ISM Biofertil N 2024 Broccoli Trial Yield

Santa Maria, CA (Betteravia Farms)

Objective:

To determine the impact of a 20% nitrogen reduction on broccoli yield and whether current or experimental ISM Biofertil N products can be used to maintain or improve yield.

Materials and Methods:

• On July 5, 2024, the plot was established in a sandy loam soil near Santa Maria, California. Broccoli was planted in plots 99 cm wide and 160 m long, with row spacing of 30 cm. The planting rate was approximately 26,136 plants per acre. Each plot was replicated four times in a completely randomized block design.

• A preplant treatment of ISM Biofertil N (2-0-0) 3.5 Gal/Ac was incorporated along with a drip application of ISM Biofertil N (2-0-0) 4 Gal/Ac before planting. For all treatments, ISM Biofertil N (2-0-0) 3.5 Gal/Ac was applied initially during thinning, followed by applications of ISM Biofertil N (2-0-0) 5 Gal/Ac every two weeks. Crop growth and yield characteristics were measured. Plant counts did not differ significantly between treatments, and crop vigor was very good in all treatments. See Table B1 for more information.

• Remote sensing equipment was used to objectively measure leaf greenness (NDRE) and canopy cover (NDVI). Each measurement increased as the season progressed, indicating healthy growth. The Canopy Chlorophyll Content Index (CCCI), a measure of canopy greenness, was also determined during this trial.

• Broccoli heads were harvested on two different dates (9/29/24 and 10/7/124) and sorted by size on each date. The heads were classified as large, medium, or small.

Conclusions:

Crop values were determined based on local market prices on California's Central Coast during the harvest week of this trial. Yield from the ISM Biofertil N treatment (No. 4) was estimated at a gross return of $3,811/acre, or $740 more per acre than the average of the eNhance-treated plots (Trt #3).

The grower's standard fertility program (Trt #1) had the lowest yield and gross value ($2,739/acre) of all treatments in this trial. Despite using 20% less nitrogen, treatment #2 had a much higher gross value per acre due to market fluctuations, $3,590/acre. The full nitrogen program (Trt #1) produced the greenest broccoli (data not shown), but the application rate exceeded the plant's needs, consequently reducing total production. Using eNhance with nitrogen solutions would improve nutrient utilization and provide more available nutrition for the plant. Nitrogen availability with this program reduced yields compared to the 80% program (Trt #2), but not as low as the 100% rate of the grower's standard. If the nitrogen rate had been reduced further with eNhance, yield levels could have been maintained or improved relative to the 80% program.

• Differences in head size can be related to crop maturity, so differences in fertility could also have influenced this. Therefore, it will be important to monitor changes in maturity when adjusting nitrogen fertilizers.

- Yields increased by 20% despite the reduction in nitrogen fertilizer application.
- Improved plant appearance, more color.
- Helped reduce plant stress with improved appearance.

Experiment Info	
Planted:	09-12-23
Harvested:	12-20-23
Yield Goal:	23000 lb/ac
Variety:	Heritage broccoli
Pop:	
Row Width	12 “
Prev. Crop:	Celery
Plot Size:	3.3 ft x 40 ft
Reps:	2

Soil Test (ppm)	
pH:	7.6
CEC:	6.8
%OM:	1.0
Bray P1	37
Bicarb. P:	-
K:	49
S:	72
%K	-
%Mg	20.80
%Ca	75.30
%H:	-
Zn:	0.7
Mn:	1.0
B:	0.3

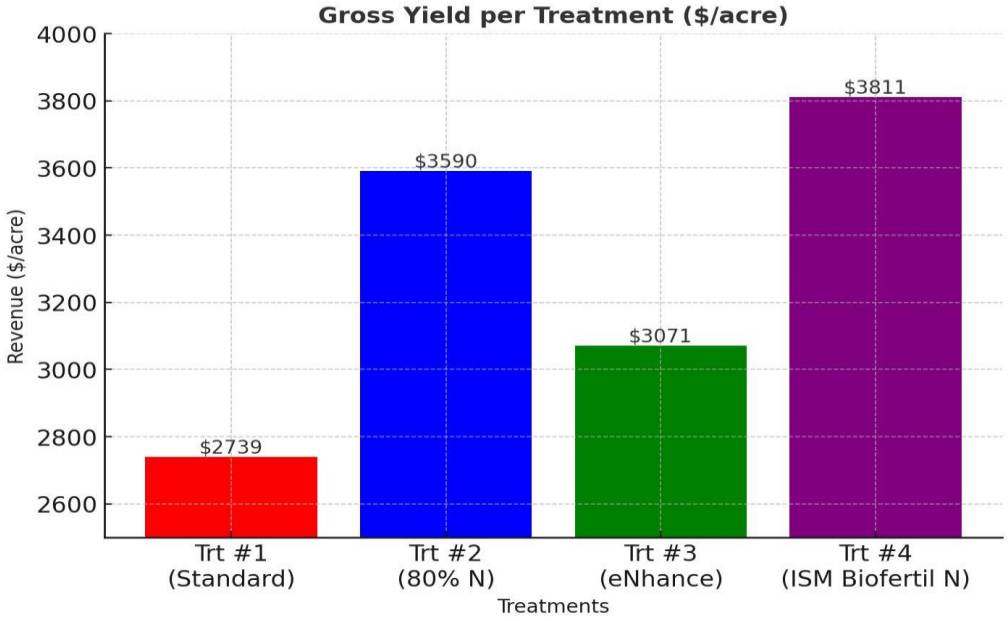

Figure L1. Effect of nitrogen fertilization programs on broccoli size and yield. Data correspond to two harvests combined, 89 and 97 days after planting. Market values are based on local harvest prices for each broccoli category