

Soil Analysis – Use and Interpretation

Dan Rodrigues

Vina Quest LLC

(805) 459-5514 cell

Soil analysis

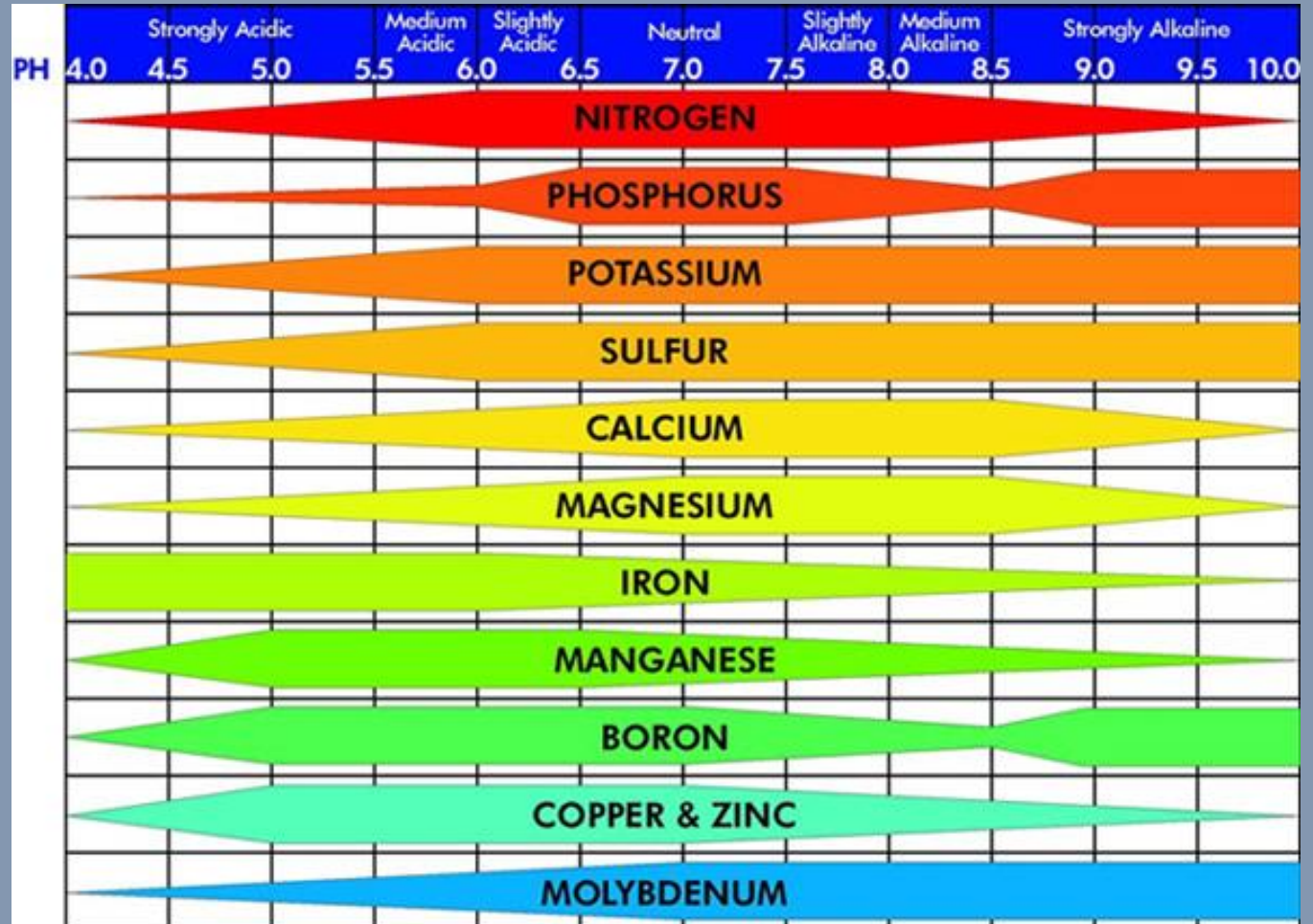
- Using of soil analysis
- Timing of sampling
- Reason
- How to sample
- Interpretation

Use of soil analysis

- Monitor important soil constituents.
- pH level.
- Salinity (ECe)
- Soluble Calcium.
- Soil hazards.
- Pool of soil nutrients.
- Effects of irrigation water.
- Not advisable solely to use in determining annual fertilization needs.

Soil pH

- pH is the relative concentration of Hydrogen ions.
- Influences nutrient availability.
- Lower pH with acidic material (Sulfur)
- Higher pH likely due to higher amounts of active lime.
- Increase pH with basic material (Lime)



Salinity (ECe)

- Excessive levels ($>1.5\text{dsM}$) will di-vigorate plants.
- Moves very easily in soil.
- Contained in soil and water.
- Used for determining Leaching factor.
- **salt** is an ionic compound which is made up of two groups of oppositely charged ions. Metal + non metal NaCl ($\text{Na}^+ \text{Cl}^-$) KCl ($\text{K}^+ \text{Cl}^-$)

Sodium Adsorption Rate - SAR

- Measurement of the suitability of water and soil for use in agricultural irrigation and soil, as determined by the concentrations of solids dissolved in the water. It is also a measure of the **sodicity** of soil, as determined from analysis of water extracted from the soil.

$$\text{SAR} = \frac{\text{Na}^+}{\sqrt{\frac{\text{Ca}^{++} + \text{Mg}^{++}}{2}}}$$

Soluble Calcium

- Proper levels (>8.0 meq/L)
- Allows “good” salt to help water infiltrate into the soil profile.
- Insufficient amounts slow water infiltration.
- Raise amounts through gypsum applications.

Soil Hazards

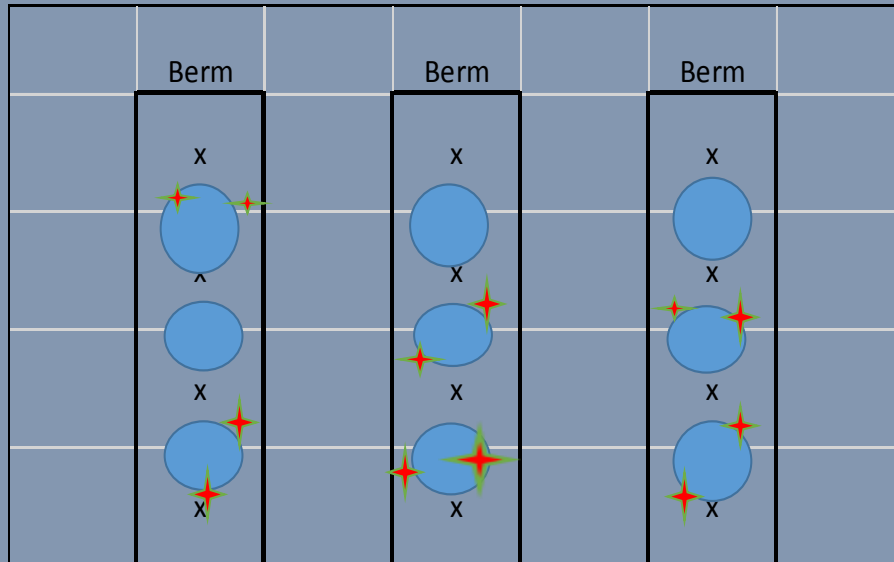
- Chloride
- Boron
- Sodium
- Nitrogen?

Sampling Techniques

- Overview of current soil levels.
- Consistent sampling in area and procedures.
- Determining problem areas.
- Depth – depends on reason for sampling.
- Area of sampling.

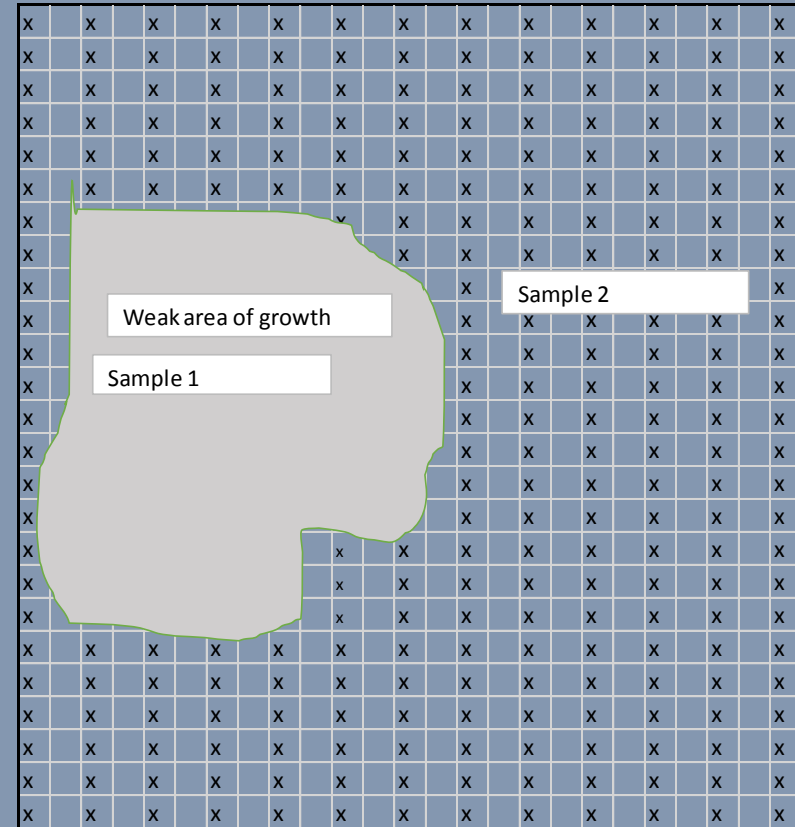
Sampling Examples

General suitability



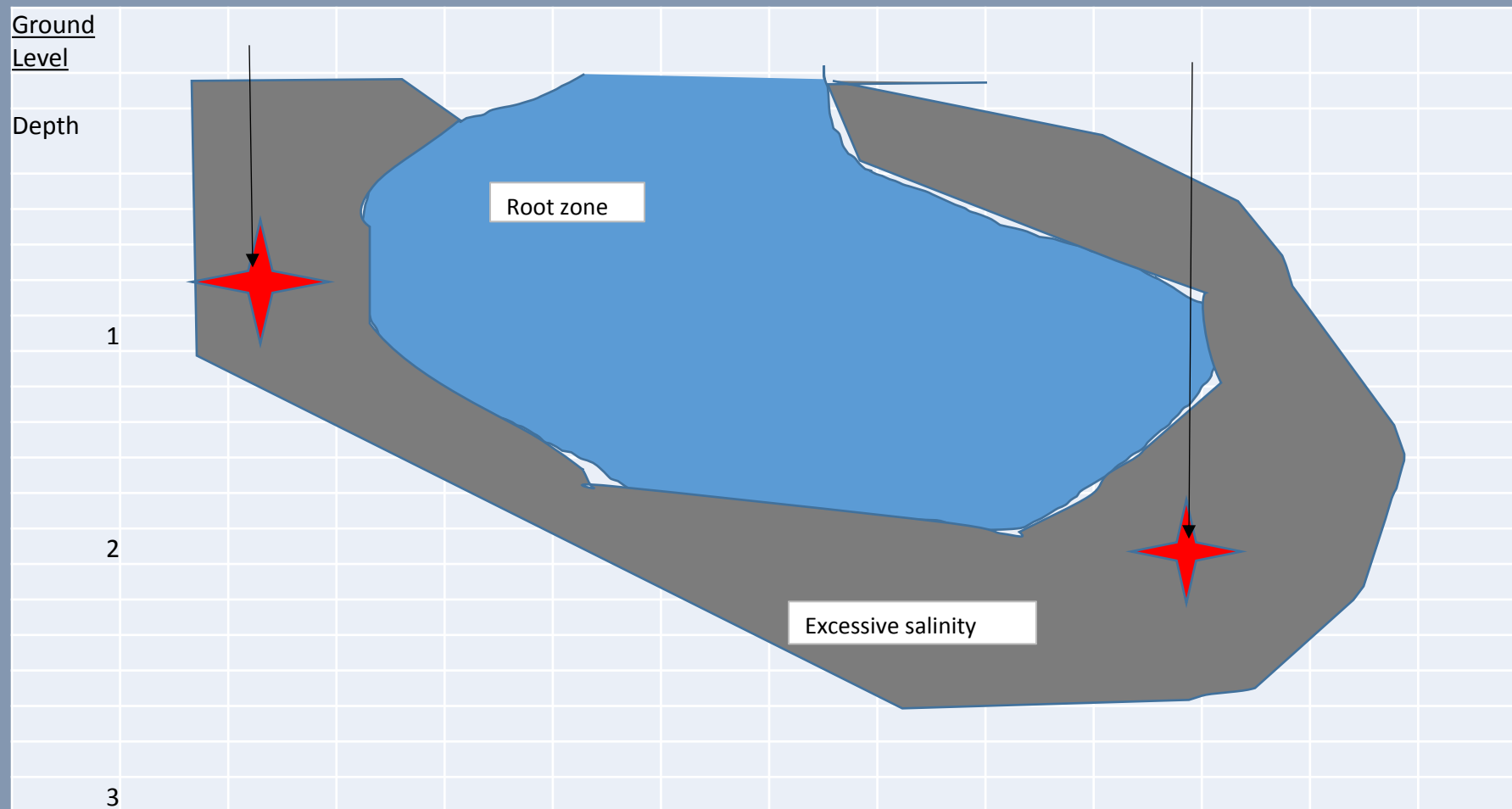
- 10-15 sub samples / 1 composited sample
- Depth range from 0.0-3.0
- Salinity (one sample 0-2ft one sample 2-4 ft)

Problem solving



- Several samples at each area (Good vs Poor)
- Compare the two results.
- Significant difference?

Depth of sampling



Interpretation of Results

- Review the results for errors
- Understand the units.
- Compare past soil results. Changes?
- Does the results change my management?
- Amendments?
- Planning



Vineyard 123
 P.O. Box 2548
 Fightertown, USA

Report of Soil Analysis and Recommendations

Grapes

11480

Field Name Area	Sample Date Sample Id	Depth	Sat %		pH	Salinity and Permeability					Free Lime	Total CEC meg/ 100g	Exchangeable Cations					Ca/Mg Ratio	Nutrients					SMP Lime Req tons/6 in.	Ammendment Recommendations		
			Org	Mtr %		Total Salts ECe dS/m	meq/l			SAR			Ca	Mg	K	Na	H		NO3-N	PO4-P	K	Zn	B		meq/l K	Lime tns/ac	100% Gypsum tons/ac
Blk 2 ZN	10/23/2014	0.0 -	18	6.9		1.37	5.2	1.8	7.8	4.2	None	100.1	76%	12%	4%	7%	0%	6.4	12	5	88	0.6	0.3		0	4	0
	15557 - 1	2.5																									
BLK 5 CH	10/23/2014	0.0 -	20	6.7		1.48	6.1	2.0	6.8	3.4	None	100.0	74%	12%	5%	6%	2%	6.1	14	4	114	1.3	0.3		0	3	0
	15557 - 2	2.5																									
BLK 8 PS	10/23/2014	0.0 -	24	6.4		1.37	6.4	2.5	6.4	3.0	None	100.0	75%	13%	4%	4%	4%	5.7	32	3	127	1.9	0.3	0.1	0.5	3	0
	15557 - 3	2.5																									
Block 11	10/23/2014	0.0 -	30	5.4		2.17	10.5	6.4	7.3	2.5	None	100.9	60%	19%	3%	3%	15%	3.1	70	13	174	0.5	0.5	1.1	3.3	0	0
	15557 - 4	2.5																									
Block 14	10/23/2014	0.0 -	40	7.1		2.23	18.2	5.7	2.9	0.8	Low	100.0	82%	14%	4%	1%	0%	6.0	94	3	254	0.3	0.6		0	0	0
	15557 - 5	2.5																									
Block 17	10/23/2014	0.0 -	30	7.1		1.74	13.4	4.1	2.9		Low	100.0	82%	13%	4%	2%	0%	6.4	54	3	181	0.4	0.5		0	0	0
	15557 - 6	2.5																									
Block 20	10/23/2014	0.0 -	30	6.6		1.61	10.4	4.0	4.5	1.7	None	100.0	76%	16%	4%	2%	2%	4.8	30	10	204	0.6	0.2		0	0	0
	15557 - 7	2.5																									
Desirable Levels For Grapes			Deficient Marginal Adequate High Excessive	6.0-7.5	<1.5	8.0+	<5.0						40%+	10-30	2-5%	<5%		2+	10+	5+	125+	1.0+	.3-1	0.2+			