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The Use of Native Arbuscular Mycorrhizal Fungi from Orchards for the Production of Seedlings

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Introduction

In Brazil, peach production is concentrated in the state of Rio Grande do Sul. Peach seedling production in southern Brazil takes place in the field, at the risk of serious phytosanitary problems. In order to avoid such problems, one alternative is the production of seedlings in environment shelter (greenhouses or nurseries). In such cases, it is necessary to disinfect the substrate to eliminate plant pathogens; however, the procedure eliminates almost all microorganisms, including beneficial ones, such as arbuscular mycorrhizal fungi (AMF) (Fachinello *et al.,* 2004).

The inoculation of endomychorrhyzal fungi in substrates and disinfected soils in nurseries, dues to their ability to improve the radicular system, may increase biotic and abiotic stresses and leading to the production of high-quality plants in systems that use lower amounts of agricultural inputs (Souza *et al.,* 2002).

The search for sustainable agriculture necessarily involves a substantial reduction of chemical inputs, including fertilizers. Integrated Production System offers a possibility to increase farmers' gains and consumers' access to high-quality products.

These facts show the importance of understanding the fluctuation of the AMF population in the orchards throughout the year, because these AMF have greater adaptation to the edaphoclimatic conditions in these locations, allowing better responses of inoculated seedlings that will be subjected to similar edaphoclimatic conditions.

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Conclusion

The correct interpretation of the local dynamics of microorganisms species present in an area is fundamental to understand the influence of AMF on the equilibrium of stabilized plants in that specific location (Allen *et al.,* 1995). In addition, diversity, density and infectivity potential of AMF propagating materials in the soil are indirectly related to the ecological conditions of each ecosystem (Maia & Trufem 1990) and directly to the fungus physiology (Morton 1993), being the colonization of mycorrhizal disease linked to the genotype of the plant and the fungus as well as the environment.

In this respect, autochthonous AMF species from a given region, which are already adapted to the edaphoclimatic conditions of the same area, tend to give a higher response potential when inoculated into plants to be cultivated in the same geographical area. For this reason, the determination of native AMF has been increasing in the world. Good examples are research projects carried out in Europe on maize, triticale and native grasses, and in Central and North America on fruit and vegetables. In Brazil, several surveys of AMF species have been carried out, concerning the cultivation of cassava, coffee, apple, guava, vine and citrus.

In order to achieve a complete knowledge of native species in a determined region, safe methods for AMF identification are required, based on AMF taxonomy by the phenotypic characteristics of their asexual spores, such as color size and shape, among the others.

However, a factor that affects the taxonomic identification of AMF is the difficulty of cultivating these fungi under axenic environment. Despite research efforts, progress in producing commercially available in vitro AMF inoculum is still limited. These fungi require the presence of living roots so that AMF spores germinate, penetrate the roots and form their propagating materials (mycelium and spores). Another factor that affects the production of inoculum in large quantities is the fact that it is not clear which species is actually colonizing the roots. Therefore, expectations regarding the use of selected AMF inoculum cannot be made yet, as the knowledge about the colonization strategies and their functioning under field conditions is still insufficient. On the other hand, several researchers around the world have been working with the detection and identification of the colonization mechanisms employed by various AMF species under field conditions, aiming to fill the knowledge gaps about their biology, ecology and applications in vegetable production.

In addition, soil management conditions may determine changes in the profile of predominant species able to colonize the plants present in the area. Therefore the importance of identify the species present in a determined region, where certain cultural practices are adopted, aim at the use of these species in the production of seedlings for use in the same region.

Another fact to consider is the ability of infection and the possibility of benefits that can be promoted by the AMF to *Prunus* plants, especially peach trees, which seem to be related to the affinity with the cultivars and not to the plant species themselves. The determination of natural colonization allows the use of AMF species that are really capable of promoting nutritional and vegetative development gains. This is because peach plants have considerable vegetative growth responses as a direct consequence of inoculation with AMF species that had the highest population frequencies in orchards. Peach and almond hybrids *Prunus persica X Prunus dulcis* Mill. Webb) showed high natural root colonization in the field, with great vegetative development and nutritional gain.

The use of native AMF species from orchards tends to be a good option to use in the production of seedlings of fruit plants, especially in the case of peach. However, in order to achieve this goal, more appropriate techniques are required for the detection and identification of the species that are actually colonizing the plants in the field in a natural way.

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