

# The Gateway Connection

*the latest local ag research news*



## Trial News

### COMPOST TRIALS

How can we use household waste to help amend field soils? By composting them, blending them with other soil amendments and incorporating them into cropland, that's how. Or so we hope!

Work that GRO is doing, in conjunction with AltRoot (local composter of post-consumer organic wastes), Dr. Derek Mackenzie (University of Alberta), his summer staff, and a local producer, will attempt to show if the

addition of composted soil amendments increases yields, preserves moisture, and reduces the net emission of greenhouse gases in crop production.

Started last year, with funding from RDAR, the project had plots near Westlock, Camrose, and Wetaskiwin. The trial plots had compost applied alone, and in various combinations with wood ash, biochar (a product of the incomplete pyrolysis of wood products), gypsum from recycled drywall, and synthetic fertilizer. Control plots with no amendments, and with synthetic fertilizer, were planted to provide comparisons. While the greenhouse gas emission results are still being analyzed, it was found that compost and compost blends did not prove to have equivalent yields to synthetic fertilizer applications. This led the researchers to question if there may be more time required to have compost replace synthetic fertilizers in the field, resulting in further trials. (For results of last year's trials see the [2022 GRO Annual Report](#) - beginning on page 88).

In 2023, a continuation of this project is being conducted at the original site in Westlock, and an adapted version at the University's historic Breton Plots. Compost and compost blends were again applied alongside synthetic fertilizer to get more information on comparative greenhouse gas emissions, soil conditions, and crop yields. Both sites had the various treatments applied mid-May, using the new compost applicator GRO has recently acquired.

We all look forward to the results of this year's work to help determine how to incorporate compost and its blends into annual cropping systems in north central Alberta, while minimizing greenhouse gas emissions in cropping systems and reducing wastes going into landfills.

This year's results will be available to members in the fall and on our website later this winter.

## WINTER CROP OPTIONS

Producers in Alberta have long considered winter wheat and fall rye as alternative crops, for many reasons. This type of cereal helps spread out the seeding season, take advantage of spring moisture and may avoid some of the insects and disease pests common to these crops. But what about other crops? Elsewhere in the world many other cereals, pulses and oilseeds have successful winter varieties that achieve the objectives that winter wheat and fall rye do here. GRO has been fortunate to have been contracted to evaluate some of these crop varieties for their potential in our local conditions.

In the fall of 2022, small plots of crops such as winter peas, lentils, camelina, barley and oats were seeded after harvest of the previous crop. Despite a mid-September seeding date being considered late for these crops by some, the dates fit best for the harvest in the area, anticipated growth window, and the workload of GRO and our cooperating producer. Emergence and fall growth of most species in the trial was considered to be more than adequate. The real concern was over-winter survivability of these crops. Winter conditions play a major factor in this of course. A quite mild winter in 2022-23, with moderate but not excessive snow cover, was considered a relatively good year for this trial to occur.

While it might yet be a little early to determine true survivability and all-important final yield results, a few of the winter varieties seem to hold some promise for area producers. To date it appears that some new winter cereals and oilseeds have survived sufficiently but the varieties of winter pulses seeded in the fall of 2022 may not be adequately winter-hardy for us in north central Alberta. Further research, observation, and analysis this spring and summer is required on these plots prior to any conclusions being made and plans for future work to be considered.

## Upcoming GRO Event

**July 17 - GRO Forage Tour & BBQ**

Start time: 5:30 pm

Please let us know you're coming!

Register at:

[GRO upcoming events](#)

We'll send you an agenda and  
directions!



As promised, this issue we introduce our second new director – Kyle Cross. As we did with Robert Geis, in issue 2, we asked Kyle: What is your background with and/or interest in GRO? What type of operation are you involved in? Do you have any particular goals/hopes with or for GRO?

## New Director – Kyle Cross

My background is farming with my dad in the Hazel Bluff area, producing seed and commercial grain. I have a background and huge interest in pedigreed seed production. I am also a partner in a spraying operation and am an employee of Jubilee Farms, a local feed lot.

By being a part of GRO I hope to gain a better understanding of agriculture in the area, and how to make a living doing it. I would like more insight into what varieties of seed to produce for this area. I believe this is the best place to learn.

As a board member I want to understand Alberta's funding for applied agriculture research. The research that GRO does is so important, and deserves public funding. I am interested in meeting like minded people who have a passion for agriculture.

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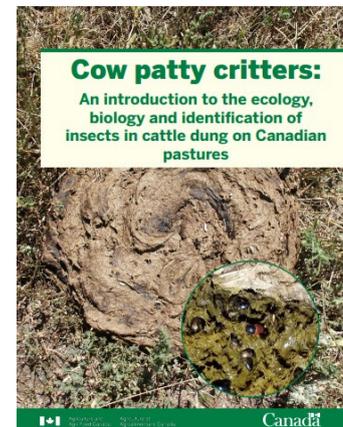
## News from our Partners

### **COW PATTY CRITTERS: AN INTRODUCTION TO THE ECOLOGY, BIOLOGY AND IDENTIFICATION OF INSECTS IN CATTLE DUNG ON CANADIAN PASTURES**

There is a new, free, comprehensive guide to assist farmers and ranchers in investigating the diverse life to be found in dung on pasture across the country. The guide highlights the valuable contributions that insects, bacteria, and other organisms contribute to pasture ecosystems. Including four broad groupings of coprophilous (dung-loving) organisms: flies, beetles, wasps, and mites tools and instructions on how to identify dung insects and other critters are included. Profiles describe biology, includes high-resolution photographs, and has detailed references for further research.

Written by Dr. Kevin Floate, a scientist with Agriculture and Agri-Food Canada's Lethbridge Research and Development Centre, this resource helps bring information together to help all of us understand the benefits that these creatures can provide. He says "The critters found in cow patties provide valuable ecosystem services and are an unexpected ally to ranchers and farmers. This is the guide I wish I had when I started my career as a researcher. If I have done my job right, readers from all backgrounds will find it informative, interesting and enjoyable."

The guide is available as a [downloadable pdf](#). Alternative formats can be requested through a Government of Canada publications search (ISBN: 9780660447551; Catalogue # A59-90/2022E-PDF; or Dept. Catalogue # 13130E).



# Rotational Grazing Webinar: Practical Approaches

## From one rancher to another

Learn about the practical aspects of using rotational grazing on your grass.  
Where to put fence lines, water sources, what worked and what didn't.

Featuring Marcel Busz,  
Mattheis Ranch  
Foreman

**July 5th, 2023 @7pm**  
**[agrisystemsll.ca/events](https://agrisystemsll.ca/events)**



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*AALL is funded in part by Agriculture and Agri-Food Canada through the Agricultural Climate Solutions - Living Labs program.*

## AFSC DATES TO REMEMBER

Jul. 15/23: Perennial Crop Insurance: Last day to file Report of Hay Prior to Harvest.

Jul. 31/23: Hail Insurance: Last day to purchase Straight Hail Insurance.

## FUNDING UPDATES

With the recent election and caretaker period now behind us, the government has been able to resume processing grant applications. While the Resilient Agricultural Landscape Program (RALP), Farm Technology Program (FTP), and Efficient Grain Handling Program (EGHP) have all been accepting applications since April 3, 2023, they are still accepting applications!

An updated RALP Funding List is available on the website. If you have any inquiries, please contact the program emails directly, or call 310-FARM.

More information on each of the programs can be found at:

The Sustainable CAP (S-CAP): <https://www.alberta.ca/sustainable-cap.aspx>

RALP: <https://www.alberta.ca/resilient-agricultural-landscape-program.aspx>

Farm Technology: <https://www.alberta.ca/farm-technology-program.aspx>

Efficient Grain Handling: <https://www.alberta.ca/efficient-grain-handling-program.aspx>

## **NEWS FROM REGENERATIVE ALBERTA LIVING LAB: HIGHLIGHTS OF DR. KRIS NICHOLS AT THE SOUTH DAKOTA SOIL HEALTH CONFERENCE**

The South Dakota Soil Health Coalition, a nonprofit organization led by producers and other agriculturalists, held their annual Soil Health Conference last January. The conference invites students, business professionals, producers, and community members to learn about soil science and the importance of healthy soils. As a keynote speaker, Dr. Kris Nichols gave a presentation about decision making tools for soil health.

At the beginning of her talk, Kris alluded to the audience experience at conferences such as this one. When you come home from a conference, she explained, you might have some ideas you want to implement or several plans that keep changing. But this isn't a bad thing: plans should be flexible and iterative, changing in response to the situation.

Regenerative agriculture can be like this too. The weather and environment doesn't stick to rules or a firm schedule. Neither does the science: it changes, it reevaluates, it discovers new ideas. Likewise, there are no rules in regenerative agriculture that a producer must follow to be certified or international standards that miss out on local nuance.

"You have options and opportunities that are almost limitless," she said, which can be both welcome and scary at the same time. So where do you start?

Here are the highlights from her presentation and practical tools for making decisions.

### **1. Nothing is free**

Soil is an economy of carbon: for a healthy ecosystem, carbon needs to flow through different elements and be transformed by organisms and natural processes. The core of regenerative agriculture is to regenerate soil through recarbonization. That is, restarting a stalled economy by adding carbon back into the system.

However, as Kris said, nothing is free. Within the concept of "carbonomics," producers are essentially paying microorganisms with carbon (through the root exudates from the plant) for the nutrients that they supply.

Carbon isn't infinite – if you want to allocate more carbon belowground, that's less carbon that can be used aboveground. Many producers are concerned that allocating carbon belowground means they have to sacrifice yield. But if the soil is managed right, it doesn't have to be a sacrifice. We need to maximize the photosynthetic capacity of plants in order to balance the underground and aboveground allocation of carbon, maintaining yield and revenue.

"We focus a lot on short-term gains but that gives us long-term losses," she said, referring to the practice of prioritizing yield without considering soil health.

Her recommendation? To focus on short-term balances and long-term gains.

### **2. Except for sunlight, that is**

Photosynthesis is the most efficient form of solar to chemical energy conversion, Kris explained. And if our goal of recarbonizing the soil is only possible through photosynthesis, then we want to maximize the amount of time that plants are green and growing.

Because, as Kris said, sunlight is free. Unlike carbon, nutrients, seeds, fuel, or our time.

She recommends a minimum of 280 days a year of growing green, photosynthesizing plants. Even in South Dakota, not so far away from Alberta, this is possible. Producers need to choose frost-tolerant plants as cover crops to ensure that the plants remain productive when the cold winter months arrive; making use of warm chinooks can help keep plants such as turnips, radishes, rye, and canola alive. Some studies have even shown, said Kris, that some plants are able to photosynthesize beneath a cover of snow.

Stretching out the growing season is critical for the survival of soil microorganisms. "In a heaping teaspoon of healthy soil, you can have more microorganisms than the number of people on planet earth," Kris said. "And they are all hungry."

Microorganisms aren't suited to feast and famine periods; they require a consistent supply of soil carbon throughout the year. And the best way to keep them fed is to have living roots depositing carbon into the soil for as many days as possible.

### **3. Birds, bats and insects**

How do you optimize the capacity of your farm ecosystem?

Producers might choose to plant flowers that attract pollinators or set up bat and bird houses. These animals are underrated pollinators on a farm; Kris explains that more pollen from grass species is found in the digestive systems of pollinators than that of flowers. Farmers can also set up insectaries to attract beneficial insects.

Kris explained a study that involved growing plants around the perimeter of a crop field to attract plant pest insects, drawing them away from the crops. The researchers added a strip of plants within that perimeter to attract insect predators; these insects helped to reduce the pest population. This study demonstrated a unique way to use valuable space and manage pests without pesticides.

This is what Kris means by "eco-function intensification" – considering every square foot of the farmscape and ensuring that it is managed as a healthy, thriving ecosystem.

### **4. Healing wounds**

A moderate amount of stress to plants can make the soil healthier. Referring to the sixth soil health principle of integrating livestock, Kris explained how the unique grazing of cattle enhances ecosystem health.

When an animal grazes, they are injuring the plant's tissues. To protect the wound, the plant produces biomolecules like antioxidants and polyphenolics, chemicals that are already created normally to guard against damage from solar radiation. The plant requires extra nutrients (she lists the elements of nitrogen, phosphorus, potassium, copper, zinc, and molybdenum as examples) to create these chemicals, so it sends down carbon in the form of root exudates. The soil microorganisms supply the plant with the nutrients it needs.

Unlike sheep and horses, who cut and tear leaves while grazing, cattle graze by wrapping their tongue around the forage and tugging on the plants. This motion applies stress to the roots and causes some root hairs to break off, leaking carbon into the soil.

These two processes – injured plant tissues and pulled roots – lead to more carbon being stored underground, improving soil health and providing food for microorganisms.

## **5. Let's get the audience involved**

Halfway through the talk, Kris invited four audience members up to the stage. She gave them two shallow plastic containers with a sponge, representing porous and compacted soil, and filled them with water. The volunteers were invited to hold each wet sponge over a cup and let the water drip out without squeezing it. This is gravitational water, Kris explained: soil moisture that drains downwards, away from the reach of plant roots. Soil with larger pore spaces is prone to this gravitational flow.

She invited the volunteers to squeeze the sponges into a different cup. What comes out is the water holding capacity, or the maximum amount of water that is available to plants. "What we have here is illustrating the power of porosity," Kris said.

The results: the highly porous sponge produced a fair amount of gravitational water and filled the water holding capacity cup by about a third to a half. The low porosity sponge produced a small amount of gravitational water and, with a nearly empty cup, showed almost no water holding capacity at all. In porous soil, she explained, some water will inevitably drain out. But with minimal infiltration in compacted soil, there won't be any water available to the plants. You need porosity in your soils to ensure that plants have an adequate and consistent supply of water.

## **6. Choosing your tools**

The question, said Kris, isn't whether you should use a certain tool or practice, but why – taking into account the positive and negative consequences and how to use the practice most effectively.

Sometimes that means you'll have to till or disturb the soil to control weeds, even if you'd prefer not to. But what you can do is reduce the damage as much as possible and think about ways to help the soil recover. You might alternatively choose to use animals as a form of soil disturbance: their hooves gently break up the soil and control weeds without causing excess damage. And anyways, she explained, the soil can tolerate some disturbance; soils in natural ecosystems deal with animals, flooding and wind and remain functional and resilient.

Kris uses the FIST acronym to explain the nuance of tool use: frequency, intensity, scale, and timing. If you use a split application of fertilizer, you will need to apply it more frequently. But that isn't necessarily a bad thing, she adds. You might choose to apply it as the plants are going into their reproductive phase, which is when they need the most amount of nutrients. The intensity of a tool can make a difference. Applying a large amount of readily available nutrients might be appropriate in one context, but other times you might want to apply nutrients in an organic form so that they are released gradually. As for scale, producers might consider the volume of soil that is disturbed by a certain tool, like a plow, or the quantity of nutrients to apply. Considering the timing of seeding, producers may choose to plant seeds before a soybean cover crop senesces and drops their leaves. The leaves will protect the seeds and allow them to germinate without experiencing damage from solar radiation.

And above all, "it's not about bad or good, it's about looking at the consequences of the tools that you're using."

See the full recording here: [2023 Soil Health Conference: Kris Nichols – Soil Context as a Decision Tool – YouTube](#)

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## What do you want to know?

### IDEAS ARE ALWAYS WELCOME

If there is a topic you'd like to learn more about in the newsletter, during an in-person workshop, or via an on-line networking event, please get in touch.

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**LET'S CHAT!**

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