

Spring 2011, No. 2

## “SHOW ME” AND FERTILIZER APPLICATIONS

**Does the fertilizer you apply always give the result you expected?** Farm customers want to know that the fertilizer they apply is resulting in a yield increase.

**Of all fertilized crops, it is my observation that we have more questions about whether the fertilizer applied worked or not when applied to forage stands.** I'm not certain why this is, but perhaps it is because whether a forage crop is grown for grazing, hay, or silage, it is more difficult to measure yield increases due to fertilizer compared to grain crops, especially when the stand is grazed. Soil testing is often used as a first step in deciding which nutrients to apply and the rate of application of each nutrient. These recommendations are usually based on regional fertilizer response trials targeting normal yields for the area.

**About 10 years ago while I was working as an agronomist out of Calgary, AB, assisting wholesale customer agronomists in western Canada, I received a phone call one late February from a customer and friend.** He was the manager of Interior Seed and Fertilizer Ltd., a dealership in Cranbrook, BC, and asked me to consider conducting a fertilizer response trial on an irrigated forage field of a ranch customer. After checking with our field research group for the availability of a plot forage harvester, I agreed to devote the time and resources to assist with the trial.

**The ranch customer thought that fertilizer response was disappointing on fields used for a combination of hay and grazing.** They usually fertilized in early spring, took the first cut as hay, and grazed the re-growth in late summer or early fall. The ranch owner had said: *“I just don't think the fertilizer you apply for us really results in much increase in forage growth. How can you ‘Show Me’ that your fertilizer works?”* The customer had soil testing done at least every few years, and the recent results showed N as deficient, P and K as marginal, and S and B as adequate. The irrigated field was estimated at having a 25% alfalfa and 75% forage grass stand, and the target forage yield was 3 tons/A. The actual nutrients applied per acre were 40 lb N, 30 lb P<sub>2</sub>O<sub>5</sub>, 40 lb K<sub>2</sub>O, and 15 lb S.

**We designed and conducted a simple fertilizer response trial using an omission technique.** This requires having a plot where each one of the nutrients being evaluated is omitted on a plot while all the other nutrients are applied. There is one plot that receives all the nutrients. If there is no decrease in yield when a nutrient is omitted compared to the all nutrient plot, it is assumed that sufficient amounts of that nutrient are being supplied from the soil. Additionally, there is a check plot where no fertilizer is added at all. We repeated each individual 6.5 ft by 13 ft (2 m by 4 m) size plot four times using a randomized block design, so we could analyze the results statistically. We evaluated the forage yield response rates of 50 lb N, 40 lb P<sub>2</sub>O<sub>5</sub>, 100 lb K<sub>2</sub>O, 20 lb S, and 1 lb B per acre.

**The two-cut total forage yield results clearly showed that there was a response to N; all other nutrients did not show a clear response compared to the complete blend or the no-fertilizer treatment.** There was a slight average yield decrease when each nutrient was omitted compared to the complete blend.

**After the study was completed, we sent a final report to the customer, stating that we could definitely conclude that there was a response to fertilizer.** We felt this would “Show Him” there was benefit...a direct benefit to N and that P, K, and S application would maintain availability for future crops.

**We wouldn't recommend running this type of trial for every customer who questions whether or not they are getting a response to fertilizer.** A soil sampling, soil analysis, and recommendation done by a retail fertilizer dealer probably costs around \$300 if you consider retail staff time involved, equipment, and laboratory analysis charges. The field trial we conducted cost close to \$3,000 when considering labor, plus travel costs taking research equipment to the ranch. So, it cost 10 times as much to conduct a “Show Me” field demonstration. Fortunately, there has been past investment in regional fertilizer trials in most agricultural regions that we can refer to, in order to estimate the yield response for most crops from added nutrients. My conclusion is that the soil testing and recommendation system we have available to us is very cost effective.

– TLJ –

For more information, contact Dr. Thomas L. Jensen, Northern Great Plains Director, IPNI, 102-411 Downey Road, Saskatoon, SK S7N 4L8. Phone: (306) 652-3535. E-mail: [tjensen@ipni.net](mailto:tjensen@ipni.net).

Abbreviations: N = nitrogen; P = phosphorus; K = potassium; S = sulfur; B = boron.

Note: *Plant Nutrition TODAY* articles are available online at the IPNI website: [www.ipni.net/pnt](http://www.ipni.net/pnt)