

# The Power of Data

**F**arming in Iowa is not an example of simple living. Historically, hard work, good ground and the cooperation of Mother Nature were enough for most growers.

Now, high production costs and incredible technology improvements have made farming anything but simple.

ISA started the On-Farm Network™ to help growers deal with these complexities and use technology to make better crop production decisions. Another benefit of the On-Farm Network is it allows growers to work together to produce and compare results from their own studies. This program has been highly successful, both at helping producers improve profits, but also at helping them, as a group, deal with environmental concerns.

One of the best examples of what has been accomplished has been a refinement of nitrogen management for corn production. For years – even generations – growers have been taught to manage their nitrogen on the simple assumption that a pound of nitrogen is a pound of nitrogen, no matter what form it's in, where it came from, or how it's applied. Part of this teaching was that the higher your grain yields, the more nitrogen fertilizer you should apply.

It is a fact that more bushels of corn contain more pounds of nitrogen than fewer bushels. So it seems reasonable to assume that if more nitrogen is removed by more grain, we should apply more nitrogen when we have higher yields.

The problem with that reasoning is that nitrogen is very dynamic in the soil and its availability and uptake by the crop are complicated to predict. Consider this: the top 7 in. of soil in the typical farm field contains more than 1000 lbs. per acre of nitrogen for every 1% organic matter in the soil.

With this large amount of nitrogen already present, subtle differences in the soil biological processes that either release or tie up nitrogen can have a significant impact on how much nitrogen will be available for the crop. In addition to variations in nitrogen transformations, the depth of rooting, genetic differences in how the corn takes up or uses nitrogen, and losses from rain and leaching further complicate the realities of nitrogen management.

Still, in hundreds of tests through the On-Farm Network, participating growers have

learned that it is often possible to reduce the amount of nitrogen used without reducing yields significantly. And, too, they've learned that this better management means better profits (and fewer environmental issues).

By evaluating current nitrogen management practices, growers have made a lot of progress in understanding some of the complexities that affect the nutrient and have made great strides in managing more profitably. One specific example is the practice of using liquid nitrogen as a carrier for herbicides. The number of growers using this 'weed and feed' program, either because they like the results, don't like using anhydrous ammonia, or just don't want to use fall nitrogen, has increased in the last few years.

In On-Farm Network studies in the Buttrick Creek Watershed project, guided stalk sampling showed a rather significant difference between preplant liquid nitrogen and other types of nitrogen management used in the watershed. The samples from fields where broadcast UAN was used were considerably lower in stalk nitrate than other no-till management practices, especially on the no-till fields.



In 2004 after a very wet spring in the Boone river watershed, where UAN was the prominent form of nitrogen used, 75% of the stalk samples collected from

participants there tested low in nitrate. An analysis of all the yield trials from 2000-2005 showed a bigger yield loss from the lower rate of preplant liquid nitrogen than low rates with preplant anhydrous. After seeing these differences across fields, we initiated in-field comparisons in 2006 for a more direct comparison of rates and forms of nitrogen fertilizer.

The first few trials analyzed this fall have shown as much as an 8.5 bu. per acre advantage for anhydrous over UAN where both were applied at 140 lb. nitrogen per acre. A more comprehensive study will be presented at the nitrogen conference along with many other examples.

The upshot is this: One farmer conducting his own research into products and practices for crop production can learn how to push up yields and profits for himself.

When that farmer's data is pooled with data from other farmers, not only can we all learn, but we can also benefit from these efforts in other ways that affect us all, like healthier local economies and environmental protection.



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