

Pest Alert

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Florida Department of Agriculture and Consumer Services
Division of Plant Industry

Helicoverpa armigera (Lepidoptera: Noctuidae), the Old World Bollworm

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INTRODUCTION: On 17 June 2015, one male *Helicoverpa armigera* (old world bollworm) was collected in a Cooperative Agricultural Pest Survey (CAPS) pheromone trap in a field in Bradenton, Florida, USA. This moth is a serious agricultural pest globally, and this is the first detection in the U.S. outside of port interceptions. The caterpillars feed on a wide variety of field crops, the adults can fly long distances, and populations have repeatedly evolved resistance to many insecticides.

DISTRIBUTION: *Helicoverpa armigera* occurs widely in tropical and subtropical regions of the Old World, from Africa and Southern Europe to New Zealand. It appeared in Brazil in recent years and rapidly spread across eastern and northern South America, devastating cotton, soy and corn crops in 2013. It has been reported in Puerto Rico and the Dominican Republic in the past year.

IDENTIFICATION: *Adult:* The adult moths have forewing length of 5/8–3/4 inches (1.6–1.9 cm) (Figs. 1, 2). The forewings are pale yellowish brown to orange brown, and the hind wings are yellowish white with a dark gray border. *Egg:* The spherical eggs are creamy white, not covered with scales, and are laid singly on vegetation, usually on leaves. *Larva:* Mature caterpillars are 1–1.5 inches (3–4 cm) long and have five pairs of prolegs. The color varies greatly, with pale green, yellow, pink, and gray forms, and the setae are dark (Fig. 3). Young larvae are more pale (Fig. 4). *Pupa:* The pupae are brown, smooth and not distinctive.



Fig. 1. Adult male *H. armigera* from Europe: Scale in mm
Photography credit: J.E. Hayden



Fig. 2. Adult female *H. armigera* from Europe: Scale in mm
Photography credit: J.E. Hayden



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Fig. 3. Mature *H. armigera* larva
Photography credit: M. van der Straten, National Plant Protection Organization, Netherlands



Fig. 4. Young *H. armigera* larva
Photography credit: M. van der Straten, National Plant Protection Organization, Netherlands

SIMILAR SPECIES: The native corn earworm, *Helicoverpa zea*, is externally identical in all life stages. Therefore, identification of *H. armigera* requires either dissection of adult moths or sequencing genes. Larvae of the native *Heliothis virescens* (tobacco budworm) are similar but can be differentiated by microscopic characters. The larvae of some *Spodoptera* species (armyworms) are also similar, but can be distinguished by color patterns.

HOSTS: Caterpillars of *H. armigera* feed on nearly 200 plant species in at least 45 families. The most preferred crops are corn, sorghum and other grains, cotton and other mallows, ornamental flowers, and plants in the tomato and bean families, including tomato, tobacco, potato, soy, alfalfa, and beans. Fruit tree hosts include citrus and apple. The larvae feed externally and internally on all above-ground parts but prefer flowers, buds, seeds and fruit (Fig. 5). Internal feeding is revealed by boreholes or cutting open fruit and buds.



Fig. 5. Mature *H. armigera* larva damaging rose bud
Photography credit: M. van der Straten, National Plant Protection Organization, Netherlands

BEHAVIOR: When food is scarce, the moths fly to high altitudes and are dispersed by wind. There are 3–5 generations per year in subtropical regions, and up to 11 per year in the tropics. The total life cycle may be as short as 30 days, but temperature and host quality affect the development time. Females lay 500–3,000 eggs. The larvae grow for at least 2–3 weeks. Pupation occurs in the soil and lasts a week, but pupae can diapause for a few months in cold conditions.

DETECTION: Males of *H. armigera* are attracted to a lure of female sex pheromones. Bucket traps with a lure are hung at chest height and the lures are effective for four weeks. Lures are useful only for detection and monitoring, not for population suppression. The same lure also attracts *H. zea*, so identification of trap samples requires dissection.

ECONOMIC IMPORTANCE: Global crop damage by *H. armigera* has been reported at more than \$2 billion annually. In Brazil in 2013, the yield of field crops was reportedly reduced by 35%, and the cost of insecticide application for cotton doubled. Climate suitability modeling predicts that significant U.S. crops could be at risk. The chief danger is control failure because of its resistance to many insecticides.

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