

# Increasing Nutrient Use Efficiency with Biostimulants

Efficient use of resources is key to maximizing yield potential and optimizing a grower's return on their fertilizer investment. Improving nutrient use efficiency (NUE) is a major concern for farmers as they plan input applications. In a recent study on biostimulants, growers cited an increase in nitrogen efficiency and a decrease in fertilizer expenses as one of the key drivers for the use of biostimulants<sup>1</sup>. As growers look to optimize inputs while meeting productivity goals, address regulatory pressure, and ultimately improve ROI, biostimulants provide a powerful tool to increase NUE.



## INCREASING NUE: LEGISLATION & RESTRICTIONS

Large fertilizer applications are an effective way to maximize yield, but this can result in offsite nutrient loss, which has led to increasing regulatory pressure. The European Commission aims to reduce nutrient losses by 50% by 2030, while maintaining soil fertility for crop production. This is projected to result in an overall 20% reduction in NPK fertilizer inputs. Compounding this challenge of reduced inputs, it is well known that 25–65% of fertilizers applied to crops are not fully utilized. Fertilizer efficiency can be impacted by a great number of factors, including environmental conditions, crop management, water quality, and soil health. As growers contend with these challenges, many are turning to biostimulants to optimize their NUE and increase their return on investment in fertilizer.

## INCREASING EFFICIENCY

FBSciences is a leader in NUE. Our proprietary biostimulant technology, Transit<sup>®</sup>, forms the foundation for our comprehensive line of crop nutrition products. Transit Soil<sup>®</sup> and Transit Foliar<sup>®</sup>, our flagship biostimulant products, work inside the plant to promote the rapid uptake, absorption, and translocation of nutrients, improving NUE of both applied nutrients and those already present in the soil. This increased nutrient uptake and utilization of nutrients means that more of what growers apply will actually get into the crops, resulting in less runoff and leaching, and less waste of a grower's fertilizer dollar. Increased NUE also reduces the necessary amount of applied fertilizer to achieve the same crop yield, meaning the same performance/results can be achieved with a lower application rate of other products. With soaring nitrogen fertilizer prices, being able to maintain efficacy and results with a lower application rate is crucial.



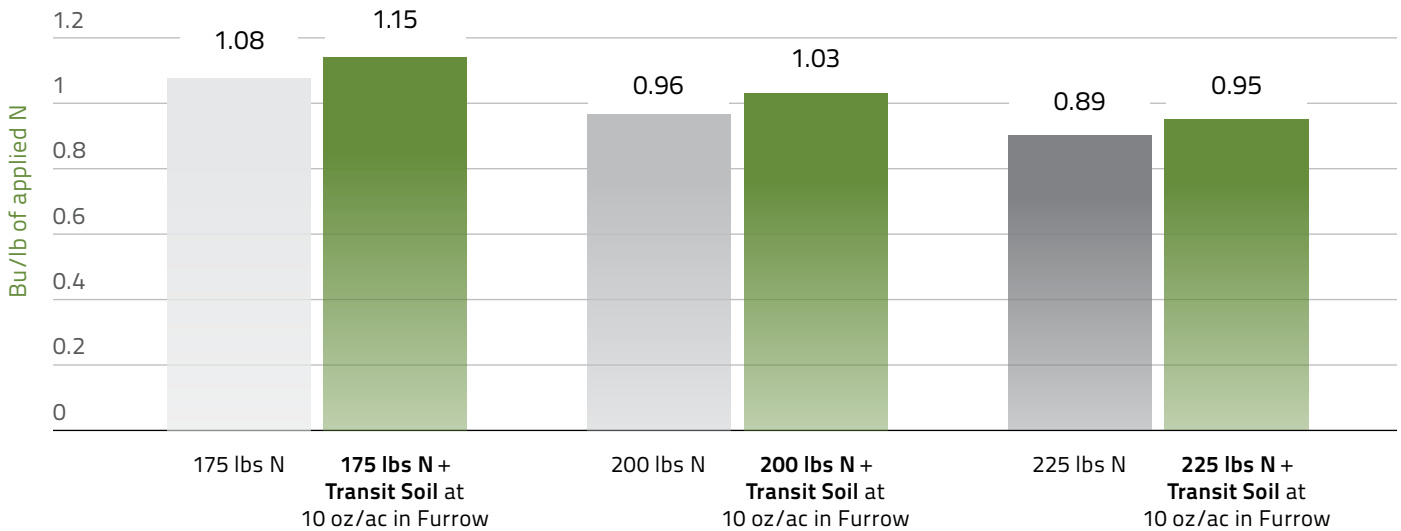
*(1) Source: Stratovation group teams with TFI, Ara and DCLRS to release benchmark study on Farmer Perceptions of agricultural biologicals. Stratovation Group. (2023, April 13)*

**PROOF IN THE FIELD**

A trial was established in Whitewater, WI to evaluate the effect of Transit Soil on corn yield and nitrogen use efficiency. The chart below shows the number of bushels per lb of applied N. At higher applications rates of N (225 lb), the incremental increase in N efficiency was lower than in lower application rates. This shows that the crop has already reached the necessary level of N efficiency at lower rates with the addition of Transit Soil, resulting in a lower level of necessary applied N and a higher ROI for the grower.



**Increased N Efficiency**



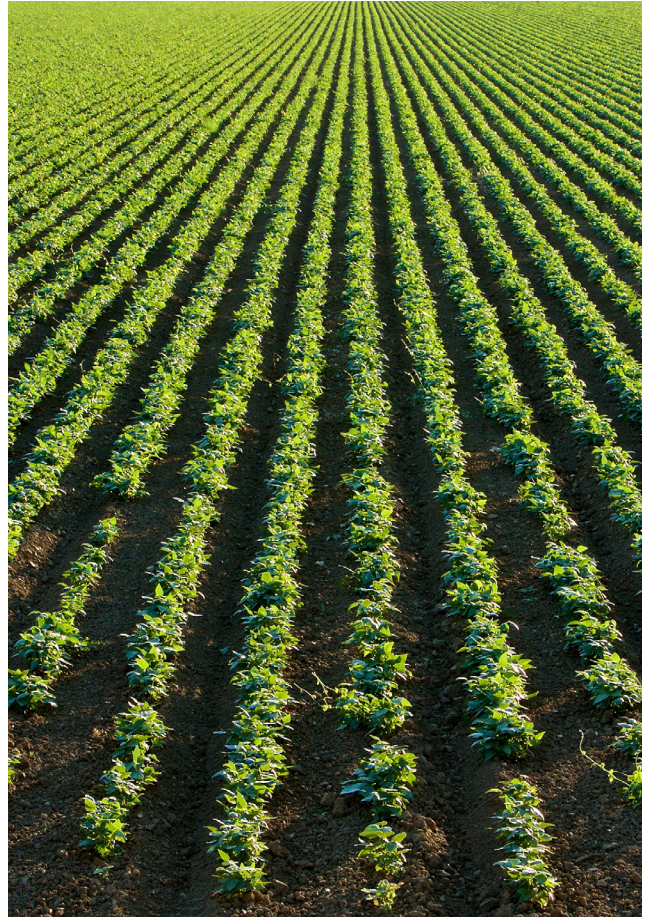
**RESULTS**

- The addition of Transit Soil to 175 lbs/ac of N provided a statistically significant yield increase of 10.1 bu/ac over 200 lbs/ac of N alone and a numerical increase of 2.0 bu/ac over the 225 lbs/ac of N alone.
- The addition of Transit Soil produced more bu/ac per lbs of nitrogen applied than applications of N alone.
- At lower nitrogen rates, the addition of Transit Soil provided more incremental yield increases.
- The addition of Transit Soil significantly increased yield and NUE over 175, 200, and 225 lbs of N alone.
- For the 3 rates of N applied, Transit Soil added to the N fertilizer increased %N in the plant tissue by 2.1% and 4.2% on average for the analyses done at V6 and VT, respectively.

## HOW DO TRANSIT SOIL AND TRANSIT FOLIAR INCREASE NUTRIENT USE EFFICIENCY?

Hundreds of research trials have been conducted on the effect of Transit® on NUE in numerous crops in multiple soil types and growing conditions over the past 15 years. The chart pictured shows a summary of some of these studies, showing that Transit Soil increased the uptake and utilization by 10%-22% in NPKs and 40%-50% in some micronutrients.

1. Mitigate early season abiotic stress to improve germination, seedling establishment, and plant uniformity.
2. Improve the bioavailability of nutrients to support root growth and improved nodulation.
3. Improve nutrient mobility and translocation within the plant.



## TRANSIT SOIL® AND TRANSIT FOLIAR® DELIVER:

Increased Movement of Nutrients Throughout the Plant

- Reduced Soil Tie-Ups
- Enhanced Transmembrane Movement
- Improved Cell to Cell Movement
- Better Movement of B, Ca, Fe, & Zn in Phloem
- Greater Moisture Utilization

Total nutrient removal trials from replicated field & greenhouse studies.

| Nutrient       | Efficiency Enhancement |
|----------------|------------------------|
| Nitrogen (N)   | 10-20%                 |
| Phosphorus (P) | 12-22%                 |
| Potassium (K)  | 15-22%                 |
| Ca & Mg        | 20-40%                 |
| Zn & Mn        | 20-50%                 |
| Boron (B)      | 15-22%                 |