

Inoculation of Almond Rootstock with Symbiotic Arbuscular Mycorrhizal Fungi

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PROJECT SUMMARY

Objectives:

- Determine if there is value in adding arbuscular mycorrhizal (AM) fungi inoculum to rootstocks at planting.
- Determine if pre-plant fumigation impacts the extent and nature of mycorrhizal populations in the soil.
- Characterize the mycorrhizal fungi populations present on field grown nursery stock vs. potted plants at the time of planting.
- Assess the effects of these mycorrhizae on tree health.

Background:

Arbuscular mycorrhizae are fungi that form a symbiotic relationship with most plant roots in the soil. The mycorrhizal hyphae network functions as an extension of the root system allowing for greater uptake of soil nutrients such as phosphorus, nitrogen, and micronutrients. In return the fungi receive sugars/starch from the plant as carbon sources.

Plants with mycorrhizal symbiotic relationships typically show signs of being healthier than those without. Research on a number of crops has shown beneficial growth/yield increases when mycorrhizal colonization has been occurred. However, very little work has been done to date with Prunus roots.

Soils for rootstock nurseries are frequently treated with a soil fumigant to prevent damage from soil borne pathogens and nematodes. Often a grower replanting an orchard also will use a

pre-plant soil fumigant. It is assumed that the fumigation removes most AM in the soil, thus it may be useful to treat the rootstocks prior to planting with AM inoculum to initiate new colonization of the soil with AM.

Discussion:

In early 2008 almond trees on Nemaguard rootstock were planted in a plot at USDA/ARS, Parlier. The treatments included with and without pre-plant chloropicrin fumigation; bare rooted vs. pot grown rootstocks; un-inoculated and inoculated with either commercially available or extracted from almond roots AM inoculum.

Almost 3 years after planting no growth effect of inoculating with AM has been seen for any of the treatments. The main treatment effect has been that trees planted in the fumigated soils are growing faster and showing more consistent bloom compared to the trees growing in non-fumigated soil.

Studies of the AM species present in the fumigated and non-fumigated soils in Sudan grass trap cultures are not showing major differences, so far. Though *Glomus mosseae* shows up with higher frequency in the fumigated soil, and an as-of-yet unidentified species of *Glomus* shows up more frequently in the non-fumigated soil samples. The significance of these differences is not apparent at this time. Further research is in progress.

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For More Details, Visit

- 2009-10 Annual Report CD (09-HORT9-Hua); or on the web (after January 2011) at AlmondBoard.com/ResearchReports