USDA

Stone Fruit Commodity-Based Pest Survey

Light Brown Apple Moth

Epiphyas postvittana

Introduction

Light brown apple moth (LBAM), a pest native to Australia, has been introduced into New Zealand, the United Kingdom, and recently found in the continental United States. It has been reported in Hawaii since the late 1800s.

LBAM was first detected in the continental United States in Alameda County, CA, on March 16, 2007. As of May 2011, additional detections have been reported in California's Alameda, Contra Costa, Los Angeles, Marin, Monterey, Napa, Orange, Sacramento, San Benito, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, and Yolo Counties.

LBAM can feed on more than 500 plant species in 121 families and 363 genera, which gives it the potential to become extremely destructive. It can damage plants ranging from nursery stock, stone fruit (peaches and apricots), pome fruits (apples and pears), grapes, and citrus. LBAM can fly short distances to find a suitable host. The pest primarily travels via infested nursery stock plants and on equipment and containers.

FIGURE 1. Eggs of LBAM *(Epiphyas postvittana)* on a leaf surface. Photo courtesy of T.M. Gilligan and M.E. Epstein, *LBAM ID* [CSU, CDFA, and USDA/APHIS/PPQ/CPHST].

FIGURE 2. Early- (top) and late- (bottom) instar larvae of LBAM. Photo courtesy of T.M. Gilligan and M.E. Epstein, *LBAM ID* [CSU, CDFA, and USDA/APHIS/PPQ/CPHST].

Biology

LBAM egg masses are flat, oval, translucent, and appear pale yellow to white in color (Figure 1). There are approximately 35 eggs in a mass, overlapping like roof tiles or shingles. Females can lay 100 to 300 eggs on average, beginning at 2 to 3 days of age. Two to four generations may occur in a year depending upon latitude and host availability. Young larvae feed on tissue beneath the leaf surface on the underside of the leaves, where they spin a protective web in which they feed. After their first molt, they abandon the web to construct a nest by webbing together leaves and/or fruit. LBAM feed under shelter. Larvae move vigorously when disturbed, but are always connected to the leaf by a silken thread to avoid being removed from the leaf. When larvae happen to fall to the ground, they feed on ground-cover hosts or can survive without feeding for several months.

The young larvae are approximately 1.6 mm long. Mature larvae range from 10 to 20 mm in length (Figure 2). The body of a mature larva is yellow green, but color can vary based on instar and host. Larger larvae construct feeding sites or "nests" between two leaves, a leaf and fruit, in the bud, or on a single leaf. The pupal stage is completed within these nests. Pupae are greenish brown after pupation, but become completely brown (Figure 3) when fully developed, and range in size from 2.5 by 7.6 mm (male) to 2.9 by 9.8 mm (female). Adult moths emerge after one to several weeks of pupation. Female moths emerge from the protective pupal nests and mate soon after emergence.

Adult male LBAMs are usually smaller than females. Male forewing length ranges from 5.3 to 11.1 mm, compared with 5.4 to 12.5 mm in females. Adults are highly variable in wing pattern and color. The color varies from rust brown to pale yellow with brown to dark-brown markings. Males tend to have a higher contrast in coloration than females, although the level of contrast varies considerably.

Symptoms

LBAM feeds on the leaves, buds, flowers, and fruits of its hosts, but the majority of economic damage is caused by fruit injury. Larvae feed on the surface of fruits under webbed leaves, causing scarring as well as providing a site for fungal and bacterial rot. During the fruiting season, they also make nests among clusters of fruits, damaging the surface and sometimes tunneling into the fruits. Larvae may enter the fruit through the calyx and cause internal damage.

Peaches and other stone fruits are damaged by feeding that occurs on the shoots and fruit. Some of the signs of infestation are larvae and webbing on the undersides of leaves near the main rib or large veins. Some leaves may be rolled and bound with silk. Feeding on the foliage by LBAM larvae can cause ragging and curling of the foliage (Figure 4).

Hosts

Major hosts include: alfalfa *(Medicago sativa),* apple *(Malus* spp.*),* apricot *(Prunus armeniaca),* avocado *(Persea americana),* blueberry *(Vaccinium* spp.*),* broad bean *(Vicia faba),* chrysanthemum *(Chrysanthemum x morifolium),* citrus *(Citrus* spp.*),* clover *(Trifolium* spp.*),* cotoneaster *(Cotoneaster* spp.*),* currants *(Ribes* spp.*),* eucalyptus *(Eucalyptus* spp.*)*, grape *(Vitis vinifera),* hawthorn *(Crataegus* spp.*),* hops *(Humulus lupulus)*, jasmine *(Jasminum* spp.*)*, kiwifruit/Chinese gooseberry *(Actinidia chinensis)*, lychee *(Litchi chinensis)*, Malabar ebony *(Diospyros* spp.*),* peach *(Prunus persica)*, pears *(Pyrus* spp.*),* pine *(Pinus* spp.*),* poplar *(Populus* spp.*),* potato *(Solanum tuberosum),* privet *(Ligustrum vulgare)*, raspberry *(Rubus* spp.*)*, rose *(Rosa* spp.*),* and wattles *(Acacia* spp.*).*

FIGURE 3. LBAM pupa (top) and typical adult male coloration and markings (bottom). Photo courtesy of T.M. Gilligan and M.E. Epstein, *LBAM ID* [CSU, CDFA, and USDA/APHIS/PPQ/CPHST].

Distribution

LBAM is widespread throughout Australia and New Zealand on many weedy hosts, including gorse *(Ulex europaeus)* and broom *(Cytisus scoparius).* It is commonly found in gardens and unsprayed horticultural crops.

Europe: United Kingdom. **North America:** United States. **Oceania:** Australia and New Zealand. Although it was reported in New Caledonia, its presence in that country could not be verified.

Identification

Confirmation of LBAM is by examining form and structure (morphological identification). Many native tortricids could be confused with LBAM. Identification requires dissection of male genitalia. Female specimens should be sent to a lepidopteran specialist for identification. Sorting and Level 1 screening may be performed without dissection by using Passoa et al [Passoa, S., Epstein, M., Gilligan, T., Brambila, J., O'Donnell, M. n.d. Light Brown Apple Moth (LBAM) Epiphyas postvittana (Walker) Screening and Identification Aid. United States Department of Agriculture, Animal and Plant Health Inspection Service, Cooperative Agricultural Pest Survey. Online: http://caps.ceris.purdue.edu/screening/epiphyas_postvittana].

FIGURE 4. LBAM typical damage to host plant foliage. Photo courtesy of T.M. Gilligan and M.E. Epstein, *LBAM ID* [CSU, CDFA, and USDA/APHIS/PPQ/CPHST].

Survey

A trap and lure combination is the common method used to survey for this pest. Details on trap type and lure compounds can be found at http://pest.ceris.purdue.edu/services/napisquery/query.php?code=cam2012.

What Can We Do?

If you find an insect that you suspect is the LBAM, please contact your local extension office or State plant regulatory official to have the specimen properly identified. For contact information, visit www.aphis.usda.gov/StateOffices, www.nationalplantboard.org/member/index.html, or www.nifa.usda.gov/Extension/index.html.

References for the above information can be found on the Cooperative Agricultural Pest Survey (CAPS) Web site at http://caps.ceris.purdue.edu/stonefruit/references.

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