Journal of Microbial & Biochemical Technology

OPEN ACCESS Freely available online

Rapid Communication

Symbiotic Association between Plant Roots and Fungi: Mycorrhizae

Milton Burns*

Department of Microbiology, Medical University of South Carolina, USA

ABSTRACT

Mycorrhiza is a symbiotic interaction between plant roots and fungus. Their primary purpose is to increase the nutrition and water intake of the host plant by utilising a larger volume of soil than roots alone can. Depending on the host plant and the fungus taxonomy, mycorrhizae exist in a variety of shapes and sizes.

INTRODUCTION

Symbionts are part of the plant-associated microbial diversity, and they protect their hosts from a variety of threats. Soil toxic chemicals and soil-borne pathogens are buffered by mycorrhizal and rhizospheric microorganisms. Plant protection is provided by endophytic bacteria and fungi, some of which are vertically inherited through seeds, by acting directly on aggressive forces mostly pathogens and herbivores or by augmenting plant responses. Plants' ecological success is determined by their protective microbial symbionts, which radically alter plant communities and trophic webs [1].

Beneficial bacteria that protect their hosts from attack are found among the microbes associated with plants. Toxic chemicals and soil pathogens are thus protected by mycorrhizal and rhizospheric bacteria. Endophytes, bacteria, and fungi, which are occasionally transmitted by seeds, protect plants by acting directly on stressors or increasing plant defenses [2]. Plants' ecological success is determined by these protective symbioses, which alter plant communities and food webs.

Physiologists have often treated plants as if they were a single creature, ignoring the diversity of their microbial symbioses. As a result, the importance of the latter's contributions was occasionally missed. One of the reasons for this is that the presence and diversity of these microbial symbiosis may be masked due to their tiny size and incorporation into substrates. Similarly, the search for plant models that can be cultivated axenically under laboratory settings and are thus more practical for experimental purposes is bolstering this trend. Although more than 90% of terrestrial plants establish mycorrhizae with soil fungus, non-mycorrhizal models, such as Arabidopsis thaliana, ignore the role of fungal partners [3,4].

Plants form symbiotic relationships with a variety of soil microbial symbionts that increase their nourishment. Mycorrhizal symbiosis, which involves soil fungus and plant roots, is the most common relationship, and it is thought to be ancestral, dating back to the colonization of terrestrial ecosystems. The plant receives water and mineral nutrients accumulated in the soil by the fungal companion in a mycorrhiza [5]. Some plants, such as legumes with Rhizobiaceae and some Rosids with Cyanobacteria and Actinomycetes, meet their nitrogen needs by forming partnerships with N2-fixing prokaryotes. As a reward, host plants give carbon to their symbionts in every situation. However, because symbiosis is defined as a mutual enhancement of fitness, a bidirectional nutrition flux is not required to create a symbiotic relationship; any protective effect of one partner toward the other, boosting the latter's survival or reproduction, is adequate [6].

CONCLUSION

Microorganisms in a variety of ecosystems, such as soil and the rhizosphere, have been profoundly changed by molecular analyses of environmental DNA samples, which have profoundly changed our perception of microorganisms in a variety of ecosystems, such as soil and the rhizosphere: 90 to 99 percent of microorganisms are not cultivable using standard techniques. DNA-based detection has also aided our understanding of plant-associated microbes, such as endophytic bacteria, which are frequently difficult to cultivate.

REFERENCES

1. Akiyama K, Matsuzaki K, Hayashi H. Plant sesquiterpenes induce hyphal branching in arbuscular mycorrhizal fungi. Nature. 2005;435:824-827.
2. Asghari HR, Cavagnaro TR. Arbuscular mycorrhizas reduce nitrogen loss via leaching. PLoS ONE. 2012;7:e29825.
3. Averill C, Turner BL, Finzi AC. Mycorrhiza-mediated competition between plants and decomposers drives soil carbon storage. Nature. 2014;505:543-545.

***Correspondence to:** Milton Burns, Department of Microbiology, Medical University of South Carolina, USA, E-mail: Milton_burns@musc.edu

Received: November 05, 2021; **Accepted:** November 19, 2021; **Published:** November 26, 2021

Citation: Burns M (2021) Symbiotic Association between Plant Roots and Fungi: Mycorrhizae. J Microb Biochem Technol. S17:004. DOI: 10.35248/1948-5948.21.S17.004.

4. Babikova Z, Gilbert L, Bruce TJA, Birkett M, Caulfield JC, Woodcock C, et al. Underground signals carried through common mycelial networks warn neighbouring plants of aphid attack. Ecology Letters. 2013;16: 835-843.

5. Barto EK, Hilker M, Mueller F, Mohney BK, Weidenhamer JD, Rillig MC. The fungal fast lane: common mycorrhizal networks extend bioactive zones of allelochemicals in soils. PLoS ONE. 2011;6:e27195.

6. Bascompte J, Jordano P, Melian CJ, Olesen JM. The nested assembly of plant–animal mutualistic networks. Proc Natl Acad Sci USA. 2003;100:9383-9387.