

Soil Health
Manning Research Farm
July 9, 2019

Garry Candy

Odette Menard - Soil Scientist; Louis Robert – Soil Structure Engineer.

Both speakers are from Quebec and have conducted meetings approximately 120 times (primarily in Quebec); Louis said the soil in Quebec is like cement and that the soil in Manning was beautiful by comparison.

Odette started the morning by saying the goal is to get the soil to do a better job and to do that you need a standard to measure from and compare to. She compared soil health to human health saying you must have a diagnosis to take medication and with soil you have to have a diagnosis in order to prescribe a series of treatment – done by checking lab results and physical properties.

Soil compaction will not allow water in – underground water will grease and helps break up the soil. They stressed through the day to test the soil yourself as well on a constant basis. They set up rainfall drainage tests to judge the aggregates.

For good soil health you must have:

- Ground cover
- Living roots
- Aggregation

Don't rely on soil sampling but rather on soil structure to improve yields to reduce erosion and pollution.

They had dug a hole with a backhoe about 3 feet deep and 15 feet long and 4 feet wide. We could then see the zones and recognize them by colour and structure. Aggregate stability should be tested in each layer, structured ability is measured in percentage of water that goes through the soil compared to what won't.

To test fields, use a pure cotton cloth, bury and leave in the ground for 8 weeks. At that time, compare according to a chart as to how much cloth should be left – do this in the same locations yearly.

Health soil could have a carbon to nitrogen ration of 10:1. If the soil has a greenish color on top, it means that the ratio is less than 10:1. With a lot of straw residue it will be about 4:1 and needs to be brought down. Warms will break that residue down, different size worms eat and bread down the residual leaving carbon and nitrogen. Carbon from the sun is the sugar and the plant moves it to the soil – plant roots demand this like zinc and more from the soil and returns

carbon. Hence cover crops. Buy cover crop seed individually, not in mixes – check a lot of plants for compatibility with conditions, soil and temperatures, then blend your own mix.

Worms eat on top of the soil so they take food from the top into the soil. Small worms stay in the top 2 -3 inches of soil while larger worms live in deeper tunnels, they poop on the surface and drag food down. Where you find large worms, there will be 25-30 small ones. They breathe through their skin so on rainy days they have to get up to where they can get air. They have no teeth so they use the soil to grind their food much like a gizzard does. Bacteria in the worms produce glomalin (mycorrhizal fungi). Big worms lay 8-12 eggs, small ones lay up to 100. Big worms winter below the frost line while small worms go dormant.

They spoke about compaction a great deal and showed where they had dug the pit; one end was under a pathway used by farm vehicles and definitely showed visible compaction.

3.5 tons per wheel total will keep the compaction above 12 inches. A comparison between tractor tires and tractor tracks showed worse sub soil compaction and the track rollers shatter and pulverize the ground.

People attending who used tracked equipment were not impressed. Bigger tires change surface compaction but don't change sub soil compaction. Surface compaction is the depth of tillage. Again not making friends, she said a grain cart has no place in any field because of the tremendously high subsoil compaction.

Good soil has 50% porosity (25 air and 25 water). Subsoil compaction cannot be repaired, subsoiling can help but you have to identify the zone or depth of the problem. They showed us the layers of compaction and made note that where water would leak into the pit was where the compaction starts.

Once the depth is established, you need to subsoil 4" below the bottom of the zone using flat nosed shanks and tips, do it in dry conditions as the last field operation of the year.

This was a good information day. They also mentioned using clovers as cover crops by interseeding or broadcasting crimson clover into barley crops or between rows on row crop plantings.

Ag in Motion
Saskatoon, Saskatchewan
July 16 – 18, 2019

Garry Candy

This is the third year that this event has been held at Lengham, Saskatchewan on 640 acres and organized by Glacier Farm Media. The event had machinery displays, short seminars, demonstrations, crop plots and much more. This year over 30,000 people attended.

All demonstrations were done in a professional manner, i.e. livestock equipment demos with live cattle were held each day but each of the seven manufacturers told the audience they did not want to talk business with them until they had seen all the different types of systems in operation. This was very fair and was the way that all equipment and demonstrations were handled.

The show highlighted the rapidly changing technologies available and in use by farmers. They announced their site as becoming the "Discovery Farm" with 380 acres to be used for in field trials. This year they had some soybean plots that had been seeded with an air seeder compared to a row planter. This is to test yields as well as more open spaces to plant cover crops in between the rows to build carbon and other soil nutrients. These results and also the fertilizer and chemical applications will be published this fall. They also seeded canola with a row crop planter to test yields there and to give the cover crop the space required. Row widths with an air seeder are usually 9 inches while with the row crop planters used, they are trying 5 – 22 inches and up to 28 or 30. Being familiar with row cropping I am very interested in seeing these results.

As far as machinery displays at the show, if you could think of it, it was there. If you could dream it, it was there. Including fully automated DOT tractor – no driver required and designed to pull several implements – all GPS controlled – in future could be possible to control several of these units simultaneously. The DOT tractor was designed by a Saskatchewan inventor and attracted sizeable numbers at each demonstration.

Stuart Chutter – gave a talk about using sheep and goats as vegetation control animals. He raises or rents animals and together with dogs they graze the animals on government and private lands that are hard to get to with machinery and to avoid tilling. He showed slides of ski hills, land under large power lines, parks, etc. they call it targeted grazing. Half of Stuart's income is derived from this operation. He said the sheep and goats will take out leafy spurge which is a large problem in Saskatchewan and in land where cows won't even walk through because of irritation. I asked about predator loss and he said they had none and that they pen the animals at night with electric wire.

Victoria Nameth – from the University of Saskatchewan talked about noxious weeds or invasive plant control – tillage, chemical and grazing. Saskatchewan has funding available up to 45,000 for some projects. The university is creating weed maps and charts and an "I" map for invasive species.

Jared Epp – a dog trainer for herding dogs gave demonstrations twice daily and talked about dog behavior and some of the training techniques. He demonstrated the commands and how to control the dogs. These dogs worked the sheep in a fairly large pen (about 100 yards by 50 yards) in front of huge crowds of people with a loud speaker without distraction.

He will train dogs for people and he also sells dogs. The city of Red Deer are using sheep and goats in their parks and river lands and in the paper they said the sheep and goats are trained to eat only the invasive plants which is highly doubtful and neither of these speakers mentioned this (I think it was simply a statement to appeal to the public).

Demonstrations of all sorts of things were ongoing: fencing equipment, pounders, wrappers, power staplers, as well as hand held small engine pounders which I think would be an ideal rental unit for the county. I have requested more information on them and will pass that along when I get it. there was also a game wire rollout machine that attaches to forks on buckets – may also be of interest as a rental unit.

As well as equipment demonstrations there were lots of short talks about commodity markets, sales volumes, etc. I attended a number of them that mainly reinforced that China and the USA as influencers are the largest concern with markets.

I saw a machine that I could not identify or even guess as to what it was and its uses. I was able to get a limited amount of information from the person and have requested more. Essentially it is a sewage lagoon cleaner with pumps, is four wheel drive, has tank mixers and drives into the lagoon and then floats. The idea is that it stirs and blends the lagoon and can also pump it out to trucks.

I spoke with Gord MacLoed (mayor of Fairview) because of the smell that comes from their lagoon. He has asked for more information – possible a number of towns could get together to purchase or lease one if it seems that it could take care of the smell. I believe it is also used to blend and load liquid fertilization for land. More info to come.

I asked a fellow familiar with New York what New York was like. His answer was that whatever you have heard or read about it is likely right. I think this is the answer I would give about Ag in Motion, whatever you may think or dream regarding agriculture; it is there.

Adaptive Grazing
July 23 - 24, 2019
Lac Cardinal, AB.
Garry Candy

Dr. Allen Williams and son, Chris Williams

Dr. Williams and his son conducted the seminar consisting of lectures and field demos to back up the classroom information. Allan has been involved in agriculture from his university days and his business partnerships. He has studied and worked in many areas of the world and currently in Mississippi. After 15 years of academia he left to begin farming, ranching and consulting. He has worked in all kinds of environments, soil conditions and climate conditions and he says the more the differences, the more the similarities. Soil and biology responds the same regardless of the location, they grass finish cattle with no grain and he is involved with poultry, hogs, eggs and dairy operations. Most of the animals are completely on pasture, managed and moved at least once a day or more, pigs included – Allen said moving pigs keeps them from rooting. They are controlled with single strand electric wire. His policy has been to leave no ground bare. With cover crops in between rows you get better control of insects and pests (the more types of plants, the better).

“Soil Carbon Cowboys” is a series of clips plus a summary:

- Carbon molecules feed soil life – microorganisms feed plants to feed animals and support life
- Over the last 200 years soils have lost half of their carbon

He blames degraded soil and farming practices for contamination of river by excess runoff of land that will not absorb it and from flooding. We have dust storms again before rain and after because of poor absorption.

Typically with conventional grazing the land is overgrazed and the animals are supplemented with grains meaning more use of equipment. Overgrazing occurs not because of the amount of animals but how long the plants are exposed to the animals. One cow on 10 acres can kill the plants, 1000 cows on 10 acres for 1 day will have no plant kill. He talked about how the bison and other herds of animals grazed the great plains, roaming and moving quickly in large groups because of predators and how we were able to plow that land because it was so mellow. Compare putting a plow into a lot of farmland today.

The power of mycorrhiza - fungi is a farm's best friend as it extends plant roots 700 to 1000 times and interconnects plants which freed from one plant to another, it stores water supply to roots in dry conditions.

Stock density rating is in lbs. per acre.

3 Principals of Adaptive Stewardship

- Compounding
 - Never a singular effect
 - Never neutral – either positive or negative
 - Everything we do creates a series of compounding and cascading events
 - Also creating epigenetics
- Diversity
 - Super weeds – weeds which have seen the same herbicides for years so the weed herbicides have not eradicated anything and they have caused immunity in some| weeds.
 - Question – why do we have to deworm cattle but not elk or deer? Because the wild animals can pick their diet.
 - Dandelions and quack grass that we have determined to be weeds can be the first line of defence against degrading soil and compaction.
 - Birdweed for compaction
 - Leafy spurge provides boron
 - Canada thistle – iodine
 - Nettle – nitrogen
 - Ragweed – nitrogen
 - Cover crops should be diverse perennials – don't continue to do things the same way
- Disruptive
 - Alter stock densities
 - Don't move stock through rotations the same way
 - Alter grazing height
 - Alter rest periods
 - Alter species order
 - Alter grazing times of the season

- Recommended – “The Nourishment Book” – Fred Provenze
 - Animals will pick what they need from a diverse diet if it is available
 - He cited a study of 30 orphaned children that were allowed to eat anything they wanted from a large selection of foods for a long time; ages ranged from 2-7 and all were extremely healthy, even their teeth.

Keys to Adaptive Grazing

- Goal oriented
- Stock density vs stocking rate
- Management and flexibility
- Root system recovery reliance on temporary fencing
- Compounding and cascading effects
- GPS training coming
- Herding instinct – people, dogs
- Yellowstone – (not natural) tame elk

Case Studies

- Mississippi Farm – Black Belt Prairie – easy to plow and grow cotton for 200 years, then corn and beans
 - Initial Measurements
 - soil organic matter 1.3 – 1.6
 - Water infiltration 1 ½ inches/hour
 - Plant brix 2%
 - Major forage species 3 – 4 types
 - Stocking rate 1 AU/6 acres
 - Implemented Measures
 - Bale grazing
 - High density, short duration grazing (did not work or fertilize)
 - Moved cows into weeds

- Cows will eat all types of weeds if forced to
 - Moved often enough to provide good trampling
 - Alternate stock density when returning to grazed areas and adjust grazing times – 30 minute grazing in cases can increase 2 – 3 % biomass
 - Herd only grazed every acre in 4 – 5 years
- Progress after 4 years
 - Organic matter – 5.2 – 5.6%
 - Forage species – 43
 - Plant BRIX 15 – 22%
 - Infiltration – 30 inches per hour
 - Stocking rate – 1 AU / 1.5 acres
 - Increases in earthworms, soil insects, pollinators and wild life
 - Compare ½" / 4 seconds infiltration ; rest of USA is ½" / hour
 - Good biology gives excellent resilience
 - Feed hay for 30 days as compared to S.E. USA feed hay for 5-6 months because of poor soil health and grazing habits
 - Trampling in material can change results in 1 year
- Carbon Data
 - 3 types of farm/ranches sampled in 2014 and continuing
 - 1 - adaptive grazing for 5 years
 - 2 - conventional farms moved cattle every 2 weeks for 30 years
 - 3 - continuous grazing 30 years
- Results:
 - Soil carbon increased 4 times as much in 5 years; organic material increased the same
 - Rapid improvement is very possible – tremendous bromes in 5 years
 - Chihuahua Desert in Mexico has less than 8" rain/year; grazed 1 cow/300 acres on mesquite

Overgrazing and poor management causes:

- Desertification – makes a desert. Water erosion can happen with only 8” rain/year. Showed carbon in the desert – traces of carbon taken down 3 feet by roots and deeper. Showed erosion over only 12 years. Should start making changes in the best areas. Mesquite pods are a very rich feed source for cattle and wildlife. In 2 years, built 3” of topsoil.
- Adaptive grazing provides a more even distribution of manure and urine – 1 pile/square yard in 1 year as compared to 1 pile/square yard in 27 years with continuous grazing. There is some astounding data on fertilizer values for manure and urine.
- Cows can't over apply fertilizer whereas machines can
 - Soil temperature – shade counts. 70 degrees– 100 % available moisture: 115 degrees – 30% available moisture
- Should cut hay leaving 6 – 8 inches standing. Cut too short changes microbial content and infiltration; bacteria eats the glues – loops aggregates.
- Indicators of healthier soils: more insects, birds, pollinators, earthworms and dung beetle
- BRIX – should be 15% or higher. This is a measure of sugars, minerals, amino acids, proteins, lipids and pectins. Higher BRIX results. Refractometer – optical and digital
 - Atego – VeeGee types. Optical: 0-32, 33 not 54

With higher BRIX, there are high sugars and pests leave it alone because the sugar turns to alcohol and bugs die of alcohol poisoning; insects can smell the sugars.

High BRIX feeds – finish cattle. 1% higher BRIZ - .1 lb ADG

Dairy results change in 24 hours – a high BRIX can be in any plant

Plan hay cutting for when you have the highest BRIX (preharvest)

Adaptive Grazing – moves – times intensity to maintain levels

- Grasses – early boot stage cutting; Move cattle in the afternoon rather than morning
- ½ lb per day gain by an afternoon move
- High Sock Density – short time – 30 minutes lays down carbon. Paddock within a paddock – high density

This was by far the best information I have seen – more information is being sent to me and I will report on it in the future

WheatStalk-One Day of Peace and Wheat

August 8, 2019

Lyons Production Services Events Center

Tepee Creek, Ab [Grande Prairie County]

By: Julie Watchorn

Very wet and cold ... this tour was an outside tour. The bus picked us up from the Event Center and took us out to the PCBFA and SARDA Applied Research trial site. The plots were beautiful well maintained!

SARDA had SARVT pea and SARVT wheat plots

PCBFA had annual crop mixtures; alternative cereals and legumes for forage production. They also had perennial forage plots which most are doing well. Alberta Barley had fungicide treatment and inter-cropping plots and a seed treatment demo

Alberta Pulse Growers had plots where they had Inter-cropping, Lupines, and without the use of seed treatment

SARVT Pea Variety Highlights-

CDC Amarillo: Yellow pea

- High yielding

- Medium maturity, good resistance to disease

- One of the best lodging resistance ratings in western Canada

CDC Limerick: Green Pea

- Good resistance to seed coat breakage, seed coat dimpling and green colour bleaching

- High protein concentration

SARVT Wheat Variety Highlights-

AC Settler: Very high grain yield

- High grain protein

- Strong straw

- Good sprouting resistance

CDC Upmost VB: One of the highest yielding CWRS varieties

- Strong straw, easy to thrash

- Good resistance to lodging and sprouting

- Wheat midge tolerant

There were many stations to visit

There was an Insect Friends and Foe station- showing good and bad insects and what to watch for

Western Winter Wheat Initiative station- showing the yields and right varieties for your area

Farm Cash station- Cash advances for 50 major commodities including major crops, livestock and honey

\$100,000 interest free and \$900,000 at a low interest rate

AgSafe station- agricultural safety

CARA Soil Health Lab- Dr. Yamily Zavala

They had a large hole dug showing biological activity, root Mycorrhizal, Active bacteria and Fungi

Compaction, texture and bulk density

www.CARASoilHealthLab.ca

403-664-3777

Oyen, AB

@CARAresearch

Alberta Canola station seeding rate calculator, cleaver control and seed placed phosphorus demos

Sponsors were

PCBFA

SARDA

Alberta Canola

Alberta Barley

Alberta Wheat

Alberta Pulse Growers

Brian Harcourt Written Report

Speaker.. Dr. Allen R Williams..PDL..SC..USA...Pt 1.

Quotes and comments.

Allen and his son Chris have cattle operations in many countries.

Problems and conditions are much the same world over.

After weaning their calves they are totally grass fed "NO' feed lots!

Cattle are biological tools! Even pigs won't root if they have enough grass.

Chickens will also do good on grass with a little grain.

Wild game will leave the birds alone with enough grass.

They also do organic gardening, 80 different vegetables
no bare ground, 3 different vegies per row.

They also have a Meat + Poultry Co. separate from the many cattle ops.

They have their own processing plant which makes all the difference.

Sells to restaurants, hotels, cafes and individuals.

Sells by taste, with farm day tours, BBQs and all day picnics, shows people everything.

The BBQ..people soon understand why he does things this way.

His Resources--Herd Impact..www,understandingag.com

grassfedexchange.com pastureproject.org

keep god Records. Google these people, Wendell Berry, Masanobu

Fukuska, Norman Wirzba..Soil is a marvel and a mystery.

Current issues..Marine Life threat-plastics..also dolphins sea turtles ans crabs.

Excess rain -a big problem, washing away nutrients sprays and soil due to flooding.

Contributors..poor infiltration, overgrazing, dust storms, H2O overground.

of animals, amount of time = pounds per acre.

Mycorrhiza Fungi is farmer's best friend!

They pick up nutrients in the area to feed plants and increase plant roots
up to 1000 times and extends the reach of the roots.

Helps preserve and supply H2O in droudht times.