

Title:

Determine the magnitude and distribution of Western bean cutworm and the risk to dry beans, in the major production areas in New York.

Project leader(s):

Margie Lund, Cornell Vegetable Program

Marion Zuefle, New York State Integrated Pest Management Program

Brian Nault, Cornell Faculty Sponsor, Entomology

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Cooperator(s):

Ariel Kirk, CCE Steuben Co.; and Ken Wise, NYS IPM Program

Abstract:

Western bean cutworm (WBC) moth counts were monitored with traps at 11 dry bean fields in Western NY in 2021. Traps were located in Genesee, Livingston, Monroe, Steuben, Wyoming, and Yates counties. WBC numbers continued to increase in 2021, catching the highest average moth numbers to date in the region. This year, we saw a 72% increase in average trap catch compared to last season, and a 17% increase in average trap catch from 2018 which had previously been the highest year for WBC numbers. All repeated trap locations saw similar catch numbers if not large increases this season compared to numbers caught in 2020.

All 11 trap locations exceeded the 50-moth threshold at which time scouting is recommended, though both Yates County traps were just barely over that threshold. The highest trap totals this year came from the Wayland site in Steuben County (739), Penfield site in Monroe County (573), and Avoca Hill site in Steuben County (542). The Wayland site saw the largest increase in moths from 2020 to 2021, with an overall trap catch 4.2 times higher in 2021 than seen the previous year. While moth numbers were high, no pod damage was found in dry beans this year.

Background and justification:

Western bean cutworm, a pest of both corn and dry beans, has moved east from its historic range in the Great Plains. It was first observed in NY in 2009 and its population has steadily increased. Monitoring in field corn and sweet corn began in 2010 and began in dry beans in 2011. Since then, the trap catch numbers have increased and damage has been reported. Feeding damage on dry beans pods was first seen in NY in 2015 and again in 2016, 2017, 2019, and 2020. Michigan has reported economic damage of 10% in dry beans, so the potential is there for NY to experience economic damage as well. When cumulative trap catches are greater than the 50-moth threshold, scouting is recommended. However, since WBC lay their eggs on the underside of dry bean leaves and the larvae feed at night on the pods and drop to the ground during the day, scouting is very difficult. Therefore, trap catch numbers are heavily relied upon to determine areas of greatest risk.

Objectives:

Continue WBC moth trapping at 11 dry bean sites across the major dry bean production area. Determine the magnitude and timing of the WBC problem and the risk to dry beans in NY. This includes areas where high WBC moths were caught in previous years, where WBC egg masses were seen in nearby corn, where dry bean pod feeding was seen, and where bean damage was seen.

Procedures:

WBC pheromone traps were placed at 11 sites located in the major dry bean producing region of NY, and included Genesee (2), Livingston (1), Monroe (2), Steuben (3), Wyoming (1), and Yates (2) counties (Figure 1). Dry bean trap locations were selected by cooperators in conjunction with growers and included sites with a history of high WBC pressure from previous trapping years as well as locations that have not yet been monitored.

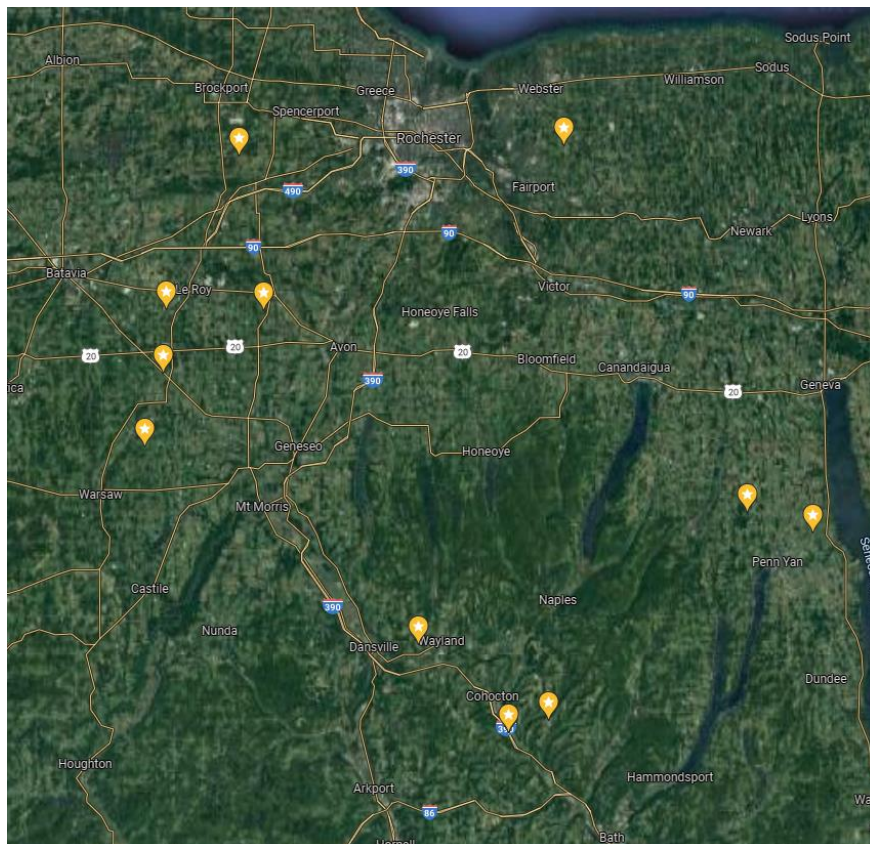


Figure 1. Location of the 8 WBC trapping sites in dry beans for 2020.

Each trapping site consisted of one commercial green bucket trap baited with a Trécé WBC pheromone lure to attract male moths and an insecticidal vaportape to kill moths once they entered the trap. Traps were hung ~4 feet from the ground in dry bean fields (that were also near corn fields) or in adjacent mowed grasses, and away from woods, hedgerows, or other tall vegetation. Traps were placed in late June to early July depending on planting date. Traps were checked weekly and pheromone lures were replaced every two weeks until the first week of September. The methods used followed the protocol outlined by the Pennsylvania State University and the Pennsylvania Department of Agriculture WBC survey.

Trap catch for each site was used to determine the time of peak flight and whether the threshold of 50 accumulated moths was reached. When the cumulative 50-moth threshold was reached or 10 days after peak flight scouting began and alerts were posted. Alerts were sent to growers through the Sweet corn pheromone trap network blog (<http://sweetcorn.nysipm.cornell.edu/>), the Cornell Vegetable Program's VegEdge newsletter, and listservs.

Results and Discussion:

Traps were set the last week of June with first trap catch reported July 6th at the LeRoy, Wayland, Avoca Hill, and Avoca Valley sites. Peak flight occurred in the last week of July for most trap locations (Figure 2), which was a week earlier than 2020 and earlier than peak flights from the past ten years of trapping (Figure 3). Many of the dry bean fields were in the R3 stage of development and nearby corn was in the R1 stage during peak flight, though there was some variation across fields. WBC is most attracted to pre-tassel to tasseling corn. When the larvae initially emerge from the eggs, they feed on tassels then make their way to the corn ear. At the time of peak flight most adjacent corn was already past tasseling.

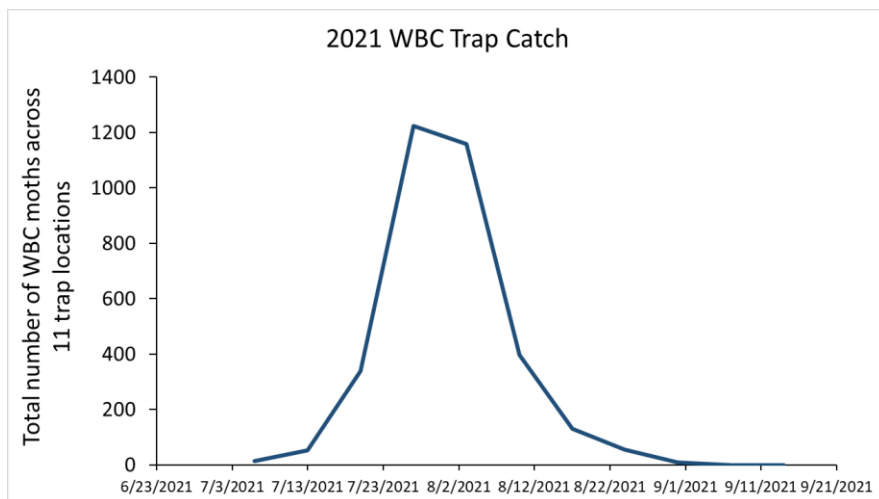


Figure 2. Peak WBC flight for the eight dry bean trapping locations in 2020.

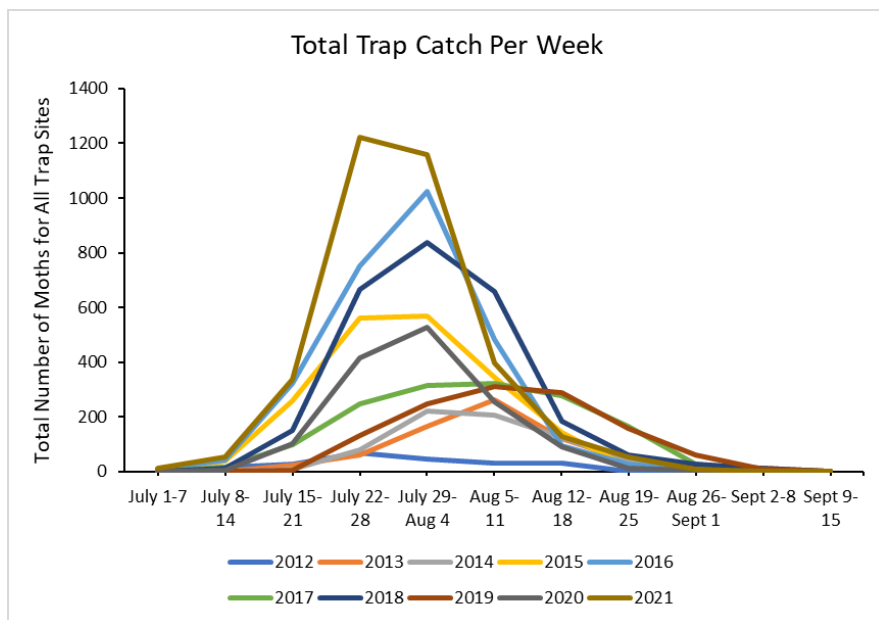


Figure 3. Average WBC caught per week near dry beans for 2012-2020.

WBC monitoring in NY began in 2010 in field and sweet corn, and in dry beans in 2011. Overall trap catches have increased in NY for all three crops (Figure 4). In 2021, both dry beans and field corn saw a spike in WBC numbers, while moths caught in traps near sweet corn remained about the same compared to 2020. The average trap catches in dry beans increased by 72% from 2020 to 2021 (Figure 5). All 11 sites monitored this year reached the cumulative trap catch threshold of 50 moths.

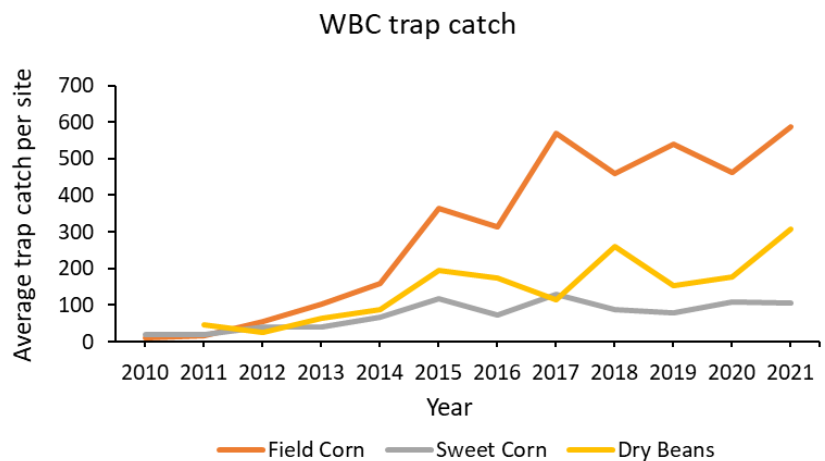


Figure 4. Average number of moths per trap for dry beans, field corn, and sweet corn across all years

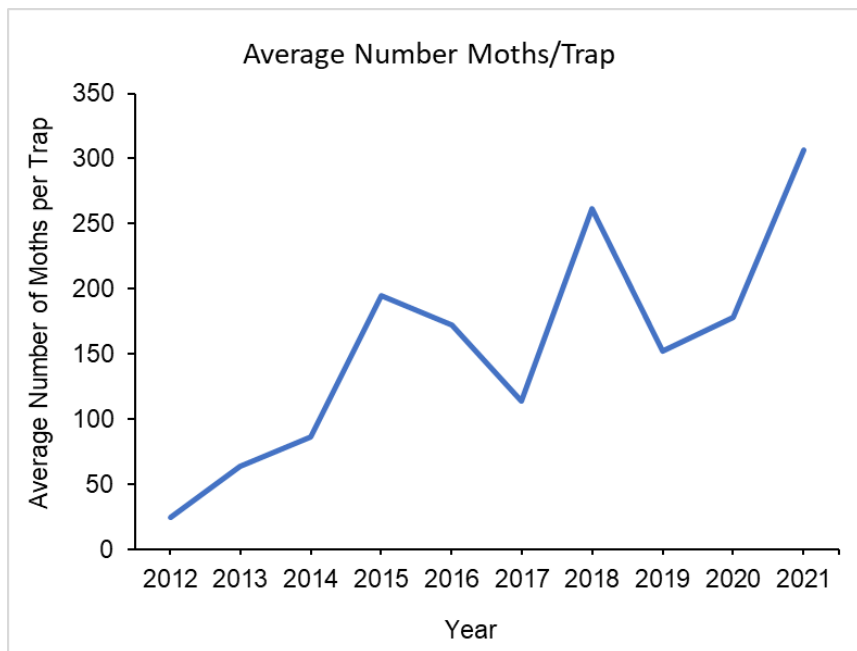


Figure 5. Average number of WBC moths caught per year per trap in dry beans

When cumulative trap catch reaches 50 moths or 10 days after peak flight scouting is recommended in dry beans. WBC lay their eggs on the underside of dry bean leaves and larvae feed at night, dropping to the soil during the day, making scouting extremely difficult. Usually, only damage will be detected in dry beans. However, while moth numbers were historically high in 2021, no pod damage was found in dry beans. This could be due to an earlier peak flight along with delayed development of many bean pods because of high rain levels causing increased soil moisture early in the season, or simply because locating pod damage can be difficult. For this reason, scouting nearby corn is recommended once the 50-cumulative moth threshold is met. This gives an indication of the local WBC pressure. If feeding damage in dry beans is observed after 30 minutes of scouting, Michigan and Ontario entomologists recommend an insecticide spray.

WBC migrates to NY annually but there has been an increase in overwintering survival in recent years. WBC overwinter as larvae in soil about 5 to 10 inches below the soil surface. Increased overwintering survival occurs in sandy soils, areas with reduced/no-till; mild fall, deep snow cover, and high summer humidity. Winter survival will decrease if temperatures drop below -20 degrees F.

Project location(s):

LeRoy and Pavilion, Genesee Co.; Caledonia, Livingston Co.; Riga and Penfield, Monroe Co.; Avoca and Wayland, Steuben Co.; Wyoming, Wyoming Co.; Penn Yan, Yates Co.

Samples of resources developed:

Five WBC alerts were posted to the Sweet Corn Pheromone Trap Network Report blog (<http://sweetcorn.nysipm.cornell.edu/>) on 7/27/21, 8/3/21, 8/10/21, 8/17/21, and 8/24/21. There are 107 subscribers to the blog and within the last year this blog has received 1,890 page views by 805 visitors.

The seven alerts were emailed or texted to dry bean growers enrolled with the Cornell Vegetable Program as well as posted in the *VegEdge* newsletter which has 435 enrollees.