

L9 Sowing Density X Sowing Date, MRZ Mid North (Pinery) and MRZ Yorke Peninsula (Melton), South Australia

Aim

To evaluate the optimum sowing density of new 'high biomass' lentil varieties alongside older varieties at two sowing dates.

Treatments

Varieties: Nugget, PBA Ace, CIPAL1203 (PBA Jumbo 2), CIPAL 1207 (PBA Giant), CIPAL1104 (PBA Greenfield), Boomer
Sowing dates: Pinery - 7th May and 5th June and Melton - 16th May and 18th June
Sowing densities: 60, 80, 100, 120 and 140 plants/m².

Other Details

Row Spacing: 22.5cm (9 inches)
Plot Size: 12m
Fertiliser: MAP + Zn (2%) @ 90 kg/ha at sowing
Foliar Fungicides: Canopy Closure –Carbendazim @500 ml/ha, Chlorothalonil @2 L/ha
Mid flowering to Early Podding – Carbendazim @500 ml/ha, Chlorothalonil @ 2 L/ha
Soil type: Pinery-Sandy loam / limestone clay;
Melton- Sandy clay loam over light clay
Inoculums: Nil
Seed treatment: PPT

Results and interpretation

Maturity

- A significant sowing time by variety response was identified for maturity time at the two sites indicating that the maturity time of the six varieties differed and was dependent on time of sowing.
- PBA Jumbo 2 was the earliest maturing variety at the early time of sowing. This variety also showed the greatest delay in maturity when sowing was delayed across all densities at the two sites, but was still relatively early (Figure 1 & 2).
- Nugget and PBA Greenfield were the equal later maturing varieties at the early time of sowing. Nugget matured significantly later than all other varieties across the two sites.
- As sowing densities were increased the maturity time of varieties was advanced, this was observed at both sites (data not shown).

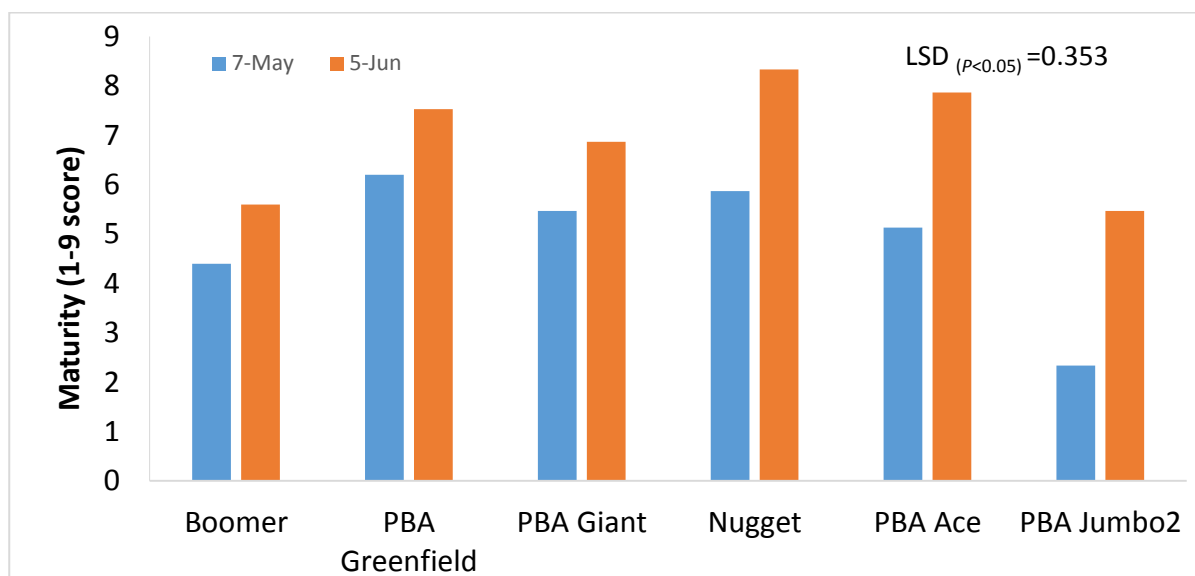


Figure 1: Maturity of 6 lentil varieties sown at Pinery, South Australia, 2014. Maturity score: 1 = early, 9 = late.

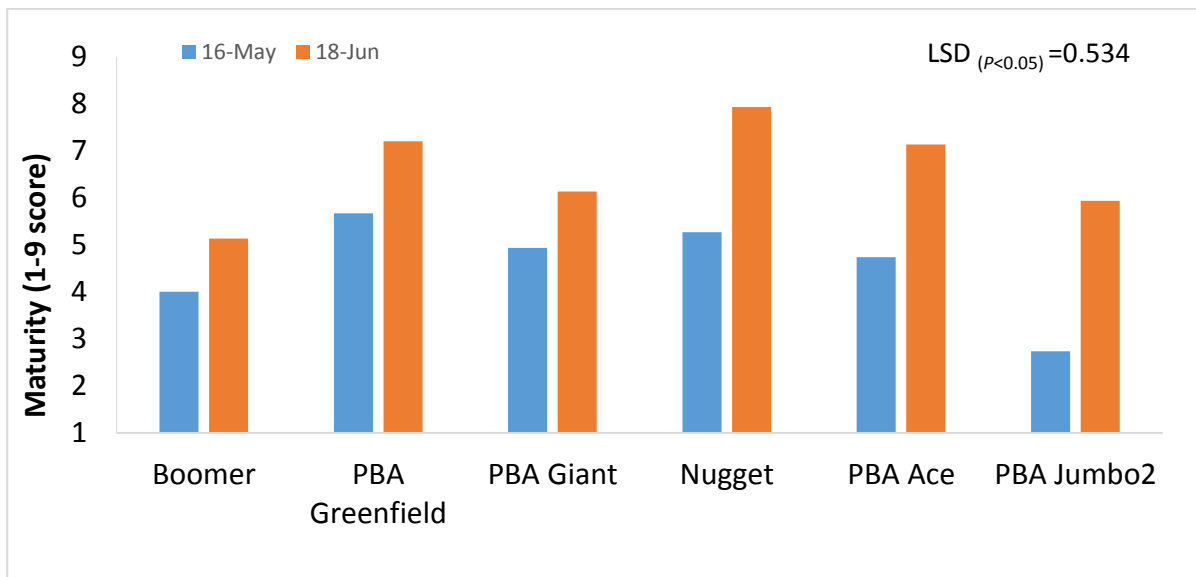


Figure 2: Maturity of 6 lentil varieties sown at Melton, South Australia, 2014. Maturity score: 1 = early, 9 = late

Lodging

- Lodging resistance scores at Pinery, showed significant time of sowing ($P<0.001$) and variety type ($P=0.002$) effects suggesting that the differences in the levels of lodging resistance between varieties remained similar across the two sowing times.
- Resistance to lodging was improved by 72% across all varieties when sowing was delayed at Pinery.
- PBA Jumbo 2 and PBA Greenfield showed equal higher lodging resistance to other varieties while Boomer had the lowest level of lodging resistance compared only to the these two varieties at Pinery (Figure 3).
- A significant time of sowing by variety response ($P<0.001$) was observed for lodging resistance at Melton. This indicates that there were differences in levels of lodging between varieties and that these differences were dependent on time of sowing.
- At the early time of sowing, Boomer showed lower lodging resistance to PBA Greenfield and PBA Jumbo 2 and to all varieties with delayed sowing. This variety showed less improvement in lodging from delayed sowing.
- Increasing sowing densities significantly ($P=0.001$) increased the susceptibility to lodging for all varieties at Melton (data not shown). At Pinery, varying sowing density had no effect on lodging resistance and on average varieties were rated as having acceptable standing ability of 6.
- Generally, all varieties showed reduced lodging from delayed sowing across the two sites.

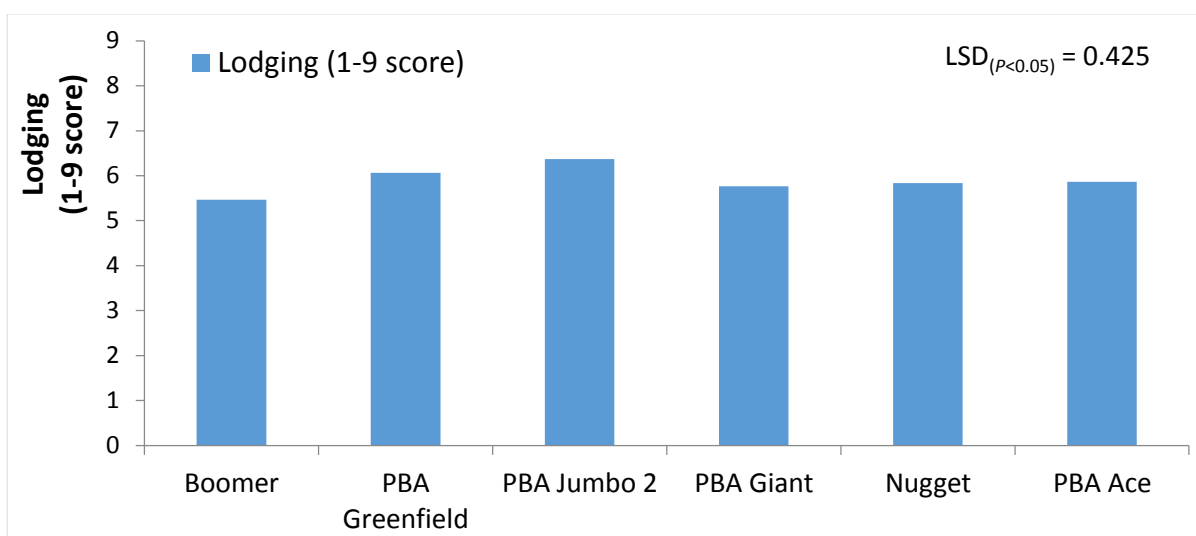


Figure 3: Lodging resistance of 6 lentil varieties sown at Pinery, South Australia, 2014. Lodging score score: 1 = flat, 9=erect

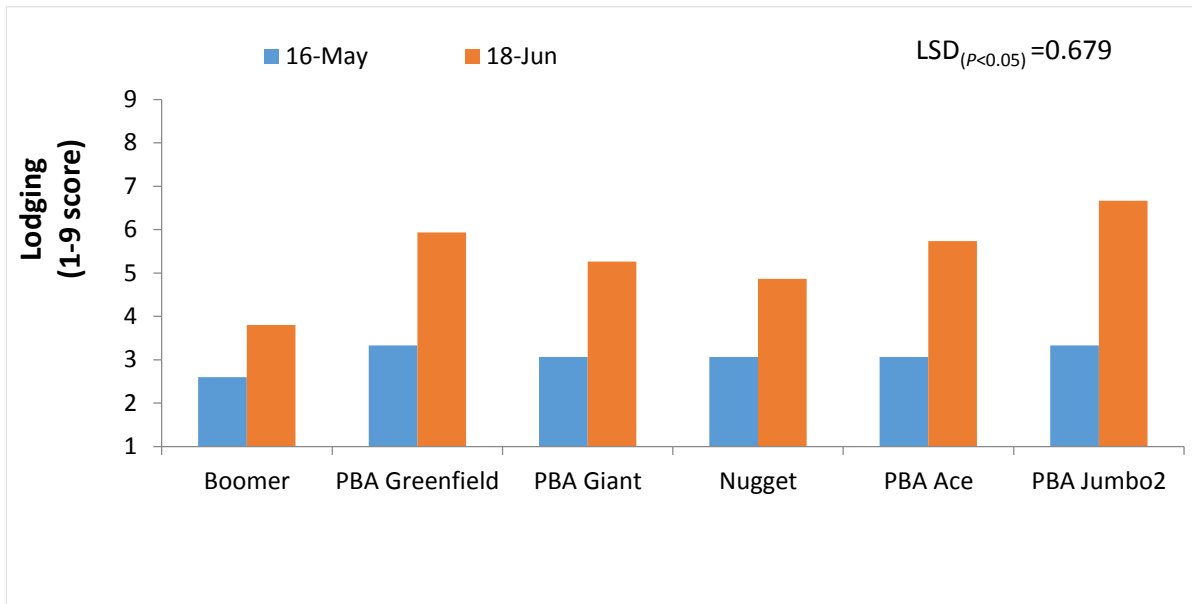


Figure 4: Lodging resistance of 6 lentil varieties at two different sowing times at Melton, South Australia, 2014. Lodging score score: 1 = flat, 9=erect

Grain Yield

- Grain yield was affected by a number factors showing different significant two way interactions across the two sites. At Pinery, these interactions were a) timing by variety ($P < 0.001$), b) timing by density ($P = 0.003$), and variety by density ($P = 0.024$). At Melton these interactions were a) timing by variety ($P = 0.018$) and b) timing by density ($P = 0.044$).
- At Pinery, PBA Greenfield, PBA Giant, PBA Ace, PBA Jumbo 2 and Nugget yielded higher and equal when sown early, with a mean yield of 2.24 t/ha, compared with Boomer (1.61 t/ha). Delayed sowing led to a yield penalty for PBA Greenfield (40%), Nugget (36%) and PBA Jumbo 2 (39%) (Figure 55).
- At Melton, PBA Greenfield (3.06 t/ha) and PBA Jumbo 2 (2.71 t/ha) yielded higher when sown early and were significantly higher than the other four varieties which showed no sowing date response (Figure 6).
- Sowing time by density interactions were found for grain yield at both Pinery and Melton however, these interactions showed only low and inconsistent differences between the densities evaluated. The current recommendation of 120 live plants/m² achieved relatively similar yields to other densities across all varieties and sowing times.
- At Pinery, Boomer showed a trend of declining yields at high densities averaged across sowing times (Figure 7). Lower sowing densities (100 plants/m²) may be considered to maintain yields in this variety which is prone to increased lodging and reduced yields from early sowing over other varieties.

Key findings and comments

- The recommended sowing density targeting 120 live plants/m² maintained high yields for all varieties at both sowing timings across the two sites.
- Lower sowing densities of 100 plants/m² may be considered for Boomer at Pinery where yields were found to decline as plant density increased.

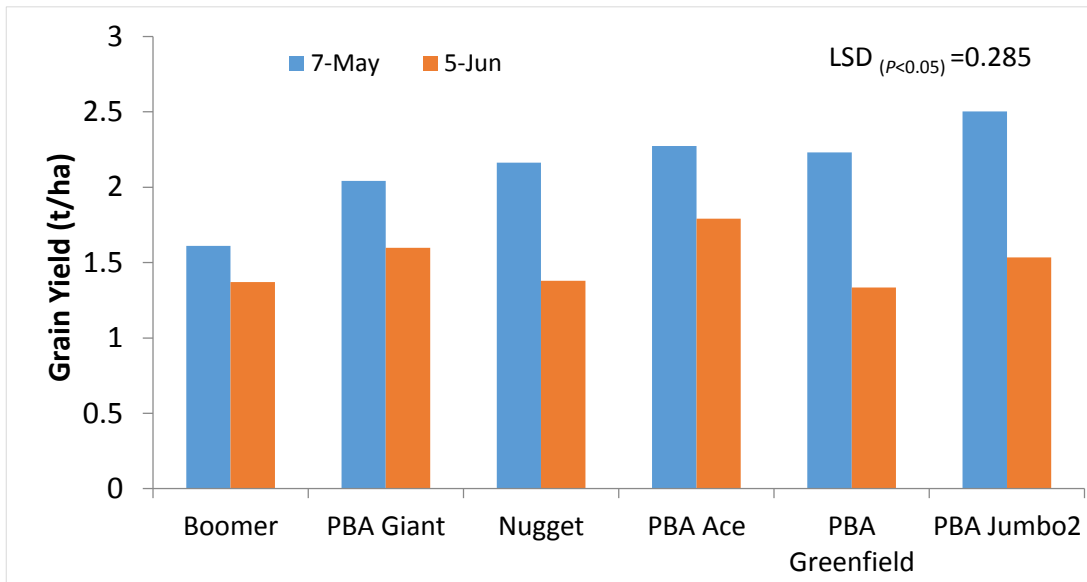


Figure 5: Grain yield (t/ha) of 6 lentil varieties at different sowing times at Pinery South Australia, 2014.

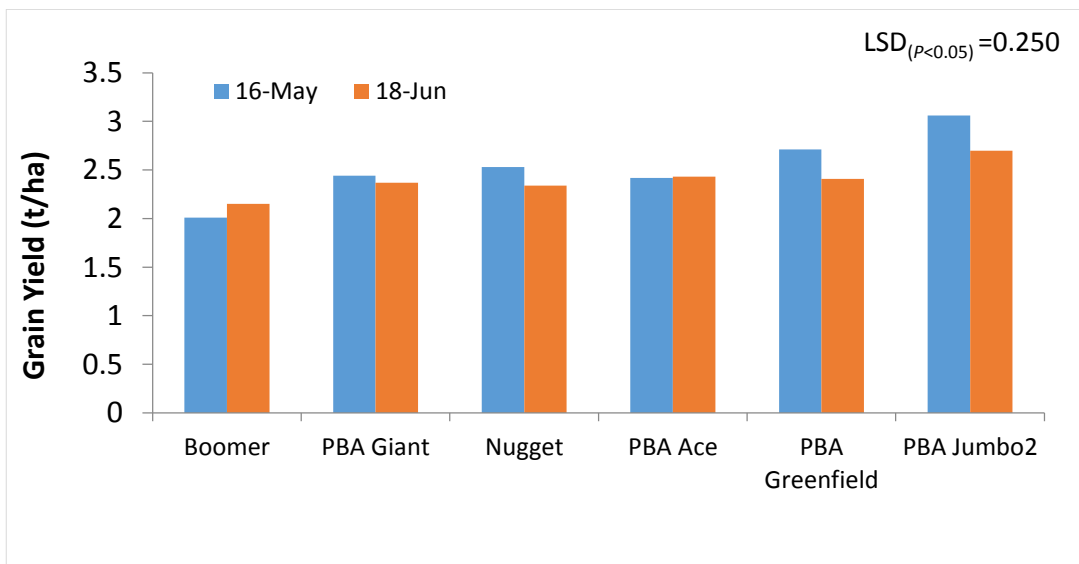


Figure 6: Grain yield (t/ha) of 6 lentil varieties at different sowing times at Melton South Australia, 2014.

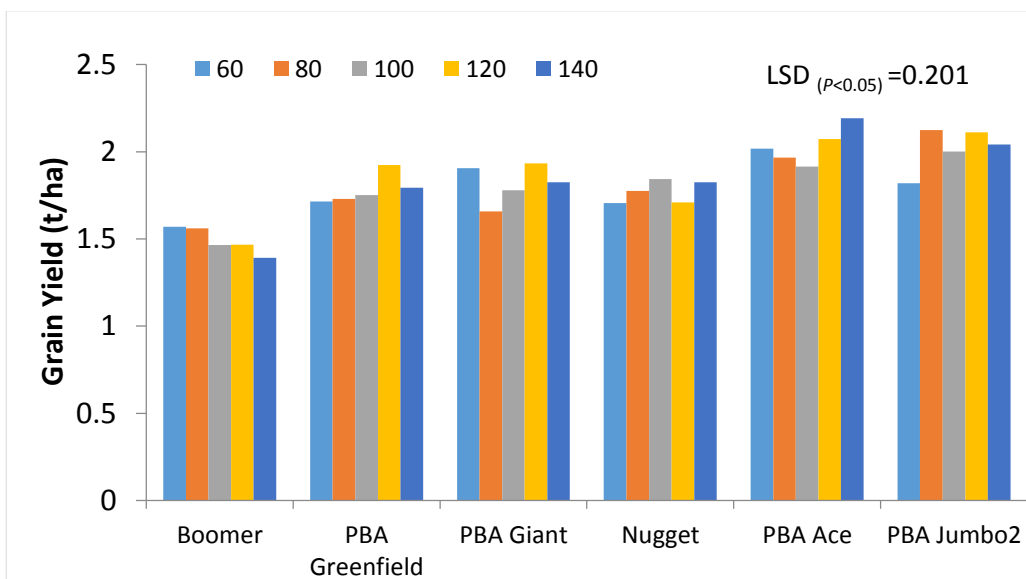


Figure 7: Grain yield (t/ha) of 6 lentil varieties under different sowing densities averaged across two sowing times at Pinery, South Australia, 2014.