

SOIL SCHOOLS

featuring

Nicole Masters



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Agenda

9:00 - Coffee & Registration

9:30 - Why Is Soil Health Important?

10:45 - Coffee Break

11:00 - Photosynthesis, Sunlight Capture
& The Carbon Cycle

12:15 - Lunch

Travel to Field Site

1:30 - Infiltration test & Monitoring Grid

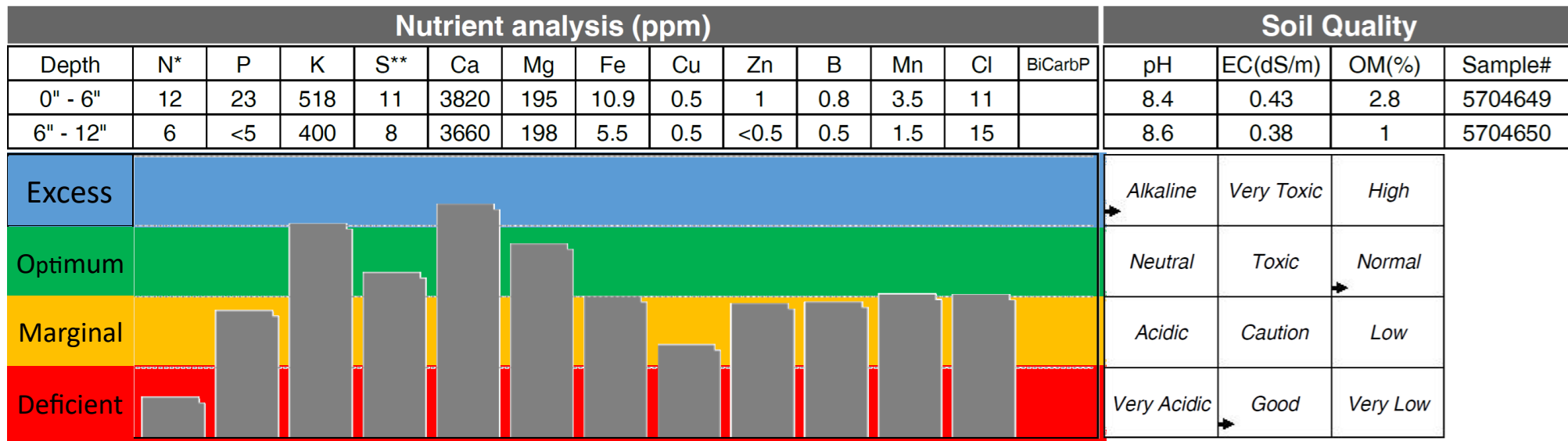
2:20 - Soil Profile: Soil trench

2:40 - Visual Soil Assessments

3:20 - Closing Remarks & Discussion

4:00 - Homeward Bound

Perennial Pasture Site

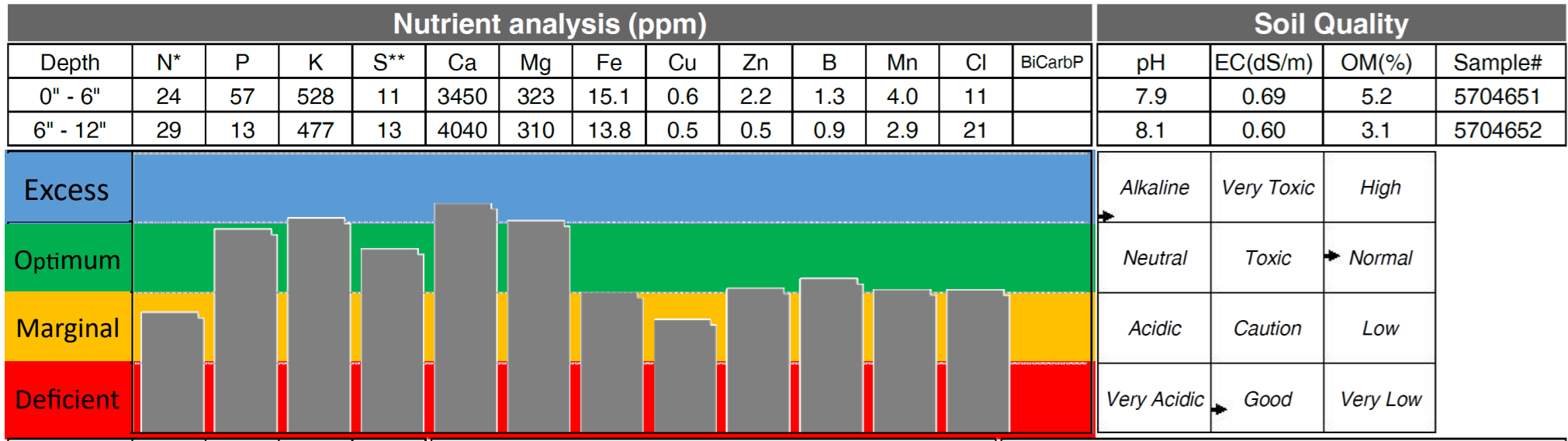


QUICK FACTS ABOUT THE SITE

- Perennial grass pasture for the past 50+ years.
- Has never had commercial fertilizer.
- Has only experienced rest rotation for the past 5 years.
- Prior to that it was continuously grazed in the summer followed by winter feeding.



Cocktail Mix/Irrigated Fallow Site



QUICK FACTS ABOUT THE SITE

- Perennial grass pasture for 50+ years until the pivot was installed in 2007.
- The first 2 years of irrigation it grew barley followed by 6 years of mixed legume grass hay.
- Each winter saw heavy concentration of cows winter feeding.
- The hay was sprayed out in the fall of 2015 and a cocktail mix of forage turnip, forage radish, hairy vetch, crimson clover, Italian ryegrass, forage peas and oats were grown in 2016 and used for winter swath grazing.
- This mix provided 9 days of grazing for 220 cow/calf pairs in July on the 36 acres followed by 35 days of winter swath grazing for 200 dry pregnant cows. Hay was fed an additional 14 days after the end of swath grazing.
- Under the hay program it received approximately 200 lbs of 11-51-0 or variations that included K, S, and B.

Perennial Pasture 0-6"

Assay Name	Result	Units	Desired Level	Commentary
Organism Biomass Data				
Dry Weight	0.84	N/A	0.45 to 0.85	Within normal moisture levels.
Active Fungi	9.23	µg/g	> 75.00	Fungal activity low, foods may be required. -
Total Fungi	904.29	µg/g	> 300.00	Good fungal biomass. - Good fungal diversity, hyphal diameter: 1.5 to 5µm
Hyphal Diameter	2.85	µm	> 2.50	Good balance of fungi. -
Active Bacteria	82.90	µg/g	> 75.00	Bacterial activity within normal levels.
Total Bacteria	1,168.75	µg/g	> 300.00	Good bacterial biomass. -
Actinobacteria	13.64	µg/g	< 20.00	
Organism Biomass Ratios				
TF:TB	0.77		1.00 to 2.00	Too bacterial for indicated plant.
AF:TF	0.01		> 0.25	Low fungal activity relative to total biomass, foods may be required.
AB:TB	0.07		> 0.25	Low bacterial activity relative to total biomass, foods may be required.
AF:AB	0.11		1.00 to 2.00	Bacterial dominated, becoming more bacterial.
Protozoa (Protists)				
Flagellates	1,641.82	number/g	> 10,000.00	Lacking species diversity.
Amoebae	16,421.77	number/g	> 10,000.00	
Ciliates	7.11	number/g	< 181.00	
Nitrogen Cycling Potential	50-75	lbs/acre		Nitrogen levels dependent on plant needs. Estimated availability over a 3 month period
Nematodes				
Nematodes	4.45	number/g	> 10.00	Low numbers, but good diversity.
Bacterial	3.94	number/g	> 4.00	
Fungal	0.00	number/g	> 4.00	
Fungal/Root	0.41	number/g	< 1.00	
Predatory	0.00	number/g	> 2.00	
Root	0.10	number/g	< 1.00	

Perennial Pasture 0-6"

Nematode Genus	#/gram	Units	Group
Acrobeles	0.10	number/g	Bacterial Feeders
Cephalobus	0.62	number/g	Bacterial Feeders
Chiloplacus	0.62	number/g	Bacterial Feeders
Monhystrella	0.52	number/g	Bacterial Feeders
Panagrolaimus	0.73	number/g	Bacterial Feeders
Plectus	0.31	number/g	Bacterial Feeders
Rhabditidae	0.93	number/g	Bacterial Feeders
Rhabdolaimus	0.10	number/g	Bacterial Feeders
Aphelenchus	0.21	number/g	Fungal/Root Feeders
Ditylenchus	0.10	number/g	Fungal/Root Feeders
Filenchus	0.10	number/g	Fungal/Root Feeders
Paratylenchus	0.10	number/g	Root Feeders

Perennial Pasture 6-12"

Assay Name	Result	Units	Desired Level	Commentary
Organism Biomass Data				
Dry Weight	0.89	N/A	0.45 to 0.85	Add organic matter to build soil structure, increase water holding capacity.
Active Fungi	2.18	µg/g	> 75.00	Fungal activity low, foods may be required. -
Total Fungi	446.27	µg/g	> 300.00	Good fungal biomass. - Fairly good fungal diversity, hyphal diameter: 1.5 to 5um
Hyphal Diameter	2.85	µm	> 2.50	Good balance of fungi. -
Active Bacteria	26.85	µg/g	> 75.00	Bacterial activity low, foods may be required.
Total Bacteria	882.47	µg/g	> 300.00	Good bacterial biomass. -
Actinobacteria	10.73	µg/g	< 20.00	
Organism Biomass Ratios				
TF:TB	0.51		1.00 to 2.00	Too bacterial for indicated plant.
AF:TF	0.00		> 0.25	Low fungal activity relative to total biomass, foods may be required.
AB:TB	0.03		> 0.25	Low bacterial activity relative to total biomass, foods may be required.
AF:AB	0.08		1.00 to 2.00	Bacterial dominated, becoming more bacterial.
Protozoa (Protists)				
Flagellates	310.51	number/g	> 10,000.00	Lacking species diversity.
Amoebae	3,108.45	number/g	> 10,000.00	
Ciliates	0.00	number/g	< 34.00	
Nitrogen Cycling Potential	<25	lbs/acre		Nitrogen levels dependent on plant needs. Estimated availability over a 3 month period
Nematodes				
Nematodes	1.03	number/g	> 10.00	Low numbers, but good diversity.
Bacterial	0.41	number/g	> 4.00	
Fungal	0.23	number/g	> 4.00	
Fungal/Root	0.05	number/g	< 1.00	
Predatory	0.00	number/g	> 2.00	
Root	0.34	number/g	< 1.00	
Mycorrhizal Fungi				
ENDO	0.09	%	> 0.10	Low colonization, foods may be required. - Vam = Hyphae
ECTO		%	> 0.10	
Ericoid		%	> 0.10	

Perennial Pasture 6-12"

Nematode Genus	#/gram	Units	Group
Acrobeles	0.08	number/g	Bacterial Feeders
Cephalobus	0.21	number/g	Bacterial Feeders
Chiloplacus	0.03	number/g	Bacterial Feeders
Wilsonema	0.10	number/g	Bacterial Feeders
Discolaimus	0.05	number/g	Fungal Feeders
Eudorylaimus	0.18	number/g	Fungal Feeders
Ditylenchus	0.05	number/g	Fungal/Root Feeders
Paratylenchus	0.03	number/g	Root Feeders
Pratylenchus	0.21	number/g	Root Feeders
Xiphinema	0.10	number/g	Root Feeders

Cocktail Mix/Irrigated Fallow Site 0-6"

Assay Name	Result	Units	Desired Level	Commentary
Organism Biomass Data				
Dry Weight	0.80	N/A	0.45 to 0.85	Within normal moisture levels.
Active Fungi	18.16	µg/g	> 75.00	Fungal activity low, foods may be required. -
Total Fungi	1,030.18	µg/g	> 300.00	Good fungal biomass. - Fairly good fungal diversity, hyphal diameter: 1.5 to 5um
Hyphal Diameter	2.85	µm	> 2.50	Good balance of fungi. -
Active Bacteria	92.16	µg/g	> 75.00	Bacterial activity within normal levels.
Total Bacteria	1,448.08	µg/g	> 300.00	Good bacterial biomass. -
Actinobacteria	17.91	µg/g	< 20.00	
Organism Biomass Ratios				
TF:TB	0.71		1.00 to 2.00	Too bacterial for indicated plant.
AF:TF	0.02		> 0.25	Low fungal activity relative to total biomass, foods may be required.
AB:TB	0.06		> 0.25	Low bacterial activity relative to total biomass, foods may be required.
AF:AB	0.20		1.00 to 2.00	Bacterial dominated, becoming more bacterial.
Protozoa (Protists)				
Flagellates	5,789.51	number/g	> 10,000.00	Lacking species diversity.
Amoebae	57,895.12	number/g	> 10,000.00	
Ciliates	0.00	number/g	< 637.00	
Nitrogen Cycling Potential	100-150	lbs/acre		Nitrogen levels dependent on plant needs. Estimated availability over a 3 month period
Nematodes				
Nematodes	2.12	number/g	> 10.00	Low numbers, but good diversity.
Bacterial	0.91	number/g	> 4.00	
Fungal	0.40	number/g	> 4.00	
Fungal/Root	0.81	number/g	< 1.00	
Predatory	0.00	number/g	> 2.00	
Root	0.00	number/g	< 1.00	

Cocktail Mix/Irrigated Fallow Site 0-6"

Nematode Genus	#/gram	Units	Group
Acrobeles	0.10	number/g	Bacterial Feeders
Cephalobus	0.30	number/g	Bacterial Feeders
Eucephalobus	0.05	number/g	Bacterial Feeders
Monhystrella	0.10	number/g	Bacterial Feeders
Plectus	0.15	number/g	Bacterial Feeders
Rhabditidae	0.20	number/g	Bacterial Feeders
Eudorylaimus	0.35	number/g	Fungal Feeders
Thonus	0.05	number/g	Fungal Feeders
Aphelenchoides	0.05	number/g	Fungal/Root Feeders
Aphelenchus	0.10	number/g	Fungal/Root Feeders
Ditylenchus	0.30	number/g	Fungal/Root Feeders
Filenchus	0.30	number/g	Fungal/Root Feeders
Malenchus	0.05	number/g	Fungal/Root Feeders

Cocktail Mix/Irrigated Fallow Site 6-12"

Assay Name	Result	Units	Desired Level	Commentary
Organism Biomass Data				
Dry Weight	0.86	N/A	0.45 to 0.85	Add organic matter to build soil structure, increase water holding capacity.
Active Fungi	10.14	µg/g	> 75.00	Fungal activity low, foods may be required. -
Total Fungi	848.63	µg/g	> 300.00	Good fungal biomass. - Fairly good fungal diversity, hyphal diameter: 1.5 to 5um
Hyphal Diameter	2.85	µm	> 2.50	Good balance of fungi. -
Active Bacteria	57.15	µg/g	> 75.00	Bacterial activity low, foods may be required.
Total Bacteria	1,118.74	µg/g	> 300.00	Good bacterial biomass. -
Actinobacteria	36.65	µg/g	< 20.00	
Organism Biomass Ratios				
TF:TB	0.76		1.00 to 2.00	Too bacterial for indicated plant.
AF:TF	0.01		> 0.25	Low fungal activity relative to total biomass, foods may be required.
AB:TB	0.05		> 0.25	Low bacterial activity relative to total biomass, foods may be required.
AF:AB	0.18		1.00 to 2.00	Bacterial dominated, becoming more bacterial.
Protozoa (Protists)				
Flagellates	3,235.72	number/g	> 10,000.00	Lacking species diversity.
Amoebae	32,352.50	number/g	> 10,000.00	
Ciliates	67.68	number/g	< 356.00	
Nitrogen Cycling Potential	100-150	lbs/acre		Nitrogen levels dependent on plant needs. Estimated availability over a 3 month period
Nematodes				
Nematodes	1.76	number/g	> 10.00	Low numbers, but good diversity.
Bacterial	0.98	number/g	> 4.00	
Fungal	0.26	number/g	> 4.00	
Fungal/Root	0.36	number/g	< 1.00	
Predatory	0.00	number/g	> 2.00	
Root	0.16	number/g	< 1.00	
Mycorrhizal Fungi				
ENDO		%	> 0.10	- Very few roots. VAM = hyphae & vesicles
ECTO	0.06	%	> 0.10	Low colonization, foods may be required.
Ericoid		%	> 0.10	

Cocktail Mix/Irrigated Fallow Site 6-12"

Nematode Genus	#/gram	Units	Group
Cephalobus	0.41	number/g	Bacterial Feeders
Cervidellus	0.10	number/g	Bacterial Feeders
Monhystrella	0.16	number/g	Bacterial Feeders
Rhabditidae	0.16	number/g	Bacterial Feeders
Wilsonema	0.16	number/g	Bacterial Feeders
Eudorylaimus	0.26	number/g	Fungal Feeders
Aphelenchoides	0.05	number/g	Fungal/Root Feeders
Aphelenchus	0.05	number/g	Fungal/Root Feeders
Filenchus	0.21	number/g	Fungal/Root Feeders
Malenchus	0.05	number/g	Fungal/Root Feeders
Paratylenchus	0.05	number/g	Root Feeders
Pratylenchus	0.10	number/g	Root Feeders

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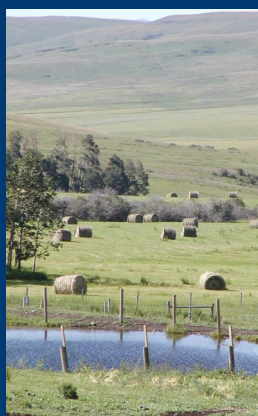


Who We Are



We're online! Check it out at:
www.foothillsforage.com

The Foothills Forage & Grazing Association is a **non-profit producer driven group** that addresses issues, ideas, and innovations for forage and livestock producers in southern Alberta.



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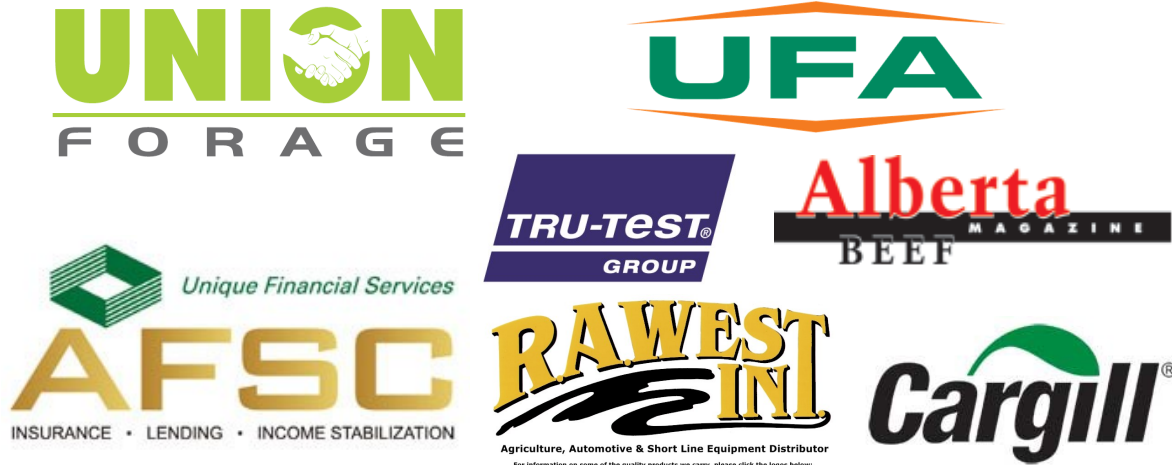
FFGA strives to bring current information to producers by hosting demonstration projects, events and workshops, **hands-on days**, as well as networking with like-minded producers and the sharing of information through our monthly newsletter, website, and social media.



We look at a wide variety of topics including: soil health, pasture management, cattle handling, animal health, business management, biological weed control, livestock watering systems, environmental impact, forage varieties, winter grazing and much more! The board of directors is currently made up of 11 volunteer forage producers from across the FFGA region. FFGA brings producers together by finding profitable and regenerative ways to produce forages and livestock.

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