

## 2020 update on NEWA western bean cutworm flight predictions for sweet corn production in New York.

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### Summary

Western bean cutworm (WBC) is an insect pest of economic concern to sweet corn growers across New York State. Recent efforts to enhance decision support resources for WBC management include an online tool that provides localized estimates of flight completion using real-time data from on-farm weather station and a project, developed in 2019, combining WBC predicted flight completion with trap catch data gathered by NYSIPM and Cornell Cooperative Extension field crop specialists statewide through the growing season for bi-weekly distribution.

### Background



*Figure 1. WBC damage to field corn. Photo credit K. Wise, New York State IPM Program.*

A [western bean cutworm flight completion model](#) is available that uses real-time weather data from any NEWA location in NY and beyond. Released in 2018, this model

tracks estimates flight completion so growers can precisely time IPM field corn, sweet corn, and dry bean IPM scouting practices. This project was funded in part by a grant from the [New York State Vegetable Research Council](#).

Western bean cutworm (*Striacosta albicosta* [Smith]) (WBC) was first discovered in New York State in 2009. It has been expanding its range from its origin in the high plains area of the US over the last 20 years. WBC is an insect pest of corn and dry beans, and can cause significant yield and quality losses to field corn grain. In other parts of the Corn Belt, it has become a pest causing significant economic losses in field corn.

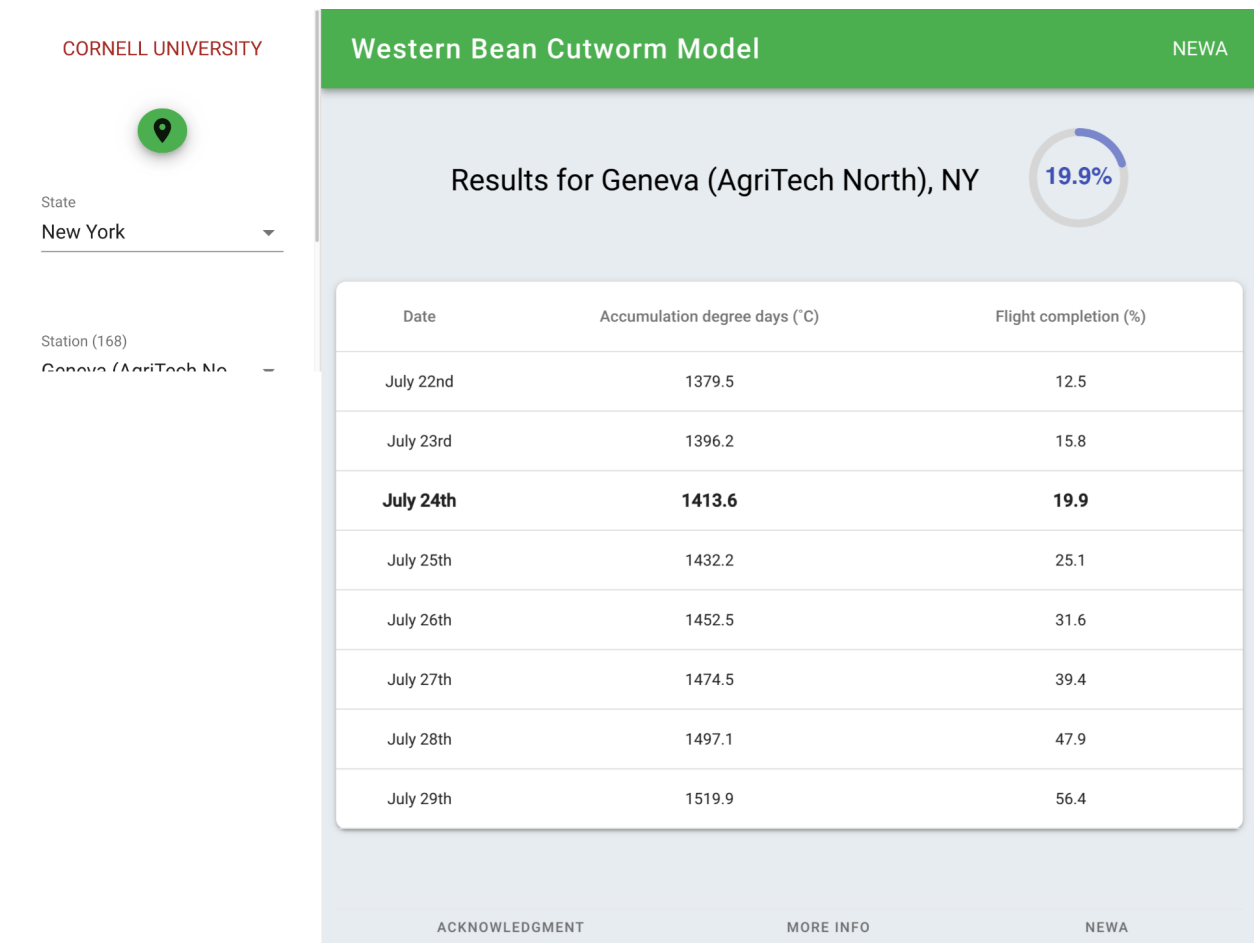


Figure 2. The NEWA Western bean cutworm online model uses real-time weather data from 167 grower-owned weather stations located across New York State. NEWA is an open-access platform and does not charge a membership fee. Accessible at <http://bit.ly/2G1U99c>

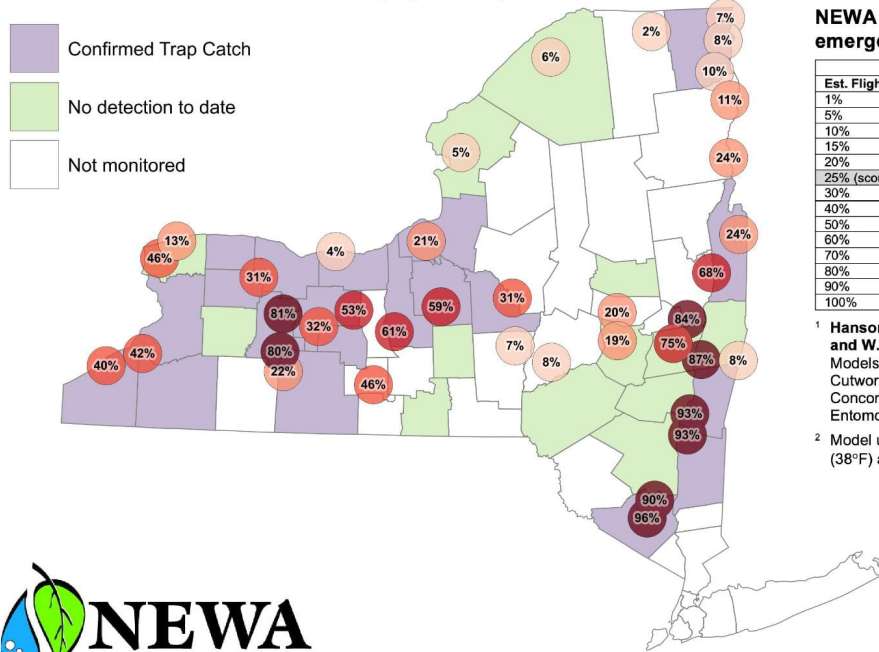
NEWA also generates twice-weekly map updates for New York State using WBC model output from a sub-set of available locations combined with WBC presence/absence data taken from the New York State IPM Program [Sweet Corn](#)

Pheromone Trap Network Report published weekly throughout the growing season. These maps will be posted to the [Your NEWA](#) blog moving forward.

## Western Bean Cutworm Estimated Flight Completion on 7/29/2019

Access the NEWA WBC model for 169 NY locations at <http://bit.ly/2G1U99c>

2019 WBC Pheromone Monitoring by County



NEWA Western bean cutworm flight emergence lookup table

Est. Flight completion	Hanson method (2015) <sup>1,2</sup>	
	Base 3.3°C	Base 38°F
1%	1230	2200
5%	1320	2390
10%	1365	2460
15%	1390	2540
20%	1415	2585
25% (scout for egg masses)	1430	2615
30%	1450	2655
40%	1475	2690
50%	1500	2735
60%	1530	2800
70%	1560	2845
80%	1600	2919
90%	1660	3030
100%	2110	3825

<sup>1</sup> Hanson, A.A., R.D. Moon, R.J. Wright, T.E. Hunt, and W.D. Hutchison. 2015. Degree-Day Prediction Models for the Flight Phenology of Western Bean Cutworm (Lepidoptera: Noctuidae) Assessed with the Concordance Correlation Coefficient. *J. Econ. Entomol.* 108:1728-1738. DOI: 10.1093/jeet/110.

<sup>2</sup> Model uses lower and upper thresholds of 3.3°C (38°F) and 23.9°C (75°F), respectively.



Part of the New York State IPM Program

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Figure 3. Maps updated twice-weekly during WBC flight emergence periods use the Hanson method<sup>2</sup> to estimate flight completion using real-time weather data streamed from 167 physical weather station located across New York State.

### Old vs New WBC Prediction Methods

Historical IPM strategies use the ‘Nebraska method’ to estimate 25% WBC flight completion.<sup>1</sup> Field scouting is employed to count egg masses when that threshold is reached, and outcomes are then used to justify management actions. The Nebraska method is a simple base 50°F degree day model that was published in 1976. In 2015, entomologists at University of Minnesota noted WBC range expansion from native areas to the northern and eastern United States. They questioned the Nebraska method’s accuracy for these regions and published a revised flight prediction model called the ‘Hanson method’.<sup>2</sup> The Hanson method also uses simple degree day calculations – but uses a different base temperature, adds an upper temperature limit,

and begins accumulating earlier in the year (Table 1). 25% emergence is still used as a threshold to begin scouting for egg masses (Table 2).

**Table 1.** Comparison of old and new model parameters for estimation of WBC flight emergence.

Method	Nebraska	Hanson
Lower threshold	10°C (50°F)	3.3°C (38°F)
Upper threshold	none	23.9°C (75°F)
Calculation method	Simple	Simple
Start	May 1	March 1

**Table 2.** WBC Estimated flight completion lookup using degree day accumulations based on the Hanson method.

Est. Flight completion	Hanson method <sup>1</sup>	
	Base 3.3°C <sup>a</sup>	Base 38°F <sup>a</sup>
1%	1230	2200
5%	1320	2390
10%	1365	2460
15%	1390	2540
20%	1415	2585
25% (scout for egg masses)	1430	2615
30%	1450	2655
40%	1475	2690
50%	1500	2735
60%	1530	2800
70%	1560	2845
80%	1600	2919
90%	1660	3030
100%	2110	3825

<sup>a</sup> The Hanson method uses lower and upper thresholds of 3.3C (38F) and 23.9C (75F), respectively.

## **References**

<sup>1</sup> Ahmed, T. R. 1979. Comparison of heat unit accumulation methods for predicting European corn borer and western bean cutworm flights. M.S. thesis, University of Nebraska, Lincoln, NE.

<sup>2</sup> Hanson, A. A., R. D. Moon, R. J. Wright, and W. D. Hutchison. 2015. Degree-Day Prediction Models for the Flight Phenology of Western Bean Cutworm (Lepidoptera: Noctuidae) Assessed with the Concordance Correlation Coefficient. *J. Econ. Entomol.* 108: 1728-1738. DOI: 10.1093/jee/tov110