EVALUATION OF CHAMP® DP, SURRENDER®, VIRKON® AND PROTECTOR® FOR USE IN BRAEBURN & SOUTHERN SNAP APPLE

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Confidential Research Report to
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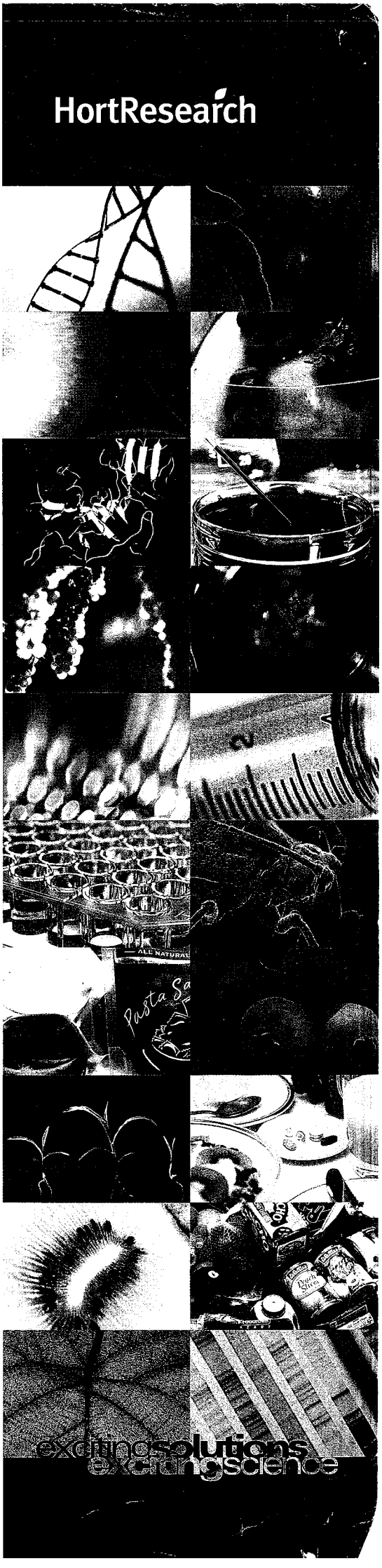


INTRODUCTION

The New Zealand pipfruit industry supports the identification of copper and sulphur replacements for use in organic apple production systems. The motivation for this support is driven by the tree damage caused by sulphur, particularly on Braeburn, and the environmental concerns of excessive copper usage.

OBJECTIVES

The aim of this trial was to evaluate Yates products in comparison to standard copper and sulphur based programmes for; a] control of black spot on apple and b] for any impact on fruit finish [russet].

MATERIALS AND METHODS

Orchard

The trial was conducted on mature Braeburn and Southern Snap apple trees at the HortResearch research orchard on Crosses Road near Havelock North. Southern Snap was managed as a conventional commercial orchard block, receiving standard practice chemical thinning and nutrient sprays. The Braeburn trees were managed using an organic style programme.

Trial Design:

A total of seven treatments were evaluated on the Southern Snap and Braeburn blocks using a randomised complete block design. An unsprayed control was also included in the Braeburn block. Each treatment plot consisted of single trees with a buffer tree to prevent over spray. There were four replicates of each treatment.

Treatments:

Treatments were applied on 12 dates between 19 October 2000 to 16 March 2001 using a knapsack sprayer at a water rate of 1000 l/ha [see appendix 1 and 2].

Treatments:

1. ***LimeSulphur 1% & Kumulus ® DF 0.2%***
2. ***Protector® PLUS 2%***
3. ***Protector® PLUS 1%***
4. ***Champ® DP 0.03%***
5. ***Protector® Plus 1% & Surrender® 0.5%***
6. ***Protector® Plus 1% & Virkon® 0.5%***
7. ***Kocide® 2000 0.03%***

Note that Protector® Plus at 1% and 2% both contained 0.5% Treet®

Assessments:

Samples of 100 fruit were harvested from each treatment plot for Southern Snap on 13/3/01 and for Braeburn on 24/4/01.

1. Each apple was examined in the laboratory for russet incidence and categorized as either;
   Exportable being nil russet and < 10% stem end russet, or
   Reject being > 10 % stem end russet, tracery russet or rough russet.
   [Note - the Protector treatments were not assessed for russet in the Braeburn orchard]

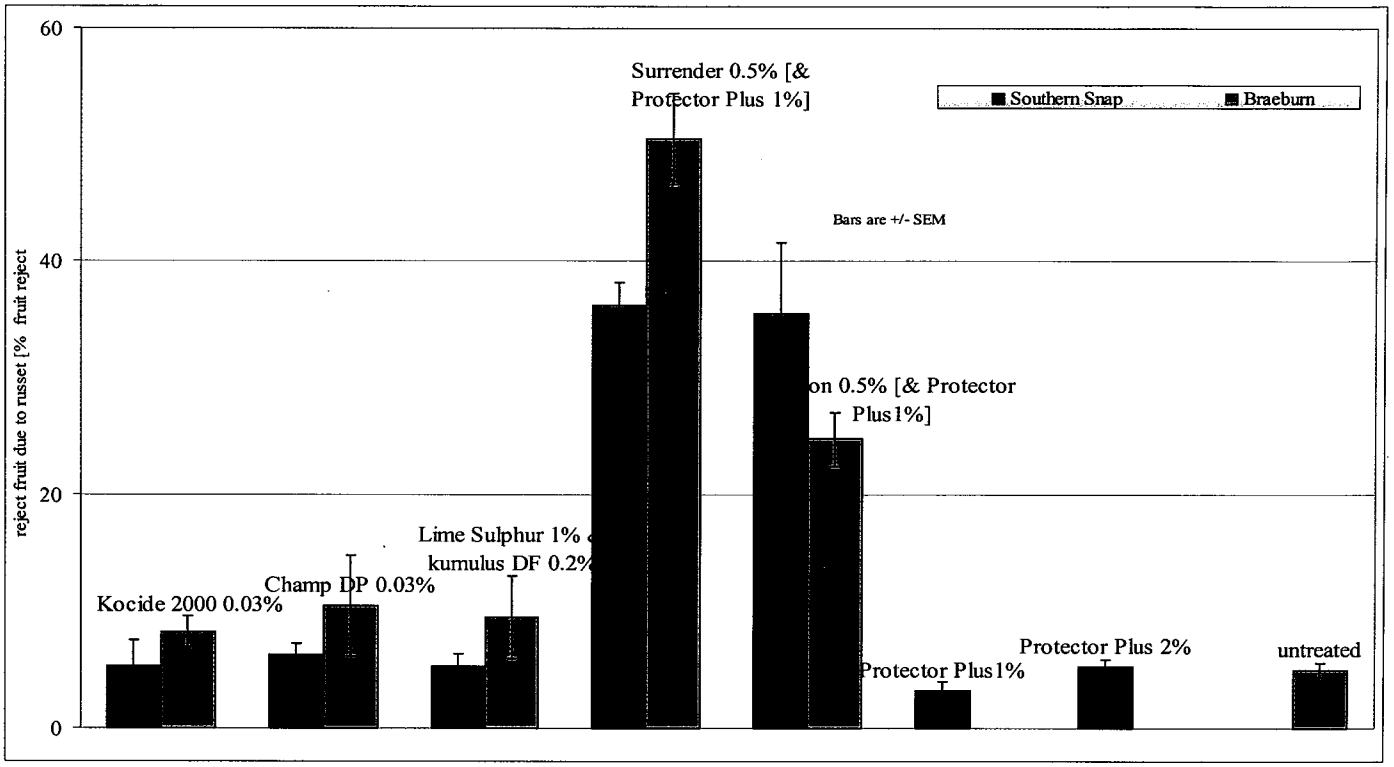
2. Each fruit was also examined for black spot incidence.

RESULTS AND DISCUSSION

In this evaluation Champ® DP only slightly elevated russet levels compared to the other copper treatment - Kocide® 2000.

Protector® Plus at the 1% rate had relatively low impact on fruit finish [Braeburn not assessed], whereas the addition of Surrender® or Virkon® resulted in severe russet [Figure 1].

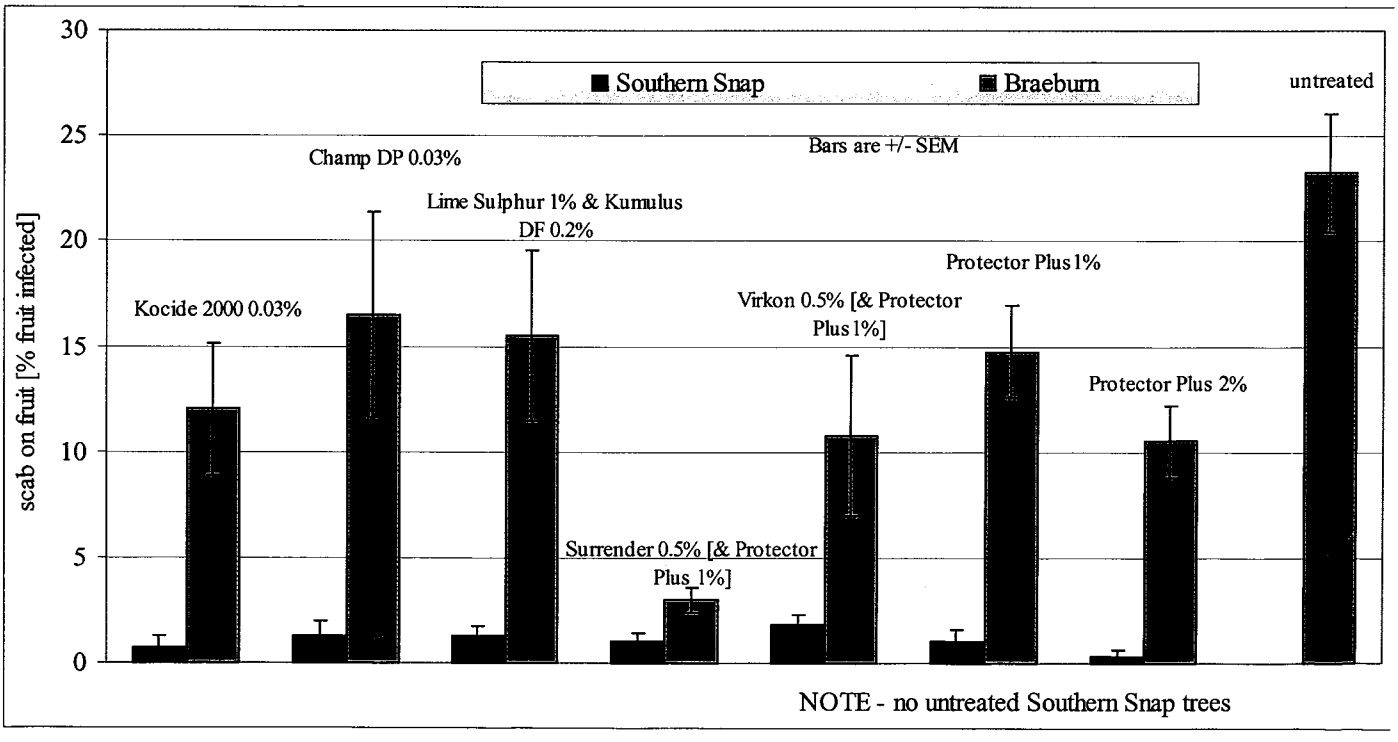
Figure 1. Fruit Rejected due to Russet.



The Protector® Plus treated trees had similar levels of black spot infected fruit as those treated with the industry standards of Lime Sulphur + Kumulus® DF and the copper-based products Kocide® 2000 and Champ® DP [Figure 2].

The addition of Surrender® to Protector® Plus significantly improved control of black spot on Braeburn fruit.

Figure 2. Fruit Infected with Black Spot.



Appendix 1. Treatment Details.

Hawkes Bay HortResearch Apple Trial 2000-01

cultivar=Southern Snap and Braeburn
Target = Black spot and to assess Russet
Water Rate = 1000l/ha

treatments	DETAILS		other ingredient
	Treet /10litres	Protector/10litres	
limesulphur 1% & Kumulus 0.2%	LimeSulphur100ml & Kumulus 20g		
Protector PLUS 2%	50ml	200ml	
Protector PLUS 1%	50ml	100ml	
Champ DP 0.03%	**Champ DP 3g/10litres**		
Protector Plus 1% & Surrender 0.5%	50ml	100ml	*50ml/10 litres Surrender*
Protector Plus 1% & Virkon 0.5%	50ml	100ml	*50g /10litres Virkon*
Kocide 0.03%	**Kocide 2000 3g /10litres**		

7 tmts x 4reps. 1 tree plots [plus 1 tree buffer]
trees/treatment of Southern Snap and Braeburn
using 1000litres/ha and 1580 trees/ha
use 10litres/ treatment/ application

applications

26/09/2000 limesulphur 1% on all trees
03/10/2000 limesulphur 1% on all trees
10/10/2000 limesulphur 1% on all trees
19/10/2000 treatments applied
27/10/2000 treatments applied
14/11/2000 treatments applied
24/11/2000 treatments applied
06/12/2001 treatments applied
17/12/2001 treatments applied
29/12/2001 treatments applied
13/01/2001 treatments applied
29/01/2001 treatments applied
15/02/2001 treatments applied
02/03/2001 treatments applied
16/03/2001 treatments applied [Braeburn only]

Appendix 2. **Graphs of Rainfall, Air Temperature, Leaf Wetness, Monitored Black Spot Infection Periods, and Treatment Applications at Trial Orchard.**