

2009 GCSAA EDUCATION CONFERENCE AND THE GOLF INDUSTRY SHOW

How to Interpret a Soil Test

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HOW TO INTERPRET A SOIL TEST

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- ### TAKE A REPRESENTATIVE SAMPLE
- COLLECT FROM SEVERAL LOCATIONS
 - DEPTH DEPENDS ON LAB
 - COMBINE AND MIX SAMPLES
 - TAKE A SUB-SAMPLE, APPROXIMATELY 1 CUP

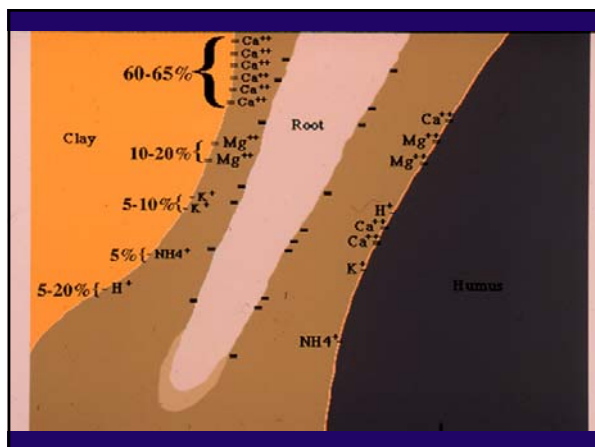
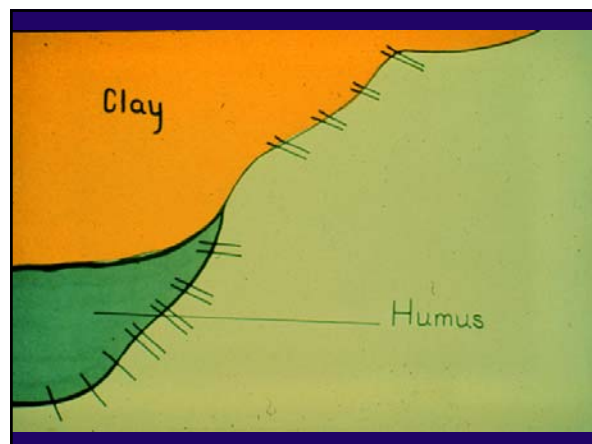
BASIC PRINCIPLES AND TERMINOLOGY

IS	CEC	2.0	1.3	1.6	1.4	1.7	1.4		
TS	Soil pH	7.4*	6.8*	7.0*	7.2*	6.8*	7.2*		
97	Buffer pH	-----	-----	-----	-----	-----	-----		
9502	Soluble Salts	0.19	0.22	0.21	0.21	0.35	0.25		
OR	Exchangeable Calcium (Ca)	274*	140*	171*	141*	177*	138*		
	Exchangeable Magnesium (Mg)	45*	42*	49*	49*	57*	49*		
	Exchangeable Sodium (Na)	13	11	12	11	15	12		
Na	% H Base Saturation	0.0	0.0	0.0	0.0	0.0	0.0		
ED BY	% K Base Saturation	10.6*	16.2*	15.2	15.6*	16.8	16.2*		
tributed	% Mg Base Saturation	18.6	26.7*	26.3*	29.7*	27.7*	29.7*		
1	% Ca Base Saturation	68.0	53.4	55.1	51.2	51.7	50.2		
	% Na Base Saturation	2.8	3.6	3.4	3.5	3.8	3.8		
ON	Fluor								
	Wenny								
	GART								
	GART								
	GART								
	GART								

CATION EXCHANGE CAPACITY (CEC)

THE ABILITY TO EXCHANGE CATIONS

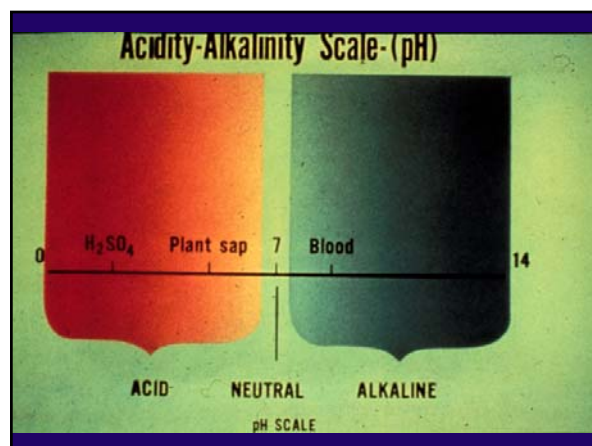
ELEMENT	SYMBOL	CATION
Hydrogen	H	H^+
Calcium	Ca	Ca^{++}
Magnesium	Mg	Mg^{++}
Potassium	K	K^+
Sodium	Na	Na^+

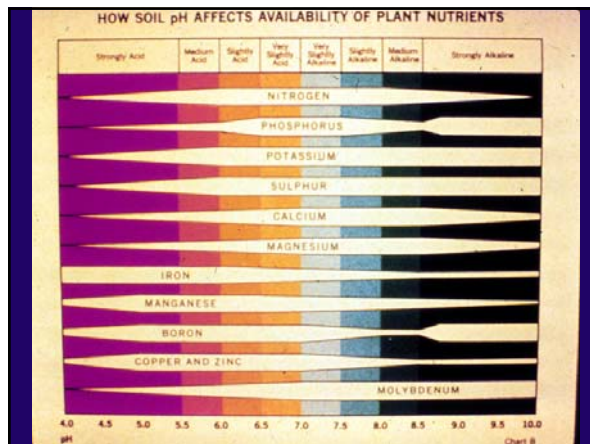
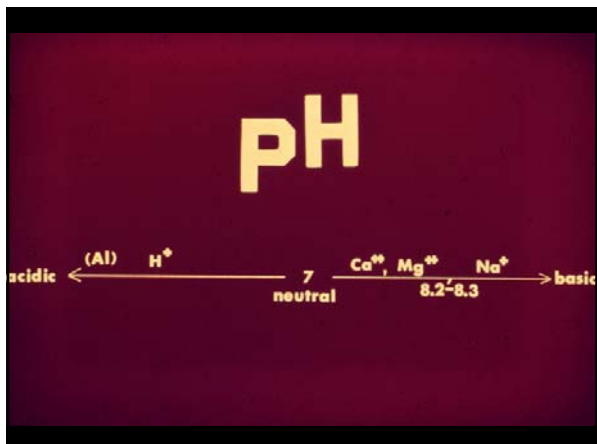


CATION EXCHANGE CAPACITY

SOIL TYPE	meq/100g
SAND	>1 - 8
CLAY	80 - 120
ORGANIC MATTER	150 - 500
CLAY LOAM SOIL	25 - 30
SAND GREEN	>1 - 14

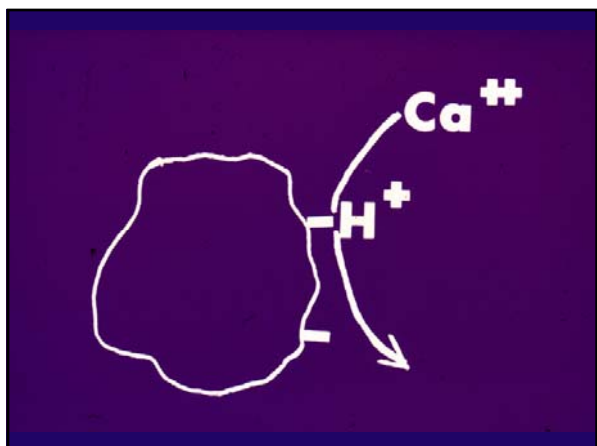
pH





LIME
CALCIUM
CARBONATE
 $CaCO_3$

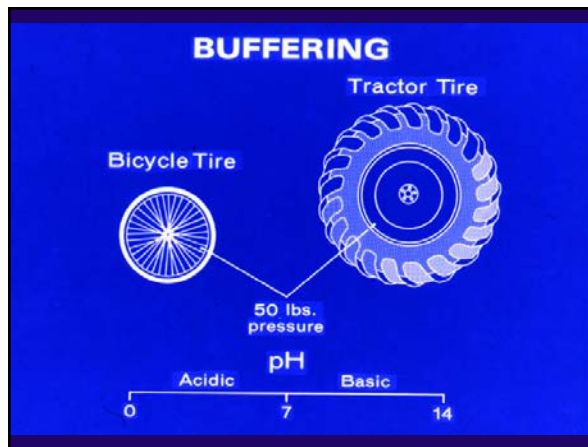
LIME
RAISES
pH



BUFFER pH

Sample Description	BRN11	BRN12	BRN13	BRN14	BRN15	BRN16	BRN17	BRN18	PG	WARRUP	
CCC	3.4	2.8	3.1	4.2	4.4	3.2	2.5	4.1	2.7	4.3	3.5
Soil pH	6.78	6.78	6.78	6.98	6.4	6.88	7.18	6.88	6.78	7.08	6.88
Buffer pH	-----	-----	-----	-----	7.2	-----	-----	-----	-----	-----	7.2
Soluble Salts	0.14	0.14	0.12	0.18	0.18	0.20	0.14	0.18	0.23	0.13	0.16
Exchangeable Calcium (Ca)	4548	3668	4178	5978	641	4528	3348	5868	3448	627	4828
Exchangeable Magnesium (Mg)	104	92	102	119	116	97	79	115	90	119	103
Exchangeable Sodium (Na)	10	10	9	10	10	8	7	14	16	8	10
% Base Saturation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Mg Base Saturation	5.48	5.28	4.88	3.78	4.08	3.88	5.38	4.08	7.58	4.28	4.88
% Na Base Saturation	25.88	27.58	27.28	23.78	22.08	25.18	26.48	23.38	27.38	22.88	25.18
% No Base Saturation	67.5	65.7	66.8	71.5	73.0	70.1	67.1	71.2	62.7	72.2	68.8
% No Base Saturation	1.3	1.6	1.3	1.0	1.0	1.1	1.2	1.5	2.5	0.8	1.3

BUFFERING RESISTANCE TO CHANGE

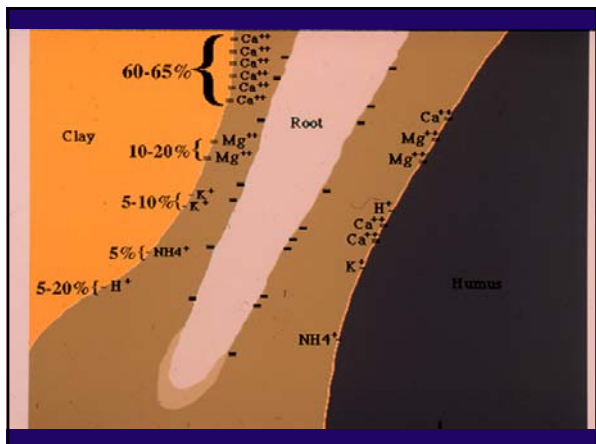


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% No Base Saturation	1.3	1.6	1.3	1.0	1.0	1.1	1.2	1.5	2.5	0.8	1.3

SOIL TESTING

SLAN--sufficiency level of available nutrients

BCSR--basic cation saturation ratio



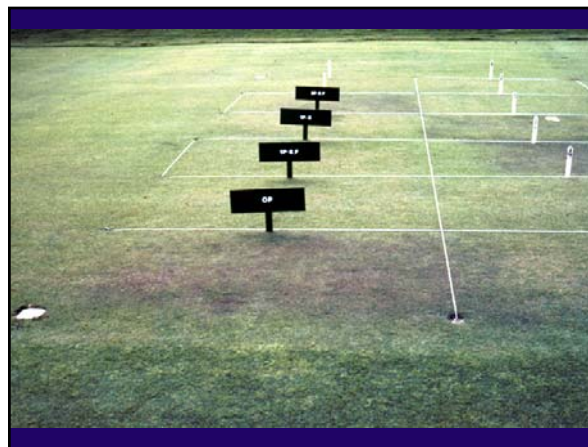
Sample Description	DRN11	DRN12	DRN13	DRN14	DRN15	DRN16	DRN17	DRN18	FB	WARRUP	
CCC	3.4	2.8	3.1	4.2	4.4	3.2	2.5	4.1	2.7	4.3	3.5
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% Na Base Saturation	25.88	27.08	27.28	23.78	23.08	25.18	26.48	23.38	27.38	22.88	25.18
% K Base Saturation	67.5	65.7	66.8	71.5	73.0	70.1	67.1	71.2	62.7	72.2	68.8
% NH4 Base Saturation	1.3	1.6	1.3	1.0	1.0	1.1	1.2	1.5	2.5	0.8	1.3

THE USEFULNESS OF A SOIL TEST DEPENDS ON PROPER INTERPRETATION

LABS TEND TO OVERESTIMATE HOW MUCH P IS NEEDED AND UNDERESTIMATE HOW MUCH K IS NEEDED

P DEFICIENCY SYMPTOMS

- INITIALLY DARK GREEN
- PURPLE DISCOLORATION
 - ANTHOCYANIN
 - OFTEN MISTAKEN



PHOSPHORUS

PPM		LB/A	KG/HA
• 0 - 5	VERY LOW	0 - 10	0 - 11
• 6 - 10	LOW	12 - 20	13 - 22
• 10 - 20	ADEQUATE	20 - 40	22 - 45
• 20 -	HIGH	40 -	45 -

POTASSIUM K

- MYSTERY ELEMENT
- NOT A PART OF BIOCHEMICALS
- ACTS AS COFACTOR
- STOMATAL CONTROL

STRESS

POTASSIUM

PPM		LB/A	KG/HA
0-40	VERY LOW	0-80	0-90
41-175	LOW	81-350	91-392
175-250	ADEQUATE	350-500	392-560
250-	HIGH	500-	560-

HOW ABOUT MICRONUTRIENTS?