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Arbuscular Mycorrhizal Fungi (AMF) and RKN (Root Knot Nematodes) are perpetually vying for food and space

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Introduction

Increased interest in AMF-nematode interactions is motivated by the possibility of AMF-infected plants developing increased resistance or, possibly, tolerance to nematodes. Numerous effective nematodes may no longer meet contemporary environmental criteria and may need to be replaced with a variety of alternative nematode control techniques with a lower impact on non-target species in order to remain effective. AMF's ability to boost host resistance and/or tolerance may represent a viable alternative therapeutic strategy. RKN is frequently viewed as detrimental to plant growth, whereas AMF is extremely beneficial. According to current knowledge, AMF may enhance host tolerance while also enhancing adversaries by inhibiting nematode development. The net effects vary by region, but they include an increase in genotype diversity, nematode species diversity, and fungal isolate diversity. Parasitism dynamics may cluster nematode species, affecting the dynamics and outcome of interactions with AMF. Numerous studies on AMF nematode interactions have focused on specific nematode species, including RKN (*Meloidogynespp.*) and root-lesion nematode interactions (*Pratylenchus spp.*). RKN consume root-tip cells, including those of Xiphinema and Longidorids. RKN are far more likely to be influenced indirectly than directly by AMF-induced physiologic changes.

The feeding cells of root-knot plus cyst nematodes can penetrate the endodermis and extend into the cortex, where they may compete with AMF for available space within the vascular cylinder. RKN and cyst nematodes may be significantly more susceptible to AMF-induced physiologic changes than migratory nematodes, which are much more mobile in their feeding locations, due to their reliance on a single feeding area where females become stationary. AMF has the ability to alter root morphology, which may affect the penetration and migration of migratory nematodes. Another possibility is that AMF is beneficial to migratory nematodes but detrimental to stationary high heels (high heels). On the other hand, for migratory nematodes, the findings were based on a small number of experiments. When it comes to stationary endoparasites, a comparison between RKN and cyst nematodes is almost certain. Nematodes may have an effect on AMF by destroying cells necessary for the AMF to feed. Despite being fed by numerous nematode species, a significant proportion of root cells remain necrotic, while other worm species induce the formation of specialized feeding structures. In addition to cyst nematodes, certain RKN species induce root development within the feeding site.

It is possible that colonizing a small portion of the proliferating beginnings would benefit the AMF's internet resources. Nematodes affect AMF in a much more indirect manner through an enhanced growth response, which renders cells significantly less sensitive to and suitable for AMF in the first place. Ectoparasites may play a role in AMF protection because they have a significantly greater effect on AMF than RKN does. This demonstrates that ectoparasites provide a much more comprehensive level of protection than sedentary endoparasitic nematodes do through their sophisticated and specialized feeding strategies. Coevolution is thought to have resulted in the development of distinct recognition mechanisms (gene-for-gene linkages) during these interactions, which have been dubbed coevolutionary recognition mechanisms. These are almost certainly connected to the suppression or absence of common plant defence mechanisms.

The ability of Rhizobacteria to produce parasitic nematodes on their hosts has been extensively studied. According to their bio possible assessments, the presence of bioagents significantly reduced the severity of M. incognita infection in basils and generally improved the overall fitness of treated plants (glasshouse).

Numerous characteristics of nematode-plant interactions, the findings of this study indicate, are critical in determining the outcome of bitrophic interactions with AMF. Environmentally invasive nematodes caused greater damage to AMF vegetation than to non-AMF vegetation. AMF has been shown to be effective against both endoparasites and nematodes. In general, AMF reduced worm populations while reducing nematode damage to plants. Additional distinctions were made within the broad feeding categories that were critical in characterizing the AMF interactions. We did not consider the unique functions of AMF plant interactions, which may have an effect on bitrophic relationship characteristics. This assessment is primarily based on research into crop plant life, with findings applied to agricultural systems. To summarize, we must ascertain the precise location and timing of the AMF and nematodes in order to ascertain potential mechanisms of action. We should examine endpoints and attempt to define and prioritize the critical phases of the interaction tasks that must be completed.

Conclusion

AMF's ability to boost host resistance and/or tolerance may represent a viable alternative therapeutic strategy. RKN is frequently viewed as detrimental to plant growth, whereas AMF is extremely beneficial. The effect of AMF-infected plants developing increased resistance or tolerance to nematodes is unclear. Ectoparasites may play a role in AMF protection because they have a significantly greater effect on AMF than RKN does. The presence of bioagents significantly reduced the severity of M. incognita infection in basils and generally improved the overall fitness of treated plants.

References

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