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Grain, Grass & Growth ***October 2024***

CARA Update

The 2024 harvest is now complete and processing of samples is going well. Yields in general were much better than the past few years and we are looking forward to putting the data together and sharing results. The small-plot research trial portfolio included many cereal and pulse variety trials, silage trials, soil health and evaluation of soil amendment projects, fertilizer and crop inputs. New crop management research included a herbicide-focused trial for Kochia funded by RDAR and a durum demo funded by the Alberta Grains commission that looked at how early and late seeded durum may out-compete kochia. Staff also looked at different agronomic practices for barley and the impact of soil applied amendments on crop yield and soil health indicators. Rangeland Sustainability Program has funded a project evaluating propagation of native grasses and CARA just received word of funding approval on a Pasture Rejuvenation Project which will involve the application of various treatments to improve forage productivity and soil health.

CARA collaborated and hosted a few well received extension events this summer including the 3rd Annual Consort School Farm Safety Day with Gould Ranching, Evaluating and Improving Soil Constraints Workshop with Battle River Research Group, MASH: Johnson-Su Bioreactor Workshop, Southern Alberta Grazing School for Women and two Crop Tours for producers to learn more about this years research plots in the MD of Acadia, Special Area #3 and Special Area #4. The MASH (Management Alternatives for Soil Health) event initiated by the CARA Soil Health Lab brought researchers Dr. David Johnson and Hui-Chun Su-Johnson from New Mexico to introduce producers to the Johnson-Su Compost Bioreactor process. The Bioreactor is a static compost system made of everyday materials found on the farm that when properly managed creates a fungal and microbial

rich compost product that can be applied to small or large-scale crop acres, lawns, gardens, etc. Dr. Yamily Zavala, CARASHL Manager, and the Johnson's facilitated the workshop for the Foothills Forage and Grazing Association, Grey Wooded Forage

Association and the Lakeland Agricultural Research Association in addition to the CARA event. Each of the hosting associations have built their own Bioreactors as a result. The CARASHL plans to evaluate and monitor the microbial community, fungi, bacteria, and quality of the compost extract from each Bioreactor during the next year.

Staff continue to respond to inquiries on a wide range of production topics as well as the current OFCAF and SCAP programs. Producers are encouraged to continue submitting feed, water and soil samples for analysis.



Canola Council of Canada Reps Visit CARA Soil Health Lab



Yamily hosted Canola Council staff from across western Canada for a tour of the lab on July 31st. She explained the processes and soil health indicators she and her lab staff can perform and also showed the group a quick demonstration of the importance of soil aggregation.

Tips for Making Fall Grazing and Winter Feeding Plans

Even though there is more forage and feed available than we have had during the past few years, using these resources wisely is still critical for the health of our cattle as well as over-all efficiency and profitability. *The following considerations have been summarized by Barry Yaremcio, Yaremcio Ag Consulting Ltd. 403-741-6032 www.beefconsultant.com*

Using Available Feeds

It is always important to inventory and evaluate different feed options. As with any ration, meeting nutrient requirements for each animal type is key. Feed testing is the first step for harvested forages, but this is more difficult with extensive late season pastures and non-traditional feedstuffs. Monitoring animal responses to available feed is one way to evaluate feed quality.

Higher quality forage options:

Although it is very tempting, grazing unharvested second or third cut forage should not occur until the crop is completely dormant or a couple good frosts have killed the plants. If grazed prior to dormancy, this may cause the plants to winter kill, especially the alfalfa.

Silage crop (or other cereal crop) regrowth can have as much quality as a mixed alfalfa grass first cut hay if grazed prior to the milk stage. Drought (or frost) stressed crops cut for swath grazing can be used immediately or later in the grazing season. Cereals are less prone to deterioration and quality loss compared to canola or cover crops.

Lower quality forage options:

Lower quality forages are best suited for dry cows because their nutrient requirements are 25% lower than for a lactating cow. Meeting protein and energy requirements should be the first considerations when using lower quality feeds.

Late season mature pasture, either tame or native, and stubble fields have variable amounts of energy and protein. For pastures, it depends on plant maturity and type of grasses present. The grazing value of cereal stubble depends on crop type, amount of grain and weed seeds thrown out by the combine and growing conditions since harvest. Both feed types are likely low in minerals, trace minerals and vitamins. Supplementation is generally required. Use of chaff piles is a modified stubble grazing system. This allows animals to continue grazing when snow is present.

Ditch and slough hay are lower quality because they are usually cut late. This type of forage works well as a filler in a pregnant cow ration. It is higher quality than cereal straw but doesn't have the nutrient content of greenfeed.

Straw-grain rations can replace grazing. This type of ration is effective for dry cows up to calving. In addition to the nutrient concerns mentioned above, calcium and magnesium are very low in this type of ration and will require supplementation.

Supplementing on pasture:

Increasing nutrients supplied to animals improves performance. For example, a lack of protein in the ration reduces rumen microbial populations that digest the feeds, including the fiber portions. If microbial populations are low, it takes longer for the feed to be digested. This slows passage rates which reduces daily feed intake and limits performance. Adding protein to the ration prevents this problem. This allows for grazing lower quality, mature forage longer into the fall. The challenge is how to get supplemental protein to the animals. It is not necessary to feed protein daily but should be done every third day.

There are many different supplemental protein sources available. Cost, availability, feeding system and effectiveness need to be considered. Feeding three or four pounds per head, of a 30% protein large diameter pellet every three days is an option. Using a larger diameter pellet reduces waste. This type of product is generally fortified to provide minerals, trace minerals, and vitamins. It can be customized to meet specific requirements.

Using protein tubs or blocks fed free choice, is an option especially when supplementing extensive or remote pastures. These products provide protein daily. It can help with grazing management by changing the location of the tubs. How frequently tubs or blocks need to be replaced depends on size of the product, number of animals, and consumption rate. These products also provide minerals, trace minerals,

and vitamins.

If energy in the forage is adequate, and the animals are maintaining body condition; feeding a mineral that contains urea increases protein intake. This accomplishes the same result as using tubs, blocks, or pellets.

If pastures are close to home, limit feeding silage as a carrier for a protein supplement, mineral, salt and vitamins is possible. Providing the silage every two or three days is recommended and only provide 50% of the dry matter intake needed for one day. This requires the animals to continue grazing and they do not become dependent on the delivered feed.

Distillers' grains, wheat midds, wheat shorts, barley malt sprouts, and other by-products are all good sources of protein. Most of these products have a small particle size. Mixing these in with silage is recommended. If feeding as a single ingredient or with grain, feed by troughs or bunks to eliminate waste.

Grain screenings, screening pellets, oat hulls, and grass screenings are a reasonable source of energy but do not contain significant amounts of protein.

Concerns with Different Feeds:

Ergot: Can cause heat and cold stress, a reduction in feed intake, reproduction concerns and gangrene. It can be found in grain, forages, grain screenings or screening pellets. Problems with sloughing hooves has occurred with 0.04% contamination. First sign of excess ergot is a reduction in feed intake within 3 to 5 days of introduction.

Kochia: If not mature, can have quality similar to mixed alfalfa grass hay for protein, calcium and phosphorus. Magnesium, potassium, sulfur and sodium levels can be much higher. Nitrates, alkaloids and saponins can accumulate in the plant. Oxalate levels increase as the plant matures, which causes issues. Calcium absorption is reduced, resulting in deficiencies. Oxalates form crystals in the kidneys causing damage, kidney failure and potentially death. Recommended feeding rate is not to exceed 20% of total dry matter intake.

Flax straw: Is very high in fiber and low in protein. Intake is limited. Green straw or grazing regrowth can contain prussic acid which is hydrogen cyanide, a poison which can kill animals within hours of ingestion. If possible, avoid this feed.

Observing Animals

Condition of the hair coat, posture and willingness to move can be indicators that the nutrition program is not meeting requirements. Skinny mature cows are noticeable when they have dropped 200 pounds. By this time, it will be difficult to get animals back into good condition by calving.

Evaluating manure structure is a tool to evaluate ration quality. A flat manure pat indicates that protein is adequate and digestion is normal. A pat that has the shape of onion rings indicates that there is undigested fibre. A pyramid shaped pat has more undigested fibre than the onion ring manure. If the manure is not normal, it is probably due to low protein content in the ration. Adding protein to the ration should result in a change in manure structure within 3 to 4 days, indicating that protein status has improved.

Conclusions

More management is needed when using alternate feeds. It takes more time and effort to develop rations, which can be more complex than when typical feeds are used. Monitoring and evaluating animals become more critical to maintain body condition and animal health. Many of the feeds have different quality compared to traditional forages and grains which requires changes to feeding rates. Protein and mineral supplementation need adjustment to meet nutritional requirements. Winter feeding programs using alternate feeds can be done successfully without reducing animal health, performance and reproduction. Knowing the forage quality is key to putting together a successful program.

Note: Please call the CARA office to borrow a probe for sampling bales. Staff can also send your feed off for analysis and help in developing appropriate rations.

RANCHING FOR PROFIT WORKSHOP: THE 3 SECRETS FOR INCREASING PROFIT

Join Dave Pratt, Ranching for Profit, for a 1-Day Workshop! Dave has helped thousands of farm and ranch families build happier, healthier lives, increase the profitability of their businesses and improve the health and productivity of millions of acres.

Topics will include:

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- Working In vs. On the Business
- 3 Secrets for Increasing Profit
- Knowing What the Numbers Mean
 - Show Me the Money
 - Working with Nature

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Introducing the Johnson-Su Bioreactor: An Alternative for Improving Soil Health

by Yamily Zavala

As farmers increasingly turn towards sustainable agricultural practices, innovative solutions for soil health are essential. One such tool gaining attention is the **Johnson-Su Bioreactor**. Developed by Dr. David Johnson and Hui-Chun Su Johnson, this composting system produces high-quality, microbially diverse compost, promoting soil regeneration and improving crop yields. Unlike traditional composting methods, the Johnson-Su bioreactor creates a fungal-dominant compost without the need for turning. By passively aerating the compost, it enhances effectiveness, especially for Alberta's bacterial-dominated soils. A higher fungal diversity can improve soil organic matter, promote soil aggregate formation, and reduce reliance on synthetic fertilizers. This summer, CARA's Management Alternatives for Soil Health (MASH) event featured the Johnsons, introducing producers to this innovative process. Dr. Yamily Zavala, CARASHL Manager, led the workshop alongside the Johnsons for agricultural association partners, including the Foothills Forage and Grazing Association, Grey Wooded Forage Association and the Lakeland Agricultural Research Association, in addition to the CARA event. As a result, each association has constructed their own bioreactors, with CARASHLab planning to evaluate their microbial communities and compost quality over the coming year.



Participants at our Johnson-Su Bioreactor Workshop June 25



What is the Science Behind the Johnson-Su Bioreactor? The Johnson-Su bioreactor addresses the limitations of traditional composting, which often results in bacterial-dominated compost that fails to support long-term soil health. Here are the key principles behind its operation:

Fungal Dominance: Traditional composting often leads to anaerobic conditions or the overgrowth of bacteria. The Johnson-Su bioreactor focuses on creating an environment that encourages fungi to thrive. Fungi play a crucial role in breaking down complex organic matter, such as cellulose and lignin, resulting in nutrient-dense, slow-releasing compost that is ideal for long-term soil health.

Aerobic Decomposition: Perforated tubes within the compost pile ensure consistent aeration, promoting beneficial microorganisms while preventing harmful anaerobic conditions.

Diverse Microbial Community: The process activates a diverse range of microorganisms, improving nutrient cycling and plant resilience against stress.

Humus Production: The final product mimics humus, improving soil structure, water retention and nutrient availability.

Carbon Sequestration: By fostering stable fungal communities, the bioreactor enhances soil's carbon storage capabilities. It improves soil aggregate formation and stability contributing to lock carbon for longer periods and climate change mitigation.



CARA's completed bioreactor at the end of July, with Dr. Zavala, Dr. Phil Burque and Summer Technicians Naman Naman and Jaskarndee Singh.

Stay tuned for our next newsletter, where we will share farmer success stories using the Johnson-Su Bioreactor!

14th Annual Cattlemen Clinic

Gather with other local producers for coffee, lunch, and a full day of conversations focused on improving beef sustainability and production!

Featuring discussions on:

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- Beef production programs**
- Water and feed quality**
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The pros and (serious) cons of fall fertilizer application

Fall application can come back to haunt you in the spring, especially when it comes to nitrogen

By Jeff Melchior

Used with permission from Alberta Farm Express



Reducing the spring workload and cost savings make fall fertilizing tempting, but the cost can be higher, especially when it comes to urea or anhydrous. Photo: Getty Images/ImagineGolf

At face value, there are several reasons for applying fertilizer post-harvest.

It reduces the workload in spring, the price of nutrients is usually lower in the fall, and it minimizes winter storage risks.

So is fall fertilizer application a no-brainer? Not necessarily, says an agronomist with Alberta Wheat and Barley.

“I would make sure that all other options are entertained beforehand,” said Jeremy Boychyn. “I don’t think fall application should be completely eliminated as an option, but I think all of the risk factors should be looked at.

“The main goal is to ensure producers evaluate the risks and take appropriate action to mitigate those risks.” Fall application can come back to haunt farmers in the spring, he said. And the biggest risk is nitrogen loss due to denitrification and leaching.

Banding beats broadcasting

There are few, if any, agronomic advantages to fall application. And the time and price savings can be cancelled out by all the things that can go wrong prior to spring seeding, said Boychyn. Generally, the closer in time a fertilizer application is to seeding, the more effective it will be, he said. Conversely, the further in time away from seeding, the more opportunity there can be for things to go sideways.

Placement considerations in fall are pretty much the same as in the spring — you either broadcast the fertilizer or place it in a band below the soil surface. But there are nuances at play. Boychyn has a hierarchy outlining the worst to the best options.



Typically, surface broadcasting without incorporation is the worst option, he said. Surface broadcasting with incorporation is better, but banding is by far the best choice.

“Broadcasting comes with great risk — run-off and volatilization. Banding can reduce those risks by nearly eliminating both of those factors,” he said. “The risk with (fall) banding is soil saturation in the spring. If the urea or anhydrous encounters saturated spring moisture, the bacteria will convert the ammonium from the urea or anhydrous to nitrates and then be subject to leaching and denitrification, with microbes using the nitrates as an oxygen source.”

Even though banding is the best option, some producers still broadcast in the fall.


“I would not recommend broadcasting urea in the fall without working it in,” he said. “However, working it in destroys soil structure and eliminates the benefits of a no-till or minimum-till system.”

If you’re going to apply in the fall, do so at the right temperature, said Boychyn, who recommends applying at temperatures of 10 C or less, particularly when broadcasting nitrogen on the surface. Otherwise, “you are going to get breakdown of urea and get some loss of nitrogen to the environment.”





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Keep soil type top of mind

Some rules of thumb go right out the window depending on where in Alberta you farm. Boychyn recommends producers be more wary of fall fertilizer application in areas where high spring moisture is common.

“The risk of fall banding is much lower in the southern parts of the province as compared to the northern parts, which typically receive more moisture. I am more comfortable with banding urea/anhydrous in the southern part of the province due to less risk of saturated soils. Wetter parts of the province would be at higher risk of denitrification in the spring.”

This is where new tools may come in handy, said Boychyn.

Nitrogen stabilizers such as Agrotain come with claims of reduced nitrogen loss. Companies producing high-efficiency fertilizers such as SuperU say they can reduce ammonia volatilization and prevent denitrification.

Producers may want to consider these in their nutrient management plans, said Boychyn.

“I think there are some opportunities with these tools.” Coarse soils require particular care when making the decision to fall apply or not, he said.

“Those guys on coarse soil are at higher risk of leaching in wet springs.”

Phosphorus pros and cons

Not all nutrients are created equal. For example, there’s sentiment in some quarters encouraging the fall application of phosphorus. Boychyn said he is much more comfortable with banding phosphorus in the fall compared to nitrogen, which more easily moves around the soil and puts it at risk of loss.

“As we are increasing our yields, producers are trying to add more phosphorus,” he said. “It is becoming harder to do that at seed-safe rates, so displacing some bulk phosphorus application to the fall can be an option.”



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Producers should still avoid applying all their P in the fall.

“I always encourage producers to have at least a little bit of phosphorus with their seed,” said Boychyn. “Displacing all of the phosphorus to the fall could potentially have some disadvantages depending on your soil phosphorus levels.”

“Research has shown crops seeded into soils with lower levels of soil phosphorus respond better to seed-placed phosphorus.”

Don’t overapply

Most producers base application rates on historical yields, soil sampling, nutrient carry-over, and expected moisture. However, there is a small minority who combat nutrient loss with overapplication.

This needs to change, said Boychyn.

“I hear producers say, ‘If I’m looking at potentially losing 20 per cent of my nitrogen to volatilization, the price of nitrogen is cheaper so I’ll just purchase more and apply more,’” he said. “I’ve heard that a couple of times, unfortunately.”

It’s not an approach he agrees with.

“When you have a hole in your door in the winter and you know you’re losing 20 per cent of your heat through that door, are you going to increase your temperature by 20 per cent or are you going to try to patch that hole?”

“We need to be thinking about how to manage product applications to limit that loss rather than apply over and above what is necessary.”

October 21, 2024
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2024 CARA Staff



Back row from left: Braeden Peers, Naman Naman, Jaskarndeeep Singh, Jerry Pratt, Karin Roen, Randi Meyers, Kinley Baier and Presley Bouvier. Middle row: Karly Willis and Nicole Bodnaruk. Front row: Dr Yamily Zavala, Lizanne Booker, Renae Pratt and Rae Jorgenson. Missing from the photo: Dianne Westerlund (photographer) and Navneet Kaur

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