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Lakeland Agricultural Research Association



The Verdant Element

Inside this issue:

Dugout Management	2
Pest Watch	3
Fundamentals of Soil	4
Environmental Farm Plan and Growing Forward 2	5
Pruning Guide	6

TIME FOR A COCKTAIL?

Have you ever stopped for a moment to ponder what lies beneath your feet? Taken the time to grab a handful of soil and rub it between your hands? Wonder why the field across the road looks different from yours? Soil is highly variable and is the basis of productivity, yet how many producers give much thought to soil? How many people can even define what soil is?

So let's start with the basics; soil is defined as a dynamic natural body composed of mineral and organic solids, gases, liquids and living organisms which can serve as a medium for plant growth (Brady & Well, 2002). Soil is defined and responds to the atmosphere, hydrosphere, biosphere and lithosphere. We need to start thinking of soil as more than just weathered rock; more than sand, silt and clay. We need to think of the soil as part of the plant. Much like how our bodies cannot function without bacteria, in fact about 70% of our cells are bacterial, we need to think of building topsoil as a biological process. In the 1890s a great deal of research was completed on soil microbes as their importance was greatly recognized. Agriculture needs to go back to those roots. This can be seen with the fact that the nutritional value of food produced today is lower than any other point in history. Our plants are not getting the nutrients and minerals from the soil that they need.

We need to step back to the foundation of agriculture, we need to improve our soils. 2015 is marked as the international year of soils. Make this the year to make some management changes to improve your money maker. This can be done with cocktail cover crops, soil amendments, adding permanent vegetative cover into rotation, crop rotation or a host of other practices into your management.



What Is In Your Water?

Dugouts are a great source of water for many uses, however many encounter problems over their lifespan. Good planning, monitoring and maintenance are key to prolong the use and maintain the quality of water in your dugout. Aeration is one of the simplest things you can do to mitigate issues and maintain water quality. Inspections should be done regularly for signs of: animal entry (both domestic and wildlife); lack of aeration (stagnant water); damage to buffer areas; erosion and bank slumping; surrounding vegetation; and visible signs of water quality (turbidity, colour, smell etc.).

Dugouts properly constructed (minimum 15 feet deep, 1.5:1 slope, spoil pile either removed or leveled out and grassed, and big enough for a two year supply of water) will provide a dependable source of water. Trees around the dugout are good for snow trap, but must be setback to prevent roots from breaking through the clay liner and reduce natural aeration. Deciduous trees should be no closer than 50 meters from the bank and coniferous trees no close than 20 meters to prevent leaves and branches from the trees from falling into the water and adding organic matter to your water source. Proper siting is also crucial for runoff capture, ensuring maximum capture to sustain over dry years. Proper diagnosis of issues is essential for determining appropriate treatment method.

Problem	Causes	Treatment
Black Smelly Water	Depletion of oxygen due to algae growth, plant decay or no aeration. Damaged or improper intake pipe. Anaerobic bacteria growth.	Install or fix aeration, change diffuser at the bottom of dugout. Control weeds and algae. Physically remove decaying matter. Raise intake pipe.
Dirty Water (Turbidity)	Soil erosion, human activities, direct access by livestock, and animals such as ducks and muskrats.	Coagulation. Plant vegetation and soil erosion control. Could create a two dugout filtration system (settling pond). Prevent livestock from entering dugout with exclusion fencing and offsite watering systems.
Algae and/or Cyanobacteria	There are many types of algae; most common is green algae and blue-green algae (cyanobacteria which are toxic).	Aeration and prevention of nutrient overloading. Offsite watering systems and fencing off dugouts from livestock. Algaecides, color dyes, hydrated lime (best for blue-green algae), or registered liquid copper.
Vegetation	Some types are beneficial (providing shade, take up excess nutrients, and lowering water temperature) and other types are harmful.	Identify what species are present in your dugout to determine treatment option. Physical removal (raking, mowing); biological control (weevils, galls); colorants; registered herbicides; aeration/diffuser.
Nutrient Build Up	Over the years sludge builds up, containing precipitated chemicals, dead biological matter, and sediments. Causes algal blooms, cyanobacteria and vegetation growth.	Clean out dugout (roughly every 10 years), usually using a track hoe to remove sludge layer at the bottom and sides and remove excessive plant growth.

Foxtail barley grows where nothing else seems to want to grow. It is a common weed problem for many producers all across Canada. Before the seed head forms, foxtail barley can be grazed by livestock and is considered to be relatively nutritious with adequate levels of protein and low crude fibre. However, mature seeds can easily lodge in the nose, mouth, throat and eyes of livestock and can cause abscesses, lump jaw and calf diphtheria.

FOXTAIL BARLEY

Foxtail barley is a short-lived perennial weed with a shallow fibrous root system. It spreads primarily by seed, but also can reproduce vegetatively by forming new tillers. The seeds can germinate at various points of the growing season (spring to fall) and are viable for up to seven years.

Foxtail barley is adapted to grow in many different conditions, from moist to arid, high salinity and various soil types (clay, loam and sand).

To control any infestations several management practices can be used. Mowing or grazing in the spring before seed set to maximize palatability and prevent seed dispersal. A second mowing or grazing may be needed later in the growing season.

In places that are heavily infested cultivation may be required and then the area should be seeded with a competitive forage species or mixture, or annual crop. In areas that are wet, seeding in the fall may be done (exceed regular seeding rate by 20%) with an appropriate forage mixture for growing conditions.



JIMSONWEED (DEVIL'S TRUMPET)



Jimsonweed has been showing up this year in Canola fields in Central Alberta. It contains tropane alkaloids, which have caused poisoning and death in humans, livestock and wildlife. The entire plant is toxic, even the nectar, which can contaminate honey.

The plant can reach 2 meters in height with thick reddish-purple smooth stems. The trumpet shaped flowers are white to purple in colour and are 7-10 centimeters long. The egg shaped seed pods are 2-5 centimeters wide with large spines and contain 6-700 seeds. The seeds are hard to clean from Canola and can easily contaminate our food system. Cases of human poisoning are much more common than livestock as jimsonweed has a strong sour odour and unpleasant taste, livestock will only eat it if no other food source is available.

Jimsonweed should be pulled from fields prior to swathing, ensuring you are wearing gloves and long sleeves, double bagging the weeds to dispose of at a landfill. Do not compost or burn as the plants will release toxins to the air, which may cause secondary poisoning.

Symptoms of poisoning from jimsonweed include: hallucinations, blurred vision, uncontrolled movements, nausea, delirium, dry mouth, dry skin, elevated temperature, flushed face and neck, and sometimes coma and death.

Report all sightings to Nicole Kimmel, weed specialist with Alberta Agriculture and Forestry at (780) 422-0885 or nicole.kimmel@gov.ab.ca
 More info: <http://www.cbif.gc.ca/eng/species-bank/canadian-poisonous-plants-information-system/all-plants-common-name/jimsonweed/?id=1370403267137> or <https://www.abinvasives.ca/>

Photos of Jimsonweed courtesy of Westlock County

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

310-APSS (2777)

Pest Watch

Fundamentals of Soil

Key Points of the Building Soils - Creating Land with Dr. Christine Jones

On August 4th Dr. Christine Jones visited us from Australia as part of the Soil Initiative summer event series. She started the day with the statement that “the nutritional value of today’s food is lower than any other point in history”. Over the last 60 years there has been dramatic decline in mineral and nutrient content in foods grown in Canada and globally. This may seem counter-intuitive as producers today are adding large amounts of fertilizers; but plants today are not acquiring the minerals and trace elements that they need from the soil. The reason for this is roots. Fertile topsoil is a product of photosynthesis and microbial resynthesis. Photosynthesis is the basis of life on Earth, so producers need to start thinking of themselves as “light” farmers.



85-90% of plant nutrient acquisition is microbially mediated.

Plants and soil microbes (mycorrhizal fungi, nitrogen-fixing bacteria) have a dependence on each other. When plants photosynthesize they feed the microbes by translocating carbon to their roots which transfers to the soil along with humification. When those microbes are not present, plants starve to death which causes producers to start applying fertilizers to try to “fix” the soil.

Building topsoil is a biological process, which begins with increasing living ground cover. To do this we need to build photosynthetic capacity and enhance the photosynthetic rate. To build capacity you need to increase leaf cover, preventing light from hitting the ground. This can be achieved with multispecies (cocktail) crops to increase the leaf cover by having different leaf shapes, number of leaves, and different heights of plants. Or by adequate seeding rates of annuals. By increasing the amount of soil carbon with an increase of plants, there will be an increase in humification, along with an increase of organic nitrogen. Increased soil carbon also leads to an increase in soil water holding capacity and greater infiltration.

It is all about the roots. Go and pull a plant, if the roots are clean that plant is not communicating with the soil.

To enhance the root systems and improve soils, having a diverse plant composition is important. Cocktail cover crops are a great way to condition your soil, but if you do not want to grow a multitude of species, there are always many varieties of a single species that you can include, all with various traits to maximize photosynthetic capture. Grazing management is also critical. If the plants are over grazed, the root system of the plant will be deteriorated. Leaving adequate plant matter, as well as long recovery periods, are integral to maintaining root systems.



Cattle grazing a cocktail crop, which was subject to three months of drought this year. (photo from Greg Nichiporik, Hotchkiss AB)

The world’s most productive ecosystems, such as rainforests and native prairies, receive no synthetic fertilizers.

If there is adequate biological (microbial) activity, if the soil is healthy, you will not have a plant response to added fertilizer. This is due to the mycorrhizal fungi and bacteria providing all the nutrients and mineral to the plants in return for liquid carbon from the plant.

“There can be no life without soil and no soil without life; they have evolved together” - Charles E. Kellogg, 1938

Healthy soils equate to healthier plants and animals meaning healthier profits for your operation.

Growing Forward 2 provides programs and services to achieve a profitable, sustainable, competitive and innovative agriculture, agri-food and agri-products industry that is market-responsive, and that anticipates and adapts to changing circumstances and is a major contributor to the well-being of Canadians.

GROWING FORWARD

The Livestock Welfare Producer program is now accepting applications with a 50% cost share to \$50,000. This program covers expenses such as portable panels, rubber matting, new handling facilities and much more. The *Growing Forward 2* Livestock Welfare Producer Program addresses three major industry objectives:

- Implementation of humane methods of livestock Euthanasia.
- Adoption of internationally recognized Mass Destruction technologies for compromised livestock.
- The elimination of injury and distress through the adoption of low stress livestock handling systems.

For assistance with any of the Growing Forward 2 programs please contact Kellie at LARA

Growing Forward Stewardship Programs

Program Area	Eligible Costs	Cost Share
Riparian Area Fencing and Management	Permanent fencing (controlled access or exclusion): <ul style="list-style-type: none"> • Permanent barbed/electric fencing systems • Construction materials and supplies. NOTE: all materials must be new materials and not materials on hand • Labour and equipment will be paid at a 1:1 ratio to materials expenses. (NOTE: refer to section 7.4 in the Terms and Conditions); Purchase and planting of native trees and shrubs and/or native or non-invasive introduced species of grass and legumes; Seed and seeding operation for revegetation; Cultural weed control systems and mulch	70% to a funding maximum of \$50,000
Year Round / Summer Watering Systems	Deeply buried, shallow buried, or surface pipeline installation used to distribute water within a pasture and protect a water body/water source; Portable watering systems; Year-round watering systems; Troughs, stock tanks, plastic tanks (or similar water storage); Frost free nose pumps; Pumping systems; Power sources such as solar panels, windmills etc. And other electrical supplies; Plumbing materials	50% to a funding maximum of \$30,000
Wetland Restoration	Earthwork related to construction or plugging of old drains; Engineering consultant fees for design and construction; Re-vegetation costs (seed plantings etc.); Applicant's equipment use at custom rates; In-kind labour at set program rates (\$25/hour)	70% at funding maximum of \$50,000
Livestock Facility and Permanent Wintering Site Relocation	Construction costs to rebuild an equivalent facility or adequately sized facility in a more suitable location; Plumbing, electrical, fence lines, feeding areas, shelter/wind protection; Earthwork; Engineering design and fees (if applicable); Tear down and removal costs of the old livestock facility; Re-vegetation costs of the old site; Applicant's equipment use and in-kind labour	50% at funding maximum of \$50,000
Used Oil and Lubricant Storage	Double wall steel storage tank design expressly for the temporary storage of used oil and lubricants that have a ULC or CSA approved stamp or plate indicating it is for that purpose (ULC-652)	50% at a funding maximum of \$2,000
On-Farm Water Management	Wells (including test drilling, new pump and well casing, electroseismology test, disinfection of new well); Dugouts (including aeration, fencing and floating intakes); Dams (including intake and fencing); Spring Development; Water tanks/storage/cisterns for low producing wells or as part of a permanent water supply; Buried pipelines Special projects include: Specified water conservation measures (purchase and installation of water use meters, well depth meters for agricultural use of water, well decommissioning by a certified contractor, well pit conversions by a certified contractor; Tie-ins	Various funding levels, refer to the terms of reference

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.

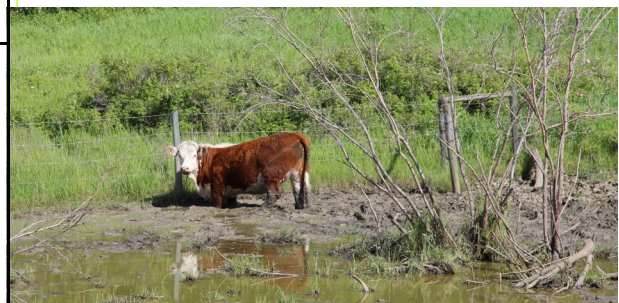
Having a completed EFP allows producers to access different funding opportunities, such as the Growing Forward Stewardship Program. It is also useful in product branding that demonstrates specific environmental standards.

The EFP Process

An EFP can be completed through workshops 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 the LARA office at 780-826-7260



Stuck in the mud? Consider an offsite watering system.

ENVIRONMENTAL FARM PLANS

From Alberta Agriculture and Forestry



Tree Pruning

For beginners doing pruning in their yards.

For any large pruning please contact professional certified arborist.

When to prune?

- **Coniferous trees**, like spruce or pine, can be pruned any time of year. For most trees, the best is time from March to mid-April or during the winter
- **Birch and Maple** – prune **ONLY** during the growing season – June and July – leaves must be fully developed
- **Elm trees** – **DO NOT** prune from April 1 till October 1
- **Hardwood trees**, like aspen or ash, and **shrubs without showy flowers**, prune in the dormant season
 - to easily visualize the structure of the tree,
 - to maximize wound closure in the growing season after pruning,
 - to reduce the chance of transmitting disease, and
 - to discourage excessive sap flow from wounds

Why prune trees?

- To remove "3D- Dead, Diseased or storm-Damaged" branches
- To thin the crown to permit new growth and better air circulation
- To reduce the height of a tree or to remove obstructing lower branches
- To shape a tree for design purposes
- To reduce potential fire hazards
- To encourage flowering, to promote fruit production
- To address safety issues for people or property

How much to prune?

- Every time you prune a tree, it stresses the tree and increases vulnerability
- Pruning increases the opportunity for insects and diseases to invade trees
- Generally speaking, prune no more than 25 % of living branches
- The amount of live tissue that should be removed depends on the tree size, species, and age, as well as the pruning objectives



Basic principles of pruning

- Visualize the shape of the plant at maturity – how the tree will look like after pruning
- Remove dead, damaged and diseased wood
- Select the key branches or main stems that you want to keep
- Remove weak crotches, crossed branches, suckers and watersprouts (new branches growing near bottom of the tree)
- Cut back to branch collar to leave the smallest wound possible
- Remember that more is not always better – you can always prune next year



Pruning techniques

- **Cleaning** is the removal of dead, dying, diseased, crowded, weakly attached, and low-vigor branches from the crown of a tree.
- **Crown Thinning** is the selective removal of branches to increase light penetration and air movement through the crown (the branches and leaves extending from the trunk or main stems). Thinning opens the foliage of a tree, reduces weight on heavy limbs, and helps retain the tree's natural shape.
- **Raising** removes the lower branches from a tree in order to provide clearance for buildings, vehicles, pedestrians, and vistas.
- **Reduction** reduces the size of a tree, often for clearance for utility lines.



Pruning Tools

- Keep pruning equipment (pruning shears, loppers, saws, etc.) sharp and clean.
- You get what you pay for, so cheaper tools....usually are !!!!
- Before you cut, dip your pruner for a few seconds in bleach.
- After pruning, put the tools under running water for 10 minutes and thoroughly dry.
- Dry tools after clean up – don't let them rust.
- Clean up tools after you finish your work.
- Buy only the tools that you really need - pruners, rounding saw, loopers, sheers, secateurs

Pruning Shrubs

- Shrubs that bloom **before June 20** should be pruned immediately after the bloom period.
- Shrubs that bloom **after June 20** should be pruned in the dormant season or just before growth in spring.
- Not all shrubs needs to be pruned, not every year and not severely.
- Many flowering trees/shrubs (eg crabapple, hawthorn, pin cherry, chokecherry, etc) are susceptible to fire blight and black knot fungus, and pruning can spread these diseases.

Pruning Roses

- In the wild, roses produce strong new shoots from near the base of the plant each season.
- Prune during the winter – March/April just before the season starts.
- Deadhead during the summer – prune back to a five leaflet leaf.
- Cut above an outward pointing bud to encourage an open center.
- Cut back into healthy wood.
- Cut any diseased or damaged branch.
- Remove all thin, weak canes that are smaller in diameter than a pencil .



SAFETY IN PRUNING

- Get pruning safety training, available at many arborists.
- Have an emergency plan in place in case an incident occurs.
- Wear eye protection at all times.
- Wear a hard hat and steel toed boots.
- Wear leather or other appropriate gloves.
- Do not use axes or hatchets—use proper pruning equipment.
- If you use power tools, please follow their safety procedures.
- For beginners, do not climb trees.
- Before trimming a tree, inspect the area to identify possible hazards (e.g. presence of power lines, broken or cracked limbs after a severe storm) and take appropriate actions to prevent injuries or accidents.
- Do not prune under power lines
- Do not use dead branches for support.
- Do not leave partially sawn limbs on trees.

Myths about Pruning (and the truth)

1. Pruning is difficult – *pruning is not complicated, but it is hard work*
2. Plants will die if they are pruned wrong time of year - *not true*
3. All pruning must be done during the winter - *with a few exceptions, you can prune year-round*
4. Removing and pruning trees is a crime against nature - *not true*
5. Most trees need pruning - *this is not true, unless there is a valid reason to prune a tree*
6. Hedge shears are all you need to prune shrubs - *shrubs require more than hedge shears, they require proper pruning*
7. Anybody with a pick-up truck, chainsaw, and pruners is an expert - *use people with knowledge and expertise in this area*
8. All cuts must be treated with paint - *not true*

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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WESTERN CANADA

Conference on Soil Health

December
8th, 9th & 10th 2015

Radisson
HOTEL EDMONTON SOUTH
4440 GATEWAY BOULEVARD

Speakers:

Dr. Yamily Zavala
Dr. Harold van Es
Gabe Brown
Dr. Jill Clapperton
Dr. Allen Williams
Dr. Jeff Battigelli
Dr. Martin Entz
Neil Dennis
Dr. Odette Menard
Jay Fuhrer
Producer Panel

Banquet Speaker:
Blake Vince

What is Soil Health?
Soil Health Assessment and Building Soils for Better Crops
Healthy Soils, Healthy Farms, Healthy Communities
Healthy Plants Grow in Healthy Soils
Adaptive Grazing Leads to Reduced Inputs & Improved Profitability;
Grazing for Soil Health
Soil Biodiversity - Exploring the World Beneath Your Feet
Ecological Farm Management to Improve Health of Prairie Soils
Grazing to Healthier Soils
Earthworms, Soil Conservation, Soil Health...Getting to the Roots of It
Cover Crops and Living Soils
How I Improved the Health of My Soil

Nuffield Scholar "Multi-species Cover Cropping Around the World"

For more information or to Register contact:
www.albertasoilhealth.ca or ARECA 780-612-9712



Soil Resources:

- www.albertasoilhealth.ca
- www.amazingcarbon.com
- www.soilcarboncoalition.org
- www.soilcc.ca
- Article on cover cropping <http://www.albertafarmexpress.ca/2014/10/24/cover-crops-and-soil-health-guru-winning-converts-in-alberta/>
- Milk Application on Pasture <http://www.westcentralforage.com/projects/milk-application-on-pasture.aspx>



The Effects of grazing and root growth <https://www.for.gov.bc.ca/hfd/pubs/docs/Fpb/Rmf01/Rmf-4023.htm>

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