

APRC Project Report

Project SP113	Apple nutrition
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Background

Skin colour, freedom from blemishes and flesh texture are critical components of fruit quality. An Agro-Food Link research project has indicated an important role for zinc in relation to fruit texture of Cox's apples. Circumstantial evidence has indicated that foliar application of boron during the period from bud burst to petal fall may benefit fruit texture and skin quality. Bramley apples are susceptible to bruising and to mineral disorders that blemish the skin and flesh, particularly when storage temperatures drop below recommended levels. A greater understanding of the use of boron and zinc may alleviate some of these problems. Guidelines for the optimum use of boron and zinc require improving and this experiment addresses these questions.

The experiment was conducted on a Bramley/M.9 orchard planted in 1990 at 3 m x 5 m spacing. Boron was applied at pink bud (8 April), start of flowering (18 April) and petal fall (6 May) at commercial rates (i.e. 1 l Bortrac/ha applied in 400 l water). Zn was applied (1 l Zintrac/ha applied in 400 l water) at bud burst (29 March). The nutrients were applied using a commercial mini-orchard sprayer.

Spur leaf samples for mineral analysis were taken on 9 May, 9 June, 15 July and 3 September 1997 (Table 1). In addition, mid-shoot leaf samples were taken on 3 September. The severe frost in April destroyed a large amount of the blossom. Therefore, it was not possible to take early samples of fruit for mineral analysis.

The harvest yields were low due to the frost and no differences occurred between treatments (Table 2). Fruit samples were taken at harvest for mineral analyses. The fruit was graded to commercial standards and assessed for colour, starch, sugar and firmness. Further fruit samples were put into controlled atmosphere cold store to determine quality after storage. These data will be presented in the next progress report.

Table 1. The effect of boron (B) application (0.38g B/l) and zinc (Zn) application (1.75g Zn/l) on B and Zn concentrations in spur leaves (μg mineral/g leaf dry weight)

Date	Boron ¹			Zinc ²		
	-	+	Statistical significance	-	+	Statistical significance
9/5/97	23	40	***	14	16	ns
9/6/97	21	22	ns	12	11	ns
15/7/97	26	27	ns	23	23	ns

¹ B applied on 8/4/97, 18/4/97 and 6/5/97

² Zn applied on 29/3/97

ns = not statistically significant

*** = very highly significant

Table 2. The influence of Boron and Zinc foliar sprays on total harvest yield per tree (kg)

Boron			Zinc		
-	+	Statistical significance	-	+	Statistical significance
13.9	13.7	ns	14.9	12.7	ns

ns = not statistically significant