Datasheet

Product Overview

- **Product Name:** EF Polymer
- **Description:** EF is an eco-friendly, biodegradable polymer designed to improve water retention in soils, reduce irrigation needs, and enhance crop productivity. Tailored for sustainable agriculture, it is especially effective for tomatoes and other field crops.
- **Applications:** Ideal for both direct-seeded and transplanted tomatoes, as well as other vegetables and row crops. Suitable for water-scarce regions or areas with erratic rainfall.

Key Benefits

- Enhances soil water retention, reducing irrigation needs by up to 40%.
- Improves nutrient availability and minimizes leaching losses.
- Encourages healthy root development and boosts crop yields.
- Fully biodegradable and safe for the environment.

Technical Specifications

- **Composition:** Plant-based, organic, non-toxic polymer blend.
- **Appearance:** Fine powder or granules.
- **Water Absorption Capacity:** Absorbs up to 50x its weight in water.
- **pH Range:** Neutral (4.0 - 9.0).
- **Biodegradability:** 100% within one year under typical field conditions.

Soybean Water Use Efficiency Trial

Collaborating Institution: University of Nebraska–Lincoln
Location: Brule North Farm, Nebraska, USA
Season: 2025 growing season
Crop: Soybean

1. Trial Overview

Background

Water availability is one of the most important factors influencing soybean productivity in irrigated agricultural systems. Increasing pressure on water resources is forcing growers to adopt practices that improve water use efficiency while maintaining yield stability.

EF Polymer (EFP) is a biodegradable superabsorbent polymer designed to enhance **soil** water retention and plant water availability. By storing water during irrigation or rainfall events and gradually releasing it to plant roots, EFP has the potential to mitigate crop stress during periods of limited water availability.

This study was conducted in collaboration with the **University of Nebraska–Lincoln** to evaluate the performance of EF Polymer in soybean production systems under different irrigation regimes. The trial specifically assessed whether EFP can improve **soil moisture retention, water use efficiency, and soybean yield** under both optimal and water-limited conditions.

Objectives

The primary objectives of this trial were to:

- Evaluate the impact of EF Polymer on soybean yield under varying irrigation levels.
- Assess the effect of EF Polymer on soil moisture retention at different soil depths.
- Compare the performance of multiple EF Polymer formulations**.**
- Determine whether EF Polymer can help maintain yield under deficit irrigation conditions**.**

2. Experimental Design and Treatments

Design

The field experiment was conducted using a small-plot design with four replications.
Plot size: 12 ft × 30 ft
Replications: 4

Irrigation Treatments

Three irrigation levels were evaluated:

- 100% FI – Full irrigation
- 50% FI – Deficit irrigation
- 0% FI – Rainfed conditions

Treatment Summary

Treatment	Description
Control	No EF Polymer
OG (17.7 lbs/ac)	Granule formulation
BB (17.7 lbs/ac)	BB granule formulation
PWR (17.7 lbs/ac)	Powder formulation
OG (120 lbs/ac)	Granule formulation
BB (120 lbs/ac)	BB granule formulation
PWR (120 lbs/ac)	Powder formulation

3. Field Operations and Polymer Application

EF Polymer was applied pre-plant using manual in-furrow placement. A planter was used to create a separate furrow approximately 2 inches deep, positioned about 2 inches laterally offset from the soybean seed row. The polymer was manually applied into the furrow at the specified application rates. Soybeans were planted immediately after polymer placement, positioning the polymer close to the developing root zone while avoiding direct contact with the seed. This placement strategy allows the polymer to absorb water during irrigation or rainfall and release it gradually as the soil dries, improving plant access to water during periods of stress.

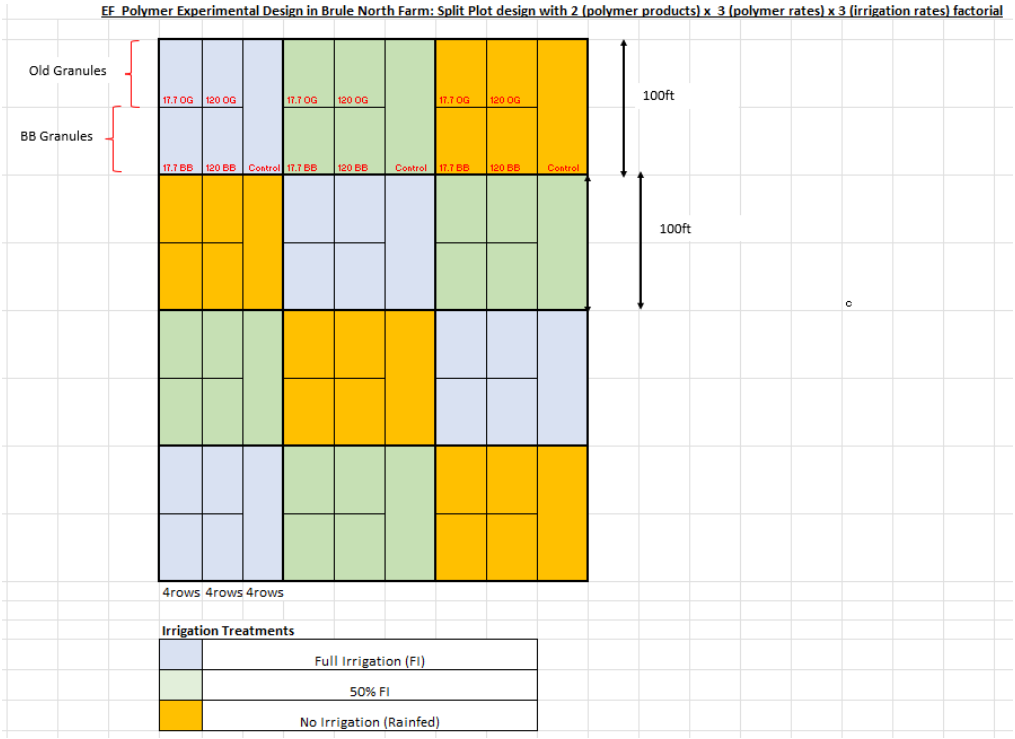
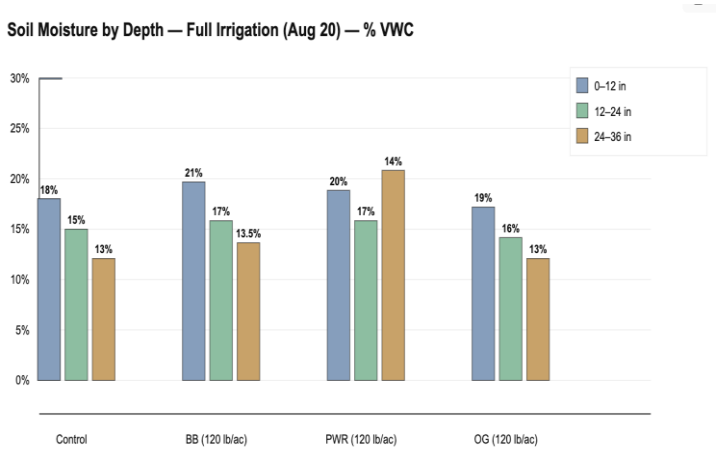


Figure 1. Experimental layout showing the randomized arrangement of polymer treatments and irrigation regimes used in the soybean trial at the University of Nebraska–Lincoln research farm.

Results

Soil Moisture

Soil moisture was monitored at multiple depths to evaluate how EF Polymer influences water distribution within the soil profile.



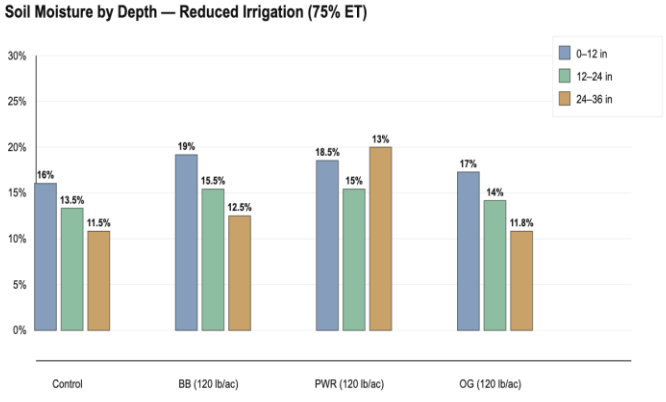


Figure 2. Soil moisture distribution across treatments under full irrigation (100% FI) and reduced irrigation (50% FI). Measurements were taken at depths of 0–12 inches, 12–24 inches, and 24–36 inches.

Key observations include:

- BB granules at 120 lbs/ac increased soil water retention, particularly in the upper soil layers.
- Powder formulation showed greater impact in deeper soil layers, suggesting improved water storage deeper in the root zone.
- The low-rate OG treatment (17.7 lbs/ac) showed limited impact compared with higher polymer application rates.

Overall, EF Polymer treatments increased the amount of plant-available water within the soil profile.

Yield

Soybean yield responses varied depending on irrigation regime and polymer formulation.

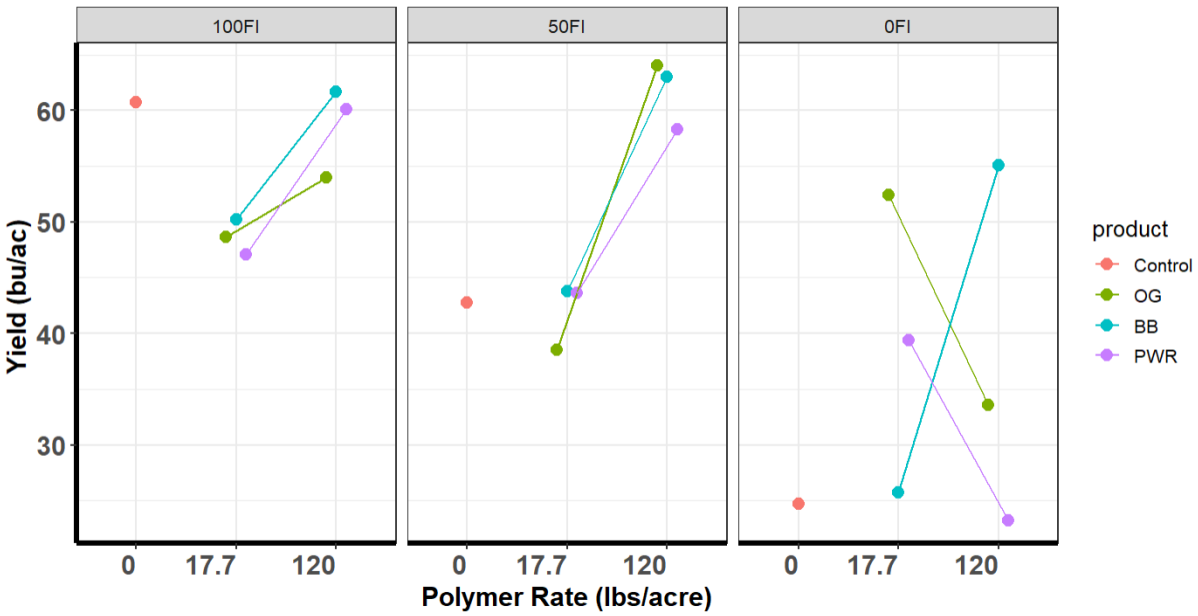


Figure 3. Soybean yield response to EF Polymer across three irrigation regimes (100% FI, 50% FI, and rainfed conditions).

Full Irrigation (100% FI)

Under full irrigation conditions, yield increases from EF Polymer were moderate. Since water availability was not limiting, the benefit of increased soil water storage was less pronounced.

Deficit Irrigation (50% FI)

The strongest yield responses were observed under deficit irrigation conditions.

- BB granules at 120 lbs/ac maintained or exceeded yields observed under full irrigation conditions
- Polymer treatments helped mitigate yield reductions associated with reduced irrigation

These results demonstrate the potential of EF Polymer to maintain productivity while reducing irrigation inputs.

Rainfed Conditions (0% FI)

Under rainfed conditions:

- BB granules significantly improved soybean yield relative to the control
- OG and powder treatments showed more variable responses at higher application rates

These findings suggest that formulation type plays an important role in polymer performance under severe water stress.

Key Findings

This trial produced several important insights regarding the performance of EF Polymer in soybean production systems.

- EF Polymer increased soil water retention across multiple soil depths
- Yield response was strongly dependent on irrigation level
- The largest yield benefits occurred under deficit irrigation
- **BB** granules at **120 lbs/ac** showed the most consistent performance
- EF Polymer functions primarily as a water stress mitigation tool rather than a yield enhancer under non-limiting water conditions

Conclusions

Results from this University of Nebraska–Lincoln soybean trial demonstrate the potential of EF Polymer to improve soil water availability and crop performance under reduced irrigation conditions. While yield improvements were modest under full irrigation, substantial benefits were observed under water-limited environments, indicating that EF Polymer can play a valuable role in improving water use efficiency in soybean production systems.

Among the formulations evaluated, BB granules at 120 lbs/ac provided the most consistent agronomic performance across irrigation regimes.

Further multi-location trials will help refine application strategies and confirm the economic benefits of EF Polymer for soybean growers.