EVALUATION OF ACROLEIN FOR PEST CONTROL IN TOMATO

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Summary. Acrolein was tested as a soil fumigant applied by drip injection at 100, 200, 300, and 400 lbs/A, and compared to methyl bromide/chloropicrin at 350 lb/A. Standard film (HDPE) and virtually impermeable films were used. Visual injury and vigor estimates indicate that acrolein was safe to tomato regardless of film. Treatment effects on weeds were not significant but do not suggest that acrolein is effective on weeds

Objective. The objective of this research was to evaluate the weed control efficacy of acrolein as well as crop safety in transplanted fresh market tomato.

Materials and methods. A field study was conducted at the Spence USDA research farm near Salinas, CA during May to September, 2008. Treatments were conducted on raised beds, 40-in wide center-to-center. Prior to fumigation weed seedbags containing 10 yellow nutsedge tubers, were installed in the center and edges of the planting beds at depths of 2- and 6-in deep. Plots were divided in half and one half tarped with VIF and one half tarped with HDPE. The commercial standard methyl bromide/chloropicrin (MBPic) 67:33 at 350 lb ai/A was applied by drip injection on May 20, 2008. Acrolein was applied at 100, 200, 300, and 400 lbs/A by drip injection on May 21, 2008. An untreated control was also included. Two drip tapes were installed per bed at a depth of 1.5 inches. The flow rate of the tape was 0.67 gal/min/100-ft, with 8-in spacing between each emitter and each treatment was injected in approximately 1.5 acre inches of water during a 4 hour interval. Plants were watered by sprinkler irrigation for the first week after transplanting and then by drip irrigation for the remainder of the trial period. All treatments were replicated 4 times and arranged in a randomized complete block design. Evaluations were visual crop injury estimates, plant height, weed densities and weed seed viability assays. Data were subjected to analysis of variance and mean separation was performed using LSD's at P = 0.05.

Table 1. Visual injury estimates and plant vigor estimates on 'Shady Lady' tomato 3 weeks after transplanting. Data were recorded on June 25, 2008.

		Injury estimates		Vigor estimates		Weed densities	
Treatment	Rate	HDPE	VIF	HDPE	VIF	HDPE	VIF
	Lb/A	0 = safe, 10 = dead		0 = dead, 10 = healthy		-- no (10 ft^2) --	
Control	0	0 d	0 d	9.1 abc	9.4 ab	30.5	10.6
MBPic	350	0.3 bc	0.3 bc	9.5 a	9.1 abc	2.6	7.6
Acrolein	100	0.1 cd	0.1 cd	9.1 abc	8.9 bcd	13.1	5.4
Acrolein	200	0.4 ab	0.4 ab	8.6 cd	8.8 cd	11.5	11.8
Acrolein	300	0.4 ab	0.4 ab	8.5 de	8.4 de	8.9	13.4
Acrolein	400	0.5 a	0.5 a	7.8 f	8.0 ef	10.5	8.1
LSD 0.05		0.18		0.62		ns	

Results. The injury estimates and plant vigor estimates indicate that acrolein concentrations in the soil under both VIF and HDPE were below the level that would be injurious to tomato (Table 1). Resident weeds were primarily common purslane and nettleleaf goosefoot and there were no significant treatment effects.