EFFECTS OF APPLICATION METHODS ON THE EFFICACY OF CHEMICAL CONTROL OF *SCLEROTINIA* DISEASE ON BEANS.

H. Pung[A], R. O'Brien[B] and S. Cross[A]
[A]Serve-Ag Research, PO Box 690, Devonport, 7310, Tasmania
[B]Queensland Department of Primary Industries, Meiers Road, Indooroopilly, 4068, Queensland

INTRODUCTION

White mould, caused by *Sclerotinia sclerotiorum*, is a major disease problem of green beans. It can cause yield losses by premature plant death through lower stem infection and/or infection of beans. Crops with greater than 8% *Sclerotinia* are rejected due to difficulties in processing.

Benomyl (Benlate) and procymidone (Sumisclex) are the two fungicide products currently registered for use to control *Sclerotinia* disease on beans. In recent years, field officers and growers have noted poor control of this disease. It is not clear whether this relates to fungicides used, spray application, crop density, spray timing, fungal resistance to fungicides, or other factors.

This study, therefore, aims to identify the cause of poor *Sclerotinia* control in the field, and to identify optimum methods for the control of the disease.

METHODS

A survey of bean growers was conducted to identify the variations in the fungicide application methods used by different growers.

The influence of application methods on *Sclerotinia* control efficacies was examined in two field trials in Tasmania. Different application methods examined included spray nozzle - fan vs cone, standard boom sprayer vs air assisted sprayer, application timing based on 10 to 90 % plants with first flowers, and spray volume ranging from 160 to 1000 L/ha. Three Sumiclex sprays were applied in both trials at 7 days interval. The trials were conducted using a randomised block design with 5 replicates in 1.2 m x 8 m plot size.

S. sclerotiorum isolates have been collected from different areas in Queensland and Tasmania, especially where Benlate and Sumisclex are used regularly for *Sclerotinia* control. Laboratory tests were then conducted on 36 isolates of *S. sclerotiorum* for resistance to benomyl and procymidone.

Investigations were also conducted to determine the level of spray coverage and penetration efficiencies by different commercial application methods.

RESULTS AND DISCUSSION

None of the 36 *S. sclerotiorum* isolates were found to be tolerant to benomyl or procymidone. Sumisclex consistently gave the greatest disease reduction compared to other products evaluated.

The grower survey findings showed that application methods used by growers are highly variable. The trials conducted indicated that application methods influenced the level of disease.

In areas that are prone to *Sclerotinia* diseases, the timing of the first spray application is likely to be the most important factor in determining the level of disease control. The first application, applied at 10% plants with open flowers, gave much better disease control than those applied at 90% plants with open flowers (Table 1).

However, in the second field trial, which was conducted in an area not prone to severe *Sclerotinia* disease, the level of disease control on plants first treated at 10% flowers was similar to those first treated at 90% flowers.

Spray nozzle types and spray water volume have little or no influence on disease control (Table 1). An increase in the spray water volume from about 250 to 600 and 700 L/ha, did not cause a significant improvement in the level of disease control.

Table 1. Effects of different methods of Sumisclex foliar application on the efficacy of *Sclerotinia* control on bean plants in an area prone to severe *Sclerotinia* disease.

Spray nozzle	Spray pressure k/Pa	Spray water volume L/ha	% Flowers opened at first spray	% Diseased plants
Fan jet XR11008	500	706	10%	23.8 a
Fan jet TP11002	500	240	10%	28.4 a
Cone jet TX10	500	250	10%	31.5 ab
Cone jet TX26	450	590	10%	32.0 ab
Twin jet 11003	300	260	90%	47.5 bc
Twin jet 11008	500	730	90%	49.4 bc
Cone jet TX10	500	250	90%	59.1 cd
Cone jet TX26	450	590	90%	70.5 de
Control		N/a	N/a	81.2 e

Within the same column, means followed by the same letter are not significantly different at the 5% level according to Duncan's Multiple Range Test.

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