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Vascular flora of calcareous outcrops in North-Western Sardinia (Italy)

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La flora vascolare degli affioramenti calcarei miocenici della Sardegna nord-occidentale (Italia) – Gli affioramenti calcarei miocenici della Sardegna Nord-occidentale occupano una superficie di circa 380 km², conosciuta come "Sassarese". Con questa ricerca si è voluto dare un contributo alle conoscenze della flora di questo territorio. L'elenco floristico, che comprende 840 entità, include: entità rinvenute nel corso di questa ricerca; entità rinvenute nello stesso territorio da altri autori in tempi recenti; entità rinvenute in epoche passate la cui presenza non è stata confermata (*inquirendae*); entità indicate per il territorio per le quali si esclude invece la presenza (*excludendae*); entità coltivate in tipi di vegetazione seminaturali o che conferiscono un'impronta caratteristica al paesaggio (*cultae*); entità introdotte e, a vari livelli, ritenute spontaneizzate. Per le entità la cui presenza non è stata confermata, si riportano in nota i riferimenti bibliografici e/o i campioni d'erbario sui quali si è basata la segnalazione. Si ritiene che il contingente floristico attuale sia pari a 730 entità, ripartite in 98 famiglie e 385 generi. Tra le entità segnalate per la prima volta nel territorio sono di particolare rilievo l'endemica sardo-corsa *Silene nodulosa* Viv. e l'endemica sarda *Hieracium gallurense* Arrigoni, precedentemente indicata esclusivamente per i substrati granitici della Sardegna Nord-orientale. Lo spettro biologico evidenzia una netta dominanza delle terofite, mentre quello corologico eveidenzia la dominanza dell'elemento Tetidico, nell'ambito del quale emerge l'elemento strettamente mediterraneo. Quattro entità endemiche hanno in questo territorio il loro *locus classicus*: *Centaurea corensis* Valsecchi et Filigheddu, *Limonium racemosum* (Lojac.) Diana e *Scrophularia morisii* Valsecchi, esclusive dell'area di studio, e *Ophrys sphegodes* Mill. subsp. *praecox* Corrias. Alcune entità rinvenute, quali *Capparis spinosa* L. subsp. *rupestris* (Sm.) Nyman, *Coridothymus capitatus* (L.) Reichenb., *Laurus nobilis* ed *Erica multiflora* L., hanno in Sardegna una distribuzione limitata o frammentaria e la loro presenza nel territorio del Sassarese è quindi di particolare interesse. Nell'area sono presenti alcune entità incluse nel Libro rosso delle piante d'Italia: *Viola arborescens* L., *Borago pygmaea* (DC.) Chater et Greuter e *Carex panormitana* Guss. Sebbene l'area indagata sia fortemente urbanizzata e sottoposta da lungo tempo all'utilizzo agro-pastorale la sua flora risulta fortemente diversificata e ancora ricca di entità significative dal punto di vista del loro areale di distribuzione generale o nell'ambito della Sardegna. Rilevante anche la presenza di specie legate alla presenza di siepi, muretti a secco e altri manufatti delle attività agricole tradizionali ancora presenti nel territorio, sebbene in molti casi in situazione di degrado o di abbandono. L'elevato livello di biodiversità dell'area, la presenza di elementi floristici di pregio, di nuclei di vegetazione spontanea residua, più o meno estesi, di numerosi elementi lineari, naturali o derivanti dalle attività agricole tradizionali, all'interno di un'area di forte impatto antropico dovrebbe essere motivo di tutela degli *habitat* oggi sempre più minacciati nel territorio dall'urbanizzazione selvaggia delle vallate, dall'utilizzo sconsiderato delle risorse idriche e dalla diffusione delle discariche e di valorizzazione delle risorse naturali anche attraverso la realizzazione di un'adeguata rete ecologica.

Key words: biodiversity, chorology, endemic taxa, flora, natural resources, Sardinia.

The North-Western calcareous outcrops in Sardinia covers an area of about 380 Km², bordering in the West the Nurra, to the South/South-East the Logudoro and East the Anglona sub-geographic regions. This area, called "Sassarese" (Mori, 1966), is one of the largest in Sardinia (Fig. 1). Sassari, the main urban settlement, is characterised by the presence of a large peri-urban belt, where small settlements and in-

tense agricultural exploitation that occurred even in the recent past. Now, it is partly occupied by new residential buildings and small, often family-owned cultivated areas. The small towns of Sorso, Sennori, Ossi, Tissi, Usini, Muros and Cargeghe represent other important urban settlements.

This study aims to concentrate on the flora of this area, so far very incomplete except on the coast. Although the study area is strongly urbanised and for a long time subjected to intensive agricultural and pastoral use, some areas of high natural and landscape interest are present, especially close to the large valleys and the rocky slopes, that characterise so much the geography of this area. The presence of buildings and structures from the traditional agricultural activities is also relevant. Terracing supported by drystone walls still standing, in spite of the abandonment of the country, characterise some aspects of the landscape and contribute to preserve plant and animal biodiversity together with other elements of the agrarian landscape (Forman & Godron, 1986; Farina, 1996).

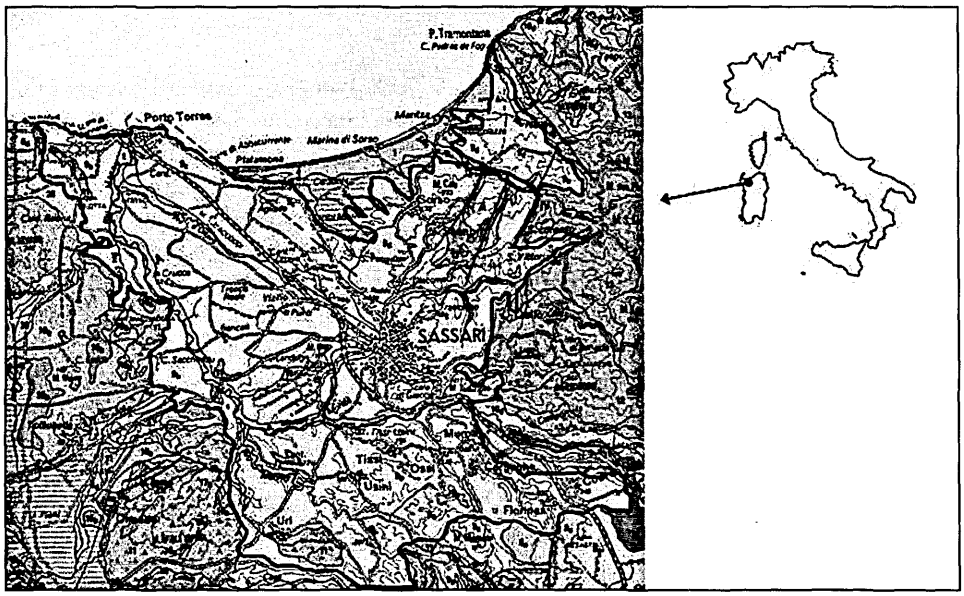

Fig. 1 – Geographical location of the study area (from Barca et al., 1996).

Study area

Geological and geomorphological traits

The lithological substratum of Sassarese is mainly composed of marine and continental deposits of middle lower Miocene. These deposits are laying on volcanic rocks from andesite to rhyolite of the calcareous-alkaline Oligo-Miocene volcanic cycle, composed of rhyolite, rhyodacite and dacite of upper Oligocene-middle lower Miocene and andesite and basalt andesite of upper Oligocene-lower Miocene (Barca et al., 1996; Carmignani et al., 2001). These former form the relief of Monte Santo (201 m a.s.l.) in the South and that of Monte Oro (227 m a.s.l.) in the West. They are present also between Sassari and Sennori. Andesites and basalt andesites crop out only South-West of Sennori. The stretch of the coast between the Abbacurrente tower, West of Porto Torres town, and the Sorso stream mouth, is characterised by the presence of imposing wind-created deposits forming a sandy barrier about 14 km long and 1.5 km deep. Various terraces and Pliocene-Pleistocene alluvial cones are present behind, and they are composed of more or less compacted conglomerates, sands and clays, where the largest is the one close to the river-bed of Santu Miali stream. Alluvial deposits of Holocene are also present along the main streams.

Miocene marine and continental deposits largely cover the surface of Sassarese and they are composed of marl sandstone, silt and sub-littoral calcareous arenites; arenaceous and silt marl, conglomerates, calcareous arenites and litoral delta siliceous sands of upper Burdigalian-Tortonian.

Due to simplicity and linearity of its morphological structures, Sassarese is sharply contrasting to the surrounding lands, especially Anglona and Nurra, from which it is also differs in the substratum nature. The border on Anglona is represented by the contact between Miocene limestone and volcanic rock characterising this area and by deep valleys of the streams: Rio di Montes, Rio Mascari, Rio di Sorso and Rio Pedras de Fogu. To the western border on Nurra, Miocene limestone lays on different lithologic types and forms flat or slightly undulated morphologies, particularly tertiary volcanic rock and Mesozoic limestone. On the other side, borders on Logudoro are sharper, especially South-East of Codrongianus. Since Miocene successions of this geographic area are different from those of Sassarese due to the abundance of Pliocene-Quaternary tuff and basalt flows, subjected to a strong reversal of the relief. To the South, in the surroundings of Uri, a transitional zone, determining an extremely complex landscape dominated by the alternation of pyroclastic flows with different welding level, marks the border between the two areas.

Sassarese calcareous tablelands, in the South inclined prevalently westwards, are cut through by several valleys, sometimes a few hundreds meters wide, with steep slopes and flat bottoms, occasionally crossed by modest streams. The Rio Mascari valley, characterised by the alternation of great marl and marl limestone banks and originating the coastal side of Mascari and Chighizzu; the Bunnari valley, with Scala di Giocca and Badde Olia and the Rio Pizzinnu valley, are the most imposing. The latter originated a real canyon dominated by the tableland of Monte Istoccu (328 m a.s.l.) North of Ossi.

To the Anglona side the plateau terminates in a precipice. It is composed of calcareous sands that extend from Monte Crasta (459 m a.s.l.) to Monte Tudurighe (411 m a.s.l.), with a North-East/South-West trend forming the ridges of Usedda, Abealzu and Sos Saltos.

The area North of Sassari, delimited by the Rio Mannu of Porto Torres, Sorso town and the coast, called Turritano, is characterised by a slightly inclined North-West tableland, interrupted by catacline incisions with terraces of a couple of meters height. The largest valley in this area is the one eroded by Rio d'Ottava, a right hand tributary of Rio Mannu. The calcareous tableland gradually slopes westwards down to the coast from the Rio di Sorso mouth.

The main stream in the area is Rio Mannu of Porto Torres, which originates in the Thiesi region and flows towards the sea, where it comes North-West of Porto Torres after a course of about 65 km. The width of its catchment basin is considerable (850 km^2), but its flow is closely related to the pluviometric trend. Its main tributaries are Rio d'Ottava and Rio Mascari on the right and Rio Minore and Rio Ertas on the left. Various streams are present in the North-eastern area: the most important are Rio Silis (or Rio di Sorso) and Rio Pedras de Fogu. Rio Buddi Buddi forms the retrodunal pond of Platamona.

Pedology

A detailed pedological study, particularly referred to the district of Sassari (Madrau, 1991) stresses the high variety of pedological types (FAO-UNESCO, 1989) present in this area. To the South of Sassari, in the valleys as Rio Mascari, Rio Mannu of Porto Torres, Logulentu, Barca and Filigheddu ones Lithic Leptosols (Lps) characterised by high superficial stoniness and rocky outcrops are present. In the valley of Rio Mascari and the adjacent sectors of Sassari, the areas characterised by these soils were used in the past for cultivating olives. Dystric (LPd), Eutric (LPe) and Lythic Leptosols, as well as Eutric Regosols (Rge) are present on marl limestone. These soils often present high superficial stoniness and rocky outcrops, and they are used for cereal and fodder cultivation and pasture. Eutric Fluvisols (FLe) are present along the streams, with a power generally higher than 100 cm or Eutric Vertisols (VRe) and Calcic Vertisols (VRc). Eutric Cambisols (CMe), Eutric Leptosols (LPe) and Lythic Leptosols (LPs) are present on flat or slightly undulated tablelands of calcareous, calcareous-marl sand calcareous deposits. Wide surfaces presenting these types of soil can be found in the northern areas, such as between Rio Mascari and Rio Giuncheddu, between Rio Mannu of Porto Torres and La Crucca and near S. Anatolia and Pedra Niedda. Chromatic Cambisol (CMx) characterised by a typical reddish colour and Lythic Leptosoils (LPs) are mainly present close around Sassari (S. Simplicio, S. Pietro, Piandanna, Valle Gardona, etc.) on limestone and Miocene calcareous dolomites with flat to undulated morphology. Surfaces of this cluster of taxonomic units, used in the past for cultivating olive trees, are almost completely urbanised. Chromatic Luvisols (LVx), commonly called Red Soils, and Lythic Leptosoils (LPs) often as-

sociated with rocky outcrops are very shallow and are mainly present in the northern sector, coverig extensive areas, on crystalline sand limestone.

Bioclimatology and biogeography

In order to define the bioclimate of the study area, pluviometric and thermometric data from Sassari and Ottava climatic stations (Pulina, 1989) were examined (Fig. 2). According to the Rivas-Martínez (1996) and Rivas-Martínez et al. (1999) bioclimatic classification, these stations fall within the oceanic pluviseasonal Mediterranean bioclimate, upper mesomediterranean thermotype, and upper humid ombrotype.

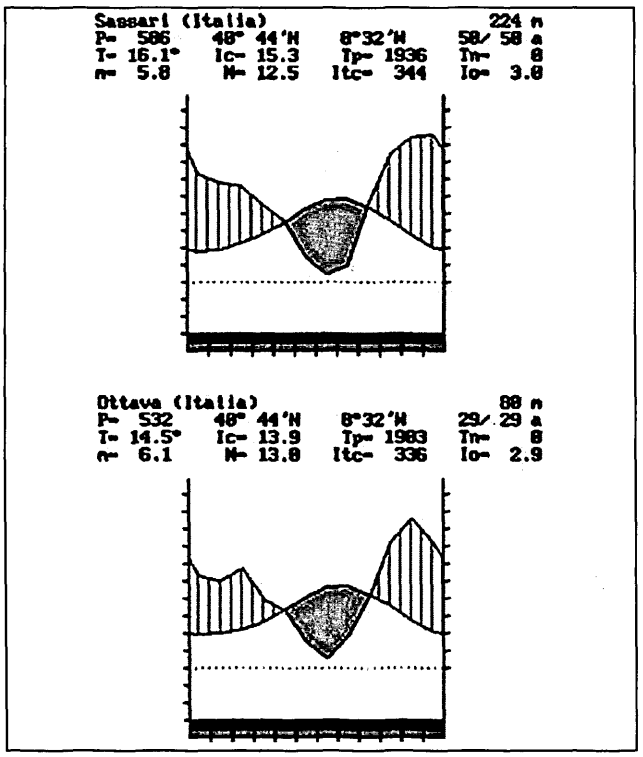

Fig. 2 – Bioclimatic diagrams of Sassari and Ottava meteorological stations.

From a biogeographic point of view, according to Rivas-Martínez et al. (2001), the entire Sardinia island falls within the Sardinian sub-district of the Italian-Thyrrenian district (Olartic kingdom, Mediterranean region, Western Mediterranean sub-region).

Arrigoni (1983a) considers Sardinia in the Sardinian sector of the Sardinian-Corsican dominion of the Mediterranean region. The study area falls within the North-western district of the coastal and hill sub-sector. From a phytogeographic point of view, the most significant species indicated for this sector and present in the study area are: *Limonium racemosum* (Lojac.) Diana, exclusive of this sector, *Anacyclus clavatus* (Desf.) Pers., *Anagallis monelli* L., *Prasium majus* L., *Urginea undulata* (Desf.) Steinh., *Viola arborescens* L. and *Vitex agnus-castus* L.

Botanical exploration

From the second half of the 19th-century, various authors have contributed to the floristic knowledge of this area. These contributions, often fragmented, mainly give information on the presence and local distribution of single entities or floristic lists of limited or only partial areas.

The first notes including taxa specifically referring to the study area are in Mola (1818-1819), Moris (1837-1859), Barbey (1884-1885) and Martelli (1896-1901, 1904). A series of contributions concerning Sardinian flora and presenting specific references to entities found in the Sassarese are due to Nicotra (1895a, 1895b, 1895c, 1896, 1897) and Béguinot (1922a).

In 1914 Nannetti published the flora of Osilo wich partially includes the calcareous sector that is the object of this study. Other contributions to the flora of Osilo were made by Desole (1947a, 1955, 1956). Atzei & Drascich-Campazzi (1988) concentred their researches on officinal flora of the low valley of Bunnari.

Desole also wrote some papers on distribution and ecology of various entities, such as *Laurus nobilis* L. (Desole, 1947b), *Salvia sclarea* L. (Desole, 1954) and *Scilla obtusifolia* Poiret (Desole, 1959).

Specific references to the study area are included in various notes and contributions on different taxa. Among them are: *Viola arborescens* L. (Nicotra, 1898); *Chamaerops humilis* L. (Béguinot, 1922b); *Chrysanthemum flosculosum* L. (Chiappini, 1964); *Adonis* L. (Steinberg, 1971); *Paspalum* L. (Garbari, 1972); *Vinca* L. (Atzei & Picci, 1975, 1977); *Echium* L. (Valsecchi, 1977); *Scrophularia* L. (Valsecchi, 1979); *Salvia desoleana* Atzei & Picci (Atzei & Picci, 1981, 1982); *Carlina* L. (Camarda, 1984a); *Ornithogalum* L. (Chiappini, 1962; Garbari, 1990); *Orchis longicornu* Poiret (Corrias et al., 1991); *Centaurea corensis* Valsecchi et Filigheddu (Valsecchi & Filigheddu, 1991); *Artemisia variabilis* Ten. (Filigheddu & Urbani, 1994); *Aspho-*

delus (Díaz Lifante & Valdés, 1996); *Quercus* L. (Camarda, 1998a, 1998b, 2003a); *Viola arborescens* L. (Atzei, 1980a) and *Linaria vulgaris* Mill. (Camarda, 1983a).

According to the data reported by Arrigoni et al. (1976-1991), endemic contingent is represented by the following entities: *Arenaria balearica* L., *Artemisia variabilis* Ten., *Arum pictum* L. fil., *Bellium bellidioides* L., *Borago pygmaea* (DC.) Chater et Greuter, *Carex panormitana* Guss., *Crocus minimus* DC., *Cymbalaria aequitriloba* (Viv.) Cheval., *Euphorbia cupanii* Guss. ex Bertol., *Genista corsica* (Loisel.) DC., *Limonium racemosum* (Lojac.) Diana, *Mentha insularis* Req., *Ophrys sphegodes* Miller subsp. *praecox* Corrias, *Ornithogalum corsicum* Jord. et Fourr., *Pancratium illyricum* L., *Plagius flosculosus* (L.) Alavi et Heywood, *Salvia desoleana* Atzei et Picci, *Scrophularia morisii* Valsecchi, *Scrophularia trifoliata* L., *Stachys glutinosa* L. and *Vinca sardoa* (Stearn) Pignatti.

A census of exotic species in Northern Sardinia (Viegi, 1993) produced a list of man-introduced species.

More recently some contributions are due to Bagella & Urbani (1994, 2003).

Vegetational, phytoclimatic and biogeographic studies also enriched floristic knowledge. First contributions date back to early 20th century (Herzog, 1909; Terraciano, 1909). Information on the vegetation of the study area are found in research by Béguinot (1922c), Desole (1947b), Moliner & Moliner (1955), Giacomini (1967) and Arrigoni (1968). More recent contributions are on nitrophilous vegetation (Biondi et al., 1988; Biondi et al., 1989; Biondi et al., 1990), communities of edafoigrophilous series of elm (Filigheddu et al., 1999), mesoigrophilous shrub groves (Biondi et al., 2002), *Olea europaea.* var. *sylvestris* woodlands (Bacchetta et al., 2003), holm-oak woods (Bacchetta et al., 2004) and plant landscape (Biondi et al., 2001; Filigheddu et al., 2003).

Plant landscape

Land use, traditionally inclined to agricultural activities in more fertile areas and to pasture in areas with less deep soils and often stony outcrops, strongly affected plant covering and landscape structure. However, as a result of reduction of cultivated surfaces and urbanisation of the country, evident variations determined by natural processes of spontaneous vegetation recovery occurred during a very short time in the last few decades, as demonstrated by recent studies (Biondi et al., 2000).

Olive groves, often terraced and with their centuries-old plants showing very large curves, represent a dominant element of Sassari countryside landscape. However, this cultivation is decreasing also due to the high costs of the manual harvest of olives, excessive breaking up of landed property and indiscriminate building in the last decades. In most cases they are not used, but totally abandoned, lacking in any preservation intervention and so destined to recede and disappear in few decades (Pietracaprina, 1989). Viticulture, on the contrary, is still rather in use, especially in the countryside of Sorso and Sennori. Vegetable cultivation has almost completely disappeared due to the town growth in the areas previously devoted to vegetable gardens. Finally, fodder and cereal are grown North of the town of Sassari, up to the coast.

Plant landscape is here described following Biondi et al. (1988, 1989, 1990, 2001, 2002); Filigheddu et al. (1999, 2002, 2003); Bacchetta et al. (2003, 2004).

Old abandoned terraces and areas once cultivated are colonised by a perennial grass vegetation, very diversified from a floristic point of view. These formations are dominated by *Dactylis hispanica* Roth, *Lotus cytisoides* L., *Daucus carota* L., *Leontodon tuberosus* L., *Piptatherum miliaceum* (L.) Coss., *Dittrichia viscosa* (L.) Greuter and other typical entities of post-cultivation coenoses.

Potential vegetation of tablelands and slopes facing South on lithosoils is represented by woods dominated by *Quercus ilex* L. referred to the association *Prasio majoris-Quercetum ilicis* Bacchetta, Bagella, Biondi, Farris, Filigheddu & Mossa 2004 with *Rhamnus alaternus* L., *Viburnum tinus* L., *Pistacia lentiscus* L., *Laurus nobilis* L., *Ruscus aculeatus* L., *Smilax aspera* L., *Rubia peregrina* L. subsp. *longifolia* (Poiret) O. Bolòs. Other thermophilous holm-oak woods typical entities are relegated to small areas, alongside the private Costa holm-oak wood, that occupies the southern steep slope of a valley. On the cooler sides, on marl outcrops or colluvial deeper soils, more mesophilous species characterise these coenoses as: *Quercus pubescens* Willd., *Asparagus acutifolius* L., *Hedera helix* L., *Euonymus europaeus* L., *Rosa sempervirens* L., *Clematis vitalba* L. They form little communities of mixed woods of sclerophilous and deciduous trees.

Shrubby formations are also different in relation to the exposition. Drier slopes are characterised by *Euphorbia dendroides* L., which also colonises very steep areas with high calcareous outcrops, and by *Anagyris foetida* L. and *Olea europaea* L. var. *sylvestris* Hoffmgg. et Link referred to the sub-association *anagyretosum foetidae* Bacchetta, Bagella, Biondi, Farris, Filigheddu & Mossa 2003 of the association *Asparago acutifolii-Oleetum sylvestris* Bacchetta, Bagella, Biondi, Farris, Filigheddu & Mossa 2003. Cooler and less steep slopes are covered by *Spartium junceum* L. e *Rhamnus alaternus* L. shrub groves.

Garigue landscape is dominated by formations of *Coridothymus capitatus* (L.) Reichenb. fil., with *Thymelaea hirsuta* (L.) Endl., *Teucrium flavum* L. subsp. *glaucum* (Jordan et Fourr.) Ronniger *Ononis spinosa* L., *Fumana thymifolia* (L.) Spach ex Webb and other camephytes. Where the soils are deeper, coenoses of *Cistus creticus* L. subsp. *eriocephalus* (Viv.) Greuter et Burdet and *Dorycnium penthaphyllum* Scop. prevail. Meadows are dominated by therophytes among them *Hypochoeris achyrophorus* L., *Plantago lagopus* L., *Plantago bellardi* All., *Bellis annua* L. and *Catapodium rigidum* (L.) C. E. Hubbard, and can also contain little bulbous plants such as *Crocus minimus* DC. and *Romulea ligustica* Parl. Xerophilous grasslands of *Brachypodium ramosum* Roemer et Schultes and *Dactylis hispanica* Roth, form a mosaic vegetation togheter with the garigue.

In valley floors, on alluvial soils, hygrophilous wood of *Ulmus minor* Miller, referred to the association *Allio triquetri-Ulmetum minoris* Filigheddu, Farris, Bagella & Biondi 1999, with *Rubus ulmifolius* Schott, *Arum italicum* Miller, *Allium triquetrum* L., *Arisarum vulgare* Targ.-Tozz. and other mesophilous entities, are present. Grass, mainly therophytic, coenoses are dominated under these conditions by typically synanthropic species, such as *Dasypyrum villosum* (L.) P. Candargy, *Bromus diandrus* Roth, *Bromus hordeaceus* L. and *Avena fatua* L. Along the streams, narrow bands of riparian woods with *Salix alba* L., *Populus alba* L., *P. nigra* L. subsp. *caudina* (Ten.) Bug. and *Vitex agnus-castus* L. are present.

Elophytic vegetation of stagnant or slowly flowing freshwaters is diversified in relation to water depth and nutrient quantity. *Apium nodiflorum* (L.) Lag., typical of highly eutrophic areas and *Phragmites australis* (Cav.) Trin. ex Steudel, species with a high ecological valence and able to survive even in case of substratum desiccation and water eutrophication, are among the most common species of these environments. Hydrophytic floating and rooting vegetation is very reduced because of pollution and eutrophication.

Calcareous cliffs and rocky slopes are colonised by casmophytic and chomophytic formations with *Capparis spinosa* L. subsp. *rupestris* (Sm.) Nyman, *Parietaria lusitanica* L., *Parietaria diffusa* Mert. & Koch, *Polypodium cambricum* L. subsp. *serrulatum* (Schinz ex Arcang.) Pic. Serm., *Dianthus siculus* C. Presl and *Phagnalon rupestre* (L.) DC.

Synanthropic vegetation is dominated by *Smyrnium olusatrum* L., *Urtica membranacea* Poiret, *Acanthus mollis* L. and *Silene latifolia* Poiret on wet and shaded roadsides and by *Sinapis alba* L., *Reseda alba* L. and *Chrysanthemum coronarium* L. in very sunny areas. *Artemisia arborescens* L. is present on the accumulation of soils rich in nitrate. *Papaver sp. pl.*, *Amaranthus sp. pl.* and other weeds are present in cultivated areas.

Finally, the hedges dominated by *Rosaceae*, such as *Crataegus monogyna* Jacq., *Prunus spinosa* L., *Rosa agrestis* Savi and *Rosa canina* L. and drystone walls are other characteristic elements of the landscape.

Floristic list

Floristic investigations were carried out between 1991 and 2003 in the tableland and valley system of Miocene limestone in the Sassarese itself and in the areas bordering it. *Exsiccata* are kept in the Herbarium of the Department of Botany and Plant Ecology of the University of Sassari (SASSA).

The nomenclature follows mainly Pichi Sermolli (1977) and Ferrarini et al. (1986) for the Pteridophytes and Tutin et al. (1964-1980, 1983), Pignatti (1982) and Greuter et al. (1984-1989) for the Spermatophytes. Other specific references are indicated in the floristic list. Family systematic order is according to Tutin et al. (1964-1980, 1993); genera, species and possible intraspecific entities are ordered alphabetically within their respective families.

Floristic list includes: native and introduced taxa found during this study or recently found in the same area by other authors (written in bold); taxa for which *herbarium specimina* or bibliographic data had been given but whose presence was not confirmed (*inquirendae*), marked by the symbol *; entities referred in various ways to this region, but which are in fact ab-

sent (*excludendae*), marked by the symbol °; entities cultivated in semi-natural vegetation types or considered as giving a characteristic mark to the landscape (*cultae*), marked by the symbol §.

For the taxa whose presence was not possible to confirm, bibliographic references and/or specific *herbarium* specimens, on which reference was based, are added. Introduced species are classified according to Viegi et al. (1974) and Viegi (2001). In particular, this list includes: "escaped from cultivation and permanently established" species (CS), "naturalized adventive" species (AN) and "causal adventive" species (AC).

The following indications are reported for each taxon in the list: biological form, chorological type, general environment where it was found, occurrence intended relative to the study area. Bibliographic references or critical notes were reported for entities when necessary. In some cases more common synonyms were also reported.

Biological forms were classified according to Raunkiaer (1905), by using types and abbreviations reported by Pignatti (1982).

Chorological types were obtained by the criteria of the phytogeographical subdivision according to Takhtajan (1986) for chorological unities at up to regional level and to Arrigoni (1974, 1983a) for sub-regional unities of the European and Mediterranean areas. Jalas & Suominen (1972-1994), Ferrarini et al. (1986), Greuter et al. (1984-1989), Pichi Sermolli (1977), Pignatti (1982) and Tutin et al., (1964-80, 1993) were the main references for defining the distribution of the taxa. A detailed distribution of the endemic entities is given, using the following abbreviation: BI (Balearis Islands), Co (Corsica), It (Italy), Sa (Sardinia), Si (Sicily), TA (Tuscan Archipelago). As well as types reported in the list, a chorological spectrum based on chorotypes reported by Pignatti (1982) was also accomplished, in order to compare it to the one of the Sardinian flora, only available in this form (Pignatti, 1994).

Frequency, assessed by observation in the field, includes three classes: rare (R), sporadic (S) and common (C).

SELAGINELLACEAE

Selaginella denticulata (L.) Spring – Ch rept – Tethydic-Eurosibiric – wet places, drystone walls. R.

ISOETACEAE

* *Isoetes histrix* Bory – G bulb. – Mediterranean-Atlantic.
In Mola (1818-1819).

EQUISETACEAE

Equisetum ramosissimum Desf. – G rhiz – Olartic-Paleotropical – wet places, ruderal places. C.

Equisetum telmateia Ehrh. – G rhiz – Olartic – wet places, ruderal places. S.

OPHIOGLOSSACEAE

* *Ophioglossum lusitanicum* L. – G rhiz –Euroasian-Tethydic.
Specimina visa: Italy, Sassari a Baddimanna, su calcare, m 240, s. d., Fiori (FI); Italy, Sassari a Baddimanna, 23.III.1907, s. coll. (SASSA); Italy, Sassari a Baddimanna, 22.IV.1909, s. coll. (SASSA); Italy, Sassari Baddimanna, 18.III.19012, s. coll. (SASSA). *O. lusitanicum* has the peculiarity to keep stayng alive even for many years under the ground. In this way it is completely impossible to see it (Pichi Sermolli, pers. comm., 2000). In 2000-2001 years, when different plants, with fertile and sterile leafs, where detected in diverse adjacent localities of NW Sardinia (Stintino, Nurra, etc.), it was actively searched in the studied area, but it couldn't be found. For this reason, even if it was given in Chiappini (1968), it presence is still doubtful.

ADIANTACEAE

Adiantum capillus-veneris L. – G rhiz – Subcosmopolitan – wet places. S.

Anogramma leptophylla (L.) Link – T caesp – Cosmopolitan – wet places, drystone walls. R.

POLYPODIACEAE

Polypodium cambricum L. subsp. **serrulatum** (Schinz ex Arcang.) Pic. Serm. – H ros – Mediterranean – rocky cliffs, drystone walls. C.
In Nicotra (1896) sub *P. vulgare* L. var. *cambricum.*

HYPOLEPIDACEAE

Pteridium aquilinum (L.) Kuhn – G rhiz – Cosmopolitan – grasslands, ruderal places. C.

ASPLENIACEAE

° *Asplenium adiantum-nigrum* L. – H ros – Subcosmopolitan.
To be excluded from this area. All of *A. adiantum-nigrum* reports, also considering the *specimina* in SS, SASSA and FI collected in the Sassarese, are to be referred to *A. onopteris* L.

Asplenium obovatum Viv. subsp. **lanceolatum** P. Silva – H ros – Tethydic-Eurosibiric – rocky cliffs, drystone walls. R.
= *A. billotii* F. W. Schultz.
Following Pichi Sermolli (1977), subspecies is the appropriate taxonomic level of this taxon. *Specimina selecta* (reviewed by R. E. G. Pichi Sermolli & P. Bizzarri): Italy, Valle sotto il muraglione del bacino di Bunnari, 14.V.1907, G. Terraciano, sub *A. lanceolatum* Huds. var. *obovatum* Viv., (SASSA); Italy, Colline attorno ai bagni di S. Martino, 29.IV.1907, s. coll., sub *A. obovatum* Viv. (SASSA).

Asplenium obovatum Viv. subsp. **obovatum** – H ros – Tethydic-Eurosibiric – rocky cliffs, drystone walls. R.
Specimina selecta (reviewed by R. E. G. Pichi Sermolli & P. Bizzarri): Italy, Sassari, s. d., Binna, sub *A. obovatum* (SASSA); Italy, Sassari: fontana di Corbu, 20.V.1907, s. coll. (SASSA); Italy, Sassari, s. d., Nicotra, sub *A. obovatum* Viv. (SASSA). This subspecies can be distinguished from the preceding one, for sori closer to leaf margin and clearly mucronate pinnules.

Asplenium onopteris L. – H ros – Paleotropical-Mediterranean – drystone walls. S.
The *specimina* in SS e SASSA sub *A. adiantum-nigrum*, collected in the Sassarese are all reviewed as *A. onopteris* L. All the bibliographic references of *A. adiantum-nigrum* could be, consequently, reinterpreted in this way, since this taxon is not present on this calcareous area.

Asplenium trichomanes L. subsp. **quadrivalens** D. E. Mey – H ros – Subcosmopolitan – rocky cliffs, drystone walls. S.
Specimina selecta (reviewed by R. E. G. Pichi Sermolli & P. Bizzarri): Italy, Scala di Giocca (Sassari), 4.V.1912, Barbey, sub *A. tricomanes* (SASSA); Valle dei Ciclamini, 19.VI.1995, Bagella et Urbani (SS).

Asplenium trichomanes L. subsp. **trichomanes** – H ros – Subcosmopolitan – rocky cliffs, drystone walls. S.
Specimina visa (reviewed by R. E. G. Pichi Sermolli and P. Bizzarri): Italy, Bassa valle di Bunnari Sa Crabola, 24.IV.1978, L. Drascich, sub *A. trichomanes* L. (SASSA); Italy, Bassa valle di Bunnari reg. Bunnari, 5.V.1979, Atzei et Drascich (SASSA); Italy, Sassari Serra Secca, s. d., Nicotra, sub *A. trichomanes* L. (SASSA).

Ceterach officinarum Willd. – H ros – European-Tethydic-Himalayan – rocky cliffs, drystone walls. S.
= *Asplenium ceterach* L.
The genus *Ceterach* is here preferred according to Ferrarini et al. (1986). *Ceterach* is *nom. cons.* (Greuter et al. 2000), its typus is that of *C. officinarum* Willd. Pichi Sermolli (1983) indicated the priority of this name against *C. officinarum* DC.

Phyllitis sagittata (DC.) Guinea & Heywood – H ros – Mediterranean – drystone walls. R.
Specimina selecta: Italy, Sassari sulle mura della chiesa di S. Pietro in Silki, 21.VIII.1978, A.D. Atzei, sub *Asplenium sagittatum* (DC.) Bange (SASSA).

Phyllitis scolopendrium (L.) Newman – H ros – Tethydic-Eurosibiric – wet places. R.

PINACEAE

Pinus halepensis Mill. – P scap – Mediterranean, CS – ruderal places. S.
Becoming "spontaneous" in the surroundings of Sassari (Camarda, 1998c).

§ *Pinus pinea* L. – P scap – European-Mediterranean, cultivated.
Differently from *P. halepensis*, *P. pinea* does not seem to be able to propagate spontaneously.

CUPRESSACEAE

Cupressus sempervirens L. – P scap – E Mediterranean, CS – ruderal places. S.
According to Camarda (1998c), an initial phase of natural diffusion of this taxon is known in Sardinia, specifically in the surroundings of Sassari.

Juniperus oxycedrus L. subsp. **oxycedrus** – P caesp – Mediterranean-Pontic – schrublands. R.
Very rare: it was found only on the S. Lorenzo cliffs, near Osilo.

SALICACEAE

Populus alba L. – P scap – Eurosibiric-Mediterranean – watercourses. S.

Populus nigra L. subsp. **caudina** (Ten.) Bug. – P scap – Mediterranean – watercourses. R.
Specimina selecta: Italy, nella valletta sotto il muraglione del bacino del Bunnari, 20.VI.1914, A. Nannetti, sub *P. nigra* var. *typica* (SASSA).

Populus tremula L. – P scap – Eurosibiric, CS – watercourses. S.

Populus x canescens (Aiton) Sm. – P scap – European – watercourses. S.
= *Populus alba* x *P. tremula*.
Specimina selecta: Italy, Bassa valle di Bunnari-Badde Olia, 3.VI.1978, Atzei & Drasich (SASSA).

Salix alba L. – P scap – Tethydic-Eurosibiric – watercourses. S.

Salix atrocinerea Brot. – P caesp – W Mediterranean-Atlantic – watercourses. S.

§ *Salix babylonica* L. – P scap – Asian, cultivated.

Salix fragilis L. – P caesp – Eurosibiric – watercourses. R.
Specimina visa: Italy, Osilo lungo il rio S. Elies, 14.VI.1913, Nannetti, sub *S. purpurea* (SASSA). Also along Mascari river (Camarda, pers. comm., 2000).

JUGLANDACEAE

§ *Juglans regia* L. – P scap – Balkan-Iranoturanic, cultivated.

BETULACEAE

° *Alnus cordata* (Loisel.) Desf. – P scap – S European.
To be excluded from this area. Nannetti (1914) report has no confirmation from *specimina* in SASSA. According to Arrigoni (1983b) this taxon is absent in Sardinia.

Alnus glutinosa (L.) Gaertner – P caesp – Eurosibiric-Mediterranean – watercourses. R.

FAGACEAE

Quercus ilex L. – P scap – Mediterranean – woods, schrublands. C.

Quercus pubescens Willd. – P scap – Mideuropean-Mediterranean – woods. C.
Camarda & Valsecchi (1983); Arrigoni (1983c); Greuter et al. (1986); Camarda (1987, 1998a, 1998b, 2003a); Schwarz (1993); Mossa et al. (1998; 1999); Brullo et al. (1998; 1999).

Quercus suber L. – P scap – Mediterranean – woods. R.

Quercus x morisii Borzì – P scap – Mediterranean – woods. R.
= *Q. ilex* x *Q. suber* Borzì.

ULMACEAE

Celtis australis L. – P scap – Mediterranean-Balcanic, CS – woods. R.

Ulmus minor Mill. – P caesp – Eurosibiric-Mediterranean – woods, wet places, ruderal places. C.

MORACEAE

Broussonetia papyrifera (L.) Vent. – P caesp – E Asian, CS – ruderal places. R.
Specimina visa: Italy, Sassari sulla strada per Ittiri poco prima dello svincolo per la SS 131, 3.VI.2001, Atzei (SASSA); Italy, Sassari: S. Giacomo di Taniga nei pressi della chiesa, 16.VII.2000, Atzei (SASSA); Italy, Sassari: Molafà, 24.IX.2000, Atzei (SASSA).

Ficus carica L. – P scap – Mediterranean-Iranoturanic – rocky cliffs, ruderal places. C.

§ *Morus alba* L. – P scap – E Asian, cultivated.

§ *Morus nigra* L. – P scap – SW Asian, cultivated.

URTICACEAE

Parietaria diffusa Mert. & Koch – H scap – European-Tethydic – rocky cliffs, drystone walls, ruderal places. C.

Parietaria lusitanica L. – T rept – Mediterranean-Balcanic – rocky cliffs. S.

Urtica dioica L. – H scap – Subcosmopolitan – ruderal places. R.

Urtica membranacea Poiret – T scap – Mediterranean – ruderal places, wet places. C.

Urtica pilulifera L. – T scap – Tethydic-Pontic – ruderal places, wet places. S.

Urtica urens L. – T scap – Boreal-Tethydic – ruderal places. R.
Specimina selecta: Italy, Sassari: orto convento S. Antonio Abate, 28.III.1985, A.D. Atzei (SASSA); Italy, Rizzeddu, 19.V.1906, s. coll. (SASSA).

SANTALACEAE

Osyris alba L. – NP – European-Mediterranean – woods, schrublands, hedges. C.

Thesium humile Vahl – T scap – Mediterranean – scrublands. R.
Specimina selecta: Italy, Sassari, Chighizzu, 27.IV.1980, Corrias et Diana (SS).

LORANTHACEAE

* *Loranthus europaeus* Jacq. – P ep – European.
Surroundings of Sassari (Atzei, 2002, pers. comm.).

RAFFLESIACEAE

Cytinus ruber (Fourr.) Komarov – G rad – Mediterranean – schrublands, scrublands. R.

POLYGONACEAE

Polygonum arenastrum Boreau – T rept – Subcosmopolitan – ruderal places. R.

Polygonum aviculare L. – T rept – Cosmopolitan – ruderal places. R.

Polygonum scoparium Req. ex Loisel. – NP – Endemic Sa Co – wet places. R.
Raffaelli (1978).

Rumex acetosella subsp. **angiocarpus** (Murb.) Murb – H scap – Subcosmopolitan – wet places, ruderal places. S.
= *R. acetosella* L. subsp. *multifidus* (L.) Arcangeli
= *R. acetosella* auct.
López Gonzáles (1990).

Rumex bucephalophorus L. subsp. **bucephalophorus** – T scap – Tethydic-Atlantic – scrublands, terophytic grasslands, ruderal places. C.

Rumex conglomeratus Murray – H scap – European-Tethydic – grasslands, wet places. S.

Rumex obtusifolius L. – H scap – Cosmopolitan, AN – grasslands. R.
In Chiappini (1963) sub *R. obtusifolius* L. subsp. *sylvester* (Wallr.) Rech.

Rumex pulcher L. subsp. **pulcher** – H scap – European-Tethydic – ruderal places, wet places. C.

Rumex thyrsoides Desf. – H scap – W Mediterranean – ruderal places. R.

CHENOPODIACEAE

Atriplex halimus L. – P suffr – Mediterranean – ruderal places. R.

* *Atriplex patula* L. – T scap – Tethydic-Eurosibiric.
Specimina selecta: Italy, Sassari Filigheddu, 29.X.1915, s. coll. (SASSA); Italy, Sassari, s. d., Nicotra (SASSA).

Atriplex prostrata Boucher ex DC. – T scap – Olartic – grasslands, ruderal places. S.
= *A. prostrata* DC.
= *A. latifolia* Wahlenb.
In Nicotra (1895b) sub *A. hastata* auct. non L.
* *Atriplex rosea* L. – T scap – Tethydic-Eurosibiric.
Specimina selecta: Italy, Sassari verso Baddemanna, s. d., Nicotra, sub *A. roseum* L. (SASSA).
Beta vulgaris L. subsp. **maritima** (L.) Arcang. – H scap – Mediterranean-Atlantic –ruderal places, fields. C.
= *B. maritima* L.
Chenopodium album L. – T scap – Olartic-Paleotropical – ruderal places. S.
* *Chenopodium ambrosioides* L. – T scap – Subcosmopolitan, AN.
In Nicotra (1897).
° *Chenopodium multifidum* L. – H scap – S American, AN.
In Viegi (1993) by mistake sub *Roubiaeva multifida* Moq. The wrong bibliographic reference given is Chiappini (1963).
Chenopodium murale L. – T scap – Subcosmopolitan – grasslands, ruderal places. S.
Chenopodium opulifolium Schrad. – T scap – Subcosmopolitan – wet places. R.
Chenopodium vulvaria L. – T scap – European-Tethydic – ruderal places. S.

AMARANTHACEAE
Amaranthus cruentus L. – T scap – Neotropical, AN – grasslands, ruderal places. S.
= *A. chlorostachys* Willd.
Amaranthus deflexus L. – H scap – S American, AN – ruderal places. R.
In Nicotra (1897) sub *Euxolus deflexsus*. *Specimina selecta*: Italy, Sassari, s. d., s. coll., sub *E. deflexus* Raf. (SASSA); Italy, Rizzeddu, 16.XI.1908, s. coll. (SASSA); Italy, Sassari a Monte Santu tenuta Murgia, 12.VI.1908, s. coll. (SASSA).
* *Amaranthus graecizans* L. – T scap – Paleosubtropical, AN.
= *A. graecizans* L. var. *sylvestris* (Vill.) Asch.
= *A. graecizans* L. subsp. *sylvestris* (Vill.) Brenan.
Specimina visa: Italy, Rizzeddu, 16.XI.1908, s. coll., sub *A. sylvestris* (SASSA). According to Arrigoni (1981a) this taxon is absent from Sardinia.

PHYTOLACCACEAE
Phytolacca americana L. – P caesp – N American, CS – ruderal places. R.

AIZOACEAE
Carpobrotus acinaciformis (L.) L. Bolus – Ch suffr – S African, CS – ruderal places. R.
= *Mesembryanthemum acinaciforme* L.
Naturalized in Sardinia (Greuter et al., 1984).
Carpobrotus edulis (L.) N. E. Br. – Ch suffr – S African, CS – ruderal places. R.
= *Mesembryanthemum edulis* L.
Naturalized in Sardinia (Greuter et al., 1984).
Mesembryanthemum nodiflorum L. – T scap – Mediterranean-Pontic – ruderal places R.
In Nicotra (1895b) sub *M. crystallinum* L.

PORTULACACEAE
Portulaca oleracea L. subsp. ***oleracea*** – T scap – Subcosmopolitan, CS – ruderal places, fields. R.

CARYOPHYLLACEAE
* *Arenaria balearica* L. – Ch suffr – Endemic Sa Co AT Ba.
Diana Corrias (1980). *Specimina visa*: Italy, Sassari a Scala du Pintore, 2.VI.1895, U. Martelli (FI); Prati a Spartivento presso la valle di Bunnari tra il 3° e il 5° Km, 14.V.1907, Terraciano (SASSA).
Arenaria leptoclados (Rchb.) Guss. – T scap – European-Mediterranean – scrublands, terophytic grasslands. C.
* *Arenaria serpyllifolia* L. – T scap – Olartic-Paleotropical.
In Nannetti (1914).
Cerastium glomeratum Thuill. – T scap – Cosmopolitan – fields, terophytic grasslands. C.
Dianthus siculus C. Presl – Ch suffr – W Mediterranean – rocky cliffs, scrublands. S.
= *D. sylvestris* Wulfen in Jacq subsp. *siculus* (C. Presl) Tutin (GREUTER et al.,1984).
Arrigoni (1984a) and Camarda & Corrias (1987). In Nicotra (1897) sub *D. arrostii*.
* *Minuartia hybrida* (Vill.) Schischk. – T scap – Euroasian-Tethydic.
= *Arenaria tenuifolia* L. (Greuter et al., 1984)
In Nicotra (1895b) sub *Arenaria tenuifolia* L. var. *viscidula* Moris. *Specimina visa*: Italy, Sassari, s. d., Nicotra, sub *A. tenuifolia* L. (SASSA).
Minuartia mediterranean (Ledeb.) K. Maly – T scap – European-Tethydic – terophytic grasslands. S.
Petrorhagia prolifera (L.) P. W. Ball & Heywood – T scap – European-Tethydic –scrublands, terophytic grasslands. C.
Ball & Heywood, 1964; Romo, 1990.
Petrorhagia dubia (Rafin.) G. López & Romo – T scap – Mediterranean – scrublands, terophytic grasslands. C.
= *P. velutina* (Guss.) P. W. Ball & Heywood
In Nicotra (1895b) sub *Dianthus velutinus* Guss. Ball & Heywood, 1964; Romo, 1990.
Polycarpon tetraphyllum (L.) L. – T scap – European-Tethydic – terophytic grasslands, ruderal places. S.
* *Rhodalsine geniculata* (Poiret) F. N. Williams – Ch suffr – Mediterranean.
= *Minuartia geniculata* (Poiret) Thell.
Specimina visa: Orto botanico, V.1907, Belli, sub *Alsine procumbens* Fenzl (SASSA).
Sagina apetala Ard. – T scap – European-Mediterranean –

terophytic grasslands. S.

Saponaria officinalis L. – H scap – Eurosibiric – watercourses. R.
Now very rare, but "... very common along the banks of Rio Scala di Gioca" (Nicotra, 1895b). *Specimina selecta*: Italy, dintorni di Porto Torres, s. d., Pitzorno (SASSA).

Silene bellidifolia Juss. ex Jacq. – T scap – Mediterranean – grasslands, ruderal places. S.

Silene gallica L. – T scap – European-Tethydic – scrublands, terophytic grasslands. S.

Silene latifolia Poiret subsp. **latifolia** – H bienn – Mediterranean – grasslands, ruderal places. C.

Silene nocturna L. – T scap – Tethydic – ruderal places, grasslands. S.

Silene nodulosa Viv. – H caesp – Endemic Sa Co – rocky cliffs. R.
Valsecchi (1978a). This is the first report of this taxon for the Sassarese calcareous cliffs.

Silene vulgaris (Moench) Garcke – H scap – Boreal-Tethydic – ruderal places, grasslands. C.

Spergularia rubra (L.) J. Presl & C. Presl – Ch suffr – Olartic-Paleotropical – ruderal places. S.

Stellaria media (L.) Vill. – T rept – Olartic-Paleotropical – fields, ruderal places. C.

Stellaria neglecta Weihe – T scap – Tethydic-Eurosibiric – fields, ruderal places. S.
This is the first confirmation of this taxon in Sardinia, after its doubt presence in Greuter et al. (1984).

RANUNCULACEAE

* *Adonis annua* L. subsp. *annua* – T scap – W European-W Mediterranean.
"Sassari a S. Giovanni, Terraciano, 19.IV.1916, (NAP)" in Steinberg (1971). *Specimina visa*: Italy, Montagna di Tissi, Cossu, 21.IV.1907 (SASSA).

Adonis annua L. subsp. **cupaniana** (Guss.) C. H. Steinb. – T scap – Mediterranean – fields. R.
"Dintorni Sassari luoghi sterili a S. Anatolia, Martelli, 9.V.1895, (FI)" in Steinberg (1971). *Specimina visa*: Italy, Sassari a Logulentu, s. coll., 25.V.1906 (SASSA); Italy, Sassari Scala di Giocca, Cossu, 4.V.1912 (SASSA); Da Sassari a Preda Niedda per Fontana di Corbu, Terraciano, 20.V.1907 (SASSA).

* *Adonis microcarpa* DC. – T scap – Mediterranean.
"Santo Mialo (*prope* Sassari), Nicotra, 1825, (PAL)" and "Sassari a Scala di Giocca, Martelli, 5.V.1894, (FI)" in Steinberg (1971).

Anemone coronaria L. – G bulb – Mediterranean – grasslands. R.
Specimina selecta: Italy, Setti Funtani e Scala di Giocca, s. d., s. coll. (SS); Tropu Ilde, 13.III.1999, Atzei (SASSA).

Anemone hortensis L. – G rhiz – Mediterranean – grasslands, ruderal places. C.

Clematis cirrhosa L. – P lian – Mediterranean – rocky cliffs, ruderal places, hedges. S.

Clematis flammula L. – P lian – Mediterranean – schrublands, ruderal places, hedges. C.

Clematis vitalba L. – P lian – European-Mediterranean – woods, schrublands, ruderal places, hedges. C.

Consolida ajacis (L.) Schur – T scap – European-Mediterranean, AN – ruderal places. R.
= *C. ambigua* (L.) P.W. Ball & Heywood.
Atzei & Drascich Campazzi (1988). *Specimina visa*: Italy, Bassa Valle del Bunnari: Calancui, 12.VII.1980, Atzei et Drascich Campazzi, (SASSA).

Delphinium halteratum Sm. – T scap – W Mediterranean – ruderal places. R.
Specimina selecta: Italy, intorni di Porto Torres, s. d., Pitzorno, sub *D. peregrinum* L. (SASSA). According to Arrigoni (pers. comm., 2003) this taxon is more probably *D. gracile*, that is a W Mediterranean entity (Greuter et al., 1989), not reported in Sardinia neither in Italy.

Nigella damascena L. – T scap – European-Tethydic – fields, grasslands, terophytic grasslands. C.

* *Ranunculus aquatilis* L. – I rad. – Subcosmopolitan
In Mola (1818-1819).

* *Ranunculus arvensis* L. – T scap – European-Tethydic.
Specimina visa: Italy, Sassari palude Rizzeddu, 30.V.1906, L. Cavallotti (SASSA); statale di Tissi, 21.IV.1907, Cossu (SASSA); Italy, montagna di Tissi, 21.IV.1907, Cossu (SASSA); Italy, Sassari al Rizzeddu e altrove, s. d., Nicotra (SASSA); Italy, Scala di Giocca, 4.V.1912, s. coll. (SASSA).

Ranunculus bulbosus L. subsp. **aleae** (Willk.) Rouy et Foucaud – H scap – Mediterranean – wet places. S.

Ranunculus bullatus L. – H ros – Mediterranean – scrublands, grasslands. C.

Ranunculus ficaria L. – H scap – Euroasian – grasslands, wet places. C.

Ranunculus macrophyllus Desf. – H scap – W Mediterranean – grasslands, wet places. S.
Italy, Sassari inter Sassari e Baddemanna, 8.IV.1909, H. Poeverlein, sub *R. repens* (SASSA).

Ranunculus muricatus L. – T scap – Paleotropical-Tethydic – ruderal places, wet places. S.

Ranunculus parviflorus L. – T scap – Mediterranean-Atlantic – wet places. R.
= *R. philonotis* Ehrh. (Greuter et al., 1989).
In Nicotra (1896) sub *R. chius* DC. and in Nicotra (1897) sub *R. philonotis* Retz.
Specimina selecta: Italy, ad muros prope l'acquedotto, s. d., Nicotra sub R. chius DC. (SASSA).

LAURACEAE

Laurus nobilis L. – P caesp – European-Mediterranean – woods, schrublands. S.

PAPAVERACEAE

* *Chelidonium majus* L. – H scap – Olartic.

In Nicotra (1895b).

Fumaria bastardii Boreau – T scap – Mediterranean-Atlantic – fields, grasslands, ruderal places. S.

Fumaria capreolata L. – T scap – Mediterranean – scrublands, grasslands, fields, ruderal places. C.

Fumaria flabellata Gasp. – T scap – Mediterranean – grasslands. S.

Fumaria officinalis L. – T scap – Eurosibiric-Mediterranean – ruderal places. S.

Fumaria parviflora Lam. – T scap – Mediterranean-Atlantic – fields, grasslands, ruderal places. C.

Glaucium corniculatum (L.) Rudolph – H scap – Mediterranean-Atlantic – ruderal places. R.

° *Glaucium flavum* Crantz – H scap – Mediterranean-Atlantic.
Reported in Atzei & Drascich Campazzi (1988), by mistake. In SASSA (!) only a specimen: Baddemanna, 16.V.1908, s. coll., sub *Glaucium* sp., is to refer to *G. corniculatum* (L.) Rudolph.

Hypecoum imberbe Sm. – T scap – Paleotemperate – ruderal places. R.

* *Hypecoum procumbens* L. – T scap – Paleotemperate.
In Nicotra (1897).

* *Papaver argemone* L. – T scap – European-Tethydic.
In Nicotra (1896).

Papaver dubium L. – T scap – Mediterranean-Iranoturanic – fields, ruderal places. R.

Papaver hybridum L. – T scap – European-Tethydic – fields, ruderal places. S.

Papaver pinnatifidum Moris – T scap – W Mediterranean – fields, ruderal places. S.

Papaver rhoeas L. – T scap – European-Tethydic – fields, ruderal places. C.

Papaver setigerum DC. – T scap – CW Mediterranean – ruderal places. R.

Papaver somniferum L. – T scap – Subcosmopolitan, CS – ruderal places. R.

CAPPARACEAE

Capparis spinosa L. subsp. **rupestris** (Sm.) Nyman – Ch frut – Mediterranean – rocky cliffs. S.
= *C. orientalis* Veillard.
The subspecific treatment of this taxon follows Higton & Akeyrod (1991), Heywood (1993) and Fici & Gianguzzi (1997). This subspecies, defined mainly on its ecology, grows mainly on limestone that is also defined as the primary habitat of *C. spinosa* s. l. in the Mediterranean and its vegetative characters are more stable than in *C. spinosa* subsp. *spinosa*.

CRUCIFERAE

Arabidopsis thaliana (L.) Heynh. – T scap – Tethydic-Eurosibiric – terophytic grasslands. R.

Arabis hirsuta (L.) Scop. – H scap – Olartic – scrubland. R.

Arabis planisiliqua (Pers.) Reichenb. – H scap – W Mediterranean – scrublands. R.
= *A. hirsuta* (L.) Scop. subsp. *gerardii* Hartman
= *A. hirsuta* (L.) Scop. subsp. *planisiliqua* (Pers.) Sojàk.
Specimina visa: Italy, Sassari: Sos Elighes (tra Luna e Sole, Funtanazza e Barca), 25.IV.1997, Atzei (SASSA); Fonte Bertoleddu (tra Sos Lacchedos e Valle Barca), 3.V.1981, Atzei (SASSA).

Arabis verna (L.) R. BR. – T scap – Mediterranean – scrublands, terophytic grasslands. R.

Brassica napus L. – T scap – Mediterranean, CS – ruderal places. S.
According to Heywood & Zohary (1995) *B. napus* is a hybrid taxon between *B. oleracea* and *B. rapa* widely naturalized.

* *Brassica nigra* (L.) Koch – T scap – European-Tethydic, CS.
Specimina visa: Italy, Sassari ponte di Rizzeddu, 30.V.1906, s. coll., (SASSA). According to Heywood & Zohary (1995) is a relict cultivation in Europe and Asia.

* *Brassica rapa* L. – H bienn – Mediterranean, CS.
= *B. campestris* L. (Heywood & Zohary, 1995).
Specimina visa: Italy, Sassari a Scala di Giocca, 5.V.1895, U. Martelli sub *B. campestris* L. (FI); Italy, Tra la cantoniera di Abealzu e la Fontana del Fico nei pascoli acquitrinosi, 2.III.1913, Nannetti (SASSA); Italy, Vallata di Bunnari scendendo da Spartivento (calcare), 14.V.1907, Terraciano (SASSA). Arrigoni (1986).

Capsella bursa-pastoris (L.) Medicus – H bienn – Cosmopolitan – fields, ruderal places. C.

Capsella rubella Reuter – T scap – CW Mediterranean – ruderal places, fields. S.

Cardamine hirsuta L. – T scap – Subcosmopolitan – terophytic grasslands, ruderal places. S.

Cardaria draba (L.) Desv. – G rhiz – European-Tethydic – ruderal places. R.

Diplotaxis tenuifolia (L.) DC. – H scap – European-Mediterranean – rocky cliffs, grasslands, ruderal places. C.

Diplotaxis viminea (L.) DC. – T scap – Mediterranean-Atlantic – ruderal places. R.
In Nicotra (1895b) sub *D. viminea* DC. var. *integrifolia* Guss.

Erophila praecox (Steven) DC. – T scap – European-Tethydic – terophytic grasslands. C.
In Nicotra (1897) sub *Draba verna* L.

Eruca sativa Mill. – T scap – Mediterranean-Iranoturanic – fields. R.

Erysimum cheiri (L.) Crantz – Ch suffr – European-Mediterranean, AN – ruderal places. S.
In Nicotra (1895b) sub *Cheiranthus cheiri* L.

Hirschfeldia incana (L.) Lagr.-Foss. – T scap – Mediterranean –grasslands, ruderal places. C.

Lepidium graminifolium L. – H scap – European-Mediterranean – ruderal places, grasslands. S.

* *Lepidium sativus* L. – T scap – African, CS.
In Macchiati (1882).

Lobularia maritima (L.) Desf. – Ch suffr – Mediterranean – ruderal places, grasslands, scrublands. C.

Matthiola incana (L.) R. Br. – Ch suffr – Mediterranean – rocky cliffs, ruderal places. C.

* *Myagrum perfoliatum* L. – T scap – Euroasian-Mediterranean.
In Barbey (1884-85).

Nasturtium officinale R. Br. – H scap – European-Tethydic – watercourses. S.
In Mola (1818-19) sub *Rorippa nasturtium-aquaticum* Sch. et Thel.

Raphanus raphanistrum L. subsp. landra (DC.) Bonnier et Layens – T scap – European-Tethydic –ruderal places, fields. C.

Raphanus raphanistrum L. subsp. **raphanistrum** – T scap – European-Tethydic –ruderal places, fields. C.

Rapistrum rugosum (L.) All. subsp. orientale (L.) Arcang. – T scap – Mediterranean –ruderal places. S.

Sinapis alba L. – T scap – European-Tethydic –ruderal places. C.
Heywood & Zohary (1995).

Sinapis arvensis L. – T scap – European-Mediterranean – ruderal places. R.

* *Sinapis pubescens* L. – Ch suffr – W Mediterranean.
In Nannetti (1914) and in Pignatti (1982).

Sisymbrium irio L. – T scap – Tethydic-Eurosibiric – ruderal places. S.

Sisymbrium officinale (L.) Scop. – T scap – Tethydic-Eurosibiric – ruderal places. S.

RESEDACEAE

Reseda alba L. – T scap – Mediterranean –ruderal places. C.

Reseda lutea L. – H scap – European-Tethydic – grasslands, ruderal places. S.

CRASSULACEAE

Sedum album L. – Ch succ – European-Mediterranean – rocky cliffs, drystone walls. S.
Specimina visa: Italy, Strada statale Sassari-Osilo di fronte alla discesa delle cave di Calancui, 11.VI.1976, Atzei (SASSA); Italy, Bassa Valle di Bunnari: Calancui, 1.VII.1978, Atzei & Drascich (SASSA); Italy, Margola (tra Cargeghe e Florinas), 21.VI. e 27.VIII.1980, Atzei (SASSA).

* *Sedum amplexicaule* DC. – Ch succ – Mediterranean.
= *S. tenuifolium* (Sm.) Strobl.
In Nannetti (1914). *Specimina visa*: Italy, Santo Mialo, s. d., Nicotra, sub *S. nicaense* All. (SASSA).

Sedum caespitosum (Cav.) DC. – T scap – Mediterranean – rocky cliffs, drystone walls. S.

Sedum cepaea L. – T scap – European-Mediterranean – drystone walls. R.
Specimina selecta: Italy, Bassa valle del Bunnari, Calancui, 15.VII.1976, Atzei et Manunta (SASSA); Italy, Sassari: a Scala di Giocca, 4.V.1912, s. coll., sub *S. caepaea* L. var. *galioides* Pers. (SASSA).

Sedum dasyphyllum L. – Ch succ – European-Tethydic – rocky cliffs, drystone walls. S.

Sedum rubens L. – T scap – European-Mediterranean – rocky cliffs, drystone walls. S.

Sedum rupestre L. – Ch succ – MedioEuropean-Atlantic – rocky cliffs, drystone walls. C.

° *Sedum sediforme* (Jacq.) Pau – Ch succ – Mediterranean.
In Atzei & Drascich Campazzi (1988). According to field and herbarium (SASSA, SS) observations, it might be referred more properly to *S. rupestre* L.

Sedum stellatum L. – T scap – Mediterranean – rocky cliffs, drystone walls. C.

Umbilicus horizontalis (Guss.) DC. – H rhiz – Mediterranean – drystone walls, rocky cliffs. C.

Umbilicus rupestris (Salisb.) Dandy – G bulb – Mediterranean-Atlantic – drystone walls, rocky cliffs. C.

SAXIFRAGACEAE

Saxifraga tridactylites L. – T scap – European-Tethydic – drystone walls, rocky cliffs. C.

ROSACEAE

Agrimonia eupatoria L. – H scap – European-Tethydic – grasslands. S.

Crataegus monogyna Jacq. – P caesp – Eurosibiric-Mediterranean – schrublands, hedges, ruderal places. C.

§ *Cydonia oblonga* Mill. – P scap – CW Asian, cultivated.

Fragaria vesca L. – H rept – Eurosibiric, CS – ruderal places. R.
Specimina visa: Italy, Logulentu, 24.V.1979, Valsecchi, sub *Potentilla sterilis* (SS); Monte Bianchinu, 24.V.1979, Valsecchi (SS).

M. pumila Mill. – P scap – CW Asian, CS – ruderal places, fields. R.
= **Malus domestica** Borkh.
= *M. communis* DC. (Pignatti, 1982)
= *Pyrus malus* L.
Heywood & Zohary (1995).

Potentilla reptans L. – H rept – Tethydic-Eurosibiric – grasslands, wet places, ruderal places. C.

§ *Prunus armeniaca* L. – P scap – C Asian, cultivated.
Nieddu & Mulas (1994) describe the "Fosso della Noce" variety, known as very rare, few individuals, in orchards and gardens of Sassari.

§ *Prunus avium* L. – P scap – Tethydic-Eurosibiric, cultivated.
Heywood & Zohary (1995).

§ *Prunus dulcis* (Mill.) D. A. Webb – P scap – S European, cultivated.
Heywood & Zohary (1995).

§ *Prunus persica* (L.) Batsch – P scap – E Asian, cultivated.

Prunus spinosa L. – P caesp – Tethydic-Eurosibiric – schrublands, hedges, ruderal places. C.
Pyrus spinosa Forssk. – P scap – Mediterranean – schrublands, hedges. S.al
= *P. amygdaliformis* Vill. (Heywood & Zohary, 1995).
Rosa agrestis Savi – NP – European-Mediterranean – schrublands, hedges, ruderal places. C.
Rosa canina L. – NP – European-Tethydic – schrublands, hedges, ruderal places. S.
Rosa corymbifera Borkh. – NP – European – hedges. S.
Rosa pouzinii Tratt. – NP – W Mediterranean – hedges. R.
Rosa sempervirens L. – NP – Mediterranean-Atlantic – woods, schrublands, hedges. C
Rubus ulmifolius Schott – NP – Mediterranean-Atlantic –ruderal places, watercourses. C.
In Nicotra (1895b) sub *R. caesius* L.
Sanguisorba minor Scop. – H scap – European-Tethydic – woods, schrublands, grasslands, ruderal places. C.
Sorbus domestica L. – P scap – European-Mediterranean, CS – ruderal places. R.
= *Pyrus domestica* (L.) Ehrh.

LEGUMINOSAE
Anagyris foetida L. – P caesp – Mediterranean – schrublands. S.
Anthyllis vulneraria L. subsp. **rubriflora** (DC.) Arcang. – H scap – Mediterranean – schrublands, scrublands, grasslands. C.
Astragalus boeticus L. – T scap – Mediterranean – grasslands, ruderal places. S.
Bituminaria bituminosa (L.) Stirton – H scap – Tethydic – schrublands, scrublands, grasslands. C.
= *Psoralea bituminosa* L.
Calicotome spinosa (L.) Link – P caesp – Mediterranean – schrublands. R.
Ceratonia siliqua L. – P caesp – Mediterranean, CS – ruderal places. R.
Specimina selecta: Italy, Sassari sotto Monte Bianchinu, 6.X.1980, Diana (SS).
Coronilla scorpioides (L.) Koch – T scap – European-Mediterranean – terophytic grasslands. S.
Dorycnium pentaphyllum Scop. subsp. **pentaphyllum** – Ch suffr – Eurosibiric – schrublands, scrublands. C.
Dorycnium rectum (L.) Ser. – Ch suffr – Mediterranean-Pontic – watercourses, wet places, ruderal places. C.
Genista corsica (Loisel.) DC. – NP – Endemic Sa Co – scrublands, schrublands. C.
Valsecchi (1978b).
Glycyrrhiza glabra L. – G rhiz – Mediterranean-Iranoturanic, CS – ruderal places, fields. R.
Specimina visa: Italy, Sorso: quartiere S. Croce, VI.1986, A. Biddau (SASSA); Italy, Sorso: zona S. Croce (entro il paese), 3.VII.1986, A.D. Atzei (SASSA); Italy, Florinas: presso la chiesa di S. Croce, 27.IX.1990, A.D. Atzei (SASSA); Italy, Ossi, 22.IX.1993, A.D. Atzei (SASSA).
Hedysarum glomeratum Dietrich – T scap – W Mediterranean – grasslands. R.
Hedysarum spinosissimum L. – T scap – W Mediterranean – grasslands. R.
Hippocrepis unisiliquosa L. – T scap – Mediterranean – scrublands, terophytic grasslands. C.
Lathyrus annuus L. – T scap – Mediterranean – terophytic grasslands. R.
Lathyrus cicera L. – T scap – Tethydic – scrublands, terophytic grasslands, grasslands. C.
Lathyrus clymenum L. – T scap – Mediterranean – grasslands, terophytic grasslands. S.
= *L. articulatus* L. (Greuter et al., 1984).
According to Pignatti (1982) *L. articulatus* e *L. clymenum* are two different taxa and, the last, not present in Sardinia.
Lathyrus hirsutus L. – T scap – Mediterranean-Iranoturanic – ruderal places. R.
Atzei & Drascich Campazzi (1988).
Lathyrus latifolius L. – H scand – European-Mediterranean – woods, schrublands, hedges. C.
Lathyrus ochrus (L.) DC. – T scap – Mediterranean – fields. S.
Lens culinaris Medicus – T scap – SW Asian, CS –fields, ruderal places. R.
Heywood & Zohary (1995).
Lotus angustissimus L. – T scap – Mediterranean – wet places. R.
Lotus cytisoides L. – Ch suffr – Mediterranean – scrublands, grasslands, ruderal places. C.
Lotus edulis L. – T scap – Mediterranean – terophytic grasslands, fields, grasslands. C.
Lotus ornithopodioides L. – T scap – Mediterranean – scrublands, terophytic grasslands. S.
Lotus tetragonolobus L. – T scap – Mediterranean – terophytic grasslands, ruderal places. C.
= *Tetragonolobus purpureus* Moench.
Medicago arabica (L.) Hudson – T scap – Mediterranean – fields, grasslands, ruderal places. C.
Medicago doliata Carmign. – T scap – Mediterranean – terophytic grasslands. R.
= *M. aculeata* Willd. (Greuter et al., 1989).
Medicago italica (Mill.) Fiori subsp. **tornata** (L.) Emberger & Maire – T scap – W Mediterranean-Macaronesic – terophytic grasslands. R.
= *M. tornata* (L.) Mill. (Greuter et al, 1989).
Medicago lupulina L. – T scap – Olartic-Paleotropical – fields, ruderal places. C.
Medicago minima (L.) L. – T scap – Olartic-Paleotropical – terophytic grasslands, ruderal places. C.
Medicago orbicularis (L.) Bartal. – T scap – European-Tethydic – terophytic grasslands. S.

Medicago polimorpha L. – T scap – Boreal-Tethydic – fields, ruderal places. C.
= *M. hispida* Gaertner [nom. ill.].
In Nicotra (1896) sub *M. denticulata* Willd. var. *pseudolappacea.*

Medicago praecox DC. – T scap – Mediterranean – terophytic grasslands, ruderal places. C.

Medicago rigidula (L.) All. – T scap – European-Mediterranean – terophytic grasslands. S.

Medicago rugosa Desr. – T scap – Mediterranean – terophytic grasslands. S.

Medicago sativa L. subsp. **sativa** – H scap – Mediterranean-Eurosibiric, CS – ruderal places, fields. S.
Heywood & Zohary (1995).

Medicago truncatula Gaertner – T scap – Mediterranean – terophytic grasslands, grasslands. S.

Melilotus albus Medicus – T scap – Subcosmopolitan –ruderal places. S.

Melilotus elegans Ser. – T scap – Mediterranean – ruderal places. S.
In Atzei & Drascich Campazzi (1988).

Melilotus indicus (L.) All. – T scap – Tethydic – terophytic grasslands. R.

Melilotus italicus (L.) Lam. – T scap – Mediterranean – terophytic grasslands. R.

° *Melilotus messanensis* (L.) All. – T scap – Mediterranean.
Sassari ai Cappuccini, 7.VI.1895, U. Martelli (FI!) in Viegi (1993) is to be referred to *M. indicus* (L.) All.

Melilotus sulcatus Desf. – T scap – Mediterranean – schrublands, scrublands, terophytic grasslands. C.

Ononis natrix L. subsp. **natrix** – Ch suffr – European-Mediterranean – scrublands. R.

Ononis pusilla L. – H scap – European-Mediterranean – scrublands. S.

Ononis reclinata L. – T scap – Tethydic – scrublands, terophytic grasslands. S.

Ononis spinosa L. – Ch suffr – European-Mediterranean – scrublands, grasslands. S.

Ononis viscosa L. subsp. **breviflora** (DC.) Nyman – T scap – Mediterranean – terophytic grasslands, grasslands. C.

Pisum sativum L. subsp. **elatius** (M. Bieb.) Asch. et Graebn. – T scap – European-Tethydic, CS – ruderal places. R.
Heywood & Zohary (1995).

Robinia pseudoacacia L. – P caesp – N American, CS – ruderal places. S.

Scorpiurus muricatus L. – T scap – Mediterranean – schrublands, scrublands, terophytic grasslands. C.

Spartium junceum L. – P caesp – Mediterranean – woods, schrublands. C.

Trifolium angustifolium L. – T scap – European-Tethydic – terophytic grasslands. C.

Trifolium campestre Schreber – T scap – European-Tethydic – scrublands, terophytic grasslands, grasslands. C.

Trifolium cherleri L. – T scap – Mediterranean – grasslands. R.

Trifolium fragiferum L. – H rept – European-Tethydic – woods. R.

Trifolium glomeratum L. – T scap – European-Mediterranean – terophytic grasslands. R.

Trifolium incarnatum L. subsp. **molineri** (Hornem.) Syme in Sowerby – T scap – European-Mediterranean – grasslands. R.

Trifolium nigrescens Viv. – T scap – Mediterranean – terophytic grasslands, ruderal places. C.

* *Trifolium phleoides* Willd. – T scap – Mediterranean.
In Nicotra (1895b).

Trifolium pratense L. – H scap – Olartic – wet places, ruderal places. S.

Trifolium repens L. – H rept – Boreal-Tethydic – wet places, grasslands. R.

Trifolium resupinatum L. – T rept – Tethydic – ruderal places, terophytic grasslands. R.

Trifolium scabrum L. – T scap – European-Mediterranean – terophytic grasslands, grasslands, ruderal places. C.

Trifolium stellatum L. – T scap – Mediterranean-Pontic – schrublands, scrublands, terophytic grasslands,. C.

Trifolium subterraneum L. – T scap – European-Mediterranean – terophytic grasslands. R.

Trifolium tomentosum L. – T rept – Mediterranean-Iranoturanic – scrublands, grasslands, terophytic grasslands. C.

Tripodion tetraphyllum (L.) Fourr. – T scap – Mediterranean – grasslands, terophytic grasslands. R.
= *Anthyllis tetraphylla* L.

Vicia atropurpurea Desf. – T scap – Mediterranean – ruderal places, schrublands. S.

Vicia bithynica (L.) L. – T scap – European-Tethydic – grasslands, terophytic grasslands. R.

Vicia cracca L. – H scap – Olartic – schrublands, hedges. S.

Vicia hybrida L. – T scap – Tethydic-Pontic – grasslands, ruderal places. S.

* *Vicia lathyroides* L. – T scap – European-Mediterranean.
In Nannetti (1914).

Vicia leucantha Biv. – T scap – CW Mediterranean – ruderal places. R.

Vicia lutea L. – T scap – Mediterranean – fields. R.

* *Vicia monantha* Retz. – T scap – Mediterranean.
= *V. calcarata* Desf.
In Nannetti (1914).

Vicia narbonensis L. – T scap – Mediterranean – terophytic grasslands. R.
Specimina selecta: Italy, Sassari Lecceta Costa, 25.05.1974, S. Diana et B. Corrias (SS).

* *Vicia peregrina* L. – T scap – European-Mediterranean.
In Nicotra (1895b).

Vicia sativa L. subsp. **macrocarpa** (Moris) Arcang. – T scap – Tethydic – schrublands, fields, grasslands, ruderal places. C.

* *Vicia sativa* L. subsp. *nigra* (L.) Ehrh. – T scap – Tethydic.
In Nicotra (1896) sub *V. segetalis* Thuill.
Vicia sativa L. subsp. **sativa** – T scap – Mediterranean-Iranoturanic, CS – ruderal places. R.
Vicia tenuifolia Roth – H scap – Euroasian – schrublands, hedges. S.
Vicia villosa Roth subsp. **varia** (Host) Corb. – T scap – European-Tethydic – ruderal places, drystone walls, grasslands. C.
= *V. dasycarpa* Ten.

OXALIDACEAE
Oxalis pes-caprae L. – G bulb – S African, CS –ruderal places, grasslands. C.

GERANIACEAE
Erodium botrys (Cav.) Bertol. – T scap – Mediterranean – fields, ruderal places. S.
Erodium chium (L.) Willd. – T scap – European-Mediterranean – terophytic grasslands, grasslands. S.
Erodium cicutarium (L.) L'Hér. in Aiton – T caesp – Tethydic-Eurosibiric – terophytic grasslands, grasslands, ruderal places. S.
Erodium malacoides (L.) L'Hér. in Aiton – T scap – Mediterranean-Iranoturanic – grasslands, ruderal places. C.
Erodium moschatum (L.) L'Hér. in Aiton – T scap – European-Mediterranean – grasslands, ruderal places. C.
Geranium columbinum L. – T scap – European-Tethydic – terophytic grasslands, grasslands. S.
Geranium dissectum L. – T scap – European-Tethydic – terophytic grasslands, grasslands, ruderal places. S.
Geranium lucidum L. – T scap – European-Tethydic – ruderal places, drystone walls. S.
Geranium molle L. – T scap – European-Tethydic – terophytic grasslands, grasslands, ruderal places. C.
Geranium purpureum Vill. – T scap – European-Tethydic – schrublands, grasslands, hedges, drystone walls. S.
Geranium robertianum L. – T scap – European-Tethydic – scrublands, terophytic grasslands. C.
Geranium rotundifolium L. – T scap – European-Tethydic – grasslands, ruderal places. S.
* *Geranium tuberosum* L. – G rhiz – Eurosibiric.
In Nicotra (1896).

ZYGOPHYLLACEAE
Tribulus terrestris L. – T rept – Cosmopolitan – fields. R.

LINACEAE
Linum bienne Mill. – H bienn – European-Mediterranean – grasslands. S.
Linum grandiflorum Desf. – T scap – Endemic Algerian, AN – ruderal places. R.
This taxon is here reported for the first time in Sardinia. *Specimina visa*: Italy, Funtana Niedda (Sorso), R. Cabras et M. Manca, IV. 1976 (SS). Described by Desfontain (1798) "in arvis argillosis prope Mascar". In Quezel & Santa (1963) is reported as Algerian Endemic and in Greuter et al. (1989) as "naturalized" in Tunisia, adventitious in France and doubt native in Marocco (Fennane & Mathez, 1989). This report extends eastward its distribution, eventhough its naturalisation in the island should be confirmed.
Linum strictum L. – T scap – Mediterranean – scrublands, terophytic grasslands. C.
Linum trigynum L. – T scap – European-Tethydic – scrublands, terophytic grasslands. R.

EUPHORBIACEAE
Chrozophora tinctoria (L.) Juss. – T scap – Mediterranean – ruderal places. R.
Specimina visa: Italy, Sassari ex orto botanico Istituto Botanica farmaceutica, 1.IX.1998, s. coll. (SASSA).
Euphorbia characias L. – Ch suffr – Mediterranean – woods, schrublands. C.
Euphorbia cupanii Guss. ex Bertol. – Ch suffr – Endemic Sa Co Si – grasslands, ruderal places. C.
= *E. pithyusa* L. subsp. *cupanii* (Bert.) A. R. Sm.
In Greuter et al. (1986) this entity is recognized to the subspecific taxonomic level, but according to the habitus, morphology and ecology the taxonomic treatment proposed by Valsecchi (1980) is here confirmed.
Euphorbia dendroides L. – NP – Mediterranean – schrublands. S.
Euphorbia exigua L. – T scap – European-Mediterranean – schrublands, scrublands, terophytic grasslands. C.
Euphorbia helioscopia L. – T scap – European-Tethydic –grasslands, ruderal places. C.
Euphorbia hirsuta L. – G rhiz – Mediterranean-Macaronesic – watercourses. R.
= *E. pubescens* Vahl.
Euphorbia peplus L. – T scap – European-Tethydic – scrublands, grasslands, terophytic grasslands C.
Euphorbia terracina L. – H scap – Mediterranean – ruderal places. R.
Mercurialis annua L. – T scap – European-Tethydic –grasslands, ruderal places. C.
Ricinus communis L. – T scap – Paleotropical, CS – ruderal places. R.
Greuter et al. (1986).

RUTACEAE
§ *Citrus limon* (L.) Burm. f. – P scap – Asian (Himalayan), cultivated.
§ *Citrus sinensis* (L.) Osbeck – P scap – Asian (Chinese?), cultivated.
° *Ruta angustifolia* Pers. – Ch suffr – W Mediterranean.

In Atzei & Drascish Campazzi (1988), probably to refer to *R. chalepensis*.

Ruta chalepensis L. – Ch suffr – Mediterranean – schrublands, scrublands, ruderal places. C.

° *Ruta graveolens* L. – Ch suffr – Mediterranean.
In BIONDI et al. (1988), probably to refer to *R. chalepensis*.

SIMAROUBACEAE

Ailanthus altissima (Mill.) Swingle – P scap – E Asian, CS – ruderal places. C.
In Nannetti (1914) sub *A. glandulosa* Desf.

POLYGALACEAE

Polygala monspeliaca L. – T scap – Tethydic-Pontic – grasslands. R.

ANACARDIACEAE

Pistacia lentiscus L. – P caesp – Mediterranean-Macaronesic – woods, schrublands. C.

ACERACEAE

Acer negundo L. – P scap – N American, CS – ruderal places. R.

CELASTRACEAE

Euonymus europaeus L. – P caesp – Euroasian – ruderal places, hedges. S.

RHAMNACEAE

Rhamnus alaternus L. – P scap – Mediterranean – woods, schrublands. C.

VITACEAE

Vitis vinifera L. subsp. **sylvestris** (C. C. Gmelin) Hegi – P lian – Doubtful origin (Mediterranean?), CS – fields. S.

MALVACEAE

Althaea cannabina L. – H scap – European – wet places. R.

* *Althaea hirsuta* L. – T scap – European-Tethydic.
In Nicotra (1896, 1897).

Lavatera cretica L. – T scap – Mediterranean – grasslands, ruderal places. C.

Lavatera olbia L. – P caesp – W Mediterranean –ruderal places. S.

Malva neglecta Wallr. – T scap – European-Tethydic – grasslands, ruderal places. C.

Malva parviflora L. – T scap – Mediterranean – grasslands, ruderal places. C.

Malva sylvestris L. – H scap – Tethydic-Eurosibiric – grasslands, ruderal places. C.

THYMELAEACEAE

Daphne gnidium L. – P caesp – Mediterranean-Macaronesic – schrublands, scrublands, grasslands. C.

Thymelaea hirsuta (L.) Endl. – NP – Mediterranean – schrublands, scrublands. C.

GUTTIFERAE

° *Hypericum androsaemum* L. – NP – Tethydic-Eurosibiric, AN.
Reported by mistake in Viegi (1993) sub *Androsaemum officinale* All. Either Greuter et al. (1986) and Camarda (1998c) exclude the presence of this taxon in Sardinia.

Hypericum perforatum L. subsp. **veronense** (Schrank) H. Lindb. – H scap – Tetidica-Eurosibirica – ruderal places, scrublands. C.

= *H. perforatum* L. var. *angustifolium* DC. (sensu Valdés et al., 1987); incl. *H. perforatum* L. subsp. *angustifolium* (DC.) Fröhlich.
The taxonomy follows Ciccarelli et al. (2002). They hypotize that, from the native south Russia and Caucaso, this taxon spreaded eastward in East Asia and westward in the mediterranean area.

Hypericum spruneri Boiss. – H scap – Mediterranean, AN – ruderal places, hedges. R.
New station in Sardinia. *Specimina visa*: Italy, Sassari: Giuncheddu bordo stradale, 12.V.2001 and 19.V.2001, A. D. Atzei (SASSA). This taxon in Sardinia was reported for Cuglieri (Atzei, 1996) and also Marganai (Atzei pers. comm., 2003).

VIOLACEAE

Viola alba Besser subsp. **dehnhardtii** (Ten.) W. Becker – H ros – European-Mediterranean – grasslands. R.

Viola arborescens L. – Ch suffr – W Mediterranean – scrublands. R.
The report of Nicotra (1896) was the first record for Sardinia. Atzei (1980a). This taxon is still present in the area in a very small and highly dangered population.

* *Viola odorata* L. – H ros – Mediterranean-Atlantic.
In Nicotra (1896).

CISTACEAE

Cistus creticus L. subsp. **eriocephalus** (Viv.) Greuter et Burdet – NP – Mediterranean-Iranoturanic – woods, schrublands, scrublands. C.

Cistus monspeliensis L. – NP – Tethydic-Atlantic – schrublands, scrublands. R.

Cistus salvifolius L. – NP – Mediterranean-Atlantic – schrublands, scrublands. S.

Fumana ericoides (Cav.) Gand. – Ch suffr – European-Mediterranean – scrublands. R.
In Nicotra (1895b) sub *Helianthemum ericoides* Guss.

Fumana thymifolia (L.) Spach ex Webb – Ch suffr – Mediterranean – scrublands. S.
In Nicotra (1895b) sub *Helianthemum glutinosum* Pers. and in Nicotra (1896, 1897) sub *H. viride* Ten.

Helianthemum ledifolium (L.) Mill. – T scap – Mediterranean – terophytic grasslands. R.
Helianthemum salicifolium (L.) Mill. – T scap – European-Mediterranean – scrublands, terophytic grasslands. S.
In Nicotra (1895b) sub *H. inflatum* Parl.

TAMARICACEAE
Tamarix africana Poiret – P scap – CW Mediterranean-Macaronesic – watercourses. S.

CUCURBITACEAE
Ecballium elaterium (L.) A. Rich. – G bulb – Tethydic-Pontic –ruderal places. S.

CACTACEAE
Opuntia ficus-barbarica A. Berger – P succ – N American, CS – rocky cliffs, ruderal places. S.
= *O. ficus-indica* (L.) Mill.
Opuntia maxima Mill. – P succ – N American, CS – rocky cliffs. S.
= *O. amyclaea* Ten.
Arrigoni (1983b); Greuter et al. (1984).

LYTHRACEAE
Lythrum junceum Banks & Solander – H scap – Mediterranean – watercourses. R.
Lythrum tribracteatum Sprengel – T scap – Mediterranean – terophytic grasslands. R.
In Nicotra (1895b) sub *L. bibracteatum* Salzm.

MYRTACEAE
§ *Eucalyptus camaldulensis* Dehnh. – P scap – Australian, cultivated.
§ *Eucalyptus globosus* Labill. – P scap – Australian, cultivated.
Myrtus communis L. – P caesp – Mediterranean-Iranoturanic – schrublands. R.

PUNICACEAE
§ *Punica granatum* L. – P scap – SW Asian, cultivated.

ONAGRACEAE
Epilobium hirsutum L. – H scap – Tethydic-Eurosibiric – wet places, watercourses. S.
Epilobium obscurum Schreber – H scap – European – wet places. S.
Epilobium parviflorum Schreber – H scap – Tethydic-Eurosibiric – wet places. R.
* *Oenothera rosea* L'Hér – T scap – American Tropical, CS.
In Chiappini (1963) sub *O. rosea* Sol.

HALORAGACEAE
* *Myriophyllum spicatum* L. – I rad – Subcosmopolitan
In Mola (1818-19).

THELIGONACEAE
* *Theligonum cynocrambe* L. – T scap – Mediterranean.
In Nannetti (1914).

CORNACEAE
Cornus sanguinea L. – P caesp – C European-Pontic – schrublands, hedges. S.
Also in Atzei (1980b).

ARALIACEAE
Hedera helix L. subsp. **helix** – P lian – European-Mediterranean – woods, rocky cliffs, ruderal places. C.

UMBELLIFERAE
Ammoides pusilla (Brot.) Breistr. – T scap – Mediterranean – scrublands, grasslands,ruderal places. C.
Apium graveolens L. – H scap – Subcosmopolitan, CS – ruderal places, wet places. R.
In Atzei & Drascich Campazzi (1988).
Apium nodiflorum (L.) Lag. – H scap – Subcosmopolitan – wet places, fresh water. C.
Cachrys sicula L. – H scap – W Mediterranean – grasslands. S.
Conium maculatum L. – H scap – Tethydic-Eurosibiric – ruderal places. S.
Daucus carota L. subsp. **carota** – H bienn – Subcosmopolitan – grasslands, fields, ruderal places. R.
Daucus carota L. subsp. **maximum** (Desf.) Ball – H bienn – Mediterranean – grasslands, fields, ruderal places. C.
Eryngium campestre L. – H scap – European-Mediterranean – grasslands. S.
Eryngium tricuspidatum L. – H scap – W Mediterranean – grasslands. S.
Foeniculum vulgare Mill. subsp. **piperitum** (Ucria) Coutinho – H scap – Mediterranean-Iranoturanic – grasslands, fields, ruderal places. C.
Magydaris pastinacea (Lam.) Paol. – H scap – W Mediterranean – ruderal places, grasslands. S.
Oenanthe crocata L. – H scap – W Mediterranean-Atlantic – wet places. R.
Oenanthe pimpinelloides L. – H scap – European-Mediterranean – wet places. S.
Oenanthe silaifolia M. Bieb. – H scap – Mediterranean-Atlantic – wet places. S.
* *Pastinaca sativa* L. – H bienn – Eurosibiric.
In Nicotra (1897) sub *P. opaca* Bernh.
Pimpinella peregrina L. – H bienn – Tethydic-Pontic – wet places. S.
* *Scandix australis* L. – T scap – Mediterranean.
In Nannetti (1914).
Scandix pecten-veneris L. – T scap – European-Tethydic – fields, ruderal places. C.
Sison amomum L. – H bienn – Mediterranean-Atlantic –

wet places. R.

Smyrnium olusatrum L. – H bienn – Mediterranean-Atlantic – ruderal places,. C.

Smyrnium rotundifolium Mill. – H bienn – Mediterranean – ruderal places. S.
In Nannetti (1914) sub *S. perfoliatum* L. var. *rotudifolium*.

Thapsia garganica L. – H scap – Mediterranean – grasslands, ruderal places, ruderal places. S.

Tordylium apulum L. – T scap – Mediterranean – terophytic grasslands, fields, grasslands. C.

Torilis arvensis (Hudson) Link – T scap – Subcosmopolitan – terophytic grasslands, fields, grasslands. S.

Torilis nodosa (L.) Gaertner – T scap – Mediterranean-Iranoturanic – fields, ruderal places, ruderal places. C.

ERICACEAE

Arbutus unedo L. – P caesp – Mediterranean – woods, schrublands. C.

Erica arborea L. – P caesp – Paleotropical-Tethydic – schrublands. R.

Erica multiflora L. – P caesp – CW Mediterranean – schrublands. R.
In Nicotra (1897) sub *E. peduncularis*.

PRIMULACEAE

Anagallis arvensis L. – T scap – Euroasian-Mediterranean – terophytic grasslands, fields, grasslands. C.

Anagallis foemina Mill. – T rept – Mediterranean – terophytic grasslands, fields, grasslands. C.

Anagallis monelli L. – H scap – W Mediterranean – scrublands. S.
In Nicotra (1896) sub *A. collina* Schousb.

Anagallis parviflora Hoffmgg. & Link – T scap – CW Mediterranean – terophytic grasslands. R.
In Atzei & Drascich Campazzi (1988).

Asterolinon linum-stellatum (L.) Duby – T scap – European-Mediterranean – scrublands. S.

Cyclamen repandum Sibth. et Sm. – G bulb – Mediterranean – woods. S.

Samolus valerandi L. – H scap – Cosmopolitan – wet places. S.

PLUMBAGINACEAE

Limonium racemosum (Lojac.) Diana – Ch suffr – Endemic Sa – scrublands. S.
Diana Corrias (1978). Endemic esclusive of the Sassari Miocenic limestone, where is its *locus classicus*. The typus is conserved in FI: "Sassari tra le rocce calcaree, 1897, Nicotra".

OLEACEAE

Fraxinus ornus L. – P caesp – Mideuropean-Mediterranean – woods, schrublands. R.

Fraxinus oxycarpa M. Bieb. – P caesp – Eurosibiric-Mediterranean – woods, schrublands. R.

Olea europaea L. var. **europaea** – P caesp – Mediterranean, CS – fields. C.

Olea europaea L. var. **sylvestris** Hoffmgg. et Link – P caesp – Mediterranean-Macaronesic – woods, schrublands. C.

Phillyrea angustifolia L. – P caesp – Mediterranean – woods, schrublands. C.

Phillyrea latifolia L. – P caesp – Mediterranean – woods, schrublands. S.

GENTIANACEAE

Blackstonia perfoliata (L.) Hudson – T scap – European-Mediterranean – terophytic grasslands, wet places. C.

Centaurium erythraea Rafin. – H bienn – European-Tethydic – scrublands, terophytic grasslands, grasslands. C.

Centaurium maritimum (L.) Fritsch – T scap – Mediterranean – terophytic grasslands. S.

Centaurium spicatum (L.) Fritsch – T scap – Mediterranean-Atlantic – terophytic grasslands. R.

Centaurium tenuiflorum (Hoffmanns. et Link) Fritsch – T scap – Mediterranean – terophytic grasslands. R.

APOCYNACEAE

Nerium oleander L. – P caesp – Mediterranean, CS – ruderal places, wet places. S.

Vinca sardoa (Stearn) Pignatti – Ch suffr – Endemic Sa – ruderal places, hedges, wet places. S.
Corrias (1981).

RUBIACEAE

Asperula laevigata L. – H scap – Mediterranean – wet places. S.

Galium aparine L. – T scap – Olartic –wet places, ruderal places. C.

Galium divaricatum Lam. – T scap – Mediterranean – wet places. S.

Galium elongatum C. Presl – H scap – Tethydic-Eurosibiric – wet places. R.

Galium lucidum All. – H scap – European-Mediterranean – scrublands, rocky cliffs. R.

Galium murale (L.) All. – T scap – Mediterranean – ruderal places, drystone walls. S.
In Nicotra (1897) sub *Callipeltis muralis*.

Galium parisiense L. – T scap – European-Mediterranean – wet places. S.

Galium scabrum L. – H scap – W Mediterranean – woods. R.

* *Galium tricornutum* Dandy – T scap – European-Mediterranean.
In Nannetti (1914).

Galium verrucosum Hudson – T scap – Mediterranean – schrublands, scrublands, grasslands, terophytic grasslands. C.

Rubia peregrina L. subsp. **longifolia** (Poiret) O. Bolòs – P lian – Mediterranean – woods, schrublands, hedges. C.
Bolòs (1995). All the *R. peregrina* specimen are to be referred to this infraspecific taxon.
Sherardia arvensis L. – T scap – European-Mediterranean – terophytic grasslands, fields, ruderal places. C.
Valantia muralis L. – T scap – Mediterranean – rocky cliffs, drystone walls. C.

CONVOLVULACEAE
Calystegia sepium (L.) R. Br. – H scand – Subcosmopolitan – watercourses. S.
Calystegia sylvestris (Willd.) Roem. & Schultes – H scand – European – S.
= *C. sylvatica* (Kit.) Griseb.
The name *Calystegia sylvestris*, accepted also by GREUTER et al. (1986), is a later synonim
In Atzei & Drascich Campazzi (1988).
Convolvulus althaeoides L. – H scand – Mediterranean – grasslands, ruderal places. C.
Convolvulus arvensis L. – G rhiz – Tethydic-Eurosibiric – fields, grasslands, ruderal places. C.
Cuscuta planiflora Ten. – T par – European-Tethydic – Parasitic. R.

BORAGINACEAE
Anchusa azurea Mill. – H scap – European-Tethydic – grasslands, ruderal places. R.
= *A. italica* Retz. (Selvi & Bigazzi 1998).
Valsecchi (1976)
Borago officinalis L. – T scap – Mediterranean – ruderal places, fields. C.
Borago pygmaea (DC.) Chater & Greuter – H scap – Endemic Sa Co AT – wet places. R.
Valsecchi (1980). *Specimina visa*: Italy, presso una sorgente sul versante N. O. di M Istoccu; tra Los Laccheddos e Valle Barca (strada Sassari-Osilo), 3.V.1981, A. D. Atzei (SASSA!).
Cerinthe major L. – T scap – Mediterranean – grasslands, ruderal places. C.
Cynoglossum creticum Mill. – H bienn – European-Mediterranean – grasslands, ruderal places. C.
° *Cynoglossum officinale* L. – H bienn – Euroasian.
In Nannetti (1914). Arrigoni (1982) and Greuter et al. (1984) exclude the presence of this species in Sardinia.
Echium italicum L. – H bienn – European-Tethydic – grasslands, ruderal places. C.
Echium parviflorum Moench – T scap – Mediterranean – grasslands, ruderal places, terophytic grasslands. C.
Echium plantagineum L. – T scap – European-Mediterranean – ruderal places. S.
Heliotropium europaeum L. – T scap – European-Mediterranean – ruderal places. S.
Lithospermum arvense L. – T scap – Tethydic-Eurosibiric – grasslands. R.
= *Buglossoides arvensis* (L.) Johnston.
Myosotis arvensis Hill – T scap – European-Pontic – fields, grasslands, ruderal places. C.
Myosotis discolor Pers. – T scap – Mediterranean-Atlantic – ruderal places. R.
In Atzei & Drascich Campazzi (1988).
Myosotis ramosissima Rochel – T scap – European-Tethydic – terophytic grasslands. R.
In Atzei & Drascich Campazzi (1988).
Symphytum bulbosum C. Schimper – G rhiz – SE European – wet places. R.
= *S. tuberosum* subsp. *bulbosum* (C. Schimper) P. Fourn.
In Nicotra (1895, 1897) sub *S. officinale*. *Specimina selecta*: Italy, Sassari, s. d., Nicotra, sub *S. officinale* L. (SASSA); Italy, Sassari regione Latte Dolce, 24.III.1959, s. coll. (SASSA).

VERBENACEAE
Verbena officinalis L. – H scap – Cosmopolitan – scrublands, grasslands. C.

Vitex agnus-castus L. – P caesp – Mediterranean-Pontic – watercourses. R.

CALLITRICHACEAE
Callitriche obtusangula Le Gall – I rad – Mediterranean-Atlantic – fresh water. R.
Scala di Giocca, 6.VI.1895, U. Martelli, sub *C. hamulata*, (FI!).
Callitriche stagnalis Scop. – I rad – Euroasian – fresh water. R.
Italy, Sassari, 4.VI.1895, U. Martelli, sub *C. verna* Guss. (FI!).

LABIATAE
Ajuga iva (L.) Schreber – Ch suffr – Mediterranean – scrublands, grasslands. S.
Ballota nigra L. subsp. **uncinata** (Fiori et Béguinot) Patzak – H scap – Mediterranean –ruderal places. C.
Coridothymus capitatus (L.) Reichenb. f. – Ch frut – Mediterranean-Pontic– scrublands, rocky cliffs. C.
= *Thymus capitatus* (L.) Hofmgg. et Link.
Lamium amplexicaule L. – T scap – European-Tethydic – grasslands, ruderal places. C.
Lamium purpureum L. – T scap – Olartic – woods, schrublands. S.
Lycopus europaeus L. – H scap – Tethydic-Eurosibiric – watercourses. S.
Marrubium vulgare L. – H scap – European-Tethydic –ruderal places. C.
Melissa officinalis L. – H scap – Tethydic – wet places, ruderal places. S.
Mentha aquatica L. – H scap – Olartic-Capense – watercourses. R.
Mentha insularis Req. – H rhiz – Endemic Sa Co AT Ba –

wet places. S.

= *M. suaveolens* subsp. *insularis* (Req.) Greuter.

In Greuter et al. (1986) this entity is recognized at the subspecific taxonomic level. Here, according to Valsecchi (1983), the species level is referred as more appropriate.

Mentha pulegium L. – H rhiz – European-Tethydic – wet places. S.

* *Mentha spicata* L. – H scap – European-Mediterranean.

In Nicotra (1897) sub *M. viridis*.

Origanum vulgare L. subsp. *viridulum* (Martin-Donos) Nyman – H scap – Mediterranean Pontic– scrublands. R.

= *O. heracleoticum* L.

Specimina visa: Italy, Strada Sassari Alghero tra il bivio per Monte Oro e Li Curuneddi, 1980, Atzei, sub *O. heracleoticum* L. (SASSA).

Prasium majus L. – Ch frut – Mediterranean – scrublands. C.

Prunella laciniata (L.) L. – H scap – European-Mediterranean – grasslands. R.

In Atzei & Drascish Campazzi (1988). *Specimina visa*: Italy, Sassari, s. d., Nicotra, sub *P. vulgaris* (FI).

Prunella vulgaris L. – H scap – Boreal-Tethydic – wet places. R.

Rosmarinus officinalis L. – NP – Mediterranean – hedges, ruderal places. S.

Salvia desoleana Atzei et Picci – Ch suffr – Endemic Sa – scrublands, grasslands. R.

In Nicotra (1895b) sub *S. sclarea* L.; Atzei & Picci (1982); Camarda (1984b).

Salvia verbenaca L. – H scap – Mediterranean-Atlantic – schrublands, scrublands, grasslands, ruderal places. C.

In Nicotra (1897) sub *S. clandestina* L.

Del Carratore & Garbari, 1997; Del Carratore et al., 1998.

Satureja calamintha (L.) Scheele – Ch suffr – Tethydic – scrublands, ruderal places. C

= *Calamintha nepeta* (L.) Savi subsp. *glandulosa* (Req.) W. Ball.

In Nicotra (1897) sub *C. nepeta*.

Satureja graeca L. – Ch suffr – Mediterranean – scrublands. C.

= *Micromeria graeca* (L.) Reichenb.

Satureja vulgaris (L.) Fritsch subsp. *orientalis* (Bothmer) Greuter & Burdet – H scap – Mediterranean-Pontic – woods, grasslands. S.

= *Clinopodium vulgare* L. subsp. *arundarum* (Boiss.) Nyman (sensu Pignatti, 1982).

Sideritis romana L. – T scap – Mediterranean – scrublands, terophytic grasslands, grasslands. C.

Stachys germanica L. subsp. **germanica** – H scap – European-Mediterranean – scrublands. S.

Stachys glutinosa L. – Ch suffr – Endemic Sa Co AT – scrublands. C.

Camarda (1980).

Stachys ocymastrum (L.) Briq. – T scap – Mediterranean – grasslands. S.

Teucrium capitatum L. – Ch suffr – Mediterranean – scrublands. S.

= *T. polium* L. subsp. *capitatum* (L.) Arcang.

Teucrium chamaedrys L. – Ch suffr – European-Mediterranean – scrublands. C.

Teucrium flavum L. subsp. **glaucum** (Jordan & Fourr.) Ronniger – Ch frut – Mediterranean – schrublands, scrublands. C.

Teucrium marum L. – Ch frut – W Mediterranean-Illiric – scrublands. C.

SOLANACEAE

Datura stramonium L. – T scap – Cosmopolitan, CS – ruderal places. R.

Hyoscyamus albus L. – T scap – Mediterranean-Macaronesic – ruderal places. S.

Lycium europaeum L. – NP – Mediterranean, CS – ruderal places. R.

Nicotiana tabacum L. – H scap – N American, CS – ruderal places. R.

Solanum dulcamara L. – NP – European – ruderal places. S.

Solanum nigrum L. – T scap – Cosmopolitan – watercourses, ruderal places. C.

SCROPHULARIACEAE

Antirrhinum majus L. – Ch frut – CW Mediterranean – rocky cliffs. S.

Bellardia trixago (L.) All. – T scap – Mediterranean-Iranoturanic – schrublands, scrublands, grasslands. C.

Cymbalaria aequitriloba (Viv.) Cheval. – Ch rept – Endemic Sa Co AT Ba – rocky cliffs. S.

Arrigoni (1979).

Cymbalaria muralis Gaertn. – H rept – European-Tethydic – ruderal places, Drystone walls. R.

Kickxia commutata (Bernh.) Fritsch – H rept – Mediterranean-Macaronesic – grasslands. S.

* *Kickxia elatine* (L.) Dumort. – T scap – European-Mediterranean.

In Nicotra (1896) sub *Linaria prestandreae* Tin.

Kickxia spuria (L.) Dumort subsp. integrifolia (Brot.) Fernandes – T scap – European-Mediterranean – fields. S.

Linaria simplex (Willd.) DC. – T scap – Tethydic – grasslands. R.

Linaria triphylla (L.) Mill. – T scap – W Mediterranean – terophytic grasslands. S.

Linaria vulgaris Mill. – H scap – Euroasian, AN – grasslands, ruderal places. R.

Camarda (1983a). *Specimina selecta*: Italy, Sassari regione S. Pietro, 23.X.1974, Diana (SS).

Misopates orontium (L.) Rafin. – T scap – European-Tethydic – scrublands, terophytic grasslands. S.

Odontites lutea (L.) Clairv. – T scap – European-Mediterranean – scrublands. S.

Parentucellia latifolia (L.) Caruel – T scap – Mediterranean-Atlantic –terophytic grasslands. C.

Parentucellia viscosa (L.) Caruel – T scap – Tethydic-Atlantic –terophytic grasslands. C.

* *Scrophularia auriculata* L. – H scap – Mediterranean-Atlantic.

Specimina visa: Bunnari (in agro sassarensis), VI.1898, Nicotra, sub *S. aquatica* leg. Valsecchi, 1977 (FI!).

Scrophularia morisii Valsecchi – H caesp – Endemic Sa – wet places. R.

Valsecchi (1979, 1983). *Locus classicus*: "Sassari, vallone del Logulentu, Pala S. Francesco". Endemic esclusive of the Sassarese valleys.

Scrophularia peregrina L. – T scap – Mediterranean – grasslands, ruderal places. R.

Scrophularia trifoliata L. – H caesp – Endemic Sa Co AT – wet places, ruderal places. S.

Valsecchi (1979, 1982). Thirrenian Endemic.

Verbascum blattaria L. – H bienn – Tethydic-European – grasslands, ruderal places. S.

Verbascum creticum (L.) Cav. – H bienn – CW Mediterranean – grasslands. R.

In Nicotra (1896) sub *Celsia cretica* L.

Verbascum pulverulentum Vill. – H bienn – CS European – grasslands, ruderal places. S.

Verbascum sinuatum L. – H bienn – Mediterranean-Iranoturanic – grasslands, ruderal places. C.

Veronica anagallis-aquatica L. – H scap – Subcosmopolitan – fresh water. S.

Veronica arvensis L. – T scap – European-Tethydic – ruderal places. S.

In Nannetti (1914) and in Biondi et al. (2002). *Specimina selecta*: Italy, Sassari ai Cappuccini, 7.V.1895, U.Martelli, (FI).

Veronica beccabunga L. – H rept – Boreal – wet places, fresh water. R.

Veronica cymbalaria L. – T scap – European-Mediterranean – fields, ruderal places. C.

Veronica hederifolia L. – T scap – Euroasian – fields, ruderal places. S.

Veronica persica Poiret – T scap – Subcosmopolitan, AN – fields, ruderal places. S.

ACANTHACEAE

Acanthus mollis L. – H scap – W Mediterranean – wet places, ruderal places. C.

OROBANCHACEAE

Orobanche minor Sm. – T par – European-Mediterranean – grasslands. S.

Camarda (1983b).

Orobanche ramosa L. subsp. **mutelii** (F.W. Schultz) Coutinho – T par – Mediterranean-Iranoturanic – grasslands. S.

Camarda (1983b).

Orobanche sanguinea C. Presl. – T par – Mediterranean – grasslands. R.

= *O. crinita* Viv. (GREUTER et al.,1989).

In Desole (1955) sub *O. sanguinea* var. *crinita*. Camarda (1983b).

PLANTAGINACEAE

Plantago afra L. – T scap – European-Mediterranean – grasslands, terophytic grasslands, ruderal places. C.

= *P. psyllium* L. nom. ill.

Plantago bellardii All. – T scap – European-Mediterranean – terophytic grasslands. S.

Plantago coronopus L. – H bienn – Mediterranean-Atlantic – grasslands. S.

Plantago lagopus L. – T scap – European-Mediterranean – scrublands, terophytic grasslands. C.

Plantago lanceolata L. – H ros – Tethydic-Eurosibiric – grasslands, ruderal places. C.

Plantago major L. – H ros – Cosmopolitan – wet places, ruderal places. C.

CAPRIFOLIACEAE

Lonicera implexa Aiton – P lian – Mediterranean – woods, schrublands, hedges, ruderal places. C.

Sambucus ebulus L. – G rhiz – European-Tethydic – wet places. R.

Sambucus nigra L. – P caesp – European-Mediterranean – woods, watercourses. C.

Viburnum tinus L. – P caesp – Mediterranean – woods, schrublands. C.

VALERIANACEAE

Centranthus calcitrapa (L.) Dufresne – T scap – Mediterranean – scrublands, terophytic grasslands. C.

Centranthus ruber (L.) DC. – Ch suffr – Mediterranean, CS – ruderal places. S.

Specimina visa: Italy, Logulentu, (Sassari) 29.IV.1975, Atzei (SASSA).

Valerianella eriocarpa Desv. – T scap – Mediterranean – scrublands, terophytic grasslands. S.

Valerianella microcarpa Loisel. – T scap – CW Mediterranean – terophytic grasslands. R.

Valerianella puberula (Bertol. ex Guss.) DC. – T scap – CW Mediterranean – terophytic grasslands. R.

In Atzei & Drascich Campazzi (1988).

DIPSACACEAE

Dipsacus ferox Loisel – H bienn – Endemic Sa Co – grasslands, ruderal places. C.

Camarda (2003).

Dipsacus fullonum L. – H bienn – European-Tethydic – ruderal places. S.

Sixalix atropurpurea (L.) Greuter et Burdet subsp. **maritima** (L.) Greuter & Burdet – H scap – Mediterranean – scrublands, grasslands, ruderal places. C.
= *Scabiosa atropurpurea* L. subsp. *maritima* (L.) Arcang.

CAMPANULACEAE

Campanula erinus L. – T scap – Tethydic – terophytic grasslands, fields. C.

* *Campanula rapunculoides* L. – H scap – Mediterranean.
In Arrigoni (1981b).

Jasione montana L. – H bienn – European-Mediterranean C W – scrublands. R.
Tutin (1976). *Specimina selecta*: Italy, Bunnari rocce presso la diga del lago alto, Atzei, 1.V.1972, sub *J. montana* L. var. *dentata* DC. (SASSA).

* *Legousia hybrida* (L.) Delarbre – T scap – European-Pontic.
In Nannetti (1914) sub *Specularia hybrida* (L.) A. DC.

Legousia speculum-veneris (L.) Chaix – T scap – European-Mediterranean – fields. R.
Specimina visa: Italy, Magola (presso Cargeghe) all'inizio della mulattiera per il paese, 6.VI.1981, Atzei & Picci (SASSA). The presence of this taxon, given as doubt in Greuter et al. (1984) and Arrigoni (1981b) is here confirmed.

COMPOSITAE

Achillea ligustica All. – H scap – Mediterranean – ruderal places, grasslands. S.

Anacyclus clavatus (Desf.) Pers. – T scap – Mediterranean – ruderal places, grasslands. C.
= *A. tomentosus* (All.) DC.

Andryala integrifolia L. – T scap – W Mediterranean – scrublands, terophytic grasslands. R.
In Nicotra (1897) sub *A. diffusa* Jan.

Anthemis arvensis L. subsp. **incrassata** (Loisel.) Nyman – T scap – Mediterranean – terophytic grasslands, fields, grasslands. C.

Anthemis cotula L. – T scap – European-Mediterranean – fields. S.

Anthemis praecox Link – T scap – Mediterranean – ruderal places, fields. S.
= *Chamaemelum fuscatum* (Brot.) Vasc.

Arctium minus (Hill) Bernh. – H bienn – European-Mediterranean – wet places, ruderal places. S.
In Nicotra (1896) sub *Lappa officinalis* All.

Artemisia arborescens L. – NP – Mediterranean –ruderal places, scrublands. C.

Artemisia variabilis Ten. – Ch frut – Endemic Sa Si It – ruderal places. R.
Filigheddu & Urbani (1994).

Artemisia verlotiorum Lamotte – H scap – CW European-E Asian (SW Cina), AN – wet places. R.

Aster squamatus (Sprengel) Hieron. – T scap – SW European-CS American, AN – fields, grasslands, ruderal places. C.

Atractylis gummifera L. – H ros – Mediterranean – fields, ruderal places. S.

Bellis annua L. – T scap – Mediterranean-Macaronesic – grasslands, ruderal places. C.

Bellis perennis L. – H ros – European-Mediterranean – grasslands, ruderal places. C.
Carano & Bambacioni (1923).

Bellis sylvestris Cyr. – H ros – Mediterranean – grasslands, ruderal places. S.
Carano & Bambacioni (1923).

Bellium bellidioides L. – H ros – Endemic Sa Co Ba – wet places, terophytic grasslands. R.
Arrigoni (1979).

Calendula arvensis L. – T scap – Tethydic-Atlantic – scrublands, ruderal places. C.

Carduncellus caeruleus (L.) C. Presl – H scap – Mediterranean-Macaronesic – ruderal places. S.

Carduus pycnocephalus L. – H bienn – Tethydic – ruderal places. C.

Carlina corymbosa L. – H scap – Mediterranean – scrublands, grasslands. C.

Carlina lanata L. – T scap – Mediterranean – grasslands. R.

Carlina racemosa L. – T scap – W Mediterranean – ruderal places, grasslands. R.
In Atzei & Drascich Campazzi (1988).

Carthamus lanatus L. – T scap – European-Tethydic – grasslands, ruderal places. S.

Centaurea aspera L. – H scap – W Mediterranean – grasslands, ruderal places. S.

Centaurea calcitrapa L. – H bienn – European-Mediterranean – grasslands, ruderal places. C.

Centaurea corensis Valsecchi et Filigheddu – Ch suffr – Endemic Sa –ruderal places. R.
Valsecchi & Filigheddu (1991). Endemic esclusive of the Sassarese Miocenic. *Typus*: Italy, Ossi (Sassari)-colline lungo la strada dalla stazione di Scala di Giocca al paese nei pressi del bivio per Muros, substr: calcari miocenici, 5.XI.1988, Valsecchi et Filigheddu (SS).

Centaurea melitensis L. – T scap – Mediterranean-Macaronesic – grasslands. R.

Centaurea napifolia L. – T scap – W Mediterranean – grasslands, ruderal places. C.

Centaurea solstitialis L. – H bienn – European-Tethydic – ruderal places. R.

Chamaemelum mixtum (L.) All. – T scap – W Mediterranean – grasslands, ruderal places. C.
= *Anthemis mixta* L.

Chamomilla recutita (L.) Rauschert – T scap – Subcosmopolitan, CS – fields, ruderal places. R.

Chrysanthemum coronarium L. – T scap – Mediterranean – ruderal places. C.

Chrysanthemum segetum L. – T scap – Mediterranean-Atlantic – grasslands, ruderal places. C.

Cichorium intybus L. – H scap – Olartic – grasslands, ruderal places. C.

Cirsium arvense (L.) Scop. – G rad – Olartic – grasslands. S.

Cirsium scabrum (Poiret) Bonnet e Barratte – H scap – W Mediterranean – ruderal places. S.
In Nicotra (1895b) sub *C. giganteum* Sprengel.

Cirsium vulgare (Savi) Ten. subsp. sylvaticum (Tausch) Dostal – H bienn – Tethydic-Eurosibiric – wet places. S.

Coleostephus myconis (L.) Cass. – T scap – Mediterranean – ruderal places. R.

Conyza albida Willd. – T scap – Cosmopolitan, CS –ruderal places. S.

Conyza canadensis (L.) Cronq. – T scap – Cosmopolitan, CS – grasslands, ruderal places. C.
In Nicotra (1897) sub *Erigeon canadense* L.

Crepis vesicaria L. – T scap – Mediterranean – scrublands, ruderal places, grasslands, terophytic grasslands. C.
In Nicotra (1897) sub *Barkhousia scariosa* Spr.

Crupina crupinastrum (Moris) Vis. – T scap – Tethydic – schrublands, scrublands, terophytic grasslands. C.

Cynara cardunculus L. – H scap – Mediterranean – grasslands, ruderal places. S.

Dittrichia graveolens (L.) Greuter – T scap – Mediterranean-Iranoturanic – grasslands, ruderal places, fields. S.
= *Inula graveolens* (L.) Desf.

Dittrichia viscosa (L.) Greuter – H scap – Tethydic – grasslands, ruderal places. C.
= *Inula viscosa* (L.) Aiton.

Eupatorium cannabinum L. – H scap – Tethydic-Eurosibiric – watercourses. R.

Evax pygmaea (L.) Brot. – T scap – Mediterranean-Macaronesic – terophytic grasslands. S.

Filago pyramidata L. – T scap – European-Mediterranean – terophytic grasslands. S.

Filago pyramidata L. var. **prostrata** (Fiori) Wagenitz – T scap – European-Mediterranean – terophytic grasslands. R.

Galactites tomentosa Moench – H bienn – Mediterranean – grasslands, ruderal places. C.

Gnaphalium luteo-album L. – T scap – Subcosmopolitan – terophytic grasslands. R.

Hedypnois cretica (L.) Dum. Cours. – T scap – Mediterranean – terophytic grasslands. S.
= *H. cretica* (L.) Willd. posterior synonim.
= *H. rhagadioloides* (L.) Willd. subsp. *cretica* (L.) Hayek
The taxonomic treatment is quite wide, sensu Sell (1976), that considers *H. polymorpha* DC. as synonim.

Helichrysum italicum (Roth) Don subsp. **microphyllum** (Willd.) Nyman – Ch suffr – Mediterranean – scrublands, schrublands. C.
Bacchetta et al. (2003).

Hieracium gallurense Arrigoni – H caesp – Endemic Sa – grasslands. R.
New report for this taxon. *Specimina visa*: Italy, Sassari Monte Bianchinu (scendendo al termine di via Luna e Sole), A. D. Atzei, 7.IX.1991, (SASSA). Arrigoni (1985) describes it as a siliciculos, endemovicariant in Sardinia of the *H. sabaudum* group. This report extends the distribution of this taxon westward and outside the Limbara Mountains (NE Sardinia).

Hyoseris radiata L. – H ros – Mediterranean – scrublands, grasslands, ruderal places, drystone walls. C.

Hypochoeris achyrophorus L. – T scap – Mediterranean – grasslands, scrublands, terophytic grasslands. C.

Inula conyza DC. – H bienn – European – grasslands, ruderal places. S.
In Nannetti (1896) sub *Conyza squarrosa* L.

Lactuca serriola L. – H bienn – Tethydic-Eurosibiric, CS – ruderal places. R.

Leontodon tuberosus L. – H ros – Mediterranean – schrublands, scrublands, grasslands. C.

Notobasis syriaca (L.) Cass. – T scap – Mediterranean – grasslands, ruderal places. S.

Onopordum illyricum L. – H bienn – Mediterranean – ruderal places. S.

Pallenis spinosa (L.) Cass. – T scap – Mediterranean – schrublands, scrublands, grasslands, terophytic grasslands. C.

Petasites fragrans (Vill.) Presl – G rhiz – W Mediterranean – wet places. S.
In Nicotra (1895b, 1896) sub *Nardosmia fragrans* Reichenb.

Phagnalon rupestre (L.) DC. subsp. **annoticum** (Jordan) Pignatti – Ch suffr – CW Mediterranean – rocky cliffs, scrublands. C.
Pignatti (1969).

Phagnalon rupestre (L.) DC. subsp. **rupestre** – Ch suffr – CW Mediterranean – rocky cliffs, scrublands. R.
Pignatti (1969). This taxon, whose circumscription is quite difficult, had detected only on the rocky cliffs Chighizzu.

Phagnalon saxatile (L.) Cass. – Ch suffr – CW Mediterranean – rocky cliffs. R.

Phagnalon sordidum (L.) Reichenb. – Ch suffr – CW Mediterranean – rocky cliffs, scrublands. C.

Picris echioides L. – T scap – Mediterranean-Iranoturanic – watercourses, ruderal places. S.

Picris hieracioides L. – H scap – Eurosibiric-Mediterranean – ruderal places. S.

Plagius flosculosus (L.) Alavi & Heywood – Ch suffr – Endemic Sa Co – wet places, ruderal places. S.
= *Leucanthemum flosculosum* (L.) P. Giraud.
Valsecchi (1978c).

Pulicaria dysenterica (L.) Bernh. – H scap – European-Tethydic – wet places. S.

Pulicaria odora (L.) Reichenb. – H scap – Mediterranean – woods, schrublands, scrublands, grasslands. C.

Pulicaria sicula (L.) Moris – T scap – Mediterranean – wet places. R.
In Atzei & Drascich Campazzi (1988).
Reichardia picroides (L.) Roth – H scap – Mediterranean – grasslands, schrublands, scrublands, ruderal places. C.
Rhagadiolus edulis Gaertner – T scap – European-Mediterranean – fields. S.
Robertia taraxacoides (Loisel.) DC. – H ros – Endemic Sa Co Si It – rocky cliffs. R.
Pignatti (1982).
* *Scolymus maculatus* L. – T scap – Mediterranean.
In Nicotra (1897).
Senecio angulatus L. fil. – Ch frut – S African, CS – ruderal places. R.
Senecio aquaticus Hill subsp. **erraticus** (Bertol.) Matthews – H bienn – European-Mediterranean – wet places, watercourses. R.
= *S. erraticus* Bertol.
Senecio delphinifolius Vahl – T scap – W Mediterranean – fields, grasslands, ruderal places. C.
Senecio leucanthemifolius Poiret – T scap – Mediterranean – ruderal places. R.
In Atzei & Drascich Campazzi (1988).
Senecio mikanioides Otto – Ch frut – S African, CS – ruderal places. R.
Senecio vulgaris L. – T scap – Boreal-Tethydic – grasslands, ruderal places. C.
Silybum marianum (L.) Gaertner – H bienn – Tethydic – ruderal places, grasslands. C.
Sonchus arvensis L. – H scap – Subcosmopolitan – ruderal places, watercourses. S.
Sonchus asper (L.) Hill – T scap – Boreal-Tethydic – ruderal places. S.
Sonchus oleraceus L. – T scap – Boreal-Tethydic – ruderal places, grasslands. C.
Sonchus tenerrimus L. – T scap – Mediterranean – ruderal places, rocky cliffs, drystone walls. C.
Taraxacum officinale Weber (group) – H ros – Boreal-Tethydic – grasslands. S.
Urospermum dalechampii (L.) Scop. ex F.W. Schmidt – H scap – CW Mediterranean – schrublands, scrublands, grasslands. C.
Urospermum picroides (L.) Scop. ex F.W. Schmidt – T scap – Tethydic – grasslands, ruderal places. C.
Xanthium spinosum L. – T scap – S American, AN – ruderal places. R.
* *Xanthium strumarium* L. – T scap – European, AN.
In Nicotra (1895a).

ALISMATACEAE
Alisma plantago-aquatica L. – I rad – Olartic – fresh water. S.

JUNCAGINACEAE
Triglochin laxiflorum Guss. – G bulb – Subcosmopolitan – wet places. R.
= *T. bulbosa* L. subsp. *laxiflora* (Guss.) Rouy.

POTAMOGETONACEAE
Potamogeton natans L. – I rad – Subcosmopolitan – fresh water. R.
* *Potamogeton lucens* L. – I rad – Boreal.
In Mola (1818-19).
* *Potamogeton pectinatus* L. – I rad – Subcosmopolitan.
In Mola (1818-19).

ZANNICHELLIACEAE
* *Zannichellia palustris* L. – I rad – Cosmopolitan.
In Mola (1818-19) and Nicotra (1895a).

LILIACEAE
Allium ampeloprasmum L. – G bulb – Tethydic-Pontic – ruderal places. S.
Allium chamaemoly L. – G bulb – Mediterranean – terophytic grasslands. R.
Allium neapolitanum Cyr. – G bulb – Mediterranean – wet places. R.
Allium nigrum L. – G bulb – Mediterranean-Macaronesic – ruderal places. R.
Allium roseum L. – G bulb – Mediterranean – grasslands, ruderal places. C.
* *Allium sphaerocephalon* L. – G bulb – European-Mediterranean.
In Nicotra (1896).
Allium subhirsutum L. – G bulb – Mediterranean – woods, schrublands, scrublands, grasslands. C.
Allium triquetrum L. – G bulb – CW Mediterranean – woods, wet places, ruderal places. C.
Allium vineale L. – G bulb – European-Mediterranean – scrublands, grasslands. R.
Asparagus acutifolius L. – G rhiz – Mediterranean – woods, schrublands, scrublands. C.
Asparagus albus L. – G rhiz – W Mediterranean – schrublands. R.
In Atzei & Drascich Campazzi (1988).
Asphodelus ramosus L. subsp. **ramosus** var. **ramosus** – H scap – Mediterranean – scrublands, grasslands. C.
= *A. microcarpus* Viv.
Díaz Lifante & Valdés (1994, 1996).
* *Colchicum cupanii* Guss. – G bulb – Mediterranean.
Béguinot (1922a). *Specimina selecta*: Italy, Sassari: orto convento S. Antonio Abate, 28.III.1985, A.D. Atzei (SASSA); Rizzeddu, 19.V.1906, s. coll. (SASSA).
* *Gagea granatellii* Parl. – G bulb – S Mediterranean.
In Nicotra (1895a).

Hyacinthus orientalis L. – G bulb – E Mediterranean, CS – ruderal places. R.
Specimina selecta: Italy, Sassari: Funtanazza (spontaneizzato), 14/15.III.1999, Atzei (SASSA).

Leopoldia comosa (L.) Parl. – G bulb – European-Tethydic – schrublands, scrublands, grasslands. C.
Garbari (1973).

Lilium candidum L. – G bulb – E Mediterranean, CS – ruderal places. R.

Muscari atlanticum Boiss. & Reuter – G bulb – European-Mediterranean-Turanica – grasslands. R.
Specimina selecta: Italy, Taniga, oliveto, N. Dolcher, 12.III.1978, (SS).

Ornithogalum arabicum L. – G bulb – Mediterranean – ruderal places. S.
In Nicotra, 1895a sub *Caruelia arabica* Parl.

Ornithogalum corsicum Jord. et Fourrr. – G bulb – Endemic Sa Co – scrublands, grasslands, terophytic grasslands. S.
= *O. biflorum* Jord. & Fourr.
Corrias (1984); Garbari (1990).

Ornithogalum narbonense L. – G bulb – Mediterranean – grasslands. R.

Ornithogalum pyrenaicum L. – G bulb – European-Mediterranean – schrublands. R.
In Atzei & Drascich Campazzi (1988).

Ornithogalum umbellatum L. – G bulb – European-Mediterranean – grasslands. S.

Ruscus aculeatus L. – G rhiz – European-Mediterranean – woods, schrublands. C.

Scilla autumnalis L. – G bulb – European-Tethydic – scrublands, grasslands, terophytic grasslands. S.

Scilla obtusifolia Poiret – G bulb – W Mediterranean – grasslands. R.

Smilax aspera L. – P lian – Paleotropical-Mediterranean – woods, schrublands, hedges, ruderal places. C.

* *Tulipa gesneriana* L. – G bulb – Asian?, CS.
According to (Viegi, 1993) various specimen collected by Terraciano in FI sub *T. strangulata* Reboul.

Tulipa praecox Ten. – G bulb – W Asian, CS – grasslands, fields. R.
Viegi (1993). *Specimina visa*: Italy, Sassari Monte Taniga, Corrias, 6.III.1979, (SS); Italy, Sassari regione Monte Taniga, 23.VII.1976, Corrias et Diana (SS).

Urginea maritima (L.) Baker – G bulb – Mediterranean-Macaronesic – grasslands, ruderal places. S.

Urginea undulata (Desf.) Steinh. – G bulb – CW Mediterranean – scrublands, terophytic grasslands. S.

AGAVACEAE

Agave americana L. – P caesp – N American, CS – ruderal places. S.

AMARYLLIDACEAE

Narcissus serotinus L. – G bulb – Mediterranean – scrublands, grasslands. R.

Narcissus tazetta L. – G bulb – Mediterranean-Macaronesic – scrublands, ruderal places, grasslands. C.

Pancratium illyricum L. – G bulb – Endemic Sa Co AT – scrublands, grasslands. R.
Vasecchi (1982). In Nicotra (1896) sub *Halmyra stellaris* Parl.

* *Sternbergia lutea* (L.) Ker-Gawler ex Sprengler – G bulb – Mediterranean.
In Nicotra (1895a, 1896, 1897).

DIOSCOREACEAE

Tamus communis L. – G rad – European-Mediterranean – schrublands, woods, ruderal places, hedges. C.

IRIDACEAE

Crocus minimus DC. – G bulb – Endemic Sa Co – grasslands, terophytic grasslands. S.
Camarda (1982).

* *Crocus versicolor* Ker-Gawler – G bulb – W Mediterranean.
In Nicotra (1895a; 1896). In Pignatti (1982) this taxon is indicated as endemic of Provence.

° *Gladiolus communis* L. – G bulb – Mediterranean-Iranoturanic.
In Atzei & Drascich Campazzi (1988). According to observations on natural populations and on *specimina* in SASSA e SS, this report is to be referred to *G. italicus* L.

Gladiolus italicus Mill. – G bulb – European-Tethydic – grasslands, ruderal places. S.

Iris florentina L. – G rhiz – Origine dubbia, CS –ruderal places. S.

Iris pseudacorus L. – G bulb – European-Mediterranean – wet places. R.

Iris sisyrinchium L. – G bulb – Mediterranean – grasslands, terophytic grasslands. S.
In Nicotra (1897) sub *Gynandriris sisyrinchium* Parl.

Romulea columnae Sebastiani et Mauri – G bulb – Mediterranean-Atlantic – scrublands, grasslands. S.

Romulea ligustica Parl. – G bulb – W Mediterranean – scrublands, terophytic grasslands. S.

JUNCACEAE

Juncus acutus L. – H caesp – European-Mediterranean – wet places. R.

Juncus articulatus L. – G rhiz – Tethydic-Eurosibiric – wet places. R.

Juncus hybridus Brot. – T caesp – Mediterranean-Atlantic – wet places. S.

Juncus inflexus L. – H caesp – Olartic-Paleotropical – wet places. S.
In Nicotra (1895a) sub *J. glaucus* Ehr.

Luzula forsteri (Sm.) DC. – H caesp – European-Mediterranean – woods, wet places. S.

GRAMINEAE

Aegilops geniculata Roth – T scap – Mediterranean-Pontic – scrublands, terophytic grasslands. C.
In Nicotra (1895a, 1897) sub *A. ovata* L.

Agrostis stolonifera L. – H rept – Boreal-Tethydic – wet places. S.
In Nicotra (1895a) sub *A. alba* L. var. *densiflora* Guss. And in Nicotra (1896) sub *A. alba* L.

Aira caryophyllea L. – T scap – Paleotropical-Tethydic – grasslands, terophytic grasslands. S.
In NICOTRA (1896) sub *A. caryophyllea* var. *anceps* Ces.

Aira cupaniana Guss. – T scap – Mediterranean –terophytic grasslands. S.
In Nicotra (1896; 1897) sub *A. capillaris* Host var. *ambigua* Dnt.

* *Aira tenorii* Guss. – T scap – Mediterranean.
In Nicotra (1896) sub *Aira intermedia* Guss.

Anthoxanthum aristatum Boiss. – T scap – W Mediterranean-Atlantic – terophytic grasslands. S.

Anthoxanthum gracile Biv. – T scap – Mediterranean – schrublands, terophytic grasslands. S.

Anthoxanthum odoratum L. – H caesp – Olartic – grasslands, ruderal places. C.

Arundo donax L. – G rhiz – Cosmopolitan, CS – watercourses. C.

Avena barbata Pott ex Link – T scap – Boreal-Tethydic – grasslands, ruderal places, ruderal places, fields. C.

Avena fatua L. – T scap – Euroasian – fields, grasslands. S.

Avena sativa L. – T scap – Tethydic-Pontic?, CS – fields, grasslands. S.

Avena sterilis L. – T scap – Tethydic-Pontic – scrublands, fields, grasslands, ruderal places. C.

Brachypodium distachyon (L.) P. Beauv. – T scap – Mediterranean-Iranoturanic – schrublands, scrublands, terophytic grasslands. C.

Brachypodium ramosum Roemer & Schultes – H caesp – W Mediterranean – schrublands, scrublands, grasslands. C.
In Nannetti (1914) sub *B. pinnatum* (L.) Beauv.

Brachypodium sylvaticum (Hudson) Beauv. – H caesp – European-Tethydic – woods, schrublands. C.

Briza maxima L. – T scap – Mediterranean – scrublands, grasslands, fields, ruderal places. C.

Briza minor L. – T scap – Mediterranean-Atlantic – wet places. R.

Bromus diandrus Roth – T scap – Mediterranean-Iranoturanic – grasslands, ruderal places. C.
= *B. gussonei* Parl.

Bromus hordeaceus L. – T scap – European-Tethydic – scrublands, fields, grasslands, ruderal places. C.

Bromus madritensis L. – T scap – European-Tethydic – scrublands, fields, grasslands, ruderal places. C.

Bromus rigidus Roth – T scap – European-Tethydic – scrublands, fields, grasslands, ruderal places. C.

* *Bromus rubens* L. – T scap – Mediterranean-Iranoturanic.
In Nannetti (1914).

* *Bromus scoparius* L. – T scap – Mediterranean.
In Nicotra (1897) sub *Serrafalcus scoparius* Parl.

* *Bromus squarrosus* L. – T scap – Paleotemperate.
In Nannetti (1914).

Bromus sterilis L. – T scap – Tethydic-Eurosibiric – grasslands, ruderal places. S.

Bromus willdenowii Kunth – H caesp – S American, CS – fields. R.

Catapodium rigidum (L.) C. E. Hubb. subsp. **rigidum** – T scap – Tethydic-Atlantic – schrublands, scrublands, grasslands, terophytic grasslands. C.
Brullo et al. (2003). In Nicotra (1895a) sub *Scleropoa rigida* Link.

Cortaderia selloana (Schultes & Schultes fil.) Asch. et Graebn. – H caesp – S American, CS – grasslands, ruderal places. S.
Camarda (1998c).

* *Corynephorus divaricatus* (Pourret) Breistr. – T scap – Mediterranean.
In Nicotra (1897) sub *C. articulatus* P. B.

Cynodon dactylon (L.) Pers. – G rhiz – Subcosmopolitan – fields, grasslands, wet places. S.

Cynosurus echinatus L. – T scap – European-Tethydic – woods, schrublands, scrublands, terophytic grasslands. C.

* *Cynosurus polybracteatus* Poiret – T scap – W Mediterranean.
In Nicotra (1895a; 1896) sub *C. cristatus* L. var. *ciliatus* Guss.

Dactylis hispanica Roth – H caesp – Mediterranean – woods, schrublands, scrublands, grasslands. C.
The report of NICOTRA (1897) of *D. glomerata* L. could be referred to *D. hispanica* L. The taxonomic circumscription of these taxa is quite controverse (Fiori, 1923-29; Pignatti, 1982; Tutin, 1980).

Dasypyrum villosum (L.) P. Candargy – T scap – Mediterranean-Pontic – fields, grasslands, ruderal places. C.
In Nicotra (1897) sub *Triticum villosum* P. B.

* *Digitaria sanguinalis* (L.) Scop. – T scap – Cosmopolitan.
In Nicotra (1895a, 1897).

* *Echinochloa crus-galli* (L.) P. Beauv. – T scap – Subcosmopolitan, AN.
In Nicotra (1895a, 1897) sub *Panicum crus-galli* L.

* *Echinochloa oryzoydes* (Ard.) Fritsch – T scap – Asian?, AC.
In Nicotra (1897) sub *Panicum phyllopogon* Stapf.

* *Eragrostis pilosa* (L.) Beauv. – T scap – Cosmopolitan.
In Nicotra (1897).

Festuca arundinacea Schreber – H caesp – European – wet places. R.

Gaudinia fragilis Beauv. – T scap – European-Mediterranean – wet places. R.

Glyceria plicata Fries – G rhiz – Subcosmopolitan – wet places. R.

Hainardia cylindrica (Willd.) Greuter – T scap – Mediterranean-Iranoturanic – grasslands, wet places. R.

Holcus lanatus L. – H caesp – European-Mediterranean – grasslands, ruderal places. C.

Hordeum bulbosum L. – H caesp – Paleosubtropical – watercourses, wet places. S.

Hordeum leporinum Link – T scap – Mediterranean-Pontic – fields, grasslands, ruderal places. C.
In Nicotra (1897) sub *H. murinum* L.

Hyparrhenia hirta (L.) Stapf – H caesp – Paleotropical-Mediterranean – scrublands, rocky cliffs. R.
= *Cymbopogon hirsutus* (L.) Janchen.

* *Koeleria splendens* Presl. – H caesp – Mediterranean.
In Nicotra (1897).

Lagurus ovatus L. – T scap – Mediterranean-Atlantic – scrublands, grasslands, ruderal places. C.

Lamarckia aurea (L.) Moench – T scap – Mediterranean-Iranoturanic – ruderal places. S.

Lolium multiflorum Lam. – H scap – European-Tethydic – grasslands, ruderal places. C.

Lolium perenne L. – H caesp – European-Tethydic – grasslands, ruderal places. C.

Lolium rigidum Gaudin – T scap – European-Mediterranean – grasslands, ruderal places. C.

Lolium temulentum L. – T scap – Olartic – fields. R.

Lophochloa cristata (L.) Hyl. – T caesp – European-Tethydic – terophytic grasslands, ruderal places. C.

Lophochloa pubescens (Lam.) H. Scholz – T scap – Mediterranean – terophytic grasslands. R.

* *Lygeum spartum* L. – H caesp – Mediterranean.
In Nicotra (1896).

Melica arrecta O. Kuntze – H caesp – Mediterranean – grasslands, ruderal places. S.

Melica ciliata L. – H caesp – European-Mediterranean – scrublands, grasslands, ruderal places. C.
In Nannetti (1914) sub *M. magnolii* G. et G.

Melica minuta L. – H caesp – Mediterranean – scrublands, schrublands, terophytic grasslands. S.
In Nicotra (1896) sub *M. major* S. et S.

* *Parapholis incurva* (L.) C. E. Hubb. – T scap – European-Tethydic.
In Nicotra (1897) sub *Lepturus incurvatus* Trin.

Paspalum paspaloides (Michx.) Scribner – H rept – Cosmopolitan (American tropicale?), AN – wet places. C.

* *Phalaris brachystachys* Link – T scap – Mediterranean-Macaronesic.
In Nicotra (1895a). According to Baldini (1993) this species is present only in S Sardinia.

* *Phalaris canariensis* L. – T scap – European-Tethydic.
In Nannetti (1914). According to Baldini (1993) native of Mediterranean Region, excluded in Sardinia.

Phalaris coerulescens Desf. – H rhiz – Mediterranean-Macaronesic – wet places. R.

Phalaris minor Retz. – T caesp – Tethydic – grasslands, ruderal places. C.

* *Phalaris paradoxa* L. – T scap – Mediterranean-Macaronesic.
In Nicotra (1896). According to Baldini (1993) this species is present only in S Sardinia.

Phragmites australis (Cav.) Trin. ex Steudel – He rhiz – Olartic-Paleotropical – watercourses, fresh water. C.

Piptatherum miliaceum (L.) Coss. – H caesp – Mediterranean-Macaronesic – grasslands, ruderal places, fields. C.
= *Oryzopsis miliacea* (L.) Asch. & Schweinf.
In Nicotra (1895a) sub *Milium multiflorum* Cav.

Poa annua L. – T caesp – Cosmopolitan – terophytic grasslands, ruderal places. R.

Poa bulbosa L. – H caesp – Tethydic-Eurosibiric – rocky cliffs, grasslands, drystone walls. C.

Poa infirma H. B. K. – T caesp – European-Tethydic –ruderal places. S.

Poa trivialis L. – H caesp – Olartic-Paleotropical – woods, grasslands. S.

Polypogon monspeliensis (L.) Desf. – T scap – Olartic-Paleotropical – scrublands, grasslands. S.

Polypogon viridis (Gouan) Breistr. – H caesp – European-Tethydic – wet places. S.
In Nicotra (1897) sub *Agrostis verticillata* Vill.

* *Setaria pumila* (Poiret) Schultes – T scap – Subcosmopolitan.
In Nicotra (1896) sub *S. glauca.*

Setaria verticillata (L.) Beauv. – T scap – Cosmopolitan – ruderal places. R.

Setaria viridis (L.) Beauv. – T scap – Subcosmopolitan, AN – ruderal places, fields. S.

Sorghum halepense (L.) Pers. – G rhiz – Cosmopolitan – ruderal places. S.

Stipa bromoides (L.) Dürfl. – H caesp – European-Mediterranean – woods, schrublands, grasslands. S.
Moraldo (1986).

Stipa capensis Thunb. – T scap – Tethydic – ruderal places, grasslands. C.
Moraldo (1986).

* *Trisetaria parviflora* (Desf.) Maire – T scap – SW Mediterranean.
In Nicotra (1897) sub *T. parviflorum* Desf.

Vulpia ciliata Dumort. – T caesp – European-Mediterranean – schrublands, scrublands, terophytic grasslands. C.

Vulpia ligustica (All.) Link – T caesp – Mediterranean – schrublands, scrublands, terophytic grasslands. C.

Vulpia myuros (L.) Gmelin – T caesp – Subcosmopolitan – scrublands, terophytic grasslands. S.

* *Vulpia sicula* (Presl) Link – H caesp – W Mediterranean.
In Nannetti (1914).

PALMAE

Chamaerops humilis L. – NP – CW Mediterranean – schrublands. R.

§ *Phoenix canariensis* Chabaud – P scap – Macaronesic, cultivated.

§ *Phoenix dactylifera* L. – P scap – N African, cultivated.

§ *Washingtonia robusta* Wendl. – P scap – CN American, cultivated.

ARACEAE

* *Ambrosinia bassii* L. – G rhiz – W Mediterranean.
The presence of this species is not confirmed and needs more investigations. Its diffusion was limited even in the past: "I look for this fantastic Aracea around Sassari, where I hoped to see it, but uselessly". (Nicotra, 1895a). Later Nicotra (1897) reported *A. bassii* "in the scrubland near Baddimanna" (SASSA).

Arisarum vulgare Targ.-Tozz. – G rhiz – Mediterranean – woods, schrublands, wet places. C.

Arum italicum Mill. – G rhiz – Mediterranean-Atlantic – woods, grasslands, ruderal places, ruderal places. C.

Arum pictum L. fil. subsp. **pictum** – G rhiz – Endemic Sa Co AT – scrublands, grasslands, ruderal places. S.
Diana Corrias (1982); Rossellò & Sàez (1998).

LEMNACEAE

Lemna gibba L. – I nat – Subcosmopolitan – fresh water. S.

Lemna minor L. – I nat – Subcosmopolitan – fresh water. S.

* *Spirodela polyrhiza* (L.) Schleiden – I nat – Subcosmopolitan.
In Nicotra (1895a).

SPARGANIACEAE

* *Sparganium erectum* L. – I rad – Olartic.
In Mola (1818-19) and in Nicotra (1895a) sub *S. ramosum* L.

TYPHACEAE

Typha domingensis (Pers.) Steudel – He rhiz – Olartic – watercourses, fresh water. R.

= *T. angustifolia* L. subsp. *australis* (Schum. & Thonn.) Graebn.

Typha latifolia L. – He rhiz – Olartic – watercourses, fresh water. R.

CYPERACEAE

Carex distachya Desf. – H caesp – Mediterranean – woods, schrublands. S.
In Nicotra (1895a) sub *C. linkii* Schkuhr.

Carex distans L. – H caesp – European-Tethydic – wet places. R.
In Atzei & Drascich Campazzi (1988).

* *Carex divisa* Hudson – G rhiz – European-Tethydic.
In Nicotra (1897).

Carex divulsa Stokes – H caesp – European-Tethydic – wet places. S.
In Nannetti (1914) sub *C. contigua* Hoppe.

Carex flacca Schreber subsp. **serrulata** (Biv.) Greuter – G rhiz – European-Tethydic – woods, schrublands, scrublands, grasslands. C.

Carex hispida Willd. – G rhiz – Mediterranean – watercourses. S.

Carex otrubae Podp. – H caesp – European-Tethydic – wet places. S.

* *Carex panormitana* Guss. – H rhiz – Endemic Sa Si.
Arrigoni (1984b), Urbani et al. (1995). *Specimina visa*: Italy, Sassari a Scala di Giocca, 5.V.1895, Martelli (FI).

Carex pendula Hudson – He rhiz – European-Tethydic – watercourses. R.

Carex punctata Gaudin – H caesp – European-Tethydic – wet places. R.

* *Carex remota* L. – H caesp – European-Pontic.
In Nicotra (1895a).

* *Cyperus fuscus* L. – T caesp – European-Tethydic.
In Nicotra (1897).

Cyperus longus L. subsp. **badius** (Desf.) Asch. & Graebn. – G rhiz – Paleotropical-Tethydic – wet places. S.
In Nicotra (1895a) sub *C. badius* Desf.

* *Isolepis cernua* (Vahl) Roem. et Schult. – T scap – Subcosmopolitan.
In Nicotra (1896, 1897) sub *Scirpus savii* S. et M., et Pignotti (2003).

Isolepis setacea (L.) R. Br. – T scap – Olartic – wet places. S.
Pignotti (2003).

Schoenoplectus tabaernemontani (C. C. Gmel.) Palla – G rhiz – Boreal-Tethydic – watercourses. R.
Pignotti (2003).

ORCHIDACEAE

Anacamptis pyramidalis (L.) Rich. – G rtb – Tethydic-Atlantic – schrublands, scrublands, grasslands. S.

Barlia robertiana (Loisel.) Greuter – G rtb – Mediterranean – schrublands, scrublands, grasslands, ruderal places. S.

Cephalanthera longifolia (L.) Fritsch – G rhiz – EurAsian-Mediterranean – woods. R.
In Atzei & Drascich Campazzi (1988).

Epipactis helleborine (L.) Crantz – G rhiz – Olartic – woods. R.
In Atzei & Drascich Campazzi (1988).

Ophrys apifera Hudson – G rtb – Mediterranean-Atlantic – schrublands, scrublands, grasslands. R.

Ophrys bombyliflora Link – G rtb – W Mediterranean-Macaronesic – schrublands, grasslands, ruderal places. S.

Ophrys ciliata Biv. – G rtb – W Mediterranean – schrub-

lands, scrublands, grasslands. S.
= *O. speculum* Link
= *O. vernixia* auct non Brot.
= *O vernixia* subsp. *ciliata* (Biv.) Del Prete.
Grünanger (2001); Rossi & Maury (2002).

Ophrys fuciflora (F. W. Schmidt) Moench – G rtb – European-Mediterranean – schrublands, scrublands, grasslands. S.
= *O. arachnites* (Scop.) Lam.
The binomial *O. holoserica* (Burm. f.) Greuter, that sustituted recently the name *O. fuciflora* (Corrias, 1983; Scrugli, 1990) and, for this reason reported also in Grünanger (2001), according to Rossi & Maury (2002), is to refer as synonim of *O. apifera* Hudson.

Ophrys fusca Link – G rtb – Mediterranean-Atlantic – schrublands, scrublands, grasslands. S.

Ophrys incubacea Bianca – G rtb – W Mediterranean – schrublands, scrublands, grasslands. R.
= *O. sphegodes* Mill. subsp. *atrata* (Lindl.) E. Mey.

Ophrys lutea Cav. – G rtb – Mediterranean – schrublands, scrublands, grasslands. S.

Ophrys morisii (Martelli) Soò – G rtb – Endemic Sa Co – scrublands. R.
= *O. exaltata* Ten. subsp. *morisii* (Martelli) Del Prete.
The taxonomic treatment is according with Rossi & Maury (2002). Grünanger (2001), instead, believes that this Sardo-Corse endemic is to be included in the centered in the Thyrrenian *O. exaltata* taxon, that refers to *O. sphegodes* s. l. group. *O. arachnitiformis sensu* Auct. sard. fl. is a synonim, as already reported in Scrugli (1990). Since possible type specimen were lacking, the Martelli (1896) iconography is the only possible reference. This figure is rather different in the labellus morphology from the majority of individuals observed and, for this reason also, other Authors considered the sardinian populations simply included in the taxon *O. arachnitiformis* Gren. et Philippe (Corrias, 1983; Corrias, pers. comm., 2002).

Ophrys sphegodes Mill. subsp. **praecox** Corrias – G rtb – Endemic Sa Co – schrublands, scrublands, grasslands. C. Corrias (1983). The presence of this taxon is here confirmed, even in its *locus classicus*, where it is still relevant.

Ophrys tenthredinifera Willd. – G rtb – Mediterranean – schrublands, scrublands, grasslands. S.

Orchis anthropophora (L.) All. – G bulb – European-Mediterranean – scrublands, grasslands. S.
= *Aceras anthropophorum* (L.) Aiton fil.

Orchis collina Banks & Solander ex Russell – G rtb – Mediterranean – scrublands, grasslands. S.

Orchis coriophora L. – G rtb – European-Mediterranean – Stony Places a M. Istoccu. R.
= *O. coriophora* L. subsp. *fragrans* (Pollini) Sudre.

Orchis lactea Poiret – G rtb – Mediterranean-Balcanic – scrublands, grasslands. R.

Orchis longicornu Poiret – G rtb – W Mediterranean – schrublands, scrublands. R.

Orchis papilionacea L. – G rtb – European-Mediterranean – schrublands, scrublands, grasslands. S.

Orchis purpurea Hudson – G rtb – European-Mediterranean – schrublands, scrublands, grasslands. S.

Orchis x bornemanni Asch. – G rtb – W Mediterranean – schrublands, scrublands, grasslands. S.
First generation hybrid, sterile, between *O. longicornu* Poiret e *O. papilionacea* L.

Serapias lingua L. – G rtb – Mediterranean – scrublands, grasslands. R.

Serapias parviflora Parl. – G rtb – Mediterranean – scrublands, grasslands. R.

Discussion

The floristic list includes 840 entities, divided into 107 families and 419 genera. Among them, 18 are cultivated (*cultae*), 11 are excluded from this area (*excludendae*) and 81 are in various ways considered as not confirmed (*inquirendae*). This latter group includes many taxa reported in the past by different authors, but not found during this study or whose actual presence is not sufficiently proven. Some of them could be considered as extinct for this area. The current floristic contingent is therefore reduced to 730 entities, divided into 98 families and 385 genera, many here documented for the first time in this area.

The biological spectrum (Fig. 3) showing a clear dominance of therophytes (41%) confirmes the Mediterranean character of this area. From a comparison to the biological spectrum calculated for the entire Sardinian flora, data taken from Pignatti (1994), no particular differences emerge. The contingent more diverging from the regional mean is the one of phanerophytes.

The chorological spectrum (Fig. 4) highlights the dominance of Tethydic element in which the dominance of more strictly Mediterranean element emerge. The presence of a high number of entities that can be identified as "link" elements between Boreal and Tethydic subkingdoms, especially as European-Mediterranean and European-Tethydic elements, is also interesting. The same dominance of Mediterranean, European-Mediterranean and European-Tethydic elements was also found by Arrigoni & Di Tommaso (1991) and Loi & Lai (2001) for calcareous outcrops in East-Eastern Sardinia.

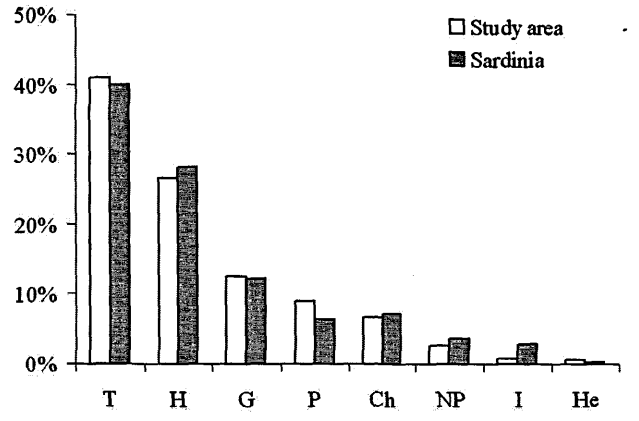

Fig. 3 – Biological spectra of the study area and the Sardinian flora.

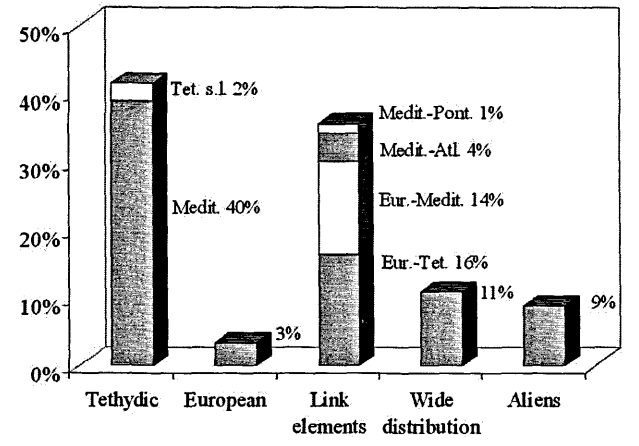

Fig. 4 - Chorological spectrum of the study area flora (Atl. = Atlantic; Eur. = European; Medit. = Mediterranean; Pont. = Pontic; Tet. = Tethydic)

Origanum vulgare L. subsp. *viridulum* (Martin-Donos) Nyman is particularly interesting among the Mediterranean-Pontic entities, here on the western limit of its distribution.

A more detailed analysis of the Mediterranean contingent (Fig. 5) shows the dominance of typical elements of the Mediterranean region (Arrigoni, 1983a), followed by the ones of the western and centre-western sub-region, which represent together about 27% of the Mediterranean contingent in the study area. This value is decidedly higher than that reported by Schmid (1933) as well as that obtained by the flora according to Pignatti (1982) for the Sardinian flora, which records about 9%. The presence of some entities with western barycentre having their eastern distribution limit in Sardinia, such as *Salix atrocinerea* Brot. (Tutin et al., 1993) and *Ranunculus macrophyllus* Desf. (Jalas & Souminen, 1989), or entities with eastern barycentre finding in Sardinia their western distribution limit, such as *Anthoxanthum gracile* Biv. (Tutin et al., 1980) or the previously cited *O. vulgare* L. subsp. *viridulum* is remarkable.

Viola arborescens L., a Western Mediterranean species, with a distribution limited to Portugal, Spain, Balearic Islands, France and Sardinia (Tutin et al., 1968); *Urginea undulata* (Desf.) Steinh., East-Western Mediterranean taxa exclusively present in Eastern Spain, Sardinia, Corsica and North Africa (Tutin et al., 1980); *Teucrium marum* L., Western Mediterranean-Illyrian species considered by other authors as endemic in Sardinia, Corsica, Monte Cristo, d'Hyères Islands and Murter (Gamisans & Marzocchi, 1966) are only some of the entities with restricted distribution present in the area.

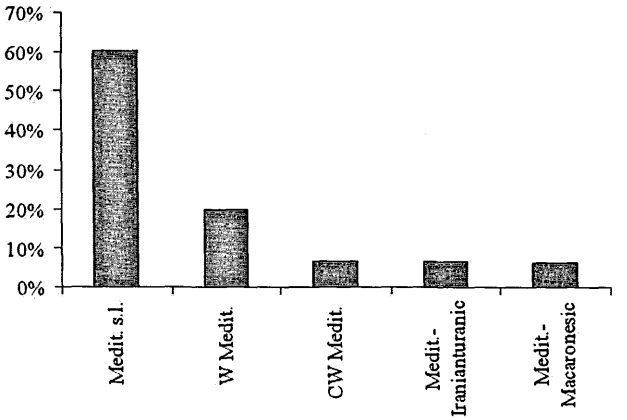

Fig. 5 – Chorological spectrum of the Mediterranean component of the study area flora.

Links to other regions of Tethys sub-kingdom are obtained through the presence of Mediterranean-Iranianturanic and Mediterranean-Macaronesic elements. On the contrary, links to Sahara-Arabian region are lacking. Among Iranian-Turanic entities with eastern barycentre, *Satureja vulgaris* (L.) Fritsch subsp. *orientalis* (Bothmer) Greuter & Burdet finds its western distribution limit in Sardinia or in any case, it is extremely close to it if its possible presence in France is also considered (Bothmer, 1967; Greuter et al., 1986). Endemic contingent is distributed between the Western Mediterranean (88%) and centre-Western Mediterranean (13%) component. It is represented by 24 entities clustered according to their areal of distribution (Fig. 6). Two new species are added to the ones already indicated for the study area (Arrigoni et al., 1976-1991): the Sardinian-Corsican *Silene nodulosa* Viv. and the Sardinian *Hieracium gallurense* Arrigoni, previously reported only for granite substrata in

North-Eastern Sardinia. On the contrary, two entities previously detected in this area, *Arenaria balearica* L. and *Carex panormitana* Guss., were not found during this study. The former, being endemic in Sardinia, Corsica, Tuscan Archipelago and Balearic Islands, was collected in 1985 (FI!) and 1907 (SASSA!) in the valley of Bunnari at "Scala du Pintore", which is currently completely included in the urban area of Sassari. *Carex panormitana* Guss is an endemic species of Sardinia and Sicily: it was found at Scala di Giocca near Sassari in 1895 (FI!) but is now probably extinct in this area.

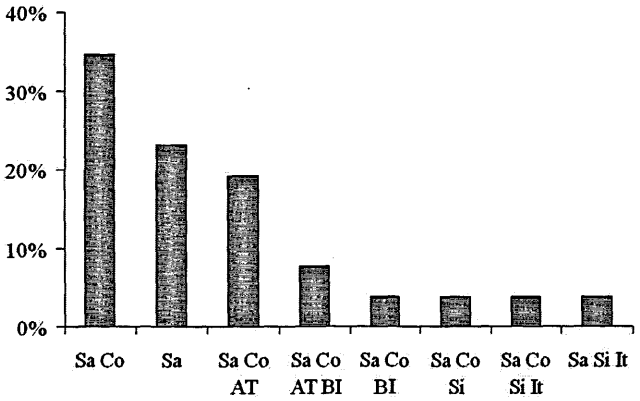

Fig. 6 – Chorological spectrum of the Endemic component of the study area flora (AT = Tuscan Archipelago; BI = Balearic Islands; Co = Corsica; It = Italy; Sa = Sardinia; Si = Sicily).

Among the endemics taxa, the Sardinian-Corsican element, with nine entities, is the most represented. Six are exclusive to Sardinia and three of them, *Centaurea corensis* Valsecchi et Filigheddu, *Limonium racemosum* (Lojac.) Diana and *Scrophularia morisii* Valsecchi, are endemic species exclusive of Miocene limestone in Sassarese.

In order to make a comparison to the chorological spectrum of the Sardinian flora (Pignatti, 1994), an other chorologic spectrum was also accomplished according to classes reported by Pignatti (1982) and grouped by Pignatti (1994). Through this comparison, the presence of Eurimediterranean entities is more considerable than the regional mean (Fig. 7) and it is probably determined by the wet mesomediterranean trait of the study area. On the contrary, the presence of cosmopolite entities turned out to be lower than the regional mean. Endemic and Atlantic elements also present lower values than those calculated for the whole region. Stenomediterranean, Eurasian, northern and Mediterranean-mountain taxa are close to the regional mean. The South European orophytes are absent because of the low altitude characterising this territory.

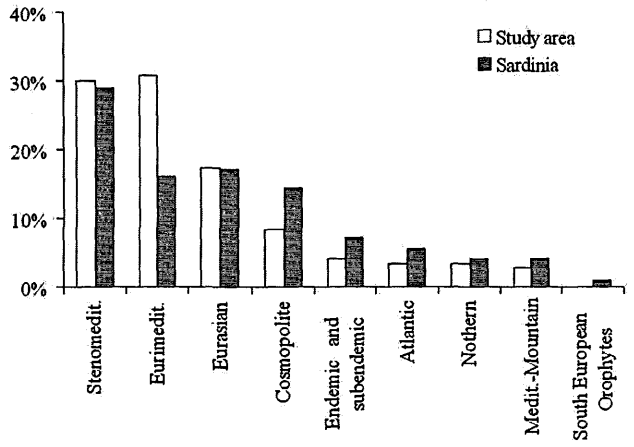

Fig. 7 – Chorological spectra of the study area and the Sardinian flora.

Conclusions

The presence of high contingent of Mediterranean entities with western gravitation and western endemic, especially Sardinian-Corsican, species confirms the settlement proposed by Arrigoni (1983a) in the Sardinian-Corsican dominion, included in turn in the western sub-region of the Mediterranean region. The coastal and hill sub-sector is the reference (Arrigoni, 1983), it shows a North-western district divisible into two sub-districts: nurric and trachyte/basalt. The presence of three exclusive endemic entities of Miocene limestone in North-Western Sardinia, could explain the introduction of a third sub-district.

Four endemic entities show their *locus classicus* in this area: *Ophrys sphegodes* Mill. subsp. *praecox* Corrias, *Centaurea corensis* Valsecchi et Filigheddu, *Limonium racemosum* (Lojac.) Diana and *Scrophularia morisii* Valsecchi.

Some entities, though not endemic, have a limited or fragmentary distrbution in Sardinia. Among them, *Capparis spinosa* L. subsp. *rupestris* (Sm.) Nyman and *Coridothymus capitatus* (L.) Reichenb. f., present in the island mainly on Miocene limestone in the *Sassarese* and in the *Cagliaritano* (Camarda & Valsecchi, 1990); *Laurus nobilis* L., which is common in the northern sector of the island around Osilo, in the Marghine and

Goceano and in the Iglesiente on calcareous or trachyte/basalt substrata (Camarda & Valsecchi, 1983); *Erica multiflora* L. reported from Capo Figari, small islands of the North-Eastern Sardinian coast, Capo Mannu and Sinis Peninsulae, Logulentu and Osilo (Camarda & Valsecchi, 1990), and also found during this research at Baddimanna on the outskirts of Sassari.

In this area, some entities included in the Red Book of Italian Plants (Conti et al., 1992, 1997) are also present: *Viola arborescens* L., reported as E category (threatened); *Borago pygmaea* (DC.) Chater et Greuter, reported as R category (rare); *Carex panormitana* Guss., reported as V category (vulnerable). Nicotra (1986) found *Viola arborescens* L. for the first time in Sardinia just in the countryside of Sassari. Arrigoni (1972) considered it as extinct in this station, but Atzei (1980a) found it again within an unauthorised dump, where it is still present, but threatened. During this study *B. pygmaea* was found only in one station, so it is believed to be at risk of extinction in the study area. *Carex panormitana* Guss., reported in the Habitat Directive (European Commission, 1992), was not recently found neither during this study nor by other authors. Therefore, so far it is considered extinct in North-Western Sardinia.

Although the examined area is strongly urbanised and has long been subjected to agricultural and pastural uses, its flora results to be quite diversified and still rich in interesting taxa, even if their general distribution or Sardinian distribution only is considered. The presence of species depending on the existence of hedges, drystone walls and other smaller structures belonging to traditional agricultural activities still present in the area is also substantial, even though their dilapidated state is often high.

This study of the flora of the Sassarese pointed out the presence of a conspicuous level of vegetal biodiversity in the area. The presence of interesting floristic elements together with small, but often very interesting, residuals of spontaneous vegetation are of very high value. Indeed several natural traditionally agricultural derived activities elements are present within an area of intense anthropic impact. All of these should be valid reasons for a better knowledge and protection of the *habitats* still present on the territory. The indiscriminate building development of the valleys, the reckless exploitation of the water sources and the diffusion of dumps, increasingly threaten some habitats of the Sassarese region. The improvement of the natural resources could be done through an adequate ecological net, but, it starts from a basic knowledge of the floristic biodiversity.

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Summary: Calcareous outcrops in North-Western Sardinia cover a large area (about 380 Km²) known as "Sassarese". In this study the vascular flora of this area is investigated. The actual flora is checked and, when possible, older references, synonyms and critical notes are given. The floristic list includes 840 entities. Among them, 18 have been cultivated (*cultae*), 11 are considered erroneously reported and so they are excluded from this area (*excludendae*) and 81 are in various ways considered not confirmed and to enquiry (*inquirendae*). The current floristic contingent is therefore reduced to 730 entities, divided into 98 families and 385 genera, many of them here documented for the first time in this area. Among them the more relevant are the Sardinian-Corsican endemic *Silene nodulosa* Viv. and the Sardinian endemic *Hieracium gallurense* Arrigoni, previously reported only for granite substrata in North-Eastern Sardinia. The biological spectrum shows a clear dominance of therophytes (41%). The chorological spectrum highlights the dominance of the Tethydic element, in which the dominance of more strictly Mediterranean element emerges. Four entities have in this area their *locus classicus*: *Centaurea corensis* Valsecchi et Filigheddu, *Limonium racemosum* (Lojac.) Diana and *Scrophularia morisii* Valsecchi, exclusive of the region object of this study, and *Ophrys sphegodes* Mill. subsp. *praecox* Corrias. Some entities, though not endemic, have a limited or fragmentary distribution in Sardinia, e.g. *Capparis spinosa* L. subsp. *rupestris* (Sm.) Nyman, *Coridothymus capitatus* (L.) Reichenb. f. and *Erica multiflora* L., whereas *Viola arborescens* L.. *Borago pygmaea* (DC.) Chater et Greuter and *Carex panormitana* Guss. are included in the Red Book of Italian Plants. Although the area is strongly urbanised and subjected since long time ago to agricultural and pastoral uses, its flora is still rather diversified. The presence of species depending on the existence of hedges, dry-stone walls and other smaller structures belonging to traditional agricultural activities still present, is also substantial, even though their dilapidated state is often high. Finally the presence of floristic elements of great interest together with small residuals of spontaneous vegetation are of very high value. Indeed, several natural elements from traditionally agricultural activities are present within an area of intense anthropic impact. The indiscriminate building development of the valleys, the reckless exploitation of the water sources and the diffusion of dumps, threaten increasingly some habitats of the region. The improvement of the natural resources could be done through an adequate ecological net starting from a basic knowledge of the floristic biodiversity, that is the main aim of this work.