

What You Need to Know to Control European Grapevine Moth *Lobesia botrana*

Adult



Egg



Larva



Larva



The European grapevine moth, *Lobesia botrana*, is a serious pest of grapes feeding on the flowers, bunches and berries. Grape cultivars with tight clusters and higher sensitivity to rots suffer greater damage.

Like other tortricid Lepidoptera European grapevine moth, when disturbed, will wiggle and drop on a silken thread. Each generation has 5 larval instars ranging in size from 0.04 of an inch to 1/2 inch. Larvae color evolves from a creamy white color with a black head upon emergence to a darker yellowish brown and green maroon colors in later instars; reflecting the colors of its gut contents. The adult moth is about 1/4 of an inch with a wing span of 1/2 inch. Wing colors are a mosaic pattern: tan-cream color, mottled with gray-blue, brown and black blotches. Pupae over-winter in a silken cocoon.

Based on climatic conditions, *L. botrana* can have from 2-4 generations per year. Under California conditions 3 generations are likely. It is recommended that all generations be controlled.

First generation adults fly between early April and mid-May. Significant egg hatch occurs 5-10 days after peak flight. Search for eggs around flower buds, pedicels and fruit clusters. After egg hatch, look for webbing and larvae around flower parts and fruit clusters. Damaging larvae continue to emerge from May to June.

Second generation adults fly from mid-June to late July. Significant egg hatch occurs 3-7 days after peak flight. Larvae feed on green berries, hollow them out and leave the skin and seeds. Larvae will continue to emerge from July to August

Third generation adults fly from late August until late September. Significant egg hatch occurs about a week after peak flight. Damaging larvae continue to emerge from August to September. Third generation larvae, if populations have been allowed to grow, cause the greatest damage by feeding on berries after veraison exposing berries and clusters to bunch rot and other secondary fungi.

Traps should be used to monitor male moth flights and should be set out at budbreak. Place at least 1 trap per 30 acres and monitor 2-3 times per week. Plot catches to determine initiation and peak flight. Continue to monitor through the peak of the third flight. **DiPel[®] Biological Insecticide applications should be initiated about 10 days after peak male flight for each generation.**



DiPel Applications in Grapevines for *Lobesia botrana*

DiPel, *Bacillus thuringiensis kurstaki*, is the gold standard of Bts. Bts were first discovered over 100 years ago and ever since have survived resistance build-up and continue to be effective and noble insecticides for man and environment. *DiPel* is safe to beneficial insects and compatible with monitoring and disruption pheromones and other IPM practices.

DiPel

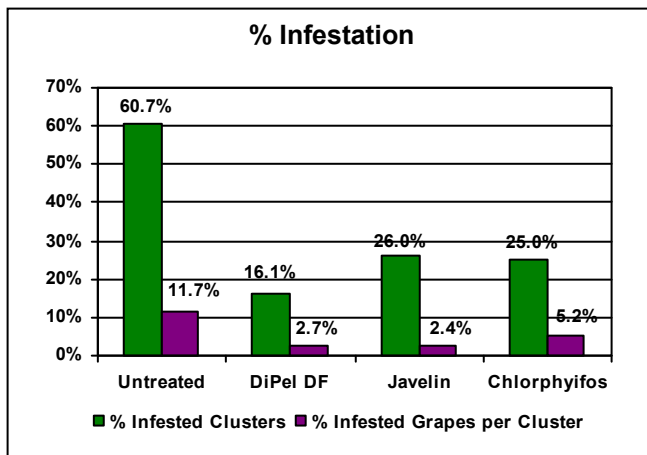
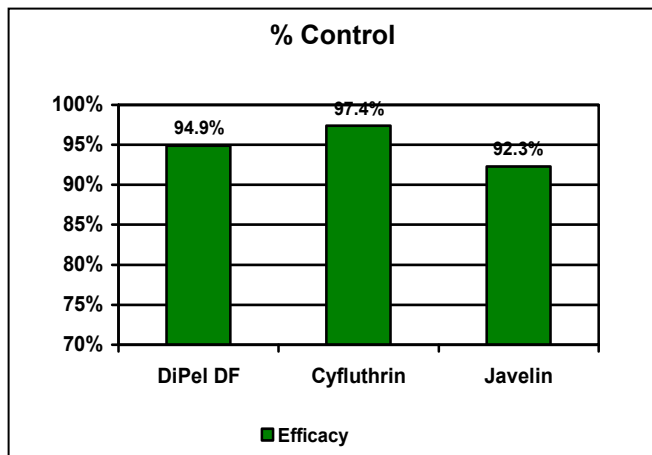
- provides effective control for *Lobesia botrana*
- is rated organic
- is exempt from MRL requirements
- does not leave a chemical residue
- toxin proteins provide a multi-component mode of action
- prevents build up of insecticide resistance
- is not harmful to beneficial insects
- is not harmful to birds, fish, bees, wildlife or the environment.

Strain Specific Insecticidal Toxins and Spores

Species	Major Toxins in <i>DiPel</i>				in <i>DiPel</i>		
	Cry1Aa	Cry1Ab	Cry1Ac	Cry1C	Cry1D	Cry2	
<i>Argyrotaenia citrana</i>	+	++	+	+			
<i>Helicoverpa zea</i>	+	++	++			+	
<i>Lobesia botrana</i>	+	++	+		++	++	++ Highly Active + Active
<i>Mamestra brassicae</i>	+	++		++	+		
<i>Plutella xylostella</i>	++	++	++	++	+		
<i>Spodoptera spp</i>	+	++		++	+		
<i>Tortrix (other species)</i>	+	++	+	+		++	
<i>Trichoplusia ni</i>	+	+	++	+	+	++	

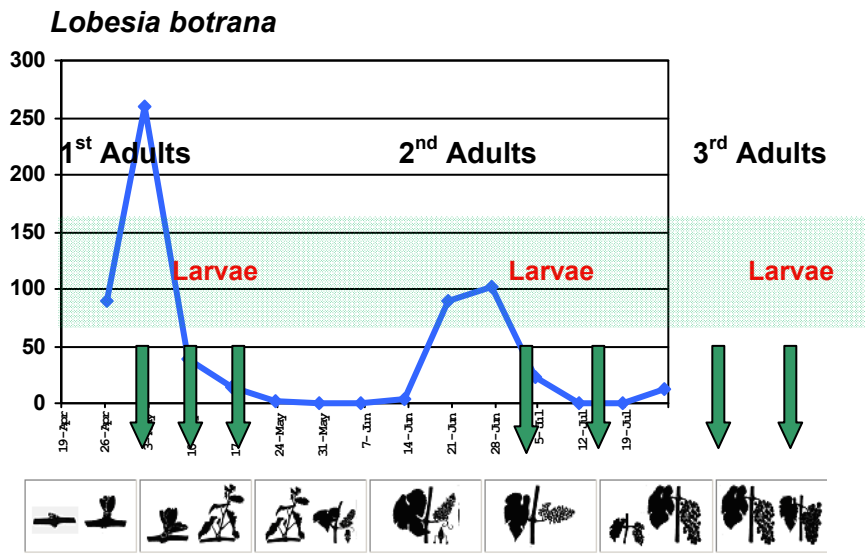
From Literature and Bt toxin websites (<http://www.gfrc.forestry.ca/bacillus/BtSearch.cfm>)

Excellent field results with *DiPel* Globally on *L. botrana*



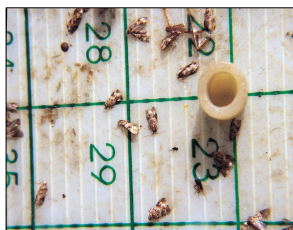
DiPel Timing

DiPel Applications
start about 10 days after peak male flight; repeat as necessary



DiPel Monitoring

Trap



1. Check traps weekly and record counts. Start **DiPel** treatments about 10 days after peak moth flight or at the black head stage.



Black Head Stage



Early Instar

For best results, apply **DiPel** at the black head stage through early (up to 3rd) instar.

DiPel Rate

1 – 2 lbs per acre. Use higher label rate under heavy pest pressure. For best results, apply twice per generation, depending on pest pressure. The first generation is more protracted and may require 3 applications.

DiPel Coverage

Thorough spray coverage is needed to obtain uniform deposit of DiPel at the site of larval feeding. Larvae must be actively feeding on the treated, exposed plant surfaces. Use a spreader sticker for hard-to-wet crops and to improve rain fastness.

ADDITIONAL INFORMATION

Cooperative Extension Newsletter

<http://cenapa.ucdavis.edu/newsletterfiles/newsletter2084.htm>

Napa County Agricultural Commissioners

<http://www.countyofnapa.org/agcom>

California Department of Food and Agriculture:

<http://www.cdfa.ca.gov/PHPPS/egvm/index.html>

UC IPM Grape Pest Management Guidelines:

<http://www.ipm.ucdavis.edu/EXOTIC/eurograpevinemoth.html>



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DiPel DF is NOP- and OMRI-listed for organic production. tl/mf 4/10