Looking for *Lobesia botrana* in Infested Clusters Processed for Wine Making

Rhonda Smith*, Lucia Varela*, Monica Cooper**
*UCCE Sonoma County; **UCCE Napa County

I. Press trials

We evaluated the survival of *Lobesia botrana* larvae in infested Chardonnay clusters processed in a small winery press in 2010. To obtain infested Chardonnay, we sourced larvae from more readily available infested Cabernet Sauvignon clusters. Infested clusters were transported to the UC Davis Oakville Experimental Vineyard under state plant pest permit No. 2723. A section of rachis containing 3-9 berries and a single larva of *L. botrana* were removed and inserted into an uninfested Chardonnay cluster. A total of 171 Chardonnay clusters infested in this manner were sewn inside individual mesh bags for processing in a 200 pound capacity Willmes press.

Mesh bags were separated into two groups of equal numbers, and 10 clusters were randomly selected from each group to be the controls. The 20 control clusters were not put into the press. Each mesh bag was cut open and the control cluster removed then observed using a dissecting scope in the cooperating winery's lab. The status of the larva – "dead", "alive" or "not found" - in each control cluster was determined while the two press cycles were underway.

The Willmes press was used in two separate press trials. A total of 75 or 76 individual Chardonnay clusters, each inside a mesh bag, constituted one third of the clusters in each of two separate press loads. Pressure was ramped up in increments of approximately 0.25 and 0.3 bars to reach 1.5 and 1.8 bar endpoints respectively. The total time under pressure and total cycle time for each load was about 56 minutes and 120 minutes respectively.

After each press cycle was complete, all mesh bags were retrieved from the press. Bags were transported to the lab at the UCCE Sonoma County office (under Compliance Agreement No. CA49QEVGMW1000418) and placed in a refrigerator. Clusters were evaluated over a three-day period to determine the status of each larva as previously described.

There were "missing larvae" in both the control clusters as well as those that were pressed. A larva could not be found in four of the 20 control clusters. Larvae were missing from 12 clusters pressed in each of the two press cycles (16% of pressed clusters per cycle). Larvae may have been overlooked while dissecting clusters or it is possible they were not present inside the Cabernet Sauvignon berries used to infest the Chardonnay clusters.

Analysis

We determined if the incidence of dead, alive or missing larvae was observed more frequently than predicted by using chi-squared analyses.

Results

A single larva survived the 1.5 bar press; no larvae survived the 1.8 bar press. **Pressure differences between 1.5 bar and 1.8 bar end points did not alter mortality, and this was true regardless of the fact there were missing larvae.** In addition, **mortality was not affected by the stage of the insect inside the pressed clusters** (clusters contained either 2nd through 5th larval stages or pupae).

Conclusion
Nearly all *L. botrana* larvae were killed by pressing whole clusters in a low capacity press. Under the conditions created by the Willmes press in these trials, it is possible that at an end pressure 1.5 bars or less, larvae could survive the press cycle. For any surviving larvae to be a source of adult moths the following year, these larvae must successfully pupate inside the pomace piles located at the winery or at a different location if the pomace is transported off site.

II. Destemmer trial

We evaluated the survival of *L. botrana* in infested Cabernet Sauvignon clusters with a destemmer set to process 4 tons per hour. First, a single tub of 51 infested clusters (containing a total of 53 larvae) was processed and berries and all waste material were collected separately. Waste material included stems, dried berries and debris collected from the tray under the sorting table or clinging to the destemmer or stainless steel drum. After the destemmer was cleaned, a larger volume of fruit was processed. A total of 905 clusters, weighing 355 pounds were sent through the destemmer. Prior to destemming, a subsample of 180 clusters was observed and 27 *L. botrana* larvae were found, thus we estimated that 15% of the total clusters were infested.

Results
The 51 clusters generated 15.9 pounds of berries and each berry was observed for the presence of a larva. A total of 16 larvae were located (30% of the total larvae that entered the destemmer) and 10 of the 16 were alive (62%). Thus 19% of the total larvae that entered the destemmer survived inside the berries that came out of the destemmer.

All waste material was observed for the presence of larvae including 1.5 pounds of stems and 0.4 pounds of dried berries and material collected from the tray under sorting table, the destemmer and stainless steel drum. No larvae were located on any waste component.

The 905 cluster lot sent through the destemmer generated 270 pounds of berries and 24.6 pounds of waste. Only the waste material was evaluated and no *L. botrana* larvae were located.

Conclusion
Larvae from infested fruit were not found on the cluster stems or on any other waste component when a single tub of clusters, each containing at least a single larva, was destemmed in a commercial destemmer. A thorough examination of all material accounted for only 30% of the total larvae. We assume the balance of the larvae were destroyed and were not recognizable in the waste materials. Larvae were only located inside intact or partially crushed berries. Under normal production practices, these berries would be transported, sometimes by pump, to a fermentation tank.

When over 350 pounds of fruit was processed, estimated to have 136 *L. botrana* larvae (15% of the clusters infested), no larvae were found on stems or other waste. Under the conditions of this trial, live larvae remain inside berries or may be killed in the destemming process and stems were not a source of live larvae.