BIODIVERSITY CONSERVATION IN COASTAL AREAS IN MOLISE (ITALY)

MARIACONCETTA GIULIANO, ANGELA STANISCI

Dipartimento di Scienze e Tecnologie per l'Ambiente e il Territorio, Contrada Fonte Lappone, 86170 Pesche (IS), Italy.
mariaconcetta.giuliano@unimol.it

ABSTRACT

The conservation of the coastal habitats has a role of primary importance for the protection of the rare and endemic species. This study, carried out along the shoreline in Molise, consists in the individuation of 59 endangered and important species from a phytogeographical point of view inside the coastal habitats of European Community Importance (92/43/EEC). Moreover, this work emphasizes the importance of the ex situ conservation for the protection of local species populations and for the restoration of the damaged habitats.

KEY WORDS

Biodiversity, Red list, Habitats of European Community Interest, seed bank, Molise, coast.

INTRODUCTION

Coastal erosion, climate change, infrastructures, fires and a not-sustainable tourism can cause the extinction of important species: locate and circumscribe the important areas for these species is the first step for their conservation. The aim of this study is to identify endangered species and relevant species linked to the coastal habitats along a sector of the South Adriatic coast. In particular, the research is focused in three Sites of Community Importance (Council Directive 92/43/EEC) along the sandy coast of Molise region: "Foce Biferno - Litorale di Campomarino", "Foce Saccione - Bonifica Ramitelli", "Foce Trigno - Marina di Petacciato".

In Molise, 18 coastal habitats of European Community Interest (92/43/EEC) were found (Carranza et al.2006; Stanisci et al. in press). They consist of halophytic and coastal sand dunes vegetation types, quite rare along Adriatic coast (Géhu et al., 1984; Biondi 1999; Stanisci et al., 2006; Frattaroli et al., 2007; Carranza et al., in press; Stanisci et al., in press;) and four of these are considered of a priority interest.

MATERIALS AND METHODS

First of all, we made a list of endangered and/or of phytogeographical interest species which should be present along the Molise coast, by the analysis of: local and regional vascular plants checklist and its integrations (Conti & Stanisci 1989; Stanisci & Conti 1990; Lucchese 1995, 1996; Acosta et al. 2005; Izzi et al. 2007); regional laws (L.R. 9/99); national and international acts (the "Habitats" Directive, Berna Convention, Washington Convention); regional and national Red Lists (Conti et al., 1992, 1997); national scientific publications about status of national flora (Scoppola & Spampinato., 2005) and endemic species (Pignatti, 1982).

A second step provides a detailed fieldwork for checking and evaluating the current occurrence of important species in the habitats of European Union Interest, which were previously recognised and mapped by Carranza et al.(2006,in press). A list of endangered and relevant species currently occurring in the coastal EU Habitats was thus realised. Nomenclature of species follows Conti et al. (2005).

Furthermore endangered and relevant species seeds were collected for preserving them in Germplasm Bank of Molise, which is a node of the national network RIBES (Bedini et al., 2005).

RESULTS AND DISCUSSION

In the 18 coastal EU Habitats occurring in Molise sandy coast, we have found 59 endangered and important species from a phytogeographical point of view on 344 coastal vascular plants registered along Molise coast (Acosta et al., 2005; Stanisci et al., 2006; Izzi et al., 2007). The 30% of the studied species are considered to elevated risk of extinction for the coast in Molise, while the remaining 70% are vulnerable or to low risk (Fig. 1).

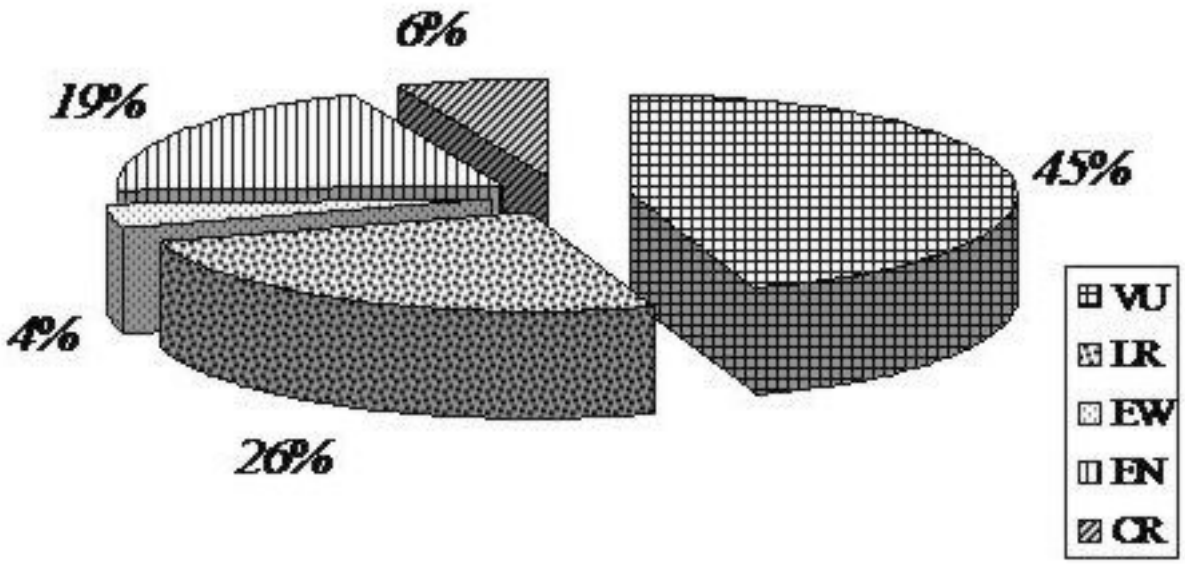

Fig.1 Coastal endangered species percentages for each Regional Red Lists categories (- EW Extinct in the Wild; - CR Critically Endangered; - VU Vulnerable; - LR Low Risk).

The species with a greater risk of local extinction are concentrated in interdunal humid and saline environments in correspondence of the mouth of the river Biferno, such as *Spartina versicolor, Puccinellia convoluta, Sarcornia fruticosa, Aeluropus littoralis* and in the interdunal gaps, like in the case of *Alkanna tinctoria* and *Malcolmia ramosissima.* Many of the species at risk along the Molise coast are also included in the Red lists of the Abruzzi region (Conti, 1997), and often they are considered at greater risk such as *Atriplex portulacoides, Carex extensa, Juncus maritimus, Otanthus maritimus, Pancratium maritimum.*

The species which reach in the Molise coast the phytogeographical limit of their Italian distribution area are found mainly in the Mediterranean maquis of fixed dunes, like *Erica multiflora, Helianthemum jonium, Cytinus ruber,* and in the interdunal gaps like *Verbascum niveum* subsp. *garganicum, Artemisia campestris subsp. variabilis, Alkanna tinctoria.*

Seeds of 30 species living in analysed coastal habitats have been collected and preserved in the Germplasm Bank of Molise (Giuliano et al. 2006).

Here we included the list of endangered and relevant species occurring in the UE habitats along Molise coast. For each species we reported: the symbol "°" for those whose seeds are conserved in Germplasm Bank of Molise; Natura 2000 codes of Habitats where the species occur; IUCN categories.

°*Aeluropus littoralis* (Gouan) Parl. -1310, 1420, 1430, 1510*- EN
Alkanna tinctoria Tausch subsp. *tinctoria* -2230, 2260 - EN
Allium atroviolaceum Boiss. -1430, 2240, 2250*, 2260, 2270*- LR
Ambrosia maritima L. -2120, 2230, 2250*-VU
Arbutus unedo L. - 9340
Arisarum vulgare Targ. Tozz. -2270*, 9340 - VU
Artemisia arborescens L. -1430 - EN
Artemisia caerulescens L. subsp. *caerulescens* -1130, 1310, 1420, 1430, 1510* - EN
Artemisia campestris L. subsp. *variabilis* (Ten.) Greuter-2120 - Endemic
Atriplex portulacoides L. -1130, 1310, 1420, 1510* - VU
Atriplex tatarica L. - 1130, 1210, 2110 - EW
Carduus corymbosus Ten. - 1430, 2240 - Endemic
Carex acutiformis Ehrh. - 1130, 2190 - VU
Carex extensa Gooden. - 1410 - LR
Carex hispida Willd. - 1130, 1410, 2190 -VU
Carex liparocarpos Gaudin subsp. *liparocarpos* - 2270*- CR
Crepis rubra L. - 2240 - EW
Crithmum maritimum L.- 1130, 1210, 1510*, 2110, 3250
Cyclamen repandum Sm. subsp. *repandum* - 9340
Cytinus hypocistis (L.) L. - 2250*, 2260, 2270*, 9340 - VU
Cytinus ruber Fourr. ex Fritsch - 2250*, 2260, 2270* - LR
Echinophora spinosa L. - 2110, 2120, 2230 - LR
°*Erica multiflora* L. - 2250*, 2260, 2270*, 9340 - LR
°*Euphorbia paralias* L. - 1130, 1210, 1510*, 2110, 2120 - LR
°*Euphorbia terracina* L. - 2120, 2230, 2240, 2250*, 2260 - LR - Endemic
Fraxinus angustifolia Vahl subsp. *oxycarpa* (Willd.) Franco & Rocha Afonso - 9340 - VU
°*Glaucium flavum* Crantz -1130, 1210, 3250 - LR
°*Helianthemum jonium* Lacaita -2240, 2250*, 2260 - VU - Endemic
Iris lorea Janka -9340 - LR
°*Juncus littoralis* C.A. Mey. -1130, 1410, 1420, 2190 - VU
Juncus maritimus Lam. -1130, 1310, 1410, 1420, 2190 - VU
°*Limonium narbonense* Mill. -1130, 1210, 1310, 1420, 1510*, 2190, 3250 - VU
Malcolmia nana (DC.) Boiss.-2230 - EN
Malcolmia ramosissima (Desf.) Gennai-2230 - VU
Micromeria canescens (Guss.) Benth. - 2240 - VU
Myrtus communis L. subsp. *communis* -2250*, 2260, 2270*, 9340
Oenanthe lachenalii C.C. Gmel. - 1130 - VU
Ophrys tenthredinifera Willd. - 2260, 2270*, 9340 - LR
°*Otanthus maritimus* (L.) Hoffmanns. & Link subsp. *maritimus* - 1130, 1210, 2110, 2120 - VU
°*Pancratium maritimum* L. -1130, 2110, 2120, 2230, 2250*, 2260, 2270* - VU
Pistacia lentiscus L.-2250*, 2260, 2270*, 9340
°*Plantago crassifolia* Forssk. -1130, 1310, 1410, 1420, 1510*, 2190, 3170* - VU
Polycarpon tetraphyllum (L.) L. subsp. *alsinifolium* (Biv.) Ball -1130, 2230, 2250*, 2260 - LR
Polygala monspeliaca L.-1130, 2230, 2260, 2240 - LR
Puccinellia convoluta (Hornem.) Hayek -1130, 1420, 2190 - EN
Romulea rollii Parl. - 2240, 2260 - VU
Ruscus aculeatus L.- 9340
Salicornia patula Duval-Jouve -1310, 1420, 1510* - VU
°*Sarcocornia fruticosa* (L.) A.J. Scott -1310, 1420, 1510* - EN
°*Sarcocornia perennis* (Mill.) A.J. Scott -1310, 1420 - EN
Silene muscipula L. subsp. *muscipula*-2240, 2270* - CR
Sonchus maritimus L. subsp. *maritimus* -1130, 1410, 1430, 1510, 2120, 2190 - VU
Spartina versicolor Fabre-1130, 1410, 1420, 2190-EN
°*Spergularia salina* J. & C. Presl-1130, 1410, 1420, 1430, 1510*-VU
Sporobolus virginicus Kunth -2110 - VU
Stachys maritima Gouan -1410, 1430, 2230 - CR
Trifolium suffocatum L.-2240, 2250*, 2260
°*Verbascum niveum* Ten. subsp. *garganicum* (Ten.) Murb.-2230, 2240, 2250*, 2260 - Endemic
Vitex agnus-castus L.-1130, 1410, 2190, 3250

CONCLUSIONS

The location of the populations of species threatened in the Sites of Community interest and their georeference are an important step for the knowledge and the protection of these areas.

Results showed that many endangered and relevant species were found in the European Community interest coastal habitats of Molise region, even if they are often very rare along the other Adriatic Italian coasts. It worth to note that some of these species should be included in the national list of relevant species for conservation purposes, since only 4 of them are now quoted (Scoppola & Spampinato 2005).

Moreover, the seeds collection and conservation ex situ of these species, and of others useful for environmental restoration activities, can contribute to restore dune ecosystems where they are strongly damaged by human disturbance.

REFERENCES

Acosta A., Carranza M.L., Conti F., De Marco G., D'Orazio G., Frattaroli A.R., Izzi C.F., Pirone G. & Stanisci A., 2005. Banca dati della flora costiera psammofila dell'Italia centrale. Inf. Bot. Ital. 37 (n. 1 Parte A), 110-111.

Bedini G., Rossi G. & Bonomi C. 2005. RIBES, la Rete Italiana delle Banche del germoplasma per la conservazione Ex-Situ della flora spontanea. Informatore Botanico Italiano 37 (1):114-115.

Biondi E., 1999. Diversità fitocenotica degli ambienti costieri italiani. Supplemento Bollettino Museo Civico Scienze Naturali di Venezia, 49:39-105.

Carranza M.L., Acosta A., Stanisci A., Pirone G. & Ciaschetti G. in press. Ecosystem classification for EU habitat distribution assessment in a sandy coastal environments: An application in central Italy. Environmental Monitoring and Assessment.

Carranza M.L., Feola S., Acosta A. & Stanisci A. 2006. Analisi della composizione e della struttura spaziale del paesaggio di duna costiera in base a cartografia CORINE land cover di dettaglio. Atti 10 Conferenza Nazionale ASITA. 6pp.

Conti F., Abbate G., Alessandrini A. & Blasi C., 2005. An annotated Checklist of the Italian Vascular Flora. Palombi Editori.

Conti F. & Stanisci A., 1989. Su alcune piante notevoli rinvenute in Abruzzo, Molise e Lazio. Inf. Bot. Ital. 21, n. 1-3:95-98.

Conti F., Manzi A. & Pedrotti F., 1992. Libro Rosso delle Piante d'Italia. Società Botanica Italiana, WWF.

Conti F., Manzi A. & Pedrotti F., 1997. Liste Rosse Regionali delle Piante d'Italia. Società Botanica Italiana, WWF.

Frattaroli A.R., Acosta A., Ciaschetti G., Di Martino L., Pirone G. & Stanisci A., 2007. Indagine sulla qualità ambientale della costa dell'Abruzzo meridionale e del Molise (Adriatico centrale) su base floristico-vegetazionale. Fitosociologia vol. 44 (1):117-127.

Géhu J.M., Costa M., Scoppola A., Biondi E., Marchiori S., Peris J.B., Franck J., Caniglia G. & Veri L., 1984. Essai synsystématique et synchorologique sur les végétations littorales italiennes dans un but conservatoire. In Dunes et vases salees. Documents phytosociologiques, N.S., Vol. VIII:394-431.

Giuliano M., Scippa G.S. & Stanisci A. 2006. Le specie rare e minacciate del litorale molisano: protezione e conservazione ex situ - Atti Tavola rotonda "La conservazione delle risorse genetiche delle specie spontanee" Roma 1 dicembre 2006.

Izzi C.F., Acosta A., Carranza M.L., Conti F., Ciaschetti G., Di Martino L., D'Orazio G., Frattaroli A.R., Pirone G. & Stanisci A., 2007. Il censimento della flora vascolare degli ambienti dunali costieri dell'Italia centrale. Fitosociologia vol. 44(1):129-137.

Lucchese F., 1995. Elenco preliminare della flora spontanea del Molise. Ann. Bot. (Roma), Studi sul Territorio, 53, Suppl. 12.

Lucchese F., 1996. Correzioni ed aggiunte alla flora del Molise. Ann. Bot. Roma, 54:1-294.

Pignatti S. 1982. Flora d'Italia. Edagricole.

Scoppola A. & Spampinato G., 2005. Atlante delle specie a rischio di estinzione. Palombi Editori.

Stanisci A. & Conti F., 1990. Aspetti vegetazionali di un settore costiero adriatico (Molise-Abruzzo). Ann. Bot. (Roma), 48, Studi sul territorio suppl. 7:85-94.

Stanisci A., Acosta A., Izzi C.F. & Vergalito M., 2006. Flora e vegetazione del litorale molisano: un patrimonio naturale da tutelare. Ed. Università del Molise, Legambiente Basso Molise.

Stanisci A., Acosta A., Carranza M. L., Feola S. & Giuliano M., in press. Gli habitat di interesse comunitario sul litorale molisano e il loro valore naturalistico su base floristica. Fitosociologia.