

Chickpeas

C1 Sowing Date, LRZ Southern Mallee (Curyo), Victoria

Aim

To investigate the adaptability of a range of kabuli chickpea varieties to sowing date.

Treatments

Varieties:	Kabuli - Genesis090, PBA Monarch, Kalkee, Almaz, CICA1156, CICA1352, CICA1451, CICA1452, CICA1453, CICA1454, CICA1455. Desi - PBA Striker
Sowing dates:	1 May (Early), 12 June (Mid)

Other Details

Row Spacings:	36 cm
Stubble:	Standing (approximately 15 cm), sown inter-row
Fertiliser:	MAP + Zn @ 60 kg/ha at sowing
Plant Density:	35 plants/m ²
Soil type:	Soil Type: Alkaline Sandy Loam over a heavy clay at about 40-60cm (See Table 1 in L1)

Results and Interpretation

- **Key Message:** This research demonstrated the potential to continue improving profitability of kabuli chickpea, with one breeding line (CICA1352) showing improved profitability over PBA Monarch. Earlier sowing was significantly higher yielding for all varieties in 2014, increasing economic returns by an average of \$220/ha. Similar to previous seasons PBA Monarch (\$400/ha) produced the highest net returns of all commercial varieties when sown early.
- **Plant establishment** – Establishment for all chickpea varieties was generally slightly lower than targeted ranging between 25 and 33 plants/m² (data not shown). All of the CICA14** series lines displayed spindly growth in early establishment, with very fine leaves. Normal plant structure had recovered by mid season, however biomass development always appeared less than other varieties. In addition the CICA 14** series lines generally had marginally lower establishment than other varieties 25-28 plants/m² compared with 28-33 plants/m².
- **Plant growth** – Growth until August was adequate and as expected given the seasonal conditions. The dry and cold conditions throughout August and September meant that growth was slowed. The ongoing dry conditions ensured plants experienced significant drought stress that rapidly progressed maturity and reduced grain yields.
- **Grain Yield** – Despite the extremely dry spring, grain yields were good, ranging between 0.34 and 1.00 t/ha (Fig. 1). Treatments sown May 2 (0.86 t/ha) were about 40% higher than those sown June 12 (0.53 t/ha). Yield loss from delaying sowing ranged from a 57% reduction for CICA1453 to a 17% reduction for Genesis090. When sown early PBA PBA Striker, CICA 1452 and CICA 1455 were equal highest yielding (1 t/ha) with CICA 1451 and Kalkee lowest (0.74 t/ha). At the later sowing date Genesis090 had the highest yields of 0.64t/ha and CICA1453 lowest, 0.34 t/ha.
- **Profitability** - Focussing on the earlier sowing date, despite having slightly lower grain yield, the estimated net income of CICA1352 (\$420/ha) and PBA Monarch (\$400/ha) was higher, because of the increased grain size and potentially higher prices received for grain (Fig. 2). Delaying sowing resulted in significant reduction in profitability for all varieties, ranging between \$340/ha for Almaz to \$70/ha for Genesis090. Both Almaz and CICA1453 had negative returns when sowing was delayed.
- **Grain weights and Seed Size Distribution** - Quality in 2014 was generally excellent and seed size slightly smaller than term averages (Data not shown). There was a generally slight increase at the earlier sowing date, but that was inconsistent across varieties. Seed size distribution for each of the varieties and sowing dates is shown in Figure 3. In the larger Kabuli's Kalkee, CICA1352 and CICA1451, generally more than 80% of the grain was in greater than 8mm class with 20-40% greater than 9mm. In comparison, Genesis090 only produced about 20% of seed greater than 8mm. Similar to previous seasons PBA Monarch produced seed mostly in the 8-9mm class. CICA1156 appeared to produce the most variable seed with approximately 20% in the less than 7mm class, 35% in 7-8mm, 40% in 8-9mm and 5% above 9mm.

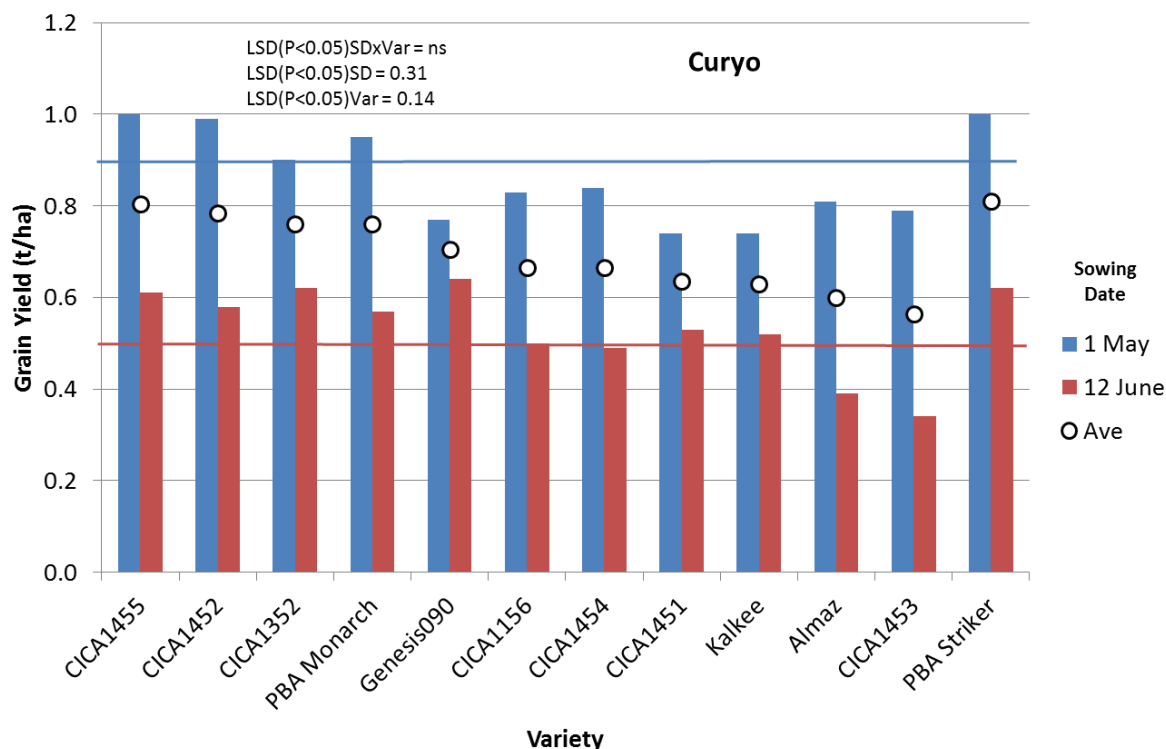


Figure 1. The effect of the interaction between sowing date and chickpea variety on grain yield at Curyo in 2014. Mean sowing date grain yield indicated by horizontal lines; mean variety grain yield indicated by circles.

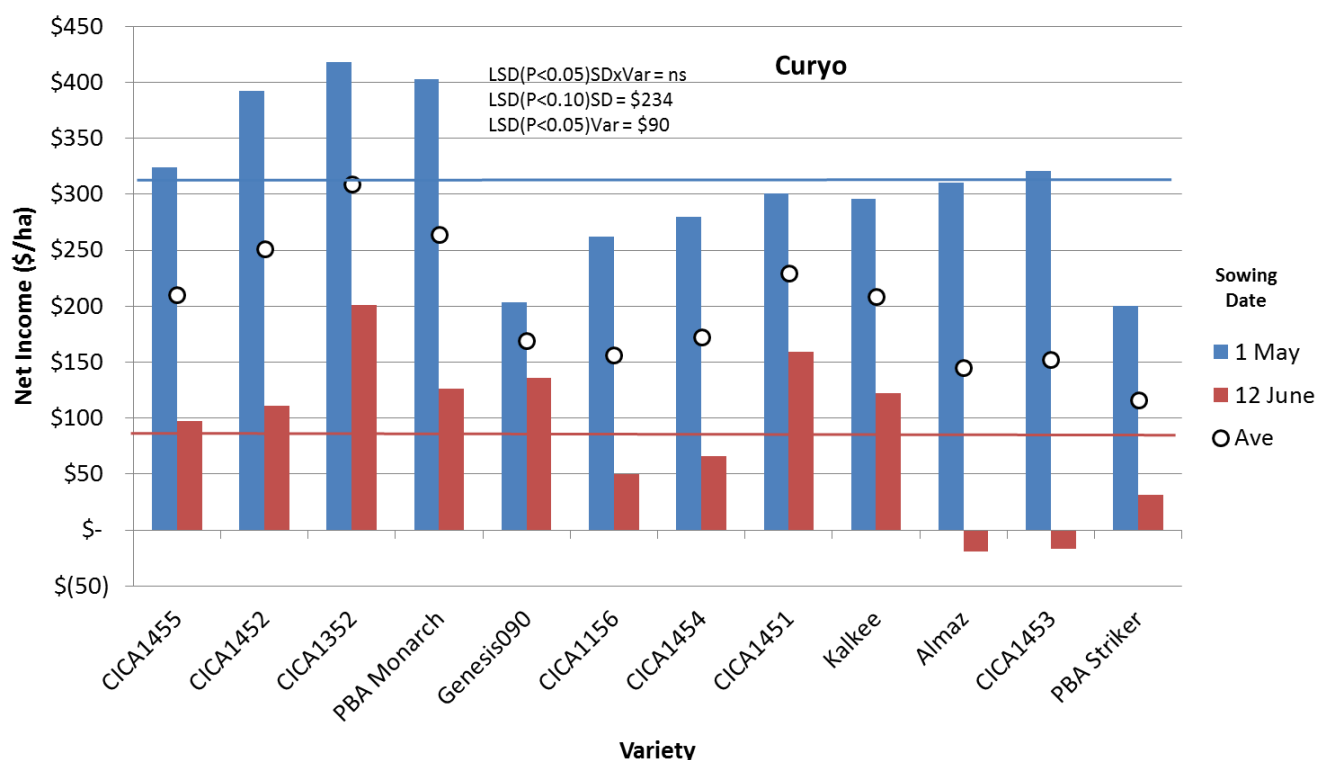


Figure 2. Net Income (\$/ha) of chickpeas sown May 1 and June 12 at Curyo in 2014. Net Income based on the following grain prices: Desi = \$450/t; Kabuli = <7mm-\$330, 7-8mm-\$550, 8-9mm-\$750, 9-10mm-\$850, 10-11mm-\$1000 with fixed management costs of \$220/ha and fungicides at \$15/ha per application (No. of sprays based on varietal resistance: resistant = 1, moderately resistant = 2, moderately susceptible = 3).

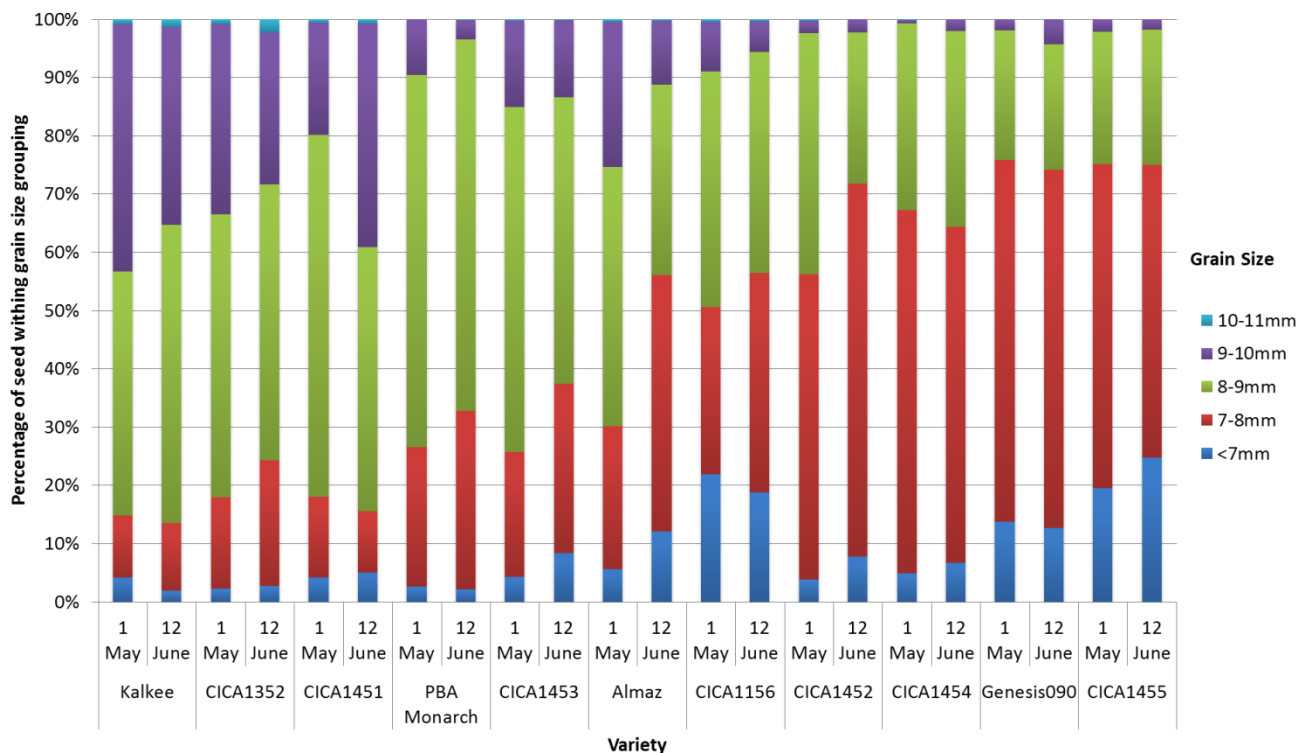


Figure 3. Proportion of grain within each grain size category for kabuli chickpea varieties grown at each sowing date at Curyo in 2014.

Key Findings and Comments

- Earlier sowing was significantly higher yielding for all varieties in 2014, increasing economic returns by an average of \$220/ha. Compared to previous seasons, Genesis090 produced unusually low yield when sown early compared with PBA Striker and PBA Monarch. It was, however, the highest yielding variety at the later sowing date.
- Similar to previous seasons PBA Monarch (\$400/ha) produced the highest net returns of all commercial varieties when sown early. This trial also demonstrates the gains being made by the breeding program with CICA1352, a new larger sized Kabuli (slightly larger than PBA Monarch) showing net returns slightly higher than PBA Monarch and yields similar to PBA Monarch.
- Seed size and quality was significantly larger and better in the Mallee than in the Wimmera.
- Further research is ongoing to investigate this range of medium Kabulis and their adaptation and yield stability in a range of environments. If consistent seed size and grain yields can continue to be replicated across seasons, the medium Kabulis could prove to be very profitable in the southern mallee, particularly given the lower disease risk due to the dryer conditions generally experienced, compared with traditional production zones like the Wimmera.