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Technical Bulletin

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CAN VAM SPORES BE WATERED INTO THE GROUND?

There have been several liquid VAM products on the market, which purport to apply VAM inoculum by washing the spores into the soil. PHC has performed several trials to determine the effectiveness of this mode of application. Following is the summary of two trials, which tested the degree of percolation of VAM spores through soil.

Test 1: Will rain water carry spores down into the soil?

Setup: Six pots were filled with standard dry sand-soil potting mix. Enough water was applied to moisten the soil from the top to the bottom of the pot. Two thousand VAM fungi spores (*Glomus clarum*) were placed on the soil surface of each pot.

Irrigate: The pots were irrigated by misting or by sprinkler to receive the equivalent of $\frac{1}{4}$ inch of rainfall, according to the following protocols:

Pot 1 was irrigated only once with 33 ml of water through a misting nozzle.

Pot 2 was irrigated twice, at a one-hour interval, with 33 ml of water through a misting nozzle.

Pot 3 was irrigated three times, at one-hour intervals, with 33 ml of water through a misting nozzle.

Pots 4-6 were placed on a lawn with a rain gauge next to the pots. The sprinkler was turned on until the rain gauge registered $\frac{1}{4}$ inch (about 4 minutes). The water dropped from a height of about 8 feet.

Pot 4 was irrigated by sprinkler only once.

Pot 5 was irrigated by sprinkler twice, at a one-hour interval.

Pot 6 was irrigated by sprinkler three times, at one-hour intervals.

Determine how far the spores moved: The top five centimeters of soil was removed from each pot in separate layers, one centimeter thick. The spores were separated from each layer and counted.

Result: In all six pots, the spores remained in the top 1-cm layer.

Test 2: Is the location of VAM in the soil important for the inoculum to be effective?

Setup: Three pots were filled with standard sand soil potting mix so that each pot received the same number and mix (cocktail mix of 4 species) of spores of VAM fungi. However, in each pot, the spores were placed at a different depth, according to the following protocol:

Pot A: 30 cc of spore inoculum (about 2200 spores) was placed on the soil surface.

Pot B: 30 cc of spore inoculum (about 2200 spores) was placed 2 cm below the soil surface.

Pot C: 30 cc of spore inoculum (about 2200 spores) was placed 4 cm below the soil surface.

Plant the seed: Twenty-two millet seeds were placed on the surface of each pot, and covered with a wet mulch suspension made of macerated paper towels. The pots were watered with mist until moist.

Grow the plants: The pots were incubated at room temperature under wide spectrum fluorescent light (16 hour/day), and watered when necessary.

Assay the roots for VAM: After 22 days, the roots were harvested, cleared, and stained to determine the degree of VAM fungi colonization.

Results:

Pot A: 0% colonization

Pot B: 14% colonization

Pot C: 32% colonization

Conclusions: 1. The results show that VAM spores remain in place in the soil, in spite of rainfall. 2. The effectiveness of an inoculum is strongly influenced by its location in the soil. Inoculum must be located in the root zone to be effective.