Impact of Deep Fumigation on Root-knot Nematodes (*Meloidogyne* spp.), Reniform Nematode (*Rotylenchulus reniformis*), and Nutsedge (*Cyperus* spp.) in Plasticulture Production in Florida

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**Abstract**

Fumigation with methyl bromide (MBr) was the primary choice to manage plant-parasitic nematodes and weeds in many horticultural crops in the United States for decades. Since the ban of MBr due to its deleterious effects to the ozone layer has come into effect, producers have transitioned to the use of alternative fumigants. Unfortunately, these alternatives have limited movement in the soil and can provide reduced effectiveness on pests and diseases compared to MBr. The deep application of such fumigants could improve nematode management but the management potential on other pests is unclear. The objective of this research was to compare the efficacy of three fumigants drip applied at a shallow (2.5 cm) and or deep (38.1 cm) depth for the control of weeds and nematodes in a plasticulture vegetable production system. Double and single cropping field trials were conducted in Quincy, FL, at the North Florida Research and Education Center in 2019 and 2020. Results from the current study have shown that shallow fumigation with dimethyl disulfide (DMDS) (375 L/ha), 1,3-Dichloropropene (1,3-D) (169 L/ha), and metam sodium (MNa) (703 L/ha) is more effective on nutsedge compared to a deep application of these chemicals in both single and double crop systems. However, deep fumigation of 1,3-D (169 L/ha), MNa (703 L/ha), and DMDS (375 L/ha) can be more effective than shallow fumigation to manage reniform nematode in both single and double crop plasticulture systems. No significant effects were observed on root-knot nematode populations in either a single or double crop system. These data illustrate the complexity of soil-borne pest management and the necessity of a systems approach in the post methyl bromide era.

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