Mycological investigations and conservation of fungi in Sicily (South Italy)

Giuseppe Venturella

Department of Botany, University of Palermo, Via Archirafi 38, I-90123 Palermo, Italy (e-mail: gvent@unipa.it)

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Abstract. An overview of the research projects recently activated in Sicily (South Italy) for the assessment of fungal diversity together with considerations on stress factors responsible of changes in the composition of mycological flora and decline of fungal communities, respectively, are here reported. The paper also deals with the problems concerning fungal conservation and the needs to co-ordinate future actions at European level.

Key words: conservation, fungi, Sicily, South Italy

Introduction

Until 1991 data on the diversity of the mycological flora in Sicily were very scarce and fragmentary, mostly restricted to fungi of phytopathological importance.

Afterwards, a meeting was organized in 1991 by the Working Group for Mycology of the Italian Botanical Society in Arzana (Sardinia, Italy) to stimulate mycologists to increase the mycological investigation in different regions of Italian territory. A research project to inventory the macromycetes in Sicily was proposed by Venturella (1992).

The first step of the project was to check all the references available for Sicilian fungi. This was followed, soon after, by the publication of a "Check-list of Sicilian fungi" (Venturella 1991). This Check-list included 1564 taxa (*ca* 650 macromycetes), while only based on bibliographic data, was the starting point for the beginning of an intense mycological exploration of the Sicilian territory that is still in progress.

The main objective of the mapping project of macromycetes from Sicily is to assess all fungal biodiversity in different ecosystems with particular reference to areas included within regional Parks and natural Reserves. The mycological flora of two of the most important areas of the province of Palermo was recently investigated by Venturella *et al.* (2000, 2001). Ecological data and distribution maps are currently available for more than 1000 macromycetes, together with quantitative data on the number of taxa per status category.

Besides the number of recorded taxa in each investigated area of Sicily there is the base to evaluate the mycofloristic richness and to identify Important Plant Areas (IPA's) for fungi according to the IPA's definition of Planta Europa (Smart 1997).

Mycofloristic investigations in selected ecosystems such as *Quercus ilex* woods, *Fagus sylvatica* woods, sandy dunes and conifer mixed woods crossed by fire, were also carried out (Venturella *et al.* 1999, Venturella & Contu 2002, Venturella & Lo Bue 2002).

The check-list of Sicilian fungi is the base of proposed new data that will be included in the red-lists of macromycetes at national and European level. Data arising from check-lists referred to Mediterranean regions are also useful to harmonize red lists of Europe. In fact the red-lists for fungi already published in Europe are mainly devoted to species and/or habitats belonging to central and northern Europe. This is, for example, the case of Ing's list (Ing 1993) in which fungi that are very common in the Mediterranean area are considered as declining species.

Mycodiversity in Sicily

At present the number of macromycetes corresponds to 1248 taxa. Since many territories of Sicily still are not well investigated the actual number of fungi is underestimated but meaningful if one consider that Sicily is a region characterized by a long dry period (5-7 months) and subjected to a thermo-Mediterranean climate.

The richest mycofloristic areas are currently concentrated in northern Sicily and precisely in the central part of the

Madonie territory and in a very large area located inside the Ficuzza Wood-Rocca Busambra territory. These areas are included in two natural Reserves corresponding to the more important woody territories of Sicily. The naturalistic and mycological importance of such areas is enhanced by the presence of the rare and/or infrequent, for Sicily, *Pleurotus nebrodensis* (Inzenga) Quél., *Amanita decipiens* (Trimbach) Jacquet., *Myriostoma coliforme* (With. : Pers.) Corda, *Plectania rhytidia* (Berk.) Nannf. & Korf, *Helvella queletii* Bres., *Lepiota cortinarius* J.E. Lange, *Macrotyphula fistulosa* (Holmsk. : Fr.) R.H. Petersen, *Entoloma atrocoeruleum* Noordel., *Entoloma bloxamii* (Berk. & Broome) Sacc., *Gyroporus cyanescens* (Bull. : Fr.) Quél., *Albatrellus pes-caprae* (Pers. : Fr.) Pouzar, *Ossicaulis lignatilis* (Pers. : Fr.) Redhead & Ginns, and *Xerocomus roseoalbidus* Alessio & Littini (Venturella *et al.* 2000, 2001).

Chorological and ecological comparisons with other Mediterranean regions or countries could be possible only if similar studies will be available in future time. An attempt in this direction was made by Venturella & Zervakis (2000) and Venturella *et al.* (2002, abstr.) which compared qualitatively and quantitatively the mycological flora of Sicily and Greece.

Stress factors, changes in the composition of mycological flora and decline of fungal communities

The mycodiversity of Sicily is day by day threatened by stress factors (climatic changes, air pollution, etc.) and mainly by man's activities. In particular fire events, grazing and destruction of habitats, together with the absence of any rules for mushroom gatherers are the most important factors responsible of decline in fungal communities. Grazing has caused the appearance of many coprophilous species fruiting on bovine and/or equine dung and the residues of fire-making by numerous visitors of regional Parks has favoured the appearance of a number of fungi belonging strictly to burnt areas. The low number of taxa recorded in areas crossed by fire and the decrease of mycorrhizal species confirmed the damage to fungal communities.

The removal by forestry workers of logs and branches during the operations of cutting and cleaning in the woods has also contributed to a drastic decrease in the number of fungal species.

As a consequence of the introduction of exotic species in the reafforestations (e.g., *Cedrus atlantica* (Endl.) Carrière, *Eucalyptus camaldulensis* Dehnh., and *Pseudotsuga menziesii* Franco var. *menziesii*) a number of alien species such as *Geopora sumneriana* (Cooke) M. Torre, *Cortinarius cedretorum* Maire, *Tricholoma tridentinum* Singer var. *cedretorum* Bon, *Setchelliogaster tenuipes* (Setch.) Pouzar, and *Boletinus lakei* (Murrill) Singer were introduced into Sicily.

Picking of immature basidiomata of species of high economic interest such as *Boletus edulis* Bull. : Fr., *B. aereus* Bull. : Fr., *Pleurotus eryngii* (DC. : Fr.) Quél., *P. eryngii* var. *ferulae* Lanzi, *P. nebrodensis* (Inzenga) Quél., and *Macrolepiota procera* (Scop. : Fr.) Singer for trade is another aspect to be considered in the evaluation of decline of fungi in different ecosystems.

Conservation and future actions

As reported by Courtecuisse (2001) the conservation strategies for fungi are nowadays mainly oriented towards: a) *in situ* conservation by conserving natural habitats, b) *in situ* conservation on mycological reserves, c) *in situ* conservation with ecological corridors, and d) *ex situ* conservation.

In Europe examples of *in situ* and *ex situ* conservation for fungi were carried out by Alexander & Watling (1987), Courtecuisse & Ansart-Chopin (1997), Courtecuisse & Blot-Quénu (1998), Homolka *et al.* (1999), Jalink & Nauta (2001).

In Sicily a protection plan for the rare *Pleurotus nebrodensis* based on legislative actions and *ex situ* cultivation was proposed by Venturella (1999, abstr.).

But mycologists still have great difficulties representing to the scientific community the importance of fungi and their fundamental role in the conservation and safeguard of the ecosystems. It's even more difficult to obtain attention on mycological problems from politicians. The legislative actions and funds are usually more oriented towards the safeguard of threatened habitats, plant communities and/or animals while cryptogams are still considered as neglected components of the ecosystems.

In order to solve such problems a synergy between mycologists, mycological amateur groups, administrators of regional natural Parks and Reserves and environmental associations should be activated.

Furthermore, the Italian Botanical Society, all mycological amateur groups, the Commission on Fungi of OPTIMA (Organization for the Phyto-Taxonomic Investigation of the Mediterranean Area), the European Council for the Conservation of Fungi, the European Confederation of Mediterranean Mycology (CEMM) and, more recently, Planta Europa are very interested in activate project on Mediterranean mycodiversity but there is still a lack of coordination among these Institutions so that it is hoped that all actions for the conservation of fungal biodiversity can be gathered in a European network.

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