Light Brown Apple Moth

Where the UK is an attractive target market for global exporting territories, not only of food, we are exposed to receiving and harbouring unwelcome foreign pests, some of whom can establish rapidly with potentially devastating results.

Exosect Ltd. is at the forefront of developing integrated pest management solutions through the introduction of species specific pheromone products to serve the agricultural and professional product sectors.

Exosect recently received many urgent requests from the horticultural and viticulture industries to solve their limited options for control of Light Brown Apple Moth (Epiphyas postvittana). In response, Exosect worked closely with the Chemical Regulation Directorate (CRD) in the UK and secured an emergency approval for a 120 day licence. This approval has been a lifeline to UK growers of high value crops of cherries, grapes, blueberries and plums. Exosect is now working with the UK authorities to develop the information required to establish full registration of Exosex® LBAM Tab™ for use from the 2010 season.

Pest Geographic Spread and Biology

Light Brown Apple moth originated from Tasmania, Australia, and has become established in mainland Australia, New Zealand, New Caledonia, Hawaii, California and the British Isles. Originally discovered in Cornwall in 1936 it is now seen as a major pest of ornamentals, soft and tree fruits across the UK.

Adults are light brown, yellowish moths with varying amounts of darker brown, with a wingspan of 16–25 mm. Females are larger than males, and usually have less distinct markings, but often have a distinct spot in the middle when the wings are closed. Male moths have a dark band on the hind part of the forewings.

Eggs are blue-green when newly laid but turn green-yellow close to hatching and are deposited slightly overlapping each other in groups of 20–50. They are superficially similar to other native tortricid larvae and analysis is usually necessary to confirm their identity. The body of a mature larva, about 18 mm long is medium green with a darker green central stripe and two side stripes. This green longitudinal striping is helpful for distinguishing light brown apple moth caterpillars from the other (native) leafrollers. Pupae are brown, about 11 mm long.

Adults are poor flyers and rely on wind for dispersal. The male typically flies in a main flight between the periods 2-3 hours after sunset. It has a smaller flight peak 2-3 hours after sunrise. There are significant peaks in flight activity associated with Full Moon and New Moon. This is believed to be associated with it's poor flying ability as the moth relies on wind for dispersal and winds are more prevalent at these times in the lunar cycle.

Light Brown Apple Moth has been associated with many plants representing 290 genera (USDA 2008). These genera contain over 2000 species and many of these species that are not already known to be hosts could prove to be hosts as LBAM becomes exposed to them.

Development is continuous, with no true dormancy. In Australia, this moth typically has three generations per year and over–winters as a larva. Life cycle projections for the UK where it has been found indicate that two to three generations are

possible. Females deposit egg masses described as egg rafts, containing 20–50 eggs on the upper leaf surface or on fruit. Fecundity varies considerably and females are capable of laying up to 1500 eggs in their lifetime. The larvae disperse and construct silken shelters on the underside of leaves, usually near a midrib or large vein. Older larvae roll together leaves and buds or fruit with webbing. Larvae can damage fruit surfaces and they will occasionally enter the fruit to feed. Pupation takes place within the larval nests. Damage can often be hidden under the shielding plant parts used by the larvae as a cover. Secondary infestations and subsequent yield loses due to diseases, including

Julian Searle UAP - Grape bunch damage

Botrytis, are a major impact of infestation from this pest. Control with insecticides is problematic as the pest tends to spin a web shelter with plant foliage and fruiting bodies. They also are found in difficult locations such as developing grape bunches. Due to the number of generations per year and the number of available host plants, the development of resistance to overused insecticides is of concern.

Exosect has been monitoring infestation levels in the UK (see below). Significant moth captures have been found in apples and vines in Kent. It has been estimated that LBAM can diminish yield by between 5-20%.

Julian Searle from UAP has noted that direct infestation of the flower clusters is a threat to cropping and comments, " This pest is now feeding amongst florets and weaving between them for protection. It is not easily seen and contact with pesticide is difficult to achieve. I recommend careful inspection and quick action. The reason to deploy Exosex LBAM Tab is that once the pest has infested it is difficult to control because it is 'tucked away' beyond conventional pesticide applications."

Control with 'active' mating disruption is relatively easy as the life cycle is targeted prior to the laying of eggs and also prior to the hatching of larvae and their construction of harborages.

Exosex LBAM Tab contains synthetic female Light Brown Apple moth pheromone, which is formulated with Exosect's patented Entostat™ powder. The system works by attracting males to the tablet where the electrostatic Entostat powder adheres to the antennae and body of the males. The sensors of the coated moths become overwhelmed. The male moths are unable to detect females, and therefore do not mate, resulting in fewer eggs and emerging caterpillars to cause damage. Exosex LBAM Tab works continuously in the background as a prophylactic treatment regardless of weather conditions. Used as the cornerstone of any control programme the Exosex LBAM Tab will result in fewer spray applications; can be used during harvest interval stage, thus helping to reduce pest resistance and eliminate insecticide residues.

A new organic vineyard in Kent is currently trialling the Exosex LBAM Tab where Chardonnay, Pinot Noir and Pinot Meunier are grown organically for the production of quality traditional method sparkling wine. The first harvest will be made in 2009 for a wine that will be released in 2012. It is vital that the crop is in optimum condition from the outset, but as an organic grower their armoury for dealing with disease is strictly limited to only copper and sulphur for protection against mildew, so treatments against botrytis is limited. LBAM is a significant contributor to botrytis damage through the damage caused to berries. Yield is also adversely affected as a result of LBAM feeding on flowers and developing berries.

Exosect works with species specific pheromones, which is most helpful for assisting biodiversity and beneficial insects. Much work is being done within Europe on other pests as well. Exosex OFM for the control of Oriental Fruit Moth *(Grapholita molesta)*, and trials are being done to control Grape Vine Moth *(Lobesia botrana)* and Grape Berry Moth *(Eupoecilia ambiguella)*.

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