Dry Beans XIII-14

Western Bean Cutworm

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The western bean cutworm causes serious damage to dry beans in the High Plains region because it feeds directly on the bean itself, reducing yield and bean quality. Its secretive feeding habits make it very difficult to scout for and often damage goes undetected until harvest. The variegated cutworm less commonly causes similar damage to dry beans.

Identification (and life cycle/seasonal history)

The western bean cutworm develops through only a single generation each year. It overwinters as a prepupa within earthen cells formed in the ground. They pupate in May and emerge as moths beginning in late June and early July. Emergence of adults from soil is aided by rainfall and irrigation. Peak moth activity in the High Plains region usually occurs from mid to late July. Western bean cutworm moths are about 3/4 inch long with a wingspan of about 1 1/2 inches. The body is light brown and the wings are generally dark brown with a distinctive pattern. The front wings have a broad white or cream stripe that runs two-thirds the length of the leading edge. The hind wings are cream colored without markings. When at rest the wings are swept back over the body. The moths are strong fliers and are known to travel several miles. Female moths emit a pheromone (scent) that attracts males for mating.

After mating, eggs are usually laid on either corn or dry beans. Peak egg laying occurs shortly after mating and this tends to overlap with the late pre-tassel period in corn. Pre-tassel corn is most attractive to moths and subsequent egg laying; however, after pre-tassel corn is no longer available, the moths’ preference for egg laying tends to switch to dry beans. At this time beans are actively flowering and this period coincides with the peak in pheromone trap catches. Eggs are laid in masses of 5-200 with an average of about 50 eggs per mass. Eggs are laid on the lower surface of bean leaves, in areas with the greatest concentration of foliage. The eggs are dome shaped with ridges and reticulations. When first laid, the eggs are pearly white, but within two days they turn tan. A few days later they turn a dark purple color just before they hatch.

After egg hatch, the larvae remain near the egg mass for several hours before moving to protected feeding sites. Larvae feed for about 30-35 days and develop through five stages (instars) on the host plant. First instar larvae are quite mobile and may infest several adjacent plants. Third instar and older western bean cutworms can be
differentiated from other cutworms and caterpillars feeding on the host plant by three characteristic dark brown longitudinal stripes immediately behind the head. Larvae continue to feed through the fifth instar then drop to the ground, burrow into the soil, and establish overwintering chambers.

**Plant Response and Damage**

Damage by young western bean cutworm larvae is not very noticeable, as they feed primarily on tender leaves and flower parts. As pods form, worms chew holes in the pod walls and feed on developing seeds. Pod feeding generally begins about three weeks after the peak pheromone trap catch. Feeding occurs primarily at night and during cloudy days. Some mid-sized worms may remain in the pod during the day, but larger cutworms will hide in the soil at the base of the plants. If the larvae have not completed development when the beans are cut, they may congregate under the windrow and feed on the pods and seeds until harvest.

**Management Approaches**

Few cultural methods effectively control western bean cutworms. Disturbing the soil by plowing or disking is thought to reduce overwintering larval survival; however, the effectiveness of this practice on a broad scale has not been tested. A few dry bean varieties have some resistance to feeding damage but the agronomic characteristics of these varieties are not favorable for commercial production. There are also several predators that help reduce western bean cutworm infestations. Survival of young cutworms is dramatically reduced by several natural enemies, including spiders, damsel bugs, and lady beetles. In addition to these natural enemies, western bean cutworm larvae are susceptible to a naturally occurring disease caused by the microsporidian, *Nosema* sp., but the impact of this disease is unknown.

Scouting for western bean cutworm in dry beans is extremely difficult. Egg masses are very difficult to find in the dense canopy of bean leaves. Both eggs and larvae are easier to scout for in corn than in beans; therefore, corn can be sampled to determine damage potential in the adjacent beans. If corn is infested, adjacent beans are at a higher risk to be infested also.

Treatment decisions in dry beans can also be based on larval counts, light trap catches, and pheromone trap catches. It is difficult to scout for western bean cutworm larvae in dry beans, but treatments are currently recommended in irrigated beans when two or more larvae are found per row foot prior to movement of larvae onto developing pods.

Light traps can be used to monitor western bean cutworm moth flights near bean fields during July and August, but pheromone traps are cheaper and easier to use. After pre-tassel cornfields are no longer available, moths tend to lay more eggs in dry beans. This switch generally corresponds to the time when pheromone trap catches peak. Western bean cutworm larvae will begin to damage pods approximately three weeks after peak pheromone trap catch. When trap catches indicate increased risk for economic losses
(see Pheromone Monitoring below), apply insecticides 10 to 20 days after the peak flight occurred to prevent pod damage. If a field has received a foliar treatment for Mexican bean beetle after peak moth flight, it is unlikely that it will need an additional western bean cutworm treatment unless the treatment was applied well ahead of the moth activity period. Pyrethroid insecticides are highly effective at controlling western bean cutworms in both corn and dry beans.

**Pheromone Monitoring for Western Bean Cutworm**

Materials needed monitoring:
- western bean cutworm pheromone source (use only Scentry pheromone sources)
- plastic milk jug traps (See Figure XIII-3)
- liquid mixture for trapping moths (4:1 mixture of water and antifreeze plus a few drops of dish soap)
- data sheets to keep track of collection data

Procedure:
1. Place traps in field no later than 1\textsuperscript{st} week of July.
   - pheromone lure is suspended on a paper clip or pin just underneath the trap lid
   - attach trap to post or other support at approximately four foot height
   - antifreeze mixture added to basin of trap
2. Place two milk jug traps (1-gallon plastic) baited with Scentry pheromone source in or along opposite borders of each bean field to be monitored.
   - avoid placing traps adjacent to areas of little vegetation (e.g. fallow areas, large roads or ditches) or next to high ditch banks
   - it is best to place traps in bean field borders that are adjacent to areas of denser vegetation (e.g. alfalfa, bean, corn, sugarbeet fields or thick grassy areas)
3. Each field should be monitored at least weekly until catches begin to increase. Then monitor at least 3-5 times weekly during the peak flight period. All traps should be monitored until moth captures begin to drop off significantly (usually in early August).
4. The number of moths in the trap should be counted and recorded each time the trap is checked. The captured moths should be removed and fresh antifreeze mixture should be added.
5. A running total of moth captures should be kept along with an average moth catch per day*. When the average moth capture begins to decline substantially, determine the time of peak catch. Calculate the average cumulative total moth capture per trap for the season at the peak catch.
   *If for some trapping periods no or questionable data were obtained from a trap (due to low water levels in the trap, the trap falling down or other reasons) do not include these data in your averages.
6. If the seasonal cumulative total trap catch averaged across the two traps for a field for the day of peak trap catch is:
   a. between 0 and 700 moths per trap—the risk of significant damage by WBC is low.
b. between 700 and 1000 moths per trap—low to moderate risk. Treatment is probably not warranted. Significant WBC damage will occur only if conditions for WBC development are good. Favorable conditions are indicated by:
• Presence of substantial WBC activity in adjacent corn fields. These fields should be thoroughly scouted to decide whether to treat either crop.
• Presence of pod feeding approximately 3 weeks after peak flight. If pod feeding is noticeable, a treatment should be considered.

c. above 1000 moths per trap—the risk for WBC damage is significant. Treatment for WBC may be warranted. The greater the trap catch, the greater the risk for damage. Adjacent corn fields and pod feeding in the beans can be checked to further verify the need for treatment.

7. If counts are high enough to warrant treatment, treatment should be applied 10 to 20 days after the peak flight. This allows for all eggs laid in beans to hatch, is early enough to avoid damage from large worms, and results in maximum control.

Cut out areas. Leave a 2 inch deep base.

Side; Front view.

Figure XIII-3. Western bean cutworm pheromone milk jug trap design.

Products for Western Bean Cutworms:

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<thead>
<tr>
<th>Insecticide</th>
<th>Product</th>
<th>Preharvest Interval</th>
<th>remarks</th>
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<tbody>
<tr>
<td>Asana XL&lt;sup&gt;R1&lt;/sup&gt;</td>
<td>5.8-9.6 oz./A</td>
<td>PHI 21 days; REI 12 hrs.</td>
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<tr>
<td>cyfluthrin&lt;sup&gt;R1&lt;/sup&gt; (Baythroid, generics)</td>
<td>See label for rates.</td>
<td>PHI 21 days; REI 12 hrs.</td>
<td></td>
</tr>
<tr>
<td>Mustang MAX&lt;sup&gt;R1&lt;/sup&gt;</td>
<td>1.28-4.0 oz./A</td>
<td>PHI 21 days; REI 12 hrs.</td>
<td></td>
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<tr>
<td>Phaser 3EC</td>
<td>1.33 qts./A</td>
<td>PHI 3 days; REI 24 hrs.</td>
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<tr>
<td>Sevin&lt;sup&gt;1&lt;/sup&gt; (multiple formulations)</td>
<td>See labels for rates.</td>
<td>PHI 21 days; REI 12 hrs.</td>
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<tr>
<td>lambda-cyhalothrin&lt;sup&gt;R1&lt;/sup&gt; (Warrior, generics)</td>
<td>See label for rates.</td>
<td>PHI 21 days; REI 24 hrs.</td>
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<sup>R1</sup>Restricted use pesticide  <sup>1</sup>Labeled for chemigation

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Categories: Dry beans, Pod and seed-feeding insects, Western bean cutworm, Variegated cutworm

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