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MANURE MATTERS

Volume 8, Number 6

Comprehensive Nutrient Management Planning

By the Nebraska CNMP Education Project and UNL Cooperative Extension

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'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

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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

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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.

Nitrogen Rate	PSNT	Chloro-phyll meter	CSNT	Grain Yield
lbs./ac.	ppm	---	ppm	bu./ac.
60	8.4	64*	957	173
80	10.3	64	1926	174

* 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.

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Corrected table from the August 2001 "CNMP News"

Livestock	Storage	Source or No. of samples	-----lb./acre-inch-----				Dry Mat. %	No. of operations
			Org.-N	Amm.-N	Total -N	P2O5		
Swine	Lagoon	Book Value ¹	29	50	79	17	0.25	-
Swine	Slurry	Book Value ¹	270	460	730	515	5	-
Swine, finishing	Flush system	Avg. of 3 ²	32	274	296	100	0.9	1
Swine, nursery	Flush system	Avg. of 10	76	163	348	92	(0.60)	1
Cattle, feeders	Holding pond	Book Value ¹	4	41	44	10	0.3	-
		Avg. of 2 ²	25	99	124	38	0.8	1
Cattle, feeders	Dirt lot solids	-----lb./ Ton, as is-----				18	59	-
		Book Value*	20	5	25			
		Avg. of 4	6.7	0.9	7.6	5.0	74.0	3

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

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