CONTROL OF IMPORTED CABBAGEWORM (ICW), DIAMONDBACK MONTH (DBM) AND CABBAGE LOOPER (CL) ON CABBAGE AND BROCCOLI AT SOUTH DEERFIELD, MA., 1989: Cabbage and broccoli were transplanted on 7 Jul in separate blocks. Plots consisted of two 15 ft rows 3 ft apart with a 6-ft fallow area between plots. Within-row plant spacing was 1.5 ft. Treatments were replicated 4 times in a randomized complete block design. Insecticide applications were made with a hand-held CO₂-pressurized sprayer delivering ca. 70 gal/acre at 40 psi., directed over the top and around the sides of the plants. All materials used were formulations of *Bacillus thuringiensis* var. kurstaki. MVP was applied with Bond spreader-sticker at 1 pt formulated material per acre. Two treatments/material consisted of sprays at weekly intervals (22, 31 Aug and 8, 13, 21 Sep) or sprays applied when larval density exceeded the action threshold of 0.5 larval units/plant (1 larval unit = 1 large CL = 1.5 small CL or large ICW = 10 DBM or small ICW) based on weekly samples. A small ICW or CL was defined as <½ inch in length. All threshold treatments received applications on 22 Aug and 21 Sep, and the MVP treatment in broccoli received an additional spray on 8 Sep. Larval density was measured by direct counts on 10 randomly selected half-plants per plot. Cabbage head quality was assessed at maturity on 27 Sep by examining 10 heads/plot. Two marketable grades were 1) no feeding damage to head or 4 inner wrapper leaves 2) not more than one 1-inch hole on head or four 1-inch holes on 4 wrappers. More severe feeding damage or presence of frass or insect parts on head or 4 wrappers rendered the head unmarketable.

All *B. thuringiensis* materials significantly reduced ICW numbers relative to the untreated control in both broccoli and cabbage, but there was no difference among materials. Numbers of CL and DBM were low and no significant difference from the control was seen, with the exception of Dipel 2x against CL in broccoli. Marketability of cabbage heads was 95% or higher with all materials when sprayed weekly. Damage and frass from late ICW feeding severely reduced marketability of cabbage heads in threshold treatments. The action threshold of 0.5 larval units, as calculated for this test, should be modified to achieve acceptable levels of control with microbial insecticides and where ICW is the dominant lepidopteran species in cabbage and broccoli.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate/acre</th>
<th>Mean no. larvae per plant</th>
<th>% Marketable heads in cabbage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ICW</td>
<td>DBM</td>
<td>CL</td>
</tr>
<tr>
<td></td>
<td>Cabb</td>
<td>Brocc</td>
<td>Cabb</td>
</tr>
<tr>
<td>Dipel 2x</td>
<td>0.33 lb</td>
<td>0.20a</td>
<td>0.60a</td>
</tr>
<tr>
<td>MVP</td>
<td>2.0 qt</td>
<td>0.15a</td>
<td>0.38a</td>
</tr>
<tr>
<td>Javelin WG</td>
<td>0.5 lb</td>
<td>0.25a</td>
<td>0.38a</td>
</tr>
<tr>
<td>Control</td>
<td>—</td>
<td>1.65b</td>
<td>1.95b</td>
</tr>
</tbody>
</table>

Means in each column followed by the same letter are not significantly different (p = 0.05, Tukey HSD). Actual means presented; data analysis of larval counts performed on log(x + 1) transformed data.

1Percentages in weekly and threshold treatments followed by the same letter are not significantly different (p = 0.05).