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75/125 N-rate comparison in 2001

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75/125 N-rate comparison in 2001

Abstract

Research during the past decade has provided evidence that most corn producers could substantially reduce rates of N fertilization if they delayed application of nitrogen (N) until after plants had emerged from the soil. Additional evidence was collected in precision farming trials in 2001. The trials were conducted in 13 fields planted to corn following soybean. None of the fields had received recent application of animal manure. None had received more than 30 lb N/acre since harvest of the previous crop.

Keywords

Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences

INTEGRATED CROP MANAGEMENT

The image shows a person in a field, possibly a farmer or researcher, with large, stylized text overlaid. The text reads "INTEGRATED CROP MANAGEMENT". The background is a photograph of a field with tall grasses and a person in the distance.

75/125 N-rate comparison in 2001

Research during the past decade has provided evidence that most corn producers could substantially reduce rates of N fertilization if they delayed application of nitrogen (N) until after plants had emerged from the soil. Additional evidence was collected in precision farming trials in 2001.

The trials were conducted in 13 fields planted to corn following soybean. None of the fields had received recent application of animal manure. None had received more than 30 lb N/acre since harvest of the previous crop.

Fertilizer N was applied at 75 and 125 lb N/acre in alternating strips after plants were at least 3 inches in height. Each treatment was replicated five times in strips that were the length of the field and at least two combine swaths in width. The strips were harvested by cooperating producers, who had combines equipped with yield monitors and global positioning system receivers.

The studies were conducted to evaluate the possibility that, for corn after soybean, profits can be essentially maximized by fertilizing at a rate of 100 lb N/acre after the crop has emerged from the soil. Such a simple recommendation would not apply to all situations, but it is not unreasonable to start learning where such a recommendation would be reasonable and where it would not be reasonable.

Results showed that the mean difference in yield over all sites was 4.1 bu/acre (Table 1). This is approximately the cost of 50 lb of N, so the two rates of N were about equally profitable. The greatest difference in yield for a site was 8 bu/acre.

The mean yield observed at the higher rate of N was 173 bu/acre. The average for the higher rate of N applied by the producers (115 lb N/acre plus starter) was substantially less than would be called for by recommendations based on yield goals and credits for N supplied by soybean. The results of 22 precision farming trials reported in the May 1999 Special Precision Ag edition of this newsletter showed that increasing rates of sidedressed N from 100 to 150 lb N/acre resulted in loss of profit for producers.

The studies include analyses to determine where yield differences occurred within fields and where they did not. Remote sensing, digitized soil survey maps, differential elevation map, and maps of electrical conductivity are being used to relate soil characteristics to spatial patterns in observed yield differences. This information is being used to develop recommendations for variable-rate application of N.

Mounting evidence suggests that it is much easier to develop reliable recommendations for

in-season applications of N than for preseason applications of N. The primary reason is that delaying applications minimizes losses of N during spring rainfalls. Year-to-year variation in early season losses seems to be a serious problem in Iowa, and the importance of this variation seems to vary with soil characteristics within a field.

Delaying application of N until plants are a few inches in height deserves attention as a possible way for Iowa corn producers to address current economic and environmental problems associated with fertilizer N. We will continue to work with producers who want to explore the potential of in-season fertilization in 2002. If you would like to participate in this program contact Brad at (515) 294-9726.

Table 1. Summary of precision farming trials comparing yields of corn (following soybean) in alternating strips fertilized at rates of 75 and 125 lb N/acre after plants were 3 inches in height.

County	Low Rate (lb N/acre)	High Rate (lb N/acre)	Yield (bu/acre)	Yield (bu/acre)	Yield Difference (bu/acre)
Black Hawk	70	120	162	167	5
Boone (1)	75	125	144	149	5
Boone (2)	75	125	137	139	2
Bremer	75	125	183	186	3
Buchanan (1)*	65	90	180	188	8
Buchanan (2)*	65	100	185	185	0
Dallas	75	125	137	139	2
Floyd	75	125	169	176	7
Lucas*	75	125	147	155	8
Marshall*	50	100	172	174	2
Mitchell*	75	100	171	168	-3
Washington (1)*	50	100	229	235	6
Washington (2)*	82	134	180	188	8
Average			168.9	173.0	4.1

* 10-30 lb N was applied with the planter.

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