

LONG TERM CONTROL OF SOILBORNE PESTS IN TOMATO WITH 1,3-DICHLOROPROPENE + CHLOROPICRIN

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The impact of soil treatments [nontreated, 67%-33% methyl bromide (MBr)-chloropicrin (Pic), 83% 1,3-dichloropropene (1,3-D) + 17% Pic + pebulate (alone or with napropamide), and soil solarization (with *Gliocladium virens* or napropamide)] and spring cropping practices (cucumber, millet, and fallow) on soilborne pest control and crop response of fall-grown staked, fresh market tomato (*Lycopersicon esculentum* Mill.) were studied over a 5 year period from 1998 to 2002. The experimental area was heavily infested with rootknot nematodes (*Meloidogyne* spp.), fusarium wilt race 3, and a mix of purple and yellow nutsedge (*Cyperus rotundus* and *C. esculentus*). Soil fumigants were applied 3 to 8 weeks prior to tomato planting, whereas soil solarization was practiced for a period of 7 to 8 weeks, depending upon the year.

Nutsedge (*Cyperus* sp.) populations, relative to those of 19 to 103-m⁻² with nontreated soil, were reduced similarly (44% to 100%) with 1,3-D + Pic + pebulate as MBr-Pic in four of five seasons. Solarization provided similar nutsedge control as MBr-Pic in two of five seasons and did not control crabgrass. Fusarium wilt (race 3, incited by *Fusarium oxysporum* f. sp. *lycopersici*) infected 32% to 78% of the tomato plants grown in nontreated soil, and MBr-Pic and 1,3-D + Pic + pebulate reduced incidences similarly and to a greater extent than solarization. Nematode populations were generally reduced to the same extent with 1,3-D + Pic + pebulate as with MBr-Pic, and 1,3-D + Pic + pebulate and MBr-Pic provided greater nematode control than solarization. Marketable tomato yield each season was highest and equivalent with 1,3-D + Pic + pebulate and MBr-Pic, intermediate with solarization, and lowest with nontreated soil.

Spring cropping practice had little influence on pest populations and crop performance. The repeated use of 1,3-D + Pic + pebulate during five consecutive cropping seasons, in the same field, did not reduce the degree of soilborne pest control or tomato production below that with MBr-Pic. Pest populations varied from year to year and appeared to be related to environmental conditions, to some extent. Tomato production declined each with all treatments and pest levels were higher after the first year, but 1,3-D + Pic + pebulate maintained similar pest control and yield to that obtained with MBr-Pic throughout the 5 year study.

- Nutsedge, Fusarium wilt, and nematodes were controlled as well with 1,3-D + chloropicrin + pebulate as they were with methyl bromide + chloropicrin over the 5 year life of this study.

- Solarization did not perform as well as methyl bromide + chloropicrin.
- Marketable tomato production was equal with methyl bromide + chloropicrin and 1,3-D + chloropicrin + pebulate.
- Fruit production was intermediate with soil solarization and lowest in the nontreated control.
- Soilborne pest populations varied from year to year, but increased after the first year with all treatments.