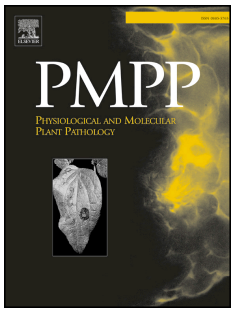
Accepted Manuscript



AMF: The future prospect for sustainable agriculture

Supratim Basu, Roel Rabara, Sangeeta Negi

PII: S0885-5765(17)30248-5

DOI: 10.1016/j.pmpp.2017.11.007

Reference: YPMPP 1304

To appear in: *Physiological and Molecular Plant Pathology*

Received Date: 19 August 2017

Revised Date: 29 October 2017

Accepted Date: 17 November 2017

Please cite this article as: Basu S, Rabara R, Negi S, AMF: The future prospect for sustainable agriculture, *Physiological and Molecular Plant Pathology* (2017), doi: 10.1016/j.pmpp.2017.11.007.

AMF: The Future Prospect for Sustainable Agriculture

Supratim Basu[1*#], Roel Rabara[1#] and Sangeeta Negi[1#]

[1]NMC Biolab, New Mexico Consortium, Los Alamos, New Mexico, USA

*corresponding author email address: sbasu@newmexicoconsortium.org

# equal contribution

Abstract

A wide range of association exists in nature of which symbiotic association is the most evolutionary conserved where both the partners are mutually benefited. However, these associations of the plants with microorganisms are both harmful as well as beneficial. Hence the key to survival for plants is to promote beneficial symbiotic associations and prevent the intruding pathogens. In this review, we focus on the beneficial role of mycorrhiza, a heterogeneous group of fungi primarily associated with plant roots. Out of these associations, one group of root obligate mycorrhiza provides the host plant with water nutrients and importantly protects from pathogens, called Arbuscular mycorrhiza fungi (AMF). This association helps in improving the nutrient supply like nitrogen and phosphorus to the plants and in turn, the fungus gets 20% of the fixed carbon from the plants. The nutrient transfer is established by the help of structures called arbuscules and the release of 'Myc factors' by fungus and strigolactones by plant root exudates induces the symbiotic reactions. A coordination of these two factors, in turn, switches on the downstream signaling cascades that further strengthens the association. In the course of research over the years several genes like novel transporters or receptor kinases have been identified that favors the association and in turn helps in dissecting the cellular responses. In this review, we discuss the current status of several studies, which unravel the contributions of partners involved in these symbiotic associations and can be exploited for improvement of agricultural crops in diverse environmental conditions.

Key words

arbuscules, mycorrhiza, phosphorus, signaling, strigolactones, systems biology

Introduction

Mycorrhiza refers to the association between plant roots and biotrophic mycorrhizal fungi, these mycorrhizal fungi form a network of filaments associated with plant roots and enable roots to absorb the nutrients from the soil. Moreover, this fungus-plant alliance stimulates plant growth and accelerates root development. Mycorrhiza is classified into five groups based on their