

Should I spray my dry beans for western bean cutworm and if so, when?

Western bean cutworm can significantly reduce the quality and yield of your dry bean crop. Below are best practices for minimizing this insect's impact to your bottom line.

The simple answer

Spraying insecticide for western bean cutworm (WBC) control in Ontario dry bean fields is warranted **only if ALL of the following criteria are met.**

1. At least 150 moths have been captured in a trap at the field.
2. Peak moth flight has passed, and the number of moths caught in traps is starting to decline.
3. There are pods on the plants.
4. You can find pod damage.

A little more information

Although many dry bean fields are in regions with high WBC pressure, pheromone traps are critical to understanding the timing and abundance of WBC moth arrival (Figure 1). The total number of moths caught in trap indicates activity (Figure 2). Low activity (<150) indicates that the field is not attractive to the moths. High activity (>150) – although not an insecticide action threshold – indicates that other criteria need to be investigated and met for insecticide application to be justified.



Figure 1. WBC trap.



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Figure 2. WBC moth.

Peak flight describes the period when the highest numbers of moths are active in an area and are likely laying eggs. Spraying insecticide 10-20 days after peak flight targets the highest number of larvae emerged from these eggs. Spraying prior to peak flight will leave the field unprotected from larvae that emerge later.

Pods are the main tissue that needs to be protected from WBC feeding. Larvae hide in soil during the day and feed on pods at night. Maximizing spray coverage on pods provides a greater chance for larvae to ingest the insecticide while feeding. Larvae also feed on flowers and may feed on leaves when they first hatch, but leaf feeding is very minor. Spraying during vegetative stages will not control WBC.

If you see pod feeding (Figure 3), an insecticide application is recommended. Thorough scouting for pod damage ensures an insecticide is required and limits injury to off-target insects. Beneficial insects and entomopathogens may be contributing to mortality of WBC in the field. While pheromone traps provide information on the local abundance of WBC moths, they do not provide information on egg laying and crop injury.



Figure 3. Pod feeding.

The full story

WBC have one generation per year and overwinter as pre-pupae in Ontario soils, emerging as moths in early July (Figure 4). Moths also migrate in each year from neighbouring states. Moths are nocturnal and the females live for an average of nine days, laying up to 600 eggs in their lifetime. Eggs are laid in clusters deep in the dry bean canopy, on upper or lower surfaces of dry bean leaves. About a week after the eggs are laid, they turn dark purple, indicating they will hatch within a day or two. Larvae first feed on their egg shells, before moving to feed on leaves (minor), flowers and pin pods (Figure 5). As they mature, larvae move to the soil during the day, and climb plants to feed at night. They may travel many meters, from plant to plant, burrowing into pods to feed directly on the beans (Figure 6).



Figure 4. WBC moth, eggs and larvae.



Figure 5. Leaf feeding.



Figure 6. Larvae feeding on leaves and pods.

In Ontario, WBC are attracted to corn fields prior to tasseling. Once tassels have dried and turned brown, more moths are typically captured in traps located in dry bean fields than corn. Ontario data on yield and quality reductions in dry beans from WBC feeding is scarce. Yield loss can occur when WBC feed on flowers, pin pods, and beans. Quality loss occurs with feeding on pods and the beans within. Seeds can be shriveled or damaged from direct feeding (Figure 7) and holes into the pod allow for the introduction of pod diseases and seed discolouration. Damaged beans (pick) will be lost out the back of the combine or will have to be removed with gravity tables or optical sorters. In some bean types, such as cranberry, beans will discolour when exposed to the air after WBC chew a hole in the pod (Figure 8).



Figure 7. Bean damage.



Figure 8. Bean damage.

Peak moth flight varies by region, so it's best to have traps in your own fields. Multi-year surveillance in Ontario has shown that **peak flight from 2018 to 2021 occurred August 1 to 7.**

Typical insecticide spray dates for WBC:

- If peak flight is July 25 (earliest observed) – spray ~August 8
- **If peak flight is August 4 (typical, on average) – spray ~August 18**
- If peak flight is August 20 (latest observed) – spray ~ September 3

Table 1. Insecticides registered for WBC control.

Product name	Active ingredient	Chemical group	Pre-harvest interval in dry beans
Matador 120 EC / Silencer 120 EC	lambda-cyhalothrin	IRAC 3A	7 days
Coragen	chlorantraniliprole	IRAC 28	1 day
Voliam Xpress	lambda-cyhalothrin + chlorantraniliprole	IRAC 3A, IRAC 28	14 days

Consult pesticide labels for all important application precautions and rates before use.

A well-timed application of an insecticide with two-week residual can control larvae already in the field and those that will emerge from the eggs laid within that period.

Table 2. Best practices for WBC management.

DO	DON'T
Place pheromone traps in dry bean fields and count moths weekly to know when peak flight occurs	Scout for egg masses or larvae, they are extremely difficult to find in dry bean fields
Scout for pod feeding damage	Add insecticide to fungicide applications without targeting a specific pest at the appropriate threshold and timing
Scout for other chewing insects like bean leaf beetle, to better understand what insect may be causing feeding damage	Add insecticide to fungicide applications at early flowering stages and expect good control of WBC
Look for insect-damaged beans in the harvest sample to better understand the percent pick caused by WBC	Spray insecticide without knowing when peak flight occurs
Scout adjacent corn fields during silking (R1) to milking (R3) for egg masses to determine local WBC populations	Use the same insecticide every year without rotating chemistries (Table 1)
Change pheromone lures in traps every three weeks and store lures in the freezer when not being used.	Expect WBC control when spraying dimethoate for other insect pests
	Expect tillage to provide control of overwintering WBC

For more information on WBC trapping and monitoring in Ontario, search:

