PCBFA

PEACE COUNTRY BEEF & FORAGE ASSOCIATION

Annual Report 2013

"Forages and Beef; Partners in Profits"

Peace Country Beef & Forage Association

The Peace Country Beef & Forage Association was founded in 1982 by livestock producers in the Fairview and Hines Creek area for the purpose of demonstrating new forage varieties and technology. The PCBFA is a non-profit, producer driven, unbiased applied research association, focusing primarily on forage and beef research. We are currently made up of 10 directors, 3 staff and approximately 125 members from across the Peace region.

Mission:

"Forages and Beef; Partners in Profits"

Mandate:

The Peace Country Beef & Forage Association believes that the sustainability of rural communities in the Peace River region will be dependent upon a strong agricultural economy with livestock production as its foundation.

Goal:

Our goal is to improve the profitability and sustainability of the forage and beef industries in the Peace region through the transfer of leading edge forage and beef technology. We hope to engage and reach producers, students and industry representatives through our innovative extension activities and initiatives. Through these activities we aim to provide producers with the required management tools needed to achieve our goals for producers and industry.

Our Region:

PCBFA works with producers in an **area stretching from High Prairie to the B.C. border and from Manning to Valleyview.** Our focus area **has 1.9 million acres** of pasture land and **118,000 breeding cows.**

PCBFA

PEACE COUNTRY BEEF & FORAGE ASSOCIATION

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MESSAGE FROM THE PRESIDENT
Peter Tindall

2013 Year in Review

This was a very busy year as my first term as President. The Peace Country Beef and Forage Association team was all across the Peace implementing projects and continuing the multi-year whole farm system program. The group has been busy over the fall and winter with workshops and conferences.

We unfortunately lost our Extension and Agriculture Service Board Project Coordinator, Karlah Rudolph, back to south west Saskatchewan, but gained Monika (Ross) Benoit, who many of us knew from her previous employment with Champion Feeds.

I am very happy to be a director and am looking forward to being a part of the Peace Country Beef and Forage Association in the 2014 season!

MANAGER'S REPORT
Morgan Hobin, MSc, PAg

The Peace Country Beef & Forage Association had another successful year in 2013. It was the second year of our "*Whole Farm Systems Analysis for Beef Cattle Production"* and *"Management of Environmental Responsibilities on Beef Cattle Operations"* programs funded through the Agriculture Opportunity Fund. It was also the third and final year for our *Agricultural Service Board (ASB) Environmental Stream* program funding. In October, PCBFA in collaboration with our partnering municipalities, submitted 3 applications for an additional 3 year term. We were fortunate to be recommended for the same funding amounts that we had previously received.

The summer created challenges not only for the PCBFA team, but for producers alike. We lost our Extension and ASB Project Coordinator, Karlah Rudolph, back to her home in south west Saskatchewan. We very much appreciated her enthusiasm towards water, soil and grazing landscapes. She was also successful in opening all of our eyes to another approach towards beef and forage production in the Peace. At the end of July, we were able to acquire a new staff member, Monika (Ross) Benoit. We are very excited that she has joined our team, as she brings a fresh and young perspective and a great network of Peace Country cattle producers from her previous role with Champion Feeds.

The PCBFA team was also happy to welcome Taylor Iwasiuk as our second summer student. Taylor was based out of the High Prairie office and made many trips back and forth to the Fairview office to help with all association projects. She was always more than eager to help and her sense of humor kept us laughing for hours!

The 2013 season kept us extremely busy with data collection and project implementation. This fall, the Association geared up again for numerous workshops and seminars. We were able to obtain some corporate sponsorship this year which helped us to hold 4 young farmer events that found well known financial institutions from around the Peace giving presentations to young farmers about general financial information, young farmer programs and local cattle producers shared their experiences. I felt that this was a great series to get the young producers of the Peace engaged and excited about the beef and forage industry. I am very much looking forward to continuing these series in the years to come!

Two thousand and fourteen will see PCBFA losing 3 directors from our board, Corey Beck, Guy L'Heureux and Denis Bouvier. Their opinions, suggestions and overall contributions to the Association will be greatly missed! They have played a large part in the success of PCBFA over the last 4 years.

This year also gave rise to a website www.peacecountrybeef.ca. We are hoping that this helps us spread the word about the projects and events that PCBFA are involved with. We have also been involved in a few tradeshows, such as the Clear Hills Agricultural Trade Show, Peace Country Classic and the Peace Country Beef Congress.

On behalf of the Peace Country Beef & Forage Association, I would like to thank all of the staff, board of directors, collaborating producers, industry and the general membership for all of their support and hard work over the past year. Without this team, we would not be as successful as we are. THANK YOU!

I am looking forward to what 2014 brings and I hope that means working with each and everyone of you.

2013 BOARD OF DIRECTORS

President:	Peter Tindall	High Prairie
Vice President:	Randi Kuriga	Whitelaw
Treasurer:	Steve Johnson	Fairview
Secretary:	Corey Beck	Sexsmith
Directors:	Denis Bouvier	Guy
	Conrad Dolen	Spirit River
	Elton Kauffman	Bluesky
	Guy L'Heureux	Joussard
	Stan Logan	Cleardale
	Gary These	Peace River

Alberta Agriculture Advisory

Calvin Yoder, Forage Specialist—Alberta Agriculture	Spirit River
Freeman Iwasiuk, Beef Business Development—Alberta Agriculture	High Prairie

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Municipalities and Counties

MD of Fairview No. 136	MD of Spirit River, No. 133
MD of Peace, No. 135	Birch Hills County
Clear Hills County, No. 21	MD of Big Lakes
Saddle Hills County	MD of Greenview, No. 16

The Agricultural Research and Extension Council of Alberta (ARECA)

In response to changing needs and the AAFRD funding structure, the applied and forage associations came together to form the Agricultural Research and Extension Council of Alberta (ARECA) in 2003. It is a not-for-profit organization working with producers to enhance and improve their operations through access to field research and new technology. It is dedicated to enhancing the sustainability and profitability of agriculture in Alberta.

Made up of 13 member organizations focused on both applied research and the forage industry, ARECA acts as a strong, united voice for producers by speaking on their behalf to industry leaders and government representatives. Each member association delivers programs and develops projects that address the concerns and priorities of producers in their specific regions.

In addition to the work done in each of the regions, ARECA oversees province-wide initiatives including Regional Variety Trials, Integrated Pest Management and Risk Management Strategies in Wheat and Other Cereals, the GPS Industrial Site Monitoring Project and the Alberta Forage Industry Network. ARECA and its member associations participate in and organize a wide variety of conferences and information sessions for producers. Some of the include: Western Canadian Grazing Conference, Forage Agronomy Update, workshops and various farm and field tours at location throughout Alberta.

ARECA Member Organizations:

- Battle River Research Group (BRRG)
- Chinook Applied Research Association (CARA)
- Farming Smarter (formerly SARA & SACA)
- Foothills Forage & Grazing Association (FFGA)
- Gateway Research Organization (GRO)
- Grey Wooded Forage Association (GWFA)
- Lakeland Agricultural Research Association (LARA)
- Mackenzie Applied Research Association (MARA)
- North Peace Applied Research Association (NPARA)
- Peace Agriculture Research and Demonstration Association (PARDA)
- Peace Country Beef & Forage Association (PCBFA)
- Smoky Applied Research and Demonstration Association (SARDA)
- West Central Forage Association (WCFA)

ARECA & PCBFA Website, Twitter & Facebook

ARECA has a section on their website for the above applied research associations. Our website can be found by going on www.areca.ab.ca and then going to the Members menu. From there you will find a link to our website www.peacecountrybeef.ca. Both ARECA and PCBFA can be followed on Twitter at ***@ARECAResearch*** and ***@PCBFA***, respectively and can be found on Facebook http://www.facebook.com/#!/pages/ARECA and http://www.facebook.com/#!/groups/pcbfa. Through these social media sites, current events, industry information and publications are shared with those that follow. It is just another great way to engage the producers of the Peace Region, across Alberta, nationally and internationally!

A YEAR IN REVIEW…

Message from the Executive Director

2013 provided opportunities as we **repainted the wagon**! We began by evaluating and refining the operational and Board functions of ARECA for the benefit of our Association members, clients and partners. We hired a consultant, John Souman with Can-Europe Consulting, who is an expert in the field of strategic planning to visit each of our Associations. At the same time, the ARECA Board moved to becoming a governance board with the coaching of Graham Gilchrist and revised the policy manual. To support the policy, the Board approved an operational manual for ARECA (these documents are posted on the ARECA information folder that can viewed by all).

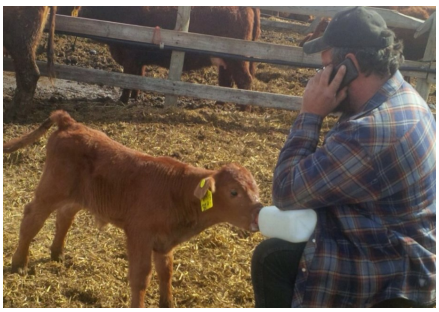
Over the past eleven months, we've spent a tremendous amount of effort and resources to address issues of conflict resolution, organizational restructuring and policy governance. We utilized the expertise of John Souman and adopted a new structure recommended by Mr. Souman which provides more transparency, clarity and accountability for our member Associations. With these changes, we expect all aspects of our operations, including communications, succession planning and HR, will be improved to better serve all ARA's and Forage Associations.

The ARECA board has taken training with Graham Gilchrist to improve our understanding and implementation of **policy governance**. One focus was the separation of our governance and operational policies which has resulted in simplification of the policy manual. A review process has been established in the new policy manual which will help the board to review the manual in its entirety over the next twelve months.

As we move forward with **ARECA's new structure**, the Forage & Livestock Team, Crops, Environment and Planning Team have put together new Terms of Reference. The team chairs are Lacey Ryan (CARA) Environment, Kabal Gill (SARDA) and Tom Fromme (NPARA) Crops, Morgan Hobin (PCBFA) Forage/Livestock and Dianne Westerlund (CARA) Planning. The Planning Team consists of Association managers and has worked with the Executive Director to put together the ARECA business plan and budget for 2014.

A special meeting was held last fall at which the ARECA bylaws were changed. The new bylaws have been posted and they expand the ARECA board to include three managers who are voting members on the Board. Currently, these positions are filled by Nora Paulovich with NPARA and Laura Gibney with FFGA. The third manager will be added to the Board at the time of the ARECA Annual General meeting in Leduc on March 5.

Our Chair, David Eaton along with board members Herman Wyering and Association staff Dianne Westerlund (CARA), Ken Coles (FS) and myself were active in **telling a great story** to government and the opposition. The meetings began with the Minister of Agriculture in February and were followed by a meeting with the Calgary caucus in the spring and the Rural Caucus in November. A brief which was an overview of ARECA and its members was provided at each meeting. Our delegation met with the Opposition and their Agriculture critic in early January to discuss ARECA and Association's impact and outcomes.



The **ARECA website** continues to about 4000 page views per month while the e-newsletter has about 55% readership. The Twitter (@ARECAResearch) account became functional in August and currently, we have about 170 followers. Please make sure to follow us on **@ARECAResearch** and get the word out.

Data for crop varieties in Alberta is generated through the **Regional Variety Testing** trials by a partnership of ARECA Associations, government and industry. RVT's compare different crop varieties side by side in actual field and weather conditions. They allow farmers to decide which variety will perform best in their soil zone, climate and management style. The pulse Regional Variety Trials received significant funding from the Pulse Cluster for the next five years.

Barley 180 What does it take to achieve 180 bus/ac? Researchers evaluated crop management strategies using the cool growing conditions of central Alberta and were successful in achieving 190 bus/ac in 1990. Despite advances in yield improvement, overall barley yield in Alberta has remained relatively low. There is interest to develop a set of Best Management Practices (BMP) and evaluate the concept of maximum yield and maximum economic yield on a field scale basis in Alberta. So far top yields in this project have been156 & 141 bu/ac on 80 acres in central Alberta. BMP's have included plant growth regulators to keep the crop standing and prevent lodging. High nitrogen rates in the spring have been successful in improving yields along with key timing of fungicides to manage disease levels. Funding for this project is being provided by the Alberta Crop Industry Development Fund and the Alberta Barley Commission.

This summer ARECA became involved in delivering the **Environmental Farm Plan** under the leadership of Fiona Briody. She has been able to engage Commissions, agencies and producer associations with promoting it to their membership.

Our mission is to support member associations as leaders in applied agricultural research and extension in Alberta. As we go forward in 2014, I wish to thank everyone for their contributions and efforts this past year.

Ty Faechner, Executive Director, ARECA

ACKNOWLEDGEMENTS

PCBFA greatly appreciates the following contributors for helping us deliver important extension programs and conduct essential projects in 2013:

Funders

Agricultural Opportunity Fund (AOF)
Alberta Agriculture and Rural Development (AARD)
Alberta & Agri-Food Canada (AAFC)

Municipal Districts & Counties

MD of Fairview, No. 136
MD of Peace, No. 135
Clear Hills County, No. 21
Saddle Hills County
MD of Spirit River, No. 133
Birch Hills County
MD of Big Lakes
MD of Greenview, No. 16

Corporate Sponsors

BEST Environmental Technologies
United Farmers of Alberta
Agriculture Financial Services Corporation

Co-operators

Peter & Mary Lundgard
Pat & Jay Eaton
Erik Verstappen & Louise Liebenberg
Aaron Zylstra
Guy & Kathy L'Heureux
Paul & Lori Kinnee
Lawrence & Lori Andruchiw
Peter & Marilyn Dolen
Lloyd & MacKay Ross
Ken Herlinveux & Judy Bowcott
Dale & Judy Smith
Wally & Christine Lentz
Nelson Ferris
Gary, Randi & Richard Kuriga
Ken & Bonnie Titford

Agri-Business & Collaborators

Brett Young Seeds
Pioneer
Viterra
Western Beef Development Centre (WBDC)
Growing Forward 2
PICKSEED
Dynamic Seeds Ltd - Fairview
Peace River Seed Co-op Ltd
Golden Acre Seeds
Grande Prairie Regional College
Alberta Treasury Branch
Farm Credit Canada

Partners

North Peace Applied Research Association
Smokey Applied Research & Demonstration Assoc
Mackenzie Applied Research Association
Back to Your Roots Solutions
High Prairie Riparian Action Team
Lesser Slave Watershed Council
Cows and Fish
County of Grande Prairie
Alpine Plant Foods

SERVICES PROVIDED BY PEACE COUNTRY BEEF & FORAGE ASSOCIATION

- Feed Testing and Ration Balancing
  - Ongoing throughout the winter

- CowBytes "Kitchen" Courses-
  Set one up at your kitchen table with some neighbours
  - Use your feed analysis and end up with a balanced ration for your operation
  - Cost $25 per farm unit

- Soil Testing and Fertilizer Analysis

- Livestock Water Quality Testing

- Age Verification and Traceability Concerns

- Environmental Farm Plan Assistance and Workshops

- Growing Forward 2, Water Management Planning Assistance

- Nutrient Management Analysis and Assistance
  - Informing producers on the benefits of manure as a fertilizer source
  - Proper manure testing techniques

- Peace Country Beef School
  - To inform and educate producers on beef fabrication and marketing of beef (gate to plate)
  - Hands on learning involving live and slaughtered carcass evaluation

- Gallgher Portable Scale and an Electronic Tag Reader for Rent ($25/day or $40/day for both)

- 320 bushel Creep Feeder Available for Use

- Portable Solar Watering System Available for Use

2013 IN REVIEW

ASB AND EXTENSION HIGHLIGHTS

Extension Activities for Every Producer

We deliver extension all over the Peace. Our direction is taken from our Board Members, a group of elected producers from the Peace Region.

Young Farmer World Cafes - Valleyview and High Prairie

During the month of March, we held two more Young Farmer World Cafes, one in Valleyview on the 1st and then in near High Prairie at the Big Meadow Hall on the 2nd. These events invited young farmers to come out for a free evening of socializing and answering two questions: What directions do young farmers see agriculture going in the Peace Region and what do they need from us as an applied research and extension organization to help them be successful? In each area, a more experienced producer was invited to attended as a facilitator and with the hope of bridging the generation gap. The Valleyview group had only 7 in attendance but there was great discussion and many important points were brought forward. The Big Meadow night had 17 participants and facilitators were able to pick out a number of similar themes from each of the brainstorming groups.

Shelterbelt Workshop - Worsley

On March 22nd, we hosted a Shelterbelt workshop in conjunction with the Alberta Woodlot and Extension Society. This event was geared towards those in the area who wanted to gain more knowledge on the type of trees, shrubs etc. to plant, how to maintain and prolong longevity and what an ideal design would be to help reduce farm odour, increase snow capture and improve pasture/crop productivity. The 7 participants also learned about silvopasture and its benefits when included in a program.

Water Works - Series 2 - High Prairie

The second session of the Water Works series with Craig Sponholtz of Dryland Solutions Inc. was held over 2 days, May 30th and June 1st at Big Meadow Hall. Ten participants had an indoor learning session on day 1, which was very convenient due to the weather being less than cooperative with multiple down pours throughout the day - which was also perfect for discussing the topic of water, runoff and riparian restoration. Day 2 was sunny and ideal for the group to head out to a site south of High Prairie to put the techniques discussed the previous day into practice. The group built a Zuni Bowl and a Log Step Down in 2 headcuts found in a local pasture. Follow up in the spring/summer of 2014 to see if it helped to reduce soil erosion is planned.

Whole Farm Water Planning - Fairview

To continue on the water theme, our next 2 day workshop was held on July 5th and 6th at Waterhole Hall near Fairview. Jesse Lemieux of Pacific Permaculture spoke to 9 producers who wanted to gain insight on how to use the water they have on farm more efficiently and effectively.

Day 1 consisted of an indoor learning session, where once again Mother Nature wanted to help strengthen the water topic by raining all day! Jesse discussed keyline design, identifying key points on one's landscape and the different types of earthen structures that can be designed to help trap water for future livestock use. Day 2 was held on site at Steve and Peggy Johnson's where the group was able to see how the points discussed on July 5th could be implemented and used in a grazing system.

Young Farmer Financial Advice Panels– Savanna, Cleardale, DeBolt and High Prairie.

Following the Young Farmer World Cafes that we held in 2012 and 2013, we took the information that was gathered and put on a series of events for the Young Farmers of the Peace Country. Financial management and decision making was identified as an area that young farmers require more education and support to build successful farm operations. The goal of these forums was to facilitate the transfer of financial information and advice to young farmers of the Peace Country through presentations from a panel of experts as well as a portion of the event being set aside for an open question period. We invited representatives from three financial institutions in the Peace Country, FCC, AFSC, and ATB. We also invited a producer from each region to share their experiences with running a farm operation in the Peace Country; they each passed on some advice and lessons they'd learned the hard way! In Cleardale we heard from Freeman Iwasiuk, in DeBolt Roland Cailliau was happy to pass on a few life lessons, and Bill Hanson shared his advice on ranching in the Peace Country. We had great turn out for each event, and all in attendance gave us positive feedback, saying that they had picked up many useful tips. In total, 46 young farmers from across the Peace attended these events.

Triticale for Swath Grazing - Whitelaw

On October 5th, we hosted a very well-attended field day at the Lentz Ranch, with 14 producers joining us. We were able to have a good look at the triticale project that PCBFA did with Wally and Christine. Twenty acres were seeded to three varieties of triticale and one variety of oats; everything was swathed to be used for swath grazing in the late fall. The field was also treated to several Best products. We had three excellent presentations during the day, including Bill Chapman of Alberta Agriculture, who gave us a very informative talk out in the field on the agronomics of growing triticale and the many advantages. After our tour of the field, we headed back to the Lentz residence and enjoyed a delicious meal prepared by Christine, and then listened to a great presentation by Garth Hein of Gallagher on electric fencing tips, followed by a presentation by the Best Environmental Technologies Team.

Gabe Brown: Cocktail Cover Crops - Valleyview, High Prairie and Rycroft

During the last week of October, PCBFA was given an opportunity to host North Dakota rancher Gabe Brown for a tour of the Peace Country. Gabe Brown and his family operate Brown's Ranch, near the city of Bismarck, North Dakota, where they run about 400 head of mother cows, grass a couple hundred yearlings, and farm several thousand acres. The Browns began using innovative ways to increase their soil fertility and overall health of their soil and land many years ago, and one of their techniques is through the use of cocktail cover crops. Gabe joined us to share his knowledge and we sure learned a lot! We spent an evening at the Hanson Ranch, south of Valleyview for an evening, taking a look at the pastures and learning what else can be done to improve soil health on an operation with only cattle; Gabe was in heaven as he toured through some gorgeous Peace Country fields of grass! The next day, Gabe presented to a small crowd in Valleyview, followed by a presentation that evening in High Prairie. The next day, we toured a possible project site west of Nampa and Gabe gave us a few tips on how to terminate an alfalfa stand without tearing it up or spraying it out; we do have some work to do on this one! Gabe then toured up to present in Manning, and the next day gave his presentation to a large crowd in Rycroft. Gabe presented to over 50 producers while he was in the Peace. Gabe left us with a wealth of information, and we are excited to start on a few cover cropping projects in the Peace.

Field Day in the Corn - GPRC Fairview Campus

On November 20th, we braved a very frigid day and headed out to take a look at the corn at the GPRC Fairview Campus farm. Before heading out to look at the corn, we had a presentation from the Pioneer Hybrid reps on the different varieties available, as well as some agronomic advice on growing corn for grazing. This year, a portion of the corn was swathed, in an attempt to try out another method of feeding cows whole corn plants. The cows hadn't been on the corn for very long when we were out there, so we will wait to hear a report on the comparison between swathing the corn and leaving it standing for cows to graze. After taking a look at the corn, we had the opportunity to have a round table discussion with the 19 attendees, including long-time corn grower Sam King of Manning. Many excellent questions were asked by producers who had never grown corn and were considering it, as well as producers who had been growing it for years; we had a very lively discussion and everyone learned a lot about growing corn in the Peace Country.

Canadian Forage and Grasslands Association Conference and AGM - Olds

December 9th to 12th PCBFA staff members travelled south to Olds for the CFGA Conference and AGM. Three directors, Stan Logan, Gary These and Elton Kauffman also joined us. PCBFA was in charge of the conference registration, so we were kept busy during the event! The theme of the conference was "Moving Forages Mainstream- The Challenges, Pitfalls and Opportunities." Day one consisted of a tour, and our board members on the tour had the privilege of touring several progressive operations in the Olds area that use forages in unique and efficient ways. There were many outstanding researchers from across Canada in attendance, and presentations were given on what kind of work is being done by researchers in the area of forage production. The forage export industry was also a large part of the conference, and it was very interesting to hear from international presenters, including the Americans and Australians on the status of their countries' forage export markets. The Canadian Forage and Grasslands Association is a member based organization representing all sectors of the forage and grassland industry; the focus of the CFGA is to promote the growth of the forage and grassland sector at home and abroad and provide a national voice for the industry.


PCBFA

Cocktail Cover Crops:
Something to Consider

Volume 9
Issue 10
Oct 2013

Forage Facts

If an image of a mixture of grasses and plants in a field popped into your mind when you read 'Cocktail Cover Crops' you are not far off. Simply put, a cocktail cover crop is a mixture of cover crops that are used to improve soil fertility and tilth. Cocktail cover crops are a mixture that can be used as a cover crop in a field or as a productive crop when a few species are combined as opposed to growing fields fallow or bare during the fall and winter months. Some cover crops are a mixture of different plants, a cocktail; some can be harvested as grain and others can be used for livestock forage. Jim Hoorman, of Ohio State University, has been studying cover crops for many years and notes, "Soil is a living, breathing system that requires energy and that energy comes from the sun through the plant and into the soil through the roots." Keeping plants in the soil on a year-round basis offers many benefits, including increased soil health, improved water infiltration and better water holding capacity. Cover crops can also be used as a method of weed control, and can result in a reduction in insect and disease damage, as weeds will be uncompeted and conditions will be less ideal for disease and bugs. Moisture retention and management are achieved with cover crops, and this in turn will help to protect water quality as there will be less run off, including a reduction in nutrient leaching. This makes it an attractive practice producers with both cropping and livestock enterprises, as it offers another source of grazing at ideal times of the year.

Cover crops were popular in the mid-80s, but when low cost nitrogen fertilizers became available, the practice of putting in a cover crop diminished. Many operations in Western Canada and across the United States would routinely seed sweet clover after they harvested their main crop and then would till it under sometime during the following summer. The clover rototilles the soil, holds it down after harvest, and nutrients are stored in the plants, which prevents any nutrient leaching. Recently, with the rise in fertilizer and fuel costs, there has been more interest in cover crops. For cropping operations, cover crops are seen by some as another practice that can improve on the great benefits we've seen with the adoption of no-till practices. In a study done by Ohio State University, it was found that after 10 years of no-till practices, the top layer of the soil, where soil phosphorous levels have also been seen to increase. For livestock producers, there are many great benefits to be found with cover crops. In Manitoba, producers have been trying it recently with success, especially where the soil is sandy and subject to erosion; a legume cocktail has been a successful mixture. The University of Manitoba has also been actively researching cover crops. Researcher Yvonne Lawley says, "Some forage crops provide permanent cover and some cover crops can provide early and late season grazing or even opportunistic grazing."

Cocktail cover crops are often used to increase the benefits of a one-species cover crop. Cocktail cover crops offer more diversity and allow more goals to be achieved with one crop. For example, tillage radishes could be added to a mix to reduce compaction, a legume seeded to fix nitrogen and barley added to the mix because it has an extensive root system and will increase the organic matter. In the end, the soil condition is improved and there would be forage available for grazing. There are many options based on a farm's needs, and to implement a cover crop program many things must be considered, including the economics, as many of the benefits will be seen over the long-term, not immediately.

There are many questions surrounding the concept of cover crops, especially if it would be viable in the Peace Country. There has been some local interest as of late, and PCBFA, along with the North Peace Applied Research Association is pleased to announce that we will be hosting Gabe Brown, of Brown's Ranch in North Dakota, a veteran of cover cropping, on a week-long speaking tour across the Peace. Brown's Ranch is located in northern North Dakota and experiences climate similar to ours, though likely a bit less hardy with a longer growing season. In addition to the cows, Gabe's family also grows cash crops and keeps a flock of pasture-raised chickens around.

"They've got good working conditions here but they have a lousy retirement plan"

Forage Facts

The Forage Facts newsletter is a monthly article that provides timely information relevant to the beef and forage sector. It is also the best source of information about what events we have planned and how you can participate! Forage Facts is mailed out to the membership, including our participating municipal districts and counties. We also have a small group that the newsletter is emailed to. The newsletter is an invaluable way to communicate information to our members, as well as inform them of new ideas on the horizon.

Forage Country Magazine

The association also produces a bi-annual publication to highlight past projects, new projects, hot topics, current events and past extension. The publication goes to 5000 rural mail boxes in our partnering municipalities. With our winter edition delivered in early February, look for a new one in the summer of 2014!

Peace Country Beef & Forage Association Website

New in 2013 was the PCBFA website, www.peacecountrybeef.ca. The website has been a great asset to the association and is a great way to keep people informed and allow us to share information with a larger audience. Information about the association, upcoming events and photos of our past events are all posted. There is also a link to our website from the ARECA webpage.

We have been contacted by many producers in the Peace Region, not only to do Environmental Farm Plans, but to also help with filling in forms for grants that are available through Growing Forward 2. Some of these forms are only available through organizations such as ours. We always take time to help producers fill out these grant applications and give them tips on the best way to do so. Our staff is available to help with these forms and/or complete an EFP. We are also always on the lookout for information to provide to producers on any available programs and help them identify what projects qualify and

Growing Forward 2
A federal-provincial-territorial initiative

ASB Program Update

The Stem Mining Weevil

We released the stem mining weevil near Whitelaw in September of 2012. The cross-provincial initiative was set up to establish whether or not this bio-control agent can effectively reduce Canada Thistle populations, potentially providing an alternative to chemical sprays in ecologically sensitive areas, such as those surrounding water ways. We monitored the weevil site near Whitelaw throughout the summer, and did observe some differences between the site with weevils and the control site without. While we couldn't visibly see any weevils, we could see evidence of their presence and the thistles did not appear as healthy as the control thistle patch. We will continue to monitor this site in 2014. We also released more weevils in Birch Hills County, north of Wanham, and we will be watching this site in 2014 as well.

Riparian Protection through Pasture Management

Cross-fencing, the creation of riparian pastures, the use of off-site watering systems and the implementation of rotational grazing regimes are all tools that can help ranchers be better environmental stewards. We are currently working with 6 land owners through our association and local watershed groups to help ranchers make these changes – often to the advantage of their production system. The new Growing Forward 2 programming offers producers the support they need to upgrade their current grazing and watering system, and we are kept busy helping producers fill out their applications. PCBFA staff isn't afraid to do a day of hard work and we've had the chance to help put in a few posts ourselves! We also have a 2 portable watering systems that are available for a producer to try out during the summer months in the MD of Big Lakes, which has been a very well-received project.

PLOT TRIALS & PROJECTS

Progress on Whole Farm Nutrient Management Project (2012-2015)

The survey carried out by PCBFA in 2012 with beef cattle producers in parts of the Peace identified farm nutrient management as one of the main areas of research and demonstrations needing more attention. PCBFA members recognized the fact that in order for the Peace Region beef industry to remain sustainable, the industry needed to decrease their economic and environmental risk. The systems approach, which is one of PCBFA programs across the Peace from 2012 to 2014 and beyond will enable an in-depth examination of farm nutrient loading and utilization, cost/benefit analysis, and the potential environmental impacts of beef cattle production systems and their components. In 2012, base data on 6 systems (bale grazing, bale processing, hay field, pasture, wintering site and stockpile forage) to be used for the project were collected. In 2013, another set of data was collected for the purpose of examining the pattern of nutrient availability, distribution and utilization in both soil and plant components of each system. As a reminder, the overall objectives of the project are:

- Create awareness of nutrients, nutrient distribution, collection and management on farm, and to increase distribution and utilization of farm resources
- Development of a site-specific nutrient management plan
- Understand and gain working knowledge of manure and general fertility management in forage and crop production for greenfeed or swath grazing systems

Methods

PCBFA is working with the following cow-calf producers (see table below) on 6 beef cattle production systems for this project:

MD/County	Collaborating Producer	Production System	Data Collection Date in 2013
Fairview	Gary Kuriga	Stockpile forage	9-Jul
Clear Hills County	Nelson Ferris	Bale grazing	15-Jul
Saddle Hills County	Ken Titford	Hay	19-Jun
Peace	Ken Herlinveaux & Judy Bowcott	Bale processing/rolling	8-Jul
Big Lakes	Erik Verstappen	Wintering site	24-Jun
Greenview	Dale Smith	Pasture	25-Jul

For each system, 2-5 acres were marked out in 2012 and these will be used for yearly data collection. Also, in 2012, notes were taken on history and managements of selected systems.

Baseline (July—August, 2012) and 2013 (June-July) data collection include the following for each project site (or selected production systems):

- soil nutrients in 0 to 24 inches soil depths
- soil moisture content (gravimetric method)
- soil compaction (digital penetrometer)
- water infiltration (ring method)
- forage yield & quality, and brix (sugar) level
- field nutrient mapping with GreenSeeker
- water quality issues

In this report, only soil measurements taken in the 0 to 6 inches soil depth are presented. The results presented in this report are summaries of two years (2012 & 2013). Two different hay fields were used between 2012 and 2013, but the 2013 site will continue to be used for future hay field evaluation.

Results and Discussion

Soil Water Infiltration and Compaction

Infiltration is the downward entry of water into the soil. The velocity at which water enters the soil is the infiltration rate. Infiltration rate is typically expressed in inches per hour and is an indicator of the soil's ability to allow water movement into and through the soil profile. Soil temporarily stores water, making it available for root uptake, plant growth and a habitat for soil organisms. A high infiltration rate is generally desirable for plant growth and the environment. The results of soil water infiltration rate (inches per hour) in the present study, over 2 years (2012 & 2013) showed that both bale grazing and bale processing increased infiltration rate (very rapid) better than the other systems (Table 1). Hay field had rapid infiltration, while both pasture and wintering site had moderately rapid infiltration. Stockpile forage had the least infiltration rate (moderate).

Soil compaction can be a serious and unnecessary form of soil degradation that can result in increased soil erosion and decreased crop production. Compaction of soil is the compression of soil particles into a smaller volume, which reduces the size of pore space available for air and water. Soil compaction can impair water infiltration into soil, root penetration and crop nutrient and water uptake, all of which result in depressed crop yield. Readings of 400 to 500 psi would indicate potential soil compaction. The preliminary soil compaction recorded for the 6 systems evaluated here showed that only pasture paddock appeared to have some potential for soil compaction (Table 1).

Soil Organic Matter and Nutrients

The mean soil organic matter was lower for both the hay field and wintering site. It is important to note that a sheep farm was used for the wintering site.

Averaged over 2 years, both bale grazing and processing had higher mean soil N than the other systems (Table 1). Bale grazing had higher mean soil P, followed by pasture and then bale processing site (Table 1). Mean soil K was higher for both bale grazing and processing, following by pasture (Table 1). Other systems had <600 lb K/acre. Mean soil S varied from 82 lb/acre for wintering site to 2559 lb/acre for stockpile forage (Table 1).

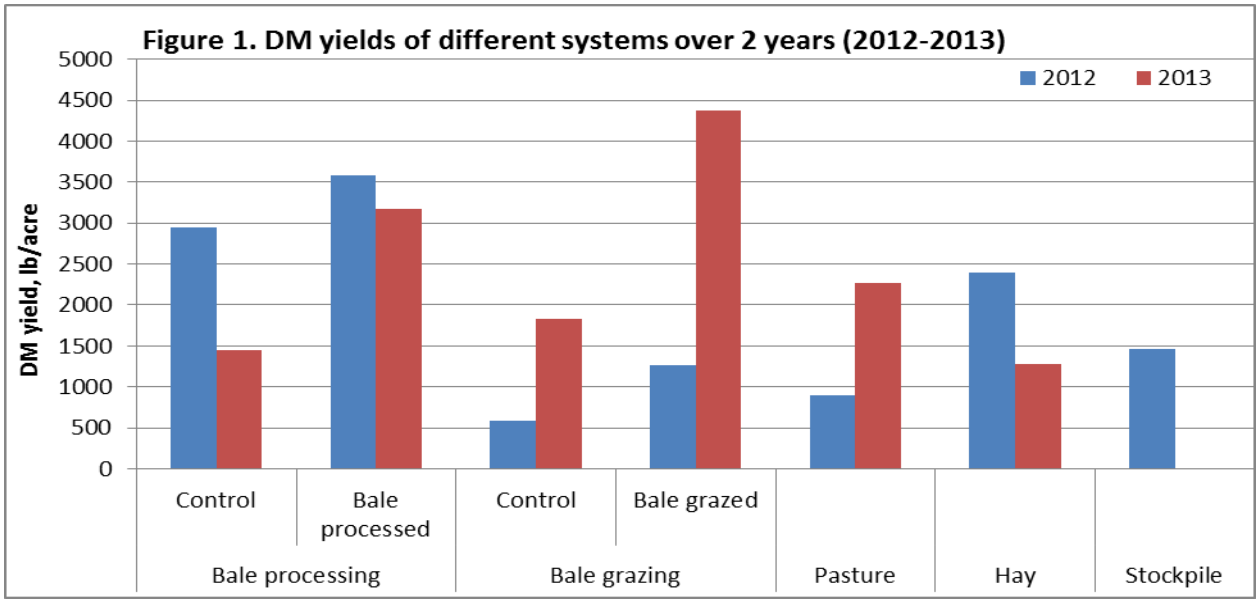
Table 1. Soil water infiltration, temperature, compaction, organic matter & nutrients (average of 2 years)

System	Water infiltration	Soil temperature (^{o}C)	Soil compaction (PSI)	Organic matter (%)	N (lb/acre)	P (lb/acre)	K (lb/acre)	S (lb/acre)
Bale grazing	Very rapid	9.8	295	9.55	153	71	1200	1065
Bale processing	Very rapid	16.0	341	8.85	157	36	1200	2313
Hay field	Rapid	18.6	286	5.00	15	20	395	183
Pasture	Moderately rapid	12.7	466	9.35	37	61	1041	1816
Stockpile	Moderate	15.3	338	9.00	17	17	251	2559
Wintering site	Moderately rapid	16.1	264	3.78	39	16	582	82

Forage DM Yield (Figure 1)

No DM yield was available from the wintering site for both years (2012 & 2013) and from the stockpile site in 2013 due to prior grazing before data collection. But the results for other sites/systems showed that for both bale grazing and processing systems, areas that were bale grazed or where bale was processed had significant increase in DM over control checks in 2012 and 2013. Bale processing increased DM by 1717 lb/acre in 2013 over 2012 compared to an increase of only 635 lb/acre for the control check over the same period. Similarly, bale grazing increased DM yield substantially in 2013 over 2012 compared to non bale grazed areas (2536 vs 673 lb/acre). For the pasture paddock being evaluated, DM was higher in 2013 than

2012 by 1381 lb DM/acre. The increase in forage production is probably the result of manure application to the paddock in 2012, in addition to the site being grazed yearly. For bale grazing, bale processing and pasture, mean DM (over 2 years) was in order of bale processing (3379 lb DM/acre) > bale grazing (2815 lb DM/acre) > pasture (1839 lb DM/acre).



Forage Quality (Table 2)

Protein - The forage protein content was highest for both bale grazing and wintering sites (15% CP) and lowest for stockpile forage (10% CP). The Beef Cow Rule of Thumb with protein is 7-9-11, which means an average mature beef cow requires a ration with crude protein of 7 per cent in mid pregnancy, 9 per cent in late pregnancy and 11 per cent after calving. With the exception of stockpile forage, which slightly fell short of 11% protein needed by a nursing cow, all systems had adequate levels of protein suggested for a dry gestating and a nursing cow.

Macro-minerals - With the exception of Na, all other measured macro-mineral contents in the present study (Ca, P, K, Mg) had sufficient amounts or levels recommended for a dry gestating cow.

For a nursing cow, only the hay field and wintering site had adequate Ca needed by this category of a beef cow. The higher Ca content for the hay field could be as a result of forage composition (substantial amount of alfalfa stands in both sites used in 2012 and 2013), date of data collection, location and nature of soil. Of the systems examined here, the P requirement of a nursing cow (0.26% Ca) was only met by the pasture site, which had 0.28% P. All systems examined had adequate amount of K suggested for a nursing cow. For Mg, both pasture and stockpile forage fell short of the 0.20% Mg needed by a lactating cow. The inconsistencies in mineral contents noted for all systems in the present study either for a dry gestating or a lactating cow, further suggests the need for a prior forage testing to determine if minerals in forages are adequate for beef cows or not before utilization. The inconsistencies further confirms the need for mineral supplementation as currently practised by producers.

Table 2. Mean (2012-2013) of forage DM & quality

Production System	CP (%)	Ca (%)	P (%)	K (%)	Mg (%)	Na (%)	ADF (%)	NDF (%)	TDN (%)	ME ——	NEG ——	NEL (Mcal/kg)	NEM ——	DE ——	RFV
Bale grazing	14.7	0.38	0.24	3.11	0.15	0.01	43.4	68.4	56.5	2.04	0.62	1.27	1.19	2.49	75
Bale processing	12.4	0.25	0.21	2.50	0.21	0.01	41.6	67.1	57.4	2.07	0.65	1.29	1.22	2.53	78
Hay field	12.7	0.45	0.18	1.66	0.56	0.01	33.7	51.4	61.3	2.21	0.77	1.38	1.35	2.70	113
Pasture	10.8	0.34	0.28	2.21	0.12	0.01	38.7	62.5	58.8	2.12	0.70	1.32	1.27	2.59	87
Stockpile	9.70	0.22	0.20	1.53	0.13	0.01	43.5	68.1	56.4	2.04	0.62	1.26	1.19	2.48	75
Wintering site	14.8	0.47	0.25	2.56	0.18	0.02	38.0	61.0	59.2	2.14	0.71	1.33	1.28	2.61	91

Forage Brix Level

The mean grass brix for the 2 years (2012 & 2013) appeared to be higher for bale grazed areas than its control check as well as other production systems (with the exception of stockpile forage, which only had data for 2012). For the legumes, hay field had the highest brix and this is probably a reflection of the good alfalfa growth observed in both hay fields used. Both hay fields were harvested earlier than other systems and they both had better alfalfa growth than other systems. We observed that both bale grazing and bale processed sites had a higher concentration of grasses than legumes (including alfalfa) and other plant types (including dandelions). Overall, only control check for bale grazing and wintering site had a mean brix level that is less 6.00%.

Table 3. Mean (2012 & 2013) of brix (% sugar) level of identified forages at harvest

Production System		Grass	Legume	Others	mean
Bale grazing	Control check	7.31	7.29	2.94	5.85
	Bale grazed	10.4		3.13	6.77
Bale processing	Control check	7.75	6.81	3.69	6.08
	Bale processed	8.13	6.94	3.44	6.17
Hay field		7.36	11.5	5.33	8.06
Pasture		7.38	7.42	4.5	6.43
Stockpile (data from 2012 only)		10.9	10.3		10.6
Wintering site		4.88	3.31	3.19	3.79

Some notes on testing brix in our forage

Brix measurements of forage are a useful technology that not many cow/calf producers currently use.

A brix measurement – which measures the amount of plant solids to water in a plant – will give the true nutrient density in a particular forage. Solids in the plant include sugars, minerals, lipids, pectins, amino acids and proteins.

Moderate to high plant sugars are necessary to adequately finish livestock on forages. High brix levels means the plants are being grown on healthy soils with good organic matter, which results in higher carbohydrate levels and higher energy levels in that forage.

Taking brix measurements requires a garlic press or other type of press and a portable refractometer (see above picture). Measurements are best taken on a sunny day in the mid-afternoon.

To take a brix measurement, producers should pick a plant sample of their forage; place the sample in a garlic press or other type of press; squeeze out the plant sap onto the stage of a portable refractometer and take a reading.

What do brix measurements of common forages mean?

In alfalfa for example, a brix measurement of 4 equals poor forage, while a brix measurement of 8 means average. A brix measurement of 16 is good and a brix of 22 on an alfalfa plant indicates excellent forage for cattle. In US, higher animal performance when brix levels in forages are higher have been found. In addition, high brix forages are more resistant to disease, pests and drought.

Progress on Sainfoin - Alfalfa Mixture Trial

Collaborator: Dr. Surya Acharya, Agriculture and Agri-Food Canada, Lethbridge

Are you thinking about seeding a new hay or pasture field in the next few years? If so, consider trying something new and adding sainfoin into the mix. This is a message from Agriculture and Agri-Food Canada (AAFC) and AARD. Development of the new cultivar, tested as LRC 3902, was led by Dr. Surya Acharya of AAFC in Lethbridge. With a proposed name of Mountainview, the new cultivar offers cattle producers a brand new 'king' to pair with the 'queen of forages' alfalfa to provide innovative new options and many superior benefits. According to Dr. Acharya, the new sainfoin cultivar is truly one-of-a-kind and represents an exciting new opportunity for cattle producers. Sainfoin in a high quality forage legume crop that features a condensed tannin concentration. This is vey effective at preventing deadly pasture bloat in ruminants. However, until now, sainfoin cultivars have not survived well in alfalfa pastures or have not grown back after the first cut. In collaboration with some of the applied research associations in Alberta, Dr. Acharya is testing some experimental sainfoin lines in alternate row mixtures with an alfalfa variety to evaluate among other attributes: adaptation, growth, persistency, forage yield and quality in parts of Alberta. PCBFA is fortunate to be a part of this collaboration, which started in 2013. The following report provides a progress for 2013 and future plans for 2014.

For more information on sainfoin, please visit the following sites:
http://www1.agric.gov.ab.ca/$department/newslett.nsf/all/agnw21219
http://www.meristem.com/feature_articles/2013/fa_2013_03.php
http://www.producer.com/2013/07/sainfoin-trial-results-puzzling/

Methods

For PCBFA, there will be two Sainfoin – Alfalfa Mixture Trials. The 1st will involve seeding of sainfoin lines in alternate rows with AC Grazeland alfalfa. The 2nd will involve seeding in the same row mixtures. Here, progress will be provided on the second trial, which commenced in 2013.

Trial site - Fairview Research Farm (NW5-82-3W6) on RR #35. Prior to seeding, a smooth seedbed was prepared by cultivating and packing. Credit® was sprayed for pre-seed weed control. The site had a canola variety trial in 2011 but left to fallow in summer of 2012. The site had a pH of 5.4 and 8.8% organic matter.

The forages were arranged in a randomized complete block design with four replications. Three experimental sainfoin lines designated LRC05-3900, LRC05-3901, LRC05-3902, and Nova (check) were seeded in the same row mixtures with AC Grazeland alfalfa seeded and fertilized on May 23, 2013 with a Fabro plot drill equipped with double shoot Atom jet openers. Suggested seeding rate was: sainfoin 30 lb/ac, alfalfa 12 lb/ac. As these were seeded in the same row mixtures, we seeded at ½ rate; sainfoin at 15 lb/ac and alfalfa at 6 lb/ac. Seeding was 0.5-0.7" deep. Seeds were seeded with inoculants. Small plots measuring 1.4 m x 8.5 m were used. Fertility according to soil test was 40 lb/acre of 11-52-0. Assure II and Basagran Forte were used to control volunteer oats and canola and other broad leaf weeds.

Field Measurements and notes in 2014 will include: (1) winter kill and early season growth assessments, (2) DM yield and (3) percent composition of each forage type. Cutting will be done twice per year (when sainfoin is at 40-50 % bloom, alfalfa will be at 20-30% bloom). Cuts will be approximately 6 weeks apart.

Future Plan: In 2014, the 2nd trial in alternate row mixtures will be seeded.

Progress on Demonstration of Soil Amendments to Control Foxtail Barley

Collaborator: Aaron Zylstra, Ag Fieldman, Clear Hills County

Foxtail barley is a shallow-rooted, perennial bunchgrass and is common. It has good tolerance to salinity and spring flooding, and it is capable of productive growth on all soil types. Foxtail barley becomes more of a concern whenever tillage intensity and frequency are reduced because few herbicide control options are available. The shallow, fibrous root system of foxtail barley makes it more susceptible to control by tillage than many other perennial weeds. Foxtail barley seeds germinate at or near the soil surface in the cooler temperatures of fall or spring. Seed heads are easily carried by the wind, which enables them to spread quickly from field margins or within fields. Seed viability declines rapidly after three years. Foxtail barley is a tough-to-control perennial weed in zero tillage systems. *For more information on control measures of foxtail barley, please visit http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex856.* The objective of the present demonstration is to assess the use of GSR Ca, Best Soil Rejuvenation and Kerb SC in the management of foxtail barley.

Methods

The demonstration is taking place in Worsley on Township road 870 at the Range Road 72 correction line.

The treatments consist of:

1. Spraying of Kerb SC, a herbicide
2. Spraying of Best Soil Rejuvenation
3. Spraying of GSR Ca
4. Unsprayed control check

Each treatment has a dimension of 100 m in length x 15 m in width.

First spraying of treatments 2 and 3 above was carried out on May 24, 2013 with a Rhino mounted sprayer. A second spraying of treatment 3 (fall spraying of GSR Ca) was done on October 22, 2013 truck mounted sprayer. Recommended rates were followed for all sprayings. For the demonstration, actual amount sprayed were GSR Ca at 31 grams/8 L of water; Best Soil Rejuvenation at 17 ml/8 L of water. Spraying speeding rate was 12 km/hr. Kerb SC will be sprayed in spring of 2014.

Field notes and Measurements (site evaluation) before and after treatments:

1. Soil tests were done in early spring (2013) before any spraying was done.
2. Soil tests will also be done again in early spring of 2014 and the two samples compared for soil nutrient changes.
3. Plant inventory and plant composition (by weight) will be taken and assessed for a decrease (if any) of foxtail barley plant stands.
4. Brix (or sugar level) of the available plants will also be done in early spring of 2014.
5. Pictures will be used to document any changes in plant stand composition among the treatments.

Other Collaborators: BEST Environmental Technologies; Back To Your Roots Soil Solutions

Future Plans: On-going demonstration. Results and notes on observation in 2014 will be available later on.

Progress on Production of Mineral Balanced Fertilizer from Compost

Collaborating Producer: Peter, Mary & Lisa Lundgard - Nature's Way Farm (MD of Peace)

Soil fertility and balanced soil mineral nutrition are important for both forage and livestock to reach their growth and production potential. Compost improves soil quality and productivity as well as prevents and controls soil erosion. It also reduces weeds, insects and diseases. In addition to serving as a nutrient source, compost supplies stabilized organic matter, which is an important component of soils. Increasing soil organic matter with compost is important for maintaining soil quality in forage based systems where most of the above-ground biomass is removed, such as through grazing, silage or hay. Providing an adequate and balanced nutrient supply to annual and perennial forage crops is important to produce high yields of quality forage while optimizing economics. The project is intended to develop a model that is practical.

Purpose of the Study:

1. To determine appropriate formulations of mineral additions to compost fertilizer
2. To compare compost with or without minerals in the production of forage crops
3. To determine appropriate compost application rates
4. To assess soil nutrient changes and potential for increased forage production
5. To find out the cost effectiveness of the formulated compost fertilizer and its practicality

We hope that the benefits of the formulated balanced mineral compost will include:

- Balanced soil mineral based elements (Mg, Na, K, Ca)
- Make nutrients available to crop
- Sustainable practical on-farm system to enhance available mineral to crop
- Adequate concentrations of macro and micro mineral in plant available forms
- Nutrient rich healthy microorganisms that (cycle plant available nutrients through soil ecology) help keep soil thriving and healthy
- Increased water retention and reduced soil compaction
- Plant disease and insect pest protection
- A product that is environmentally friendly - no harmful chemicals or salts to be released to the environment

Methods

Site: Nature's Way Farm (NW14 T82 R24 W5), Grimshaw. The soil type at the site is clay base with high calcium (marl) and high CEC

Compost Fertilizer Formulation:

Following soil, plat and manure analysis, a recipe was developed for a compost fertilizer formulation. The target is an application rate of 1000 lb/acre of the compost fertilizer formulation. The recipe incorporates both compost materials and organic mineral sources. The recipe for the organic mineral sources will serve to address the short fall of various soil nutrients and provide the ideal levels of all soil base element saturation (Ca=66-70%, Mg=8-15%, K=1-5%, Na=1-3%), as well as meeting the minimum soil trace mineral requirements for plant growth and production.

Laboratory Analyses Carried Out:

- Comprehensive Soil Test Boron and SOLVITA® Test options
- Texas Plant & Soil Lab (using Albrecht methods) - Soil samples @0-6 to include % Base Saturation of Ca, Mg, K, H, Na and the trace minerals Cu, Z, B, Se and Fe and Mn.
- Alfalfa hay, compost starter and manure testing for nutrient composition. The C/N ratio of plant samples was determined. *The usual recommended range for C/N ratios at the start of the composting process is about 30/1, but this ideal may vary depending on the bioavailability of the carbon and nitrogen.*

Compost Making Method:

Sabino Cortez method of composting will be used. This is a (semi-static) method and will be monitored and accomplished by the cooperator. The composting will start this fall and the compost will be applied next summer. This will allow the composting process to take more than 90 days. The compost based plant materials include: alfalfa, crop residue from alfalfa seed crop and alfalfa-grass mix.

Experimental Treatments:

2 main compost piles (treatments) were made in late October 2013 and these consisted of:

a. compost + minerals (Pile 2)
b. compost without minerals (Pile 1)

Pile 1: Compost without added minerals (Compost check treatment)

Materials and amounts used:

- 10 bales of aftermath = 8000 lbs
- Manure added = 1300 lbs @20% loss = 1040 lbs/row (104 lbs/ac)
- Compost starter = 1300 lbs @20% = 1040 lbs/row (104 lbs/ac)

Total weight = Brome aftermath + manure + compost starter = 10,000 lbs (i.e. 1000 lbs/ac application target)

Note: No minerals added to pile 1.

Pile 2: Compost with added minerals (Compost +minerals treatment) =8,000 lbs of alfalfa + brome aftermath

Materials and amounts used:

- 10 bales of aftermath = 8000 lbs
- Manure added = 1300 lbs @20% loss = 1040 lbs/row (104 lbs/ac)
- Compost starter = 1300 lbs @ 20% = 1040 lbs/row (104 lbs/ac)

Total weight = Brome aftermath + manure + compost starter = 10,000 lbs (i.e. 1000 lbs/ac application target)

Minerals added to pile 2:

- Marl (Calcium carbonate, 98%) =2100 lbs in total (or 210 lbs/ac)
- Clay = 250 lbs in total (or 25 lbs/acre)
- Rock powder (Mg & K) = 50 lbs/acre
- Borax (15% B actual) = 0.25 lbs/acre
- Soft rock phosphate = 10 lb/acre
- Redmond salt = 10 lbs/acre
- Copper sulphate = 1 lb/acre

Water utilization: Each row of compost pile got a total of 11 hrs of water (i.e. 66,000 lbs of water/row or 6600 gallons of water/row). Estimated water flow rate = 600 gallons per hour

Plans for 2014 and Beyond

Field trial to evaluate the 2 compost piles will be carried out. Field experimental design will be a split-plot design in 4 replications and in small plots.

There will be 2 main-plots, which will be the 2 compost types:

- Compost alone
- Compost + minerals

Sub-plots will be the following compost application rates (4 rates):

1. 0 (check)
2. 500 lbs/acre
3. 1000 lb/acre
4. 1500 lb/acre

Area for each main plot- 0.09 acres (4085 sq ft)
Sub-plot size- 2.5m x 7.5m
Gaps between plots-0.50m
Gaps between main- & sub-plots and between reps- 1.0m
Total area needed for the trial – 0.53 acre (23250 square feet)

Compost Application Method:

For this trial, manual application of the compost will be carried out going by the individual plot size, which is 2.5m x 7.5m. The required compost amount for each plot will be weighed and evenly spread out manually using a rake.

Measurements will Include:

Compost

- Compost analysis to determine composition and bulk densities
- Ammonia & nitrate to be determined (these are immediately plant available forms of nitrogen)

Soil

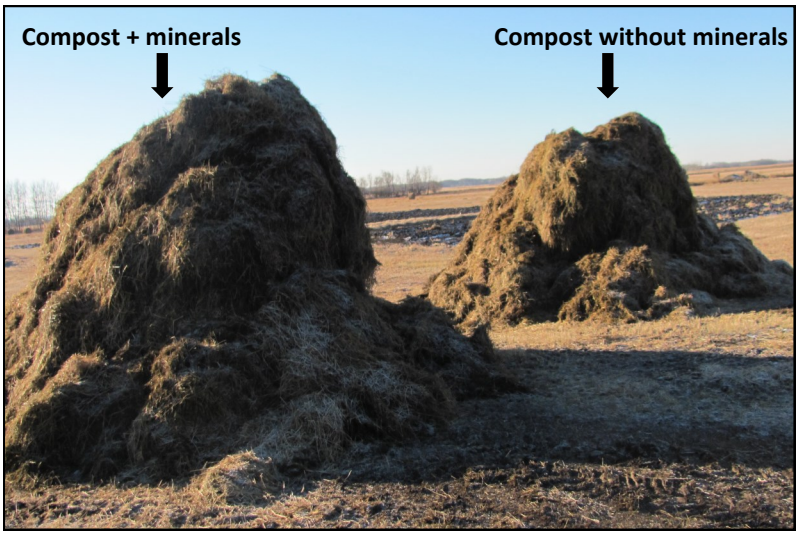
- Soil to be taken @ 0-6" to monitor soil nutrients changes including base saturation
- Ammonia & nitrate & available minerals
- Soil texture
- Soil compaction (with a digital penetrometer)
- Soil water infiltration using ring method
- Soil moisture content/water holding capacity through gravimetric method

Forage

- Plant mineral uptake
- Plant growth, tissue analysis, forage yield & quality
- Brix (sugar) level to measured

Economics

- Direct input costs associated with compost making and addition of minerals
- Cost effectiveness of using compost with or without mineral application will be determined



Other Collaborators:

- Texas Plant & Soil Lab, US
- Back To Your Roots Soil Solutions

Forage Type Barley Varieties for Forage Yield and Quality

Barley varieties are generally classified as two rows or six rows, as feed grain or malting, as covered or hulless; and these are used for animal feed as grain, whole plant (hay, silage or green feed) or straw. Several studies have shown that forage of barley is higher in CP than forage of oat, triticale and spring wheat. Sixteen forage type barley varieties were tested by PCBFA as part of the Regional Silage Variety Trials (RSVT). It is necessary to test new barley varieties as they become available and identify those with superior yield and quality that could replace the present varieties used by producers or varieties that could be incorporated into the producers current forage production systems in the different regions of the province.

Objectives

- To compare barley varieties for forage yield and quality
- To communicate findings to beef cattle producers in the Peace Region and to other parts of Alberta through the RSVTs (The results will also be reported in the Alberta Seed Guide (www.seed.ab.ca)).

Methods

The trial took place at Fairview Research Farm (NW5-82-3W6) on RR #35, MD of Fairview. The site was left to fallow in the summer of 2012, but had a Pioneer® brand canola variety trial in 2011. Prior to seeding, soil samples were taken at 0-6" depth for N, P, K & S tests, after which the site was harrowed. After harrowing, a pre-seed weed control was carried out with Credit®. The soil test showed that the site had a pH of 5.4 and 8.8% organic matter.

Plant Material, Experimental Design, Seeding and Crop Management

The treatments consisted of 16 barley varieties (10 two-row and 6 six-row varieties). Most of them have been briefly described in the "2013 Cereal Research Report" by Agriculture and Agri-Food Canada & Alberta Agriculture and Rural Development (http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/fcd5506/$FILE/2013_cereal_research_report.pdf).

Two-row barley varieties:

- Busby - feed barley, rough awned
- CDC Austenson - rough awn variety, high feed yield
- CDC Cowboy - forage barley
- CDC Coalition - general purpose type, good yield potential
- CDC Maverick - a new smooth awned forage barley for swath grazing, bale grazing and silage
- Conlon - smooth awned, easily the nicest barley to roll
- Gadsby - rough awned, general purpose barley
- Ponoka - feed barley for grain or silage
- Seebe - feed barley for silage
- Xena - semi-smooth awns

Six-row barley varieties:

- AC Ranger - feed barley, smooth awns
- Chigwell - feed barley, smooth awns
- Muskwa - smooth awned, hulled, general purpose type
- Sundre - feed barley for grain and forage
- Trochu - feed barley for silage , smooth awn
- Vivar - feed barley

The treatments (16 barley varieties) were arranged in a randomized complete block design with four replications. Plot size at seeding was 8.5 m long 6 rows at 23 cm (9 inches) spacing between rows. Plot length was later trimmed to 6.5 m long. Seeding rate was 250 live seeds m^{-2}. The calculated seed rate varied from 88 lbs/acre for Muskwa to 157 lbs/acre for CDC Maverick. All seeds were treated. A Fabro plot drill equipped with Atom jet openers was used to seed on May 23, 2013. All plots were fertilized with a blend of 90N-30P-20K-30S (lbs/acre). In crop spraying was done with Frontline XL.

Field Notes and Forage Yield Estimation

Plant stand was visually inspected in all plots to assess adequacy of crop emergence at 4 weeks after seeding. Prior to harvest, notes were taken on plant lodging. Harvesting for forage yield was done at the soft dough stage. The plots were assessed to estimate any major part of rows without plants to determine the actual harvest area per plot. The above ground parts of plants were harvested on August 1, 2013. For each plot, four 3 m long inner rows were hand harvested with a sickle knife or cordless grass shears and weighed for plot fresh forage yield. About 0.5 kg of the freshly harvested forage was sub-sampled and air-dried for a few days to constant weight for forage dry matter (DM) yield estimation.

Forage Quality Analysis

The forage quality (based on % dry matter bases) was determined using two dry composite forage samples per treatment, one for replications 1 & 2, and the other for replications 3 & 4. The samples were analyzed for feed quality using standard laboratory procedures for wet chemistry analysis.

Results and Discussion

Forage Moisture Content and DM Yield at Soft-Dough Stage

The forage moisture content at harvest at the soft dough stage varied from 65.9% for Chigwell to 68.9% for Ponoka (Table 1). The forage DM yield was highest for AC Ranger (8638 lbs DM/acre) and lowest for Vivar (6995 lbs DM/acre), giving a difference of 1643 lbs DM/acre between the two barley varieties (Table 1). Seven of the 16 barley varieties tested had >8000 lbs DM/acre.

Table 1. Forage moisture content, DM yield and quality of 16 forage type barley varieties tested in Fairview in 2013.

Barley variety	Moisture %	DM lb/acre	CP %	Ca %	P %	Mg %	K %	Na %	ADF %	TDN %	ME -----	DE -----	NE_L Mcal/kg	NE_M -----	NE_G -----
2-Row Barley															
PONOKA	68.9	7990	13.7	0.42	0.22	0.27	1.20	0.59	29.8	63.3	2.29	2.79	1.43	1.41	0.83
BUSBY	66.5	8320	13.8	0.33	0.24	0.24	0.96	0.57	25.4	65.5	2.36	2.88	1.49	1.49	0.89
CDC COWBOY	68.4	7685	14.4	0.27	0.26	0.25	1.20	0.48	28.6	63.9	2.31	2.81	1.45	1.43	0.85
CDC AUSTENSON	66.8	7838	15.4	0.26	0.24	0.21	1.12	0.43	27.5	64.4	2.33	2.84	1.46	1.45	0.86
XENA	68.5	8172	14.1	0.35	0.21	0.25	1.27	0.53	30.0	63.2	2.28	2.78	1.43	1.41	0.83
GADSBY	66.2	7499	13.8	0.36	0.25	0.25	1.27	0.53	29.5	63.4	2.29	2.79	1.44	1.42	0.84
CONLON	67.5	8519	12.0	0.32	0.27	0.23	1.01	0.34	22.9	66.7	2.41	2.94	1.52	1.53	0.93
CDC MAVERICK	67.6	7680	14.6	0.37	0.24	0.28	1.23	0.56	27.8	64.3	2.32	2.83	1.45	1.45	0.86
CDC COALITION	67.2	7789	14.2	0.30	0.22	0.24	1.40	0.53	28.7	63.9	2.30	2.81	1.45	1.43	0.85
SEEBE	67.3	7580	14.7	0.35	0.24	0.24	1.44	0.43	32.0	62.2	2.24	2.74	1.41	1.38	0.80
Mean	67.5	7907	14.1	0.33	0.24	0.24	1.21	0.50	28.2	64.1	2.31	2.82	1.45	1.44	0.85
6-Row Barley															
VIVAR	68.7	6995	14.1	0.35	0.21	0.26	1.08	0.52	28.9	63.8	2.30	2.81	1.45	1.43	0.85
AC RANGER	67.6	8611	14.7	0.53	0.24	0.33	1.42	0.65	28.7	63.8	2.30	2.81	1.45	1.43	0.85
SUNDRE	67.7	8638	14.4	0.29	0.24	0.24	1.24	0.63	31.0	62.7	2.26	2.76	1.42	1.40	0.81
TROCHU	67.5	7920	13.2	0.34	0.19	0.24	1.11	0.63	28.5	63.9	2.31	2.81	1.45	1.44	0.85
CHIGWELL	65.9	7982	14.2	0.30	0.23	0.24	0.95	0.43	27.4	64.5	2.33	2.84	1.46	1.46	0.87
MUSKWA	66.5	8259	15.1	0.37	0.24	0.28	1.29	0.68	29.8	63.3	2.28	2.79	1.43	1.42	0.83
Mean	67.3	8068	14.3	0.36	0.22	0.26	1.18	0.59	29.0	63.7	2.30	2.80	1.44	1.43	0.84
*Significant?	No	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No
$LSD_{0.05}$	-	-	-	0.08	-	0.05	0.27	-	-	-	-	-	-	-	-
**CV, %	2.07	11.1	8.18	12.1	11.8	10.0	10.7	26.5	12.1	2.7	2.68	2.68	2.95	3.89	6.00

* Indicates variety significance, yes when P<0.05 & No when P>0.05. **,CV indicates coefficient of variation.

Forage Quality (Table 1)

Generally, forage protein content was >11% for all barley varieties. Protein varied from 12.0% for Conlon to 15.4% for CDC Austenson. All varieties exceeded the recommended protein values for a dry gestating cow in mid and late pregnancy stages, which respectively requires 7 and 9% protein and even for a lactating cow that requires 11% protein. This further confirms the value of forage type barley varieties used as silage and feed to different categories of beef cows.

Three (Ca, Mg & K) of the 5 macro minerals analyzed for varied among the 16 barley varieties tested. AC Ranger consistently had the highest forage Ca, Mg & K contents. All macro minerals analyzed for in this study (Ca, P, Mg, K, Na) were well above the recommended values for a dry gestating cow both in the mid and late pregnancy stages. But for a lactating cow, the requirements of Mg, K and Na were all met by the barley varieties tested. The Ca requirement by a lactating cow was only met by Ponoka, while the P requirement was only met by CDC Cowboy and Conlon.

Energy content (TDN) was similar for all varieties and mostly well above 62%. This shows that the suggested energy requirements for a dry gestating cow, which is 55% TDN at mid-pregnancy stage and 60% at late pregnancy stage have both been adequately met by all barley varieties. For a lactating cow, which requires 65% TDN, only 3 (Busby, Conlon and Chigwell) of the 16 varieties sufficiently met this amount.

Conlon is one of the two smooth-awned 2-row varieties tested here. It had the highest DM (8519 lbs/acre) among the 2-row varieties and ranked 3rd in general. This variety has also shown some feed quality potential probably because it is easily the nicest barley to roll. It has consistently out performed all other varieties in ADF and digestible energy content, as well as in the respective net energy for lactation, maintenance and gain.

Pea - Cereal Mixtures for Forage Yield and Quality

Peas are usually included in mixes to improve the quality of the feed. Peas and oats, barley or triticale are some of the most common types of intercropping. Pea/cereal mixtures can produce better quality silage than cereals alone. Pea silage could be 13-18% protein so theoretically a pea/cereal mix should have higher protein than a cereal silage alone which is usually about 10% protein. In reality however, the potential protein benefits of peas in silage mixtures often are not attained because of the competitive effects of the cereal crop. Several studies have shown that pea/cereal mixtures can produce better quality silage than cereals alone, but the success of these intercrops is highly dependent on the seeding rates for both crops and making sure that there are enough peas in the mixture to influence feed quality. Legumes don't need nitrogen (N) fertilizer and have higher forage protein content than cereals. Seeding mixtures of peas and cereals may reduce land, inputs and labour costs per unit of forage production, which will improve beef production efficiency and contribution margin.

Objectives

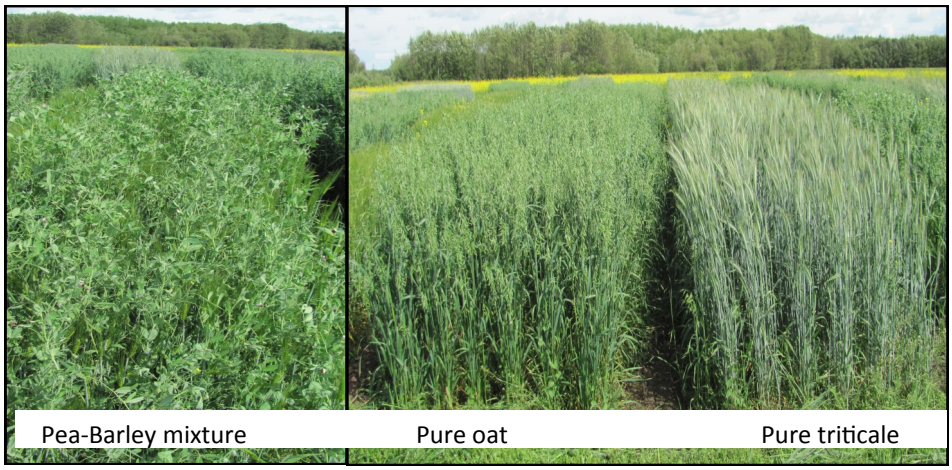
- To compare the mixtures of forage peas with barley, oat and triticale for forage yield and quality
- To communicate findings to beef cattle producers in the Peace Region and to other parts of Alberta through the RSVTs (The results will also be reported in the Alberta Seed Guide (www.seed.ab.ca)).

Methods

This trial is part of the Regional Silage Variety Trials. The trial was conducted at Fairview Research Farm (NW5-82-3W6) on RR #35, MD of Fairview. Soil test for the site at 0-6" indicated a pH of 5.4 and 8.8% organic matter. The site was left to fallow in the summer of 2012, but had a Pioneer® brand canola variety trial in 2011.

Seeding and Crop Management

Prior to seeding, the site was harrowed and then sprayed with Credit® for a pre-seed weed control. Three cereal varieties (Vivar barley, Pronghorn triticale & Murphy oat) and 2 forage type pea varieties (40-10 & CDC Horizon) were used for the trial. The treatments (9) consisted of 3 pure cereal crop plots (Vivar barley, Pronghorn triticale & Murphy oat) and mixtures of each cereal variety with each of 40-10 & CDC Horizon (6 mixtures in total).


Pea-Barley mixture Pure oat Pure triticale

The treatments were arranged in a randomized complete block design with four replications. Plot size at seeding was 8.5 m long 6 rows at 23 cm (9") spacing between rows. Seeding rate was 250 live seeds m^{-2} for the pure cereals, corresponding to 100, 87 and 108 lbs/acre seeded respectively for Vivar barley, Murphy oat and Pronghorn triticale. For the mixtures, seeding was done at 50% (of pure cereal seeding rate) + 75% (of peas seeding rate). Seed rates of 104 and 115 lbs/acre were respectively used for 40-10 and CDC Horizon in the mixtures. A Fabro plot drill equipped with Atom jet openers was used to seed on May 23, 2013. All plots were fertilized with a blend of 48N-30P-10K-15S (lbs/acre). In crop spraying of the pure cereal plots was with Frontline XL. No spraying was done on the mixed plots. Hand weeding was done once to remove visible volunteer canola plants.

Field Notes and Forage Yield Estimation

Plant stand was visually inspected in all plots to assess adequacy of crop emergence at 4 weeks after seeding. Prior to harvest, notes were taken on plant lodging. Harvesting for forage yield was done at the soft dough stage for pure barley, milk stage for oat and late milk for triticale. Each mixture was harvested 10 days later after the cereal in the mixture was at the recommended stage of maturity for harvest. For each plot, four 3 m long inner rows were hand harvested and weighed for wet yield determination. About 0.5 kg of the freshly harvested materials was sub-sampled and air-dried for a few days to constant weight for forage dry matter (DM) yield estimation.

Forage Quality Analysis

The forage quality (% DM) was determined using two dry composite forage samples per treatment, one for replications 1 & 2, and the other for replications 3 & 4. The samples were analyzed in a commercial laboratory using standard laboratory procedures for wet chemistry analysis.

Results and Discussion

Forage Moisture and DM yield (Table 1)

Forage moisture at harvest was similar for pure cereals as well as pea-cereal mixtures. Moisture varied from 63.4 - 66.7% and was 64.7% on average.

DM yield varied from 6380 lbs/acre for CDC Horizon/Murphy mixture to 8473 lbs/acre for pure Vivar barley. Generally, pure cereals appeared to have slightly yielded more DM than peas-cereal mixtures. Pure Vivar barley appeared to have out yielded peas-Vivar barley mixtures by 740 - 934 lbs DM/acre. Pure triticale out yielded peas-triticale mixtures by 529 - 1221 lbs DM/acre. Pure oat out yielded peas-oats mixtures by 778 - 1410 lbs DM/acre.

Table 1. Forage moisture content, DM and quality of pure cereals and pea-cereal mixtures tested in Fairview in 2013.

Crop Type	Moisture %	DM yield lbs/acre	CP %	Ca %	P %	Mg %	K %	Na %	ADF %	TDN %	ME —-	DE ——	NEM Mcal/kg	NEG ——
Pure Vivar barley	64.0	8473	11.5	0.40	0.20	0.26	1.10	0.45	29.2	63.6	2.30	2.80	1.43	0.84
Pure Pronghorn triticale	65.8	7965	13.6	0.49	0.24	0.31	1.16	0.88	35.3	60.5	2.19	2.67	1.33	0.75
Pure Murphy oat	64.0	7790	11.5	0.98	0.21	0.42	0.93	0.11	32.8	61.8	2.23	2.72	1.37	0.79
CDC Horizon/Murphy	66.7	6380	11.3	0.95	0.16	0.39	1.12	0.36	32.2	62.1	2.24	2.73	1.38	0.80
CDC Horizon/Vivar	63.6	7539	10.9	0.50	0.19	0.23	1.25	0.32	33.2	61.6	2.22	2.71	1.36	0.78
CDC Horizon/Pronghorn	64.5	6744	11.4	0.67	0.17	0.31	1.24	0.28	31.7	62.4	2.25	2.75	1.39	0.81
40-10 /Murphy	64.6	7012	11.8	0.27	0.26	0.23	1.62	0.89	37.1	59.7	2.16	2.63	1.30	0.72
40-10 /Vivar	63.4	7733	8.80	0.27	0.16	0.19	1.32	0.11	32.2	62.1	2.24	2.73	1.38	0.80
40-10 /Pronghorn	65.0	7436	13.4	0.45	0.27	0.24	1.02	0.45	30.4	63.0	2.28	2.78	1.41	0.82
Significance @P<0.05?	No	No	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No
$LSD_{0.05}$	-	-	2.59	0.21	0.07	0.10	-	0.47	-	-	-	-	-	-
Coeff. of variation, %	4.15	15.3	9.73	16.8	15.3	16.5	19.3	16.7	15.5	4.09	4.11	4.15	6.14	9.52

Forage Quality (Table 1)

Protein varied significantly different among crop treatments. Pure triticale and 40 - 10/Pronghorn mixture had up to 13% protein. The other pure cereals and mixtures (except for 40-10/Vivar mixture) had >11.0% protein. With the exception of 40-10/Vivar barley mixture, all pure cereals as well as peas-cereal mixtures had adequate levels of protein required by a dry gestating and lactating cow. 40-10/Vivar barley mixture was sufficient for a dry gestating cow but not for a nursing cow.

Of the 5 macro minerals tested for, only K did not vary much among crop treatments. Forage Ca, P, Mg and Na contents all varied greatly among pure cereals and peas-cereal mixtures. Forage Ca content was greatly higher for pure Murphy oat and CDC Horizon/Murphy oat mixture. Five of the 9 mixtures had 0.20% P and above. Other mixtures had <0.20% P. Pure Murphy oat had the highest forage Mg content (0.42%). Pure Pronghorn triticale and 40-10/Murphy oat mixture had 2-8 times higher Na content than crop treatments.

For a lactating cow, only pure Vivar barley and mixtures of 40-10/Murphy oat and 40-10/Vivar oat were deficient in the amount of Ca needed by this category of cow. Only 40-10/Murphy oat and 40-10/Pronghorn triticale mixtures had up to the 0.26% P that has been suggested for a lactating cow. All pure cereals as well as peas-cereal mixtures had sufficient amounts of Mg, K and Na needed by a lactating cow.

Energy (TDN) values did not vary much among pure cereals as well as among peas-cereal mixtures. TDN values varied from 60-64% for all crop treatments. Using TDN per cent, the Rule of Thumb is 55-60-65. This rule says that for a mature beef cow to maintain her body condition score (BCS) through the winter, the ration must have a TDN energy reading of 55 per cent in mid pregnancy, 60 per cent in late pregnancy and 65 per cent after calving. From the TDN values obtained in the pure cereals and peas-cereal mixtures in the present study, it is evident that all treatments had sufficient energy for a dry gestating cow, both in the mid and late pregnancy stages, but slightly fell short of the 65% TDN suggested for a lactating cow.

2013 Regional Silage Variety Trials

Cattle producers grow ever increasing amounts of annual crops for feed (silage, greenfeed and swath grazing), and measuring those that produce the highest forage yield becomes increasingly important. Silage is an integral forage source in feedlots across the province and has become more prevalent in cow herds as well. With many producers trying to lower production costs, swath grazing of cow herds has increased dramatically in the last few years. It could also be argued that there is more grain forage than cereal grain fed to take a market animal from conception to plate.

Participating Organizations

Under the umbrella of the Agricultural Research and Extension Council of Alberta, eight applied research groups performed the project at twelve locations throughout the province.

- Agricultural Research and Extension Council of Alberta, Sherwood Park, ALTA., (780) 416-6046
- Battle River Research Group, Forestburg, Alta., (780) 582-7308
- Chinook Applied Research Association, Oyen, Alta., (403) 664-3777
- Gateway Research Organization, Westlock, Alta., (780) 349-4546
- Lakeland Agricultural Research Association, Bonnyville, Alta., (780) 826-7260
- Smoky Applied Research and Demonstration Association, Falher, Alta., (780) 837-2900
- West Central Forage Association, Evansburg, Alta., (780) 727-4447
- North Peace Applied Research Association, Manning Alta., (780) 836-5230
- Peace Country Beef and Forage, Fairview, Alta., (780) 835-6799

Major Sponsors

- Government of Alberta (ARD)
- A & L Canada Laboratories Inc.
- Association of Alberta Co-op Seed Cleaning Plants
- Alberta Seed Growers' Association

Trial Information

This is the fifth year the groups have conducted forage testing of various varieties. The tables show the summaries from the last two years as compared to the control variety (**in bold**). Test Yield categories are similar to the crop variety tables and are further explained below.

Varieties of barley, oats, triticale and peas commonly used for silage, greenfeed and swath grazing were included in the trial as well as new varieties showing good potential for these uses. The cereal trials, (Barley, Oats & Triticale), were seeded at recommended seeding density rates and at recommended fertility; and its objective was to determine yield and nutritional values. The pulse mixture trial looked at increasing the nutritional value of silage, as well as decreasing nitrogen costs. Thus, the pulse mix plots were seeded with 50 pounds of 11-52-0-0 only, while the monoculture cereal comparison plots were fertilized with 50 per cent of the recommended cereal rates. Peas were seeded at 75 per cent of their recommended seeding rate and cereals at 50 per cent when in mixtures. The monoculture cereal comparison plots were seeded at 100 per cent the recommended seeding rate.

Test Yield Categories

The defined range for each Test Yield Category is provided in tons per acre. Variety yields are reported as average yields in Low, Medium and High Test Yield Categories for comparison with the check for productivity regimes and environments that may be anticipated. Varieties that are statistically higher (+) or lower (–) yielding than the standard check are indicated. No symbol after the yield figure indicates that there is no statistical difference. Caution is advised when interpreting the data with respect to new varieties that have not been fully tested.

To make effective use of the yield comparison tables, producers first need to decide if their target yield for the season fits within the Low, Medium or High Test Yield categories. It should be noted that the indicated yield levels are those from small plot trials, which are often 15 to 20 per cent higher than yields expected under commercial production. Also remember that yield is not the only factor that affects net return. Be sure to consider the other important agronomic and disease resistance characteristics. The genetic yield potential of a variety is often masked by various crop management factors, some of which can be controlled.

Site Information

There were 12 sites across the province, representing various agrological zones. Sites were located near Castor, Stettler, Fort Kent, High Prairie, Evansburg, Hanna, Manning, Fairview, St. Paul, Stony Plain, and Neerlandia. The Fairview site only seeded the barley trial. Maturity, plant height and lodging were not measured in the trials as it was felt that most have already gone through the Cereal RVT program, and have been extensively reported on.

Nutritional Analysis

Nutrition was assessed using wet chemistry analysis. Full nutritional analysis was done on each sample, however, we have only reported on six nutritional categories; crude protein (CP), total digestible nutrients (TDN) which is an estimation of energy, calcium (Ca), phosphorus (P), potassium (K) and magnesium (Mg).

BARLEY

Variety	Overall Yield	Overall Station Years of	Yield Category (% Vivar)			Nutritional Data					
			Low < 2.0 (t/ac)	Medium 2.0 - 4.0 (t/ac)	High > 4.0 (t/ac)	CP (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Varieties tested in the 2012 - 2013 trials (Yield and agronomic data only directly comparable to Vivar)											
Vivar (t/ac)	**4.3**		**1.5**	**3.1**	**5.3**	**10.4**	**66.2**	**0.4**	**0.2**	**1.3**	**0.2**
Vivar	**100**	**17**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Busby	101	17	101	99	102	101	99	100	103	98	92
CDC Austenson	111+	17	125	108	111	108	100	87	105	108	94
CDC Coalition	101	17	97	103	100	104	100	82	104	104	88
CDC Cowboy	110+	17	133	108	109	98	97	100	107	114	105
CDC Maverick	99	7	XX	106	94	97	97	97	104	109	101
Chigwell	96	17	104	96	96	104	97	109	100	106	100
Conlon	94	7	XX	101	88	98	98	86	107	97	88
Gadsby	110+	17	148	105	110	100	99	101	106	98	97
Muskwa	99	7	XX	103	97	104	97	104	103	124	97
Ponoka	106	17	120	100	109	97	98	118	107	106	98
Ranger	101	7	XX	96	104	101	99	103	115	125	104
Seebe	105	17	118	103	106	109	97	103	118	115	91
Sundre	96	17	102	97	95	107	98	104	108	120	103
Trochu	96	17	112	92	97	105	100	108	108	111	107
Xena	105	17	111	108+	103	104	100	82	116	98	89

TRITICALE

Variety	Overall Yield	Overall Station Years of Testing	Yield Category (% Pronghorn)			Nutritional Data					
			Low < 3.0 (t/ac)	Medium 3.0 - 4.5 (t/ac)	High > 4.5 (t/ac)	CP (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Varieties tested in the 2012 - 2013 trials (Yield and agronomic data only directly comparable to Pronghorn)											
Pronghorn (t/ac)	**4.4**		**2.9**	**3.9**	**5.3**	**9.6**	**62.7**	**0.2**	**0.2**	**1.5**	**0.1**
Pronghorn	**100**	**17**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Bunker	100	17	99	104	98	95	98	118	94	97	104
Sunray	101	8	86	103	102	103	99	121	99	102	94
Taza	100	17	105	98	100	99	101	112	107	95	98
Tyndal	95-	17	89	96	97	94	99	102	102	94	94

OATS											
Variety	Overall Yield	Overall Station Years of Testing	Yield Category (% Murphy)			Nutritional Data					
			Low < 2.0 (t/ac)	Medium 2.0 - 4.0 (t/ac)	High > 4.0 (t/ac)	CP (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Varieties tested in the 2012 - 2013 trials (Yield and agronomic data only directly comparable to Murphy)											
Murphy (t/ac)	**3.7**		**1.5**	**3.3**	**4.5**	**8.9**	**59.4**	**0.3**	**0.2**	**1.9**	**0.2**
Murphy	**100**	**17**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
AC Juniper	103	12	108	97	109	126	104	104	110	105	108
AC Morgan	104	17	97	102	108	116	106	107	109	95	96
AC Mustang	98	17	108	93	104	130	104	104	105	100	101
CDC Baler	98	17	93	95	103	129	105	108	109	105	101
CDC Haymaker	101	9	XX	99	104	128	104	108	107	111	98
CDC SO-I	95	17	89	91	101	123	105	105	94	106	106
Foothills	101	17	111	94	108	121	102	102	103	101	98
Jordan	100	17	100	95	107	122	103	99	99	104	109
Waldern	103	17	126	101	102	113	103	117	98	98	99

PULSE MIXTURES											
Variety	Overall Yield	Overall Station Years of	Yield Category (% Vivar)			Nutritional Data					
			Low < 2.0 (t/ac)	Medium 2.0 - 4.0 (t/ac)	High > 4.0 (t/ac)	CP (%)	TDN (%)	Ca (%)	P (%)	K (%)	Mg (%)
Varieties tested in the 2012 - 2013 trials (Yield and agronomic data only directly comparable to Vivar)											
Vivar (t/ac)	**4.1**		**2.5**	**3.5**	**5.3**	**9.6**	**63.1**	**0.5**	**0.2**	**1.5**	**0.2**
Vivar	**100**	**18**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Murphy	117	17	129	119	92	91	95	85	103	122	97
Pronghorn	112	18	109	116	108	106	103	61	116	96	80
40-10 /murphy	96	18	105	97	75	130	98	153	122	119	133
40-10 /pronghorn	95	18	99	94	92	125	97	148	117	103	126
40-10 /vivar	94	18	101	94	83	143	99	174	112	106	137
CDC Horizon/murphy	107	18	117	107	89	109	95	129	103	118	117
CDC Horizon/pronghorn	106	18	112	108	89	127	99	136	109	104	110
CDC Horizon/vivar	95	18	96	99	81	134	99	146	111	105	121

2013 Silage trials CV and LSD									
Site	Organization	CV				LSD, g			
		Barley	Oats	Pulse Mix	Triticale	Barley	Oats	Pulse Mix	Triticale
St Paul	LARA	18.1	11.5	12.3	11.2	2245	1267	848	1819
Fairview	PCBFA	11.1	-	11.9	-	390		410	
Manning	NPARA	9.4	9.3	10.5	6	353	424	614	282
Stettler	BRRG	14	-	12.8	-	1296	-	725	
Ft. Kent	LARA	12.8	11.6	13.9	7.7	1501	1280	1380	1017
Lac La Biche	LARA	13.4	12.2	13	12.4	1561	1352	988	1817
Castor	BRRG	-	13.7	11	13.6		785	702	1013
Hanna	CARA	13.2	11.9	12.7	10.1	609	386	374	416
Stony Plain	GRO	26	11.3	-	14	700	460		625
Big Lakes	SARDA	-	6.3	-	-		405		
Wildwood	WCFA	20.5	12.3	9.1	5.9	1200	1033	780	550
Neerlandia	GRO	7.6	-	17.6	-	281		236	

Note: Only trials with CVs less than 15.0 are added to the database.

A Comparison of Selected Forage Type Cereal Crops for Forage Yield & Quality

Cereal crops can be successfully used as a source of quality forage for beef cattle. The most common cereals used for forage are oats, barley and spring triticale. Various studies by researchers at Lacombe have recognized the potential of triticale in beef cattle production systems, especially when used for swath grazing. In parts of the Peace, triticale is not yet a commonly grown crop for cow-calf feeding systems. Different types of cereal crops have different recommended stage of maturity for harvest for optimum beef cattle performance. And the stage of maturity is the most important factor determining the yield and quality of a cereal crop when used as forage. Small grain cereals are a good primary forage when backgrounding beef cattle. A small plot replicated trial was conducted in Fairview to examine a variety of cereal crop types, including 2 warm-season cereals.

Methods

The trial was conducted at Fairview Research Farm (NW5-82-3W6) on RR #35, MD of Fairview. The site used had been summer fallowed in 2012, but had a Pioneer® brand canola variety trial the year before (2011). Soil tests for the site showed a pH of 5.4 and 8.8% organic matter. The site was harrowed and then sprayed with Credit® for pre-seed weed control.

Seeding and Crop Management

A total of 9 cereal forage type crops and varieties (7 cool- & 2 warm-season) were tested. Cool-season cereals consisted of: 4 triticale (Bumper, Bunker, Taza & Tyndal varieties), 1 barley (CDC Cowboy variety) and 2 oat varieties (CDC SO-I & CDC Baler). Red Proso millet and forage sorghum were the 2 warm-season cereals used.

The treatments (9 crop varieties) were arranged in a randomized complete block design with 3 replications. Plot size at seeding was 8.5 m long 6 rows at 23 cm (9 inches) spacing between rows. A Fabro plot drill equipped with Atom jet openers was used to seed on May 23, 2013. Seeding rate was 250 live seeds m^{-2} (that is = 24 viable seeds per square foot) for triticale, barley and oats. Red Proso millet and forage sorghum were seeded at 20 lbs/acre. All plots were fertilized with a blend consisting of 48N-30P-10K-15S (actual lbs/acre). For triticale, barley and oat plots, in crop spraying was done with Frontline XL to control weeds. For millet and forage sorghum plots, 2,4 DE 700 was used for in crop spraying to control weeds.

Field Notes, Forage Yield Estimation and Feed Quality Analysis

Prior to harvest, notes were taken on plant lodging. Harvesting for forage yield was done at the soft dough stage for CDC Cowboy barley and forage sorghum, at the milk stage for the 2 oat varieties and at the late milk stage for the 4 triticale varieties. Red Proso millet was harvested at about 14 days after heading. For each plot, four 3 m long inner rows were hand harvested and weighed for wet yield determination. About 0.5 kg of the harvested fresh material was sub-sample and air-dried for a few days to constant weight for forage dry matter (DM) yield estimation.

Results and Discussion

Moisture Content and Dry Matter Yield

Moisture content at harvest varied significantly from 60.8% for Bumper triticale to 68.6% for CDC Cowboy barley (Table 1).

Forage DM yield varied greatly among the crop varieties tested (Table 1). CDC Cowboy barley had the highest DM (8255 lbs/acre), followed by Bunker triticale (7956 lbs/acre) and then Tyndal triticale (7676 lbs/acre). Forage sorghum had the lowest yield (3716 lbs/acre). Of the 4 triticale varieties tested, Bumper had the least DM yield. The warm season cereals generally produced lower yields than the cool season cereals.

Crop Variety	Moisture %	DM yield lb/acre	CP %	Ca %	P %	Mg %	K %	ADF %	TDN %	ME —--	DE —--	NE_L Mcal/kg	NE_M ——	NE_G ——
Bumper	60.8	6479	10.8	0.14	0.22	0.18	0.91	23.0	66.7	2.41	2.94	1.52	1.53	0.93
Taza	63.5	7101	11.3	0.15	0.24	0.17	0.95	25.4	65.5	2.37	2.89	1.49	1.49	0.90
Tyndal	62.6	7676	12.3	0.13	0.24	0.17	0.89	23.4	66.5	2.40	2.93	1.51	1.52	0.93
Bunker	63.5	7956	11.7	0.16	0.26	0.24	1.03	26.4	65.0	2.35	2.86	1.47	1.47	0.88
CDC SO-I	67.1	6314	10.6	0.31	0.25	0.20	1.91	31.4	62.5	2.26	2.75	1.41	1.39	0.81
CDC Baler	68.0	7115	12.0	0.29	0.23	0.24	1.47	35.9	60.3	2.18	2.65	1.36	1.32	0.74
Proso millet	66.6	5973	16.9	0.32	0.24	0.65	2.31	31.0	62.7	2.26	2.76	1.42	1.39	0.81
Sorghum	64.9	3716	12.5	0.30	0.20	0.39	1.63	29.9	63.2	2.28	2.78	1.43	1.41	0.83
CDC Cowboy	68.6	8255	13.4	0.34	0.22	0.25	1.17	14.3	65.8	2.31	2.54	2.10	1.43	1.12
Significance?	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No	No	No	No
$LSD_{0.05}$	1.88	929	2.51	0.13	-	0.10	-	-	-	-	-	-	-	-
CV, %	1.73	7.97	8.78	24.8	10.8	16.2	30.6	27.8	12.4	3.49	6.19	19.8	5.08	14.8

Forage Quality (Table 1)

Forage protein was highest for Red Proso millet (16.9%), followed by CDC Cowboy barley (13.4%) and then forage sorghum (12.5%). Protein content was generally >10% for all crops tested. The various protein contents met the protein requirements of a dry gestating cow in the mid and late pregnancy stages, as well as during nursing of calves.

Forage Ca content was generally lower for the 4 triticale varieties than other crops. Barley, millet, forage sorghum and oat varieties had about twice the forage Ca content of the triticale varieties. Of the 9 crop types and varieties tested, only the 4 triticale varieties fell short of 0.18% Ca that is needed by a dry gestating cow in the mid and late pregnancy stages. All crop types and varieties were far from meeting the Ca requirement of a lactating cow, which requires about 0.42% Ca.

Forage P content varied from 0.20 - 0.26%. Forage Mg content varied from 0.17 - 0.65%. Forage K varied from 0.89 - 2.31%. The P, Mg and K requirements of a dry gestating cow respectively are 0.16, 0.12 and 0.6%. All the crop types and varieties tested met and even exceeded these values. Of these minerals, only the K requirement of a lactating cow was conveniently met by all crop types and varieties.

Energy (TDN) was generally between 60 and 67% for the 9 crop type and varieties. This shows that the TDN values were adequate to meet the needs of a cow in the mid and late pregnancy stages. For a lactating cow, which requires 65% TDN, the 4 triticale varieties and CDC Cowboy barley had sufficient TDN values for this category of cow. Oats, Red Proso millet and forage sorghum fell short of 65% TDN.

Taking into consideration the DM, protein, ADF, TDN, NEL and NEG, of the 9 crop types and varieties tested, CDC Cowboy barley appeared to rank higher than other crops and varieties. CDC Cowboy barley is a 2-row forage barley and probably more than adapted to this area than the other crop types and varieties.

Some Notes on Triticale

Spring triticale also provides an excellent high yielding alternative to barley and spring oat forage. Drought tolerance is the primary advantage that spring triticale varieties have over other spring cereal crops. Under dryland conditions, these varieties are a valuable alternative to feed barley and oats. In particular, a silage yield advantage of around 10 per cent over barley and oats under dryland conditions makes triticale an excellent choice for livestock producers. Triticale generally ranks between barley and oats for silage quality.

Evaluation of Forage Type Soybeans and Peas for Forage Yield and Quality

Annual forage legume crops can complement annual cereals or perennial forages or they can be utilized as emergency feed. Using annual legumes can provide additional rotational benefits with about 25% of the overall nitrogen fixed by the legume plant remaining in the soil. Utilizing annual forage legumes in a portion of the forage based cropping systems will also allow the producer to diversify without taking land out of annual crop production. The objective of this trial was to assess the performance of forage type soybean and pea varieties for forage yield and quality for beef cattle production.

Methods

Trial Site: Fairview Research Farm (NW5-82-3W6) on RR #35, MD of Fairview. The site had no crop planted in 2012, but had a canola variety trial in 2011. The site had a pH of 5.4 and 8.8% organic matter. Prior to seeding, a pre-seed weed control was carried out with Credit® after the site had been harrowed.

Crop Variety, Seeding and Crop Management: Three forage/silage type roundup ready soybean varieties (P001T34R (from Pioneer), Mcleod R2 (from Secan) and Mammoth R2 (from BrettYoung) and two forage type pea varieties (40-10 and CDC Horizon) were used for the trial. The crop varieties were arranged in a randomized complete block design with two replications in plots measuring 1.4 m in width and 8.5 m in length. Seeding and fertilizer application were done on May 23, 2013 with a Fabro plot drill equipped with double shoot Atom jet openers. Inoculated soybean and peas seeds were used. Fertility was 40 lbs/acre of 11-52-0. Seeding rate was 104 lbs/acre for 40-10 pea, 115 lbs/acre for CDC Horizon pea, 48 lbs/acre for P001T34R soybean, 75 lbs/acre for Mcleod R soybean and 62 lbs for Mammoth R2 soybean. Seeding rate was based on 4 seeds/sq ft for soybeans and 10 seeds/sq ft for peas. In crop weed control in soybeans involved the use of roundup and for peas, Basagran Forte was used. Hand weeding of volunteer canola took place twice in the soybean plots.

Field Notes and Measurements: Notes were taken on seedling emergence, flowering, lodging and plant height. Crop harvest for forage yield estimation and feed quality test was done on August 18 and August 31 respectively for peas and soybeans.

Results and Discussion

Seedling Emergence and Crop Growth

Both pea varieties germinated at the same time and 7-10 days earlier than soybeans. Soybeans are warm season crops that require warmer soil temperature (about 10°C) to germinate. Peas generally grew taller than soybean varieties. 40-10 pea variety lodged heavily, while no lodging was observed for CDC Horizon and any of the soybeans. All crop varieties (except for P001T34R) flowered and had their pods filled to some extent at harvest .

Forage Yield

The DM yield was highest for 40-10 pea and lowest for P001T34R soybean. The lowest DM yield recorded for P001T34R probably resulted from its inability to flower during the growing season and absence of pods at harvest. This is probably an indication that DM would generally decrease for later maturing soybean varieties in this environment. But generally, pea varieties appeared to have higher forage DM yields (3.9 - 4.1 ton/acre) than soybean varieties (2.9-3.3 tons/acre). 40-10 pea out yielded CDC Horizon pea by 428 lbs DM/acre.

Legume Variety	Moisture (%)	DM yield (lb/acre)	CP (%)	Ca (%)	P (%)	Mg (%)	K (%)	Na (%)	ADF (%)	TDN (%)	ME ——	DE (Mcal/kg)	NEM ——	NEG —-
Mcleod R2	61.2	6654	17.9	1.78	0.18	0.60	1.74	0.02	28.8	63.8	2.30	2.81	1.43	0.85
Mammoth R2	65.1	6133	17.3	1.59	0.17	0.61	1.29	0.01	31.0	62.7	2.26	2.76	1.40	0.81
P001T34R	65.2	5868	18.2	1.56	0.15	0.73	1.73	0.01	31.8	62.3	2.25	2.74	1.39	0.81
40-10	65.2	8288	11.4	1.54	0.13	0.50	0.82	0.06	32.5	62.0	2.24	2.73	1.37	0.79
CDC Horizon	62.5	7860	11.9	1.30	0.15	0.37	0.96	0.05	33.3	61.6	2.22	2.71	1.36	0.78
Variety significance?	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No
LSD0.05	-	1639	3.92	-	-	-	-	-	-	-	-	-	-	-
CV, %	3.01	15.1	9.22	11.0	8.10	16.0	21.7	25.3	5.44	1.37	1.39	1.33	2.08	3.00

Forage Quality

Protein content was between 11.4 and 11.9% for pea varieties and > 17.0% for soybean varieties. Soybean varieties had 5.9 - 6.8% more protein than pea varieties. Protein was highest for P001T34R (18.2% CP). The protein values obtained for both peas and soybeans were sufficient for a dry gestating (7-9% CP) and lactating (11% CP) cow. All soybeans far exceeded the protein requirements by these categories of cows. For growing and finishing calves, which require 12-13% CP, all soybeans even far exceeded the required values.

The forage Ca content was lowest for CDC Horizon (1.30%) and highest for Mcleod R2 (1.78%). All the crop varieties exceeded the suggested Ca requirements for various categories of beef cattle (0.31% for growing & finishing calves, 0.18% for dry gestating cows and 0.42% for lactating cows).

For a dry gestating cow which requires 0.16% P, only two of the crop varieties (Mcleod R2 and Mammoth R2) met P requirement. Other varieties fell short (0.13-0.15%) of meeting what is needed by a dry gestating cow.

The requirements of both 0.12 % Mg and 0.6% K by a dry gestating cow were both met by all crop varieties. Of the five crop varieties, only 40-10 pea variety met the suggested Na content for a dry gestating cow.

Forage energy content (TDN) was >61% for all crop varieties and sufficient for cows in the mid and late pregnancy stages, but all crops had insufficient TDNs needed by a lactating cow (65% TDN).

Generally, though no significant differences were observed for all feed quality parameters analyzed for in the present study (except protein), soybean varieties appeared to be favoured by all feed quality parameters than pea varieties (Table 1).

Triticale Varieties for Swath Grazing

Collaborating Producer: Wally and Christine Lentz, Whitelaw (Clear Hills County)

Studies at Lacombe Research Centre have shown that swath grazing triticale can save a producer time, money and machinery costs. Research indicates that swath grazing can reduce total daily feeding cost per cow by 41 to 48%. This is based on a 78% reduction in yardage costs and a 25% reduction in feed costs. Daily feed costs range from $0.61 to $1.80 per cow, largely due to variability in the number of grazing days per acre. Also, studies at Lacombe that compared the carrying capacities of triticale and barley for swath grazing showed that triticale achieved almost double the carrying capacity of barley. The use of triticale for swath grazing is not commonly done in the Peace. The present trial tested 3 reduced-awn triticale varieties and Mustang oat for forage yield and quality in a swath grazing system.

Methods

The trial took place in Whitelaw (RGE RD 13) on a 20 acres of land. 4 crop varieties (3 reduced-awn spring triticale varieties (Bunker, Taza & Tyndal)) and a Mustang oat variety were seeded. Each crop variety occupied 5 acres of land. Seeding was done on June 4, 2013, with a no-till air drill at a rate of 2 bushels/acre for each triticale and about 2.5 bushels per acre for Mustang oat variety. Fertility at seeding was 145 lb/acre fertilizer blend consisting of N, P, K & S.

In mid-July, a section (a bit more than 2/3) of the field consisting of all seeded crops was sprayed with Best Foliar Fertilizer (Best FF) for crop (15% N – 25% P – 8% K) and the remainder of the field was left unsprayed and this was used as check (test) strip. For more information, please visit: http://www.bestenvirotech.com/best-farming-system

Harvest for forage DM yield determination was done on September 4. Oat was harvested at the late milk/early dough stage, while triticale was harvested at the mid-dough stage. Swathing of the whole field was done on September 7. Plant height was also measured on September 4. Forage samples were analyzed for quality. The field was grazed with 45 cow-calf pairs.

Results and Discussion

Plant Height & Moisture Content

Plant height did not vary much for the variety x spraying treatments interactions. Tyndal, Bunker and Taza triticale varieties, when sprayed with Best FF only increased plant height respectively by 5.4, 1.1 and 2.0 cm over unsprayed treatment (check) (see Figure 1). Generally, the sprayed crops appeared to have a 2.0 cm plant height advantage over check. For all sprayed crop varieties (crop variety x treatment interaction),

moisture content at harvest was higher by 1.5 to 4.7% over check (see Figure 2). Overall, moisture content at harvest was significantly higher for sprayed treatment than unsprayed check strip. When sprayed with Best FF, all crop varieties have improved forage DM yield compared to check. DM yields from sprayed strips varied from 632 lb/acre to Tyndal to 1055 lb/acre for Mustang oat over check strips (see Figure 3). Overall, forage DM yield was higher with Best FF by 812 lb/acre than check.

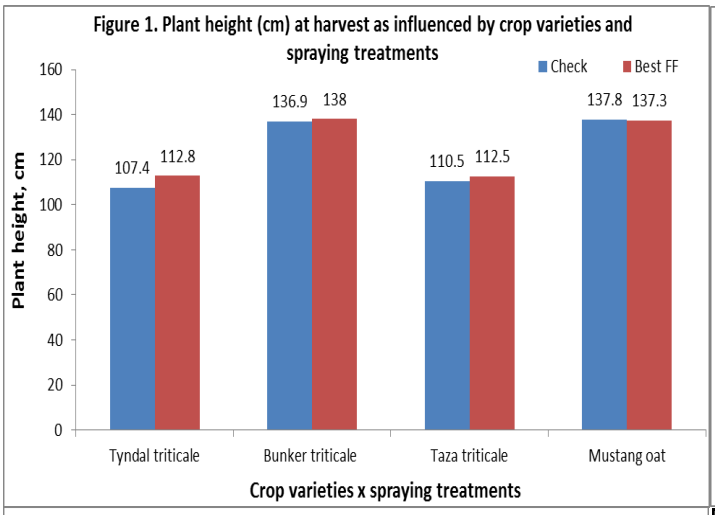


Figure 1. Plant height (cm) at harvest as influenced by crop varieties and spraying treatments

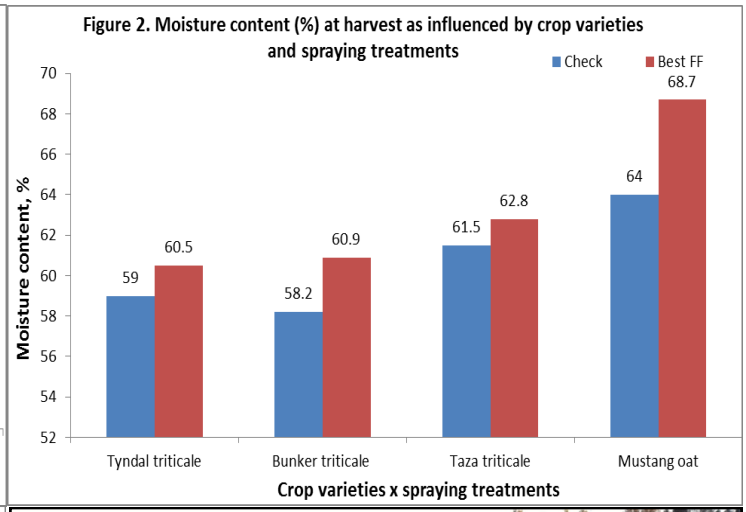


Figure 2. Moisture content (%) at harvest as influenced by crop varieties and spraying treatments

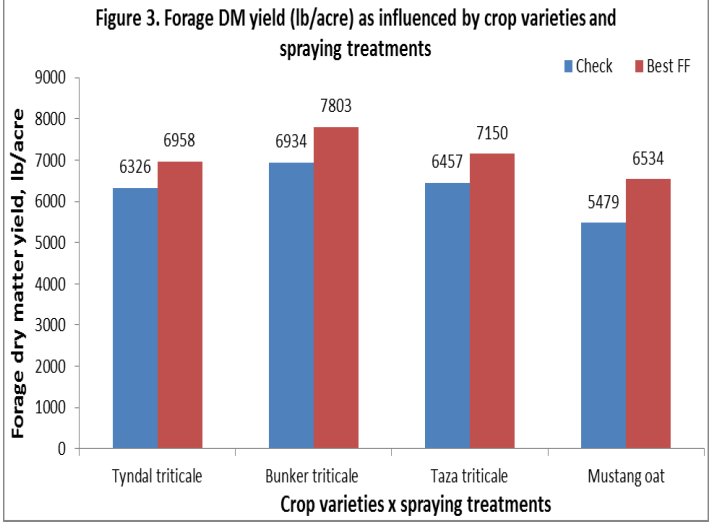


Figure 3. Forage DM yield (lb/acre) as influenced by crop varieties and spraying treatments

Forage Quality (Table 1)

Forage protein was generally favored by Best FF. Increases in protein content were 1.17 to 4.66% for crops sprayed with Best FF over check. Overall, Best FF improved protein by 2.19% over check. Averaged across both spraying treatments, all crop varieties had sufficient amount of protein needed by a dry gestating cow, which is 7 per cent in mid pregnancy and 9 per cent in late pregnancy stage. Similarly, across all crop varieties, protein contents in both spraying treatments were adequate for a dry gestating cow.

Ca and Mg contents of each crop variety were greatly improved by Best FF. But forage P content was generally unaffected by Best FF. Except for Tyndal triticale, K content appeared to be favoured by Best FF.

The energy content determined by total digestible nutrients (% TDN) did not show any consistent values with the spraying treatments (Best FF vs Check). Energy content was generally >60%, indicating that the energy requirements of a dry gestating cow (55-60% TDN) were met by both crop varieties and spraying treatments.

Table 1. Forage quality of triticale and oat varieties with or without Best FF application

Quality	Treatment	Tyndal	Bunker	Taza	Oat	mean
CP, %	Check	7.88	9.98	10.59	9.64	9.52
	Best FF	12.54	11.16	12.32	10.81	11.71
	mean	10.21	10.57	11.46	10.23	
Ca, %	Check	0.16	0.12	0.15	0.23	0.17
	Best FF	0.75	0.29	0.43	0.32	0.45
	mean	0.46	0.21	0.29	0.28	
P, %	Check	0.19	0.24	0.25	0.24	0.23
	Best FF	0.19	0.23	0.23	0.22	0.22
	mean	0.19	0.24	0.24	0.23	
Mg, %	Check	0.11	0.13	0.11	0.13	0.12
	Best FF	0.35	0.22	0.26	0.15	0.25
	mean	0.23	0.18	0.19	0.14	
K, %	Check	1.26	0.89	0.97	1.01	1.03
	Best FF	0.97	1.09	1.27	1.37	1.18
	mean	1.12	0.99	1.12	1.19	
Na, %	Check	0.01	0.01	0.02	0.04	0.02
	Best FF	0.01	0.01	0.01	0.14	0.04
	mean	0.01	0.01	0.02	0.09	
ADF, %	Check	35.92	29.48	23.92	25.69	28.75
	Best FF	31.16	29.97	29.61	31.58	39.02
	mean	33.54	29.73	26.77	28.64	
TDN, %	Check	60.22	63.44	66.22	65.34	63.81
	Best FF	62.6	63.2	63.38	62.39	62.89
	mean	61.41	63.32	64.8	63.87	
DE, Mcal/kg	Check	2.65	2.79	2.91	2.87	2.81
	Best FF	2.75	2.78	2.79	2.75	2.77
	mean	2.7	2.79	2.85	2.81	
NE_M, Mcal/kg	Check	1.31	1.42	1.51	1.48	1.43
	Best FF	1.39	1.43	1.42	1.38	1.41
	mean	1.35	1.43	1.47	1.43	

Conclusion

All triticale varieties had higher DM yields than Mustang oat. Of the 3 triticale tested here, Bunker variety appeared to have a greater potential for forage production for the purpose of swath grazing for extending the grazing season of beef cows. The use of Best FF would go a long way in improving forage DM yield and some quality parameters of both triticale and oat varieties.

Soil Rejuvenation versus Foliar Fertilizer on Oats

Collaborating Producer: Lloyd & MacKay Ross, Cleardale (Clear Hills County)

The mineral nutrients, which come from the soil, are dissolved in water and absorbed through a plant's roots. There are not always enough of these nutrients in the soil for a plant to grow healthy. One approach is to provide required nutrients to each crop in a soluble form that plants can use immediately, i.e., feed the plant. The advantage to this approach is the opportunity to quite accurately meet a crop's need. There has been an increase in the number of foliar fertilizers on the agricultural chemical market in recent years. These can be used to correct nutrient deficiencies in plant parts such as leaves and fruit. If soil pH is not limiting nutrient availability, root health and growth are not restricted, and transport of the nutrient in the crop is not restricted, soil applications of fertilizers are also very efficient methods. The present trial examined different sources of soil, seed germination and foliar nutrients on grain production, forage yield and quality of two oat varieties.

Methods

The trial was carried out in Cleardale (RGE Rd 102 TWP Rd 850) on 40 acres. Glyphosate was used as the pre-seed burn off. Two oat varieties Athabasca (20 acres) and CDC SO-I (20 acres) were seeded on May 17/18, 2013 @ 2.1 bushels/acre with a John Deere drill at 7.5 inches row spacing. Fertility following soil test was 209 lb/acre of fertilizer blend (28.7-14.4-0.0-7.2). Both oats seeds were treated with CruiserMaxx® Vibrance® (cereals seed treatment insecticide/fungicide) before seeding.

The following 5 spraying treatments (4 acres/treatment) were applied to each oat variety:

- Control (check)
- Best Soil Rejuvenation (Best Soil Rej) @ 100 ml/acre - sprayed (after seeding but before seed emergence) on May 24, 2013
- Best Foliar fertilizer (Best FF) for crop (15% N – 25% P – 8% K) - sprayed on June 22, 2013, just over a month following seeding
- Best Seed germination (Seed Germ) @ 100 ml/acre - treated with seed just before seeding.
- GSR Ca was sprayed (a few days after seeding but before seed emergence) on May 24.

Measurements of plant height, forage brix and forage yield were carried out at the milk stage (August 8). Harvest for grain yield estimation was done on September 4.

Results and Discussion

Plant Height and Moisture Content

Generally, the addition of nutrients (Best products and GSR Ca) improved the growth of oat varieties as determined by plant height (see Figure 1). But plant height was better generally with Best Seed Germination than with other treatments. The Athabasca oat grew taller than CDC SO-I for every treatment even for the check. The taller growth of Athabasca than CDC SO-I probably has to do with the genetic make up of the variety. When the oats were treated with Best Seed Germination, Athabasca grew taller by 15.3 cm over check. For CDC SO-I oat, when treated with Best Seed Germination plant height was higher by 10.0 cm over check. The benefits observed with Best Seed Germination for both oats suggest the need for treating oats seeds before seeding for the purpose of good seedling vigor and subsequent crop growth.

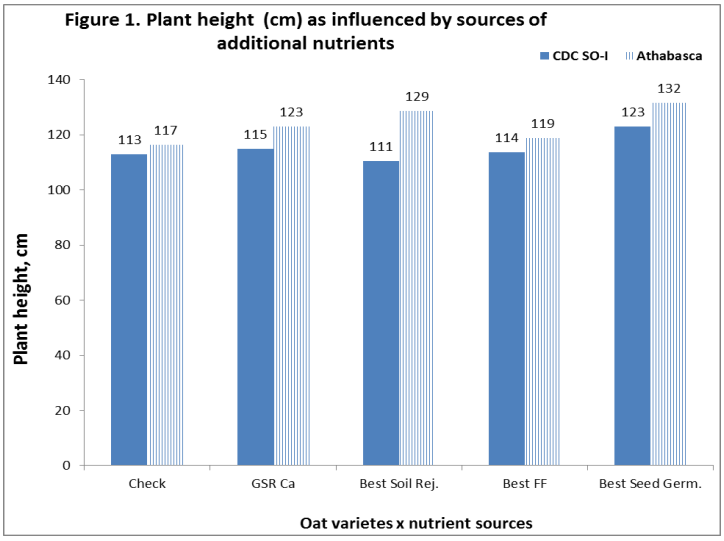


Figure 1. Plant height (cm) as influenced by sources of additional nutrients

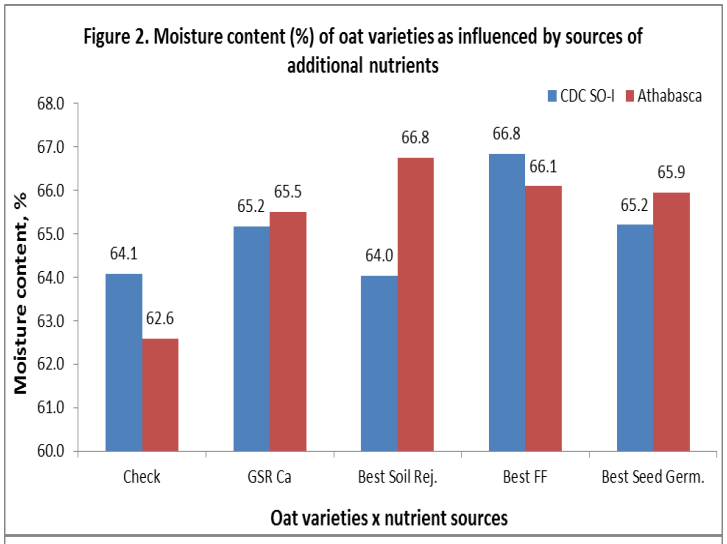


Figure 2. Moisture content (%) of oat varieties as influenced by sources of additional nutrients

The moisture content of oats at harvest for green feed appeared to be slightly higher with additional nutrients (except for Best Soil Rej for CDC SO-I) (Figure 2). For CDC SO-I oat, moisture content was highest (66.8%) with Best FF. While for Athabasca oat, highest moisture content at harvest (66.8%) was with Best Soil Rej.

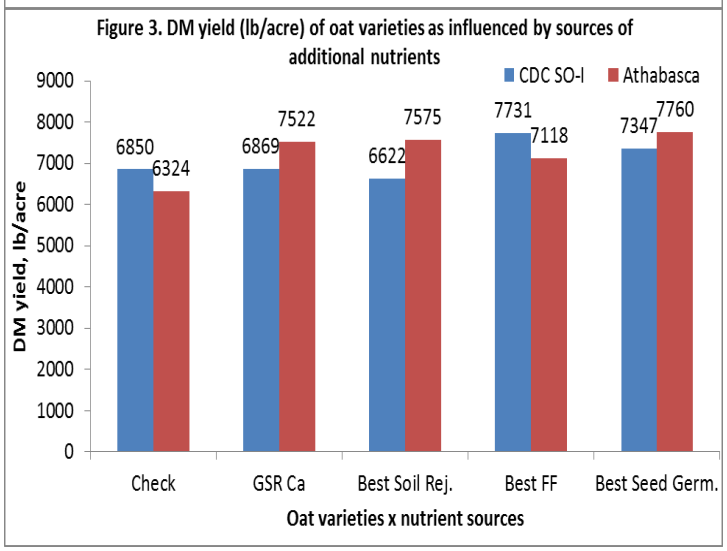


Figure 3. DM yield (lb/acre) of oat varieties as influenced by sources of additional nutrients

Forage DM Yield

The DM yields were generally improved by the spraying treatments (except for CDC SO-I in a few instances) (see Figure 3). Both Best FF and Best Seed Germ improved DM yields of both oat varieties over check. Overall, for Athabasca, DM yield was improved by all nutrients over check. DM yield was as high as 1436 lb/acre for Athabasca oat treated with Best Seed Germ over check.

Forage Quality (Table 1)

All Athabasca oat sprayed plots had higher protein than check (unsprayed Athabasca plots). Athabasca + Best Soil Rejuvenation had the highest protein (8.61%). For CDC SO-I oat, except for Best Soil Rejuvenation, all other spraying treatments had higher protein than check. Overall, CDC SO-I + GSR Ca had the highest protein content (9.24). Averaged across the 5 spraying treatments, CDC SO-I oat had higher protein than Athabasca oat (8.34 vs 7.41%). Generally, the protein contents of the 2 oats following the 5 spraying treatments were only mostly sufficient for cows in the mid-pregnancy stage. Only unsprayed (check) Athabasca oat had

lower than 7% protein suggested for cows in the mid-pregnancy stage.

Except for the forage Ca content of Athabasca oat + Best Soil Rej, all spraying treatments for both oats had sufficient amounts of Ca, P, Mg and K needed by a dry gestating cow.

Energy content (%TDN) was generally about 60%. Generally, energy did not vary much between sprayed and unsprayed (check) plots for both oats. The values of TDN obtained here was adequate for a dry gestating cow, which requires 55 and 60% respectively in the mid and late pregnancy stages. Feeding the both oats as green feed to a nursing cow would therefore require additional source of energy to achieve the 65% TDN needed by this category of cow.

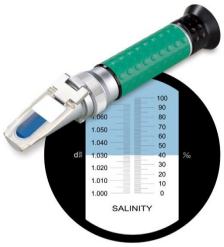
Generally, CDC SO-I oat appeared to be slightly better in quality (see mean values in Table 1) than Athabasca oat.

Table 1. Forage quality (milk stage) of Athabasca and CDC SO-I oats with 5 spraying treatments.

Oat variety & Spraying treatment	CP %	Ca %	P %	Mg %	K %	ADF %	TDN %	ME ——-	DE ——-	NE_L (Mcal/kg)	NE_M ——--	NE_G ——--
Athabasca + Best Seed Germ	7.36	0.23	0.24	0.15	1.95	37.0	59.7	2.15	2.63	1.34	1.30	0.72
Athabasca + Best Soil Rej	8.61	0.17	0.23	0.14	1.76	37.3	59.5	2.15	2.62	1.34	1.29	0.72
Athabasca + GSR Ca	7.33	0.20	0.22	0.14	2.21	40.3	58.0	2.09	2.55	1.30	1.24	0.67
Athabasca + Best Foliar Fert	7.68	0.20	0.21	0.14	2.08	38.0	59.2	2.14	2.60	1.33	1.28	0.71
Athabasca (Check)	6.05	0.19	0.22	0.13	1.97	37.5	59.4	2.14	2.61	1.34	1.29	0.72
Mean	7.41	0.20	0.22	0.14	1.99	38.0	59.2	2.13	2.60	1.33	1.28	0.71
CDC SO-I (Check)	7.85	0.25	0.25	0.16	2.30	37.3	59.5	2.15	2.62	1.34	1.29	0.72
CDC SO-I + GSR Ca	9.24	0.23	0.24	0.15	2.28	40.0	58.2	2.10	2.56	1.31	1.24	0.68
CDC SO-I + Best Soil Rej	7.31	0.21	0.23	0.14	1.78	33.6	61.4	2.22	2.70	1.38	1.35	0.77
CDC SO-I + Best Foliar Fert	8.63	0.25	0.25	0.14	2.26	35.4	60.5	2.18	2.66	1.36	1.32	0.75
CDC SO-I Seed Germ	8.67	0.21	0.29	0.15	1.90	37.2	59.6	2.15	2.62	1.34	1.29	0.72
Mean	8.34	0.23	0.25	0.15	2.10	36.7	59.8	2.16	2.63	1.35	1.30	0.73

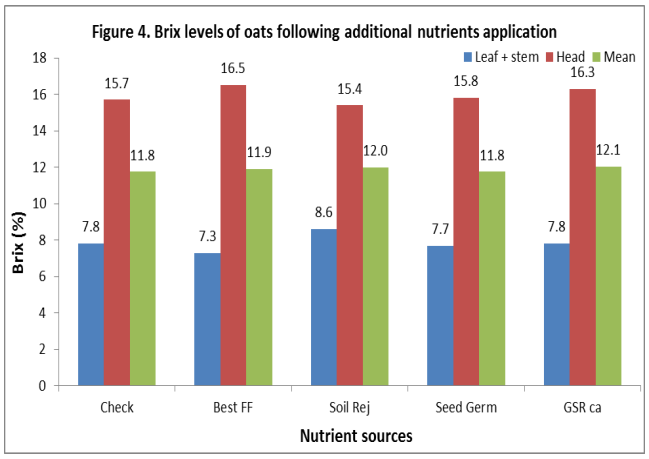
Brix (Sugar) Level

The brix level for the different nutrient sources or spraying treatments obtained in the present trial was similar in most cases to check (see Figure 4).



Brix is a measurement of the sugar level in plant extracts as created through photosynthesis. Brix is measured with an instrument called a Refractometer.

Brix Testing is a measurement of the Degrees of Brix in the plant sap and is an excellent way to determine plant energy, as well as nutrition. Use of a refractometer is easy and economical. Increased levels of Brix indicate a healthier plant with increased energy and nutrient dense produce.



Grain Moisture Content, Weight and Yield (Table 2)
Grain moisture content respectively averaged 10.4 and 9.9% for Athabasca and CDC SO-I oats. Seed weight of both oats was not consistently affected by spraying compared to unsprayed checks. Overall, seed weight of CDC SO-I oat was higher than that of Athabasca oat by 5.2 g/100 seed.

Generally, grain yield of both oats was not consistently affected by spraying treatments. For Athabasca oat, only Athabasca oat + Best foliar fertilizer had higher grain yield than check (167 vs 133 bu/acre). Grain yield was higher for Athabasca oat + Best foliar fertilizer by 34-80 bu/acre than other Athabasca spraying treatments and check. For CDC SO-I oat, CDC SO-I + Best seed germination had the highest grain yield (188 bu/acre). Overall, CDC SO-I oat had higher grain yield of 21 bu/acre than Athabasca oat.

The inconsistency of grain yield from both oats with respect to spraying treatments could be as a result of the effects of size, scope of field or field variation, which couldn't be properly addressed during sampling for grain yield estimation.

Table 2. Grain moisture content, 1000-seed weight and grain yield of Athabasca and CDC SO-I oats and different spraying treatments

Oat variety & Spraying treatment	% Moisture	TSW adj for moisture (g/100 seed)	Grain yield (bu/acre)
Athabasca (check)	10.0	36.48	109.8
Athabasca + Best Foliar Fert	9.9	35.49	137.6
Athabasca + GSR Ca	10.9	34.76	71.8
Athabasca + Best Seed Germ	10.7	39.91	97.3
Athabasca + Best Soil Rej	10.7	36.53	109.4
Mean	10.4	36.6	105.2
CDC SO-I (check)	9.7	43.44	137.7
CDC SO-I + Best Foliar Fert	10.0	42.61	115.0
CDC SO-I + GSR Ca	9.5	40.11	125.3
CDC SO-I Seed Germ	9.5	41.48	155.3
CDC SO-I + Best Soil Rej	10.7	41.27	85.2
Mean	9.9	41.80	123.7

For more information on GSR Ca, brix, brix testing process and brix chart, please visit: http://back-to-your-roots.com/
For more information on Best products used here and other available products, please visit: http://www.bestenvirotech.com/best-farming-system

Future Plan
The trial will continue next year (2014) with further evaluation of Best Seed Germination and GSR Ca on CDC SO-I oat for grain and forage production.

Evaluation of Low Heat Unit Corn Hybrids Compared to Barley for Grazing

Collaborator: Dr. Bart Lardner, Western Beef Development Centre (WBDC), Humboldt, Saskatchewan

Corn is an option for producers looking to extend the grazing season and reduce feed costs per cow per day. One of the initial concerns was getting corn hybrids with heat unit requirements that will match the heat units of the Peace Region and elsewhere in Alberta and parts of Saskatchewan. Advances in plant breeding have resulted in hybrid corn varieties that require less crop heat units and therefore can be grown more successfully in these areas. Western Beef Development Centre (WBDC) developed a protocol to evaluate corn hybrids with low heat units in comparison with AC Ranger barley for grazing in parts of Alberta and Saskatchewan. The project started in the spring of 2012 and will continue until the early fall of 2014. The main objective is to evaluate 3 different corn varieties (1 Monsanto; 1 Pioneer; 1 Hyland) and 1 forage barley (AC Ranger) for quality and yield grown at different sites in the Parkland area of Western Canada.

Methods

One of the locations for the trial is Fairview, MD of Fairview. In Fairview, the trial took place at the Fairview Research Farm (NW5-82-3W6) on RR #35. Prior to seeding, the site was harrowed and then Credit® was sprayed for pre-seed weed control. The site had a canola variety trial in 2011 but left to fallow in summer of 2012. The site had a pH of 5.4 and 8.8% organic matter.

3 corn hybrids (Monsanto corn DKC 26-25, Pioneer corn P7443R & Hyland corn 2D093) and AC Ranger barley variety. AC Ranger is a 6-row feed barley and has smooth awns. The crops were arranged in a randomized complete block design with four replications. Small plots measuring 1.4 m x 8.5 m were used. Corn and barley were both seeded and fertilized on May 23, 2013 with a Fabro plot drill equipped with double shoot Atom jet openers. Seeding rates were 30,000 seeds/acre for corn hybrids and 100 lb/acre for AC Ranger barley seed. All plots received equivalent amounts of fertilizer, based on the soil tests done (corn - 90 lb actual N/acre + 30 lb actual P/acre & barley - 40 lb actual N/acre + 23 lb actual P/acre). In crop spraying of Roundup at 0.67 L/ac application rate at the 5-leaf stage was carried for corn hybrids. For barley, 2-4 D amine at 0.67L/acre at the 4 -leaf stage was used. Hand weeding of volunteer canola took place twice in the corn plots.

On August 1, 2013, barley plots were harvested at the soft dough stage, weighed to obtain wet yield, subsampled and subsequently dried for dry matter (DM) yield estimation. On September 26, 2013, each corn hybrid was harvested for estimation of wet and dry forage yields. Randomly, corn plants were selected from each replicate for each corn hybrid and then chopped with a small wood chipper for determination of feed quality in a commercial laboratory. On the sampling day, the numbers of cobs per plant and cob maturity were assessed.

Results and Discussion

Number of Cobs, % DM and DM Yield (Table 1)

The number of cobs per corn plant did not vary much among corn hybrids. Cobs/plant for Pioneer corn P7443R, Hyland corn 2D093 and Monsanto corn DKC 26-25 were respectively as 1.35, 1.10 and 1.15.

At harvest for determination of forage DM yield, the % DM was significantly higher for Pioneer corn P7443R (27.84%) than the other corn hybrids tested (25.02-25.88%). Generally, the cobs were at the 1/2 to 2/3 milk line stage.

In terms of DM yield, all corn hybrids tested had higher yield than AC Ranger barley by 0.58 -2.08 ton/acre. For the corn hybrids, Pioneer P7443R had the highest DM (5.64 ton/acre), followed by Monsanto DKC 26-25 (4.57

ton/acre) and then Hyland 2D093 (4.14 ton/acre). It is evident from the trial that corn DM yield is dependent on corn heat unit requirements. The lower the corn heat unit, the higher the DM yield.

Feed Quality (Table 1)

Generally, AC Ranger barley had higher protein (15.11%) than the three corn hybrids tested (9.71 - 11.00%). For the corn hybrids, the order of protein was: Hyland corn 2D093 (11.00%) > Monsanto corn DKC 26-25 (10.57%) > Pioneer corn P7443R (9.71%). The protein obtained in all the corn hybrids and barley exceeded the suggested protein requirements of dry gestating cows. This therefore shows that protein supplementation in form of a good legume hay or protein block is not required during grazing with dry gestating cows.

The suggested Ca and P contents in feeds for a dry gestating cow respectively are 0.18 and 0.16%. AC Ranger barley had 0.46% Ca, while Ca content for corn hybrids varied from 0.25-0.40%. Barley and corn hybrids had between 0.21 and 0.28% P. The values obtained for both Ca and P therefore show that both Ca and P requirements of dry gestating cows were met by all crops.

Energy gives the ability to use the building blocks for growth and other productive purposes. Using total digestible nutrients (TDN) per cent as a measure of energy, for a mature beef cow to maintain her body condition score (BCS) through the winter, the ration must have a TDN energy reading of 55 per cent in mid pregnancy, 60 per cent in late pregnancy and 65 per cent after calving. The three corn hybrids and AC Ranger barley tested in this trial met the energy requirements of these categories of cow and exceeded 65% TDN suggested for lactating cows.

Table 1. Cobs per plant, DM yield and feed quality of 3 low heat units corn hybrids and AC Ranger barley in Fairview in 2013.

Parameter	Pioneer corn P7443R	Hyland corn 2D093	Monsanto corn DKC 26-25	AC Ranger
Corn heat unit (CHU)	2100	2350	2125	-
Yield				
No. of cobs	1.35	1.1	1.15	-
Dry matter (DM, %)	27.84	25.88	25.02	31.21
DM yield, t/acre	5.64	4.14	4.57	3.56
Feed quality parameter				
Crude Protein (%)	9.71	11	10.57	15.11
ADF (%)	30.55	31.45	34.67	25.68
NDF (%)	54.53	53.48	56.27	-
Total Digestible Nutrients (%)	68.86	68.13	67.28	67.9
Calcium (%)	0.25	0.28	0.4	0.46
Phosphorous (%)	0.21	0.26	0.28	0.23
Metabolizable Energy (Mcal/kg)	2.49	2.46	2.43	2.45
Net Energy Maintenance (Mcal/kg)	1.6	1.57	1.55	1.57
Net Energy Gain (Mcal/kg)	1	0.97	0.95	0.97
	No. of cobs	% Dry matter	DM yield	
Significance at P<0.05?	No	Yes	Yes	
$LSD_{0.05}$	-	0.711	0.394	
Coefficient of variation (%)	12.11	1.62	5.51	

Conclusion

All 3 corn hybrids produced good yields and were of suitable quality to meet nutrient requirements of grazing beef cows in the mid and late pregnancy stages.

Forage Yield & Feed Quality of Four Corn Hybrids

Collaborating Producers: Peter & Marilyn Dolen, Fourth Creek (Saddle Hills County)

Corn is an option for producers looking to extend the grazing season and reduce feed costs per cow per day. Corn is a high energy feed with protein levels that will normally match the nutritional needs of a dry cow in mid and late pregnancy. It also has the potential to produce more dry matter than tame hay or forage cereals. By replacing other forms of feed with standing corn particularly in late fall and during winter, labour time, machinery use and associated costs are reduced as no summer feed harvesting is required and winter supplemental feeding is limited. Through a series of corn field days and on-farm trials and demonstrations, and the support of seed companies in the Peace, PCBFA continues to renew producer's interest and awareness in using corn to extend the grazing season. PCBFA works with producers in many parts of the Peace to help them evaluate corn hybrids and identify suitable hybrids for extending the grazing season of beef cows for their area. The following report is one of these mentioned collaborations.

Methods

The trial took place at Peter & Marilyn Dolen's farm (RGE RD 81) in Fourth Creek (Saddle Hills County) on a 50 acre field. The site has had corn hybrids tested twice before the present trial. In 2012, corn grazing lasted for 32 days. Soil test done before seeding showed excess amounts of N needed for a corn crop for the year, so no dry N fertilizer was applied. Liquid fertilizer consisting of the following nutrients was applied: Alpine (6-22-2), copper, boron, manganese, zinc and magnesium. Seeding was done on May 20 with a 6-row corn planter at 30-inch row spacing. Four corn hybrids were seeded (Pioneer corn P7443R, Pioneer corn P7213R, Monsanto corn DKC 26-25 and Pioneer corn 39F44). Weeds were controlled with Roundup.

On October 7, forage yield was determined from harvesting four 17.5ft long corn rows per corn hybrid. The corn forage samples were weighed fresh. Some corn plants were chopped with a wood chipper for determination of moisture content and feed value in a laboratory. Dry matter (DM) yield was later calculated for each corn hybrid. On the sampling day, the numbers of cobs per plant, cob maturity and final stand count were also determined.

Results and Discussion

Number of Cobs, Cob Maturity, % DM, Plant Population and DM Yield (Table 1)

One cob per plant was recorded for each corn hybrid.

Percent DM at harvest varied from 17.76% for P7213R to 24.48% for P7443R.

The cobs were at the half milk line stage for P7213R, P7443R and DKC 26-25 and about 2/3 milk line stage for 39F44.

Final plant population at harvest was more than 36,000 plants per acre for each corn hybrid.

Pioneer corn 39F44 had the most DM yield (5.97 ton/acre). Next was Pioneer corn P7443R with 5.28 ton/acre. Both Pioneer corn P7213R & Monsanto DKC 26-25 had less than 5 ton/acre.

Forage Quality (Table 1)
Protein was highest for Pioneer corn 39F44 (10.66%) and lowest for Pioneer corn P7443R (8.61%). The protein level obtained for all corn was adequate for a dry gestating cow in the mid and late pregnancy stages.

Forage Ca & P contents was highest for Pioneer 39F44. Generally, all corn hybrids were able to meet 0.18% Ca requirement by a dry gestating cow from mid to late pregnancy stage. But of the 4 corn hybrids tested here, only one (P7213R) fell short of P needed by a dry gestating cow. Corn forage Mg content was similar for all hybrids tested here. But K content varied greatly among hybrids. The amounts of 0.12 % Mg and 0.6% K suggested for a dry gestating cows were far exceeded by all corn hybrids.

Energy (TDN) varied from 57.9% for P7213R to 61.0 for DKC26-25. Energy was >60% for 2 of the 4 hybrids.

Table 1. Corn heat units, forage yield & quality of 4 corn hybrids @ Fourth Creek, 2013

Measurement	Corn hybrids			
	Pioneer P7443R	Pioneer P7213R	Monsanto DKC 26-25	Pioneer 39F44
Corn heat unit (CHU)	2100	2150	2125	2000
No. of cobs	1.00	1.00	1.00	1.00
Dry matter (DM, %)	24.48	17.76	22.83	19.96
Wet yield, ton/acre	21.58	24.24	21.21	29.89
DM yield, ton/acre	5.28	4.31	4.84	5.97
Final corn stand population/acre	36,103	37,511	36,489	37,801
Forage Quality				
Crude protein (% DM)	8.61	9.69	9.75	10.66
Calcium (% DM)	0.21	0.19	0.22	0.27
Phosphorus (% DM)	0.16	0.13	0.17	0.19
Magnesium (% DM)	0.24	0.24	0.25	0.24
Potassium (% DM)	1.56	2.10	1.93	2.00
Acid Detergent Fiber (ADF, % DM	35.41	40.63	34.29	37.92
Total Digestible Nutrients (TDN, % DM)	60.48	57.87	61.04	59.22
Metabolizable Energy (Mcal/kg)	2.18	2.09	2.20	2.14
Net Energy for Maintenance (NE_M, Mcal/kg)	1.32	1.23	1.34	1.28
Net Energy for Gain (Mcal/kg)	0.75	0.67	0.76	0.71
Digestible Energy (Mcal/kg)	2.66	2.55	2.69	2.61

Notes on Savings on Fertilizer Application
As pre-seeding soil tests indicated sufficient N in the soil for corn growth for the year, no dry N fertilizer was applied during and after seeding. Small amount of N was however present in the liquid fertilizer applied, which mainly consisted of P, Cu, B, Mn, Mg and Zn. The lack of additional N fertilizer application in 2013 resulted in fertilizer savings of $76.48 per acre compared to 2012 season. This benefit came as a result of subsequent corn grazings for some years now at the site.

Conclusion
In general, Pioneer corn 39F44 with 2000 heat units appeared to have slightly higher DM yield, protein and minerals (particularly Ca & P) than other corn hybrids. Because cows selectively graze cobs first, it is important to control access to the corn to ensure proper utilization, and to provide a good water source and mineral/salt package to address any short falls. The reduction in direct input costs for 2013, should further reduce feeding cost/head/day.

Forage Yield & Feed Quality of Five Corn Hybrids

Collaborating Producer: Lawrence & Lori Andruchiw, Happy Valley (Saddle Hills County)

Corn is known as a forage crop that has the potential of yielding more energy per acre than any other forage crop in areas of western Canada, which have suitable heat units to get corn to the required half milk line stage for silage or grazing. Additionally, corn has an advantage as a winter grazing crop because it stands above the snow, and it stands up in windy conditions as well as providing a windbreak for cattle grazing it. Using livestock to graze corn reduces the need for investing in harvest and feeding equipment. With the potential to produce more than 10 tons of forage dry matter to the acre, few annual crops can compare to corn in terms of dry-matter (DM) yield per acre and cost per pound of gain.

Methods

The trial was carried out at Double LA Farms (Lawrence & Lori Andruchiw) in the Happy Valley area (RGD Road 75, SW-05-78-07-W6), near Spirit River, Saddle Hills County. The site (27 acres) had corn varieties tested on it the year before and was grazed with 77 cows and 2 bulls.

On May 21, 2013, five corn varieties (39F44, 39M26, 2501RR, Fusion R, DKC26-28) with varied corn heat units were seeded with a 6-row corn planter. Fertility according to soil tests consisted of 84 N + 37 P + 0K + 8 S (actual nutrient lbs/acre). Roundup was used to control weeds @0.67 L/ac on June 25.

On October 7, forage yield was determined from harvesting four 17.5ft long corn rows per corn hybrid. Some corn plants were chopped with a wood chipper for determination of moisture content and feed value in a commercial laboratory. Dry matter (DM) yield was later calculated for each corn hybrid. On the sampling day, the numbers of cobs per plant, cob maturity and final stand count were also determined.

Results and Discussion

There was mostly one cob per plant for hybrids tested (Table 1).

At harvest, per cent DM varied greatly from 16.35% for 39F44 to 23.31% for 2501RR (Table 1).

At harvest on October 7, DKC26-28, 39F44 and 39M26 were mostly in the 2/3 milk line stage. Some of the Fusion RR and2501RR were in the half milk stage, but a lot of the cobs were observed a little bit far from the half milk stage.

Corn hybrid 39F44 had the highest DM yield(5.09 ton/acre), followed by both 2501RR and 39M26 (4.70 ton/acre). Both Fusion RR and DKC 26-28 had <4.0 ton DM/ac (Table 1).

Corn forage protein was generally >9.0% for all corn hybrids (Table 1). 39F44 had the highest protein (12.98%). Protein content increased with decreased corn heat unit requirements of the corn hybrids tested.

All corn hybrids tested in this trial were well above the protein requirements of 7-9% by a gestating cow in the mid and late pregnancy stages.

Forage Ca content varied from 0.24 for Fusion RR to 0.39% for DKC 26-28. P content varied from 0.16-0.20%. Mg and K respectively varied from 0.22-0.28% and 1.56-2.40%. All corn hybrids tested here had sufficient amounts of minerals (particularly Ca, P, Mg & K) needed by a dry gestating cow.

The energy (% TDN) content of tested hybrids was generally >60.0% (Table 1). This shows that the all corn hybrids were able to meet the needed energy by a cow in the mid pregnancy stage, which requires 55% and even when the cow is in the late pregnancy stage with more energy needs (60% TDN).

Table 1. Corn heat units, forage yield & quality of 5 corn hybrids in Happy Valley area in 2013

Measurement	Corn hybrids				
	BrettYoung Fusion RR	Pickseed 2501RR	Monsanto DKC 26-28	Pioneer 39F44	Pioneer 39M26
Corn heat unit (CHU)	2350	2300	2150	2000	2100
No. of cobs	1.30	1.00	1.00	1.00	1.00
Dry matter (DM, %)	21.57	23.31	20.56	16.35	19.15
Wet yield, ton/acre	22.87	24.54	19.20	23.60	20.14
DM yield, ton/acre	3.74	4.70	3.95	5.09	4.69
Corn stand population/acre	36,004	36,000	38,671	41,339	42,005
Forage Quality					
Crude protein (% DM)	9.34	10.05	10.51	12.98	11.46
Calcium (% DM)	0.24	0.26	0.39	0.37	0.29
Phosphorus (% DM)	0.16	0.19	0.17	0.20	0.19
Magnesium (% DM)	0.22	0.23	0.25	0.28	0.23
Potassium (% DM)	1.58	1.56	1.81	2.40	2.39
Acid Detergent Fiber (ADF, % DM	35.57	32.89	34.43	33.75	33.57
Total Digestible Nutrients (TDN, % DM)	60.40	61.74	60.97	61.31	61.40
Metabolizable Energy (Mcal/kg)	2.18	2.23	2.20	2.21	2.22
Net Energy for Maintenance (Mcal/kg)	1.32	1.36	1.34	1.35	1.35
Net Energy for Gain (Mcal/kg)	0.74	0.78	0.76	0.77	0.77
Digestible Energy (Mcal/kg)	2.66	2.72	2.68	2.70	2.70

Conclusion

Looking at the DM yield and feed quality indicators measured in this trial, 39F44 appeared to have higher DM yield, protein and minerals (particularly Ca, P, Mg, K) than other corn hybrids. 39F44 has the lowest corn heat requirements (2000) than any corn hybrids and this probably explains why it has performed better than the other hybrids. As a reminder, the CHUs rating is an indicator of how many heat units are required for the grain to reach maturity. On average, 200 fewer CHUs are required for grazing or silage corn to reach 65 per cent whole plant moisture (35 per cent dry matter) as compared to grain corn. To increase the chances of a high yielding and high quality corn crop for grazing, it is advisable to select a variety that will match the CHUs rating for your area. Select an early-maturing silage corn variety. Silage varieties of corn are more palatable and better suited to grazing than grain corn.

The entire field was grazed for 44 days with 35 cows and 7 calves.

Corn for Silage Grazing & Silage Production

Collaborating Producer: Pat & Jay Eaton, Valleyview (MD of Greenview)

Corn, being a warm-season annual grass, can be planted in parts of the Peace for corn silage or grazing. As an annual, it can be grazed successfully during the fall and winter to extend the grazing season, and thereby reducing feed cost per head per day. This is because using livestock to graze corn reduces the need for investing in harvest and feeding equipment. Sam King, a producer with years of experience grazing standing corn in the region averages 55 cents/cow/day at a yield of seven to eight tons DM/acre, while his brome aftermath feed costs him $1/cow/day. With the potential to produce more than 10 tons of forage dry matter to the acre, few annual crops can compare to corn in terms of dry-matter (DM) yield per acre and cost per pound of gain. Depending on the type of livestock used, producers may have to supplement to compensate for lower protein levels. The following report looks at corn production on 155 acres for grazing and silage.

Methods

There were three corn fields and all fields were near Valleyview at Pat and Jay Eaton's ranch. One field was on Alder Ridge Road by RGE road 204 (50 acres, field 1). The other two fields were on RGE road 205 (35 acres (field 2) & 70 acres (field 3). Fields 1 & 2 had corn last year. The new addition this year was field 3.

Two corn varieties (BrettYoung corn Fusion RR and Pioneer corn 39F44) were seeded. Fusion RR has a corn heat unit requirement (CHU) of 2350, while 39F44 requires 2000 heat units to get to full grain maturity. The CHUs rating is an indicator of how many heat units are required for the grain to reach maturity. On average, 200 fewer CHUs are required for grazing or silage corn to reach 65 per cent whole plant moisture (35 per cent dry matter) as compared to grain corn. This moisture level is normally when silage corn is ready to harvest. Fields 1 & 2 were seeded on May 16, and field 3 was seeded on May 15. Seeding was done with an Air Seeder at 12-inch row spacing.

Fertility was 150 lbs/acre blend consisting of 75% 46-0-0 + 25% 11-51-0 (field 1), 65 lbs/acre blend consisting of 75% 46-0-0 + 25% 11-51-0 (field 2) & 250 lbs/acre blend consisting of 75% 46-0-0 + 25% 11-51-0 (field 3).

Weeds were controlled once with Roundup at 0.67 L/acre.

On October 7, corn forage yield for each field was determined. Some corn plants were chopped with a small wood chipper for determination of moisture content and feed value in a commercial laboratory. On the sampling day, the number of cobs per plant, plant population and cob maturity were determined. Field 3 corn was ensiled at about two-third milk line stage (with about 70% moisture) using a corn silage chopper.

Results and Discussion

Cobs per Plant, Cob Maturity and Forage Yield

The number of cobs per plant was in the order of: 1.93 for Fusion RR (field 1) > 1.53 for Fusion + 39F44 (field 2) > 1.20 for 39F44 (field 3) (Table 1).

At harvest for forage yield estimation (wet & DM) on October 7, the cobs corn hybrids fields 1 and 2 had 1/4 to 1/2 milk line stage. For field 3, which had 39F44, the cobs had between 1/2 and 2/3 milk line.

The percent DM (about 30%) at harvest was similar for the corn hybrids used at different fields (Table 1).

Wet forage yield was highest for Fusion RR (25.9 ton/acre) in field 1, closely followed by field 2 that had Fusion RR + 39F44 (24.6 ton/acre) and then 39F44 with 17.0 ton/acre (field 3).

Forage DM yield followed the same trend with wet yield. The DM yields were 7.53, 7.30 and 5.10 ton/acre respectively for fields 1, 2 and 3. To increase the chances of a high yielding and high quality corn crop for grazing, it is advisable to select a variety that will match the CHUs rating for your area. Select an early-maturing silage corn variety. Silage varieties of corn are more palatable and better suited to grazing than grain corn.
Field 3 had more plant population than other fields, indicative that seeding was done at a higher rate. This probably explains why field 3 had more than 2 tons/DM/acre than fields 1 and 2. Corn does not like competition, even with itself, so adequate seeding rate and appropriate spacing between corn stands is essential.

Forage Quality

Forage protein was higher for field 1 (10.1%), followed by field 3 (9.47%) and then field 2 (8.13%). The protein requirements for a dry gestating cow in the mid pregnancy stage was conveniently met by the corn on all fields. For a cow that is in the late pregnancy stage, only field 2 corn fell short of 9% protein, which is needed by this category of cow. Grazing cows in the late pregnancy stage on field 2 would therefore require some form of protein supplementation in the form of a good legume hay or protein blocks.

Fusion RR (field 1) had the highest Ca, Mg and K contents than other fields. But the requirements of Ca, P, Mg and K by a dry gestating cow in the mid and late pregnancy stages were all met and even exceeded by corn on all fields.

Table 1. Corn heat units, forage yield & quality of corn hybrids from 3 fields

Measurement	Fields (Sites)		
	Field 1 (Fusion RR)	Field 2 (Fusion RR+39F44)	Field 3 (39F44)
No. of cobs	1.93	1.53	1.20
Dry matter (DM, %)	29.11	29.65	29.95
Wet yield, ton/acre	25.88	24.62	17.03
DM yield, ton/acre	7.53	7.30	5.10
Final corn stand population/acre	33,131	37,108	43,393
Forage Quality			
Crude protein (% DM)	10.10	8.13	9.47
Calcium (% DM)	1.73	0.22	0.19
Phosphorus (% DM)	0.20	0.18	0.20
Magnesium (% DM)	0.33	0.19	0.18
Potassium (% DM)	2.31	1.46	1.44
Acid Detergent Fiber (ADF, % DM	37.60	36.07	29.26
Total Digestible Nutrients (TDN, % DM)	59.38	60.15	63.55
Metabolizable Energy (Mcal/kg)	2.14	2.17	2.29
Digestible Energy (Mcal/kg)	2.61	2.65	2.80
Net Energy for Maintenance (Mcal/kg)	1.29	1.31	1.42
Net Energy for Gain (Mcal/kg)	0.71	0.74	0.84
Statistics			
	Cobs	Wet yield	DM yield
Significance at P<0.05?	Yes	Yes	Yes
$LSD_{0.05}$	0.32	3.05	0.79
Coefficient of variation (%)	10.71	6.78	6.84
*NS, not significant			

Corn hybrids in field 3 (39F44) had the highest energy content (63.6% TDN) than other fields. The high energy content in field 3 resulted from the advanced stage of cobs at harvest, which were mostly around the 2/3 milk line stage. Generally, the TDN values obtained for the 3 fields were within the range of 55-60% TDN suggested for dry gestating cows.

Perennial Forage Demonstration in Fairview:
Yield & Feed Value Following Third Year of Cutting

Location: Fairview Research Farm, RR #35 (MD of Fairview)

Following the establishment of the perennial forage demonstration plots in 2010 in Fairview, the plots have continued to provide us with necessary data on agronomic adaptation, dry matter (DM) yield and nutritive value of the over 40 grass and legume species and varieties. The PCBFA Annual Reports for 2010, 2011 and 2012 have information regarding seeding, management and some reports on DM yield and quality as well as the selenium contents of selected forage varieties. In 2011, each forage variety was divided into three sections. These sections were cut at different times during the summer months of 2011, 2012 and 2013.

Plots Management and Measurements in 2013

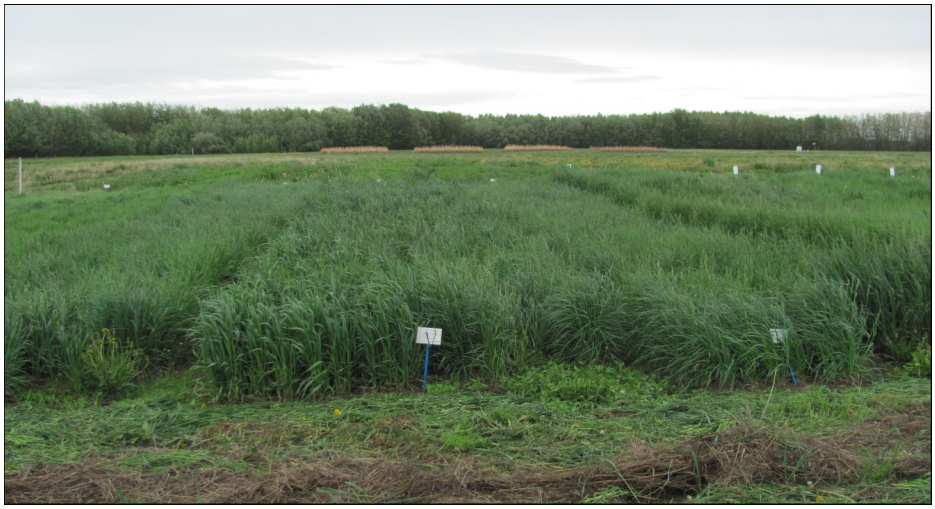
There are 2 separate blocks of grasses and legumes. Varieties used for yearly checks are: Fleet meadow bromegrass & Carlton smooth bromegrass (grasses); Anik, Peace & Algonquin alfalfa varieties (legumes).

Fertility - Soil tests were carried out on both blocks in early spring at a depth of 0-6". The test results showed sufficient amounts of N, P, K and S for plant growth, so no additional fertilizer was applied in 2013.

Weed Control – No weed control was necessary for any of the grasses. Hand pulling of a few weeds from both grass and legume plots was done early in the season. After the June cut, the whole legume block was sprayed with Basagran Forte at the rate of 0.91L/ac at 45L water volume.

Winter Kill - Notes on winter kill were taken early in the spring by assessing crown and root health and any damages done. Plants suffering from winterkill would normally have soft and fibrous crowns.

Plant Growth, Cutting and Recovery Following Cutting Treatments – In 2011, each forage variety plot measuring 2.5m x 17m was divided into three sections. In 2012 and 2013, the first, second and third sections were respectively cut: (1) in first week of June (1 cut only - June only), (2) first week of June & first week of August (2 cuts) and (3) first week of August (1 cut - August only) for DM yield and feed value determination. Following forage sampling with quadrats, a sickle mower was used to cut the remainder of the cut section. Six top grasses and top 7 legumes were selected based on DM yields, winter hardness and early spring growth and had their feed quality determined. The following forages from the late cut (August only) were analyzed for selenium content: Tall fescue, Anik alfalfa, Carlton smooth bromegrass, Fleet meadow bromegrass, Algonquin alfalfa, and timothy.



Results and Discussion

DM Yield

Grasses (Figure 1)

When cut in early June, Palaton reed canary grass, Carlton smooth brome, AC Rocket smooth brome and Promesse timothy were the top 4 grasses with significantly higher yield than other grasses. They had about 3.0 ton/acre more than most grasses.

The June DM yield (1st of 2-cut system) following cutting twice per year for 2 or 3 years in a row, was >2.5 ton/acre only for 7 grasses (Palaton reed canary grass, Derby timothy, AC Nordic orchard grass, Manchar smooth bromegrass, Promesse timothy, and Potamac orchard grass). The June DM yield (1st of 2-cut system) was <1.2 ton/acre 5 grasses (Barolex tall fescue, Fleet meadow bromegrass, Carlton smooth bromegrass, AC Rocket smooth bromegrass and AC Goliath crested wheatgrass). Consequently, August cut (2nd of 2-cut system) also declined for these 5 grasses. The total DM yield resulting from the 2-cut system (early June & early August) was higher for (5 top yielders): Palaton reed canary grass (5.13 ton.acre), Promesse timothy (5.05 ton/acre), Potamac orchard grass (4.90 ton/acre), Manchar smooth bromegrass (4.51 ton/acre) AC Success bromegrass.

The DM yields for Climax timothy, Grindstad timothy, Promesse timothy and Palaton reed canary grass were higher (3.48-3.62) than other grasses when cutting in the season was delayed from June till early August (August only cut). Three of these top 4 grasses were timothy varieties, suggesting that timothy varieties may generally be better yielder later in the season than most other grasses tested here.

Generally, pooled across the 3 cutting treatments (June only, June & August, August only), the top 6 grasses for DM in 2013 were in the order of: Palaton reed canary grass > Promesse timothy > Manchar smooth bromegrass > Derby timothy > Grindstad timothy > AC Nordic orchard grass.

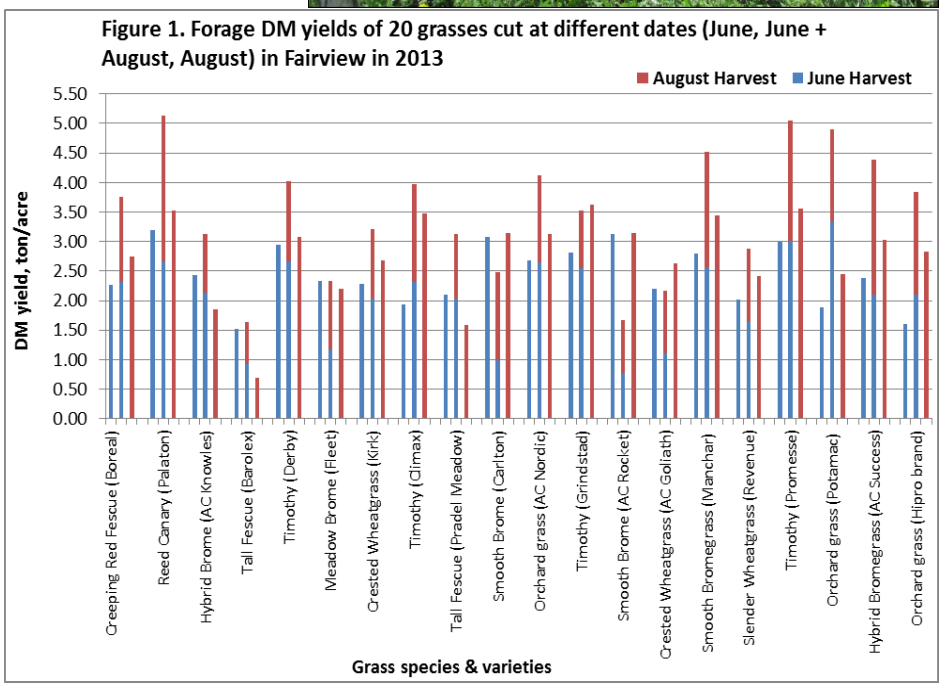


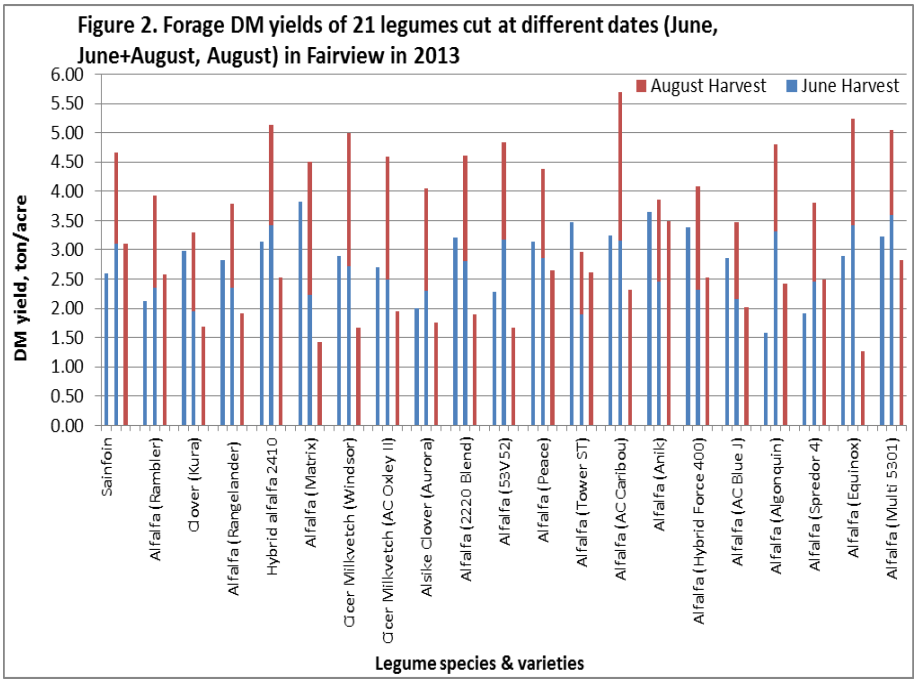
Figure 1. Forage DM yields of 20 grasses cut at different dates (June, June + August, August) in Fairview in 2013

Legumes (Figure 2)

Cutting the legumes in early June (June only cut) produced DM yield varying from 1.58 ton/acre for Algonquin alfalfa to 3.81 ton/acre for Matrix alfalfa. The top 5 DM yielders (3.38-3.81 ton/acre) were in the order of: Matrix alfalfa > AC Caribou alfalfa > ST Tower alfalfa > Anik alfalfa > Hybrid force alfalfa.

For legumes cut twice in a year (2-cut system), the June cut (1st of 2-cut system) was higher (>3.00 ton/acre) for 7 legumes (6 alfalfa varieties: Hybrid 2410, 53V52, Equinox, Algonquin, Multi 5301 & Anik and sainfoin). The total DM yield (early June + early August cuts) for the top 7 was in the order: Alfalfa multi 5301 > Alfalfa Equinox > Hybrid alfalfa > Anik alfalfa > Windsor cicer milkvetch > alfalfa 53V52 > sainfoin.

Delaying cutting in the season until early August (for August only cut) resulted in lower DM yields than June only cut or 2-cut systems (June & August cuts). The top 6 legumes with better DM yield when cutting was made for August only cut were in the order of: AC Caribou alfalfa > Sainfoin > Anik alfalfa > Peace alfalfa > ST Tower alfalfa > Rambler alfalfa. The top 6 legumes produced 2.61-3.49 ton DM/acre.



Generally, pooled across the 3 cutting treatments (June only, June & August, August only), the average DM yield for 2013 was higher for the following 6 legumes, which were in the order of: AC Caribou alfalfa > Multi 5301 alfalfa > Anik alfalfa > Hybrid 2410 alfalfa > Sainfoin > Peace alfalfa.

Forage Quality

Grasses (Table 1)

The forage quality indicators presented here are for the top 8 grasses based mostly on average DM yield ranking. With the exception of August only cut, the grasses mostly had protein in excess of a dry and lactating cow protein requirements. For the August only cut, only 3 (AC Success & Manchar smooth bromegrass, and Promesse timothy) of the top 8 grasses had sufficient protein requirements for both dry and lactating cows. AC Nordic orchard grass slightly fell short of what is needed by a dry gestating cow in the mid pregnancy stage. Other 4 grasses (except for Grindstad timothy) had sufficient amount of protein for a dry cow in the late pregnancy stage when cutting was delayed till August.

Even when cutting was delayed in the year until early August (August only cut), the following 4 grasses maintained a larger proportion of green leaves than other grasses: Promesse timothy, AC Success smooth bromegrass, Manchar smooth bromegrass and Palaton reed canary grass. The higher protein recorded in August only cut for the 4 grasses probably resulted from the presence of green leaves.

Forage Ca content varied from 0.15% for both Palaton canary grass (August only cut) & for AC Success smooth bromegrass (2nd of 2-cut system) to 0.43% for Promesse timothy grass (2nd of 2-cut system).

With the exception of Manchar & AC Success smooth bromegrasses and Promesse Timothy grass, forage P was generally low for August only cut (0.06 - 0.12%). The grasses that had lower P contents for August only cuts fell short of the P requirements for a dry gestating and lactating cow, which respectively require 0.16 and 0.26% P. Other cutting times mostly had forage P content which exceeded those required P by a dry gestating and lactating cow.

Forage Mg content varied from 0.14 to 0.31% for the grasses and cutting treatments imposed. A dry gestating cow requires 0.12%, an indication that this requirement has been met by these grasses regardless of when cutting was made. For a lactating cow, which requires 0.20% Mg, the Mg requirement was only occasionally met by grasses following cutting treatments.

Forage K was very high for all grasses regardless of cutting treatments and the requirements of a dry gestating and a lactating cow have adequately been met by the grasses.

Similarly, forage Na contents requirements by a dry gestating and lactating cow have been met.

Forage energy content (%TDN) of grasses was mostly sufficient for a cow in the mid-pregnancy stage, which requires 55% TDN. For a cow in the late-pregnancy stage, which requires 60% TDN, this requirement was only met by Palaton reed canary grass (June only cut), Carlton smooth bromegrass (2nd of 2-cut system) and Grindstad timothy (1st of 2-cut system).

Table 1. Feed quality of grasses in Fairview

				Macro-minerals					Det. Fibres		Energy				
Grass	**Cutting treatment**		**CP**	**Ca**	**P**	**Mg**	**K**	**Na**	**ADF**	**NDF**	**TDN**	**ME**	**NEG**	**NEM**	**RFV**
Reed Canary Grass		Jun only	17.6	0.21	0.37	0.25	3.42	0.01	40.6	65.1	61.7	2.09	0.67	1.24	82
(Palaton)	2 cuts	Jun	18.2	0.25	0.30	0.29	2.85	0.02	38.7	62.3	59.5	2.12	0.70	1.27	88
		Aug	16.6	0.20	0.35	0.28	3.33	0.01	41.1	66.0	58.6	2.08	0.66	1.23	80
		Aug only	9.56	0.15	0.12	0.19	1.43	0.02	43.3	65.9	57.9	2.04	0.63	1.19	78
Timothy		Jun only	14.2	0.33	0.33	0.29	2.67	0.02	41.4	66.3	58.8	2.07	0.66	1.22	79
(Derby)	2 cuts	Jun	13.1	0.26	0.32	0.20	2.30	0.03	38.1	64.5	57.6	2.13	0.71	1.28	85
		Aug	17.0	0.30	0.33	0.31	2.94	0.01	37.5	59.7	56.6	2.15	0.72	1.29	93
		Aug only	9.39	0.24	0.11	0.15	0.91	0.01	36.2	58.3	57.5	2.17	0.74	1.31	97
Timothy		Jun only	14.4	0.22	0.29	0.17	3.21	0.01	49.9	73.8	59.1	1.92	0.52	1.08	63
(Climax)	2 cuts	Jun	12.3	0.24	0.26	0.14	2.36	0.01	40.8	65.3	59.5	2.09	0.67	1.23	81
		Aug	13.6	0.26	0.32	0.20	3.34	0.01	42.5	67.1	60.1	2.05	0.64	1.20	77
		Aug only	9.26	0.26	0.12	0.18	1.24	0.01	38.6	60.5	53.3	2.12	0.70	1.27	90
Orchard grass		Jun only	14.3	0.24	0.29	0.24	2.97	0.01	45.0	70.4	57.8	2.01	0.60	1.16	71
(AC Nordic)	2 cuts	Jun	12.6	0.23	0.29	0.21	2.37	0.01	41.6	69.7	56.9	2.07	0.65	1.22	75
		Aug	11.7	0.33	0.25	0.18	2.27	0.01	35.5	57.9	58.9	2.18	0.75	1.32	98
		Aug only	6.71	0.19	0.06	0.20	1.20	0.06	46.0	71.3	55.7	1.99	0.58	1.14	69
Timothy		Jun only	15.8	0.30	0.34	0.22	2.52	0.13	42.0	66.4	57.4	2.06	0.65	1.21	79
(Grindstad)	2 cuts	Jun	10.0	0.31	0.31	0.14	2.07	0.01	43.1	68.6	60.4	2.04	0.63	1.19	75
		Aug	12.5	0.34	0.33	0.19	2.84	0.05	39.4	62.5	55.2	2.11	0.69	1.25	87
		Aug only	8.75	0.20	0.14	0.14	1.19	0.02	39.6	63.0	57.2	2.11	0.68	1.25	86
Smooth bromegrass		Jun only	17.0	0.21	0.28	0.18	2.76	0.01	44.8	71.3	56.6	2.01	0.60	1.16	70
(Manchar)	2 cuts	Jun	18.1	0.21	0.30	0.16	2.70	0.01	44.1	70.0	58.5	2.03	0.61	1.18	72
		Aug	17.0	0.28	0.25	0.18	2.75	0.01	41.7	66.0	58.4	2.07	0.65	1.22	79
		Aug only	13.6	0.21	0.23	0.21	2.52	0.01	51.1	76.2	55.8	1.90	0.50	1.06	60
Smooth bromegrass		Jun only	16.9	0.15	0.24	0.21	1.75	0.01	43.7	67.8	56.1	2.03	0.62	1.18	75
(AC Success)	2 cuts	Jun	16.4	0.30	0.30	0.17	3.05	0.01	48.7	73.4	57.3	1.94	0.54	1.10	65
		Aug	8.18	0.28	0.09	0.20	1.33	0.01	41.2	59.4	52.6	2.08	0.66	1.23	89
		Aug only	17.8	0.37	0.30	0.21	3.36	0.01	41.9	64.2	56.4	2.07	0.65	1.21	82
Timothy		Jun only	15.2	0.29	0.36	0.22	2.72	0.01	41.3	64.2	53.8	2.08	0.66	1.22	82
(Promesse)	2 cuts	Jun	14.6	0.33	0.35	0.19	2.66	0.01	39.0	62.8	57.6	2.12	0.69	1.26	87
		Aug	15.0	0.43	0.25	0.23	2.46	0.01	36.0	56.1	57.3	2.17	0.74	1.31	101
		Aug only	15.0	0.32	0.35	0.23	2.72	0.01	42.2	65.7	57.6	2.06	0.64	1.21	79

Legumes (Table 2)

Forage protein content was mostly >11% for the 6 top selected legume varieties. This shows that the 7, 9 & 11% protein needed by a cow in the mid-pregnancy, late-pregnancy and lactating stages have been met and even exceeded by the legumes regardless of the cutting treatments imposed.

Forage Ca content varied from 0.52 to 1.95% for the 6 legumes, an indication that the needed amounts of Ca by a dry gestating (0.18%) and lactating cow (0.42%) were exceeded by the legumes. The P requirement

by a dry gestating cow (0.16%) were met by the selected legumes but the legumes on a few occasions fell short of 0.26% P needed by a lactating cow. The requirements of Mg and K by a dry gestating cow both in the mid and late pregnancy stages were generally met by the selected legume varieties. The Na needed by cows both in the pregnancy and nursing stages have not been consistently met by the selected legumes.

Forage energy content varied from 52.8 to 62.4% for the selected legume varieties. With the exception of August only cut for 2410 hybrid alfalfa and sainfoin, the energy requirements of lactating and non-lactating cows were mostly met by the selected legume varieties.

Table 2. Feed quality of legumes in Fairview

			Macro-minerals						Det. Fibres		Energy				
Legume	**Cutting treatment**		**CP**	**Ca**	**P**	**Mg**	**K**	**Na**	**ADF**	**NDF**	**TDN**	**ME**	**NEG**	**NEM**	**RFV**
Hybrid alfalfa (2410)		Jun only	12.5	1.39	0.29	0.44	1.65	0.01	39.5	51.9	58.4	2.11	0.68	1.25	104
	2 cuts	Jun	16.7	1.57	0.33	0.57	2.80	0.04	44.3	55.0	56.0	2.02	0.61	1.17	92
		Aug	19.2	1.82	0.32	0.57	1.99	0.16	35.5	47.8	60.5	2.18	0.75	1.32	119
		Aug only	13.6	0.99	0.23	0.35	2.14	0.07	50.8	61.3	52.8	1.90	0.51	1.06	75
Sainfoin		Jun only	23.0	0.91	0.20	0.30	1.71	0.02	34.1	46.0	61.1	2.21	0.77	1.34	126
	2 cuts	Jun	18.2	1.64	0.30	0.52	3.06	0.05	41.0	53.4	58.1	2.10	0.67	1.24	100
		Aug	19.9	1.26	0.28	0.38	3.01	0.22	38.5	49.7	58.9	2.13	0.70	1.27	110
		Aug only	10.5	0.60	0.18	0.31	1.63	0.14	49.7	65.8	53.3	1.92	0.52	1.08	71
Alfalfa (Peace)		Jun only	17.6	1.38	0.34	0.46	2.67	0.06	39.6	54.0	58.4	2.11	0.68	1.25	100
	2 cuts	Jun	16.4	0.91	0.29	0.32	2.45	0.09	42.7	58.2	56.8	2.05	0.63	1.20	89
		Aug	11.1	0.52	0.15	0.26	1.63	0.10	47.3	63.7	54.5	1.97	0.56	1.12	76
		Aug only	19.8	1.95	0.32	0.44	2.65	0.05	34.1	47.2	61.2	2.21	0.77	1.34	123
Alfalfa (AC Caribou)		Jun only	18.0	1.10	0.35	0.37	3.02	0.03	37.4	51.9	59.5	2.15	0.72	1.29	107
	2 cuts	Jun	20.8	1.42	0.37	0.47	2.79	0.06	34.8	49.6	60.8	2.19	0.76	1.33	116
		Aug	15.2	1.10	0.23	0.39	2.33	0.15	43.2	59.0	56.6	2.04	0.63	1.19	87
		Aug only	10.5	0.62	0.17	0.29	1.59	0.05	47.3	64.0	54.6	1.97	0.56	1.12	76
Alfalfa (Anik)		Jun only	19.2	1.25	0.35	0.40	2.69	0.01	36.6	50.0	59.9	2.16	0.73	1.30	112
	2 cuts	Jun	17.8	1.35	0.39	0.45	3.07	0.01	36.6	51.3	59.9	2.16	0.73	1.30	109
		Aug	20.4	1.45	0.32	0.53	2.64	0.04	31.6	45.1	62.4	2.25	0.80	1.38	132
		Aug only	13.5	0.94	0.20	0.38	1.79	0.12	43.5	59.1	56.4	2.04	0.62	1.19	87
Alfalfa (Multi 5301)		Jun only	21.2	1.37	0.39	0.43	3.29	0.11	35.2	48.7	60.6	2.19	0.75	1.32	117
	2 cuts	Jun	20.5	1.68	0.35	0.46	2.85	0.13	33.7	46.6	61.3	2.21	0.77	1.35	125
		Aug	19.2	1.12	0.26	0.49	3.27	0.08	35.8	50.7	60.3	2.17	0.74	1.31	112
		Aug only	14.1	1.61	0.22	0.41	1.41	0.10	41.8	55.0	57.3	2.07	0.65	1.21	95

Forage Selenium Content

The selenium (Se) requirement of beef cattle is 0.10 mg/kg of diet dry matter. According to the information on the AARD website, approximately 20% of legume and grass-legume forages, and 50% of grass and cereal forages do not contain the required concentration of Se. From the forage demonstration plots in Fairview, the following forages from the August only cut were analyzed for Se content: Tall fescue (0.11 mg/kg), Anik alfalfa (0.11 mg/kg Se), Carlton smooth bromegrass (0.26 mg/kg Se), Fleet meadow bromegrass (0.11 mg/kg Se), Algonquin alfalfa (0.08 mg/kg Se) and timothy (0.11 mg/kg Se). This indicates that the selected forages have mostly met the suggested Se value for beef cattle.

General Notes

Legume varieties were more affected by winter kill than grass varieties in Fairview. With the exception of AC Caribou, Anik and Peace alfalfa varieties, all other alfalfa varieties tested appeared to be significantly affected by winter kill. Also, delaying cutting in the year until early August seemed to have affected most alfalfa plant stands over time. Forage plant stands particularly for alfalfa decreased slowly over the years with early August cut (August cut only). Juliet red clover has not been doing well at the site. Hay from grasses cut in early August (for August only cut) would not generally be as palatable as those cut in early June (for June only) or early June + early August cuts (for 2-cut system) because of reduced forage quality and advanced growth.

Perennial Forage Demonstration in High Prairie: Yield & Feed Value Following Third Year of Cutting

Location: High Prairie Airport (MD of Big Lakes)

The forage plots in High Prairie is one of the two PCBFA perennial forage plots established in 2010 in the Peace Region. The site has continued to provide us with necessary data on agronomic adaptation, dry matter (DM) yield and nutritive value for the 32 grass and legume species and varieties seeded in 2010. The PCBFA Annual Reports for 2010, 2011 and 2012 have information regarding seeding, management and some reports on DM yield and quality as well as the selenium contents of selected forage varieties. In 2011, each forage variety was divided into three sections. These sections were cut at different times during the summer months of 2011, 2012 and 2013.

Management and Measurements in 2013

There are 2 separate blocks of grasses and legumes. Varieties used for comparison were: Fleet meadow bromegrass & Carlton smooth bromegrass (grasses); Anik, Peace & Algonquin alfalfa varieties (legumes).

Fertility - Broadcast of 67.5 lbs actual N/acre was done on the entire plot of grasses. No fertilizer application was made on the legume plots.

Weed Control – The grass species plots were sprayed once with Curtail M at the rate of 0.7 L/acre @40L water volume and the legumes also sprayed once with Basagran Forte at the rate of 0.91 L/ac at 45 L water volume. Hand weeding was occasionally done.

Winter Kill - Notes on winter kill were taken early in the spring by assessing crown and root health and any damages done. Plants suffering from winterkill would normally have soft and fibrous crowns.

Plant Growth, Cutting and Recovery Following Cutting Treatments – In 2011, each forage variety plot measuring 2.5m x 17m was divided into three sections. In 2012 and 2013, the first, second and third sections were respectively cut: (1) in first week of June (1 cut only - June only), (2) first week of June & first week of August (2 cuts) and (3) first week of August (1 cut - August only) for DM yield and feed value determination. Forage DM yield estimation was done using two randomly placed 0.5m x 0.5m quadrats in each plot. Following forage sampling with quadrats, a sickle mower was used to cut the remainder of the cut section. Yearly, the 6 top grasses and top 7 legumes were selected based on DM yields, winter hardiness and early spring growth and had their feed quality determined. The following forages from the late cut (August only) were analyzed for selenium content: Tall fescue, Anik alfalfa, Carlton smooth bromegrass, Fleet meadow bromegrass, Algonquin alfalfa, and timothy.

Results and Discussion

DM Yield

Grasses (Figure 1)

When cut in June for the June only cut, only 3 (Kirk crested wheatgrass, AC Goliath crested wheatgrass and AC Rocket hybrid bromegrass) of the 14 grasses had > 1.0 ton forage DM/acre. The 11 other grasses had < 1.0 ton DM/acre.

For the 2-cut system, when cut in June (1st of 2-cut system), DM yield of the top 5 grasses (0.56 - 0.88 ton DM/acre) was in order of: AC Goliath crested wheatgrass > Kirk crested wheatgrass > Carlton smooth brome

grass > Grindstad timothy > Derby timothy. But when cut in August (2nd of 2-cut system), the order of the top 5 grasses in DM yield (0.99 - 1.67 ton DM/acre) was: Palaton reed canary grass > Boreal creeping red fescue > Derby timothy > Climax timothy > AC Knowles hybrid bromegrass. Only 6 of the 14 grasses had total DM (June + August cuts), which equalled or greater than 1.50 ton DM/acre. Total yield for other grasses was lower than 1.5 ton DM/acre for 2013.

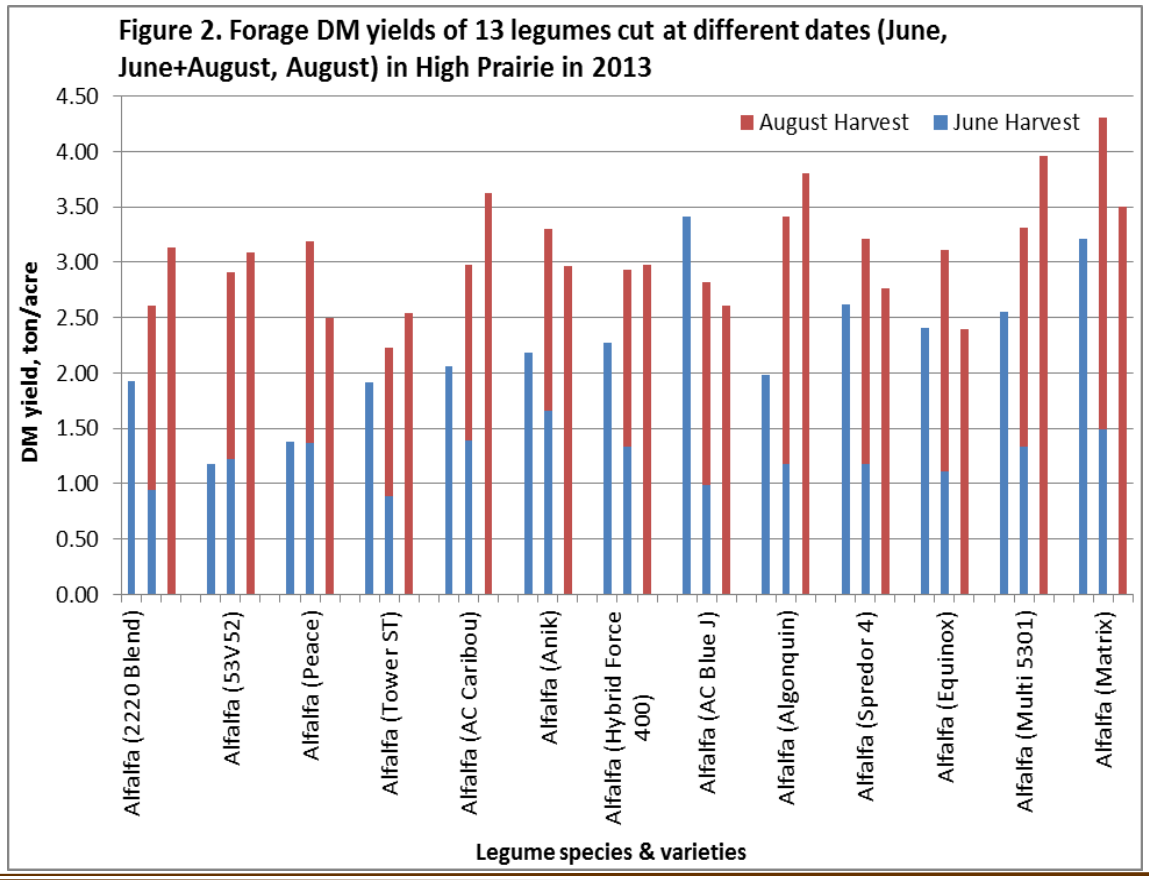
When cutting was delayed until August (August only cut), DM yield varied from 0.74 ton/acre for Barolex tall fescue grass to 2.64 ton DM/acre for Palaton reed canary grass. For August only cut, Palaton reed canary grass, Grindstad timothy, Derby timothy, Kirk crested wheatgrass and Climax timothy were the 5 top grasses.

At the High Prairie site, pooled across the cutting treatments, only 4 (Palaton reed canary grass, Kirk crested wheatgrass, Derby timothy and Grindstad timothy) of the 14 grasses had an average DM >1.50 ton DM/acre for the year.

Legumes (Figure 2)

For the early June one cut system, of the 17 legumes at the site, only 4 alfalfa varieties (AC Blue, Spredor 4, Multi 5301 and Matrix) had >2.50 ton DM/acre. Other legume varieties had lower than 2.50 ton DM/acre. For the early June only cut, AC Blue J alfalfa had the highest DM yield (3.41 ton DM/acre) and closely followed by Matrix alfalfa (3.22 ton DM/acre).

For the 2-cut system (early June and early August), when cut in early June (1st of 2-cut system), DM yield was highest for Anik alfalfa (1.66 ton DM/acre), followed by Matrix alfalfa with 1.49 ton DM/acre. The lowest DM was with ST Tower alfalfa variety (0.89 ton DM/acre). For the second cut in early August (2nd of 2-cut system), Matrix alfalfa had the highest DM (2.82 ton DM/acre), followed by Algonquin alfalfa (2.23 ton DM/acre), then Spredor 4 alfalfa (2.04 ton DM/acre) and then Equinox alfalfa (2.00 ton DM/acre). Other legumes had < 2.00 ton DM/acre. The total DM yield resulting from early June + early August cuts was in the following order for the top 6 alfalfa: Matrix > Multi 5301 > Algonquin > AC Blue J > AC Caribou > Spredor 4.



When cutting was delayed in the year until early August (August only cut), 7 of the 13 legumes had higher DM yields than any of the other cutting treatments (early June only cut or the 2-cut system (early June + early August)). For the August only cut, the top 5 legumes were all alfalfa varieties, had >3.00 ton DM/acre and were in the order of: Algonquin > AC Caribou > Matrix > Blend 2220 > 53V52.

The average DM yield when pooled across the cutting treatments for High Prairie forage plots varied from 2.23 to 3.67 ton DM/acre for the legumes. The top 5 legumes (all alfalfa) with higher average DM yield for the year were: Matrix, Multi 5301, Algonquin, AC Blue J & AC Caribou.

Forage Quality

Grasses (Table 1)

The forage protein content was mostly higher for early June than early August cuts. Palaton reed canary grass had the highest protein for any cuttings in June. For any of the August cuts, Climax timothy had the highest protein. The protein requirements of a dry gestating and a lactating cow were generally met by the selected top grasses when cut in June (except for AC Goliath crested wheatgrass). With the exception of Climax timothy and AC Rocket smooth bromegrass which had 12.5 - 13.4 % protein, the selected grasses were only mostly able to meet the protein requirement of a dry gestating cow in the mid-pregnancy stage. Looking at Table 1, Climax timothy, AC Rocket smooth bromegrass and AC Goliath crested wheatgrass had much lower protein contents (4.9 - 6.4% CP) when cutting was delayed until August cut for August only cut, and therefore these grasses fell short of meeting the protein requirements of both dry gestating and lactating cows.

The requirements for Ca, P and Mg by a dry gestating cow in the mid and late pregnancy stages were mostly met by the selected grass varieties. The few exceptions were when cutting was delayed from early June till early August. Of the top 7 selected grass varieties, AC crested wheatgrass generally had lower macro-mineral contents measured in this study and these minerals were mostly short of meeting a dry gestating cow requirements. The forage K content varied from 0.58 to 3.35% for the selected 7 grass varieties, with only AC Goliath crested wheatgrass when cut in August falling short of what a dry gestating cow needs. Forage Na content was mostly 0.01% for all grasses and this fell short of the requirement of a dry gestating cow.

Forage energy content varied from varied from 55.5 to 61.1% TDN for the selected 7 grass varieties. With the exception of a few cases, the energy requirements of lactating and non-lactating cows were generally met by the selected grass varieties even when cutting was delayed from early June until early August.

Legumes (Table 2)

Forage protein content was generally >13% for the selected legume varieties, indicating that the 7, 9 & 11% protein needed by a cow in the mid-pregnancy, late-pregnancy and lactating stages have been met and even exceeded by the legumes.

Forage Ca content varied from 0.80 to 2.13%for the selected legumes and the needed amounts by a dry gestating and a lactating cow were exceeded by all legumes. The P requirement by a dry gestating cow were met by the selected legumes but the legumes only on a few occasions met the 0.26% P needed by a lactating cow. The requirements of Mg and K by a dry gestating cow in the mid and late pregnancy stages were generally met by the selected legume varieties. The Na needed by a beef cow has not been consistently met.

Forage energy content varied from varied from 53.9 to 61.2% TDN for the selected legume varieties. With the exception of when AC Caribou was cut in early August for the August only cut treatment, the energy requirements of a lactating and a non-lactating cow were mostly met by the selected legume varieties even when cutting was delayed from June until August.

Table 1. Feed quality of selected grasses in High Prairie

Grass	Cutting treatment		CP	Macro-minerals Ca	P	Mg	K	Na	Det. Fibres ADF	NDF	Energy TDN	ME	NEG	NEM	RFV
Reed Canary Grass		Jun only	14.6	0.22	0.22	0.17	1.89	0.01	44.3	71.2	56.1	2.02	0.61	1.17	71
(Palaton)	2 cuts	Jun	18.0	0.27	0.34	0.26	3.35	0.01	34.7	58.5	60.8	2.20	0.76	1.33	98
		Aug	8.3	0.18	0.17	0.16	1.62	0.01	37.5	59.8	59.4	2.14	0.71	1.29	93
		Aug only	9.5	0.15	0.19	0.16	1.91	0.01	38.0	61.5	59.2	2.14	0.71	1.28	90
Timothy		Jun only	11.7	0.21	0.19	0.15	1.76	0.01	34.3	56.9	61.1	2.20	0.76	1.34	102
(Derby)	2 cuts	Jun	13.9	0.21	0.26	0.16	2.15	0.01	38.9	59.0	58.8	2.12	0.69	1.26	92
		Aug	9.4	0.22	0.18	0.15	1.42	0.01	37.2	57.1	59.6	2.15	0.72	1.29	98
		Aug only	8.0	0.19	0.12	0.12	1.14	0.01	36.3	56.5	60.1	2.17	0.73	1.31	100
Timothy		Jun only	13.7	0.17	0.26	0.15	2.38	0.01	38.4	61.6	59.0	2.13	0.7	1.27	89
(Climax)	2 cuts	Jun	12.8	0.22	0.26	0.15	2.29	0.02	36.4	59.4	60.0	2.16	0.73	1.3	95
		Aug	13.4	0.19	0.25	0.15	2.17	0.01	35.7	60.8	60.4	2.18	0.74	1.32	94
		Aug only	6.2	0.15	0.1	0.08	0.85	0.01	35.4	54.7	60.5	2.18	0.75	1.32	104
Smooth bromegrass		Jun only	12.2	0.22	0.21	0.15	2.46	0.01	41.7	65.6	57.3	2.07	0.65	1.22	80
(Carlton)	2 cuts	Jun	10.9	0.32	0.27	0.21	2.59	0.01	45.3	66.9	55.5	2.00	0.59	1.16	75
		Aug	9.0	0.3	0.24	0.21	2.22	0.01	43.6	62.2	56.4	2.03	0.62	1.18	82
		Aug only	7.6	0.27	0.13	0.14	1.49	0.01	38.2	60.7	59.1	2.13	0.7	1.28	91
Timothy		Jun only	11.5	0.16	0.23	0.14	1.94	0.01	39.4	61.4	58.5	2.11	0.69	1.25	88
(Grindstad)	2 cuts	Jun	11.3	0.23	0.25	0.15	2.12	0.01	39.2	62.7	58.6	2.11	0.69	1.26	87
		Aug	12.5	0.21	0.14	0.14	1.39	0.01	35.0	52.9	60.7	2.19	0.75	1.33	108
		Aug only	8.1	0.2	0.21	0.14	1.93	0.01	35.6	58.3	60.4	2.18	0.74	1.32	98
Smooth bromegrass		Jun only	12.7	0.23	0.19	0.16	2.05	0.01	39.8	64.1	58.3	2.10	0.68	1.25	84
(AC Rocket)	2 cuts	Jun	12.9	0.25	0.23	0.17	2.16	0.01	38.5	62.5	58.9	2.13	0.7	1.27	88
		Aug	12.8	0.19	0.18	0.16	2.19	0.01	40.0	65.4	58.2	2.10	0.68	1.25	82
		Aug only	6.4	0.29	0.11	0.18	1.4	0.01	40.7	60.5	57.8	2.09	0.67	1.23	88
Crested wheatgrass		Jun only	10.2	0.13	0.15	0.1	1.2	0.01	37.8	62.6	59.3	2.14	0.71	1.28	88
(AC Goliath)	2 cuts	Jun	8.1	0.14	0.18	0.1	1.33	0.01	39.1	61.6	58.6	2.12	0.69	1.26	88
		Aug	4.1	0.18	0.1	0.11	0.56	0.01	38.4	59.5	59.0	2.13	0.7	1.27	92
		Aug only	4.9	0.21	0.12	0.12	0.58	0.01	40.1	61.4	58.2	2.10	0.68	1.24	87

Table 2. Feed quality of legumes in High Prairie

Legume	Cutting treatment		CP	Macro-minerals Ca	P	Mg	K	Na	Det. Fibres ADF	NDF	Energy TDN	ME	NEG	NEM	RFV
Alfalfa		Jun	20.0	1.02	0.25	0.38	2.86	0.02	38.0	49.7	59.2	2.13	0.71	1.28	111
(AC Caribou)	2 cuts	Jun	19.7	1.71	0.28	0.56	2.39	0.04	33.9	47.1	61.2	2.21	0.77	1.35	124
		Aug	18.2	1.74	0.22	0.52	2.26	0.05	40.3	52.8	58.1	2.09	0.67	1.24	101
		Aug	13.5	0.80	0.14	0.31	2.10	0.05	48.6	60.8	53.9	1.94	0.54	1.10	78
Alfalfa		Jun	19.6	1.25	0.22	0.48	2.50	0.10	36.1	45.5	60.1	2.17	0.74	1.31	124
(AC Blue J)	2 cuts	Jun	20.1	1.59	0.28	0.61	3.14	0.06	35.6	43.8	60.4	2.18	0.74	1.32	130
		Aug	21.4	1.36	0.28	0.45	2.69	0.03	37.9	46.1	59.3	2.14	0.71	1.28	120
		Aug	16.8	1.21	0.17	0.49	1.78	0.14	44.0	56.1	56.2	2.03	0.61	1.18	91
Alfalfa		Jun	21.0	1.10	0.29	0.35	2.64	0.04	35.1	47.2	60.6	2.19	0.75	1.33	121
(Algonquin)	2 cuts	Jun	20.7	1.60	0.28	0.56	2.55	0.03	33.1	46.7	61.7	2.22	0.78	1.36	126
		Aug	18.9	1.08	0.21	0.35	2.62	0.16	37.0	48.9	59.7	2.15	0.72	1.30	114
		Aug	17.2	1.20	0.16	0.35	1.45	0.16	41.6	53.7	57.4	2.07	0.65	1.22	98
Alfalfa		Jun	19.9	1.89	0.29	0.39	2.37	0.04	36.2	47.4	60.1	2.17	0.73	1.31	119
(Spredor 4)	2 cuts	Jun	19.7	1.77	0.28	0.49	2.50	0.04	35.1	47.8	60.7	2.19	0.75	1.33	120
		Aug	15.3	1.30	0.16	0.56	1.33	0.17	43.2	56.3	56.6	2.04	0.63	1.19	91
		Aug	20.0	1.51	0.26	0.36	2.49	0.06	36.4	47.4	60.0	2.16	0.73	1.31	119
Alfalfa		Jun	20.6	1.41	0.27	0.38	2.76	0.01	35.1	48.7	60.7	2.19	0.75	1.33	118
(Multi 5301)	2 cuts	Jun	19.1	2.13	0.26	0.75	3.07	0.04	40.6	48.9	57.9	2.09	0.67	1.24	109
		Aug	19.8	1.75	0.25	0.49	2.72	0.11	37.8	46.2	59.3	2.14	0.71	1.28	120
		Aug	13.3	1.09	0.17	0.32	1.87	0.04	42.4	57.6	57.0	2.06	0.64	1.20	90
Alfalfa		Jun	22.4	1.46	0.31	0.35	2.87	0.04	37.1	48.0	59.7	2.15	0.72	1.29	116
(Matrix)	2 cuts	Jun	21.3	2.06	0.27	0.52	2.33	0.03	34.0	43.0	61.2	2.21	0.77	1.34	135
		Aug	19.9	1.53	0.21	0.41	2.82	0.06	40.2	47.5	58.1	2.10	0.67	1.24	113
		Aug	14.9	1.50	0.16	0.36	1.49	0.05	45.0	59.7	55.7	2.01	0.60	1.16	84

Forage Selenium Content

The selenium (Se) requirement of beef cattle is 0.10 mg/kg of diet dry matter. From the forage demonstration plots in High Prairie, the following forages from the August only cut were analyzed for selenium content: Tall fescue (0.11 mg/kg Se), Anik alfalfa (0.11 mg/kg Se), Carlton smooth bromegrass (0.10 mg/kg Se), Fleet meadow bromegrass (0.26 mg/kg Se) and Algonquin alfalfa (0.18 mg/kg Se). The Se requirement of beef cattle have been met by the selected grass and legume varieties.

General Notes

All alfalfa varieties tested at the High Prairie plots appeared to be less affected by winter kill even with the different cutting treatments. Delaying cutting in the year until early August seemed to have affected alfalfa stands more than grasses over time. The clover and cicer milkvetch varieties have not been doing well at the site. Hay from grasses cut in early August (for August only cut) would not generally be as palatable as those cut in early June (for June only) or early June + early August cuts (for 2-cut system) because of reduced forage quality and advanced growth.

Pasture Rejuvenation with Soil and Foliar Fertilizers

Collaborating Producer: Paul & Lori Kinnee, Brownvale (MD of Peace)

Foliar nutrients are mobilized directly into plant leaves, which is the goal of fertilization to begin with, increasing the rate of photosynthesis in the leaves, and by doing so stimulating nutrient absorption by plant roots. Foliar fertilization is by far the most effective way to apply micro nutrients or trace elements, and supplement the major elements. The readily-available nutrients are more easily utilized, because they do not have to be dissolved by moisture and go into the soil solution. Foliar fertilizers used in conjunction with solid fertilizers, can be used to quickly correct a nutrient imbalance and stimulate increase in root uptake. This does not mean that foliar fertilizers replace solid fertilizer, but the use of foliar fertilizer has been shown to increase the availability of the applied major elements, that have been applied in solid form. The objective of this study was to examine the effects of soil rejuvenation versus foliar fertilizer forage growth, yield and quality.

Methods

The project was located in Brownvale (MD of Peace) on RGE road 263 and on 225 acres of land. The site was used as a hay field for years, but used as pasture for the last 4 years. Dominant forages are fescue, timothy and quack grass, and some alfalfa and a few stands of clover.

A section of a 75 acre field was used for the demonstration. There were four soil/plant nutrient/fertilizer treatments, which consisted of the following:

1. Check control
2. Best Soil Rejuvenation (BSR) - in liquid form (0.1% N - 0.02% P - 0.14% K - 0.007% S - 0.013% Ca)
3. Best Foliar fertilizer (BFF) - in granular form (7% N - 35% P - 8% K - 2% Mg - 6% S)
4. A combination of treatments 2 & 3 above

Spraying was done twice, with about 5 weeks between sprayings. Application rates used are:
BFF - One 22.5 kg pail of BFF treats 32 acres (the fertilizer was dissolved in water and then sprayed).
BSR - applied at a rate of 100 ml/acre.

For treatment 4 (a combination of treatments 2 & 3), a full rate of each BFF and BSR was used. BSR is used to restore soil nutrients, microbial populations and to promote plant growth.
(For more information, please visit: http://www.bestenvirotech.com/best-farming-system.
Preliminary results of an early study at the present study site by PCBFA is also available from:
http://peacecountrybeef.ca/wp-content/uploads/2013/02/Final-PCBFA-2012-Annual-Report.pdf)

Results and Discussion

DM Yield (Table 1)

Feeding the plant through the soil by using BSR or feeding the plant via the leaf by using BFF or a combination of the two appeared to have some positive effect on DM production. The DM was highest for the combination of BFF + BSR (5041 lbs DM/acre) and lowest for control check (3402 lbs DM/acre). A combination of BFF + BSR (treatment 4), BFF (treatment 3) and BSR (treatment 2) respectively increased DM yield by 148, 112 and 125% over control check. The higher DM yield resulting from BFF + BSR indicates the likely potential benefit of applying both forms of nutrients/fertilizer to pasture for the purpose of improving forage growth.

Forage Quality (Table 1)

The forage protein content was in the order of: BFF + BSR (treatment 4) > BFF (treatment 3) > BSR (treatment 2) > control (treatment 1). The application of a combination of BFF + BSR increased protein content by double over control check. With the exception of control check, which appeared to slightly fall short of the 11% protein needed by a lactating cow, all spraying treatments exceeded the protein requirements of a dry gestating (7-9 % CP) and a lactating cow.

The forage Ca content was not consistently affected by the spraying treatments. But the Ca values obtained for all the spraying treatments far exceeded the Ca requirements by both pregnant and lactating cows.

Forage P and K followed the same pattern with the combination of BFF + BSR giving the highest values, followed by BFF, then BSR and then control check. Though forage P was greatly improved by spraying BFF or BSR or a combination of both, but none of the treatments applied increased the level of forage P up to the required P level needed by a lactating cow. All the treatments however had sufficient amount of P needed by a dry gestating cow both in mid and late pregnancy stages. The K requirements by beef cows were exceeded by all treatments including the control. Forage Mg content varied from 0.17% for both BFF + BSR (treatment 4) & control to 0.24% for BSR (treatment 2). All spraying treatments including control had adequate amount of Mg needed by a dry gestating cow, but only BSR (treatment 2) was able to meet the 0.20% Mg needed by a nursing cow. None of the spraying treatments had sufficient amounts of Na needed by beef cows.

Forage energy (%TDN) was in order of: BFF + BSR (60.33% TDN) > BFF (59.25% TDN) > BSR (56.61% TDN) > control (55.13% TDN). Only the combination of BFF + BSR (and possibly treatment BFF) conveniently met the 55 and 60% TDN needed by a dry gestating cow in the mid and late pregnancy stages. Other treatments only had sufficient amounts of energy needed by a dry gestating cow in the mid pregnancy stage.

Table 1. Forage DM yield and forage quality 4 weeks after the second spraying treatment.

Spraying treatment	DM (lb/ac)	CP ——	Ca ——	P ——	Mg ——	K (%)	Na ——	ADF ——	NDF ——	TDN ——	ME Mcal/kg	NEM Mcal/kg	NEG Mcal/kg	RFV
BFF + BSR	5041	20.02	0.51	0.24	0.17	3.68	0.01	35.70	57.60	60.33	2.18	1.32	0.74	99
BFF	3826	13.60	0.77	0.23	0.19	2.01	0.02	37.87	57.50	59.25	2.14	1.28	0.71	96
BSR	4244	11.98	0.84	0.17	0.24	1.85	0.02	43.14	60.45	56.61	2.04	1.19	0.63	85
Control check	3402	10.14	0.59	0.14	0.17	1.66	0.03	46.11	67.09	55.13	1.99	1.14	0.58	73

Brix (sugar level)

Generally, all the forage types found in the respective treatment plots and tested for brix appeared to be increased by BFF than other treatments (Table 2).

Table 2. Brix of individual forage within each treatment block 4 weeks after 2nd spraying.

Spraying treatment	Alfalfa	Bromegrass	Clover	Vetch	Others
BFF + BSR	9.33	7.33	6.33	10.33	4.67
BFF	10.3	10.0	5.20	14.20	5.83
BSR	7.67	6.83	6.00	-	5.00
Control check	7.16	9.50	5.50	-	5.50

Field Observations

After the first spraying, cows were allowed to graze the plots. Just before the second spraying was done, we observed that cows had heavily grazed plots sprayed with a combination of BFF + BSR than other plots. This is an indication that cows probably preferred treatment 4 to other treatments. And BFF was slightly grazed more than BSR or the control. The greater consumption of the preferred treatments could be related to better forage quality (particularly lower values of both ADF and NDF) and brix levels for treatments BFF + BSR and BFF than either BSR or control check.

MUNICIPAL DISTRICT & COUNTY REPORTS

CLEAR HILLS COUNTY REPORT

The Wolf Hunt Incentive program received one significant change this past year. As of March 2013, only wolves that are caught in the agricultural land are eligible for the program. We have already seen a significant reduction in the number of claims as a result of this change. 78 wolves were claimed in 2013.

There has been no sign of Clubroot in the County, yet. I would like to encourage all landowners to require good sanitation practices when moving equipment into the area, especially from locations known to have Clubroot infestations. Weeds, disease, and insects can all be transported via equipment, livestock, seed, feed, and human movement. Be sure to check the sanitation requirements of any third parties that are entering your land to do work or are just passing through.

Our weed program includes private and public land inspections, educating the public, managing weed infestations and preventing the establishment of new weeds to the area. Himalayan Balsam was discovered in the County in 2012 in two locations, a third location in Hines Creek was found in 2013. This plant has a habit of 'shooting' seeds about six feet away to propagate and spread. These plants should be completely removed & destroyed. Spotted Knapweed was discovered several years ago along the Peace River, and in cooperation with the landowners it appears to have been eradicated. We need to continue monitoring the site for any rogue plants. White Cockle was found 3-4 years ago, after removing the few plants we found and monitoring the site carefully I am hopeful that we may have eradicated them from that area and the County (for now). We continue to work with landowners and managers to control Scentless Chamomile, Common Tansy, Yellow Toadflax, Canada Thistle and Sow Thistle. Please help prevent the spread of these weeds by cleaning or requiring equipment to be cleaned when leaving an area or field that is infested with any of these weeds. When purchasing feed, do a field inspection to determine what kind of weeds will be in the feed. When purchasing seed, require a seed analysis certificate for the seed lot you intend to buy.

The focus of the spray program is to spray as much as necessary but as little as possible to obtain the most effective long term control of brush and weeds. To more effectively spot spray, all our weed inspectors are also equipped with handwand sprayers and are trained to properly and safely apply herbicides for control of weeds. Large areas of weeds are still controlled using a contract spray truck. If you discover a patch of weeds or a few plants give the weed inspector in your area or myself a call.

The 14 bales self-loading bale wagon was added to the rental program in 2013 and it has been busy. In the short time we've had it, it's been busy, but it has also needed a lot of repairs. Go online to www.clearhillscounty.ab.ca or call the County office for more information on the complete rental equipment list.

The 2013 Clear Hills County Agricultural Trade Show was a great success, despite the terrible road conditions. Hines Creek was the warm spot while the rest of the region it seemed was dealing with a snow storm. Only a few exhibitors were unable to attend. The County's 20th Annual Agricultural Trade Show will be on April 12, 2014 at the Dave Shaw Memorial Complex in Hines Creek, AB. It's going to be a good one!

Aaron Zylstra, Agricultural Fieldman

MD of FAIRVIEW REPORT

Hi folks. It seems hard to believe that 2013 has gone by and we are well on our way into 2014. It seems that the combines had just been put away, but I guess when we look at the tremendous amount of snowfall we have received so far, well, it's a good thing they have been tucked away and hidden from all this white stuff!

For as fast as it has went, the Agricultural Department of the M.D. of Fairview have accomplished some impressive achievements. Our weed inspectors, 2 of them, completed over 540 weed inspections on our municipalities lands this past season. For most part, the producers here are very proactive on their weed control which benefits their crop production and benefits the agriculture department. We also had done a weed survey for Alberta Agriculture again this year. Certain types of Prohibited Noxious weeds, which under the Weed Control Act has to be eradicated immediately if found, and also a list of Noxious weeds were given to us that we had to report on. Most of the Prohibited Noxious weeds were found in old farm sites or in flower beds.

In our Vegetation Management program, we had sprayed 593 ditch miles north and west of highway #2. This is half our municipality and we rotate yearly so 2014 will see us applying herbicides south and east of highway #2. We also have a toadflax spray program, especially on the eastern part of our municipal roads, where we spot spray approximately 180 ditch miles. Other areas that need attention also get spot sprayed, especially on the half that doesn't receive a herbicide application. We also mowed all our municipal ditches once and due to the early starts, we redo the area where we started and mow until we find shorter growth. That is approximately 1300 ditch miles per year. If time permits, we also make some second passes on market roads. We have also worked with some oil companies and a couple landowners over the last few years to deal with some scentless chamomile issues and presently, they are non-existent but some seed may still be in those areas so we monitor those sites very closely.

We also have a pest and disease inspection program. For Alberta Agriculture, we do grasshopper counts and set up Bertha Armyworm traps and do counts on them. Alberta Agriculture compiles that information from all municipalities within Alberta that participate and are able to predict the next years infestations. That information is valuable to our producers and can be found on Alberta Agricultures website. The Fairview Cooperative Seed Cleaning plant will also send out our local producers cereals samples for Fusarium Head Blight with no charge to you producers as the M.D. of Fairview will pay for the testing. I believe there is a limit on how many samples each individual producer can have tested so please be aware of that. We also have completed 75 quarters of land for clubroot inspections in 2013 and have found none. Our priority areas that are checked first are areas where there may have been oilfield construction or leases built, or power line companies installing new poles or lines with contractors that are out of our area, or road building companies and bridge replacement areas also. Just remember that you as a producer have the right to have these contractors have their equipment steam cleaned prior to entering your land.

As far as problem wildlife, we find that our municipalities largest problem are coyotes. They tend to come out in full force for our cattle producers when cattle are calving. Mostly in the spring and with us having such a harsh winter with little food available to them, the ones that have survived will be out in full force. The afterbirth is usually what attracts them and if that can be moved to a distant location away from your calving area, the calves for most part will stay safe. This goes for the sheep farmer also. We do have poisons available free of charge that I can distribute, but only under legitimate circumstances. The first priority as far as you, the producer can do is be proactive on your calving techniques.

2013 has been a busy year for the Agriculture Department and have plans for a busy 2014. The Agriculture Department of the M.D. of Fairview wish you all a happy and productive New Year. We look forward to your questions and comments as we move towards the years to come.

Submitted by Fred Sawchuk, Agricultural Fieldman, M.D. of Fairview #136

SADDLE HILLS COUNTY REPORT

2013 was an extremely busy and productive year for Saddle Hills County's Agricultural Service Board. It was a year of positive changes, as we upgraded some of our equipment to help us serve the agricultural community more efficiently. The County also moved to a new facility at the junction of Highways 49 and 725, which sees both administration and public works at one central location within the county boundaries.
We had our four annual ASB breakfasts where speakers were invited to share various topics of interest with our ratepayers. Among the speakers were Calvin Yoder from Alberta Agriculture and Rural Development (AARD), Karlah Rudolph formally of the Peace Country Beef and Forage Association (PCBFA) and Bill Kingston formerly from Alberta Agriculture and Food Regulatory Services.

We also had our annual ASB BBQs over the summer, which were held in Gundy, Savanna, Blueberry Mountain and Woking. We had booths set up by Sustainable Resources Spirit River, the Fire Safety Crew out of Grande Prairie and Agriculture Financial Services Corporation (AFSC) to provide pertinent information in an accessible way for our attendees.

Throughout the year we had various delegates that came to our monthly meetings and made informative presentations on a wide variety of subjects and programs.

In February, Tom Penner, a biologist from SRD Grande Prairie, held a question and answer session with our ASB and guests from the Municipal District of Spirit River No. 133 regarding their compensation levels for elk damage to production.

Akim Omokanye from PCBFA made a verbal presentation to the ASB in March, and discussed what the organization had been doing in regards to program delivery in 2012.

A team from AARD visited Saddle Hills County for a field trip in September. The purpose of this visit was to strengthen relationships with the ASB and to fulfill recommendations made in a previous report by the Office of the Auditor General.

Saddle Hills County introduced a MRF Weed Identification System to our weed inspectors. This system is another tool that weed inspectors have at their disposal to aid them in digital data collection. The system gives the most up-to-date data on any parcel of land to help identify weeds, its abundance and land owner contact information. It also includes the technology of photographing the weeds, as well as printing out a weed report or weed notice on site.

We also upgraded our spray unit from a single mix tank unit to an injection system with a larger tank and an extended boom. This upgrade will see the liquids mixed on demand instead of in advance, which will increase the efficiency of our program.

The wet weather affected our operations during 2013. However, we were able to complete spraying and mowing by the end of September and managed to get the majority of our targeted areas. Weed control was our main focus for 2013 and will continue to be a priority for the next two to three years.

The prohibited noxious weed Orange Hark Weed was identified in three locations; two sites were completely eradicated by September, however the third site is still under surveillance and will continue to be until early spring 2014. We had over 70 per cent of our ratepayers complying with the control or total removal of noxious weeds (namely Scentless Chamomile, Canada Thistle, Tansy, Toadflax and Oxeye Daisy) from their properties. We will continue to work with them to control these noxious plants.

Saddle Hills County has participated in the Veterinary Services Incorporated program since 1998. The intent of this program is to assist producers in offsetting some of the rising costs relating to veterinarian services, as well as encourage large animal practitioners to service our area. Cattle, sheep, goat and pig producers are eligible for the VSI program. We had approximately 160 people enrolled in the program in 2013. We look forward to continuing to participate in this program in 2014.

Saddle Hills County has encountered an increase of wolf attacks on livestock and domestic animals and has put into effect a Wolf Hunt program. Producers within the County have to speak with the Agricultural Fieldman and sign a contract before hunting these predators under the program. In 2013, we had 24 people register in the program.

Saddle Hills County will continue to provide equipment for rent, as a service to our ratepayers. Our most recent addition to our inventory is a grain bag roller, which was purchased in 2013.
We look forward to providing value and solutions to our ratepayers in 2014 as we continue to build a safe, strong and sustainable county.

For more information on the Saddle Hills County ASB, contact the Manager of Rural Development, Dave Thompson, at (780) 864-3760.

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