontodontoides All. – H ros – W-Mediterranean-Montane – Uncropped fields; NC.

Crepis neglecta L. – T scap – NE-Eurimediterranean – Grasslands, ruderal environments; C. *Crepis pulchra* L. subsp. *pulchra* – T scap – Eurimediterranean Uncropped fields, ruderal environments; NC.

Crepis sancta (L.) Babc. subsp. *nemausensis* (Gouan) Babc. – T scap – Mediterranean-Turanian – Annual meadows, uncropped fields, ruderal environments; CC.

Crepis setosa Haller f. – T scap – E-Eurimediterranean – Cultivated fields. Observed in Pietralacroce and at Trave (Paolucci 1890-91); NC.

Crepis vesicaria L. subsp. *vesicaria* – T scap – Eurimediterranean-Subatlantic – Annual meadows, uncropped fields, ruderal environments; NC.

Crepis zacintha (L.) Loisel. – T scap – N-Stenomediterranean – Grasslands, observed on Mount Conero at Pian Grande (Brilli-Cattarini & Sialm 1973); R.

Crupina vulgaris Cass. – T scap – S-European-S-Sibiric – Grasslands and uncropped fields; NC.

Cyanus segetum Hill – T scap – Stenomediterranean – "*Dovunque nei dintorni di Ancona*" (Paolucci 1890-91); in ruderal environments next to Pietralacroce until the '60s of last century; NP.

Cynara cardunculus L. – H scap – Stenomediterranean – Spontaneous on the cliff near the villages; R.

Dittrichia graveolens (L.) Greuter – T scap – Eurimediterranean-Turanian – Wet meadows. Recently observed around Marcelli di Numana (ANC), it was common in the past: "*Dovunque presso Ancona*" (Paolucci 1890-91); NC.

Dittrichia viscosa (L.) Greuter subsp. *viscosa* – H scap – Eurimediterranean – Uncropped fields, ruderal environments; CC.

Erigeron bonariensis L. – T scap – Adventive naturalized – Uncropped fields, ruderal environments; C.

Erigeron canadensis L. – T scap – Adventive naturalized – Uncropped fields, ruderal environments; C.

Erigeron sumatrensis Retz. – T scap – Adventive naturalized – Uncropped fields, ruderal environments; C.

Eupatorium cannabinum L. subsp. *cannabinum* – H scap – Paleotemperate – Wetlands, ruderal environments, along watercourses; C.

Filago germanica (L.) Huds. – T scap – Eurimediterranean – The species was reported by Paolucci (1890-91) sub *Filago germanica* L. for the localities of Trave, Mount Conero and Pietralacroce but it is believed that most of the indications are to be reported to *Filago pyramidata* L.; R.

Filago pyramidata L. – T scap – Eurimediterranean – Cultivated fields, uncropped fields, ruderal environments; NC.

Galactites elegans (All.) Soldano – H biennial – Stenomediterranean – Uncropped fields, ruderal environments; NC.

Galatella linosyris (L.) Rchb.f. subsp. *linosyris* – H scap – S-European-S-Sibiric – Grasslands, garigues; NC.

Glebionis coronaria (L.) Spach – T scap – Stenomediterranean – Spontaneous in uncropped fields; NC.

Hedypnois rhagadioloides (L.) F. W. Schmidt – T scap – Stenomediterranean – Backdunes, annual meadows; NC.

Helianthus tuberosus L. – G bulb – Adventive naturalized – Spontaneous in uncropped fields and in wetlands; NC.

Helichrysum italicum (Roth) G. Don subsp. *italicum* – Ch suffr – N-Eurimediterranean – Garigues, grasslands; C.

Helichrysum italicum (Roth) G. Don subsp. *pseudo-litoreum* (Fiori) Bacchetta, Brullo, Mossa – Ch suffr – Endemic – Calcareous cliffs (ANC, PESA); R.

Hieracium murorum L. s. l. – H scap – European-Caucasian – Woods; NC.

Hieracium racemosum Waldst. & Kit ex Willd. s. l. – H scap – European-Caucasian – Woods in the western side of Mount Conero, also observed in shrublands and maquis near the rocks of Due Sorelle (ANC, PESA); R.

Hyoseris radiata L. subsp. *radiata* – T ros – Stenomediterranean – Uncropped fields and ruderal environments; C.

Hypochaeris achyrophorus L. – T scap – Stenomediterranean – Annual meadows, grasslands, arid uncropped fields; C.

Hypochaeris radicata L. – H ros – European-Caucasian – Dunes and backdunes between Marcelli di Numana and the mouth of River Musone; R.

Hypochaeris taraxacoides (Loisel.) DC. – H ros – Endemic – On the cliff near the harbour of Numana (ANC); RR.

Inula conyzae (Griess.) Meikle – H biennial – European-Caucasian – Woods, forest edges, uncropped fields; C.

Inula salicina L. – H scap – European-Caucasian – Wetlands, forest edges, woods; NC.

Lactuca muralis (L.) Gaertn. – H scap – European-Caucasian – Forests, shrublands; C.

Lactuca saligna L. – T scap – Eurimediterranean-Turanian U– ncropped fields, ruderal environments; NC.

Lactuca serriola L. – H biennial – S-European-S-Sibiric – Uncropped fields, ruderal environments; C.

Lapsana communis L. subsp. *communis* – T scap – Paleotemperate Woods; NC.

Leontodon crispus Vill. subsp. *crispus* – H ros – S-European – S-Sibiric Grasslands, garigues; NC.

Leontodon hirtus L. (= *L. villarsii* (Willd.) Loisel.) – H ros – NW Stenomediterranean – Grasslands, garigues; NC.

Leontodon hispidus L. – H ros – European-Caucasian – Grasslands; NC.

Leontodon tuberosus L. – H ros – Stenomediterranean – Grasslands and ruderal environments; it has been observed next to the mouth of River Musone (ANC), in the eastern side of Mount Conero, in M. dei Corvi and M. del Trave (sub *Thrincia tuberosa* DC., Paolucci 1890-91) and in Pietralacroce; C.

Leucanthemum vulgare (Vaill.) Lam. subsp. *vulgare* – H scap – Eurosibiric – Grasslands, uncropped fields, ruderal environments; C.

Limbarda crithmoides (L.) Dumort. subsp. *crithmoides* – Ch suffr – Stenomediterranean-Atlantic – Dunes; a rich population was observed in Portonovo next to Lago Profondo (Biondi 1986); R.

Matricaria chamomilla L. – T scap – Subcosmopolitan – Cultivated fields, uncropped fields, ruderal environments; NC.

Onopordum acanthium L. subsp. *acanthium* – H biennial – E-Mediterranean-Montane – Ruderal environments; NC.

Onopordum illyricum L. subsp. *illyricum* – H biennial – Stenomediterranean – Ruderal environments; NC.

Pallenis spinosa (L.) Cass. subsp. *spinosa* – T scap – Eurimediterranean – Grasslands, uncropped fields, ruderal environments; C.

Petasites fragrans (Vill.) C. Presl – G rhiz – Eurimediterranean – Spontaneous in ruderal environments and in woods; C (Sb-Um).

Petasites hybridus (L.) G. Gaertn., B. Mey. & Scherb. subsp. *hybridus* – G rhiz – Eurasian – Wetlands, watercourses; NC.

Picnomon acarna (L.) Cass. – H scap – Stenomediterranean – Mount Conero (Béguinot 1905, sub *Cirsium acarna* Ten.); NP.

Picris echioides L. – T scap – Eurimediterranean – Uncropped fields and ruderal environments; C.–

Picris hieracioides L. subsp. *hieracioides* – H scap – Eurosibiric – Uncropped fields and ruderal environments; CC.

Pilosella piloselloides (Vill.) Soják subsp. *piloselloides* – H scap – European-Caucasian – Uncropped fields and grasslands; NC.

Pilosella officinarum Vaill. – H ros – European-Caucasian – Grasslands, C.

Pulicaria dysenterica (L.) Bernh. – H scap – Eurimediterranean – Uncropped fields, ruderal environments, wetlands, forest edges; C.

Pulicaria odora (L.) Rchb. – H scap – Eurimediterranean – Grasslands, woods, shrublands; C.

Reichardia picroides (L.) Roth – H scap – Stenomediterranean – Grasslands, uncropped fields, ruderal environments; CC.

Reichardia picroides (L.) Roth var. *maritima* (Boiss.) Fiori – H scap – Stenomediterranean Cliffs (ANC, PESA) and slopes over the sea of Mount Conero (Brilli-Cattarini & Sialm 1973), in the sea side of Mount Conero between the Church of St. Maria di Portonovo and Sassi Neri (Biondi 1986) and across the cliffs of the southern coastal area of Mount Conero wih *Crithmum maritimum*; R.

Rhagadiolus edulis Gaertn. – T scap – Eurimediterranean – Uncropped fields, hedges, shrublands; NC.

Rhagadiolus stellatus (L.) Gaertn. – T scap – Eurimediterranean – Annual meadows, uncropped fields, ruderal environments; NC.

Scolymus hispanicus L. subsp. *hispanicus* – H biennial – Eurimediterranean – Uncropped fields, ruderal environments; NC.

Scorzonera laciniata L. subsp. *laciniata* – H biennial – Paleotemperate – Uncropped fields. It has been observed at Trave (Paolucci 1890-91), on the marly-arenaceous cliff between Ancona and Portonovo, on M. of the Corvi, M. del Trave, Montirozzo and at the Passo di Portonovo (Brilli-Cattarini *in verbis*); R.

Senecio angulatus L. f. – Ch frut – Adventive (S-Africa) – Spontaneous in ruderal environments on the cliff of Sirolo (ANC); R.

Senecio aquaticus Hill – H biennial – C-Europe – Wetlands and ruderal environments; NC.

Senecio erucifolius L. subsp. *erucifolius* – H scap – Eurasian – Grasslands and uncropped fields; NC.

Senecio mikanioides Otto ex Walp. – Ch frut – Adventive – Spontaneous in ruderal environments next to the crossroad for Massignano (ANC); R.

Senecio vulgaris L. – T scap – Eurimediterranean – Uncropped fields, ruderal environments; C.

Serratula tinctoria L. subsp. *tinctoria* – H scap – Eurosibiric – Hop hornbeam woods on Mount Conero (Biondi 1986); on the eastern side between San Benedetto's cave and the ancient Monastery of San Pietro, along Fosso di S. Antonio (PESA); R.

Silybum marianum (L.) Gaertn. – H biennial – Mediterranean-Turanian – Uncropped fields and ruderal environments; it has been observed on the NW side of Mount Conero at Pian Grande (PESA); R.

Solidago virgaurea L. subsp. *virgaurea* – H scap – Circumboreal – Woods, shrublands, forest edges, uncropped fields; C.

Sonchus asper (L.) Hill subsp. *asper* – T scap – Eurasian – Uncropped fields and ruderal environments. The specimen of *S. arvensis* L. preserved into the *Herbarium Picenum* of L. Paolucci, was collected near Ancona and it is to be referred to *S. asper* (L.) Hill s. l.. Moreover, in consideration that *S. arvensis* L. is a rather rare species in the Marche region, where it is known for a few localities in the mountain sector, it is considered that the reports of Paolucci (1890-91) of *S. arvensis* for Mount Conero are to be reported to *S. asper* (L.) Hill s. l.; C.

Sonchus asper (L.) Hill subsp. *glaucescens* (Jord.) Ball – T scap – Eurasian – Along the cliff from Portonovo to Ancona (ANC, PESA, Brilli-Cattarini & Sialm 1973). More recently, it has been observed next to Due Sorelle and the Scoglio della Vela, Sassi Neri, in Sirolo's beach and Grotta di Sirolo (ANC; Biondi 1986); R.

Sonchus bulbosus (L.) N. Kilian & Greuter subsp. *bulbosus* – G bulb – Stenomediterranean Grasslands, forest edges, ruderal environments; NC.

Sonchus maritimus L. subsp. *maritimus* – H ros – Eurimediterranean – Wetlands at ponds of Portonovo (PESA; Biondi 1986); Portonovo (Béguinot 1905); recently the species has not been found in the Lago Profondo; RR (Sm-Cm).

Sonchus oleraceus L. – T scap – Eurasian – Uncropped fields, ruderal environments; C.

Sonchus tenerrimus L. – T scap/H scap – Stenomediterranean – Uncropped fields and ruderal environments; once very common in the shoreline from Numana to the mouth of River Musone (PESA), where it now appears extremely rarefied or disappeared; R.

Staehlina dubia L. – Ch frut – W-Mediterranean – Montane Garigues, shrublands; C.

Symphyotrichum squamatum (Spreng.) G. L. Nesom – T scap – Neotropical – Wetlands, uncropped fields, ruderal environments; C.

Tanacetum corymbosum (L.) Sch. Bip. subsp. *achilleae* (L.) Greuter – H scap – Eurimediterranean – In sparse shrublands and uncropped fields in the southern slope of Mount Conero near Fonte d'Olio (PESA); RR.

Tanacetum parthenium (L.) Sch. Bip. – H scap – E-Eurimediterranean – Spontaneous in woods, shrublands and ruderal environments near old cottages and farms; NC.

Tanacetum vulgare L. – H scap – Eurasian – Spontaneous in woods, shrublands and ruderal environments near old cottages and farms; NC.

Taraxacum sect. *Erythrosperma* (H. Lindb.) Dahlst. – H ros – Paleotemperate – Grasslands; it has been observed between Case Marcelli and the mouth of River Musone, in Pian Grande and around the ancient Monastery of San Pietro (PESA); R.

Taraxacum sect. *Ruderalia* Kirschner & al. – H ros – Circumboreal – Uncropped fields, ruderal environments, wetlands; CC.

Tragopogon crocifolius L. – H biennial – T scap – Garigues and grasslands; grasslands at Pian Grande (Brilli-Cattarini *in verbis*); NP.

Tragopogon dubius Scop. – H biennial – S-European-S-Sibiric – Uncropped fields; NC.

Tragopogon porrifolius L. subsp. *australis* (Jord.) Nyman – H biennial – Eurimediterranean – Uncropped fields and ruderal environments; NC.

Tragopogon porrifolius L. subsp. *porrifolius* – H biennial – Eurimediterranean – Uncropped fields and ruderal environments; NC.
Tragopogon samaritani Heldr. & Sart. ex Boiss. – H biennial – Orophyte SE-European – Grasslands; it has been observed on Mount Conero (Brilli-Cattarini & Sialm 1973); R.
Tussilago farfara L. – G rhiz – Paleotemperate – Clay cliffs, uncropped fields, wetlands and ruderal environments; C (Dc-Tf).
Urospermum dalechampii (L.) Scop. ex F. W. Schmidt – H scap – Eurimediterranean – Uncropped fields and ruderal environments; C.
Urospermum picroides (L.) Scop. ex F. W. Schmidt – T scap – Eurimediterranean – Uncropped fields and ruderal environments; NC.
Xanthium orientale L. subsp. *italicum* (Moretti) Greuter – T scap – Exotic nauralized – Beaches, dunes and ruderal environments; C.
Xeranthemum inapertum (L.) Mill. – T scap – S-European-S-Sibiric – Grasslands and garigues; NC.

Adoxaceae
Sambucus ebulus L. – G rhiz – Eurimediterranean – Ruderal environments, uncropped fields; NC.
Sambucus nigra L. – P caesp – European-Caucasian – Ruderal environments, hedges; C. *Viburnum lantana* L. – P caesp – C-European – Woods, shrublands, forest mantles; NC. *Viburnum tinus* L. subsp. *tinus* – P caesp – Stenomediterranean – Woods, shrublands, forest mantles; C.

Caprifoliaceae
Centranthus ruber (L.) DC. subsp. *ruber* – Ch suffr – Stenomediterranean – Rocky walls, old walls, ruderal environments; NC.
Cephalaria leucantha (L.) Roem. & Schult. – H scap – Orophyte S-European – Rocky walls, uncropped fields; NC.
Dipsacus fullonum L. – H biennial – Eurimediterranean – Uncropped fields, ruderal environments; C.
Lonicera caprifolium L. – P lian – S-European-S-Sibiric – Woods, shrublands, forest mantles; NC.
Lonicera etrusca Santi – P lian – Eurimediterranean – Woods, shrublands, forest mantles; C.
Lonicera implexa Aiton subsp. *implexa* – P lian – Stenomediterranean – Shrublands; C.
Lonicera xylosteum L. – P caesp – European-Caucasian – Woods; R/NC.
Scabiosa columbaria L. subsp. *columbaria* – T scap – Eurasian Uncropped fields, ruderal environments (Biondi 1986) probably to be referred to *S. uniseta*; R.
Scabiosa uniseta Savi – H scap – Endemic Uncropped fields, ruderal environments. The reports of Paolucci (1890-91) sub *S. pauciseta* DC. are probably to be referred to this species; C.
Sixalix atropurpurea (L.) Greuter & Burdet subsp. *grandiflora* (Scop.) Soldano & F. Conti – H biennial – Stenomediterranean – Ruderal environments, uncropped fields; C.
Valerianella coronata (L.) DC. – T scap – Eurimediterranean – Uncropped fields; R.
Valerianella dentata (L.) Pollich – T scap – Subatlantic Uncropped fields on the NW side of Mount Conero next to Pian Grande (PESA) and near Ancona (Paolucci & Cardinali 1900); R.
Valerianella eriocarpa Desv. – T scap – Stenomediterranean – Uncropped fields, cultivated fields, E side of Mount Conero (PESA), next to Trave (Paolucci 1890-91); R.

PITTOSPORACEAE

Pittosporum tobira (Thunb.) W. T. Aiton – NP – E-Asian – Spontaneous in ruderal environments and in Portonovo thickets. This species, coming from Japan and eastern Asia, is considered to be naturalized in Marche Region; in Portonovo it can be considered as invasive in holm oak woods and in clearings; R.

ARIALACEAE

Hedera helix L. subsp. *helix* – P lian – Eurimediterranean – Woods, forest mantles, ruderal environments; CC.

APIACEAE

Aegopodium podagraria L. – H scap – Eurasian – Woods, shrublands, watercourses; C.

Ammi majus L. – T scap – Eurimediterranean – Cultivated and uncropped fields; C.

Ammi visnaga (L.) Lam. – T scap – Eurimediterranean – Cultivated fields, uncropped fields, ruderal environments; NC.

Ammoides pusilla (Brot.) Breistr. – T scap – Stenomediterranean – Xeric grasslands, annual meadows; NC.

Angelica sylvestris L. subsp. *sylvestris* – H scap – Eurosibiric – Wet grasslands, along the rivers (Brilli-Cattarini *in verbis*); R.

Bifora testiculata (L.) Spreng. – T scap – Stenomediterranean – Cultivated fields; NC.

Bupleurum baldense Turra – T scap – Eurimediterranean – Grasslands, annual meadows; NC.

Bupleurum subovatum Link ex Spreng. – T scap – Eurimediterranean-Turanian -– Grasslands, ruderal environments (ANC, PESA); "*Dovunque presso Ancona ...*" (Paolucci 1890-91 sub *B. protractum* Link); R.

Bupleurum tenuissimum L. – T scap – Eurimediterranean – Ruderal environments next to Massignano (ANC), at Trave (Paolucci 1890-91); at the mouth of River Musone (PESA); R.

Caucalis platycarpos L. – T scap – Eurimediterranean-Turanian– Cultivated fields. On Mount Conero and in Pietralacroce (Paolucci 1890-91 sub *C. daucoides* L.). Mount Conero in the NW side next to Pian Grande (PESA); R.

Cervaria rivinii Gaertn. – H scap – Eurosibiric – The species, once common, now became sporadic in cultivated and uncropped fields; NC.

Chaerophyllum temulum L. – T scap – Eurasian – Forest edges, ruderal environments; C.

Conium maculatum L. subsp. *maculatum* – H scap – Paleotemperate – Ruderal environments; R.

Coriandrum sativum L. – T scap – SW-Mediterranean – Ancona (Paolucci & Cardinali 1900); NP.

Crithmum maritimum L. – Ch suffr – Eurimediterranean – Rocky cliffs overlooking the sea. Locally the species is named "*paccasassi*"; NC.

Daucus broteri Ten. – T scap – E-Mediterranean – Mount Conero (Béguinot 1905); NP.

Daucus carota L. subsp. *carota* – H biennial – Paleotemperate – Ruderal environments, uncropped fields, cultivated fields, grasslands; C (Dc-Tf).

Daucus carota L. subsp. *commutatus* (Paol.) Thell. – H biennial – Steno-W-Mediterranean – Rocky walls, on the cliff between Valle delle Vellare and Sassi Neri; Mount Conero in the lower E side near the rocks of Due Sorelle (PESA). The indications of *Daucus gingidium* (Béguinot 1905; Paolucci 1890-91) are to be reported to this entity; NC.

Echinophora spinosa L. – H scap – Eurimediterranean – Dunes in Marcelli di Numana (ANC; PESA). Reported in the past also in the foot of the cliff between Ancona and Portonovo and on Portonovo's beach; R.

Eryngium amethystinum L. – H scap – SE-European-Pontic – Garigues, grasslands, uncropped fields; C.

Eryngium campestre L. – H scap – Eurimediterranean – Grasslands, uncropped fields, ruderal environments; NC.

Eryngium maritimum L. – G rhiz – Stenomediterranean-Atlantic – Dunes near the mouth of River Musone next to Marcelli di Numana (ANC, PESA), Portonovo (PESA); RR.

Foeniculum vulgare Mill. subsp. *piperitum* (Ucria) Bég. – H scap – C European – Grasslands, uncropped fields; C.

Foeniculum vulgare Mill. subsp. *vulgare* – H scap – S-Eurimediterranean – Grasslands, uncropped fields; NC.

Helosciadium nodiflorum (L.) W. D. J. Koch – H scap – Eurimediterranean – Backwaters or slowly flowing fresh water; C (An).

Oenanthe lachenalii C. C. Gmel. – H scap – Eurimediterranean-Subatlantic – Wet grasslands, ponds. Portonovo's ponds (Béguinot 1905; Brilli-Cattarini 1968); Brilli-Cattarini (1969) considered that the plant observed by Bettini (1947) in Portonovo in the late '40s that he called *O. globulosa* is to be referred to *O. lachenalii*. A few years later (1965), Brilli-Cattarini found in the same place a sample of *O. lachenalii*, stored in PESA. However, *O. globulosa* is not present in Marche Region (Conti & al. 2005) having a distribution range mainly thyrrenian (along the Adriatic Italian coast it is not present); RR.

Oenanthe pimpinelloides L. – H scap – Eurimediterranean-Subatlantic – Wet grasslands, uncropped fields; C.

Oenanthe silaifolia M. Bieb. – H scap – Mediterranean-Atlantic – Along the waterways near Marcelli di Numana (ANC); R.

Orlaya grandiflora (L.) Hoffm. – T scap – S-European-S-Sibiric – Xeric grasslands in Pian dei Raggetti and the lower part of Fosso di S. Antonio (Brilli-Cattarini *in verbis*); R.

Orlaya kochii Heywood – T scap – Stenomediterranean – Uncropped fields, cultivated fields, ruderal environments in the medium SW slope of Mount Conero, in the S slope along the road from Fonte d'Olio to the ancient Monastery, in the NW slope at Pian Grande (PESA) "*... a Pietralacroce presso Ancona, ove l'ho raccolta*." (Paolucci 1890-91); NC.

Pastinaca sativa L. subsp. *urens* (Req. ex Godr.) Celak. – H biennial – Eurosibiric Cultivated fields, ruderal environments; C.

Petroselinum crispum (Mill.) Fuss – H scap – Cultivated – Spontaneous in ruderal environments; NC.

Petroselinum segetum (L.) W.D.J. Koch – T scap – W-European – Uncropped fields at the mouth of River Musonee by the limit of the investigated area (PESA); R.

Pimpinella peregrina L. – H biennial – Eurimediterranean – Uncropped fields and shrublands along the lower part of Fosso di Sant'Antonio, in xeric backdune grasslands in Marcelli di Numana (Brilli-Cattarini *in verbis*); R.

Pimpinella saxifraga L. – H scap – European-Caucasian – Grasslands and ruderal environments in Camerano, Pietralacroce, Varano (Brilli-Cattarini *in verbis*) and on Mount Conero (Paolucci 1890-91); NC.

Sanicula europaea L. – H scap – Paleotemperate – Woods; NC.
Scandix pecten-veneris L. subsp. *pecten-veneris* – T scap – Eurimediterranean – Cultivated and uncropped fields; "*Dovunque presso Ancona*" (Paolucci 1890-91); NC.
Sison amomum L. – H biennial – Eurimediterranean-Atlantic – Wetlands along Fosso Betelico (PESA) at the mouth of River Musone; R.
Smyrnium olusatrum L. – H biennial – Eurimediterranean-Subatlantic – Forest edges, ruderal environments; C.
Tommasinia verticillaris (L.) Bertol. – H scap – Orophyte SE-European – Woods, ruderal environments, forest edges; NC.
Tordylium apulum L. – T scap – Stenomediterranean – Forest edges, ruderal environments; NC.
Torilis arvensis (Huds.) Link subsp. *arvensis* – T scap – Subcosmopolitan – Cultivated fields, uncropped fields, ruderal environments; C.
Torilis arvensis (Huds.) Link subsp. *purpurea* (Ten.) Hayek – T scap – Subcosmopolitan –cultivated and uncropped fields, ruderal environments; NC.
Torilis japonica (Houtt.) DC. – T scap – Paleotropical – Cultivated and uncropped fields, ruderal environments; C.
Torilis nodosa (L.) Gaertn. – T scap – Eurimediterranean-Turanian – Uncropped fields, ruderal environments, "*... a Pietralacroce, al Trave, presso Ancona, ove l'ho raccolta.*" (Paolucci 1890-91); NC.
Turgenia latifolia (L.) Hoffm. – T scap – Eurimediterranean – "*Fra le biade, e nei campi coltivati, specialmente nella zona littorale……a S. Margherita, a Pietralacroce, al Trave presso Ancona, ove l'ho raccolta*" sub *Caucalis latifolia* L. (Paolucci 1890-91); NP.

Discussion

Some numerical data on the flora

The floristisc list of vascular plants counts a total of 1169 entities divided in 101 families and 507 genera.

In the floristic list 64 species currently disappeared or not recently found have been included; these entities were present in the past in the studied territory and mentioned in bibliography by several authors that studied the flora of Conero and Marche. In the notes concerning these entities, the loss of recent records is indicated by the indication NP (not recently recovered) and bibliographic sources and herbaria where those species are cited and in some cases conserved are mentioned. These are mainly species typical of environments currently disappeared as sand dunes, salt retrodunal meadows, weeds of cereal coltures disappeared due to the use of herbicides and to the strong reduction of cultivated areas. Nevertheless, it is extremely important not to miss the information about the past presence of this group of species, because that allows considerations about territory changes over the years. One of these disappeared species is *Anthyllis barba-jovis*, recently studied in a project of re-implantation carried out by the Centro Interdipartimentale dell'Orto Botanico dell'Università Politecnica delle Marche, granted by the Ente Parco Naturale Regionale del Conero. Through this project, some populations of *Anthyllis barbajovis* seedlings, reproduced by seeds coming from the National Park of Gargano, have been planted (Morbidoni & al. 2008).

Moreover, 20 species, mainly woody have been included in the list. These are species used for reforestation or ornamental uses and some of them reproduce spontaneously and became part of the Conero Nature Park flora. Some of these species belong to the Italian native flora and thus, can not be considered "alien species", so they have been considered allochthonous for the Park flora because they have been introduced for different aims. In some other cases, even if not spontaneous, they are showy species or very aboundant.

Concerning species currently rare, these are 389 and represent more than 30% of the Conero Nature Park flora. These are, in this case too, entities became rare because of rarefaction of their living habitats especially for segetal, hygrophilous, psammophilous and grasslands' species. Instead, other species are rare because of bioclimatic conditions of the area that lies in the transition zone between Mediterranean and Temperate macrobioclime, so they found few habitats suitable for their survival. A typical example is *Euphorbia dendroides*, here in the northern limit of its distribution range in the Adriatic area, occuring exclusively at the Valle delle Vellare and in the nearby Spiaggia dei Gabbiani where, for local, geomorphological and microclimate conditions, a thermomediterranean isle occurs where other thermomediterranean species could conservate and optimally reproduce. Actually, a vigorous specimen of *Euphorbia dendroides* had naturally developed in the continental side of Mount Conero, at the crossroad to Massignano but, unfortunately, the cuts of roadside vegetation carried out by the Province of Ancona, have inexorably eliminated it.

Some considerations can be done regarding habitat preferences for the entities found. In tab. 1 it has been reported a simple calculation indicated by the number of species and percentage values, graphically represented by Fig. 5.

It is possible to observe that the most part of entities occurs in grasslands (16,77%) and in uncultivated fields (16,51%); moreover, it is significative the richness of entities of ruderal environments (14,59%), of woods (11,38%) and of wet grasslands (9,5%).

The Biological spectrum

The life-form spectrum was calculated over 1105 entities that is the number corresponding to all of the entities that form the current flora of the Conero Park, then subtracting the extinct species and these ones no longer recorded (Fig. 6). The principal life-form category is represented by annual species (T) representing the 37.8% of the total number. The high presence of annual species is due to the bioclimatic conditions caracterized by marked mediterranean features in some areas and to the presence of disturbed environments caused by the intense anthropic attendance. Rather abundant are also perennial herbaceous species (H) which form the 31.10% of the flora; they occupy open spaces, uncultivated areas, grasslands and degraded areas. The following categories are represented by geophytes, the 11.9% of the total, mainly represented by grasslands's species and the phanerophytes (10.6%), showing a good coverage of woodlands. The low frequency of the typical species of wet environments (helophytes and hydrophytes) is also significant, indeed they together slightly exceed 1% of the total, confirming the scarce presence of this type of habitat that was probably much more widespread in the past.

The chorological spectrum

The chorotypes of entities that constitute the park's flora were defined according to Pignatti (1982) and grouped into the following functional categories for a better interpretation of the flora itself:

Table 1. Number of species and percentage value for kind of habitat.

habitats	species no.	%
sea	1	0.09
fresh water	21	1.80
wet grasslands	111	9.50
uncultivated fields	193	16.51
backdunes	36	3.08
rocky habitats	22	1.88
ruderal habitas	170	14.54
forest edges	43	3.68
cultivated fields	87	7.44
shrubs	31	2.65
garigues	40	3.42
grasslands	196	16.77
annual meadows	38	3.25
beaches	32	2.74
woods	133	11.38
reforestation	15	1.28
	1169	100.00

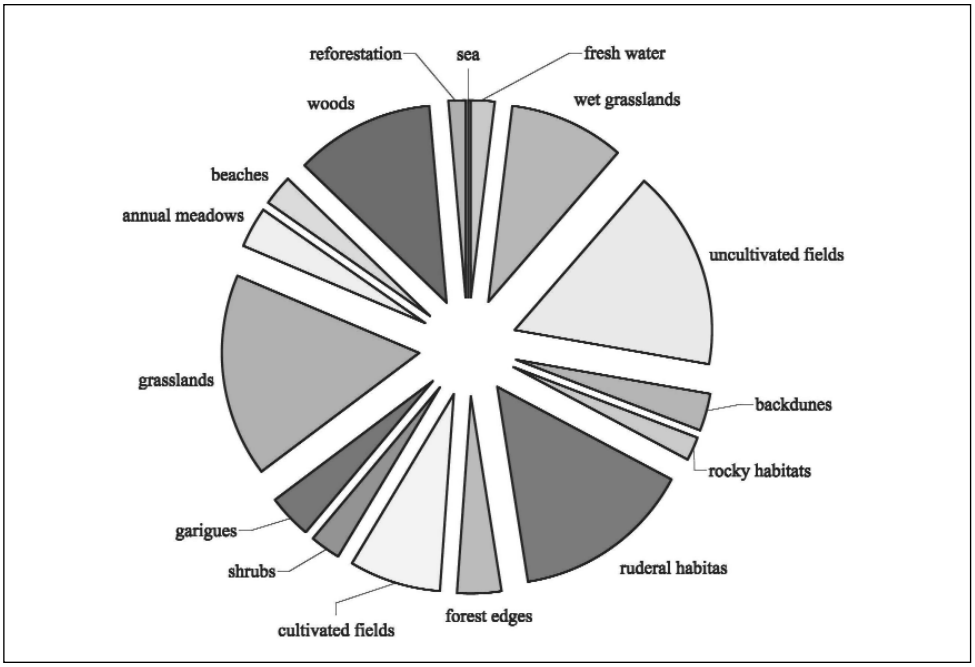

Fig.5. Distribution of the entities of the Conero flora according to different habitats.

- Exotics: including all species identified as such by Celesti-Grapow & al. (2009, 2010);
- Eurasian species: category that includes the chorological groups of Eurasian *s.s.*, European, Southern European, Paleotemperate, European-Caucasian and SouthEuropean/South-Siberian;
- Boreal: it includes Circumboreal and Euro-Siberian species;
- Steno-Mediterraneans;
- Cultivated species: in this category we have included only the wood species used for rows and reforestations but not crop plants for production purposes;
- Wide distribution: category including the following chorological groups: Cosmopolite and sub-cosmopolite, Mediterranean-Turanian, Pan-Tropical, Paleo-Tropical and Sub-Tropical species;
- Eurimediterranean;
- Endemic and sub-endemic: in the examined territory, endemic species (in the strict sense) do not occur, therefore, endemic species of Apennines and subendemic species have been included in this group.
- Atlantic and sub-Atlantic: also including W-European and Mediterranean-Atlantic chorological groups.

The chorological spectrum of Conero's flora is shown in table 2.

The calculation of the chorological spectrum showed that the overwhelmingly chorotype is that one of Eurasian species; it is due to the paleogeographic history of the Italian peninsula's flora, they together constitute the 29% of the flora of the park. Eurimediterranean species constitute about the 26% of the total, while Stenomediterranean species, also well represented, account for 13% of the total. This datum is perfectly correlated with the results of the phytoclimatic analysis carried out for Marche region (Biondi & Baldoni 1995a, 1995b) according to which the Mount Conero marks the northern limit of the Mediterranean macrobioclimate along the Adriatic side. The consistency of species widely distributed is also significant; indeed they represent the 12% of the total indicating the high anthropic utilization of the Park area where there are towns, villages and wide rural areas.

Other chorological categories (Boreal, cultivated, Endemic and sub-endemic, Atlantic and Sub-Atlantic species) contribute very little to the flora of the park; however, their presence is very important as it demonstrates the environmental variability of the area and the complex origin of its flora. Finally, regarding the category of Exotic, these species will be discussed in detail in the following paragraph.

Non-native flora

In the Conero Nature Park's territory 105 exotic entities are present; they represent the 9,5% of the total flora; this percentage is lower than the Marche's one that is 12,57% (Gubellini & Pinzi 2010b), and the Italian one which is 13,4% (Celesti-Grapow & al. 2009, 2010).

Within exotic species, naturalized species are dominant (40% approximately) followed by the invasive and casual entities riching the same number (31 species) correspondig to about 30% for both categories.

The most part of naturalized species comes from Asia such as *Tulipa* sp.pl., *Prunus* sp.pl. and *Crepis sancta*, whereas the invasive species arrive mainly from America

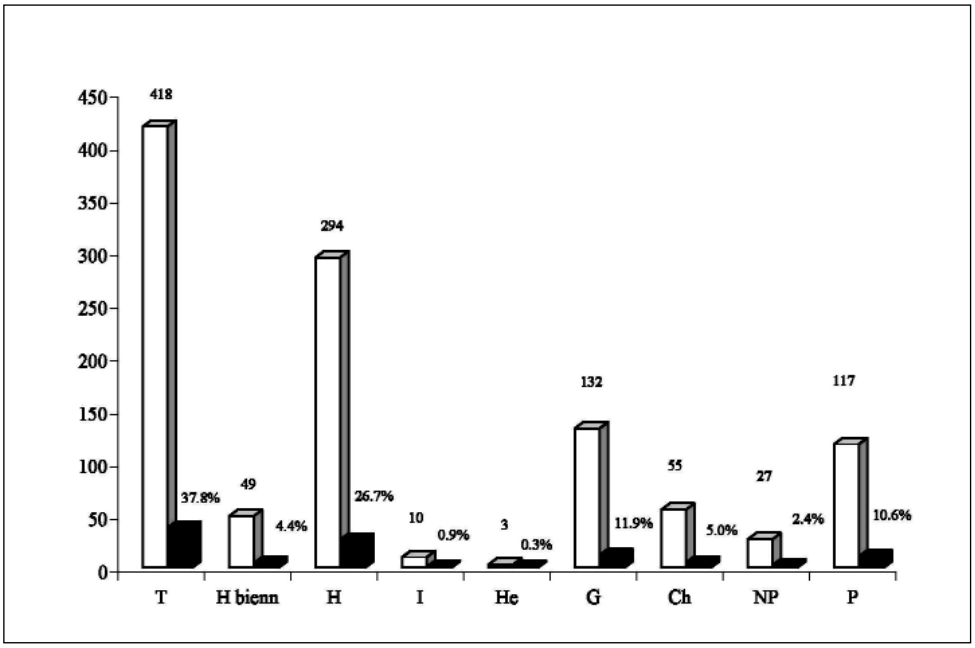

Fig. 6. Biological spectrum of the Conero Park's flora. The white columns represent the current number of entities while the black ones the percentage quantities.

Table 2. Chorological spectrum of Conero Park's flora.

Principal chorological groups	Secondary groups	Entitie no.	%
1 Alien		105	10
2 Eurasian	Eurasian s.s.	86	8
	European	23	2
	South-European	43	4
	Paleotemperate	81	7
	European-Caucasian	54	5
	S European-S Sibiric	30	3
3 Boreal	Circumboreal	31	3
	Eurosibiric	23	2
4 Steno-Mediterranean		142	13
5 Cultivated		20	2
6 Wide distribution	Cosmopolitan and subcosmopolitan	93	8
	Mediterranean-Turanian	22	2
	Pan-Tropical	1	0
	Paleo-Tropical	2	0
	Sub-Tropical	12	1
7 Euri-Mediterranean *s.l.*		288	26
8 Endemic and Sub-endemic		10	1
9 Atlantic and Sub-Atlantic	Sub-Atlantic	6	1
	W-European	5	0
	Mediterranean-Atlantic	28	3
	Tot.	1105	100

(*Amaranthus* sp.pl. and *Erigeron* sp.pl.), finally casual species come mainly from the Mediterranean basin (Fig. 7).

Concernig with habitats, exotic species colonize firstly ruderal areas (52%) and uncultivated fields (21%), whereas species that occupy natural habitats are relatively low in number such as beaches (2%), grasslands and wet uncultivated areas (5%), garigues (5%), woods (6%) and shrublands (6%). The species of cultivated areas (weeds) are very few and in strong reduction because of the deep plowings and the intense use of herbicides. Some species, once common in fields, currently find shelter in uncultivated areas (e.g. *Tulipa, Papaver* ecc); on the contrary, *Abutilon theophrasti* is a species in rapid expansion in the territory (Fig. 8).

About life-forms, therophytes, which represent the most abundant category (36%), are distributed mainly in ruderal environments (24 entities) and in uncultivated areas (10 entities).

The following category is that of Phanerophytes that reach the 24% of the total and are found in woods, shrublands and ruderal environments. Geophytes (16%) and Hemicryptophytes (12%) too are localized mainly in ruderal environments and in uncultivated fields, whereas Chamaephytes (7%) develop in cultivated fileds as well as in ruderal areas. Just a modest percentage of Geophytes and Chamaephytes colonizes natural habitats: Geophytes colonize beaches and wet meadows while Chamaephytes garigues. Finally, the presence of Hydrophytes (1%) and Nanophanerophytes (3%) is completely negligible (Fig. 9).

In conclusion, it can be highlined that in the Conero Nature Park, even if present, the contingent of exotic flora is modest and has not yet reached natural habitats of high quaity.

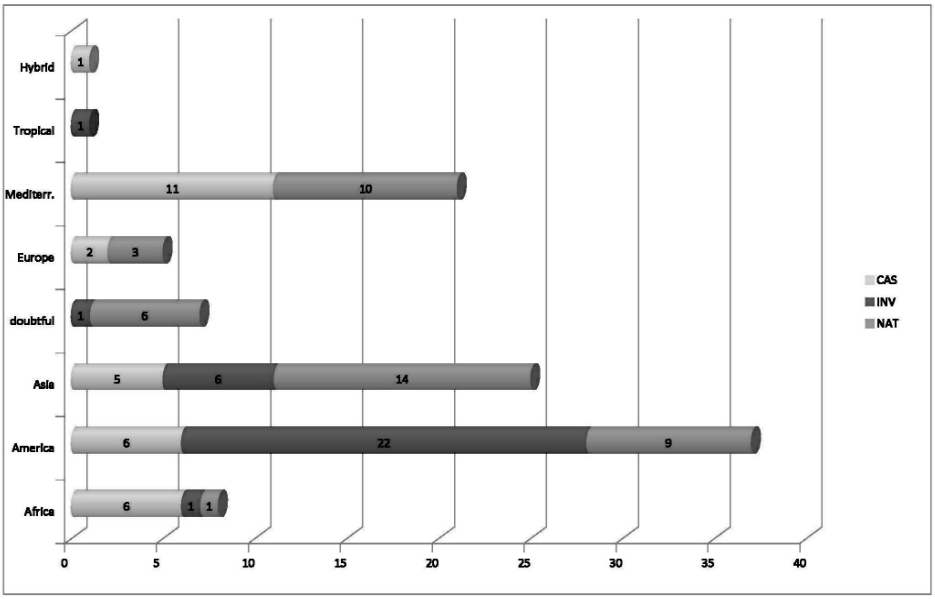

Fig. 7. Geographical origin of non-native species.

Nevertheless, the invasion of these species is often fast and the number of exotic entities is slowly but continuosly increasing all over the region where it seriously threathens the natural biodiversity; thus the diffusion of this species have to be constantly monitored.

At this moment, the most dangerous alien species are *Robinia pseudacacia* and *Ailanthus altissima*, indeed they represent a serious threat for conservation of natural habitats. The first species colonizes wet areas near fluvial terraces and sometimes the low area, within deciduous woods and Mediterranean maquis. In more xeric forest aspects, the invasion of *Ailanthus altissima* becomes important because, thank to its fast growing capacity, it forms dense groups inclined to suppress spontaneous woody plants. The other exotic plants of the territory of the Park, at present, do not have an aggressive behavior against native species.

Definitely, Conero Nature Park's administrators have the responsibility to control the diffusion of the allochthonous flora emanating rules that prohibit the use of exotic species in State zones as beaches, military and public areas. Indeed, it is regrettable the use of exotic species, even if undoubtelly with a high esthetic value, in roundabouts as it is possible to find in many coastal roads of the Conero Nature Park. We consider, indeed, very important to discourage marketing and cultivation of invasive plants, as well as to inform the population and local administrations about these problems in order to sensitize them on the necessity of avoiding use, just to decorate, of allochthonous species.

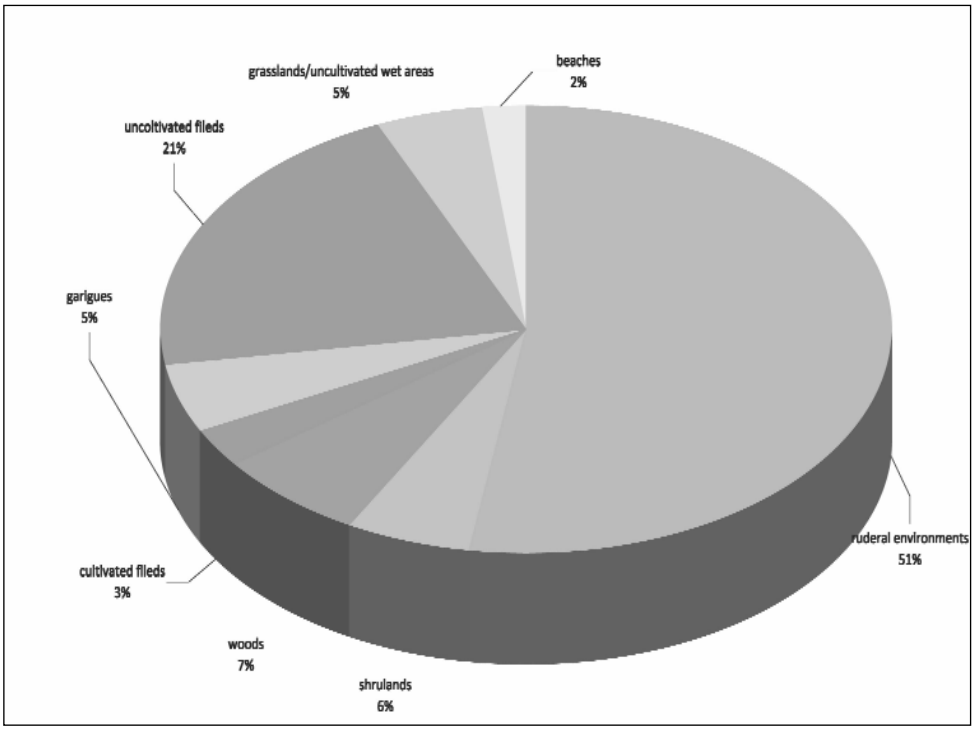

Fig. 8. Relationship between exotic species and environments that are preferentially colonized.

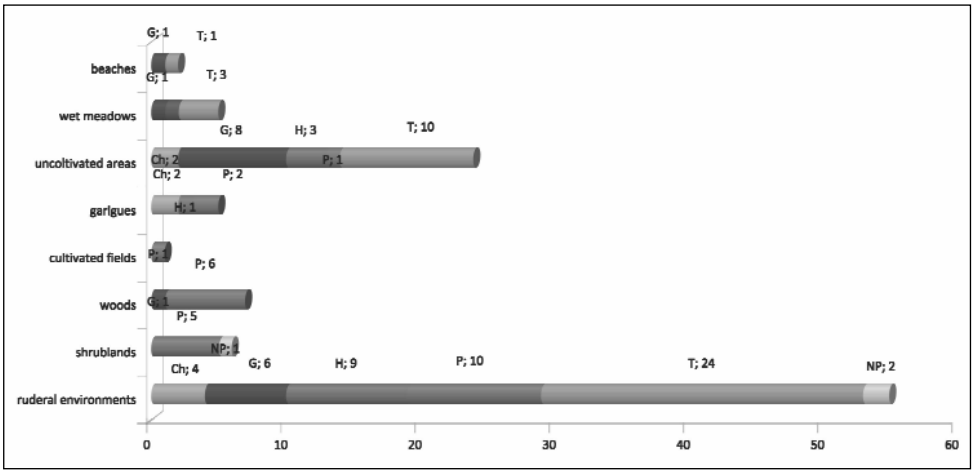

Fig. 9. The histogram relates biological forms of exotic species with different types of environment. It is clear that the habitats most affected by the presence of exotic species are ruderal environments and uncultivated areas.

Some biogeographic considerations

The great floristic richness of Conero Nature Park comes from a high environment diversity as well as from paleogeographic events of the Adriatic basin that allow the interpretation of some biogeographic aspects to justify why on Mount Conero it is not possible to find some balcanic species or, more in general, eastern species, that are frequent on Gargano and in the Murge.

The Conero massif emerged in the late Miocene, after the orogenesis of Umbria-Marche Apennines, when the territories of the Gargano and the Murge were already present and still attached to the Aegean continent. Much later, during the Pliocene, the two areas separated from the mainland and, like Mount Conero, they formed islands in the "Pliocene sea". The following links that took place between Mount Conero and the Dinaric mountains through the sea regressions during glacial periods did not allow the spread of Balkan species, especially plants, on Conero because no suitable habitats were present. During Quaternary the alternation of glacial and interglacial periods brought strong variations in the level of the sea. During the Würm glaciation, when the marine regression reached its maximum value in the Adriatic, the northern coast of the adriatic basin arrived at the northern limit of the meso-Adriatic depression, along the Pescara-Zara line. The subsequent transgression called "flandrian" led to the entrance of the sea and the remodeling of the fluvial-lacustrine plain that had originated as a result of Würm regression. Other reasons justifying the extraordinary phyto-diversity of the park is due to the climatic (macro, meso and micro) and bioclimatic conditions occurring in these areas. Indeed, Mount Conero is considered to be the point of transition between the Temperate and the Mediterranean macrobioclimates (Biondi & Baldoni 1995b). In fact, the particular meso and microclimate characteristics occuring along this stretch of coast, especially along the two sides faced to

the sea of the Conero promontory, allowed to some entities, having a Mediterranean distribution, to find here their northern limit of distribution range along the western Adriatic coast (Paolucci 1890-91; Paolucci & Cardinali 1895; Béguinot 1905; Brilli-Cattarini 1965, 1967; Biondi 1981, 1986): *Ampelodesmos mauritanicus*, *Melica minuta*, *Lolium rigidum* subsp. *lepturoides*, *Rapistrum rugosum* subsp. *linneanum*, *Hippocrepis ciliata*, *Coronilla valentina*, *Sulla capitata*, *Euphorbia dendroides*, *Plantago serraria*, *Fumana arabica*, *Brassica montana* and *Juniperus oxycedrus* subsp. *macrocarpa*.

Other entities that can be found on the Conero are not present, instead, along the northern coast between Conero and Venezia Giulia: *Pinus halepensis, Achnatherum bromoides, Asphodeline liburnica* (actually present in Istria but not in Italian territory), *Emerus major* subsp. *emeroides*, *Pistacia terebinthus*, *Lonicera implexa* subsp. *implexa*, *Euphorbia veneta*, *Trigonella monspeliaca*, *Astragalus sesameus*, *Ruta chalepensis*, *Convolvulus elegantissimus* and *Crucianella latifolia* although this latter is not currently present in the park.

Conservation aspects

The Conero Park extends over an area that can be considered intensively used. In Table 3 the real and percetage surfaces of the different classes of land use are shown. As can be seen, more than 50% of the area of the park is directly used for productive purposes.

In particular, coastal areas both north and south of the calcareous promontory are heavily exploited for bathing and even where there is not the presence of stable infrastructure, the attendance by tourists and the local population is rather intense. This causes the strong alteration of psammophilous and retro-dunal vegetation, indeed these communities are reduced to small residual strips.

Sub-coastal areas are still largely used for agricultural purposes and there is a high density of scattered houses, different kinds of infrastructures and service roads. The inner part of the promontory, while presenting aspects of high naturalness is also frequented by men, especially for trekking and recreation.

In recent years, two studies aimed at assessing the environmental quality of the territory of the Conero park have been carried out. They were based on the calculation of various types of indexes, some of which are already known in the literature and others new, designed to express the environmental quality of a territory on the basis of the potential vegetation and of the current knowledge about the dynamic processes allowing to identify the vegetation series in which the different plant communities are involved. Starting with basic synphytosociological and geosynphytosociological knowledge, through the calculation of indices that take into account the environmental quality of the of plant landscape units (Biondi & Colosi 2005), it was demonstrated that the area of the park can be classified into four zones with increasing conservation levels (Fig. 10). The area where the conservation value was judged as excellent is localised on the calcareous massif of Conero, the following is the area with good conservation value that extends along the coastal areas of marly-arenaceous cliff distributed north and south of the promontory. The area judged with a sufficient value of conservation, concerns a large part of the territory of the park and is represented by the internal hilly sector while the area which, according to the calculation of different indices of quality, reaches minimum values of environmental quality an

Table 3. Land use and surfaces of Conero Nature Park.

Physionomies	Surface (m^2)	Surface (ha)	Surface (%)
Crop	32923555.09	3292.36	54.38
Urban	7535799.79	753.58	12.45
Woods	6583855.46	658.39	10.88
Reforestation	4945325.76	494.53	8.17
Shrublands	3679456.20	367.95	6.08
Grasslands	2229394.69	222.94	3.68
Tree rows	942745.19	94.27	1.56
Beach vegetation	636155.99	63.62	1.05
Sport gardens	581925.48	58.19	0.96
Aquatic vegetation	217689.63	21.77	0.36
Garigues	105613.36	10.56	0.17
Quarries	87831.52	8.78	0.15
Reefs	36835.44	3.68	0.06
Lakes and ponds	24446.50	2.44	0.04
Rochy vegetation	8669.42	0.87	0.01
TOTAL	**60539299.52**	**6053.93**	**100.00**

consequently judged as vulnerable in terms of the state of conservation, extends into the southern sector of the park regarding the flood plain and low hills nearby. The second study aimed instead to assess the quality of agro-ecosystems in terms of biodiversity and naturalness (Galdenzi & al. 2011) through the use of indicators applied on vegetation maps. This study has allowed to produce the naturalness map of the park (Fig. 11) through the spatial visualization of the NSI values. As it is possible to observe, the areas with the greatest naturalness are not concentrated exclusively on the calcareous massif of Conero but are spread throughout the territory corresponding to watercourses and habitats of modest extension of conservation interest. Areas having the lowest value of naturalness, which are also spread throughout the country, are localised particularly in plains and valleys.

For the purposes of environmental protection and the conservation of plant and animal biodiversity, with Bioitaly Project within the European project Natura 2000, three Sites of Community Importance (SCI) and one Special Protected area (SPA) have been identified in Conero Nature Park: SCI “Portonovo e falesia calcarea a mare” (IT5320006), SCI “Costa tra Ancona e Portonovo” (IT5320005), SCI “Monte Conero” (IT5320007) and the SPA “Monte Conero” IT5320015 (Fig. 12).

The habitats recognized for the Park territory, in accordance with the Directive

92/43/EEC, known as Habitats Directive, interpreted according to the Italian Manual of interpretation (Biondi & al. 2009; Biondi & al. 2012) are shown in Table 4. The study of Natura 2000 areas and of the specific habitats carried out through geobotanical and phytosociological methods within the project of Ecological Network of the Marche Region (Biondi & al. 2007; Pesaresi & al. 2007) including phytosociological and geosynphytosociological maps on a scale of 1:10,000 from which habitat maps have been obtained can be found on the websites of Marche Region (www.regione.marche.it) and in the we site of

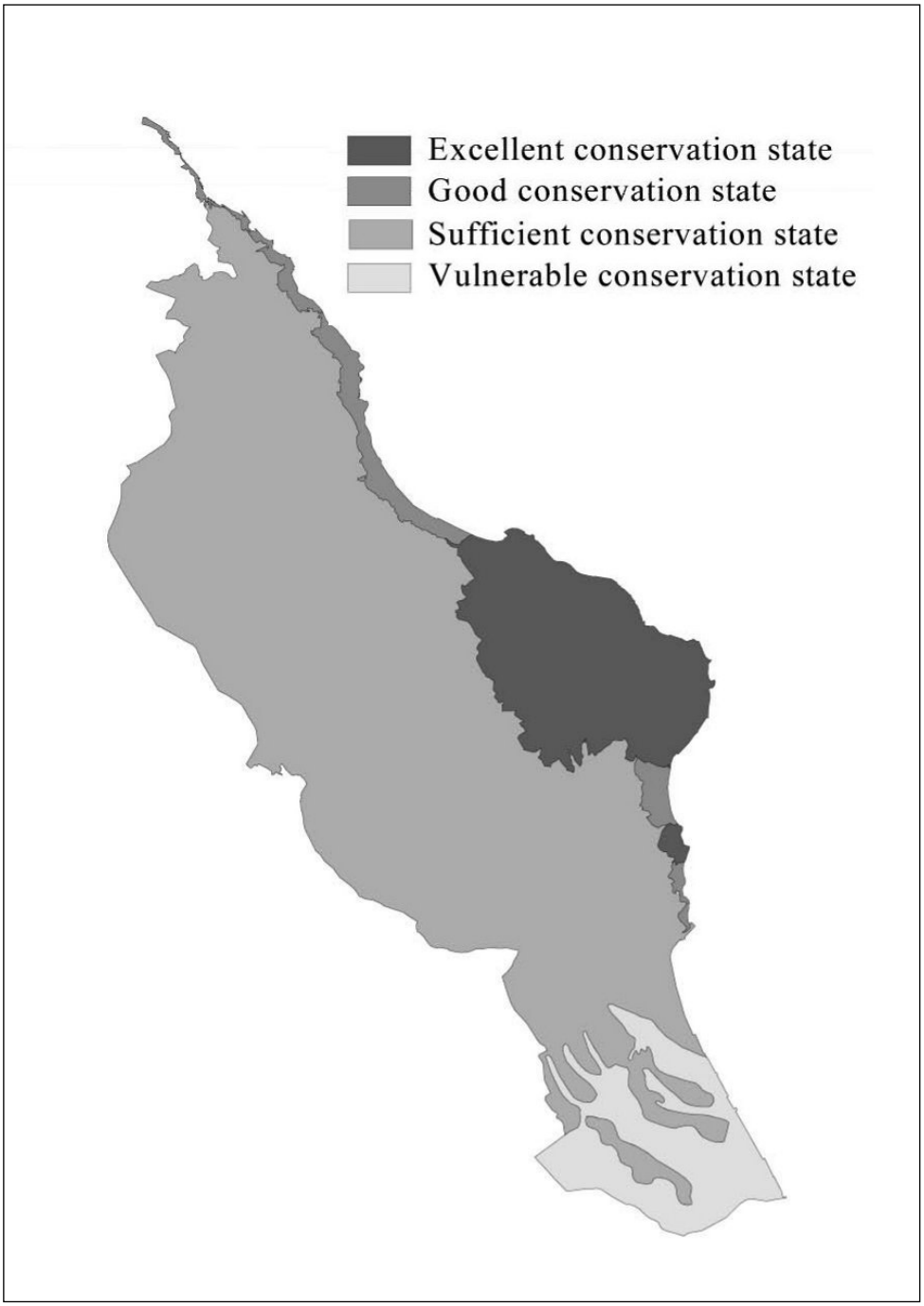

Fig.10. Conservation state of the landscape units of the Conero Regional Nature Park (from Biondi & Colosi 2005).

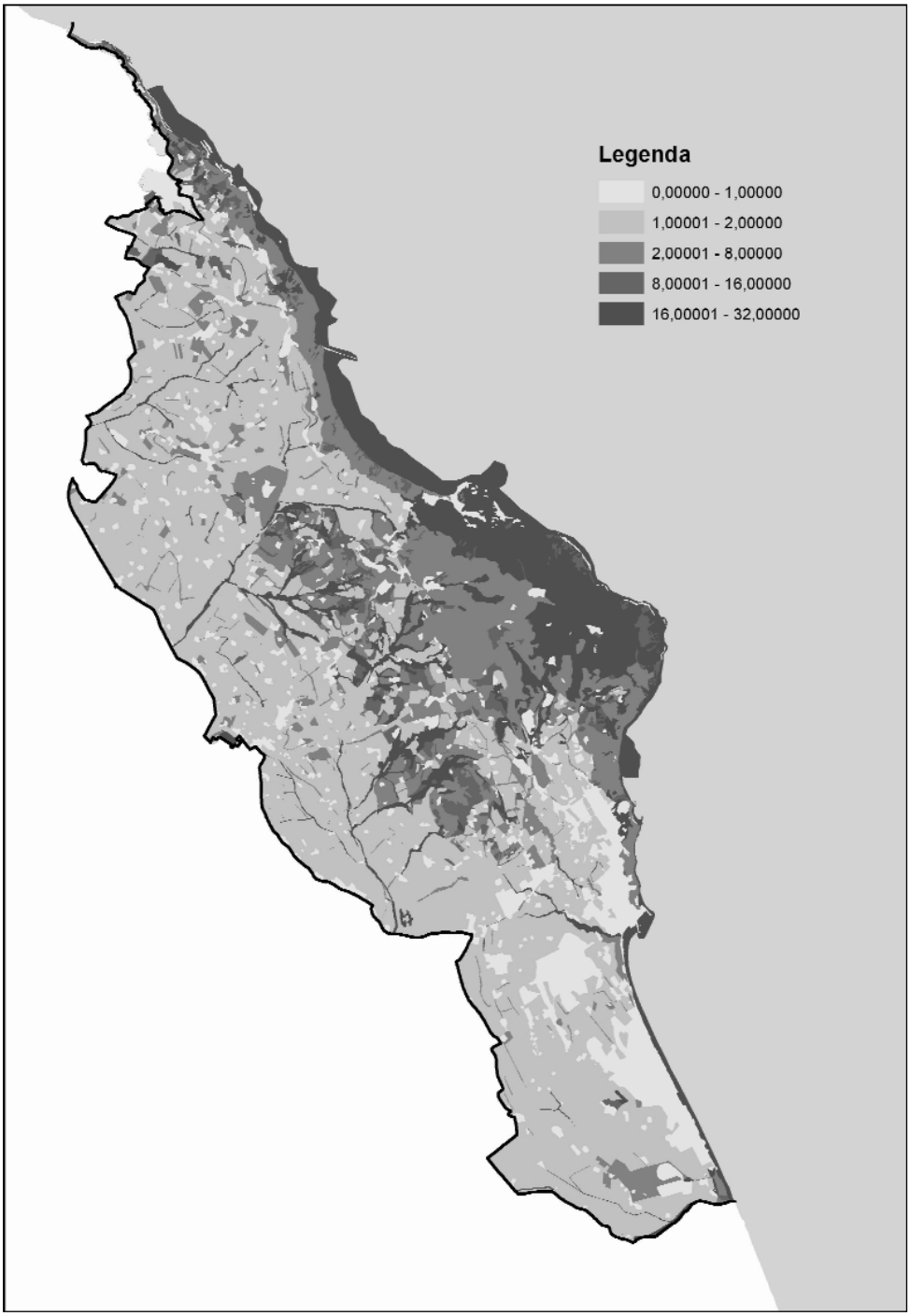

Fig. 11. The Naturalness map of the Conero Regional Nature Park (from Galdenzi & al. 2011).

the Botanical Garden "Selva di Gallignano" of the Università Politecnica delle Marche (http://www. ortobotanico.univpm.it).

For active management with conservation purposes and for sustainable development of these areas, the syndynamic and plant landscape maps (called respectively synphytosociological and geosynphytosociological maps) are extremely useful; these maps have been made for the Conero Park on a scale of 1:10,000 and are available at the websites already cited. Indeed, these maps allow to know in advance the current potential vegetation of the whole territory and, through knowledge of the dynamic series, determine which dynamic processes are in place or can be triggered as a result of different measures of intervention or non-intervention. Among the most fragile and threatened ecosystems in terms of conservation, currently we can consider secondary grasslands and among these, particularly vulnerable appears to be the xeric grassland rich in chamaephytes of the association *Convolvulo elegantissimi-Brometum erecti* (Biondi 1986). This grassland in the '80s of the last century was considered endemic to a small sector of the Park including the western slopes of Mount Conero and limited areas of the hills immediately surrounding the same (Mount Larciano and Mount Colombo), where there are outcrops of Scaglia Cinerea. This secondary grassland shows a particular floristic combination where, in addition to hemicryptophytes there is a large number of chamaephytes having mainly a Mediterranean range. Unfortunately, this grassland is nowadays in rapid decline due to natural recovery processes of shrub vegetation, particularly in these areas *Juniperus oxycedrus* is very aggressive having largely invaded xeric grasslands after the previous colonization of the grass *Ampelodesmos mauritanicus*. Even the grasslands of the association *Centaureo bracteatae-Brometum erecti*, also having a post-culture origin, are in strong reduction due to the non-use normally carried out with an annual mowing and grazing animals. The abandonment of anthropogenic actions, able to ensure the maintenance of these important ecosystems, is particularly evident after the establishment of the park that marked deep changes in the land use destination toward the tertiary activity related to the development of tourism.

As for the rare and worthy of preservation species, the only species belonging to Annex II ("animal and plant species of community interest whose conservation requires the designation of special areas of conservation") of Habitats Directive, even if not having a priority condition, is *Himantoglossum adriaticum* of which, as has been said previously, it was found a single sample in the only known locality. Annex V (animal and plant species of community interest whose taking in the wild and exploitation may be subject to management measures) only includes *Ruscus aculeatus*, a common species in Conero Park's woods.

Several plants requiring a careful conservation at the regional level are present in the Conero Park. The entities included in the list of more than 5000 entities belonging to the regional law n. 52 of 30 December 1974 and following amendments ("Provvedimenti per la tutela degli ambienti naturali") are 101.

Even at the regional level, there is the presence of 62 species included in the "Liste rosse regionali delle Piante d'Italia" (Conti & al. 1997), among which 5 species are included in the category CR (Critically Endangered), 24 in the category EN (Endangered), 1 in the category EW (Exinct in the wild, this is obviously *Anthyllis barba-jovis*), 15 fall into the category VU (Vulnerable) and finally 17 in the category LR (Lower Risk).

Fig. 12. SCI and SPA map of Conero Nature Park.

Table 4. List of habitats found in the Conero Nature Park and their surfaces.

Habitat code	Name	level	kind of habitat	Surface (ha)	Surface (%)
1150	Coastal lagoons	priority	open sea and tidal areas	0.17	0.00
1160	Large shallow inlets and bays	non priority	open sea and tidal areas	0.46	0.01
1170	Reefs	non priority	open sea and tidal areas	1.33	0.02
1210	Annual vegetation of drift lines	non priority	sea cliffs and shingle or stony beaches	45.59	0.75
1240	Vegetated sea cliffs of the Mediterranean coasts with endemic Limonium spp.	non priority	sea cliffs and shingle or stony beaches	0.96	0.02
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	non priority	Standing water	0.11	0.00
5130	Juniperus communis formations on heaths or calcareous grasslands	non priority	Sub-mediterranean and temperate scrub	13.60	0.22
5310	Laurus nobilis thickets	non priority	Thermo-mediterranean and pre-steppe brush	1.51	0.02
5330	Thermo-Mediterranean and pre-desert scrub	non priority	Thermo-mediterranean and pre-steppe brush	40.58	0.67
6110	Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi	priority	Natural grasslands	0.04	0.00
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites)	priority	Semi-natural dry graslands and scrubland facies	29.57	0.49
6220	Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea	priority	Semi-natural dry graslands and scrubland facies	5.23	0.09
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	non priority	Semi-natural tall-herb humid meadows	1.16	0.02
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	priority	Calcareous fens	0.19	0.00
91AA	Eastern white oak woods	priority	Forests of temperate Europe	116.78	1.93
91B0	Thermophilous Fraxinus angustifolia woods	non priority	Forests of temperate Europe	0.44	0.01
92A0	Salix alba and Populus alba galleries	non priority	Mediterranean deciduous forests	93.92	1.55
9340	Quercus ilex and Quercus rotundifolia forests	non priority	Mediterranean sclerophyllous forests	336.23	5.55
9540	Mediterranean pine forests with endemic Mesogean pines	non priority	Mediterranean and Macaronesian mountainous coniferous forests	274.00	4.50

Finally, none of the entities found in the Parco del Conero is included in the Red Book of Plants of Italy (Conti & al. 1992).

The species that are particularly rare in the Park, where are threatened of extinction, are those species being the natural colonizers of dune environments: *Echinophora spinosa*, *Achillea maritima*, *Euphorbia paralias*, *Eryngium maritimum*, *Calystegia soldanella*, *Polygonum maritimum*, *Medicago marina*, *Cuscuta cesatiana*, *Glaucium flavum*; particularly rare is *Lolium rigidum* subsp. *lepturoides*.

The flora of rocks and of shores includes particularly rare and localized species facing extinction in these territories because of erosion. These include: *Euphorbia dendroides*, *E. veneta*, *Juniperus oxycedrus* subsp. *macrocarpa*, *Helichrysum italicum* subsp. *pseudolitoreum*, *Hypochaeris taraxacoides*, *Daucus carota* subsp. *commutatus*.

The retro-dunal sands harbor some rare species such as: *Trifolium suffocatum*, *Allium chamaemoly*, *Silene nocturna* subsp. *nocturna*, *Romulea ramiflora* and *R. columnae*.

The species of the brackish waters of the ponds of Portonovo, in particular *Cladium mariscus* and *Sonchus maritimus*, both survived only in the Lago Grande where once used to be also frequent in Lago Profondo, are particularly threathened.

Furthermore, the presence in the flora of the park of some hygrophilous species is very important; these species are present in wet lowland, formerly occupied by extensive marshes near the mouth of River Musone, such as: *Ranunculus peltatus* subsp. *baudotii*, *Lythrum tribracteatum, Scutellaria hastifolia* and *Scrophularia auricolata* subsp. *auricolata.*

Another risk factor is the voluntary introduction of species not belonging to the flora of the area and therefore definable "alien". In fact, in some areas of the park where the number of tourists is higher and along the main roads near the main tourist centers of the Park, green areas have been made designed according to essentially aesthetic objectives ignoring the principles of conservation of naturalness. Indeed, several shrubs belonging to species which are not part of the native flora of the park have been planted, such as: *Rosmarinus officinalis* (Mediterranean species present along the Italian coast, but not native at Conero), *Cistus albidus* (steno-western-mediterranean species present in Italy along central and northern Tyrrhenian coasts), *C. ladanifer* (Western-Mediterranean species, in Italy present only in Liguria), *Thymus vulgaris* (steno-western-Mediterranean species not present in Marche Region), *Myrtus communis* - species not native in Conero area but present in few localities in southern Marche (Allegrezza & al. 2006; Biondi & al. 2012; Manzi 1998). Those entities could, in the medium term, spread from planting areas and become spontaneous and so become part of the flora of the Park. It is therefore important to monitoring over time these species and, remembering their origin, to prevent their spread.

Conclusions

The flora of the Conero Park is very rich due to the great diversity of habitats. Despite the high anthropization and the strong exploitation for production activities, the component of exotic species is decidedly modest but it is more conspicuous the number of species that have become rare or very rare due to the loss of natural habitats.

Conservation measures, although have been established because of the presence on the territory of three SCI and one SPA in which the most part of the territory of the park is

included, do not seem sufficient to protect fragile and extremely fragmented habitats such as coastal dunes, retro-dunal areas, secondary grasslands and wetlands for which it would be necessary to plan for the protection and management interventions targeted through the implementation of specific projects.

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