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NEWS RELEASE



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**Diversity of Mycorrhizal Fungi in Kern County and
Dependency of Carrots for Optimal Growth**

Arbuscular mycorrhizal fungi (AMF) are obligate symbiotic fungi that colonize the roots of about 80% of vascular plant species. There are about 150 different species of AMF, many of them forming symbiotic relationship with agronomically important crops. The fungi are characterized by finely branched hyphal structures, termed arbuscules that are produced inside plant cortical cells and function in the absorption of carbon food source from the plant.

The AMF symbiosis is typically mutualistic, meaning both the plant and the AMF provide benefit to each other. Extra-radical hyphae of AMF can effectively act as extensions of the plant root as they extend up to 4 inches beyond the root to acquire soil nutrients. Most importantly, AMF are able to uptake immobile nutrients such as P and Zn.

Because the host plant generally receives a variety of benefits that may result in increased growth and yield, exploitation of this symbiotic relationship is of great interest to agriculture. In arid/semiarid regions (e.g., much of California) the application of phosphorus fertilizer in a highly soluble form is regularly used to obtain higher yields. However, due to the high pH of the soils in these regions, much of the applied P fertilizer is converted into an insoluble form. AMF increases P uptake efficiency and yields in many crops such as garlic, onion, celery and potato. AMF may be used to compensate for P deficiencies.

The species diversity of arbuscular mycorrhizal fungi in agricultural systems and undisturbed sites in Kern County, CA, was studied over the course of a year and a half. Surprisingly, the composition of AMF was limited in all sites to two species, *Glomus mosseae* and *Glomus intraradices*. There were no differences in species diversity between organic and conventionally farming systems. We also looked at the degree of dependency of carrots on *G. mosseae* and *G. intraradices* for optimum growth.

Carrots were highly dependent on mycorrhizae and P for optimum growth. Carrot growth was increased by AMF in comparison to the biomass of non-inoculated plants. Carrots are highly dependent on P regardless of whether the source is from AMF or applied P. However, at high levels of P root weight of mycorrhizal carrots did not benefit from additional P, indicating that AMF growth enhancement is inhibited at high levels of P.

Arbuscular mycorrhizal fungi are beneficial for carrot growth in conventional and organic production systems. In Kern County agricultural systems there appears to be only two species, both *Glomus* species.

