

Yield responses to individual inputs are often measured in research or on-farm trials; however, it is unclear how combinations of multiple inputs interact and effect yields. Farmers need to determine how these input combinations impact harvestable yield and provide best economic return. Treatments used in this study were “empty” input package (seeding rate of 60 seeds m⁻² with liquid inoculant) and the effects of additional inputs such as high Seeding Rate (SR) (120 seeds m⁻²), Foliar Fungicide (Fn), Seed Treatment (ST), Granular Inoculant (GI) or 30 lbs N ac⁻¹ starter fertilizer (Fz) both alone and in various combinations were measured. The “full” input package received all five of the additional inputs. The objectives of the study were to determine 1) which individual agronomic input contributes 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 effected by inputs interactions.

Field trials were conducted from 2012-2014 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; therefore, data was collected from only twelve site years. 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. 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. To download a copy of the full field pea input study, please visit:

www.westernappliedresearch.com

