DIMETHYL DISULFIDE PLUS CHLOROPICRIN AS METHYL BROMIDE ALTERNATIVE FOR STRAWBERRY PRODUCTION

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Introduction

Growers face challenges from the phase out of methyl bromide and the stringent rules on the use of alternative fumigants. One of the promising alternatives to methyl bromide for soil fumigation in strawberries production is dimethyl disulfide (DMDS). It can be applied by shank injection or drip fumigation as a mixture with chloropicrin. The efficacy of DMDS may be maximized when applied under virtually or totally impermeable films (VIF or TIF). As the regulations governing buffer zones and by-stander exposure become more stringent, DMDS may provide a potential for minimizing buffer zones and reducing by-stander exposure because it can be applied only under retentive film, such as VIF. Studies over the past two years have shown that DMDS/chloropicrin pre-mixed or sequentially applied with chloropicrin can sustain strawberry yields similar to those obtained with MB/Pic fumigation. The objective of this study was to evaluate DMDS in combination with chloropicrin for pathogen and weed control in strawberry production system.

Methods

Experiments were initiated on November 5, 2009 at the Monterey Bay Academy (MBA) near Watsonville and in Salinas, CA. Drip fumigation treatments for Salinas and Watsonville are listed in Table 1. Beds were tarped with VIF for all treatments and with standard polyethylene tarp (STD PE) for methyl bromide. Chloropicrin treatments were drip-applied with and without sequential application at different rates of DMDS. Sequential applications of treatments involving DMDS took place five days following the primary application. Strawberry plants (Albion variety) were transplanted four weeks after the sequential applications. Yield data were taken weekly throughout the production season and were graded as marketable and nonmarketable yield. Soil samples for pathogen assays were collected at-planting and weed evaluations were made prior to each weeding activity throughout the growing season.

Results

There was no significant difference in the mean of strawberry yield from soil treated with methyl bromide and soil treated with DMDS/chloropicrin. Total and marketable yields per each treatment are listed in Table 2. The studies suggests that DMDS sequential and DMDS and chloropicrin pre-mixed applications can also control soilborne plant pathogens such as *Pythium* spp. and weeds such as annual grasses and pigweed. This presentation will discuss the efficacy of DMDS/chloropicrin mixtures and sequence of application to control weeds and soilborne pathogens.

Table 1. Drip fumigation treatments applied under virtually impermeable film (VIF) and standard polyethylene tarp (STD PE) at the Salinas and Watsonville sites.

Treatments	Rate lb/acre	Film type
Untreated control	--	VIF
Chloropicrin (Pic)	200	VIF
Dimethyl disulfide (DMDS) + chloropicrin (Pic), Tank mix	100 + 350	VIF
Chloropicrin (Pic) followed by dimethyl disulfide (DMDS)	100 fb 350	VIF
Chloropicrin (Pic) followed by dimethyl disulfide (DMDS)	100 fb 440	VIF
Methyl bromide/Pic (57:43)	300	STD PE
Pic followed by Metam-K	100 fb 30 gal/ac	VIF

Table 2. Marketable and total strawberry yield per plant through July 2010 at the Salinas and Watsonville sites.

Fumigant (lbs/acre)	Marketable Yield	Total Yield	Marketable Yield	Total Yield
	Salinas		Watsonville	
	(g/plant)			
Control	355.5	467.3	306.6	413.9
Pic 200 lbs	488.2	616.4	368.3	486.4
DMDS-Pic (350+100) lbs	508.3	615.4	339.9	453.3
Pic f/b DMDS (100 fb 350) lbs	482.3	601.6	381.9	492.4
Pic f/b DMDS (100 fb 440) lbs	479.5	586.0	359.9	458.7
MB/Pic	507.6	627.5	349.7	464.1
Pic fb metam-K	471.5	591.4	____	____
ANOVA	*P*=.004	*P*=.003	n.s	n.s

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