



Management Practices for Optimizing Yield and Productivity in Corn

Trial Objective

- Optimizing farm productivity requires the efficient and sustainable use of farm inputs and management practices, such as the choice of corn product, seeding rate, soil fertility, seed treatment, and pest management, that ultimately determine profitability.
- This study was conducted to evaluate the economic impact of different management inputs and practices on corn yield and profitability.

Research Site Details

Location	Soil Type	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield (bu/acre)	Seeding Rate (seeds/acre)
Huxley, IA	Clay loam	Soybean	Strip tillage	04/30/2018	09/28/2018	225	33K, 38K

- Two corn products were used for this trial:
 - A 110-relative maturity SmartStax® RIB Complete® corn blend product
 - A 114-relative maturity SmartStax® RIB Complete® corn blend product
- Each product was planted at a regional standard rate of 33,000 (33K) seeds/acre and a higher rate of 38,000 (38K) seeds/acre.
- The trial was carried out in 30-inch row spacing, six rows per treatment, with two replications.
- Management practices that were tested were: choice of corn product, seeding rate, seed treatment, additional nitrogen, and fungicide application. These practices were compared in incremental stair-step treatments (Table 1).
- All treatments received a maximum return to nitrogen (MRTN) rate of 140 lb of nitrogen/acre in the form of 32% urea ammonium nitrate (UAN) in the spring during the strip-till operation. In the “N” treatments, an additional 45 lb/acre of UAN was side dressed at the V5 growth stage.

Table 1. Treatments used in the trial with their associated costs.

Treatments	Input	110 RM Cost (\$/acre)	114 RM Cost (\$/acre)
33K	33,000 seeds/acre	\$ -	\$ -
33K+Q	QuickRoots® Dry Planter Box Corn (Q), \$6.19/acre	\$6.19	\$6.19
33K+Q+N	Side dress 32% UAN at V5 growth stage (N)	\$16.54	\$16.54
33K+Q+N+F	Fungicide application at VT/R1 growth stage (F)	\$48.54	\$48.54
38K	Additional 5,000 seeds/acre	\$25.50	\$26.13
38K+Q	QuickRoots® Dry Planter Box Corn (Q), \$7.19/acre	\$32.63	\$33.26
38K+Q+N	Side dress 32% UAN at V5 growth stage (N)	\$42.98	\$43.61
38K+Q+N+F	Fungicide application at VT/R1 growth stage (F)	\$74.98	\$75.61



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- All seed used was treated with the Acceleron® Seed Applied Solutions ELITE offering, consisting of fungicide, insecticide, and nematicide with Enhanced Disease Control (EDC) for the control of early- to mid-season diseases caused by *Fusarium*, *Rhizoctonia*, and *Colletotrichum*.
- In the “Q” treatments, QuickRoots® Dry Planter Box Corn, a microbial seed inoculant, was added as a dry planter box formulation for enhanced nutrient availability.
- In the “F” treatments, Delaro® 325 SC fungicide was applied at the VT/R1 growth stage.

Understanding the Results

- The early RM product produced higher yields than the late RM product in all treatments except for the 38KQNF treatment (Figure 1 and 2).
- There was a minimal yield response to QuickRoots® Dry Planter Box Corn in the early RM product, but a 4-6 bu/acre yield improvement in the late RM product at both seeding rates (Figure 1 and 2).
- In general, for the early RM product, the addition of inputs did not substantially improve yields at the higher seeding rate. At the standard seeding rate, additional nitrogen produced the highest yield response (Figure 1 and 2).
- For the late RM product, yield increased incrementally with the addition of inputs at the higher seeding rate. At the standard seeding rate, QuickRoots® Dry Planter Box Corn and additional nitrogen improved yields but not fungicide (Figure 1 and 2).
- In both corn products, the higher seeding rate out-yielded the standard rate across all treatments (Figure 1 and 2).

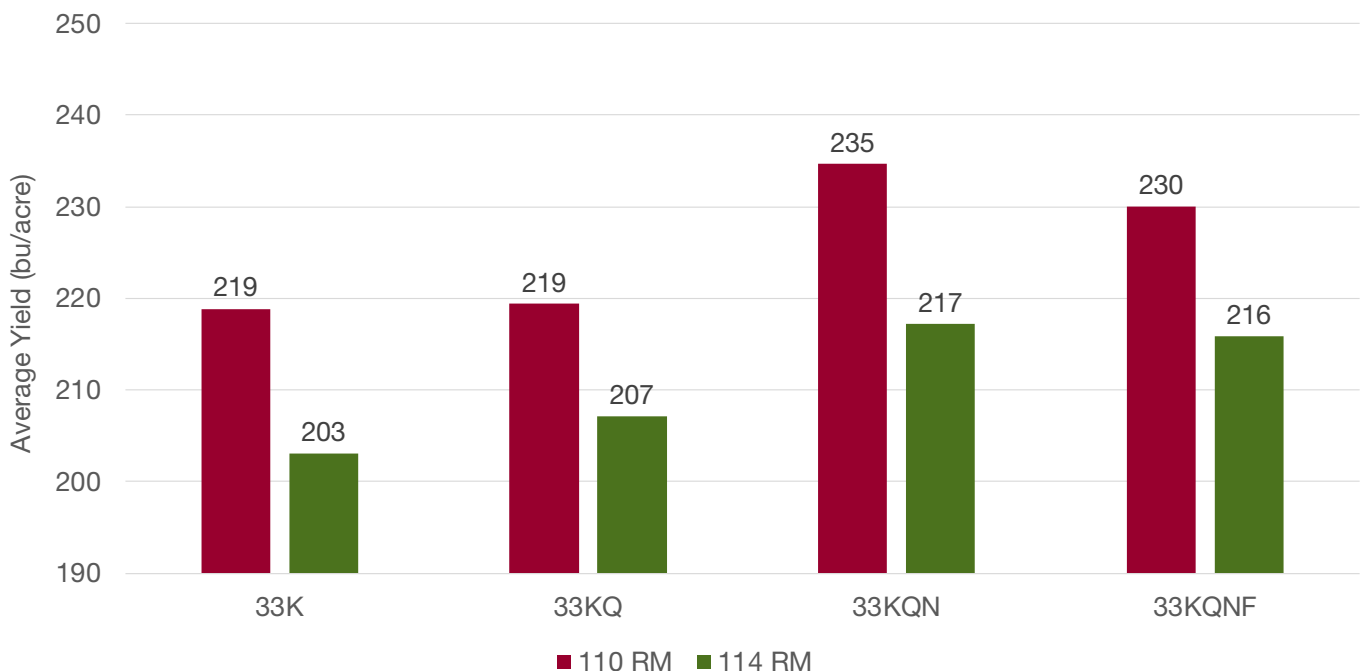


Figure 1. Yield response of two corn products to production inputs at the standard seeding rate.

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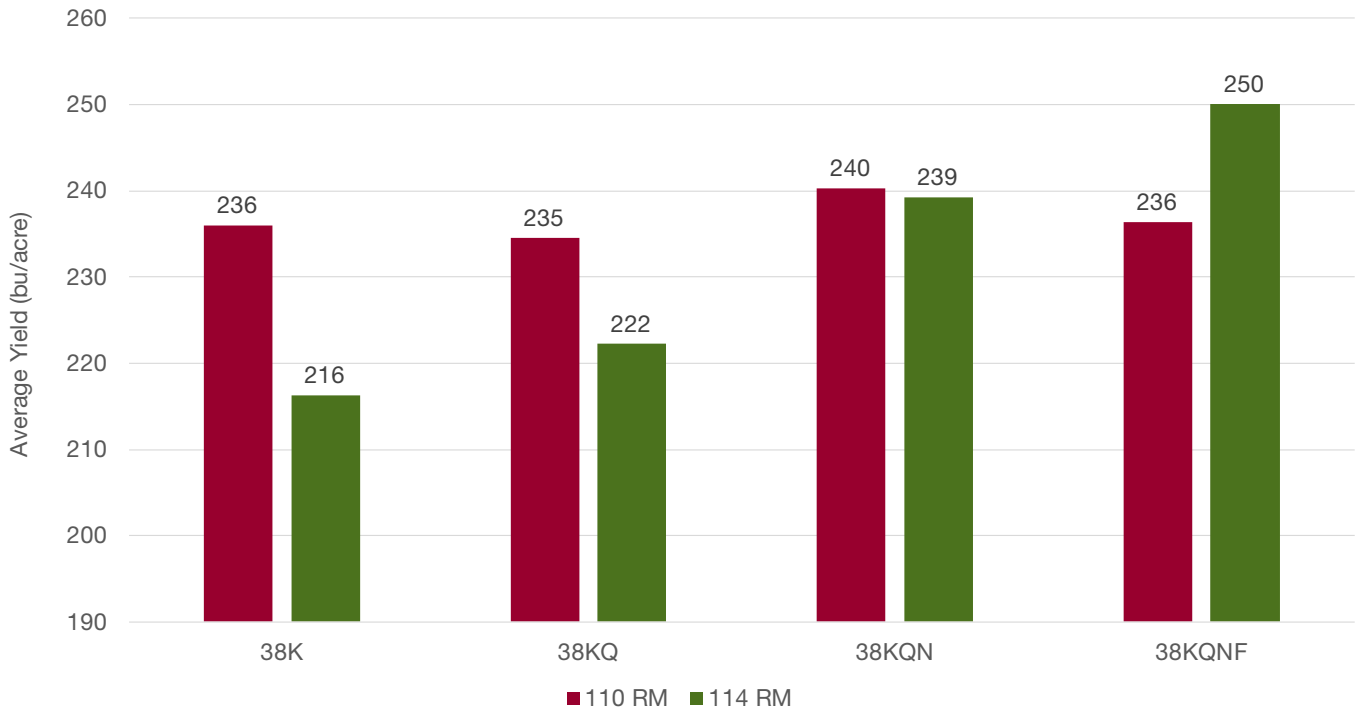


Figure 2. Yield response of two corn products to production inputs at the higher seeding rate.

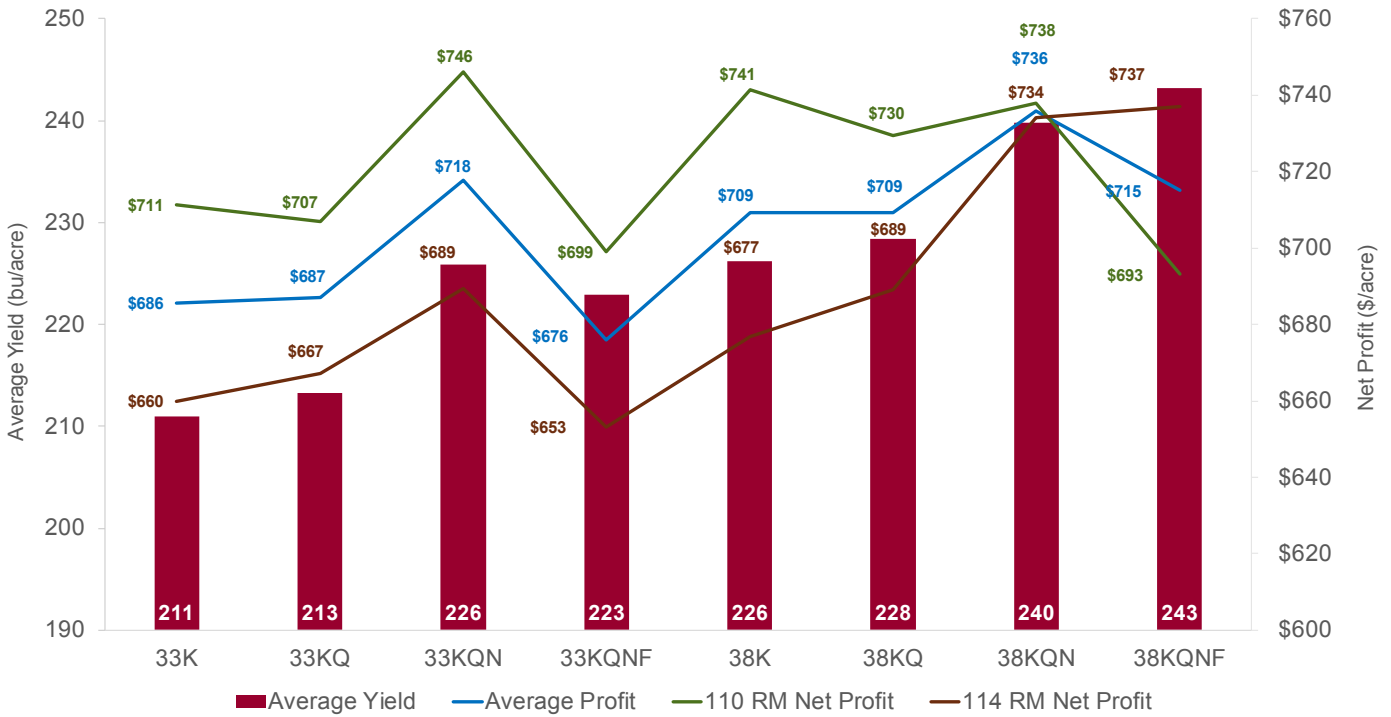


Figure 3. Average yield and economic impact of corn products in response to production inputs. Corn price was set at \$3.25/bu.

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- In terms of economic value, the early RM product was more profitable than the late RM product at all treatment levels, except when fungicide was applied at the higher seeding rate (Figure 3).
- The most profitable treatment in this trial was the early RM product planted at the standard rate with QuickRoots® Dry Planter Box Corn and additional nitrogen (33KQN) (Figure 3).
- At each treatment level, the yield difference between the two seeding rates was substantial enough for the higher rate to be more profitable than the standard rate. This is true for both corn products (Figure 3).
- For the late RM product, the treatment with the most inputs (38KQNF) produced the highest yield and the highest profit (Figure 3).
- Profit per acre was calculated by multiplying total yield of the treatment by \$3.50 minus the inputs selected for each treatment.

What Does This Mean For Your Farm?

- Corn products respond differently to farm inputs. Environmental factors during the growing season highly affect the yield response to inputs.
- Inputs like nitrogen will continue to provide positive yield responses and economic gains if it is used within the MRTN range for the region.
- Yield response to fungicides can be highly variable and depends on the growing season. It's unclear why there wasn't a consistent yield response to fungicide in this trial as there were minimal levels of gray leaf spot and northern corn leaf blight at the trial site.
- Where feasible, growers are encouraged to plant more than one corn product. This provides a good risk management strategy for their operation. They should also have a discussion with their trusted agronomists on how well a corn product of interest performs under different growing conditions and management practices.

Legal Statements

The information discussed in this report is from a single-site, replicated demonstration trial. This informational piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.

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B.I. products may not yet be registered in all states. Check with your seed brand representative for the registration status in your state.

IMPORTANT IRM INFORMATION: RIB Complete® corn blend products do not require the planting of a structured refuge except in the Cotton-Growing Area where corn earworm is a significant pest. SmartStax® RIB Complete® corn blend is not allowed to be sold for planting in the Cotton-Growing Area. **See the IRM/Grower Guide for additional information. Always read and follow IRM requirements.**

Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

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