Investigating Biological Nitrogen Fixation Products for Corn

Simple Summary

- Biological products capable of fixing atmospheric nitrogen (N) are promoted to increase yields or reduce N fertilizer needs in corn. This could provide significant economic and environmental benefits for corn production.
- In 2021, 19 Ontario corn trials were conducted to investigate biological N fixation products. All 2021 trials investigated the product Envita.
    - Under grower's existing N programs (or the highest N rates at multi-rate N trials) the average yield response for Envita was 3 bu/ac compared to non-treated control plots.
    - At the 4 multi-rate N trials, there did not appear to be stronger yield response for Envita at lower N fertilizer rates.
- Investigation of biological N fixation products for corn will continue in 2022. Growers are encouraged to add to this dataset by testing Envita or other biological N fixation products on-farm.

Purpose

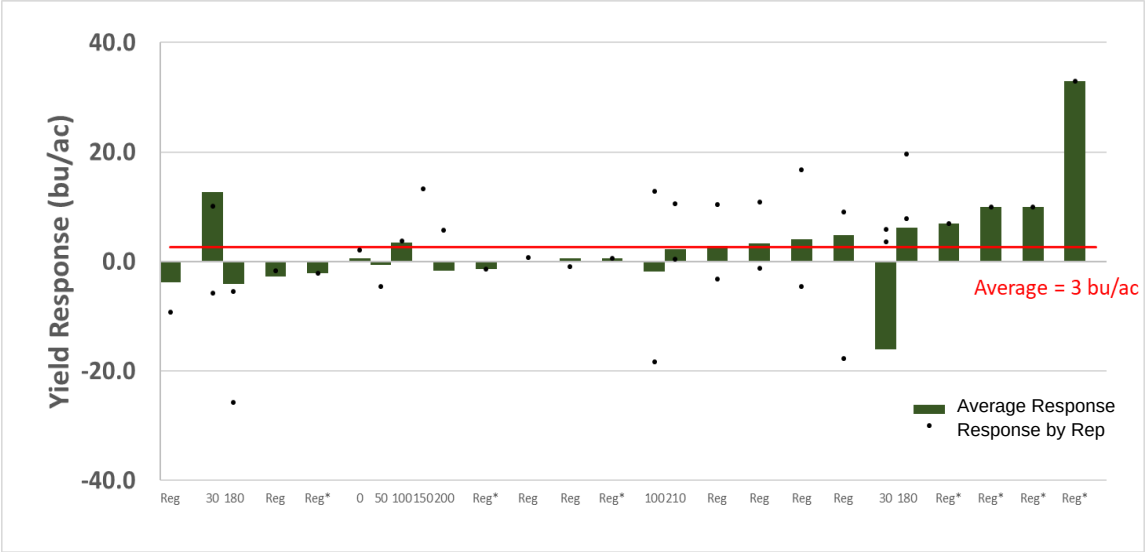
Nitrogen (N) fertilizer is one of the greatest input expenses for corn production. It also carries environmental costs through its production (fossil fuels) and fate (residual nitrates, nitrous oxide emissions) when it is not taken up by crops. Biological products that can fix atmospheric N may provide an ability to increase yields or reduce N fertilizer requirements. The purpose of this project is to investigate yield response to biological products that are promoted to provide N fixation for corn in Ontario. Identifying products than can reliably increase yields or reduce nitrogen fertilizer requirements could provide great economic and environmental benefits for corn production.

Methods

Growers were asked to replicate side-by-side comparisons of treated (biological N fixation product) and untreated strips in their corn fields. Applications were to follow label directions (rates, carrier products, application timings and methods). Yields were collected by weigh scale (plot combine, weigh wagon, grain buggy) or yield monitor. Agronomic information was collected from growers. In 2021, all trials investigated the product Envita.

Results

In 2021, 19 corn trials were conducted to investigate biological N fixation products. All 2021 trials investigated the product Envita. Under grower's existing N programs (or the highest N rates at multi-rate N trials) the average yield response for Envita was 3 bu/ac compared to non-treated control plots (Figure 1). At the 4 multi-rate N trials, there did not appear to be stronger yield response for Envita at lower N fertilizer rates.



Reg = grower's regular N program
Reg* = data not replicated at that location, interpret with caution
Numbers are N rates at trials where multiple N rates tested

Figure 1. Yield responses to biological N fixation product Envita at 19 Ontario corn trials in 2021.

Next Steps

2021 was the first year of this project. Ontario Soil and Crop members will continue this project in 2022. Growers are encouraged to investigate any biological N fixation products for corn that are currently available in the market to help build this dataset.

Acknowledgements

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