

Demonstrating the Efficacy of Foliar-Applied Nitrogen Fixing Bacteria for Wheat



Objective:

- To demonstrate the effects of commercially available, foliar-applied nitrogen (N) fixing bacteria products under a range of N fertility levels in canola.

Trial Design:

- Sites included all eight AgriARM sites; Scott (WARC), Indian Head (IHARF), Melfort (NARF), Outlook (ICDC), Yorkton (ECRF), Redvers (SERF), Prince Albert (CLC), Swift Current, SK (WCA).
- Data from Prince Albert, Swift Current, and Yorkton was excluded from the combined analyses due to inconsistent results or weather events.

#	Nitrogen Fertility (soil + fert)	Biological Foliar Treatment
1)	Low (45 lbs total N/ac)	None
2)		Envita
3)		Utrisha-N
4)	Medium (89 lbs total N/ac)	None
5)		Envita
6)		Utrisha-N
7)	High (134 lbs total N/ac)	None
8)		Envita
9)		Utrisha-N

*Foliar treatments were applied at 4-6 leaf stage.

Results:

- Increases in both seed yield and protein concentrations with the addition of N fertilizer in the form of the side-banded urea were observed.
- No observations of effects indicated an improved N status or biological N₂ fixation associated with the foliar applications Envita or Utrisha-N regardless of site or fertility rate.
- There were no trends that were consistent enough to suggest positive responses to the biological treatments with any confidence.

- Yield and protein were observed to statistically increase as the N rate increased at all sites evaluated.

Conclusions:

These results are generally consistent with those of a similar project conducted with spring wheat, field-scale trials funded by SaskWheat and SaskCanola, and complementary, ongoing research at the University of Saskatchewan. With all this in mind, we recommend that farmers avoid reducing their N fertilizer rates when using biological products intended to improve N nutrition in crop production and utilize untreated check strips (preferably replicated) to confirm whether or not they are realizing any benefits on their own farms. While we cannot rule out that positive responses might occur with either different crop types or under environmental conditions that were not met in the current project, we did our best to allow the foliar products to succeed. Including careful storage of the products, using distilled water as a carrier, ensuring adequate water volumes, attempting to apply the biological products during cooler conditions, and testing them under N limiting conditions.

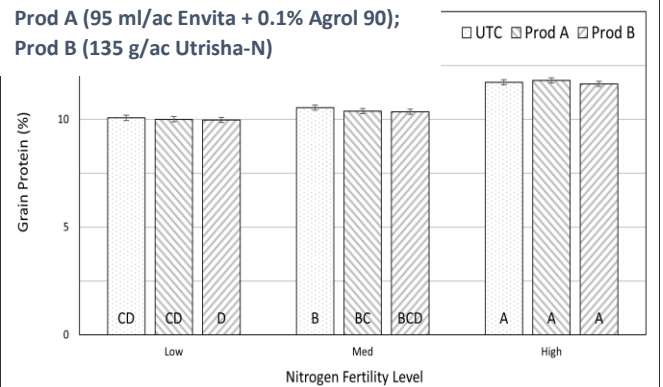


Figure 2. Nitrogen (N) fertility level by foliar-applied N fixing bacteria treatment effects on wheat grain protein, averaged across 5 sites.

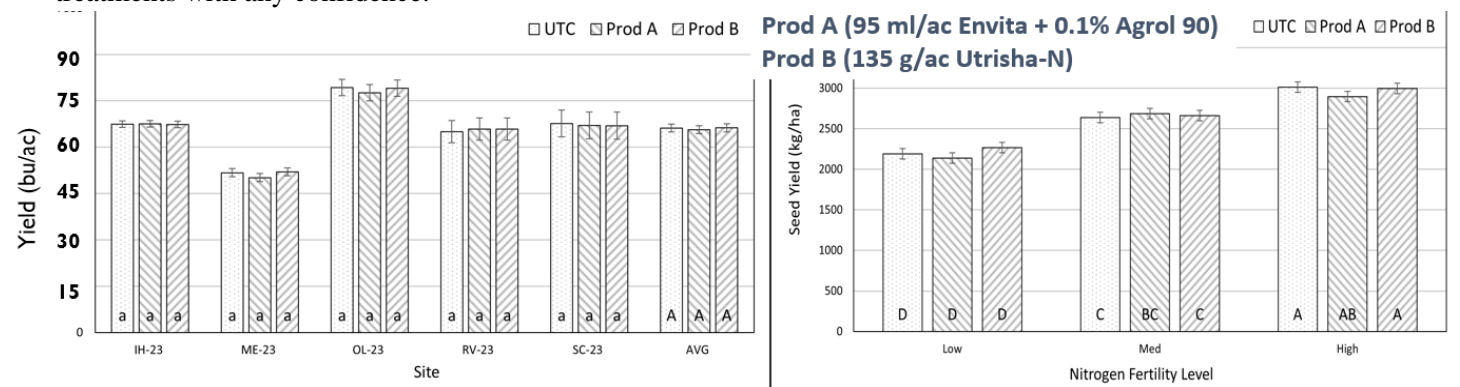


Figure 1a, b). Nitrogen (N) fertility level by foliar-applied N fixing bacteria treatment effects on wheat grain yields, averaged across 5 sites. The N fertility levels were Low (50 kg N/ha), medium (100 kg N/ha), and high (150 kg N/ha), including residual soil N. The foliar treatments were UTC (untreated check), Prod A (Envita), and Prod B (Utrisha-N).

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