WEED, SOIL PATHOGEN AND NEMATODE CONTROL IN MICROPLOTS

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Weeds, nematodes and soil pathogens are often found as pest problems in the same site. Each species can be a problem in cut flower production, whether they are in the field or greenhouse. Emphasis of this work has been the control of different pests in an interdisciplinary study. The three sites selected were chosen to represent three different soil types and environments. We wanted to determine if pests could be controlled in an enclosed container with different treatments as an alternative to methyl bromide.

Methods: Twenty gallon plastic containers were placed into a trench 16 inches deep as micro-plots for treatments. Each container was a treatment and was replicated four times into a completely randomized design. Soil was placed into the base of the container so that the first treatment depth was 30 cm. Satchets of pest cultures were placed at this depth. The bags of materials were sprayed with water to moisten the pests and the soil at each depth, and then soil was filled again until the 15 cm depth. At this depth another set of pests were placed, sprayed with water and then filled to 5 cm for another set of pests. After spraying with water, the soil was filled to the top and irrigated again to get the soil moisture to just below field capacity. These same treatments were conducted at three sites with soils of a sandy loam, clay loam and a clay. Treatments were: methyl bromide at 325 lb/A (methyl bromide 67% and chloropicrin 33%), propargyl bromide at 25,50,75, 100 and 150 lb/A, methyl iodide at 150 and methyl iodide + chloropicrin (67/33% at 325 lb/A and metham at 320 lb/A. The methyl bromide was applied from a pressurized cylinder at 12 inches through a clear 1.1mil polyethylene tarp, then the hole was taped with mending tape. The propargyl bromide was applied with a gas tight syringe with a stainless steel needle through a hole in the tarp to 12 inches. Methyl iodide was applied in the same manner. Metham was applied using a syringe and injecting from the surface into a 3/8 inch hole pressed to the 30 cm depth (It was noted that this method did not push the metham to the lower depths of the container, since organisms at 30 cm were not controlled).

The weed species tested in individual satchets were *Poa annua* (annual bluegrass), *Amaranthus retroflexus* (redroot pigweed), *Portulaca oleraceae* (common purslane), *Convolvulus arvensis* (field bindweed)and *Malva parviflora* (cheeseweed). Plant

pathogens were Rhizoctonia solani, Fusarium oxysporum 'dianthii', and Sclerotium rolfsii and the plant nematode species (citrus nematode).
Temperature was recorded at 5, 15 and 30 cm using Onsett Stowaway microloggers and a thermistor at each depth. Each study remained intact for 7 days before removal of the organisms. The satchets were removed and placed into a chilled cooler and returned to the laboratory for evaluation.
Weed seeds were removed from the satchets and placed into petri dished with moistened filter paper then were placed into a growth chamber or at room temperature to germinate. Seeds that did not germinate were tested for viability with tetrazolium or with a pressure test. Nematodes were filtered into water and examined. Pathogens were plated out and read.

Results.

The citrus nematodes were killed with all materials and rates except the nematodes at the 30 cm depth treated with metham at 325 lb/A. These nematodes were not killed because apparently the metham never reached the 30 cm depth using this application technique. All soil pathogens were controlled at all depths except with metham at 30 cm because of the same application problem.
Annual bluegrass, rough pigweed and common purslane seeds were controlled with methyl bromide throughout the profile from 5 to 30 cm. Methyl iodide + chloropicrin gave similar results, but methyl iodide alone at 235 lb/A did not give control in some of the 5 cm depth samples. Neither field bindweed or cheeseweed seed was controlled through the profile. Propargyl bromide did not effectively control weeds at 25 and to a lesser extent at 50 lb/A. Results were more consistent at rates of 75 lb/A and above. Field bindweed and cheeseweed were not completely controlled even at 150 lb/A. Differences in control between methyl bromide, methyl iodide and propargyl bromide, likely is related to the movement of the chemicals in the pots in the gas phase.