

# Foliar Applications of Boron to Pecan Trees Does Not Affect Fruit Set

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## **Abstract**

*Boron was applied as a foliar spray to pecan trees in a pecan orchard located in Cochise County. Single or repeated application prior to pollination did not affect nutlet set. Leaf analysis indicated that the boron levels in all trees were in the sufficient range for optimum growth and production.*

## **Introduction**

Pecan tree yield patterns vary considerably from year to year, which has been contributed to the natural tendency of the pecan to irregular or alternate bearing. However, recent research by USDA Scientist Dr. Bruce Wood (personal communication) indicates that fruit set can be improved with an increased level of boron in the tree of the desirable cultivar. The response was obtained through soil applications of sodium borate. In light of their results, pecan growers in the pecan growing district of southeastern Arizona, have been applying boron as a foliar spray to ensure maximum fruit set. General application rates by these growers are 1 lb. of sodium borate per acre in two to three foliar applications coinciding with required zinc sprays. Part of this use of boron stems from the pistachio cultural practice, where boron sprays are essential for maximum nut set and fill. However, there is no solid evidence that pecan trees in southeastern Arizona are deficient in or need boron. This research project was established to determine the effect on boron foliar sprays on pecan nut set and leaf boron content.

## **Methods**

The site of this experiment was the Sunland Farms ranch near Cochise, Arizona. Pecan trees used for the study were approximately 20 years old and were of the 'Western Schley' cultivar. The orchard is furrow irrigated. Boron applications were made as single or double sprays. Each spray was applied at the rate of 1.5 lbs. of sodium borate per acre. Each spray or double spray was designated as either an early or late spray or a combination of early and late. The early sprays were applied on April 23 (100% bud break). The late spray date was May 10 but prior to pollination. The sprayer had a pecan volute and was calibrated to deliver 125 gallons of water per acre and both sides of the tree were sprayed on each spray date. The control was not sprayed with water. The objective was to apply as much boron as possible at the prescribed rate prior to fruit set.

There were four treatments consisting of boron or no boron in this test. The treatments were as follows: 1) no spray (control), 2) early spray of boron (4/23/97), 3) late spray of boron (5/10), and 4) early plus late spray of boron. The experimental design was a randomized complete block with 3 tree plots and 4 replicates.

Prior to fruit set 10 clusters of nutlets were tagged on each tree in the test. The number of nutlets in each cluster was

recorded. In mid-July the number of nutlets in each tagged cluster was recounted and nutlet set was calculated. At the time of the last nutlet count, leaf samples were collected and analyzed for boron content.

## **Results**

Boron foliar applications at the rate of 1.5 lbs. or 3.0 lbs. per acre of sodium borate (solubore) as prepollination sprays did not significantly increase fruit set in pecan c.v. Western Schley (Table 1). Leaf samples collected in July and analyzed by a commercial laboratory indicated the boron levels in leaves were not affected by these sprays (Table 2).

## **Summary and Discussion**

It is rather apparent by this experiment that boron spray applications have little effect on fruit set of pecan, c.v. 'Western Schley'. Actually this is to be expected under the conditions of this test. The control trees had a boron content of 50 ppm which is in the sufficient range for optimum growth and production. Since the trees were not low or deficient in boron we would not expect additional boron levels to cause increased fruit set.

In another context, the physical application of boron to the female flowers, in particular the stigma, could have increased fruit set. However, this did not occur as nutlet set was not affected.

The most puzzling result of this test was the lack of increased boron in leaves of the boron treatments. Boron was added to normal zinc sprays consisting of zinc sulfate and UN32. This solution acts as a buffer to lower the pH of the spray solution. In addition, trees were sprayed from two sides with more than adequate water to sufficiently cover leaves and immature nutlets. Possibly, higher rates could be applied for better results.

This orchard produces about 2000 lbs. per acre on the average. This is considered to be an excellent yield. Increased production in a given year may not be an ideal situation as the orchard could enter into an alternate bearing situation. If trees have sufficient boron levels than it is highly questionable that boron be applied. It would not be recommended to do so.

**Table 1. Effect of boron foliar sprays on fruit set in pecan, c.v. 'Western Schley'**

<b>Treatment</b>	<b>% fruit set</b>
Control	62 a*
Early	67 a
Late	63 a
Early & Late	70 a

\* numbers followed by the same letter in a vertical column are not significantly different at the 5% level of probability.

**Table 2. Effect of boron foliar sprays on boron leaf content in pecan, c.v. 'Western Schley'**

<b>Treatment</b>	<b>Boron (ppm)</b>
Control	50 a*
Early	43 a
Late	51 a
Early & Late	53 a

\* numbers followed by the same letter in a vertical column are not significantly different at the 5% level of probability.