AN ADDITIONAL TIME/TEMPERATURE SOLARIZATION TREATMENT APPROVED IN CALIFORNIA TO ENSURE AGAINST NEMATODE PEST INFESTATION OF CONTAINERIZED NURSERY STOCK

J.J. Stapleton*, T.S. Ruiz, M.V. McKenry, and L. Ferguson, UC Kearney Agricultural Center, University of California, Parlier, CA 93648

The State of California requires specific soil treatments and handling procedures to ensure against nematode pest infestation of field and container, flat, and frame-grown nursery stock for farm planting (California Code of Regulations, Sections 3055-3055.6 and 3640). In addition to methyl bromide fumigation and steam treatments, a "double tent" solarization technique was approved by the California Department of Food and Agriculture (CDFA) in 1999 to ensure against nematode pest infestation of soil and other planting media used for container, flat, and frame-grown nursery stock for farm planting. The approved treatment stipulated, among other conditions, soil maintained at 70 ^{0}C (158 ^{0}F) for 30 continuous minutes (1). Additional laboratory and field data demonstrating the destruction of phytoparasitic nematodes in soil subjected to 60 ^{0}C (140 ^{0}F) solarization for 60 continuous minutes were submitted, along with a proposal to amend the existing regulations to allow this additional treatment option.

The proposal was accepted by CDFA, and wording of amended solarization treatment protocols for CDFA Nursery Inspection Procedures Manual (NIPM) Item #12 is as follows:

"Solarization of soil using a 'double-tent' setup until the temperature of all soil reaches a minimum of 158 ^{0}F (70 ^{0}C) that is maintained for at least 30 continuous minutes, or a minimum of 140 ^{0}F (60 ^{0}C) that is maintained for at least 60 continuous 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, concrete pad, or other material, 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 ^{0}F (70 ^{0}C) for 30 minutes, or 140 ^{0}F (60 ^{0}C) for 60 minutes is achieved. Following treatment, the soil and containers shall be protected from reinfestation by nematodes" (3).

- In addition to nematode control, the "double tent" solarization technique has been shown to provide soil and planting media free of weed seed (2).

- Due to the nature of the solarization treatment, longer treatment times at lower soil temperature (e.g. 50^{0}C) may also be useful, particularly for household gardeners.

- This information can be used by nursery operators, and by household gardeners, for soil disinfestation.

References

1. Stapleton, J.J., McKenry, M.V., and Ferguson, L. 1999. Methyl bromide alternatives: CDFA approves a solarization technique to ensure against nematode pest infestation of containerized nursery stock. UC Plant Protection Quarterly 9(2):14.

2. Stapleton, J.J., Prather, T.S., Mallek, S.B., Ruiz, T.S., and Elmore, C.L. 2000. High temperature solarization for weed control in container soil and potting mixes. Proceedings of the 52nd Annual Conference of the California Weed Science Society 52:204-207.

3. Stapleton, J.J., Ruiz, T.S., McKenry, M.V., and Ferguson, L. 2001. Methyl bromide alternatives: CDFA approves an additional time/temperature solarization treatment to ensure against nematode infestation of containerized nursery stock. UC Plant Protection Quarterly 11(3):7.