Safir, G.R., J.S. Boyer, and **J.W. Gerdemann.** 1972. Nutrient status and mycorrhizal enhancement of water transport in soybean. Plant Physiol. 49:700-703.

St. John, T.V. 1993. Benefits of mycorrhizae in revegetation and restoration. In: J. E. Keeley (ed.). Interface between ecology and land development in California. Southern California Academy of Sciences, Los Angeles, California.

Sylvia, D.M. and **S.E. Williams.** 1992. Vesicular-arbuscular mycorrhizae and environmental stresses. P. 101-124. In: G. J. Bethlenfalvay and R. G. Linderman (eds.). Mycorrhizae in sustainable agriculture. American Society of Agronomy, Madison, Wisconsin.

Tinker, P.B.H. 1978. Effects of vesicular-arbuscular mycorrhizas on plant nutrition and plant growth. Physiol. Veg. 16:743-751.

Trappe, J.M., R. Molina, and **M. Castellano.** 1984. Reactions of mycorrhizal fungi and mycorrhiza formation to pesticides. Ann. R. Phyto. 22:331-359.

QUESTION-ANSWER FRIDAY MORNING

Barbara Selemon: Will mycorrhizae work with exotic plants? Can mycorrhizae be introduced after the plant has been grown for 1 year?

Ted St. John: It is not too late. You can certainly inoculate after the fact. It's not the best thing to do when plants are in large containers. With special plants or for research purposes, it has been done. For the first question, whether the fungus is suitable, the only real question here is whether your plants are the vesicular-arbuscular type. If they are, then these general fungi are suitable. In fact, the same species are probably found in their home countries. They tend to be globally distributed and there are about 200 species. You do have to make sure it's the right kind of fungus and the fungi tend to be quite specialized for soil although they are very unspecialized with regard to host. The fungus that comes from an acid soil will not work in a neutral or basic soil, for instance.

Christy Alterman: How can you tell the difference between fungus gnat larvae and shore fly larvae?

Karen Robb: If they have a dark brown head capsule it is diagnostic for fungus gnats?

Christy Alterman: Would your potato idea attract shore flies as well or is it specific for fungus gnats?

Karen Robb: The potato slices or cores attracts only fungus gnat larvae.

Andrew Davis: Are mycorrhizae affected by herbicides (e.g., RoundUp) that are applied to the soil around landscape plants?

Ted St. John: No, herbicides are not usually directly damaging to the fungi, although if you were to eliminate the host plant over a long period of time the fungi would gradually die out.

Andrew Davis: How long is long?

Ted St. John: The only answer is, it depends on the host plant, how it propagates itself and the soil. Some fungi have spores that are quite resistant. One to two years there will probably be a significant amount of inoculum, but 3 to 5 years is too long.

Barbara Selemon: What about propagating from a diseased one-of-a-kind plant? Is it worth taking the chance?

Randy Keim: No problem as you don't propagate from the diseased tissue.

John LaForge: Why do I sometimes not observe an improvement in growth in *nursery plants that have been inoculated with mycorrhizae?*

Ted St. John: There's a long of list of reasons that make it unpredictable in the nursery. First, if you're fertilizing heavily the plants often don't become mycorrhizal at all. If the plant is receiving plenty of phosphorus then the fungus is not needed. Second, even if it became mycorrhizal it's possible your fertilization program is masking the benefits of the fungi. This difference usually does not appear until after the plants have been transplanted to the field.

Shelley Androse: Are there chemicals we should be careful using when we are inoculating with mycorrhizae?

Ted St. John: Yes, any general biocide, Vapam, for instance. Some systemic fungicides especially if applied to the leaves may slow them down. Drenches may be more hazardous, but it is a bit unpredictable. There are compatible fungicides, Subdue, for instance. Fungicides that kill *Rhizoctonia* will also kill mycorrhizae.

Roger Hollinsworth: We have been using biological control for root weevils. How far from the original pot would be a good idea to put on the biological control (25, 100, 1500 ft.)?

Karen Robb: That's a very difficult question to answer. It really depends on the situation and the seriousness of the infestation. Traps can help determine where most of the infestation is. Recipe recommendations are not a good idea since every situation will be different.

Theresa Lipton: Are there cultural practices that will control ants?

Karen Robb: Cultural ant control is very difficult. I don't know of any cultural control methods.

Nevin Smith: Are there adverse effects of redwood and other barks in container media on the inoculation and growth of mycorrhizae?

Ted St. John: Work that I have done in the past with phenolics and hyphal growth showed that they were not inhibitory. There are many organic components that cause problems and we don't know why. I suspect that phenolics are not a serious problem unless they are at very high concentrations.

Don Dillon: Do excessive amounts of phosphorus that are associated with UC mixes inhibit mycorrhizal activity?

Ted St. John: Large amounts of phosphorus are quite inhibitory in most cases.

Bruce Briggs: If you had to do it over again would you do things any different in relation to your IPPS Work Study Grant?

Becky Jo Summers: I'm very happy with my decision. Everything I did over there (New Zealand) was a new experience for me. The ability to move around was very nice also. I was able to attend IPPS-New Zealand in October and made many

contacts. If anyone were to come here that should be made available to them. The whole experience was just wonderful. Thank you.

David South: One thing that has always confused me about quantifying mycorrhizal infection is that it is always done on a root length basis instead of on a per plant basis so that as you increase phosphorus fertilization you might get a bigger plant with more roots and if you actually counted the number of infection points you would have the same number of mycorrhizals per plant as a smaller non-fertilized plant and yet you would conclude that the phosphorus decreased mycorrhizae because of number of infections per cm of root was reduced. Am I stating this correctly?

Ted St. John: Obviously, you're not a newcomer to mycorrhizae. I've written a paper that addresses this very point and would be happy to mail it to you. There is no way of quantifying infection that does not mislead into one direction or another. You made a very important point, one that's overlooked by a number of mycorrhizal researchers and the real answer is that you need both total root length colonized and the percentage colonized to interpret what you're seeing and, in fact, you could go beyond that and say you need something about the intensity of infection within each centimeter that is colonized as well.