

## Assessment of the diversity of epigeous *Basidiomycota* under different soil-management systems in a montado ecosystem: a case study conducted in Alentejo

Celeste Santos-Silva · Rogério Louro

Received: 21 April 2014 / Accepted: 18 March 2015  
© Springer Science+Business Media Dordrecht 2015

**Abstract** Several management practices that are employed in *Montados* are known to affect the establishment and maintenance of *Basidiomycota* communities immediately after disturbances have occurred, contributing to their development or, conversely, decreasing their diversity. In this study we aim to evaluate the effects of the most common understory and soil-management practices on the diversity of the epigeous *Basidiomycota* a long time after disturbances have taken place. The study was conducted in a *Montado* (cork and holm-oak ecosystem) area in Southern Portugal (Alentejo). In 1998, four experimental treatments—control (C), mulching (Mu), mowing (Mo) and ploughing (P)—with three replicates each were carried out: C—untreated/untouched; Mu—cutting of shrubs followed by deposition of plant residues on soil surfaces; Mo—cutting of shrubs followed by biomass removal and soil tilling; P—cutting of shrubs followed by the incorporation of plant biomass into the soil through tillage. Macrofungal surveys were conducted fortnightly in the experimental plots between Autumn 2007 and Spring 2012. Significant differences in total and mycorrhizal richness were found between plots, with higher values being found for non-tilled plots and lower values for

tilled plots. No significant differences were found in saprotrophic richness between treatments. Regarding the composition of *taxa*, *Boletus* and *Russula* were the main taxonomic groups affected by experimental treatments. Our results showed that soil tillage can result in a decrease in mycorrhizal *taxa* even a long time after disturbances have taken place.

**Keywords** Epigeous *Basidiomycota* · Mediterranean ecosystem · Shrub clearing · Soil tillage · Mycorrhizal fungi · Portugal

### Introduction

Cork-oak (*Quercus suber* L.) and holm-oak (*Quercus rotundifolia* Lam. = *Quercus ilex* subsp. *ballota* (Desf.) Samp.) montado ecosystems, are the most common agroforestry systems in Portugal, covering nearly 800,000 ha, mainly in the Alentejo region (Pinto-Correia et al. 2011). These man-made savannah-type ecosystems are typically characterized by a few scattered cork and/or holm oak trees with an average tree density of about 60–100 trees per hectare, with a mosaic of pastures and agricultural fields as understory, in a rotation scheme that includes fallows (Pinto-Correia 1993). Shrub clearing and rotational ploughing are common practices used to control shrub invasion, promote pasture production and prevent fires (Calvo et al. 2005; Plieninger et al. 2004).

C. Santos-Silva (✉) · R. Louro  
Biology Department, Instituto de Ciências Agrárias e Ambientais Mediterrânicas, University of Évora,  
Apartado 94, 7002-554 Évora, Portugal  
e-mail: css@uevora.pt