

Protocol for Monitoring Bertha Armyworm with Pheromone-Baited Traps



Purpose of Monitoring the Moth Stage of Bertha Armyworm

Bertha armyworms (*Mamestra configurata*) can be a serious pest of canola, and may also feed on mustard, flax, quinoa and several other crops. It is the larval stage that is damaging to the plants, however the adult stage appears before the larvae are present. This provides an opportunity to assess in advance the risk of the potential for high levels of larvae, provided natural controls are not sufficient.

The pheromones used by female bertha armyworm moths to attract males are known and are synthesized for use in monitoring programs. These synthetic pheromone lures are effective at attracting male moths to traps, which have been designed to capture and kill the moths. This system provides a relatively simple and effective method of monitoring adults and using this data to predict in advance the risk of higher levels of the damaging larval stage of bertha armyworm. This enables farmers, extension specialists, agronomists, and others involved in pest management to place proper emphasis on monitoring for the larvae.

Number of Traps per Region

This monitoring program helps predict risk on a regional, but not field specific, basis. Capture of a large number of moths per trap does not necessarily indicate that larval populations will be high in the field containing the trap. Several high trap counts within a region can indicate a potentially higher risk in a region, but should higher levels of larvae appear they may or may not be in the field the traps are in. Thus, this monitoring has a regional focus, not field specific.

For an agricultural region, such as southwest Manitoba, 15 or 20 traps spread over the region among all cooperators in the monitoring program should be sufficient to predict this regional risk.

Unfortunately, bumblebees are often attracted to and end up getting killed in the traps set up for bertha armyworm moths. So setting up too many traps in an area may have the unfortunate consequence of reducing pollinator levels.

When to Monitor

Bertha armyworm traps are normally placed in canola fields during the **first week in June** with the first moth counts being recorded the second week in June. Traps should be checked and the number of moths counted once per week. Traps can be removed after counts for the last week of July.

Where to Put the Traps

Traps should be located two meters in from the field edge and away from any existing shelterbelts. As forest cover near the traps increases, the amount of bumble bee bycatch increases. One trap per field is sufficient. If diamondback moth and bertha armyworm traps are both located in the same field, a distance of at least 50 meters between the two trap types is recommended.

The site selected for the traps should be representative of the surrounding area, and at least 1/4 mile from the nearest farmyard so that the lights do not compete with trap attraction.

Trap Assembly

The all-green model of the universal moth trap (unitrap) is used to monitor bertha armyworm.

1. Tape a vaportape insecticidal strip to the inner side of the bucket of the trap so the moths are killed when they fly in (Figure 1).
2. Twist the funnel and bucket so they interlock together. Then secure the lid in place (see Figure 2). Place the lure basket into the lid of the trap.



Figure 1. Vaportape insecticidal strip (red) in trap

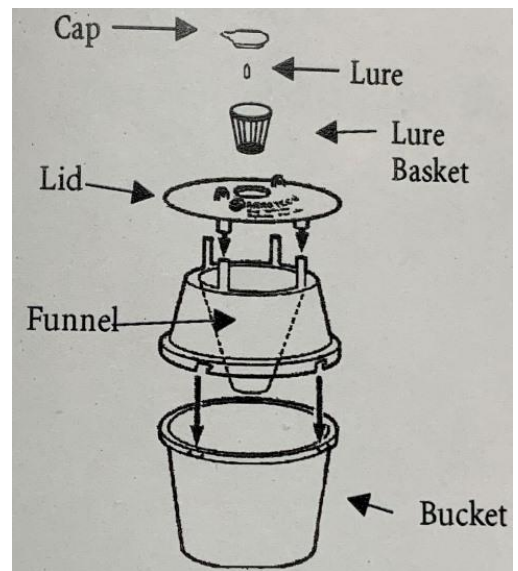


Figure 2. Trap components of Unitrap for monitoring moths of bertha armyworm

3. Place the lure (rubber stopper containing pheromone) into the lure basket, and place the cap on the lure basket. Do not handle the rubber stopper with your hands. Oil from your skin can lessen the lures' effectiveness. Carefully transfer the lure from its package into the lure basket, or use rubber or latex gloves or tweezers to handle lures. Lures should be stored in sealed containers at temperatures below 0°C until you are ready to use them.

4. Mount the traps about three feet off the ground on a sturdy stake. The trap can either be hung by a wire hanger or rope from a horizontal post (Figure 3a), or it can be secured by placing a metal spike secured to the bottom of the trap into a hollow metal pole that has been hammered into the ground (Figure 3b).



Figure 3a. Trap hung from post



Figure 3b. Trap secured using spike

Unitrap for bertha armyworm monitoring

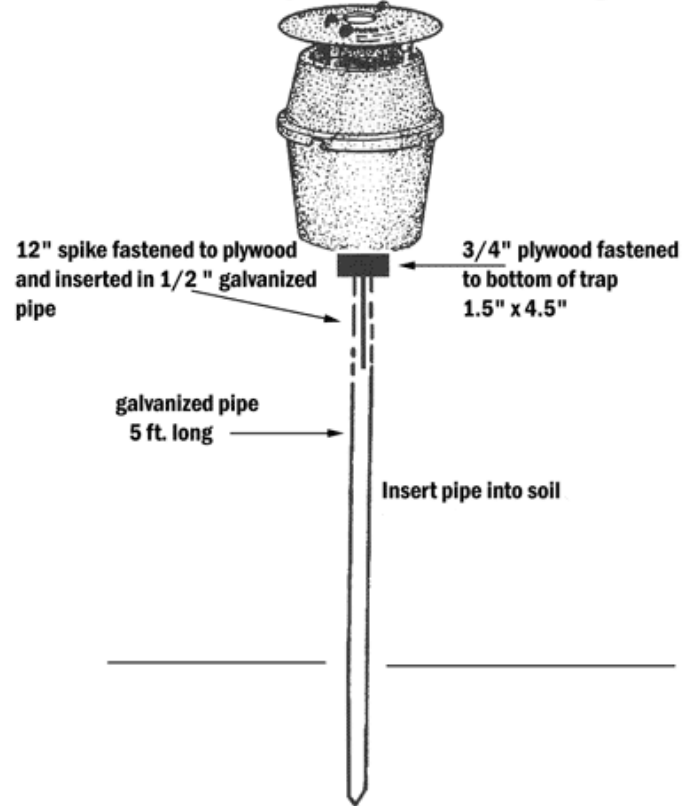


Figure 4. Unitrap for bertha armyworm monitoring

Checking Traps

Length of trapping period:

Traps should be checked and the moths removed and counted once a week over a six to eight week period. The pheromone lures for bertha armyworm will remain attractive for the full trapping period and do not need to be replaced.

Identification:

Sometimes moths other than bertha armyworm will end up in the trap. At times, the majority of moths that end up in the trap may not be bertha armyworm.

Do not assume all moths in the trap are bertha armyworm. Don't count all moths as bertha armyworm without having a look to remove, or not include in the total, moths that are clearly not bertha armyworm. For moths that have lost a lot of scales, making determining whether they are bertha armyworm difficult, these can be counted as though they are bertha armyworm if they are otherwise the right size and shape. Moths that are too small, or do not have the proper markings of bertha armyworm, should not be included in the count.

To identify bertha armyworm, look near the middle of the forewing towards the leading wing margin for the prominent, white, kidney-shaped marking defined with a ring of whitish scales. Near the tip of the forewing, there is a conspicuous white and olive-coloured, irregular transverse marking (see Figure 5 and the links below for detailed pictures).

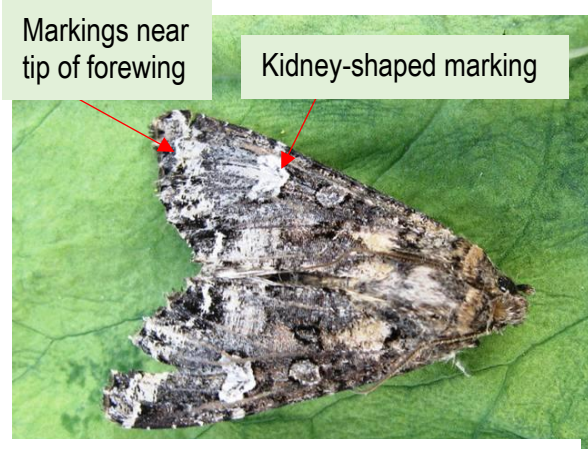


Figure 5. Adult moth of bertha armyworm.



Figure 6. Clover cutworm.

One of the bycatch moths frequently found in traps for bertha armyworm is clover cutworm (*Discestra trifolii*). A 2025 study in Manitoba found clover cutworm to be the most numerous moth in traps for bertha armyworm of the traps that were assessed for the study. Clover cutworm (Figure 6) is one of the moths to pay attention for when assessing catch in traps for bertha armyworm.



Figure 7. Moths from trap for bertha armyworm.

Figure 7 shows four moths caught in traps for bertha armyworm. Only one is bertha armyworm. Make sure you can recognize the distinctive markings of bertha armyworm and distinguish them from other moths in the trap.

Interpreting moth counts from the traps

The table below relates cumulative counts of moths per trap to the risk of larvae of bertha armyworm potentially being at higher levels in some fields within the region.

Levels of larvae of bertha armyworm can vary greatly between fields within a region, and higher levels of larvae may not be in the same fields the traps were in due to the stage of the crop at the time of egg laying

and other factors. Thus the data from these traps should not be used to make control decisions for bertha armyworm, but to encourage enhanced scouting for larvae in regions with higher trap counts.

Interpreting Bertha Armyworm Cumulative Moth Counts

The following table relates the cumulative moth counts over the trapping period with the risk of larval infestation.

Cumulative number of Moths / Trap		
From	To	Larval Infestation Risk Level
0	300	Low - Infestations are unlikely to be widespread, but fields should be inspected for signs of insects or damage.
300	900	Uncertain - Infestations may not be widespread, but fields that were particularly attractive to egg-laying females could be infested. Check your fields.
900	1200	Moderate - Canola fields should be sampled regularly for larvae and for evidence of damage.
1200	1500+	High - Canola fields should be sampled frequently for larvae and for evidence of damage.

Decisions on whether control is economical can only be made by sampling for the damaging (larval) stages of bertha armyworm and determining if the levels of larvae present in the field are above the economic threshold. Weather can affect the success of mating and laying eggs, and many mortality factors could reduce the numbers of eggs and larvae before they develop to the damaging stage. In addition, the stage of the crop at the time females are laying eggs will determine how preferred the crop is for egg laying. It is possible for traps to have a large number of the male moths, yet few larvae in the field later in the summer.

Additional information on the biology of bertha armyworm and scouting for larvae can be found at:
<https://www.gov.mb.ca/agriculture/crops/insects/pubs/bertha-armyworm-factsheet.pdf>

For further information on monitoring bertha armyworm please contact:

John Gavloski
 Entomologist, Manitoba Agriculture
 Box 1149, Carman, Manitoba R0G OJO
 Phone: 204-750-0594 (cell)