

I. Deciduous Orchard Diseases
 d. Chemical and Biological Control
 1. Replant Problem; Apple

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Old apple trees with their roots were removed from the sites in Summerland and Kelowna in the fall of 1985 and the field ground was cultivated twice. The soils (pH 6.0) at both sites were sandy loam with 3% organic matter. Ammonium phosphate was thoroughly mixed with soil (approximately 100 L) in each planting hole on May 5, 1986 at Summerland and on May 9, 1986 at Kelowna. Formalin was drenched at each planting site with 6 L of water on May 8, 1986 at Summerland and on May 13, 1986 at Kelowna. Plots at both locations were replicated 3 times, 10 trees per plot, in a randomized complete block design. Tree spacing was 4.5 m between rows and 1 m between trees. Trees were planted on June 2, 1986 at Summerland and on June 5, 1986 at Kelowna. The biological treatments were applied as a soil drench in 2L water per site immediately after planting. Trees were budded with spur McIntosh scion cultivars in the last week of August 1986. Initial trunk diameter was measured 4 inches above the soil line on June 13, 1986. Total current season shoot growth of scion and trunk diameter of rootstock was measured on September 25, 1987. Increase in trunk diameter was calculated by subtracting the value for 1986 from the 1987 value.

The ammonium phosphate application significantly increased shoot growth and trunk diameter at the Summerland site but not in Kelowna. Fumigation of soil with Formalin did not increase shoot growth at both locations but has increased trunk diameter at the Kelowna site in the second year of the test. The application of Enterobacter aerogenes B8 alone was not effective at both locations. However, this treatment showed significant increase in total shoot growth and trunk diameter when applied in combination with ammonium phosphate at the Summerland site and with fumigation at the Kelowna site.

				Increased trunk diameter (mm)		Shoot growth (cm)	
Rate							
ai/site				Summerland	Kelowna	Summerland	Kelowna
Treatments*							
NF	NP	NB	- - - -	3.6c†	6.7d†	50.3a†	94.5a†
NF	NP	B8	6 x 10 ¹⁰ CFU	4.7c	7.4cd	58.7ab	106.1a
NF	P	NB	100g	8.3b	6.5d	88.1b	119.1ab
NF	P	B8	100g + 6 x 10 ¹⁰	9.8a	8.1bc	118.4c	91.1a
F	NP	NB	74g	4.5c	8.4bc	64.9ab	110.2ab
F	NP	B8	74g + 6 x 10 ¹⁰	4.5c	9.1ab	50.6a	173.6c
F	P	NB	74g + 100g	7.7b	10.4a	69.4ab	131.6abc
F	P	B8	74g + 100g + 6 x 10 ¹⁰	8.0b	9.9a	65.5ab	141.3abc

* NF= no fumigation, NP= no phosphate fertilization, NB= no bacterial antagonist, F= Formalin (37%), P= ammonium phosphate (11-55-0), B8= strain B8 of Enterobacter aerogenes, antagonist of Phytophthora cactorum.

† Numbers followed by the same letter are not significantly different (P=0.05) DMRT.