CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Proposal

Epiphyas postvittana (Walker): light brown apple moth (LBAM)

Lepidoptera: Tortricidae

Current Rating: A

Proposed Rating: C

Comment Period: 12/22/2021 – 02/05/2022

Initiating Event:

Effective December 17, 2021, the United States Department of Agriculture is ending the light brown apple moth (LBAM) quarantine in California and Hawaii and reclassifying it as a non-quarantine pest (United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine Federal Order DA-2021-29). LBAM is currently regulated in California and is the subject of a state interior quarantine. Is widely distributed in the state. In light of this, the risk it poses to the state should be re-assessed. Therefore, a pest rating proposal is needed.

History & Status:

Background: LBAM is a highly polyphagous tortricid moth that is reported to feed on hundreds of species of woody and herbaceous plants in over 100 families, including **Asteraceae** (including *Aster* sp. (aster)), **Brassicaceae** (including *Brassica* sp.), **Cannabaceae** (including *Humulus lupulus* (hops)), **Cupressaceae** (including *Cupressus* sp. (cypress)), **Ericaceae** (including *Arbutus* sp. (madrone)), **Juglandaceae** (including *Juglans* sp. (walnut)), **Fagaceae** (including *Quercus* sp. (oak)), **Lamiaceae** (including *Mentha* sp. (mint)), **Lauraceae** (including *Persea americana* (avocado)), **Myrtaceae** (including *Eucalyptus* sp.), **Pinaceae** (including *Pinus* sp. (pine)), **Rosaceae** (including *Fragaria* sp. (strawberry), *Malus* sp. (apple), and *Prunus armeniaca* (apricot)), **Rutaceae** (including *Citrus* sp.),

Solanaceae (including *Lycopersicum* sp. (tomato)), and **Vitaceae** (including *Vitis* spp. (grape)) (Brown et al., 2010).

The eggs are laid on leaves. Early-instar larvae feed on the surfaces of leaves. Third instar larvae roll leaves or make a nest of multiple leaves, securing them with silk as a shelter (Bailey et al., 1996; Brown et al., 2010). Feeding also occurs on buds, flowers, and fruit (Light brown apple moth). Pupation apparently occurs in the leaf "nest." There are multiple overlapping generations per year, and there is no diapause. The number of generations per year depends on climate. There are reportedly two to three generations per year in coastal northern California (Buergi, 2012).

LBAM was reported to be a serious pest of fruit crops in Australia and New Zealand. The most significant damage caused by LBAM is reported to be feeding damage on fruit (Brown et al., 2010). Terauds (1977) reported LBAM to cause severe damage to apples in Tasmania; in one experiment, over 15% of apples were lost due to this pest. Damage to grapes in Australia was reported by Bailey et al. (1996). In that case, feeding on the grapes allowed infection by fungal rot, which led to the loss of fruit.

LBAM was considered to pose a serious threat to California agriculture when it was first detected in this state in 2007. Efforts were made to eradicate and contain it. The eradication plan was eventually given up but containment efforts continued in the form of the state interior quarantine. There are currently recommendations for management of LBAM in California, including a variety of sprays (Light brown apple moth). At least 20 species of insects are known parasitoids of LBAM eggs, larvae, and pupae, and parasitism of LBAM averages 34% in California (Buergi, 2012). This may be providing a level of control of this pest.

Based on the information that was found, it appears that the presence of LBAM in California has not resulted in, and is unlikely to result in significant damage to commercial agriculture in this state, which is the conclusion reached in a USDA report That report concluded that LBAM has only been a significant pest "under crop management schemes that eliminated natural enemies and allowed secondary pests like LBAM to develop insecticide resistance." (United States Department of Agriculture, 2019).

Worldwide Distribution: LBAM is native to Australia. It has been introduced to New Zealand, Europe, and the United States (Hawaii and California).

Official Control: LBAM is on the A1 list in Egypt, South Africa, Argentina, Brazil, Chile, and Jordan and it is a quarantine pest in Morocco, Canada, and Mexico (EPPO Global Database). It will presumably become non-reportable (USDA) as of December 17, 2021, which may prompt some states to impose quarantines on California products.

California Distribution: LBAM was first found in Berkeley, Alameda County, California in 2006 (Brown et al., 2010). It is now established in 21 California counties: Alameda, Contra Costa, Los Angeles, Marin, Mendocino, Monterey, Napa, Orange, Sacramento, Sen Benito, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Cruz, Solano, Sonoma, Ventura, and Yolo.

California Interceptions: LBAM is not often intercepted in California on shipments from out the state (California Department of Food and Agriculture).

The risk LBAM poses to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** Gutierrez et al. (2010) used a temperature-driven demographic model to show that the central and southern coastal areas are the most suitable areas in California for LBAM, with the Central Valley being much less suitable. LBAM is currently established in 21 counties in California, and the current distribution largely agrees with the areas Gutierrez et al. reported to be most suitable for this pest. Therefore, LBAM receives a **High (3)** in this category.

   – Low (1) Not likely to establish in California; or likely to establish in very limited areas.

– Medium (2) may be able to establish in a larger but limited part of California.

– High (3) likely to establish a widespread distribution in California.

2) **Known Pest Host Range:** LBAM is highly polyphagous and is reported to feed on plants in over 100 families. Therefore, it receives a **High (3)** in this category.

– Low (1) has a very limited host range.

– Medium (2) has a moderate host range.

– High (3) has a wide host range.

3) **Pest Reproductive and Dispersal Potential:** LBAM can fly. It can also be moved with infested plant material. It has multiple overlapping generations per year. Therefore, it receives a **High (3)** in this category.

– Low (1) does not have high reproductive or dispersal potential.

– Medium (2) has either high reproductive or dispersal potential.

– High (3) has both high reproduction and dispersal potential.

4) **Economic Impact**. LBAM has been established in California for at least 15 years. It has not been reported to cause significant impacts in this state, although some impacts may have gone unreported. LBAM is a quarantine pest in some countries. Some states may impose quarantines on California commodities to protect themselves against LBAM. Therefore, LBAM receives a **Medium (2)** in this category.

Economic Impact: A, C

A. The pest could lower crop yield.

B. The pest could lower crop value (includes increasing crop production costs).

C. The pest could trigger the loss of markets (includes quarantines).

D. The pest could negatively change normal cultural practices.

E. The pest can vector, or is vectored, by another pestiferous organism.

F. The organism is injurious or poisonous to agriculturally important animals.

G. The organism can interfere with the delivery or supply of water for agricultural uses.

Economic Impact Score: Medium

– Low (1) causes 0 or 1 of these impacts.

– Medium (2) causes 2 of these impacts.

– High (3) causes 3 or more of these impacts.

5) **Environmental Impact**. LBAM is highly polyphagous. It appears likely it is having some degree of impact to native plants; such impacts are rarely studied and in natural situations, chemical treatments that may control LBAM in agricultural settings are not present. Therefore, LBAM receives a **High (3)** in this category.

Environmental Impact: A, B

A. The pest could have a significant environmental impact such as lowering biodiversity, disrupting natural communities, or changing ecosystem processes.

B. The pest could directly affect threatened or endangered species.

C. The pest could impact threatened or endangered species by disrupting critical habitats.

D. The pest could trigger additional official or private treatment programs.

E. The pest significantly impacts cultural practices, home/urban gardening or ornamental plantings.

Environmental Impact Score: High (3)

– Low (1) causes none of the above to occur.

– Medium (2) causes one of the above to occur.

– High (3) causes two or more of the above to occur.

Consequences of Introduction to California for light brown apple moth: High (14)

Add up the total score and include it here.

–Low = 5-8 points

–Medium = 9-12 points

–High = 13-15 points

6) **Post Entry Distribution and Survey Information:** LBAM is established in 21 California counties. It receives a **High (-3)** in this category.

–Not established (0) Pest never detected in California, or known only from incursions.

–Low (-1) Pest has a localized distribution in California, or is established in one suitable climate/host area (region).

–Medium (-2) Pest is widespread in California but not fully established in the endangered area, or pest established in two contiguous suitable climate/host areas.

–High (-3) Pest has fully established in the endangered area, or pest is reported in more than two contiguous or non-contiguous suitable climate/host areas.

Final Score:

7) The final score is the consequences of introduction score minus the post entry distribution and survey information score: Medium (11)

Uncertainty:

There is uncertainty regarding the extent of environmental impacts LBAM may be having in California. There is some uncertainty regarding potential for LBAM to become a serious pest in the Central Valley.

Conclusion and Rating Justification:

Light brown apple moth is a pest that has been established in California since at least 2006. Efforts were made to eradicate and later contain it, but it has spread in the state and is now present in 21

counties. It does not appear feasible to eradicate it. In light of this and the lack of evidence for significant impacts in the state, continued regulation appears to be a poor use of resources. For these reasons, a C rating is justified.

References:

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Brown, J. W., Epstein, M. E., Gilligan, T. M., Passoa, S. C., and Powell, J. A. 2010. Biology, identification, and history of the light brown apple moth, *Epiphyas postvittana* (Walker) (Lepidoptera: Tortricidae: Archipini) in California. American Entomologist 56:34-43.

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Responsible Party:

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***Comment Period: 12/22/2021 – 02/05/2022**

***NOTE:**

You must be registered and logged in to post a comment. If you have registered and have not received the registration confirmation, please contact us at permits[@]cdfa.ca.gov.

Comment Format:

- Comments should refer to the appropriate California Pest Rating Proposal Form subsection(s) being commented on, as shown below.

  Example Comment:
  Consequences of Introduction: 1. Climate/Host Interaction: [Your comment that relates to "Climate/Host Interaction" here.]

- Posted comments will not be able to be viewed immediately.

- Comments may not be posted if they:

  Contain inappropriate language which is not germane to the pest rating proposal;

  Contains defamatory, false, inaccurate, abusive, obscene, pornographic, sexually oriented, threatening, racially offensive, discriminatory or illegal material;

  Violates agency regulations prohibiting sexual harassment or other forms of discrimination;

  Violates agency regulations prohibiting workplace violence, including threats.

- Comments may be edited prior to posting to ensure they are entirely germane.

- Posted comments shall be those which have been approved in content and posted to the website to be viewed, not just submitted.

Proposed Pest Rating: C