



United States
Department of
Agriculture

Animal and Plant
Health Inspection
Service

Plant Protection and
Quarantine

November 16, 2015



Pest Risk Evaluation on Cacti and Succulents for Light Brown Apple Moth (LBAM): Can They Be Exempted?

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BACKGROUND

From the time light brown apple moth, *Epiphyas postvittana*, was discovered in California in 2006, APHIS and the California Department of Food and Agriculture (CDFA) have taken steps to prevent its spread by implementing the *E. postvittana* Federal Domestic Quarantine Order (APHIS, 2007). This Federal Order defines quarantine areas and restricts the movement of numerous agricultural commodities.

For some of the regulated commodities, the likelihood of spreading *E. postvittana* may be sufficiently low to justify exempting these commodities from the quarantine, based on host status and specific industry practices.

Previous Plant Protection and Quarantine (PPQ) documents (APHIS, 2012a, 2012b, 2013) have led to the exemption of several commodities from the Light Brown Apple Moth (LBAM) program requirements. This current document is in response to a request from the California Association of Nurseries and Garden Centers exempt a list of cacti and succulent plants from all intrastate regulatory requirements contained in Title 3, Division 4, Chap. 3, Sect. 3434 *E. postvittana* Interior Quarantine (Zanobini, 2015)

Since its discovery in California, APHIS and the California Department of Food and Agriculture (CDFA) have taken steps to prevent the light brown apple moth from becoming widely established by enforcing quarantine areas and implementing certain restrictions on movement of agricultural produce out of quarantine areas. In addition to the program requirements, specific production practices for each commodity may reduce the risk of moving light brown apple moth out of the quarantine areas.

ASSESSMENT

We have already established that the consequences of introducing LBAM to new areas of the United States are unacceptable, so here we will focus only on the likelihood of introduction. This document considers the chain of events that must occur for the light brown apple moth to move outside of the quarantine area on a commodity and become established in new locations, and the likelihood of that happening. The following steps must be successfully completed:

1. The commodity must serve as a host for LBAM, and larvae must be present on the commodity during production
2. LBAM larvae must remain with the host plant through inspection and packing
3. LBAM larvae must survive shipment and arrive in an area suitable for their establishment
4. Larvae must escape from the host commodity into the open environment
5. Larvae must complete development to adults
6. From the resulting adults, moths of opposite gender must find each other and mate
7. Mated females must find host plants on which to oviposit
8. The resulting eggs must hatch and larvae develop through to adulthood in quantities sufficient to produce a breeding population

Host status is the first step in the chain of events needed to start a new LBAM population outside of the quarantine area through human intervention. Plants not known to be hosts are highly improbable pathway for LBAM introductions into new areas. Lack of host evidence indicates that the plant is probably not a preferred host, and that large infestations are highly unlikely to

occur on that host. Light brown apple moth has been in California for almost ten years and a large body of host data has been collected over that period.

Of the genera of cacti and succulents requested for exemption, we only found information on possible host associations between LBAM and the succulent genera *Euphorbia* and *Senecio*. Geier and Briese (1981) listed *Senecio* spp. (Compositae) and Zimmerman (1978) listed *Euphorbia* spp. (Euphorbiaceae) as hosts of light brown apple moth. Based on host status, the remaining genera requested for exemption (see Appendix 1) pose negligible risk for moving LBAM populations.

Recommendation

Exempt the genera listed in Appendix 1 from all intrastate regulatory requirements contained in Title 3, Division 4, Chap. 3, Sect. 3434 *E. postvittana* Interior Quarantine. Request more information about the production of the genera *Senecio* and *Euphorbia* before considering them for exemption based on production practices.

References

- APHIS. 2007. Federal Domestic Quarantine Order, *Epiphyas postvittana* (Light Brown Apple Moth), DA-2007-42. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Riverdale, MD. 5 pp.
- APHIS. 2012a. Risk Assessment: Exemption of Citrus, Stone Fruits, Apples, and Pears from Regulated Status in the Light Brown Apple Moth Federal Quarantine Order Based on Production Practices. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Center for Plant Health Science and Technology, Raleigh, NC.
- APHIS. 2012b. Risk Assessment: Exemption of Kiwi Fruit, Blueberries, Persimmons, Green Beans, and Daikon Radish (with or without tops) from Regulated Status in the Light Brown Apple Moth Federal Quarantine Order Based on Production Practices. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Center for Plant Health Science and Technology, Raleigh, NC.
- APHIS. 2013. Risk Assessment: Exemption of Cherries from Regulated Status in the Light Brown Apple Moth Federal Quarantine Order Based on Production Practices. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Center for Plant Health Science and Technology, Raleigh, NC.
- Geier, P. W., and D. T. Briese. 1981. The light-brown apple moth, *Epiphyas postvittana* (Walker); a native leafroller fostered by European settlement. Pages 131-155 in R. L. Kitching and R. Jones, (eds.). *The Ecology of Pests. Some Australian Case Histories*. CSIRO Australia.
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Appendix 1. Genera requested for exemption from the Light Brown Apple Moth quarantine by the California Association of Nurseries and Garden Centers

Cactaceae - *Acanthocalycium*, *Acanthocereus*, *Acanthorhipsalis*, *Aporocactus*, *Aporophyllum*, *Astrophytum*, *Austrocephalocereus*, *Azureocereus*, *Bolivocereus*, *Browningia*, *Buiningia*, *Carnegia*, *Cephalocereus*, *Cephalocleistocactus*, *Cereus*, *Chamaecereus*, *Chamaelobivia*, *Cleistocactus*, *Cochemiea*, *Coleocephalocereus*, *Consolea*, *Copiapoa*, *Coryphantha*, *Cryptocereus*, *Cryptocereus*, *Deamia*, *Denmoza*, *Disocactus*, *Dolicothele*, *Eccremocactus*, *Echinobivia*, *Echinocactus*, *Echinocereus*, *Echinopsis*, *Epiphyllum*, *Epiphyllum*, *Eriosyce*, *Erythrorhipsalis*, *Escobaria*, *Escontria*, *Espostoa*, *Espostopsis*, *Eulychnia*, *Facheiroa*, *Ferocactus*, *Gymnocalycium*, *Haageocereus*, *Hamatocactus*, *Hatiora*, *Heliabravoa*, *Helianthocereus*, *Hertrichocereus*, *Hylocereus*, *Isolatocereus*, *Isolatocereus*, *Lemaireocereus*, *Lemaireocereus*, *Lepismium*, *Lepismium*, *Leuchtenbergia*, *Leuchtenbergia*, *Lobivia*, *Lophocereus*, *Mammillaria*, *Matucana*, *Melocactus*, *Micranthocereus*, *Monvillea*, *Morawetzia*, *Myrtillocactus*, *Neobuxbaumia*, *Neocardenasia*, *Neoporteria*, *Notocactus*, *Opuntia*, *Opuntia*, *Opuntia*, *Oreocereus*, *Pachycereus*, *Parodia*, *Pereskia*, *Pilosocereus*, *Polaskia*, *Polaskia*, *Rebutia*, *Rhipsalidopsis*, *Rhipsalis*, *Rhipsalis*, *Schlumbergera*, *Selenicereus*, *Selenicereus*, *Stenocereus*, *Stenocereus*, *Stephanocereus*, *Stetsonia*, *Sulcorebutia*, *Tephrocactus*, *Thelocactus*, *Thrixanthocereus*, *Trichocereus*, *Vatricania*, *Weberbauerocereus*, *Weingartia*, *Zygocactus*, and *Zygophyllanthus*.

Agavaceae - *Mangave*

Aizoaceae - *Aloinopsis*, *Antimima*, *Aptenia*, *Argyroderma*, *Carpobrotus*, *Cephalophyllum*, *Cerochlamys*, *Conophytum*, *Cylindrophyllum*, *Delosperma*, *Dinteranthus*, *Drosantemum*, *Faucaria*, *Fenestriaria*, *Frithia*, *Gibbaem*, *Glottiphyllum*, *Lampranthus*, *Lapidaria*, *Lithops*, *Oscularia*, *Pleiospilos*, *Rabiea*, *Rhombophyllum*, *Ruschia*, *Schwantesia*, *Titanopsis*, and *Trichodiadema*.

Aloaceae – *Gasteraloe*, *Gasterworthia*

Amaryllidaceae - *Allium*

Apocynaceae - *Caralluma*, *Ceropegia*, *Cynanchum*, *Fockea*, *Hoodia*, *Huernia*, *Orbea*, *Stapelia*

Asparagaceae - *Agave*, *Aloe*, *Bowiea*, *Calibanus*, *Dasyilirion*, *Drimiopsis*, *Furcraea*, *Gasteria*, *Haworthia*, *Hesperaloe*, *Ledebouria*, *Ornithogalum*, *Sansevieria*, *Veltheimia*, *Yucca*

Commelinaceae - *Tradescantia*

Compositae - *Kleinia*, *Othonna*

Crassulaceae - *Adromischus*, *Aeonium*, *Aichryson*, *Bryophyllum*, *Cotyledon*, *Cotyledon*, *Crassula*, *Crassula*, *Cremnosedum*, *Dudleya*, *Echeveria*, *Graptopetalum*, *Graptosedum*, *Graptoveria*, *Jovibarba*, *Kalanchoe*, *Monanthes*, *Orostachys*, *Pachyphytum*, *Pachysedum*, *Pachyveria*, *Rosularia*, *Sedeveria*, *Sedum*, *Sempervivella*, *Sempervivum*, *Tacitus*

Cucurbitaceae - *Xerosycos*

Didiereaceae - *Alluaudia*, *Didierea*

Dioscoreaceae - *Dioscorea*, *Testudinaria*

Euphorbiaceae - *Monadenium*, *Pedilanthus*, *Synadenium*.

Fouquieriaceae - *Fouquieria*

Gesneriaceae - *Reichsteinaria*

Malvaceae – *Bombax*

Piperaceae - *Peperomia*

Portulacaceae - *Anacampseros, Calandrinia, Portulaca, Portulacaria*

Vitaceae - *Cyphostemma*

Xanthorrhoeaceae - *Bulbine*