Chickpea variety evaluation

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SUMMARY

1999 Mallee advanced chickpea yields ranged from 0.88 to 1.21t/ah. Desi chickpeas grown in the Mallee under current fungicide application regimes are unlikely to be as profitable as most other crops. Kabuli returns may rival or exceed other options, but the risk of crop failure is high. Victorian chickpea production is unlikely to increase above 1999 levels until varieties with improved Ascochyta resistance become available.

Economic control of Ascochyta has become the most important factor determining whether chickpeas are grown in Victoria. Until varieties with improved Ascochyta resistance are developed, successful production must rely on good management, particularly the use of well-timed protective foliar fungicides.

The advanced chickpea variety trials were sown at eight locations across the Mallee (Birchip, Warne, Quambatook and Rainbow) and Wimmera (at Horsham, Laen East, Tarranyurk and Kaniva) with the same entries in each trial.

METHOD

All entries in the advanced chickpea yield trials were treated with P-Pickel T SC and at a depth of 5cm at various rates to obtain a target plant population of 50 plants/m^2. The Birchip trial was sown on June 7 with 70kg/ha of Grain Legume Super, as a randomised design with four replications. Plots were 5m long and 6 rows wide at 15cm spacings.

Chickpea *Rhizobium* inoculum was applied at sowing. Spraying for weed and pest management took place during the season. All 1999 advanced chickpea yield trials were sprayed with fungicide to minimise losses due to Ascochyta. At Birchip, the fungicide chlorothalonil (Bravo 720 g/l) was applied at 1.5 L/ha in ten separate applications at two weekly intervals from mid Jul to mid Nov to control Ascochyta. The trial was harvested on December 6.

RESULTS

Lasseter, a variety highly susceptible to Ascochyta, was on average the top yielding entry in the Birchip trial (Table 1.26). On average, Lasseter and Kaniva were the top desi and kabuli varieties respectively across all Victorian advanced trials (Tables 1.26 and 1.27). Chickpea yields in 199 Wimmera-Mallee advanced trails ranged from 0.5 to 2.0t/ah. Hail damage limited yields at Kaniva. Horsham was the highest yielding site. Ascochyta did not affect yield significantly at any site.

At Birchip Lasseter was the top variety but it was not significantly better than 8511-19, a new desi to be released in NSW, or any other entry except the two lowest yielding ones, Amethyst and FLIP86-85C. Most entries at Birchip yielded ca. 1.0 t/ha, ranging from 0.77 to 1.07 t/ha (Table 1.27). The kabuli variety Kaniva yielded well (0.96 t/ha).

In contrast, kabuli yields of 1.0 t/ha, such as those achieved by the cultivar Kaniva at Birchip, would have provided a gross margin of $320/ha, assuming a grain price of $800/t, production costs of $230/ha and fungicide costs of $250/ha. At $900/t, this variety could have cleared $420/ha.

Although kabuli chickpea crops are more difficult to produce successfully than desi crops, the returns can be very good when crops are managed well. Kabulis are not very well suited to the southern Mallee and northern Wimmera. They generally prefer slightly higher rainfall and a less abrupt finish to seasons than those provided by most Mallee districts. However, the occurrence of Ascochyta in Victoria may cause the industry to reconsider kabulis in areas where desis were once favoured.

Agriculture Victoria's Ascochyta control strategy in its advanced chickpea trials was in excess of that required to achieve good yields. Perhaps 4 or 5 well-timed foliar fungicide sprays would have been sufficient. Such spraying regimes may have made desi production profitable. But the risk of crop failure remains high if very susceptible varieties are grown.

Table 1.26 1999 Wimmera results (t/ha and % Lasseter)

Variety	Wimmera		Horsham A		Horsham B		Laen East		Kaniva		Tarranyurk	
	t/ha	%Lass*	t/ha	%Lass	t/ha	%Lass	t/ha	%Lass	t/ha	%Lass	t/ha	%Lass
Amethyst	1.31	89	1.94	101	1.35	82	1.70	96	0.57	141	1.26	93
Dooen	1.22	84	1.82	95	1.32	80	1.65	93	0.60	151	1.20	89
Tyson	1.21	83	2.05	107	1.27	76	1.57	89	0.65	161	1.09	81
Kaniva	1.43	98	2.01	105	1.33	80	1.84	104	0.27	68	1.42	105
*Lasseter	1.46	100	1.91	100	1.66	100	1.77	100	0.40	100	1.35	100
8511-19	1.31	89	1.68	88	1.44	87	1.73	98	0.68	168	1.35	100
8523-1	1.40	96	1.92	100	1.48	89	1.81	102	0.63	157	1.33	99
8616-2H	1.22	84	1.56	82	1.23	74	1.72	97	0.66	164	1.35	100
Sona	1.39	95	2.04	107	1.45	87	1.78	100	0.44	108	1.21	90
Heera	1.49	102	1.89	99	1.58	95	1.93	109	0.52	130	1.25	93
FLIP86-85C	1.43	98	1.82	95	1.53	92	1.83	103	0.49	123	1.63	121
Jimbour	1.37	93	2.05	107	1.37	82	1.75	99	0.59	147	1.54	114
lsd (P=0.05)			0.36	19	0.11	7	0.13	7	0.10	25	0.12	9
CV%			7.9		4.8		4.7		10.9		5.1	

Wimmera = Statistically weighted regional average
Horsham A = Horsham interstate/advanced trial
Horsham B = Horsham pathology trial
*Lasseter is the check variety for percentage calculations

Table 1.27 1999 Mallee results (t/ha and % Lasseter)

Variety	Mallee		Birchip		Warne		Quambatook		Rainbow	
	t/ha	%Lass	t/ha	%Lass	t/ha	%Lass	t/ha	%Lass	t/ha	%Lass
Amethyst	0.97	80	0.85	79	0.70	69	1.33	80	1.09	102
Dooen	1.05	87	0.94	87	0.78	77	1.40	84	1.14	106
Tyson	0.88	73	0.87	81	0.58	57	1.33	80	1.23	115
Kaniva	1.05	87	0.96	90	0.74	73	1.55	93	1.09	102
Lasseter	1.21	100	1.07	100	1.02	100	1.67	100	1.07	100
8511-19	1.02	84	0.93	87	0.70	69	1.45	87	1.42	133
8523-1	1.08	89	1.03	96	1.06	104	1.37	82	1.23	115
8616-2H	1.01	83	0.99	92	0.68	67	1.38	83	1.04	97
Sona	1.03	85	1.04	97	0.79	78	1.46	88	1.15	108
Heera	0.98	81	0.93	86	0.72	71	1.48	89	1.21	113
FLIP86-85C	1.08	89	0.77	72	0.99	98	1.64	98	1.16	108
Jimbour	1.02	84	0.95	88	0.75	74	1.49	89	1.26	118
lsd (P=0.05)			0.22	21	0.23	23	0.12	7	0.13	12
CV(%)			16.3		11.6		4.7		6.2	

Mallee = Statistically weighted regional average

Long term data (Table 1.28) suggest that several newer varieties (Lasseter, Sona, Heera) yield more than older ones (Amethyst, Dooen, Tyson).

Tables 1.29 to 1.32 illustrate various economic scenarios for chickpea production in the Mallee. They assume variation in yield, grain price, cost of fungicide and frequency of fungicide application. A desi gross margin of over $200/ha may be achieved with yields of 2 t/ha when chlorothalonil is used and the grain is sold at $300/t (Table 1.29). However 2t/ha desi yields are rare for most districts. In Table 3b, returns in excess of $200/ha could be made from a 1.25 t/ha desi crop sprayed with Mancozeb if grain is sold at $400/t. Such yields have not been uncommon in parts of the Wimmera.

At $800/t, kabuli crops of 1 t/ha that received chlorothalonil, would have returned around $400/ha (Table 1.31). Alternatively, if mancozeb were applied, a 1 t/ha kabuli yield was obtained and the grain was sold at $900/t, then a gross margin above $500/t could have been achieved (Table 1.32).

Table 1.28 Wimmera and Mallee advanced chickpea long-term yields (% Lasseter)

Entry	Wimmera		Mallee	
	1990-99 35 trials	**1997-99** 15 trials	**1990-99** 36 trials	**1997-99** 12 trials
Lasseter (t/ha)	1.54	1.19	1.35	0.99
Desi				
Amethyst	91	92	-	-
Dooen	88	88	87	82
Tyson	86	90	97	85
Lasseter	100	100	100	100
8511-19	-	99	-	101
8523-1	-	-	-	-
8616-2H	-	-	-	-
Sona	-	96	-	96
Heera	-	97	-	93
Jimbour	-	-	-	-
Kabuli				
Kaniva	84	79	78	79
FLIP86-85C	-	100	-	86

Table 1.29 Gross margin for desi chickpea (chlorothalonil)

Average yield (t/ha)	0.5	0.75	1	1.25	1.5	1.75	2
Net price ($/tonne)	300	300	300	300	300	300	300
Income ($/ha)	**150**	**225**	**300**	**375**	**450**	**525**	**600**
Expenses ($/ha)							
Variable costs (non fungicide)	160	160	160	160	160	160	160
Total variable costs							
4 Sprays @ $25[a]	260	260	260	260	260	260	260
6 Sprays @ $25	310	310	310	310	310	310	310
8 Sprays @ $25	360	360	360	360	360	360	360
Gross margin ($/ha)							
4 Sprays @ $25	-110	-35	40	115	190	265	340
6 Sprays @ $25	-160	-85	-10	65	140	215	290
8 Sprays @ $25	-210	-135	-60	15	90	165	240

[a] Fungicide costs include $20/ha for 1 l/ha of chlorothalonil and $5/ha for application

These tables highlight the risk associated with chickpea production with susceptible varieties. The difference between an acceptable return and negative income may only be a modest decline in yield or an unexpected rainfall event where an essential fungicide application was either missed or applied too late.

INTERPRETATION

The yields were similar among entries in the 1999 Birchip advanced chickpea trial. Desis varieties are not profitable to grow, if given 10 fungicide sprays of chlorothalonil at 1.5 l/ha as occurred at Birchip. However, the kabuli variety Kaniva would have been profitable to grow, even with 10 sprays.

Desi chickpea production is unlikely to be profitable in the Mallee until Ascochyta resistant varieties are released. Kabuli production may be profitable but there are many risks associated with the growing of kabuli chickpeas in low-rainfall areas.

Varieties with improved Ascochyta resistance are expected to be released within 4-5 years. This will allow a return to viable production of desi chickpeas in Victoria. However, kabuli varieties may still be more profitable to grow than desis in many areas.

COMMERCIAL PRACTICE

Most growers will avoid chickpea production until new varieties with improved resistance to Ascochyta are released. Until then, kabuli varieties may become more popular.

Table 1.30 Gross margin for desi chickpea (mancozeb) with improved grain price

Average yield (t/ha)	0.5	0.75	1	1.25	1.5	1.75	2
Net price ($/tonne)[b]	400	400	400	400	400	400	400
Income ($/ha)	**200**	**300**	**400**	**500**	**600**	**700**	**800**
Expenses ($/ha)							
Variable costs (non fungicide)	160	160	160	160	160	160	160
Total variable costs							
4 Sprays @ $15[c]	220	220	220	220	220	220	220
6 Sprays @ $15	250	250	250	250	250	250	250
8 Sprays @ $15	280	280	280	280	280	280	280
Gross margin ($/ha)							
4 Sprays @$15	-20	80	180	280	380	480	580
6 Sprays @ $15	-50	50	150	250	350	450	550
8 Sprays @ $15	-80	20	120	220	320	420	520

[b] Higher grain price (sometime achieved with premium grain or opportune trading)
[c] Fungicide costs include $10/ha for 1.5 kg/ha of mancozeb and $5/ha for application

Table 1.31 Gross margin for kabuli chickpea (chlorothalonil)

Average yield (t/ha)	0.5	0.75	1	1.25	1.5	1.75	2
Net price ($/tonne)	0. 800	800	800	800	800	800	800
Income ($/ha)	**400**	**600**	**800**	**1000**	**1200**	**1400**	**1600**
Expenses ($/ha)							
Variable costs (non fungicide)	230	230	230	230	230	230	230
Total variable costs							

4 Sprays @ $25[d]	330	330	330	330	330	330	330
6 Sprays @ $25	380	380	380	380	380	380	380
8 Sprays @ $25	430	430	430	430	430	430	430
Gross margin ($/ha)							
4 Sprays @ $25	70	270	470	670	870	1070	1270
6 Sprays @ $25	20	220	420	620	820	1020	1220
8 Sprays @ $25	-30	170	370	570	770	970	1170

[d] Fungicide costs include $20/ha for 1 l/ha of chlorothalonil and $5/ha for application

Table 1.32 Gross margin for kabuli chickpea (mancozeb) with improved grain price

Average yield (t/ha)	0.5	0.75	1	1.25	1.5	1.75	2
Net price ($/tonne)[e]	900	900	900	900	900	900	900
Income ($/ha)	**450**	**675**	**900**	**1125**	**1350**	**1575**	**1800**
Expenses ($/ha)							
Variable costs (non fungicide)	230	230	230	230	230	230	230
Total variable costs							
4 Sprays @ $15[f]	290	290	290	290	290	290	290
6 Sprays @ $15	320	320	320	320	320	320	320
8 Sprays @ $15	350	350	350	350	350	350	350
Gross margin ($/ha)							
4 Sprays @ $15	160	385	610	835	1060	1285	1510
6 Sprays @ $15	130	355	580	805	1030	1255	1480
8 Sprays @ $15	100	325	550	775	1000	1225	1450

[e] Higher grain price (for opportune trading or higher percentage of 9mm grain)

[f] Fungicide costs include $10/ha for 1.5 kg/ha of mancozeb and $5/ha for application