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The vascular flora of Monte Cetona (S.-E. Tuscany, Italy)

Abstract

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The vascular flora of Mt. Cetona, an isolated calcareous massif in SE Tuscany still unexplored from the geobotanical viewpoint, is fully reported. The flora includes 650 native species distributed in 422 genera and 91 families. New records for the flora of Tuscany are: *Silene catholica, Sternbergia colchiciflora, Valeriana tuberosa, Ornithogalum divergens, Thymus pannonicus* and, possibly, *Linum austriacum* subsp. *tommasinii*. Old records of rare plants are also confimed for the regional flora. In respect of the close Mt. Amiata, the flora of Mt. Cetona is much richer, but, at the same time, it is not as rich as other comparable Apenninic areas. The life-form spectrum highlights an Hemicryptophytes/Terophytes ratio of 2.2 that reflects a submontane, suboceanic bioclimate. Chamaephytes are well represented, consistently with the rocky, barren nature of the massif. Also geophytes are somewhat abundant, possibly because of the coexistence of xeric geophytes of stony pastures with mesic geophytes of nemoral habitats. From the chorological viewpoint, the Mt. Cetona flora is characterized by a relatively low proportion of boreal species and by a marked incidence of the Oromediterranean element. Owing to the presence of several apenninic endemic species it is to be included in the Apenninic sector of the oroipsophytic dominion of the European subregion. In particular, this flora has phytogeographical linkages with the central Apennines, of which it appears as a northern isolated appendix harbouring a number of species towards their northern distribution limit. This affinity is confirmed by the presence of several rare species with a distribution barycentre in the Balkans. The phytogeographical distinctiveness and the good conservation status of the Cetona flora suggest the institution of a nature reserve aiming at protecting it against future changes.

Our current knowledge of the flora of southern Tuscany is still poor and largely restricted to the coastal areas. The greatest part of the rest of the territory is unexplored from the phytogeographical viewpoint, so that information mostly relies on ancient and fragmentary records often in need of taxonomic verification and distributional confirmation. Numerous herbarium records are still waiting for publication, while several literature citations are not supported by herbarium specimens. This is unfortunate as Tuscany harbours one of the richest regional floras of Italy (Pignatti & Pignatti 1990),

which would merit a deeper knowledge especially in view of the current conservation problems.

No doubt, one of the areas still waiting for a phytogeographical study was Mt. Cetona, a continental island arising in orographic isolation from lowlands in Southeastern Tuscany. Unlike the close Mt. Amiata, now sufficiently known from the geobotanical viewpoint, Mt. Cetona has been almost completely neglected from the floristic viewpoint, although already Santi (1798) highlighted its attractiveness to the field botanist in view of its "aspra, arida e nuda" nature. In spite of this lack, Mt. Cetona already appears in the CORINE inventory of Biotopes (no. 899) of major importance for nature conservation in the European Community (CORINE 1991). This paper aims at filling this gap and at illustrating the phytogeographical relevance of Mt. Cetona in the regional and peninsular context.

Geomorphological and climatic outline

Mt. Cetona lies in S.-E. Tuscany (Lat. 42°56'N, 11°52'E), Siena province, and is delimited by the valley of Canale della Chiana to the east and by the clayey hills of the upper Orcia valley to the west. It is placed at the eastern border of the Tuscan anti-apenninic system and is one of the southernmost manifestations of N-S oriented Mesozoic fold passing from Mt. Orsaro, the Lima valley, Mt. Albano and the Rapolano hills (Passerini 1964, Lazzarotto 1993). This mountain reaches 1148 m (Fig. 1) and has the shape of a narrow ridge N.-S. oriented. The eastern and western flanks steeply degrade on a basement of various geological nature lying at about 500-600 m.

It is almost exclusively composed of compact Mesozoic limestones containing a rich ammonitic Retic microfauna characterized by the mollusc *Rhaetavicula contorta* Portl. (Lazzarotto 1993). Linear outcrops of Jurassic jasper surround the basement at the Southeast, while Pliocene sands and clays occur at the western base of the massif (Passerini 1964).

As other calcareous reliefs in southern Tuscany of about the same altitude (i.e. Mt. Labbro and Mt. Civitella), Mt. Cetona is a fossil island because it remained well above the sea level during the great marine ingression of the lower Pliocene (Pasquarè & al. 1983, Lanza 1984). This is an additional differential feature in respect of the close Mt. Amiata, a volcanic relief of Pleistocene origin with which Mt. Cetona only shares the orographic isolation and the approximate geographical position. Owing to its ancient origin and to its calcareous nature, therefore, Mt. Cetona is closer to the northern Umbro-Latial apenninic massifs than to the greater part of the Thyrrenian antiapennine, in which only a few areas are geomorphologically comparable to it.

Soils evolved from the calcareous rocks of Mt. Cetona are basically of the Rendzina type. Their depth and degree of pedogenetic evolution depend on the local topographic conditions and on the vegetation cover. Soils have a remarkable fertility, water capacity and balanced pH values under beech and mesic broadleaf canopy, where brown, non-acid humus of the Mull type is usually developed. Depth and water capacity of soils decrease under mesoxeric woods with *Ostrya* and *Fraxinus ornus* and they become even much lower in open areas with scrub and stony pastures, where they become of the Xero-Ranker type. Rocky outcrops of limestone are widespread, especially in the southern side and towards the summit.

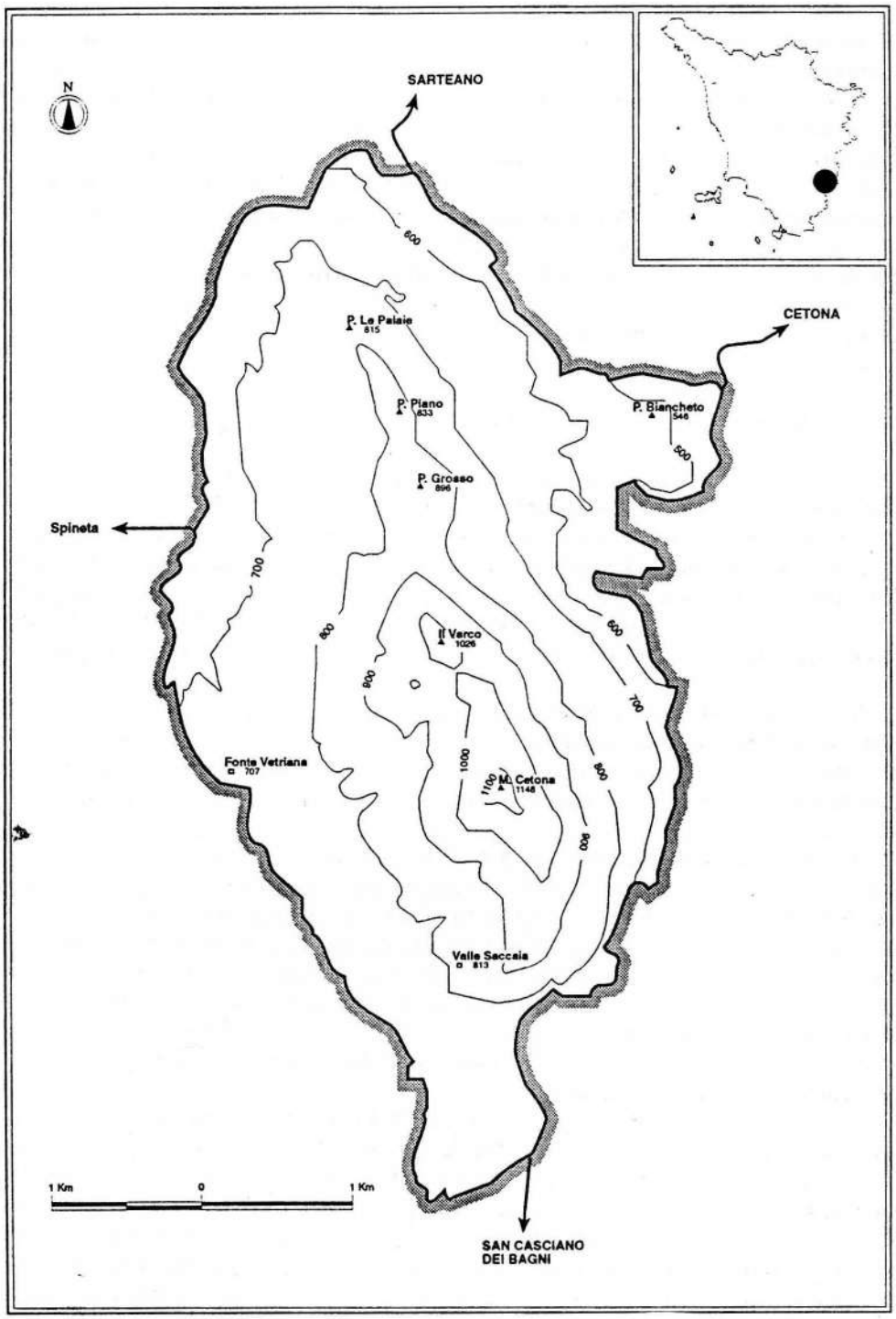

Fig. 1. Delimitation and location of the study area.

From the climatic point of view only a few things can be said because metereological data are only available from three stations at the base of the massif, well below 1000 m a.s.l. From these, it appears that rainfall decreases from the eastern to the western side (Cetona 1351 and Spineta 929 mm, respectively) and is intermediate at the south (San Casciano dei Bagni, 1062 mm). The same phenomenon was observed on Mt. Amiata (Selvi 1996). In the summit parts of the massif, rainfall is well above 1000 mm, of which a small part is in the form of snow. Mean temperatures are about 1° C lower (12.4 and 12.6 °C) in the two stations lying at about 600 m a.s.l. in respect of the town of Cetona which is 384 m a.s.l. At the summit of the massif, therefore, the mean temperature is approximately 10 °C. The range of yearly thermic excursion is around 17 °C in all the three stations, with January values between 3.3 °C (Spineta) and 5.5 °C (Cetona) and July values between 20.5 °C (Spineta) and 22.2 °C (Cetona). According to the classification by Thornthwaite & Mather (1957), Spineta is of the «first mesothermic» type (B'1) with a slight summer water deficit (s) while Cetona and San Casciano dei Bagni fall in the «second mesothermic» type (B'2) without water deficit (r). They all belong to the «humid» type (B1, B2 and B4), with Cetona falling in the oceanic category (a') and S. Casciano dei Bagni and Spineta in the suboceanic one (b'4).

However, these formulas were derived from data referring to the period 1920-1950, and there is evidence that rainfall is actually somewhat lower and mean temperatures somewhat higher.

Vegetation outline

Mt. Cetona is characterized by a fine mosaic of deciduous woodlands, screes, stony pastures and rocky, barren habitats. Forest vegetation is of mesic, oceanic type towards the summital parts of the massif and in some N.E.-facing slopes, where *Fagus sylvatica* and *Acer* sp. pl. are the dominant trees. The understory flora of these woodlands is of montane-nemoral type, with many species characteristic of the eutrophic beech woods on non-acid substrates. However, their extent on Mt. Cetona is somewhat exiguous because the calcareous rocks and the historical degradation processes (felling, coppicing, burning, grazing, etc.) have led to the spread of mesoxeric coppices with *Ostrya carpinifolia, Fraxinus ornus, Acer obtusatum, A. monspessulanum, Quercus pubescens, Q. cerris* and others, with a understory flora often dominated by xeric, sun-loving herbs and grasses. Further erosion and degradation has favoured the spread of xeric grass communities, especially in steep, barren slopes.

The travertine platform of Pgio Biancheto-Belverde is covered by an heterotopic tall forest of *Quercus ilex* on a fractured substrate with large stones and deep crevices.

Unfortunately, also artificial conifer plantations are present, although their extent is not such as to determine an impoverishment of the native local flora.

Methodology

The study area (Fig. 1) roughly corresponds with the geomorphological boundaries of the compact calcareous rocks, which are well recognizable in the field. The travertine platform of Poggio Biancheto-Belverde was also included in the study area, as well as the

area of Pliocene clays at the western base of the calcareous massif. This area has an approximate surface of 18 km^2 and an altitudinal range of about 650 m.

Specimen collections in FI and SIENA from this area were scanty. The only ones of appreciable representativeness were that by Negri, Corti, Corradi and Messeri (FI) who visited Mt. Cetona in the years between 1933 and 1943. This material was integrated by A. Mazzeschi in the years 1964-1966 in the framework of his thesis. Finally, numerous field surveys between 1994-1998 completed the floristic knowledge of the massif. Voucher specimens are in part in FI and mostly in SIENA.

All the available herbarium material was studied by means of the standard European and Italian Floras (Tutin & al. 1964-80, 1993, Fiori 1923-29, Pignatti 1982a), and, when possible, by means of revisions and monographic contributions. The systematic order of the floristic list follows Pichi Sermolli (1977) for the *Pteridophyta*, Cronquist (1981) for the *Magnoliopsida* and Dahlgren & al. (1985) for the *Liliopsida*. Nomenclature follows mostly Greuter & al. (1984-89) and Tutin & al. (1964-80, 1993) and, in some cases Pignatti (1982a). *Orchidaceae* and *Pteridophyta* are treated according to Del Prete & Tosi (1988) and Ferrarini & al. (1986) respectively. Specimen identification was carried out up to the infraspecific level, but subspecies were specified only when differing from the typical one or when in coexistence with this. Authors abbreviations follow Brummitt & Powell (1992).

The following data were reported for each species: 1) life-form, following the Raunkiaer classification; 2) chorological element according to the supra-regional classification by Takhtajan (1986) and to the synthesis of the European sub-regional units by Arrigoni (1973, 1983); 3) the habitat type(s) in which the species is usually found on Mt. Cetona, by means of the following code: **A,** fresh, open areas, edges and clearings in mesic woods; **D,** anthropized areas such as road margins, fallow fields and ruderal sites; **F,** *Fagus sylvatica* forest; **G,** stony pastures, garrigues and screes; **L,** *Quercus ilex* forest (Pgio Biancheto-Belverde); **Q,** mixed broadleaf woods with *Acer* sp. pl., *Quercus* sp. pl. and others; **R,** rocky and barren habitats; **U,** wet areas (springs and streams). The frequency of the species was indicated by means of the following code: **c,** common all over the study area; **r,** fragmentarily distributed and with few localities; **rr,** no more than 2 known localities with small-sized populations. For some of these species, the record localities have also been reported. In the floristic list, species not collected by Negri, Corti, Corradi & Messeri are marked as +.

Floristic list

PTERIDOPHYTA

Equisetaceae

Equisetum palustre L. — G rhiz - Bor-Medit - U - r
Equisetum ramosissimum Desf. — G rhiz - Holarct-Paleotrop - A - r
Equisteum telmateja Ehrh. — G rhiz - Holarct - U - r

Polypodiaceae

Polypodium interjectum Shivas — H ros - Tethyan-Eur - Q - c

Adiantaceae
Adiantum capillus-veneris L. — G rhiz - SubCosmop - R - r

Hypolepidaceae
Pteridium aquilinum (L.) Kuhn — G rhiz - Cosmop - L, Q - c

Aspleniaceae
Asplenium onopteris L. — H ros - Medit-Paleotrop - L, Q - c
[+]*Asplenium ruta-muraria* L. — H ros - Bor-Oromed - R - r
Asplenium trichomanes L. — H ros - SubCosmop - R - c
Ceterach officinarum DC. — H ros - Bor-Tethyan - R - c
Phyllitis scolopendrium L. — H ros - Tethyan-Eur - R - rr (Belverde)

Athyriaceae
Cystopteris fragilis (L.) Bernh. — H caesp - Cosmop - F - r

Aspidiaceae
Polystichum setiferum (Forssk.) T. Moore ex Woyn. — G rhiz - Tethyan-Eur - F - c

PINOPHYTA

Cupressaceae
Juniperus communis L. — P caesp - Holarct - Q, G - c

Pinaceae
Pinus nigra Arnold — P scap - Culta - G - c
Pinus pinea L. — P scap - Culta - Q - r

MAGNOLIOPHYTA-MAGNOLIOPSIDA

Lauraceae
Laurus nobilis L. — P scap - Culta - D - c

Aristolochiaceae
[+]*Aristolochia lutea* Desf. — G rhiz - Medit-Pont - Q - r
Aristolochia rotunda L. — G rhiz - Medit-Eur - Q,A - c

Ranunculaceae
[+]*Ranunculus arvensis* L. — T scap - Tethyan-Eur - D - r
Ranunculus bulbosus L. subsp. *aleae* (Willk.) Rouy & Fouc. — H scap - Medit - D, G - c
Ranunculus ficaria L. subsp. *ficaria* — H scap - Eurosib-Medit - A - c
Ranunculus garganicus Ten. — H scap - Medit-M. Eur - G - c
Ranunculus lanuginosus L. — H scap - M.Eur - Q - c
[+]*Ranunculus monspeliacus* L. — H scap - W Medit - G - c
[+]*Ranunculus neapolitanus* Ten. — H scap - Medit-Pont - L - r
Ranunculus repens L. — H scap - Bor-Tethyan - U - r

[+]Ranunculus trichophyllus Chaix — I rad - Holarct - U - r
Ranunculus velutinus Ten. — H scap - Medit - L, Q - r
Helleborus bocconei Ten. — G rhiz - Apenn (Endem) - Q, A - c
Helleborus foetidus L. — Ch suffr - M. Eur-Atl - L, Q - c
Eranthis hiemalis (L.) Salisb. — G rhiz - Mediterraneo-Eur - F - c
Nigella damascena L. — T scap - Eur-Tethyan - D - c
Delphinium fissum Waldst. & Kit. — H scap – Apenn-Balc - Q, F - c
Consolida regalis S. F. Gray — T scap - Eur-Medit - D - c
Anemone apennina L. — G rhiz - Apenn-Balc - Q, L, F - c
Anemone hortensis L. — G rhiz - Medit-Eur - G - c
[+]Anemone nemorosa L. — G rhiz - Medit-Eur - Q - c
Anemone ranunculoides L. — G rhiz - Eur - Q, F - c
Hepatica nobilis Mill. — G rhiz - Eur - Q - c
Clematis vitalba L. — P lian - Medit-Eur - L, Q - c
Adonis annua L. — T scap - Medit - D - r
Thalictrum aquilegifolium L. — H scap - Eur - F - c
Thalictrum morisonii Gmel. subsp. *mediterraneum* (Jord.) P. W. Ball — H scap - Apenn-Lig. Tirr. (Subendem) - U - r

Papaveraceae
[+]Papaver dubium L. — T scap - Tethyan-Eur - D - c
Chelidonium majus L. — H scap - Bor-Tethyan - L, Q - r

Fumariaceae
Fumaria officinalis L. — T scap - Medit-Eurosib - D - c
Corydalis cava (L.) Schweigg. & Koerte — G bulb - Eur - Q, F - c

Ulmaceae
Ulmus minor Mill. — P scap - Tethyan-Eur - Q - r

Moraceae
Ficus carica L. — P caesp - Medit-Ir. Tur - R - r

Urticaceae
Urtica dioica L. — H scap - Holarct - A, D - c
Parietaria judaica L. — H scap - Tethyan-Eur - A, D - c
Parietaria officinalis L. — H scap - Tethyan-Eur - L - r

Fagaceae
Fagus sylvatica L. — P scap - Eur - F - c
[+]Castanea sativa Mill. — P scap - Oromed-Eur - Q - r
Quercus cerris L. — P scap - Medit-M. Eur - Q - c
Quercus ilex L. — P scap - Medit - L - c
Quercus pubescens Willd. — P scap - C. Medit-Pont - L,Q - c

Betulaceae
Carpinus betulus L. — H scap - Eur - Q - r
Ostrya carpinifolia Scop. — P scap - Eur - Q,G - c
Corylus avellana L. — P caesp - Eur - Q,A - c

Chenopodiaceae
Chenopodium urbicum L. — T scap - SubCosmop - D - r

Caryophyllaceae
Arenaria leptoclados (Reichenb.) Guss. — T scap - Medit-Eur - G - c
Arenaria serpyllifolia L. — T scap – Holarct-Paleotrop - D - c
Minuartia mediterranea (Link) K. Maly — T scap - Medit - G - rr
Stellaria holostea L. — H scap - Eurosib-Tethyan - A, Q - c
Stellaria media (L.) Vill. — T rept - Holarct-Paleotrop - D, F, Q - c
Cerastium arvense L. subsp. *arvense* var. *etruscum* Fiori — H scap - Apenn (Endem) - A, G - c
Cerastium arvense L. subsp. *suffruticosum* (L.) Nyman — Ch suffr - Oromed - G - c
Cerastium brachypetalum Desportes in Pers. — T scap - Medit-Eur - L, G - r
Cerastium fontanum Baumg. subsp. *vulgare* (Hartman) Greuter et Burdet — H scap - Bor-Tethyan - D - r
Cerastium glomeratum Thuill. — T scap - Cosmop - G, D - c
Cerastium ligusticum Viv. — T scap - C. W. Medit - G, D - c
Cerastium pumilum Curtis — T scap - Medit-Eur - G - c
Silene catholica (L.) Aiton fil. — H ros - Apenn-Illir - A - rr (scattered in scrubs between Spineta and Boccatananna, c. 630 m)
Silene conica L. — T scap - Tethyan-Eur - G - c
Silene cretica L. — T scap - Medit - D - r
Silene flos-cuculi (L.) Greuter & Burdet — H scap - Eurosib-Medit - A - c
Silene italica (L.) Pers. subsp. *nemoralis* (Waldst. & Kit.) Nyman — H scap - Tethyan-Eur - L, Q, A - c
Silene latifolia L. subsp. *alba* (Mill.) Greuter & Burdet — H scap - Bor-Tethyan - D - c
Silene otites (L.) Wibel — H ros - Tethyan-Eurosib - G - c
Silene vulgaris (Moench) Garcke subsp. *vulgaris* — H scap - Bor-Tethyan - D, G - r
Silene vulgaris (Moench) Garcke subsp. *angustifolia* (Miller) Hayek — Hscap - Medit - G, R - c
Saponaria ocymoides L. — H scap - Oromed-M. Eur - R - c
Petrorhagia prolifera (L.) P. W. Ball & Heywood — T scap - Tethyan-Eur - G - c
Petrorhagia saxifraga (L.) Link — H scap - Medit - G,R - c
Dianthus armeria L. — H scap - Eur-Ir. Tur - Q - c
Dianthus balbisii Ser. — H scap - C. Oromed - G - r (sporadic between Palaie and Campitelli)
Dianthus sylvestris Wulf. subsp. *longicaulis* (Ten.) Greuter & Burdet — H scap - C. W. Medit - G - c

Polygonaceae
Rumex crispus L. — H scap - SubCosmop - D - c

Rumex sanguineus L. — H scap - Tethyan-Eur - Q, F - c

Clusiaceae
Hypericum hirsutum L. — H scap - Tethyan-Eurosib - A - r
Hypericum montanum L. — H scap - C. W. Medit-Eur - L, Q - c
Hypericum perforatum L. — H scap - Tethyan-Eurosib - G, D - c

Tiliaceae
Tilia × *vulgaris* Hayne — P scap - Culta - D - r

Malvaceae
Malva sylvestris L. — H scap - Tethyan-Eurosib - D - c
Althaea hirsuta L. — T scap - Medit-Ir.Tur - G - r

Cistaceae
[+]*Cistus creticus* L. subsp. *eriocephalus* (Viv.) Greuter & Burdet — NP - Medit-Pont - G - r
[+]*Cistus salvifolius* L. — NP - Medit-Atl - G - r
Helianthemum apenninum (L.) Mill. — Ch suffr - Medit-Eur - G - r
Helianthemum nummularium (L.) Mill. subsp. *obscurum* (Celak) Holub — H scap - Tethyan-Eur - G - c
[+]*Helianthemum salicifolium* (L.) Mill. — T scap - Medit-Eur - G - r
Fumana procumbens (Dunal) Gren. & Godr. — Ch suffr - Medit-Eur - G - c

Violaceae
Viola alba Besser subsp. *dehnhardtii* (Ten.) W. Becker — H ros - Medit-Eur - Q, L - c
[+]*Viola kitaibeliana* Roem. & Schult. — T scap - Oromed-Pont - G – r (versante N presso la vetta)
Viola odorata L. — H ros - Medit-Eur - Q, L - r
Viola reichenbachiana Jord. ex Boureau — H scap - M. Eur - L, Q - c
Viola riviniana Reichenb. — H scap - Medit-Eur - Q - c

Salicaceae
[+]*Salix alba* L. — H scap - Tethyan-Eurosib - U - r
Salix apennina Skvortsov — P caesp - Apenn (Endem) - A - r
[+]*Populus alba* L. — P scap - Eurosib-Medit - U - r
[+]*Populus nigra* L. — P scap - Eurosib-Medit - U - r
Populus tremula L. — P scap - Bor-Oromed - Q, U - c

Brassicaceae
Sinapis alba L. — T scap - Medit - D - r
[+]*Sysimbrium officinale* (L.) Scop. — T scap - Tethyan-Eurosib - D - r
Alliaria petiolata (Bieb.) Cavara & Grande — H bienn - Tethyan-Eur - F, Q - c
Myagrum perfoliatum L. — Tscap - Tethyan-Pont - D - r
Erysimum pseudorhaeticum Polatschek — H scap - C. S. Apenn (Endem) - G - c

Hesperis laciniata All. — H scap - Oromed - Q - rr (rocky habitats at the summit of Mt. Cetona)
Nasturtium officinalis R. Br. — Hscap - Tethyan-Eur - U - c
Cardamine bulbifera (L.) Crantz — G rhiz - Eur - Q, F - c
Cardamine enneaphyllos (L.) — G rhiz - M. Eur - F - rr (very rare in the mesic beech forest between Mt. Cetona and Il Varco)
Cardamine graeca L. — T scap - Oromed - R - r (on mesic travertine rocks at Belverde, c. 500 m)
Cardamine hirsuta L. — T scap - Cosmop - A, D - c
Cardamine impatiens L. — H scap - Bor-Tethyan - R - r
Arabis collina Ten. — H scap - Medit - R - r
Arabis hirsuta (L.) Scop. — H scap - Holarct - G - c
Arabis turrita L. — H scap - Medit-Eur - Q, L - c
[+]*Alyssum alyssoides* (L.) L. — T scap - Medit-Eur - G - c
Alyssum minus (L.) Rothm. — T scap - Medit-Ir. Tur - D, G - r
Alyssum montanum L. — Ch suffr - Oromed-Eur - G - c
Draba muralis L. — T scap - Medit-Eur - G, R - c
Erophila praecox (Steven) DC. — T scap - Tethyan-Pont - G - c
Hornungia petraea (L.) Reichenb. — T scap - Medit - R - r
Thlaspi perfoliatum L. — T scap - Tethyan-Eur - D, G - c
Aethionema saxatile (L.) R. Br. — Ch suffr - G - Oromed-M. Eur - G - c
Lepidium campestre (L.) R. Br. — T scap - Medit-Eur - D - c

Resedaceae
Reseda luteola L. — T scap - Tethyan-Eur - G - r

Primulaceae
Primula acaulis (L.) L. — H ros - Oromed-Eur - A, Q - r
[+]*Cyclamen hederifolium* Aiton — G bulb - Medit-Eur - F, Q - c
Cyclamen repandum Sibth. & Sm. — G bulb - Medit - L - c
Anagallis arvensis L. — T scap - SubCosmop - D - c

Crassulaceae
Umbilicus rupestris (Salisb.) Dandy — G bulb - Medit-Atl - R - c
Sedum album L. — Ch succ - Medit-Eur - G - c
Sedum cepaea L. — T scap - Medit-Eur - Q, F - r
Sedum dasyphyllum L. — Ch succ - Medit-M. Eur - R - r
Sedum sexangulare L. — Ch succ - Eur - R - r
[+]*Sedum telephium* L. subsp. *maximum* (L.) Schinz. & Thell.—H scap - Eur-Oromed - R - r

Saxifragaceae
Saxifraga bulbifera L. — H scap - Eur - A, D - c
Saxifraga tridactylites L. — T scap - Medit-Eur - R - c

Rosaceae
Rosa arvensis Hudson — NP - Eur-Oromed - L, Q - c

Rosa canina L. — NP - Tethyan-Eur - D, Q - c
Rosa gallica L. — NP - Eur - Q - r
Rubus canescens DC. — NP - Medit-Eur - A, Q - r
Rubus ulmifolius Schott — NP - C. W. Medit-Atl - A, L, Q - c
Filipendula vulgaris Moench — H scap - Eurosib-Oromed - G - c
Agrimonia eupatoria L. — H scap - Tethyan-Eur - A - c
Sanguisorba minor Scop. subsp. *muricata* Briq. — H scap - SubCosmop - D, G - c
Geum urbanum L. — H scap - Tethyan-Eurosib - Q, F - c
[+]*Potentilla detommasii* Ten. — H scap - Apenn-Balc - G - r
[+]*Potentilla hirta* L. — H scap - C. W. Medit-Eur - G - c
Potentilla micrantha Ramond ex DC. — H scap - Medit-Eur - F, Q - c
Potentilla recta L. — H scap - Tethyan-Eurosib - G - c
Potentilla reptans L. — H rept – SubCosmop - A, D - c
Fragaria vesca L. — H rept - Eurosib - A, Q, F - c
Pyrus amygdaliformis Vill. — P caesp - Medit - G - c
Pyrus pyraster Burgsd. — P scap - Medit-Eur - Q - r
Malus sylvestris (L.) Mill. — P scap - Eur - Q - c
[+]*Sorbus aria* (L.) Crantz — P scap - Oromed-Eur - G - rr
Sorbus domestica L. — P scap - Medit-Eur - Q - c
Sorbus torminalis (L.) Crantz — P scap - Medit-Eur - Q - r
Pyracantha coccinea M. J. Roem. — NP - Medit - L, Q - c
Crataegus laevigata (Poiret) DC. — P caesp - Eur - Q - r
Crataegus monogyna Jacq. — P caesp - Medit-Eur - M, Q - c
Prunus spinosa L. — NP - Medit-Eur - G, Q - c

Leguminosae
Cytisus scoparius (L.) Link — P caesp - M. Eur-Atl - Q - r
Cytisophyllum sessilifolium (L.) O. F. Lang — P caesp - W. Medit - L, Q - c
Chamaecytisus triflorus (Lam.) Skalicka — P caesp - Eur-Ir.Tur - Q - c
Genista tinctoria L. — Ch suffr - Eur - Q - r
Colutea arborescens L. — P caesp - Eur-Pont - D - r
Robinia pseudacacia L. — P scap - Advent - Q, A, D - r
Astragalus glycyphyllos L. — H ros - Eurosib - Q - r
Astragalus monspessulanus L. — H scap - Medit-Eur - G - r
Astragalus muelleri Steud. & Hochst. — H scap - Illir-Apenn - G - r (locally very abundant on the barren southern slopes at about 800-1000 m)
Spartium junceum L. — P caesp - Medit - G - c
Lathyrus aphaca L. — T scap - Tethyan-Eur - G, D - c
[+]*Lathyrus clymenum* L. — T scap - Medit - D - c
[+]*Lathyrus linifolius* (Reichard) Bässler — G rhiz - M. Eur-Atl - Q - c
Lathyrus niger (L.) Bernh. — G rhiz - Oromed-Eur - Q - r
[+]*Lathyrus nissolia* L. — T scap - Medit-Eur - G - r
[+]*Lathyrus pratensis* L. — H scap - Holarct-Paleotrop - D - r
Lathyrus sativus L. — T scap - Culta - D - r
Lathyrus sphaericus Retz. — T scap - Medit-Eur - Q - c
Lathyrus sylvestris L. — H scand - Eur - Q, D - c

Lathyrus venetus (Mill.) Wolhf. — H scap - M. Eur - Q, L - c
Lathyrus vernus (L.) Bernh. — H scap - Eurosib - F - r
[+]*Vicia bithynica* (L.) L. — T scap - Medit-Eur - A, D - r
[+]*Vicia cassubica* L. — H scap - Eur - Q - r
Vicia disperma DC. — T scap - C. W. Medit - G - r
Vicia grandiflora Scop. — H scap - Tethyan-Eur - Q - c
Vicia hirsuta (L.) S. F. Gray — T scap - Tethyan-Eur - G, D - c
[+]*Vicia hybrida* L. — T scap - Tethyan-Pont - D - c
Vicia lutea L. subsp. *vestita* (Boiss.) Rouy — T scap - Medit - G - r
Vicia peregrina L. — T scap - Medit-Eur - G - r
Vicia sativa L. subsp. *nigra* (L.) Ehrh. — H scap - Tethyan - D - c
Vicia sepium L. — H scap - Eurosib - Q, F - c
[+]*Vicia tenuifolia* Roth — H scap - Tethyan-Eurosib - Q - r
[+]*Vicia tenuissima* (Bieb.) Schinz. & Thell. — T scap - Medit-Eur - D - r
[+]*Vicia villosa* Roth subsp. *varia* (Host) Corb. — T scap - Tethyan-Eur - D - c
[+]*Lens nigricans* (Bieb.) Godr. — T scap - Medit-Pont - G - r
Ononis pusilla L. — H scap - Medit-Eur - G - c
Ononis reclinata L. — T scap - Tethyan-Atl - G - c
Ononis spinosa L. subsp. *antiquorum* (L.) Arcang. — Ch suffr - Tethyan - G - c
Ononis viscosa L. subsp. *breviflora* (DC.) Nyman — T scap - Medit - D - r
[+]*Melilotus albus* Medicus — T scap - Tethyan-Eurosib - D - c
[+]*Melilotus altissima* Thuill. — G rhiz - Eurosib - D - r
Melilotus officinalis (L.) Palla — H bienn - SubCosmop - D - c
Medicago lupulina L. — T scap - Holarct-Paleotrop - D - c
[+]*Medicago orbicularis* (L.) Bartal. — T scap - Tethyan-Eur - D - r
Trigonella gladiata Steven ex Bieb. — T scap - Medit - G - r
Trifolium angustifolium L. — T scap - Tethyan-Eur - G, D - c
[+]*Trifolium arvense* L. — T scap - Tethyan-Eurosib - G - c
[+]*Trifolium campestre* Schreb. — T scap - Tethyan-Eur - D,G - c
[+]*Trifolium incarnatum* L. subsp. *molinerii* (Balb. ex Hornem.) Syme — T scap - Medit - D, G - c
Trifolium medium L. — G rhiz - Eurosib - Q - c
Trifolium ochroleucum Huds. — H scap - Oromed-Eur - G - c
Trifolium pratense L. — H scap - Holarct - D - c
[+]*Trifolium repens* L. subsp. *prostratum* Nyman — H rept - Bor-Tetidico - D, G - c
Trifolium resupinatum L. — T rept - Tethyan - A - r
[+]*Trifolium scabrum* L. — T scap - Medit-Eur - G - r
Trifolium stellatum L. — T scap - Medit-Pont - G, D - c
Trifolium subterraneum L. — T rept - Medit-Eur - D - c
Dorycnium herbaceum Vill. — H scap - Medit-Eur - G - r
Dorycnium hirsutum (L.) Ser. — Ch suffr - Medit - G, L - r
Anthyllis vulneraria L. subsp. *rubriflora* (DC.) Arcang. — H scap - Medit - G - c
Lotus corniculatus L. — H scap - Holarct-Paleotrop - G - c
Lotus ornithopodioides L. — T scap - Medit - G, D - r
Coronilla minima L. — Ch suffr - C. W. Medit-M. Eur - G - c
Coronilla scorpioides (L.) Koch — T scap - Medit-Eur - D - c

⁺*Coronilla varia* L. — H scap - Medit-Pont - D - r
Hippocrepis comosa L. — H scap - Medit-Eur - G - c
Hippocrepis emerus (L.) Lassen — NP - Medit-Eur - Q, L - c
Hippocrepis unisiliquosa L. — T scap - Medit - D - r
Hedysarum coronarium L. — H scap - Culta - D - c
Onobrychis caput-galli (L.) Lam. — T scap - Medit - D - r

Lythraceae
Lythrum salicaria L. — H scap - Holarct - U - r

Thymelaceae
Daphne laureola L. — P caesp - C. W. Medit-Eur - Q, F, L - c

Punicaceae
Punica granatum L. — P scap - Culta - D - r

Onagraceae
⁺*Epilobium hirsutum* L. — H scap - Subcosomopolita - U - r
Epilobium lanceolatum Seb. & Mauri — H scap - Oromed-Eur - U, F - r
⁺*Epilobium montanum* L. — H scap - Bor - F - c

Cornaceae
Cornus mas L. — P caesp - M. Eur-Pont - Q, F - c
Cornus sanguinea L. — P caesp - Eur - D, Q - c

Santalaceae
Osyris alba L. — NP - Medit-Eur - Q, L - c
Thesium divaricatum Jan. — Ch suffr - Medit-Eur - G - c
⁺*Thesium linophyllon* L. — H scap - Eur - G - c

Loranthaceae
Loranthus europaeus Jacq. — NP par - Medit-Eur - Q - c

Raffflesiaceae
Cytinus hypocistis (L.) L. — G par - Medit-Macar - G - r

Celastraceae
Euonymus europaeus L. — P caesp - Oromed-Eur - Q, L - c

Buxaceae
Buxus sempervirens L. — PN - Eur - L - r

Euphorbiaceae
Euphorbia amygdaloides L. — Ch suffr - Eur - Q - r
Euphorbia cyparissias L. — H scap - Tethyan-Eur - G - r
⁺*Euphorbia dulcis* L. — G rhiz - Eur - Q - c

Euphorbia exigua L. — T scap - Medit-Eur - G - r
[+]*Euphorbia falcata* L. — T scap - Medit-Ir.Tur - G - r
Euphorbia helioscopia L. — T scap - Tethyan-Eur - D - r
Mercurialis annua L. — T scap - Tethyan-Eur - D - c
Mercurialis perennis L. — G rhiz - Medit-Eur - Q, F - c

Rhamnaceae
Rhamnus alaternus L. — P caesp - Medit - L - r
Rhamnus catharticus L. — P caesp - Tethyan-Eurosib - Q - r

Vitaceae
Vitis vinifera L. subsp. *sylvestris* (Gmel.) Hegi — P lian - Medit-Eur - L - r

Linaceae
[+]*Linum austriacum* L. subsp. *tommasinii* (Reichenb.) Greuter & Burdet — H scap - Illir-Apenn - G - r (localized in dry stony pastures between Valle Saccaia and Fonte Vetriana, c. 800 m)
[+]*Linum bienne* Mill. — H bienn - Medit-Eur - G - r
Linum catharticum L. — H scap - Eur - G - r
[+]*Linum strictum* L. — T scap - Medit - G - c
[+]*Linum tenuifolium* L. — Ch suffr - Medit-Eur - G - c

Polygalaceae
Polygala flavescens DC. — H scap - Apenn-Lig. Tirr (Endem) - G - c

Aceraceae
Acer campestre L. — P scap - Medit-Eur - L, Q - c
Acer monspessulanum L. — P scap - Medit-Eur - Q - c
Acer obtusatum Waldst. & Kit. — P scap - Oromed-Eur - F, Q - c
[+]*Acer pseudoplatanus* L. — P scap - Eur - Q, F - r

Geraniaceae
Geranium columbinum L. — T scap - Tethyan-Eur - A - c
[+]*Geranium dissectum* L. — T scap - Tethyan-Eur - A, D - r
Geranium lucidum L. — T scap - Tethyan-Eur - L, A, Q - c
[+]*Geranium molle* L. — T scap - Tethyan-Eur - D - c
Geranium robertianum L. — H scap - Tethyan-Eur - L, F, Q - c
Geranium sanguineum L. — H scap - Eur - L, Q - c
Erodium acaule (L.) Becherer & Thell. — H ros - Medit - G - r
Erodium cicutarium (L.) L'Hér. — T scap - Tethyan-Eurosib - D - r

Araliaceae
Hedera helix L. — P lian - Medit-Eur - L, Q - c

Apiaceae
[+]*Apium nodiflorum* (L.) Lag. — H scap - Holarct-Paleotrop - U - r

Bupleurum baldense Turra — T scap - Medit-Eur - G - c
Bupleurum lancifolium Hornem. — T scap - Medit-Ir.Tur - D - rr (Belverde)
Bupleurum praealtum L. — T scap - Medit-Eur - Q - r
Trinia glauca (L.) Dumort. — H scap - Medit-Eur - G - c
Bunium bulbocastanum L. — G bulb - C. W. Medit-Eur - Q - c
Scandix pecten-veneris L. — T scap - Tethyan-Eur - D - r
Chaerophyllum temulentum L. — T scap - Medit-Eur - Q - c
Torilis arvensis L. subsp. *purpurea* (Ten.) Hayek — T scap - Medit - D - c
Torilis japonica (Houtt.) DC. — T scap - Eurosib-SinoJap - D - c
Orlaya grandiflora (L.) Hoffm. — T scap - Medit-Eur - D - r
Orlaya kochii Heyw. — T scap - Medit - D - r
Daucus carota L. — H bienn - Holarct-Paleotrop - D, G - c
Seseli tortuosum L. — H bienn - Medit - G - c
Oenanthe pimpinelloides L. — H scap - Medit-Eur - Q - c
Foeniculum vulgare Mill. — H scap - Medit-Ir. Tur (Culta ?) - D - c
Peucedanum cervaria (L.) Lapeyr. — H scap - Eurosib - Q - c
Ferulago campestris (Besser) Grec. — H scap - Eur - G - r
Pastinaca sativa L. — H bienn - Eurosib - D - r
Tordylium apulum L. — T scap - Medit - D - c
Sanicula europaea L. — H ros - Eurosib-Oromed - Q, F - c
Eryngium campestre L. — H scap - Medit-Eur - G, D - c

Genzianaceae
Blackstonia perfoliata (L.) Huds. — T scap - Medit-Atl - D - r
Centaurium erythraea Rafn. — H bienn - Tethyan-Eur - D, G - c

Apocynaceae
Vinca minor L. — Ch rept - Medit-Eur - L, Q - c

Solanaceae
Atropa belladonna L. — H scap - Tethyan-Eurosib - F, Q - r
Hyoscyamus niger L. — H bienn - Tethyan-Eurosib - D - r

Convolvulaceae
Convolvulus arvensis L. — G rhiz - Cosmop - D - r
Convolvulus cantabrica L. — H scap - Medit-Eur - G - c
Calystegia sepium (L.) R. Br. — H scand - SubCosmop - U - r

Cuscutaceae
Cuscuta epithymum (L.) L. — T par - Tethyan-Eurosib - G - c

Boraginaceae
Borago officinalis L. — T scap - Medit - D - r
Lithospermum arvense L. — T scap - Tethyan-Eurosib - D - c
Lithospermum purpureo-caeruleum L. — H scap - Medit-Eur - Q, L - c
Echium vulgare L. — H bienn - Tethyan-Eurosib - D - c

Pulmonaria picta Rouy — H scap - Alp-Apenn - Q, F - c
Symphytum tuberosum L. subsp. *angustifolium* (A. Kerner) Nyman — G rhiz – Eur - Q, F - c
[+]*Anchusa azurea* Mill. — H scap - Tethyan-Eur - D, G - c
Anchusa undulata L. subsp. *hybrida* (Ten.) Béguinot — H bienn - Medit - G, D - r
Cynoglottis barrelieri (All.) Vural & Kit Tan — H scap - Apenn-Balc - G - r (localized in the summital parts above 1050 m)
Myosotis arvensis (L.) Hill — T scap - Medit-Eur - G - r
[+]*Myosotis decumbens* Host subsp. *florentina* Grau — H scap - Apenn (Endem) - F - r
[+]*Myosotis ramosissima* Rochel in Schult. — T scap - Tethyan-Eur - G - c
[+]*Cynoglossum creticum* Mill. — H bienn - Medit-Eur - D, G - c
Cynoglossum officinale L. — H bienn - Oromed-Eur - G - r

Verbenaceae
Verbena officinalis L. — H scap - Holarct-Paleotrop - D - r

Lamiaceae
Lamium amplexicaule L. — T scap - Tethyan-Eur - D - c
Lamium bifidum Cirillo — T scap - C. W. Medit - D, A - c
Lamium garganicum L. subsp. *laevigatum* Arcang. — H scap - Medit - Q - r
Lamium maculatum L. — H scap - Eur - A, Q - c
Ajuga chamaepitys (L.) Schreb. — T rept - Tethyan-Eur - D - c
Ajuga reptans L. — H rept - Medit-Eur - A, Q, L - c
Teucrium chamaedrys L. — H scap - Medit-Eur - G, Q - c
Teucrium flavum L. — Ch suffr - Medit - G - c
Teucrium polium L. subsp. *capitatum* (L.) Arcang. — Ch suffr - Medit-Eur - G - c
[+]*Scutellaria columnae* All. — H scap - Medit-Balc - Q - r
Marrubium incanum Desr. — H scap - Medit-Balc - G - c
Marrubium vulgare L. — H scap - Tethyan-Eur - D - r
Sideritis romana L. — T scap - Medit - G - c
[+]*Galeopsis angustifolia* Ehrh. — T scap - Eur - D - r
[+]*Ballota nigra* L. subsp. *meridionalis* (Bég.) Bég. — H scap - Medit-Eur - D - c
Stachys cretica subsp. *salviifolia* (Ten.) Rech. fil. — H scap - Medit - G - c
Stachys heraclea All. — H scap - C. W. Oromed-Apenn - G - c
Stachys officinalis (L.) Trevis. — H scap - Eurosib-Medit - Q - c
Stachys recta L. subsp. *labiosa* (Bertol.) Briq. — H scap - Alp-Apenn - G - c
Glechoma hirsuta Waldst. & Kit. — H rept - Oromed-M. Eur - F - r
Prunella laciniata (L.) L. — H scap - Medit-Eur - A, G - c
Prunella vulgaris L. — H scap - Bor-Tethyan - A, Q - c
Melittis melissophyllum L. — H scap - Eur - L, Q - c
Acinos alpinus (L.) subsp. *meridionalis* (Nyman) Greuter & Burdet — Ch suffr - Oromed-Apenn - G - c
Satureja juliana L. — Ch suffr - Medit - G - r
Satureja nepeta (L.) Scheele — H scap - Tethyan - A - c
Satureja sylvatica Bromf. — H scap - Medit-Eur - Q - r
Satureja vulgaris (L.) Fritsch — H scap - Holarct - A - r

Origanum vulgare L. — H scap - Tethyan-Eurosib - A - r
[+]*Thymus oenipontanus* H. Braun — Ch rept - Alp-Apenn - G - c
[+]*Thymus pannonicus* All. — Ch rept - Eurosib - G - r
Mentha suaveolens Ehrh. — H scap - Medit-Eur - D - r
Salvia verbenaca L. — H scap - Medit-Atl - G - r

Plantaginaceae
[+]*Plantago lagopus* L. — T scap - Medit-Eur - G - r
Plantago lanceolata L. — H ros - Tethyan-Eurosib - D - c
[+]*Plantago major* L. — H ros - Cosmop - D - c

Oleaceae
Ligustrum vulgare L. — NP - Eur - Q - c
Fraxinus ornus L. — P scap - Medit-M. Eur - Q, G - c

Scrophulariaceae
Scrophularia canina L. — Ch suffr - Medit-Eur - G - c
Scrophularia nodosa L. — H scap - Eurosib - F, Q - r
Scrophularia scopolii Hoppe — H scap - M. Eur-Pont - F - r (mesic woods of the summit)
Scrophularia vernalis L. — T scap - Eur - F - rr (restricted to very mesic and shady niches between the large stones on the top of Mt. Cetona)
Verbascum blattaria L. — H bienn - Tethyan-Eur - D - r
Verbascum lychnitis L. — H bienn - E. Medit-Eur - G - c
Verbascum phoeniceum L. — H scap - Eurosib - G - r (restricted to the southern slopes above 900 m)
Verbascum thapsus L. — H bienn - Tethyan-Eurosib - G - c
Antirrhinum latifolium Mill. — Ch suffr - W. Medit - R - r
Cymbalaria muralis Gaertn., Meyer & Scherb. — H scap - Tethyan-Eur - R - c
Linaria vulgaris L. — H scap - Bor - D - c
[+]*Digitalis ferruginea* L. — H scap - Apenn-Balc - A, Q - c
Digitalis micrantha Roth — H scap – CyrnoSard-Apenn (Subendem) - Q - c
[+]*Veronica arvensis* L. — T scap - Tethyan-Eur - G - r
Veronica beccabunga L. — H rept - Holarct-Paleotrop - U - c
Veronica chamaedrys L. — H scap - Bor - A,Q - c
[+]*Veronica hederifolia* L. — T scap - Medit-Eur - F - c
[+]*Veronica officinalis* L. — H rept - Bor - Q - r
Veronica prostrata L. — H caesp - Eurosib - G - c
[+]*Veronica serpyllifolia* L. — H rept - Eurosib - F - r
[+]*Veronica spicata* L. subsp. *barrelieri* (Roem. & Schult.) Murb. — H rept - M. Eur-Pont - G - r (restricted to the southern slopes above 900 m)
Euphrasia pectinata Ten. — T scap - Eurosib - G - c
[+]*Odontites lutea* (L.) Clairv. — T scap - Medit-Eur - G - c
[+]*Odontites verna* (Bellardi) Dumort. subsp. *serotina* (Dumort.) Corb. — T scap - Eurosib - D,G - c
Parentucellia latifolia (L.) Caruel — T scap - Medit - G - c
[+]*Parentucellia viscosa* (L.) Caruel — T scap - Tethyan-Atl - G - r

[+]Rhinanthus alectorolophus (Scop.) Pollich — T scap - Eur - G - c
[+]Lathraea squamaria L. — G par - Atl-M.Eur - F - r

Globulariaceae
Globularia punctata Lapeyr. — H ros - Medit-Eur - G - c

Orobanchaceae
[+]Orobanche alba Stephan ex Willd. — T par - Tethyan-Eur - G - r
Orobanche caryophyllacea Sm. — T par - Tethyan-Eur - G - c
Orobanche crenata Forssk. — T par - Tethyan-Eur - D - r
Orobanche hederae Duby — T par - Tethyan-Eur - L - r
Orobanche ramosa L. subsp. *nana* (Reut.) Coutinho — T par - Medit - G - r

Campanulaceae
[+]Campanula erinus L. — T scap - Tethyan - G - r
Campanula rapunculus L. — H bienn - Medit-Eur - D - c
Campanula trachelium L. — H scap - Oromed-Eur - Q - c
[+]Legousia speculum-veneris (L.) Chaix — T scap - Medit-Eur - D - r

Rubiaceae
Rubia peregrina L. — P lian - Medit-Atl - L, Q - c
[+]Sherardia arvensis L. — T scap - Medit-Eur - G - c
Asperula aristata L. subsp. *scabra* (J. C. Presl) Nyman — H scap - Medit-Eur - G - c
Galium aparine L. — T scap - Holarct - Q, A - c
[+]Galium corrudifolium Vill. — H scap - Medit - G - c
Galium lucidum All. — H scap - Medit-M. Eur - G - c
Galium odoratum (L.) Scop. — G rhiz - Bor - F, Q - r
Galium verum L. — H scap - Bor - G, A - c
Cruciata glabra (L.) Ehrend. — H scap - Oromed-Eur - Q - c
Cruciata laevipes Opiz. — H scap - Medit-Eur - D - r

Caprifoliaceae
Sambucus ebulus L. — G rhiz - Oromed-Eur - F, A - c
Sambucus nigra L. — P caesp - Medit-Eur - A - r
Lonicera caprifolium L. — P lian - M. Eur-Pont - Q - c

Adoxaceae
Adoxa moschatellina L. — G rhiz - Bor - F - r

Valerianaceae
Valeriana tuberosa L. — G rad - Oromed - G - c
Valerianella carinata Loisel. — T scap - Medit-Eur - D - c
Valerianella coronata (L.) DC. — T scap - Tethyan-Eur - D, G - r
Valerianella dentata (L.) Pollich — T scap - Tethyan-Eur - D, G - r
Valerianella echinata (L.) Lam. & DC. — T scap -Medit-Eur - D - r
Centranthus ruber (L.) DC. — Ch suffr - Medit - R - r

Dipsacaceae

Dipsacum fullonum L. — H bienn - Bor-Medit - A, D - c
Knautia integrifolia (L.) Bertol. — T scap - Medit - D - c
Knautia purpurea (Vill.) Borbàs — H scap - Oromed-Eur - G - r
Scabiosa argentea L. — H scap - Medit-Pont - G - r
Scabiosa columbaria L. — H scap - Holarct-Paleotrop - G, D - c
Scabiosa triandra L. — H scap - Medit-M. Eur - G, D - c
Sixalix atropurpurea (L.) Greuter & Burdet subsp. *maritima* (L.) Greuter & Burdet — H scap - Medit - D - c

Asteraceae

Bellis perennis L. — H ros - Medit-Eur - D - c
Bellis sylvestris Cirillo — H ros - Medit - G - r
Conyza canadensis (L.) Cronquist — T scap - Advent - D - c
Solidago virgaurea L. — H scap - Holarct - Q - c
Filago pyramidata L. — T scap - Tethyan-Atl - G - c
Bombycilaena erecta (L.) Smolj. — T scap - Medit-Eur - G - c
Helichrysum italicum G. Don. — Ch suffr - Medit - G - c
Inula conyza DC. — H bienn - Eur - D, Q - c
Inula montana L. — Hcaesp - C. W. Medit - G - c
Inula salicina L. — H scap - Bor - Q - r
Pulicaria dysenterica L. — H scap - Tethyan-Eur - D - c
Pallenis spinosa (L.) Cass. — H bienn - Medit - D - r
Tussilago farfara L. — G rhiz - Tethyan-Eur - D - c
Senecio erucifolius L. — H scap - Eurosib - D - r
Senecio vulgaris L. — T scap - Bor-Tethyan - D - c
Calendula arvensis L. — H bienn - Tethyan-Atl - D - c
Anthemis arvensis L. subsp. *incrassata* (Loisel.) Nyman — T scap - Medit - G, D - c
Anthemis altissima L. — T scap - Tethyan - D - r
Anthemis tinctoria L. subsp. *australis* R. Fernandez — Ch suffr - Medit-Eur - D, G - c
Achillea ageratum L. — H scap - W. Medit - D - c
Achillea collina Becker ex Reichenb. — H scap - Eur - D - c
Achillea setacea Waldst. & Kit. — H scap - M. Eur-Pont - D - r
Chrysantemum achilleae L. — H scap - W.Medit-M. Eur - G - c
Leucanthemum vulgare Lam. — H scap - Holarct - D, Q, A - c
Artemisia verlotorum Lamotte — H scap - Bor - D - c
Eupatorium cannabinum L. — H scap - Eur - U - r
Carlina corymbosa L. — H scap - Medit - D, G - c
Carlina vulgaris L. — H scap - Eur - D - r
Xeranthemum cylindraceum Sibth. & Sm. — T scap - Eur - G - r
Xeranthemum inapertum (L.) Mill. — T scap - Medit - G - r
Echinops ritro L. — H scap - Eurosib - G - r
Echinops siculus Strobl — H scap - Apenn (Endem) - Q - r
Arctium nemorosum Lej. — H bienn - Eur - F, Q - c
Carduus micropterus (Borbàs) Teyber — H bienn - C. W. Medit - G - r
Carduus nutans L. — H bienn - Eur - D, A - r

Carduus pycnocephalus L. — H bienn - Tethyan - D, G - c
[+]*Cirsium arvense* (L.) Scop. — G rad - Holarct - G - r
[+]*Cirsium tenoreanum* Petrak — H bienn - Apenn (Endem) - G - c
Cirsium vulgare (Savi) Ten. — H scap - Tethyan-Eurosib - G, D - c
[+]*Galactites tomentosa* Moench — H bienn - Medit - D, G - r
Centaurea ambigua Guss. — H scap - Apenn (Endem) - G - c
Centaurea bracteata Scop. — H scap - Alp-Apenn - G - c
Centaurea cyanus L. — T scap - Eurosib - D - r
Centaurea rupestris L. — H scap - Apenn-Balc - G - c (very abundant on the rocky southern slopes)
[+]*Centaurea solstitialis* L. — H bienn - Tethyan-Eur - D - r
Centaurea triumfetti All. — H scap - Medit-Eur - Q - r
[+]*Crupina vulgaris* Cass. — T scap - Tethyan-Eur - G - c
Carthamus lanatus L. — T scap -Tethyan-Eur - D - c
Cichorium intybus L. — H scap - Holarct - G - c
Rhagadiolus stellatus (L.) Gaertn. — T scap - Medit - D - c
[+]*Hypochoeris achyrophorus* L. — T scap - Medit - D - c
Urospermum dalechampii (L.) Schmidt — H ros - C. W. Medit - G - r
Leontodon cichoraceus (Ten.) Sang. — H ros - Oromed-Apenn - G - c
Leontodon crispus Vill. — H ros - M. Eur-Pont - D, G - c
[+]*Leontodon villarsii* (Willd.) Loisel. — H ros - C. W. Medit - G - c
[+]*Picris echioides* L. — T scap - Medit-Atl - D - c
Picris hieracioides L. — H scap - Eurosib-Medit - D - c
Scorzonera cana (C. A. Meyer) O. Hoffm. — H scap - M. Eur-Pont - G - r
[+]*Tragopogon porrifolius* L. subsp. *australis* (Jord.) Nyman — H scap - Medit - D - r
Tragopogon samaritani Heldr. & Sart. ex Boiss. — H scap - Apenn-Balc - G - c
[+]*Sonchus asper* (L.) Hill — T scap - Bor-Tethyan - D - c
Sonchus oleraceus L. — T scap - Bor-Tethyan - D - c
Lactuca perennis L. — H scap - M. Eur - G - r
[+]*Lactuca serriola* L. — H bienn - Tethyan-Eurosib - G - c
Mycelis muralis (L.) Dumort. — H scap - Oromed-Eur - Q, F - c
Taraxacum sect. *Erythrosperma* Dahlst. — H ros - Holarct (the aggregate) - G - c
Taraxacum officinale Weber — H ros - Bor-Tethyan - D - c
Chondrilla juncea L. — H scap - Medit-Eur - D - c
Lapsana communis L. — T scap - Oromed-Eur - A, Q, F - c
Crepis foetida L. — T scap - Tethyan-Eur - D - r
Crepis lacera Ten. — H scap - C. S. Apenn (Endem) - G - c
[+]*Crepis leontodontoides* All. — H scap - C. W. Medit - Q - r
[+]*Crepis neglecta* L. — T scap - Medit-Balc - G - c
Crepis pulchra L. — T scap - Tethyan-Eur - D - r
Crepis sancta (L.) Babc. — T scap - Tethyan-Pont - D - c
[+]*Crepis setosa* Hall. fil. — T scap - E. Medit-Eur - D - r
Crepis vesicaria L. — H scap - Medit-Pont - D - c
Hieracium pilosella L. — H ros - Medit-Eur - G - c
Hieracium piloselloides Vill. — H scap - Medit-Eur - D, G - c
Hieracium sabaudum L. — H scap - Eur - Q - r

Hieracium virgaurea Cosson — H scap - Apenn (Endem) - Q - r

MAGNOLIOPHYTA-LILIOPSIDA

Dioscoraceae
[+]*Tamus communis* L. — G rad - Medit-Eur - L, Q - c

Convallariaceae
Polygonatum multiflorum (L.) All. — G rhiz - Tethyan-Eur - Q, F - r
Polygonatum odoratum (Mill.) Druce — G rhiz - Bor - Q - r

Asparagaceae
Asparagus tenuifolius Lam. — G rhiz - M. Eur-Pont - Q, F - r

Ruscaceae
Ruscus aculeatus L. — rhiz - Medit-Eur - Q - c

Asphodelaceae
[+]*Asphodeline lutea* (L.) Reichenb. — G rhiz - Medit - G - rr (restricted to a single locality at c. 950 m on the southern slopes)

Hyacinthaceae
[+]*Bellevalia romana* (L.) Sweet — G bulb - Medit - D - r
[+]*Muscari atlanticum* Boiss. & Reut. — G bulb - Medit-Eur - D, G - c
Muscari botryoides (L.) Mill. — G bulb - Medit-M. Eur - D - r
Leopoldia comosa (L.) Parl. — G bulb - Tethyan-Eur - D, G - r
[+]*Scilla autumnalis* L. — G bulb - Tethyan-Eur - G - c
Scilla bifolia L. — G bulb - Oromed-Eur - Q - c
[+]*Ornithogalum divergens* Boreau — G bulb - Medit-M. Eur - G - r
[+]*Ornithogalum gussonei* Ten. — G bulb - Medit - G - r
Ornithogalum pyramidale L. — G bulb - Eur-Pont - G - r
Ornithogalum umbellatum L. — G bulb - Medit-Eur - D, G - c

Alliaceae
Allium nigrum L. — G bulb - Medit-Macar - D - r
[+]*Allium pendulinum* Ten. — G bulb - C. W. Medit - Q - c
Allium sphaerocephalon L. — G bulb - Medit-Eur - G - c
[+]*Allium tenuiflorum* Ten. — G bulb - Medit - G - r

Amaryllidaceae
Narcissus × *medioluteus* Mill. — G bulb - Advent (Culta) - D - r
Galanthus nivalis L. — G bulb - Eur - Q,F - c
[+]*Sternbergia colchiciflora* Waldst. & Kit. — G bulb - Oromed - G - r (found in two localities: Il Varco at 1000 m, and below the top of Mt. Cetona on the southern slopes at about 1000 m)

Colchicaeae
[+]*Colchicum lusitanum* Brot. — G bulb - C. W. Medit - A - r

Liliaceae
Lilium bulbiferum L. subsp. *croceum* (Chaix) Baker — G bulb - Alp-Apenn - Q, F - r
Lilium martagon L. — G bulb - Eurosib - Q, F - c
[+]*Fritillaria orientalis* Adams in Weber fil. & Mohr — G bulb - C. E. Oromed-Pont - Q - (sporadic on the eastern slopes between Il Varco and Mt. Cetona at about 1000 m)
[+]*Gagea arvensis* (Pers.) Dum. — G bulb - Medit-Eur - G - r
[+]*Gagea lutea* (L.) Ker.-Gawl. — G bulb - Holarct - F - r

Iridaceae
[+]*Iris lutescens* Lam. — G rhiz - W. Medit - G - r
Gladiolus italicus Mill. — G bulb - Tethyan-Eur - D - c
Romulea bulbocodium (L.) Seb. & Mauri — G bulb - Medit - G - c
[+]*Crocus biflorus* Mill. — G bulb - Medit-Pont - G - c
Crocus vernus (L.) Hill — G bulb - M. Eur - Q, F - c

Orchidaceae
[+]*Orchis mascula* (L.) L. — G bulb - Oromed-Eur - G - r
Orchis morio L. — G rhiz (tub) - Medit-Eur - G - c
[+]*Orchis papilionacea* L. — G rhiz (tub) - Medit-Eur - G - r
Orchis pauciflora Ten. — G bulb - C.E.Oromed - G - c
Orchis provincialis Balbis ex Lam. & DC. — G rhiz (tub) - Medit-Balc - G - c
Orchis purpurea Huds. — G rhiz (tub) - Medit-Eur - G,A - c
Orchis simia Lam. — G bulb - Medit-Eur - G - c
Orchis tridentata Scop. — G bulb - Tethyan-Eur - G - c
[+]*Orchis ustulata* L. — G bulb - Eur-Oromed - G - r
[+]*Orchis* × *colemanii* Cortesi — G bulb - Apenn (Endem) - G - r
[+]*Dactylorhiza fuchsii* (Druce) Soò — G rhiz (tub) - Eurosib-Medit - Q - r
Dactylorhiza insularis (Somm.) Landw. — G bulb - W. Medit - G - rr (a single population near Valle Saccaia, m 900)
Dactylorhiza romana (Seb. & Mauri) — G rhiz (tub) - Medit-Pont - G - r
Ophrys apifera Huds. — G rhiz (tub) - Medit-Eur - G, A - c
Ophrys bertolonii Moretti — G bulb - C. W. Medit - G - c
Ophrys crabronifera Mauri — G bulb - Ligure-Tirrenica (Endem) - G - rr (a single locality at the margins of the Belverde *Quercus ilex* wood)
Ophrys fuciflora (F. W. Schmidt) Moench — G rhiz (tub) - Medit-Eur - G - r
Ophrys fusca Link — G bulb - Medit - G - r
Ophrys sphegodes Mill. — G rhiz (tub) - Medit-Eur - G - c
[+]*Serapias vomeracea* (Burm.) Briq. — G rhiz (tub) - Medit-Eur - G, A - c
Aceras antropophorum (L.) R. Br. — G bulb - Medit-Eur - G - r
Himantoglossum adriaticum Baumann — G bulb - C. E. Medit - G - r
Anacamptis pyramidalis (L.) L. C. Rich. — G bulb - Medit-Eur - G - r
[+]*Platanthera bifolia* (L.) Rich. — G rhiz - Tethyan-Eur - Q - c
[+]*Platanthera clorantha* (Custer) Reichenb. — G rhiz - Tethyan-Eur - L, Q - r

Gymnadenia conopsea (L.) R. Br. — G bulb - Tethyan-Eurosib - G - c
Listera ovata (L.) R.Br. ex Aiton — G rhiz - Oromed-Eur - Q - r
Neottia nidus-avis (L.) Rich. — G rhiz - Bor-Tethyan - Q, F - r
Epipactis helleborine (L.) Crantz — G rhiz - Tethyan-Eurosib - Q, F - r
Epipactis microphylla (Ehrh.) Sw. — G rhiz - Oromed-Eur - Q - r
[+]*Cephalanthera damasonium* (Mill.) Druce — G rhiz - Tethyan-Eur - Q - r
[+]*Cephalanthera longifolia* (L.) Fritsch — G rhiz - Medit-Eur - Q - r
[+]*Limodorum abortivum* (L.) Sw. — G rhiz - Medit-Eur - Q - r

Araceae
[+]*Arum italicum* Mill. — G rhiz - Medit-Atl - A, D - c
Arum maculatum L. — G rhiz - Medit-Eur - F - c

Zannichelliaceae
Zannichellia palustris L. — I rad - Holarct - U – rr

Thyphaceae
[+]*Typha latifolia* L. — G rhiz - Holarct - U - r

Juncaceae
[+]*Juncus articulatus* L. — G rhiz - Tethyan-Eurosib - U - r
[+]*Juncus inflexus* L. — H caesp - Holarct-Paleotrop - U - r
[+]*Juncus subnodulosus* Schrank — G rhiz - Medit-Eur - U - r
Luzula campestris (L.) DC. — H caesp - Medit-Eur - Q, A - c
Luzula forsteri (Sm.) DC. — H caesp - Medit-Eur - Q - c

Cyperaceae
[+]*Cyperus longus* L. — G rhiz - Tethyan-Eur - U - r
Scirpus holoschoenus L. — G rhiz - Tethyan-Eurosib - U - r
Eleocharis palustris (L.) Roem. & Schult. — G rhiz - Holarct - U - r
Carex caryophyllea La Tourr. — H scap - Eurosib-Medit - G - c
[+]*Carex depauperata* Good — H caesp - Medit-Atl - F - r (sporadic on the Northern slopes at c. 1050 m)
[+]*Carex distachya* Desf. — H caesp - Medit - L - c
Carex distans L. — H caesp - Tethyan-Eur - U - r
Carex flacca Schreb. — G rhiz - Tethyan-Eur - Q, G - c
Carex hallerana Asso — H caesp - Medit-Eur - L, Q - c
Carex hirta L. — G rhiz - Tethyan-Eurosib - U - r
Carex liparocarpos Gaud. — G rhiz - M. Eur-Pont - G - r
Carex muricata L. — H caesp - Bor-Tethyan - A - r
Carex remota L. — H caesp - Tethyan - U - r
[+]*Carex sylvatica* Huds. — H caesp - Oromed-Eur - Q, F - c

Poaceae
Poa bulbosa L. — H caesp - Tethyan-Eurosib - G, D - c
[+]*Poa compressa* L. — H caesp - Medit-Eur - A - r

Poa pratensis L. — H caesp - Holarct - A, D - c
Poa trivialis subsp. *sylvicola* (Guss.) H. Lindb. fil. — H caesp - Medit-Eur - L, Q - c
Festuca arundinacea Schreb. — H caesp - Eur - A - c
Festuca heterophylla Lam. — H caesp - Eur - Q, F - c
[+]*Festuca inops* De Not. — H caesp - Endemica (C. N. Apenn) - G - c
[+]*Festuca pratensis* Hudson subsp. *apennina* (De Not.) Hackel — Apenn-Balc - G - r
Festuca rubra L. — H caesp - SubCosmop - A, L - r
Festuca brevipila R. Tracey — H caesp – Eur - G - c
Lolium multiflorum Lam. — T caesp - Medit-Eur - A, G - c
Lolium perenne L. — H caesp - Tethyan-Eur - A - c
Lolium rigidum Gaudin — T scap - Medit-Eur- A, D - c
[+]*Vulpia ciliata* (Danth.) Link — T caesp - Medit-Eur - G - c
Desmazeria rigida (L.) Tutin — T scap - Tethyan-Atl - D, G - c
Dactylis glomerata L. subsp. *glomerata* — H caesp - Bor-Tethyan - A - c
Dactylis glomerata L. subsp. *hispanica* (Roth) Nyman — H caesp - Medit - G - c
Cynosurus cristatus L. — H caesp - Eur - D - c
Cynosurus echinatus L. — T scap - Medit-Eur - G - c
Briza media L. — H caesp - Eurosib - G, D - c
[+]*Sesleria tenuifolia* Schrader — H caesp - Apenn-Balc - G - r. According to Conert (1994) the name *S. tenuifolia* should be replaced by *S. juncifolia* Suffren.
Bromus erectus Huds. — H caesp - Medit-Eur - G - c
Bromus diandrus Roth — T scap - Medit-Ir. Tur- D - r
[+]*Bromus hordeaceus* L. — T scap - Tethyan-Eur - G - c
[+]*Bromus madritensis* L. — T scap - Tethyan-Eur - D - c
[+]*Bromus ramosus* Huds. — H caesp - Eur - A, F - r
Bromus sterilis L. — T scap - Tethyan-Eurosib - D - c
Brachypodium distachyon (L.) P. Beauv. — T scap - Medit-Ir. Tur - D, G - c
Brachypodium rupestre Roem. & Schult. — H caesp - Tethyan-Eurosib - A - c
[+]*Brachypodium sylvaticum* (Huds.) P. Beauv. — H caesp - Tethyan-Eur - Q, F - c
[+]*Elymus caninus* (L.) L. — H caesp - Eurosib - L, Q, F - r
[+]*Elymus repens* (L.) Gould — G rhiz - Tethyan-Eur - D - c
[+]*Aegilops geniculata* Roth — T scap - Medit-Pont - D, G - c
[+]*Avena barbata* Pott. ex Link — T scap - Tethyan-Pont - D - c
[+]*Arrhenatherum elatius* (L.) Beauv. ex J. & C. Presl — H caesp - Medit-Eur - D - c
Gaudinia fragilis (L.) P. Beauv. — T scap - Medit-Eur - D - c
Koeleria splendens Presl — H caesp - Oromed-Eur - G - c. According to Conert (1987) the name *K. splendens* should be replaced by *K. lobata* (Bieb.) Roem. & Schult.
Lophochloa cristata (L.) Hyl. — T caesp - Tethyan-Eur - D - r
[+]*Aira caryophyllea* L. — T scap - SubCosmop - G - r
[+]*Aira elegantissima* Schur. — T scap - Tethyan-Eur - G - r
Polypogon viridis (Gouan) Breistr. — H caesp - Tethyan-Eur - U - r
Phleum ambiguum Ten. — H caesp - C. S. Apenn (Endem) - G - c
Phleum pratense L. — H caesp - Bor-Tethyan - G - c
Alopecurus myosuroides Huds. — T scap - Tethyan-Eurosib - D - r
Holcus lanatus L. — H caesp - Medit-Eur - D - r
Anthoxanthum odoratum L. — H caesp - Eurosib-Medit - A - c

Melica ciliata L. — H caesp - Medit-Eur - D - c
Melica uniflora Retz. — H caesp - Oromed-Eur - Q, L, F - c
Milium effusum L. — G rhiz - Bor - L - r
Setaria viridis (L.) P. Beauv. — T scap - Advent - D - c
Dichanthium ischaemum (L.) Roberty — H caesp - Bor-Tethyan - D - c
[+]*Phragmites australis* (Cav.) Trin. ex Steud. — G rhiz - Holarct-Paleotrop - U - r

Discussion

The above floristic list consists of 662 specific and subspecific taxa, of which 7 are cultivated and 5 are adventive, naturalized species. The native flora of Mt. Cetona includes therefore 650 species and subspecies, distributed in 422 genera and 91 families. Floristic richness of this massif is strikingly higher than that of Mt. Amiata (Selvi 1996), consistently with its older origin, higher habitat diversity and calcareous nature. At the same time, the Mt. Cetona flora is not as rich as generally reported from C.-N. Apenninic areas with comparable geoecological features (Zangheri 1966, Raffaelli & Rizzotto 1991, Vos & Stortelder 1992). This lower species richness in respect of areas which are part of a continuous and extensive mountain chain may be related to the same island effect that explains the lower biological diversity that generally occurs on true islands in respect of continental areas (Pignatti 1990).

As Mt. Amiata (Selvi 1997), Mt. Cetona is an ecological island in which some species may lack for historical rather than ecological reasons.

However, the Mt. Cetona flora becomes of substantial interest when considering its qualitative aspects. Five species are new to the regional flora: 1) *Silene catholica*, an Illiric-Apenninic species with a fragmentary Italian distribution in the central Apennines (Pignatti 1982a), 2) *Thymus pannonicus*, a S.-Eurosiberian inhabitant of arid, steppic grasslands occurring in Italy in the Alps and in some central calcareous Apenninic massifs, 3) *Valeriana tuberosa*, an Oromediterranean species occurring mostly in the mountains of peninsular Italy and rare in the N.-W. Alps (Pignatti 1982a), 4) *Sternbergia colchiciflora*, another Oromediterranean plant with a fragmentary Italian range in the central Apennines (Pignatti 1982a), 5) *Ornithogalum divergens*, a Mediterranean-European species distributed over most of Italy but still not recorded for Tuscany (Pignatti 1982a). To these regional novelties is probably to be added *Linum austriacum* subsp. *tommasinii*, whose specimens from the western slopes of Mt. Cetona match those from the *locus classicus* (Mt. Spaccato in Friuli V. Giulia, FI !) very well. This critical species has recently been reported (Anzalone & Corazzi 1998) from the calcareous mountains of central Italy and from the Apuan Alps, where, however, only *Linum alpinum* subsp. *gracilius* has been recorded by Ferrarini & al. (1997). *L. austriacum* subsp. *tommasinii* probably occurs in the Apuan Alps, especially at the lower altitudes, but all the herbarium records examined up to date from this area actually belong to the *L. alpinum* group.

In addition, the following old records are here confirmed for the regional flora: *Fritillaria orientalis*, *Verbascum phoeniceum* and *Carex depauperata*. These species are rare also all over Italy and were recorded in Tuscany only in one or two localities about a century ago. Other rare plants of phytogeographical and conservation relevance in the region are: 1) *Viola kitaibeliana*, restricted to some parts of the Apuan Alps (Ferrarini & al. 1998), 2) *Scrophularia vernalis* collected only once at Vallombrosa by Fiori (FI !),

3) *Achillea setacea*, restricted to the lower altitudes of Mt. Amiata (Selvi 1996), 4) *Cardamine enneaphyllos* and 5) *Crepis lacera*, both only recently recorded in Tuscany (Raffaelli & Rizzotto 1991 and Selvi 1998, respectively).

To these species, the following may be added in view of their more or less precarious conservation status because of isolation, small population size or limit distribution: *Astragalus muelleri, Asphodeline lutea, Carex liparocarpos, Centaurea rupestris, Dactylorhiza insularis, Delphinium fissum, Dianthus balbisii, Hesperis laciniata, Lactuca perennis, Minuartia mediterranea, Orchis pauciflora, Potentilla detommasii, Ranunculus monspeliacus, Sesleria tenuifolia, Thymus oenipontanus* and *Tragopogon samaritani.*

Of these species, *Astragalus muelleri* appears in the Lower Risk IUCN category (IUCN 1994) of the Red List of the Italian flora (Conti & al. 1997, see also Selvi & Fiorini 1994), while *Dactylorhiza insularis, Fritillaria orientalis, Lilium martagon* and *Zannichellia palustris* are in the Regional Red-List.

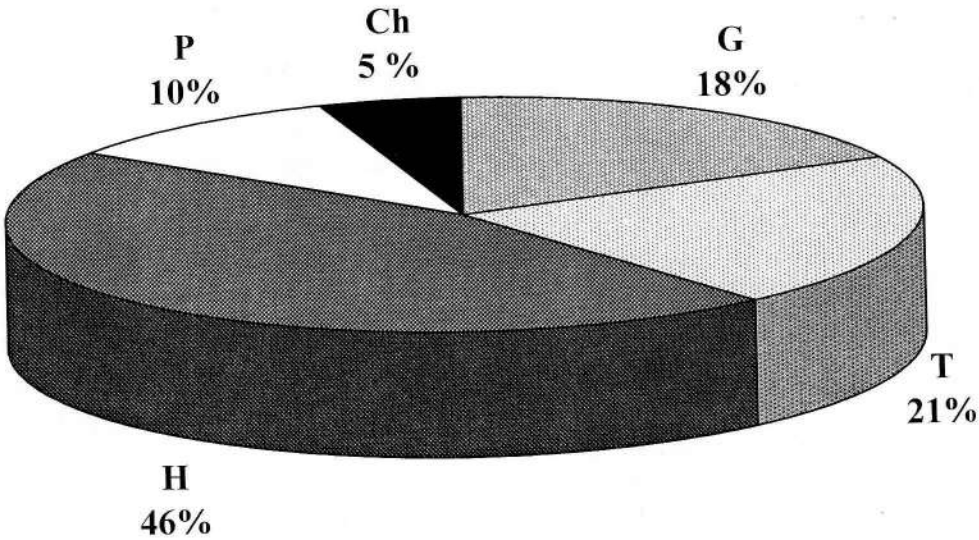

Fig. 2. Life-form spectrum: **Ch,** chamaephytes; **G,** geophytes; **H,** hemicryptophytes; **P,** phanerophytes; **T,** terophytes. Hydrophytes (I rad) are not reported as they represent the only 0.3 % of the total flora.

The life-form spectrum of the Mt. Cetona flora (Fig. 2) highlights an H/T ratio of 2.2, that reflects a submontane-suboceanic bioclimate (Sabato & Valenziano 1975). Terophytes are more abundant than at Mt. Amiata, the same proportion as Alpe della Luna (Raffaelli & Rizzotto 1991) and considerably less represented than in the close Mt. Labbro, a calcareous relief (1193 m a.s.l.) with a very poor forest vegetation (Maccherini & al. 1994, Baldini 1996).

In respect of these areas, Mt. Cetona shows also a higher percentage of chamaephytes, consistently with its rocky, calcareous nature and its mediterranean-montane climate with dry summers and cool winters. Geophytes are also more represented than in the above areas, possibly because of the coexistence of xeric geophytes of barren substrates with mesic geophytes of nemoral habitats.

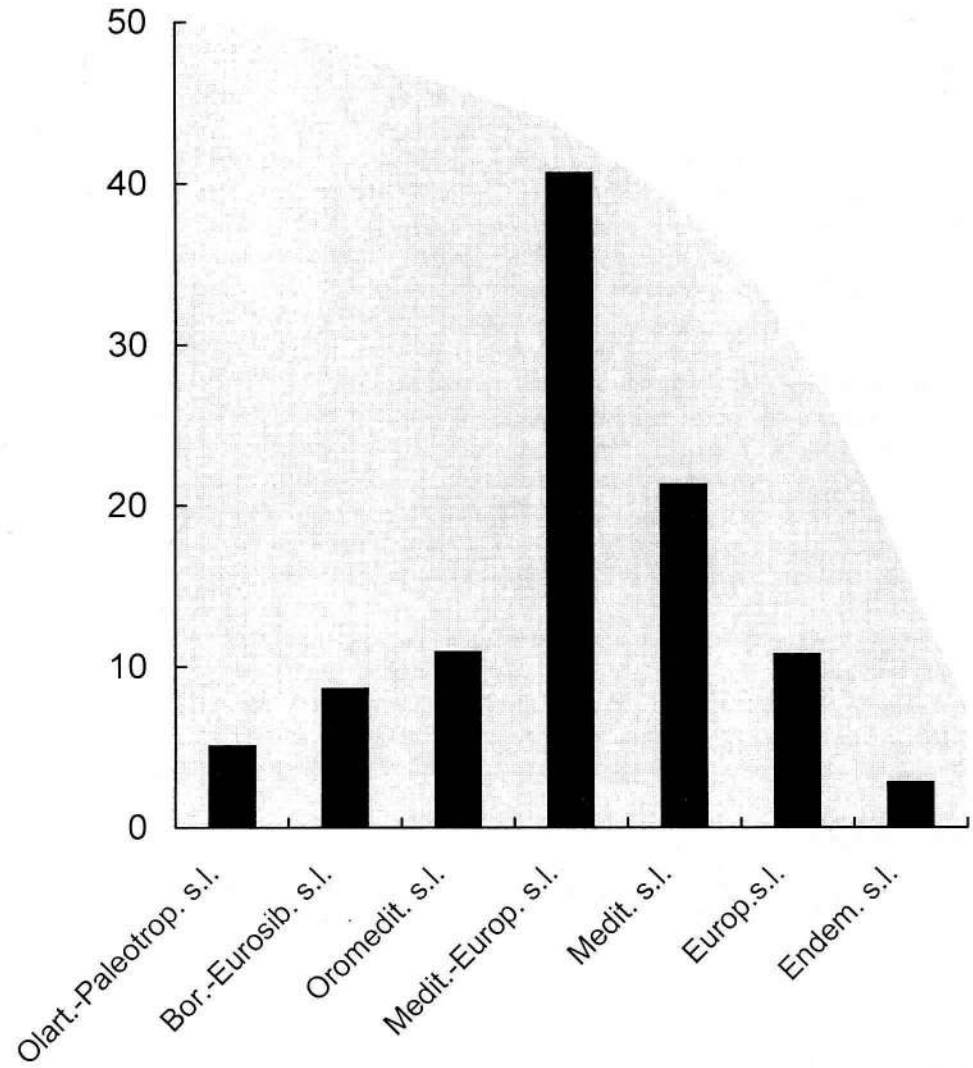

Fig. 3. Simplified spectrum of the main chorological elements.

Despite their fragmentation, woodlands contain a rich arborescent flora that accounts for a appreciable phanerophytic diversity.

The main phytogeographical component of the Cetona flora is the Europeo-Mediterranean *sensu lato* (Fig. 3), highlighting the biogeographical position of Mt. Cetona in the peninsular zone of transition between the Eurosiberian and the Mediterranean region. Genuine mediterranean species are also well represented, although they are largely restricted to the lower altitudes. At higher elevations, they are increasingly replaced by the Oromediterranean (incl. Oromed-Eur.) element, which is more represented than at Alpe della Luna and Mt. Amiata, both characterized by higher proportions of Boreal, Eurosiberian and European species. Within the Oromediterranean element, the conspicuous proportion of common endemic Apenninic species (i.e. *Helleborus bocconei, Salix apennina, Myosotis decumbens subsp. florentina, Hieracium*

virgaurea, Festuca inops, Cerastium arvense var. *etruscum Polygala flavescens* and others, see below) confirms that Mt. Cetona belongs to the Apenninic sector as Mt. Amiata (Selvi 1996). However, the peculiar feature of the Cetona flora lies in its clear phytogeographical links with the Apenninic-Balcanic and Illiric floras, represented by *Silene catholica, Potentilla detommasii, Cynoglottis barrelieri, Digitalis ferruginea, Centaurea rupestris, Tragopogon samaritani, Sesleria tenuifolia, Astragalus muelleri* and *Linum austriacum* subsp. *tommasinii*. Other species with distribution barycentres in the Balkans are *Fritillaria orientalis, Sternbergia colchiciflora, Viola kitaibeliana, Veronica spicata* subsp. *barrelieri, Scabiosa argentea* and *Valeriana tuberosa*. In Italy, the majority of these plants are distributed in the calcareous massifs of the central Apennines, whose phytogeographical links with the Balkans are well-known (Pignatti 1982b, Strid & Tan 1997). Further evidence of affinities with the central Apenninic flora is provided by the endemics *Crepis lacera, Cirsium tenoreanum, Phleum ambiguum, Erysimum pseudorhaeticum, Echinops siculus* and *Centaurea ambigua*, all widespread in central-southern Italy and very abundant on Mt. Cetona. From the phytogeographical viewpoint, therefore, this massif appears as an isolated northern appendix of the central Apennines in which several species mainly distributed in this area find their northwards distribution limit.

The above considerations show that Mt. Cetona harbours one of the most peculiar local floras of Tuscany. Its phytogeographical significance, good conservation status and aesthetic value would suggest the institution of a nature reserve enclosing all the massif above 5-600 m a.s.l. This would enhance its potential as scientific and didactic natural laboratory and would preserve its rich flora from future undesirable changes.

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