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The vascular Flora of the "Bosco Isola" at Lesina (Foggia – Apulia)

Abstract

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In this work the vascular flora of the "Bosco Isola" at Lesina (Foggia, Apulia), which is almost included within the Gargano National Park, is analysed. The study was carried out taking into account soil, climate and bioclimate that are the main factors affecting the chorological and biological aspects.

In total 678 taxa of subgeneric rank were found, 521 by field investigation and 157 by literature, that are equivalent to 32,67% of the entire Apulian flora. 19 of them are new to Apulia and 131 to the " Bosco Isola".

In the studied area there were ascertained 161 and 28 subgeneric taxa more than in previous works concerning the Lesina area and the whole Apulia, respectively.

The chorological spectrum shows the dominance of the Mediterranean elements and, even if to a lesser extent, some others occurring under cooler and more humid climates.

Introduction

The Lesina lagoon, extending from East to West, lies North-West of the Gargano promontory in the Foggia Province (Apulia - S. Italy). Included between the mouth of the Fortore river, Capo Mileto and Littoral dunes, it is adjacent to the littoral. This lagoon is connected to the sea by two artificial canals: to the West, Acquarotta, about 2 km long and 6 to 10 m wide, and to the East, Schiapparo, about 1 Km long and 25 m wide.

The lagoon was originated by accumulation of rheolithic and eolic material transferred by the rivers in the upper basin and partly from accumulation of lake deposits coming from the lake itself shore. Both Monte Elio, to the East, and the eastern part of the Punta delle Pietre Nere, to the West, barred such detrital deposits of different origin. A large sequence of Littoral dunes, growing parallel to the coastline, originated from their accumulation forming the lagoon from the barred expanse of sea. Such sequence of Littoral dunes, locally known as "L'Isola di Lesina", probably developed between the Bronze Age and the Roman period (Gravina 1995).

The flora of the 14-kilometres-wide area included between the Acquarotta canal and the Schiapparo mouth (Fig. 1), within "L'Isola di Lesina", is here analysed. The area East to

Fig. 1. The "Bosco Isola" at Lesina locality.

the Schiapparo canal, being drastically reduced in its floristic component under the human pressure, has been excluded from this research.

The vegetation in this part of the Littoral dune sequence, named "Bosco Isola", consists of a mosaic of both tree or shrub and herbaceous vegetational types, the related environments are directely affected by variations of different ecological factors. The sea distance, the water table, salt concentration in the soil and its dependence on the lagoon brackish water, altitude influencing the supply from the ground water table, are the main ecological factors affecting vegetation.

The main vegetational features are: *Quercus ilex* L. wood and maquis, and evergreen sclerophyllous maquis (*Quercion ilicis* Br.-Bl. (1931) 1936); *Juniperus oxycedrus* subsp. *macrocarpa* (S. & S.) Ball and *Juniperus turbinata* Guss. (*Juniperion lyciae* Rivas - Martinez 1975) littoral maquis; nanophanerophyte garrigue dominated by *Rosmarinus officinalis* L., *Erica* sp. and *Cistus* sp. (*Cisto-Ericion* Horvatic 1958) mixed with the *Fumana thymifolia* (L.) Spach and *Helianthemum jonium* Lacaita (*Cisto-Ericion* Horvati? 1958) chamaephyte garrigue; plantations with *Pinus halepensis* Miller or *P. pinea* L.; therophytic arid grasslands (*Tuberarietea guttatae* (Br.-Bl. 1952) Riv.-Mart. 1978); embryonal and mobile dune vegetation (*Cakiletea maritimae* Tx. & Prsg. 1950 and *Ammophiletea* Br.-Bl. & R. Tx. 1943); halophyte, therophyte (*Thero-Salicornietea* Pign. 1953 em. R.Tx. 1958) and succulent subshrub vegetation with perennial *Salicornia* sp. pl. (*Arthrocnemetea* Br.-Bl. & R. Tx. 1943 corr. Bolos 1957); hygrophilous communities represented by *Phragmites australis* (Cav.) Trin., *Cladium mariscus* (L.) Pohl, *Typha angustifolia* L., *Juncus acutus* L., *Schoenus nigricans* L. or *Erianthus ravennae* (L.) Beauv. formations (*Phragmitetea* R.Tx. er Prsg. 1942 and *Molinio-Juncetea* Br.-Bl. (1931) 1947); cultivated and abandoned fields (Forte, 2001; 2002).

The flora of the study area was previously investigated by several authors: Porta & Rigo (Fenaroli, 1966), Rigo (1877), Martelli (1893) and Fiori (1899), followed by Pignatti (Fenaroli, 1966); Fenaroli (1966; 1970; 1973; 1974) collected and analysed the reference and herbarium material concerning the whole area of the Gargano Promontory; Corbetta (1970) studied the lagoon shore taxa; Curti & al. (1974) published a full plant catalogue of the lake basin and, finally, Pantaleo (1991) investigated the flora of Foce S. Andrea in the Littoral dune sequence. This paper is a contribution to the assessment of the plant patrimony in the Bosco Isola, which is an area particularly interesting from the scientific and naturalistic point of view. It is located in the Gargano National Park and shows peculiar plant and vegetational features.

Material and methods

The pedological characteristics of the investigated area have been defined basing on both literature and in-the-field surveys.

The local climate and bio-climate were determined on the basis of the 30 years thermopluviometric data recorded at the Lesina meteorological station (5 m a.s.l.) and published in the Annali Idrologici del Servizio Idrografico del Ministero dei Lavori Pubblici d'Italia (1963-1992).

Such data were used to obtain more effective climatic and bio-climatic indexes and/or diagrams.

The De Martonne (*IA* – 1926) drought, continentality (*Ic*), annual ombrothermic (*Io*), summer ombrothermic (*Ios2*, *Ios3* and *Ios4*), thermic (*It*), annual positive temperature (*Tp*) (Rivas-Martinez 1987; 1996; Rivas-Martinez & al. 1999) ed the Emberger Q_2 (1955) indexes were determined. Both the Emberger Q_2 climatediagram after Nahal (1981) and the bioclimatic diagrams after Montero de Burgos e Gonzales Rebollar (1974; Forte & Vita 1998) were realised. The hydrologic balance, needed for the Bioclimatic Indexes (*IB*), was calculated using both the Thornthwaite (1948) evapotranspiration potential algorithm and the two maximum different values of the available water capacity (*AWC*). The former was considered as equal to the real one (*AWC* = *CR* = 11 mm) verified in the commonest sandy soils of the "Bosco Isola" area (Forte & al., 2002), while the latter equal to the theoretical maximum (*CRT*, water retention typical coefficient), i.e. determined by the only thermopluviometric characteristics of the considered station (*AWC* = *CRT* = CR = 188.6 mm).

The research on the vascular flora of the "Bosco Isola" at Lesina was carried out for two years (1999-2000). The collected material was identified basing on Pignatti, (1982), Fiori (1923-1929), Zangheri (1976) and Tutin & al. (1968-1976).

The plant list includes both 521 taxa identified by the field surveys and collections and 157 taxa reported by Fenaroli (1966; 1970; 1973; 1974), Corbetta, (1970), Curti & al. (1974) and Pantaleo (1991).

Nomenclature, with a few exceptions, and family arrangement are after *Flora d'Italia* di S. Pignatti (1982). Species are alphabetically arranged within the families. For the taxa found in the field, life form following Raunkiaer (cfr. Pignatti 1982), the chorological type, habitat, locality and collecting date are given. These latter two data are omitted for the taxa reported by other Authors, referring to their published works. Binomials marked by an asterisk refer to taxa not reported by Curti & al. (1974); binomials marked by two asterisks refer to either species or subspecies found in the field and not reported for Apulia by Pignatti (1982); names of species new to the "Bosco Isola" are marked by "n", while those new to Apulia are marked by "N". Records with the collecting date (in total 503) are provided with herbarium specimens that are kept in the Herbarium of the Bari Botanical Garden Museum (BI).

For each taxon, its incidence in the relevant localities was evaluated. Furthermore chorological spectra were elaborated.

Pedological, climatic and bioclimatic outlines

The pedological substratum of the "Bosco Isola" mainly consists of sand of different origin, being the most important component of the Littoral dune sequence separating the lagoon from the sea. Either in the most internal parts of the Littoral dunes, where the water periodically surfaces in the wet hollows (locally known as "fantine") or in the areas near the lagoon, the pedologic substratum is made of either sand mixed to blackish clay, typical of the marshy swamps, or clayish muds originated by silt and plant residuals decomposed.

Some plant communities with the therophytic halophytes *Bassia hirsuta* (L.) Asch. and *Suaeda maritima* (L.) Dumort, or with *Salicornia europaea* L. ones, occur on a quite particular substratum made of *Ruppia maritima* L. residuals on the lagoon shore. Nevertheless, the commonest soil in the study areas is to be classified, at each layer, as "sand", following the U.S.D.A. (cfr. Rasio & Vianello 1995). The sand percentage (coarse sand + fine sand) exceeds 90%, at the root depth, while the percentage of sift and clay is always low (Tab. 1). Only the soil upper layer (ranging between 0 and 10 cm in depth) includes a large amount of organic matter (Tab. 1) improving the water storage. Owing to the soil texture, the plant absorption water capacity (*AWC*) is, indeed, rather low (the *AWC* value at the root depth from 0 to 80 cm in soil depth is 11 mm), and slightly higher only in the upper layer (Tab. 1). Stratification is scarce, as it is shown by a poorly differentiated profile. According to Giordano (1999) this soil can be included within the 'Entisols psamments' characterized by subalkaline pH on the surface and alkaline pH into the depths (Tab. 1). These pedologic properties affect the local flora.

The macro-climate, following De Martonne classification modifyed by De Philippis (1937), belongs to the warm-temperate type, with mild winter (only three months with the mean temperature lower than 10 °C), warm (23,9 °C, the mean temperature in July, the hottest month) and relatively dry summer (116,1 mm, the mean summer rainfall). The pluviometric regimen belongs to the Mediterranean type and ranges between the winter maximum in December (74,8 mm) and the summer minimum in June (28,1 mm).

Following the Rivas-Martinez (1987; 1996) and Rivas-Martinez & al. (1999) classification, according to the deduced index values (Tab. 2), the macro-bio-climate is of the Mediterranean type and the bio-climate of the 'pluviseasonal-oceanic' type, between the

Tab. 1. Physical-chemical characteristics of the soil.

Granulometry						%	
Layer	% clay	% mud	% Fine sand	% Coarse sand	% Sand	**Organic matter**	**pH**
0 - 10	2.0	2.0	22.1	73.9	96.0	2.110	8.08
10 - 20	1.5	0.0	11.3	87.2	98.5	0.570	7.84
20 - 40	1.0	0.5	16.6	81.9	98.5	0.570	8.22
40 - 60	1.0	0.5	15.6	82.9	98.5	0.201	8.50
60 - 80	0.0	1.5	15.3	83.2	98.5	0.101	8.72

lower meso- Mediterranean belt and in the upper horizon of the dry ombro-type. The Emberger (1955) Q_2 value and the mean value of the minimum temperature in the coldest month (climatediagram after Nahal, Fig. 2) show that the bioclimate is Mediterranean sub-humid of a temperate type. The De Martonne IA value (Tab. 2) points out xerothermic conditions suitable for maquis formations (*durifruticeta*).

Plant sprouting, except a few periods, occur all the year long, according to the annual bio-climatic data, analysed following the Montero de Burgos and Gonzaler Rebollar (1974) pattern. The bio-climatic diagram (Fig. 3; Tab. 3), in facts, shows that in this area the water availability (D), calculated after a soil water storage value (CR) equal to 11 mm, is lower than the potential requirements, indicated through the potential evapotranspiration (ETP), since early May until late September. Such water deficit brings about low values in the plant sprouting activity (Free Bio-climatic Intensity in the warm period IBLc) during this period, showing higher values only in September. Besides, the winter thermic values (from December to February), if not determining an interruption (IBLf equal to 0; Tab. 3), strongly reduce the plant activity. Such activity increases in spring – with the April peak – and in autumn – with the October peak. As showed in the above mentioned diagram, the highest IBLc values occur in autumn; accordingly, species either under shooting or shoot-

Tab. 2 - Climatic and bioclimatic indexes.

Index	
Io	3.34
Ios_2	1.84
Ios_3	1.68
Ios_4	1.74
Ic	16.30
It	306.82
Tp	1851
Q_2	87.41
IA	24.31

Io = Ombrothermic index; Ios2 = Ombrothermic index concerning the two summer warmest months; Ios3 = Ombrothermic index concerning three months; Ios4 = Ombrothermic index concerning four months; Ic = Continentality index; It = Thermic index; Tp = Annual positive temperatures; Q2 = Pluviothermic rate; IA = Drought index

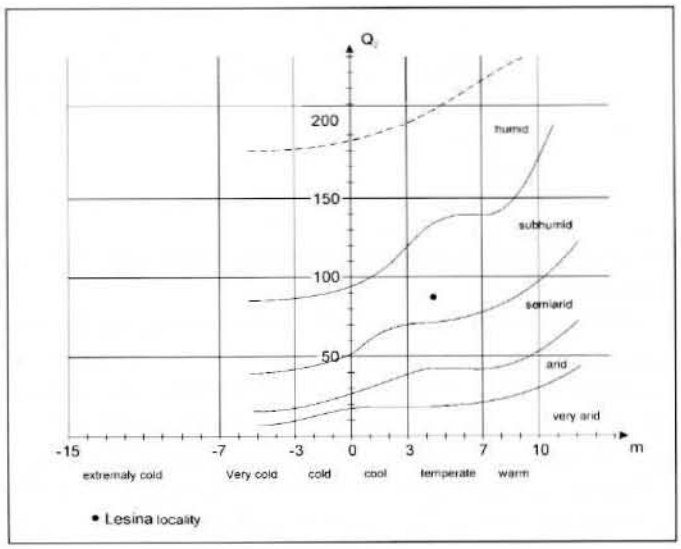

Fig. 2. Climate diagram after Nahal.

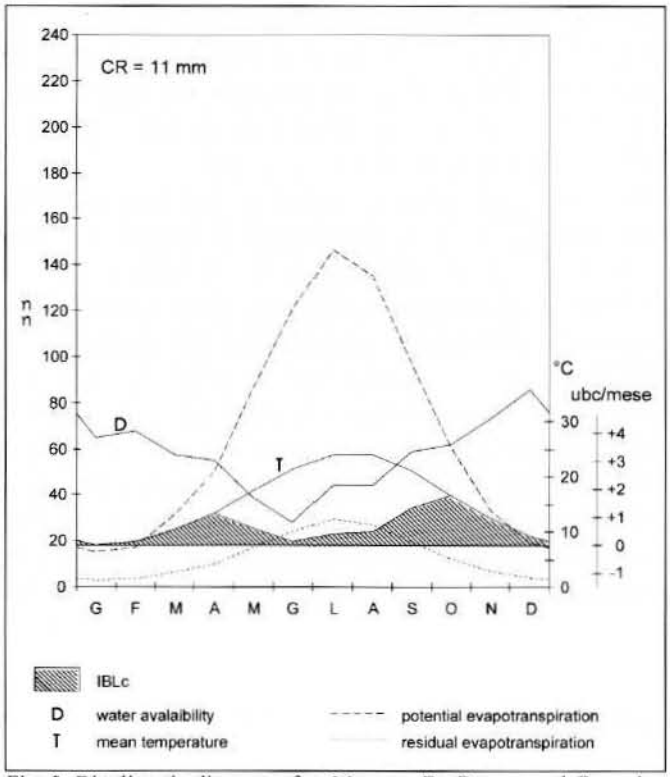

Fig. 3. Bioclimatic diagram after Montero De Burgos and Gonzales Rebollar (1974) with the watwr retention coefficent (CR) equal to 11 mm.

ing renewal (woody evergreen species) in this period are the best adapted to this bioclimatic trend.

The above remarks concern the taxa occurring on the sandy areas where the water supply depends on the substantial meteoric water stored as reserve (S) in the soil. Species occurring on environments with water table supply, quite common in this territory (e.g.: *Quercus ilex* L. woods and shrubbish formation; "fantine", etc.), often show a dramatically different bio-climatic trend. Assuming that the whole seasonal meteoric water is available as the only ground water supply for the plant, i.e. the CR value in the bio-climatic diagram equal to CRT (Fig. 4; Tab. 4), it follows an "unsaturated" bio-climate, even leading to a quite higher productivity. In facts, the increased spring-summer water availability in the study locality, even originating a significant sprouting activity (IBLc; Tab. 4), does not reduce the water deficit as deduced from the summer values in the thermopluviometric table (ETP > Rainfall + Reserve). Therefore, the Real Bio-climatic Intensity (IBR) is always lower than Potential one (IBP) (Fig. 4). Besides, in such environments spring, rather than autumn, is fuller sprouting time.

Tab. 3. Climatic and bioclimatic parameters concerning the bioclimatic diagram after Montero de Burgos e Gonzaler Rebollar (1974) calculated by a retention coefficient (CR) equal to 11 mm.

CR = 11 mm													
	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
T (°C)	7.6	8.2	10.4	13.3	17.3	21.3	23.9	23.8	21.1	16.6	12.5	9.1	15.4
P (mm)	53.7	56.4	46.5	43.8	34.0	28.1	43.9	44.1	58.9	61.9	71.9	74.8	618.0
ETP (mm)	15.1	17.0	31.2	50.2	86.0	120.8	146.3	135.1	97.4	60.7	33.3	19.3	812.4
D (mm)	64.7	67.4	57.5	54.8	38.6	28.1	43.9	44.1	58.9	61.9	73.1	85.8	678.8
S (mm)	11.0	11.0	11.0	4.6	0.0	0.0	0.0	0.0	0.0	1.2	11.0	11.0	
etr (mm)	3.0	3.4	6.2	10.0	17.2	24.2	29.3	27.0	19.5	12.1	6.7	3.9	162.5
IBP (ubc/month)	0.02	0.14	0.58	1.16	1.96	2.76	3.28	3.26	2.72	1.82	1.00	0.32	19.02
IBR (ubc/month)	0.02	0.14	0.58	1.16	0.61	0.11	0.41	0.52	1.38	1.82	1.00	0.32	8.06
IBLc (ubc/ month)	0.02	0.14	0.58	1.16	0.61	0.11	0.41	0.52	1.38	1.82	1.00	0.32	8.06
IBSc (ubc/ month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IBCc (ubc/ month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IBLf (ubc/ month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

T = Monthly mean temperature; P = Monthly raainfall; ETP = Potential evapotranspiration; D = Water availability; S = Water supply; etr =Residual evapotranspiration; IBP = Potential bioclimatic intensity; IBR = Real bioclimatic intensity; IBLc =Warm period free bioclimatic intensity; IBSc = Warm period dry bioclimatic intensity; IBCc = Bioclimatic intensity affected by the warm period; IBLf = Cold period free bioclimatic intensity.

Tab. 4. Climatic and bioclimatic parameters concerning the bioclimatic diagram after Montero de Burgos and Gonzaler Rebollar (1974) calculated by means of the retention coefficient (CR) considered equal to the standard water retention coefficient (CRT)

CR = CRT = 188,6 mm													
	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
T (°C)	7.6	8.2	10.4	13.3	17.3	21.3	23.9	23.8	21.1	16.6	12.5	9.1	15.4
P (mm)	53.7	56.4	46.5	43.8	34.0	28.1	43.9	44.1	58.9	61.9	71.9	74.8	618.0
ETP (mm)	15.1	17.0	31.2	50.2	86.0	120.8	146.3	135.1	97.4	60.7	33.3	19.3	812.4
D (mm)	49.0	190.3	219.8	232.4	216.2	158.3	81.4	44.1	58.9	61.9	73.1	114.6	1600.0
S (mm)	33.9	173.3	188.6	182.2	130.2	37.5	0.0	0.0	0.0	1.2	39.8	95.3	
etr (mm)	3.0	3.4	6.2	10.0	17.2	24.2	29.3	27.0	19.5	12.1	6.7	3.9	162.5
IBP (ubc/month)	2.08	13.74	8.56	5.54	2.89	1.39	0.45	0.16	0.51	1.02	2.49	7.17	
IBR (ubc/ month)	0.02	0.14	0.58	1.16	1.96	2.76	3.28	3.26	2.72	1.82	1.00	0.32	19.02
IBLc (ubc/ month)	0.02	0.14	0.58	1.16	1.96	2.76	1.46	0.52	1.38	1.82	1.00	0.32	13.11
IBSc (ubc/ month)	0.02	0.14	0.58	1.16	1.96	2.76	1.46	0.52	1.38	1.82	1.00	0.32	13.11
IBCc (ubc/ month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IBLf (ubc/ month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(T = Monthly mean temperature; P = Monthly raainfall; ETP = Potential evapotranspiration; D = Water availability; S = Water supply; etr =Residual evapotranspiration; IBP = Potential bioclimatic intensity; IBR = Real bioclimatic intensity; IBLc =Warm period free bioclimatic intensity; IBSc = Warm period dry bioclimatic intensity; IBCc = Bioclimatic intensity affected by the warm period; IBLf = Cold period free bioclimatic intensity.)

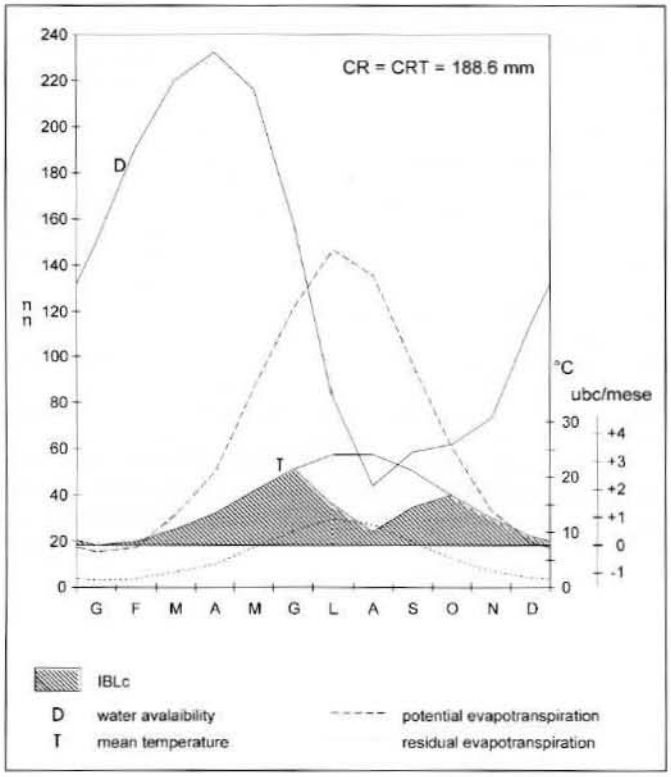

Fig.4 - Bioclimatic diagram after Montero De Burgos and Gonzales Rebollar (1974) with the watwr retention coefficent (CR) considered equal to standard one (CRT).

Plant list

Equisetaceae

Equisetum fluviatile L. – G rhiz - Circumbor. – Humid Sands – S. Andrea (29/05/99).

Equisetum ramosissimum Desf. subsp. ***ramosissimum*** – G rhiz - Circumbor. – Humid sands, brackish hollows and uncultivated sandy lands – S. Andrea (23/08/1999) and Cornone (09/04/00).

Hypolepidaceae

Pteridium aquilinum (L.) Kuhn - G rhiz - Cosmop. – Shrublands – Acquarotta (01/06/00).

ASPLENIACEAE

n ****Asplenium trichomanes*** subsp. ***quadrivalens*** D. E. Meyer – H ros - Cosmop. – Vertical shaft – Scampamorte (19/05/00).

PINACEAE

Pinus halepensis Miller – P scap - Stenomedit. – Littoral maquis and artificial planting – S. Maria (09/01/99).

n ****Pinus pinaster*** Aiton – P scap - W-Medit. – Windbreak planting – S. Maria (15/09/99).

Pinus pinea L. – P scap - Euri-Medit. – Artificial planting and scrub – acquarotta (09/10/99).

CUPRESSACEAE

Juniperus oxycedrus subsp. ***macrocarpa*** (S. & S.) Ball – P caesp - Euri-Medit. – Littoral maquis – S. Maria (09/01/99).

N ***Juniperus turbinata*** Guss. – P caesp - Euri-Medit. – Littoral maquis – S. Maria (09/01/99).

SALICACEAE

Populus alba L. – P scap - Paleotemp. – Depressed Scrubs – Acquarotta (07/09/99).

N ** ***Populus canescens*** (Aiton) Sm. – P scap - S-Europ. – Wet soil planting, marsh edges

Acquarotta (25/03/2000) and (09/10/99).

Populus nigra L. – P scap - Paleotemp. – Wet soil, pastures – Acquarotta (09/10/1999) and Porcareccia (01/04/99).

Salix fragilis L. – P scap- Eurosib. – Wet soils and ditch edges – (Curti & al. 1974)

Salix alba L. subsp. ***alba*** P scap - Paleotemp. – Marsh edges – Acquarotta (09/10/99)

Corylaceae

Carpinus betulus L. – P scap - Europ.– Scrubs – (Curti & al. 1974)

Taxon frequent mesophile woods and Po Valley forests (*Querco-Carpinetum*), in the Gargano area it mainly occur at Bosco Quarto and within a mesophile and submesophile context in the Foresta Umbra. On the lesina dune its occurrence is to be verified.

n ****Carpinus orientalis*** Miller – P caesp - Pontic – Depressed Scrubs – Acquarotta (07/09/99)

FAGACEAE

n ****Quercus cerris*** L. – P scap - N-Euri-Medit. – Ilex grove near fantina "Pierazzone" – Between Pennacchio and Spedale

Quercus ilex L. – P scap – Stenomedit. – Woods and scrubs – Acquarotta (09/10/99)

Quercus pubescens Willd. *s.l.* – P caesp- SE-Europ. – Woods and scrubs – Acquarotta (10/05/00)

ULMACEAE

Ulmus minor Miller – P caesp – Europ.-Caucas. – Hollow scrubs, road-edges planting – Cornone (10/05/2000) and Acquarotta (22/05/99)

MORACEAE

Ficus carica L. – P scap- Medit.-Turan. – Uncultivated lands – Porcareccia (05/06/99)

URTICACEAE

Parietaria diffusa M. & K. H scap- Euri-Medit.-Macaron. Shaded walls – Scampamorte (29/05/99) and (05/06/99)

Urtica dioica L. – H scap - Cosmop. – Hedges, ruins and uncultivated lands – (Curti & al. 1974)

Urtica urens L. – T scap - Subcosmop. – Synanthropic ruins and beaten grounds – Schiapparo (16/01/99) and Porcareccia (01/04/99)

SANTALACEAE

Osyris alba L. – NP - Euri-Medit. – Maquis – Acquarotta (22/05/99)

RAFFLESIACEAE

Cytinus hypocistis (L.) L. – G rad - Macaron.-Medit. – Garrigue – Loc. Chiusa

POLYGONACEAE

Fallopia convolvolus (L.) Holub – T scap- Circumbor. – Cultivated and uncultivated fields (Curti & al. 1974)

Polygonum aviculare L. – T rept- Cosmop. – Salty and clayey lands – S. Andrea (12/06/99) and Acquarotta (08/05/99)

Polygonum lapathifolium L. – T scap- Paleotemp. – Cultivated and uncultivated fields (Curti & al. 1974; Pantaleo 1991)

Polygonum maritimum L. – H rept - Subcosmop. – Dunes, uncultivated lands near the sea – Scampamorte (19/08/99) and Punta Pietre Nere (09/10/99)

Rumex acetosa L. – H scap - Circumbor. – Ruins (Curti & al. 1974)

Rumex crispus L. – H scap - Cosmop. – Salty fields – S. Andrea (12/06/99) and (29/05/99)

Rumex pulcher L. subsp. ***pulcher*** – H scap - Euri-Medit. – Uncultivated lands – Acquarotta (08/05/99)

CHENOPODIACEAE

Arthrocnemum fruticosum (L.) Moq. – Ch - succ - Euri-Medit. and S-Afr. – Littoral halophyte – Foce S. Andrea

Arthrocnemum glaucum (Delile) Ung.-Sternb.– Ch - succ - Medit.-Macaron. – Salty hollows – Foce S. Andrea (23/08/99)

Atriplex halimus L. – P caesp - S-Afr. -Atl. - Stenomedit. Salty and subsalty environments – Foce Schiapparo

Atriplex latifolia Wahlenb. – T scap - Circumbor. – Subsalty soils – Foce S. Andrea (23/08/99)

Bassia hirsuta (L.) Asch. – T scap - C-Asia-Europ. – Accumulation and bank gravels – Gravaglione (15/09/99)

Beta vulgaris subsp. ***maritima*** (L.) Arcang. – H scap - Euri-Medit. – Accumulation and brackish clays – S. Andrea (12/06/99)

Chenopodium album L. – T scap - Subcosmop. – Cultivated and uncultivated fields – (Curti & al. 1974)

Chenopodium murale L. – T scap - Cosmop. – Uncultivated lands near the sea – Punta Pietre Nere (09/10/99)

n ****Chenopodium opulifolium*** Schrader – T scap - Paleotemp. – Fields S. Andrea (29/05/99) and Schiapparo (16/01/99)

Corispermum leptopterum (Asch.) Iljin – T scap - Europ. – Psammophyte and littoral halophyte (Fenaroli 1966)

Reported by Fenaroli as *C. hyssopifolium* **L.**, this taxon was not later found owing to the strong alterations the site underwent when both the Acquarotta canal and the recent wharf were built.

Halimione portulacoides (L.) Aellen – Ch caesp - Circumbor. – Salty hollows – Foce S. Andrea (23/08/99)

Salicornia europaea L. – T scap- Europ. – Brackish ditches, salty hollows – S. Andrea (12/06/99) and Foce S. Andrea (23/08/99)

N ****Salicornia ramosissima*** J. Woods – T scap– Medit.-Atl. – Salty hollows – S. Andrea (15/09/99)

Salsola kali L. subsp. ***kali*** – T scap - Paleotemp. – Salty hollows – S. Andrea (23/08/99)

Salsola soda L. – T scap - Paleotemp. – Uncultivated salty soils – S. Andrea (12/06/99) and (09/04/2000)

Suaeda fruticosa (L.) Forsskål – NP - Cosmop. – Littoral Psammophyte – Foce Schiapparo, Loc. Acquarotta

Suaeda maritima (L.) Dumort. – T scap - Cosmop. – Brackish uncultivated lands, salty fields – S. Andrea (12/06/99)

AMARANTHACEAE

Amaranthus albus L. – T scap - N-Amer. – Cultivated fields (Curti & al. 1974)

n ****Amaranthus lividus*** L. – T scap - Euri-Medit. – Beaten soils – S. Andrea (12/06/99)

n ****Amaranthus lividus*** L. var. ***ascendens*** (Loisel.) Thell. – T scap - Euri-Medit. – Beaten soils – Zappino (05/06/99)

Amaranthus retroflexus L. – T scap - Cosmop. – Uncultivated lands (Curti & al. 1974)

NYCTAGINACEAE

n ****Mirabilis jalapa*** L. – G bulb - S-Amer. – Synanthropic uncultivated lands – Acquarotta (07/09/99)

AIZOACEAE

Carpobrotus edulis (L.) N. E. Br. – Ch suffr - S-Afr. – Dunes – Marina di Lesina (08/05/99)

PORTULACACEAE

Portulaca oleracea L. subsp. ***oleracea*** – T scap - Subcosmop. – Uncultivated lands – S. Andrea (15/09/99)

CARYOPHYLLACEAE

Arenaria serpyllifolia L. – T scap - Subcosmop. – Sandy grasslands – Schiapparo (28/03/99)

Cerastium glomeratum Thuill. – T scap - Euri-Medit. – Fields – Punta Pietre Nere (24/03/99)

n ****Cerastium glutinosum*** Fries – T scap - Euri-Medit. – Grassy glades, carriage-road edges, sandy grasslands – Punta Pietre Nere (24/03/99) Acquarotta (25/03/00) and S. Maria (10/03/99)

Cerastium ligusticum Viv. – T scap - W-Medit. – Grasslands and sandy lands (Curti & al. 1974)

n ****Cerastium pumilum*** Curtis – T scap - Euri-Medit. – Clayey field edges – Acquarotta (08/05/99)

Cerastium semidecandrum L. – T scap - Euras. – Fields – Schiapparo (28/03/99)

Herniaria glabra L. – T scap - Paleotemp. – Sandy grasslands and grassy glades – S. Maria (10/03/99) and Morella (07/04/99)

n ****Herniaria hirsuta*** L. – T scap - Paleotemp. – Field edges – Cornone (09/04/00)

n ****Minuartia hybrida*** (Vill.) Schischkin – T scap - Paleotemp. – Shrubbery – Zappino (20/04/99)

n ****Minuartia mediterranea*** (Link) Maly – T scap - NW-Medit. – Fields – Zappino (20/04/00)

Petrorhagia prolifera (L.) Ball & Heyw. – T scap - Euri-Medit. – Uncultivated lands, olive groves, sandy places (Curti & al. 1974)

Petrorhagia saxifraga subsp. ***gasparrinii*** (Guss.) Pign. – H caesp - Euri-Medit. – Sand – S. Maria (29/05/99)

n ****Petrorhagia velutina*** (Guss.) P. W. Ball & Heywood – T scap - S-Medit. – Shrubbery – Zappino (20/04/99)

Polycarpon tetraphyllum L. – T scap - Euri-Medit. – Carriage-path edges – Acquarotta (25/03/00)

Silene alba (Miller) Krause – H scap - Paleotemp. – Hedges and scrubs (Curti & al. 1974)

Silene colorata subsp. ***canescens*** (Ten.) Cif. & Giac. – T scap - Stenomedit. – (Fenaroli 1966)

See note under ***Corispermum leptopterum*** (Asch.) Iljin

Silene colorata Poiret subsp. ***colorata*** – T scap - Stenomedit. – Sandy grasslands – Morella (07/04/99)

n ****Silene conica*** L. subsp. ***conica*** – T scap - Paleotemp. – Sandy grasslands – Cornone (09/04/00)

n ****Silene gallica*** L. – T scap - Euri-Medit. – Shrublands – Acquarotta (08/05/99)

Silene italica (L.) Pers. subsp. ***italica*** – H ros- Euri-Medit. – Shrublands – Canale Zappino (20/04/99)

Silene latifolia Poiret – H bienn- Stenomedit. – Grasslands – Schiapparo (28/03/99)

Silene vulgaris (Moench) Garcke subsp. ***vulgaris*** – H scap– Paleotemp. – Uncultivated and grassy fields (Curti & al. 1974)

Silene vulgaris subsp. ***angustifolia*** (Miller) Hayek – H scap - E-Medit. – Uncultivated fields – Acquarotta (08/05/99)

Spergularia marina (L.) Griseb. – T scap - Subcosmop. – Brackish fields – S. Andrea (12/06/99)

Spergularia media (L.) C. Presl. – Ch suffr– Subcosmop. – Littoral brackish places (Curti & al. 1974)

Stellaria media (L.) Vill. – T rept- Cosmop. – Uncultivated fields and ruins (Curti & al. 1974)

n ***Stellaria pallida*** (Dumort.) Piré – T scap - Paleotemp. – Grassy glades – Morella (07/04/99)

RANUNCULACEAE

Adonis annua L. subsp. ***annua*** – T scap - W-Europ. – Cultivated and uncultivated fields (Curti & al. 1974)

Anemone hortensis L. – G bulb- N - Medit. – Shrublands and scrubs – Cornone (25/03/00) and Spedale (01/04/99)

Clematis flammula L. – P lian- Euri - Medit. – Hedges – Zappino (05/06/99)

Clematis viticella L. – P lian- SEurop.- C-Asiatic – Scrubs (Curti & al. 1974)

Delphinium halteratum S. & S. – T scap - Stenomedit. – Uncultivated and arid fields – Porcareccia (05/06/99) and S. Maria (19/08/99)

n ***Ranunculus baudotii*** Godron – Rooting hydrophyte - Medit.- Atl. – Brackish shallow water – Canale Zappino (20/04/99)

n ***Ranunculus bulbosus*** subsp. ***aleae*** (Willk.) Rouy & Fouc. – H scap - Euri-Medit. – Clayey fields – Canale Zappino (20/04/99)

n ***Ranunculus ficariiformis*** F. W. Schultz – G bulb- Euri-Medit. – Cart-tracks edges – Acquarotta (25/03/00)

Ranunculus muricatus L. – T scap - Euri-Medit. – Shaded grasslands – Scampamorte (29/05/99)

Ranunculus neapolitanus Ten. – H scap - NE-Medit. – Scrubs and grassy places (Curti & al. 1974)

n ***Ranunculus ophioglossifolius*** Vill. – T scap - Euri-Medit. – Muddy shallow water – Canale Zappino (20/04/99)

Ranunculus sardous Crantz – T scap - Euri-Medit. – ayey wet fields – Acquarotta (08/05/99)

Ranunculus sceleratus L. – T scap - Paleotemp. – Muds – Porcareccia (08/05/99) and (05/06/99)

Ranunculus trichophyllus Chaix subsp. ***trichophyllus*** – Rooting hydrophyte - Europ. – Watercourses – (Curti & al. 1974)

Thalictrum exaltatum subsp. ***mediterraneum*** (Jordan) P. Fourn. – H scap - SW-Europ. – Brackish muds – Spedale (14/06/00)

*****Thalictrum lucidum*** L. – H scap - SE-Europ. – Fantine in the *Q. ilex* wood – Acquarotta (05/06/99) and (01/06/00)

N *****Thalictrum simplex*** L. – H scap - Eurosib. – Wet flat places and shrublands – Acquarotta (22/05/99)

GUTTIFERAE

****Hypericum perfoliatum*** L. – H scap - Medit. – Shrublands – (Fenaroli 1973)

Hypericum perforatum subsp. ***angustifolium*** (DC.) Gaudin – H scap - Paleotemp. – Shrublands – Acquarotta (22/05/99)

LAURACEAE

Laurus nobilis L. – P caesp - Stenomedit. – Wood and scrub – Spedale (01/04/99)

PAPAVERACEAE

Fumaria capreolata L. – T scap - Euri-Medit. – Grasslands among shrubs – Punta Pietre Nere (24/03/99)

Fumaria flabellata Gasparr. – T scap - Stenomedit. – Cultivated and uncultivated fields, walls – (Curti & al. 1974)

Fumaria officinalis L. subsp. ***officinalis*** – T scap - Paleotemp. – Sandy fields – Acquarotta (25/03/00) and (01/04/99)

n ****Fumaria vaillantii*** Loisel. – T scap - Medit.-Turan. – Fields – Acquarotta (25/03/00) and (01/04/99)

Glaucium corniculatum (L.) Rudolph – T scap– S-Medit. – Fields and littoral uncultivated fields – (Fenaroli 1966)

See note under ***Corispermum leptopterum*** (Asch.) Iljin

Glaucium flavum Crantz – H scap - Euri-Medit. – Rocks by the shore – Punta Pietre Nere (22/05/99)

Hypecoum procumbens L – T scap– Paleotemp. – Grasslands – Scampamorte

n ****Papaver dubium*** L. – T scap - E-Medit.-Turan. – Shoddy-ground – Acquarotta (22/05/99)

n ***Papaver hybridum*** L. – T scap– Medit.-Turan. – Field edges – Acquarotta (08/05/99) and Cornone (09/04/2000)

Papaver rhoeas L. subsp. ***rhoeas*** – T scap - E-Medit. – Removed soils – Acquarotta (22/05/99)

CRUCIFERAE

n ***Arabidopsis thaliana*** (L.) Heynh. – T scap - Paleotemp. – Grassy glades – Punta Pietre Nere (24/03/99)

n ***Arabis hirsuta*** (L.) Scop. – H bienn- Europ. – Clearings in the scrub – Acquarotta (01/06/00)

N ****Arabis rosea*** DC. – H scap - Endem. – Shrublands – Spedale (07/04/99)

Arabis verna (L.) R. Br. – T scap - Stenomedit. – Shrublands – Cornone (09/04/00)

Biscutella didyma L. – T scap - S-Medit-Turan. – Shrublands – Spedale (07/04/99)

Brassica nigra (L.) Koch – T scap - Medit. – Hedges at the field edges – S. Andrea (12/06/99)

Brassica tournefortii Gouan – T scap - Medit.-Saharo-Sind. – Shoddy-ground – Punta Pietre Nere(24/03/99)

Bunias erucago L. – T scap - N-Medit. – Field edges – Cornone (09/04/00)

Cakile maritima Scop. subsp. ***maritima*** – T scap– Medit.-Atl. – Dunes – Scampamorte (19/08/99)

Capsella bursa-pastoris (L.) Medicus – H bienn- Cosmop. – Uncultivated fields – Cornone (09/04/00)

n ***Capsella rubella*** Reuter – T scap - Euri-Medit. – Paths – Schiapparo (28/03/99)

Cardamine hirsuta L. – T scap - Cosmop. – Fields – Acquarotta (27/01/99)

Cardaria draba (L.) Desv. – G rhiz - Medit-Turan. – Uncultivated fields near houses, carriage-path edges – Schiappano and Acquarotta (28/03/99)

Clypeola jonthlaspi L. – T scap - Stenomedit. – Sand – Acquarotta (01/04/99)

Diplotaxis erucoides (L.) DC. – T scap - Stenomedit. – Uncultivated fields – Acquarotta and S. Andrea (28/03/99)

Diplotaxis muralis (L.) DC. – T scap - N-Medit-Atl. – Cultivated fields and ruins (Curti & al. 1974)

Diplotaxis tenuifolia (L.) DC. – H scap - Submedit-SubAtl. – Clayey uncultivated fields – Acquarotta (22/05/99) and S. Andrea (29/05/99)

Erophila verna (L.) Chevall. subsp. ***verna*** – T scap - Circumbor. – Sandy grasslands – S. Maria (10/03/99)

Eruca sativa Miller var. ***longirostris*** (Vechtr.) Roay – T scap - Medit-Turan. – Uncultivated fields – Acquarotta (25/03/00)

Hirschfeldia incana (L.) Lagr.-F. – H scap - Medit-Macaron. – Sandy uncultivated fields – Acquarotta (08/05/99)

Lobularia maritima (L.) Desv. – T scap - Stenomedit. – Fields – S. Maria (09/01/99)

Maresia nana (DC.) Batt. – T scap - Stenomedit. – Sand – S. Maria (10/03/99)

Raphanus raphanistrum subsp. ***maritimus*** (Sm.)Thell. – T scap - Euri-Medit. – Fields and road edges (Curti & al. 1974)

Raphanus raphanistrum L. subsp. ***raphanistrum*** – T scap - Euri-Medit. – Sandy fields – Acquarotta (01/04/99)

Rapistrum rugosum subsp. ***orientale*** (L.) Arcang. – T scap - Euri-Medit. – Uncultivated fields – Acquarotta (08/05/99)

Sinapis alba subsp. ***dissecta*** (Lag.) Bonnier – T scap - E-Medit. – Cultivated fields, ruins and walls – (Fenaroli 1966)

See note under *Corispermum leptopterum* (Asch.) Iljin

Sinapis arvensis L. – T scap - Stenomedit. – Canal banks and carriage-path edges – Zappino (05/05/99) and Acquarotta (22/05/99)

Sinapis pubescens L. – Ch suffr - SW-Medit. – Uncultivated fields – Porcareccia (05/06/99)

Sisymbrium irio L. – T scap - Paleotemp. – Ruins – Scampamorte (29/05/99)

n ***Sisymbrium officinale*** (L.) Scop. – T scap - Paleotemp. – Shrublands – Canale Zappino (20/04/99)

n ***Sisymbrium orientale*** L. – T scap - Euri-Medit. – Sandy grasslands – Acquarotta (08/05/99)

RESEDACEAE

Reseda alba L. – T scap - Stenomedit. – Shrublands and uncultivated fields – Canale Zappino (20/04/99)

Reseda lutea L. – H scap - Europ. – Sandy fields – Acquarotta (01/04/99)

Reseda phyteuma L. – H scap– Euri-Medit. – Cultivated and uncultivated fields – (Curti & al. 1974)

CRASSULARIACEAE

Sedum stellatum L. – T scap - Stenomedit. – Walls and stony places – (Curti & al. 1974)

SAXIFRAGACEAE

Saxifraga tridactylites L. – T scap - Euri-Medit. – Arid places, garrigue – (Curti & al. 1974)

ROSACEAE

n ****Agrimonia eupatoria*** L. – H scap - Cosmop. – Field edges – Acquarotta (09/10/99)

n ****Crataegus monogyna*** subsp. ***azarella*** (Griseb.) Franco – P caesp- Paleotemp. – Shrublands in *Q. ilex* wood – Acquarotta (01/06/00)

Crataegus monogyna Jacq. subsp. ***monogyna*** – P caesp- Paleotemp. – Wood and scrub – Canale Zappino (20/04/99)

Crataegus oxyacantha L. – P caesp– Centroeurop. – Scrubs and maquis – (Curti & al. 1974)

This species is rare to Apulia and several past records were erroneous owing to confusion with the former species. It mainly occurs in submontainous and montainous environments, in mesophilous and sub-mesophilous decidous woods even at their deterioration stages. In the "Bosco Isola" at Lesina, this species has not been found by the authors and, taking into account its apulian distribution, the Curti & al. (1974) record appears doubtful and has to be verified.

n ****Cydonia oblonga*** Miller – P scap - SW-Asiatic – Shrublands – Acquarotta (01/06/2000)

n ****Malus sylvestris*** Miller – P scap - Europ. – Scrubs – Zappino (29/10/99)

Potentilla recta L. – H scap– Medit.-Pontic – Arid fields – Acquarotta (10/05/00)

Potentilla reptans L. – H ros - Paleotemp. – Clayey and humid grasslands – Porcareccia (05/06/99) and (07/09/99)

n ****Prunus domestica*** subsp. ***insititia*** (L.) C. K. Schneider – P scap - Unknown – Hollow scrubs – Acquarotta (10/05/00)

Prunus mahaleb L. – P caesp - SEurop-Pontic – Scrubs – (Curti & al. 1974)

Prunus spinosa L. – P caesp - Europ-Caucasian – Shrublands – Acquarotta (07/09/99)

Pyrus amygdaliformis Vill. – P caesp - Stenomedit. – Maquis, hedged and uncultivated fields – (Curti & al. 1974)

n ****Pyrus communis*** L. – P scap - SE-Europ. – Hollow scrubs – Acquarotta (10/05/00) and Cornone (09/04/00)

n ****Pyrus pyraster*** Burgsd. – P scap - Eurasiatic. – Hollow scrubs – Acquarotta (10/05/00)

Rosa sempervirens L. – NP - Stenomedit. – Shrublands – Zappino (05/06/99)

****Rubus candicans*** Weihe – NP - ? – Hedges – (Pantaleo 1991)

N *****Rubus procerus*** P.J.Muller – NP - Europ. – Hedges – Porcareccia (05/06/99)

Rubus ulmifolius Schott – NP - Euri-Medit. – Hollows in the scrubs – Acquarotta (10/05/00)

n ****Sanguisorba minor*** Scop. subsp. ***minor*** – H scap - Paleotemp. – Grasslands – Cornone (09/04/00)

Sorbus domestica L. – P scap - Euri-Medit. – Cultivated and naturalized – (Curti & al. 1974)

LEGUMINOSAE

Acacia cyanophylla Lindley – P scap - Australian – Windbreak hedges – acquarotta (14/06/00)

*****Amorpha fruticosa*** L. – P caesp - N-American – Mud – S. Andrea (29/05/99)

Anthyllis vulneraria subsp. ***maura*** (Beck) Lindt. – H scap - SW-Medit. – Garrigue – Spedale

Astragalus hamosus L. – T scap - Medit-Turan. – Uncultivated fields – Cornone (09/04/00)

Colutea arborescens L. – P caesp - Medit-Pontic – Maquis – Acquarotta (08/05/99)

Coronilla emerus subsp. ***emeroides*** (Boiss. & Spruner) Hayek – NP - East-Medit-Pontic – Shrublands – Punta Pietre Nere (24/03/99)

Dorycnium hirsutum (L.) Ser. – Ch suffr- Euri-Medit. – Garrigue – Canale Zappino (05/05/99)

Dorycnium pentaphyllum subsp. ***suffruticosum*** (Vill.) Rouy – H scap - W-Medit. – Clayey hollows – Acquarotta (08/05/99)

Dorycnium rectum (L.) Ser. – Ch suffr- Stenomedit. – Brackish mud – Spedale (14/06/00)

Glycyrrhiza glabra L. – G rhiz- W-Asiatic-Stenomedit. – Sandy hollows – Scampamorte (19/05/00)

Hedysarum coronarium L. – H scap - W-Medit. – Shrublands – Acquarotta (08/05/99)

Hedysarum glomeratum Dietrich – T scap - W-Medit. – Stony grasslands – Acquarotta (24/03/99)

Hippocrepis ciliata Willd. – T scap - Stenomedit. – Sandy grasslands – Schiapparo (28/03/99)

Lathyrus aphaca L. – T scap - Euri-Medit. – Uncultivated fields – Acquarotta (08/05/99)

Lathyrus cicera L. – T scap - Euri-Medit. – Srublands – Acquarotta (20/04/00)

Lathyrus ochrus (L.) DC. – T scap - Stenomedit. – Uncultivated fields – Cornone (09/04/00)

Lathyrus sphaericus Retz. – T scap - Euri-Medit. – Arid grasslands, fields – (Curti & al. 1974)

Lotus commutatus Guss. – Ch suffr- Stenomedit. – Rocks, dunes – Punta Pietre Nere (22/05/99) and Canale Zappino (20/04/99)

Lotus corniculatus L. – H scap - Paleotemp. – Humid grasslands – Spedale (14/06/00)

Lotus ornithopodioides L. – T scap - Stenomedit. – Grasslands – Zappino (20/04/99)

n ***Lotus uliginosus*** Schkuhr – H scap - Paleotemp. – Mud – S. Andrea (29/05/99)

Medicago hispida Gaertner – T scap– Euri-Medit. – Grassy places and cultivated fields – (Curti & al. 1974)

Medicago litoralis Rohde – T scap– Euri-Medit. – Sandy shores and garrigue – (Curti & al. 1974; Pantaleo 1991)

Medicago lupulina L. – T scap - Paleotemp. – Grasslands – Canale Zappino (20/04/99)

Medicago marina (L.) Miller – Creeping chamaephyte - Euri-Medit. – Littoral sandy places – Littoral dune

Medicago minima (L.) Bartal var. ***minima*** – T scap - Eurimedit-C-Asiatic – Arid grasslands – Acquarotta (08/05/99)

Medicago minima (L.) Bartal var. ***recta*** (Willd.) Burnat – T scap - Eurimedit-C-Asiatic – Grassy clearings – Morella (07/04/99)

Medicago orbicularis (L.) Bartal. – T scap - Euri-Medit. – Grasslands – Canale Zappino (20/04/99)

Medicago rigidula (L.) All. – T scap - Euri-Medit. – Grasslands – Acquarotta and Canale Zappino (20/04/00)

Medicago sativa L. subsp. ***sativa*** – H scap - W- Asiatic – Sand, sandy fields. – Maria (29/05/99) and Acquarotta (07/09/99)

Medicago scutellata (L.) Miller – T scap - Euri-Medit. – Grasslands, arid places and cultivated fields – (Curti & al. 1974)

Medicago tenoreana Ser. – T scap - SW-Europ. – Arid grasslands and ruins – (Curti & al. 1974)

Medicago truncatula Gaertner – T scap - Stenomedit. – Arid grasslands – (Curti & al. 1974)

N *****Melilotus alba*** Medicus – T scap - Subcosmop. – Fields – S. Andrea (29/05/99)

Melilotus indica (L.) All. – T scap - Medit.-Turan. – Grasslands, cultivated fields – (Curti & al. 1974)

Melilotus sulcata Desf. – T scap - S-Medit. – Fields – S. Andrea (29/05/99) and Acquarotta (08/05/99)

Onobrychis caput-galli (L.) Lam. – T scap - Stenomedit. – Arid grasslands – Acquarotta (08/05/99)

n ****Ononis diffusa*** Ten. – T scap - S-Medit. – Fields – S. Andrea (29/05/99)

Ononis ornithopodioides L. – T scap - Stenomedit. – Arid places – (Curti & al. 1974)

n ****Ononis reclinata*** L. – T scap - S-Medit-Turan. – Sand and grassy clearings – Acquarotta (08/05/99) and Morella (07/04/99)

Ononis variegata L. – T scap - Stenomedit. – Littoral dunes – Marina di Lesina (Torre Fortore) (08/05/99)

Pisum sativum subsp. ***elatius*** (Bieb.) Asch. & Gr. – T scap - Stenomedit-Turan. – Scrub and maquis – (Curti & al. 1974)

****Psoralea bituminosa*** L. – H scap – Medit.-Atl. – (Fenaroli 1973)

Scorpiurus muricatus L. – T scap - Euri-Medit. – Carriage-path edges – Acquarotta (10/05/00)

Spartium junceum L. – P caesp- Euri-Medit. – Uncultivated fields – Acquarotta (08/05/99)

Trifolium angustifolium L. subsp. ***angustifolium*** – T scap - Euri-Medit. – Grasslands and sandy grasslands – Zappino and Acquarotta (08/05/99)

Trifolium campestre Schreber – T scap - Paleotemp. – Sandy grasslands – Zappino (05/05/99)

Trifolium cherleri L. – T scap - Euri-Medit. – Arid grassy places – (Curti & al. 1974)

n ****Trifolium fragiferum*** subsp. ***bonannii*** (Presl) Sojak – H rept- Paleotemp. – Humid grasslands – Porcareccia (05/06/99) and Spedale (14/06/00)

n ****Trifolium lappaceum*** L. – T scap - Euri-Medit. – Uncultivated fields – S. Andrea (29/05/99)

Trifolium pratense L. subsp. ***pratense*** – H scap - Eurosib. – Clayey fields – Canale Zappino (20/04/99)

Trifolium repens L. subsp. ***repens*** – H rept- Paleotemp. – Clayey fields – Canale Zappino (20/04/99)

Trifolium resupinatum L. – T rept- Paleotemp. – Grasslands – Canale Zappino (05/05/99)

Trifolium scabrum L. subsp. ***scabrum*** – T rept- Euri-Medit. – Grasslands – Canale Zappino (20/04/99)

Trifolium stellatum L. – T scap - Euri-Medit. – Arid and rocky grassy places, ruins – (Curti & al. 1974)

Vicia bithynica (L.) L. – T scap - Euri-Medit. – Cultivated and uncultivated fields (Curti & al. 1974)

Vicia hybrida L. – T scap - Euri-Medit. – Field edges – Acquarotta and Cornone (08/05/99)

Vicia lutea subsp. ***vestita*** (Boiss.) Rouy – T scap - Euri-Medit. – Grassy places, cultivated fields (Curti & al. 1974)

Vicia sativa subsp. ***angustifolia*** (Grufb.) Gaudin – T scap - Medit.-Turan. – Arid grassy places – (Curti & al. 1974)

Vicia sativa subsp. ***cordata*** (Wulfen) Ascherson & Graebner – T scap - Medit.-Turan.

Arid grassy places – (Curti & al. 1974)

Vicia sativa subsp. ***macrocarpa*** (Moris) Arcangeli – T scap - Medit.-Turan. – Grassy places – (Curti & al. 1974)

Vicia sativa L. subsp. ***sativa*** – T scap - Medit.-Turan. – Fields – Acquarotta (08/05/99) and (09/04/00)

n ***Vicia sativa*** subsp. ***segetalis*** (Thuill.) Gaudin – T scap - Medit.-Turan. – Uncultivated and sandy fields – Cornone (09/04/00) and Acquarotta (08/05/99 and 01/04/99)

Vicia tenuissima (Bieb.) Sch. & Th. – T scap - Euri-Medit. – Uncultivated fields – Acquarotta (08/05/99)

Vicia villosa subsp. ***varia*** (Host) Corb. – T scap - Euri-Medit. – Maquis – Acquarotta (22/05/99)

OXALIDACEAE

Oxalis pes-caprae L. – G bulb - S-Afr. – Wastelands – Punta Pietre Nere (5/09/1999 and 24/03/99)

GERANIACEAE

Erodium acaule (L.) Becherer & Thell. – H ros - Montainous - Medit. – Arid and grassy places, ruins – (Fenaroli 1970)

See note under *Corispermum leptopterum* (Asch.) Iljin

Erodium cicutarium (L.) L'Hér. var. ***arenarium*** (Jordan) Rouy – T scap - Subcosmop. – Uncultivated fields – Acquarotta (24/03/99)

Erodium cicutarium (L.) L'Hèr. – T scap - Euri-Medit. – Sandy and grassy places, ruins

(Curti & al. 1974)

Erodium chium (L.) Willd – T scap - Euri-Medit. – Littoral, sandy and arid grassy places – (Curti & al. 1974)

Erodium laciniatum (Cav.) Willd. – T scap - Stenomedit. – Sandy grasslands – Punta Pietre Nere – (24/03/99)

Erodium malacoides (L.) L'Hér. – T scap - Medit.-Macaron. – Uncultivated, arid grassy places and ruins – (Curti & al. 1974)

Geranium columbinum L. – T scap - Europ.-S.-Siberian – Uncultivated clayey fields, grassy clearings – Morella (07/04/99) and Acquarotta (22/05/99)

Geranium dissectum L. – T scap - Eurasiatic – Uncultivated fields – Acquarotta (08/05/99)

Geranium molle L. – T scap - Eurasiatic – Farm-yards – Schiapparo (28/03/99)

Geranium purpureum Vill. – T scap - Euri-Medit. – Shrublands – Punta Pietre Nere – (24/03/99)

Geranium rotundifolium L. – T scap - Paleotemp. – Uncultivated fields and ruins – (Curti & al. 1974)

ZYGOPHYLLACEAE

Tribulus terrestris L. – T rept- Cosmop. – Beaten uncultivated fields – S. Andrea (12/06/99)

LINACEAE

Linum bienne Miller – H bienn– Medit.-Atl. – Sandy grasslands – Zappino (05/05/99)

Linum decumbens Desf. – T scap - W-Medit. – Grassy places – (Curti & al. 1974)

*****Linum maritimum*** L. – H scap– W-Medit. – Humid grasslands – S. Andrea (12/06/99)

Linum strictum L. subsp. ***strictum*** – T scap - Stenomedit. – Sandy grasslands – Canale Zappino (05/05/1999) and S. Maria (29/05/99)

EUPHORBIACEAE

Chrozophora tinctoria (L.) Juss. – T scap - Medit.-Turan. – Cultivated and uncultivated fields near the sea – (Curti & al. 1974)

Euphorbia ceratocarpa Ten. – Ch suffr- Endem. – Humid hollows – Acquarotta (10/05/00)

Euphorbia chamaesyce L. – T rept– Euri-Medit. – Uncultivated fields – (Curti & al. 1974)

Euphorbia cyparissias L. – H scap– Centroeurop. – Grassy places, maquis, uncultivated fields – (Fenaroli 1970)

See note under *Corispermum leptopterum* (Asch.) Iljin. Pignatti (1982) reports this taxon only in northern and central Italy.

Euphorbia helioscopia L. – T scap - Cosmop. – Uncultivated grassy fields – Schiapparo (10/03/99)

Euphorbia paralias L. – Ch caesp- Euri-Medit.-Atl. – Dunes – S. Andrea (12/06/99)

Euphorbia peplis L. – T rept- Euri-Medit. – Dunes – Scampamorte (19/08/99)

Euphorbia peplus L. – T scap - Eurosib. – Shrubby cultivated and uncultivated fields

(Curti & al. 1974)

N *****Euphorbia platyphyllos*** L. – T scap - Euri-Medit. – Clayey fields – Acquarotta (08/05/99)

Euphorbia pubescens Vahl – G rhiz - Medit-Macaron. – Canal edges, mud – Zappino (05/05/99) and S. Andrea (29/05/99)

Euphorbia terracina L. – T scap - Stenomedit. – Dunes, uncultivated fields – S. Andrea (12/06/99) and Schiapparo (28/03/99)

Mercurialis annua L. – T scap - Paleotemp. – Carriage-path edges – Acquarotta (25/03/00)

ANACARDIACEAE

Pistacia lentiscus L. – P caesp - Stenomedit. – Maquis – S. Maria (16/01/99)

CELASTRACEAE

Euonymus europaeus L. – P caesp - Eurasiatic – Hedges – Cornone (09/04/00)

RHAMNACEAE

Paliurus spina-christi Mill. – P caesp - Pontic – Maquis – Gravaglione (15/09/99)

Rhamnus alaternus L. – P caesp - Stenomedit. – Maquis and scrubs – Punta Pietre Nere (24/03/99)

n ****Rhamnus saxatilis*** subsp. ***infectorius*** (L.) P. Fourn. – P caesp - SE-Europ. – Maquis – Gravaglione (15/09/99)

VITACEAE

Vitis vinifera L. subsp. ***vinifera*** – P lian - Unknown – Shrublands – Punta Pietre Nere (22/05/99)

MALVACEAE

Althaea officinalis L. – H scap - SE-Europ. – Reed thickets – Acquarotta (07/09/99)

*****Kosteletzkya pentacarpos*** (L.) Ledeb. – H scap - Pontic – Subsalty marshlands – S. Andrea

Malva sylvestris L. – H scap - Eurosib. – Beaten environments – Porcareccia (05/06/99)

ELAEAGNACEAE

n ****Elaeagnus angustifolia*** L. – P scap - C-Asia – Cultivated for plantings – Acquarotta (29/10/99)

VIOLACEAE

Viola alba subsp. ***dehnhardtii*** (Ten.) W.Becker – H ros – SEurop. – *Q. ilex* wood undergrowth – Acquarotta (10/05/00)

CISTACEAE

Cistus clusii Dunal – NP - W-Medit. – Garrigue – Chiusa

Cistus incanus L. – NP - Stenomedit. – Maquis – Zappino (05/05/99)

Cistus monspeliensis L. – NP – Stenomedit-Macaron. – Maquis – Acquarotta (22/05/99)

Cistus salvifolius L. – NP – Stenomedit. – Maquis – Zappino (05/05/99)

Fumana thymifolia (L.) Spach – Ch suffr – Stenomedit. – Sandy grasslands – Acquarotta (20/04/00) and Zappino (05/05/99)

Halimium halimifolium (L.) Willk. – NP - W-Medit. – Maquis – Acquarotta (22/05/99)

Helianthemum apenninum (L.) Miller – Ch suffr – SW-Europ. – Dunes – Spedale (07/04/99)

Helianthemum jonium Lacaita – Ch suffr – Endem. – Sandy grasslands – Zappino (25/03/00)

n ****Helianthemum salicifolium*** (L.) Miller – T scap – Euri-Medit. – Grasslands – Cornone (25/03/00)

TAMARICACEAE

Tamarix africana Poiret – P scap – W-Medit. – Periodically flooded littoral places – (Curti & al. 1974)

n ****Tamarix canariensis*** Willd. – P caesp – E-Medit. – Windbreak plantings – Punta Pietre Nere (09/10/99)

This taxon has not been reported for Apulia by Pignatti(1982).

n ****Tamarix gallica*** L. – P caesp – W-Medit. – Brackish hollows – Acquarotta (09/10/99)

CUCURBITACEAE

Bryonia dioica Jacq. – G rhiz – Euri-Medit. – Reed thickets – Acquarotta (10/05/00)

Ecballium elaterium (L.) A. Rich. – G bulb – Euri-Medit. – Ruins – S. Andrea (12/06/99)

LYTHRACEAE

Lythrum junceum Banks & Sol. – H scap – Stenomedit-Macaron. – Humid clayey grasslands – Porcareccia (05/06/99)

Lythrum salicaria L. – H scap – Cosmop. – Wet hollows (fantine), ditches – Acquarotta

MYRTACEAE

Eucalyptus camaldulensis Dehnh. – P scap - Australian – Plantings (cult.) – S. Maria (12/06/99)

Myrtus communis L. – P caesp - Stenomedit. – Maquis – S. Maria (09/01/99)

Myrtus communis subsp. ***tarentina*** (L.) Arcangeli – P caesp - Stenomedit. – Maquis and garrigue by the sea – (Curti & al. 1974)

ONAGRACEAE

****Epilobium hirsutum*** L. – H scap - Paleotemp. – Humid places – (Fenaroli 1973)

*****Oenothera biennis*** L. – H bienn - Subcosmop. – Uncultivated fields in dune flat hollows – Cauto (12/09/00)

Although not reported for Apulia by Pignatti (1982), this species had already been recorded in the Gargano area by Rabenhorst and by Fenaroli & Grilli (Fenaroli 1970) in the Vieste littoral.

N *****Oenothera parviflora*** L. – H bienn - Subcosmop. – Carriage-path edges – Acquarotta (10/05/00)

CORNACEAE

Cornus sanguinea L. – P caesp - Eurasiatic – Maquis and shrublands – Acquarotta (20/04/00 and 01/06/00)

ARALIACEAE

Hedera helix L. subsp. ***helix*** – P lian - Euri-Medit. – Scrubs – Acquarotta (09/10/99)

Umbelliferae

Ammi majus L. – T scap - Euri-Medit. – Weed – (Curti & al. 1974)

Apium graveolens L. – H scap - Paleotemp. – Mud – Porcareccia (05/06/99)

Apium nodiflorum (L.) Lag. – H scap - Euri-Medit. – Ditches and marshlands – (Curti & al. 1974)

n ****Bupleurum baldense*** Turra subsp. ***baldense*** – T scap - Euri-Medit. – Shrublands – Acquarotta (22/05/99)

n ****Bupleurum praealtum*** L. – T scap - SE-Europ. – Scrubby hollows – Acquarotta (07/09/99)

Coriandrum sativum L. – T scap - SW-Medit. – Cultivated and weed – (Curti & al. 1974)

Crithmum maritimum L. – Ch suffr – Euri-Medit. – Rocks – Scampamorte (23/08/99)

Daucus carota subsp. ***maritimus*** (Lam.) Batt. – H bienn – W-Medit. – Uncultivated fields, subsalty hollows – Acquarotta (22/05/99) and (09/10/99)

Daucus guttatus Sibth. & Sm. – T scap – Euri-Medit. – Cultivated and uncultivated fields – (Curti & al. 1974)

As for Apulia, this species is recorded at the Tremiti Isles by Pignatti (1982).

Echinophora spinosa L. – H scap – Euri-Medit. – Dunes – Schiapparo (23/08/99)

Eryngium maritimum L. – G rhiz – Medit-Atl. – Sandy shore – S. Andrea (12/06/99)

Foeniculum vulgare subsp. ***piperitum*** (Ucria) Coutinho – H scap - S-Medit. – Shrublands – Acquarotta (07/09/99)

****Oenanthe lachenalii*** Gmelin – H scap – Medit-Atl. – Mud – Schiapparo and Acquarotta (08/05/99)

Oenanthe pimpinelloides L. – H scap – Medit-Atl. – Clayey hollows – Acquarotta (08/05/99)

Orlaya kochii Heyw. –T scap – Stenomedit. – Sandy shore – Punta Pietre Nere (22/05/99)

Pseudorlaya pumila (L.) Grande – T scap – Stenomedit. – Sandy dunes – Dune sequence

n ****Scandix australis*** L. subsp. ***australis*** – T scap – Stenomedit. – Grasslands – Cornone (09/04/00)

Smyrnium rotundifolium Miller – H bienn – S-Medit. – Grassy and shrubby places – (Curti & al. 1974)

Torilis nodosa (L.) Gaertner – T scap – Euri-Medit.-Turan. – Uncultivated fields – Scampamorte (29/05/99) and Porcareccia (05/06/99)

ERICACEAE

Arbutus unedo L. – P scap – Stenomedit. – Maquis and garrigue – S. Maria (09/01/99)

Erica arborea L. – P caesp- Stenomedit. – Maquis – S. Maria (28/03/99)

Erica multiflora L. – NP – Stenomedit. – Maquis and garrigue – S. Maria (09/01/99)

PRIMULACEAE

Anagallis arvensis L. – T rept – Euri-Medit. – Grasslands and clayey fields – Acquarotta (08/05/99 and 10/05/00) and Porcareccia (01/04/99)

Anagallis foemina Miller – Therophyte creeping – Stenomedit. – Grassy places – (Fenaroli 1973; Curti & al. 1974)

Asterolinon linum-stellatum (L.) Duby – T scap - Stenomedit. – Sand – Acquarotta (01/04/99)

Cyclamen repandum S. & S. – G bulb - N-Medit. – Wood and scrub – Spedale (01/04/99)

*****Lysimachia vulgaris*** L. – H scap - Eurasiatic – Mud – Foce S. Andrea (23/08/99)

Although not reported in Apulia by Pignatti (1982), this species had already been recorded at the Spedale locality by Curti & al. (1974) and at the S. Andrea locality by Pantaleo (1991).

Samolus valerandi L. – H scap - Cosmop. – Muddy wet flat hollows – Acquarotta (22/05/99)

PLUMBAGINACEAE

Limonium bellidifolium (Gouan) Dumort. – H ros - Medit.Turan. – Brackish places – (Corbetta 1970; Curti & al. 1974)

Limonium serotinum (Rchb.) Pign. – H ros - Euri-Medit. – Brackish hollows – Acquarotta (07/09/99)

Plumbago europaea L. – Ch caesp - Stenomedit. – Uncultivated fields – Zappino (20/04/00)

OLEACEAE

Fraxinus ornus L. – P scap - Medit.-Pontic – Wood and Scrub – Acquarotta (07/09/99)

Fraxinus oxycarpa Bieb. – P scap - SE-Europ. – Hollow scrubs – Acquarotta (07/09/99)

Ligustrum vulgare L. – NP - Europ. – Wood and Scrub – Acquarotta (22/05/99)

Olea europaea L. var. ***sylvestris*** Brot. – P caesp - Stenomedit. – Maquis – Gravaglione (15/09/99)

Phillyrea latifolia L. –P caesp - Stenomedit. – Maquis – Schiapparo (19/08/99)

GENTIANACEAE

Blackstonia perfoliata (L.) Hudson subsp. ***perfoliata*** – T scap - Euri-Medit. – Clayey grasslands, maquis – Porcareccia (05/06/1999) and Acquarotta (22/05/99)

Centaurium erythraea subsp. ***rhodense*** (Boiss. & Reut.)Melderis – H bienn - Paleotemp. – Maquis – Porcareccia (05/06/99) and Acquarotta (22/05/99)

****Centaurium maritimum*** (L.) Fritsch – T scap - Medit-Atl. – Littoral Gramineae fields – (Fenaroli 1973)

ASCLEPIADACEAE

Cynanchum acutum L. – P lian – Paleosubtrop. – Reed thicket – Schiapparo (15/08/00)

RUBIACEAE

Asperula arvensis L. – T scap - Euri-Medit. – Cultivated and uncultivated fields – (Curti & al. 1974)

Galium aparine L. – T scap – Eurasiatic – Uncultivated fields – Acquarotta (08/05/99)

Galium debile Des. – H scap – Euri-Medit. – Wet grasslands – Acquarotta (10/05/00)

n ****Galium elongatum*** Presl – H scap – Euri-Medit. – Riparian hedges – Porcareccia (05/06/99)

Rubia peregrina L. – P lian – Stenomedit. – Maquis – Zappino (05/05/99)

Sherardia arvensis L. – T scap - Euri-Medit. – Grasslands – S. Maria (28/03/99)

Valantia muralis L. – T scap – Stenomedit. – Sandy places in maquis – Spedale (01/04/99)

CONVOLVULACEAE

Calystegia sepium (L.) R.Br. – Scandent hemicryptophyte – Paleotemp. – Reed thicket – S. Andrea (12/06/99)

Calystegia soldanella (L.) R. Br. – G rhiz – Cosmop. – Sandy shore, brachish uncultivated fields – S. Andrea (12/06/99)

Convolvulus arvensis L. – G rhiz – Paleotemp. – Cultivated and uncultivated fields – (Curti & al. 1974)

Convolvulus cantabrica L. – H scap – Euri-Medit. – Carriage-path edges – Acquarotta (22/05/99)

N ***Cuscuta campestris*** Yuncker – Therophyte parasitic – N-American – Sandy uncultivated fields – Foce S. Andrea (23/08/99)

BORAGINACEAE

Alkanna tinctoria (L.) Tausch – H scap – Stenomedit. – Sandy shore, sandy uncultivated fields – Zappino (05/05/99) and Schiapparo (28/03/99)

n ****Anchusa hybrida*** Ten. – H scap – Stenomedit. – Uncultivated fields by the sea – Punta Pietre Nere (22/05/99)

Anchusa italica Retz. – H scap – Euri-Medit. – Fields and uncultivated fields – (Curti & al. 1974)

Anchusa undulata L. – H bienn – W-Stenomedit. – Cultivated and uncultivated fields

(Curti & al. 1974)

It is reported for Sardinia by Pignatti (1982).

Buglossoides arvensis (L.) Johnston – T scap - Euri-Medit. – Grasslands, hedges – Punta Pietre Nere (24/03/99) and Acquarotta (22/05/99)

Buglossoides purpurocaerulea (L.) Johnston – H scap - Pontic – Woods, shrublands, hedges – Cornone (09/04/00) and Acquarotta (22/05/99)

Cerinthe major L. – T scap - Stenomedit. – Shrublands, shaded trenches – Zappino (29/10/99) and Acquarotta (25/03/00)

n ****Cynoglossum creticum*** Miller – H bienn - Euri-Medit. – Uncultivated fields – Porcareccia (05/06/99)

Echium asperrimum Lam. – H bienn - Euri-Medit. – Arid and uncultivated fields – (Curti & al. 1974)

Echium plantagineum L. – T scap - Euri-Medit. – Field and grassland edges – Cornone (09/04/00) and Acquarotta (20/04/00)

N ***Echium sabulicolum*** Pomel emend. Klotz – H scap - W-Stenomedit. – Sandy uncultivated fields – Punta Pietre Nere (09/10/99)

Heliotropium europaeum L. – T scap - Eurimedit-Turan. – Arid grasslands – S. Maria (19/08/99)

Lithospermum officinale L. – H scap - Eurosib. – Canal banks – Canale Zappino (20/04/99)

Myosotis arvensis (L.) Hill – T scap - Europ-W-Asiatic – Sandy fields – Acquarotta (01/04/99)

Myosotis ramosissima Rochel in Schultes – T scap - Europ-W-Asiatic – Grasslands in shrublands – Morella (07/04/99)

LABIATAE

Ajuga chamaepitys (L.) Schreber – T scap - Euri-Medit. – Sandy fields, uncultivated clayey fields – Acquarotta (01/04/1999 and 22/05/99)

n ****Ballota nigra*** subsp. ***uncinata*** (Fiori & Bég.) Patzak – H scap - Stenomedit. – Shrublands – Acquarotta (07/09/99)

Ballota nigra L. subsp. ***nigra*** – H scap - Euri-Medit. – Hedges and road edges – (Curti & al. 1974)

****Ballota rupestris*** (Biv.) Vis. – Ch caesp - E-Medit. – (Fenaroli 1973)

Calamintha nepeta (L.) Savi subsp. ***nepeta*** – H scap – Montainous-Medit. – Arid fields – Scampamorte (19/08/99)

Clinopodium vulgare L. subsp. ***vulgare*** – H scap – Circumbor. – Shrublands – Acquarotta (01/06/00)

Lamium amplexicaule L. – T scap – Paleotemp. – Grassy uncultivated fields and grasslands – Schiapparo (10/03/99) and Porcareccia (01/04/99)

Lycopus europaeus L. subsp. ***europaeus*** – H scap – Paleotemp. – Mud, reed thicket – Spedale (14/06/00) and Foce S. Andrea (19/08/99)

Marrubium vulgare L. – H scap – Eurimedit-S-Siberian – Pastures and shrublands – Gravaglione (15/09/99) and Zappino (05/05/99)

Mentha aquatica L. subsp. ***aquatica*** – H scap – Paleotemp. – Marsh banks – S. Andrea (23/08/99)

Micromeria graeca (L.) Bentham subsp. ***graeca*** – Ch suffr – Stenomedit. – Shrublands – Zappino (05/05/99 and 20/04/99)

****Origanum vulgare*** L. – H scap – Eurasiatic – Shrublands – (Fenaroli 1973)

Prasium majus L. – Shrubby chamaephyte – Stenomedit. – Garrigue and scrubs – Tra Gravaglione and S. Andrea

Prunella vulgaris L. – H scap – Circumbor. – Grassy places and scrubs – (Curti & al. 1974)

Rosmarinus officinalis L. – NP – Stenomedit. – Maquis – S. Maria (09/01/99)

Salvia multifida S. & S. – H scap – SE-Europ. – Grasslands – Cornone (09/04/00)

Salvia verbenaca L. – H scap - Medit-Atl. – Grassy clearings, grasslands – Cornone (25/03/00 and 09/04/00)

Sideritis romana L. – T scap –Stenomedit. – Grasslands – Zappino (20/04/00)

Stachys maritima Gouan – H scap – Stenomedit. – Dunes – Foce S. Andrea (19/05/00)

n ****Stachys officinalis*** subsp. ***serotina*** (Host) Murb. – H scap – Europ. – Shrublands – Acquarotta (07/09/99)

n ****Stachys sylvatica*** L. – H scap – Eurosib. – Shrublands – Acquarotta (01/06/00)

Teucrium chamaedrys L. – Ch suffr – Euri-Medit. – Shrublands – Zappino (05/06/99)

Teucrium polium subsp. ***capitatum*** (L.) Arcang. – Ch suffr – Stenomedit. – Garrigue and sandy grasslands – Acquarotta (22/05/99) and S. Andrea (29/05/99)

Teucrium scordium subsp. ***scordioides*** (Schreber) Maire & Petmg. – H scap - Europ. – Mud – S. Andrea (23/08/99)

SOLANACEAE

Datura stramonium L. – T scap - Subcosmop. – Fields – Acquarotta (07/09/99)

Solanum dulcamara L. – NP - Paleotemp. – Marsh banks – Canale Zappino (15/09/99)

Solanum nigrum L. – T scap - Cosmop. – Cultivated and uncultivated fields – (Curti & al. 1974)

n ***Solanum nigrum*** subsp. ***schultesii*** (Opiz) Wessely – T scap - Cosmop. – Brackish, uncultivated fields – S. Andrea (12/06/99)

Solanum sodomaeum L. – NP - S-Afr. – Ruins – Scampamorte (29/05/99)

SCROPHULARIACEAE

Bellardia trixago (L.) All. – T scap - Euri-Medit. – Fields and uncultivated fields, – Punta Pietre Nere (22/05/99) and S. Andrea (29/05/99)

Odontites lutea (L.) Clairv. – T scap - Euri-Medit. – Arid grasslands – S. Maria (19/08/99)

Parentucellia latifolia (L.) Caruel – T scap - Euri-Medit. – Sandy grasslands – Schiapparo (28/03/99)

Parentucellia viscosa (L.) Caruel – T scap - Medit-Atl. – Fields – S. Andrea (29/05/99)

Verbascum niveum subsp. ***garganicum*** (Ten.) Murb. – Emicryptophyte biennal - Endem. – Sandy uncultivated fields – S. Maria (12/06/99)

Verbascum phlomoides L. – H bienn - Euri-Medit. – Sandy uncultivated fields – (Curti & al. 1974)

Verbascum samniticum Ten. – H bienn - NE-Montainous-Medit. – Arid grasslands – S. Maria (12/06/99)

Verbascum sinuatum L. – H bienn - Euri-Medit. – Sandy uncultivated fields – S. Maria (08/05/1999 and 12/06/99)

Verbascum thapsus L. – H bienn - Europ-caucasic – Sandy uncultivated fields – (Curti & al. 1974)

Verbascum thapsus subsp. ***crassifolium*** (Lam. & DC.) Murb. – H bienn - Europ-Caucasic – Uncultivated fields – (Curti & al. 1974)

It is only reported for northern Italy by. Pignatti (1982)

Veronica anagallis-aquatica L. – H scap – Cosmop. – Muddy shallow water – Canale Zappino (20/04/99)

n ***Veronica arvensis*** L. – T scap – Cosmop. – Arid grasslands – Acquarotta and Schiapparo (28/03/99)

Veronica hederifolia L. – T scap – Eurasiatic – Sandy fields – Acquarotta (25/03/00)

n ***Veronica polita*** Fries – T scap – Subcosmop. – Grassy uncultivated fields – Schiapparo (10/03/99)

OROBANCHACEAE

Orobanche crenata Forsskål – Therophyte parasitic - Euri-Medit. – Leguminous plant parasite. Cultivated and uncultivated fields – (Curti & al. 1974)

n ***Orobanche hederae*** Duby – Therophyte parasitic- Euri-Medit. – Q. ilex wood – Acquarotta (10/05/2000 and 01/06/00)

n ***Orobanche ramosa*** subsp. ***nana*** (Reuter) Coutinho – Therophyte parasitic – Paleotemp. – Grasslands, grassy clearings – Zappino (20/04/00) and Morella (07/04/99)

PLANTAGINACEAE

Plantago bellardi All. – T scap – S-Medit. – Sandy grasslands – Canale Zappino (05/05/99)

n ***Plantago coronopus*** subsp. ***commutata*** (Guss.) Pilger – T scap – Euri-Medit. – Carriage-paths – Acquarotta (22/05/99)

Plantago crassifolia Forsskål – H ros- Stenomedit. – Clayey hollows – Acquarotta (08/05/99)

Plantago lagopus L. – T scap – Stenomedit. – Grasslands, sandy grasslands – Schiappano (28/03/99) and Zappino (05/05/99)

Plantago lanceolata L. var. ***lanceolata*** – H ros – Eurasiatic – Grasslands – Acquarotta (10/05/00)

Plantago major L. subsp. ***major*** – H ros – Eurasiatic – Subsalty beaten soils – Foce S. Andrea (19/08/99)

Plantago serraria L. – H ros – Stenomedit. – Uncultivated fields by the sea – Punta Pietre Nere (09/10/99)

CAPRIFOLIACEAE

Lonicera implexa Aiton – P lian – Stenomedit. – Maquis – S. Maria (12/06/99)

Viburnum tinus L. – P caesp – Stenomedit. – Scrubs – Acquarotta (24/03/99)

VALERIANACEAE

Valerianella coronata (L.) DC. – T scap - Euri-Medit. – Sandy grasslands – Schiapparo (28/03/99)

Valerianella dentata (L.) Pollich – T scap - Submedit-subAtl. – Cultivated and uncultivated fields – (Curti & al. 1974)

n ***Valerianella eriocarpa*** Desv. – T scap - Stenomedit. – Shrublands (clearings) – Acquarotta (12/06/99 and 20/04/00)

Valerianella locusta (L.) Laterrade – T scap - Euri-Medit. – Grassy places and cultivated fields – (Curti & al. 1974)

n ***Scabiosa columbaria*** L. – H scap - Eurasiatic – Uncultivated fields – Acquarotta (22/05/99)

Scabiosa maritima L. – H bienn - Stenomedit. – Sandy places and mainly littoral uncultivated fields – (Curti & al. 1974; Pantaleo; 1991)

CAMPANULACEAE

Legousia speculum-veneris (L.) Chaix – T scap - Euri-Medit. – Fields edges – Acquarotta (08/05/99)

Compositae

Achillea ageratum L. – H scap - W-Stenomedit. – Wet places – (Curti & al. 1974)

Aetheorrhiza bulbosa (L.) Cass. – G bulb - Stenomedit. – Sandy grasslands – S. Maria (28/03/99)

N ***Ambrosia coronopifolia*** Torr. & Gray – G rhiz - N-American – Sandy uncultivated fields – Schiapparo (19/08/99)

N ***Anacyclus radiatus*** Loisel. – T scap - Stenomedit. – Clayey field edges – Acquarotta (08/05/99)

Anacyclus tomentosus (All.) DC. – T scap - Stenomedit. – Carriage-path edges, uncultivated fields – Acquarotta (22/05/1999 and 08/05/99)

Anthemis arvensis L. – T scap - Stenomedit. – Common to cultivated and uncultivated fields – (Curti & al. 1974)

n ***Anthemis cotula*** L. – T scap - Euri-Medit. – Clayey grasslands – Porcareccia (05/06/99)

n ***Anthemis maritima*** L. – H scap - W-Medit. – Littoral dunes – Marina di Lesina (Torre Fortore) (08/05/99)

Anthemis tomentosa L. – T scap - NE-Medit. – Littoral sandy shore – (Curti & al. 1974)

Artemisia coerulescens L. – Ch suffr– Euri-Medit. – Brackish places – (Curti & al. 1974)

N ***Artemisia variabilis*** Ten. – Ch caesp – Endem. – Sandy uncultivated fields – Schiappano (15/09/99)

*****Artemisia verlotorum*** Lamotte – H scap – E-Asiatic – Brackish hollows – Foce S. Andrea (23/08/99)

n ****Artemisia vulgaris*** L. – H scap – Circumbor. – Uncultivated fields by the sea – Punta Pietre Nere (09/10/99)

n ****Aster linosyris*** (L.) Bernh. – H scap – Euromedit-S-siberian – Shrublands – Acquarotta (07/09/99 and 09/10/99)

Aster squamatus (Sprengel) Hieron. – T scap – Subcosmop. – Humid uncultivated fields – Acquarotta (07/09/99)

Aster tripolium L. – H bienn – Eurasiatic – Marshlands – Acquarotta (09/10/99)

Bellis perennis L. – H ros – Europ. – Clayey grasslands – Porcarecchia (01/04/99)

Bellis sylvestris Cyr. – Rosulate hemicryptophyte – Stenomedit. – Grasslands and maquis – (Curti & al. 1974)

Calendula arvensis L. subsp. ***arvensis*** – T scap – Euri-Medit. – Synanthropic uncultivaed fields – Schiapparo (16/01/99)

Carduus pycnocephalus L. – H bienn – Eurimedit-Turan. – Uncultivated fields – Acquarotta (08/05/99)

Carduus tenuiflorus Curtis – T scap – W-Europ. – Uncultivated fields – (Curti & al. 1974)

n ****Carlina corymbosa*** L. – H scap - Stenomedit. – Stony uncultivated fields by the sea – Punta Pietre Nere (09/10/99) and Cauto (12/09/00)

Carthamus lanatus L. – T scap – Euri-Medit. – Uncultivated fields – (Curti & al. 1974)

n ****Centaurea bracteata*** Scop. – H scap – Sud-East-Europ. – Shrublands – Acquarotta (07/09/99)

Centaurea calcitrapa L. – H bienn – Euri-Medit. – Uncultivated fields – Spedale (14/06/00)

Chondrilla juncea L. – H scap - Eurosib. – Fields edges, arid grasslands – Cornone (09/04/00) and Schiapparo (19/08/99)

n ****Chrysanthemum coronarium*** L. – T scap - Stenomedit. – Carriage-path edges – Acquarotta (22/05/99)

Chrysanthemum segetum L. – T scap - Stenomedit-Turan. – Cultivated and uncultivated fields, road edges – (Curti & al. 1974)

Cichorium pumilum Jacq. – T scap - Stenomedit. – Grassy uncultivated fields – Acquarotta (14/06/00)

Cirsium arvense (L.) Scop. – Budded–root geophyte - Eurasiatic – Uncultivated fields – Zappino (05/06/99)

Cirsium palustre (L.) Scop. – H bienn - Paleotemp. – Wet places – (Curti & al. 1974)

It has not been reported for Apulia by Pignatti (1982)

Cirsium vulgare (Savi) Ten. subsp. ***vulgare*** – H bienn - Paleotemp. – Hollows and uncultivated fields – Acquarotta (07/09/99)

n ****Conyza albida*** Willd. – T scap - Subcosmop. – Brackish fields – S. Andrea (12/06/99)

Conyza bonariensis (L.) Cronq. – T scap - Subcosmop. – Fields edges – Acquarotta (09/10/99)

Conyza canadensis L. Cronq. – T scap - N-Amer. – Uncultivated fields – (Curti & al. 1974)

n ****Crepis apula*** (Fiori) Babc. – T scap - Endem. – Grasslands, shrublands – Cornone (09/04/00) and Canale Zappino (20/04/99)

Crepis capillaris (L.) Wallr. – T scap - Centroeurop. – Grasslands, cultivated fields, paths – (Curti & al. 1974)

It has not been reported for Apulia by Pignatti (1982)

Crepis neglecta L. – T scap - N-E-Euri-Medit. – Grasslands – Acquarotta (20/04/00)

Crepis rubra L. – T scap - N-E-Steno-Medit – Cultivated and uncultivated fields – (Curti & al. 1974)

N ****Crepis sancta*** (L.) Babc. subsp. ***sancta*** – T scap - Euri-Medit. – Grasslands – Cornone (09/04/00)

Although not reported for Apulia by Pignatti (1982), this species had previously been recorded in the Gargano area by several Authors and referred to two different subspecies [*C. sancta* subsp. *bifida* (Vis.) Thellung (Fenaroli 1974) and *C. sancta* subsp. *nemausensis* (Gouan) Thellung (Agostini 1967; Agostini and Fenaroli 1968; Fenaroli 1974)]. It had never been recorded in the "Bosco Isola" di Lesina before.

Crepis setosa Haller Fil. – T scap – E-Euri-Medit. – Coltivated and uncultivated fields, paths – (Curti & al. 1974)

Crepis vesicaria L. subsp. ***vesicaria*** – T scap – Submedit-subAtl. – Shrublands – Spedale (07/04/99)

Eupatorium cannabinum L. – H scap – Paleotemp. – Mud – Foce S. Andrea (23/08/99)

n ****Evax asterisciflora*** (Lam.) Pers. – T rept – Stenomedit. – Grasslands, clayey uncultivated fields – Canale Zappino (20/04/99) and Acquarotta (22/05/99)

n ***Filago pyramidata*** L. – T scap – Euri-Medit. – Clayey uncultivated fields – Acquarotta (22/05/99)

Galactites tomentosa Moench – H bienn- Stenomedit. – Shrublands – Zappino (05/05/99)

n ***Hedypnois cretica*** (L.) Willd. (fo. *coronopifolia* Ten.) – T scap – Stenomedit. – Grasslands – Acquarotta (20/04/00)

Hedypnois rhagadioloides (L.) Willd. – T scap – Stenomedit. – Cultivated and uncultivated fields – (Curti & al. 1974)

Helichrysum italicum (Roth) Don – Ch suffr – SEurop. – Arid fields and garrigue – (Curti & al. 1974)

Hieracium piloselloides Vill. – H scap – Europ-Caucasic – Grasslands – (Curti & al. 1974)

Hypochoeris achyrophorus L. – T scap – Stenomedit. – Grasslands in maquis – Morella (07/04/99) and Canale Zappino (05/05/99)

Hypochoeris radicata L. subsp. ***radicata*** – H ros – Europ-Caucasic – Sandy uncultivated fields – S. Andrea (29/05/99)

Hypochoeris radicata subsp. ***neapolitana*** (DC.) Guadagno – H ros – Europ-caucasic – Clearings – Zappino (29/10/99)

Inula conyza DC. – H bienn – Europ. – Hollow scrubs – Acquarotta (07/09/99)

Inula crithmoides L. – Ch suffr – Europ. – Dunes – Scampamorte (23/08/99)

Inula viscosa (L.) Aiton – H scap – Euri-Medit. – Humid uncultivated fields – Acquarotta (07/09/99)

Lactuca saligna L. – T scap – Euri-medit.-Turan. – Arid uncultivated fields – (Curti & al. 1974)

n ***Lactuca serriola*** L. – H bienn - Eurosib. – Road edges – Acquarotta (14/06/00)

Lactuca viminea (L.) Presl – H bienn - Euri-medit. - W-Asiatic (sub-Pontic) – Arid places. – (Curti & al. 1974)

n ***Leontodon tuberosus*** L. – H ros - Stenomedit. – Maquis – Acquarotta (22/05/99)

n ***Onopordum horridum*** Viv. – H bienn - NE-Medit. – Ruins – Scampamorte (29/05/99)

Otanthus maritimus (L.) Hoffmgg. & Link – Ch suffr - Medit-Atl. – Dunes – S. Andrea (12/06/99)

Pallenis spinosa (L.) Cass. – T scap - Euri-Medit. – Uncultivated fields – Acquarotta (22/05/99)

Picris echioides L. – T scap - Euri-Medit. – Uncultivated fields – Zappino (05/06/99)

Picris hieracioides L. – H scap - Eurosib. – Road edges – Acquarotta (01/06/00)

Pulicaria dysenterica (L.) Bernh. – H scap - Euri-Medit. – Humid grasslands – Zappino (12/06/99)

Reichardia picroides (L.) Roth – H scap - Stenomedit. – Uncultivated fields – Schiapparo (16/01/99)

Rhagadiolus stellatus (L.) Willd. – T scap - Euri-Medit. – Arid grasslands – Acquarotta (08/05/99)

Scolymus hispanicus L. – H bienn - Euri-Medit. – Arid grasslands – Schiapparo (19/08/99)

n ****Senecio erraticus*** Bertol. subsp. ***erraticus*** – H bienn - Europ-subMedit. – Canal banks – Zappino (15/09/99)

Senecio jacobaea L. – H scap - Paleotemp. – Hedges, trinches, road edges – (Curti & al. 1974)

It is not reported for Apulia by Pignatti (1982)

Senecio vulgaris L. – T scap - Euri-Medit. – Grasslands – Schiapparo (28/03/99) and Acquarotta (27/01/99)

Silybum marianum (L.) Gaertner – H bienn - Medit-Turan. – Shrublands and uncultivated fields – Zappino (05/05/99)

Sonchus arvensis L. – H scap - Eurosib. – Cultivated and uncultivated fields – (Curti & al. 1974)

It is not reported for Apulia by Pignatti (1982)

Sonchus asper (L.) Hill subsp. ***asper*** – T scap – Eurasiatic – Wastelands – Acquarotta (22/05/99)

Sonchus maritimus L. – H scap – Euri-Medit. – Subsalty mud – S. Andrea (19/08/99)

Sonchus oleraceus L. – T scap – Eurasiatic – Shrublands – Punta Pietre Nere (20/04/00)

Sonchus palustris L. – H scap – Europ-caucasic – Marshlands – (Curti & al. 1974)

It is not reported for Apulia by Pignatti (1982)

n ****Sonchus tenerrimus*** L. – T scap – Stenomedit. – Carriage-path edges – Acquarotta (25/03/00)

n ***Taraxacum megalorrhizon*** (Forsskål) Hand.-Mazz. s. l. – H ros – Euri-Medit. – Sandy beaten soils – Gravaglione (29/10/99)

Taraxacum officinale Weber s. l. – H ros – Circumbor. – Limestone carriage-path edges – Acquarotta (22/05/99)

n ***Tragopogon porrifolius*** subsp. ***australis*** (Jordan) Br.-Bl. – H bienn – Euri-Medit. – Uncultivated fields – Acquarotta (22/05/99)

Tyrimnus leucographus (L.) Cass. – T scap - Stenomedit. – Uncultivated fields – Acquarotta (22/05/99)

Urospermum dalechampii (L.) Schmidt – H scap – Euri-Medit. – Grasslands – Zappino (20/04/99)

Urospermum picroides (L.) Schmidt – T scap – Euri-Medit. – Shrublands – Punta Pietre Nere (20/04/00)

Xanthium italicum Moretti – T scap – SEurop. – Sandy uncultivated fields – Foce S. Andrea (19/08/99)

Xanthium spinosum L. – T scap – S-Amer. – Sandy paths – Scampamorte (19/08/99)

ALISMATACEAE

****Alisma plantago-aquatica*** L. – I rad – Cosmop. – Mud and bogs – S. Andrea (05/06/99)

POTAMOGETONACEAE

Potamogeton natans L. – I rad – Subcosmop. – Lakes, bogs, rivers – (Curti & al. 1974)

****Potamogeton pectinatus*** L. – I rad – Subcosmop. – Ditch and canals – (Pantaleo 1991)

Ruppia maritima L. – I rad – Cosmop. – Saltish water – Canale Cauto (12/09/00)

Zostera noltii Hornem. – I rad – Medit.-subAtl. – Muddy and sandy shoals – (Curti & al. 1974)

ZANNICHELLIACEAE

Cymodocea nodosa (Ucria) Asch. – I rad - Medit.-Atl. – Muddy shoals – Dunes

LILIACEAE

Allium ampeloprasum L. – G bulb - Euri-Medit. – Carriage-path edges – Acquarotta (22/05/99)

Allium chamaemoly L. – G bulb - Stenomedit. – Grasslands – S. Maria (09/01/99)

Allium sphaerocephalon L. – G bulb - Paleotemp. – Dry and sandy uncultivated fields – Acquarotta 14/06/00

Allium subhirsutum L. – G bulb - Paleotemp. – Maquis and Shrublands – S. Maria (05/06/99) and Scampamorte (10/05/00)

Asparagus acutifolius L. – G rhiz - Stenomedit. – Maquis – S. Maria (19/08/99)

Asparagus officinalis L. – G rhiz - Euri-Medit. – Humid hollows – Acquarotta (08/05/99)

Asparagus tenuifolius Lam. – G rhiz - SE-Europ. - W-Asiatic (Pontic) – Scrubs and grasslands – (Curti & al. 1974)

Asphodelus fistulosus L. – H scap - Paleosubtropicale – Arid grasslands and pasture – Zappino (20/04/99) and Schiapparo (28/03/99)

Asphodelus microcarpus Salzm. & Viv. – G rhiz - Stenomedit. – Uncultivated fields and grasslands – Tra Acquarotta and Zappino (20/04/00)

n ****Colchicum cupanii*** Guss. – G bulb - Stenomedit. – Sand – Punta Pietre Nere (09/10/99)

Colchicum neapolitanum Ten. – G bulb - W-Stenomedit. – Shrublands – Acquarotta (09/10/99)

n ****Gagea mauritanica*** Durieu – G bulb - SW-Stenomedit. – Sandy grasslands – Acquarotta (07/03/00)

Gagea villosa (Bieb.) Duby – G bulb - Eurasiatic-temperate – Grasslands, cultivated and uncultivated fields – (Curti & al. 1974)

Leopoldia comosa (L.) Parl. – G bulb - Euri-Medit. – Grasslands – Acquarotta (08/05/99)

Muscari atlanticum Boiss. & Reut. – G bulb - Euri-Medit.–Turan. – Grasslands and cultivated fields – (Curti & al. 1974)

Ornithogalum exscapum Ten. subsp. ***exscapum*** – G bulb - Sud-Europ. – Sandy grasslands – Cornone (09/04/00)

Ornithogalum umbellatum L. – G bulb – Euri-Medit. – Sandy fields – Acquarotta (01/04/99)

Ruscus aculeatus L. – G rhiz – Euri-Medit. – Woods and shrublands – S. Maria (09/01/99)

Smilax aspera L. – NP – Paleosubtrop. – Woods, maquis, shrublands and hedges – Punta Pietre Nere (09/10/99)

AMARYLLIDACEAE

Narcissus tazetta L. – G bulb – Stenomedit. – Cultivated fields, grasslands, garrigue – (Curti & al. 1974)

Pancratium maritimum L. – G bulb- Stenomedit. – Dunes – Scampamorte (23/08/99) and Schiapparo (20/07/00)

DIOSCOREACEAE

Tamus communis L. – G rad- Euri-Medit. – Hedges and scrubs – Canale Zappino (20/04/99)

IRIDACEAE

n ****Gladiolus dubius*** Guss. – G bulb – SEurop. – Grasslands in maquis, hedges – S. Andrea (29/05/99) and Acquarotta (22/06/99)

Gladiolus byzantinus Miller – G bulb – Stenomedit. – Uncultivated and cultivated fields

(Curti & al. 1974)

This species has not been reported in Apulia by Pignatti (1982)

Hermodactylus tuberosus (L.) Salisb. – G rhiz – N-Medit. – Grasslands – Cornone (25/03/00)

n ****Iris collina*** Terr. – G rhiz – NE-Medit. 7 Hedges – Acquarotta (22/05/99)

Iris graminea L. – G rhiz – SE-Europ. – Grasslands – (Curti & al. 1974)

Doubtful report, partly referring to *Iris collina* Terr. Fenaroli (1974) does not report it for the Gargano area.

Iris pseudacorus L. – G rhiz – Eurasiatic – Wet hollows (fantine) – S. Andrea (29/05/99)

****Iris sisyrinchium*** L. – G bulb - Medit. – Litoral garrigue – (Fenaroli 1974)

Romulea columnae Seb. & Mauri – G bulb - Stenomedit. – Sandy grasslands – Schiapparo (10/03/99)

n ****Romulea ramiflora*** Ten. – G bulb - Stenomedit.-Macaron. – Sandy grasslands – Cornone (25/03/00)

JUNCACEAE

Juncus acutus L. – H caesp - Euri-Medit. – Bogs – Canale Zappino (15/09/99)

Juncus bufonius L. – T caesp - Cosmop. – Sandy and clay wet places – (Fenaroli 1974; Curti & al. 1974)

n ****Juncus gerardi*** Loisel. – G rhiz - Circumbor. – Clay soils – Acquarotta (08/05/99)

n ****Juncus hybridus*** Brot. – T caesp - Medit.-Atl. – Mud – Canale Zappino (20/04/99)

****Juncus litoralis*** C. A. Meyer – H caesp - Medit.-Turan. – Bogs – Canale Zappino (15/09/99)

Juncus maritimus Lam. – G rhiz - Subcosmop. – Salty hollow – Foce S. Andrea (19/08/99)

n ****Juncus multibracteatus*** Tineo – H caesp - W-Medit-Macaron – Mud – Porcareccia (05/06/99)

****Juncus striatus*** Schousb. – G rhiz - W-Stenomedit. – Mud – (Pantaleo 1991)

GRAMINEAE

Aegilops geniculata Roth subsp. ***geniculata*** – T scap - Stenomedit.-Turan. – Sandy grasslands – Zappino (05/05/99)

Aeluropus litoralis (Gouan) Parl. – G rhiz - N-Medit.-Turan. – Sandy salty coasts – (Corbetta 1970; Curti & al. 1974)

Agropyron elongatum (Host) Beauv. – H caesp - Euri-Medit. – Beaches, wet and salty places – (Curti & al. 1974; Pantaleo 1991)

Agropyron junceum (L.) Beauv. – G rhiz - Euri-Medit. – Dunes – S. Andrea (12/06/99)

n ****Agropyron pungens*** (Pers.) R. & S. – G rhiz - Euri-Medit. – Salty clay fields – S. Andrea (12/06/99)

Agropyron repens (L.) Beauv. – G rhiz - Circumbor. – Salty mud – Spedale (14/06/00)

N *****Agrostis castellana*** Boiss. & Reuter – H caesp – Euri-Medit. – Mud – Spedale (14/06/00)

Agrostis maritima Lam. – H rept – ? – Humid grasslands – (Corbetta 1970; Pantaleo 1991)

n ****Alopecurus bulbosus*** Gouan – H caesp – Euri-Medit.-subAtl. – Clay soils – Acquarotta (08/05/99)

Alopecurus myosuroides Huds. – T scap – Paleotemp. – Cultivated and uncultivated fields – (Curti & al. 1974)

Ammophila littoralis (Beauv.) Rothm. – G rhiz- Euri-Medit. – Dunes – Schiapparo (29/05/99)

Arundo donax L. – G rhiz – Subcosmop. – Edges of canals – Foce S. Andrea (15/09/99)

Arundo pliniana Turra – G rhiz – Stenomedit. – Wet hollows (fantine) – Acquarotta

Avellinia michelii (Savi) Parl. – T scap – Stenomedit. – Littoral sandy places – (Curti & al. 1974)

Avena barbata Potter – T scap – Euri-Medit.-Turan. – Uncultivated fields – Acquarotta (22/05/99)

Brachypodium distachyum (L.) Beauv. – T scap – Stenomedit.-Turan. – Uncultivated fields – Acquarotta (22/05/99) and S. Andrea (29/05/99)

Brachypodium ramosum (L.) R. & S. – T caesp – W-Stenomedit. – Dry grassy places and garrigue – (Curti & al. 1974)

Brachypodium sylvaticum (Hudson) Beauv. – H caesp – Paleotemp. – Wood – Acquarotta (01/06/00)

Briza maxima L. – T scap – Paleosubtrop. – Sandy grasslands – Canale Zappino (05/05/99)

Briza minor L. – T scap – Subcosmop. – Grasslands – Acquarotta (05/05/99)

n ****Bromus gussonei*** Parl. – T scap – Euri-Medit. – Hedges – S. Andrea (12/06/99)

Bromus hordeaceus L. – T scap – Cosmop. – Hedges (on clay) – Acquarotta (22/05/99)

n ****Bromus molliformis*** Lloyd – T scap - Euri-Medit. – Maquis – Acquarotta (08/05/99)

Bromus rigidus subsp. ***ambigens*** (Jordan) Pign. – T scap – Paleosubtrop. – Grasslands and Carriage-path edges – Acquarotta (20/04/2000 e22/05/99)

Calamagrostis epigejos (L.) Roth – H caesp - Eurosib. – Hollows, scrubs in low grounds – S. Andrea (29/05/99) and Acquarotta (07/09/99)

Catapodium hemipoa (Delile) Lainz – T scap - W-Stenomedit. – Shrublands – Canale Zappino (20/04/99)

****Catapodium marinum*** (L.) Hubbard – T scap - Medit.-Atl. – Littoral sands – (Fenaroli 1974)

n ****Catapodium rigidum*** (L.) Hubbard – T scap - Euri-Medit. – Sandy grasslands – Zappino (05/05/99)

N *****Cenchrus incertus*** Curtis – T scap - America Trop. and Subtrop. – Sandy uncultivated fields – Foce S. Andrea (19/08/099)

Cynodon dactylon (L.) Pers. – G rhiz - Cosmop. – Salty fields – S. Andrea (12/06/99)

Cynosurus echinatus L. – T scap - Euri-Medit. – Subhumid grasslands – Zappino (05/05/99)

Cutandia maritima (L.) Richter – T scap - Stenomedit. – Littoral sandy places – (Fenaroli 1974; Curti & al. 1974)

Dactylis glomerata L. – H caesp - Paleotemp. – Grasslands and arid scrubs – (Curti & al. 1974)

n ***Dactylis hispanica*** Roth – H caesp - Paleotemp. – Shrublands and uncultivated fields – Acquarotta (01/06/00 and 22/05/99)

Dasypyrum villosum (L.) Borbas – T scap - Euri-Medit.-Turan. – Uncultivated fields – Acquarotta (22/05/99)

Digitaria sanguinalis (L.) Scop. – T scap - Cosmop. – Sandy uncultivated fields – Foce S. Andrea (19/08/99)

****Eragrostis minor*** Host – T scap - Subcosmop. – path edges – Acquarotta (07/09/99)

Although not reported by Pignatti (1982), this species has been recorded in the same locality by Curti & al. (1974)

Erianthus ravennae (L.) Beauv. – H caesp - Medit.-Turan. – Humid flat hollows – S. Andrea (15/09/99)

Festuca arundinacea Schreber var. ***mediterranea*** (Hackel) Richter – H caesp - Paleotemp. – Humid grasslands – Zappino (05/05/99)

n ***Festuca drymeia*** M. & K. – G rhiz - Medit.-Mont. – Shrublands – Acquarotta (01/06/00)

n ***Festuca fenas*** Lag. – H caesp – Euri - Medit. – Uncultivated fields, sub-brackish grasslands – S. Andrea (29/05/99) and Acquarotta (07/09/99)

Hainardia cylindrica (Willd.) Greuter – T scap - Euri-Medit. – Littoral sandy places – (Curti & al. 1974)

Hordeum murinum L. – T scap - Circumbor. – Carriage-path edges – Acquarotta (22/05/99)

Imperata cylindrica (L.) Beauv. – G rhiz - Cosmop. – Hollows in dunes – S. Andrea (23/08/99)

Lagurus ovatus L. subsp. ***ovatus*** – T scap - Euri-Medit. – Sandy grasslands – Zappino (05/05/99)

Lolium rigidum Gaudin – T scap - Paleosubtropical – Maquis, Clay soils – Acquarotta (08/05/99)

Lolium temulentum L. subsp. ***temulentum*** – T scap - Subcosmop. – Field edges – Acquarotta (20/04/00)

Lophochloa cristata (L.) Hyl. – T caesp - Paleotemp. – Arid grasslands – Acquarotta (08/05/99)

n ***Lophochloa hispida*** (Savi) Pign. – T scap - SW-Stenomedit. – Uncultivated fields – Acquarotta (22/05/99)

Lophochloa pubescens (Lam.) Scholz – T scap - Stenomedit. – Shrublands, dunes – Punta Pietre Nere (22/05/99) and Schiapparo (29/05/99)

n ****Melica arrecta*** O. Kuntze – H caesp - Stenomedit. – Shrublands – Cornone (09/04/00) and Canale Zappino (20/04/99)

Melica ciliata L. – H caesp - Euri-Medit.-Turan. – Arid grasslands – (Curti & al. 1974)

Melica magnolii Gren. & Godr. – H caesp - Stenomedit.-Turan. – Arid grasslands – (Curti & al. 1974)

Melica minuta L. – H caesp - Stenomedit. – Arid grasslands – (Curti & al. 1974)

As for southern Italy, Pignatti (1982) reports this species only in Sicily. Fenaroli (1974) did not report it for Lesina. Probably it has been confused with *Melica arrecta* O. Kuntze.

****Melica nutans*** L. – H caesp - Europ. – Shrublands and clearings – (Fenaroli & Agostini 1971; Fenaroli 1974)

Milium effusum L. – G rhiz - Circumbor. – Scrubs – (Curti & al. 1974)

Within the Gargano area this taxon occurs in mesophilous *Q. cerris* and *Fagus sylvatica* woods (Fenaroli 1974). For this reason this record is to be verified.

Oryzopsis miliacea (L.) Asch. & Schweinf. subsp. ***miliacea*** – H caesp - Stenomedit.-Turan. – Uncultivated fields, hedges – Acquarotta (22/05/99) and S. Andrea (23/08/99)

Parapholis incurva (L.) Hubbard – T scap - Medit.-Atl. – Uncultivated fields on clay soils, salty soils – Acquarotta (22/05/99) and Foce S. Andrea (19/08/99)

Paspalum paspaloides (Michx.) Scribner – G rhiz - Neofite – Mud and humid grasslands – Zappino (15/09/99) and Porcareccia (05/06/99)

Phalaris brachystachys Link – T scap - Stenomedit. – Shoddy ground – Acquarotta (22/05/99)

n ****Phalaris coerulescens*** Desf. – H caesp - Stenomedit.-Macaron. – Hedges – S. Andrea (12/06/99)

Phleum arenarium L. – T scap - Medit.-Atl. – Sandy grasslands – Canale Zappino (05/05/99)

n ****Phleum paniculatum*** Hudson – T scap - Euri-Medit.-Turan. – Shrublands – Punta Pietre Nere (22/05/99)

Phragmites australis (Cav.) Trin. – Elofita rhizomatous - Cosmop. – Field edges, hollows – Acquarotta (29/10/99 and 09/10/99)

Poa bulbosa L. – H caesp - Paleotemp. – Arid grasslands – (Curti & al. 1974)

n ***Poa infirma*** H.B.K. – T caesp - Euri-Medit. – Shrublands – Zappino (20/04/99)

N ****Poa palustris*** L. – H caesp - Circumbor. – Humid grasslands – Canale Zappino (05/05/99)

Poa trivialis L. – H caesp - Eurasiatic – Grasslands – (Curti & al. 1974)

Polypogon monspeliensis (L.) Desf. – T scap - Paleosubtrop. – Clay soils – Acquarotta (08/05/99 and 07/09/99)

Psilurus incurvus (Gouan) Sch. & Th. – T scap - Euri-Medit. – Dry places – (Curti & al. 1974)

Puccinellia distans (Jacq.) Parl. – H caesp - Paleotemp. – Bogs – (Curti & al. 1974)

n ****Puccinellia convoluta*** (Hornem.) Hayek – H caesp - Stenomedit. – Clay soils, salty soils – Acquarotta (08/05/99) and S. Andrea (12/06/99)

Setaria verticillata (L.) Beauv. – T scap - TermoCosmop. – Cultivated and uncultivated fields, weed – (Curti & al. 1974)

Setaria viridis (L.) Beauv. – T scap - Cosmop. – Uncultivated fields – S. Andrea (23/08/99)

Sporobolus pungens (Schreber) Kunth – G rhiz - Subtropical – Dunes – Scampamorte (19/08/99)

Stipa bromoides (L.) Dorfl. – H caesp - Stenomedit. – Maquis – Acquarotta (22/05/99)

Tragus racemosus (L.) All. – T scap - Cosmop. – Uncultivated sandy soils – Foce S. Andrea (23/08/99)

Typhoides arundinacea (L.) Moench – He - Circumbor. – Wet places – (Curti & al. 1974)

Vulpia ciliata (Danth.) Link – T caesp - Euri-Medit. – Arid grasslands – (Curti & al. 1974)

Vulpia geniculata (L.) Link – T caesp - W-Stenomedit. – Grasslands – (Curti & al. 1974)

Vulpia ligustica (All.) Link – T caesp - Stenomedit. – Arid grasslands – (Curti & al. 1974)

****Vulpia membranacea*** (L.) Link – T caesp - Medit.-Atl. – Coatsal sands – (Fenaroli 1974)

****Vulpia myuros*** (L.) Gmelin – T caesp - Subcosmop. – Littoral weeds – (Fenaroli 1974)

ARACEAE

Arisarum vulgare Targ.-Tozz. – G rhiz - Stenomedit. – Scrubs – Zappino (29/10/99)

Arum italicum Miller – G rhiz - Stenomedit. – Shrublands and clearings – Cornone (09/04/00)

TYPHACEAE

Typha angustifolia L. subsp. ***angustifolia*** – G rhiz - Circumbor. – Lagoon shores, bogs – Zappino (05/05/99), Porcareccia (05/06/99) and Foce S. Andrea (19/08/99)

****Typha minima*** Hoppe – G rhiz - Eurasiatic – Ponds – (Fenaroli 1974)

CYPERACEAE

Bolboschoenus maritimus (L.) Palla – G rhiz - Cosmop. – Clay soils, muddy hollows – Acquarotta (08/05/99 and 22/05/99)

Carex distachya Desf. – H caesp - Stenomedit. – *Q. ilex* woods – Acquarotta, Spedale, Pennacchio

Carex distans L. – H caesp - Euri-Medit. – Humid grasslands and scrubs – (Curti & al. 1974)

Carex divisa Hudson – G rhiz - Medit.-Atl. – Clay grasslands – Porcareccia (01/04/99)

Carex extensa Good. – H caesp - Medit.-Atl. – Sub-brackish hollows – Foce S. Andrea (10/05/00)

n ****Carex flacca*** subsp. ***serrulata*** (Biv.) Greuter – G rhiz - Europ. – Mud – Canale Zappino (20/04/99)

Carex hallerana Asso – H caesp - Euri-Medit. – Dry places – (Curti & al. 1974)

Carex hispida Willd. – G rhiz - Stenomedit. – Fantine in *Q. ilex* wood, humid grasslands, hollows – Acquarotta (01/06/00 and 10/05/00)

N *****Carex panicea*** L. – G rhiz - Eurosib. – Shrublands – Acquarotta (14/06/00)

Carex punctata Gaud. – H caesp - Euri-Medit. – Bogs – (Curti & al. 1974; Pantaleo 1991)

Pignatti (1982) does not report it for Apulia

Carex riparia Curtis – He rhiz - Eurasiatic – Edges of salty bogs – Canale Zappino (20/04/99)

*****Carex vulpina*** L. – H caesp - Eurosib. – Canal edges – Zappino (05/05/99)

Although not reported by Pignatti (1982) in Apulia, this taxon had already been recorded by Martelli (Fenaroli 1974) from Lesina lake.

Cladium mariscus (L.) Pohl – G rhiz - Cosmop. – Wet hollows (fantine) – Acquarotta (22/05/99)

n ****Cyperus fuscus*** L. – T caesp - Paleotemp. – Mud – Foce S. Andrea (23/08/99)

Cyperus kalli (Forsskål) Murb. – G rhiz - Stenomedit. – Dunes – Acquarotta (05/05/99)

Eleocharis palustris (L.) R. & Sch. – G rhiz - Subcosmop. – Humid places, marshes, ditches – (Fenaroli 1974; Curti & al. 1974)

****Holoschoenus australis*** (L.) Rchb. – G rhiz - Euri-Medit. – Mud – S. Andrea (29/05/99)

n ****Holoschoenus romanus*** (L.) Fritsch – G rhiz - Stenomedit. – Hollows in dunes – Acquarotta (05/05/99)

Holoschoenus vulgaris Link – G rhiz - Medit.-Atl. – Marshlands, ditches – (Curti & al. 1974)

Schoenoplectus tabaernemontani (Gmelin) Palla – G rhiz - Eurosib. – Mud – S. Andrea (29/05/99)

Schoenus nigricans L. – H caesp - Cosmop. – Wet hollows – Zappino (05/05/99)

ORCHIDACEAE

Anacamptis pyramidalis (L.) L. C. Rich. – G bulb - Euri-Medit. – Grasslands, scrubs, garrigue – (Curti & al. 1974)

****Epipactis palustris*** (L.) Crantz – G rhiz - Circumbor. – Mud – Foce S. Andrea (15/09/99)

n ****Limodorum abortivum*** (L.) Swartz – G rhiz - Euri-Medit. – *Q. ilex* wood – Pennacchio, Acquarotta, Spedale

****Ophrys apifera*** Hudson – G bulb - Euri-Medit. – Subhumid shrublands – S. Andrea (29/05/99)

Ophrys fuciflora (Crantz) Moench subsp. ***fuciflora*** – G bulb - Euri-Medit. – Maquis, garrigue, scrubs – (Curti & al. 1974)

Ophrys fusca Link subsp. ***fusca*** – G bulb - Stenomedit. – Shrublands – Spedale (01/04/99)

Ophrys sphegodes Miller – G bulb - Euri-Medit. – Grasslands – Cornone (25/03/00)

n ****Ophrys tenthredinifera*** Willd. – G bulb - Stenomedit. – Grasslands – Cornone (09/04/00)

****Orchis palustris*** Jacq. – G bulb - Euri-Medit. – Humid grasslands – S. Andrea (29/05/99)

Serapias vomeracea (Burm.) Briq. – G bulb - Euri-Medit. – Grasslands, maquis and scrubs – (Curti & al. 1974)

Discussion

The plant list, based on field investigations and literature data, includes 678 subgeneric taxa (of which, 662 at specific rank) belonging to 354 genera and 83 families. 5 species considered doubtful and to be verified have also been added. The most represented families are *Compositae*, *Graminaceae* and *Leguminose* with 87, 83 and 65 taxa, respectively, which are 50% of the total (Fig. 5), including *Cruciferae* (31), *Caryophyllaceae* (27), *Labiatae* (24) and *Cyperaceae* (21).

The analysis of the life forms (Fig. 6) and growth forms spectra (Fig. 7) shows the clear dominance of therophytes (41,6%), notably scapose (38,1%), on the other biologic and growth forms. Hemichryptophytes (27,6%), geophytes (13,4%), chamaephytes (4,0%), phanerophytes (9,1%), NPs (2,7%), hydrophytes (1,2%) and Hes (0,4%) follow. This is the typical Mediterranean biologic spectrum. Although the brackish and fresh water humid environments include a large part of the area (Forte 2001), both hydrophytes and Hes (1,6% represented by 11 taxa) play a secondary role.

The chorological spectrum (Fig. 8) shows the clear dominance of taxa with Mediterranean distribution, i.e. 59,3% of the whole taxa found in the area. Notably, the

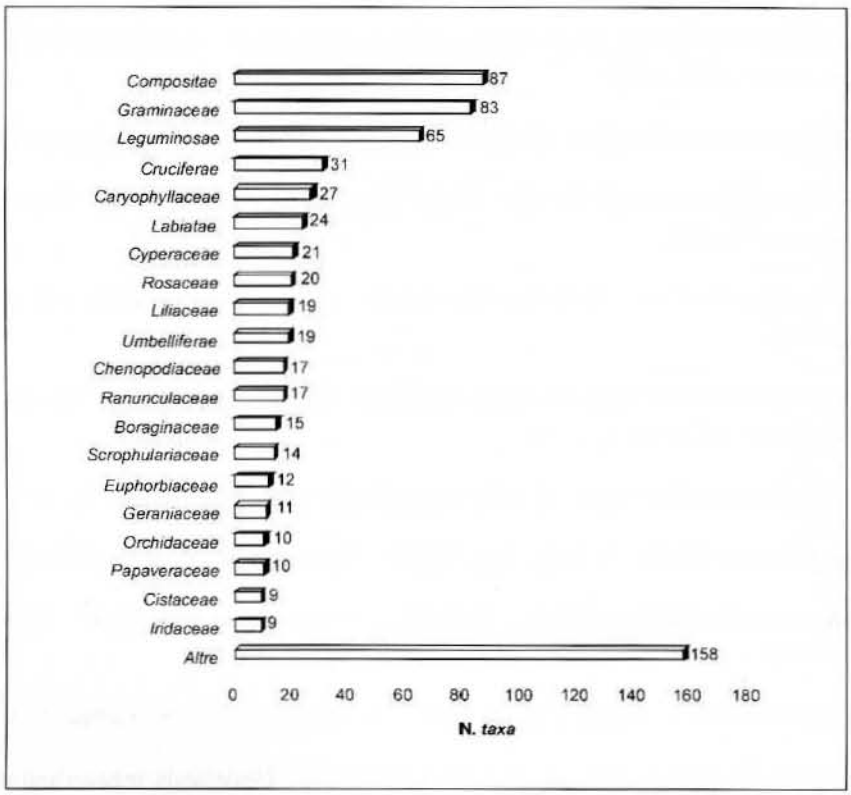

Fig. 5. taxa numerically arranged in family.

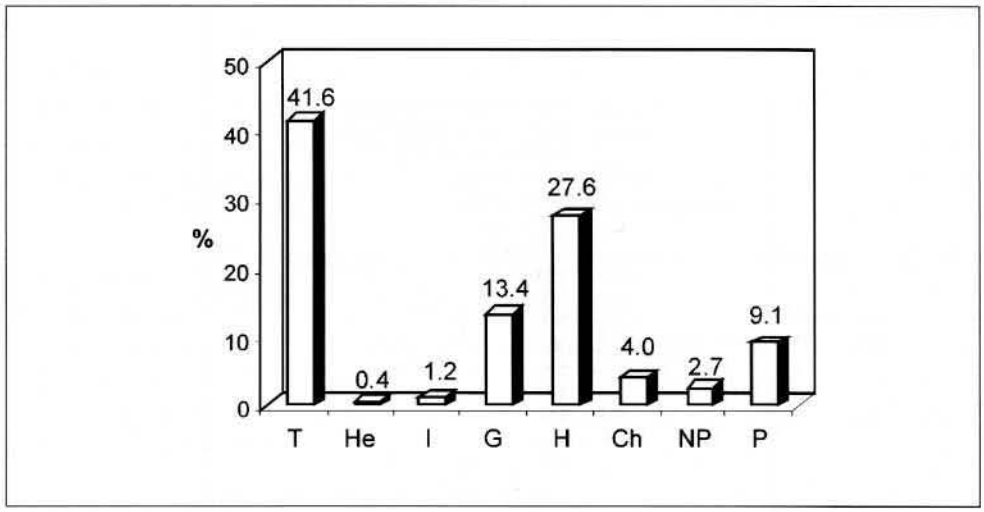

Fig. 6. Biological spectrum. (T = Therophytes; He = Helophytes; I = Hydrophytes; G = Geophytes; H = Hemichryptophytes; Ch = Chamaephytes; NP = Nanophanerophytes; P = Phanerophytes).

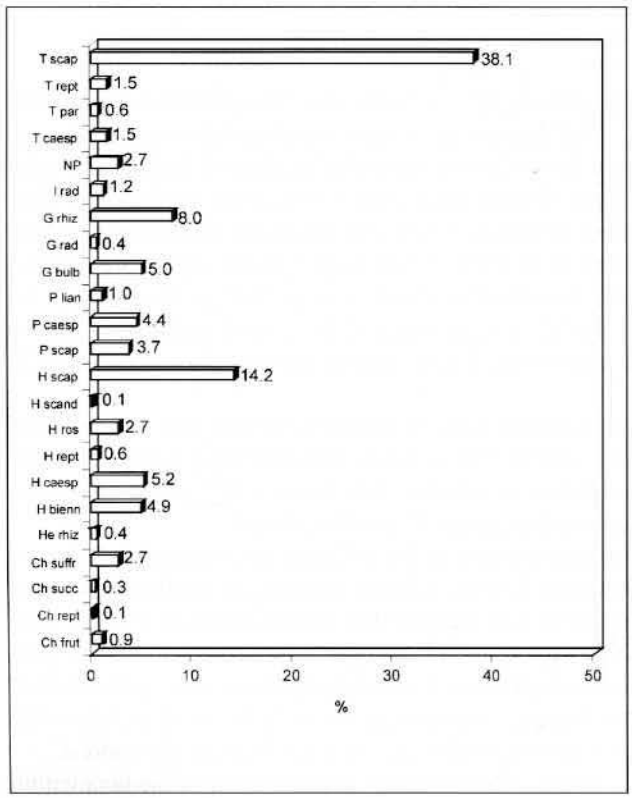

Fig. 7. Growth form spectrum.

(T scap = Terophytes scapose; T rept = Terophytes creeping; T par = Terophytes parasite; T caesp = Terophytes caespitose; NP = Nano-Phanerophytes; I rad = Hydrophytes rooting; G rhiz = Geophytes rhizomatous; G rad = Geophytes root-budded; G bulb = Geophytes bulbous; P lian = Phanerophytes climbing; P caesp = Phanerophytes tufted; P scap = Phanerophytes scapose; H scap = Hemicriptophytes scapose; H scand = Hemicriptophytes climbing; H ros = Hemicriptophytes rosetted; H rept = Hemicriptophytes creeping; H caesp = Hemicriptophytes caespitose; H bienn = Hemicriptophytes biennial; He rhiz = Helophytes rhizomatous; Ch suffr = Chamaephytes subshrubby; Ch succ = Chamaephytes succulent; Ch rept = Chamaephytes creeping; Ch frut = Chamaephytes shrubby).

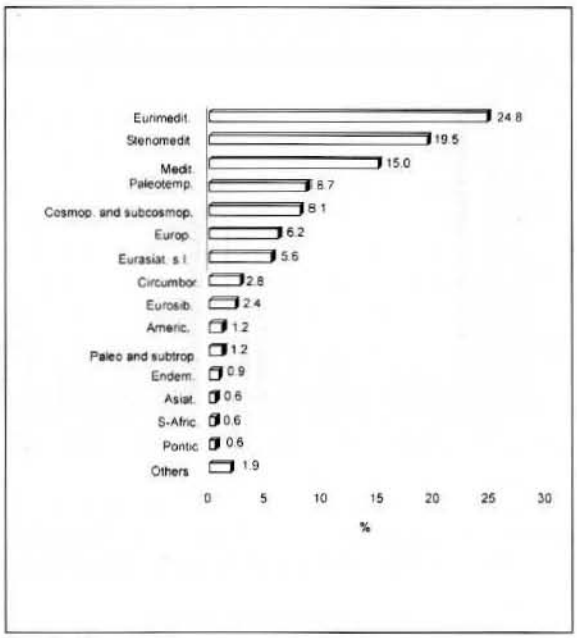

Fig. 8. Chorologic spectrum.

Euri-Medit. chorotype (24,8%) dominates on both the Stenomediterranean and Mediterranean s.l. (15,0%) ones. Such data not only stress out the Mediterranean character of this flora but also show that in the Lesina "Bosco Isola" ecological factors act so that the comparatively more mesophilous floristic contingent is prevailing on the more thermoxerophilous one. Besides, from a comparison between the above percentages and the whole Apulian flora ones (Marchiori & al. 2000) it follows that in the region Stenomedit. elements (31,37%) prevail on the EuroMediterranean ones (17,64%). The rate of the European (6,2%), Eurasiatic s.l. (5,6%), Circumboreal (2,8%) and Eurosiberian (2,4%) chorotypes, remarking the above mentioned climatic and bioclimatic characters (see § 2), indicates some thermophily.

The Endem. chorotype (0,9%) is rather poor in comparison with the Apulian flora (4,48% Endem.s; Marchiori & al., 2000) and includes *Helianthemum jonium* Lacaita, *Artemisia variabilis* Ten., *Crepis apula* (Fiori) Babc., *Arabis rosea* DC., *Euphorbia ceratocarpa* Ten. and *Verbascum niveum* subsp. *garganicum* (Ten.) Murb.

The analysis of the taxa distribution pattern in the different environments of "Bosco Isola" at Lesina (Fig. 9) shows a greater floristic richness (in terms of number of species; Ganis 1991) in dry grasslands (28,9%) and uncultivated lands (abandoned fields, road edges, ruins, removed lands) (25,7%), i.e. in anthropogenic environments. Of a great importance is the large amount of taxa (101, i.e. 14,9%) occurring in fresh water humid environments and including rare or threatened species as shown in the Red List below. On the contrary, the brackish humid environments (29 species, i.e. 4,3%) are the poorest.

Relating to the environmental diversity the chorological distribution of the taxa within "Bosco Isola" is quite diversified. A comparison between the chorological spectra related

to each environment (Figs. 10a and 10b) and the general one (Fig. 8) shows some significant differences. As far as dry grasslands and uncultivated lands – excluding the contingent belonging to colder regions such as Europ., Circumbor. and Eurosib. chorotypes - are concerned, the chorological spectra are very similar to the general one. As for dune, and mainly for maquis and garrigue environments, the Mediterranean chorotype rate is the highest (80,6% and 90,2%, respectively) with the dominance, reversed respect to the general spectrum, of the Stenomediterranean taxa on the Euri-Mediterranean ones. Such dominance, extremely strong as concerns maquis and garrigue (58,5% of Stenomediterranean types), marks these environments as the most thermoxerophilous where the stational thermopluviometric and bioclimatic parametres, strongly affected by the sand substratum, show extreme values (Fig. 3). On the contrary, both the not-brackish humid environments and the wood and scrub ones, that in this area are dependent on the surface ground water table, show a strong decrease in the Mediterranean chorotypes against a medium increase in the contingent of species from cooler and humid regions. As far as the wood and scrub spectra are concerned, the percentual value of the Europ. chorotype (21,1%), more than tripled compared with the general chorologic spectrum (6,2%; Fig. 8), highlights higher (Fig. 4) mesophilous conditions. Finally, in brackish environments Cosmop. and Subcosmop. taxa are widespread (20,7%).

	Symb.	N. *taxa*	%
Arid grassland species	PA	196	28.9
Uncultivated field species (abandoned cultivated fields, road edges, ruins, shoddy-grounds)	In	174	25.7
Wet environment species (marshlands, "fantine", banks, canals, ditches, humid grasslands)	AU	101	14.9
Wood and scrub species	Bo	76	11.2
Maquis and garrigue species	MM & G	41	6.0
Dunal environment species	AD	36	5.3
Brackish environment species	AS	29	4.3
Other environment species	Al	25	3.7

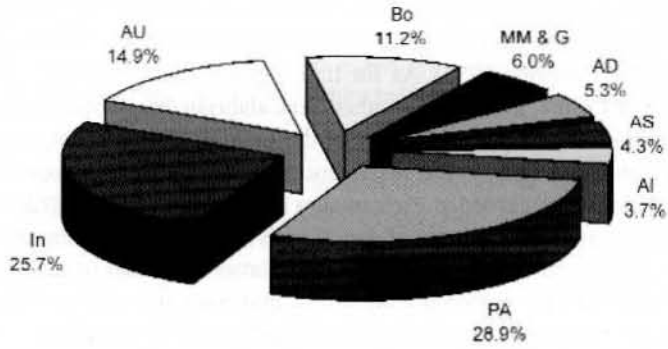

Fig. 9. Distribution of taxa in the different environments.

Tab. 5. Taxa are included in the national and regional *Red Lists* and their status (- = no detrminate status - Conti & al. 1997).

Taxa	*Status*	
	Italia	**Puglia**
Bassia hirsuta (L.) Asch.	VU	VU
Carex vulpina L.	CR	-
Cistus clusii Dunal	EN	CR
Corispermum leptopterum(Asch.) Iljin		CR
Epipactis palustris (L.) Crantz		CR
Equisetum fluviatile L.		LR
Euphorbia ceratocarpa Ten.		VU
Gagea mauritanica Durieu	DD	CR
Juncus litoralis C. A. Meyer		EN
Kosteletzkya pentacarpos(L.) Ledeb.	CR	-
Limonium bellidifolium (Gouan) Dumort.	VU	VU
Linum maritimum L.		EN
Orchis palustris Jacq.	EN	EN
Ranunculus baudotii Godron		CR
Sonchus palustris L.	CR	-

Among the 678 taxa of the Lesina "Bosco Isola" flora, 15 (Tab. 5) that are included in the national and regional *Red Lists* (Conti & *al.* 1992; 1997) and some others are considered in detail:

Cistus clusii Dunal – It is a very rare species to Italy and is included in the "Red plant list for Italy" (Conti & al. 1992) as a vulnerable species, while, concerning Apulia, it is listed among the seriously threatened species, exposed to high extinction risk (Conti & al. 1997). Its general distribution includes southern and eastern parts of Spain, the Balearic Islands (Bolaños & Guinea Lopez 1949), Morocco (Emberger 1939), Algeria (Quezel & Santa 1963), arid mountains and hills of Tunisia (Andreanszky 1937), southern Sicily (Fiori 1923-1929; Giardina 1988). As for Italian peninsula, the sole *C. clusii* presently known locality is Lesina, given that another old Calabrian one quoted by Pignatti (1982) needs confirmation. The Apulian locality of the Lago di Lesina basin, very likely to be exclusive to peninsular Italy, is the easternmost in the distribution area of this species. Two other populations recorded at Pietramaura by Chiesura Lorenzoni & al. (1976), the former occurring on a few hectares of sandy soils disappeared both under the pressure of a holiday village and repeated ploughing; the latter consisted of a single individual. Similarly, in the locality between Acquarotta and Spedale, with a single individual recorded, the species occurrence has not been confirmed. Nevertheless, following field investigations, a small population of *C. clusii,* consisting of very few individuals, has been reported for Chiusa. Accordingly, the species is not considered extinct to this region (Forte & Macchia 2001).

Juniperus turbinata Guss. subsp. *turbinata* – On the basis of morphological, biogeographical and phytochemical characters, Rivas-Martinez & al. (1993) divide *J. phoenicea*

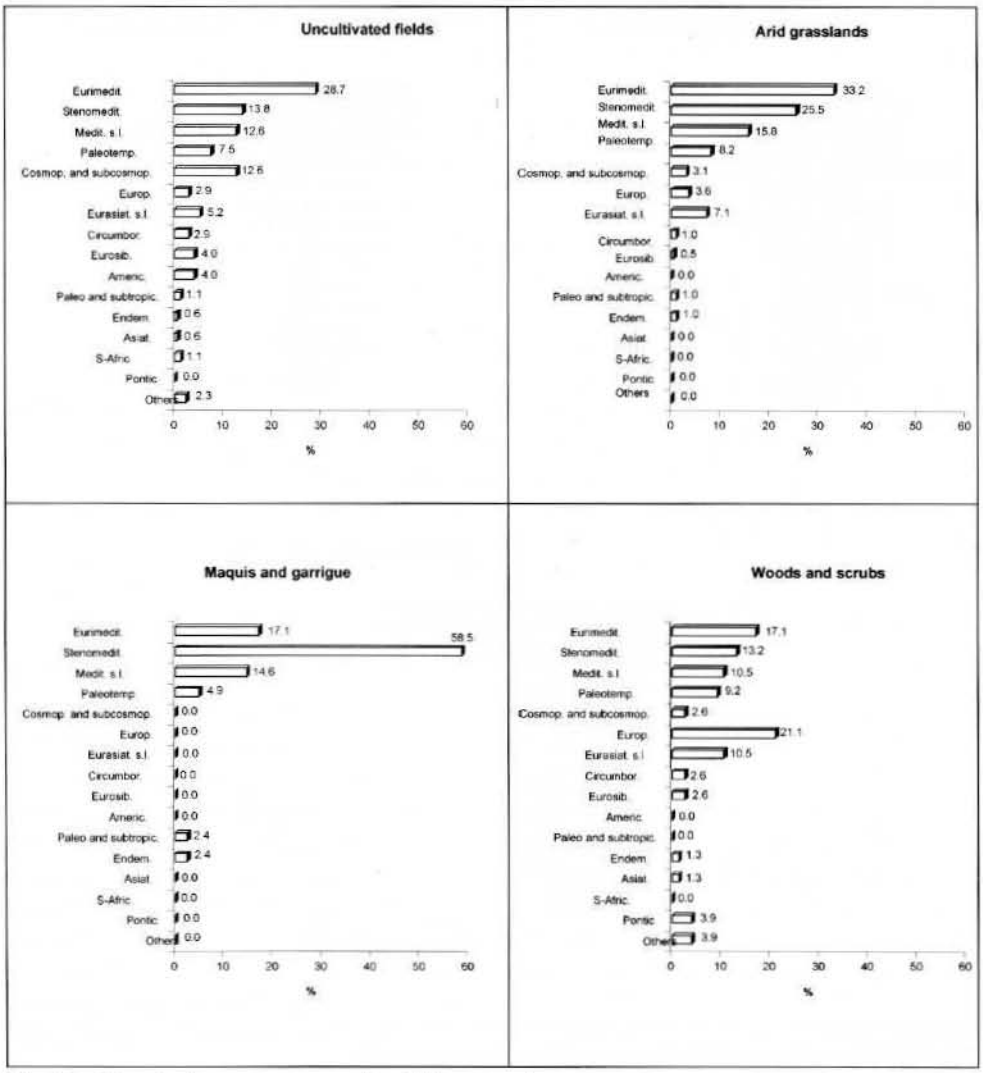

Fig. 10a. Chorologic spectra concerning different environments.

aggr. into three taxa. All samples from the Lesina dune are to be referred to *J. turbinata* Guss. subsp. *turbinata*. Therefore samples from the same locality misidentified as *J. phoenicea* by Curti & al., (1974) and by Pantaleo (1991) have to be reffered to the same taxon. According to Rivas-Martinez & al. (1993), *J. phoenicea* occurs in Italy while *J. turbinata* Guss. subsp. *turbinata* in Sicily and Sardinia. *J. turbinata* was recorded at Vadicamo (Condofuri Commune, Reggio Calabria Province) in Calabria by Bombino & al. (1997). In 1907 Trotter (Fenaroli 1966) reported the same species in the Gargano Promontory, between Rodi and Peschici, as *J. phoenicea* var. *turbinata*;

Quercus cerris L. – This species is quite widespread on the Gargano Promontory, ranging

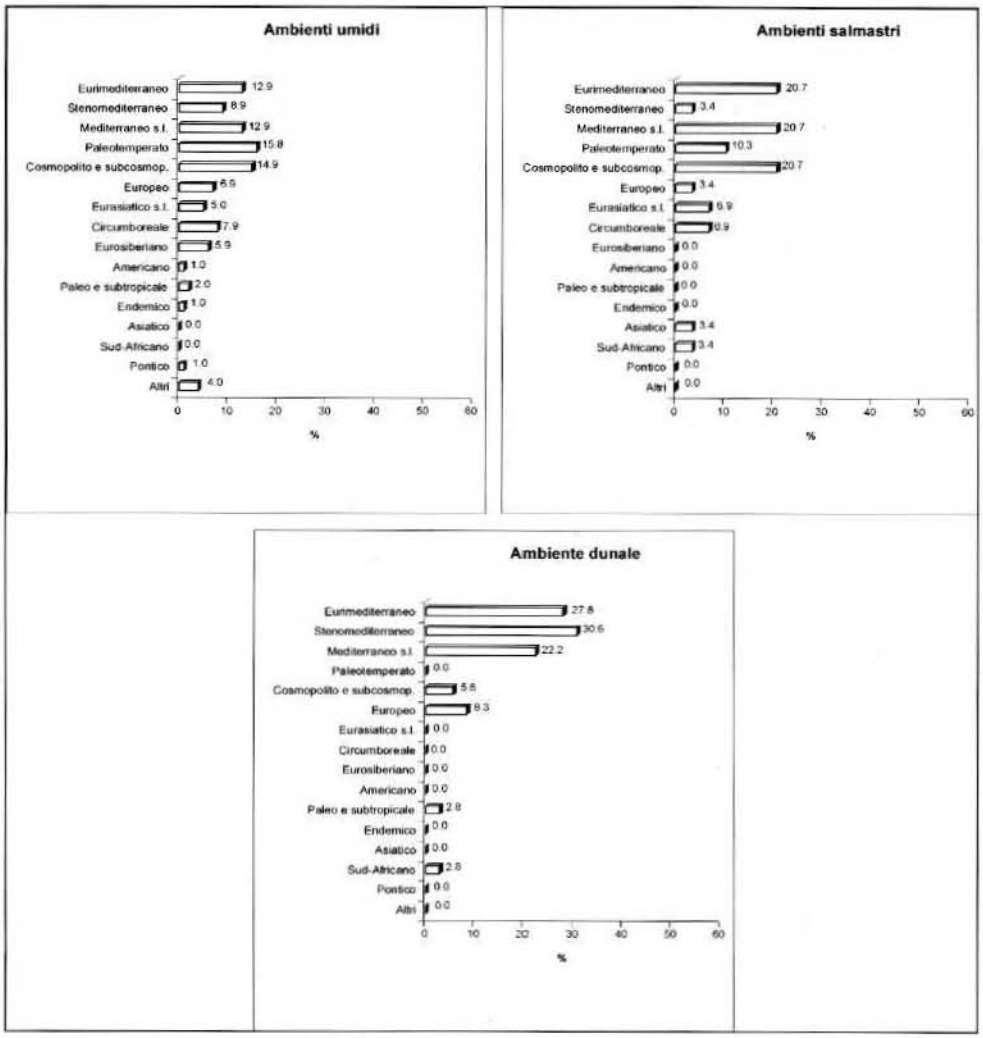

Fig. 10b. Chorologic spectra concerning different environments.

between 100 and 800 m a.s.l. (Fenaroli 1966) but in floristic, vegetational and climatic conditions definitely more mesouphilous or submesophilous than the Lesina "Bosco Isola" ones. The finding of two Turkey oaks in the ilex wood near the "Pierazzone fantina", between Pennacchio and Spedale, is therefore of great importance.

Salicornia ramosissima J. Woods. – Occurring in brackish humid environments, this species has been reported for the lagoons of Venice and Grado, Trieste and Leghorn Provinces and Elba isle by Pignatti (1982). As concerns "Bosco Isola" at Lesina, it has been found at Foce S. Andrea;

Thalictrum simplex L. – It is known to grow in northern Italy and along the peninsula in the Tuscan-Emilian Appenines, Abruzzo, Basilicata, Calabria (Pignatti 1982), Molise

(Lucchese 1995) and Campania (Moggi 2001) with scattered distribution. It occurs in humid grasslands mainly of the internal areas up to 1800 m a.s.l. The finding in the littoral Acquarotta locality is the first to Apulia;

Thalictrum lucidum L. – This species has been reported for some territories of north-eastern Italy by Pignatti (1982), for Abruzzo by Conti (1998), for Marche by Brilli-Cattarini & al. (Pantaleo 1991), for Latium by Anzalone (Pantaleo 1991) and for Basilicata by Corbetta & Pirone (1996). Fenaroli (1966) considered erroneous an old record from Manfredonia by Tenore (Fenaroli 1966). For the first time in southern Italy Pantaleo (1991) recorded it between the Acquarotta and S. Andrea di Lesina canals. This record for Apulia has been confirmed by another finding in the Acquarotta "fantine";

Arabis rosea DC. – This species is known to occur in pastures and rocky environments between 100 and 1600 m a.s.l. (Pignatti 1982) in south-central peninsular Italy, Sicily and Sardinia. The finding in the Spedale locality is the first record of the species in Apulia and is to be added to its southern distribution;

Amorpha fruticosa L. – Species introduced and naturalized to several Italian regions from North America. In southern Italy it occurs in Campania, Calabria and Sardinia. The finding near S. Andrea confirms the former record by Pantaleo (1991);

Linum maritimum L. – Relatively frequent in subsalty humid grasslands, this species, according to Pignatti (1982), occurs in Sicily and Sardinia. As for Apulia, it has been included in the "Regional Red List" (Conti & al. 1997) as endangered (EN). Its regional distribution consists of a single locality in Salento near the Rauccio marsh (Lecce) (Marchiori & al. 1998) and the Lesina dune humid environments (Pantaleo 1991). The finding near the S. Andrea canal confirms the former record by Pantaleo (1991).

Euphorbia ceratocarpa Ten. – This species, Endem. to southern Italy and common to Sicily, is rare to Calabria and Apulia where it is considered vulnerable (VU) by Conti & al. (1997). Fenaroli (1970) reported a probably erroneous Pignatti's record from arid uncultivated lands at Ripalta (Lesina, Apulia). Later Pignatti (1982) Reported the species in the Bari Province. Curti & al. (1974) report *E. Ceratocarpa* In *"Arid Uncultivated Lands"* In The Acquarotta Locality. Finally, It Has Been Found By Us In Humid Hollows (Fantine) Near Acquarotta. This record confirms the species occurrence in Gargano (Apulia).

Euphorbia platyphyllos L. – According to Pignatti (1982), this species occurs in all Italian regions except Apulia. The specimen found in the Acquarotta locality is the first record from this region.

Kosteletzkya pentacarpos (L.) Ledeb. – This species, living in littoral subsalty marshes, is very rare to Italy under dramatical environmental changes. It is included in the red lists (Conti & al. 1992; 1997) among the seriously threatened species (CR). Furthermore it is extinct in the wild (EW) in Tuscany and at present only occurs in the Venetian littoral from Caorle to Polesine, the Mesola Wood, in Emilia Romagna, the Fondi lake in Latium, the Licola locality in Campania (Conti & al. 1997) and the Lesina "Bosco Isola" locality at S. Andrea (Pantaleo 1991).

Echium sabulicolum Pomel emend. Klotz – The species is confined to Calabria, Sicily and Sardinia (Pignatti 1982). Its finding in arid uncultivated lands in the Punta Pietre Nere locality is the first record to Apulia that represents the northern distribution boundary in Italy.

Anacyclus radiatus Loisel. – In Italy it is known occurring along the Tyrrenic littoral from Liguria to both Naples (Pignatti 1982) and Cilento (Negri & Moggi 1952). It has recently been found by Bartolo & al. (1992) also near the Neto River mouth (Crotone Province, Calabria Region). The "Bosco Isola" locality is the first record in Apulia;

Artemisia variabilis Ten. – Endem. to central-southern Italy, this species is known occurring in Campania, Basilicata, Calabria, Sicily, (Pignatti 1982), Molise (Lucchese 1995), Latium (in Conti & al. 1997) and Abruzzo (Conti 1998). In Sicily and Abruzzo it is listed as vulnerable (VU) by Conti & al. (1997). The finding at the Schiapparo locality is the species first record to Apulia.

Agrostis castellana Boiss. & Reuter – This species has been reported in Italy, from the Triestine Karst and along the Peninsula with a scattered distribution, in Sicily where it is vulnerable (Conti & al. 1997) and in Corsica (Pignatti 1982; Moggi 2001). The specimen found on muddy soil at the Spedale locality is the first record to Apulia;

Poa palustris L. – This species has been reported in northern Italy (except Liguria), the Naples area, where it is very rare (Pignatti 1982), Molise (Lucchese 1995), and Abruzzo (Conti 1998), where it is considered vulnerable (VU) by Conti & al. (1997). In Apulia it had not been recorded before this finding in the humid grasslands at Zappino locality;

Carex panicea L. – In Italy this species is known occurring in the northern (Pignatti 1982) and central (in Conti & al. 1997) regions down to Abruzzo. In southern Italy it has not been recorded except Sila in Calabria (Pignatti 1982). This finding in the "Bosco Isola" area is the first record to Apulia.

Conclusions

The flora of the "Bosco Isola" area at Lesina is clearly Mediterranean with elements from areas under more humid and cooler climate. Both the area global climate with comparatively low temperatures during the winter months (Macchia & al. 2000) and the strongly diversified environments led to the penetration of taxa not closely linked to the Mediterranean basin. Humid fresh water environments with surface ground water tables and, even more, woods and scrubs closely linked to the topographic hollows are the areas with more significant Mediterranean chorotypes.

The high number of taxa occurring there depends on the highly diversified ecological conditions. In facts, 678 taxa occur in an area extending about 1.500 Ha (15,09 Km^2), i.e. 32,67% of all taxa in the Apulian flora. This latter consists of 2.075 subgeneric entities in an area of 19.346 Km^2 (Marchiori & al. 2000).

Finally, the occurrence in the study area of 161 subgeneric taxa more than the ones reported by Curti & al. (1974) and 28 more than those by Pignatti (1982) has been ascertained. 131 of these subgeneric taxa are new to the "Bosco Isola" at Lesina and 19 to Apulia.

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