

ROLE OF MYCORRHIZA IN SUSTAINABLE AGRICULTURE

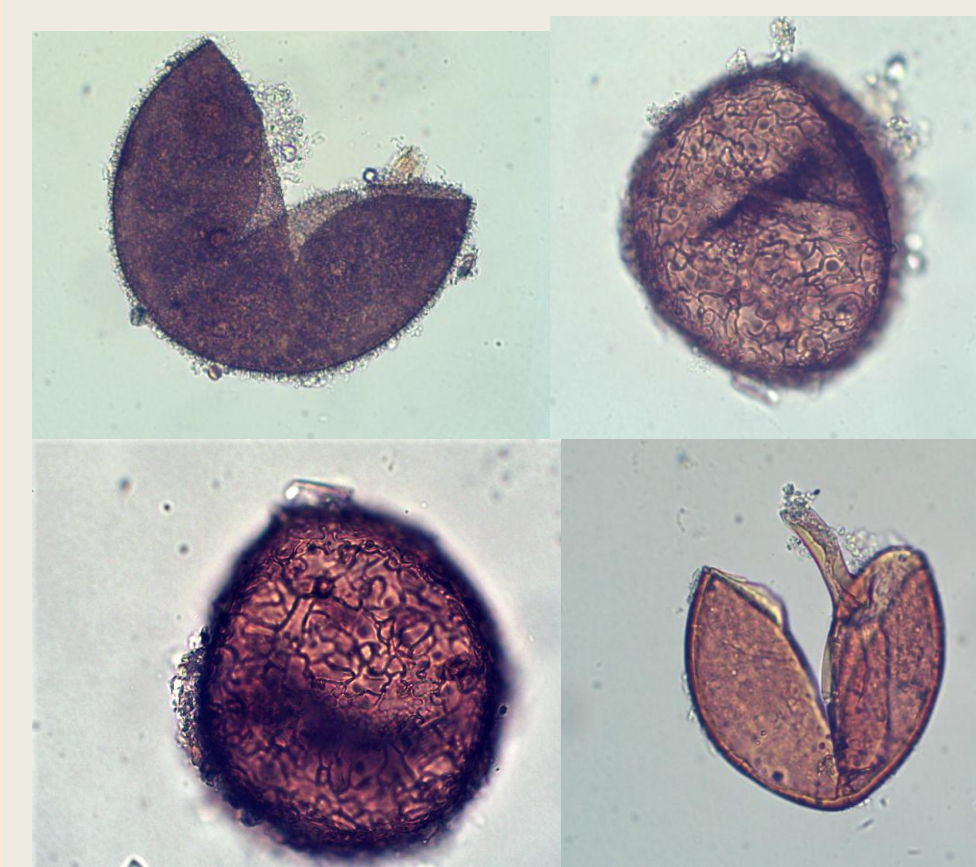
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INTRODUCTION

Xenobiotic pollutants accumulate in the environment as a result of agriculture chemicalization. Chemicals in agriculture are one of the significant ecological stresses also faced by plants, as they can block their enzymatic systems, contribute to physiological changes, which is often associated with tissue and cell death.

One of the strategies is to promote and implement sustainable or organic farming. Biological control (BC) has become one of the most widely applied alternatives to pesticides for pest and disease control in agriculture production (Elliott et al. 2009).

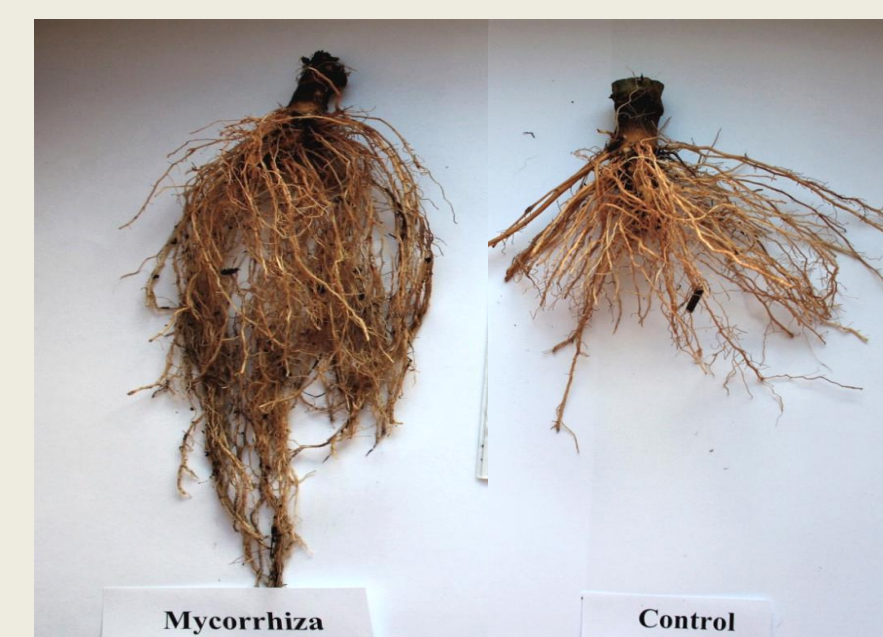


Claroideoglomus etunicatum, *Rhizophagus intraradices* spores - MF

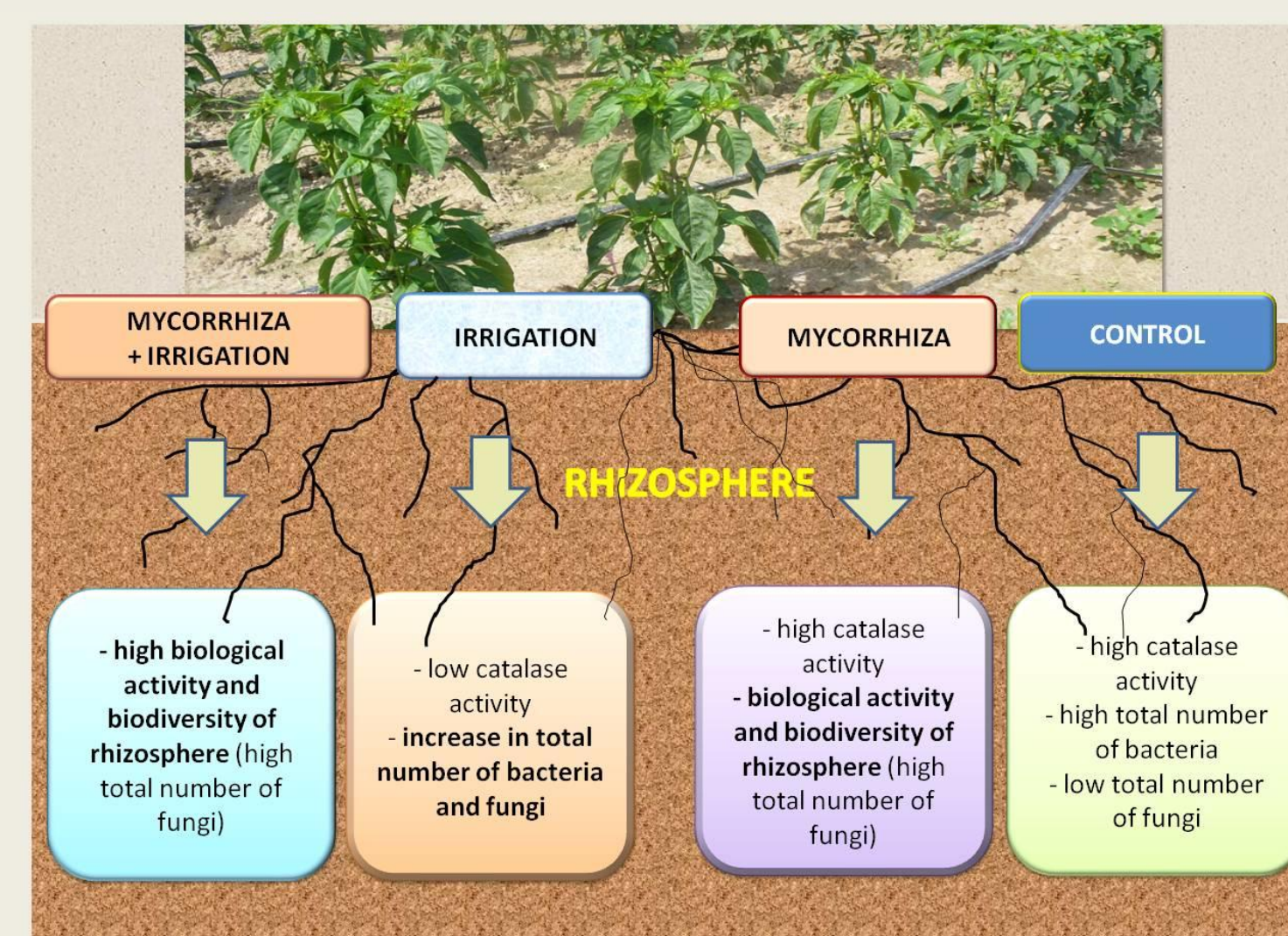
DISCUSSION

Mycorrhiza plays a significant role especially as a factor limiting biotic and abiotic plant stresses, thereby indirectly contributing to reducing the consumption of agrochemicals, e.g. pesticides (Mahmood and Rizvi 2010, Wang et al. 2012, Jamiołkowska et al. 2018). MF have the potential to influence the economic benefits of agricultural systems through both direct and indirect processes related to plant nutrition (Smith and Smith 2012).

MF provide plants with access to soil nutrients, protect against diseases and toxicities and play other roles such as soil aggregation, plant protection against drought stress and soil pathogens, as well as increasing plant diversity. MF interact with most crop plants, including cereals, vegetables and fruit trees, and are therefore receiving increasing attention due to their potential use in sustainable agriculture. MF can also alter the accumulation of contaminants in plants.



Roots of *Capsicum annum* L.: mycorrhized roots and control



Jamiołkowska et al. 2020. Effect of Mycorrhizal Inoculation and Irrigation on Biological Properties of Sweet Pepper Rhizosphere in Organic Field Cultivation, *Agronomy* 10(11), 1693. (graphical abstract)

CONCLUSION

The benefits and mechanisms behind MF's role in ameliorating organic contaminant residues in crops can be summarized as follows: (1) increased biomass through improved mineral nutrition and water availability, (2) alleviation of oxidative stress induced by contaminants, (3) enhanced activity of contaminant degradation-related enzymes, (4) accumulation and sequestration of contaminants by AMF structures, (5) stimulation of contaminant-degrading microorganisms in soil, (6) improved soil structure, and (7) reduced pesticide application due to increased crop resistance to pathogens and improved competition with weeds.

LITERATURE

Elliott M. et al. 2009. *Biocontrol Science and Technology*, 19(10), 1007-1021; Jamiołkowska A. et al. 2018. *International Agrophysics*, 32, 133-140; Mahmood I., Rizvi R. 2010. *Asian Journal of Plant Sciences*, 9, 241-248; Smith S.E., Smith F.A. 2012 *Mycologia*, 104(1), 1-13; Wang K.Q. et al. 2012. *Chinese Herbal Medicine*, 14, 24-27.