

Underground Allies: The Crucial Role of Mycorrhizae in Fruit Crop Success

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Excessive chemical fertilizer use is harmful to soil microorganisms, particularly mycorrhizal fungi. Recent environmental trends, together with customer demand for healthful, environmentally friendly meals, indicate to the use of minimal, if any, chemicals in agricultural production. Mycorrhizal fungi can help plant roots grow in moderately poor soils and stressful environments. Many plants, including citrus, pistachio, cherry, banana, and grapevine rootstocks, rely on mycorrhizae for phosphorus supply. It has been shown that using AM fungus can enhance horticultural plant growth, nutrient uptake, and fruit quality.

Role of Mycorrhizae in Fruit Crops

Mycorrhizae, specifically arbuscular mycorrhizal (AM) fungi, have been extensively studied for their potential to enhance fruit quality and production in various fruit crops. These fungi form a symbiotic relationship with plant roots, facilitating nutrient uptake and improving plant growth. The application of mycorrhizal fungi in fruit crops can lead to several benefits, including improved fruit quality, increased yields, and enhanced disease resistance.

Improved Fruit Quality

Studies have shown that mycorrhizal fungi can increase the nutritional value of fruits by enhancing the levels of carotenoids, amino acids, and sugars. For example, in tomatoes, mycorrhization has been found to increase the content of sugars (T.S.S), carotenoids, and amino acids, particularly in red fruits. Mycorrhization can also accelerate fruit maturation, which can be beneficial for commercial fruit production.

Increased Nutrient Uptake

Mycorrhizal fungi help plants absorb nutrients like phosphorus, nitrogen, and other essential elements from the soil more efficiently. This enhanced nutrient uptake can improve overall plant health and fruit quality. The extraradical hyphae of mycorrhizal fungi increase the soil area under root investigation, which improves nutrient absorption (Naik et al., 2018).

Enhanced Antioxidant Capacity: Fruits from mycorrhizal plants have been found to possess higher

antioxidant capacities, which can contribute to their overall nutritional value. Arbuscular Mycorrhizal Fungi (AMF) can boost plant antioxidant levels by improving the action of leaf antioxidant enzymes (AOEs). Plants in symbiosis with AMF displayed the strongest antioxidant potential, with 1.5 to 2 fold increases in AOE functions compared to non-mycorrhizal plants (Hristozkova et al., 2017).

Potential for Bio stimulation

Mycorrhizal fungi can be used as bio stimulants to enhance fruit quality without affecting plant growth or yield. This approach is particularly relevant for hydroponic systems, where precise control over nutrient levels is crucial.

Potential for Disease Resistance

Some studies suggest that mycorrhizal plants may exhibit increased resistance to diseases, although this aspect has not been extensively explored in fruit crops. AM fungi can reduce soil-borne diseases and improve plant vigor and survival (Naik et al., 2018).



Practical Applications

To apply mycorrhizal fungi in fruit growing, it is recommended to choose the best product and apply it to the soil during planting. Mycorrhizal fungi form a dense network of filaments in the soil that connect the tree roots and soil life in symbiosis, facilitating plant development through better access to soil resources and limiting the effects of biotic and abiotic stresses. (Ortas, 2017) found that



banana and fig plants treated with mycorrhizal fungi had larger shoot and root dry weights and improved nutrient uptake than non-mycorrhizal plantlets under micro propagated condition. (Cecatto et al., 2016) revealed that the addition of arbuscular mycorrhizal fungus had a significant impact on the anthocyanin and phenolic content. When inoculation was done during transplantation, the fruits had a high concentration of anthocyanin and total phenols. Mycorrhizal inoculation lowers acidity in fruit throughout the growing season, while boosting firmness only in the early phases of production.

Conclusion

The use of mycorrhizae in fruit crops has significant potential to enhance fruit quality, nutritional value, and disease resistance. By understanding the specific effects of mycorrhization on different fruit cultivars and optimizing application methods, farmers and researchers can harness the benefits of these fungi to improve fruit production and sustainability.

References

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