

Section VIII  
Mites & Sap-sucking Insects

A SEQUENTIAL SAMPLING PLAN FOR LEAFHOPPERS ON WINE GRAPES

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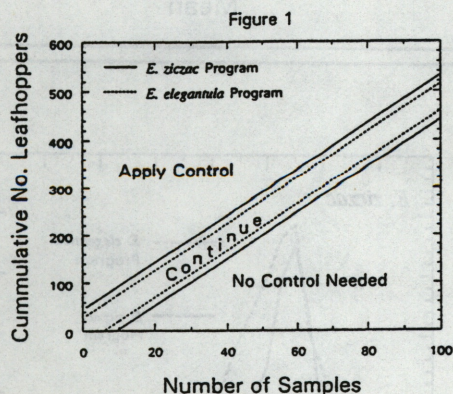
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The western grape leafhopper (WGLH), *Erythroneura elegantula*, and the Virginia creeper leafhopper (VCLH), *E. ziczac*, are pests of wine grapes in south central Washington. Most vineyards are sprayed at least once each summer to control these leafhoppers. We developed sequential sampling programs based on leafhopper nymphs to give growers a relatively easy method to help them decide when spraying is necessary.

Data from 110 WGLH and 91 VCLH field samples from vineyards sampled in 1991, 92 and 93 were used to develop the sampling programs. Two separate sampling programs had to be developed because VCLH had a more aggregated spatial distribution than WGLH. We developed the sampling programs based on Wald's sequential probability ratio test, which is a standard method. Figure 1 shows a graphical representation of the sampling programs. No economic injury level has been



established for these insects on wine grapes, but growers have been using a mean of five nymphs per leaf in the first generation as a level at which to spray. The lower decision line, below which no control should be needed, was set at a mean of 4 nymphs per leaf. The upper line, which indicates that a control should be applied, was set at 6 leafhoppers per leaf. The  $\alpha$  and  $\beta$  values, which adjust the error and number of samples, were set at 0.1. The decision lines for VCLH are farther apart than for WGLH because the greater aggregation

(variance) of VCLH requires more samples for the same level of precision.

The sampling programs were tested by using them to sample computer-generated data sets and comparing the sampling results with the true means of the data sets. Both

sampling programs were used for each species of leafhopper. The computer simulation allowed us to determine the average number of samples (the amount of effort) required to make a decision, and the error (percentage of wrong decisions) over a range of leafhopper densities. The VCLH program required more samples than the WGLH program because the decisions lines were farther apart (Fig. 2). The percent of wrong decisions made when sampling WGLH was not greatly different between the two programs (Fig. 3). However, sampling VCLH with the VCLH program resulted in considerably less error than the WGLH program. Because vineyards often contain both species of leafhoppers, the safest general approach would be to use the VCLH program. However, by identifying the nymphs, probably some time could be saved by using the appropriate sampling program.

Figure 2

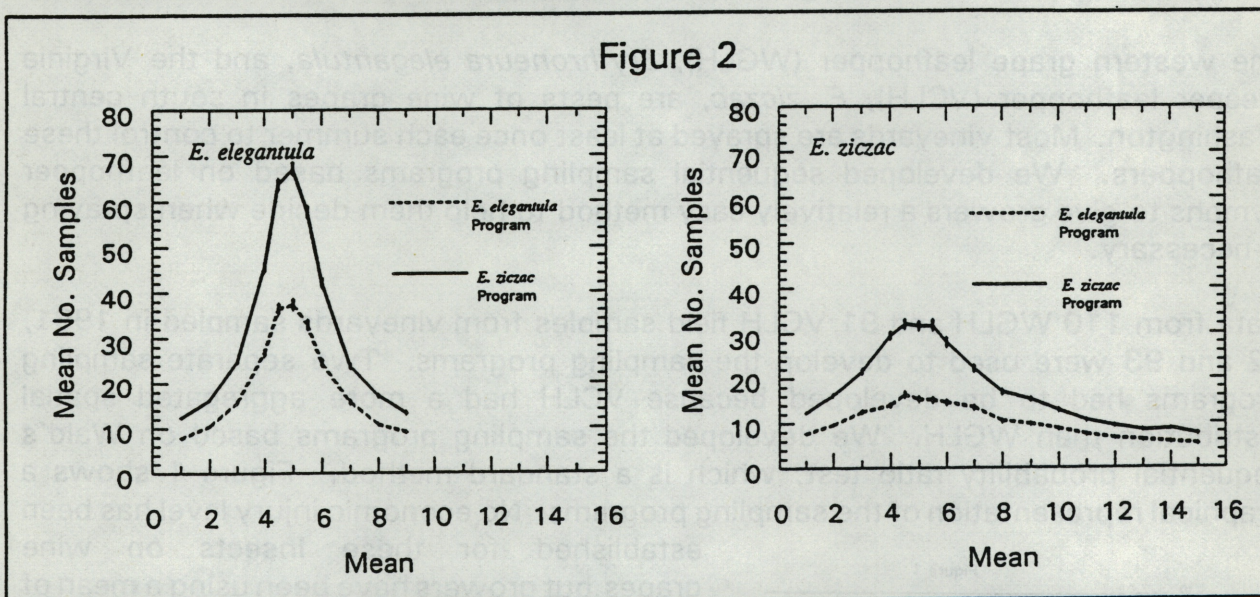


Figure 3

