

Western Bean Cutworm

Scouting and Management in Dry Beans

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Emerging Pest of Dry Beans in Ontario

Native to North America, Western bean cutworm, *Striacosta albicosta* has been a long-time resident of the western Great Plains region until it began expanding its range eastward in 2000. First detected in Ontario in 2008, it has become established here and has become the primary pest of corn in Ontario. In 2014, WBC damage was found in some dry bean fields in the Thamesville to Strathroy area. Since then, other dry bean growing areas of Ontario have found WBC damage, indicating that it becoming a new emerging pest for this crop.

Identification

Despite its name, Western bean cutworm (WBC) is a pest of corn (field, sweet and seed) as well as dry bean. Unlike other cutworms, this pest feeds on the fruit of the plant, i.e., corn ears and bean pods. Adult WBC moths have a white band along the margin of each wing and each wing has a “full moon” and boomerang-like mark (Fig. 1).

Newly hatched WBC larvae have dark heads and spots along their bodies, somewhat resembling European corn borer larvae. As they enter the third instar stage, their heads lighten and bodies change to a tan-pink colour, with subtle longitudinal stripes. Once in their final fifth and sixth instars, two distinctive broad dark brown stripes develop behind their head

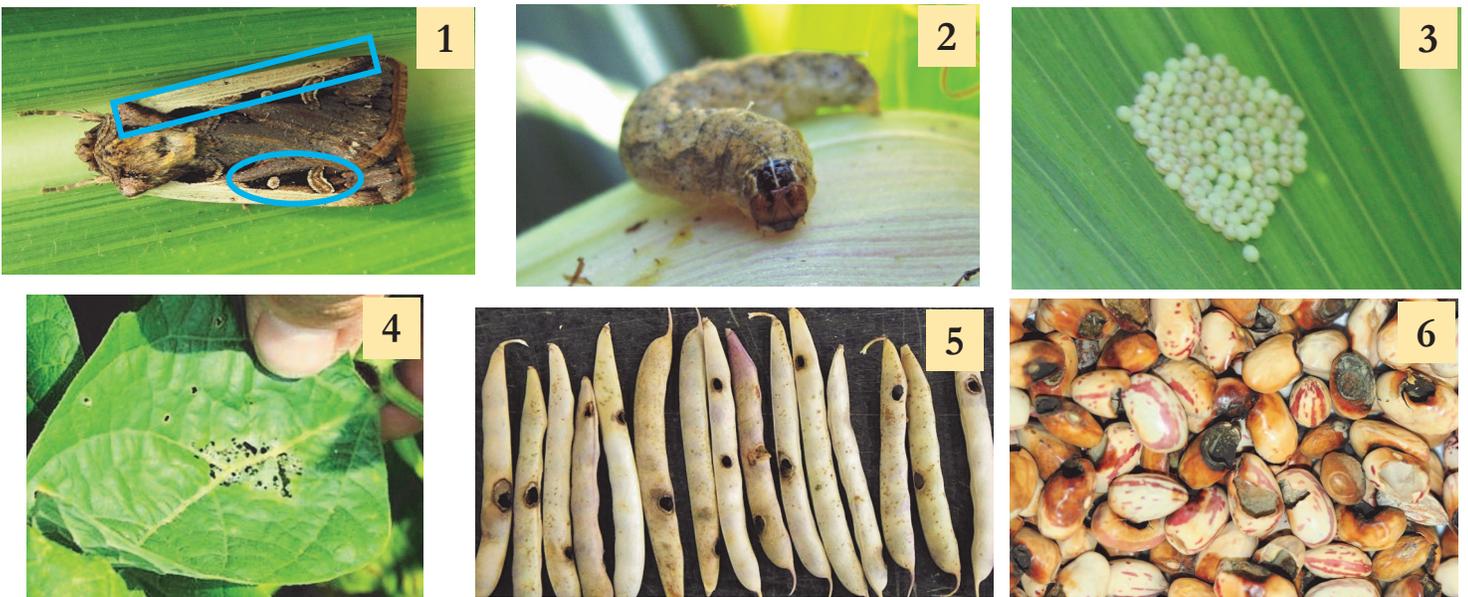
(pronotum) which distinguishes them from other ear feeding larvae. (Fig. 2)

Eggs are laid in masses of 5-200 eggs, typically on the upper surface of corn leaves, close to the tassel. Eggs are the size of a pin head, pearly white when first laid and are shaped like tiny cantaloupes (Fig. 3). They take 5-7 days to hatch, gradually darkening to tan and then purple, within 2-3 days before hatching.

Damage

Feeding damage in dry beans begins as tiny shot holes in leaves by the very young larvae (Fig. 4). Once larvae reach the 3rd instar, they move to feeding on and within the pods. These older larvae only feed at night, spending the day in and on the soil surface. Each night, the larvae climb up the plant to feed on a new pod and exit again before morning.

Entry holes can be seen on the outside of the pod (Fig. 5). Seeds can be shriveled or damaged from direct feeding. Yield loss from direct bean feeding is less of a concern than quality issues causing caused by this feeding. The holes allow for the introduction of pod diseases, which in turn impact seed quality. Damaged bean seed is further docked as “pick” requiring additional screening and cleaning (Fig. 6).



Figures 1-6. From top left to bottom right– 1. WBC adult moth. Photo credit: Jocelyn Smith, UGRC; 2– WBC larva. Photo Credit: Tracey Baute, OMAFRA; 3– Freshly laid WBC eggs on corn. Photo Credit: Tracey Baute, OMAFRA; 4–WBC leaf feeding damage on beans. Photo Credit–Chris DiFonzo, Michigan State University; 5–WBC pod feeding damage. Photo Credit–Jocelyn Smith, UGRC; and 6–WBC seed damage. Photo Credit–Chris DiFonzo, Michigan State University

Life Cycle

Western bean cutworm complete one generation per year (Fig. 7). Through fall to early summer, pre-pupae lie dormant beneath the soil in chambers until spring when they pupate (A). Adult moths climb out of the soil in early July (B) though migratory moths from nearby states (eg. Michigan) can be captured in traps in Ontario as early as the first week of June (C). Peak moth emergence in Ontario typically occurs during the last week of July, though some counties may peak one week earlier or later than that.

Moths are mostly active at night, searching for mates and nectar to feed. Mated females are preferentially attracted to late whorl to early-tassel stage corn to lay their eggs on the top two or three leaves of the corn plants (D). Once corn fields in the area are past the early tassel stages, moths prefer to lay their

eggs in dry bean fields or late planted corn fields (E).

Eggs in dry bean fields are laid on the underside of the leaves, deep in the crop canopy. Eggs are white when first laid but turn to a purple colour within a few days of hatching. Egg laying can occur in Ontario anytime from mid-June to the end of August.

Once the eggs hatch (F), the tiny larvae consume their egg shell then then feed on the leaves until 3rd instars (G). They then spend most of the day in the soil surface. At night, the larvae crawl up a bean plant, feeding on a new bean pod each night (H). They continue this until the bean pods are ready for harvest (I). The larvae then drop to the ground to burrow down and enter the pre-pupal stage in the fall (J).

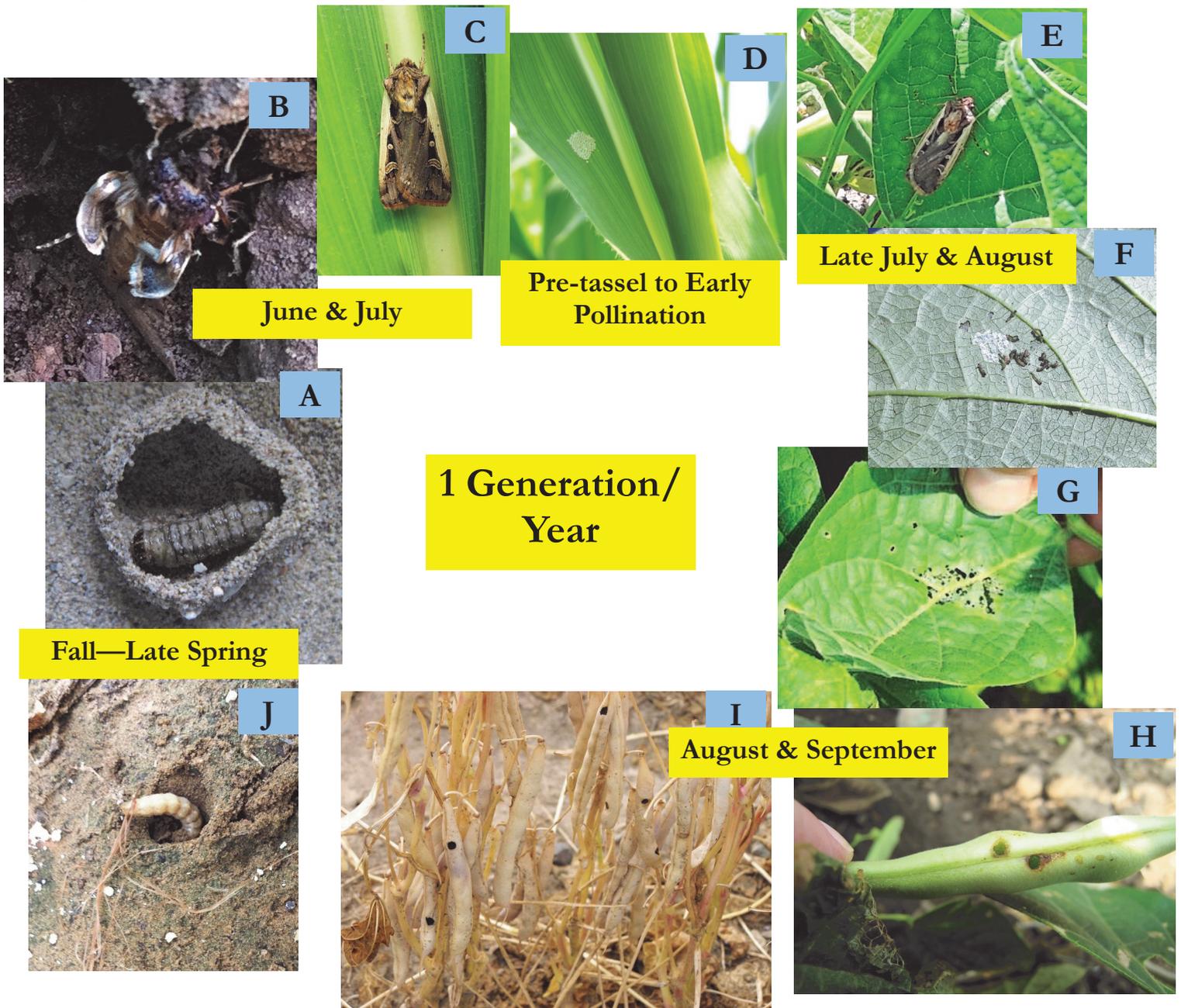


Figure 7. Life cycle of western bean cutworm in dry beans in Ontario.

Photo Credits: Jocelyn Smith, UGRC for A, C and J; Tracey Baute, OMAFRA for D and H; Jennifer Bruggeman, UGRC for E and F and Chris DiFonzo, Michigan State University for G and I.

Scouting Guidelines for Dry Beans

Pheromone Trapping

Pheromone traps are used to monitor moth activity and detect peak flight. Traps also determine if WBC are active outside of the known hotspots in Ontario. Trap counts are not used to determine when to spray, but identify fields at risk and when scouting is required. Peak flight in Ontario typically occurs in the last week of July but can be one week earlier or later depending on weather and other factors. Peak egg laying follows shortly after peak flight.

Traps should be monitored at least weekly in early July until late August. Count and discard any moths captured within the bucket. Ensure that the moths counted are WBC. Large yellow underwing moths can be captured in these traps, especially early in the season and may be misidentified as WBC. As peak flight approaches, plan to monitor the traps more frequently so that there are fewer moths to count at one time and the moths are less likely to be deteriorated and difficult to identify.



Green bucket or universal traps (uni-traps) are the preferred trap for WBC (Fig. 8). Milk jug traps are more labour intensive, often drying out of antifreeze in hot weather, rendering the trap useless.

Figure 8. All green bucket traps used for WBC monitoring. Photo credit: Jen Bruggeman, UGRC

Each dry bean site requires two traps per field. Mount each trap to hang from a stake 4 feet (1.2 metres) above the ground. Each trap will need 5 WBC pheromone lures (1 for every 3 weeks of monitoring) and 1-2 insecticide vapour strips per season. The lure is placed inside the small cage area suspended below the trap lid. Lures must be changed every 3 weeks and stored in the freezer. Discard old lures off site away from the trap. Plastic vapour strips impregnated with insecticide are placed in the bottom of the trap to kill moths so they don't escape when the trap is opened. One strip will last for approximately 2 months. Use gloves when handling the lures and vapour strips. Trap supplies can be purchased at a number of supply companies listed on the WBC Trap Network website.

Place each trap on opposite sides of the field, in the first few rows of the beans or along the field's edge above low lying weeds.

Trap participants are encouraged to join the WBC Trap Network at www.cornpest.ca and provide their weekly trap counts during the season. In return, interactive maps are created to help identify those areas at risk that require scouting. Weekly

maps can be found at OMAFRA's AgMaps site at: <http://ontarioca11.maps.arcgis.com/apps/MapSeries/index.html?appid=66f543e8df17462cb6cae35aa04c0341>

Scouting

WBC displays different behaviour in dry beans than in corn. Unlike in corn, WBC are nearly impossible to find in dry bean fields until pod feeding begins. Fortunately, since WBC exit and enter new pods each night, foliar insecticides can still work at controlling the larvae if used when early signs of pod feeding are observed.

Pheromone traps as described above help indicate which fields are at greater risk. Traps at dry bean fields that capture an accumulation of 50 or more moths per trap are likely at greater risk and require scouting for pod feeding. Pod feeding is expected to begin 10 to 20 days after peak moth flight has occurred, as indicated when trap counts begin to decline after weeks of steady increase.

Prior to pod stage in beans, scouting for egg masses in adjacent cornfields can also help determine what the local WBC populations are like. If any of the corn fields in the immediate area are past early tasseling, the dry bean fields will be more attractive. If an adjacent corn field reached the threshold and required spraying, the dry bean field is also likely at risk.

Once pods are present, scout 100 plants (20 plants in 5 areas of the field). Look for signs of early surface feeding (Fig. 9) or complete holes within the pod. Take note if feeding is limited to one area of the field or is present in several areas. Try to determine if the feeding is caused by WBC. Other culprits are likely still actively feeding during the day. Slugs will have left slime trails on the pod surface or leaves. European corn borer or loopers and bean leaf beetles will likely be within the pod or on the plants.



Figure 9. Signs of early pod feeding by young WBC larvae. Older, larger larvae are able to mine directly through the pod wall to feed on the bean seed. Photo Credit: Tracey Baute, OMAFRA

Action Threshold for Dry Beans

Thresholds are currently not available for WBC in the Ontario dry bean crop. Trapping thresholds established in western U.S. have not been found to be effective for dry beans grown in the Great Lakes region.

Begin scouting for pod feeding 10-20 days after peak moth flight (determined by using pheromone traps in the field). If pod feeding is easily found, a spray application is necessary. Research indicates that control is still very effective when done shortly after pod feeding is found. A dry edible bean field that is adjacent to a corn field that has reached threshold for WBC will likely need to be sprayed once pods are present and pod feeding is found.

Spraying too early when pods are not present on the plants will not protect the crop from damage. Spraying too late, when pod feeding has been taking place for some time will not reduce the risk of seed damage and disease incidence (Fig. 10). The key is to protect the plants when the larvae are feeding on the pods.



Figure 10. Pod feeding damage only found prior to harvest is too late for effective management. Photo Credit: Chris DiFonzo, Michigan State University

Management Strategies

- Several insecticides are registered for WBC control on the dry beans. Select insecticides that have some residual and pay attention to pre-harvest intervals.
- Spot treatments may be effective if injury is concentrated in one area of the field.
- To reduce the risk of resistance, rotate between chemical families for each application and each year.
- Follow label restrictions regarding application timings to protect pollinators. Avoid spraying insecticides in flowering fields during the daylight hours when bees are in flight.
- Follow buffer zone requirements to minimize spray drift in pollinator and beneficial habitats close to the application site.
- Deep tillage can help disturb and kill larvae overwintering in soil chambers, though is unlikely to significantly reduce populations.
- Several natural enemies feed on egg masses and young larvae, including lady beetles, lacewing larvae and others.

Other WBC Resources

Western Bean Cutworm Trapping Network :
www.cornpest.ca

Interactive WBC Trap Maps for Ontario, Michigan and Quebec:
<http://ontarioca11.maps.arcgis.com/apps/MapSeries/index.html?appid=66f543e8df17462cb6eae35aa04c0341>

WBC Biology and Management Information:

Pest Manager:
<http://gfo.ca/apps>

OMAFRA Publication 811, Agronomy Guide for Field Crops:
<http://www.omafr.gov.on.ca/english/crops/pub811/13corn.htm#wbcutworm>

OMAFRA Publication 812, Field Crop Protection Guide for Field Crops:
<http://www.omafr.gov.on.ca/english/crops/pub812/p812toc.html>

In-Season Activity and Alerts:

Field Crop News/Baute Bug Blog
<http://fieldcropnews.com/category/bautebugblog/>

Twitter Feeds
[@TraceyBaute](https://twitter.com/TraceyBaute)
[@megnmoran](https://twitter.com/megnmoran)
[@JocelynSmith](https://twitter.com/JocelynSmith)
[@JenniferBruggem](https://twitter.com/JenniferBruggem)

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