2009 ANNUAL REPORT

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NPARA FARM: NW 32 - 90 - 23 - W5M
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The North Peace Applied Research Association is a non-profit, producer driven organization that conducts applied agricultural research, demonstration trials, research plots and extension in the County of Northern Lights.

The North Peace Applied Research Association’s mission is to serve farmers within County of Northern Lights to meet the special needs that result from our unique climatic, geographic and soil conditions. To meet these needs, NPARA conducts applied research as determined by our producer Board of Directors. Our goal is to promote soil and water conservation, agricultural production, marketing and technology transfer in the County.

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Acknowledgements

NPARA would like to acknowledge the contribution of our membership, municipal, provincial and federal governments, industry plus local and regional businesses. The success of our research and extension programs depend on the dedication of numerous individuals who contribute their expertise, time, land and equipment to assist our association in achieving its goals. Thank-you, thank-you, thank-you….

PEST SURVEY COOPERATORS: Alan Evanoff, Lanny Soroka, Bob Noble, Peace River Timothy

COMBINE OPERATOR: Bob Noble

GRAIN MARKETER: Lanny Soroka

MAJOR FUNDING AGENCIES

Agricultural Opportunity Fund (AOF)
Agricultural Research & Extension Council of Alberta (ARECA)
Alberta Agriculture & Rural Development (AARD)
Alberta Environmentally Sustainable Agriculture (AESA)
County of Northern Lights
Greencover Canada Technical Assistance Program (GCTAP)
Prairie Farm Rehabilitation Administration (PFRA)
AGRI-BUSINESSES, CORPORATE SPONSORS, LOCAL INDUSTRY & PRODUCERS

AFSC
Agritrend
Agroplow
Allflex
ATB Financial
BASF
Battle River Agricultural Society
Bayer Crop Science
Becker Underwood
Brad Nicklason
Brent Nordstrom
Brett Young
Calvin Lambert
Cargill AgHorizons, Manning
Chris Lindberg
Corns Brothers Farm Ltd, Grassy Lake
Daishowa Marubeni International
Dan Ropchan
Dave Kamieniecki
DOW AgroSciences
Dynamic Seeds, Fairview
Dupont Canada
Ed Schmidt
EFD Ventures
Farm Credit Canada
Felix Jungnitsch
Gene and Augusta Kuhn
Haney Farms, Picture Butte
Homesteaders Building Supplies
Houlder Farm Supplies
Huvenaars Seed Farms, Hays
Janet Vandemark Accounting
Joe Webber
John Russnak
Kevin Elmy, Friendly Acres, SK
Leading Edge, Manning
Linus Becher
Manning Diversified Forest Products Ltd.
Markert Seeds Ltd, Vulcan
Monsanto
North Peace Agro Service Inc.
Outback - Jerry Frank
Patricia Ford Sales Ltd.
Pioneer Seeds
Peace Farm Power
Peace Regional Economic Development Association
Pick Seeds
Reduced Tillage Linakges
Robert Frey
Sam King
Sendziak Seed Farms, Calmar
Solick Seeds Ltd, Halkirk
Stone Insurance
Toerper Tech & Precision
Tony Znak
Trevor Paulovich
UFA, Grimshaw & Manning
Venture Parts & Supplies, Manning
Viterra, Manning
Woodlot Extension Program-Doug Macaulay

PRODUCER GROUPS
Alberta Canola Producers Commission (ACPC)
Alberta Pulse Growers (APG)
Battle River Research Group (BRRG)
Grey Wooded Forage Association (GWFA)
Lakeland Agricultural Research Association (LARA)
Mackenzie Applied Research Association (MARA)
Peace Country Beef & Forage Association (PCBFA)
Smoky Applied Research and Demonstration Association (SARDA)
2009 EXTENSION ACTIVITIES

ENVIRONMENTAL FARM PLAN WORKSHOP
On January 14, 2009 NPARA, SARDA, and PCBFA hosted an EFP workshop in Peace River.

CARBON CREDIT TRADING SEMINAR
Held January 21 @ the Legion Hall in Manning with 25 participants. The seminar included presentations by Kerrianne Koehler-Munroe of the Climate Change Program and Marti Hurdal of Agri-Trend.

COST OF PRODUCTION WORKSHOP
Two workshops were held, February 11 & 12 at the NPARA office with Dale Kaliel, Economist with Alberta Agriculture discussing AgriProfit$, Business Analysis Program and CropChoice$ Computer Software.

SHELTERBELT WORKSHOP
On February 25 we had 3 guest speakers: Allan Eagle, PFRA, explained the Shelterbelt Program; Doug Macaulay, Woodlot Extension Program spoke about insect problems in shelterbelt trees and Lisa Ladd, Ladderscape Contracting & Design demonstrated pruning techniques.

MARKETING
On March 25, Dave Wong gave a presentation on Hedging, Forward Contracting and Understanding Basis; followed by some exercises in paper trading.

CERTIFIED LIVESTOCK TRANSPORT COURSE
Instructors from Fairview College conducted a day long course on March 25.

SPRING AGRICULTURAL SHOWCASE & NPARA AGM
On April 2 we held our AGM together with seminars and a trade show. Our guest speakers were:
- Holly Gelech of Biovision Labs spoke about Seed Quality Diagnostics
- Calvin Yoder, Forage Specialist, Alta Ag addressed Direct Seeding into Sod
- Arvid Aasen, Forage Specialist, discussed Annual Forages for Swath Grazing/Greenfeed
- Dave Wong, Market Specialist, Alta Ag gave a Market Update

We gave a presentation on the research we have conducted, plus as a summary of activities.

ALTERNATIVE ENERGY WORKSHOP
Held April 20 @ the Ag Hall with information sessions on:
- On-Farm Energy Assessment Program Overview & Field Efficiency with Lawrence Papworth of Alta Ag
- Micro-Generation Regulation by Andy Nikiforuk & Jeff Bell, Alberta Energy
- Wind Energy by Drennan Hallett of Golden Sheep Power, Inc
- Solar and Low Energy Winter Livestock Watering Systems with Randy Ehman, Dugout Dude

SURFACE RIGHTS INFORMATION MEETING
The meeting was held on April 16 with speakers from the Energy Resources Conservation Board; Surface Rights Board and Farmers Advocate plus a presentation from the Smoky River Surface Rights Society out of Falher.

PRUNING WORKSHOP WITH LISA LADD
An informal pruning workshop was held on April 29 at the Manning Elementary School with Lisa Ladd
of Laddscape Contracting & Design giving a hands-on demonstration of pruning various trees.

**CLASSROOM AGRICULTURE PROGRAM**

In June we participated in the CAP Program with presentations about agriculture to the Grade 4 classes at both Rosary and Manning Elementary Schools.

**AGROWPLOW DEMONSTRATION**

On May 26, Graeme Finn of Agrowplow demonstrated ‘non-inversion tillage’ at our research farm on an established smooth bromegrass stand plus on annual crop land.

**ANNUAL FIELD DAY & CROP TOUR**

Our annual field day was held on July 29 at the NPARA Research farm with a tour of the plots plus presentations by Jeff Millang, Ag Economist with Alberta Agriculture discussing AgriProfit$ and Claus Toerper of Toerper Tech & Precision speaking on Variable Rate Fertility.

**PEACE AGROFORESTRY TOUR**

On August 12 we hosted Ag Canada (formerly PFRA) staff of their Agroforestry Branch from the Peace plus Melville and Indian Head, Saskatchewan and conducted tours of the Agroforestry Project at Murdoch Lake; Shelterbelt project at the research farm and the Gurtler Agroforestry project.

**PASTURE WALKS**

(1) Fifteen producers toured Trevor Kershbaumer’s pastures at Dixonville on August 14 to observe the ‘mob grazing’ that Trevor is practicing. Rancher, Jack Olsen from southern Alberta was also in attendance and discussed pasture management and grazing techniques.

(2) Grant Lastiwka, Grazing/Forage/Beef Specialist with Alberta Agriculture conducted a Pasture Walk on August 25 on Kelly Broadhead’s pasture at Keg River.

**MURDOCH LAKE TOUR**

On September 30 we conducted a tour for a group from Agriculture and Agri-Food Canada, including the Assistant Deputy Minister and other staff from eastern Canada plus directors from Calgary.

**PLANNING YOUR WINTER FEEDING PROGRAM & BEEF INDUSTRY UPDATE**

NPARA organized a series of workshops around the Peace in the fall of 2009. In Manning the workshop featured: Planning Your Winter Feeding Program & Rations by Freeman Iwasiuk, Alta Ag; Livestock Identification and Commerce Act by Chad Vander Meer & Karl Sorensen; Verified Beef Production, Age Verification and Growing Forward updates by Amber Havens of CCIA and an overview of the CPIP insurance
program by Judi McCracken of AFSC.

**WATER QUALITY WORKSHOPS**
Two workshops were held on November 24 at Keg River during the day and at the Warrensville Hall in the evening. Topics and presentations: Growing Forward & Water by Wendi Dehod, Water Engineer, Alta Ag; Reducing Your Environmental Impact and Fostering Neighbor Relations by Doug Beddome, NRCB; Randy Ehman, The Dugout Dude discussed Treating Water Sources and Livestock Watering Systems and Nadine Newman, Environmental Health Services, Peace Country Health spoke on In-house Water Treatment Options & Water Testing.

**BEEF MARKETING: OPPORTUNITIES & STRATEGIES SEMINAR**
This regional workshop was held in Fairview with keynote speaker Anne Dunford of Gateway Livestock Exchange. There were also presentations by Bruce Viney, Alta Ag Risk Management Specialist on Assessing Feeding and Retained Ownership Opportunities plus AFSC on their Cattle Price Insurance Program.

**NEWSLETTERS**
We published and distributed 2 newsletters within the County. Plus we published a Regional Newsletter in collaboration with the other Applied Research and Forage Associations in the Peace which was sent to every rural mailbox in the Peace.

**STOCKPILED GRAZING PROJECT**
We continued with the province wide project, assessing quantity and yield of stockpiled forages. Samples were taken summer and fall of 2008 and winter and spring of 2009.

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**2009 PRECIPITATION LEVELS AT NPARA FARM**

![Graph showing precipitation levels for May to September 2009](image)

May 3.0, June 1.5, July 1.0, August 0.5, September 1.0
EARTHQUAKE MONITORING RESEARCH

Partner: University of Calgary

This research project by the University of Calgary, in co-operation with the ERCB/Alberta Geological Survey, is intended to monitor seismic activity caused by tiny earthquakes and human-induced vibrations in Alberta. The equipment will also help to study deep regions of the Earth, using techniques akin to medical ultrasound imaging. A set of 9 seismographs (earthquake monitoring devices) will be installed at different locations across the province from Medicine Hat to the Northwest Territories. The duration of this project is intended to last a minimum of 3 years.

Earthquakes are currently monitored by the Geological Survey of Canada, but numerous small events are missed due to the sparse seismograph station coverage. Although large events are rare, such as the 2001 magnitude 5.4 event near Dawson Creek, it is important to have an accurate earthquake hazard model to help guide current and future development of critical infrastructure. Project lead, Dave Eaton, professor of Geophysics and Head of the Department of Geoscience, University of Calgary states that the goal of the project is to improve the understanding of the causes and consequences of poorly-understood earthquakes that occur in the interior of a tectonic plate. Furthermore, he feels that it will help monitor tremors that may be caused by the impacts of oil and gas activity in the province such as enhanced recovery of heavy oil by steam injection, and better understand the potential seismic effects of underground CO₂ storage. It will also help to unravel the deep geology - up to hundreds of kilometres - beneath the surface, which can help to guide diamond exploration. Eaton says that some past studies have noted possible links between oil and gas production and a small series of earthquakes, known as earthquake swarms, near Fort St. John and Rocky Mountain House.

In October of 2009, a seismograph station was installed at the NPARA research farm. The station consists of a buried seismometer (which measures ground motion), a digital seismograph (which converts data to a format understood by a computer), internet communication and power subsystems. The equipment operates passively to record background vibrations.

The information gathered at these stations will be sent over the Internet to the Geological Survey of Canada and people can access the data from all over the world. They will also be able to measure the earthquakes that happen all around the world. This statement was put to the test in January of 2010 and despite being 1000’s of kilometres away from the epicentre, the seismograph station at the NPARA farm recorded the waves generated by the devastating magnitude 7 earthquake in Haiti on January 12, 2010. Go to this website and check it out: www.ucalgary.ca/geoscience/January_2010
ALBERTA PEST MONITORING NETWORK

Partners: Agriculture Research & Extension Council of Alberta, Alberta Agriculture, University of Alberta, Agriculture & Agri-Food Canada, Alberta Research Council

Through network surveys and mapping, insect outbreaks across Alberta are identified and provide an early warning for prevention and control of insect pests. Transfer of information on pests and control measures allows producers to implement effective integrated pest management (IPM) reducing crop damage and their costs. Pest monitoring is a cornerstone for an effective Integrated Pest Management system, allowing pest outbreaks to be predicted and their progress historically tracked. This system results in a well prepared industry that is able to manage risk and reduce crop losses. It also enables everyone to work toward a more integrated approach to pest management, reducing the impact on the environment.

Eight insects were monitored across Alberta in 2009, all of which have the potential to cause significant economic impact. NPARA participated in the provincial pest surveys of wire worms, diamondback moths and bertha army worms. Traps were installed on fields of Al Evanoff and Peace River Timothy Inc.

Wireworm: Although the plan was to sample for wireworm, the funding came too late for an effective program to be implemented. However, NPARA and one other ARA put out traps in a total of 7 locations. No wireworms were found although several samples were submitted.

Diamondback moth: A consortium of cooperators maintained 22 trapping sites across Alberta. Diamond back moth numbers were very low early in the season in 2009 but numbers increased towards the end of the growing season in some areas. A new mapping system was created through Roping the Web in 2009. Diamond back moth rarely overwinters in western Canada so major outbreaks are often the result of migrations from United States and warm dry conditions that allow multiple generations to develop.

Bertha armyworm: again a consortium making up the 91 sites being monitored. The data collection and mapping system set up in 2008 seemed to work very well with very few problems. The moth catches were very low throughout the province. Cumulative moth counts in traps during June and July of 2009 help determine the level of risk for August. The results from 2008 suggest that bertha armyworm is a low part of the cycle.

Producers are encouraged to visit Alberta Agriculture's website for full information on insect forecasts and to continue to monitor the website for updates, information and maps as the 2010 growing season progresses. The maps are easy to use and during the growing season are updated in real time, giving Alberta producers access to the most current information possible. Forecast maps have been posted to the website and can be viewed and downloaded by visiting: www.rtw.ca/621
SHELTERBELT TREE PROJECT

Partners: Greencover Canada/Alberta Technical Assistance Program, Agriculture & Agri-Food Canada - Prairie Farm Rehabilitation Administration Shelterbelt Centre, Bowden Nurseries, Alberta Agriculture, Sinorefor Products Inc, Tree World Plant Care Products Inc.

PART A: SURVIVAL AND GROWTH RATE

Background:
Trials conducted by Agriculture and Agri-Food Canada’s (AAFC) Shelterbelt Center have illustrated the benefits of yard shelterbelts for reducing home heating costs. Research comparisons found that homes on sites protected by shelterbelts have a reduction in fuel use by 18-25%. Field shelterbelts will reduce wind and soil erosion and increase snow retention resulting in increased soil moisture. Shelterbelts also provide habitat for diversification of wildlife, encouraging nesting sites and hunting habitat for raptors (birds of prey) which will help control agricultural pests. Additional benefits include wood for fuel and depending on the species of tree, fruits for human consumption.

There are 25 species of trees and shrubs available through the PFRA Prairie Shelterbelt Program and many more from privately owned nurseries. Every year rural landowners order trees from the PFRA Shelterbelt Center for planting on their land. Careful consideration is required to select the appropriate species for each shelterbelt design and planting site. A lot of work goes into planning, planting and maintaining a shelterbelt, so knowing what species grow well in this area is helpful.

Objectives:
+ Establish a site featuring trees available for shelterbelt plantings using recommended spacing and design
+ Determine survival rates, winter hardiness and growth rates of trees commonly used in shelterbelts
+ Demonstrate the use of plastic mulch

Materials and Methods:
The shelterbelt project was initiated in 2007 with 14 varieties of trees planted. More trees were planted in 2008 and 2009 bringing the total to over 1300 trees featuring 45 varieties. Twenty-two varieties were obtained through the PFRA Shelterbelt Tree Program and 23 varieties were generously
donated by Alberta Nurseries in Bowden. Plastic mulch was used throughout the project - applied after the trees were planted - and Sheep’s fescue was broadcast seeded between the tree rows. Tree heights and survival rates were recorded in September 2007, September 2008 and October 2009. Survival rates and average heights will continue to be measured annually in the fall. Each spring any dead trees are replaced, depending on availability of stock.

**Results and Discussion:**
In 2009 Cherminsina willow were planted in the spring but none survived. Herbicide drift that occurred in the spring of 2008, had a detrimental effect on the survival and growth rates of the Saskatoon, Blueberry, Cranberry, Raspberry, Chokecherry and Pin cherry stock. The charts below show the growth rates of all the varieties planted. Negative values are due to ungulate damage and mortality.
PART B: UNGULATE DETERRENT PROJECT

Objective:
Assess the effectiveness of the different products available on the market to protect trees from ungulate damage.

NPARA shelterbelt August 2008; plastic tube shelters were installed on trees as part of the ungulate deterrent demonstration.

Materials and Methods:
In August 2008 five types of plastic shelters were installed in a randomized pattern on five poplar tree varieties. The shelters used were Tubex, Bluex, Rigid Diamond mesh, Protex Pro/Gro solid tube, and Sinocast Treecone. Rebar and zip-ties were used to support the shelters. In September 2008 three types of spray-on products, Tree Guard, Plantskydd, and Deer Away – Big Game Repellent, were applied to the poplar trees, as well as garlic probes and Irish Spring soap were hung on the tree branches. In each poplar row there were 2 replications of each product plus trees left untreated for a check.

The goal of these products is to minimize ungulate damage to the shelterbelt trees. The focus of the demonstration was on the Katepwa, Walker, Assiniboine, Okanese and Hill poplar. Deterrents were also installed on other varieties of trees to minimize browsing but no data was collected. The trees were assessed for ungulate damage, using a rating scale developed by Doug Macaulay, Woodlot Extension Specialist, Alberta Agriculture in December 2008 and January 2009 with the final assessment done in April 2009.

Ungulate Deterrent Damage Rating System:
1 – No Damage: Tree is in good condition with no breakage caused by ungulates.
2 – Minor Damage: Light damage or breakage to lateral or terminal branches or stem. Likelihood of the tree recovering without human intervention is excellent.
3 – Major Damage: Severe damage to stem, terminal or lateral branches. Likelihood of the tree recovering without human intervention is good.
4 – Decimated: Entire tree removed or broken off or severe damage to majority of tree. Likelihood of the tree recovering without human intervention is poor.
Results and Discussion:
The assessments revealed that the physical shelters were the most effective with the Tubex, Bluex, and Protex Pro/Gro tube shelters all exhibiting 100% effectiveness (based on all 10 trees in the treatment receiving a rating of 1). The Rigid Diamond mesh and Sinocast Treecone physical shelters were slightly less effective than the other three types of physical shelter, but still better than no shelter at all. The shelters are recommended for use on seedling trees and our poplar trees were two years old when the shelters were installed. With the Rigid Diamond mesh and Sinocast Treecone being only 36” tall compared to the Tubex, Bluex and Protex Pro/Gro tube shelters at 54” tall, more of the tree was exposed to the ungulates and this is probably why there was a slight reduction in effectiveness compared to the other physical shelters.

(Left) Irish Spring soap that was pulled off the tree; this happened to two trees causing the leaves to be stripped off. (Right) NPARA shelterbelt; ungulate deterrent demonstration in January 2009.

The spray-on products, Tree Guard, Plantskydd, and Deer Away, Irish Spring soap and the garlic repellent sticks were not considered to be effective. These products did not reduce the amount of damage to the tree compared to the control group. There are several reasons the spray-on products may have exhibited such a low rate of success: time of application, weather conditions during application, the amount of product used in application and over the course of the trial, the product was not reapplied. We will continue to test the effectiveness of the spray-on products.
Descriptions of Ungulate Deterrents Used

**Rigid Diamond Mesh Seedling Protector Tubes - 4” x 36”, 250 Pack is $115.90**
These yellow shelters are constructed of tough yet flexible UV inhibited polyethylene and polypropylene material. The diamond mesh tubes protect young seedlings from nibbling intruders for up to five years. They also allow young seedlings to grow and then slowly photodegrade once seedlings have grown to a point of establishment. Stakes should be used to support the shelters.

**Protex Pro/Gro Solid Tube Tree Protectors - 4” x 60” Solid Tube is $2.45 each**
Each tube speeds up photosynthesis by trapping moisture thereby raising relative humidity and ambient temperature inside the tube. They also protect the tree from animals, wind desiccation, small rodents and insects. The diameter around the tree may be expanded by linking two or more of the tubes using the easy latch tabs. Stakes should be used to support the shelters.

**Blue-X Tree Shelters - 3” x 54”, 100 Pack is $156.90**
This patented two-piece construction creates a beneficial microclimate to aid in seedling survival. Comprised of a single sheet of blue plastic film, which is inserted into a blue-tinted poly sleeve, producing amplified blue light to increase beneficial photosynthetically active radiation and boost tree diameter growth. In addition, these shelters block a significant amount of harmful UV light. The shelters have an outdoor life of 5 years. Stakes should be used to support the shelters.

**Tubex Tree Shelters - 5’ Tube, 5 Pack is $23.90**
These twin-walled, green translucent tubes provide a protected, growth-friendly environment for tree seedlings. Offers protection from animals, wind and chemical sprays, as well as providing a greenhouse environment promoting seedling growth and reducing plant stress. These shelters are designed with laser-line perforations which are supposed to split to prevent fast growing trees from being constricted. Stakes should be used to support the shelters, and the shelters come with releasable cable ties for easy installation.

**Deer-Away Big Game Repellent - 1 Gal Kit is $20.90**
This is a liquid product that is sprayed onto the trees. It repels deer and elk away from conifer seedlings, ornamentals, and fruit trees, by odor and taste and is effective for eight to ten weeks. The active ingredient is inedible egg solids.

**Tree Guard Deer Repellent - 1 Quart is $15.25**
This is another liquid product that is sprayed onto the trees. It contains a bitter substance, Bitrex, as well as an agent that allows deer to detect the treatment. It is rain resistant.

**Plant Pro-Tec Garlic Repellent Sticks - Pack of 250 is $79.90**
These unique sticks, which clip onto tree branches, are made of garlic oil and a pinch of chili pepper to keep animals from browsing on tree seedlings. They have approximately a 6 to 8 month active life and photodegrade in 24 months.

> The above products were ordered from the US, the prices listed are in US funds and do not include shipping and handling. A broker was required to move the products across the border; the fee for this was approximately $175.00 plus GST.

**Sinocast (Donated)**
The company that markets these shelters is located in the Vancouver area and they are a major supplier to the forestry industry in B.C. These white, pyramid shaped shelters provide protection.
against browsing and produce a greenhouse-like microclimate for accelerated growth. The flapped bottoms accommodate different terrains, and the flared tops reduce wind-induced abrasive damage to shoots. Theses shelters are reusable. Stakes should be used to support the shelters, and the shelters come with releasable cable ties for easy installation.

**Plantskydd Animal Repellent (Donated)**

This is a water soluble powder concentrate that is applied by spraying onto the trees. It provides organic protection against deer, rabbits, and elk. The rain resistant formula also acts as a foliar fertilizer. Protection lasts up to 6 months.

**Bamboo Stakes (Donated)**

The bamboo stakes were inserted next to the tree. The bamboo stake has the potential of preventing ungulates from grazing the tree by acting as a physical barrier.

**Irish Spring Soap - 6 Pack is $5.39**

Odor of this soap repels deer and other animals. Pieces of soap were suspended in stockings and tied to tree branches no more than six feet above the ground, and no more than three feet apart. The soap will last approximately four months.

This project has now concluded and we have extra shelters and spray on products. If you wish to try any of these, please contact us.

**PART C: FALL VS. SPRING PLANTING COMPARISON**

**Objectives:**

Compare the growth and survival rate of trees planted in the fall vs. in the spring.

**Materials and Methods:**

In September 2008 plastic mulch was laid down and in late October, 50 hybrid poplar were planted. On May 4, 2009, another 50 hybrid poplar were planted. Survival and growth rates will be measured on an annual basis.

NPARA and PFRA employees fall planting a hybrid poplar mix.
WHEAT VARIETY DEMONSTRATION

Seed donations from: Ed Schmidt, Dave Kamieniecki, Trevor Paulovich, Lanny Soroka, John Russnak, Tony Znak, Chris Lindberg, Markert Seeds Ltd, Brent Nordstrom, Sendziak Seed Farms

Objectives:
- To establish a side-by-side demonstration of 13 wheat varieties.
- Obtain harvest data to compare yield, protein, and grade.

Materials and Methods:
The varieties of wheat used in the demonstration:

<table>
<thead>
<tr>
<th>Canada Prairie Spring (CPS)</th>
<th>Soft White Spring Wheat (SWSW)</th>
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<tbody>
<tr>
<td>AC Crystal</td>
<td>AC Andrew</td>
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<tr>
<td>AC Foremost</td>
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<td>5700 PR</td>
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<th>Hard White Spring Wheat (HWSW)</th>
<th>Hard Red Spring Wheat (HRSW)</th>
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<td>Snowstar</td>
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<td>Journey</td>
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<td></td>
<td>Superb</td>
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<td>AC Intrepid</td>
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<td></td>
<td>Alikat</td>
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<td></td>
<td>Harvest</td>
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<td></td>
<td>AC Splendor</td>
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</tbody>
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The varieties were seeded on May 14 & 15, 2009 in 0.1 acre plots. Seeding rates were calculated using 1000 kernel weights. Fertilizer was applied as per soil tests at 50 lb/ac of 11-52-0 and 120 lb/ac of 46-0-0. The plot was sprayed in-crop on June 8 with a tank mix of Frontline A & B and Lontrel. No pre-burn was applied this spring because there was a fall application of glyphosate and with the cool spring, weeds were slow to emerge.

The wheat varieties were harvested on September 18, 2009, using a John Deere 6600 combine, and samples were collected and submitted to Viterra for grade and protein assessments.
VARIETAL DESCRIPTIONS

HARD RED

PRODIGY - has high yield potential (9% over Neepawa), high protein (1% over Katepwa and McKenzie), high test weight, awned, strong straw, and resistant to leaf and stem rust and bunt. It is 2 days later maturing than Neepawa, slightly taller than Neepawa, and moderately susceptible to loose smut.

JOURNEY - has high grain yield, test weight, and protein +0.6%. Journey has strong straw and reduced height. It is resistant to rust and bunt. Moderate resistance to Fusarium head blight, loose smut, common root rot and leaf spot with improved pre-harvest sprouting resistance. It matures 1 day earlier than AC Barrie.

SUPERB - Registered in 2000, this awned hard red spring wheat has large kernel weight, high test weight, high grain yield (20% over Neepawa and 1-2% over McKenzie), shorter straw with better lodging resistance. It is resistant to leaf stem rust, moderately resistant to bunt, loose smut and root rot. However, it is late maturing.

AC INTREPID - matures 2 days earlier than Neepawa and Katepwa and with maturity similar to Roblin. It is shorter than Neepawa, Katepwa and AC Majestic with lodging resistance similar to AC Majestic. It had a higher test weight than Neepawa, Katepwa and AC Majestic. with good resistance to stem and leaf rust and bunt, and has fair resistance to loose smut.

ALIKAT - This variety is suited to acidic soil conditions where aluminum tolerance is required. Similar to Neepawa for most agronomic traits, but slightly shorter with an improved test weight. Susceptible to bunt. More susceptible to stem and leaf rust than Roblin and AC Splendor.

HARVEST - Hard red spring wheat registered in 2004. It is higher yielding than AC Barrie by 5% but lower than Superb. Matures earlier than Superb and similar to AC Barrie. Moderately resistant to leaf rust and bunt. Resistant to stem rust and loose smut. Susceptible to Fusarium head blight. Fair lodging resistance, similar to Katepwa.

AC SPLendor - matures 3 days earlier than Neepawa and Katepwa. It is shorter than Neepawa and Katepwa and taller than Roblin. It has a test weight similar to Neepawa and slightly lower than Katepwa and AC Majestic. It has good resistance to stem and leaf rust, and bunt, and has fair resistance to loose smut.

HARD WHITE

AC SNOWBIRD - 3% yield over AC Barrie, better lodging resistance than McKenzie, resistant to leaf rust, with moderate resistance to stem rust, loose smut and root rot. Maturity is similar to AC Barrie (1 day later than McKenzie), small kernel size and medium test weight.

SNOWSTAR - an awnless variety. When compared to Snowbird: Grain yield is 99% of Snowbird, maturity is one day earlier, it is 10 cm shorter, has a better pre-harvest sprouting score, and a higher test weight. Good leaf and stem rust resistance. Fusarium head blight resistance is similar to Snowbird and better than Superb and CDC Teal. Is susceptible to loose smut and common bunt.
SOFT WHITE

**AC ANDREW** - yields about 35% more than AC Barrie. AC Andrew is a lower quality high protein wheat, which is much higher yielding (15-19%) than regular low protein SWS wheat. It is resistant to stem rust, powdery mildew, with moderate resistance to leaf rust and black point. Good lodging and shattering ratings. It is susceptible to loose smut.

**CANADA PRAIRIE SPRING**

**AC CRYSTAL** - matures 1 day later than AC Foremost and similar to AC Taber, and yields similarly to AC Taber. It has short straw which is slightly stronger than AC Taber and has very good lodging resistance. It has a heavier test weight than AC Foremost and a similar weight as AC Karma. AC Crystal has improved Fusarium head blight tolerance, but is susceptible to the new loose smut race T9.

**5700PR** - yields 3% above AC Crystal, has high test weight, very good lodging resistance and matures one day earlier than AC Crystal. Moderate resistance to stem rust, intermediate resistance to leaf rust and very good resistance to common bunt.

**AC FOREMOST** - Similar to Biggar but resistant to loose smut and bunt. Has an improved sprouting resistance and is earlier maturing than AC Taber. Susceptible to common root rot and is late maturing.

**Results and Discussion:**

*Please note that this was a demonstration only, not a replicated trial - refer to the 2010 Alberta Seed Guide for the Regional Variety Trial results. There is also a new interactive website, Grain Varieties for Alberta and British Columbia 2010: [www.abbcvarinfo.com/](http://www.abbcvarinfo.com/)*

Prodigy and Superb yielded the highest of the Hard Red wheat varieties with 5700 PR, a CPS variety yielding the highest overall. Yields of the Hard Red Spring varieties ranged from 30-44 bu/ac, the Canada Prairie Spring varieties ranged from 36-50 bu/ac, the Hard White Spring ranged from 33-36 bu/ac and the Soft White yielded 45 bu/ac. Harvest had the highest protein content of the Hard Red varieties and the overall highest protein at 14.8% with Splendor running a close second at 14.7%.

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>PROTEIN</th>
<th>GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alikat</td>
<td>13.7</td>
<td>#3</td>
</tr>
<tr>
<td>Harvest</td>
<td>14.8</td>
<td>#2</td>
</tr>
<tr>
<td>Intrepid</td>
<td>13.5</td>
<td>#3</td>
</tr>
<tr>
<td>Journey</td>
<td>14.3</td>
<td>#3</td>
</tr>
<tr>
<td>Prodigy</td>
<td>14.4</td>
<td>#2</td>
</tr>
<tr>
<td>Splendor</td>
<td>14.7</td>
<td>#3</td>
</tr>
<tr>
<td>Superb</td>
<td>13.4</td>
<td>#3</td>
</tr>
<tr>
<td>Snowbird</td>
<td>12.2</td>
<td>#2</td>
</tr>
<tr>
<td>Snowstar</td>
<td>12.2</td>
<td>#1</td>
</tr>
<tr>
<td>Andrew</td>
<td>10.5</td>
<td>#3</td>
</tr>
<tr>
<td>5700</td>
<td>11.1</td>
<td>1CPS(R)</td>
</tr>
<tr>
<td>Crystal</td>
<td>12.4</td>
<td>2CPS(R)</td>
</tr>
<tr>
<td>Foremost</td>
<td>12.2</td>
<td>2CPS(R)</td>
</tr>
</tbody>
</table>
BARLEY VARIETY DEMONSTRATION
Seed Donations from Dave Kamieniecki, Felix Jungraith, Robert Frey, Sam king, Gene Kuhn, Calvin Lambert

Objectives:
To establish a side-by-side demonstration of 7 barley varieties:

- Dolly
- CDC Thompson
- Conlon
- Cowboy
- Ponoka
- Sundre
- Xena

Materials and Methods:
The barley was seeded on June 1 with the Seed Hawk zero-till drill at a depth of 1”. Fertility included 145 lb/ac of 46-0-0 and 50 lb/ac of 11-52-0-0. The varieties were sprayed in-crop with a tank mix of Frontline A @ 40 mL/ac & B @ 280 mL/ac and Lonrel @ 85 mL/ac on June 8. The barley varieties were harvested on September 14, 2009 with the John Deere 6600 combine.

Varietal Descriptions:
SUNDRE - 6 row feed barley with smooth awns. Overall yields are comparable to AC Rosser and 5% greater than AC Lacombe. Has higher test weight and percent plump seed compared to Rosser and Lacombe. Resistant to scald covered smut and false loose smut. Susceptible to septoria, loose smut, net form of net blotch and common root rot. Good lodging resistance.

XENA - 2 row rough awn feed barley. High yielding (5-10% over CDC Dolly), good lodging resistance, and high percentage plump grain. Resistant to common root rot. Moderate resistance to surface borne smuts. One day later maturing and slightly lower test weight than CDC Dolly. Susceptible to loose smut, scald, and net-form of net blotch.

PONOKA - 2 row feed barley with rough awns. Grain yields are 8% higher than CDC Dolly and 12% higher in the black/grey soil zone. Silage yields are comparable to Lacombe. Matures about three days later than Dolly with good lodging resistance. Is resistant to loose smut and surface born smuts. Has moderate resistance to the net-form of net blotch, spot blotch and scald.

CONLON - smooth awn 2 row general purpose barley maturing one day earlier than Harrington. Has good lodging resistance, high test weight, kernel weight, and percent plump. Is resistant to common root rot and stem rust, but susceptible to septoria, scald and spot blotch.

CDC DOLLY - 2 row feed barley with rough awns. Has high test weight and superior plumpness. Maturity is about one day later than Harrington. It is resistant to surface borne smuts, with moderate resistance to scald and common root rot. Is susceptible to net blotch, septoria, and loose smut and has only fair resistance to lodging.
**CDC COWBOY** - 2 row rough awn forage barley. It has high forage dry matter yield potential in non scald areas. Plump grain with high test weight and kernel weight. It is resistant to stem rust, covered and false loose smuts and moderately resistant to net blotch. Is susceptible to spot blotch, barley yellow dwarf and loose smut. Has lower grain yield than Lacombe but similar good lodging resistance.

**CDC THOMPSON** - 2 row semi-dwarf feed barley with rough awns. Has good yields in high productivity conditions. Disease resistance is similar to Manley, except it is moderately resistant to scald. Low yielding in stress environments

**Results and Discussion:**
As can be seen in the yield chart below, Ponoka barley had the highest yield overall, with Conlon yielding the second highest and Sundre and Xena next in line for yield. With the dry year, Thompson was extremely short, making it difficult to harvest.

![Figure 1: 2009 barley yields](image)

Please note that this was a demonstration only, not a replicated trial - please refer to the 2010 Alberta Seed Guide for the Regional Variety Trial results. There is also a new interactive website, Grain Varieties for Alberta and British Columbia 2010: [www.abbcvarinfo.com](http://www.abbcvarinfo.com/)
PULSE VARIETY DEMONSTRATION

Partners: Alberta Pulse Growers

Seed Donations from Trevor Paulovich, Ed Schmidt, Chris Lindberg, Linus Becher, Spruce Vista Seed Farm, SARDA

Objectives:
- To compare different varieties of field peas
- To promote the use of field peas for crop rotations and increase awareness about variety options

Methods & Materials:
The demonstration plot was seeded on May 15, 2009 using the zero-till Seed Hawk drill. The demonstration plots measured 17.8’ x 200’. Seeding depth was 1 ½” and the seeding rates were determined using 1000 kernel weight (refer to Table 1).

Fertility included N-Prove inoculant and 50 lb/ac of 11-52-0-0. The plot was sprayed with Odyssey at 17 g/ac on June 8 at the 3-4 node stage.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Seeding Rate (lb/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meadow</td>
<td>194</td>
</tr>
<tr>
<td>Midas</td>
<td>194</td>
</tr>
<tr>
<td>Agassiz</td>
<td>221</td>
</tr>
<tr>
<td>Miami</td>
<td>221</td>
</tr>
<tr>
<td>Thunderbird</td>
<td>198</td>
</tr>
<tr>
<td>Cutlass</td>
<td>208</td>
</tr>
<tr>
<td>Cooper</td>
<td>274</td>
</tr>
<tr>
<td>Nitouche</td>
<td>274</td>
</tr>
</tbody>
</table>

VARIETAL DESCRIPTIONS

Cooper - a semi-leafless green field pea with large seed size. It yields 2% lower than Nitouche and is a medium maturing cultivar. Has good lodging resistance with very good resistance to powdery mildew and fair resistance to Mycosphaerella and Fusarium blight diseases. Has good resistance to seed coat breakage and green color bleaching.

Nitouche - a semi-leafless green field pea with a medium seed size. Is a medium maturing cultivar with slightly less resistance to lodging compared to Cooper. Good resistance to seed coat breakage and green color bleaching. Is susceptible to powdery mildew, Mycosphaerella and Fusarium blight diseases.

Agassiz - a yellow field pea with very good resistance to seed coat dimpling and powdery mildew. Fair
resistance to Mycosphaerella blight and Fusarium wilt diseases. Good lodging resistance.

**CDC Meadow** - semi-leafless yellow field pea with a medium seed size. Is taller than Cutlass. Good resistance to seed coat breakage and lodging. Yields 13% higher than Cutlass. Early maturing. Very good resistance to powdery mildew and fair resistance to Mycosphaerella blight and Fusarium wilt.

**Cutlass** - an early maturing, semi-leafless yellow field pea with a medium seed size. Good resistance to seed coat breakage and fair resistance to lodging. Very good resistance to powdery mildew and fair resistance to Mycosphaerella blight and Fusarium wilt.

**Miami** - an early maturing, semi-leafless yellow field pea with a large seed size. Good resistance to seed coat breakage. Yields 8% higher than Carrera. Susceptible to powdery mildew.

**Midas** - a yellow field pea with good lodging resistance. Good resistance to seed coat breakage and dimpling. Very good resistance to powdery mildew. Susceptible to Mycosphaerella blight.

**Thunderbird** - a medium maturing, semi-leafless yellow field pea with a medium seed size. Excellent resistance to lodging. Yields 1% lower than Cutlass. Resistant to powdery mildew. Moderately susceptible to Mycosphaerella blight and Fusarium wilt. Very good resistance to seed coat dimpling.

**Results & Discussion**

Field peas are poor competitors which was very evident this year. With the cool, late spring, weed emergence was late and, although the plot was sprayed once, a second flush of weeds emerged and the weed population was abundant. The plots were straight combined on September 14, 2009 with a John Deere 6600 combine.

Due to poor site selection, growth of the varieties at one end of the plot were adversely affected making the yield data unreliable. Under the growth conditions, the green field peas (Cutlass, Cooper and Nitouche) out yielded the yellow field peas. Cooper and Nitouche both had higher yields than Cutlass. Miami had the highest yield of the yellow peas with Meadow and Midas having the lowest yields, however, site selection had a negative impact on the yields. These plots did not emerge evenly and had overall poor stand establishment which was reflected by the lower yields. The Agassiz plot may have also been affected by the poor site. The field peas were not submitted for grading.

Please note that this was a demonstration only, not a replicated trial - please refer to the 2010 Alberta Seed Guide for the Regional Variety Trial results. There is also a new interactive website, Grain Varieties for Alberta and British Columbia 2010: [www.abbcvarinfo.com/](http://www.abbcvarinfo.com/)
Background:
Excerpt from AGROWPLOW brochure:
“Traditional cultivation and sowing techniques, which require soil to be ploughed and cultivated before sowing, have caused erosion by wind, and rain and severe break down of soil structure. Continual passes of the tractor and deterioration of the soil structure have also formed compacted layers below the soil surface. Non-inversion tillage lifts and shatters hard soil pans without soil inversion. The task is accomplished with minimum soil disturbance ensuring that precious top soil is left on the surface and minimal moisture is lost to the atmosphere. Top soil is not mixed with less fertile sub-soils or less fertile sub-soils mixed with fertile top soil. The top soil remains virtually undisturbed and is less susceptible to wind and water erosion than conventionally cultivated soils. This unique ability of root bed renovation improves water infiltration, humus levels, soil structure and sustainable productivity. Root development is enhanced by an unrestrictive soil environment.”

Objectives:
• To evaluate the effect of sub-soiling at different depths on crop yields

Materials and Methods:
On May 26 Graeme Finn with AGROWPLOW sub-soiled a plot sized area on annual crop land at three different depths. Sub-soiling left the area very rough so it had to be cultivated and harrowed prior to seeding. Ideally sub-soiling should be done later in the year.

Cowboy barley was seeded at a rate of 135 lb/ac on June 3 with 145 lb/ac of 46-0-0 and 50 lb/ac of 11-52-0. The plot was sprayed at flag leaf on July 10 with MCPA Na-Salt @ 750 mL/ac.

Results and Discussion:
The barley yields were less than average due to dry conditions. The sub-soiling did not show any benefit in terms of yield response in the first year of cropping. However, we will continue to crop this area and monitor yields to determine if there are long term benefits to sub-soiling.
A COMPARISON OF SOYBEANS & FABABEANS TO FIELD PEAS

Partners: Alberta Pulse Growers

Cooperators: Battle River Research Group (BRRG), Lakeland Agricultural Research Association (LARA), Mackenzie Applied Research Association (MARA), Peace Agricultural Research and Demonstration Association (PARDA).

Background:
Several factors have encouraged increased acreage of pulse crops on the Canadian Prairies: reduced summer fallow acreage; longer crop rotations; continuous cropping; direct seeding; the nitrogen-fixing ability of pulses; and improved control of disease and weeds through better rotations. Pulse production increases will likely continue as farmers improve their knowledge of pulse production and continue to include pulses in sustainable crop rotations. Pulses can give significant benefits to succeeding crops. They provide a nitrogen benefit that can replace 10 to 15 kg of nitrogen per hectare. They also provide an additional benefit, which is usually larger than the nitrogen benefit, by reducing weed and disease problems and improving soil tilth (Pulse Crops in Alberta, 1999). This project demonstrates the use of several different pulse crops which may be used in crop rotations.

With increasingly high fertilizer prices; interest may increase in fababean, as it has the highest nitrogen fixing potential of Alberta pulse crops. Soybeans are gaining popularity in the eastern prairies and producers in Alberta are interested in seeing how early maturing varieties do here. This project will be a valuable extension tool for demonstrating how other pulse crops compare to field peas in terms of production risk, economic risk, and how they fit into a crop rotation.

Objectives:
- To evaluate the adaptation of fababean in different regions across Alberta
- To evaluate maturity of soybeans in northern Alberta
- To provide relevant pulse agronomy information

Materials and Methods for plots at NPARA:
The site for this plot was seeded to wheat in 2008 and received a post-harvest application of glyphosate in the fall of 2008. The demonstration plots were seeded with a zero-till Seed Hawk drill, the plots measured 17.8’ x 50’. Appropriate inoculants were applied as per product directions for the pulse crops. Odyssey was sprayed in-crop on June 8 at a rate of 17 g/ac on the peas and fababean. Transorb Round-up was back-pack sprayed on June 8 on the soybeans and canola. The plots were harvested on September 14, 2009 with a John Deere 6600 combine.

Table 1. Seeding information 2009

<table>
<thead>
<tr>
<th>SEEDING DATE</th>
<th>CROP</th>
<th>SEEDING RATE</th>
<th>DEPTH</th>
<th>FERTILIZER</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 11</td>
<td>Snowbird Fababean</td>
<td>235 lb/ac</td>
<td>3”</td>
<td>11-52-0-0 @ 50 lb/ac</td>
</tr>
<tr>
<td>May 12</td>
<td>Midas peas</td>
<td>230 lb/ac</td>
<td>1 ½”</td>
<td>11-52-0-0 @ 50 lb/ac</td>
</tr>
<tr>
<td>May 12</td>
<td>LS 0036 RR Soybeans</td>
<td>105 lb/ac</td>
<td>1 ½”</td>
<td>11-52-0-0 @ 50 lb/ac</td>
</tr>
<tr>
<td>May 15</td>
<td>Cooper peas</td>
<td>275 lb/ac</td>
<td>1 ½”</td>
<td>11-52-0-0 @ 50 lb/ac</td>
</tr>
<tr>
<td>May 21</td>
<td>45H24 RR Canola</td>
<td>7 lb/ac</td>
<td>½”</td>
<td>11-52-0-0 @ 50 lb/ac</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21-0-0-24 @ 389 lb/ac</td>
</tr>
</tbody>
</table>
Results and Discussion for the NPARA plots:
Yields were 39 bushels per acre for green peas and 40 bushels per acre for the yellow peas. The canola yielded 36 bushels per acre. We were unable to collect accurate data from the soybeans because the plants were so short we could not combine all of the seed and there was still green seed at time of harvest.

The plot area will be seeded to wheat in 2010 with 60% of the recommended rate of nitrogen fertilizer being applied to the pulse crop stubble areas. Yield data will be collected at harvest to determine which crop seeded in 2009 was more beneficial in a crop rotation. This project will be conducted for two more years.

Results from the Provincial Sites
There was good stand establishment at all sites. The plots were inspected for herbicide injury 7 and 14 days after application. No injury symptoms were observed at any of the sites. The LARA site was not harvested due to hail damage.

<table>
<thead>
<tr>
<th></th>
<th>Castor</th>
<th>Killam</th>
<th>Viking</th>
<th>MARA</th>
<th>PARDA</th>
<th>NPARA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canola (bu/acre)</td>
<td>XX*</td>
<td>36</td>
<td>35</td>
<td>48</td>
<td>16.5</td>
<td>36</td>
</tr>
<tr>
<td>Yellow Field Peas (bu/acre)</td>
<td>21</td>
<td>44.4</td>
<td>44.9</td>
<td>52</td>
<td>XX**</td>
<td>40</td>
</tr>
<tr>
<td>Green Field Peas (bu/acre)</td>
<td>15</td>
<td>40</td>
<td>39.1</td>
<td>54</td>
<td>XX**</td>
<td>39</td>
</tr>
<tr>
<td>Red Lentils (lbs/acre)</td>
<td>145*</td>
<td>770</td>
<td>990</td>
<td>1069</td>
<td>XX**</td>
<td>Not sown</td>
</tr>
<tr>
<td>Green Lentils (lbs/acre)</td>
<td>410*</td>
<td>700</td>
<td>1280</td>
<td>1088</td>
<td>XX**</td>
<td>Not sown</td>
</tr>
<tr>
<td>Fababean (bu/acre)</td>
<td>XX</td>
<td>33.9</td>
<td>48.5</td>
<td>12</td>
<td>XX**</td>
<td>36</td>
</tr>
<tr>
<td>Soybeans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>XX***</td>
</tr>
</tbody>
</table>

*The lentils at the Castor site were extremely short in height and there was considerable harvest loss. Conditions were extremely dry in 2009 with less than 6 inches of precipitation. There was also some
harvest loss at the Killam and Viking sites. Green lentils were observed to be later maturing than the red.
** There was wildlife damage at the PARDA site, deer consumed the fababeans. The lentils were laden with snow before they were mature. Drought conditions led to poor field pea yield potential, there was not a harvestable yield.
*** The soybeans near Manning were too short to be harvested with a lot of green seed evident late in the season

**Provincial Scope** by Alvin Eyolfson of Battle River Research Group
These demonstrations illustrate the relative risk of production in the challenging 2009 year. Field peas were successfully harvested in five of the six sites. The PARDA site at Fairview was suffering from 2 years of dry weather.

In comparison, lentils only had mediocre yields at three of five sites sown. Crop height at harvest was a challenge at some of the sites, especially at Castor. Weed control was good with Odyssey herbicide.

With good yields, lentils can be more profitable than field peas. A 40 bu/acre crop of field peas on dryland at $4.50/bu has a gross return of $180/acre. In comparison a good lentil crop of 2000 lbs/acre at 12 cents per pound would return $240/acre. Lentil prices have ranged much higher than this. Prices were ranging around 24 cents/lb in the early winter of 2010. For a 1000 lb/acre crop (as at Viking and at the MARA site) this price would return $240/acre. Yellow peas at 45 to 55 bushels/acre would return $202 to $247/acre.

Fababeans had fair to good yields at three of the six sites. A production return is difficult to determine, but generally a crop of more than 35 bushels/acre is needed. Soybeans did not mature at the NPARA site. More site years will be valuable in comparing the relative yields, returns, and production risk of field peas, lentils, fababeans and soybeans in different zones of Alberta.
Objective:
This trial was to demonstrate the use of different pulses as a green manure crop and alternative methods to discing or plowing for incorporating the green manure crop under a zero-till regime.

Materials and Methods:
In 2007, four different pulse crops were seeded: lupins, fababeans, peas and soybeans. Treatments included desiccating with glyphosate at flowering and podding stages, followed by rolling or mowing to obtain plant to soil contact. Except for the peas, the pulses would not “flatten” with the roller. Since inadequate plant to soil contact was achieved with some of the plots, everything was mowed in the fall. Soil samples from each pulse crop area were obtained in early May 2008 and 2009.

In the second year, a Seed Hawk drill was used to seed AC Splendor wheat on May 15, 2008 at a rate of 105 lb/ac (seeding rate was determined based on 1000 kernel weight) with 50 lb/ac of 11-52-0-0 supplying the phosphorus requirement and no additional nitrogen was applied. The plot was combined in mid-September 2008 with a John Deere 6600 combine and yield data collected. Wheat yields ranged from 50-65 bu/ac.

Harvesting each different crop area and treatment in 2008 proved to be a difficult task, so the decision was made to simplify harvest for 2009. Yield data was obtained from each of the five pulse crop areas but not each treatment.
For the third and final year of the demonstration, a Seed Hawk drill was used to seed 45H24 RR canola on May 20 & 21, 2009 at a rate of 7.3 lb/ac with 50 lb/ac of 11-52-0-0 and 60 lb/ac of 20.5-0-0-25, meeting phosphorus and sulfur requirements. The plot was sprayed in-crop on June 9 with 0.6 L/ac of Roundup Transorb. The plot was straight combined on September 18, 2009 with a John Deere 6600 combine. The seed was extremely dry at harvest, making shattering losses high.

Results and Discussion:
The objective of this project was to see how many years we could grow a crop using only the nitrogen produced by the green manure crops. The wheat crop in 2008 had above average yields on all of the plot area and in 2009 the canola yields were below average on all of the plots. This was expected in view of the soil test results, reaffirming that in the second year following a green manure crop, additional nitrogen is required but at a reduced rate. Our data is insufficient to determine which pulse crop gave the highest nitrogen benefit. The second objective was to determine if tillage could be eliminated when including a green manure crop in a rotation. We discovered that we were able to ‘roll’ the green manure crop and seed a crop the following spring using a zero-till Seed Hawk drill with no tillage operations needed.
Background:
Including green manure in a crop rotation adds nitrogen and organic matter to the soil. It also protects the soil from erosion, retains moisture and is an alternative to conventional summer fallow. The main benefit of using a legume for the green manure crop is that legumes fix nitrogen from the atmosphere and convert it into a form that is available to other plants.

Objectives:
- To demonstrate the use of various annual legumes or pulses for green manure in zero-till regimes

Materials and Methods:
This demonstration included a chemfallow and a canola crop for controls. All the crops seeded had 50 lb/ac of 11-52-0-0 applied and the canola had 389 lb/ac of 21-0-0-24 as well. On June 9 a post seeding application of Roundup Transorb was sprayed at 0.6 L/ac.

<table>
<thead>
<tr>
<th></th>
<th>Seeding Date</th>
<th>Seeding Rate</th>
<th>Seeding Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>45H24 RR canola</td>
<td>May 21</td>
<td>7.3 lb/ac</td>
<td>¼”</td>
</tr>
<tr>
<td>Midas peas</td>
<td>June 3</td>
<td>216 lb/ac</td>
<td>1”</td>
</tr>
<tr>
<td>LS 0036 RR soybeans</td>
<td>June 3</td>
<td>112 lb/ac</td>
<td>1”</td>
</tr>
<tr>
<td>Snowbird fababean</td>
<td>June 3</td>
<td>235 lb/ac</td>
<td>2.5”</td>
</tr>
<tr>
<td>Hairy vetch</td>
<td>June 4</td>
<td>25 lb/ac</td>
<td>¾”</td>
</tr>
<tr>
<td>Fenugreek</td>
<td>June 4</td>
<td>34 lb/ac</td>
<td>¾”</td>
</tr>
<tr>
<td>Berseem clover</td>
<td>June 4</td>
<td>8 lb/ac</td>
<td>¼”</td>
</tr>
</tbody>
</table>

A crop roller was constructed locally by Ian Sparshu of Birdman Welding based on a design developed at The Rodale Institute. It is a 10.5’ wide x 16” steel cylinder (that is filled with water for weight) with chevron - patterned blades welded on, which are designed to crimp the stems of the plants and promote soil to plant contact. The crops were rolled at flowering: fababean, peas and fenugreek on August 6 and the hairy vetch, soybeans and berseem clover on August 26. The canola control treatment was harvested on September 18.

Results and Discussion:
The crop roller worked quite well on all of the crops with the exception of the hairy vetch. It produced such an incredible amount of plant material that it was mowed on September 15 to facilitate seeding next spring. Also, the crop roller did not cut and push the plant material into the soil for really good plant to soil contact. Some modifications will be done to add more weight to the roller. In 2010 the plot area will be seeded to spring wheat with no commercial nitrogen fertilizer. The plot area will be soil tested and yields will be measured to determine the benefits of including green manure in a crop rotation.
Background:
Swath grazing is a low cost winter feeding strategy that works best with intensive management. There are many variables to be considered when growing a crop for swath grazing: crop selection; time of seeding and swathing, and also variety selection. There is variation between crops and also varieties in animal preference.

Objectives:
- To assess the palatability of different crops and varieties for swath grazing

Materials and Methods:
The plot was seeded on June 10 with approximately one acre of each crop seeded. Each crop was swathed at the soft dough stage.

<table>
<thead>
<tr>
<th>4010 Silage peas</th>
<th>Fenugreek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baler oats</td>
<td>Conlon barley</td>
</tr>
<tr>
<td>Waldern oats</td>
<td>Xena barley</td>
</tr>
<tr>
<td>Morgan oats</td>
<td>Sundre barley</td>
</tr>
<tr>
<td>Everleaf oats</td>
<td>Bunker triticale</td>
</tr>
</tbody>
</table>

Results and Discussion:
The varieties were seeded north-south and the electric fence ran east-west to limit the amount the cow herd was given access to. However, the cow/calf herd did have equal access to all of the crops at the same time. The fenugreek was severely damaged by grasshoppers and as a result was not included in the palatability assessment.

Palatability was assessed by visually observing which crops the cattle went to first when allowed into a new area and the amount of waste. Observations indicated that the cattle preferred the oat and barley varieties over the peas and triticale. With the drought, the peas dried up and the triticale may have been more mature when swathed which would have affected its palatability.
INTERCROPPING FOR SILAGE/GREENFEED PRODUCTION AND EXTENDED GRAZING

Background:
As fertilizer and fuel costs rise, cattle producers are looking for alternative forage production systems. Intercropping a spring cereal with a winter cereal offers flexibility. The spring cereal can be grazed or harvested as silage or greenfeed and the winter cereal allowed to regrow for fall and/or spring grazing. Winter cereals seeded in the spring remain vegetative throughout spring, summer and fall. There is no heading because seedlings do not receive the cold treatment (vernalization) which normally occurs in the fall. With this combination, the spring cereal has very vigorous growth providing excellent forage quality for earlier season grazing or silage/greenfeed harvest. Allowing the winter or fall cereal to regrow provides high quality pasture for fall grazing as regrowth potential for spring cereals and perennials decreases.

Objectives:
- Demonstrate the potential of intercropping with different forage crop mixtures.
- Promote extended and sustainable grazing, with the potential to increase production, reduce input costs, improve profitability, improve feed quality, and improve efficiency and environmental stability.

Materials and Methods:
Ranger barley and Baler oats were seeded in combination with winter cereals (Prima fall rye, Osprey winter wheat, and Fridge winter triticale) on May 14, 2008. The target seeding rates were 75% of the recommended rate for solo seeding. Ranger barley and Baler oats were also seeded without the winter cereals as check s for yield, energy and protein. At seeding, 50 lb/ac of 11-52-0-0 and 140 lb/ac of 46-0-0 were applied. Herbicides included a preburn with Cleanstart on May 16 and an in-crop application of Frontline A at 40 mL/ac, Frontline B at 280 mL/ac and Lontrel at 85 mL/ac on June 19.

On July 24 clips were taken using a ¼ m² to estimate yields and plots were mowed to simulate greenfeed/silage harvest. The samples were then submitted for nutritive analysis. Clips were taken again on September 24, and mowed again, this time to simulate fall grazing. The final clips were taken in the spring of 2009 to assess yield and nutritive values for spring grazing. In 2008 no samples were
taken from the Baler oats/fall rye or the Baler oats/winter wheat plot due to excessive weed growth. All plots were sampled in May 2009.

Results and Discussion:

From the yield data obtained, there was no yield benefit to intercropping a spring and winter cereal. However, it did demonstrate that an annual crop presents options for grazing. Energy values of the winter and fall intercrops were very high in the spring of 2009, demonstrating excellent nutritive value for early spring grazing.
MURDOCH LAKE AGRO FORESTRY DEMONSTRATION

Project Partners: Ducks Unlimited, Daishowa-Marubeni International Ltd (DMI), Alberta Environmentally Sustainable Agriculture (AESA), Prairie Farm Rehabilitation Administration (PFRA), Woodlot Extension Program (WEP), Reduced Tillage Linkages (RTL) and NPARA

Location: SE-16-89-23-W5; 12 miles south from the town of Manning on Hwy#35, 2 miles east on Hwy #690 and 1½ miles south. The site borders waterfowl rich Murdoch Lake.

Background:
This field demonstration was developed to show landowners the potential benefits of combining tree farming with traditional agricultural practices. The purpose is to allow farmers to see that raising trees and livestock or hay on the same land can be an economically viable practice while providing wildlife and waterfowl benefits. The goal of a tree improvement program is to develop fast growing aspen and poplar genotypes that would be suitable for use in agro forestry. Companies would be able to obtain portions of their fibre requirements from these privately owned woodlots.

Objectives:
• To establish an extensive, long term demonstration site that will showcase tree production and forage management, which will include hay production and grazing livestock
• To demonstrate opportunities for landowners to combine tree production with standard agricultural practices

The Site:
The project area covers 60 acres of land controlled by Ducks Unlimited and is surrounded by an eight foot high elk fence. In 2003 the site was prepared with a combination of chemical weed control and cultivation. In the spring of 2004, a forage crop (alfalfa/timothy/meadow brome grass) was seeded, and 17,352 Walker Hybrid Walker Poplar trees were planted at a spacing of 2.5m [in-row and between rows]. The basic design of the demonstration is three “treatments” represented in each of three replicates:
   Treatment #1 has “forage crop only.”
   Treatment #2 has “trees only.”
   Treatment #3 has “trees and forage” (alley cropped)

In treatments #2 & #3, half of the trees had plastic mulch applied and half did not. Tree performance is measured biannually - DBH (diameter at breast height) and tree height.
In treatment #2 mowing was conducted between tree rows annually. For treatments #1 & #3, forage crop productivity is measured annually. Each replicate is about 20 acres in size, and each treatment within each replicate about 6 acres. Strips between replications and
around the project perimeter are retained for access and are therefore non-treatment areas and total about 6 acres.

The initial hypothesis of this project was that, by alternating hay and tree production in the same field, the overall productivity of the site would increase. The trees would retain snow fall, increasing available soil moisture for hay production; hay strips would allow the trees to have access to more sunlight therefore stimulate increased tree growth.

**Results & Discussion:**
During the first fall/winter after planting (2004), voles, feeding on the bark and phloem of the young trees (and living under the mulch safe from predators) girdled most of the trees. When the girdling was observed the following spring (May 2005), every stem was cut off below the girdle to allow new stems to grow from the stump. Innovative strategies were implemented to reduce the vole population including raptor nesting boxes, brush piles for weasels and compressing the mulch with quads. The year following the decapitation, all trees had to be “singled” due to the growth of multiple stems. In May, 2006 every tree was singled by leaving the dominant stem and removing all others. A small portion of trees had to be singled again in 2007.

To date, tree growth between 'trees with mulch' and trees with 'no mulch' treatments has been significantly different. Mulching definitely had a positive effect. Growth of the mulched trees was much greater than the unmulched trees, and mortality rate much lower.

Permanent tree sample plots were established in 2005, and the heights and diameters of trees within these plots measured in 2005 and 2007. It was deemed adequate to measure trees every two years rather than every year as initially planned. They were re-measured in 2009. There has been some phenomenal growth by these hybrid trees with heights of up to 5.4 meters (almost 18 feet) recorded in the fall of 2007! However, between the treatments of 'trees only' and 'alley-cropping', the difference in tree growth has not been significant. The forage crop was hayed and baled in 2005-2007 inclusive. Forage crop productivity was measured as yield in pounds per acre and number of round bales. In 2008 and 2009 forage yield was measured by hand using square meter sample plots, randomly located in each treatment. To date there has been no significant trend in forage crop productivity between 'forage crop only' and 'alley-cropped forage and trees' treatments.

In the spring of 2007, and again in 2008, the decision was made to delay the grazing until 2009 to provide for additional growth on the smaller (unmulched) trees. Finally, in this year of 2009, the ultimate goal of introducing cattle to the project was reached. The cattle were rotationally grazed in the alley cropping treatment in 1 hectare paddocks which included a ‘forage only’ strip 15m wide and a ‘trees only’ strip 15m wide. The cattle have caused little or no damage to the trees. Tree damage assessments, forage production, manure deposition, and cattle behaviour are just a few of the many parameters that were measured. The grazing project will continue for an additional 2 years, to gather 3 years of data. These will be tabulated and published in the final report.

**Conclusions to date:**
- It requires about 6 years to establish an alley cropping and silvipastoral system with hybrid poplar.
- The survival rate of trees with plastic mulch is 3 times greater than those without mulch.
- With proper management, grazing by cattle to utilize forage is a viable option in agro forestry.
STOCKPILED GRAZING PROJECT

Background
Cattle producers across the province are looking for ways to reduce the annual maintenance expense of their cow herd. The winter feeding period makes up the largest component of these annual costs. A primary method of managing the maintenance expense is to extend the grazing season. Research has shown producers they can realize significant annual savings by allowing their cattle to harvest the forage where it grows instead of packaging and delivering the forage to the cattle. A key to successful extended grazing is meeting the nutritional needs of the cow at various stages of her pregnancy. Unfortunately, the nutritional quality of the forage being grazed in an extended grazing system, either as standing material or in swaths, is often not known. This project will provide nutritional data for producers when planning to utilize dormant season grazing.

In northern Alberta the 2 main concerns with a stockpiled forage system are snow depth and forage quality. There has to be sufficient standing forage that can be accessed through the snow by the livestock and the nutritional quality of the feed has to be sufficient to meet animal requirements.

The nutritional quality of stockpiled forages is often unknown and can change significantly from year to year. Initiated in 2008, the purpose of this project is to gather nutritional information on stockpiled forages from across Alberta with 9 groups participating.

Objectives
To provide guidelines of the nutritional content of standing forage at several locations across Alberta for the purpose of late fall and winter grazing.

Methods
The sites selected for the NPARA area were perennial forage stands that had either been grazed up to but not after mid-July or untouched current year growth. Five one-quarter meter samples at each site were collected mid August, one week after the killing frost, January and after snow melt in the spring. Grazing cages were erected on the sites which were to be grazed. Samples collected were dried, weighed and submitted for nutritional analysis. Aggregate samples from each clip and field were sent to the lab except for the check field. All participating groups from across the province selected one meadow brome field as a check species; from this site the 5 samples from each clip were analyzed separately. Sites #1, #2, #3 & #4 were all grazed prior to July 15, and site #5 was a hayfield with a sample area left untouched for our clipping purposes.
Results to Date

Table 1: Basic Feed Analysis of Selected Stockpiled Forages in 2008 and 2009

<table>
<thead>
<tr>
<th>Site</th>
<th>SPECIES</th>
<th>Date</th>
<th>DE Mcal/kg</th>
<th>Protein (%)</th>
<th>ADF (%)</th>
<th>TDN (%)</th>
<th>RFV INDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 - Deadwood</td>
<td>Meadow Brome</td>
<td>Aug 08</td>
<td>2.70</td>
<td>8.73</td>
<td>35.80</td>
<td>61.04</td>
<td>94.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct 08</td>
<td>2.56</td>
<td>8.61</td>
<td>39.94</td>
<td>57.78</td>
<td>87.44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan 09</td>
<td>2.36</td>
<td>6.33</td>
<td>45.78</td>
<td>53.24</td>
<td>70.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>April 09</td>
<td>2.40</td>
<td>9.21</td>
<td>44.50</td>
<td>54.24</td>
<td>77.76</td>
</tr>
<tr>
<td>#2 - North Star</td>
<td>Smooth Brome &amp; Alsike Clover</td>
<td>Aug 08</td>
<td>2.90</td>
<td>7.56</td>
<td>30.40</td>
<td>65.20</td>
<td>108.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct 08</td>
<td>2.30</td>
<td>5.81</td>
<td>46.40</td>
<td>52.80</td>
<td>67.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan 09</td>
<td>2.30</td>
<td>3.94</td>
<td>46.80</td>
<td>52.40</td>
<td>64.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>April 09</td>
<td>2.20</td>
<td>8.8</td>
<td>48.78</td>
<td>50.90</td>
<td>67.80</td>
</tr>
<tr>
<td>#3 - Chinook Valley</td>
<td>Smooth &amp; Meadow Brome &amp; Alfalfa</td>
<td>Aug 08</td>
<td>2.60</td>
<td>6.06</td>
<td>39.46</td>
<td>58.20</td>
<td>85.90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct 08</td>
<td>2.60</td>
<td>7.13</td>
<td>40.36</td>
<td>57.50</td>
<td>87.90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan 09</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>Fescue</td>
<td>April 09</td>
<td>2.30</td>
<td>8.8</td>
<td>47.88</td>
<td>51.60</td>
<td>67.30</td>
</tr>
<tr>
<td>#4 - Hawk Hills</td>
<td>Smooth Brome</td>
<td>Aug 08</td>
<td>2.80</td>
<td>6.00</td>
<td>31.86</td>
<td>64.10</td>
<td>111.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct 08</td>
<td>2.70</td>
<td>10.25</td>
<td>36.02</td>
<td>60.80</td>
<td>100.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan 09</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>April 09</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>#5 - North Star</td>
<td>Smooth &amp; Meadow Brome &amp; Cicer Milk Vetch &amp; Clovers &amp; Alfalfa</td>
<td>Aug 08</td>
<td>2.40</td>
<td>13.56</td>
<td>43.00</td>
<td>55.40</td>
<td>80.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct 08</td>
<td>2.00</td>
<td>10.00</td>
<td>58.92</td>
<td>43.00</td>
<td>55.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan 09</td>
<td>2.10</td>
<td>6.25</td>
<td>54.68</td>
<td>46.30</td>
<td>58.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>April 09</td>
<td>2.10</td>
<td>7.88</td>
<td>52.90</td>
<td>47.70</td>
<td>62.50</td>
</tr>
</tbody>
</table>

**no clips taken**

RECOMMENDED LEVELS (For a cow in mid pregnancy)

<table>
<thead>
<tr>
<th>DE</th>
<th>Protein</th>
<th>ADF</th>
<th>TDN</th>
<th>RFV</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>8.0</td>
<td>55.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DE = Digestible Energy; ADF = Acid Detergent Fibre (least digestible portion of a roughage); TDN = Total Digestible Nutrients; RFV = Relative Feed Value (index for assessing quality of forages based on the ADF and NDF levels)

Discussion

In doing the clips in January, leaves were definitely lost working in the snow. And in April, it was difficult to get only stockpiled forage without any new growth. Prior to sample submission the samples were sorted through, however, some new growth may still have been included which would explain the higher nutrient levels in some of the April samples.

Protein levels generally decreased between August and October and energy levels (DE & TDN) declined across the board. The recommended protein requirement for a cow in mid-pregnancy is 8% on a maintenance diet and none of the samples collected in January met this requirement, nor was the energy requirement met.

This project illustrates that the nutritional analysis of a species changes over the course of the year. When grazing stockpiled forage, do not assume that what the feed tested in the summer or fall will be the same as what the cows are eating in the winter. Management is very important with this system, matching feed quality to animal requirements.
The Agricultural Research and Extension Council of Alberta (ARECA) is a not-for-profit, producer-driven organization working to enhance and improve agricultural operations through increased access to field research and new technology.

Made up of 15 member associations and one associate member, 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. ARECA's member associations include:

- Battle River Research Group (BRRG)
- Central Peace Conservation Society (CPCS)
- Chinook Applied Research Association (CARA)
- Foothills Forage Association (FFA)
- Gateway Research Organization (GRO)
- Grey Wooded Forage Association (GWFA)
- Lakeland Agricultural Research Association (LARA)
- Lakeland Forage Association (LFA)
- Mackenzie Applied Research Association (MARA)
- North Peace Applied Research Association (NPARA)
- Peace Country Beef and Forage Association (PCBFA)
- Peace Agricultural Research and Demonstration Association (PARDAA)
- Smoky Applied Research and Demonstration Association (SARDA)
- Southern Applied Research Association (SARA)
- West Central Forage Association (WCFA)
- Reduced Tillage LINKAGES (RTL)

In addition to the work done in each of the regions, ARECA oversees province-wide initiatives including the Sustainable Grazing Mentorship Program; Regional Variety Trials; Environmentally Sustainable Agriculture Initiatives Program (ESAIP); and the Industrial Site Monitoring Project.

ARECA and its member associations participate in and organize a wide variety of conferences and information sessions for producers.

Some of these include:
- Western Canadian Grazing Conference
- The Alberta Forage Industry Network (AFIN) and the Forage Agronomy Update
- Workshops on age verification, riparian health assessment, ranching & marketing for women, crop strategy, energy efficiency and more
- Various farm and field tours at locations throughout Alberta

For more information on ARECA, the specific projects taking place in each of the regions or upcoming special events, please go to www.areca.ab.ca or call us at (780) 416-6046.