Optimum Nitrogen Fertilizer Rates for Corn following Soybean and Corn following Corn in Northeast Iowa

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Knowledge of the optimum nitrogen fertilizer rate for corn is important for maximizing crop yields, return on fertilizer inputs, and environmental sustainability. The objective of this report is to quantify the 2021 economic optimum nitrogen rate (EONR) from Iowa's Northeast crop reporting district per continuous corn and corn following corn crop rotations.

Materials and Methods

The 2021 experimental data were collected from a long-term nitrogen by rotation study (established in 2000) in Nashua, Iowa. On April 16, N fertilizer applied at seven rates ranging from 0 to 240 (lbs. N per acre) in 40 lbs. per acre increments. Corn was planted April 18 (Pioneer 0157 AMXT at 35,000 pl per acre) in plots following corn and soybean. Grain yields (15.5% moisture) at harvest and plant counts on June 16 were measured. To estimate the economic optimum nitrogen rate (EONR), regression models using a 0.10 N fertilizer price-to-corn price ratio were used. Yield at the EONR (YEONR) was derived from the best yield response to N curve.

Results

In 2021, the EONR was 230 and 199 lbs. N per acre for continuous corn and corn following soybean, respectively (Figure 1). The yield at the EONR was 218 and 236 bushels per acre for continuous corn and corn following soybean, respectively. The 2021 EONR results were 22% and 42% greater than the long-term location average EONR values (2000 to 2021) for the continuous corn and corn following soybean systems, respectively.

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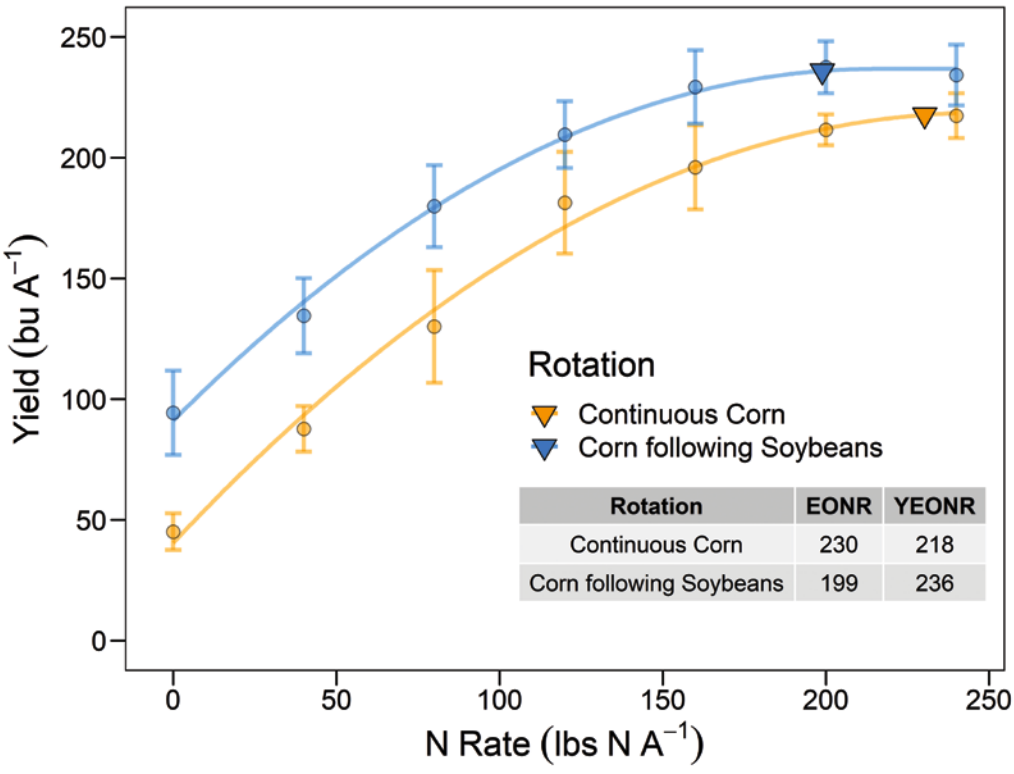

Rotation	EONR	YEONR
Continuous Corn	230	218
Corn following Soybeans	199	236