

Objective:

Within the different soil/climatic zones of western Canada, determine

- 1) Which individual agronomic inputs contribute most to field pea seed yield
- 2) Which combination produces the highest seed yield and economic return and
- 3) How plant population, leaf and stem disease, crop maturity, grain yield and quality are affected by input interactions.

Methodology:

Field trials were conducted in 2012-2014 at the Agri-ARM sites located at Scott, Swift Current, Melfort and Indian Head SK and a fifth site, Minto MB, was added in 2014. Due to excess moisture in 2013, the trial at Melfort was terminated after assessing plant populations; therefore data was collected from only twelve site years. Twenty two treatments were arranged as a randomized complete block design with four replicates. The check treatment received only the “empty” input package (seeding rate of 60 seeds m⁻² with a liquid inoculant) (Table 3). All other treatments received the “empty” input package with the addition of one, two, three or four of the additional inputs: higher seeding rate (SR), a seed treatment (ST), granular inoculant (GI) (instead of liquid inoculant), starter N fertilizer (Fz) or two applications of foliar fungicide (Fn) (Table 1). The “full” input package received all five of the additional inputs. Only Fz was not applied in combinations of three or four inputs to reduce the number of treatments in the study. A semi-leafless yellow pea variety (CDC Meadow) was direct seeded into spring wheat, barley or canola stubble between mid-May to early June

Table 1. Details of inputs applied in the Empty input package and as additional inputs

| Input | Empty Package | Additional Inputs |
|----------------------------------|--|--|
| Seeding rate (SR) | 60 viable seeds m ⁻² | 60 viable seeds m ⁻² |
| Seed treatment (ST) | None | Apron Maxx RTA at 235mL 100kg ⁻¹ seed (<i>Fludioxonil + Metalaxyl-M & S-isomer</i>) |
| Inoculant (GI) | Liquid Boost N ^z Liquid Cell-Tech ^y | Granular Optimize ^z Granular Cell-Tech ^y |
| Starter nitrogen fertilizer (Fz) | None | Granular Urea at 30 lb N ac ⁻¹ (46-0-0) |
| Foliar Fungicide (Fn) | None | Headline EC at 160mL ac ⁻¹ (<i>pyraclostrobin</i>) Priaxor DS at 160mL ac ⁻¹ (<i>pyraclostrobin + fluxapyroxad</i>) |

^zUsed in 2012 and 2013 site years

^yUsed in 2014 site years

Key Findings:

- Plant density was increased from an average of 56 to 102 and 52 to 89 plants m⁻² with low to high seeding rates at high and low yielding sites, respectively. This range of densities is outside the traditionally recommended plant density.
- Granular inoculant and ST increased plant density, but to a much lower extent than SR. Starter N fertilizer resulted in significant, but relatively small reductions in plant density.
- Disease levels were generally higher with SR early and later in the growing season and lower with Fn later in the season, regardless of environment. Granular inoculant also decreased disease levels when averaged across high yielding site years.

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

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- Maturity was affected by SR and Fz only; generally, SR decreased maturity and Fz increased maturity. Under relatively good growing conditions, such as those encountered at Scott, Melfort and Minto, input combinations of two or three inputs interacted in an additive fashion on average.
- Generally, averaged across high yielding sites, seed yield increased and yield variability decreased with each additional input added to the input package. Higher seeding rates, Fn and GI were the three inputs which consistently increased seed yields and economic return at these sites, especially when applied in combination.
- In contrast, the addition of ST or Fz did not consistently improve yields or economic returns. Under poor growing conditions, such as those encountered at Indian Head and Swift Current, seed yields were more variable and input interactions were generally not additive.
- The overall response to SR and Fn was significant; however, the high cost of the Fn resulted in those treatments having the lowest economic return. Either SR or Fz applied alone maximized yield and economic return averaged across low yielding sites.
- We recommend all farmers use seeding rates to target the recommended plant population to maximize yield potential. Under situations where the farmer targets relatively high yields, we recommend also using a GI to ensure nodulation and nitrogen fixation to provide sufficient levels of nitrogen to the crop.
- If the crop develops a thick canopy and/or disease develops, adding a foliar fungicide will protect and maintain the yield potential of the crop.
- We do not expect to see a yield response using starter nitrogen fertilizer, except when there are other limitations which restrict yield potential and nitrogen fixation.
- Seed treatments did not result in consistent yield improvements in field peas and this should be further investigated

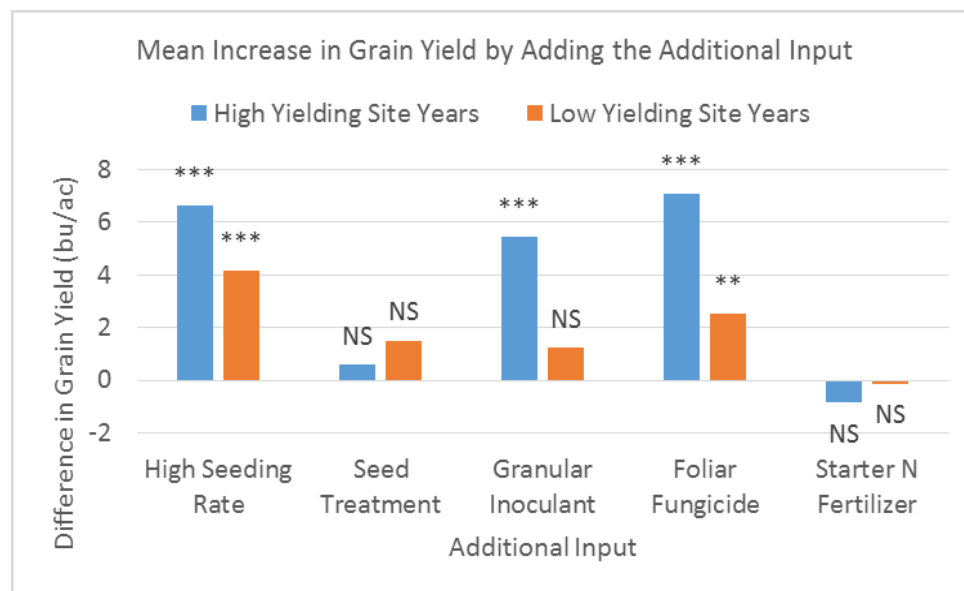


Figure 1: Mean increase in grain yield by adding the additional Input.

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