

KEY FEATURES

- Is a large sized kabuli type chickpea (predominantly 9 mm) subject to rainfall at podset.
- Has moderate ascochyta blight resistance, more susceptible than Genesis™ 090.
- Requires 2 to 3 strategic foliar fungicide applications to manage ascochyta blight.
- Is suited to regions with 400 – 700 mm annual rainfall.
- Yields are equal to Genesis™114 and Almaz[Ⓛ] but seed size is larger.
- Flowering and maturity time are slightly later than Almaz[Ⓛ]
- Medium to tall plant height with an erect plant type which is resistant to lodging.
- Sets pods high in canopy (increased height to lowest pod than Genesis 090)
- Produces cream coloured, large seed, larger than Genesis™ 090 and Almaz[Ⓛ].
- Improved grain weight (45g/100 seeds) compared to Genesis 090 (33g/100 seeds).

Where Kalkee fits into the farming system:

Kalkee is a medium to large seeded kabuli chickpea that is a good replacement for Genesis™114, and a larger seed size alternative to Almaz[Ⓛ]. It has moderately improved ascochyta blight resistance over Almaz[Ⓛ] and offers a lower disease risk option, but a strategic fungicide strategy (2 -3 applications) similar to that used in Almaz[Ⓛ] will still be required.

Variety Characteristics:

Breeding: Kalkee (tested as Genesis 115 and FLIP97- 114C*05PSL) is a selection from FLIP97-114C, an introduction from the International Centre for Agricultural Research in the Dry Areas (ICARDA), Syria. It was selected and released by the Victorian Department of Primary Industries in 2011 as part of the National Chickpea Breeding Program.



Agronomic Characteristics: Kalkee is a medium to large seeded kabuli chickpea with yields similar to Genesis™114 and Almaz[Ⓛ] but less than the smaller seeded Genesis™ 090. Kalkee has moderate resistance to ascochyta blight which will require strategic fungicide management to protect yield and ensure high quality seed is produced. Its flowering time is slightly later (3-5) days than Genesis™114, and Almaz[Ⓛ]. Its plant height is medium to tall with an erect plant type. Harvestability of Kalkee is excellent with its lowest pod positioned higher on the plant than Genesis™ 090 and Almaz[Ⓛ]. Seed size will predominately be in the 9 mm range subject to seasonal conditions, particularly during podfill. Other grain quality characteristics are generally consistent with other kabuli chickpea varieties. Kalkee is highly susceptible to phytophthora.

Agronomic features & disease resistance:

Variety	Type	Seed Weight (g/100)	Main seed sizes (mm)	Seed colour	Flowering time	Maturity time	Plant height	Lodging	Ascochyta blight	Botrytis grey mould	Phytophthora
Almaz [Ⓛ]	Kabuli	41	8-9	cream	mid-late	late	medium	MR	MS-MR	S	S
Genesis™ 079	Kabuli	25	6-7	cream	early	early	short	MR	R	MS	S
Genesis™ 090	Kabuli	30	7-8	cream	mid	mid-late	medium	MR	R	S	S
Genesis™114	Kabuli	39	8-9	cream	mid-late	late	medium-tall	R	MS-MR	S	VS
Genesis™ 425	Kabuli	32	7-8	Cream	mid	mid-late	medium	MR	R	S	MS
Kaniva	Kabuli	38	7-9	cream	late	late	medium	MS	VS	VS	VS
Kalkee	Kabuli	45	8-9	cream	mid-late	late	medium-tall	R	MS-MR	S	VS
Nafice [Ⓛ]	Kabuli	43	8-9	cream	late	late	medium	MR	MS-MR	S	S

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

Yield and adaptation

Kalkee yields similarly to GenesisTM114 and Almaz^{db} in long-term experiments across southern and northern Australia. Kalkee is well adapted to medium to high rainfall areas (400-700 mm annual rainfall) and in particular longer growing season environments to enable more reliable yields and larger seed size.

Kalkee is susceptible to phytophthora which makes it less suited to parts of northern New South Wales and southern Queensland. The seed size of Kalkee is larger than GenesisTM114 and Almaz^{db}. Gross margin return differences between the kabuli varieties will be determined by their relative yields, price based on grain size, and fungicide requirements.

National Variety Trials – Kabuli Long Term Yields as % of GenesisTM 090 (2005-2011).

Variety Name	Southern Australia		Northern Australia	
	High rainfall southern	Low rainfall southern and western	High rainfall northern	Low rainfall northern
Almaz ^{db}	85 (44)	84 (24)	92 (11)	84 (16)
Genesis TM 079	101 (44)	103 (24)	99 (11)	93 (13)
Genesis TM 090	100 (44)	100 (24)	100 (11)	100 (17)
Genesis TM 114	88 (44)	85 (24)	94 (11)	86 (16)
Genesis TM 425	95 (25)	94 (11)	97 (11)	90 (17)
Kalkee	86 (24)	85 (11)	92 (2)	86 (6)
Genesis TM 090 yield (kg/ha)	1554 (44)	1442 (24)	2954 (11)	1933 (17)

* Numbers in () = site years. Data courtesy NVT, PBA, SARDI, DPI Vic, DEEDI and NSW DPI.

Quality Characteristics

Kalkee is a large kabuli (9 mm) and can attract the price premiums paid for larger seeded kabuli grains over smaller seeded types (7 to 8 mm and 8 to 9mm). It is likely to be graded to size for marketing.



Kalkee



Genesis 114



Almaz

Kabuli seed size distribution and range 2008-2010 (10 trials)

	%10mm		%9mm		%8mm		%7mm		%6mm	
	Mean (%)	Range (%)	Mean (%)	Range (%)	Mean (%)	Range (%)	Mean (%)	Range (%)	Mean (%)	Range (%)
Almaz ^{db}	0	0-1	16	0-34	47	15-61	27	9-46	9	1-32
Genesis TM 079	0	0-0	0	0-0	1	0-3	45	13-75	47	22-73
Genesis TM 090	0	0-0	2	0-21	21	1-49	57	37-76	19	2-54
Genesis TM 114	0	0-1	14	0-33	45	10-65	25	9-48	13	1-44
Kalkee	1	0-2	27	1-51	44	21-59	20	4-45	8	0-29

Management Package

(Consult local grower guides for more detailed information)

This VMP updates and reinforces those management issues with Kalkee chickpeas that may be different to other chickpea varieties. Refer to existing guides for other general chickpea management issues.

Seeding Date and Rate:

- Target a sowing rate to give the same plants per square metre (20-35) as other medium to large seeded kabuli chickpeas for your region.
- Sow at similar times as used for chickpeas in your region now and before ascochyta blight became a problem. Gains in yield and grain quality can be made from timely sowing.
- Avoid sowing too early in medium and longer growing season areas to ensure flowering and podding occurs in temperatures (mean nightly plus daily temperatures greater than 15 °C) more favourable for pod set.
- Inoculate with Group N Chickpea rhizobial inoculum at sowing.

Row Spacing:

Trial work and commercial experience has shown that chickpea's can be grown successfully and harvested efficiently at a range of row spacing's. At the wider spacing's (>30 cm) stubble cover maintained may help avoid evaporation losses. Kalkee is tall and resistant to lodging, and can fit into systems of inter-row sowing in wider rows into standing stubble.

Herbicide Sensitivity:

Preliminary herbicide tolerance trials in South Australia (alkaline sandy loam soil) show that herbicides commonly used in Genesis™ 090 and other kabuli chickpeas can be used on Kalkee with the same degree of safety. Further evaluation is ongoing.

Disease Management:

To minimise yield losses to ascochyta blight, botrytis grey mould and phytophthora, follow local best management guidelines for your region, eg see disease management guides on www.pulseaus.com.au or Departmental web sites. Use a seed dressing (containing thiram or thiabendazole plus thiram) for the control of ascochyta blight, botrytis grey mould and common root rots.

Ascochyta blight disease management with Kalkee is the same as with the other intermediate (MS-MR) resistant varieties like Genesis™ 114 and Almaz[Ⓛ]:

- Kalkee has intermediate (MS-MR) resistance to ascochyta blight and will suffer a yield penalty if the disease is not controlled. Up to 45 % yield loss has been recorded under high disease pressure with no fungicide management.
- Apply a foliar fungicide 4-6 weeks after emergence to prevent initial development of ascochyta blight. Follow with 2 to 4 applications throughout flowering and podding to ensure yield is protected, and high quality, disease free grain is produced.
- Time fungicide applications prior to an approaching rain event.
- Fewer applications will be required in shorter, dry seasons and more applications will be required in longer wet seasons.

Example of yield loss due to ascochyta blight under different fungicide regimes in a research trial

Variety	% Yield loss [#] Fortnight vs Nil	Horsham (Vic) 2009 Yield (t/ha) A difference of greater than 0.18 t/ha is required for significant differences			
		Nil	Podding	Strategic	Fortnight
Almaz [Ⓛ]	66	0.45	0.56	0.57	1.31
Genesis™ 090	2	1.28	1.25	1.22	1.31
Genesis™ 114	39	0.71	0.87	0.64	1.16
Genesis™ 425	2	1.34	1.45	1.41	1.37
Kalkee	45	0.59	0.63	0.69	1.08

* Horsham: Nil = no fungicide applied; Strategic = 4 fungicide applications (6-8 weeks after emergence, mid-late vegetative stage, early podding and mid podding); Fortnight = fortnightly fungicide spray from 8 weeks after sowing; Podding = 1 application at early podding (all applications were 2 L/ha of Chlorothalonil (720 g/L).

[#]% Yield loss is the yield difference between the fortnight fungicide treatment and the nil fungicide treatment.

Botrytis grey mould management is the same as for other chickpeas;

- Fungicide applications from canopy closure stage will assist in controlling botrytis grey mould if disease is present or in tall bulky crops in areas prone to infection.

Kalkee is susceptible to Phytophthora root rot and should be considered high risk in regions where this disease is a major production constraint.

Insect control:

Monitoring and early budworm control is critical with all chickpeas crops, particularly if they are late maturing.

Crop topping and Weed wiping:

Kalkee is late maturing, and like other chickpeas is poorly suited to crop topping and weed wiping for prevention of weed seed set, particularly ryegrass. Grain yield loss and weed seed set may be severe if early ryegrass escapes proceed through to crop maturity. Correct paddock selection is essential to reduce weed issues in this variety.

Desiccation and Harvest:

- Desiccation may be beneficial to enable early harvest and ensure kabuli quality is achieved.
- Harvester settings will need to be similar to that for other medium to large kabuli chickpeas.
- Early harvest is recommended to maximise yield and reduce seed staining through weathering, disease and pests.

Marketing:

- Kalkee is a medium to large seeded kabuli and is likely to be graded to size for marketing.
- It is likely to receive prices higher than smaller sized chickpea varieties like Genesis™ 090
- Kalkee has an End Point Royalty (EPR) of \$5.50 per tonne (inc GST) marketed which includes management, administration costs and a plant breeder's return.
- Kalkee grain will be able to be freely marketed to Authorised Trading Companies (ATCs) established through agreements with Australian Agricultural Crop Technologies (AACT).
- ATCs include the majority of pulse trading companies within Australia and are listed on the AACT website. The ATC will deduct EPR from grower payments automatically. Any commercial pulse trading company is welcome to apply to be an ATC.

Seed Availability and PBR:

Kalkee will be available for sowing in 2012, and is being commercialised through Australian Agricultural Crop Technologies (AACT). Seed will be covered by a licence and growers will be required to sign a Seed Variety Licence Agreement. Kalkee seed is available through authorised Sub Licensee Agents listed on the AACT website.



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For details on registered seed re-sellers or
Authorised Trading Companies contact:
Australian Agricultural Crop Technologies
National Office: Ph (02) 6795 3050
or visit the website www.acropotech.com



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Other Reading: For field chickpea management guidelines, see:

- Grain Legume Handbook 2008
- Pulse Australia publications: "Chickpea disease management strategy for southern region GRDC" and supplements, and "Pulse seed treatments and foliar fungicides" (www.pulseaus.com.au)
- SARDI fact sheet "Chickpea variety sowing guide 2012"
www.sardi.sa.gov.au/pdfserve/fieldcrops/research_info/sowing_guide/chickpeas.pdf)
- NSW DPI publications (www.agric.nsw.gov.au): "Winter Crop Variety Sowing Guide 2012"; Pulse Point 20 "Germination testing and seed rate calculation"; "Weed Control in Winter Crops 2012"; "Insect and Mite Control in Winter Crops";
- Vic DPI "Winter Crop Summary 2012" and fact sheets (www.dpi.vic.gov.au).

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