

# Potpourri of Hot Topics

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1. Electronic improvements at UW - Soil and Plant Analysis Lab
2. Sulfur research update
3. Soil sampling requirement clarification
4. Risk from copper sulfate footbaths

# New Report/Information Formats

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- Plant analysis
- Forage quality
- Manure analysis
- Routine farm soil info

# Electronic options at Madison

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- On-line info sheets (RFS and L&G)
- On-line account access
- On-line payment
- Soil test summaries
- E-newsletter

# Online information sheet

**Soil & Plant Analysis Laboratory - Microsoft Internet Explorer provided by the Soil & Plant Analysis Lab**

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Send this sheet with samples to:  
**UW Soil and Plant Analysis Lab**  
**5711 Mineral Point Road**  
**Madison, WI 53705**

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Account #: **556996**

Name: **Bucky Badger**

Dept/Organization:

Address: **5711 Mineral Point Road**

City, State, Zipcode: **Madison, WI, 53705**

County: **Dane**

Phone number: **608-262-4364**

E-mail: **soil-lab@uwmadmail.services.wisc.edu**


Plow depth: **7 inches**

Total samples: **2**

Field ID	Sample IDs	Field Information				4 Year Crop Rotation			Fertilizer Credit Information								
		Irrigated?	Soil Name	Acres	Slope %	Crop	Conserv Tillage?	Yield Goal	Previous Legume Crop			Manure Applied to Field Since Last Crop					
									Previous Crop	Forage % Stand	8"+ Regrowth?	Animal Species	Form	App rate T/a or 1000 gal/a	Application Method	Years of App	
1	1		Antigo	12	2								Dairy	Solid		Surface	3+
2	2		Plano	18	4	1			1		Yes	none					
						1											
						1											
						1											

**Special Tests/Instructions** (additional fee required for special tests):

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1001112602

Done Internet

# Online account

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**Account Summary**

[View Pending Lab Work](#)  
[View Submitted Samples](#)  
[Submit Samples](#) ▶

[Routine Farm Soil](#)  
[Other Lab Work](#)

General Information	
Account ID	555800
Current Balance	\$0.00
Last Activity	11/25/2002
Last Login	11/26/2002

Payment Information	
Current Payment Due Date	N/A
Current Amount Due	\$0.00
Last Payment Date	8/13/2002
Last Payment Amount	\$30.00

 Please use the drop-down menus on the orange bar above.

# Online credit card payment

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Read about the [security](#) measures we have taken to keep your information safe.



Please select which card you would like to use:

Select Card	Credit Card Number	Type	Expiration Date	
<input checked="" type="radio"/> Card 1	<a href="#">XXXX-XXXX-XXXX-2212</a>	Visa	07/2004	<input type="checkbox"/> Remove this card from file
<input type="radio"/> Specify Other	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	Visa <input type="text"/>	01 / 2002	<input type="checkbox"/> Keep this card on file

Enter the amount you want to pay: \$

# Sulfur Responses and the Wisconsin Alfalfa Sulfur Survey

K.A. Kelling, P.E. Speth, and S. van Wychen  
Department of Soil Science  
Univ. of Wisconsin-Madison

# Sulfur responses at on-farm trials

	1999	2000		2001		
S rate	Man	FDL	Man	Dodge	FDL	Dodge
lb/acre	----- T/acre -----					
0	3.28	4.75	4.08	5.11	5.56	3.70
25	3.23	5.36	4.48	--	5.68	--
50	3.83	--	4.91	5.27	--	4.08
P value	0.08	<0.01	0.06	0.15	0.45	0.02

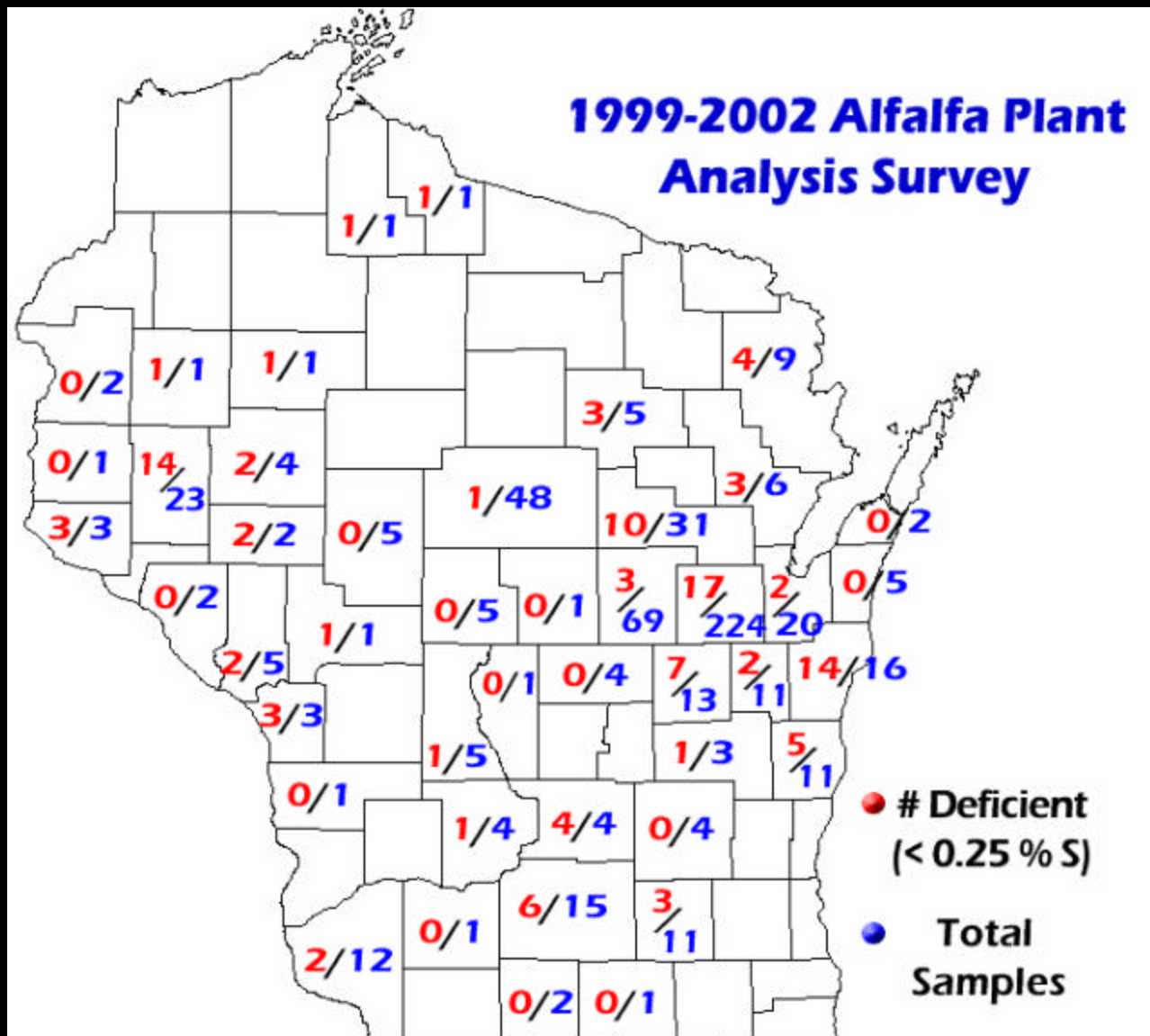


# Wisconsin Alfalfa Sulfur Survey:

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- Sample numbers:
  - 53 in 2000
  - 82 in 2001
  - 5 in 2002
- Obtained routine alfalfa results from WI labs
  - 462 samples 1999-2002
- 44 counties represented
- Tissue S data:
  - 0.09 to 0.58%
  - 55 of 140 survey samples < 0.25% S
  - 40 of 462 routine samples < 0.25 % S

# Sulfur Deficiency More Common



# Conclusions:

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- Sulfur deficiency possible in southern Wisconsin on medium-textured soils
- Tissue S             $< 0.23$  = deficient  
                          $> 0.25$  = sufficient  
                         0.23 to 0.25 = maybe
- SAI needs work; precipitation S over-weighted

# Soil sampling requirements clarified

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- Single recommendation per field
- **Minimum** requirements
  - More intense is OK
  - Each sample comprised of 10-20 cores

# Needed intensity varies with:

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## 1. Sampling history

- No samples in last 4 years, take 1 sample / 5 acres
- Have samples - use table as guide

## 2. Expected responsiveness

- If either P or K in high range or below, take 1 sample / 5 acres
- If both P and K are VH or EH, use table

# Recommended sample intensity for non-responsive fields tested within past 4 yrs

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Field size (acres)	Suggested sample number*
<5	1
5-10	2
11-25	3
26-40	4
41-60	5
61-80	6
81-100	7

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\*10 cores/sample minimum

# Multiple samples give better recommendations:

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Number of samples per field	Permitted number of outliers omitted
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1-2

0

3-4

1

5+

2

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# Small fields / contour strips with identical management / crop histories

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Field size	Number of samples	Recommendations
>5 acres	1 / strip	Similar strips
<5 acres	Combine 2-3 strips	Similar strips

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# Are copper sulfate footbaths a problem?

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- Large amounts of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  being used, ie 50 bags every other day
- Spent bathwater added to manure slurry
- Inorganic copper fungicides have caused Cu toxicities
- Recommendations suggest lifetime loading of  $<30 \text{ lb/a}$  on sands

# How much Cu is being added?

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## Farm 1

$$50 \text{ lb CuSO}_4 \times 180 \text{ day} \times 25\% \text{ Cu} = 2250 \text{ lb Cu/yr}$$

$$2250 \text{ lb Cu/yr over 295 acres} = 7.6 \text{ lb Cu/yr}$$

## Farm 2

$$10,000 \text{ gal/a manure} \times 90 \text{ ppm Cu} = 7.5 \text{ lb Cu/yr}$$

# How much copper in Wisconsin manures?

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Type	min	max	avg	load 160 lb N
	----- ppm Cu -----			lb/a/yr
Dairy solid	12	200	27	0.6
Dairy liquid	16	1320	191	2.4
Swine liquid	146	1923	673	11.1
Poultry solid	35	1350	438	3.7

# Copper behavior in soil:

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- Ionic and exchangeable forms available to plants
- Strongly bound by organic matter and to less extent minerals (not available)
- Availability not greatly affected by pH
- Time results in reversion to low available forms (2 weeks measured much less)
- Not moved to subsoil

# Several studies with high-Cu swine manure:

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- No yield decreases
- Up to 250 lb Cu/a added
- Only small increase in plant Cu
- Significant reversion occurred

# Fractionation of one WI dairy manure sample

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Total Cu = 329 ppm

Water phase Cu = 0.127 ppm

Ionic Cu = 0.00034 ppm

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# Biosolids Cu loading limit guidelines:

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> 4300 ppm ; no application

1500-4300 ppm ; 66 lb/a annual  
1349 lb/a lifetime

< 1500 ppm ; no restriction

# Summary:

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1. Short term likely no problems
2. Long term problems seem unlikely
3. Continued monitoring warranted



# Acknowledgements:

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