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## **European Corn Borer (*Ostrinia nubilalis*); A New Pest Affecting Connecticut Hops**

European corn borer is a moth pest whose costly damage to hop bines first became evident in Connecticut in 2019, resulting in significant bine damage and cone loss. ECB is primarily a corn pest but has more than 200 plant hosts and is the most important insect pest in peppers. It is likely that 2019 had the first significant ECB incidence in hopyards due to weather-related delayed corn plantings, as was also the case for Michigan hop growers, whereby moths found hop leaves and bines to be a good alternative for their egg-laying and development.

Adult ECB females are 1/2 - 5/8" long light-yellow moths (Figure 1, lower), with wavy brown markings on their wings. Males are slightly smaller and darker (Figure 1, upper). ECB has a four-stage life cycle: egg, larva/caterpillar, pupa and adult moth. The insects overwinter in the stems of last year's host plants.

The first moth flight begins in late May or early June and females lay eggs in 1/4" wide clusters (Figure 2) that appear as overlapping fish scales.



Figure 1. Adult European Corn Borer, male (upper) and female (lower). Photo credit: Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org. 2003.

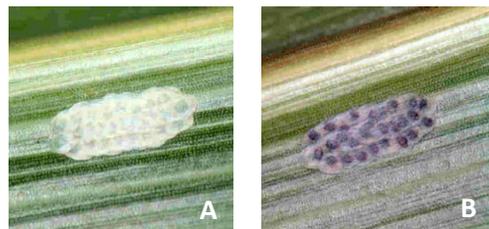


Figure 2. A. ECB, egg mass (1/4" in diameter) on a corn leaf. B. ECB, egg mass at blackhead stage on a corn leaf. Photo credit: Jim Kalisch, University of Nebraska Lincoln. 1995.

Larvae are light colored with dark spots on each segment and a dark brown head capsule. Full grown larvae are 3/4 - 1" long (Figure 3C). Foliar feeding of early instar larvae produces minimal damage. However, larvae will then bore into bines (Figure 4), side arms, and leaf petioles, reducing water and nutrient translocation within the plant, and leading to wilted or dead bines, browning cones and reduced hop cone yield and quality. Additionally, fully grown (fifth instar) larvae overwinter in the bines and emerge the following spring ready to pupate (Figure 5).

**Symptoms and signs**

- Tiny egg masses (1/4" wide) on underside of leaves (Figure 2).
- Bore holes in bines (Figure 4).



Figure 4. 2019 Field photo of ECB damage.



Figure 3 A. ECB, newly hatched first instar larvae. B. ECB, first instar larvae, enlarged. C. ECB, larva. Photo credit: A. J.C. French Sr., Universities: Auburn, GA, Clemson and U of MO, Bugwood.org. 2011., B. J. Kalisch, University of Nebraska Lincoln. 1995., C. Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org. 2002.



Figure 5. 2019 Field photo of ECB larva within a bine, discovered during harvest.

## **Management**

Based on the lack of significant incidence in hops prior to 2019, corn and other plants are likely preferred hosts compared to hop. However, when host plant seeding, transplanting or emergence is delayed, ECB moths may lay eggs on hop plants as in 2019. In addition, hop bines from the previous year should be buried, burned or managed so that ECB do not overwinter and survive.

Scout early in the season, after first moth flight, and watch for small larvae and their bore holes. Refer to UConn's pest alert ([http://ipm.uconn.edu/pa\\_vegetable/pestMessages.php](http://ipm.uconn.edu/pa_vegetable/pestMessages.php)), as there are early-season updates on ECB moth flights. Once larvae are inside the bines, contact-pesticides are ineffective, since the stem provides a physical protective barrier. Therefore, any pesticide applications should target first generation moths to prevent egg laying or kill younger larvae. Insecticides containing Bt (*Bacillus thuringiensis*) may also be used before larvae penetrate plants. An early planting of Bt-corn may act as a trap plant, especially for the second generation as there are often 2 generations per year in southern New England. Early monitoring and translaminar systemic insecticide application of spinosads (Entrust) may impede ECB early, before heavy vascular tissue feeding by larvae affect cone production. A foliar application of chlorantraniliprole (Coragen) may also be used. In both cases, control is best attempted before larvae bore into bines.

## **References**

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