1.5.3 Field Pea Agronomy for the HRZ – Hamilton

Location
Hamilton (37°49'S, 142°04'E)

Funding
GRDC (DAV00061)

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Rainfall (mm) April – November
360mm (annual: 493mm) Averages: A-N 481mm (annual: 688mm)
Nine frosts were recorded in October, with the lowest being -4.1^{O}C on the 21st.

Summary of Findings

- Timely sowing is essential for the profitable production of field peas. Sowing in May or June produces the highest grain yields and biomass.
- Despite several frost events and dry, hot conditions during flowering, all varieties sown were able to produce profitable grain yields.

Background to the trial
Field peas can form an integral part of a sustainable and profitable farming system in the HRZ. Currently, they are perceived as a high risk option, due to unsuitable varieties and agronomic packages. However, new varieties of field peas are now available with disease resistance and agronomic adaptation for reliable and profitable production in the HRZ. Agronomic packages to optimise yields and minimises risks are being developed and trials to identify traits for further varietal improvement are being conducted. This article highlights findings from a time of sowing trial which aims to determine optimum sowing times for the various field pea varieties in the HRZ.

Trial Inputs
Sowing dates – see below
Harvest dates – 8/12/2006 and 23/1/2007
Fertilizer – 100kg/ha MAP
Herbicides – Pre sowing, glyphosate 1.5L/ha; Post sow pre- emergence, metalochlor 500ml/ha + diuron 800ml/ha; Post emergence, clethodim 500ml/ha, diflufenican 150ml/ha + MCPA 150ml/ha.
Insecticides: Post sow pre-emergence, bifenthrin 100ml/ha; Flowering, alpha-cypermethrin 200ml/ha.
Fungicides: Chlorothalonil 1.8l/ha applied at various stages to ensure no fungal diseases.

Trial Design

Experiment 1 - Time of Sowing

The trial was conducted in small plots on raised beds, with 3 replicates of 4 varieties (Kaspa, Bundi, Mukta and Snowpeak) and 3 sowing dates (May 11, June 8 and Sep 15). Measurements of flowing date and biomass, grain yield and grain weight at maturity were recorded.

Trial Results

Experiment 1 – Time of Sowing

There was a significant variation in flowering dates for Bundi, Kaspa, Mukta and Snowpeak. Generally, Snowpeak flowered earliest and Kaspa and Mukta latest (Table 1).

Table 1. Flowering dates for field pea varieties sown at 3 sowing times at Hamilton in 2006.

Sowing Time	Bundi	Kaspa	Mukta	Snowpeak
May 11	31-Aug	18-Sep	9-Sep	29-Aug
June 8	1-Oct	7-Oct	7-Oct	18-Sep
Sep 15	24-Nov	27-Nov	27-Nov	17-Nov

The trial highlighted the benefits of timely sowing for all field pea varieties compared, with grain yields in excess of 1.2t/ha (up to 2.3 t/ha) when sown in May or June (Table 2). In comparison, the highest yield achieved for September sowing was 0.3t/ha. Kaspa was generally the lowest yielding variety. Each variety had different optimum sowing windows in 2006. Highest grain yields for Bundi occurred when sown May 11, for Mukta when sown June 8 and for Snowpeak and Kaspa when sown either May 11 or June 8 (Table 2). Despite the lower grain yield, Kaspa produced the highest biomass at all times of sowing, while Bundi and Mukta produced lowest biomass. Grain weights of varieties were generally highest when sown June 8 and lowest when sown Sep 15. Harvest indicies were extremely low this year ranging between 0.15 and 0.37. Under optimal conditions a harvest index above 0.40 could be expected.

Table 2. Grain yield, biomass production, grain weight and harvest index field pea varieties sown at 3 sowing times at Hamilton in 2006.

Sowing Time	Bundi	Kaspa	Mukta	Snowpeak	Mean $_{(ST)}$
Grain Yield (t/ha)					
May 11	1.92	1.38	1.69	1.96	1.74
June 8	1.66	1.27	2.28	2.09	1.83
Sep 15	0.27	0.26	0.17	0.30	0.25
Mean$_{(Var)}$	1.28	0.97	1.38	1.45	
$LSD_{(ST \times Var)}$[1]	0.49				
$LSD_{(Var)}$[2]	0.28				
$LSD_{(ST)}$[3]	0.24				
Biomass (t/ha)					
May 11	5.66	7.23	5.92	6.58	6.35
June 8	3.82	5.43	3.97	4.67	4.47
Sep 15	0.67	0.94	0.77	1.12	0.88
Mean$_{(Var)}$	3.38	4.53	3.55	4.12	3.90
$LSD_{(ST \times Var)}$[1]	NS[4]				
$LSD_{(Var)}$[2]	0.43				
$LSD_{(ST)}$[3]	0.37				
Grain weight (g/100seed)					
May 11	20.6	21.5	22.6	20.6	21.3

June 8	24.1	25.6	21.8	22.6	23.5
Sep 15	14.5	16.1	15.9	14.5	15.3
Mean$_{(Var)}$	19.7	21.1	20.1	19.2	20.0
LSD$_{(ST \times Var)}$[1]	NS				
LSD$_{(Var)}$[2]	NS				
LSD$_{(ST)}$[3]	1.2				
Harvest Index					
May 11	0.25	0.15	0.22	0.23	0.21
June 8	0.30	0.19	0.37	0.31	0.29
Sep 15	0.23	0.21	0.19	0.19	0.20
Mean$_{(Var)}$	0.26	0.18	0.26	0.24	0.24
LSD$_{(ST \times Var)}$[1]	NS				
LSD$_{(Var)}$[2]	0.06				
LSD$_{(ST)}$[3]	0.05				

1. LSD for comparing sowing time (ST) x variety (Var) interaction
2. LSD for comparing means of varieties (Var)
3. LSD for comparing means of sowing times (ST)
4. NS – Not significant

Trial Observations

Results this year were significantly influenced by frosts and dry conditions through flowering and podding. Symptoms of frost damage were scored on November 11 and indicated that Kaspa generally had the worst frost damage while Snowpeak had least damage. This probably explains the lower yields observed with Kaspa this year compared with other varieties. Kaspa appears to be very sensitive to frost when it occurs in the late flowering to early podding stage because it sets a large number of pods rapidly on the first node to flower. Other varieties tend to flower over a longer period and are able to set more pods at a later stage. The damage of the frost is also reflected in the low harvest indices. Despite the adverse environmental conditions, similar to previous seasons, earlier sowing (May and June) will produce highest grain yields. Growers should be careful of results in this year, because normally very few frosts occur at Hamilton in October, particularly late October. Under these conditions, Kaspa will produce the highest yields and greatest returns.

The results from this trial indicate that in 2006 at Hamilton, peas would have been a profitable option when sown in May or June, particularly with prices in excess of $300/t for grain and $150/t for straw. A 1.5t/ha crop of field peas would provide returns in excess of $250/ha from grain (allowing for production costs of $200/ha). The straw (at 7t/ha) could return $700.

Photographs

Figure 1. Kaspa (L) and Bundi (R) flowering at Hamilton in 2006.