Manure Matters, Volume 8, Number 6

Follow this and additional works at: http://digitalcommons.unl.edu/manurematters

Part of the Agronomy and Crop Sciences Commons

http://digitalcommons.unl.edu/manurematters/18
Comprehensive Nutrient Management Planning

By the Nebraska CNMP Education Project and UNL Cooperative Extension

‘Tools’ for growing season nitrogen management. The pre-sidedress nitrate test, the chlorophyll meter, and the corn stalk nitrate test are three ‘tools’ that are available to farmers and their advisors to improve nitrogen management, both environmentally and economically. To help participants in the 2001 CNMP program become familiar with these tests, we helped them conduct these tests on their manured fields. Most of the manure had been applied without calibrating the spreader or testing the manure. Here is a summary of the results...

#1: The pre-sidedress nitrate test (PSNT) is conducted by sampling the top 12 inches of soil when corn is 6 to 12 inches tall. For manured fields, 15 ppm nitrate-N or more generally indicates there will be enough nitrogen available for optimum yields.

The soil samples with the highest nitrate-N (40 & 58 ppm) were taken where manure was applied on soybean residue the fall before. The next highest PSNT results were 31 & 35 ppm in continuous corn that received a heavy manure application in spring of 2001. Two fields of second year corn that received manure in fall 1999 had 9 & 15 ppm nitrate-N. Two continuous corn fields with 5 & 8 ppm had received cattle manure that spring, but the manure was very low in ammonium-N. The only field with corn that looked nitrogen deficient had just 5 ppm nitrate-N in the sandy soil before sidedressing N. It had received a spring surface application of a quarter inch of effluent, but no other N.

These results indicate that some fertilizer nitrogen may be needed in the spring where applied manure is left on the surface, especially if it is low in ammonium-N (e.g. feedlot manure). Sites with high PSNT values demonstrate the value of manure tests and calibration.

#2: A Chlorophyll meter is a handheld device that measures the ‘greenness’ of a corn leaf. To use it UNL Extension Specialists recommend putting out a comparison
strip with extra nitrogen. If the readings in the bulk of the field are at least 95% of those in the extra N rate, then no more N is needed.

There were three fields where manure alone had readings that averaged 98% of readings in fertilizer or manure plus fertilizer areas. Chlorophyll meter readings were not different between single and double rates of effluent in four fields. Where half of each of two manured fields received extra fertilizer N there was no difference in readings between the halves.

These comparisons show that manure alone can be adequate at providing the nitrogen needed for a crop. The chlorophyll meter cannot detect excess nitrogen.

#3: Corn Stalk Nitrate Tests (CSNT): Shortly after black layer, corn stalks can be tested for nitrate content to indicate if there was too little, enough, or excess N for optimum yields. The range of 700 - 2000 ppm stalk nitrate-N generally produces maximum and most profitable yields.

One CSNT sample area had only fertilizer nitrogen applied. It had 2100 ppm nitrate-N, just above the Optimum range. Fourteen fields or sample areas received either only manure or manure plus fertilizer. They averaged 6440 ppm nitrate-N, three to four times an adequate concentration for top yields. One of these was the nitrogen deficient field that had just 5 ppm in the PSNT. The sidedress N may have been excessive, but this field was under some drought stress. This field yielded 160 bu/acre, with one area at 220 bu/acre. We have no other yield reports from the fields we sampled.

'Tools' Summary: The only nitrogen deficiency we found was due to surface application of effluent, and that was temporary. We found many examples of excess nitrogen, due to either excess manure application or to supplemental fertilizer. All these tests are a clear indicator that manure and or fertilizer N can be reduced.

How are you going to modify your plan for this year? We encourage you to calibrate your manure applicators, test your manure, calculate the nitrogen available from the manure, use the UNL corn nitrogen recommendation, and give full credit to each source of nitrogen.

Test Plot by Dwight Dam (Hooper, NE, participant in the 2001 CNMP class): Dwight tested two rates of nitrogen at planting following a fall 1999 application of manure. He applied two nitrogen rates (60 & 80 lbs. /ac.), with three replications of each, in plots 24 rows wide and ¼ mile long. We took a PSNT, chlorophyll meter readings, and CSNT in his plots.

The PSNT showed soil nitrate-N was low in both plots (see Table 1). Current recommendations would be to apply 40 more pounds of nitrogen, which was not done. The chlorophyll meter readings at silking indicated there was no difference between the treatments. The corn stalk nitrate test at the end of the season showed both treatments were in the Optimum range (700 – 2000 ppm). Bottom line: the one bushel yield increase did not pay for the extra 20 pounds of
UNL’s Livestock Environmental Issues Committee includes representation from UNL, Nebraska Department of Environmental Quality, Natural Resources Conservation Service, Natural Resources Districts, Center for Rural Affairs, Nebraska Cattlemen, USDA Ag Research Services, and Nebraska Pork Producers Association.

Contact: Chris Henry
217 LW Chase Hall
University of NE
Lincoln, NE 68583
(402) 472-6529
chenry@unl.edu

nitrogen applied. Because there was no ‘zero’ N rate, we do not know for sure the 60 lb./acre rate was profitable.

Table 1. Dwight Dam test plot results.

<table>
<thead>
<tr>
<th>Nitrogen Rate</th>
<th>PSNT</th>
<th>Chlorophyll meter</th>
<th>CSNT</th>
<th>Grain Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs./ac.</td>
<td>ppm</td>
<td>---</td>
<td>ppm</td>
<td>bu./ac.</td>
</tr>
<tr>
<td>60</td>
<td>8.4</td>
<td>64*</td>
<td>957</td>
<td>173</td>
</tr>
<tr>
<td>80</td>
<td>10.3</td>
<td>64</td>
<td>1926</td>
<td>174</td>
</tr>
</tbody>
</table>

* These meter readings are the average of 90 plants; the 80 lb. rate was the check strip.

Spring manure sampling and calibration:

Sampling: Every season that you apply manure is another time to take manure samples.

Calibration: We have five rain gauges for calibrating irrigation systems. Call if you would like to borrow them for a week. Help may also be available to help calibrate application equipment and take samples.

Correction to “CNMP News” last August: Several typos showed up in the table at the bottom of page one. Below is the table with correct information. We took these spring samples at facilities of winter 2001 CNMP participants. We have added an extra ‘Book Value’ line for swine slurry to show that the swine samples are intermediate between lagoon and slurry ‘Book Values’.

CCA Credits: For those who are Certified Crop Advisors and attended our three week training series: this series received approval for 7.5 CCA credits. Your roster should already show this credit if you attended last year.

Contact for more information:

Dick DeLoughery at 601 E. Benjamin, Ste. 101, Norfolk, NE 68701, 402-371-7313, DELOUGHERY1@UNL.EDU

Charles Shapiro at 57905 866 Rd, Concord, NE 68728-2828, 402-584-2803; cshapiro@unl.edu; or

Rick Koelsch at 218 L.W. Chase Hall, East Campus, University of Nebraska-Lincoln, Lincoln, NE, 68583-0726; 402-472-4051; RKOELSCH1@UNL.EDU.
## Corrected table from the August 2001 “CNMP News”

<table>
<thead>
<tr>
<th>Livestock</th>
<th>Storage</th>
<th>Source or No. of samples</th>
<th>Org.-N</th>
<th>Amm.-N</th>
<th>Total -N</th>
<th>P2O5</th>
<th>Dry Mat.</th>
<th>No. of operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swine</td>
<td>Lagoon</td>
<td>Book Value¹</td>
<td>29</td>
<td>50</td>
<td>79</td>
<td>17</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Swine</td>
<td>Slurry</td>
<td>Book Value¹</td>
<td>270</td>
<td>460</td>
<td>730</td>
<td>515</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Swine, finishing</td>
<td>Flush system</td>
<td>Avg. of 3²</td>
<td>32</td>
<td>274</td>
<td>296</td>
<td>100</td>
<td>0.9</td>
<td>1</td>
</tr>
<tr>
<td>Swine, nursery</td>
<td>Flush system</td>
<td>Avg. of 10</td>
<td>76</td>
<td>163</td>
<td>348</td>
<td>92</td>
<td>(0.60)</td>
<td>1</td>
</tr>
<tr>
<td>Cattle, feeders</td>
<td>Holding pond</td>
<td>Book Value¹</td>
<td>4</td>
<td>41</td>
<td>44</td>
<td>10</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Cattle, feeders</td>
<td>Dirt lot solids</td>
<td>Avg. of 2²</td>
<td>25</td>
<td>99</td>
<td>124</td>
<td>38</td>
<td>0.8</td>
<td>1</td>
</tr>
<tr>
<td>Cattle, feeders</td>
<td>Dirt lot solids</td>
<td>Book Value*</td>
<td>20</td>
<td>5</td>
<td>25</td>
<td>18</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Avg. of 4</td>
<td>6.7</td>
<td>0.9</td>
<td>7.6</td>
<td>5.0</td>
<td>74.0</td>
<td>3</td>
</tr>
</tbody>
</table>

¹NebGuide G97-1335-A ²The first sample in these series was not included due to unusually high values

---

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperative with the U.S. Department of Agriculture. Elbert Dickey, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources. University of Nebraska Cooperative Extension educational programs abide with the non-discrimination policies of the University of Nebraska Lincoln and the United States Department of Agriculture.