

Updates on Western Bean Cutworm Biology & Management

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Session Goals

- Understand the transgenic Bt trait options and their efficacy against the western bean cutworm
- Know the resources available to determine timing and increase efficiency of scouting corn for western bean cutworm
- Recognize the “good guys” out there- the beneficial insects preying upon western bean cutworm in the field
- Understand recommendations for chemical applications targeting western bean cutworm in corn

Western Bean Cutworm



Western Bean Cutworm



July-August

Late June-
July

August-
September

October-
June

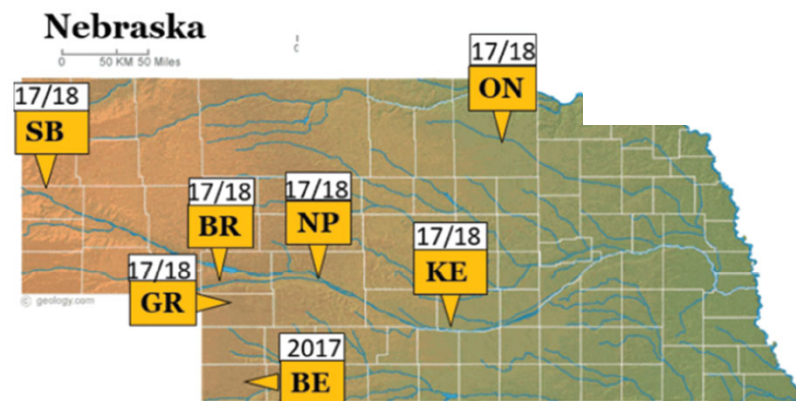


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Bt trait
selection

Bt Trait Updates

- Not all caterpillar traits will affect WBC
- Cry1F: Herculex, SmartStax
 - 88% of NE crop consultants reported that Cry1F Bt corn is providing less control (2014-2016)
 - Confirmed resistance to Cry1F in Nebraska (2017-2018)
 - WBC removed from label of all Cry1F products
- Vip3A: Viptera, Leptra, Trecepta
 - Traits provide very good control, but resistance is always on the horizon



[Handy Bt Trait Table](#)

Western Bean Cutworm



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2 Scouting



1 Bt trait
selection

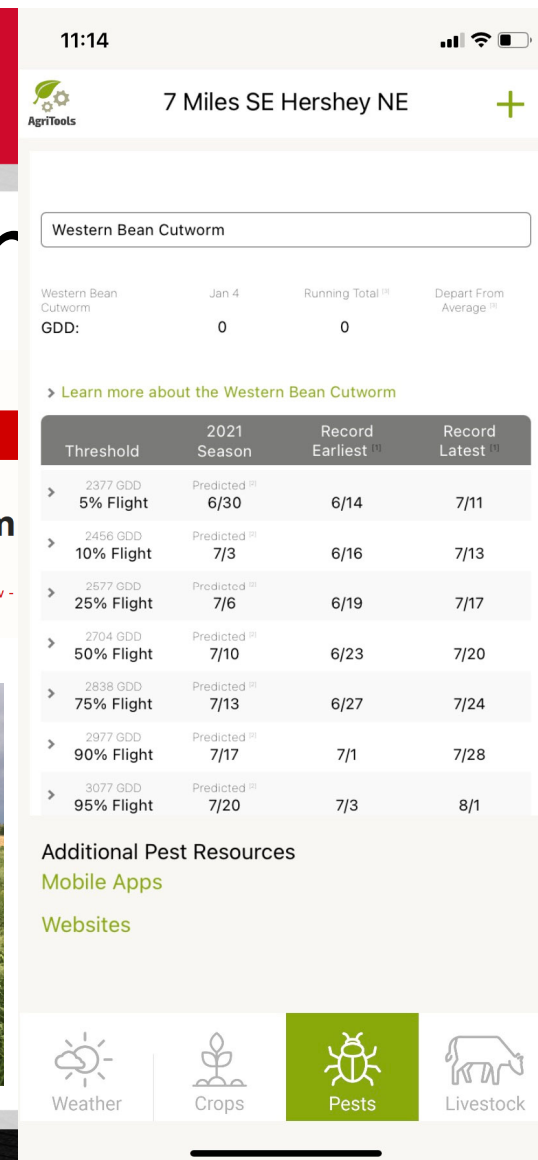
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When to Start Scoutin

- Be informed about moth flight predictions from the degree-day model:
 - CropWatch article
 - [AgriTools App](#)
- Monitor moth flights through trapping:
 - UNL black light trap data [online](#)
 - Green bucket and pheromone



The screenshot shows the CropWatch website interface. At the top, there is a navigation bar with 'Home', 'Weather (GDD & ET) Info & Resources', and 'Crops'. The main heading is 'Western Bean Cutworm' with a date of 'JUNE 17, 2020'. Below the heading, there is a credit line: 'Jeffrey Cluever - Entomology PhD Student | Jeff Bradshaw - Wright - Extension Entomologist'.



The screenshot shows the AgriTools app interface. At the top, it displays the time '11:14' and the location '7 Miles SE Hershey NE'. The app is currently showing data for 'Western Bean Cutworm'. Below the location, there is a search bar and a table with the following data:

Western Bean Cutworm	Jan 4	Running Total ⁽¹⁾	Depart From Average ⁽²⁾
GDD:	0	0	

Below the table, there is a link to 'Learn more about the Western Bean Cutworm'. A table of flight thresholds is also shown:

Threshold	2021 Season	Record Earliest ⁽¹⁾	Record Latest ⁽¹⁾
> 2377 GDD 5% Flight	Predicted ⁽²⁾ 6/30	6/14	7/11
> 2456 GDD 10% Flight	Predicted ⁽²⁾ 7/3	6/16	7/13
> 2577 GDD 25% Flight	Predicted ⁽²⁾ 7/6	6/19	7/17
> 2704 GDD 50% Flight	Predicted ⁽²⁾ 7/10	6/23	7/20
> 2838 GDD 75% Flight	Predicted ⁽²⁾ 7/13	6/27	7/24
> 2977 GDD 90% Flight	Predicted ⁽²⁾ 7/17	7/1	7/28
> 3077 GDD 95% Flight	Predicted ⁽²⁾ 7/20	7/3	8/1

At the bottom of the app, there are navigation icons for 'Weather', 'Crops', 'Pests', and 'Livestock'. The 'Pests' icon is currently selected.

WBC Scouting

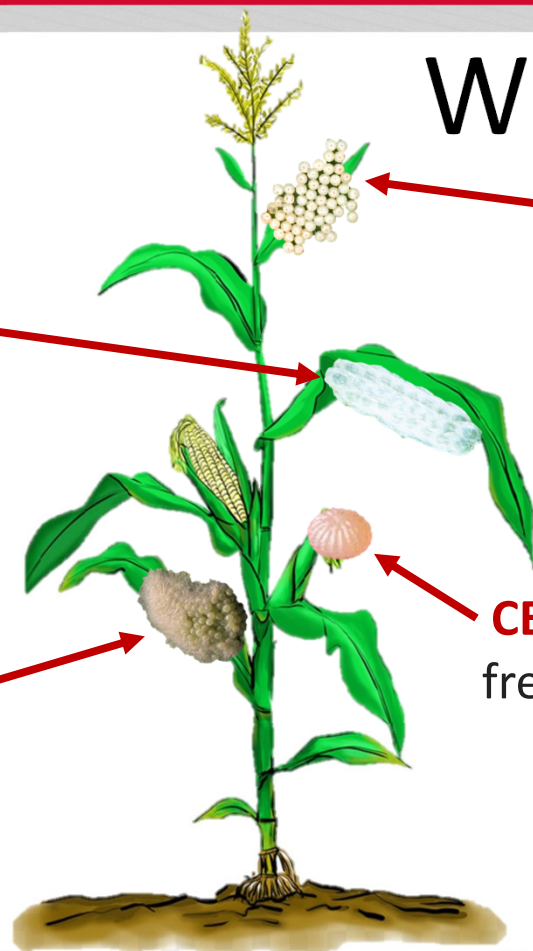


- Select 20 plants in 5 different parts of each field (100 plants)
 - ❖ Or reduce # of plants using [WBC Speed Scout App](#)
- Examine the surface of corn leaves in the upper third of the plant for egg masses and the tassel, leaf axils, and ear tips for larvae
- Treatment is recommended if 5-8% of plants are infested with eggs or larvae
- If corn is at milk stage (R3) before eggs are laid, no treatment is needed

WBC Egg Identification

ECB: Underside of leaves, often in the middle third of plant

FAW: On immature leaves



WBC: Top side of leaves in the upper third of plant
(prefers late whorl stage corn prior to tasseling)

CEW: On fresh silks



Western Bean Cutworm

3 Biocontrol



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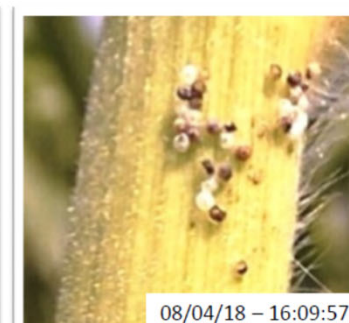
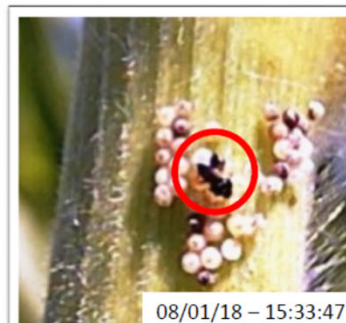
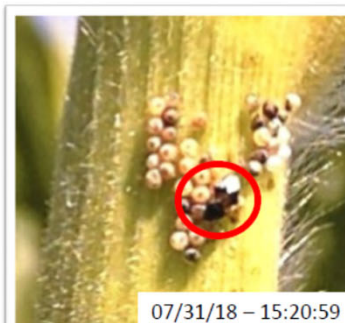
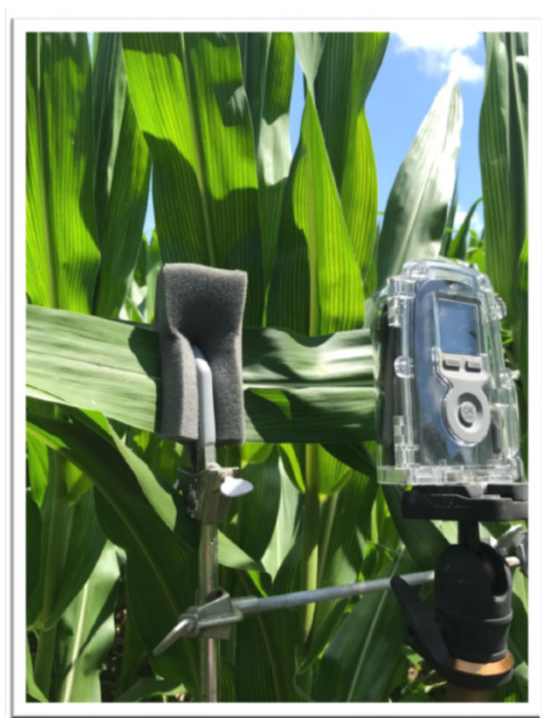


The Good Guys At Work!



Spying on Egg Masses in the Field

- Larvae may stay near the egg mass for 12 hours
- Hatching not synchronized, may take 10 h
- Neonates not disrupted by a rainstorm
- Minute pirate bugs feed on egg masses



How Can You Support the Good Guys?

- Plant non-crop, perennial, diverse habitat around crop fields
- Use thresholds to avoid unnecessary insecticide spraying; choose products that are less toxic to beneficials



Western Bean Cutworm

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4 Insecticides



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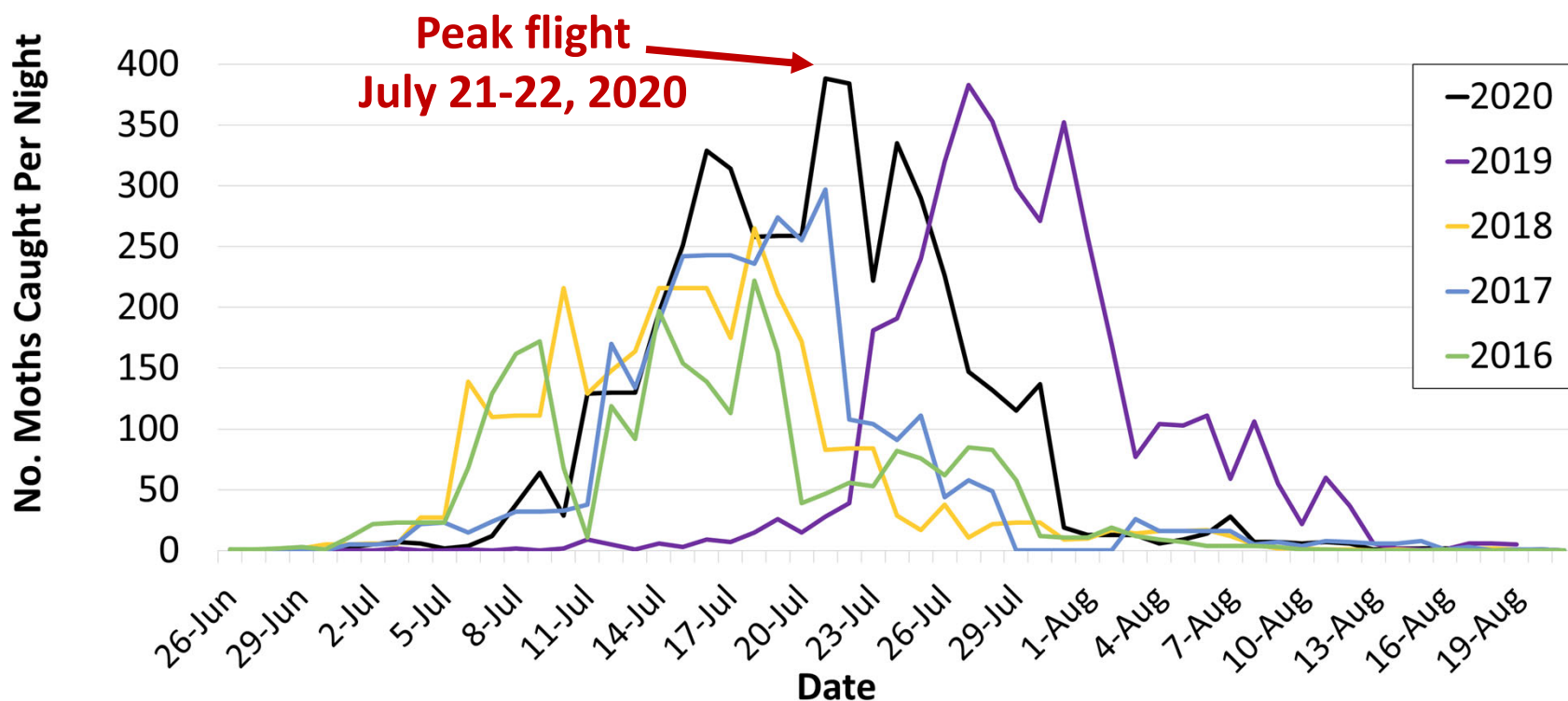
Insecticides: Timing

- Threshold of >5-8% of plants infested has been met through scouting
- Plants are at ~95% tassel
- Egg masses are purple to hatching
- Peak of moth flight has been reached
- Favorable environmental conditions



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North Platte Moth Flight Over Time:

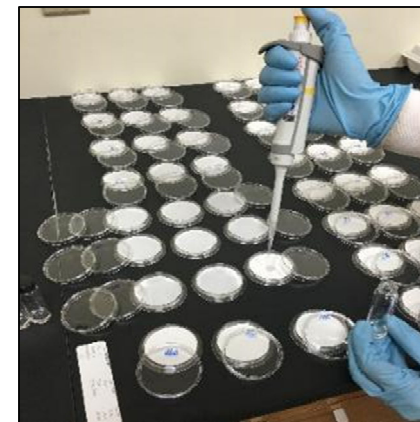


Insecticides: Product Choice

- Between 2014-2016, 88% of NE crop consultants treated at least once for WBC
- Pyrethroids comprise 80% of insecticides used
 - Bifenthrin and zeta-cypermethrin most common AI's:
Brigade, Hero, Mustang Maxx, generic bifenthrin
- 51% of crop consultants reported decreased pyrethroid efficacy

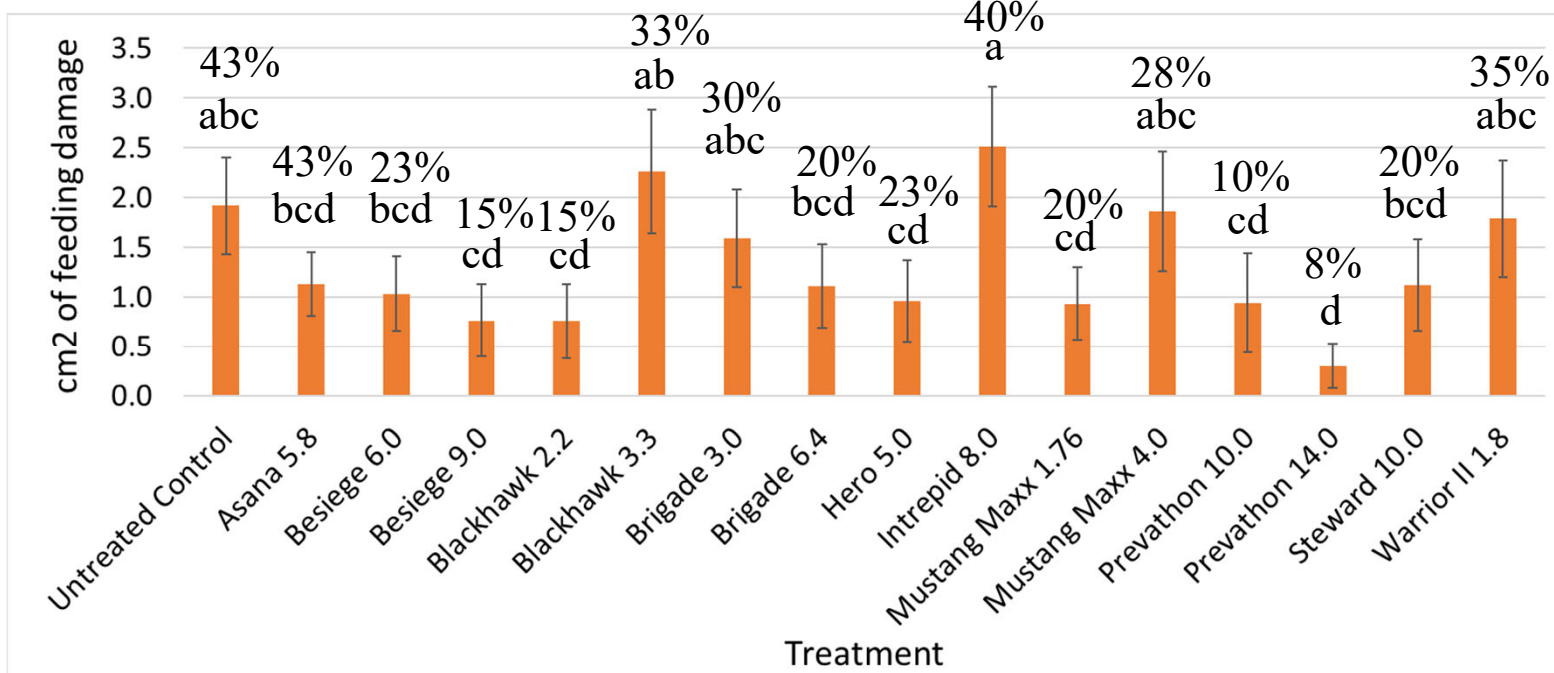
Pyrethroid Study Results

- Nebraska WBC less susceptible to bifenthrin than Canadian population
- No differences between NE locations
- Resistance ratios reflect partial resistance or resistance in progress
- No previous baseline data for WBC
- When applications are “ideal” they are effective
- Resistance not the whole story:
 - Application timing and technique
 - Temperature or other environmental conditions
 - Pest and crop phenology



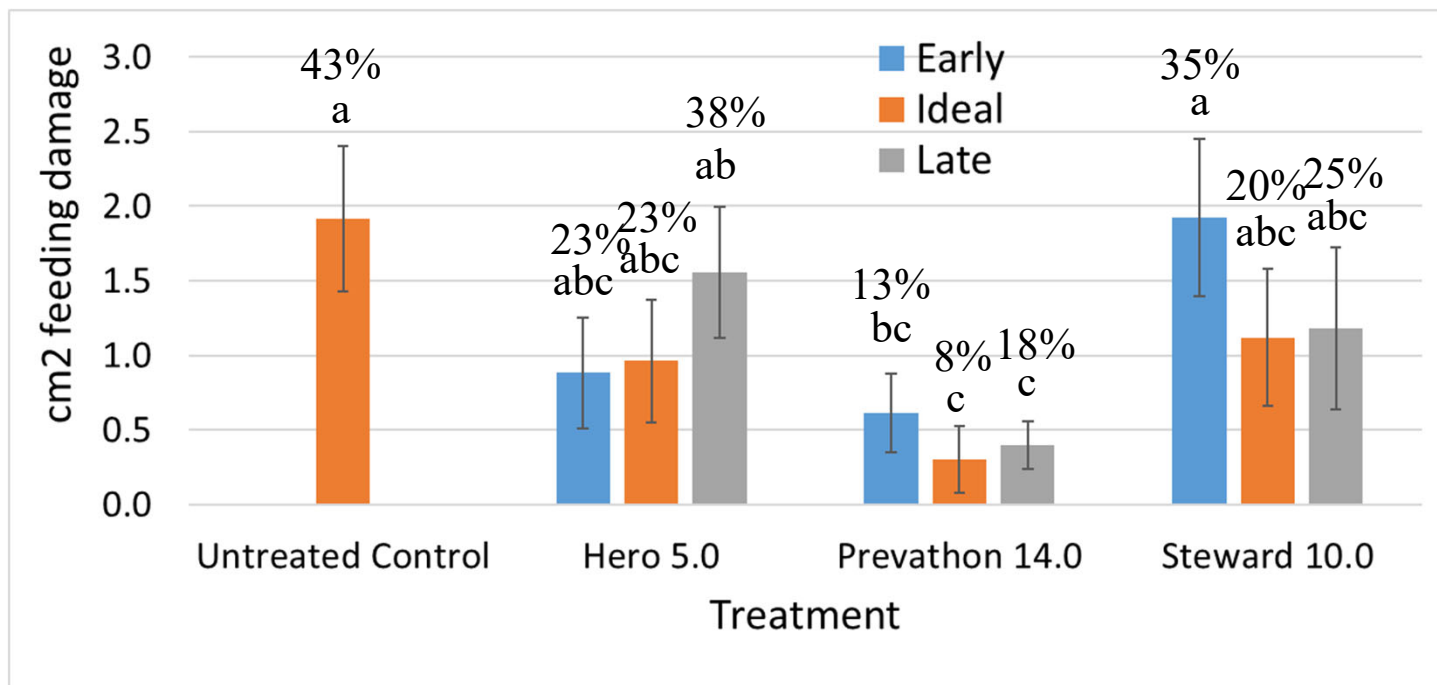
Insecticide Trials: Grant 2018

- Medium pressure (17% egg masses)
- Mixed population of WBC (72%) and CEW (28%) upon assessment of ear damage



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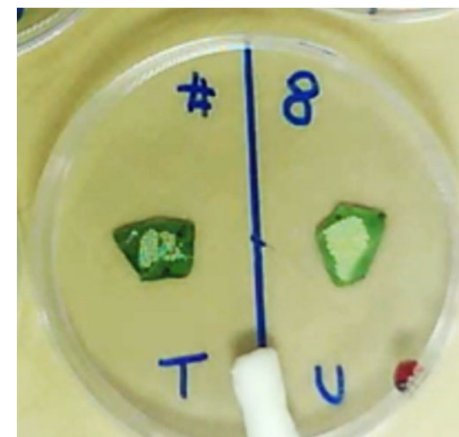
- Early: July 17 (<50% tasseled)
- Ideal: July 24 (90% tasseled)
- Late: July 31 (100% tasseled)



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Can insecticides kill W BC eggs?

- No evidence for ovicidal effects at the low and high label rates of:
 - Mustang Maxx
 - Brigade
 - Hero
 - Prevathon
 - Steward
- But, after hatching larvae died quickly in all treatments but Steward (needs ingestion for higher efficacy)
- Lab conditions were ideal for up to 5 days of insecticide residual
- Lady beetles that ate eggs sprayed with Mustang Maxx did not die, but were severely disoriented compared to eating eggs sprayed by Prevathon



Take Home Points

- Western bean cutworm has evolved resistance to the Cry1F Bt protein (a trait found in Herculex and SmartStax), leaving Vip3A as the sole highly effective protein
- There are many beneficial insects that help out by eating WBC eggs and larvae
- Insecticide applications should be made only when the economic threshold has been met and timing is carefully considered
- Insecticide product choice is important to minimize resistance and risk to beneficial insects

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N EXTENSION

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