

Field pea variety development

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The aims of these trials are to 1) Compare field pea variety performance for Victoria's grain growing regions and 2) Assess the relative performance of advanced breeding lines identified as potential commercial releases by the national field pea breeding program.

Summary

Field pea grain yields were severely affected by a combination of moisture and heat stress and frost damage during flowering and podding. As a consequence, experimental and commercial grain yields were very low and discrimination between varieties often too small to interpret. Downy mildew and bacterial blight were observed in the Wimmera but had relatively very little impact on yield.

Sturt is the best performing variety long term and this was also reflected by its yield performance in 2004. Experimentally Sturt appears to have much better tolerance to frost damage. Sturt is licensed to Premier Seeds and seed supply will be limited to seed production in 2005.

For 2005 Kaspia will continue to be the best variety option based on yield performance and agronomic attributes.

Background

The Australian Field Pea Improvement Program coordinated from Horsham, Victoria aims to deliver superior varieties that combine high and stable yield potential, vigorous early growth, disease resistance to downy mildew, powdery mildew, ascochyta blight and bacterial blight, lodging resistance at harvest reducing reliance and cost of specialised pea harvesting fronts, resistance to pod shattering, tolerance to frost and drought (eg Boron toxicity) related stresses and suitable grain quality for marketing.

Methods

All sites were managed to reflect the best local practice for site selection, sowing time, fertiliser and herbicide types and rates, cultural practice (eg cultivation) and the timing of harvest. The Birchip and Gooroc trials were not harvested due to low yields as a result of drought. Data from the Walpeup, Quambatook and Kaniva trials is not presented due to high variability (CV higher than 15%).

Results

Field peas were generally sown late, particularly in the mallee districts, because of inadequate rainfall. Following sowing, early plant growth was generally slow as consequence of continuing dry weather. However, field pea crops responded quickly to good rainfall events over August and September and produced enough biomass for average production in most regions. Virtually no rainfall for the entire month of October and very high temperatures, followed by heavy frosts at the time when most

field pea crops were flowering and podding, severely reduced grain yield. Experimental grain yields reflected those of commercial crops and were on average 0.4 t/ha in the Mallee and 0.9 t/ha in the Wimmera.

Table 1. Mean grain yields (t/ha) from the advanced field pea trials for the Mallee region in 2004 and long term (up to 2003).

Line	Warne	Rainbow	Beulah	Ultima	Mean 2004	Victorian Long term
Sturt	0.80	0.40	0.49	0.50	0.55	2.2
Parafield	0.80	0.28	0.35	0.41	0.46	1.9
Moonlight	0.77	0.44	0.35	0.39	0.49	1.9
Kaspa	0.93	0.34	0.25	0.41	0.48	1.9
Snowpeak	0.76	0.36	0.38	0.43	0.48	1.8
Excell	0.65	0.34	0.29	0.28	0.39	1.7
96-286*1	0.73	0.24	0.35	0.37	0.42	2.0
96-262*1	0.81	0.35	0.47	0.48	0.53	2.0
89-036*3-6	0.76	0.35	0.29	0.44	0.46	2.0
89-036*9-8	0.80	0.41	0.56	0.51	0.57	1.9
MEAN	0.73	0.34	0.32	0.41	0.45	
LSD (P<5%)	0.08	0.08	0.07	0.08		
CV %	7	15	13	11		

Table 2. Mean grain yields (t/ha) from the advanced field pea trials for the Wimmera region in 2004 and long term (up to 2003).

Line	Laen	Horsham	Tarranyurk	Mean 2004	Victorian Long term	Minyip 2004 (Severe frost affect)
Sturt	1.33	1.01	1.02	1.12	2.2	0.97
Parafield	1.13	0.81	0.83	0.92	1.9	0.36
Moonlight	1.30	0.97	0.90	1.06	1.9	0.49
Kaspa	1.14	0.81	0.76	0.90	1.9	0.37
Snowpeak	1.29	0.92	0.91	1.04	1.8	0.30
Excell	1.29	0.91	0.77	0.99	1.7	0.52
96-286*1	1.31	0.82	0.72	0.95	2.0	0.52
96-262*1	1.30	0.99	0.87	1.05	2.0	0.59
89-036*3-6	1.31	0.85	0.86	1.01	2.0	0.41
89-036*9-8	1.31	1.06	0.91	1.09	1.9	0.47
MEAN	1.25	0.91	0.76	0.97		0.54
LSD (P<5%)	0.18	0.09	0.11			0.11
CV %	6	7	9			21

Interpretation

Experimental grain yields were very low and differences between varieties difficult to interpret. Sturt was again the best performing line on average and continues to be the highest yielding variety long term. Sturt has consistently yielded well where frost damage is severe. For example, at Minyip in 2004 Sturt out yielded Kaspa and Parafield by 250% following a severe frost that caused major pod damage and complete flower abortion in all lines (Table 2).

Several advanced breeding lines are being considered for commercialisation in 2005. All have high yield potential, broad adaptation, good resistance to downy mildew and stand reasonably erect at harvest (eg similar to Kaspa). Specifically:

- 89-036*9-8 is a very early flowering line, which has excellent early vigour. It produces large white seed and is pod shatter resistant.
- 96-286*1 is an early to mid flowering type. It produces dun type grain and shows good tolerance to boron toxicity.
- 89-036*3-6 is very similar to Kaspera in terms of plant type and grain produced but differs in that it flowers slightly earlier.
- 96-262*1 is an early flowering, powdery mildew resistant, white seeded line. This line has poorer early vigour but is consistently high yielding.

Variety selection

The best field pea variety for an area should be selected on the basis of yield potential, disease resistance and marketing arrangements.

- Kaspera (dun type) has excellent yield potential in the Mallee and Wimmera, is resistant to downy mildew and pod shattering and has good standing ability at harvest.
- Parafield (dun type) has performed consistently well in Victoria. It is susceptible to downy mildew, and lodges at harvest.
- Snowpeak and Moonlight are alternatives for growers wanting to grow white peas. Both have good lodging resistance at harvest, good resistance to downy mildew. Moonlight is also resistant to pod shattering.
- Excell is the best choice for growers wanting to grow blue peas. It is resistant downy mildew and shows excellent lodging resistance at harvest.

Crop Production Issues

- Bacterial blight was present in Kaspera crops in the Wimmera but caused minimal damage. All varieties are susceptible to severe damage, but Parafield appears more tolerant than Kaspera, Excell, and Snowpeak. Grain harvested from crop patches infected with bacterial blight should not be kept for sowing in subsequent years. Stubble from paddocks infected with bacterial blight should be destroyed or removed.
- To manage downy mildew and ascochyta blight growers should use wide cropping rotations, grow more resistant varieties and use seed dressings.
- Frost can cause significant yield losses in field pea and therefore early sowing should be avoided, particularly in the Wimmera region.
- Blue and white peas can attract price premiums for human consumption trade, depending on market demand and quality of grain.

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