CERTIFIED CROP ADVISER

Managing Nitrogen Applications in Corn — Finding the "Right" Rate

By Steve Redmond, *CCA*

Corn has been grown intensively in Ontario for over 50 years and although yields continue to increase and the tillage, planting and weed control systems continue to evolve, the management of nitrogen has changed very little for many farms. If your corn fields receive a broadcast application of 250-300 lbs/acre of urea or 50-60 gal/acre of UAN in a single pass you need to ask yourself why?

The corn crop grown in 2007 is a great example of how our nitrogen management needs to change. In 2006 many farmers in Southwestern Ontario had an above average corn crop, so the approach in 2007 was to target and fertilize for the same high yield level achieved the previous year. Many of us who made recommendations easily fell into this trap as we were convinced that global warming was a reality and corn yields were trending upward. We were convinced that this was a good strategy. In 2007, many areas in Southwestern Ontario received approximately 50 to 75 per cent of normal rainfall and the expected large crop literally shrank before our eyes. The result was that many fields had 60 to 80 lbs of nitrate nitrogen remaining in the field after harvest. *(Table 1)*.

In times of high nitrogen costs and environmental concerns about nutrients in ground and surface water, we can ill afford to be applying fertilizer that will only pay-off when we have above average corn yields.

What can you do?

Whether you apply manure or commercial fertilizer as your source of nitrogen, there is a large amount of information available to help guide your decision. The www.gocorn.net website has both a Nitrogen Calculator and a Manure Nitrogen Calculator that can provide any corn producer with a head start on fine tuning the nitrogen rate for their soil types.

In-Field Management Ideas:

Here are some proven techniques that will get you closer to a nitrogen rate that will be economical on a regular basis. All ideas will not fit every farm or situation but some farms are using these techniques with great success and the result is great yields with lower input costs:

1. **Fall or Early Spring Nitrate Testing:** Although testing soils for nitrogen in the fall or early spring is an inconsistent measurement of how much nitrogen is going to be available for the corn crop in the critical months of June, July and August, it will help you understand what happens to nitrogen in the various fields on your farm, especially if you are applying manure in late summer or fall.
2. **Analyzing Manure:** This is simple math. You need to know what you are applying each year to understand how much commercial fertilizer to add to your corn crop. The results of a liquid dairy sample taken from a large tank in September this year came in at 30% of the expected dry matter and nitrogen values. The calculations show we applied much less nitrogen than in 2007.
3. **Detailed Weather Records:** The application method along with the exact weather conditions during and after application will help you calculate the amount of ammonia nitrogen lost from manure.
4. **Split Applications of Nitrogen:** Applying all commercial nitrogen in one pass before or right after planting may be efficient from a labour and equipment perspective but it is not very efficient when it comes to nitrogen use efficiency since there is too much risk of denitrification or leaching. Half the nitrogen at planting and half at the 3-8 leaf stage of corn will reduce N requirements by 20 to 30 lbs per acre on many soils under many growing conditions.
5. **Pre-sidedress Nitrate Test:** This is the most misunderstood tool or management technique available to corn farmers. The "myth" in the countryside says that this test is unreliable. Personal experience over the last few years tells me that someone is not telling the truth. If a proper 12-inch sampling procedure is taken at the same time of year for a given land base (ie. your farm) you can very accurately determine how much nitrogen is available from organic matter and previous manure applications. This technique has saved clients thousands of dollars in commercial nitrogen over the years.
6. **Innovative Nitrogen Application Ideas:** Your field sprayer is your most under-utilized piece of fertilizer application equipment. This idea borrowed from Western Canada is to use the large, accurate field sprayers that are now on many farms as fertilizer applicators. Many farms are now using their field sprayers to quickly and efficiently apply nitrogen to corn after the results of the pre-sidedress nitrogen test are in. Again the coffee shop myth says that this will damage your corn. Field experience by innovative farmers has shown that this is simply not true. The secret is the use of the same streamer nozzles we use for wheat. Applications to large corn can show some leaf burn where the UAN stream makes a direct hit but since UAN is not systemic there is no effect on the new leaves of the fast growing corn crop in June.

Table 1: Fall 2007 Nitrate Soil Sample Results in Middlesex County

Site	Fall Nitrogen after Corn Harvest at 0-12" depth. lbs/acre
1	58
2	42
3	80
4 - manured	106
5 - manured	92

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This industry driven program helps ensure that Ontario crop producers are well served by those providing their crop production advice. This article was written by one of those CCA's.