


2018 Georgia Grazing School:

How to use soil testing and plant tissue analyses in grazing systems

Dr. Dennis Hancock
Prof. & Forage Ext. Specialist

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UNIVERSITY OF GEORGIA
EXTENSION

GRASS
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Take care of the soil and it will take care of you.

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Macro- (Primary)		Plant Nutrients	
Element	Available Form		
Oxygen	O_2 , OH^-		
Carbon	CO_3^{2-} , HCO_3^- , CO_2		
Hydrogen	H^+ , OH^-		
Nitrogen	NO_3^- , NH_4^+		
Phosphorus	HPO_4^{2-} , $H_2PO_4^-$		
Potassium	K^+		
Meso- (Secondary)			
Element	Available Form		
Calcium	Ca^{+2}		
Magnesium	Mg^{+2}		
Sulfur	SO_4^{2-}		

Plant Nutrients

Micro- (Trace)

Element	Available Form
Iron	Fe^{+2} , Fe^{+3}
Copper	Cu^{+2} , Cu^+
Zinc	Zn^{+2}
Manganese	Mn^{+2} , MnO_4^-
Molybdenum	$HMoO_4^-$, MoO_4^{2-}
Boron	H_3BO_3 , $B_4O_7^{2-}$
Chlorine	Cl^-

Liebig's Law of the Minimum



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Soil Test and Follow Fertility Recommendations




Sample 1/3 of your pastures each year and hayfields every year.



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Soil Sampling – What You Need

- Soil probe(s)
 - Mark at 4" depth
- Clean plastic bucket
- UGA soil test bags
- Knife or flathead screwdriver
- Piece of scrapwood
 - To crush cores and mix.



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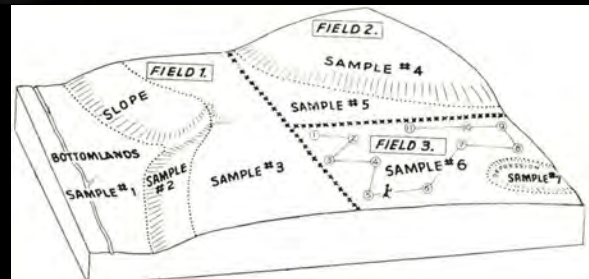
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Soil Sampling – *The Sample*

- 1 sample should represent 5 to not more than 15 acres.
 - Tremendous variability
 - Soil types, slope, drainage, past mgmt., etc.
- 1 sample should consist of 15-20 cores from random locations around the field.
 - Place in bucket, mix thoroughly, and “move mountains” until you’ve gotten it down to a size that fills the soil test bag.

Soil Sampling – *Defining Locations*



Soil Sampling – *Ensure Representation*

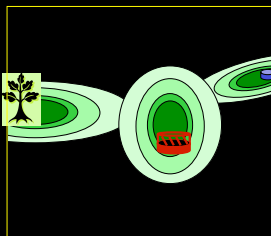


Photo credit: Dr. Dory Franklin, UGA-CAES

Soil Test Ranges

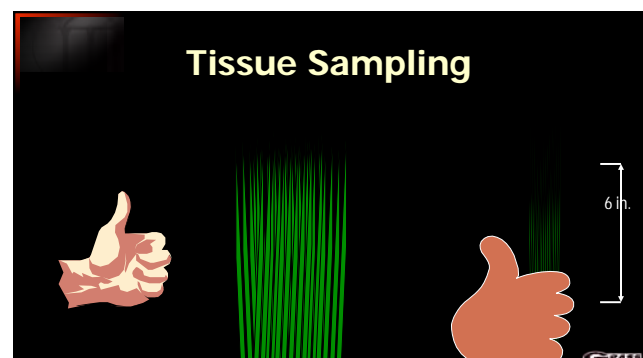
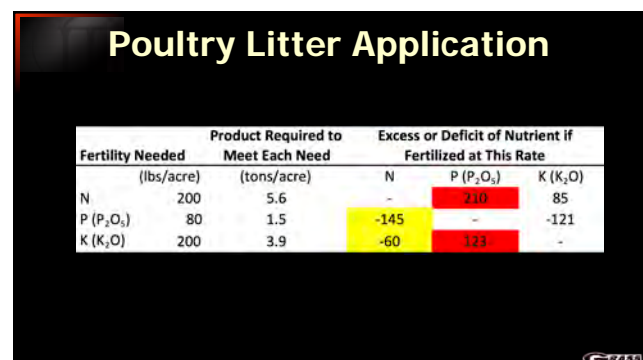
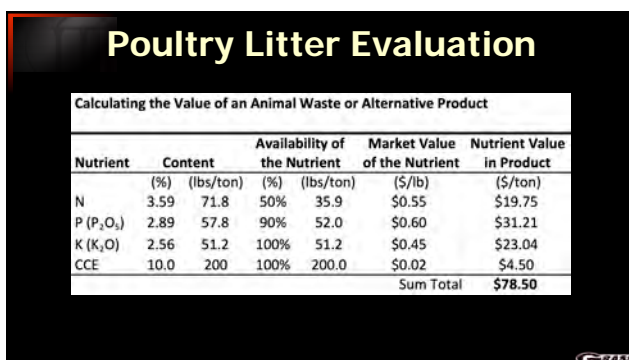
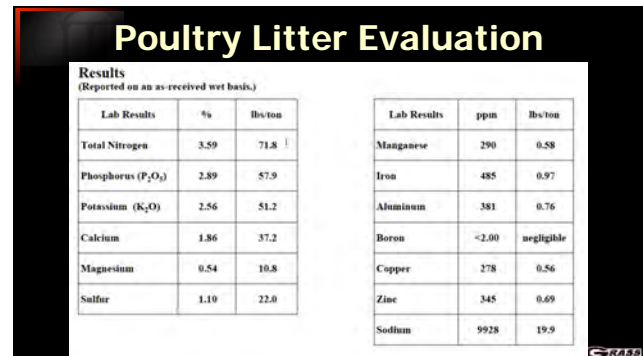
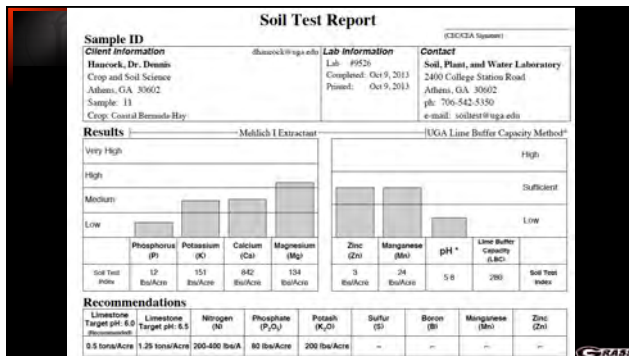
	Low	Med	High	V. High
Phosphorus	0-20	21-40	41-75	75+
Potassium	0-100	101-200	201-350	350+
Calcium	Low		Adequate	
	0-400		401+	
Magnesium	Low	Med	High	
	0-60	61-120	121+	

Piedmont



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Troubleshooting

Bad Zones

- Tissue Sample
- Soil Sample
- Other(?)

Good Zones

- Tissue Sample
- Soil Sample
- Other(?)

Representative Samples

- ~ 20 similar specimens

Tissue Sampling

Targets for the Ratios			
10.11 N:P	10.00	8.30	
11.85 N:S	30.00	8.00	
7.61 N:Ca	12.00	4.52	
14.94 N:Mg	20.00	10.00	
0.71 K:N	0.67	0.70	
0.14 P:K	0.15	0.22	
0.87 S:P	0.33	1.05	
0.76 P:Ca	1.25	0.71	
1.48 P:Mg	2.00	1.57	
0.12 S:K	0.05	0.23	
5.37 K:Ca	8.00	3.16	
10.7 K:Mg	13.33	7.00	
1.97 Ca:Mg	1.67	2.21	
0.65 S:Ca	0.40	0.74	
1.29 S:Mg	0.67	1.64	

Forages

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