

VEGETABLE CROPS

INSECTS OF CORN European Corn Borer

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European corn borer

Ostrinia nubilalis (Hubner)

INTRODUCTION

The European corn borer is a major pest of corn and feeds on over 200 plant species including many weeds. This insect generally produces generations in June and August in most areas of the United States and the northeast. However, a strain producing only one annual generation in July may also be present in some fields. In some areas of the northeast, the single and multi-generation strains may be present together.

ADULTS

The adult female is a creamy, yellowish-brown moth approximately 0.75 inches long (Fig. 1). It has a stout body and a wing expanse of about 0.6 inches in the resting stage. The outer third of the forewings is marked by two dark serrated lines that run across the wings. The forewings of the female are usually lighter in color than those of the male. The hind wings of both

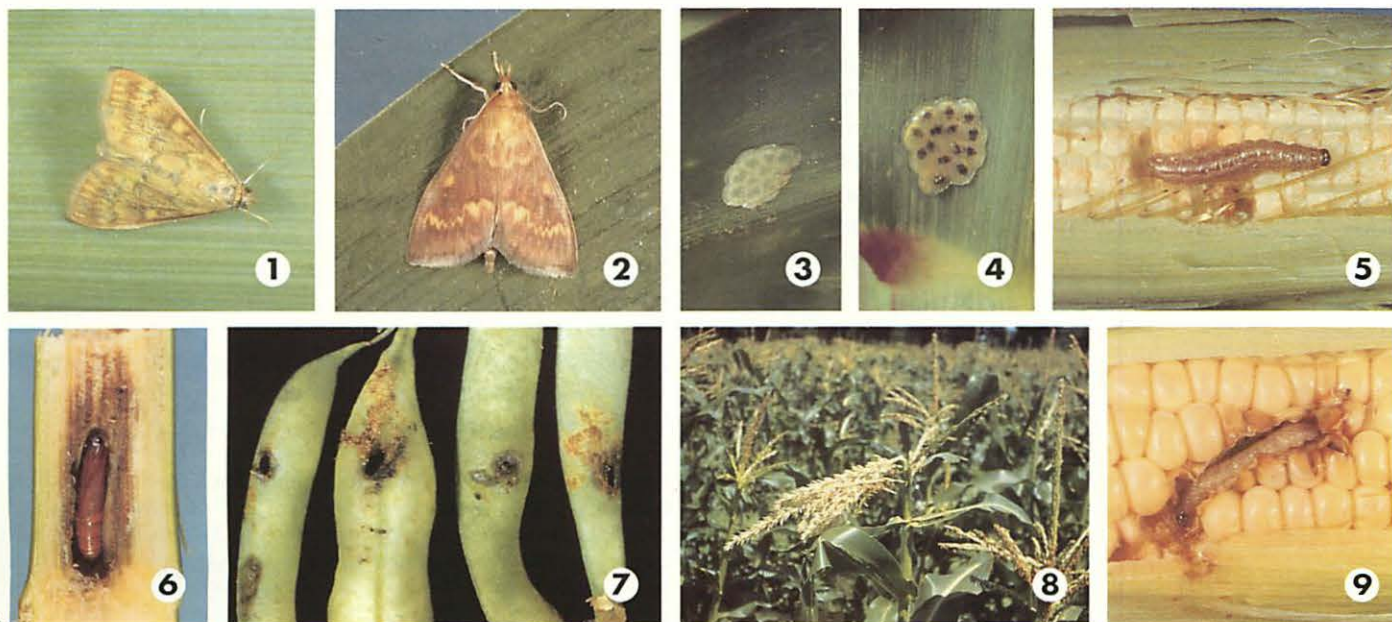
males and females have light markings. The abdomen of the female does not extend beyond the wings at rest. The reddish-brown male has a long slender body and is slightly smaller than the female (Fig. 2). The male's abdomen usually extends beyond the closed wings at rest and is tufted at the tip.

Corn borers overwinter as the last larval instar (fully grown larva) in the stalks and stems of the host plant. The larvae pupate in late April or early May. Adults of the two generation strain first emerge in late May to early June and again in August. Adult emergence of the single generation strain peaks in July.

Moths spend the daylight hours in sheltered areas (weeds and grasses) that often border the host crop field. They can survive in the field for 3-4 weeks depending on availability of food and water. On warm, calm evenings, they fly into susceptible crop fields and lay their eggs. Each female may lay up to 500 eggs during its lifespan.

EGGS

Eggs of the corn borer are white and laid in masses resembling overlapping fish scales (Fig. 3). Masses of 5 to 50 eggs can be found on the undersides of the



leaves of their food plants, especially on the lower leaves near the midrib of young corn plants. A few days after being laid, eggs become cream-colored and dull. Later they turn orange-tan and finally the black heads of the unhatched larvae show through the transparent egg membrane (Fig. 4). Eggs hatch in 4-9 days, depending on temperature.

LARVAE

The European corn borer larva (borer) is flesh-colored, ranging from light gray to faint pink with small round, dark brown spots on each segment. The larva has a brown head and indistinct reddish stripes running the length of its body. Mature larvae are about 3/4 to 1 inch in size (Fig. 5).

Within hours after hatching, the tiny borers crawl to protected places on the plant where they feed. Young larvae feed on leaf tissue of both corn and beans for 5-7 days before boring into stalks or stems and, if available, the pods of bean plants. The corn borer larva passes through five stages (instars) of development. Mature larvae of the two generation strain, after feeding in June and July, pupate in late July and moths emerge in August. Offspring from these adults go into diapause (resting stage) and overwinter as larvae. Larvae from moths of the single generation strain, which peaks in July, are believed to go directly into diapause before pupating. The subsequent moths from these larvae do not emerge until the following summer.

PUPAE

The reddish-brown pupa is the resting stage (Fig. 6) that is found nestled in a chamber inside the larval burrow. In corn, the pupa is located inside the stems or ear where the full-grown larva had been feeding. The pupa is approximately 3/4 inch long with segmentation evident on half of the body. The pupal stage lasts approximately 2 weeks.

DAMAGE

The corn borer attacks all parts of the corn stalk and the ear. Larvae also infest green, wax, lima, and soy beans, green peppers, potatoes, apples, small grains, millet, buckwheat, sorghum, dahlias, smartweed, pigweed, and most other commercial crops and weeds. Larvae may bore into stems and pods of beans making the latter unmarketable (Fig. 7). Larvae feed on the leaves of corn and cause shot-hole damage. Borers may enter the midrib or tassel causing them to break (Fig. 8). Extensive tunneling within the host plant can contribute to stalk breakage, resulting in a yield reduction when mechanical harvesters fail to pick up the dropped ears or fruit. Because the borer may enter the ear from the base, side (Fig. 9), or tip, it can greatly affect fresh market sweet corn quality or salability. In processing crops, even slight levels of contamination render the crop unfit for human consumption (under FDA regulations) and result in rejection by the processors and, thus, a significant loss of product.

PEST MONITORING

European corn borer moth populations can be monitored by using blacklight traps, pheromone (sex attractant) traps, or by direct observations of moths in the field. The blacklight and pheromone traps provide relative information on seasonal moth flights. It is advisable to sample the grassy weed areas bordering fields since the adults frequent these areas and may be more readily found than within cropped areas.

To assess egg populations and larval activity in corn, 10 consecutive plants are examined at 5 to 10 (depending on field size) random locations per field. Sampling along an X or V pattern is suggested so the field is adequately covered. The entire plant should be inspected for the number and developmental stage of egg masses and/or the percentage of feeding signs. It is not practical to sample for egg masses or for borer infestations in snap beans.

CONTROL

Parasites, predators, and disease organisms can play a significant role in reducing borer numbers. Up to 60 per cent of overwintering larvae in the field may be killed by plowing or disking prior to moth emergence. Leaving short stubble and shredding stalks will destroy many overwintering larvae. However, stalk destruction must be implemented over a wide area to have an appreciable effect on the overwintering population. Volunteer corn should be removed from bean fields since corn is the preferred crop and may attract moths into the field. Mowing grasses around fields force egg laying moths, which reside in weedy, grassy areas at field edges during the day, to move away from the fields. Corn borers are controlled most effectively with insecticides during the whorl stage, when egg masses are hatching, and the pre-tassel stage when the borers are feeding in emerging tassels. During mid-to-late whorl stage, one spray is beneficial if applied when approximately 15 per cent of the plants exhibit feeding damage. To protect the ear from infestation by corn borer larvae during the silking stage, insecticide applications should be applied when the majority of egg masses have hatched.

Before treating snap beans with insecticides for corn borer control, there are various factors that are important to consider. They are: magnitude of blacklight trap counts, time of peak moth emergence, moths present in bean fields, European corn borer history in the area, and amount of volunteer corn and grassy weeds in the bean fields. Beans should be treated only when they are in the vulnerable stage, i.e., from early bud until early podding.

Consult your local extension recommendations to determine the timing and most effective insecticides for control of European corn borer in your area.

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