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SOIL MICROBIAL COMMUNITIES AND THEIR POTENTIAL FOR ROOT-KNOT NEMATODES MANAGEMENT: A REVIEW

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Abstract

Biological control relying on soil microorganisms may offer feasible and sustainable perspectives in many agrosystems for management of soil pests such as root-knot nematodes (RKNs, *Meloidogyne* spp.). The rhizosphere environment shows a complex of soil microbial communities, including beneficial organisms such as specialized bacterial pathogens and/or of rhizosphere fungi. New advanced technologies like Next Generation Sequencing (NGS) may enlarge our knowledge about the biodiversity and role of these rhizosphere communities. The numbers of microbial species usually range around 10^3 - 10^4 taxonomic units · g^{-1} of soil. This dimension suggests that the nematode antagonists known today represent only a fraction of the total number potentially available. The soil microbiome activity may lead to soil suppressivity, a stable nematode control effect related to species undetected or undescribed. Known parasitic microorganisms like the bacterium *Pasteuria penetrans* show specific and density-dependent links with the host. Other species such as the nematophagous fungus *Pochonia chlamydosporia* can also induce plant growth promotion effects. NGS transcriptomic data indicate that it can elicit a plant response to many biotic and abiotic stresses. In conclusion, the biodiversity of antagonists and the mechanisms they exert in nematode regulation have yet to be fully explored. However, new high-throughput analytical technologies may fill this gap. Experimental assays for RKN management and/or plant growth promotionindicate that biological management of nematodes is a promising alternative to chemicals. However, this approach requires detailed knowledge about the composition, role and effects of the microbial community present in soil and/or about the right and accurate aggregate of biological entities to apply.

Key words: bacteria, biocontrol, fungi, management, nematodes

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