



What's In Your Soil?

THE BASICS OF A SOIL ANALYSIS

Devin Knopp, B.Sc, PAg
Benalto Agri Services



Topics of Discussion

Brief overview of importance of:

- N, P, K, S

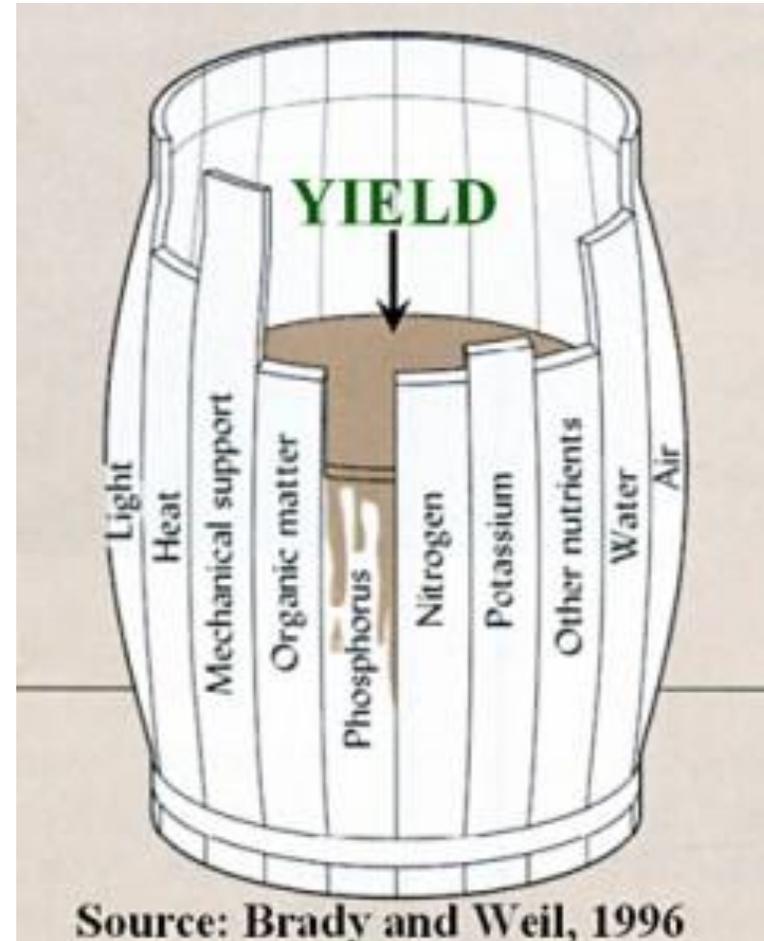
Soil Sampling

- Techniques
- Tools

How to 'Read' a soil sample

Soil Fertility

- Take all 'nutrients' into account
 - Everything essential to plant growth/health
- Need correct nutrient balance
- Law of the Minimum:
 - The nutrient in the shortest supply determines yield



Nitrogen

Nutrient Removal:

- * 35 lbs./ton of grass hay DM
- ** 60lbs/ton of alfalfa DM
- *** 1lbs./Bu of barley

Most commonly deficient

Greatest Impact to yield

Component of:

- Amino acid & Protein formation
- Chlorophyll Synthesis/Photosynthesis
- Vitamins
- DNA

Deficiency Signs

- Yellowing of the leaves starting with oldest leaves, then younger ones
- Slow growth and stunted plants



https://extension.udel.edu/wee_klycropupdate/?p=9003

Phosphorous

Nutrient Removal:

* 10lbs/ton of grass hay DM

**15lbs/ton of alfalfa DM

*** 0.5lbs/Bu of barley

Important for:

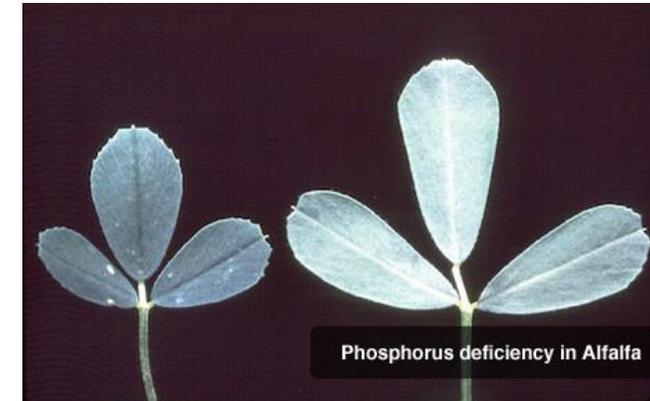
- Root development
- Stalk strength
- Metabolism
- Winter survival

Deficiency reduces nodulation and N fixation

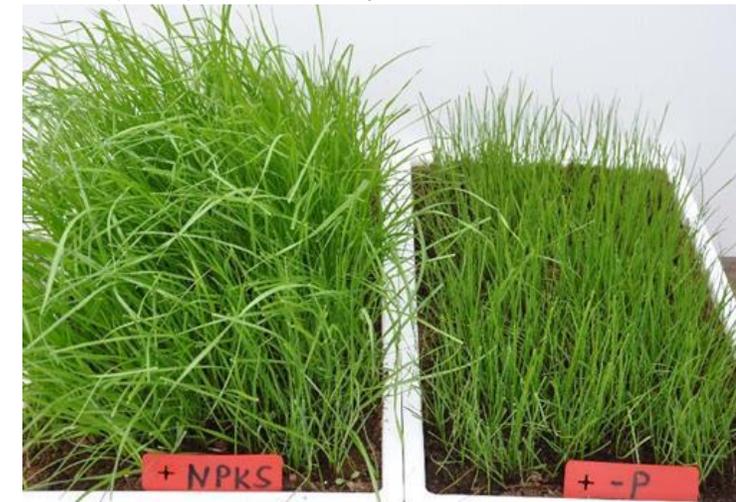
- Reduced Legume performance/Yield

Deficiency Signs

- Difficult to diagnose/limited signs
- Slow spring vigour
- Stunting in early growth
- Abnormal colour/may purple



<http://www.cropnutrition.com/nutrient-knowledge>



<http://www.ya.ac.uk/crop-nutrition/crops/grass/crop-nutrition/deficiencies/p/14339-phosphorus-deficiency-vs-optimum--grass/>

Potassium

Nutrient Removal:

*47lbs/ton of grass hay DM

**63lbs/ton of alfalfa DM

***0.35lbs/Bu of barley

Regulatory role in plant

- Involved in MANY processes

Important for:

- Winter survival
- Disease resistance
- Stress reduction
- Stand longevity
- Building cellulose
- Plant strength
- Water regulation
- Root growth

Deficiency Signs

- Chlorosis
- Scorching of leaves
- Slow or Stunted growth
- Poor resistance to temperature changes, drought & disease



<http://www.yara.co.uk/crop-nutrition/crops/grassland/crop-nutrition/deficiencies/k/9134-potassium-deficiency--grass/>

Sulphur

Nutrient Removal:

*4.5lbs/ton of grass hay DM

**6.5lbs/ton of alfalfa DM

***0.4lbs/Bu of barley

Important for

- Amino Acid Synthesis
- Photosynthesis
- Chlorophyll formation
- Nodule formation
- Winter survival

Needed for efficient nitrogen uptake and fixation

Deficiency Signs

- pale-green coloring on new growth
- leaves shrivel as deficiency progresses
- White tips on leaves





Determining Soil Nutrients

Soil Test

- Asses soil fertility
- Do we need to fertilize
- Make accurate & economical recommendations
- Find problem areas
- Track changes

A & L CANADA LABORATORIES INC.
 2136 Jetstream Road, London, Ontario N5V 3P5, Tel 519/457-2575 Fax: 519/457-2664
 Web Site: www.alcanada.com Email: aginfo@alcanada.com

**WESTERN CANADA
 SOIL SAMPLE SUBMITTAL FORM**



SUBMITTED BY:

Address: _____

Province: _____ Postal Code: _____

Phone: _____ Fax: _____

Email: _____

Account #: _____

CLIENT/GROWER:

Address: _____

Province: _____ Postal Code: _____

Phone: _____ Fax: _____

Email: _____

Grower Code: _____ Farm: _____

FIELD ID	SAMPLE NUMBER (MAX 4 DIGITS)	TEST PACKAGES				COMPLETE FOR RECOMMENDATIONS				LAB USE ONLY
		Soil Depth	SW1B2	SW	SWB	OTHER TESTS	PREVIOUS CROP	INTENDED CROP	YIELD GOAL	
		0-6								
		6-12								
		12-24								
		0-6								
		6-12								
		12-24								
		0-6								
		6-12								
		12-24								
		0-6								
		6-12								
		12-24								
		0-6								
		6-12								
		12-24								
		0-6								
		6-12								
		12-24								

EXPLANATION OF TEST PACKAGES

Basic Analysis
 OW1B2 Organic Matter, Bicarb P and Bray P, exchangeable K, Mg, Ca, Sodium, Al, Soil pH, buffer pH, H, K/Mg Ratio, S, Nitrate, CEC, % base saturation of cations and %P.

Complete Analysis
 OW Organic Matter, Bicarb P and Bray P, exchangeable K, Mg, Ca, S, Zn, Mn, Fe, Cu, B, Sodium, Al, Soil pH, buffer pH, S, Nitrate, K/Mg Ratio, CEC, % base saturation of cations and %P.

SWB Nitrate, Sulphur, pH, exchangeable Potassium, Magnesium, Calcium, Sodium (As part of complete OW or Basic OW1B2 soil test package)

Other Tests

O2 Zn, Mn
 O4 Zn, Mn, B
 O5 Zn, Mn, Fe, Cu
 O6 Zn, Mn, Fe, Cu, B, S

ADDITIONAL INFORMATION

Please fax a copy of the analysis to: _____

Please email a copy of the analysis to: _____

A&L-F009 Revised March 2016

NOT JUST FOR CROPS!

Technique

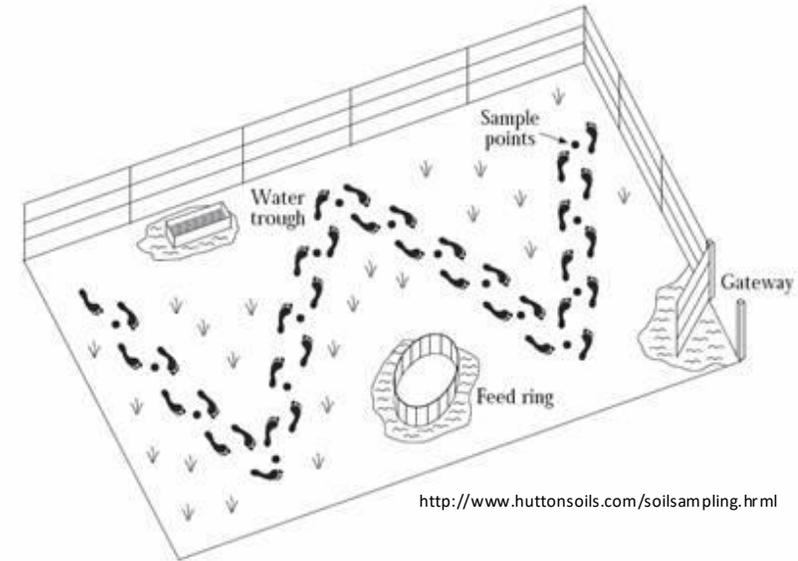
Improper sampling = Inaccurate result = improper recommendations

Sample fields separately

Want 15-20 representative samples

Sample 'average areas'

- Avoid unusual areas
- Benchmark vs Random



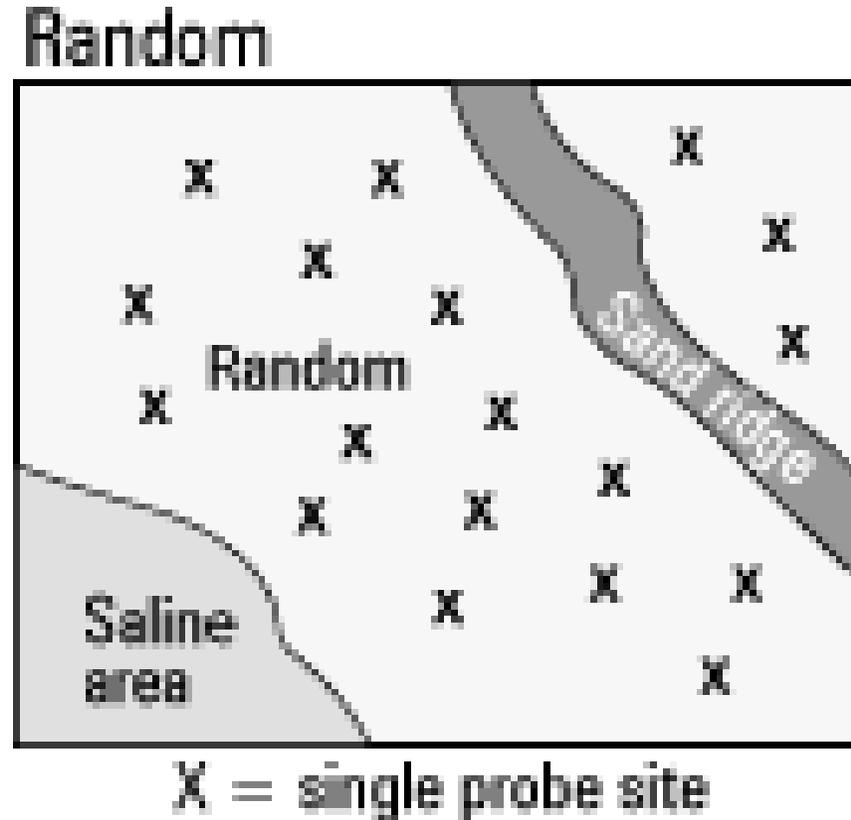
Random Soil Sampling

Traditional approach

- Mostly recommended for field management
- Most common approach
- Cores taken throughout field

Average

- Representation of whole management area
- Doesn't pinpoint problem
- If not done properly can get skewed results



Benchmark Sampling

Sample small area

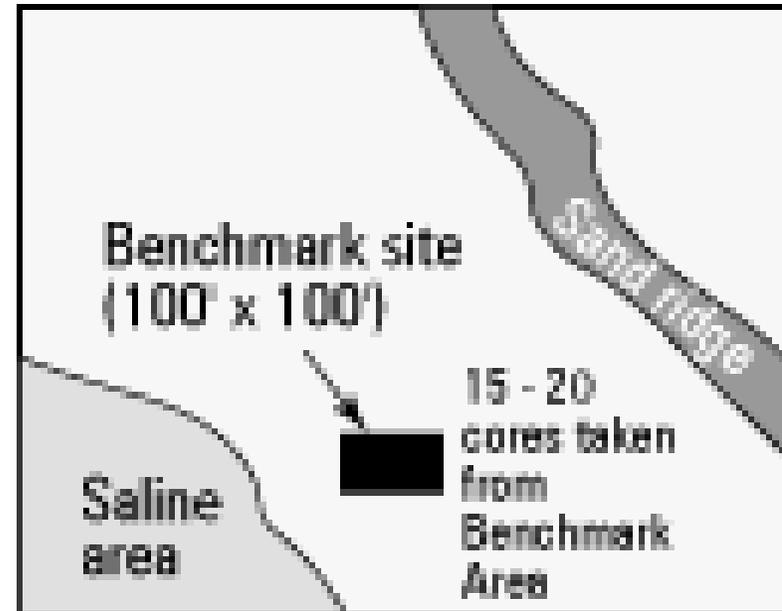
- Creates reference area for revisit

Mark with GPS

Benchmark a few locations first year to determine best spot for future samples

- Intensive
- Should be done with prescribed action

Benchmark



Timing

Cultivated fields

- Mid October
- Or early spring (As soon as frost is out)

Forage fields

- After mid September
 - Dormancy

Problem soil

- Anytime

NO frozen or water-logged soil



Sample Tools

Core sampling tool

- Soil probe
- Shovel or garden trowel

Pail

Screwdriver

- Easier to remove core from probe

Sample bags

- Keep clean and dry



How To Sample

1. Start walking/driving pattern
2. Take 15cm (6") soil core at 15 to 20 sampling locations
 - 12" samples can be difficult with shallow topsoil
 - Recommend second sample of 6-12" core
3. Place cores in clean pail
4. Mix thoroughly crushing any lumps



How To Sample

5. Fill the sample bag and label with identifying information
6. Fill in sample submission sheet



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**WESTERN CANADA
 SOIL SAMPLE SUBMITTAL FORM**



SUBMITTED BY: Benalto Agri Services

Address: Box 10
 Benalto

Province: Alberta Postal Code: T0M 0H0

Phone: 403-746-2012 Fax:

Email:

Account #:

CLIENT/GROWER: Brenna Knopp

Address:

Province: Postal Code:

Phone: Fax:

Email:

Grower Code: Farm:

FIELD ID	SAMPLE NUMBER (MAX 4 DIGITS)	Soil Depth	TEST PACKAGES				COMPLETE FOR RECOMMENDATIONS				LAB USE ONLY	
			SW1B2	SW	SWB	OTHER TESTS	PREVIOUS CROP	INTENDED CROP	YIELD GOAL	UNITS		
Hay	1	0-6	<input checked="" type="checkbox"/>									
		6-12	<input checked="" type="checkbox"/>									
		12-24	<input type="checkbox"/>									
		0-6	<input type="checkbox"/>									
		6-12	<input type="checkbox"/>									
		12-24	<input type="checkbox"/>									
		0-6	<input type="checkbox"/>									
		6-12	<input type="checkbox"/>									
		12-24	<input type="checkbox"/>									
		0-6	<input type="checkbox"/>									
		6-12	<input type="checkbox"/>									
		12-24	<input type="checkbox"/>									

EXPLANATION OF TEST PACKAGES

DW1B2 Basic Analysis
 Organic Matter, Bicarb P and Bray P, exchangeable K, Mg, Ca, Sodium, Al, Soil pH, buffer pH, H, K/Mg Ratio, S, Nitrate, CEC, % base saturation of cations and %P.

DW Complete Analysis
 Organic Matter, Bicarb P and Bray P, exchangeable K, Mg, Ca, S, Zn, Mn, Fe, Cu, B, Sodium, Al, Soil pH, buffer pH, S, Nitrate, K/Mg Ratio, CEC, % base saturation of cations and %P.

SWB Nitrate, Sulphur, pH, exchangeable Potassium, Magnesium, Calcium, Sodium (As part of complete SW or Basic DW1B2 soil test package)

Other Tests

02 Zn, Mn
 04 Zn, Mn, B
 05 Zn, Mn, Fe, Cu
 06 Zn, Mn, Fe, Cu, B, S

ADDITIONAL INFORMATION

Please fax a copy of the analysis to:

Please email a copy of the analysis to:

A&L-F009 Revised March 2016

Results

Create a plan of action

- Short term changes
 - Adjust fertilizer blends
 - Adjust feeding or bedding
 - Manure app
 - Feed Samples
 - Tissue Samples

- Long term changes
 - Prescribed remediation products
 - Crop rotations
 - Field prep
 - Harvest methods

Report Number: C16117-10134
Account Number: 00252

To: BENALTO AGRI SERVICES
BOX 10
4803 50TH AVE
BENALTO, AB T0M 0H0
Attn: PAT O'BRIEN
403-746-2235

Reported Date: Printed Date: Apr 28, 2016

A & L Canada Laboratories Inc.

2136 Jetstream Road, London, Ontario, N5V 3P5
Telephone: (519) 457-2575 Fax: (519) 457-2664

For: TWANORTH INC.



C16117-10134



SOIL TEST REPORT Page: 1 / 2

Sample Number	Legal Land Descpt:	Depth	Lab Number	Organic Matter	Phosphorus - P ppm Bicarb	Phosphorus - P ppm Bray-P1	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	pH	CEC meq/100g	Percent Base Saturations					
										Buffer	%K	%Mg	%Ca	%H	%Na		
1	1	6	10478	9.0	9 VL	17 VL	143 M	415 H	2780 M	6.7	6.9	19.0	1.9	18.2	73.1	6.1	0.7
T1	T1	6	10479	8.7	16 L	22 L	199 H	410 H	2950 M	6.4	6.9	20.0	2.6	17.1	73.9	5.8	0.7
T2	T2	6	10480	7.6	9 VL	14 VL	241 H	395 M	2820 M	6.3	6.6	22.9	2.7	14.4	61.7	20.8	0.5
T3	T3	6	10481	7.2	10 VL	14 VL	277 VH	460 H	2790 M	6.4	6.7	22.1	3.2	17.3	63.0	16.0	0.5

Sample Number	Sulfur S ppm	Nitrate Nitrogen NO3-N ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Soluble Salts mmhos/cm	Saturation %P	Aluminum Al ppm	Saturation %Al	K/Mg Ratio	Chloride Cl ppm	Sodium Na ppm
1	18 VL	32 H	21 H	38					7 G	304	0.0 G	0.10	103	31 M
T1	10 VL	18 L	8 L	14					6 G	501	0.1 G	0.15	100	30 M
T2	8 VL	14 L	7 L	13					3 L	592	0.1 G	0.19	89	24 L
T3	8 VL	14 L	6 L	11					3 L	595	0.1 G	0.18	85	23 L

W VL = VERY LOW, L = LOW, M = MEDIUM, H = HIGH, VH = VERY HIGH, G = GOOD, MA = MARGINAL, MT = MODERATE PHYTO-TOXIC, T = PHYTO-TOXIC, ST = SEVERE PHYTO-TOXIC

SOIL FERTILITY GUIDELINES (lbs/ac)

Sample Number	Previous Crop	Intended Crop	Yield Goal	Lime Tons/Acre	N	P2O5	K2O	Mg	Ca	S	Zn	Mn	Fe	Cu	B
1		Grass-Leg. Hay 50/50	4 mt/ha	0.0	0	110	50	0	0	25					
T1	Timothy Build	Timothy Build	4 tons	0.0	40	35	25	0	0	35					
T2	Timothy Build	Timothy Build	4 tons	0.0	51	45	25	0	0	30					
T3	Timothy Build	Timothy Build	4 tons	0.0	55	45	25	0	0	35					

* Recs are based on building nutrients to a level to maintain soil health. Banding and/or precision placement techniques can be utilized to increase fertilizer efficiency.

* If this report contains soil in excess of 7500 ppm Ca it may or may not effect the calculated Cation Exchange Capacity. Excessive seed placed fertilizer can cause injury.

The results of this report relate to the sample submitted and analyzed.

* Crop yield is influenced by a number of factors in addition to soil fertility.

No guarantee or warranty concerning crop performance is made by A & L.

Results Authorized By:  Ian McLachlin, Vice President

A&L Canada Laboratories Inc. is accredited by the Standards Council of Canada for specific tests as listed on www.scc.ca and by the Canadian Association for Laboratory Accreditation as listed on www.cala.ca

How to Read a Soil Sample



Element
7217 Roper Road NW
Edmonton, Alberta
T6B 3J4, Canada

T: +1 (780) 438-6522
E: info.Edmonton@element.com
W: www.element.com

Farm Soil Analysis

Bill To: Clearwater County Address: Box 550 4340-47 Avenue Rocky Mountain House, T4T 1A4 Agreement: 40201	Grower Name: ██████████ Site ID: Field Name: NE 13 39 7-W5 Acres: Legal Location: NE 13 39 7 W5 Previous Crop: Hay - 25% legume	Lot ID: 1768508 Report Number: 3061043 Report Type: Final Report Date Received: Oct 17, 2024 Date Reported: Oct 21, 2024 Event Code:
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Nutrient analysis (ppm)													Soil Quality				
Depth	N*	P	K	S**	Ca	Mg	Fe	Cu	Zn	B	Mn	Cl	Na	pH	EC(dS/m)	OM(%)	Lot Ref #
0" - 6"	<2	16	121	2										8.0	0.37	5.7	6202

Excess														Alkaline	Extreme	High
Optimum														Neutral	Very High	Normal
Marginal														Acidic	High	Low
Deficient														Very Acidic	Good	Very Low

Total lbs/acre	4	32	241	4	Texture n/a	Hand Texture n/a	BS n/a	CEC n/a			
Estimated lbs/acre	8	32	241	8	Sand n/a	Silt n/a	Clay n/a	Ca n/a	Mg n/a	Na n/a	K n/a
					Ammonium n/a			TEC n/a			
					Lime n/a	Buffer pH n/a	K/Mg Ratio n/a				

*Nitrate-N **Sulfate-S n/a = not analysed

RECOMMENDATIONS FOR BALANCED CROP NUTRITION

Macro-nutrients	Hay - 25% legume					Hay - Grass				
	Yield	N	P2O5	K2O	S	Yield	N	P2O5	K2O	S
Growing Condition	T/ac	To be added (lbs/acre)				T/ac	To be added (lbs/acre)			
Excellent	4.7	98	39	46	20	4.9	103	36	44	21
Average	3.8	65	34	38	17	3.3	83	27	30	15
Your Goal	2.0	1	23	21	11	2.0	66	20	18	11
Removal Rate (Seed/Total)	2.0	0 / 89	0 / 25	0 / 100	0 / 8	2.0	0 / 75	0 / 22	0 / 95	0 / 9
Micro-nutrients	Iron	Copper	Zinc	Boron	Manganese	Iron	Copper	Zinc	Boron	Manganese
To be added (lbs/ac)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Report Number: C24116-10020
Account Number: 00252

A & L Canada Laboratories Inc.

2136 Jetstream Road, London, Ontario, N5V 3P5
Telephone: (519) 457-2575 Fax: (519) 457-2664



C24116-10020



To: BENALTO AGRI SERVICES
BOX 10
4803 50TH AVE
BENALTO, AB T0M 0H0
Attn: PAT O'BRIEN
403-746-2235

For: ██████████

Reported Date: Printed Date: Apr 29, 2024

SOIL TEST REPORT

Sample Number	Legal Land Descpt:	Depth	Lab Number	Organic Matter	Phosphorus - P ppm Bicarb	Potassium Bray-P1	Magnesium Mg ppm	Calcium Ca ppm	pH	CEC	Percent Base	Saturations
1A		12	86783	5.7	25 G	40 G	91 M	185 L	1790 L	5.5	6.4	18.0
1B		12	86784	6.7	24 G	51 G	41 VL	147 L	20 VL	5.1	6.0	21.5

Sample Number	Sulfur S ppm	Nitrate NO3-N ppm	Nitrogen lbs/ac	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Soluble Salts mmhos/cm	Saturation %P	Aluminum Al ppm	Saturation %Al	K/Mg Ratio	Chloride Cl ppm	Sodium Na ppm
1A	10 VL	36	2 VL	7						6 G	857	0.9 G	0.15	70	22 L
1B	10 VL	36	1 VL	4						7 G	999	1.7 M	0.09	80	19 L

W VL = VERY LOW, L = LOW, M = MEDIUM, H = HIGH, VH = VERY HIGH, G = GOOD, MA = MARGINAL, MT = MODERATE PHYTO-TOXIC, T = PHYTO-TOXIC, ST = SEVERE PHYTO-TOXIC

SOIL FERTILITY GUIDELINES (lbs/ac)

Sample Number	Previous Crop	Intended Crop	Yield Goal	Lime Tons/Acre	N	P2O5	K2O	Mg	Ca	S	Zn	Mn	Fe	Cu	B
1A	Canola	Wheat Red Spring	50 bu	4.5	45	10	25	20	0	15					
1A	Canola	Wheat Red Spring BI	50 bu	4.5	45	20	100	20	0	15					

Organic Matter

“The Bank”

- Stores & releases N, P, S, some micro’s
- Water holding capacity
 - Acts as a sponge
- Microbials

At or above 4%

- Efficient N,P,S, micro release
 - ENR – Expected Nitrogen Release
 - OM x 10 = ENR
 - OM x 2 = EPR
 - OM x 1 = ESR
- CEC
 - Soil's ability to hold free ions without leaching

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Attn: PAT O'BRIEN
403-746-2235

For: [REDACTED]

Reported Date: [REDACTED] Printed Date: Apr 29, 2024

SOIL TEST REPORT Page: 1 / 1

Sample Number	Legal Land Descpt:	Depth	Lab Number	Organic Matter	Phosphorus - P ppm Bicarb	Phosphorus - P ppm Bray-P1	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	pH	pH Buffer	CEC meq/100g	Percent Base Saturations				
												% K	% Mg	% Ca	% H	% Na	
1A	1	12	86783	5.7	25 G	40 G	91 M	185 L	1790 L	5.5	6.4	18.0	1.3	8.6	49.7	39.9	0.5
1B	2	12	86784	6.7	24 G	51 G	41 VL	147 L	1620 VL	5.1	6.0	21.5	0.5	5.7	37.7	55.7	0.4

Sample Number	Sulfur S		Nitrate Nitrogen NO3-N		Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Soluble Salts mmhos/cm	Saturation %P	Aluminum Al ppm	Saturation %Al	K/Mg Ratio	ENR	Chloride Cl ppm	Sodium Na ppm
	ppm	lbs/ac	ppm	lbs/ac													
1A	10 VL	36	2 VL	7							6 G	857	0.9 G	0.15	70	22L	
1B	10 VL	36	1 VL	4							7 G	999	1.7 M	0.09	80	19L	

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Sample Number	Previous Crop	Intended Crop	Yield Goal	Lime Tons/Acre	N	P2O5	K2O	Mg	Ca	S	Zn	Mn	Fe	Cu	B
1A	Canola	Wheat Red Spring	50 bu	4.5	45	10	25	20	0	15					
1A	Canola	Wheat Red Spring BI	50 bu	4.5	45	20	100	20	0	15					

pH

6.3 to 6.8 optimum

- Below 6
 - Reduced forage longevity, yield, establishment

5.5-5.8

- Significant reductions in yield (all crops)
 - Extensive management necessary

<5.5 should consider buffering

- Lime
 - Return on Lime investment

Micro's release optimum at 5.5

- Imbalances with Macro's
 - Tie up
 - Nutrient imbalance in plants

pH determines which Phos test to use

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A & L Canada Laboratories Inc.
2136 Jetstream Road, London, Ontario, N5V 3P5
Telephone: (519) 457-2575 Fax: (519) 457-2664

For: XXXXXXXXXX


C24116-10C

SOIL TEST REPORT

Sample Number	Legal Land Descpt:	Depth	Lab Number	Organic Matter	Phosphorus - P ppm Bicarb	Phosphorus - P ppm Bray-P1	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	pH	pH Buffer	CEC meq/100g
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Sample Number	Sulfur S		Nitrate Nitrogen NO3-N		Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Soluble Salts mmhos/cm	Saturation %P	Aluminum Al ppm	Saturatio %Al
	ppm	lbs/ac	ppm	lbs/ac									
1A	10	VL 36	2	VL 7							6 G	857	0.9 G
1B	10	VL 36	1	VL 4							7 G	999	1.7 M

W VL = VERY LOW, L = LOW, M = MEDIUM, H = HIGH, VH = VERY HIGH, G = GOOD, MA = MARGINAL, MT = MODERATE PHYTO-TOXIC, T = PHYTO-TOXIC, S

SOIL FERTILITY GUIDELINES (lbs/ac)

Sample Number	Previous Crop	Intended Crop	Yield Goal	Lime Tons/Acre	N	P2O5	K2O	Mg	Ca	S	Zn	I
1A	Canola	Wheat Red Spring	50 bu	4.5	45	10	25	20	0	15		
1A	Canola	Wheat Red Spring BI	50 bu	4.5	45	20	100	20	0	15		

Phosphorous

pH <7 Bray Test

pH >7 Bicarb

PPM Phosphorus

- P available for plants
- 2 X ppm = Available P

% Saturation P

- 5-10%
- Adequate P for plant uptake
- Not bound

Nutrient Removal:

- * 10lbs/ton of grass hay DM
- ** 15lbs/ton of alfalfa DM
- *** 0.5lbs/Bu of barley

Report Number: C24116-10020
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For: XXXXXXXXXX

OIL TEST REPORT



C24116-100

Sample Number	Legal Land Descpt:	Depth	Lab Number	Organic Matter	Phosphorus - P ppm Bicarb	Phosphorus - P ppm Bray-P1	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	pH	pH Buffer	CEC meq/100g
1A	1	12	86783	5.7	25 G	40 G	91 M	185 L	1790 L	5.5	6.4	18.0
1B	2	12	86784	6.7	24 G	51 G	41 VL	147 L	1020 VL	5.1	6.0	21.5

Sample Number	Sulfur S		Nitrate Nitrogen NO3-N		Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Soluble Salts mmhos/cm	Saturation %P	Aluminum Al ppm	Saturatio %Al
	ppm	lbs/ac	ppm	lbs/ac									
1A	10	VL 36	2	VL 7							6 G	857	0.9 G
1B	10	VL 36	1	VL 4							7 G	999	1.7 M

W VL = VERY LOW, L = LOW, M = MEDIUM, H = HIGH, VH = VERY HIGH, G = GOOD, MA = MARGINAL, MT = MODERATE PHYTO-TOXIC, T = PHYTO-TOXIC, S

SOIL FERTILITY GUIDELINES (lbs/ac)

Sample Number	Previous Crop	Intended Crop	Yield Goal	Lime Tons/Acre	N	P2O5	K2O	Mg	Ca	S	Zn
1A	Canola	Wheat Red Spring	50 bu	4.5	45	10	25	20	0	15	
1A	Canola	Wheat Red Spring Bl	50 bu	4.5	45	20	100	20	0	15	

Potassium

Nutrient Removal:

*47lbs/ton of grass hay DM

**63lbs/ton of alfalfa DM

***0.35lbs/Bu of barley

Mostly locked in Rock

- Can skew K ppm

%K Base Saturation

- 4%
- Adequate dissolved K for plant uptake

Manure is good source of K

Often overlooked on fertilizer blends

- Particularly if high ppm in soil test

Report Number: C24116-10020
Account Number: 00252

To: BENALTO AGRI SERVICES
BOX 10
4803 50TH AVE
BENALTO, AB T0M 0H0
Attn: PAT O'BRIEN
403-746-2235

A & L Canada Laboratories Inc.
2136 Jetstream Road, London, Ontario, N5V 3P5
Telephone: (519) 457-2575 Fax: (519) 457-2664

For: [REDACTED]

Reported Date: [REDACTED] Printed Date: Apr 29, 2024

SOIL TEST REPORT

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Sample Number	Legal Land Descpt:	Depth	Lab Number	Organic Matter	Phosphorus - P Bicarb	Phosphorus - P Bray-P1	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	pH	pH Buffer	CEC meq/100g	Percent Base Saturations				
												% K	% Mg	% Ca	% H	% Na	
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1B	2	12	86784	6.7	24 G	51 G	41 VL	147 L	1620 VL	5.1	6.0	21.5	0.5	5.7	37.7	55.7	0.4

Sample Number	Sulfur S ppm	Sulfur S lbs/ac	Nitrate NO3-N ppm	Nitrogen NO3-N lbs/ac	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Soluble Salts mmhos/cm	Saturation %P	Aluminum Al ppm	Saturation %Al	K/Mg Ratio	ENR	Chloride Cl ppm	Sodium Na ppm
1A	10 VL	36	2 VL	7							6 G	857	0.9 G	0.15	70		22 L
1B	10 VL	36	1 VL	4							7 G	999	1.7 M	0.09	80		19 L

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Sample Number	Previous Crop	Intended Crop	Yield Goal	Lime Tons/Acre	N	P2O5	K2O	Mg	Ca	S	Zn	Mn	Fe	Cu	B
1A	Canola	Wheat Red Spring	50 bu	4.5	45	10	25	20	0	15					
1A	Canola	Wheat Red Spring Bl	50 bu	4.5	45	20	100	20	0	15					

Calcium

Soil 'Important' Nutrient

- Maintains soil structure/aggregation
- Ca loosens tight soils
 - Important for nutrient cycling
 - Water infiltration and holding capacity
- Ideal Ca 60-80%
 - Below 60
 - Soil structure affected
 - Smearly soils & reduced aggregation
 - Above 80
 - Excessive tie up of P and other nutrients

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1A	Canola	Wheat Red Spring	50 bu	4.5	45	10	25	20	0	15					
1A	Canola	Wheat Red Spring BI	50 bu	4.5	45	20	100	20	0	15					

Sulfur

Ideally 20ppm

- Highly leachable
- Often deeper down
- OM x 1 = ESR

Often overlooked

- No longer getting free S from air
- Low sulfur diesel fuels

Sulfur important for N uptake

Elemental S

- Can skew ppm
- Not plant available
 - Slow conversion
 - Can acidify soils quickly

Nutrient Removal:

- *4.5lbs/ton of grass hay DM
- **6.5lbs/ton of alfalfa DM
- ***0.4lbs/Bu of barley

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1A	Canola	Wheat Red Spring Bl	50 bu	4.5	45	20	100	20	0	15	

Nitrogen

Nutrient Removal:

- * 35 lbs./ton of grass hay DM
- ** 60lbs/ton of alfalfa DM
- *** 1lbs./Bu of barley

Nitrate

- o Plant available
- o Highly leachable
- o Should sample deeper for true N

ENR

- o Nitrogen release from OM
- o OM x 10 = ENR

CEC

- o How much N can the soil hold

Determine supplemental N requirements

- o Crop needs

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What about Micro's

Usually, macro's more limiting to yield

- Balance the macros first
 - Imbalanced macronutrients can lead to micronutrient issues
 - Balancing macronutrients can correct some/most micronutrient issues
 - Do complete soil tests to confirm micronutrients
 - Add micronutrients as needed
- Heavy lime applications can tie up micros
 - Stage applications over a few years

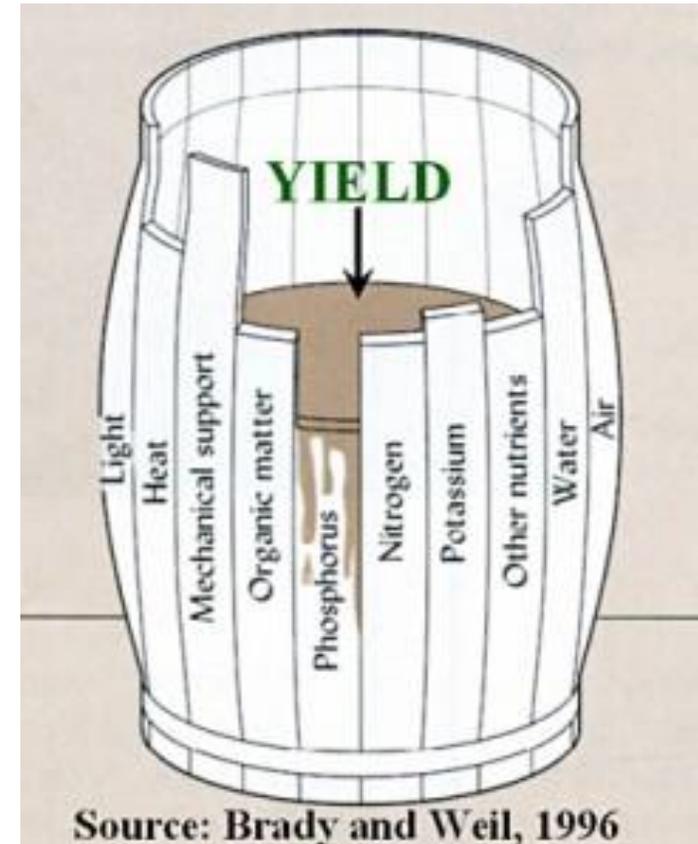
Zinc – 1.5 - 3.5ppm

Iron – 20 - 40ppm

Manganese - 20 - 40ppm

Copper – 1.5 - 2ppm

Boron – 1 - 3ppm





Summary

Macronutrients are most commonly deficient in Grey Wooded soils

- Shallow topsoil
- Formed under forest

Most producers don't have balanced nutrients

- Not testing
- Lack of fertility planning
 - Too much or not enough fertilizer
 - Improperly balanced blends
 - Heavy manure
- Excessive cultivation/summer fallow
 - Reduces OM
 - Leaches Nutrients
 - Newly cleared land



Summary

Soil testing helps answer a lot of questions

- Organic Matter
 - How are nutrients cycling in the soil
 - Am I mining my OM
- pH imbalance
 - Is pH affecting nutrient release
 - Is there issues with crop longevity, establishment and yield
- N, P, K, S, Ca
 - Why am I not getting the yield
 - Am I mining my nutrients
 - Should I be fertilizing more/less
 - Is my soil improving or not
 - What type of fertility products should I use



Summary

Soil Samples are Cheap!

Soil sampling allows you to make educated management changes

- Chopping straw instead of baling it
- Changes to your fertility program
- Changes to manure management
- What crops/forages I should grow in rotation
 - Adding supplemental biologicals to help
- Manage disturbance
 - Burning
 - Pipelines/oilfield activity
- Cultivation

If you don't test you don't know

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