INCIDENCE, NATURAL SPREAD AND EPIDEMIOLOGY OF WALNUT BLACKLINE DISEASE

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ABSTRACT

The incidence of blackline was determined in 16 counties. One-hundred-eighty-five orchards were randomly selected and the trees inspected during the summer. The data was then summarized by county and district. Blackline was found in all counties inspected. Low incidence of blackline was found in Lake, all Sacramento Valley counties except Yolo, and counties in the southern San Joaquin Valley. A high incidence was found in Contra Costa, San Joaquin, Stanislaus, Merced, Yolo and San Benito County.

Although we do not have experimental evidence, these surveys suggest a possible relationship between the pattern of natural spread and the prevailing direction of wind currents. When plotted on a state map the disease incidence decreases with distance from the San Francisco bay area (original point of introduction).

The data is being analyzed further to examine blackline differences in relation to location, age and variety. The impact of blackline on yield also is being evaluated.

OBJECTIVES

1. To assess the geographic distribution and incidence of blackline in commercial walnut orchards.

2. Attempt to measure the present economic impact of the disease on the industry and project possible future effects of blackline on walnut productions.

3. To delineate those areas with very low disease incidence where a blackline eradication program might be considered.

4. To determine feasibility of seriological testing (ELISA) of pollen, in estimating the extent of symptomless trees that may be infected with blackline virus in diseased orchards, and to utilize this information to improve current control strategies.

PROCEDURE

A sample of 3 to 5% of the walnut acreage within each county was randomly obtained. A twenty percent sub sample of each orchard was visually inspected during the summer for blackline. A window at the bud union was cut in all trees with symptoms suggesting the presence of blackline for final confirmation of the disease.
After the orchard was examined and mapped, the data was tabulated and statistically evaluated. The incidence of blackline within each county or geographic area is being determined from these samples.

Information on yields and tree losses from high incidence blackline orchards is being obtained. From these data an attempt will be made to measure the effect of blackline on orchard production. Also, the yields of selected low incidence orchards throughout the state will be monitored over the next several years in relation to the progression of blackline in the orchard.

One-hundred trees were shook and catkins sampled in several orchards during the spring. These samples were then analyzed by the ELISA test for the presence of the blackline virus.

RESULTS

The incidence of blackline was determined in one-hundred-eighty-five randomly selected orchards in 16 counties. The data has been summarized by county and district. Blackline was detected in all counties inspected. Low incidence of blackline was found in Lake, all Sacramento Valley counties except Yolo, and counties in the southern San Joaquin Valley. A high incidence was found in Contra Costa, San Joaquin, Stanislaus, Merced, Yolo and San Benito counties.

The data is being further analyzed to define those parameters such as location, age and variety which might help in the interpretation of the survey results. Thus, this is a preliminary report on work that is still in progress.

Because of the extremely wet spring this year, several problems occurred during pollen collection. Many orchards were too wet for shaking equipment and past their prime pollen shedding time when we could get equipment into the field. Many of the catkins collected had already shed most of their pollen; thus, the amount of pollen from these catkins was insufficient to provide a reliable sample for detection of blackline virus by ELISA. As a result, only a small proportion of symptomless trees were shown to be positive and many of the trees with known blackline were shown to be negative by the test.

CONCLUSIONS

Although we do not have experimental evidence, these surveys suggest a possible relationship between the pattern of natural spread and the prevailing direction of wind currents. When plotted on a state map, the disease incidence decreases as distance from the San Francisco bay area increases.

Blackline was detected in an occasional tree in all counties surveyed. It appears that quarantines to prevent the introduction of blackline from all outside sources probably would not prevent the occasional introduction by natural causes and thus would not be totally successful.