Strawberry Production with Reduced Rates of Methyl Bromide Alternatives Applied under Retentive Film

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The overall purpose of the project was to facilitate the adoption of methyl bromide (MB) alternatives fumigants by California strawberry growers and to evaluate the efficacy of reduced application rates to control soil pests. One strategy to reduce the fumigant losses to atmosphere and the bystander exposure is the use of retentive tarp such as totally impermeable film (TIF) and virtually impermeable film (VIF). The focus of this research was to evaluate strawberry yield under combinations of reduced fumigant application rates under standard tarp polyethylene (PE) tarp, TIF, and VIF.

Methods

Studies were initiated in October 2008 at the USDA-ARS/UC-Davis research facilities in Salinas and at the Monterey Bay Academy research facilities near Watsonville. The treatments included five reduced rates of drip-applied fumigants, three plastic films, and sequential application of metam potassium (K-Pam) seven days after the primary fumigation date. The treatments were: 150 lbs/ac of methyl bromide/Pic (50% MB + 50% Pic, drip formulation), 150 lbs/ac of Midas Gold (33% iodomethane + 67% Pic), 150 lbs/ac of Pic-60 (60% Pic + 35% 1,3-D), 150 lbs/ac of chloropicrin (96% Pic), 200 lbs/ac of InLine (62% 1,3-D: + 33% Pic) alone in combination with 36 gal/ac of metam potassium (K-Pam). These treatments were compared to standard MB/Pic (67/33) fumigation at 300 lbs/ac. Strawberry plants (Albion variety) were transplanted approximately four weeks after fumigation to the center 20 feet of the tarped beds. Harvesting started in March 2009. Strawberry yield was collected once a week throughout the production season and graded into marketable and nonmarketable. Yields from the alternative fumigants under different films, with and without metam potassium were compared.

Results

Strawberry yield data relative to MB/Pic under standard tarp in the research trials in Salinas and Watsonville are listed in Tables 1 and 2, respectively. The preliminary results indicate that low application rates of some fumigants (such as

Midas) or sequential application of K-Pam and Inline can produce equivalent yields to the standard MB/Pic fumigation if applied under retentive tarps.

Table 1. Average strawberry total yield relative to MB/Pic from Salinas soils treated with reduced rates of alternative fumigants applied under virtually impermeable film (VIF), totally impermeable film (TIF) and standard polyethylene tarp (STD PE).

Treatment	Rate lbs/acre	% Yield under		
		TIF	VIF	STD PE
Untreated Control		86	96	82
Pic60	150	104	122	113
Midas 33/67	150	129	116	105
Inline	200	109	101	110
Inline followed by K-Pam	200	128	114	114
MB/Pic 50/50	150	132	138	128
MB/Pic 67/33	300	129	126	100
Pic	150	113	131	117
K-Pam followed by Inline	200	134	112	114
K-Pam	----	97	99	92

* TIF, totally impermeable film; VIF, virtually impermeable film; and STD PE, standard polyethylene tarp.
† K-Pam at 36 GPA was applied alone and with Inline 200 lb/acre under TIF, VIF, and STD PE.

Table 2. Average strawberry total yield relative to MB/Pic from Watsonville soils treated with reduced rates of alternative fumigants applied under virtually impermeable film (VIF), totally impermeable film (TIF), and standard polyethylene tarp (STD PE).

Treatment	Rate lbs/acre	% Yield under		
		TIF	VIF	STD PE
Untreated Control		93.4	84.8	81.5
Pic60	150	95.5	103.2	92.3
Midas 33/67	150	89.7	89.4	96.5
Inline	200	81.8	80.5	84.4
Inline followed by K-Pam	200	82.6	77.7	81.9
MB/Pic 50/50	150	93.5	92.6	96.3
MB/Pic 67/33	300	99.8	99.0	100.0
Pic	150	81.8	83.8	102.1
K-Pam followed by Inline	200	86.0	78.5	84.3
K-Pam	----	89.1	92.2	81.5

* TIF, totally impermeable film; VIF, virtually impermeable film; and STD PE, standard polyethylene tarp.
† K-Pam at 36 GPA was applied one week before or after Inline at 200 lb/acre under TIF, VIF, and STD PE.

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