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THE FLORIDA HOME GARDENER AND MYCORRHIZAL FUNGI

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Abstract. **Soil Mycorrhizal Fungi develop a symbiotic relationship with the root system of plants that has the effect of giving the plant an extended root system. The fungi gives the plant more efficient recovery of nutrients and water. The two basic classes of Mycorrhizal are ectomycorrhizal and endomylcorrhizal.**

The species of fungi that will be beneficial will depend on the host plant specie, soil and climate. There has been great beneficial effects from mycorrhizal relationship to plants in tropical and subtropical regions.

The home gardener can improve plant growth through soil practices that encourage symbiotic mycorrhizal development.

"Many scientists are beginning to realize how important mycorrhizae are to the growth and health of plants. Few plants around the world can develop normally without them; almost all plants that are economically important have them. Plants with mycorrhizae are really two organisms; the plant itself and the fungus that is fastened to its feeder roots" [1].

The home gardener is in the most favorable situation regarding the beneficial effects and use of mycorrhizae in his production of ornamentals, flowers and vegetable crops because of his ability over a limited area to (A) manufacture soil structures favorable to the establishment and maintenance of the mycorrhizae, (B) populations possibly provide natural control of many soil pest problems (disease and nematodes) and (C) provide maximum yield with minimum care (nutrition and water management).

There has been an awareness of mycorrhizae since 1840 and "the application of modern experimental methods of research" since 1900 [2].

Mycorrhizae are fungi growing on the root system of plants in a symbiotic (mutual beneficial relationships) manner that greatly extends the capacity of the plant root system to recover nutrients and soil moisture.

The fungi prolifirate the soil profile and transmit back to the host roots the recovered nutrients and water thereby multiplying many times the potential recovery area of the normal functional area of the host plants root system.

The Mycorrhizae are divided into two principal types, depending on the manner of association with the roots. The fungi of *ectomycorrhizae* do not penetrate the root tissue but form a mantle or covering over the feeder root and through contact transmit the nutritional benefits. This class are most often Basidiamycetes, which produce mushrooms or puffballs from which the spores are dissiminated.

Endomycorrhizae fungi penetrate the root tissue, into the cortex cells of the root. These fungi are Phycomycetes and have no above ground fruiting bodies. Their spores are spread by root contact, ground water, or human activity.

Soils

While it appears that mycorrhizae appear to do best in soils rich in humus [2] the fungus does well on a wide variety of soils or soil mixes. Some soils reviewed are 1 part peat; 1 part sand by volume ammended with 4.2 kg dolomite, 2.1 kg superphosphate and 0.9 kg micronutrient blend per M^3; [3] also sand; pine bark; peat (1:1:1) [3]. Mycorrhizae strains have been selected or tailored to improve growth response of plants on a wide variety of soil types. "Forest regeneration programs with the aid of mycorrhizae have taken place in France, Ghana, Peru, Mexico, Switzerland, and the Phillipines. With Marx's help, one industry is reforesting land in Copperhill, Tennessee, that has been a man made biological desert for a century. Mycorrhizae research has helped reforest coal spills in Pennsylvania, Ohio, Kentucky, Virginia and Indiana" [1]. Special tailored inoculum was developed for these special cases.

"*Vesicular-arbuscula* (VA) endomycorrhizae have benefitted growth of numerous plant species in soils of low fertility" [1]. Increased growth response from VA endomycorrhizae are more likely to occur in tropical than in temperate soils because these soils are highly leached and are low in base exchange capacity and high in acidity with high amounts of exchangeable aluminum [7].

The home gardener in Florida can greatly improve his crop, flower or ornamental plant response through the incorporation of organic trash into the soil profile in areas to be planted. In areas of sufficient size the growing of sudangrass (*Sorghum Vulgare Pers.*), a good host of VA endomycorrhizae [5] can be grown and then incorporated into the soil well in advance of planting to increase the mycorrhizae population and a resulting improved plant response.

Fertility

Mycorrhizal infected plant roots increase the efficiency of plant nutrition, particularly when major and minor elements are in low concentration in the soil. The mycorrhizal are particularly efficient in their ability to capture phosphates when they are limited. There does not seem to be any indication that mycorrhizal roots can recover insoluble phosphates.

Greater soil exploitation by mycorrhizal roots increase the uptake of N, K, Ca, Mg, Fe, Cu, Mn, Na, Si, Zn, Al and B, when these elements are in limited amounts [6].

This nutrient recovery ability of mycorrhizae root infected plants may be of great value to the home gardener that applies his nutrients on a hit and miss basis and on soils that are rapidly depleted of nutrients due to leaching subtropical rains or overirrigation.

Soil Moisture

The extended area of moisture recovery by the mycorrhizal fungi on the root system greatly extends the period of time before a plant goes into wilt with the result of better plant growth [6]. This factor can be of great importance to the home gardener that may have poor watering practices or lacks control over maintaining favorable soil moisture at all times.

Plant Stimulants

Plant physiologists have done little work on growth hormone stimulants produced by ectomycorrhizae fungi. The symbiatic ectomycorrhizae are believed to provide the

host plant with auxins, cytosines, gibberellins and growth-regulating B vitamins [6] to fortify these compounds already produced by the plant and thereby increase plant growth or response.

Sterile Soils

It has been proven that on chemically fumigated soils that are deficient in mycorrhizae it results in plants inability to take up phosphorous [8] and plants grow better in pasturized soils that have been inocculated with certain VA fungi [3].

Summary

The home gardener can successfully grow plants in soils that have a good level of mycorrhizae inoculum with a low fertility level and variable moisture. Chemical fumigation or soil pasturization reduces the mycorrhizae population and can reduce plant response and growth. Good soil management such as the incorporation of organic material into the soil profile and minimizing excessive cultivation will increase the soil mycorrhizae level and give increased plant growth.

"But the best news of all is that mycorrhizal fungi may soon be available in quantities to commercial growers; it may even be in plant stores for the use of the weekend gardener" [1].

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DECIDUOUS FRUIT FOR THE DOORYARD LANDSCAPE

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Abstract. **Many deciduous fruits can be used in landscaping the dooryard to provide both beauty and fruit. The various deciduous fruits for the state will be discussed with attention to the location of the plants and the limitations of the various cultivars in north, central and south Florida.**

Many deciduous fruit cultivars can be used in the Florida landscape to enhance the beauty of the homesite and to supply fruit for fresh or processed consumption. Florida is unique in that a fairly complete range from temperate to subtropical fruit trees may be raised in some part of the state. Selection of fruit species that are properly adapted to a given area is essential if the plants are to survive [1]. Chilling requirements of deciduous fruit plants determine whether a cultivar will grow in a given location. The average number of chilling units (hours) that may be expected in Florida during a normal year can vary from as few as 50 in south Florida to as many as 650 in north Florida. Hours of temperatures below 45°F (7°C) are the units used and the total number of hours below 45°F accumulated through the winter gives the total chilling units for an area.

Table 1. Deciduous fruit varieties.

Deciduous fruit enjoy greatest success in north Florida, but there are varieties recommended for all climatic zones.

Variety	Zone[1]		
APPLE			
Ein Shemer	N		
Anna[2]	N	C	
Dorsett Golden	N	C	
BLACKBERRY			
Brazos	N	C	S
Flordagrand[3]		C	S
Oklawaha[3]		C	S
BLUEBERRY			
Climax[4]	N		
Blue Belle[4]	N		
Briteblue[4]	N		
Southland[4]	N		
Tifblue[4]	N		
Bluegem[5]	N		
Delite[5]	N		
Woodard[5]	N		
Flordablue[6]		C	
Sharpblue[6]		C	
Aliceblue[7]	N	C	
Beckyblue[7]	N	C	
FIG			
Alma	N	C	S
Brown Turkey[7]	N	C	S
Celeste	N	C	S
Green Ischia	N	C	S
Magnolia	N	C	S
San Piero	N	C	S
GRAPE, BUNCH			
Blue Lake	N	C	
Lake Emerald	N	C	
Stover	N	C	
Roucaneuf	N	C	
GRAPE, MUSCADINE			
Creek[8]	N		
Dearing	N	C	
Fry[8]	N	C	