

Inoculants Improve Pea Yield when Peas are Grown in Areas of Low Pulse History

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Pulse crops, like peas and lentils, form symbiotic relationships with rhizobium bacteria, which allow producers to grow these crops without the need for synthetic fertilizers. Rhizobium can be applied directly to seeds as a liquid suspension or powdered peat, or it can be incorporated with the seed during planting in a granular formula. Liquid inoculants typically induce less nodulation compared to granular or peat-based formulas.

The Carrington REC participated in a broader study that compared the effects of commercial and custom inoculants on field pea and lentil yields. This research was conducted on sites with both low and high pulse cropping histories. The study included two main types of peas grown in North Dakota: green peas (ND Victory) and yellow peas (ND Dawn). North Dakota has considerable variation in pulse cropping history, so the study incorporated two distinct cropping histories: a low pulse history, where no pulse crops were grown for more than seven years, and a high pulse history, where peas were grown two seasons prior.

The study examined six different treatments (Table 1). The control treatment had no inoculant and served as the baseline for yield comparisons. Granular inoculants, which are popular due to their ease of application, were tested alongside liquid inoculants, as custom inoculants are often easier to produce in liquid form. The pea portion of the study was divided into four distinct trials - one for each pea color (green and yellow) and one for each type of pulse cropping history. Planting occurred in mid- to late-May due to a cool, wet spring. Seeds were inoculated just before planting, with liquid inoculant applied or granular inoculant placed in the furrow during planting.

Table 1. Inoculant effect on pea yield using various types of rhizobium species.

	Yellow Pea		Green Pea	
	Low History	High History	Low History	High History
Control	0	0	0	0
Granular	3%	-1%	19%	0%
Commercial Liquid - Standard Species	9%	-1%	32%	-4%
Custom Liquid - Standard Species	12%	4%	28%	25%
Custom Liquid - Species A	9%	4%	39%	-11%
Custom Liquid - Species B	11%	5%	34%	-17%

No significant differences were observed in flowering time or duration within each trial site. The trials were desiccated after physiological maturity was reached and harvested in mid to late August, as weather permitted. Yields were significantly different at $\alpha = 0.10$ only in the trials with low pulse cropping history (Figure 1). To facilitate comparison, yields were adjusted as a percentage of the control treatment (Table 1). In the high pulse history trial, yields for both green and yellow peas were significantly lower. Several factors contributed to this yield reduction, including slower soil drainage at the high history site, which led to more saturated soils and slightly delayed planting. Root rot was also observed at the high history site.

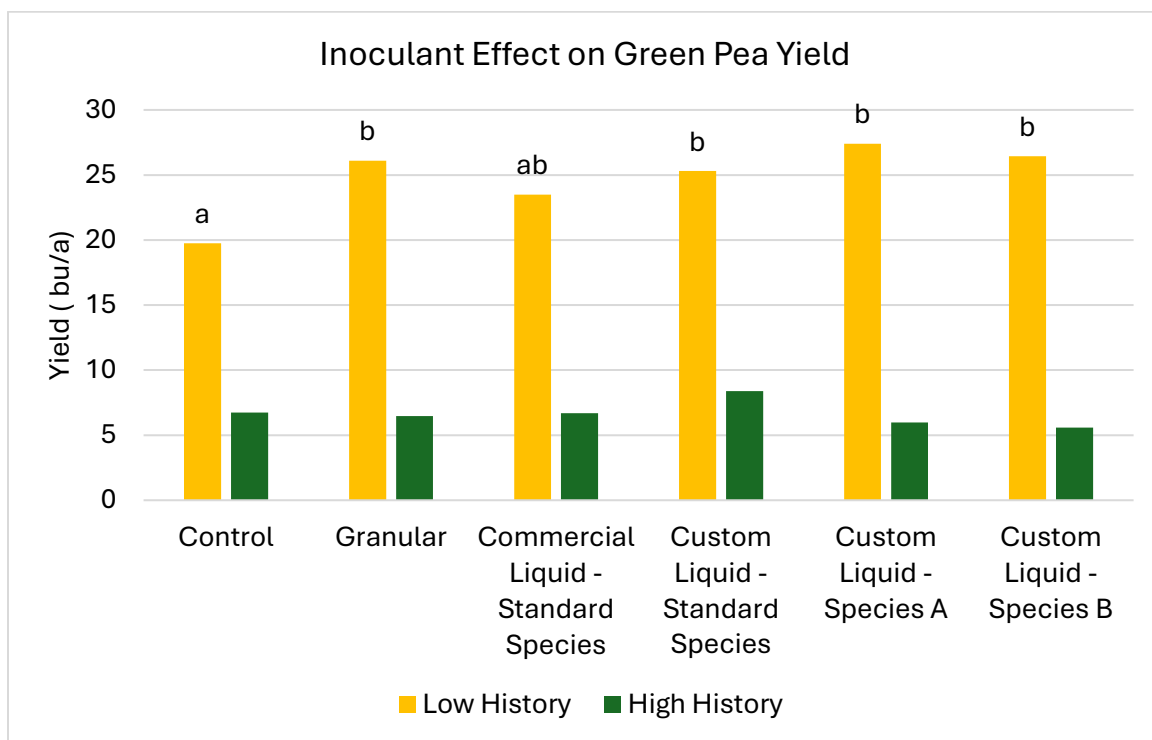
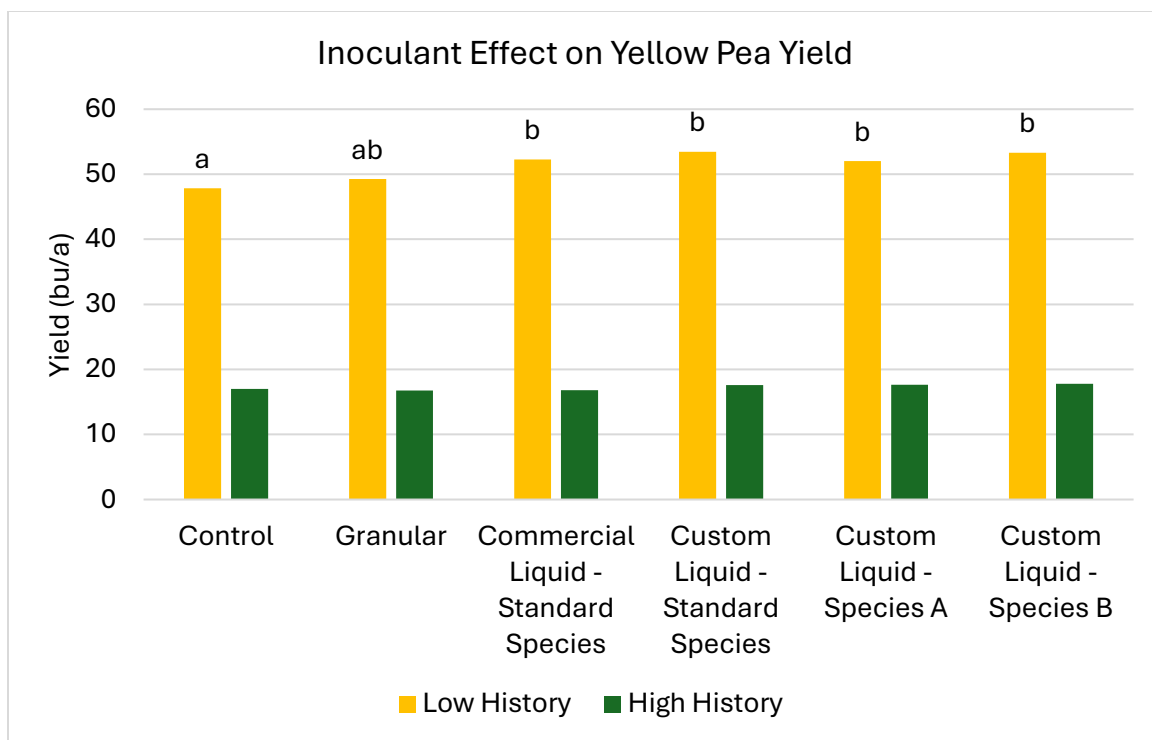


Figure 1. Inoculant significantly affected the yield of both green and yellow peas with a low pulse cropping history. Letters above the bars indicant significant groupings.

In the low pulse cropping history trials, all liquid inoculants had a positive effect on yellow pea yields, while both custom-produced liquid inoculants and granular inoculants significantly improved green pea yields. Table 1 shows the percentage effect of inoculants on yield. Notably, the range of yield change was smaller for yellow peas compared to green peas, though whether this is due to pea color, variety, or environmental factors remains unclear.

In conclusion, pulse inoculants can increase yields for both green and yellow peas. Further research is needed to confirm these findings and to determine whether the observed effects are specific to pea color or genotype.

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