IMPACT OF SOIL DISINFESTATION PRACTICES ON PLANT HEALTH

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The impact of 19 different soil disinfestation treatments on marketable yield, disease incidence and fungal colonization of root systems was studied on pepper and tomato (Table 1). Treatments were applied and the crops grown on either commercial production farms or and experiment station. Sample dates for fungal colonization ranged from 20 to 116 days after transplanting. Fifty-one data sets representing combinations of site, soil disinfestation treatment, crop and sample date were obtained.

Marketable yields in alternative treatments ranged from 96% to 123% of yields obtained in methyl bromide fumigated soil. Yields in soils treated with a combination of soil solarization and biosolid compost declined slightly after the first year but increased after the second and third consecutive year of treatment. Deep disking prior to the application of soil solarization resulted in increased yields.

Disease incidence was highly variable and ranged from < 1% in some sites to as high as 51% for Phytophthora blight of pepper in methyl bromide fumigated soil. In general, all treatments provided similar levels of disease control.

All root systems, including those growing in methyl bromide fumigated soil, were rapidly colonized by fungi. By harvest, the level of root colonization was similar among treatments with as many as 13 fungal genera identified from methyl bromide fumigated plots and 15 genera identified in solarized treatments. Plant pathogenic species of *Phytophthora* and *Pythium* were isolated from the root systems in all treatments. The incidence of colonization by mycorrhizal fungi was low (< 8%) in all treatments.

The implications of these findings as they relate to plant health will be discussed.

Table 1. Soil disinfestation treatments and crops studied.

Treatment	Crop
solarization	pepper, tomato
solarization (2^{nd} consecutive year)	pepper
solarization/biosolid compost	pepper, tomato
solarization/biosolid compost (2^{nd} consecutive year)	pepper
solarization/biosolid compost (3^{rd} consecutive year)	pepper
solarization/biosolid compost/resistant cultivar[1]	tomato
solarization/deep disk (30 cm)	pepper
solarization/shallow disk (15 cm)	pepper
solarization/DiTera	tomato
solarization/deep disk/Ditera	pepper
solarization/shallow disk/DiTera	pepper
solarization/DiTera/resistant cultivar[1]	tomato
solarization/recycled yard waste/poultry manure	pepper, tomato
recycled yard waste/poultry manure	pepper, tomato
methyl bromide	pepper, tomato
methyl bromide/biosolid compost	pepper, tomato
methyl bromide/resistant cultivar[1]	tomato
resistant cultivar[1]	tomato
untreated control	tomato

[1]tomato cultivar resistant to Fusarium wilt races 1,2,3