Greetings:

We received several traps reports after the maps were made for the week. They were all negative.

Please get your pheromone trap placed if you have not yet done so. Although we have not had any significant captures we now are starting to pick up more moths. We are more likely to predict problems accurately if we have good trap coverage.

Even within the same county one trap may capture moths and one may not. Like rainfall, moth arrival can be variable!

Don't lose heart if you have not caught a moth yet.

Several locations in the south central part of the state caught moths this week (see map). Michael Bates’ trap in Martin
County had 2 moths 4/25-26. Other traps with captures were Waseca and Nicollet 4/26, Meeker 4/25, and Steele 4/22.

The typical male mates as quickly as they can and the pheromone traps will only catch unmated male black cutworm moths for a few days after a flight arrives. These captures indicate a flight made it into Minnesota but are not large enough for concern. They do indicate how variable these captures are.

So it’s a winter storm warning on May 1st, eh? Well, you might want to watch where the low pressure for this current storm system tracks through Minnesota. Since temperatures are not projected to go much below freezing, any recently arriving moths should be ok. However, I doubt that females will lay eggs in the snow.

**Predicting black cutworm development: Degree- days.**

Since insects are cold blooded, their activities’, including how quickly they grow, depends on the temperature of their environment. The effect of temperature on growth is known as temperature dependant development. An organism grows and develops faster if it is exposed to cumulative heat. Similar to predicting corn growth with degree day accumulations (a.k.a. growing degree, heat units, growing degree days), we can use degree-days to predict what stage the cutworm eggs, larvae or pupae will be at.

There are several ways to calculate degree-days for insect development but for crops and black cutworm the simple model works fine. First, you need to know the maximum and minimum daily temperatures. Secondly, you also need to know the minimum temperature (threshold or base temperature) at which growth occurs. Below this temperature, little development occurs. Conveniently, we can use a 50° F lower developmental threshold for both corn and black cutworms.

Degree day = \((\text{Maximum temperature} + \text{Minimum temperature}) / 2\) - developmental threshold temperature

*Technically, limited development can occur when part of the day but not the average temperature exceeds the developmental threshold, development ceases at an upper temperature threshold (e.g. 86°F for corn), individual life stages can have different threshold temperatures and temperature dependant development rates, and some black cutworms go through an extra larval stage (instar). Fortunately, for our purposes, these subtleties can be ignored.*

For an example of calculating degree-day accumulations: The daily high was 70°F and the daily low was 48°F. The degree-day accumulation would be: \(((70+48) / 2) - 50 = 9\). Daily degree-day accumulations are summed over the time period of interest.
To know when to start the degree day accumulations we need a “biofix”. That biofix is a significant moth capture (8 or more moths in a 2 night period) and is where the black cutworm trapping network comes in.

The black cutworm life cycle, from egg to moth, takes 1 ½ months or more.

<table>
<thead>
<tr>
<th>Cumulative Degree Days</th>
<th>Black Cutworm Stage</th>
<th>Black Cutworm Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0  (Biofix)</td>
<td>Significant Moth Capture</td>
<td>Egg laying</td>
</tr>
<tr>
<td>90</td>
<td>Egg hatch</td>
<td></td>
</tr>
<tr>
<td>91-311</td>
<td>1st-3rd instar</td>
<td>Leaf feeding</td>
</tr>
<tr>
<td>312-364</td>
<td>4th instar</td>
<td>Cutting begins</td>
</tr>
<tr>
<td>365-430</td>
<td>5th instar</td>
<td>Cutting begins</td>
</tr>
<tr>
<td>431-640</td>
<td>6th instar</td>
<td>Cutting slows</td>
</tr>
<tr>
<td>641-989</td>
<td>Pupa</td>
<td>No feeding</td>
</tr>
</tbody>
</table>

Only larger 4th – 6th instar cutworm larvae can cut corn plants. We can use degree-days to predict when larvae will be large enough to cause visible damage, begin to cut corn and cease feeding.

Scouting corn crops for black cutworms should start before 300 degree days after a significant catch accumulate. This will, of course, happen sooner if warm and later if cool but is about three weeks in a normal Minnesota spring. We will be making cutting projections but now you can fine tune things for your own location.

In the next issues we will talk about other cutworm species, black cutworm risk, scouting and treatment thresholds.

Good luck!

Bruce Potter, Ken Ostlie, Fritz Brietenbach and Travis Vollmer