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Biodiversity and important plant areas in the Palermo province (N Sicily)

Abstract

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The Palermo province is one of the most interesting areas in Sicily with respect to the plant biodiversity. In this territory 2148 specific and infraspecific taxa occur, i.e. 80% of the vascular flora of the region; furthermore 232 of such taxa are endemic, i.e. 60% of the whole endemics in Sicily. The distribution of this remarkable heritage is represented in an integrated map in which GIS data are analytically combined with other ones from different sources. The incidence and distribution of the flora of the province (which is divided 167 quadrants) are comprehensively shared out through a chromatic range of eight classes while incidence and distribution of endemics are displayed within each quadrant through five red dots of different diameter.

Introduction

Sicily is one of the most representative areas in Europe and in the Mediterranean basin as far as the floristic richness and rate of endemic taxa are concerned (Di Martino & Raimondo 1979). Within its territory, the Palermo Province (Fig. 1), extending about 5000 km^2, lies in north-western Sicily in a mainly mountainous and hilly area including different environments with various habitats. They give birth and shelter to biological formations and plant communities of great scientific and naturalistic value. Indeed, 80% of the whole sicilian vascular flora and more than the 60% of endemics there occur.

On the basis of floristic surveys, the heritage in question has been updated and the data acquired have been processed in order to realise a plant biodiversity map related to the distribution of floristic richness and incidence of the endemic taxa.

Material and methods

The present work was carried out according to a stepwise methodology and on the base of literature information (Raimondo 2000) verified and supplemented with appropriate field surveys also leading to record further data.

The resulting map was a combination of up-to-date computer graphics software and computer tools, GIS analytically correlating data from different sources.

The distribution of the records was digitised by means of the geographical grid used in

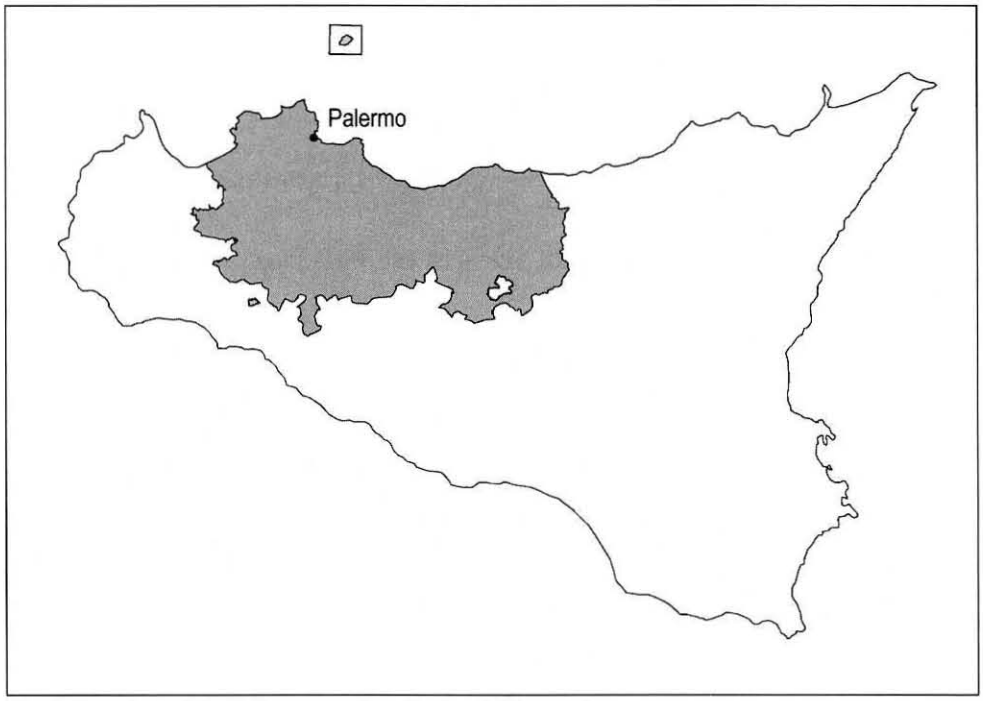

Fig. 1. Location of the Palermo province in the Sicilian territory.

the *Cartografia floristica dell'Europa Centrale* (sensu Pignatti 1978; Raimondo & al. 1998; Raimondo 2000), then applied by Poldini (1991) for the Friuli-Venezia Giulia. The grid rate is 6' latitude and 10' longitude. The derived unit (*base area*) is divided into 3' latitude and 5' longitude four *sectors*, with a 40,5 km^2 average extension.

The territory of the province is therefore divided in 167 quadrants within which the incidence and distribution of the vascular flora are marked by a chromatic range of eight classes. Each class corresponds to a different number of taxa as follows: < 400, 400-500, 501-600, 601-700, 701-800, 801-900, 901-1000, > 1000.

Incidence and distribution of endemics are displayed within each quadrant through five red dots of different diameter. Each dot represents a range of endemics as follows: 1-25, 26-50, 51-75, 76-100, > 100.

The amount of endemics exclusive to a single quadrant is shared by their number placed within it.

Results

The 2148 specific and infraspecific taxa (1814 species; 285 subspecies; 39 varieties; 2 forms; 8 nothotaxa) occurring in the province, whose extension is 19,5% of the whole region, represent a conspicuous biological heritage, being about 81% of the Sicilian flora.

There are 127 families; among them the richest ones in genera are *Asteraceae*,

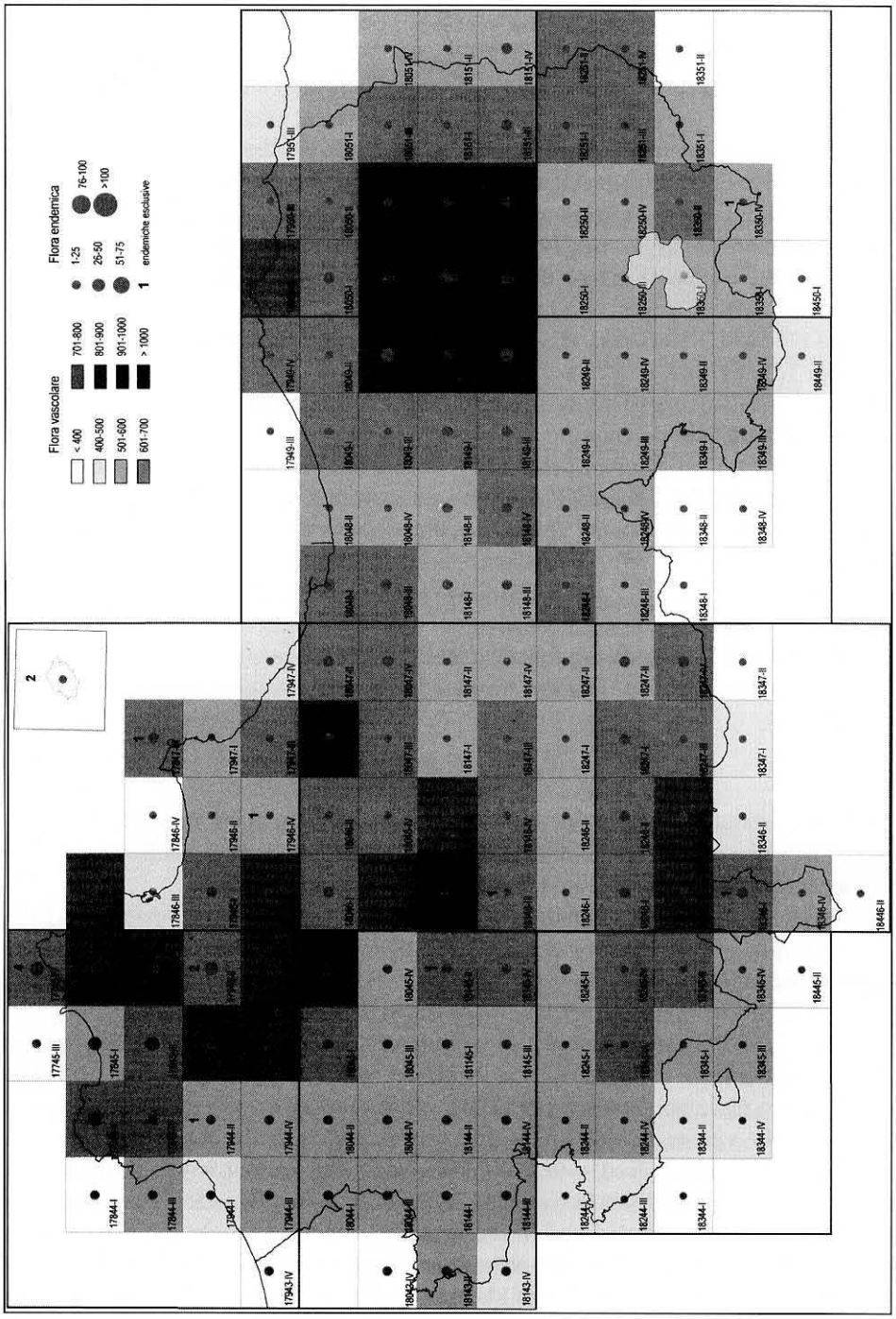

Fig. 2. Range of the floristic richness and endemics per quadrant in the Palermo province.

Fabaceae, *Gramineae*, *Brassicaceae*, *Apiaceae*, *Caryophyllaceae* and *Liliaceae* with 253, 225, 219, 98, 96, 89 and 78 specific and infraspecific taxa, respectively.

The endemics are represented by 232 taxa i.e. 10,8% of the vascular flora of the province territory, that corresponds to 8,75% of the whole flora of Sicily. Also considerable is the number of species of taxonomical and phytogeographycal interest. The processing and the relating cartographic representation of data (Fig. 2) shows that every quadrant has an average of 588 taxa with the maximum of 1175 in the Pizzo Carbonara–Piano Battaglia (18150-I) quadrant, and the minimum of 103 in Borgo Callea (18348-IV) quadrant.

The plant biodiversity is usually the highest in the almost not antrophized zones, especially in the carbonate massif of the "Madonie" – in which the number of species records per quadrant ranges between 822 and 1175 – as well as in Ficuzza–Rocca Busambra (18146-I) 1093 taxa (Fig. 3), Piana degli Albanesi (18045-II) 933 taxa and Pizzo della Trigna (18047-I) 822 taxa.

Under the qualitative aspect it can be noted, on the whole, a close correlation between endemics and biological diversity.

In the quadrants relating to the Madonie mountains the endemics range between 34 and 118 units in the Pizzo Carbonara–Piano Battaglia quadrant (Figs 4, 5) which also is the richest in taxa. The endemics are also well represented in the North-Western part of the territory (between 39 and 85) – where other floristically rich quadrants lie (Capo Gallo, Palermo mountains, Moarda e Pizzuta Mounts) – and in the South-Western area in correspondance of "Palazzo Adriano" mountains.

The range between 20 and 35 is found in several quadrants where seminatural areas lie, while low values are recorded in areas affected by a bigger antrophic incidence.

Conclusion

Under the naturalistic point of view, the Palermo province is one of the most interesting areas in Sicily and even in the Mediterranean basin. Due to its well diversified habitats, it shows an extraordinary biodiversity both in quantity and quality terms.

According to the recent guidelines of Planta Europa (Palmer & Smart 2001) the biodiversity map of Palermo province territory shows the first Important Plant Areas in Europe (IPDs) especially in Pizzo Carbonara–Piano Battaglia, Isnello (18050-III), Polizzi Generosa Est (18150-III) and Ficuzza–Rocca Busambra quadrants.

There is a close correlation between endemism and biological diversity. In the quadrant including the Madonie mountainous the incidence of endemics is at its peak with 118 endemic taxa in the quadrant Pizzo Carbonara – Piano Battaglia, with the highest number of taxa. Lower values or even no value are recorded in the areas under strong anthropogenic pressure. Indeed, over 64% of the Palermo province territory includes rural systems (50%) – in the hilly hinterland and in the lower mountain – and human systems under intensive exploitation (14%) in the littoral and hilly area. On the contrary, the partially natural systems (30%), the subnatural systems (5,52%) and natural systems (0,1%) are mainly located in the Park of Madonie and in some natural reserves (Raimondo 2000).

Fig. 3. *Centaurea busambarensis*, a rare endemic exclusive to the carbonatic cliffs of Rocca Busambra, Pizzuta, Kumeta and Isnello.

Fig. 4. *Abies nebrodensis,* the most relevant endemic to the Madonie Mountains. Its natural population do not exeeds 30 mature plants.

Fig. 5. *Genista cupanii,* endemic to the Madonie Mountains, where it occurs only on the quartzarenite substrates.

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References

Di Martino, A. & Raimondo, F. M. 1979: Biological and chorological survey of the Sicilian flora. — Webbia, **34**: 309-335.

Palmer, M. & Smart, J. 2001: Important Plant Areas in Europe: Guidelines for the selection of Important Plant Areas in Europe. — London.

Pignatti, S. 1978: Dieci anni di cartografia floristica nell'Italia di Nord-Est. — Inform. Bot. Ital., **10**: 212-219.

Poldini, L. 1991: Atlante corologico delle piante vascolari nel Friuli-Venezia Giulia. — Univ. Trieste, Regione Friuli-Venezia Giulia.

Raimondo, F. M. 2000: Carta del paesaggio e della biodiversità vegetale della provincia di Palermo. — Quad. Bot. Ambientale Appl., **8(1998)**: 1-164.

— , Certa, G., Gianguzzi, L., Ilardi, V. & Norata, G. 1998: Materiali per una nuova "flora palermitana". — Quad. Bot. Ambientale Appl., **6(1995)**: 125-130.

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