EFFICACY OF TWO FORMULATIONS OF MIDAS FOR STRAWBERRY PRODUCTION

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Iodomethane (IM) is a broad-spectrum soil fumigant and can be a drop-in replacement to methyl bromide soil fumigant. Our early research evaluated several formulations of IM plus chloropicrin (Pic) for strawberry production in California and found that shank application of Midas-50 (50% IM plus 50% Pic) or drip application of Midas-33 (33% IM plus 67% Pic) at 300 lbs/A under standard high density polyethylene (HDPE) tarp had equivalent efficacy to standard MB/Pic (67/33) at 350 lbs/A. The objective of the current study was to evaluate weed control and strawberry yield under reduced rates of Midas-33 and Midas-50 applied to soil beds by shank injection or drip fumigation under virtually permeable film (VIF).

Methods
Two studies were conducted in Watsonville and Salinas, CA. The Watsonville studies were initiated on October 10, 2005, at the Monterey Bay Academy (MBA) research facilities. The Salinas studies were initiated on October 29, 2005, at the USDA-ARS research facilities (Spence farm). Fumigant treatments included untreated control, Midas (33:67 and 50:50) shank injected and drip applied at 200 lb/A, and MB/Pic (67:33) at 300 lb/A. In all experiments, beds were covered with clear VIF. Treatments were replicated four times and plots were 33 or 43 feet long and 54 inches center-to-center. Seed bags containing 35 seeds of the following weeds: little mallow, common purslane, common chickweed and knotweed were installed at the bed center and edge at 2 and 6” depth prior to the fumigation. Seed bags were retrieved one week after fumigation and seed viability was determined by species with TZ test. Resident weed biomass was also determined. Strawberry plants (Diamante) were transplanted approximately four weeks after fumigation. Strawberry fruit was harvested weekly and sorted into marketable and culls.

Results
All fumigant treatments provided excellent control of the resident weeds (except for little mallow at MBA) (Table 1). Also, the control of weed seed in buried bags was similar for Midas and MB/Pic, but both had poor control of little mallow seed (Table 2).

At both locations, fumigated plots had significantly higher total and marketable yield than the untreated control (Figures 1 and 2). Midas treatments were not significantly different the MB/Pic treatment.
Table 1: Accumulated weed densities of little mallow, annual bluegrass, and the total weed density at MBA and Spence farm.

<table>
<thead>
<tr>
<th>Fumigant and application method</th>
<th>Rate</th>
<th>MBA</th>
<th>Spence Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Little mallow</td>
<td>Annual bluegrass</td>
</tr>
<tr>
<td></td>
<td>lbs/A</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Untreated</td>
<td>-----</td>
<td>1509 a</td>
<td>51935 a</td>
</tr>
<tr>
<td>Midas 50 Drip</td>
<td>200</td>
<td>503 b</td>
<td>0 b</td>
</tr>
<tr>
<td>Midas 33 Drip</td>
<td>200</td>
<td>503 b</td>
<td>0 b</td>
</tr>
<tr>
<td>Midas 50 Bed Shank</td>
<td>200</td>
<td>2767 b</td>
<td>0 b</td>
</tr>
<tr>
<td>Midas 33 Bed Shank</td>
<td>200</td>
<td>2137 b</td>
<td>503 b</td>
</tr>
<tr>
<td>MbPic Drip</td>
<td>300</td>
<td>1006 b</td>
<td>1006 b</td>
</tr>
</tbody>
</table>

ANOVA

| P-value | ns | <0.001 | <0.001 | 0.001 | <0.001 |

Table 2: Survival of weed seeds in buried seed bags installed prior to the soil fumigation at MBA and Spence Farm.

<table>
<thead>
<tr>
<th>Fumigant and application method</th>
<th>Rate</th>
<th>MBA</th>
<th>Spence Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Little mallow</td>
<td>Common purslane</td>
</tr>
<tr>
<td></td>
<td>lbs/A</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Untreated</td>
<td>80.5 a</td>
<td>95.8 a</td>
<td>77.7 a</td>
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<tr>
<td>Midas 50 drip</td>
<td>200</td>
<td>64.6 b</td>
<td>0.0 b</td>
</tr>
<tr>
<td>Midas 33 drip</td>
<td>200</td>
<td>58.9 bc</td>
<td>0.0 b</td>
</tr>
<tr>
<td>Midas 50 shank</td>
<td>200</td>
<td>58.0 bc</td>
<td>0.0 b</td>
</tr>
<tr>
<td>Midas 33 shank</td>
<td>200</td>
<td>56.7 c</td>
<td>7.7 b</td>
</tr>
<tr>
<td>MbPic 67:33</td>
<td>300</td>
<td>66.0 bc</td>
<td>0.6 b</td>
</tr>
</tbody>
</table>

ANOVA

| P-value | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
Figure 1: Relative yields to plots fumigated with MbPic at 300 lb/a at MBA. Total yield through August 11, 2006, for the MbPic treatment was 40,747 lbs/A.

Figure 2: Relative yields to plots fumigated with MbPic at 200 lb/a at Spence. Total yield through August 9, 2006, for the MbPic treatment was 26,840 lbs/A.