Changes in Manure Nutrient Credits

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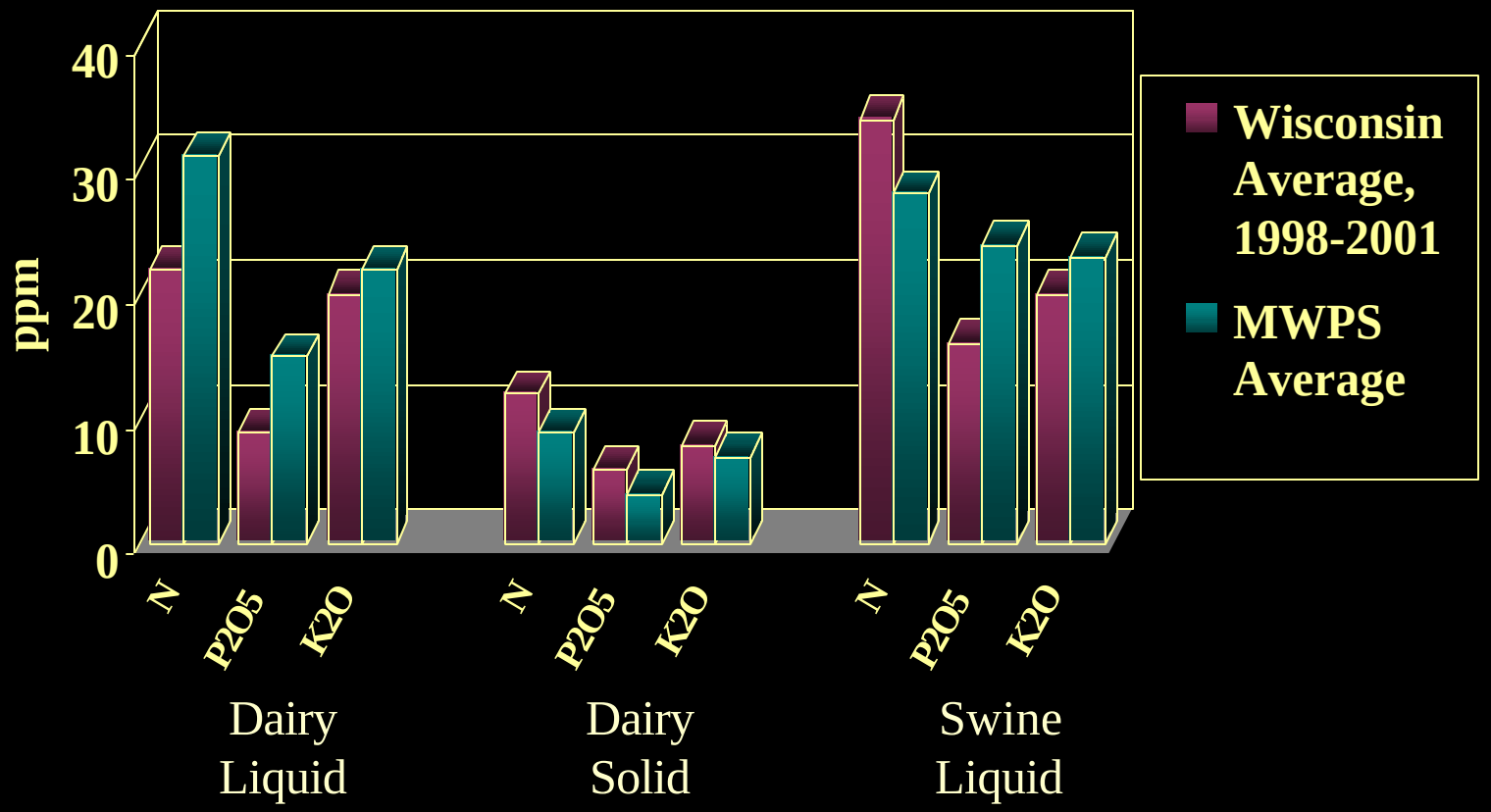
Introduction

- New manure analysis data indicated a need to update manure nutrient “book” values.
- Continuing field research helps fine-tune availability estimates.
- New species and management categories established.

"Book Values"

- **Nutrient concentrations can be estimated using "book" values for available N, P_2O_5, and K_2O**
- **Testing is needed to determine if a farm is typical and to establish an individual farm "typical" value**
- **If management and feeding practices do not change, manure analysis values will not vary significantly on a farm**

Comparison of analyzed and "typical" manure nutrient content



Laboratory Data

- **Lab values from 1998-2001 were summarized by management (liquid vs. solid) and species**
- **Data from UW Soil and Forage Analysis Laboratory, AgSource Laboratory, Dairyland Laboratory, Midwest Plan Service and Iowa State University**
- **Includes 1,476 liquid dairy, 1,243 solid dairy, 898 solid poultry, 457 liquid swine and 627 solid swine samples, as well as smaller numbers of samples for other species**

Average nutrient & dry matter content from solid manure

Species	% Dry Matter	N	P_2O_5	K_2O	S
	---------- Pounds per ton ----------				
Dairy	24	10	5	9	1.3
Beef	**35**	**14**	**9**	**11**	**1.5**
Swine	20	14	10	9	2.5
Chicken	60	40	50	30	4

Average nutrient & dry matter content from liquid manure

Species	% Dry Matter	N	P_2O_5	K_2O	S
	---------- Pounds per 1000 gal ----------				
Dairy	6	24	9	20	2.3
Beef	5	20	9	20	2.3
Swine, indoor pit	**7**	**50**	**42**	**30**	**4.2**
Swine, outdoor pit	4	34	16	20	4.2
Poultry	3	16	10	12	5

*Estimated first-year nutrient availability of various manures**

Species	N	P_2O_5	K_2O	S
Dairy, surface applied	30%	60%	80%	60%
Dairy, incorporated	**40%**	**60%**	**80%**	**60%**
Beef, surface applied	25%	60%	80%	60%
Beef, incorporated	**35%**	**60%**	**80%**	**60%**
Swine, solid surface applied	50%	60%	80%	60%
Swine, solid incorporated	**65%**	**60%**	**80%**	**60%**
Poultry, solid surface applied	50%	60%	80%	60%
Poultry, solid incorporated	**60%**	**60%**	**80%**	**60%**

* If manure has been applied to the same field at similar rates for 2 consecutive years, increase the nutrient values an additioanl 10%. If manure has been applied to the same field at similar rates for three or more consecutive years, increase the nutrient values by 15%.

Available nutrients in solid manure for one year of application

Species	N		P_2O_5	K_2O	S
	Surface applied	Incorporated by 3rd day			
	---------- lbs/ton total available nutrients ----------				
Dairy	3	4	3	7	0.8
Beef	**4**	**5**	**5**	**9**	**0.9**
Swine	7	9	6	7	1.5
Chicken	20	24	30	24	2.4

Available nutrients in liquid manure for one year of application

Species	N		P_2O_5	K_2O	S
	Surface applied	Incorporated by 3rd day			
	-----lbs/1000 gal total available nutrients-----				
Dairy	7	10	5	16	1.4
Swine indoor pit	**25**	**33**	**25**	**24**	**2.5**
Swine outdoor pit	17	22	10	16	2.5
Swine Farrow nursery indoor pit	**13**	**16**	**14**	**18**	**2.5**

Available nutrients in liquid manure for three years of consecutive application

Species	N		P_2O_5	K_2O	S
	Surface applied	Incorporated by 3rd day			
	----lbs/1000 gal total available nutrients----				
Dairy	11	13	7	19	1.7
Swine indoor pit	**33**	**40**	**32**	**29**	**3.2**
Swine outdoor pit	22	27	12	19	3.2
Swine Farrow nursery indoor pit	**16**	**20**	**17**	**21**	**3.2**

Manure Sampling and Testing

- **Manure testing takes management practices into account and delivers more accurate values**
- **Sampling technique greatly influences test results**
- **Sample handling and testing methods also affect analytical results**

Recommended Sampling Procedures: Solid Manure

- **Sampling while loading**
  - **Take samples from several spreader loads**
  - **Combine samples to form one composite sample**

Recommended Sampling Procedures: Solid Manure

- **Sampling daily haul**
  - **Place five-gallon bucket under the barn cleaner 4-5 times while loading spreader**
  - **Repeat sampling 2-3 times and test separately**

Recommended Sampling Procedures: Liquid Manure

- **Sampling from storage**
  - **Agitate storage facility thoroughly (2-4 hrs minimum)**
  - **Collect at least five samples from storage facility or during loading using a five gallon pail**

Sample Storage and Handling

- **Solid/Semi-solid samples**
  - **Thoroughly mix composite sample**
  - **Fill a one-gallon heavy-duty ziplock bag approximately one-half full**
  - **Squeeze out excess air, close and seal**
  - **Store sample in freezer if not delivered to the lab immediately**

Sample Storage and Handling

- **Liquid samples**
  - **Thoroughly mix composite sample**
  - **Fill a one-quart plastic bottle not more than three-quarters full**
  - **Store sample in freezer if not delivered to the lab immediately**

Samples Analyzed By:
UW Soil & Forage Analysis Lab
8396 Yellowstone Dr
Marshfield, WI 54449
(715) 387-2623

WASTE ANALYSIS REPORT

Cooperative Extension
UW - Extension
UW - Madison
Soils Dept, Madison, WI

Lab Number: 2 **Date received:** 9/25/02 **Account #:** 553901

County: Wood **Date processed:** 9/25/02 **Client:** UW Soil & Forage Analysis Laboratory

Send to:
UW Soil & Forage Analysis Laboratory
8396 Yellowstone Drive
Marshfield, WI 54449

Sample Information

Sample Name: #2

Material: Dairy **Type of Storage:** Lagoon

Storage System: Liquid **Type of Bedding:**

Comments:

Laboratory Analysis

Moisture: 95.20 %

Dry Matter: 4.80 %

	Total Nutrients lbs/1000 gal	Estimated Available Nutrient Credits for Manure: In 1st Year of Application lbs/1000 gal	If Applied 2 Consecutive Yrs lbs/1000 gal	If Applied 3 Consecutive Yrs lbs/1000 gal
Total Nitrogen (Injected)	27.09	10.84	13.55	14.90
Total Nitrogen (Surface Applied)	27.09	8.13	10.84	12.19
Total Phosphorus as P2O5	15.51	9.31	10.86	11.63
Total Potassium as K2O	28.68	22.94	25.81	27.25
Sulfur	1.27	0.70	0.83	0.89
Estimated Value of Available Nutrients in Surface Applied Manure[1]		$7.08	$8.43	$9.10

Additional Tests

NH4-N

Ash

Additional Information

1 Value based on commercial fertilizer costs as of 3/1/2002:

N (urea)	$0.21/lb
P_2O_5 (Triple Superphosphate)	$0.24/lb
K_2O (Potash)	$0.13/lb
S (Elemental Sulfur)	$0.23/lb

Laboratory Analysis

Moisture: 95.20 %

Dry Matter: 4.80 %

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Sulfur	1.27	0.70	0.83	0.89
Estimated Value of Available Nutrients in Surface Applied Manure[1]		$7.08	$8.43	$9.10

Samples Analyzed By:
UW Soil & Forage Analysis Lab
8396 Yellowstone Dr
Marshfield, WI 54449
(715) 387-2523

WASTE ANALYSIS REPORT

Cooperative Extension
UW- Extension
UW- Madison
Soils Dept, Madison, WI

Lab Number: 1 **Date received:** 9/25/02 **Account #:** 555801

County: Wood **Date processed:** 9/25/02 **Client:** UW Soil & Forage Analysis Laboratory

Send to:
UW Soil & Forage Analysis Laboratory
8396 Yellowstone Drive
Marshfield, WI 54449

Sample Information

Sample Name: #1

Material: Dairy **Type of Storage:** Stack

Storage System: Solid **Type of Bedding:** hay/straw

Comments:

Laboratory Analysis

Moisture: 81.50 %

Dry Matter: 18.50 %

	Total Nutrients lbs/ton	Estimated Available Nutrient Credits for Manure: In 1st Year of Application lbs/ton	If Applied 2 Consecutive Yrs lbs/ton	If Applied 3 Consecutive Yrs lbs/ton
Total Nitrogen (Injected)	11.50	4.60	5.75	6.33
Total Nitrogen (Surface Applied)	11.50	3.45	4.60	5.18
Total Phosphorus as P2O5	5.75	3.45	4.03	4.31
Total Potassium as K2O	11.32	9.06	10.19	10.75
Sulfur	0.51	0.26	0.33	0.36
Estimated Value of Available Nutrients in Surface Applied Manure[1]		$2.79	$3.33	$3.60

Additional Tests

NH4-N

pH

Ash

Additional Information

1 Value based on commercial fertilizer costs as of 3/1/2002:
N (urea) $0.21/lb
P_2O_5 (Triple Superphosphate) $0.24/lb
K_2O (Potash) $0.13/lb
S (Elemental Sulfur) $0.23/lb

Laboratory Analysis

Moisture: 81.50 %

Dry Matter: 18.50 %

	Total Nutrients lbs/ton	Estimated Available Nutrient Credits for Manure: In 1st Year of Application lbs/ton	If Applied 2 Consecutive Yrs lbs/ton	If Applied 3 Consecutive Yrs lbs/ton
Total Nitrogen (Injected)	11.50	4.60	5.75	6.33
Total Nitrogen (Surface Applied)	11.50	3.45	4.60	5.18
Total Phosphorus as P2O5	5.75	3.45	4.03	4.31
Total Potassium as K2O	11.32	9.06	10.19	10.75
Sulfur	0.51	0.28	0.33	0.36
Estimated Value of Available Nutrients in Surface Applied Manure[1]		$2.79	$3.33	$3.60

Samples Analyzed By:

SOIL & FORAGE ANALYSIS LAB
8396 YELLOWSTONE DRIVE
MARSHFIELD, WI 54449

SOIL TEST REPORT

LAB NO. 1-99999

County: WOOD
Account No.: 901
Date Received: 08/14/00
Date Processed: 14-Aug- 0

Field: 1
Acres: 5.0
Soil Name (or subsoil group): Withee
Plow Depth: 7.0

UW SOIL & FORAGE LAB
8396 YELLOWSTONE DRIVE
MARSHFIELD WI 54449

This Report is for:
UW SOIL & FORAGE LAB
8396 YELLOWSTONE DRIVE
MARSHFIELD WI 54449

NUTRIENT RECOMMENDATIONS

Cropping Sequence	Yield Goal	Crop Nutrient Need			Fertilizer Credit				Nutrients to Apply		
		N	P_2O_5	K_2O	Legume N	Manure N	P_2O_5	K_2O	N	P_2O_5	K_2O
	per acre	lbs/a			lbs/a	lbs/a			lbs/a		
Corn, grain	111- 130 Bu	120	25	65	0	20	15	45	100	10	20
Oats	61.0-90.0 Bu	40	15	90	0	8	3	8	33	12	83
Alfalfa	4.6- 5.5 T	0	65	290	0	3	1	3	0	64	288

The lime required for this rotation to reach pH 6.8 is 8.0 T/a of 60-69 lime or 6.5 T/a of 80-89 lime.

ADDITIONAL INFORMATION

First year replacement credit based on 2 years of non-incorporated Dairy 5.0 tons manure/acre.
If corn harvested for silage instead of grain, add extra 30 lb P2O5/A and 90 lb K2O/A to next crop.
Reduce nitrogen by 50% if barley or oats are underseeded with a legume forage.
If lime has been applied in the last 2 years, more lime may not be needed due to incomplete reaction.

A lime recommendation is calculated only when soil pH is more than 0.2 units below the optimum pH.

Starter fertilizer (e.g. 10-20-20 lbs N-P_2O_5-K_2O/a) is advisable for row crops on soils slow to warm in the spring.

A soil nitrate test may better estimate actual corn N needs.

If conservation tillage leaves more than 60% residue cover when corn follows after corn, add an additional 30 N lbs/a.

If alfalfa will be maintained for more than three years, increase recommended K_2O by 20% each year.