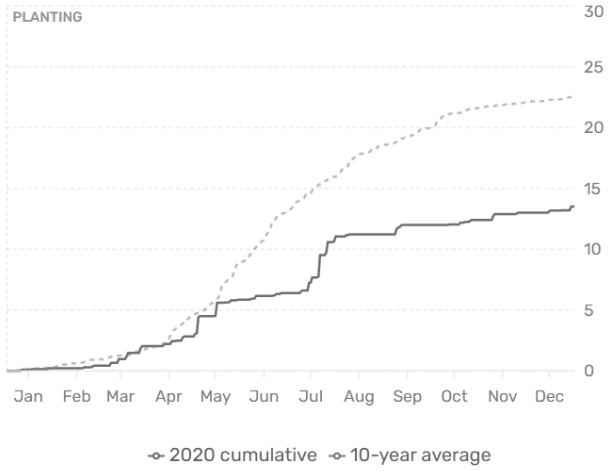
Granular vs Adapt-N for In-Season Nitrogen Management on Irrigated Corn

Study ID: 0678111202002
County: Lincoln
Soil Type: Hord fine sandy loam 1-3% slope; Holdrege silt loam 3-7% slopes, eroded; Hersh-Valentine soils 6-11% slopes; Uly-Coly loam 6-11% slopes; Hersh fine sandy loam 3-6% slopes; Anselmo fine sandy loam 1-3% slope
Planting Date: 5/6/20
Harvest Date: 10/28/20
Seeding Rate: 32,600
Row Spacing (in): 30
Hybrid: Golden Harvest® G13Z50-5222 EZ
Reps: 6
Previous Crop: Popcorn
Tillage: Strip-till

Irrigation: Pivot
Rainfall (in):



Introduction: This study evaluated two commercially available crop models, Granular by Corteva Agriscience™ and Adapt-N by Yara International, comparing the in-season N rate recommendations produced by each. Nitrogen applications to the field include:

1) Variable-rate strip-till application of 10-34-0 on April 1, 2020, resulting in an average of 22 lb/ac N.
2) 10 gal/ac of 6-24-6 starter fertilizer resulting in 7 lb/ac N.
3) Variable-rate sidedress application with a dual coulter applicator applying 32% UAN using either Adapt-N or Granular prescriptions on June 11 and 12, 2020. Across the entire field, the Granular in-season N prescription recommended an average of 95 lb/ac N, whereas the Adapt-N in-season N prescription recommended an average of 82 lb/ac N. Prescriptions for each are shown in Figure 1.
4) 35 lb/ac N fertigated with 28-0-0-5S on June 5, 2020.
5) 35 lb/ac N fertigated with 28-0-0-5S on July 17, 2020.

Both the Granular and Adapt-N model recommendations were accounting for the 70 lb/ac N that would be applied through fertigation. Geospatial yield monitor data were collected at the end of the growing season and post-processed to remove errors with Yield Editor software from the USDA. The as-applied sidedress data were evaluated and only areas that achieved N application rates within 10% of the target rate were included for yield analysis.

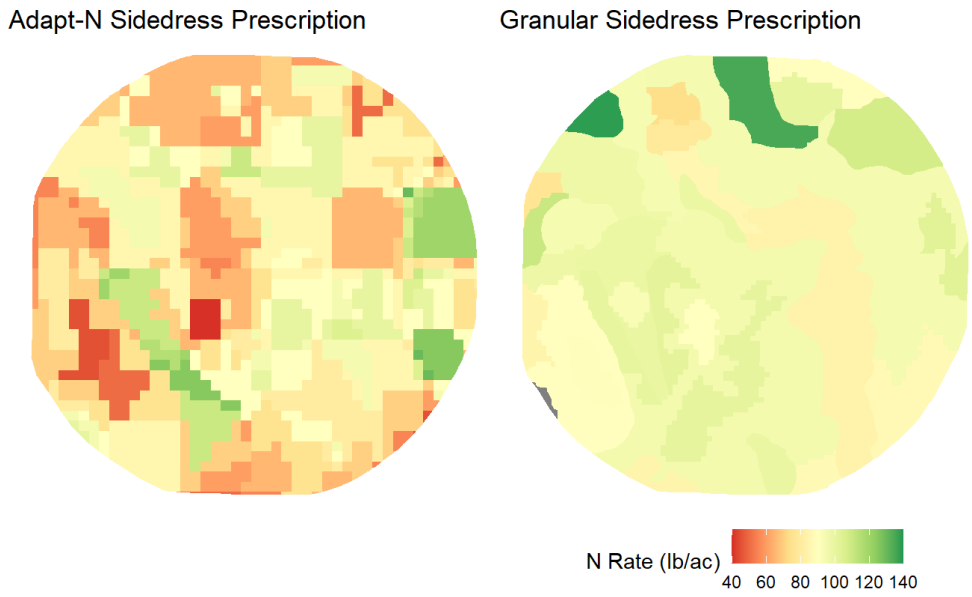


Figure 1. Adapt-N and Granular N recommendation prescriptions for in-season application.

Results:

	Total N rate (lb/ac)	Moisture (%)	Yield (bu/ac)†	Partial Factor Productivity of N (lb grain/lb N)	lbs N/bu grain	Marginal Net Return‡ ($/ac)
Adapt-N	188 A*	17.0 A	229 A	68 A	0.82 A	728.21 A
Granular	194 A	17.1 A	225 A	65 A	0.86 A	713.20 A
P-Value	0.129	0.974	0.482	0.201	0.202	0.425

*Values with the same letter are not significantly different at a 90% confidence level.
†Yield values are from cleaned yield monitor data. Bushels per acre corrected to 15.5% moisture.
‡Marginal net return based on $3.51/bu corn and $0.40/lb N.

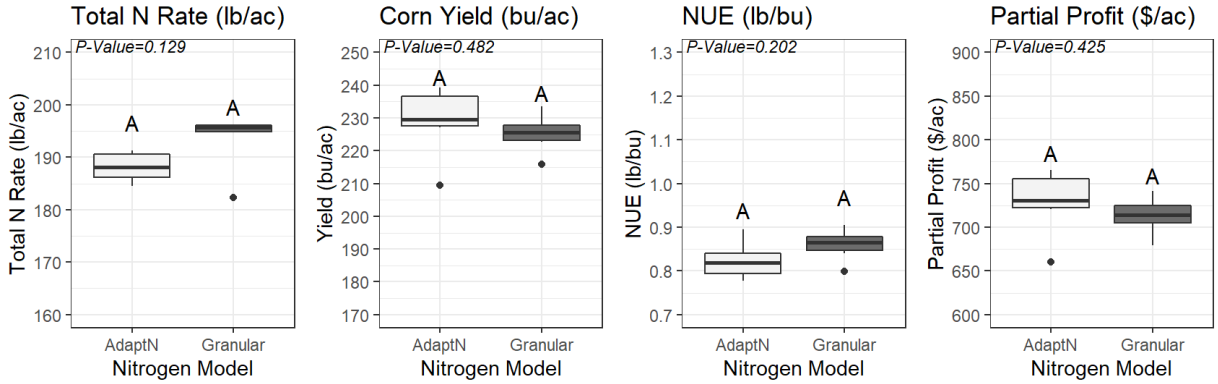


Figure 1. Total N rate, irrigated corn yield, nitrogen use efficiency, and partial profit for the Adapt N model and Granular model. Boxplots with the same letter are not significantly different at a 90% confidence level.

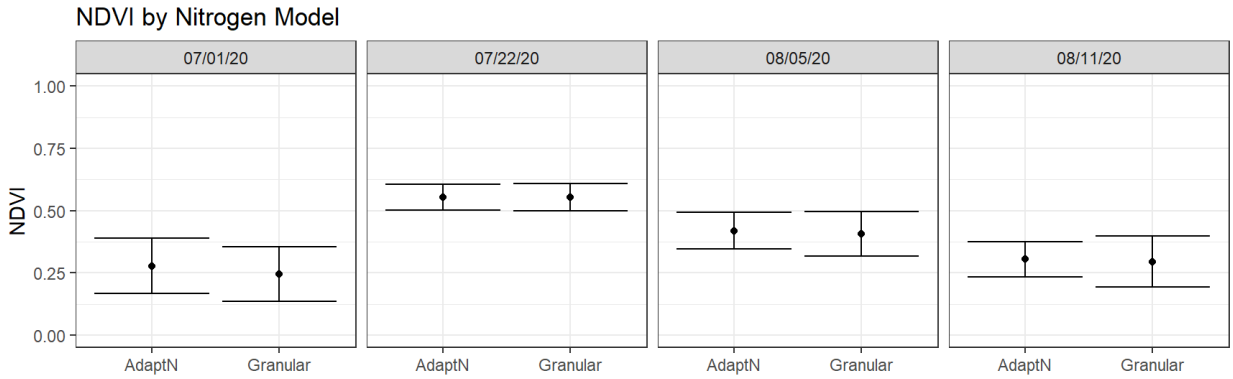


Figure 2. Normalized difference vegetation index (NDVI) mean and standard deviation values from aerial imagery for corn in Adapt N and Granular strips from July 1 to August 11. There were no statistical differences in NDVI between the treatments within dates.

Summary:

- The total N rates for the Granular and Adapt-N recommendations were not statistically different.
- Yields were not different between the two nitrogen models evaluated.
- Nitrogen use efficiency was not statistically different between the two models evaluated, with nitrogen use around 0.82 to 0.86 lbs of N per bushel of corn.
- Marginal net return was not statistically different between the two treatments.

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