THE EFFECT OF CROWN GALL ON TREE GROWTH AND PRODUCTIVITY 1999

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ABSTRACT

A study conducted in 1997 evaluating trunk cross sectional growth of crown gall infected trees showed that the trees with crown gall infecting more than seventy five percent of the circumference of the trunk were visibly stunted and showed a severe reduction in trunk growth from 1996-1997. Because surgical removal of galls of this proportion would require girdling nearly one hundred percent of the trunk’s circumference, these trees were replaced. Trees with galls infecting less than seventy five percent of the trunk circumference had no reduction in trunk cross sectional growth.

In 1999, from trees that had galls successfully removed (those with less than seventy five percent of the trunk infected) there was no statistical difference between those trees and trees that were never infected by crown gall in terms of yield or trunk growth.

In 1999, trunk growth of infected trees in which galls were not surgically removed was not significantly different from uninected trees. However there was a yield difference with trees with no gall and galls up to ¼ around the trunk out yielding trees with larger galls.

The success of surgically removing galls was very good in cases where the area infected with crown gall was completely exposed and the gall was completely extracted. One hundred percent of galls that were not completely exposed and isolated from the surrounding soil had re-growth and had to be treated a second time. Surgical removal was not successful where the gall was not fully exposed. Crown gall infection must be completely exposed to insure successful treatment. Treating galls with heat is being evaluated as a new technique for eliminating galls.

OBJECTIVES

A goal of this study is to determine the effect of crown gall infection on trunk growth and yield of Chandler walnuts on paradox rootstock where the galls were successfully surgically removed. Another goal is to examine the effect of crown gall infection on growth and yield of “76-80” walnut trees on paradox rootstock in which the galls were left untreated. The degree of success of removal of galls using various techniques is the third goal of this study.

PROCEDURES

All trees on Paradox rootstock were examined for crown gall infection in 1997 in this five acre variety trial. Trees were grouped into four categories: 1) no crown gall infection 2) crown gall infection up to 25 percent of the trunk circumference 3) crown gall infection up to 50 percent of the trunk circumference 4) crown gall infection up to 75 percent of the trunk circumference. “76-80” trees on Paradox rootstock were left untreated. Chandler trees on Paradox rootstock were treated. Five single tree replicates in each category were evaluated. Yield and trunk cross
sectional area (TCSA) were measured as pounds of nuts per tree and TCSA 20 cm above graft union, respectively.

Surgical removal followed by chemical treatment was used to eradicate galls. Trees were then evaluated three months after treatment for gall re-growth. Trees with re-growth of crown gall were treated again. Re-treatment was done with heat using a propane torch. Evaluation of this technique will take place in 2000.

RESULTS

In 1999 there was no significant difference in TCSA or yield from trees that were treated for various size galls and trees that had no galls (Figures 1 and 2).

Trees with crown gall girdling up to seventy five percent of the trunk circumference were not statistically different from trees that were not infected in terms of TCSA but were different in terms of yield (Figures 3 and 4). The ultimate growth and yield potential of these trees is not known. To answer this question, measurements will continue for a number of years.

Gall removal with heat began in the summer of 1999. Previous experience suggests evaluation of the success of gall removal techniques wait 6-9 months. Consequently evaluation of this technique will be made next year.

DISCUSSION

Crown gall infection has had no significant affect on trunk growth or yield of trees when the galls were removed in the second year. Where galls were not removed a yield difference was seen in 1999. This suggests that prompt gall removal is important. The long-term effect of not treating crown gall infection is not fully known but severe infection may affect the longevity of an orchard. It is suspected that untreated crown gall infection could make trees more susceptible to root rots and blow over problems. For successful surgical removal of galls, the entire gall should be exposed and isolated from healthy tissue with at least a one-inch margin of uninfected tissue around the gall. The use of heat may be a new and improved method of treating galls.