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Myxomycete diversity from arid and semiarid zones of the Canary Islands (Spain)

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Abstract — A study of the myxomycetes recovered from the arid, semiarid, and dry zones of the Canary Islands is presented herein. A total of sixty-three species, most growing on succulent plants, is reported. *Physarum bethelii, P. confertum,* and *Stemonitis herbatica* are cited for the first time from the Canaries, with additional new records from each island. The importance of the endemic plants such as *Euphorbia canariensis* as substrates for myxomycetes is analyzed. As reported from other arid zones of the world species belonging to the orders *Physarales* and *Trichiales* dominate. *Badhamia melanospora*, commonly recorded from the deserts of America, was the most frequently recovered species from the Canaries. The parallel between the myxobiotas of the dry areas of the Americas and the Canary Islands is also discussed. The complete study and catalogue is available at http://www.mycotaxon.com/resources/weblist.html.

Key words — biodiversity inventory, Macaronesian bioregion, thermophilous habitats, xerophytic substrates

Introduction

The study of myxomycetes from the arid lands of the world is a subject of recent interest (Lado et al. 1999, 2009; Mosquera et al. 2000a,b, 2003; Wrigley de Basanta et al. 2008, 2009). Cacti and other succulent plants have been found to support a characteristic succulenticolous species assemblage (Lado et al. 1999). Inventories of the myxomycetes from some deserts, especially from the Americas and other regions of the world, have been published in the last decades (Blackwell & Gilbertson 1980; Novozhilov et al. 2006; Lado et al. 2007a,b; Estrada-Torres et al. 2009) but information about the myxomycetes of insular arid lands is very scarce (Eliasson 1971, 1991, 2004).

The Canary Islands are a group of islands of volcanic origin located in the Atlantic Ocean, between 27°40'–29°30'N latitude and 13°25'–18°10'W longitude, approximately 100–500 km from the west African coast and the Sahara desert and on about the same latitude as Florida (USA). The Archipelago is composed of seven major islands (Hierro, La Palma, Gomera, Tenerife, Gran Canaria, Fuerteventura, Lanzarote) and a few smaller ones. Due to their volcanic nature the relief is very abrupt, and the elevation ranges from sea level to 3718 m, on Tenerife Island. The considerable elevation gradient produces substantial environmental variation with respect to temperature and moisture across the islands.

The vegetation of the Canary Islands is highly stratified due to the influence of climatic factors, altitude, and exposure. From a bioclimatic point of view, there are six ombrotypes in the Canaries (hyperarid, arid, semiarid, dry, subhumid, humid). From sea level to 200-400 m on their northern slopes and up to 600-1000 m on the southern side, there is an arid-semiarid-dry climate, characterized by high temperatures (18°-22°C) and low annual precipitation (50-350 mm). The vegetation of these zones represents a characteristic xerophytic scrubland (called "cardonal-tabaibal" in Spanish) with succulent plants and occasional aphyllous or spiny shrubs dominated by *Euphorbia* spp. with a high proportion of endemic plants (> 50%). Above the *Euphorbia* communities there are woodland and forest belts, followed by dry xerophytic summit vegetation represented only in the highest islands.

In several places the natural vegetation was replaced by cultivated plots, and many exotic species such as *Opuntia* spp. and *Agave* spp., were introduced. Presently these disturbed formations form part of the Canary landscape. These are the anthropic plant communities.

The overall aim of our investigation was to study the myxomycetes associated with arid, semiarid, and dry zones. As a result, most of the sampled stations were located in the lower elevations of the islands, between sea level and 500 m.

Material and methods

During eleven years (1994–2005) 72 localities were sampled at lower elevations (generally below 500 m) across seven of the Canary Islands. Microscopic measurements were made from material directly mounted in Hoyer's medium. An Olympus BH-2 and a Zeiss Jenemad-2 achromatic phase contrast microscope were used in the identification of the specimens. The specimens have been deposited in TFC Mic, and MA-Fungi herbaria. Nomenclature largely follows that of Lado (2001).

Results

A total of 63 species of myxomycetes were recovered, of which *Physarum bethelii* T.Macbr. ex G.Lister, *P. confertum* T.Macbr., and *Stemonitis herbatica*

Peck are reported for the first time from the Canaries. The taxa recovered were distributed across 21 genera, among which *Physarum* has the greatest representation with 15 species, followed by *Didymium* (12 species), and *Arcyria* (7). As reported from other arid zones of the world the species belonging to the order *Physarales* and *Trichiales* dominate. *Badhamia melanospora*, commonly recorded from the deserts of America, was the most frequently recovered species from the Canaries.

The analysis of the substrates was based on a total of 463 samples, collected from 34 vascular plant species, of which 14 are characterized by succulent biotypes, 19 are woody, and 1 herbaceous. The greatest number of myxomycete species (51) was collected from succulent plants. Of these 32 could be characterized as strictly succulenticolous, since they were only observed from this type of substrate, whereas the remaining species appeared on woody remains and/or leaf litter. *Euphorbia canariensis* was found to be the most productive substrate with respect to species richness among the endemic succulent species with a total of 117 collections distributed across 27 species of myxomycetes. *Opuntia maxima* was the most productive substrate among the introduced succulent species, with 138 samples belonging to 23 species of myxomycetes.

This study was carried out in the same way as research on the myxomycetes of arid lands in Mexico (Estrada-Torres et al. 2009). Some of the results have been similar and have resulted in several taxa new to science (e.g. *Cribraria zonatispora, Trichia agaves, Licea succulenticola,* and *Didymium wildpretii*) having been described based on material from both areas. Several centuries ago succulent plants and cacti from America were introduced to the Canary Islands to see whether they could become acclimated and be cultivated in Europe. Therefore, the similarity in the myxobiota of these areas could potentially have been influenced, as has been suggested previously (Lado et al. 2007b), by the introduction of these plants.

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