Learning Circle:
Biodiversity

In the early months of 2026, the Regenerative Organic Oats (ROO) program hosted a series of virtual gatherings called Learning Circles that became a place for farmer-to-farmer learning opportunities, focused on key topics in regenerative organic agriculture. They are designed to reflect on previous guest presentations, share on-farm experiences, explore curiosities, and provide a space to learn collectively within a regenerative organic agriculture framework. This resource shares the experiences, insights, and advice of ROO farmers on biodiversity, highlighting their unique experiments, methods, and practices that supported their soil's health and built on-farm resilience.

Grounding in the Iterative Process

The ROO learning circles provide a supportive space to share knowledge, build confidence, and adapt to new practices, grounded in regenerative principles. These principles focus on improving soil function, such as water infiltration, nutrient cycling, soil structure, and carbon storage, while also supporting productivity, profitability, and healthy landscapes.

Introduction to Biodiversity

Diversity is a central principle in regenerative agriculture, and adding life to your farming system can help improve system function. Diversity should not be added randomly; it should align with specific goals. It is suggested to choose species that you are confident will succeed and build from there.

Soil Amendments and In-Row Applications

A producer from Treherne, MB was curious to know who has used in-row liquid amendments during planting, and another producer from Saskatoon, SK shared his experience:

- He used liquid fish, molasses, compost extracts, humic products.
- He recommended using equipment like individual row drops, a tank with agitation, screen management to prevent plugging, and pH compatibility and jar testing.
- He suggested that this requires more management than standard fertility programs, and ensuring organic compliance.

The main takeaway is that biological inputs can work, but it is important to be careful with handling and system compatibility.

Field Experience with Diversity

This producer also tried an in-row Italian ryegrass trial and experienced the following results:

- Strong fall growth.
- No tilling.
- Following year: mixed or reduced yields in some fields.

His main reflections are:

- Diversity alone is not a guaranteed solution.
- Nutrient deficiencies must still be addressed.
- Living roots may not always outperform incorporation (context matters).
- More research needed on nutrient cycling speed in annual cropping systems.

He hypothesized:

- Even single-species crops can drive significant microbial diversity.
- Some dramatic improvements observed after pea plow-down were likely due to organic matter inputs rather than species diversity alone.

Adding diversity is not a “recipe” or silver bullet. Intention matters: What is the next crop? What nutrient cycle are you trying to influence? What assumptions are being made? You need to test assumptions when using biological feedback loops. Nuance and context are critical.

Converting Diverse Pasture to Cropland

A producer from Nipawin, SK is transitioning a highly diverse but unproductive pasture (willows, grasses, legumes) into a more monocropped system. He holds concerns about “going backwards” in terms of diversity. A few trials he has attempted in the past are:

- Partial tillage vs. leaving cover crop standing.
- Applying alfalfa pellets (200 lb/ac ≈ 6 lb N/ac).
- Avoiding liquid seed-applied inputs for simplicity.

His main concern was: will alfalfa pellets meaningfully stimulate soil biology?

The Scoop on Alfalfa Pellets

Alfalfa pellets provide carbon, nitrogen, and potassium. They are likely to stimulate microbial activity indirectly through increased plant growth and root exudation. Excess available nitrogen may reduce biological N-fixation signaling. Alfalfa pellets can be a potential short-term “nudge,” but not necessarily a long-term strategy.

There are a few considerations to make before integrating alfalfa pellets into a farm system. They require moisture for breakdown. They may function more as carbon/food source than microbial inoculant. Dry environments may reduce pellet effectiveness, and the dehydration process may limit retained biology.

Real Experiences with Alfalfa Pellets

Another producer from Balcarres, SK shared that a consultant recommended that he dissolve pellets into compost tea for biological impact. In the past, he applied compost extract using an IBC tote mounted to drill and a gravity-fed ABS pipe system (~30 gal/ac).

He made a few observations:

- Greener crop response
- Higher Brix readings (via refractometer)
- Fewer grasshoppers in treated area

However, he also faced a few challenges:

- Inconsistent pressure without pump
- Suspended solids clogging screens
- Tank stability issues

Here are some of this producer’s suggestions for improvements to the system:

- 12V pump for consistent pressure
- Proper filtration before tank entry
- Avoiding high suspended solids

These trials are technically demanding. They can also be frustrating and costly. Persistence is often driven by curiosity and conviction.

Monitoring Deep Compaction Interventions

A producer from Treherne, MB has a plan to address deep compaction in certain parts of his fields. He aims to do mechanical deep ripping where the penetrometer shows a ~300 psi hard layer, and follow it up with a deep-rooted cover crop blend of sweet clover, alfalfa, kale, and sunflower. He will be focusing on low spots with water pooling along with side-by-side field trials. He plans to undergo these monitoring metrics:

- Visual crop performance
- Brix testing
- Penetrometer readings
- Water infiltration tests
- Photo documentation
- Consultant guidance
- Compare managed vs. unmanaged areas at same time.

Monitoring should highlight management impact. Relative measurements (e.g., infiltration) are context-dependent. It is a good consideration to follow the impact into the next cash crop year for monitoring carryover effects.

Landscape Diversity and Tree Removal

One producer from North Battleford, SK is considering clearing aging native poplar bluffs. The land is historically prairie, but the trees increased after fire suppression. The poplars are now partially dead, and they have resulted in being economically inconvenient.

His idea is to:

- Remove low-function stands.
- Reintroduce trees strategically.
- Plant more diverse native species in engineered windbreak or conservation zones.

Considerations to Make for Tree Removal

Trees are part of diversity, but placement and function matter. It is important to consider conservation vs. strategic integration (i.e. intensify production zones, design conservation elements intentionally). Here are some questions to consider:

- What hydrological function are existing trees serving?
- Will removal increase erosion?
- How will water flow patterns change?

The idea is that: “It’s not the cow, it’s the how.” Management determines ecological outcome.

Crop Performance Near Tree Bluffs

A producer from Balcarres, SK observed that oats and peas yielded significantly better within 100–200 feet of bush/bluff areas.

Possible contributing factors:

- Soil shading → cooler soil temperatures
- Wind protection
- Snow trapping → improved spring moisture
- Reduced crop stress

The producer from North Battleford, SK made another consideration which could have explained the increased yield near the bush. Bluffs are often located in lower landscape positions with deeper topsoil zones. These are naturally higher moisture areas which could suggest yield difference may be due more to landscape position than tree presence. For example, at a past field day, dense spruce shelterbelts resulted in poor crop growth within ~100 feet. This could be a result of excessive moisture competition, soil acidification, or overly dense windbreak design.

Research on Habitat Proximity and Crop Productivity

An ecologist from the University of Alberta presented findings at the Manitoba Forage and Grassland Association conference in 2025. They found that perennial habitat areas adjacent to crops improved crop productivity. This was demonstrated in canola, which received a pollinator-mediated benefit, and oats, which is a non-pollinated crop.

The proposed mechanisms were as follows:

- Beneficial insect habitat → pest suppression
- Improved ecological balance near perennial zones
- Enhanced system resilience

Windbreaks that filter wind may benefit crops. Dense tree rows can act as:

- Moisture sinks
- Competitive zones
- Reduced-function shelterbelts

The design matters more than simply “having trees.” One producer suggested a few alternative solutions to costly tree-planting:

- Willow and poplar cuttings:
  - Low-cost
  - Locally adapted
  - Time investment only
  - Pine transplants purchased separately.

Ecological Succession & Human Attraction

The producer from North Battleford, SK shared a permaculture concept:

- Rebuild soil life → Plants establish → Animals return → Predators follow → Eventually, people are drawn to healthy systems.

Farms are not just industrial systems. Beauty, biodiversity, and inspiration matter. Landscape management influences succession planning, family engagement, and community vitality. Healthy farms attract both ecological diversity and human connection.

Grass-Dominant Soils and Rotation Philosophy

Native prairies are ~90% grasses. So, are heavy oat rotations ecologically aligned with grass-based soils? Are strict rotation rules (e.g., no more than two years of the same crop) always biologically justified? Could diversity exist within an oat-dominant system?

Say a field in one year has 90% oats with a 10% integrated understory (alfalfa, brassicas, pulses, forbs), grazing integration, reduced tillage, and continuous root activity. Does diversity depend on the main cash crop, or on total system function?

Some Considerations to Make
Even small percentages of non-dominant functional groups may have:

- Disproportionate ecological influence.

- Key microbial interactions.
- Nitrogen fixation roles.
- Pest suppression contributions.

Applying These Considerations in Real Time
This producer shared his current strategy along this line of thinking:

- Oats interseeded with ~10 lb/ac alfalfa.
- Harvest oats.
- Short post-harvest nitrogen fixation window.
- Return to oats next year (within standards).

His future goals are to reduce plow-down years, maintain soil health without sacrificing profitability, integrate taproots (e.g., sunflowers), avoid cleaning/downgrading complications, and reduce tillage frequency.

Soil Health, Weeds and Tillage

Healthy soil reduces weed outbreaks (e.g., quackgrass). Soil health may reduce tillage requirements. This suggests soil function precedes weed suppression.

It is something like the “Chicken or the Egg” dilemma. Tillage may degrade soil health, but soil health may require system shifts before tillage can be reduced.

Monitoring as Decision Framework

Management should be guided by measurable indicators:

- Water infiltration
- Brix readings
- Pest incidence
- Crop vigor
- Soil nutrients
- Microbial indicators (where available)

The goal should be to marry organic standards with functional soil health metrics. But not through rules alone – through function-driven management.

Struvite and Phosphorus Management

Struvite is recovered phosphorus from wastewater streams. Struvite is processed into pelleted form (“pearls”) and side-banded or applied with crop. It is a slow-release phosphorus source that is non-burning to roots.

Cost and Logistics
Struvite costs about $1,800/ton and it is sold in 22-ton “cube” units (so about $40,000 for one cube). It is a significant upfront capital and supply limitations are possible if demand increases.

Canadian Organic Standards
The use of struvite sourced from plant and plant by-products or livestock manures on organic farms is approved in the updated COS, but certification body approval is still required.

Research
There have been several conventional trials conducted in Northeast Saskatchewan (WARC region). Rate comparisons are 100–300 lb/ac. Evidence suggests that there is a residual effect across seasons.

The Bigger Debate: Are We Mining Phosphorus?

Grain exports phosphorus annually. There is no biological pathway that “creates” new phosphorus. Long-term organic systems may become phosphorus limited. For example, 20+ year organic fields are struggling to establish alfalfa. Phosphorus is ultimately a mining equation unless inputs return it.

On the other hand, there is the Regenerative Biology Theory. Total soil minerals are often abundant, and biology can unlock existing reserves. Total nutrient analysis can assess reserves. The availability vs. total quantity distinction matters, and in reference to Gabe Brown, biological activation is greater than mineral additions.

One producer from Saskatoon, SK shared that his former dairy land had high soil phosphorus. He brought up the issue that tissue tests don’t always reflect soil test abundance. He uses fish inputs for nitrogen and believes biology is the cheapest tool, if it works. But he still relies on inputs where necessary.

Kernza Discussion

Kernza is a perennial intermediate wheatgrass. It was developed by The Land Institute, and it is a gluten-containing variety known for its deep root systems. Kernza has soil-regenerative potential, and one producer from Treherne, MB shared that he grew 5-15 acres of it one year. He harvested the seed in August and grazed the regrowth post-harvest. He suggested that spring grazing is possible before seed set.

This producer claimed that it helped suppress weeds. He terminated the Kernza with a high-speed disc and followed this up with a strong flax crop. However, he noted some challenges:

- Weak flour characteristics.
- Limited established market.
- Initial interest faded.
- Marketing barrier halted expansion.