



Alternative fungicides to procymidone for control of white rot on bunching onions



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Aims

- Identify new fungicide treatments to replace procymidone (suspended by APVMA) for control of onion white rot on bunching onions.
- Evaluate application methods and investigate infection criteria to improve the efficacy and timing of fungicide sprays.

Methods

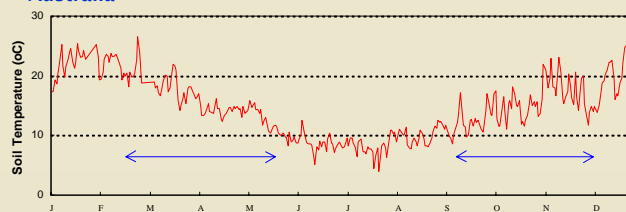
- Field trials were conducted within commercial crops in Victoria.
- In vitro* tests and multi-site field trials over three years (2002-2005) generated data to identify soil temperatures favourable for disease development.
- Fungicide treatments were applied using a variety of methods including soil surface sprays within 2 weeks after sowing and thereafter as stem-base sprays applied at four and six weeks after sowing.
- The number of plants infected with white rot and number of marketable bunches were assessed per square metre 10-14 weeks after sowing.
- Fungicide residue data was collected to support minor use permits.

Temperatures favourable for disease development

- Exudates produced by the roots of *Allium* plants stimulate germination of sclerotia of the fungus *Sclerotium cepivorum*.
- Sclerotia germinate when soil temperatures are between 9-25°C, the optimum is 13-18°C.
- Mycelial growth occurs between 5-30°C, the optimum is 10-20°C



Fig.1 Defining the risk periods for white rot in southeastern Australia



- Autumn and spring are the periods of the year when soil temperatures are most favourable for disease development (Fig. 1).
- However, disease can also develop outside these periods if weather is warm with soil temperatures persisting within the range of infection, soil is wet for extended periods and density of sclerotia is high.

Application methods developed to improve efficacy of fungicide

- Soil surface and stem-base sprays were applied in a band across plant rows with a knapsack using 1000L water/ha (Fig. 2). These methods of fungicide application gave similar or better results than seed or fertiliser treatments in sandy soils.
- In commercial trials, fungicide treatments were applied with a boom sprayer modified to deliver the appropriate rate of fungicide/ha using at least 1000L water/ha. Sprays were applied across plant-rows (Fig. 3).

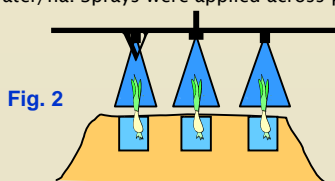


Fig. 3

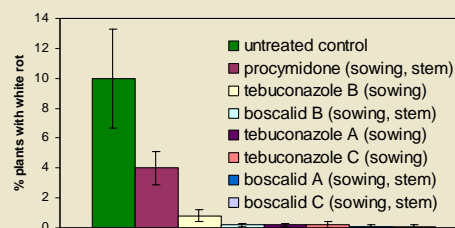


Table 1. Effect of fungicide treatments on disease incidence and no. of marketable bunches of spring onions, Autumn 2004

Treatment	% plants with white rot	Number bunches
untreated control	26.4c	16.6b
procymidone (sowing & 4-weeks later)	20.4c	17.2b
azoxystrobin (4&6 weeks after sowing)	6.4b	21.2a
triadimenol (4&6 weeks after sowing)	5.9ab	19.2a
boscalid (4&6 weeks after sowing)	4.6ab	21.0a
boscalid (sowing)	4.2ab	19.0a
tebuconazole (sowing)	1.3a	21.8a
boscalid (sowing & 4-weeks later)	0.5a	20.4a

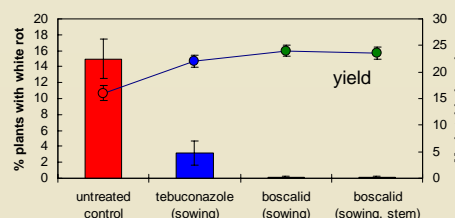
- Two sprays with boscalid or one spray with tebuconazole were highly effective in controlling white rot (Table 1).
- Two sprays with either boscalid, azoxystrobin or triadimenol were more effective than procymidone in controlling white rot.

Fig. 4. Effect of different rates of two fungicide treatments on disease incidence of spring onions, Spring 2004



- The three rates of boscalid and tebuconazole were all equally effective in controlling white rot in a low disease site (Fig. 4).

Fig. 5. Effect of fungicide treatments on disease incidence and no. of marketable bunches of spring onions, Autumn 2005.



- In a commercial trial, either one or two sprays with boscalid provided almost complete control of white rot (Fig. 3).
- Tebuconazole applied after sowing was also very effective controlling disease (79% reduction compared to untreated).

Conclusions

- Procymidone (Sumislex™) applied properly did not provide effective control of white rot on spring onions.
- Boscalid (Filan™) was highly effective controlling white rot and therefore is a suitable replacement for procymidone.
- Tebuconazole (Folicur™) showed potential for effective white rot control but its use could be limited due to the withholding period.
- Azoxystrobin (Amistar™) and triadimenol (Bayfidan™) also showed potential for the control of white rot, especially for use integrated with boscalid or tebuconazole.
- Fungicide efficacy, application timing and methods and residue data were collected to support applications for minor use permits for the fungicide treatments.