COMPARISON OF EFFICIENCY OF POTASSIUM APPLICATION METHODS TO WALNUTS INCLUDING INJECTION AND DISTRIBUTION THROUGH SPRINKLERS

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ABSTRACT

A trial was set up in a potassium-deficient walnut orchard in 1984 to compare the efficiency of various methods of applying potassium. Of the methods tested, KNO₃ foliar sprays showed no benefit in terms of increased leaf K levels. All other treatments including sprinkler-applied, drilled in applications, banded applications, and untreated showed a slight improvement in leaf K levels. Soil analysis has been shown to be a useful tool in finding where soil-applied K goes in the soil.

OBJECTIVE

To question the practice and belief that potassium applied with water and held in the water film is more available to tree roots and therefore the application of potassium through sprinkler systems is a desirable way of maintaining good potassium status in the tree. Also to evaluate the efficiency of this and other methods of applying potassium.

PROCEDURE

A trial was established to compare different application methods of dry potassium: 1) Jan. '84, 1000 pounds/acre potassium sulfate drilled in every 3-4 years; 2) Jan. '84, 1000 pounds/acre potassium chloride drilled in every 3-4 years; 3) Each September starting in '84, 400 pounds/acre potassium chloride banded annually; 4) 400 pounds/acre potassium chloride injected through sprinkler system during each growing season, starting in '84; 5) untreated check; and 6) foliar nutrient sprays in 1985 (one year only).

The injection of KCl is accomplished with four irrigations during the growing season, each irrigation receiving 100 lbs. of KCl. Dry KCl is being dissolved in water for the injection. Liquid KCl was considered but was found to be too expensive.

Leaf and soil analysis and visual symptoms will be the initial measurements taken to reveal any benefits from the various application methods.

RESULTS

Results from 1986 and 1987 leaf analysis are not available at this time. Soil samples taken to determine the depth of applied K revealed that sprinkler-applied K is in the top 3" of soil while banded applications have gone down deeper in the soil (see graph).
CONCLUSION

No conclusion can be drawn at this time about the efficiency of the K application methods tested except that foliar K sprays on walnuts appear to have no benefit. Since soil samples indicate that banded treatments penetrate the soil to deeper depths than broadcast treatments, this may be a better way to apply K.
PPM SOIL K

KCL BANDED
400 LBS/A/YR (3 YEARS)

KCL BANDED
1500 LBS/A (1986)

SPRINKLER
400 LBS/A/YR (3 YRS)

CHECK

SOIL DEPTH

0-3"
3-6"
6-12"
12-18"
18-24"