SASKATCHEWAN pulse Growers

Pulse Replicated On-Farm Independent Trials

Foliar-Applied Nitrogen Fixing Biological For Dry Bean Trial

Biological nitrogen fixation (BNF) of dry beans is relatively low in comparison to other legume crops with roughly 50% of the plant derived N coming from BNF. Although there is the ability for inoculation of dry bean using Rhizobium leguminosarum biovar phaseoli, due to the poorer nitrogen fixation ability of dry bean and inoculant not being widely available, the recommendation is to fertilize dry beans like a non-legume crop. As dry bean is a poor nitrogen fixer, a supplemental nitrogen option using a nitrogen fixing foliar biological may offer plant available nitrogen at peak demands when soil nitrogen is inadequate.

Objective

To compare the response of irrigated dry beans to an application of a foliar applied N fixing biological product versus an untreated check. This evaluation aims to examine crop performance of a single variety of dry bean under typical field management practices.

Treatments

Treatments (Envita® vs untreated check) were arranged in randomized strips, the width of one sprayer boom per strip, with three replicates.

Methodology

- The trial was seeded and fertilized per usual practices and biological treatment strips were established at herbicide timing.
- Envita® was applied following label recommendations.
- Yield was determined for each plot separately by weighing with a weigh wagon or grain cart with scale.
- Composite grain samples were collected from each treatment for quality analysis.

Data Collection

- Spring soil test
- Spring plant density
- Harvest data
- Weather data
- Field history and management practices
- General in-season observations

SPG thanks Syngenta for their support by donating Envita®.

Foliar-Applied Nitrogen-Fixing Biological Products In Dry Bean
(Riverhurst)

Objective: To determine if there are agronomic and economic benefits of applying a commercially available, foliar-applied N-fixing bacteria product in dry bean.

Treatments:
1. Untreated check
2. Envita®

Replicates: Three

General Trial Information:	
Variety	CDC Blackstrap
Soil type & texture	Orthic Brown Chernozem, sandy loam/fine sandy loam
Seeding date	May 26
Seeding depth	1.5 inches
Seeding speed	6 mph
Seed treatments	Vibrance Maxx® (sedaxane + metalaxyl + fludioxonil)
Row spacing	15 inch
Drill & opener type	Vacuum planter - disc type opener
Previous crop	Durum
Soil organic matter	2.4%
Residual Nitrate-N (0-24”)	80.6 lbs/ac
Fertility and placement	300 lbs 28.5-26-0 (urea + MAP blend) - banded fall 2022
Harvest date	Sept 6

Envita® Application:	
Date / Time	June 20
Crop stage	2nd Trifoliate
Tank mix	Viper® (imazamox + bentazon + Merge + 28% UAN) + Basagran® (bentazon)
Water volume	20 gal/ac
Weather conditions	Sunny 20 degrees

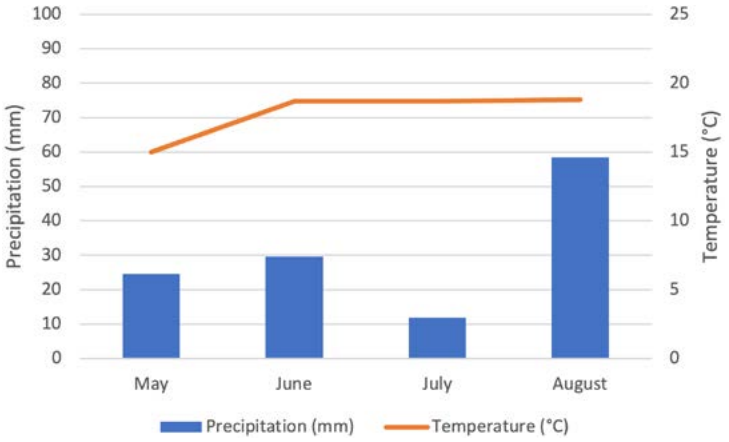
In-crop pesticide applications:	
July 19	Cotegra® (boscalid + prothioconazole)
Aug 2	Acapela™ (picoxystrobin) + Parasol® (copper hydroxide)
Aug 31	Reglone® (diquat)

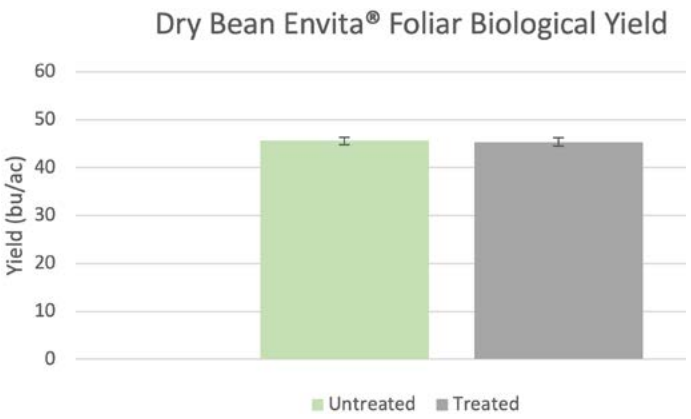
Results:	
Treatment	Yield [1] (lbs ac^{-1} / bu ac^{-1})
Untreated	2740 / 45.67
Envita®	2720 / 45.33
SE[1]	± 0.78
P-value [2]	*0.32*

Summary:
We were unable to detect differences in yield as a result of the application of Envita® foliar-applied N-fixing bacteria to dry bean under these trial conditions.

Economics:
There was no significant difference in yield resulting from Envita® application. Therefore, the most economical treatment in regard to Envita® application is the untreated check.

Weather: nearby or in-field weather station.





*An additional 228.6 mm of water was applied through pivot irrigation to this field.

1. SE is the standard error which is in the same unit as the measurement and indicates the level of variability or uncertainty in the data.
2. The P-value indicates the statistical significance, or likelihood that the measured difference was a result of the treatment:
   P < 0.01 = Very likely; Very high probability that the difference was due to the treatment (***)
   P < 0.05 = Likely; Good probability that the difference was due to the treatment (**)
   P < 0.1 = Possibly; Moderate probability that the difference was due to the treatment (*)
   P > 0.1 = Not likely; Probability too low to confirm if the difference was due to the treatment (not significant)