COMPARISON OF METHYL IODIDE FORMULATIONS WITH METHYL BROMIDE, AND AN UNTREATED CONTROL ON THE MANAGEMENT OF ROOT-KNOT NEMATODES, WEEDS AND YIELD OF TOMATO IN FLORIDA.

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Three formulations of methyl iodide-chloropicrin mixtures were compared with one formulation of methyl bromide-chloropicrin for their effects on root-knot nematode and weed management, and yield of tomato.

Methods

The field study was conducted in the spring 2003 at the University of Florida's Plant Science Research and Education Center in Citra, FL. Treatments were arranged in a randomized complete block design and replicated four times. A preplant application of fertilizer was applied on the flat soil surface. Immediately afterwards plots were formed by prebedding with a power bedder forming a 9-inch tall bed. The fumigants were applied with a mini-combo unit with three swept-back chisels placing the material ca. 10 to 12-inches deep under the bed press pan. Applicators from Hendrix and Dail Company calibrated and applied all the treatments. The treatments which were applied 21 days preplant were :1) untreated, 2) methyl bromide:chloropicrin 67:33 at 350 lbs/a, 3) methyl iodide:chloropicrin 50:50 at 240 lbs/a, 4) methyl iodide:chloropicrin 50:50 at 300 lbs/a, 5) methyl iodide:chloropicrin 67:33 at 240 lbs/a, 6) methyl iodide:chloropicrin 98:2 at 100 lbs/a + metam sodium applied via drip at 75 gpa. The beds were covered by a 30-µm-thick low-density black polyethylene mulch with one drip irrigation line per bed. 'Florida 47' tomato seedlings were transplanted in plots spaced 18" apart in a single row.

Results and Discussion

The marketable yield per plot was highest in the methyl bromide treatment compared to all other treatments, and lowest in the untreated control plots (Table 1), however there were no significant differences among any of the fumigant treatments.

Plant growth ratings taken 6 weeks following transplanting showed a high degree of plant stunting in the untreated control plots. Methyl bromide 67:33 gave a better growth rating then methyl iodide 67:33, 9.1 vs. 8.0 ($P \leq 0.05$). Weed management was a serious limitation of the methyl iodide treatments with MeI:pic 50:50 and MeI:pic 98:2 failing to give control of nutsedges compared to the untreated plots ($P \leq 0.05$). Weeds (crabgrass, Texas panicum, and goose grass) coming through the plant hole also was a major problem with all the MeI treatments. All treatments provided a high degree of control of root-knot nematode compared with the untreated control, however, the root-knot nematode galling in the MeI:pic 98:2 plots were higher than in all other fumigant treatments ($P \leq 0.05$). There was no apparent benefit of the metam Na treatment applied via drip over the MeI 98:2 treatment. In summary, MeI:pic 50:50 or 67:33

both provided tomato yields and root-knot nematode control equivalent to Mbr, however weed management was poor, especially around the plant hole. It is likely that if one chose to apply MeI:pic at rates tested than one would have to consider applying a herbicide to improve on weed management.

Table 1. Comparison of marketable tomato yield in a field trial at the Plant Science Unit, Citra, FL. Spring 2003.

Treatment	Rate/acre	Marketable fruit yield (lb/plot).....			
		Extra large	Large	Medium	Total
Untreated		3.8 b	8.2 c	17.8 c	29.7 b
Mbr + Pic 67:33	350 lbs	19.9 a	41.0 a	75.3 a	122.0 a
MeI + Pic 50:50	240 lbs	16.1 a	31.5 ab	48.4 b	96.0 a
MeI + Pic 50:50	300 lbs	15.4 a	32.1 ab	60.3 ab	107.8 a
MeI + Pic 67:33	240 lbs	19.1 a	32.0 ab	48.6 b	99.8 a
MeI + Pic 98:2 + Metam Na	100 lbs + 75 gal	9.4 ab	23.2 bc	49.0 ab	81.6 a

Data are means of four replication. Means within a column followed by a common letter are not different according to Duncan's multiple-range test ($P \leq 0.05$).

Table 2. Effect of different treatments on plant growth, weed and root-knot nematode management on tomato cv. Florida 47 in a field trial at the Plant Science Unit, Citra, FL. Spring 2003.

Treatment	Rate/acre	Growth rating[a]	Weeds[b]	Galling[c]
Untreated		4.5 c	15.0 a	78.1 a
Mbr + Pic 67:33	350 lbs	9.1 a	1.0 c	0.00 c
MeI + Pic 50:50	240 lbs	8.5 ab	11.0 ab	4.8 c
MeI + Pic 50:50	300 lbs	8.0 ab	5.0 c	1.2 c
MeI + Pic 67:33	240 lbs	8.0 ba	6.0 bc	6.3 c
MeI + Pic 98:2 + Metam Na	100 lbs + 75 gal	8.6 ab	15.0 a	28.8 b

Data are means of four replication. Means within a column followed by a common letter are not different according to Duncan's multiple-range test ($P \leq 0.05$).

[a]Rating based on a 1 to 10 scale with 1 = poor plant growth, and 10 = excellent plant growth.

[b]Nutsedges that penetrated through the mulch were counted in a 25 x 25 cm square on the wet side of the bed.

[c]Galling was subjectively rated based on a scale of 0 = no galling, 1 = 10% of root system galled, ...100 = 100% of the root system galled.