EFFECT OF ALTERNATIVE TARP AND FUMIGANTS COMBINATIONS WITH METAM SODIUM ON STRAWBERRY YIELD.

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Previous research has shown that the use of Virtually Impermeable Film (VIF) tarp or sequential application of metam sodium could improve pest control efficacy of InLine and chloropicorin (Pic). Such that even reduced rates of these fumigants will ensure effective pest control and equivalent yield to plots treated with methyl bromide Pic (MbPic). However, combinations of impermeable film and sequential application of metam sodium have not tested at the same time. This study evaluates strawberry yield as affected by: 1) fumigant type, 2) film used, and 3) sequential application of metam sodium following a base fumigant application. The objective is to demonstrate weed control efficacy and yield in plots treated with alternative fumigant under commercial production practices and standards.

Methods

Research and demonstration trials were conducted on commercial strawberry fields in Oxnard, Santa Maria and Pajaro- California during the 2005 production season. Studies were initiated on Sep. 2 , 2004 at Oxnard, Sep. 23, 2004 at Santa Maria, and Oct. 7, 2004 at Pajaro.
Fumigants used in these studies were: InLine^{TM} at 300 lb/A, MbPic at 200 lb/A, Pic at 200 lb/A, Midas^{TM} at 200 lb/A and sodium azide (NaAz) at 50 lb/A. Plots were split between 4 different tarps; VIF tarp from two manufactures Rimini and Klerks refered to as (VIF 1 and 2), cross layered polyethylene (PE) and the standard polyethylene (STD). Metam sodium (Vapam at 35 gal/A or Kpam at 20 gal/A), was applied to half of the plots one week after the drip fumigation. Strawberry transplants were planted at least four weeks after final fumigation, and harvested fruits were sorted into marketable quality and culls. Weed densities were evaluated by counting all weeds prior to each hand weeding from the entire plot length (75-100 feet bed top only), the cumulative weed densities are presented.

Summary of results

Yield: Most fumigant application resulted in similar yields to the MbPic with the standard polyethylene tarp. The untreated control had a significantly lower yields (Table 1). Tarp type and Kpam application did not have a significant effect on marketable yield. Treatment combination of tarp fumigant and sequential application of metam sodium had a significant effect on the marketable yield but had no significant effect on the non-marketable yield. The highest yield was in plots tarped with VIF mulch and fumigated with InLine without sequential application of metam sodium (Table 1).

Table 1: Effect of fumigant and tarp type, sequential application of metam sodium on strawberry yield quality and quantities at Oxnard, CA in the 2004-05 season.

Fumigant	Tarp	Marketable yield		Unmarketable yield	
		With kpam	Without kpam	With kpam	Without kpam
		----------lb/A----------			
Untreated control	VIF1	58,833	54,942 *	11,482	9,733
InLine 300 lb/A	VIF1	63,364	69,628	11,744	12,380
MbPic 200 lb/A	VIF1	62,253	64,585	10,522	10,894
Midas 200 lb/A	VIF1	62,926	65,194	12,777	12,805
NaAz 50 gal/A	VIF1	62,692	61,527	11,443	10,512
Pic 200 lb/A	VIF1	67,097	66,622	13,505	11,806
Untreated control	PE	59,248	55,274 *	10,755	10,027
InLine 300 lb/A	PE	65,715	65,094	13,837	12,474
MbPic 200 lb/A	PE	68,680	69,412	11,786	11,526
Midas 200 lb/A	PE	64,553	62,765	11,835	11,750
NaAz 50 gal/A	PE	62,752	59,595	11,452	11,292
Pic 200 lb/A	PE	66,742	67,780	11,962	11,803
Untreated control	STD	57,482	59,818	8,969	9,622
InLine 300 lb/A	STD	66,169	67,748	13,037	12,421
MbPic 200 lb/A	STD	63,376	66,412	10,565	10,942
Midas 200 lb/A	STD	66,319	68,204	11,769	10,800
NaAz 50 gal/A	STD	60,659	63,313	11,240	10,297
Pic 200 lb/A	STD	67,547	66,806	12,388	11,314
ANOVA (P-value)					
Fumigant		**<0.001**		**<0.001**	
Tarp		ns		**ns**	
Metam sodium (kpam)		ns		**ns**	
Combine treatment (tarp, fumigant and kpam)		**0.01**		**0.2 ns**	
LSD		**7,292**		**NA**	

***- significantly different than MbPic yield under standard film.**

Weed control: the best weed control was found in plots treated with Inline at 300 lb/A under VIF tarp. VIF and PE tarps alone controlled over 40 percent of the weeds without any fumigation. Over all, most fumigants provided good weed control and yield. However not all fumigants provided better weed control when followed by a sequential application of metam sodium.

Table 2: Effect of fumigant and tarp type, sequential application of metam sodium on weed densities at Oxnard, CA in the 2004-05 season.

Fumigant	With kpam application			Without kpam application		
	VIF1	PE	STD	VIF1	PE	STD
	----------1000's/ A----------					
Untreated control	26.3	39.8	41.6	19.1	19.8	33.0
InLine 300 lb/A	18.5	30.5	36.6	10.0	14.5	19.7
MbPic 200 lb/A	14.8	25.4	29.4	11.5	18.2	11.7
Midas 200 lb/A	17.1	39.7	42.1	11.7	15.8	19.4
NaAz 50 gal/A	17.1	25.3	22.7	16.0	23.6	34.5
Pic 200 lb/A	20.5	35.7	38.5	15.0	17.8	25.8

ANOVA		
	With Kpam	Without Kpam
Fumigant	0.024	0.07 ns
Tarp	<0.001	0.01
Combine treatment (fumigant and tarp)	0.02	<0.001
LSD	19.7	18.9
Kpam	<0.001	