Lakeland Agricultural Research Association

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2018



The Verdant Element

LIBERATING SOIL PROFIT

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There is a wealth of potential laying untapped in the soil. Nutrients in abundance are out there just waiting to be liberated. However, most are in inaccessible forms for our plants to utilize. Soil health is directly related to this ability to release the nutrients and increase our plants potential and profitability without adding thousands of dollars in fertilizers and chemicals. The air that we breathe is made up of 78% nitrogen. If we have healthy soil and microbiology, that nitrogen can become fixed and available to our plants. This is how our natural ecosystems obtain nitrogen for their growing requirements. And the best part is, it is completely FREE!

The biological part of our soils are comprised of millions of species which include types of bacteria, fungi, protozoa and nematodes. These workers of our soils create aggregates, and directly affect the water, carbon and nutrient cycles that allow for our plants to flourish and be nutrient dense. These are also the species that allow us to build our top soil. Bacteria are involved in disease suppression, nutrient retention, form soil micro-aggregates, decompose simple sugars, and are important in the nitrogen cycle. Fungi are important for disease suppression, retaining nutrients, form soil macro-aggregates and hold soil together and decompose complex carbons (cellulose and lignin). Protozoa consume the bacteria and release 60% of nitrogen and phosphorous held by the bacteria. Nematodes eat bacteria, fungi, algae, protozoa, and other nematodes and are important for nutrient cycling of both macro and micro nutrients.

Modern agronomy pushes the chemical side of soil, and often overlooks the physical and biological aspects. We need to recognize that healthy soil is comprised of the complex interaction between the biological, physical and chemical processes and build all three. To be profitable there needs to be a balance between natural soil properties, uncontrollable environmental conditions and our land management.

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Liberating Soil Profit

There are many ways to promote the biological side of our soils depending on what you are hoping to achieve. Gypsum for instance is a good way to add calcium to the soil (which is needed in plant cell structure), but it also opens up the soils and reduces compaction, improves soil structure, and helps with soils with salinity issues.

Compost teas are a great method to increase the bacterial function of your soil; but you can also add green plant materials, molasses and other sources of simple sugars. To increase actinomycetes (long chains of bacteria) activity you can add woodier plant materials such as a white wood mulch compost. Fungi can be pro-

moted by adding wood, paper, fish oils, cellulose, and humic acid. To promote protozoa you can add compost tea, good compost or straw. Having a diverse nematode population can be encouraged by having a diverse and healthy bacteria and fungal populations.

Most of all look at what is available to you at the lowest cost. If you live near a woodlot, consider purchasing some wood mulch or scrap to create a compost pile with, If white sugar is on sale consider adding some to your field (via sprayer), as a little goes a long way. Humates are fantastic to promote soil health and can be

Protozoa Tea:

Soak good alfalfa hay for 3 days and apply at 20 liters per hectare

sourced from a variety of sources. There are many different products out there so do your research, but don't be afraid to think outside the box!



White Cockle

White cockle is commonly found in hay fields, fence lines and orchards. Leaves are opposite, hairy with prominent veins on mature leaves. There can be several stems per plant growing up to 120 centimeters tall, turning purplish when flowering. The plants are

diecious with the flowers having five white notched petals.

The male flowers have 10 veins at the base, whereas the female has 20 veins which inflate when the seeds are ripe. White cockle produces large quantities of small seeds that are similar to clover and often are found to be in forage seed.

White cockle is commonly mistaken for night-flowering catchfly (which is sticky to touch and hairy) and bladder campion (hairless and smooth).

Control: cultivation is not recommended as white cockle can re-sprout from root

pieces. Frequent mowing will prevent the plants from producing seed, but white cockle is a perennial, so will continue to grow from the root system. Herbicide options are usually limited due to occurrence in pastures and hay fields. There is some herbicide resistance with white cockle. Cutting and fertilizing to get grass and other species to compete is another possible control method.



Canada Thistle





Canada thistle is an aggressive per ennial with an extensive root system that has been found to go down to depths of 6 meters. It spreads primarily by creeping roots

to form colonies that can be found in a variety of habitats. It is a species of reputable concern as it has been on the Weed Act since 1907! Control: most of the Canada thistle biomass is in the root system so the only

effective control is to kill the roots. Cultivation spreads small root pieces around, allowing for the establishment of new plants from those roots. Re-

peated mowing will eventually deplete root energy reserves, however this will take several years to be effective. There are over 280 registered herbicides for Canada thistle, however one with a residual would be more effective. The best time to spray is when the plant is in early bud stage (see picture to the right), or in the fall when the plant is moving energy into the root system.

In 2012, LARA released 1260 Canada thistle Stem Mining Weevils (*Hadropontus litura*) to determine if the weevils can establish native populations for Canada thistle suppression. The sites were monitored and over the course of several years, the Canada thistle was suppressed. The weevils are host specific to Canada thistle, and as adults, feed on the leaves of plants and when reproducing, the eggs are laid in the stem and the larvae mine down in the stem to the roots feeding on plant tissue.. This year LARA ordered several trays of weevils. If you are interested please contact the LARA office to find out availability or more in-







formation on the species.

To report prohibited noxious weeds call the Alberta Pest Surveillance System at :

310-APSS (2777)

Riparian Health Assessment

The riparian zone is the interface between the upland and a water course. A healthy riparian area: traps and stores sediment; builds and maintains banks and shorelines; stores water; recharges aquifers; filters and buffers water; creates primary production and much more!

A riparian health assessment is a tool designed to evaluate the site and can provide a foundation to build an action plan and identify priorities.

If you would like a FREE Riparian Health Assessment conducted on your property or more information please call Kellie at 780-826-7260 or email sustainag.lara@mcsnet.ca



Pest Watcı

Soils School with Nicole Masters

In June we were joined by Nicole Master of Integrity Soils from New Zealand. She lead us through a two day intensive soil school. Nicole is an agroecologist which encompasses regenerative agriculture. Regenerative agriculture incorporates enhancing the natural (nutrient) cycles, repairing disturbance events, minimizes inputs, builds outputs and creates a resilience of the land. In essence building healthy soils.

Healthy soils have resilience by:

- * Able to hold onto and release nutrients and water
- * Have great structure
- * Being full of life
- * Protecting against pests and disease
- * Decomposing organic materials and detoxifying pollutants
- * Buffering against changeable climate
- * Being full of secondary metabolites, plant growth hormones and enzymes
- * Growing healthy, nutrient dense crops



Soils are the lungs, liver, stomach and skin of the planet with the global carbon cycle, detoxifying pollutants, digestion of organic materials to produce food for us and protection.

You may have heard the term "light farmers" before. Your profit is directly related to your ability to harvest solar energy.

To be able to maximize solar capture you need to have healthy soils. If you think in

the rule of 3: we can survive without oxygen for 3 minutes, without water for 3 weeks and without food for 3 months. Soils are very similar. Healthy soils need to be able to breathe; good soil structure that is aerated and not compacted is essential. They need water, and need to be able to digest the organic matter. You need to feed your soil microbes! A soil with a thick thatch, that is compacted with a huge layer of undecomposed organic matter is not a healthy soil. And lastly you need to soil test to see what is your limiting factor for balanced nutrition. Soil fertility was sufficient before we came and managed it. The native prairie grasses were productive and required no additional inputs from humans. We need to work with the natural nutrient cycles to increase our profits by reducing our inputs and maintain/improve our yields. In every breath that you take it is 78% nitrogen, 21% oxygen and the other 1% is primarily argon but contains other molecules. There is an abundance of FREE nitrogen in the air that if you had healthy soils with abundant microbiology you could access. In most systems where you are adding nitrogen fertilizers, for every 100 units you are on average only retaining and your crop is utilizing 5-15 units, with good management you may get up to 25 units. That is a huge loss that impacts your pocketbook. The amount of nitrogen available is directly related to soil compaction. The more compacted your soil is the less accessible nitrogen is. A quick way to look at nitrogen is looking at your plant nodules. When they are pink/red they are healthy and actively fixing nitrogen, when they are green it means that they had been working but have stopped (due to a change in temperature, pH, cobalt deficiency, etc.), and when they are white they never have fixed nitrogen.

CANADIAN PARTNERSHIP

The Canadian Agricultural Partnership is a five-year, \$3 billion federalprovincial-territorial investment in the agriculture, agri-food and agri-based products sector set to begin in April 2018, and is the successor of the 2013-**ÅGRICULTURAL** 18 Growing Forward 2 partnership. In Alberta, the Canadian Agricultural Partnership represents a federal - provincial investment of \$406 million in strategic programs and initiatives for the agricultural sector.

Currently accepting funding applications is the Environmental Stewardship and Climate Change program and Farm Water Supply.

Funding Opportunities

Stewardship covers projects such as:

Riparian Area Fencing and Management	Permanent fencing and potentially cross fencing	Funding Maximum: \$75,000 Cost Share: 30%, 50%. Or 70%
Year-Round / Summer Water- ing Systems	Portable or permanent systems that are not in your yard site	Funding Maximum: \$50,000 Cost Share: 30%, 50%. Or 70%
Watercourse Crossings	Construction materials needed for watercourse crossing in accordance with the Water Act	Funding Maximum: \$10,000 Cost Share: 30%, 50%. Or 70%
Grazing Management Strategies or Innovative Solutions	Consideration will be given to projects that provide solutions to improve grazing management. The projects must meet the objectives of Environmental Stewardship and Climate Change Program and significantly improve the grazing management performance of an operation.	Funding Maximum: \$100,000 Cost Share: 30%, 50%. Or 70%
Manure and Livestock Facilities Management	Construction of surface water management system; engineering assessment; improved storage facilities; relocation of livestock facility; improved land application; manure and livestock facilities management	Funding Maximum: \$15,000 - \$100,000 Cost Share: 30%, 50%. Or 70%
Agricultural Input and Waste	Improved pesticide management; improved nutrient management (sectional controls); plastic rollers; shelterbelts; wetland assessments	Funding Maximum: \$7,000 - \$15,000 Cost Share: 30%, 50%. Or 70%

More Information On Funding Opportunities

For more information on these funding opportunities go to: https:// cap.alberta.ca/CAP/index.html

Call the LARA office to set up a time to go over funding possibilities and for assistance with the application forms.

Please note that applications must be approved prior to work being done or purchases made to be eligible for the funding.



Stuck in the mud? Consider an offsite watering system.

The Verdant Element

Soil School Continued

Soil changes constantly. Whenever there is a disturbance, be it a large disturbance such as floods, earthquakes, or fire or a small disturbance such as tillage, over/under grazing, or chemical sprays, the ecosystem will have a change both above and below ground. The biology and plant species will change depending on the conditions. New (disturbed) or primitive soils tend to have higher bacterial populations which favor more primitive grasses, mosses and lichens. Old growth and conifer forests tend to favor higher fungal populations. Most agricultural practices create soils that are more primitive with higher bacterial populations and low fungal populations that encourage weed and pest species to flourish.

There is a great Ted Talk with mycologist Paul Stamets

titled "6 Ways Mushrooms Can Save the World". Fungi are truly amazing and beneficial organisms. Fungi, in particular the 'Endo' Arbuscular Mycorrhizal fungi (AMF) are extremely important to the health of the soil and the plants that grow. AMF is a symbiotic fungi that works with plant roots. The plant provides sugars to the fungi and in return the fungi provide the plant with nutrients such as phosphorous, zinc, nitrogen, trace elements and water. 90% of plant species form this symbiotic relationship with AMF. The exceptions include brassica, amaranthus, chenopodium, sedges and lupins. AMF aside from providing plants nutrients and water also protect roots from disease and defend against pests. They also produce glomalin, which is a dark sticky substance which improves soil structure, water and nutrient holding capacity and increases soil carbon. The fungi also holds

the calcium in the soil which is important for plant cell development and soil structure.

Other important organisms to consider are protozoa and nematodes. Protozoa are single celled organisms that feed on bacteria, and provide a food source for higher organisms. If you have low populations of protozoa you will have low nutrient cycling as protozoa help release the nitrogen and phosphorous held by bacteria and make it available for plant species. 95% of nematodes are beneficial nonsegmented worms. They help guard the plants roots from pests. Nematodes are vital in nutrient mobilisation as they release nitrogen, sulfur and phosphorous to plants when they consume the bacteria, fungi,

algae and other nematodes.

The soil biology is essential to both plant and soil health. We need to feed our biology and ensure that it is healthy and in return we will see resilient, profitable systems. If you are going to rip (disturb the soil) consider a drip (feeding the microbes with sugars, compost tea, humic, probiotic or fish product).







OLISTIC MANAGA

Holístic Management with Kelly Sidoryk

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St. Paul Area

For over 35 years farmers and ranchers in Alberta have used Holistic Management to improve land, grow nutritious food, gain control of their finances and improve their quality of life.

Holistic Management is a values-based decision making framework that integrates all aspects of planning for sustainable social, economic and environmental considerations. Each and every operation is unique and by using Holistic Management farmers and ranchers can achieve improvements in their land and mitigate risk.

Module 1

Introduction to HM Paradigm shifts Enhanced decision making through testing questions Developing holistic goals for higher quality of life, more profit and healthier land Secrets of effective communication

Module 2

Review principles of analytical testing questions Learn about using tools and their effects Grazing principles Develop a biological plan

Module 3 Principles of holistic financial planning Definition of wealth Enterprise analysis Plan a profit

Develop your operations annual financial plan Create a learning (support) group



There is no blanket solution or one size fits all approach to management. This course allows you to consider your own goals and what would work best for you and help you to get to where you want to go. The course is laid out into three modules over 6 days. The Cost of the Holistic Management Course is \$1,500.00.

If you are interested in the HM course, or want additional information please call Kellie at 780-826-7260.

HOW CAN WE ASSESS (SOIL) HEALTH?

Soil Indicators

- Soil structure / porosity •
- Colour and number of mottles •
- Soil colour / carbon •
- Earthworms and dung beetles .
- Soil smell •
- Infiltration rates •
- Surface relief
- Temperature •
- Penetrometer, pH, EC
- Soil mineral and biological testing •
- Enzyme activity •
- Extractable minerals •

Plant Indicators

- Brix / EC / pH
- Plant growth
- Legume nodules
- Weeds / pests / disease
- Plant color
- Urine patches
- Pasture utilization
- Root length and density
- Area of bare ground •
- Drought stress •
- Input costs to maintain
- Plant tissue test

Why are Mycorrhizal Fungi (AMF) important?

- Improve drought resistance
- Increase nutrient cycling
- Major pathway for plants to • obtain nutrients such as phosphorous, trace elements and enzymes
- Build and hold soils together •
- Plant health
- Pest resistance
- Disease resistance



Having the Safety Talk on Your Farm

By Elaine Froese http://elainefroese.com

Like many of you, I've checked out the grain bin suffocation demonstration at the farm shows and collected many farm safety brochures. I think this spring is finally the time when we'll do things more intentionally on our farm, including have the safety talk.

Why now?

We experienced family trauma in October during harvest when a key person crashed a vehicle. It made us all realize that we need to have more safety tools and plans in place.

- It's time to do a safety walk around the property and clean up hazards again. •
- It's time to fill some ice cream pails with basic first aid supplies and put them in tractor cabs and mechanic's • workplaces.
- It's time to have safety conversations with those folks who are aging, and who require a few adjustments to • what they can safely do on the farm this spring.

Farms that rely on aging labour can find it hard to know when it is the best time and safest decision to tell folks that they no longer can work safely. This is the "s" talk, i.e., the safety talk.

We had this experience with my father-in-law when he met a hydro pole with his harrow bar in his late seventies. We also did not know at the time that he had a brain shrinking disease. Another elder employee was badly bruised when he jumped off his tractor which had caught fire (hydraulics and straw combined in mucky conditions). For more smooth operations tips, consider my <u>"Farming's In-Law Factor"</u>.

Considerations for the Safety Talk

Every farm has a story, yet what needs to change is conflict avoidance. We all want to do good work and feel respected and appreciated for the work we contribute to the success of the farm. Having a <u>tough conversation</u> about safety requires a few considerations:

1. Safety First

Telling someone that their abilities are no longer safe is necessary.

2. Approach

Take the other person's perspective, use sound listening skills, and ask them to consider

the risk to others and themselves if they cannot function safely. We were concerned that Dad would hurt himself and possibly others, so he had to stop driving.

3. Create Solutions

What jobs can still be performed well? Ask the elder person, "What does a good day on the farm look like to you?" and find new tasks that work.

4. Respect

You can use phrases like "I am just curious, do you realize that you (Fill in the blank ______,) for example, did not check all the things you needed to before you started up?"

5. Attack the Issue, Not the Person

Profanity, blaming, or accusations are not going to help the situation." We have a problem here, your abilities to respond quickly are changing, what do you think is a good adjustment to make?" My father was very angry with me the day he was no longer allowed to drive (due to his Alzheimer's), but I was more concerned about his well being and the well being of others. Sometimes you have to be able to accept the hurt and frustration of others in their anger and not take it personally.

A Safety Culture on the Farm

Culture is an invisible glue that holds the farm together, it is what you believe about safety, how you behave by acting in a safe manner, and what you decide about following regulations and safety guidelines.

This all hits close to home for us in 2018 as our grand-daughter turns one and we begin with keeping another generation safe on our farm. I remember keeping our toddler son in the safe zone, and now he is the father and the successor on safety watch.

I think the biggest factor in farm safety is your attitude towards being safe and cleaning up hazards, or preventing accidents in the first place. I am a big fan of encouraging good sleep so folks are well rested on the job. As a farm family coach, I see toxic farm cultures where folks yell and scream at each other rather than acting as mature adults and creating solutions to conflict. High stressed families in conflict use way too much emotional energy in a negative fashion which creates distracted management.

I also believe that our bodies, mind, and spirits need good fuel. That means eating regular nourishing meals, affirming each other, and taking care of our mental health on a daily basis. The Do More Ag foundation is working to address ways to help farmers cope with depression, stress, and anxiety, and know that they are not alone. As a depression survivor, I encourage all farmers who have a genetic history of depression and anxiety to seek out treatment with their medical doctor.

So, you've had your pep talk now. What are you going to do? Make the safety stories on your farm happy ones. Stay safe. Be safe.



My Dirty Laundry

Now I like to think that I have learned a thing or two over the years on soil. However I too have had many soil issues that I seem incapable of solving. For one, I have dew worms (night crawlers thanks to my fishing neighbors that released their bait worms). Now many people like to think that all worms are great, however once you have dew worms you are going to re-think that pretty quick. I essentially have been evicted out of my lawn. The dew worms casting piles are like mole hills, except that they are cement hard. My poor lawn mower has lost more bolts due to the vibrations of going over what seems like exaggerated cement egg cartons than I care to admit. There is no soft, spongy healthy soil to be seen; you could easily roll an ankle walking across the cement like lumpy grass. So because these worms are so hard to eradicate, I have decided to improve my soil health to mitigate their effects. I first spread diatomaceous earth to discourage them from coming to the surface and then spread lime (calcium) to open up my soil structure, allowing my soil to breath and improve aggregation and essentially become softer. I then have also added some sugar to the soil to increase my bacteriological potential and get my nutrient cycle more active. In the last month (since the first application), my soil lumps are drastically less noticeable, and the grass looks much greener and more lush. I should have taken a brix reading to determine if my nutrient cycle was more effective, and I still may do that just for my own interest. I also have not been back on my hands and knees searching for bolts that have rattled off the mower, so I take that as a positive sign that there are improvements to my soil structure. [Photo right: dew worm along side of a men's size 9 shoe]



FARM ENERGY AND AGRI-PROCESSING (FEAP) PROGRAM

FEAP is a combination of two discontinued GF2 programs: Dn-Farm Energy Management Program Accelerating Agricultural Innovation Program (Stream C)

> FARMS RANCHES

AGRI-PROCESSORS

ENERGY EFFICIENCY INCENTIVES

Ag-Info Centre: 310-FARM (3276) agriculture.alberta.ca/feap

ON-FARM SOLAR PHOTOVOLTAICS (OFSPV) PROGRAM

be eligible for funding, a Photovoltaic system must be

Approved under Alberta's Micro-Generation Legislation Positioned to optimize sunshine and minimize shading Have manufacturer-warranties on: Solar modules, Racking, Inverters and/or Micro-inverters, and Installed on a Site ID that has a Distribution Rate Class

Retroactive projects that have been completed AFTER APRIL 15, 2017 are eligible. See website for more details!

> Ag-Info Centre: 310-FARM (3276) agriculture.alberta.ca/solar

Canada



Environmental Farm Plans

The environment is becoming a more prominent issue. It is a large factor in marketing agriculture and food products in today's global markets. Consumers are demanding more transparency and are demanding high quality and safe products. Reputation of food safety is critical to retain and gain access to domestic and international markets.

Environmental Farm Plans (EFP) provide a tool for producers to self analyze their operation and identify environmental risks, current standards, areas for improvement and also highlight what they are doing well.

Having a completed EFP allows producers to access different funding opportunities, such as the Growing Forward Stewardship Program. It is also useful in product branding that demonstrates specific environmental standards.

The EFP Process

An EFP can be completed through workshops, online or one-on-one session(s). The EFP first identifies the soil and farm site characteristics. Following this, the producer completes only the relevant chapters that apply to their operation; such as wintering sites, fertilizer, pesticides, crop management etc.

Upon completion the EFP is submitted to a Technical Assistant for review. Once reviewed the EFP will be returned along with a letter of completion.

The EFP is a living document and should be reviewed and updated periodically.

If you wish to complete an EFP or have any questions regarding EFP please contact Kellie at the LARA office at 780-826-7260

Effective April 1, 2018, producers will need to have an EFP completion letter dated within the last 10 years to be considered current and eligible for cost-share funding with the Environmental Sustainability and Climate Change programs of the Canadian Agriculture Partnership (CAP). That means, for example, if you apply in September 1, 2018, your EFP will need to have been approved on or after September 1, 2008 to be considered for current funding.



Lakeland Agricultural Research Association

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Sustainable farming encompasses a wide range of practices and principles; combining environmental stewardship with profitability and ensuring that the family farm will be there for generations to come.

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DATES TO WATCH FOR:

- Implementing Cover Crops and Improving Soil Health on August 15th
- Living with Beavers Workshop August 29th in Elk Point
- Summer field days; various locations and dates
- Alberta Lake Management Society Conference September 28 & 29 at Buffalo Lake



Food For Thought...

- Go and smell your soil... What does it smell like? The smell after a rain is a reflection of soil health. The smell is courtesy of procreating bacteria in the soil that improve soil health, building soil humus, vital for the nitrogen cycle and are used to create many of the antibiotics we use today.
- Carbon is the soil's bank, hospital and engine and is fundamental for life

WWW.LARAONLINE.CA