

Factsheet: Optimal Seeding Rate and Disease Management for Yield and Quality in Faba Bean



Objective:

The objective of the first experiment is to identify the optimal seeding rate required to maximize yield in three faba bean varieties. The objective of the second experiment is to identify the optimal disease control practices required to minimize disease severity, and increase yield and quality, in two faba bean varieties.

Methodology:

At the same time the experiments in this thesis were being conducted at Melfort and Saskatoon sites, a sub-set of treatments were trialed at five Agri-ARM locations across Saskatchewan at Outlook, Indian head, Swift Current and Scott. For the seeding rate experiment, CDC Snowdrop was the only variety seeded, at the same rates (20, 40, 60, 80, and 100 viable seeds m⁻² in 2015 and 2016, then 5, 10, 20, 40, and 60 viable seeds m⁻² in 2017). For the disease control experiment, CDC Snowdrop was the only variety seeded, with applications of the four

Key Findings:

- Results indicate that there is no need to modify faba bean seeding rates beyond innate thousand kernel weight differences.
- The seeding rate required to reach maximum agronomic yield, ranged from 20 to 77 seeds m², averaging 49 seeds m². This result is only slightly greater than the current 44 plants m² recommendation.
- Higher plant densities can be beneficial towards hedging variability losses, as they alter the canopy in order to increase weed control, hasten maturity, and increase harvestability.
- This was especially noted in circumstances where herbicide resistant weeds were present and when late flushes of weeds occurred. As faba bean is a late season crop, with 104 to 109 days to maturity, earlier maturity can help prevent fall frost damage on the seed. Frost damage on the seed results in black to grey discoloration, resulting in downgrading, and consequently economic losses
- Higher plant densities can also result in taller plants, with pods higher off of the ground, easing harvestability. However, although higher seeding rates can have significant benefits for faba bean production, higher rates need to be weighed against the increased risk of lodging and disease development.
- Although there were significant differences in disease severity between the site-years, all fungicide products and applications timings were equally effective in controlling disease development.
- Although CDC Snowdrop was slightly more responsive to the various disease control measures than CDC SSNS-1, results were not always biologically or agronomically significant.
- Foliar fungicide may not always be warranted, due to minimal disease development even under conducive environmental conditions, and in the presence of pathogens. Therefore, faba bean disease control should primarily focus on integrated disease control measures.
- Clean, unblemished seed, at the recommended seeding rate, with adequate nutrition and weed control should be integral practices for disease management of faba bean in Saskatchewan.
- Under low disease pressure all four fungicide products are equally effective towards controlling faba bean diseases in Saskatchewan.
- These results also suggest that application timing at either 10% or 50% flowering may be too early, as disease progression did not escalate until nearly 6 weeks after first flowering occurred.
- There was no significant difference using a strobilurin-based fungicide over a nonstrobilurin fungicide and multi-over single active ingredient product, application timing and the diseases present, should be the largest driver for product selection.

The full report is available at www.warc.ca. This project was funded by the Saskatchewan Pulse Growers Association.
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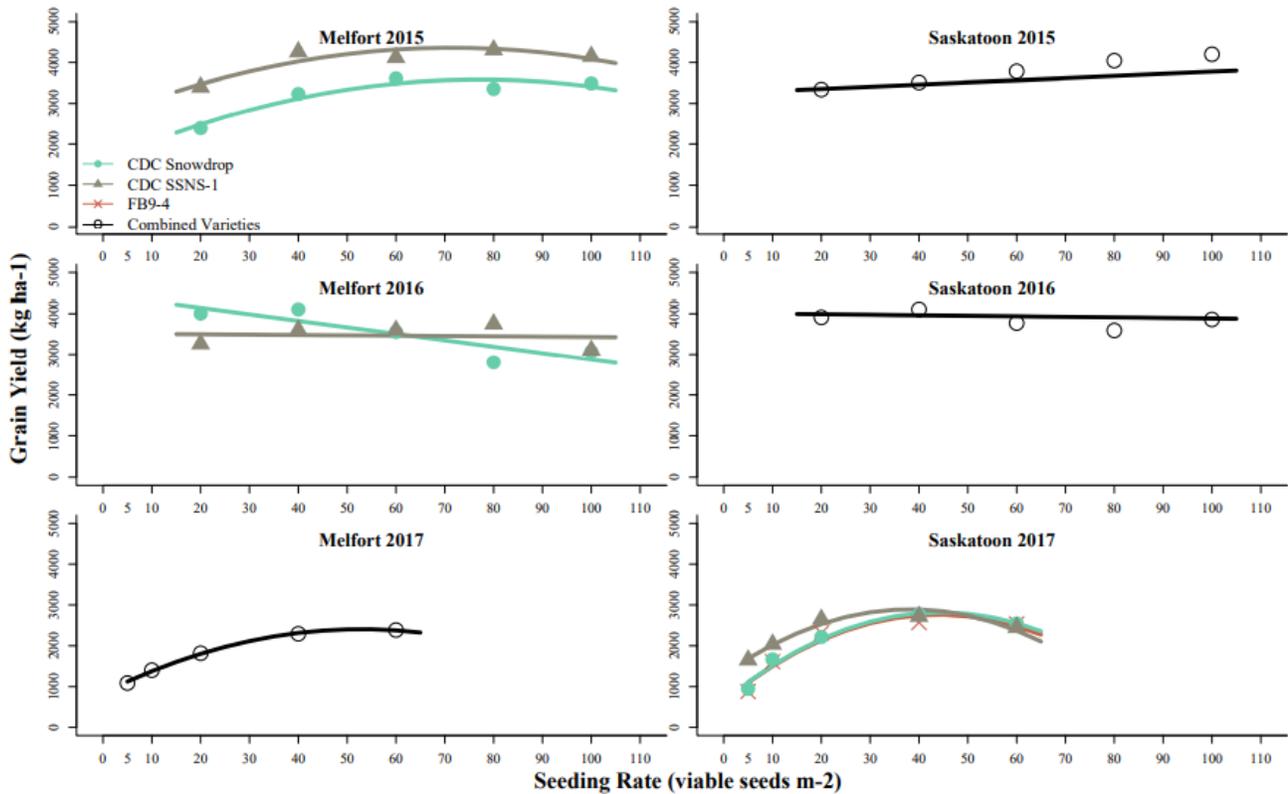


Figure 1: Seeding rate (viable seeds m⁻²) effect on grain yield (kg ha⁻¹) of three faba bean varieties from Melfort and Saskatoon in 2015 to 2017.

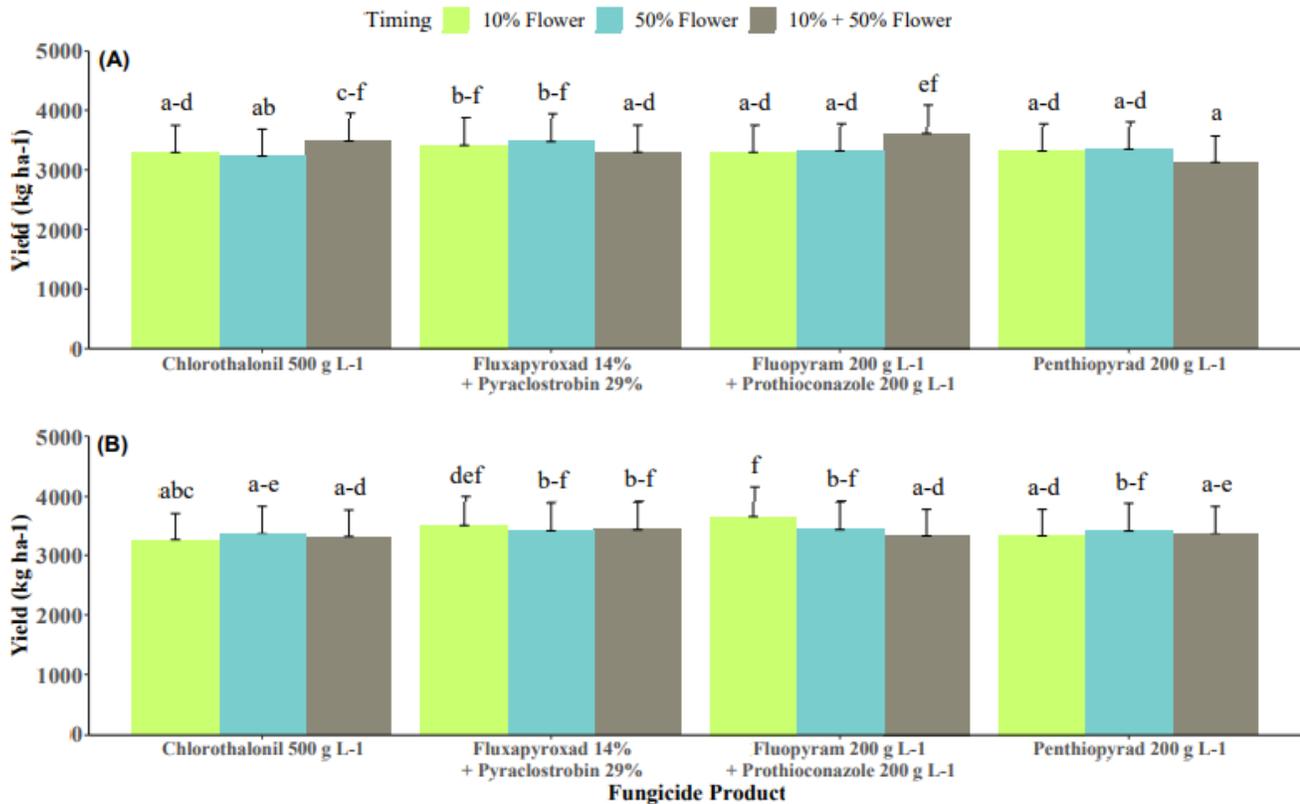


Figure 2: Product and timing effects on yield (kg ha⁻¹) of CDC Snowdrop (A) and CDC SSNS-1 (B) averaged across 6 Saskatoon locations from 2015 to 2017. Values with the same letter are statistically similar at P < 0.05.