PRAIRIE STEWARD

FARMING FOR YOUR FUTURE ENVIRONMENT

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FORAGES IN ROTATION AND SOIL FERTILITY

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When we think of rotational crops, forages may not be the first crop that comes to mind. However, well-managed forage stands can provide benefits when included in a rotation with annual crops. In addition to contributing to supply of animal feed, benefits of perennial forages include a break in pest pressures as well as contribution to improved soil quality, especially organic matter. Research on the effect of grass-legume forage mixes in south-central and north-eastern Saskatchewan in the 1990s and 2000s revealed significant increases in soil organic carbon content in the top 15 cm (~ .5 to 2 tonnes C/ha/yr) over a five- to ten-year period when marginal annually cropped lands were converted to perennial forage cover (Mensah et al., 2003; Nelson et al., 2008).

In these studies, legumes in the mixture were noted to be important contributors to the enhanced nitrogen fertility observed after several years of forage seed-down. However, low phosphorus fertility in the stands was often observed, and sometimes lack of other nutrients like potassium and sulfur were limiting the productivity of these old forage stands and the annual crops that followed. When forage stands are harvested for hay, the off-site export of nutrient in the hay can be considerable (example 60-80 lbs P_2O_5/acre for a 5 ton/acre alfalfa stand). As such, forage stands may be effectively rejuvenated through addition of nutrient as commercial fertilizer, manure and via in-field feeding and grazing strategies that strive to replace the nutrient that has been harvested over the years.

What about forages in rotation with annual crops for a short (example two years) period of time? Recent research by the Western Beef Development Center, University of Saskatchewan and Agriculture Agri-Food Canada at four sites across Saskatchewan has addressed this question. The study compared the impact of two years of alfalfa, two years of red clover, barley followed by pea, and barley followed by flax on soil and plant nitrogen (Jefferson et al. 2014) and phosphorus (Rehemuti, 2014) in these crops and in the wheat and canola that was grown the following two years. The nitrogen fertilizer equivalent (NFE) of the legume in rotation was calculated in this

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study. The NFE is the amount of additional nitrogen fertilizer that it would take to achieve the same yield of wheat grown on flax stubble as was observed for the wheat grown on the legume stubble. As an example, the calculated nitrogen fertilizer equivalent at the Lanigan site ranged from ~ 100 to 170 kg N/ha for the two years of forage legume. Non-N benefits of the two years of forage legume were also apparent. Some of this short-term benefit may be attributed to phosphorus. An important observation of this study was that despite greater removal of phosphorus in harvest of forage material compared to removal of phosphorus in grain of the annual crops over two years (Table 1), the available phosphorus concentration and supply rate in the top-soil after two years remained similar.

Sites	A-A†	RC-RC	B-P	B-FL
	----------	(kg P_2O_5 ha^{-1})		----------
Saskatoon	70§	58	15	22
Lanigan	80	58	25	24
Swift Current	35	24	14	13
Melfort	44	44	36	45

Table 1. Phosphorus removal (kg P_2O_5/ha) by crops in rotation over two years (2010 + 2011). A-A is alfalfa-alfalfa; RC-RC is red clover; B-P is barley-pea; B-FL is barley-flax. *From M. Rehemuti 2014 MSc thesis, Soil Science Department, University of Saskatchewan.*

This suggests that the forage legume was able to access and render available some additional soil phosphorus via their deep rooting system, production of root exudates, and associations with beneficial soil fungi. Overall, forage legumes in rotation, even for a short time, can generate significant fertility benefits. However, over several years, the greater removal of phosphorus by harvested forages and the annual crops that follow will eventually need to be balanced by fertilizer or manure to maintain soil fertility.

F. Mensah, J.J. Schoenau and S.S. Malhi, 2003. Soil Carbon Changes in Cultivated and Excavated Land Converted to Grasses in East-Central Saskatchewan. Biogeochemistry, 63, 85-92.

J.D. Nelson, J.J. Schoenau and S.S. Malhi, 2008. Soil Carbon Changes and Distribution in Cultivated and Restored Grassland Soils in Saskatchewan. Nutrient Cycling in Agroecosystems, 82, 137-148.

P. Jefferson, J.J. Schoenau and B. Coulman, 2014. Short Rotation Forage Legumes For Reducing Nitrogen Fertilizer Costs in Saskatchewan. Final Report. Agriculture Development Fund Project 20090283: 55pp.

M. Rehemuti, MSc. Department of Soil Science, University of Saskatchewan. Effect of Forage Legumes in Short-Term Rotation on Phosphorus Fertility of Four Saskatchewan Soils, Fall 2014.

INVASIVE PLANTS: OUR SHARED RESPONSIBILITY

Rachel Turnquist, BSA, PAg, Regional Forage Specialist Moose Jaw, Saskatchewan Ministry of Agriculture

Spring is the time for new beginnings and new life! Spring is a fresh start with new tree leaves emerging and pasture grasses pushing out from the beneath the litter. Unfortunately, invasive plants are growing, too. Invasive plants are defined by the Saskatchewan Forage Council as "*a non-native plant that, because of its growth and reproductive characteristics, can adapt to one or more habitats very quickly and proliferate, expanding in range*".

Invasive plants are a threat to native and tame rangelands, to wildlife habitat and to recreational areas. They can spread agressively and have a negative economical, environmental and/or aesthetical effect. These plants are introduced from other countries or other environments. Without their natural predators, there is little to keep them from expanding in acreage. They take away valuable nutrients from existing vegetation and displace most vegetation in their path.

Leafy spurge infestation displacing native rangeland vegetation

Invasive plants impact us all either directly or indirectly. If you live in an urban or rural area, if you are a gardener, livestock manager, restaurant employee, hunter, retiree, teacher, annual crop grower, acreage owner, student, trades person, cabin dweller, snowmobile/ATV rider, roadway grass mower, nurse, parent etc., you are impacted. The humbling truth is that we all have the ability to add to the spread. There is an unlimited list of ways to spread invasive plants (and a matching list of best management practices to prevent or manage them). We can spread them with our vehicles or farm equipment. Tufts of invasive plant-contaminated hay can blow off into the ditch while in transport. We can drag seeds or rhizomes when mowing the grass and take them to a new location. Wildlife and migrating birds can spread plants by ingesting an invasive plant or carrying the seeds on their fur and feathers to deposit the seed miles away. The list goes on. Bottom line, it is the same wind that blows through town or on the farm. Rivers and roadways connect us all.

FIVE REASONS TO CARE ABOUT INVASIVE PLANTS:

1. Saskatchewan is an agricultural province. We or our neighbors grow food that feeds the world. When invasive plants are introduced into agriculture they create not only a labour and monetary expense, but also personal stress, livestock stress and potential reduction in food quality and quantity. Being a good neighbor is important.

2. Invasive plant species are a threat to our natural ecosystems, to native and tame rangelands. As an example, the invasive plant baby's breath is so aggressive that it can displace all the vegetation in a pasture. This reduces not only the forage yield, but also the biodiversity in our environment.

3. Not every invasive plant can be easily controlled by herbicide. Many pasture acres with invasive plants on them are growing in sensitive areas such as sandy soils, riparian areas with challenging topography. Herbicides cannot always be applied in these areas and alternative, innovative and often more labour intensive options are required.

4. The next generation. Every parent wants the best for their children. Let us strive to have fewer invasive plants for our children to combat.

5. We can all spread invasive plants. It can be as simple as not knowing what is an invasive plant, growing it in a garden or driving down a road transporting an invasive plant seed in the tire tread. We don't spread them on purpose, but we all need to be responsible.

Early detection and rapid response are key to keeping invasive plants manageable. For example, it is feasible and realistic to spray out a patch of invasive plants the size of a small car at a considerably lower cost for chemicals and labour than to tackle a whole field. Leaving the patch to grow without management can turn a few square feet into many acres quickly, and the feasibility of eradication decreases.

Brandon University conducted an economic impact assessment for leafy spurge in 2010. They estimated that the 1.2 million acres of leafy spurge in Manitoba cost 40 million dollars per year in both direct and indirect costs. The Canada Food Inspection Agency conducted a nationwide economic impact assessment in 2008 and estimated that invasive plants on all agricultural land (crop and pasture) in Canada cost approximately 2.2 billion dollars. These are only two examples of the significant price tags that can be associated as we strive to deal with invasive plants.

Common tansy seed spreading on top of the snow on a snowmobile trail

WHAT WE CAN DO

The first step is to learn how to identify and how to control invasive plants. A good starting point is learning the prohibited and noxious species listed in the *Weed Control Act*. Some species may be familiar, such as leafy spurge, common tansy or absinthe, but some may challenge your skills, such as downy brome, salt cedar, wild parsnip or nodding thistle. Learning the species involved can prepare you to identify invasive plants that are threatening neighbouring jurisdictions. Early detection can identify new plants, for example, the recent discovery of diffuse knapweed in central Saskatchewan. Diffuse knapweed is a prohibited weed in Saskatchewan and has the ability to reduce forage production by more than 88 per cent.

Best management practices such as cleaning equipment regularly, purchasing feed that is weed-free, spreading gravel from pits that do not have invasive plants present, and seeding certified weed-free seed when establishing new pastures, can help to prevent invasive plants. The Saskatchewan Forage Council has four best management practices fact sheets available on their website at http://www.saskforage.ca.

The Farm Stewardship Program has a Beneficial Management Practice (BMP), Invasive Plant Management Plan that is intended to assist Rural Municipalities (RMs) and First Nations Bands (FNBs) to map invasive plant species, and develop management plans to control the spread and/or eliminate the presence of invasive plant species.

The Saskatchewan Association of Rural Municipalities (SARM) administers the Invasive Plant Control Program (IPCP). This program is intended to assist with costs incurred for RMs, FNBs and, through RMs, producers and other stakeholders, to undertake and coordinate the control of prohibited weeds under *The Weed Control Act* and specific noxious weeds identified as persistent and problematic invasive plants. The Saskatchewan Association of Rural Municipalities (SARM) is administering the IPCP on behalf of the Saskatchewan Ministry of Agriculture and the Federal Government under *Growing Forward 2*.

SSCA STUDENT MEMBERSHIP

The Board of Directors recently decided to offer a new "Student Membership" for a fee of just $10 to encourage students to learn about our organization and its role in Saskatchewan's history of soil conservation, and perhaps to contribute to its future goals. This membership is available to all students at either undergraduate or graduate levels, and also allows them to attend the annual SSCA conference for the membership price offered to all SSCA members.

If you know any students who may be interested in this offer, please direct them to the Student Membership Form under "What's New" on our website at

http://ssca.ca/images/pdf/Student_Membership_Form.pdf.

SECOND DATE NOW AVAILABLE

BUS TRIP & PRIVATE TOUR OF BROWN'S RANCH – JULY 11-13, 2017

The SSCA has organized a second bus trip to Brown's Ranch in Bismarck, North Dakota due to continued interest. The price includes chartered bus travel from Saskatoon (or points along the highway south by request), bus transportation from the hotel to Brown's Ranch, a private 8-hour tour by either Gabe or his son Paul with lunch included, accommodation for two nights in Bismarck (single or double occupancy as requested), and two breakfasts at the hotel.

With only minimal stops along the way, including crossing the border, the driving time from Saskatoon to Bismarck should be 9 to 10 hours.

Accommodation is tentatively booked at Ramada, a three-star hotel centrally located in Bismarck. The hotel rooms have two queen beds, a refrigerator and microwave. There is free Wi-Fi, a heated indoor pool, hot tub and sauna, fitness and business centre, restaurant and lounge, and the entire building is non-smoking.

Schedule:

Tuesday, July 11	8:00 am – Depart Saskatoon – everyone to bring own lunch
	6:00 pm – Arrive Bismarck – dinner together or on own, evening free
Wednesday, July 12	8:00 am – Depart Ramada Hotel
	8:30 am – 5:00 pm – tour Brown's Ranch, lunch provided by Brown family
	Evening free for dinner and other activities
Thursday, July 13	8:00 am – Depart Bismarck – everyone to bring own lunch
	6:00 pm – Arrive Saskatoon

Price: (includes transportation, hotel and specified meals, in Canadian dollars, based on 56 participants*)

$350 per person – double occupancy $475 per person – single occupancy

To Register:

Contact Gerry Burgess (SSCA Office Manager) by email at info@ssca.ca or by phone 306-371-4213

Seats reserved on first registered basis – full payment due June 15, 2017

***Price may increase or tour may be cancelled if there is not sufficient registration by May 31**

CATTLE AND SOIL WORKING TOGETHER

Jocelyn Velestuk, MSc, PAg

Good soil management is vital to the long-term profitability on any farm operation, including those involving cattle. Farms that raise cattle can manage to improve rather than degrade the land. Balancing the removal of nutrients with the addition of manure and other fertilizers as well as using practices to encourage good microbial activity/diversity and improve soil tilth and water infiltration can have long-term benefits. Minimizing erosion and compaction from cattle traffic is also important to maintaining the soil structure and proper functioning of the soil. Let's take a look at some of the different practices that farmers can adopt to improve their soil health and make their cows and soil work together.

Manure Management

Manure is a valuable organic form of fertilizer and can be an asset to soil management. Areas with low organic matter or shallow topsoil can benefit greatly from manure addition. Soil quality is improved with addition of manure, which supplies, in a sense, a slow release form of nitrogen (N) as well as organic carbon (C), phosphorous ($PO4^{2-}$), potassium (K), and micronutrients such as zinc and copper. Nitrogen in manure is in both plant available and organic forms. The organic N is transformed over time to plant available forms of N through microbial activity through a process called mineralization.

The highly variable composition and nutrient content of manure depends on feed composition, bedding, and storage. Manure that is composted will often have increased levels of plant available forms of N, such as ammonium and nitrate, compared to fresh manure. So how much do you apply to meet your crop nutrient demands? The amount of manure to apply is often based on the available P in the manure because the N to P ratio (N:P) is often different in manure compared to what plants require. Fields that have had manure in the past will often show consistently higher soil P and additional fertilizer N might be required to create balanced fertility for crop growth. Sampling of manure and soil by a qualified agronomist can aid in creating a balanced fertility plan.

Cattle manure and urine deposited directly on the land from in-field winter feeding systems such as bale grazing, chaff grazing, cover crop grazing, or bale processing/rolling on pasture or cropland can also return some nutrients to the land. Nitrogen in a winter feeding system may have increased levels of plant available N in the spring because of the decreased loss of ammonia from decomposition of urea in urine directly deposited on soil versus a system where the manure is spread. Another efficiency of in-field feeding is that cattle do the nutrient spreading themselves, saving the producer time, labour, and equipment costs. Feeding can also be done on areas such as hill tops that can benefit from the organic matter addition of manure and left over feed.

Considerations when animals are on the land including minimizing manure in low areas and around wetlands as much as possible to prevent manure from directly entering the water. High cattle traffic on moist soil in the springtime is also a concern if the cattle are not pulled off the land before the frost melts. Cattle hooves can cause compaction which can result in decreased crop yields. Limiting cattle traffic on cropland to when there are frozen or dry soil conditions can alleviate some of the compaction risk.

Straw and Forage

Baling and removal of cereal straw for cattle bedding following crop harvest exports nutrients from the land such as N, P, K and organic C. Rainfall on straw swaths prior to baling may leach some of the nutrients in the residue back into the soil, although some biomass losses can occur. Potassium is a nutrient that relies on leaching from crop residue to return plant available K^+ ions to the soil. Continuous removal of straw from cropping systems might result in a decrease in available K. Organic matter losses from straw removal over time can also decrease soil quality and the soil's ability to retain nutrients. Methods to reduce the effects of straw removal can include rotating straw removal between fields (i.e. every four years) and lengthening the period of time between removals to build a protective surface mulch. One other consideration is importing straw to bring nutrients in to rather than out of the farm. A management plan for straw removal is important to maintain the long-term productivity of the land.

Annual forage crops used for silage or greenfeed such as barley, oats, and corn are removed at an earlier stage than crops for grain harvest. The desire for high nutrients in the feed results in removal of the above ground plant material at a stage when the plant is actively taking up nutrients which means a high level of nutrients are removed from the soil. This loss of nutrients should be accounted for in the soil fertility plan in order to maintain the soil nutrient status for the upcoming and subsequent growing seasons.

Perennial Forage Stands

Perennial forages with their extensive root systems are beneficial to soil health as they increase soil organic carbon, enhance soil microbiological diversity and activity, and maintain soil cover to prevent erosion. Including forage legume species, such as alfalfa, will allow for nitrogen fixation and increase the soil N as well as access nutrients and water lower in the soil profile. Declining productivity in hay stands can be due to decreasing levels of available nutrients in the soil from continuous removal of above ground stands. Plant species like alfalfa use high levels of K and P, although fixing high amounts of N. Providing balanced fertility for the duration of the stand is, therefore, important when seeding and maintaining hay crops.

Grazing management is also integral to the long term health of forage stands. Allowing grasslands enough rest period and implementing practices such as rotational grazing are essential to maintaining healthier plant stands for long term production. As previously mentioned, cattle distribute nutrients in manure as they graze and maintaining plant cover decreases erosion potential and retains more nutrients.

Minimizing erosion is integral when managing soil and can be done through minimizing tillage and maintaining plant cover. Feeding cattle on grassed areas can eliminate the need to till manure into the soil. When seeding annual crops into terminated forage stands, using a low-disturbance seeder with a disc or knife opener can result in comparable crop yields to terminating via tillage. When soil is kept in place, the arbuscular mycorrhizal fungi can create a network in the soil to increase the nutrient and water uptake of plants. A healthy, functioning soil has good microbial diversity including beneficial bacteria and fungi species. Soil that is left in place can also develop better soil tilth and structure over time, creating a better functioning soil.

A productive mixed farm operation is one that focuses on both the nutrition of animals and health of the soil. It all starts with balanced nutrition and adopting good management practices to make the soil and cattle work together. Tweaking the management of your farm can be as simple as make one change at a time with soil health in mind to suit what works for you and your farm. When farm management prioritizes maintaining soil fertility and long term soil health alongside healthy cattle everyone wins!

Conservation Agriculture 2018

SOIL HEALTH IN A NEW CLIMATE

The 30th Annual Conference of the
Saskatchewan Soil Conservation Association
Monday, January 8th, 2018
Western Development Museum – Saskatoon

SOIL HEALTH SESSION

FARMING SYSTEM SESSION

CONFIRMED GUEST SPEAKERS INCLUDE:

Jill Clapperton—Rhizoterra

Dr. Martin Entz—University of Manitoba

Dr. Rene Van Acker—University of Guelph

Producer Panel

Jill Clapperton (PhD) is the Principal Scientist and Co-founder of Rhizoterra Inc. She is a well-known researcher, international lecturer and advocate for practices that promote soil health. In 2013 she was the Syngenta No Till Innovator for Research and Education, other awards include the Environment Canada Patricia Roberts-Pichette Award for enthusiastic leadership and commitment to furthering ecological monitoring and assessment in Canada. Her company, Rhizoterra, believes that healthy soil grows healthy food and that makes healthy people (livestock, too). Our research farm in eastern Washington is a proving ground for new dryland crops, rotations, technology, and products that help create healthy, productive soils. We are also developing new technology to help farmers make real-time decisions about soil fertility, plant nutrition, and soil microbial activity. Rhizoterra wants agricultural businesses and consumers to make informed decisions about food based on science.

For more information see https://www.rhizoterra.com/

"Underground Livestock"

Photo Credit Larry Reichenberger

OPTIONS FOR CONTROLLING SALINITY

Abbey Wick, North Dakota State University Extension Soil Health Specialist

Managing salinity is not an easy task, but is becoming more important as these areas continue to grow in size. In the northern plains, USA, we are trying a variety of approaches which focus on water management to stop saline patches from growing and to ultimately regain ground. Here are a few steps that are working for farmers in North Dakota. With anything farming-related, a certain level of patience is required to avoid frustration along with persistence to stay the course. Keep that in mind as you read this.

The first thing we recommend in North Dakota with salinity management is to figure out how you can better manage surface and sub-surface water. This is a universal recommendation and applies anywhere. Salinity is closely tied to water management, so our motto is, "manage the water, you can manage the salts". Often times, saline areas are developing alongside ditches that don't drain well, around potholes, in seep areas or in areas where there is a high water table.

I'll walk through each situation where we are seeing salinity issues develop in North Dakota, share my ideas and talk about what farmers are trying here. Please recognize that these recommendations are for North Dakota, but maybe something from these recommendations can be applied further north. I am including the names of the farmers who are doing these practices because we have several videos posted on the NDSU Soil Health webpage (www.ndsu.edu/soilhealth), some featuring these farmers, and there are recent articles written about these farmers that you may be able to find online.

DITCH EFFECT SALINITY:

For saline areas along ditches, start by cleaning out the ditch and getting the water to flow. The water standing in the ditch is upwelling into the field, dissolving salts and carrying them towards the surface about 30 feet within the field. When the water evaporates, the salts remain. The key to managing these areas is going to be (1) reduce evaporation in areas where the salts are being pulled to the surface and (2) intercept the water coming into the field.

I'll take you step by step through a scenario at Terry Wehlander's farm in Sargent County, North Dakota. In Terry's field, which is still very productive in a majority of the field, he now has ditch effect salinity because of a wildlife easement that left him with a permanent ditch along the field edge. Since he can't drain the ditch, he has to figure out how to reduce evaporation and manage the water upwelling into the field.

Step 1: Divide the field into two – a 10-acre piece along the ditch that is saline and a 100-acre piece that is still highly productive with some spotty salinity patches. Manage them differently when conditions allow – you can maximize your production on the good parts of the field and focus on remediating the saline areas.

Step 2: Stop tilling – he did this on the entire field because he wanted to improve water movement, protect his soils and he does have some salts in patches and under the productive areas as well that he wanted to keep below the rooting zone. The crust on the surface of the saline area helps to reduce the evaporation that is drawing the salts up to the surface. The root channels that are not disrupted by tillage in the rest of the field improve drainage to leach salts deeper in the soil profile.

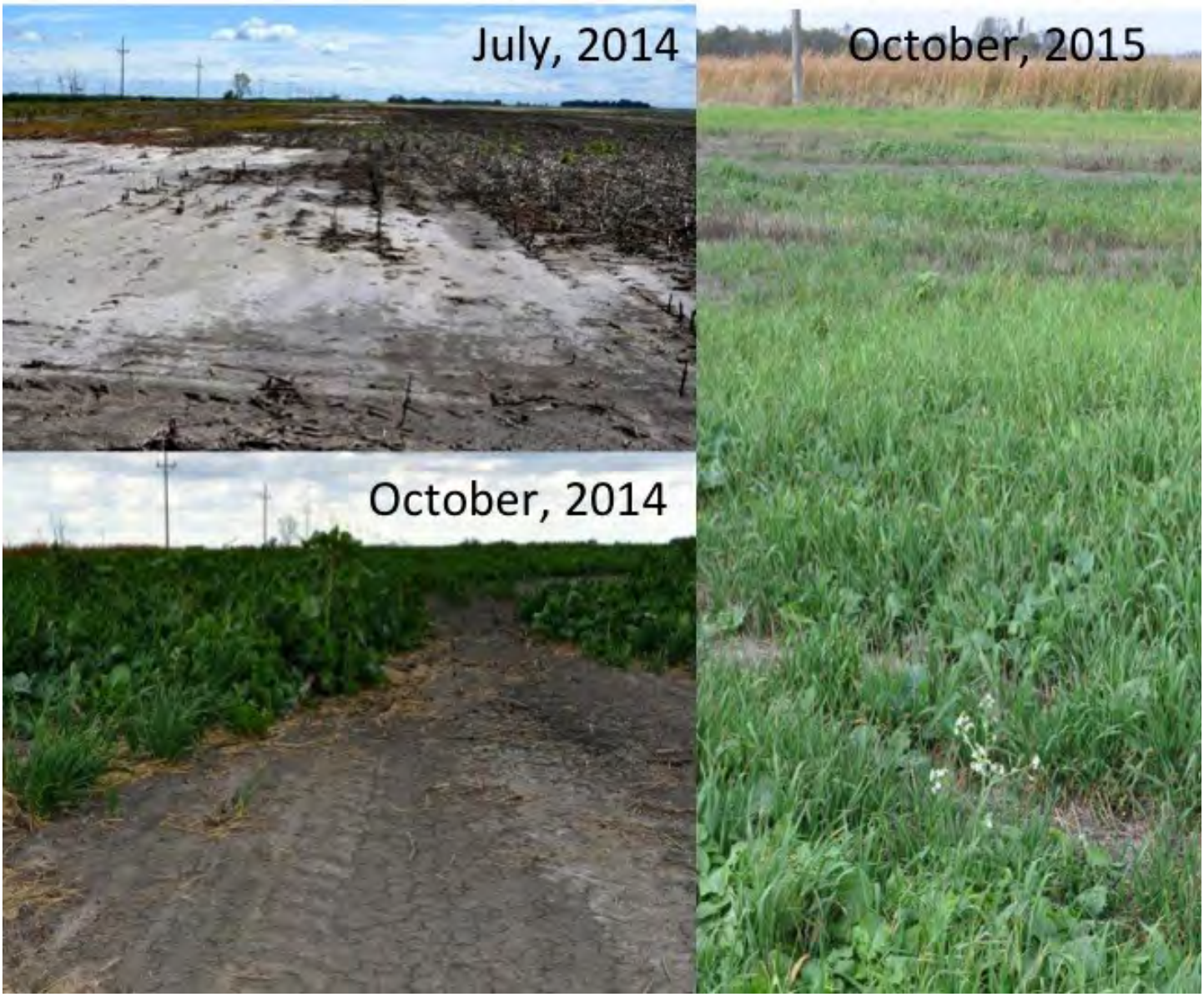
Dividing the field at Terry Wehlander's farm in Sargent County, North Dakota

Step 3: Change up the rotation and include cover crops - In North Dakota, 2014 was a tough spring with a deep frost and a lot of water logging. Terry direct seeded a full season cover crop (barley, radish, turnip, dwarf essex rapeseed) across the entire field.

In 2015, he chose barley as a cash crop across the 100 productive acres that have sporadic salt spots and followed it with a cover crop that included cereal rye in the mix. Small grains are generally more tolerant of salts, more so than his previous corn-soybean rotation, and would do better on the patchy salt areas for a more even crop stand. The 10-acre piece got a full season cover crop again, similar mix as 2014.

In 2016, he seeded soybean into the cereal rye (a concept called planting green) on the 100 acre piece and did a full season cover crop seeded in early May on the 10-acre piece. To manage the weeds in this areas that established over the summer, Terry terminated the cover crop in August with an herbicide, hit it with a batwing mower and the re-seeded barley, radish and cereal rye to get something growing again.

In 2017, the 10-acre piece will stay in cover crops with the goal of eventually seeding a perennial for haying. The 100-acre piece will get barley again followed by a cover crop.



Improvements made to ditch effect salinity by using full season cover crops

POTHOLES:

Potholes are similar to ditch effect salinity, where sitting water upwells into the surrounding field through evaporation. These areas are just a little more difficult to get to than the ditch effect salinity areas because they are spread throughout the field. The first step for the area around potholes will be to avoid tilling those areas and direct seed into them to reduce the evaporation. Here are a few recommendations – that are just ideas based on what we are playing around with here.

Idea 1: Direct seed cereal rye in saline parts of your field in the fall. Even if the cereal rye doesn't grow much in the fall (1-2 leaf), it will grow in the spring, at least that's the case in North Dakota. Then plant your cash crop around those areas and let the cereal rye grow throughout the season. You may be able to harvest the cereal rye and have your own cover crop seed for the next year. You probably won't want to use this approach if wheat is your cash crop on that field, but it could work with other broadleaf crops. Tony Wagner, who farms in Stutsman County, North Dakota is doing this and it's a nice way to get a cover crop in those saline areas without having to go in later and run over your cash crop. It's also excellent for weed control.

Idea 2: If you feel your entire field could benefit and it fits with your rotation, **seed cereal rye across the entire field in the fall**, then plant green into that with a broadleaf crop. Farmers, Lee Trautman in Stutsman County and Tyler Speich in Sargent County are doing this with soybean and sunflower in North Dakota. Never do this before a wheat crop because you can't effectively control the volunteer rye in your wheat. Then plant your broadleaf crop directly into the cereal rye, but only where the cereal rye is "looking good". Spray out the cereal rye where you planted your crop and let the cereal rye continue to grow in the other areas. A poor cover crop is better than no cover crop. This will get a cover crop on your saline areas right off the bat and you won't have to go in later to seed those areas. It should help manage weeds as well through competition and the allelopathic effect of cereal rye (a chemical that leaks out of its roots).

Soybean planted green into 40 lbs of cereal rye cover crop

Idea 3: If the saline areas are growing in size, it may be worth it to run over a little of your cash crop to access those areas. Or another option is to take some areas out of cash crop production to figure out a way to **connect the potholes with cover crops or a perennial to an access point from the road**. What do I mean by this? Choose an access point from the road to run your drill. Seed a pathway from the road to the area around the first pothole, then continue seeding a pathway until you reach the second pothole and go around that, do the same as you approach the third pothole. By doing this you will create an "avenue" for you to either hay the alfalfa if that's what you're seeding or to harvest the cereal rye or barley you put around the potholes. Then you may be able to get something from those areas – at least hay or a cover crop seed for next year. You will put the remaining part of the field into your cash crop, so do what makes sense for your equipment size and accessibility. You will be taking good areas out of production to connect these potholes with a more salt tolerant crop, but this approach is working well for farmers in North Dakota. They are seeding barley as a cover crop into these areas first and then seeding alfalfa into the barley stubble for something more permanent that they can hay. Again, several farmers from Sargent to Stutsman Counties are doing this and having great luck with getting saline areas under control.

SEEP AREAS:

These areas are a real challenge because the water is entering at the top of a hill, dissolving salts and moving towards the base/low area where the water evaporates and leaves the salts behind. At NDSU, we used to recommend managing the hilltops to use as much water as possible. That sometimes meant growing a different cash crop (something deep rooted like sunflower) or a full season cover crop on the hilltops. To manage seeps, I don't think you need to switch up the crop on those hilltops, instead you could figure out a way to interseed a cover crop or follow the cash crop with a cover crop to get more water usage. We did this at Nick Vinje's farm in Cass County, North Dakota. We interseeded corn at the hilltop to use more moisture in the fall and spring and help control the seep at the base of the slope, which got seeded with cover crops.

A more practical approach that could be used in combination with the cover crops on the hilltop is to put a cover crop in the seep area. You won't get a good stand if the saline area is barren, but you may be able to work around the edges and keep those areas under control using cereal rye (fall seeded), followed by barley (spring seeded), followed by cereal rye (fall seeded). Once you can weave radish or dwarf essex rapeseed into the barley phase, do it. Both radish and dwarf essex will use a lot of water and help manage those areas. Be patient with these seep areas, they will take several years to get something growing. If you go from a bare area to having weeds that is a step in the right direction so don't get discouraged.

This seep area was once bare and now has some barley established along with weeds

HIGH WATER TABLE:

Salinity issues as a result of a high water table are pretty common in the Red River Valley of North Dakota. We see a "wavy" response in the crop because this creates patches of salts across the field and varies based on micro-topography. In this situation, salts dissolved in the groundwater are moving up towards the surface through capillary action. Again, this is a process driven by evaporation, so anything that can reduce evaporation like reducing tillage and mulching along with high water usage by a cash crop followed by a cover crop is important. On these fields, we are also switching up our rotations to include more small grains, we are interseeding cash crops (in our case corn) with cereal rye and planting soybean directly into the living cereal rye. The goal is to use as much water as possible and have a cover crop overwinter to use moisture and manage salts immediately in the spring.

Managing salinity that results from a high water table by interseeding cereal rye into corn

Keep in mind that the ideas shared in this article are specific to what we are doing in North Dakota with our crops in rotation and our growing season. I have never been comfortable recommending practices for other areas without an in-depth knowledge of the system. However, rather than writing another article on how salts are moved throughout the landscape with little to no ideas shared for management, I wanted to give you a few ideas of what is working here. Hopefully these concepts can be tweaked to fit your system. You can get more ideas or information on extension events in North Dakota by visiting the NDSU Soil Health Webpage (www.ndsu.edu/soilhealth) or following me on Twitter (@NDSUsoilhealth).

Syngenta Canada and the Soil Conservation Council of Canada partner to expand Operation Pollinator program on-farm in Western Canada

April 24, 2017 – Beausejour, Man. – Operation Pollinator, a Syngenta program focused on research and partnerships to promote the health and well-being of bees and other pollinators given their essential role in agriculture and nature, is expanding its footprint in Western Canada through a multi-year partnership with the Soil Conservation Council of Canada (SCCC).

Through the partnership, farmers in Manitoba, Saskatchewan and Alberta can sign-up to establish Operation Pollinator sites on their farms. SCCC is collaborating with three provincial partners to deliver the program in each of the Prairie provinces -- the Agriculture Research and Extension Council of Alberta (ARECA), Manitoba Conservation Districts Association (MCDA) and the Saskatchewan Soil Conservation Association (SSCA).

To enroll in the program, producers agree to convert one-to-two acres of lower-productivity land to establish a dedicated Operation Pollinator site. In exchange for dedicating the land, participating producers receive a provision of high-quality, pollinator-friendly wildflower seed, agronomic advice, and assistance to help offset site establishment costs.

The goal of the program is to establish and maintain new pollinator-friendly habitat over the long term, study and learn from these sites, and enhance biodiversity for the benefit of the larger Prairie ecosystem.

Farmers wishing to sign up can visit the SCCC website (www.soilcc.ca) where they will find details regarding participation in the program.

“We are excited about working with the Soil Conservation Council of Canada to expand the on-farm footprint of Operation Pollinator in Western Canada,” says Dr. Paul Hoekstra, Senior Stewardship and Policy Manager with Syngenta Canada. “We have and continue to see benefits from Operation Pollinator activities,” Hoekstra adds, noting that information gathered from Operation Pollinator sites confirms their positive contribution to the diversity and abundance of pollinators.

“Soil Conservation Council of Canada is privileged to be working with Syngenta in the delivery of Operation Pollinator in Canada,” says Jim Tokarchuk, Executive Director. “Their strong support anchors this effort and our network of Prairie partners will ensure this program will benefit farmers and the land they steward on behalf of all of society. This is strong fit with our organization’s mandate.”

About Operation Pollinator

Operation Pollinator is a program focused on research and partnerships to promote the health and well-being of bees and other pollinators given their essential role in agriculture and nature. The program's mandate is to support activities that enhance biodiversity, habitat and other practical initiatives that contribute to healthy pollinator populations. Originating in the United Kingdom, the Operation Pollinator program has since been expanded to several countries around the world, including Canada. It includes both on-farm and off-farm components.

Become Involved with Operation Pollinator

If you are interested in co-operating on this project, here is what you need to do:

1. Contact SSCA by phone or email (306.371.4213 or info@ssca.ca) to fill out an enrollment form. Your application will be sent to the Soil Conservation Council of Canada for approval.
2. Upon approval, you will receive 25 kg of seed (alsike clover, birdsfoot trefoil, phacelia, red clover, timothy, yellow and white sweet clover) at no charge (valued at $260)
3. Seed 1 - 2 acres of low productivity agricultural land (low disturbance is recommended)
4. Manage and maintain the site as you would any other newly established site
5. Restrict grazing on the site for 3 years
6. Be willing to allow access to the site for monitoring and tours

In addition to the seed, approved applicants will receive $100/acre seeded (maximum 2 acres) for each of 3 years (2017/2018/2019).

Additional Information

For project updates and more information, including "Why Get Involved?" and "What's in your Operation Pollinator seed mix", please visit the SCCC website at http://www.soilcc.ca/pollinator/index.php.

Soil Health Workshops—Two Locations

When: June 27, 2017 Time: 9 a.m.—3:30 p.m.

Where: Hope Hall, Highway #26, Mervin

Cost: $75 (Lunch Included)

Registration Deadline: June 20, 2017

When: June 29, 2017 Time: 9 a.m.—3:30 p.m.

Where: Thomson Room, AAFC Swift Current Research and Development Centre

Cost: $75 (Lunch Included)

Registration Deadline: June 22, 2017

A practical overview of soil health with

Nicole Masters of Integrity Soils

http://www.integritysoils.co.nz/

Nicole is an agro-ecologist, educator and systems thinker with over 18 years of extensive, practical and theoretical experience in regenerative farming practices. She has been communicating these methods throughout Australia, New Zealand and North America since 2003; helping to inspire and guide farmers into new and innovative ways to produce food.

Work shop classroom topics include soil health and nutrient cycling followed by a practical field exercise.

TO REGISTER, CONTACT THE AGRICULTURE KNOWLEDGE CENTRE @ 1-866-457-2377

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SSCA's mission is "to promote conservation agriculture systems that improve the land and environment for future generations."

SSCA's vision is "to be the recognized driver and facilitator of change that leads to conservation agriculture being practiced on prairie agriculture land."

Disclaimer: The opinions of the authors do not necessarily reflect the position of the Saskatchewan Soil Conservation Association.

www.ssca.ca

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