NEW APPROACHES TO *MELOIDOGYNE ARENARIA* CONTROL IN FLORIDA CUT-FLOWER PRODUCTION

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Two approaches for root-knot nematode (*Meloidogyne arenaria*) control in Florida cut-flower production were investigated in separate trials. Two years of replicated field trials were conducted for each alternative nematode control approach at a commercial flower farm in Florida with naturally-occurring populations of *M. arenaria*. In both sets of trials, experimental treatments were compared to methyl bromide (MeBr 392 kg/ha 80:20 MeBr:chlorpicrin). The first set of experiments evaluated DOMINUS® (allylisothiocyanate (AITC); 374 L/ha); and the second set of experiments evaluated steam combined with soil solarization.

Dominus is a biofumigant which is registered for conventional and organic farms. Floral crops grown for Dominus trials were sunflower (*Helianthus annuus*), millet (*Pennisetum glaucum*), zinnia (*Zinnia angustifolia*), celosia (*Celosia argentea*), and tuberose (*Polianthes tuberosa*). Dominus and MeBr were shank applied to 3.6 m x 33.5 m plots and covered with totally impermeable film (TIF) for 2 weeks. Plots were replicated 4 times and split among cut flower species. Soil samples were collected throughout the season for nematode analysis. After harvest, plant growth and disease were assessed, and nematodes were isolated from soil and roots. In steam trials, pre-plant steam treatments were evaluated alone and in combination with soil solarization, and were compared with MeBr for *M. arenaria* control on larkspur (*Delphinium elatum*), snapdragon (*Antirrhinum majus*), and sunflower (*Helianthus annuus*). Treatments were; solarization alone, steam treatment after solarization using standard 7.6 cm-diameter perforated plastic drain tile (steam 1), steam treatment following solarization using custom-drilled plastic drain tile with 1.6 mm holes spaced every 3.8 cm (steam 2), and MeBr applied as described above. Drain tiles were buried approximately 25 cm deep with four tiles per 1.8 m by 30 m plot. Steam application followed a four week solarization period in mid-October. All steam was generated using a Sioux propane boiler system. Plots were steamed for sufficient time to reach the target temperature of 70°C for 20 min. Solarization plastic was retained on plots during steaming and plots were covered with an insulating material. Larkspur, snapdragon, and sunflower were produced according to standard commercial practices.

In Dominus trials in the first season, low numbers of *M. arenaria* juveniles (J_2) were present in pre-treatment soil samples and no *M. arenaria* J_2 were detected in either Dominus or MeBr treatments 18 days after application. At snapdragon harvest, there were no differences between treatments for root condition ratings or root galling. Roots harvested from Dominus plots were heavier than roots from MeBr. At larkspur and delphinium harvest there were no differences between treatments for root ratings, except that root galling in MeBr was slightly higher in delphinium. Lupin had larger root systems and stems in Dominus plots. No differences occurred between Dominus and MeBr for *M. arenaria* in roots or soil of snapdragon, larkspur, delphinium, and lupin. Total number of marketable cut stems harvested from Dominus and MeBr

plots was not different for any of the flower species tested. In the second season, with plots in the same location. *M. arenaria* in soil were not different between treatments, but were numerically higher in MeBr compared to Dominus. Celosia root populations were similar between treatments and roots were equivalently galled. Plants from Dominus-treated plots were taller than those in MeBr. Soil populations of *M. arenaria* did not increase by the end of the season with no differences between treatments for soil or root nematodes. Overall, there were no differences in the total number of marketable stems from either celosia or sunflower plots. In steam experiments, one month after treatment in both years of the study, soil populations of *M. arenaria* were lower in both steam treatments and in MeBr compared to solarization. At the end of the season in both years, galling on *Delphinium elatum*, snapdragon, and sunflower was lower in both steam treatments. Both steam treatments also provided control of *M. arenaria* in soil at the end of the season comparable to, or exceeding that of MeBr. Both steam treatments also reduced *M. arenaria* in snapdragon roots comparable to, or exceeding control with MeBr. *M. arenaria* in soil increased following solarization alone treatment. Solarization alone had higher gall ratings than all other treatments on *Delphinium elatum*, snapdragon, and sunflower. Both Dominus and steam were comparable to MeBr for control of root-knot nematodes in cut flower production in Florida.