Chickpea Ascochyta Blight Management Trial

Jason Brand, VDPI - Horsham

Summary

Trials were sown west of Beulah to assess the optimum fungicide management strategy for new varieties of chickpea. Results indicate that resistant varieties will still produce excellent yields under high disease pressure and provide growers with a low risk alternative to grow chickpeas again.

Background

In 1998, the fungal disease ascochyta blight devastated chickpea crops in Victoria, reducing the expanding chickpea industry from 150,000 ha to less than 10,000 ha/annum. Recently new varieties of chickpeas have been commercialised that have resistance to ascochyta blight. These varieties include Genesis^{TM} 090 and Genesis^{TM} 509 and will enable the sustainable revival of the industry. Genesis 090 is a high yielding, ascochyta resistant, kabuli chickpea available to growers in 2006. It is well adapted to all chickpea growing areas of southern Australia and yields as well as the best desi varieties. Genesis 509 is potentially available to growers in 2007 pending a final decision on release

The research presented here focuses on the development of management packages for these new varieties to optimise yield and quality. Field trials conducted during 2005 compared 5 ascochyta blight management strategies on the performance of three recently released varieties of chickpeas with a currently grown variety. The trial is part of a GRDC funded project collecting data on the optimum management practises for new pulse varieties across SE Australia (plant density, sowing time, disease management and herbicide tolerance). Data is used for the development of variety management packages.

Methods

Trial was sown June 28 in small plots (8m x 1.5m) on a site 15 km west of Beulah to compare 4 varieties of chickpea (Table 1) and 5 fungicide treatments (Table 2). Seed was sown with 60 kg/ha of Grain legume super + 2% Zn (0:15:7), at a target plant density of 35 plants/m^2. Weeds were managed with conventional herbicide applications. The experiment was designed as a split plot with 4 replicates (i.e. varieties were randomized within each replicate of fungicide treatment).

To induce significant ascochyta blight pressure, infected stubble was spread around the site 6 weeks after sowing.

Table 1: Descriptions of chickpea varieties sown at Beulah in disease management trials in 2005.

Variety	Grain type	Seed size	Ascochyta blight	Botrytis grey mould	Maturity
Howzat	Desi	Med/Large	S	MS	Mid
Sonali	Desi	Small	MS	S	Early
Genesis 509	Desi	Small	R	S	Early/Mid
Genesis 090	Kabuli	Medium	R	S	Mid

S = susceptible, MS = moderately susceptible, MR = moderately resistant, R = resistant

Table 2: Fungicide Treatments, rates and timings

Treatment	Chemical & Rate	Timing	Total sprays
Chloro(Fort)	Chlorothalonil 500 @ 1.5L/ha	Fortnightly from Aug 17 to Oct 27	7
Chloro(Strat)	Chlorothalonil 500 @ 1.5L/ha	Strategically from vegetatively through to podding (Aug 17, Sept 31, Oct 14, Oct 25)	4
Chloro(Pod)	Chlorothalonil 500 @ 1.5L/ha	Podding	1
Manco(Pod)	Mancozeb 750 @ 1kg/ha	Podding	1
Nil	Nil	Nil	0

Measurements and Analysis

Emergence was recorded 6 weeks after sowing. Symptoms of ascochyta blight were scored twice (14 Oct and 9 Nov) on a 1-9 scale (1 – no symptoms, 9 – complete death). Pod abortion was also scored 9 Nov. Biomass cuts were taken 24 Nov and are being used to assess the effects of ascochyta blight on pod abortion and seed size and infection. Plots were harvested 10 December and grain yields recorded. All trials were analysed using ANOVA. This report summarise crop symptoms and grain yield. Other data can be supplied upon request.

Results

Growth for chickpeas throughout the season was good considering the later than optimum sowing. The disease pressure in this trial was high due to the moderate spring temperature and regular significant rainfall events (70mm in October). This caused severe symptoms in the susceptible varieties Howzat and Sonali in the nil treatment and where fungicide application were insufficient to adequately control the disease (Chloro(Pod) and Manco(Pod)). There was a low level of the disease in the resistant varieties Genesis 090 and Genesis 509 in these treatments. In terms of symptoms of ascochyta blight on the pods, Howzat and Sonali were severely affected in the Nil treatment, while Genesis 090 showed moderate symptoms and Genesis 509 a low level of symptoms.

Genesis 090 and Howzat produced the highest yields of 2.8 t/ha in the fortnightly chlorothalonil treatment (Table 3). Grain yield trends reflected disease symptoms. There was an 85-95% reduction in yield in the Nil, Chloro(Pod) and Manco(Pod) treatments for Howzat and Sonali. In the same treatments for Genesis 090 and Genesis 509 there was only 10-15% yield loss (Table 3). The strategic treatment resulted in a 30% yield loss for Howzat and 15% for Sonali. No yield loss was recorded in the Genesis lines.

Table 3: Grain Yield (t/ha)

Treatment	Genesis 090	Genesis 509	Howzat	Sonali
Chloro(Fort)	2.8	2.3	2.8	2.3
Chloro(Strat)	2.8	2.3	1.9	2.0
Chloro(Pod)	2.3	2.0	0.5	0.5
Manco(Pod)	2.5	2.0	0.2	0.5
Nil	2.4	2.1	0.3	0.5

LSD – 0.3

Interpretation and Commercial Practice

- The resistant varieties Genesis 090 and Genesis 509 produce excellent yields under high disease pressure and provide growers with a low risk alternative to grow chickpeas again.
- Growing resistant varieties of chickpeas such as Genesis 090 and Genesis 509 will significantly reduce the need for fungicides. In most situations, 1 or 2 sprays applied during podding will be sufficient to protect pods and prevent seed infection.
- The disease pressure in a paddock of a resistant variety is unlikely to be ever as high as seen in these types of trials. Susceptible varieties in these trials provide a constant source of inoculum for new infection. Therefore the levels of pod infection seen in this trial would be unlikely in field conditions as there is not the constant source of inoculum.