Vineyard Fertility

Striving for Perfection

Brian Morasch
G.S. Long Co., Inc.

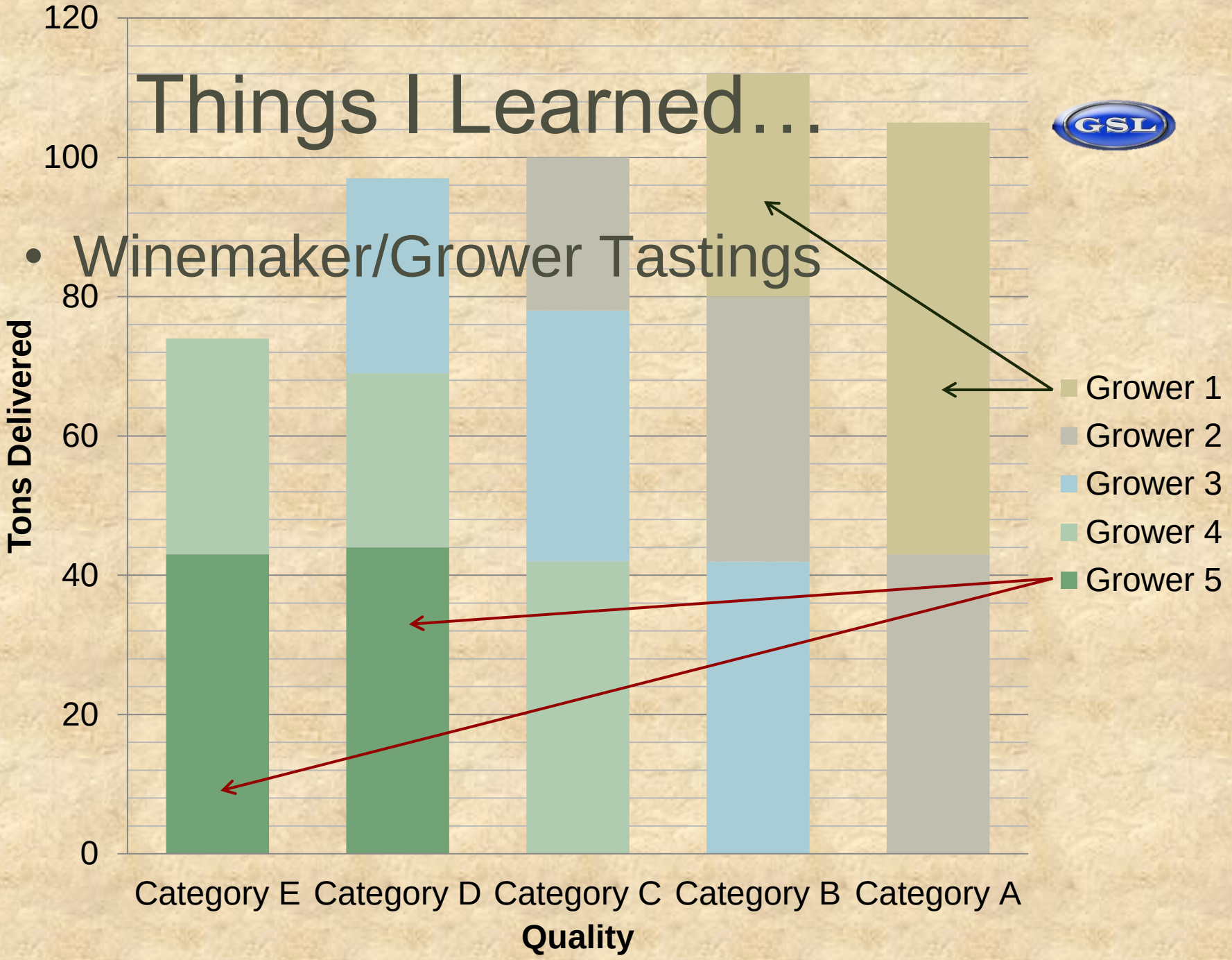
The Early 1990's

THE FORMATIVE YEARS

“Wine grapes don’t need to be fertilized.”

Things I Learned…

- Winemaker/Grower Tastings



Report: P0527001

Grower: B A Grower

Send to: G S LONG
P.O. Box 9783
Yakima WA 98909-9783

Albion® Advanced Nutrition
P.O. Box 750 ? Clearfield, Utah 84089 U.S.A.
101 North Main Street ? Clearfield, Utah 84015 U.S.A.
Tel: +801-773-4631 ? Fax: +801-773-4633
Email: plant.soils@albion-an.com
Website: www.albion-an.com

T.E.A.M.® Analysis Report

Lab Number: 90637 Crop: WINEGRAPES

Sample: #4 Field: BLK 9B CS Date of Report: 01-Jun-05

Analyzed Results

N	S	P	K	Mg	Ca	Na	NO_3-N	Fe	Al	Mn	B	Cu	Zn	Mo
		(%)						(ppm)						
4.10	0.35	0.62	0.90	0.17	1.48	0.071	350	75	25	73	26	17	18	3.00

Optimal Ranges

N	S	P	K	Mg	Ca	Na	NO_3-N	Fe	Al	Mn	B	Cu	Zn	Mo
1.50	0.15	0.25	1.50	0.25	0.80	Less than 0.100		40	Less than 200	40	30	10	25	
3.50	0.35	0.60	2.50	0.80	3.00			100		100	50	30	40	

Nutrient Level	Mineral Name	Nutrient Index
Very Low	ZINC (Zn)	-33
Low	POTASSIUM (K)	-30
	BORON (B)	-21
	MAGNESIUM (Mg)	-20
	CALCIUM (Ca)	-2
	COPPER (Cu)	-1
Optimum	MANGANESE (Mn)	8
	IRON (Fe)	9
	SULFUR (S)	25
	PHOSPHORUS (P)	28
High	NITROGEN (N)	39
Very High		

T.E.A.M.® Recommendations

32.0 FL OZ/AC ZINC METALOSATE
64.0 FL OZ/AC POTASSIUM METALOSATE
12.0 FL OZ/AC BORON FOLIAR
16.0 FL OZ/AC MAGNESIUM METALOSATE

By: tg

Report: P0520001

Grower: A Vineyard

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T.E.A.M.® Analysis Report

Lab Number: 90388 Crop: WINEGRAPES

Sample: 1 Field: CS 01 Date of Report: 25-May-05

Analyzed Results

N	S	P	K	Mg	Ca	Na	NO_3-N	Fe	Al	Mn	B	Cu	Zn	Mo
		(%)						(ppm)						
3.70	0.30	0.57	0.95	0.16	1.07	0.001	348	58	16	60	41	17	25	

Optimal Ranges

N	S	P	K	Mg	Ca	Na	NO_3-N	Fe	Al	Mn	B	Cu	Zn	Mo
1.50	0.15	0.25	1.50	0.25	0.80	Less than 0.100		40	Less than 200	40	30	10	25	
3.50	0.35	0.60	2.50	0.80	3.00			100		100	50	30	40	

Nutrient Level	Mineral Name	Nutrient Index
Low	POTASSIUM (K)	-29
	MAGNESIUM (Mg)	-21
	ZINC (Zn)	-15
	CALCIUM (Ca)	-9
	IRON (Fe)	-2
	COPPER (Cu)	-1
	MANGANESE (Mn)	-1
Optimum	BORON (B)	7
	SULFUR (S)	16
	PHOSPHORUS (P)	22
High	NITROGEN (N)	31
Very High		

T.E.A.M.® Recommendations

96.0 FL OZ/AC POTASSIUM METALOSATE
32.0 FL OZ/AC MAGNESIUM METALOSATE
12.0 FL OZ/AC ZINC METALOSATE
16.0 FL OZ/AC CALCIUM METALOSATE

By: tg

12/3/2013

1998 FERTILIZER RECOMMENDATIONS

FARM: A Vineyard
BLOCK: CS 1
VARIETY: Cabernet
ACRES: 15

DATE SAMPLED: 11/3/1998
SOIL SERIES: 23887
SOIL TEXTURE: LOAM

Nutrients		Normal Levels of Soil Nutrients (Ideal Soil Conditions)	1998 Residual	Fertilizer Recommendation per acre (lbs)
N 1'	lbs/acre	60-100 pounds	52.5	3 to 16
P	ppm	20-25 ppm	[illegible]	40
K	ppm	312.8 ppm	614	0
Zn	ppm	2-5 ppm	3.2	0
S	ppm	20 ppm	21	0
B	ppm	.5-1.5 ppm	0.60	0.25
Fe	ppm	10-15 ppm	0.57	Low
Mn	ppm	7-12 ppm	8.2	Level Okay
Cu	ppm	1 ppm	1.2	Level Okay

BASES

SS	Mmhos/cm	0-1.5 Mmhos/cm	0.60	Level Okay
Na	Meq/100g	0-1 Meq/100g	1.0	Level Okay
CEC	Meq/100g	2-60 Meq/100g	16	Level Okay
Ca	Meq/100g	12-22 Meq/100g	[illegible]	Low
Mg	Meq/100g	2.5-8 Meq/100g	2.7	Level Okay
Ca	%	65-75%	61	Add Gypsum
K	%	3-7%	9.8	High
Mg	%	10-15%	16.7	
Na	%	0-5%	6.1	

SOIL PROPERTIES

OM	%	.5-3.0%	1.8	Level Okay
pH		6.5.-7.5	7.6	High

Report: P0520001

Grower: A Vineyard

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3.70	0.30	0.57	0.95	0.16	1.07	0.001	348	58	16	60	41	17	25	

Optimal Ranges

1.50	0.15	0.25	1.50	0.25	0.80	Less than		40	Less than	40	30	10	25
3.50	0.35	0.60	2.50	0.80	3.00	0.100		100	200	100	50	30	40

Nutrient Level	Mineral Name	Nutrient Index
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By: tg

T

- Wine
- Com
- Corr
- Past

NOVEMBER 3, 2010

G.S. LONG CO. INC
33626

A VINEYARD
(CS01) 1520402

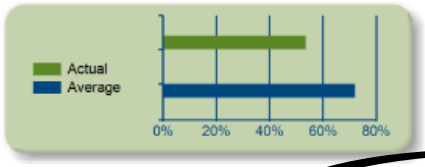
CEC: 11.1
% Organic Matter: 0.9
pH: 8.9

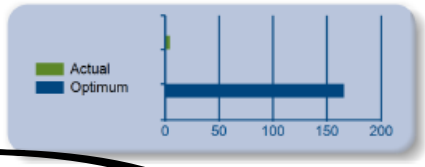
Soil Solution Weight: 113329
Soluble Salts - EC: 0.19

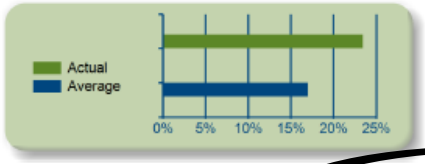
Redox — the power of nature
PLANT NUTRITION · AGRONOMIC SOLUTIONS

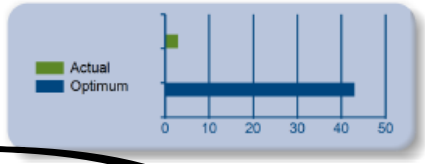
GSL

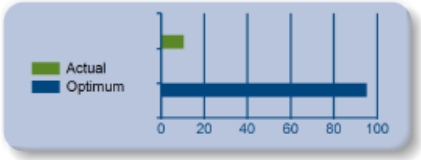
CHEMICAL EXTRACTION		PASTE EXTRACTION	
CALCIUM		**CALCIUM**	
Soil ppm:	1188.0 (low)	Solution ppm:	4.47 (very low)
% Soil Cations (CEC):	53.7% (low)	% Solution Cations:	8.7% (very low)
MAGNESIUM		**MAGNESIUM**	
Soil ppm:	311.3 (high)	Solution ppm:	3.00 (very low)
% Soil Cations (CEC):	22.5% (high)	% Solution Cations:	9.8% (very low)
POTASSIUM		**POTASSIUM**	
Soil ppm:	492.6 (ok)	Solution ppm:	10.62 (very low)
% Soil Cations (CEC):	11.4% (ok)	% Solution Cations:	10.6% (low)











208.678.2610 130 South 100 West, Burley, Idaho 83318 www.redoxchem.com

Things I Learned…

- Winemaker/Grower Tastings
- Compared Soil / Leaf Samples
- Correlate Soil and Leaf Samples
- Paste Extract Samples
- Mackenzie and Christy's "Soil Chemistry" Paper

The Role of Soil Chemistry in Wine Grape Quality and Sustainable Soil Management in Vineyards

- A study to establish if soil structure and/or chemical composition influence wine grape quality.

- Purpose: To better understand the role of soil in *terroir.* Do geochemical factors affect grape vines and the development of their fruit?

D.E. Mackenzie and A.G. Christy
Australian National University

The Role of Soil Chemistry in Wine Grape Quality and Sustainable Soil Management in Vineyards

…nutrients in a balanced form that the plants can use,

- *"It is evident from our results that soil cation chemistry does indeed have an influence on wine grape composition."*
- *"Such knowledge has the potential to be used in managing – or modifying – soils for optimum viticultural results and better wines in a more sustainable way."*

D.E. Mackenzie and A.G. Christy
Australian National University

Things I Learned…

Lead Me to Believe…

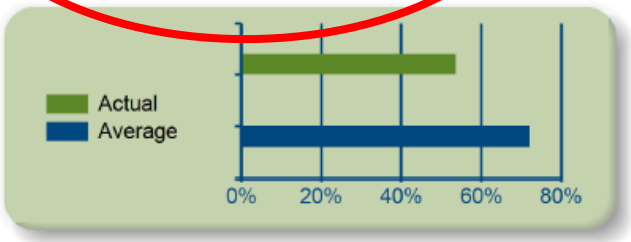
- Winemaker/Grower Tastings
- Compared Soil / Leaf Samples
- Correlate Soil and Leaf Samples
- Paste Extract Samples
- Mackenzie and Christy's "Soil Chemistry" Paper

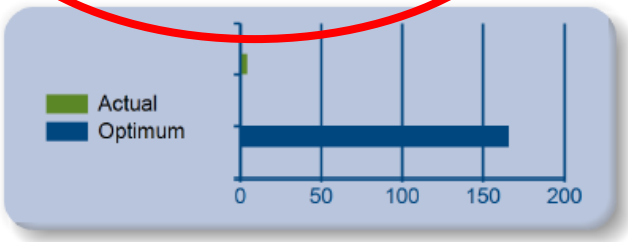
"Wine grapes do need to be fertilized."

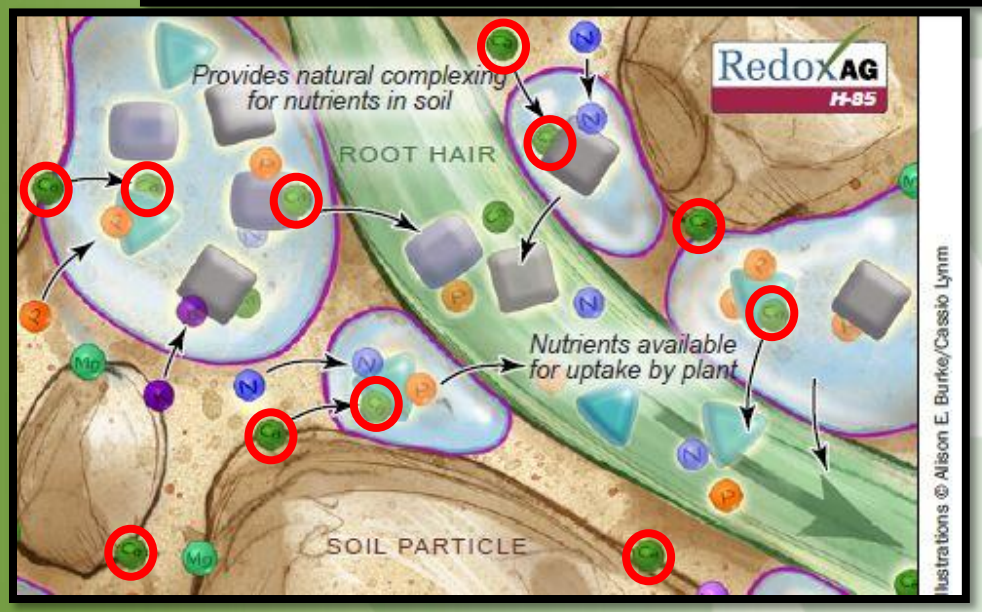
Form, Timing, and Placement

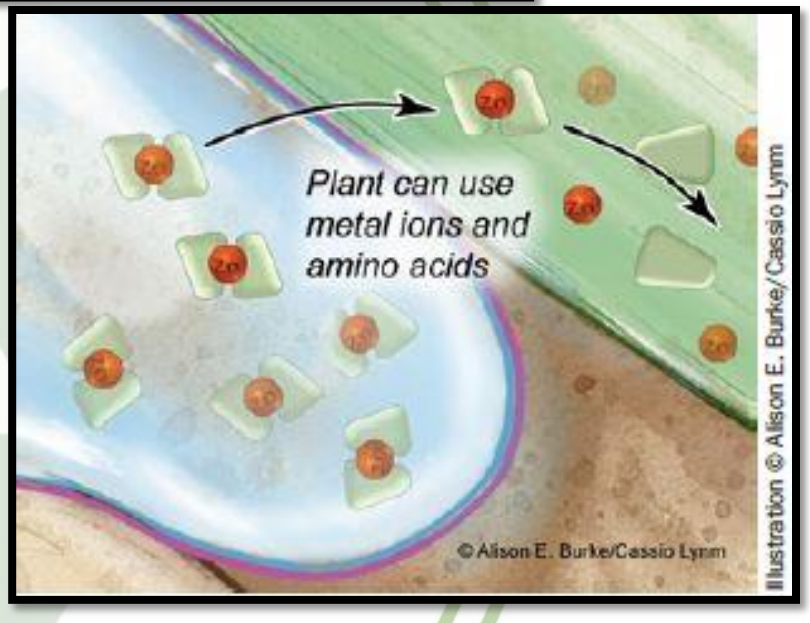
APPLYING WHAT I LEARNED

CHEMICAL EXTRACTION		PASTE EXTRACTION	
CALCIUM		**CALCIUM**	
Soil ppm:	1188.0 (low)	Solution ppm:	4.47 (very low)
% Soil Cations (CEC):	53.7% (low)	% Solution Cations:	8.7% (very low)

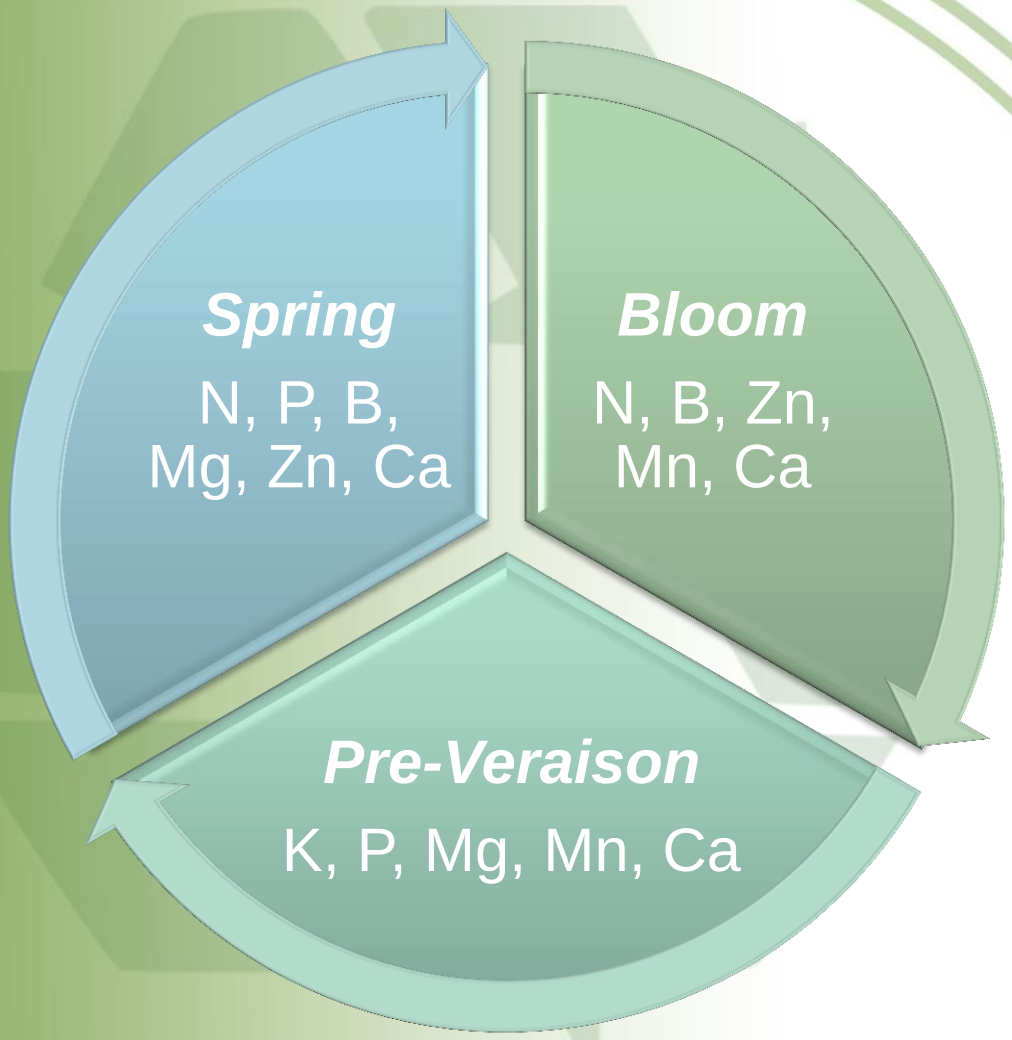








Timing
"When Should I Apply?"



Nutrient Uptake Zone: 8-10” below soil.

Placement

- Drip Irrigation – Ideal for fertilizer application. Fertilizer is in solution, and placed in the root zone.

- Shank Machine – Developed to apply fertilizer in the root zone, when running irrigation is not desirable.

Placement

Show Me the Money!

PROVEN RESULTS

GSL

GSLong 440

161980 SY 22-Feb-06

CEC 22.2

% Organic Matter 1.4

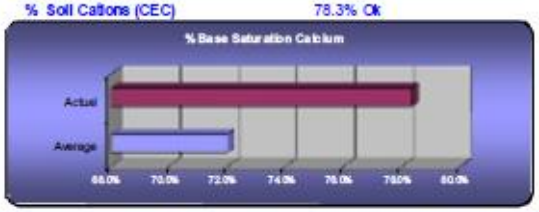
pH 8.7

Soil Solution Weight 159319

Soluble Salts - EC 0.2

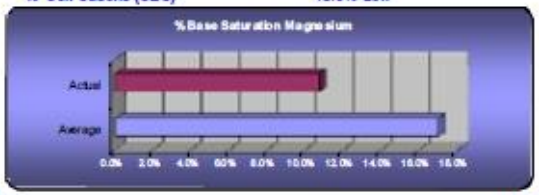
Calcium

Soil ppm	3477.0 Ok	Solution ppm	13.0 Very Low
% Soil Cations (CEC)	78.3% Ok	% Solution Cations	24.0% Low



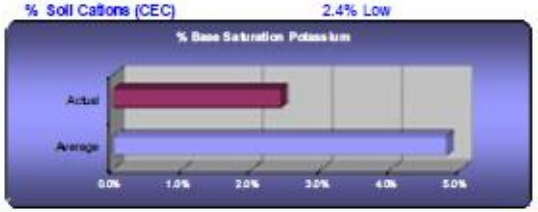
Magnesium

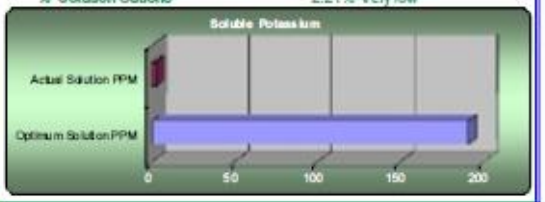
Soil ppm	287.0 Low	Solution ppm	0.84 Very Low
% Soil Cations (CEC)	10.6% Low	% Solution Cations	2.6% Very low



Potassium

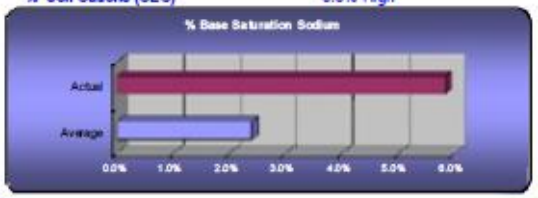
Soil ppm	209.0 Low	Solution ppm	2.34 Very Low
% Soil Cations (CEC)	2.4% Low	% Solution Cations	2.21% Very low





Sodium

Soil ppm	298.0 High	Solution ppm	44.4 Very high
% Soil Cations (CEC)	5.8% High	% Solution Cations	71.2% Very high



Summary:

- Use Soil and Leaf Samples to Determine Nutrient Needs.
- *“Adequate” is not the same as “Ideal” or “Optimum”.*
- *Form, Timing, and Placement* Apply Nutrients that the Plant Can Use, at the Right Time, in the Right Place.

Thank You!