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Leafhopper Management

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Leafhoppers are a serious pest of grapevines in the San Joaquin Valley. A complex of two leafhopper species are involved: variegated and grape. The biggest concern for raisin and wine grape growers is excessive damage to the vine's leaf canopy from feeding and the discomfort to pickers caused by the adult leafhoppers.

Many raisin vineyards don't require treatment for leafhoppers every year. To help make the correct treatment decision, leafhoppers should be monitored during the season, especially during summer broods beginning early July. Treatment with a pesticide is only necessary when the leafhopper population exceeds the action level. A population greater than the action level can result in excessive canopy damage, loss of yield, and delayed fruit maturity.

Canopy damage primarily occurs from July until the end of the season. Both leafhopper adults and nymphs feed on leaves by puncturing the leaf cells and sucking out the contents. Feeding damage appears as white spots or stippling. Leaves that are heavily damaged lose their green color, dry up, and fall off the vine.

Monitoring Leafhoppers

Monitoring is accomplished by counting the nymphs (crawlers) which are young leafhoppers that cannot fly. Nymphs are counted on 15 to 20 leaves for a vineyard block (40 acres or less), and the average nymphs per leaf calculated. This operation takes about 20 to 30 minutes and, in addition to monitoring leafhoppers, it is a good opportunity to scrutinize the vineyard. During the summer, select leaves from the midshoot position showing the heaviest feeding damage. Count the leafhopper nymphs on both sides of the leaf. It is not necessary to distinguish between the variegated and grape leafhopper.

Don't pick leaves in just one location. Walk around the perimeter of the vineyard stopping every six to ten rows. Walk down the row at least five vines before picking a leaf to count. After the nymphs have been counted on 15 or 20 leaves (each leaf from a different vine) then determine the average. Record the average nymphs per leaf, date, and block identification.

Estimating Canopy Damage

In addition to monitoring leafhopper nymphs, it is useful to estimate damage of a vine's canopy during the season. Keep in mind that the loss of more than 20 percent of the effective leaf area by harvest should be avoided. Excessive defoliation can reduce yields or delay maturity.
Begin by sharpening your observation skills. Pick a leaf with feeding damage, study it carefully, and then estimate percent loss of green color, chlorophyll. Expand your observational skills by selecting an exposed shoot on the outside of the canopy. Look at each of the 10 or 15 mature leaves on the shoot and again estimate loss of chlorophyll for the entire

shoot. Now that you're trained, stand back and look at the entire vine, and make a judgment on loss of chlorophyll for the entire vine.

There is a close relationship between visible leaf damage observed in the field and the actual loss of photosynthetic activity measured in the laboratory. A leaf that is estimated to have 30 percent visible leaf damage is in fact absorbing 20 to 25 percent less photosynthetically active radiation and has 20 to 25 percent less chlorophyll than an undamaged leaf. The leaf damage you see is a close approximation to the actual photosynthetic loss measured in the laboratory.

Most vineyards in the San Joaquin Valley have much more leaf area than needed to mature the crop. Therefore, it is understandable that a loss of 20 to 30 percent of the canopy from leafhopper feeding usually does not affect yield or maturity. For example, table grape growers routinely remove 30 to 50 percent of the canopy on some varieties with no discernible effect on production or maturity.

Action Levels for Raisin and Wine Grapes (Thompson Seedless)

Damage to leaves primarily occurs after July; therefore, it is important to monitor leafhoppers and vine damage beginning early July. The best time to treat 2nd brood leafhoppers varies slightly from year to year but is usually towards the end of July or early August. Treatment should occur before a significant number of nymphs have emerged as adults.

Treatment is not necessary if nymphal populations do not exceed an average of 20 nymphs per leaf or canopy damage does not exceed 20 percent by harvest. It is important to emphasize this is based on an average, not on one leaf that happens to have a high population: the number of leafhopper nymphs varies widely from leaf to leaf.

There is a distant relationship between the average nymphal populations and canopy damage. As a rule, an average of one nymph per leaf sustained through the months of July and August will result in 1% damage to the canopy by September 1, and 20 nymphs per leaf will result in 20% damage, 30 nymphs per leaf equal 30% damage, etc.

No action level has been established for first brood (May through June). First brood nymphal populations begin to develop on basal leaves around bloom but rarely result in enough leaf loss to affect vine growth, yield, or fruit quality. Leaf damage from feeding is limited to basal leaves which are shaded by the time significant damage has occurred. Also, nymphal populations during the first brood do not always reflect summer brood populations.

Leafhopper adults can be a serious nuisance for workers during harvest. The above action levels are based on canopy damage and production consideration. However, these levels may result in adult populations above the comfort threshold of some workers at harvest.

Action Levels for Table Grapes

Spotting of berries from leafhopper excrement is the primary concern with table grapes; therefore, the action level is lower for table grapes. Table grapes can tolerate about one-half to two-thirds the leafhopper nymphal populations tolerated by wine or raisin grapes.