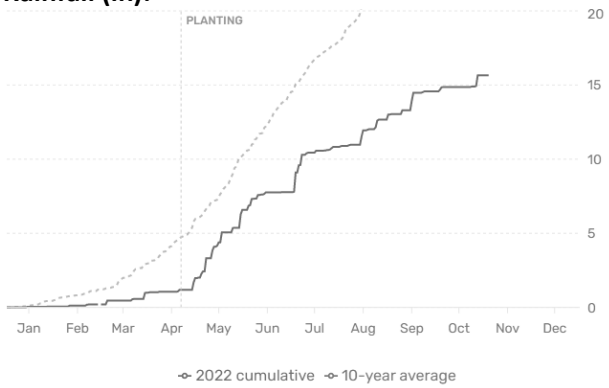
Evaluating Corteva Agriscience™ Granular Nitrogen Model on Irrigated Corn

Study ID: 1256139202201
County: Pierce
Soil Type: Crofton-Nora silt loam 6-11% slopes; Moody silty clay loam 2-6% slopes; Hord-Hobbs silt loam 0-6% slopes
Planting Date: 4/21/22
Harvest Date: 10/11/22
Seeding Rate: 33,000
Row Spacing (in): 30
Hybrid: Pioneer® P1185AM®
Reps: 17
Previous Crop: Soybean
Tillage: No-till
Herbicides: ***Pre:*** 0.95 oz/ac Reviton® and 1.5 qt/ac Keystone® ***Post:*** 1.25 gal/ac Resicore® and 32 oz/ac Roundup®
Seed Treatment: Standard Pioneer® treatment

Foliar Insecticides: Sniper® applied via irrigation on 7/12/22
Foliar Fungicides: 6.8 oz/ac Aproach® Prima applied via irrigation on 7/12/22
Note: 5-15% wind damage (broken plants) on NE-facing slopes
Irrigation: Pivot
Rainfall (in):



Baseline Soil Samples, 0-6" (5/11/2022):

	pH	BpH	OM LOI %	Melich-lll P ppm	Nitrate – N ppm N	Bray P1 ppm	Sulfate-S ppm S	-------Melich lll------- K	Ca	Mg	Na	CEC me/100g	Sand (%)	Silt (%)	Clay (%)
Zone 1	6.7	6.9	0.8	64	2.4	49	9	143	978	152	10	6.9	92	5	2
Zone 2	6.3	6.84	2.4	42	7.2	32	8	89	1237	191	11	9	66	27	6
Zone 3	5.8	6.69	2.6	34	10.7	26	15	154	1504	264	20	12.6	48	43	8
Zone 4	8.1	6.93	2.8	22	17.2	17	11	182	4785	313	15	27.1	29	55	16
Zone 5	7.5	6.93	3.5	43	15	33	9	198	2371	324	12	15.1	33	49	18

Introduction: Nitrogen fertilizer is a significant input in corn systems. Additionally, N losses through leaching, volatilization, and denitrification pose environmental concerns and reduce profit. There are several digital agriculture tools available to provide site-specific, variable-rate, in-season N recommendations. This study evaluated a crop model-based N tool, Granular, a subsidiary of Corteva Agriscience™ company, and compared it to the grower's traditional N management. Nitrogen applications on the field included:

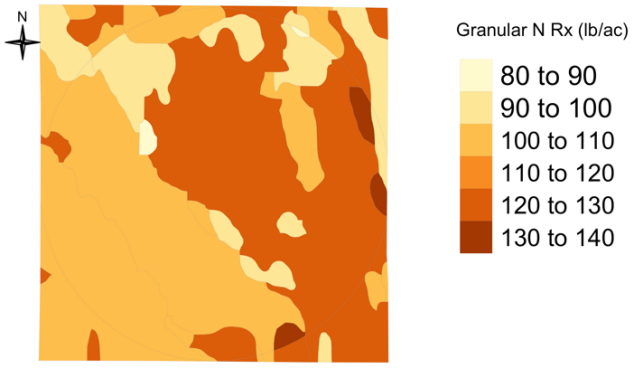


Figure 1. Corteva Agriscience™ Granular model variable rate prescription.

1) 120 lb/ac MAP (13.2 lb N credit) applied in the fall
2) 35 lb N/ac applied as 32% UAN with planter on 5/14/22
3) 20 lb N/ac as 32% UAN and thiosulfate blend fertigated on 6/28/22
4) 20 lb N/ac as 32% UAN fertigated on 7/7/22.

On June 9, 2022, sidedress was applied as a blend of 95% 32% UAN and 5% thiosulfate. For the grower's traditional management, 102 lb N/ac was applied in a flat rate. For the Granular N management, a variable-rate prescription was used (Figure 1), which averaged 114 lb N/ac.

As-applied fertilizer maps were used to evaluate the accuracy of fertilizer application, and yield monitor data were used to analyze differences between treatments.

Results and Summary:

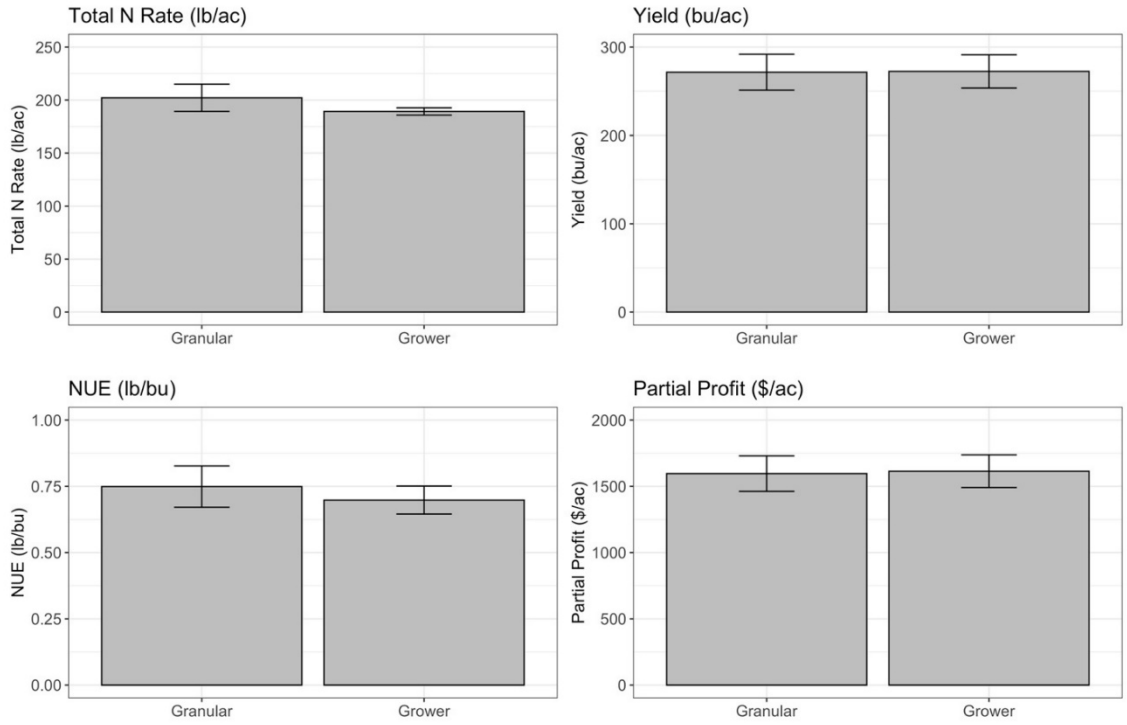


Figure 2. Total N rate, yield, nitrogen use efficiency (NUE), and partial profit for Corteva Agriscience™ Granular model and the grower's traditional management.

	Total N rate (lb/ac)	Yield (bu/ac)†	Nitrogen Efficiency (lb N/bu grain)	Partial Profit‡ ($/ac)
Grower N Management	190 B	272 A	0.70 B	1612 A
Granular N Management	202 A	269 A	0.76 A	1580 B
P-Value	0.001	0.117	0.001	0.018

*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 $6.57/bu corn and $0.93/lb N fertilizer.

- The total N rate for the grower's traditional management was 12 lb/ac lower than the Granular model on average; however, the Granular model distributed N applications site-specifically based on historic yield, soil texture, and elevation (Figure 1).
- Yield was very similar between the grower's traditional management and the Granular model on a whole-field basis.
- Profit was $32/ac greater for the grower's traditional management compared to the Granular model.
- Nitrogen use efficiency was good for both approaches, below the traditional 1.2 lb of N per bushel of grain assumed for yield-based N recommendations. The grower's typical N management had better nitrogen use efficiency than the Granular model.

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NEBRASKA EXTENSION FARMBITS PODCAST

GRANULAR GUIDANCE FOR N MANAGEMENT

Bob Gunzenhauser, Corteva

This episode features Bob Gunzenhauser, research scientist at Corteva Agriscience™. Bob describes the Granular model and discusses the future of nitrogen modeling.