

## **An Investigation of the Effect of Boron and Maxicrop Triple on the Yield and Quality of Cider Apples:**

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### **Abstract**

The aim of this investigation was to assess the effect of boron and Maxicrop Triple foliar sprays on the yield and quality of cider apples.

The study site was a 3.04 ha, 10 year old bush orchard. Four treatments including the untreated control, Maxicrop triple only, boron only and Maxicrop Triple + boron were tested on the cultivar Michelin. Three replicate blocks each contained 1 or 2 rows of approx. 40 trees under treatment.

Significant effects were observed of the foliar treatments as follows;

Fruit russet was significantly increased [ $p < 0.001$ ] by the application of Maxicrop Triple and boron treatments only. Percentage dry matter was significantly reduced [ $p = 0.05$ ] by the application of boron only. Percentage sucrose content of the apples was significantly reduced by the application of Maxicrop Triple only.

Boron content of the fruitlets, leaves and apples [ $p = 0.001$ ].:

A significant increase between all the treatments except boron alone, and between Maxicrop Triple + boron and Maxicrop Triple was observed in the fruitlets. Maxicrop Triple + boron treatment significantly increased the boron content of the leaves, whereas Maxicrop Triple alone, significantly reduced the boron content. A significant reduction in the boron content in the apples followed the application of Maxicrop Triple + boron. Boron content was significantly higher in the fruit from the boron alone treatment compared with those treated with Maxicrop Triple alone. There were no significant differences between treatments found in yield, nitrogen, calcium, magnesium, phosphorus and potassium.

It was concluded from this single year of observations, that the application of Maxicrop Triple and boron foliar sprays did not significantly effect the yield and quality of cider apples.

### **Second Year Follow-Up Assessments and Further Comments**

Yield of fruit from cider apples tends to fluctuate in a biennial pattern, so that a realistic assessment of the effect of treatments on yield can only be accurately made by taking the yield from two consecutive years together. In this trial, fruit set/branch unit was recorded again in the year after spraying, and the cumulative yield over two years was calculated. [Table 1]

Fruit set of Michelin was enhanced following 7 applications of Maxicrop Triple in this one year spray trial. Maxicrop Triple with or without boron significantly increased the calculated cumulative yield. However the apparent 15% increase in yield with Maxicrop Triple sprays is likely to be an inflated figure, since it is calculated from the numbers of fruit set alone and does not take final fruit weight into account. There were likely to have been less differences between real yields because of some compensatory increases in fruit size and weight where set was lighter. Boron sprays slightly depressed the cumulative yield but not significantly so.

Boron uptake was initially rapid and showed as high levels in the first leaf analysis in June, but fell by August close to the unsprayed levels. There was little difference in the fruit levels by harvest. [Table 2]

Maxicrop Triple sprayed with boron, initially increased its uptake by the leaves, at a time when there would be the most demand for this element.

Trees sprayed with Maxicrop alone had slightly less boron in the leaves [possibly because this treatment produced more dry matter]. Fruit analysis at harvest showed that both Maxicrop Triple with or without boron, also had slightly lower levels of B, Ca, Mg, P and K than the no Maxicrop treatments.

Boron did not seem to be beneficial in this trial, resulting in both more fruit russetting, and lower yields, but this may have been as a result of some phytotoxicity from the harsh nature of the source of boron used [Extrabor]. Russetting does not occur with other formulations. Interestingly, Maxicrop Triple seems to have overcome the ill effects to some degree.

### Synopsis of treatments and records

#### Spray treatments 1995

- a) Boron [applied as Extrabor] at 1 kg/500 l : pink bud, petal fall and 2 weeks after.
- b) Maxicrop Triple at 1.2 l/acre [3l/ha]: bud burst, pink bud, full bloom, petal fall and at 3 further occasions at approximately 14 day intervals.
- c) Routine fungicides were applied on all of the above occasions to all treated and control trees at 40 gals/acre approx.

#### Samples and records

- a) Leaf nutrient analysis; June, August 1995
- b) Leaf colour; August 1995
- c) Fruit set [expressed as fruit/branch unit cross sectional area]; July 1995 & 1996
- d) Fruit quality, russet assessment; June and at harvest 1995
- e) Mean fruit weight; harvest 1995
- f) Blossom return bloom in year 2; May 1996

**Table 1: Effect of one season's sprays on fruit yield**

<b>Fruit set/branch</b>	<b>Year 1 1995</b>	<b>Year 2 1996</b>	<b>Year 1 + 2</b>
Control	12.8	7.5	20.3
Boron alone	12.6	6.6	19.2
Maxicrop Triple	14.0	9.3	23.3
Maxicrop + boron	13.3	8.9	22.2

**Table 2: Effect of sprays on boron levels [mg/kg dry weight]**

<b>Sample [1995]</b>	<b>Control</b>	<b>Boron</b>	<b>Maxicrop Triple</b>	<b>Maxicrop Triple + boron</b>
Leaves [June]	11.3	21.7	9.2	25.8
Leaves [August]	1.3	2.3	0.8	2.9
Fruit [at harvest]	4.4	4.6	2.8	4.1