

It pays to trap: Virginia Case Studies of Corn Earworm IPM on Sweet Corn

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Introduction

Corn earworm (CEW), *Helicoverpa zea* (Fig. 1) is the primary pest that drives insecticide applications by sweet corn growers in the mid-Atlantic U.S. Historically sweet corn growers have used multiple (4 to 8) insecticide applications from first silk to harvest and/or Bt transgenic sweet corn hybrids to protect their crop from damage. Managing CEW has become a greater challenge in recent years because of the development of resistance to both pyrethroids and the Bt Cry toxins found in many of the Bt transgenic corn and cotton hybrids.



Fig. 1. Corn earworm larvae in sweet corn.

Moth trapping to guide the number of sprays

CEW pest pressure varies each year. It is driven by moths' dispersal throughout the landscape and prevailing winds from southerly regions carrying moths northward. Monitoring moth activity with traps can help inform the frequency of insecticide sprays required for control (Fig. 2). This threshold-based approach has been well adopted in the northern U.S. However, CEW pest pressure is higher in more southerly locations like Virginia. Therefore, growers have not typically followed scouting guidelines, opting for scheduled sprays every 2-3 days.

AVERAGE # OF CEW MOTHS PER TRAP		Spray Interval
Moths per Day	Moths per Week	
<0.2	<1.4	No Spray
0.2-0.5	1.4-3.5	Every 5 Days
0.5-1	3.5-7	Every 4 Days
1-13	7-91	Every 3 Days
>13	>91	Every 2 Days

Fig. 2. Scentry® *Heliothis* trap, corn earworm moth, and action thresholds adapted from: Sweet Corn Insect Management Field Scouting Guide. <https://www.northeastipm.org/neipm/assets/File/NRCS-Resources/Sweet-Corn-IPM-Field-Scouting-Guide.pdf>

Field experiments in VA

From 2017 to 2023, we conducted 8 separate sweet corn field experiments, comparing insecticide spray intervals dictated by CEW trap catch (Threshold), spraying every 2-3 days (Standard), and no sprays (Control) through silking. **Plot Design:** In each sweet corn planting, the three treatments were applied to two rows wide x 25 ft long plots that were arranged in a randomized complete block with 4 replications. Insecticides were sprayed with a backpack sprayer equipped with a single nozzle boom directed at the ears and silks (see footnote in Table 1 for specific insecticide treatments). Both threshold and standard treatments received their first spray at ~10% of ears with silks. **Insect Monitoring:** A Scentry® Heliothis trap (Fig. 2) was baited with commercial Hercon® Luretape® corn earworm pheromone lure and installed adjacent to each field to monitor CEW moth activity. Traps were checked every other day, the number of moths were recorded, then the traps were emptied and reset.

This research demonstrated the benefits of a threshold-based approach to control CEW in Virginia sweet corn. Overall, the threshold treatment performed as well as the standard insecticide sprays applied every 2-3 days with both averaging about 82-83% clean ears (Table 1), which was significantly higher than the untreated control (15% clean ears). However, **the threshold treatment required ~ 1.5 fewer applications per field than the standard sprays every 2-3 days**, reducing chemical inputs, time and energy, and impact on non-target organisms including humans. After a trap is obtained (~\$125 for a Scentry® Heliothis trap), the cost of CEW lures is minimal (~\$2 per Hercon® Luretape®). It is recommended to replace the lures every 2-3 weeks.

Table 1. Effectiveness of two different insecticide spray strategies in sweet corn in Virginia: 1) standard (sprays every 2-3 days at silking), 2) threshold (spraying based on pheromone trap catch of corn earworm moths); 3) untreated control.

Year	Location	Avg. CEW moth catch/week during silking	# of sprays		% clean ears		
			Threshold	Standard (every 2-3 days)	Threshold	Standard (every 2-3 days)	Untreated Control
2017	Whitethorne A	1.0	3 ^a	7 ^c	76	93	2
2017	Whitethorne B	5.4	3 ^a	5 ^c	99	98	56
2017	Whitethorne C	9.1	4 ^a	5 ^c	99	96	29
2018	Whitethorne	3.8	5 ^a	7 ^c	64	88	2.5
2017	Painter A	20.0	6 ^a	6 ^c	91	53	3
2017	Painter B	34.9	4 ^a	5 ^c	65	72	2
2018	Painter	138.0	8 ^a	8 ^c	83	69	2
2023	Painter	9.7	5 ^b	7 ^d	85	91	23
	Average		4.8	6.3	82.7	82.4	15

^a 2017 & 2018 IPM - Coragen® 3.5 fl oz/A followed by Warrior II 1.92 fl oz/A as needed (based on trap catch).

^b 2023 IPM - Vantacor® 1.2 fl oz/A rotated with Radiant® SC 6 fl oz/A as needed (based on trap catch)

^c 2017 & 2018 - Conventional – Warrior II every 2-3 days.

^d 2023 Conventional – Bifenthrin 2E 3 fl oz/A rotated with Besiege® 8 fl oz/A every 2-3 days.