

## Nutrient Management

# How Much N Fertilizer on Corn Following Soybeans or Wheat/Clover?

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Nitrogen fertilizer prices have increased dramatically during the past year. Meanwhile, corn grain prices have remained very low. As a result, over-applying N fertilizer could have severe economic consequences. Now would be a good time to carefully analyze N fertilizer practices on corn follow-

100 lbs N/acre or 150 lbs N/acre, the Cornell recommended rate for continuous corn. Adding the additional 50 lbs of N did not increase corn yields on these fields. The average yields were low because of the very dry conditions in 1999 so the lack of a response to an application above 100 lbs/acre was

(*What's Cropping Up?* Vol. 9, No. 3, p. 4-5).

The 2000 growing season was wet, and yields were high in fields that had drainage and were planted early. Nevertheless, a study at the Aurora Research Farm, indicated that optimum corn yields were obtained at a sidedress N rate of 100 lbs/acre independent of the previous soybean yield (Fig. 1). Despite the wet conditions and high corn yields, corn required only a total of 125 lbs N/acre to maximize yields (25 lbs N/acre as a starter plus 100 lbs/acre sidedressed). Based on these results, we recommend an application of about 85 to 100 lbs/acre under dry spring conditions and 100 to 125 lbs/acre of fertilizer N under wet spring conditions when corn follows soybeans.

Table 1. Corn yields following soybeans at two N rates on three farmers' fields in Seneca County in 1999.

| N RATE                            | FIELD I           | FIELD II | FIELD III | MEAN |
|-----------------------------------|-------------------|----------|-----------|------|
| lbs/acre                          | -----bu/acre----- |          |           |      |
|                                   | ---               |          |           |      |
| 50 <sup>†</sup> + 50 <sup>‡</sup> | 98                | 103      | 63        | 88   |
| 50 + 100                          | 98                | 101      | 59        | 86   |

<sup>†</sup> Applied at planting.

<sup>‡</sup> Applied at sidedressing.

ing annual legumes such as soybeans, dry beans, and peas or following green manure crops such as red clover interseeded into wheat. This article will discuss N fertilization of corn following soybeans or wheat/clover, which represents about 33% of the grain corn acreage in New York.

We evaluated corn yields following soybeans under two N rates in a precision agriculture study on three farmers' fields in 1999 (Table 1). Application rates were

expected. Similar results were obtained in 1993, 1995 and 1997 which were all dry years as well

We compared optimum N rates for corn following soybean, corn following soybean-wheat/clover,

Table 2. Corn yields, averaged across the 1993 through 1997 growing seasons, in three crop rotations under two N rates.

| ROTATION                  | 85 lbs N/acre <sup>†</sup> | 145 lbs N/acre <sup>‡</sup> |
|---------------------------|----------------------------|-----------------------------|
|                           | -----bu/acre-----          |                             |
| Continuous Corn           | 85                         | 124                         |
| Soybean-Corn              | 129                        | 144                         |
| Soybean-Wheat/Clover-Corn | 139                        | 147                         |

<sup>†</sup> Applied as 25 lbs N/acre in starter and 60 lbs N/acre sidedressed.

<sup>‡</sup> Applied as 25 lbs N/acre in starter and 120 lbs N/acre sidedressed.

and continuous corn using two inorganic N levels (85 vs. 145 lbs N/acre) in field trials conducted from 1993 through 1997 at the Aurora Research Farm (Table 2). The results for corn following soybean were previously reported (*What's Cropping Up?* Vol. 9, No. 3, p. 4-5). When corn followed wheat/clover, corn yielded only 8 bu/acre less at 85 vs. 145 lbs/acre. A significant response was observed in the wetter years only. In the dry years of 1993, 1995, and 1997, corn following wheat/clover

yielded the same at 85 and 145 lbs N/acre (data not shown). Corn following wheat/clover vs. soybean yielded 10 bu/acre more at the 85 lb/acre N rate and 4 bu/acre more at the 145 lb N/acre rate, indicating the addition of a wheat/clover crop will allow for a reduction in N application without yield decline. Thus, if the red clover interseeded into wheat establishes well and has significant fall growth, we recommend 60 to 85 lbs/acre under dry spring conditions and up to 100 lbs/acre of fertilizer N under wet

spring conditions on corn following wheat/clover.

Our results indicate that New York corn growers, who plant corn following soybeans or wheat/clover, can achieve optimum yields at significantly reduced N fertilization rates. The use of the pre-sidedress nitrogen test (PSNT) may provide growers with additional guidance on how much N to apply, especially if spring conditions are excessively wet or dry.

