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Opinion

Arbuscular Mycorrhizal Fungi: Meet Them in the Present, to Use Them in the Future

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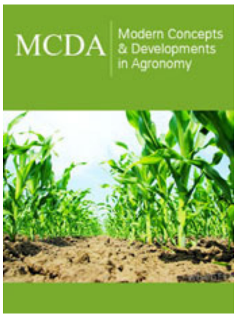

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Opinion

One of the great challenges of the 21st century for researchers act in the area of Plant Physiology is to understand how climate change will affect the development of plants. It is known that periods of drought and high temperature peaks have become more frequent, which will harm the growth of cultivated and forest species. Thus, it is essential understand the strategies that are already used by plants to efficiently tolerate abiotic stresses, so that in the future it can be used with the aim of mitigating the harmful effects of climate change. Among the strategies, Arbuscular Mycorrhizal Fungi (AMF) are in increasing evidence, because it is a relationship between fungi and plants that has been present for 400 million years bringing benefits to both [1].

The AMF belong to the phylum Glomeromycota which comprises 3 classes, 5 orders, 16 families, 44 genera and approximately 322 species. AMF do symbiosis with approximately 90% of higher plants, besides some cryptogams [2]. This mutualistic relationship is formed by the root of the host plant, the intraradical mycelium (including the symbiotic interface), extraradical mycelium (network of hyphae in the soil) and the spores. In the mutualistic relationship, plants provide the AMF with energy mainly in the form of lipids and hexoses, on the other hand, the AMF provide the plants with mineral nutrients, such as phosphorus and nitrogen and afford more efficient water absorption.

Temperature and pH, together with precipitation and soil nutritional conditions, determine the diversity of AMF [3]. Therefore, the Alter do Chão savanna, located in the western region of the state of Pará, Brazil, surrounded by the Amazon Forest, is an area indicated for the bioprospecting of native AMF species, because the predominant soil is of the latosol type, drained, with intense weathering, high acidity, high content of iron and aluminum oxides and phosphorus deficiency, making it an environment with low natural fertility [4], that is, the plant species in that area need the AMF for their ample survival and proliferation. By virtue of that, studies are being carried out at the Laboratory of Plant Physiology and Plant Growth, of the Federal University of Oeste do Pará with AMF native to the Alter do Chão savanna and the species, maize (Zea mays) and *Handroanthus serratifolius* (Vahl) S.O. In the initial studies with maize plants at different P doses, was observed increments of 25% in root volume, 5% in leaf water content, 50% in the concentration of reducing sugar in the shoot, besides the increase in accumulation in 36%, 69% and 36% of ammonium in the shoot, root and P, respectively, in relation to the control plants, which were not inoculated with AMF. Already the in plants of *H. serratifolius*, under drought-stressed and well-watered conditions, the inoculation with AMF provided an increase of about 30% of the total free amino acids, 50% proline, 50% nitrate and 45% P, in relation to the control plants that did not were inoculated [5,6].

These physiological and nutritional benefits provided greater growth and development of plants inoculated with AMF, reflecting a greater dry mass of shoot and root, as well as providing a greater tolerance to stress abiotic. Because with the accumulation of soluble solutes such as proline and some carbohydrates it reduces the osmotic potential and, therefore, the leaf water potential, maintaining the level of hydration and turgor of the organs, which maintain the general physiological activities of the cells, especially photosynthesis [7].

Thus, carrying out studies on the mechanisms that AMF influence the growth and development of plants under both abiotic stress conditions and under ideal conditions is important to be able to use this knowledge, be for a more sustainable agricultural production through the use of less chemical fertilizers and water for irrigation or reforestation in an area under unfavorable soil and climate conditions [8].

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