C7 Row Spacing x Disease Management x Stubble, MRZ Wimmera (Rupanyup), Victoria

Aim

To investigate if optimum disease management strategies change in different row spacings in standing and burnt residue across a range of chickpea varieties, differing in ascochyta blight susceptibility.

Experimental Treatments

Varieties: Genesis 090, Genesis 079, Genesis 114, Kalkee, CICA0604, PBA Slasher, Almaz and Howzat.

Fungicide Regimes:

Regime	Chemical & Application Rate[1]	Timing
Fortnightly	chlorothalonil 500 @ 2 L/ha	Fortnightly starting 6 weeks after emergence.
Strategically	chlorothalonil 500 @ 2 L/ha	Strategically from vegetatively through to podding
Podding	chlorothalonil 500 @ 2 L/ha	Podding
Nil	Nil	Nil

1. Refers to application rate of the product

Ascochyta Blight inoculant applied 23rd July

Row Spacings/Stubble: 30 cm row spacing, standing stubble (ST30),
30 cm row spacing, burnt stubble (B30),
60 cm row spacing, inter-row, standing stubble (ST60),
60 cm row spacing, inter-row, burnt stubble (B60).

Note: Stubble treatments were sown as independent trials.

Other Details

Sowing date: 10 May (burnt stubble); 17 May (standing stubble).
Fertiliser: MAP + Zn @ 60 kg/ha at sowing.
Plant Density: 35 plants/m^2.

Results and Interpretation

- Key Message: Under higher disease pressure it is still economically beneficial to actively manage ascochyta blight through regular fungicide application even in moderately resistant varieties.

- Establishment – Visually, establishment for all varieties in the burnt stubble trial was excellent, except for Kalkee which was variable and low in some treatments. In the standing stubble trial, there was significant rabbit damage (grazing), which delayed early growth. Plants were able to reshoot and recover.
- Ascochyta Blight Damage – Due to suitable winter and spring time conditions, ascochyta blight was present at high levels in the susceptible variety (Howzat) in the trial on burnt stubble. However, in the standing stubble trial, due to the rabbit damage and delayed growth, symptoms of damage were delayed and significantly less. Therefore, data for disease scores has only been presented for the trial in the burnt stubble. Unlike 2010, ascochyta blight symptoms were the same in both row spacing's, so data presented is based on the interaction between fungicide regime and variety only (Fig C7.1). In the 'nil' treatment Genesis 090 showed only slight symptoms of disease, while Howzat was almost completely killed. Moderate disease symptoms (score between 3 and 5) were observed in all other varieties except PBASlasher, which was slightly worse than Genesis090. The podding fungicide regime only slightly reduced disease symptoms in most varieties, however significant reduction in disease were seen with the strategic and fortnightly regimes (Fig C7.1). In the strategic regime, disease scores were reduced to less than 3 in all varieties except Howzat, indicating a low presence of disease. In the fortnightly treatments, almost no disease was seen in all varieties except Howzat, which still had a low level present (Fig C7.1).

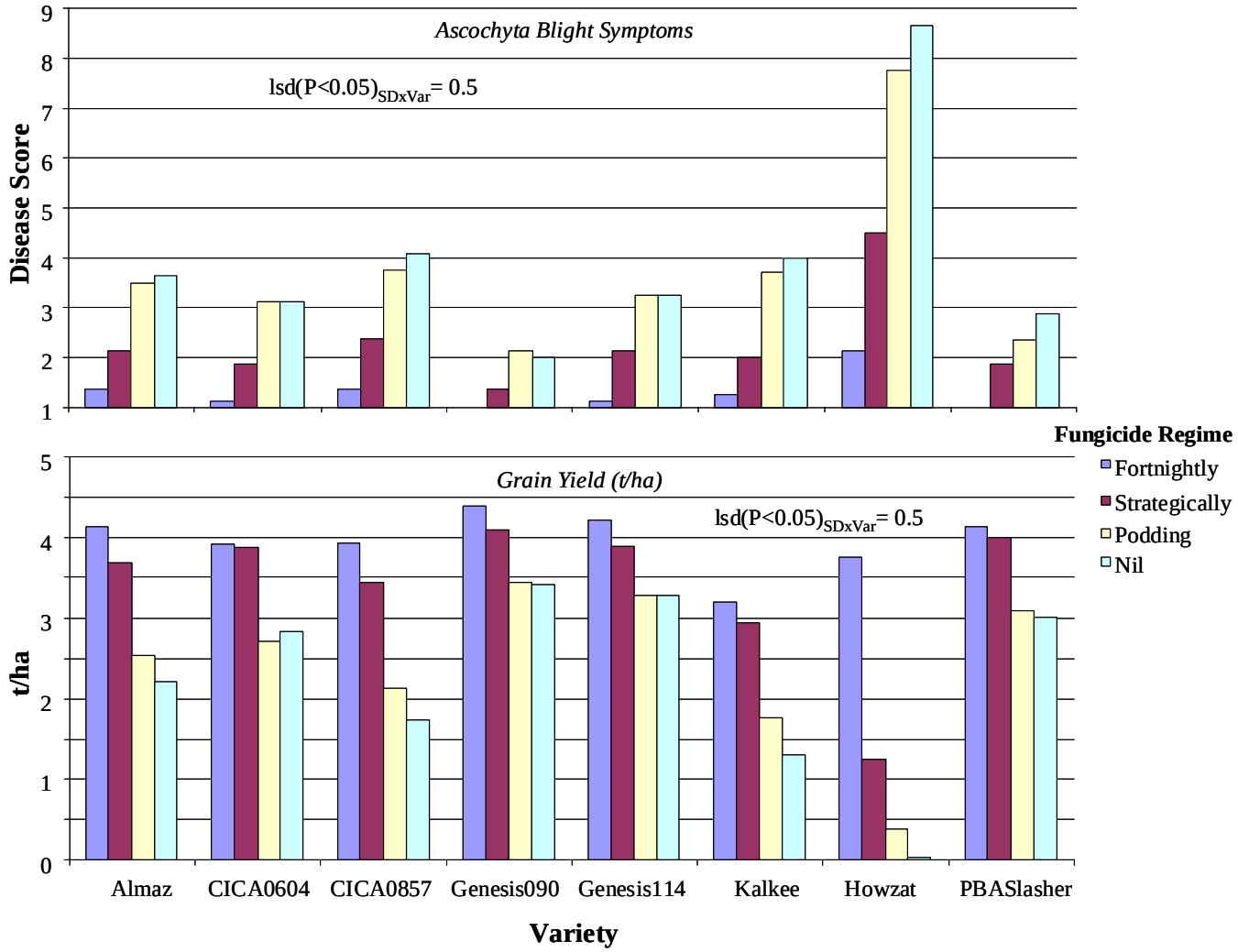

Figure C7.1. The interaction effect of fungicide regime and variety on ascochyta blight damage score (1 – no symptoms present, 9 – complete plot death) and grain yield of chickpeas in burnt stubble at Rupanyup in 2011.

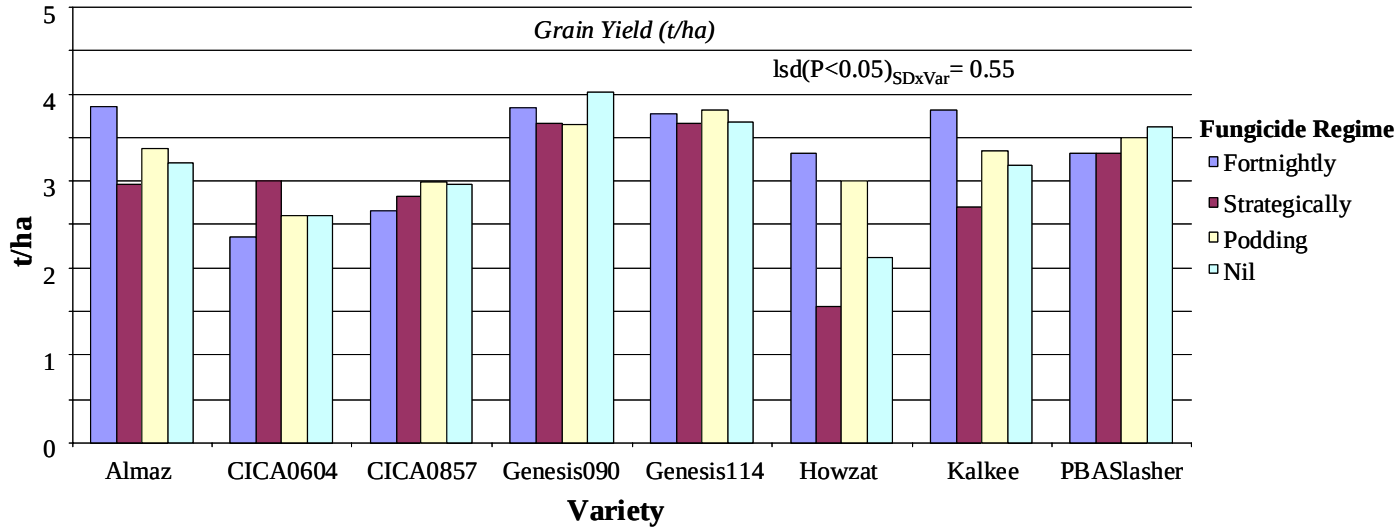

Figure C8.2. The interaction effect of fungicide regime and variety on grain yield of chickpeas in standing stubble at Rupanyup in 2011.

- Grain Yield – Grain yields on burnt stubble in 2011 were relatively high ranging from 3.2 to 4.4 t/ha in the fortnightly fungicide regime (Fig C7.1). Grain yields were similar in both row spacing's, so data presented is based on the interaction between fungicide regime and variety only. Trends in grain yield across fungicide regimes in the trial were similar to ascochyta scores.

Grain yield loss in the nil treatment compared with fortnightly ranged from approximately 20% in Genesis090 and Genesis114 to 100% in the susceptible variety Howzat. The podding fungicide application had almost no effect on relative grain yield loss, while the strategic application reduced grain yield losses to less than 10% in all varieties except Howzat and Almaz. Grain from this trial was also assessed for the presence of ascochyta blight and indicated little disease despite the high disease pressure experienced throughout the growing season.

Despite the early setback from rabbit grazing in the trial sown on standing stubble excellent grain yields were achieved, ranging from 2.4 to 3.9 t/ha in the fortnightly fungicide treatment (Fig C7.2). The maturity of this trial was delayed by approximately 3-4 weeks compared with the burnt stubble trial. Although very little disease was observed in this trial, there was still evidence of grain yield loss in the more susceptible varieties, such as Almaz, Kalkee and Howzat (Fig C7.2).

Table C7.1. The interaction effect of fungicide regime and variety on seed size index in kabuli chickpeas in burnt stubble at Rupanyup in 2011.

Regime	Almaz	CICA0857	Genesis090	Genesis114	Kalkee
Fortnightly	8.21	8.38	7.61	8.02	8.67
Strategically	8.15	8.29	7.59	7.85	8.43
Podding	7.82	7.99	7.46	7.77	8.17
Nil	7.80	7.82	7.34	7.67	8.01

lsd(P<0.1) regimexvar = 0.15

- Seed Size Index – Seed size index provides a guide to the proportion of grain sizes in a sample of seed. The higher the number the greater proportion of larger seed. In the fortnightly treatment Kalkee produced the largest seed size, significantly higher than the other large seeded Kabulis' Genesis114, Almaz or CICA0857 (Table C7.1). Similar to grain yield, seed size index was significantly reduced when disease was no fully controlled.

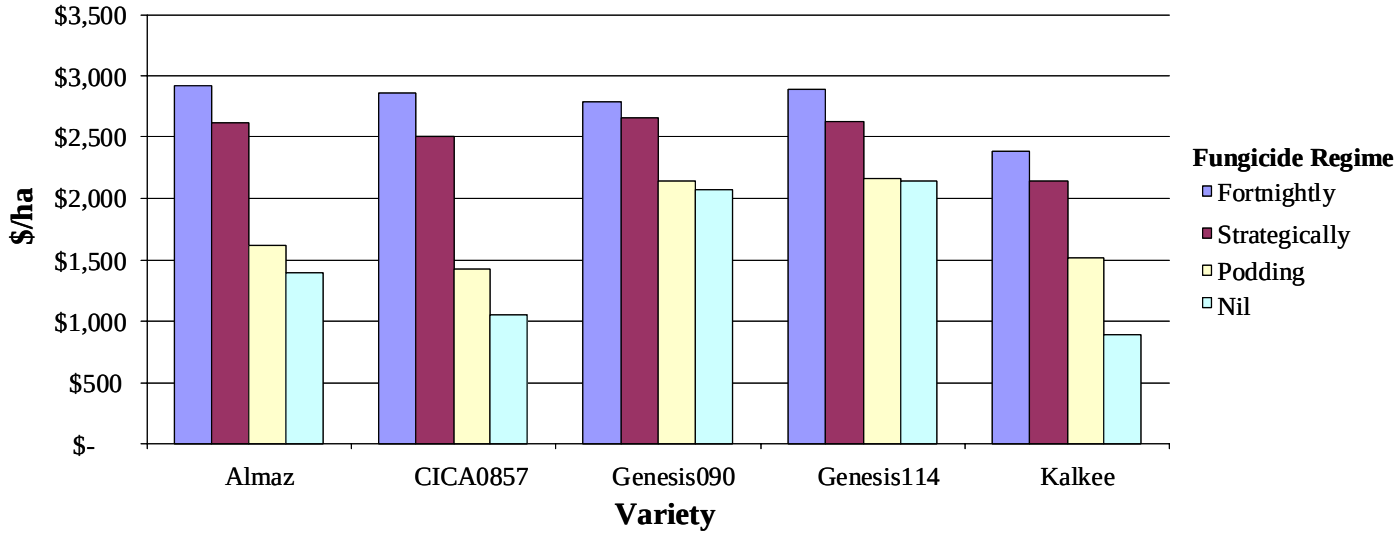

Figure C7.3. The interaction effect of fungicide regime and variety on profitability of chickpeas in burnt stubble at Rupanyup in 2011. *Profitability calculated as income – production costs. Income is based on the grain yield x price received for each seed size as at February 2012 (10mm - $1000/t; 9mm - $900/t; 8mm - $780/t; 7mm - $650/t; 6mm - $350/t). Production costs are based on a fixed rate of $250/ha + $15/ha per fungicide application.*

- Profitability – The profitability of all varieties was greatest in the fortnightly fungicide regime ranging between $2800 and $2900/ha for all varieties, except Kalkee ($2400/ha; Fig C7.3).

Key Findings and Comments
Growing conditions in 2011 were ideal for chickpeas, due to extreme rainfall events during the summer of 2010/11 which resulted in soil profiles at or near field capacity at sowing. In addition, temperatures were mild in the in the flowering and podding periods with few frost or high temperatures, so yield potential was high. Grain yields up to 4.4t/ha and profitability estimates of up to $2900/ha in the fortnightly fungicide treatment where indicative of this potential.

Unlike 2010 wider row spacing's had no significant effect on visual symptoms of ascochyta blight and grain yields in 2011. Disease pressure was very high in this trial on the burnt stubble and results should be viewed accordingly, as this sort of pressure is unlikely to occur in a field situation were a resistant variety is being grown. The importance of improved resistance in chickpeas combined with appropriate fungicide strategies was again demonstrated. The resistant varieties Genesis090 and PBASlasher, similar to previous research, were in the group with the lowest level of grain yield loss in the nil and podding fungicide treatments. However Genesis114, which is classified moderately resistant to ascochyta blight showed a similar response, which needs further investigation. CICA0604, appeared slightly worse than this group and caution would be needed if it were released as a variety. Almaz, Kalkee and CICA0857, all suffered significant yield and profitability loss under these conditions, indicating the importance of a strategic fungicide management strategy to ensure disease id controlled adequately.

Visual seed quality was excellent in this trial with little or no seed staining from ascochyta blight. The low level of disease apparent on seed from this trial is probably due to the relatively dry podding conditions that were experienced meaning that little disease was transferred from the pod onto the seed. Even though seed quality was excellent, seed size was reduced proportionally to the reduction in fungicide sprays applied. This is important as seed size can have a significant impact on profitability (see Fig C7.3). Ongoing work will occur in 2012 to expand on the findings of this trial.