

European corn borer

Resistance to Bt corn identified in Canada



THREAT

The European corn borer (ECB) is one of the most serious insect pests for corn in Ontario. The larvae chew tunnels through many parts of the plant, leading to a decrease in agricultural yield ranging from 5 - 12 bushels/acre, as well as making the plant more susceptible to diseases such as deoxynivalenol (DON). Since the 1990s, commercialized Bt corn has been used to reduce management costs and yield losses from ECB larvae. Now ECB is developing resistance to some Bt corn. •



IDENTIFICATION

STAGES

- **Eggs:** Egg masses consist of 10 - 40 eggs and can be found on the underside of corn leaves close to the mid-rib. If egg masses are found, return to the field later in the season to look for signs of feeding.
- **Larvae:** Early instar larvae are whitish with black heads and feed within the whorl, causing shothole and windowpane damage. Older larvae are cream coloured with black spots along their body (no stripes) and have a black head. Larvae bore into the stalk and tunnel within the stalk and ear shank, resulting in yield loss, lodging, broken stalks, broken tassels, and dropped ears. Larval feeding can increase the risk of stalk rots and ear mould.
- When scouting, look for broken tassels, bent leaves at the midribs, sawdust-like excrement ("frass") present at the leaf axils, lodged plants, and dropped ears.
- **Adults:** Adult moths are 12 - 25 mm long and pale yellow-brown in colour. Mating adults can be found in dense, grassy areas adjacent to corn fields.

FAVOURABLE CONDITIONS

- A population of European corn borer (ECB) suspected to be resistant to Cry1Ab has been identified in Nova Scotia. In 2018, ECB resistance to Cry1F was first documented in Nova Scotia, and has since been observed in Quebec and Manitoba.
- ECB has a wide variety of host plants besides corn, including potatoes, peppers, beans, wheat, and some weed species.
- Note that ECB tunnelling and boring may permit secondary infection and damage by rotting of the stalk and ear.
- ECB overwinter as mature larva in the lower 30 cm of corn stalks and debris on the soil surface.
- In Ontario, 1 - 2 generations can be expected, with two generations observed in the southwestern portion of the province.



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PREVENTION AND CONTROL

- Shred stalks shortly after harvest, using flail mowers, which will kill overwintering ECB that are in corn stubble left on the soil surface.
- Time insecticide applications when small larvae are present on the plant, before they mine into the mid-rib or stalk. Apply your product towards the whorl of the plant in early season or the ear zone for later season infestations. Visit www.cornpest.ca/corn-pests/european-corn-borer/ for a fillable threshold calculator to determine the appropriate insecticide timing. Find a complete list of currently registered insecticide products at: www.cropprotection.hub.omafra.gov.on.ca/control-solutions/field-crop-protection. Note that insecticides are ineffective once the larvae have entered the stalk.

WHAT TO DO TODAY

- Scout fields and report any unexpected damage in Bt corn to the seed provider and provincial specialist (Ontario - Tracey Baute). Any damage that progresses beyond pinholes and windowpaning is considered unexpected damage. More than five per cent of the plants in a Bt corn field with ECB injury is considered unexpected injury.



Information sources:

- *What does ECB Resistance to Cry1Ab Mean?* (<https://fieldcropnews.com/2023/05/what-does-ecb-resistance-to-cry1ab-mean/>)
- *Signs of ECB Activity and Damage to Scout for in Bt Corn Fields* (<https://cornpest.ca/wp-content/uploads/2023/04/Signs-of-ECB-Activity-and-Damage-to-Scout-for-in-Bt-Corn-Fields.pdf>)
- *Canadian Corn Pest Coalition* (<https://cornpest.ca/>)

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Tracey Baute and Jocelyn Smith

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