

EUROPEAN CORN BORER SURVEY



Background and Timing

The fall European corn borer (ECB) survey has been conducted annually in Wisconsin since 1942. Randomly selected grain corn fields and non-Bt fields are assessed in September for larvae and damage. Sampling prioritizes the state's top 30 corn-producing counties, with site density proportional to USDA NASS harvested corn acreage. Results offer long-term and predictive data on ECB risk and help detect emerging Bt resistance in ECB populations.

Survey Method

- Once a corn field is selected, walk at least 50 paces, or 20 rows, into the field to avoid edge effect. Starting with the first plant on your right, count 25 consecutive stalks.
- Closely inspect each stalk from tassel to base for signs of infestation (including the ear and shank). Look for exit holes and frass, carefully cutting tissue vertically around holes to reveal larvae and tunnels. Total the number of infested stalks and divide by 25 to get the % of stalks infested.
- Dissect the last two infested corn stalks by splitting them lengthwise from tip to base with a sharp knife. Also check the ear and shank. Stalks may have several larvae. Add up the number of 4th and 5th instar larvae in the two split stalks. Divide by two to calculate larvae per infested stalk.
- Determine the average number of larvae per 100 stalks by multiplying the percent of stalks infested by the average number of larvae per infested stalk.

DETERMINE

Percent of stalks infested

(10 / 25 = 40% of stalks infested)

Count all plants showing signs of ECB, such as exit holes, frass, and old and new tunnels.

CALCULATE

Larvae per infested stalk

(3 / 2 = 1.5 per infested stalk)

Count only live 4th and 5th-instar larvae as winter survival is unlikely for younger larvae.

RECORD

Larvae per 100 stalks

(40% x 1.5 larvae = 60 larvae/100 stalks)

An average of 50 larvae per 100 corn stalks indicates a high or economic ECB field population.



WISCONSIN DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION

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Bt Resistance Detection and Testing

DATCP collaborates with University of Minnesota (UMN) to detect and document Bt-resistant ECB populations. Testing for Bt traits is conducted at any random field or non-Bt field survey site where ECB larvae are found. DATCP uses Agdia ImmunoStrips for Bt-Cry1Ab/1Ac and Bt-Cry1F. In addition, larvae collected during sampling are sent to UMN for Bt-resistance testing.

On-Site Testing for Bt Traits

- Bt trait testing should be performed for any survey site where larvae are found, random field or non-Bt field.
- Collect six separate leaf pieces (approx. ¼ x ¼ inch) from the two corn stalks containing live larvae. Place the six leaf pieces into the mesh buffer solution packet and macerate.
- Insert both a **Bt-Cry1Ab/1Ac** test strip and a **Bt-Cry1F** strip into the SEB4 buffer bag up to the lowest fill line. Check for results after 10 minutes and record in the Survey123 app.

Collecting Larvae for Bioassay

- Collect any live larvae found while sampling and immediately transfer to diet cups. Label diet cup(s) with site number, county, and date. Cups may have up to two larvae.
- Store cups in a cool, dark environment until all larval samples are combined for shipment to UMN.



Collect larvae found while sampling



Test for Bt traits using Agdia strips



Transfer larvae to diet cups



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