SOLARIZATION APPROVED AGAINST NEMATODE INFESTATION OF CONTAINERIZED NURSERY STOCK

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In accordance with regulations of the Nursery Stock Nematode Control Program, CCR Sections 3055-3055.6 and Section 3640, the California Department of Food and Agriculture (CDFA) specifies treatment and handling procedures to ensure against nematode pest infestation of media (soil, etc.) used for nursery stock for farm planting. Because of the impending international regulatory phaseout of methyl bromide scheduled for 2005, there is an urgent need to provide California growers with usable alternatives. Various solarization techniques were tested during summer 1995-1998 for potential to disinfest soils for containerized nursery stock of certain nematode and fungal pathogens which attack a variety of high-value horticultural crops in California's inland valleys. Moistened field soils, free of roots and organic debris larger than 12mm x 12mm and naturally infested with nematode pathogens including citrus (*Tylenchulus semipenetrans*), root lesion (*Pratylenchus vulnus*), root knot (*Meloidogyne incognita*), ring (*Criconemella xenoplax*), and others; and with the fungal pathogen *Pythium ultimum*, were placed in black polyethylene (poly) planting sleeves (20 x 20 or 20 x 45 cm) or left in 23 or 30 cm high piles and subjected to one of four treatments for a period of one to four weeks: (1) placed on a sheet of poly in the field and exposed daily to open sun; (2) as #1, but also covered with a single layer of transparent poly film; (3) as #1, but also covered with two layers of transparent poly separated by wire hoops; or (4) not heated. Soil temperatures reached as high as 74 C in treatment 3. Among the various solarization techniques, treatment #3 was the most effective in reducing nematodes to undetectable levels as determined by soil extractions and root bioassays in susceptible test plants. Results of the experiments indicated that solarization may be used commercially in nursery operations in the SJV and other desert areas in California, and data were provided to the Nematode Study Committee of the CDFA for review. A protocol for Treatment #3 (above) was approved earlier this year for nematode-free production of container, flat and frame grown nursery stock as follows. We are continuing to work on these techniques to increase efficiency for end users, and perhaps, to include other treatment options.

Approved Solarization Treatment (excerpted from CDFA NIPM Item #12).

"Solarization of soil until the temperature of all the soil reaches a minimum of 158^{o} F (70^{o} C) that is maintained for at least 30 contiguous minutes. Soil must be either in polyethylene planting bags or in piles not more than 12 inches high. Soil in piles must be placed on a layer of polyethylene film, disinfested concrete pad, or other materials which will not allow reinfestation of soil, and covered by a sheet of clear polyethylene film. An additional layer of clear polyethylene film must be suspended over the first layer to create a still air chamber over the soil to be treated. Soil moisture content must be near field capacity. Soil temperature at the bottom center of the pile or bag must be monitored and recorded to ensure that the minimum temperature of 158^{o}F (70^{o}C) for 30 minutes is achieved.

Following treatment, the soil and containers shall be protected from reinfestation by nematodes."