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Introduction

Arbuscular mycorrhizal (AM) fungi are the most ubiquitous underground organisms living in symbiosis. They occur in the roots and surrounding soil of a wide variety of host plants. The AM fungi are aseptate symbiotic fungi grouped in a new phylum, the Glomeromycota. The host plants include angiosperms, gymnosperms, pteridophytes, the gametophytes of some mosses and lycopods. The understanding of this universal fungus/root association provides insight of the basic biological process including the compatibility and synergism between organisms as well as the functioning of ecosystems. Both mycorrhizal partners (AM fungi and plants) evolved during land colonisation by plants, where mycorrhiza played a key role in the adaptation to new environments. Since the moment that plants and AM fungi have co-evolved, they co-occur in symbiotic interactions with their environment.

Over the last decades, the understanding of the AM fungal symbiosis has increased. In Europe, networks of scientists and AM fungi producers were set up to stimulate collaborations in research on AM fungi and the development of AM fungal products. These first two networks, COST Actions 821 and 838, have resulted in considerable progress in the knowledge of the biology and functioning of this plant-fungus interaction. The third network, COST action 870, has endeavoured to attempt bridging the gap between science and society. COST action 870 focuses on a multidisciplinary approach aimed at increasing the awareness of the importance of AM fungi among technical advisors and growers for the development of a more sustainable agriculture and an environmentally sound approach to the re-vegetation of eroded and degraded lands. In fact, this means that an increase of knowledge is needed for enhancing implementation of AM fungi in agricultural systems. Therefore, COST Action 870 has been structured into four different working groups.

Working group 1, led by Prof. M. Jones (United Kingdom) and Prof Y. Kapulnik (Israel), is focused in the study of responsiveness of crop plants to AM fungi through novel approaches in plant breeding. In the last decades, plant breeding programmes have resulted in crops that have higher levels of resistance to pathogens, however, some also show a reduced AM root colonisation and a diminished responsiveness to AM fungi. More research on plant breeding is desirable to detect the plant genes involved in mycorrhization with the objective of developing crops with enhanced responsiveness to the colonisation of AM fungi, leading to enhanced use of mycorrhizal resources in agriculture, and thereby increasing the sustainability of the system.

Working group 2 with the working group leaders Dr. J. Baar (The Netherlands), Dr. A. Alodheya (India) and Prof. DeClerck (Belgium) is studying on the development of an independant quality control label for AM fungi. In the last decades, the number of new, small to medium sized, companies around the world producing inocula of mycorrhizal fungi has increased. Still, there are great problems in bringing high quality and fit for purpose AM fungal products to target markets. Therefore, there is an urgent need for better understanding of the relevant issues on the production and storage of AM fungal products to obtain good standardized products with a control label that would be a key point for the end-user.

Working group 3 is studying the application of AM fungi in agricultural systems ranging from low- to high input systems in Europe north of the Mediterranean regions. The group leaders are Dr. M. Vestberg (Finland) and Dr. S. Ravnskov (Denmark). This group increases knowledge about the effects of different soil conditions on the development of AM fungi resulting in the development of more AM fungal products for the specific soil conditions in Europe north of the Mediterranean regions. The North Western soil types where mesic to eutrophic conditions prevail differ from the Mediterranean area soils that are poor in organic matter and nutrients. Also, a considerable amount of land in the Mediterranean regions is arid or semi-arid with a risk of salinisation, and degradation.

For the Mediterranean area, working group 4 focuses on the application of AM fungal inoculum specific for Mediterranean conditions. This working group, led by Dr. V. Estaun (Spain) and Prof. I. Ortas (Turkey), enhances insight on the effects of different soil conditions on the development of AM fungi in the Me-

diterranean regions resulting in the further development and application of AM fungal products.

The four workings groups were present at the COST Action 870 in Calella near Barcelona, Spain, in March 2009. This issue brings together the papers presented at this joint meeting. The papers include novel steps made for enhancing the understanding of AM fungi biology and its application to different systems. Also, some papers have been presented by technical advisors and scientists involved in the development of mycorrhizal inocula, fulfilling one of the main aims of this COST action, which is to encourage and facilitate the communication between academic researchers and companies, in order to secure the link between research and society.

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Local organizer COST Action 870 meeting in Calella, Spain, in March 2009

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