

Chickpea varieties

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Summary

Chickpea production in Victoria will increase in 2006 due to the wide availability of the ascochyta blight resistant variety Genesis™ 090. This variety will provide a new small seeded high yielding kabuli chickpea option for growers, particularly those in traditional desi growing areas. Two new larger seeded kabulis, Almaz and Nafice, with moderate ascochyta blight resistance are good varieties for areas where Kaniva has been grown successfully.

Background

The immediate goal of the National chickpea program is to develop and release ascochyta blight resistant varieties that will restore the chickpea industry in southern Australia. The first ascochyta blight resistant varieties are now available to growers. These varieties will be a major component of an ascochyta blight management package that will ensure the return of economically viable production of chickpeas in Victoria. Emphasis is now being placed on releasing varieties that combine good ascochyta blight resistance, high yield and good quality.

Methods

Yield data is from the Victorian component of the National chickpea breeding program. Data from the national variety testing (NVT) system was not available at the time of publication. All sites were managed in a way to reflect the best local practice. Yield trials received fungicide management required by the new ascochyta resistant varieties (i.e. sprays at podding). An ascochyta blight yield loss trial at Horsham compares the yield of varieties under various fungicide spray regimes to assess both the resistance and tolerance of varieties.

Interpretation

Despite a late break to the season, good October rains ensured good Spring growth of chickpeas at both Wimmera and southern Mallee sites. The rains also favoured ascochyta blight infection with moderate levels of disease present at Beulah and Minyip, and a severe infection at Horsham. Prolonged cool periods during November resulted in pod abortion in most varieties. Pod drop in chickpeas was also more noticeable in 2005 and was likely to be related to the wet conditions approaching maturity, delayed harvest as a result of the inclement weather, and strong winds. Later maturing varieties had less pod drop and kabuli types were less affected than desi types.

Howzat yielded well at Warne and Marnoo, the sites where ascochyta blight was absent but yields at Beulah, Horsham and Minyip were poor due to its susceptibility to ascochyta blight (Table 1). Varieties with good ascochyta blight resistance had the most stable yields across the five sites. The desi breeding lines CICA0503 and CICA0505 performed very well at all sites and no yield loss due to ascochyta blight was observed at Horsham. These lines have seed quality similar to Howzat and could be available to growers in 2010.

In the kabuli trials (Table 2) Genesis 090 was the highest yielding variety. Another smaller seeded kabuli, the breeding line FLIP94-079C, had very good yields at the southern Mallee sites and has yielded well in the shorter season sites in South Australia (SA). The larger seeded types, Almaz and Nafice, had similar or higher yields than Kaniva where ascochyta blight was controlled.

The high yield of Genesis 090 in the Horsham yield loss trial without the application of fungicides demonstrates the benefit of ascochyta blight resistance (Table 3). However, under the most severe ascochyta blight infected trial conducted in Australia so far, at Turretfield in SA, Genesis 090 lost 35% yield without fungicides and Almaz 95%. A fungicide application during podding is recommended to protect susceptible pods from ascochyta blight infection and ensure the production of disease free seed for sowing. Almaz and Nafice have less resistance to ascochyta blight than Genesis 090 but much better than Kaniva and are a good option for traditional kabuli growing areas.

New varieties

Desi

Genesis™ 508 has good ascochyta blight resistance and is likely to require only one fungicide application during podding. Seed is less preferred than that of Howzat and lower prices are paid for grain. Genesis 508 is lower yielding than Howzat in short season areas such as the Mallee and when the season ends relatively early. Therefore it is only suited to areas with greater than 380mm annual rainfall on heavier soils (eg Wimmera grey clays) and on sandy loam soils in the northern Wimmera and southern Mallee. Sister lines to Genesis 508, Genesis 509 and/or FLIP94-510C, are likely to be available to growers in 2007. They have similar ascochyta resistance and quality to Genesis 508 but much higher and more stable yields. All are available from AAC.

The high yielding, ascochyta blight resistant kabuli variety Genesis™ 090 is likely to be a better alternative to current desi chickpea varieties and Genesis 508 in traditional desi growing areas, as the price of its grain is expected to be similar or higher than desi price. See comments in kabuli section below.

Kabuli

Genesis™ 090 (FLIP94-090C) has good ascochyta blight resistance and has shown wide adaptation and excellent yield stability, including the drier environments. Genesis 090 has a smaller sized seed that is approximately 1mm smaller than that of Kaniva. Genesis 090 is widely available to farmers in 2006 and has the potential to be grown as a good alternative to desi chickpeas or as a higher yielding but lower value alternative (smaller seed) to kabulis such as Almaz and Nafice. Available through AAC.

Almaz and Nafice are the larger seeded kabuli varieties with moderate ascochyta blight resistance. They have larger seed than Kaniva, with Nafice being slightly larger than Almaz. Both have yielded equal or better to Kaniva and offer a much lower disease risk option, however they will require at least 3 fungicides to be successfully grown. Seed is available through AWB Seeds.

Table 1: Victorian desi chickpea yield results (% Genesis 090) from breeding trials, 2005.

	Mallee		Wimmera			*Yield loss%
	Warne	Beulah	Horsham	Minyip	Marnoo	Horsham
Genesis 090 t/ha	1.27	1.80	1.91	2.20	1.76	5
Howzat	102	46	12	70	101	81
Genesis 508	89	74	88	91	89	3
Genesis 509	100	88	99	93	102	0
FLIP94-510C	105	86	100	94	95	9
Sonali	85	60	33	82	88	68
CICA0503	106	105	103	107	118	0
CICA0505	109	108	108	112	109	0
CV (%)	8.1	5.5	5.0	17.4	21.2	
LSD (0.05)	16	10	9	12	16	

* % of yield lost in no spray treatment compared to fortnightly sprayed treatment at Horsham in 2005. Infected chickpea stubble spread 10 weeks after sowing.

Table 2: Victorian kabuli chickpea yield results (% Genesis 090) from breeding trials, 2005.

	Mallee		Wimmera			*Yield loss%
	Warne	Beulah	Horsham	Minyip	Marnoo	Horsham
Genesis 090 t/ha	1.24	1.59	1.93	2.32	1.70	0
Almaz	67	59	46	65	72	36
Nafice	64	55	48	82	83	27
Kaniva					64	99
FLIP94-079C	117	110	91	102	104	16
FLIP97-114C	87	76	61	93	87	18
CV (%)	7.5	8.2	7.8	7.3	6.6	
LSD (0.05)	13	14	11	13	11	

* % of yield lost in no spray treatment compared to fortnightly sprayed treatment at Horsham in 2005.

Table 3: Kabuli yield results (t/ha) under four different fungicide regimes at Horsham. Infected chickpea stubble spread 10 weeks after sowing.

	Yield (t/ha)			
	Fortnightly	Strategic	Podding	Nil
Genesis 090	1.74	1.67	1.82	1.72
Almaz	1.59	1.20	1.18	1.00
Nafice	1.48	1.22	1.14	1.05
Kaniva	1.49	0.07	0.00	0.00
LSD	0.268			

Commercial Practice

- Resistant varieties such as Genesis™ 508 and Genesis™ 090 will reduce ascochyta blight risk to very low levels with minimal use of fungicides.
- Returns from larger sized kabulis will improve with varieties such as Almaz and Nafice, which will require fewer fungicide sprays than Kaniva.