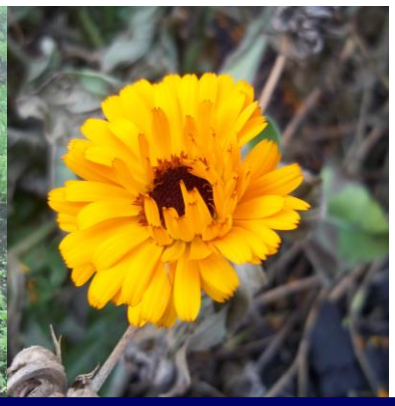

PESAI
Supporting ALL Agricultural Sectors

Annual Report 2010-2011

Prairies East Sustainable Agriculture Initiative Inc.

Report Compiled By:
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Manitoba Agriculture, Food & Rural Initiatives

Box 2000 • Arborg MB • R0C 0A0 • 204.376.3300 • prairies.east@gmail.com

Funded by:

Canada Growing Forward Manitoba

A. PRAIRIES EAST SUSTAINABLE AGRICULTURE INITIATIVE INC.

INTRODUCTION

Prairies East Sustainable Agriculture Initiative, Inc. (PESAI) is a not-for-profit organization (incorporated December 2005) serving the Eastern Prairie region of Manitoba. The initiative is the product of a partnership between the agricultural community of Interlake / Eastern Manitoba and Manitoba Agriculture, Food and Rural Initiatives (MAFRI). PESAI's objective is to support innovation, diversification and value-added opportunities in the Eastern and Interlake areas. Group activities are funded by provincial and federal levels of government and by members of the Agriculture Industry in Manitoba.

PESAI activities are directed by an elected Board comprised of agricultural producers and entrepreneurs from the Eastern Prairie region. Staff from Manitoba Agriculture, Food & Rural Initiatives' Agri-Food Innovation & Adaptation Knowledge Centre helps to carry out PESAI activities.

Headquartered in Arborg, PESAI serves agricultural producers in the Eastern and Interlake regions of Manitoba. Working in partnership with individual producers or producer groups, PESAI focuses on applied research, innovation, diversification, value-added, advanced technology, market development and sustainability initiatives that directly benefit local area producers. Extension programs include applied field research and demonstrations; tours, seminars, workshops; and reports, fact sheets and newsletters. A wide range of rentable plot equipment for research projects, including an RFID panel reader set, a portable handling facility and cattle scale are available to local producers and producer groups. The PESAI Board is also open to research and project submissions from individuals and producer groups. Contact PESAI for a project submission form or to become a member.

BACKGROUND

The Prairies East Sustainable Agriculture Initiative, Inc. (PESAI) concept began in 2004. With the reorganization of Manitoba Agriculture, Food and Rural Initiatives (MAFRI) in April 2005, PESAI found its place as one of four Manitoba Diversification Centres, including: Parkland Crop Diversification Foundation (PCDF) – Parkland Region, Westman Agriculture Diversification Organization (WADO) – Southwest Region and Canada-Manitoba Crop Diversification Centre (CMCDC) – Central Region.

In 2005/06, PCDF, WADO and PESAI each received $250,000 funding through the Agricultural Policy Framework for the purchase of capital assets to support diversification projects. In addition, each fiscal year, the groups are notionally allocated funding to carry out such projects.

BOARD OF DIRECTORS

The Board in 2010/11of director changes f.

Chair	Leslie Jacobson	Arborg	376-5062
Vice-Chair	Joel Grenier	Woodridge	429-3241
Secretary/Treasurer	David Schettler	Riverton	378-2830
	Bill Jonasson	Dugald	219-8213
	Bruce Modjeski	Beausejour	268-3059
	Adriana Pausenwein	Whitemouth	348-7040
	Shannon Pyziak	Fisher Branch	372-6690
	Rick Rutherford	Grosse Isle	467-5613
	David Vielfaure	La Broquerie	392-9227

SUPPORT STAFF – MANITOBA AGRICULTURE, FOOD & RURAL INITIATIVES

Diversification Specialist	Paula Halabicki	Arborg	642-2883
Diversification Technician	Roger Burak	Arborg	641-4640
Diversification Technician	James Lindal	Arborg	641-0064
Summer Research Assistant	Heather Sparkes	Arborg	2009

MEMBERSHIP STATISTICS

As of the March 31, 2010, Prairies East Sustainable Agriculture Initiative, Inc. (PESAI) had 51 individual members (including directors) and 9 corporate members, for a combined total membership of 60, up from last year's membership of 55.

PROJECT SUMMARY STATISTICS

In 2010/10, PESAI was allotted $150,000 funding from Manitoba Agriculture, Food & Rural Initiatives. PESAI received 15 project submissions from partners, with requests ranging from $1000 to $12,500, totalling over $60,000. PESAI allocated approximately $35,000 funding to 9 partner-led projects, or 58% of the requested amount. PESAI also allocated funding to PESAI Promotions, 20 PESAI-led Field Trials and various equipment purchases, upgrades and modifications.

PROJECT SUBMISSIONS

The Board of Prairies East Sustainable Agriculture Initiative, Inc. (PESAI) focuses on applied research, innovation, diversification, value-added, advanced technology, market development and sustainability initiatives that directly benefit local area producers. They look to grassroots organizations and producers for project ideas that fall within their mandate. If you have an idea you'd like to share, fill out PESAI's Project Submission Form found on page 5. An electronic version of the Project Submission Form is also available – contact PESAI to receive it via email.

MEMBERSHIP

Share your expertise, share your voice, and be a part of the latest developments in agriculture, by becoming a Member of Prairies East Sustainable Agriculture Initiative, Inc. (PESAI). Membership to PESAI is free and open to individuals and corporations that are interested in the development of the Prairies East Region of Manitoba and whose applications for membership have been approved by the Board of Directors. Please fill out the application on page 7 and mail to PESAI at the above address. PESAI Members will receive copies of the PESAI newsletter and the annual reports. Via email, members will be informed of upcoming PESAI-sponsored workshops or events, including the summer research tour and winter meeting.

RENTABLE EQUIPMENT

Prairies East Sustainable Agriculture Initiative, Inc. (PESAI) has a range of facilities and plot equipment located near Arborg to be used for applied research activities. Much of their equipment can also be rented by producers or producer groups. A list of rentable equipment and rental rates can be found on page 8.

CONTACT

For more information please contact:

Prairies East Sustainable Agriculture Initiative, Inc. (PESAI)

Box 2000
317 River Road West
Arborg MB R0C 0A0

PHONE: 204.376.3300
FAX: 204.376.3311
EMAIL: prairies.east@gmail.com

Prairies East Sustainable Agriculture Initiative Inc.

Box 2000, 317 River Rd W
Arborg MB R0C 0A0

Phone: (204) 376-3300
Fax: (204) 376-3311
Prairies.East@gmail.com

B. PROJECT SUBMISSION FORM

INSTRUCTIONS

- Applications should be written in point-form
- Applications must not exceed 3 pages in length (you may include a separate page if needed)
- Completed applications can be emailed, faxed or mailed

APPLICANT'S INFORMATION

Name of Organization		
Contact Person (Name & Title)	Telephone #	Email Address
Street and/or Postal Box Address		
Town/City		Postal Code

PROJECT TITLE

PROJECT DESCRIPTION

Objectives (i.e. What do you want to accomplish?)
Background/History (i.e. Why is the project needed?)

Fit to PESAI Priorities (i.e. How does the project support innovation, diversification and value-added opportunities in the Eastern/Interlake region?)
Project Activities/Details (i.e. How will the project be carried out and what information/measurements will be collected?)
Project Output/Deliverables/Communication (i.e. How will the project and/or results be communicated?)
Partners
Locations

PROPOSED PROJECT BUDGET

Budget Item	Total Project Cost	Requested from PESAI	Partner Contributions	
			Amount	Partner Name
Labour Costs				
Travel Expenses				
Supplies/Materials				
Fees/Analysis				
Equipment/Facility Rental				
Advertising & Promotion				
Other (please specify)				
TOTAL				

APPLICANTS SIGNATURE: _____ **DATE:** _____

C. PESAI MEMBERSHIP APPLICATION FORM

Membership to PESAI is free and open to individuals and corporations that are interested in the development of the Prairies East Region of Manitoba and whose applications for membership have been approved by the Board of Directors. If you are interested in becoming a member, please fill out the application below and mail or fax to PESAI at the above address.

ADMISSION OF MEMBER

TO: Prairies East Sustainable Agriculture Initiative, Inc.

CIRCLE ONE: Corporation Individual

NAME: _____

REPRESENTATIVE: _____
(if corporation)

MAILING ADDRESS: _____

_____

PHYSICAL ADDRESS: _____

PHONE NUMBER: _____

EMAIL ADDRESS or FAX NUMBER: _____
(to be used for updates, meeting notices, tour announcements, etc. – will not be shared)

DATE: _____

SIGNATURE: _____

D. PESAI EQUIPMENT RENTAL RATES

Prairies East Sustainable Agriculture Inititative - Equipment Rental Rates			
Item Description	**Rental Rate**		**Conditions**
3/4 tonne grey Chevrolet Silverado	$ 0.30	per kilometer,dry	Valid drivers license, user pays fuels cost
Trailer - 2006 Darco, 20' deck, tri-axle, 9525 kg capacity	$ 0.11	per kilometer	Class 3 license required
Tractor - 65HP John Deere, 3pt hitch, front end loader, front wheel assist	$ 30.00	per hour of use, dry	Operator restricted to trained individuals
Plot Combine, Wintersteiger - equipped	$ 130.00	per hour of use, equipped	
Plot Combine, Wintersteiger	$ 100.00	per hour of use, dry	Operator restricted to trained individuals
Plot Seeder - 3 pt hitch, no-till, hoe drill	$ 30.00	per hour of use	Operator restricted to trained individuals
Tractor Mount Sprayer - 3 pt hitch plot, offset boom, hydraulic height adjustment	$ 24.00	per hour of use	Operator restricted to trained individuals
Bicycle Sprayer - Hand pushed sprayer	$ 10.00	per day, dry (no $C0_2$ included)	Operator restricted to trained individuals
5' Rototiller, FarmKing C2560	$ 50.00	per day	Operator restricted to trained individuals
Seed Cleaning Equipment	$ 25.00	per day, no charge if combine used	Operator restricted to trained individuals
Digital Platform Scale for weighing cattle	$ 50.00	per day	
RFID Cattle Tag Reader Wand	$ 30.00	per day	
Weather Stations - rainfall, wind speed & direction, barometric pressure, temperature	$ 300.00	per season, cost can be split by parties using data	Set up by PESAI employees only

Equipment is to be used for research purposes, or at the discretion of the PESAI Board of Directors.
Rental rates subject to change.
Equipment must be visually inspected and returned in equivalent condition.
Cost of repair from damage due to misuse will be charged to the renter.

E. PESAI-FUNDED PROJECT REPORTS – PESAI AND PARTNER-LED PROJECTS

NOTE: Project Reports for Partner-led Projects were submitted to PESAI by the Lead Partner listed. The information contained in the report was not verified.

PROJECT #1:

Lead Partner:

Allotted Funding from PESAI:

PESAI Funding Spent:

Total Project Cost:

Contributors:

Background/Objective:

Project Activities:

PROJECT #2

Lead Partner

Allotted Funding from PESAI:

PESAI Funding Spent:

Total Project Cost:

Contributors:

Background/Objective

Project Activities:

Results/Observations:

Conclusions/Recommendations:

PROJECT #3: SASKATOON MODEL (RESEARCH) ORCHARD

Lead Partner: Eastern Plains Saskatoons Incorporated (EPSI)

Allotted Funding from PESAI: $2826

PESAI Funding Spent: $3065

Total Project Cost: $3787

Contributors: EPSI, MAFRI – Stan Stadnyk, Stonewall

Background/Objective: Since 2005/06, PESAI has provided funding to EPSI for the establishment, maintenance and research activities of the Saskatoon Model Research Orchard located near Stonewall.

The objective of this project was to demonstrate and evaluate sustainable beneficial production practices for the establishment and management of a productive saskatoon fruit orchard. The demonstrations and evaluations will be based on the application of principles of economic threshold levels, demonstration of recently registered pesticides

promoted as having reduced residual and persistence in the soil, and demonstration of innovative equipment used in other fruit type orchards

Project Activities & Results: Numerous activities were completed in 2000/10:

1. *Mankar Shield Herbicide Applicator* - The Mankar Shielded sprayer is a light weight portable herbicide applicator that uses one nozzle under a shroud that is about 12 inches wide. A strap slung over the shoulder supports the weight of the unit. Pure glyphoshate is used and the product is atomized into a fine spray applied onto target plants. The shield allows an applicator to target herbicide applications within close proximity to non target plants, as long as the shield is maintained fairly close to the ground. Raising the unit will result in fatal contact of non target plants, as was experienced. The unit is powered by battery and is light weight which minimizes fatigue from continual usage over long durations. This unit was found to be effective in spot treating weeds but caution had to be used as saskatoon plants do sucker next to the main plants. Leaf contacted with glyphosate on the main plant or on suckers is fatal to the saskatoon plant. The Mankar applicator is an effective tool to apply glyphosate onto perennial weeds in an orchard setting.

2. *Pest Control* - The orchard had several treatments of herbicides including registered products plus products not registered and evaluated for crop safety. Specific saskatoon rows were treated with Linuron, Casaron, and a recently registered herbicide, Chateau. Chateau is not currently registered for applications in saskatoon orchards. A short row was treated with Lontrel, also not currently registered for saskatoon fruit. The product is being monitored for any negative affects on the growth of the saskatoon plants. Lontrel and Chateau were 2 of the 4 products requested to be evaluated by PMRA for minor use registration. The fungicide Topas was applied throughout the orchard to control leaf and berry spot disease. A practice not commercially used, is the applicaton of Topas to control leaf and berry spot disease post fruit harvest, as the disease can infect leaves of susceptible saskatoon varieties in August. A half to ¾ rate of Topas was used in August and the treatment will be evaluated for any effectiveness in reducing levels of spring and early summer infections. The treatments will be monitored for any negative effects including a reduction in winter hardiness. The August application of Topas did control the disease and healthy leaves were maintained on the treated plants late into the season. Rains in August will spread the disease onto the leaves resulting in infected leaves which tend to die off prematurely. Air injected nozzles were evaluated in the application of the fungicides to attain a high volume low drift spray pattern with good coverage.

3. *Bird Control* - A few EPSI members have complained about birds (finches and robins) being a problem by feeding on fruit in their orchards. Anecdotal observations made include presence of predator birds like crows being beneficial in detracting the presence of the birds that consume fruit crops in their diet. A raptor perch was set up at the saskatoon research orchard to attract the birds of prey (raptors) that include

small birds in their diet. The presence of raptors and fruit feeding birds will be monitored for effectiveness of the perch.

4. *Tissue testing* - Leaf samples were submitted for analysis to monitor for the nutrient status of the developing orchard and compare the effectiveness of fertilizer between treatments. Tissue testing is a tool to monitor the nutrient status of fruit crops. A deficiency has been measured on one row that had a visual pale color in the leaves in August 2009. The testing and comparisons made is confirming the leaf nitrogen content considered to be at a deficient level. Nitrogen fertilizer will be applied in the spring of 2010 to the row found to be deficient in nitrogen. Saskatoon fruit producers are encouraged to complete tissue analysis and soil analysis on their orchards to monitor the soil for changes in fertility status as the orchards develop and enter the fruit production phase.

5. *Drainage* - The north end of the saskatoon orchard is at the lowest point of the surrounding field and has water ponding on it annually from the snow melt. The spring melt results in water flowing in from the surrounding higher elevated forage field that tends to readily catch snow. The saskatoon trees are dormant in the spring and have not been severely affected by water ponding which is up to one foot deep in places. However, water ponding in the summer would be fatal on the plants that are submerged in water. The water ponding is suspected to have caused a nitrogen deficiency in the plants as denitrification occurs in water saturated soils and nitrogen is lost to the atmosphere. In the fall of 2009 a drain was created to take the ponded water off the site and into an adjacent pot hole located within the same field the orchard is located in. The drain installation cost came in a bit higher than expected.

6. *Mulch comparison* - When the orchard was established, plastic mulch was applied throughout all the rows. The initial selection of a plastic mulch was based on research results from Saskatchewan indicating a preference of plastic mulch over other mulch alternatives. Recently, local interest has been increasing in having other mulches used on orchards. In the fall of 2009 one large truck load of woodchips was delivered to the research orchard. The woodchip mulch will be applied to two saskatoon rows in the spring of 2010. Two saskatoon rows had straw mulch applied to them in the fall of 2009 to observe the advantaged and disadvantages of cereal straw, which is readily available in the area. The straw was applied with a feed mix wagon that has a side discharge to lay the straw on the ground next to the row of trees. The consistency of the straw was less bulky and appeared to improve in density when the bottom half of the tank was being emptied. There was more mixing at the bottom of the mixer tank and the straw was broken down more. A tub grinder would likely achieve a more dense straw cover. A bulky product can be blown about by wind and may not provide as good a cover to smother weeds and retain moisture. The cereal straw, woodchips and plastic mulch will be monitored. Fruit crop research results from other locations in Canada is indicating a positive benefit to the soil and orchard productivity resulting from an organic mulch. A few benefits include weed control, soil moisture preservation, and maintaining soil structure and beneficial microbe populations.

7. *Fruit Yield Data* - Yield and quality data was collected on saskatoon fruit harvested in July 2009, in the 3 year old orchard. Eleven varieties replicated in 3 rows were harvested for the yield data. A fourth row of the variety trial was used for a taste test trial and comparison. Fruit yield varied significantly between varieties. The fruit was hand picked. Mechanical harvesting would have resulted in lower yields on the varieties that have fruit lower to the ground and below the height of the harvester table. One variety was not harvested at all as a two legged fruit bandit made off with the fruit before it was harvested for the yield data. The variety was obviously the favourite choice from the whole site. This was the 3rd year of establishment of the orchard. With the aid of a weather station at the research orchard we were able to monitor moisture, and the growing conditions. On June 6 we had frost at the orchard, as occurred throughout the Interlake. On this date most of the orchard was in the flowering stage. The temperature sensor was about 2 to 2.5 feet above ground level and the temperatures hit minus one at 1:00 a.m. and dropped to a low of minus 2.5 C at 3:46 a.m. and stayed at that temperature until 6:06 a.m. Despite the frost, fruit developed on the orchard and provided yield data. The saskatoon plant can withstand more degrees of frost up to the flowering stage than after flowering. Tolerance to frost decreases as the fruit starts to develop, but it would depend on the degree of frost. Flowering dates were also monitored in the spring of 2009 and did vary between varieties.

   Results Observed - This was the first year a decent volume of fruit was available and yields will continue to increase as the amount of new growth and buds increase. There was significant yield difference between varieties. The harvest dates varied between early and late maturing varieties. The 2009 saskatoon fruit yield data is shown below.

8. *Fruit Quality And Taste Test* - At time of harvest the fruit was measured for its BRIX reading which is a measure of the sugar content. A taste test was completed on ten varieties by 6 individuals. Ten saskatoon varieties were compared to a standard variety which in this case was Smokey.

   Results Observed: There was a difference in taste and preference of taste between the 10 rated varieties. The ratings were fairly consistent in terms of positive and negative taste preference on the fresh fruit from the ten saskatoon varieties. Taste of fruit will be another variety selection criteria used when growers consider adding to the diversity of varieties grown on their orchards. An interesting observation was made on one variety. It did not get a favourable rating when it was tasted fresh but it did carry a saskatoon flavour quite well in a baked item that contained its fruit. A copy of the taste test results is available upon request.

Variety	Harvest Date	Yield (Pounds per 1000 ft)	Yield (Pounds per Acre)*	Brix**	Notes
Martin	30-Jul	53.5	119.5	18.4	large berries
Smokey	30-Jul	80.2	179.2	17.7	
Honeywood	30-Jul	285.8	638.4	17.0	entomosporium on berries, more than on Martin and Thiessen
Pembina	04-Aug	141.3	315.7	16.3	
Northline	04-Aug	170.6	381.1	16.6	
Thiessen	04-Aug	174.9	390.7	17.5	large berries
Lee # 8	04-Aug	372.8	832.9	14.1	small berries, high fibre
Success	04-Aug	302.7	676.2	14.9	small berries, high fibre
Nelson	11-Aug	319.2	713.1	17.1	tasted strong & woody, saskatoon taste carried well into a baked product
Parkhill	11-Aug	573.9	1282.1	14.7	one of the 1st to flower and last one for mature fruit
JB 30	variety picked over by a "poacher" before harvest, but appeared to have good yield potential				

*Conversion to pounds per acre is based on 19.5 row spacing.
**Brix readings were taken on the date of harvest.
Rep 1 used for onsite taste comparison

9. *Weigh Scale-Fruit Production* - Fruit production will continue to increase from the research orchard and thus a weigh scale was purchased to measure and collate yield data planned to be collected annually from the research orchard. EPSI is undertaking a fresh saskatoon fruit marketing trial with several retail stores in Winnipeg and one retail store in Stonewall. This summer will be second year for the fresh fruit marketing trial and a scale will be required to measure the production purchased for resale from one of the local commercial orchards. The fruit will be packaged into 300 gram clamshell containers for offer in the retail stores. The scale will used to ensure the minimum weight required for the packaging. EPSI will also be donating saskatoon fruit to the U of M Food Science Department for research and lab analysis.

10. *Site Maintenance* - The area between tree rows and the perimeter area within the orchard was sown down to grass. The orchard site is located along a highway that has a relatively high level of traffic on it. The grassed area was mowed several times over the summer to maintain an eye appealing and presentable site to the public.

Communications: The information discussed above with summaries of results have been circulated to EPSI members and will be presented and discussed at the EPSI AGM in April 2010.

Conclusions/Recommendations: The project expenditures funded by PESAI is having a significant impact in assisting EPSI member saskatoon producers in the region to apply production practices to their new saskatoon orchards. The orchard has been used as a testing site for production and management practices before the growers have been applying them in their orchards. The variety trial with eleven saskatoon varieties is providing valuable information for future production and marketing plans. Several projects are addressing innovative practices with potential for positive impact on the productivity of recently established saskatoon orchards. The results attained from comparisons made on the research trial is also providing growers with information on practices that will have no impact or negative impact on orchard development and productivity.

Activities and demonstrations related to saskatoon production will continue to occur at the orchard site. As fruit production starts to increase over the next few years the intent is to have sufficient fruit sales from the orchard to cover more of the future operating costs. It is expected that funding requests made by EPSI will start to decrease within next year or two.

PROJECT #4

Lead Partner:

Allotted Funding from PESAI:

PESAI Funding Spent:

Contributors:

Background/Objective:

Project Activities:

Results/Observations:

Communications:

.

Conclusions/Recommendations:

PROJECT #5:

Lead Partner:

Allotted Funding from PESAI:

PESAI Funding Spent:

Total Project Cost:

Contributors:

Background/Objective:

Project Activities:

Communications:

Conclusions/Recommendations:

PROJECT #6: FORAGE SEED HERBICIDE TRIALS

Lead Partner: Manitoba Forage Seed Association (MFSA)

Allotted Funding from PESAI: $4725

PESAI Funding Spent: $4725

Total Project Cost: $17,925

Contributors: MFSA, producer-cooperators

Foreword: It is advised that the results presented in this report may not be representative of the actual herbicide effect on established alfalfa, timothy and or perennial ryegrass. Environmental conditions in 2009 were not necessarily ideal for this type of trial and the following report is simply a synopsis of observations made and data collected in 2009.

Conclusions made within this document are not intended to be interpreted as production advice and producers are advised to use their discretion, and if available, professional advice from the respective chemical company representative when considering the application of any herbicide on their crops. This includes, but is not limited to; ensuring herbicides of interest are registered in Canada for use on the crop/weed combination intended.

The Manitoba Forage Seed Association does not condone the use of any of the following herbicides on any of the crops discussed herein until such time as the Pest Management Centre of Canada, in conjunction with the Pest Management Regulatory Agency of Canada, deems them safe to use on said crops. If you have any questions at all regarding the current registration status of certain herbicides, please contact the Manitoba Forage Seed Association's Research Manager at 204.376.3314 or your local Manitoba Agriculture, Food and Rural Initiative's Farm Production Advisor (also known as you local 'Ag Rep').

6.1: TOLERANCE AND EFFICACY OF SELECT HERBICIDES FOR CONTROL OF CANADA THISTLE IN ESTABLISHED ALFALFA PRODUCED FOR SEED

Background/Objective: Canada thistle is a well known weed in seed alfalfa which is characteristically hard to manage and even harder to control. It has received the attention of many producers, researchers, trades people and government officials as new and diverse attempts to control this pesky weed are tested. On a national priority level, Canada thistle in seed alfalfa has been an "A" Priority Without Solution (APWS) through the Canadian Pest Management Centre's (PMC) Minor Use Priority Setting Program for over 3 years (for more information see http://www.agr.gc.ca/prrmup).

The life cycle similarities between Canada thistle and seed alfalfa eliminate many of the traditional control measures annual cropping systems allow against perennial pests and substantially narrows the window of opportunity producers have to treat their fields for this weed. As such producers are often left searching for in-crop treatments of Canada thistle in order to avoid yield loss, quality reduction and stand infestation.

Over the years MFSA has tried many different chemical treatments in attempts to control Canada thistle and has continued this year, because although the PMC approved this project for APWS status, any information we provide from our own trials may be able to help speed things along and move this project from an APWS to an "A" priority. This will guarantee a dedicated screening trial carried out by the PMC to determine a solution followed by immediate registration.

The objective of this report is to present the results from the 2009 Manitoba Forage Seed Association in-field alfalfa seed herbicide trials and report the tolerance of seed alfalfa and the corresponding control of Canada thistle to herbicides Embutox (2,4D-B: 625 g/L), Pardner (bromxynil: 280 g/L), Basagran (bentazon: 480 g/L), Reflex (formesafen: 240 g/L), Odyssey (imazamox: 35% + imazethapyr: 35%), Basagran Forte (bentazon: 480 g/L + oil based adjuvant Assist or XA oil concentrate: 83% paraffin based mineral oil + 17% surfactant blend), Solo (imazamox: 70%) and where applicable Assist (paraffin based mineral oil: 83% + surfactant: 17%) and Agral 90 (non-ionic surfactant: 90%) when applied in various combinations in early spring on an established alfalfa seed stand.

Project Activities: In 2009 the herbicide trials on seed alfalfa consisted of 2m by 6m plots replicated four times in a random complete block design situated in producer fields. The trial was carried out in two locations, one near Rosenburg, Manitoba and one near Broad Valley, Manitoba. The Rosenburg site was a first year production field with a variety of soil types including stony coarse loamey areas, imperfectly drained organic soils, impermeable clayey sections and coarse loams with shallow bedrock. The Broad Valley site is a fifth production year field with mostly imperfectly drained coarse loams and a small area of imperfectly drained clayey soils. Plots were placed equal distance from nearby leafcutter bee shelters so as to not skew the yields by uneven pollination.

Both areas experienced unseasonably cold temperatures and excess moisture for the entirety of the spring prior to herbicide application as well as the remainder of the summer and early fall. Regarding the Rosenburg site, local mean monthly temperatures recorded for the 2009 growing season were below historical normals for May (7.2°C versus 10.5°C), June (14.6°C versus 15.7°C), July (16.3°C versus 18.3°C) and August (17°C versus 17.1°C) with greater than normal precipitation in May (60.8 mm versus 48.4 mm), June (117.2 mm versus 76.9 mm) and August (147.8 mm versus 79.7 mm). Regarding the Broad Valley site, local mean monthly temperatures recorded for the 2009 growing season were below historical normals for May (7.2°C versus 10.8°C), June (14.5°C versus 15.7°C), July (15.5°C versus 18.5°C) and August (16.4°C versus 17.2°C) with greater than normal precipitation in May (54.5 mm versus 48.2 mm), June (89.2 mm

versus 84.5 mm), July (66.6 mm versus 62.9 mm) and August (78.4 mm versus 72.9 mm).

Treatments were applied on 22 June 2009. This was later than preferable based on the crop and weed staging (alfalfa: 12 to 18 inches, Canada thistle: 6 to 10 inches), however night-time temperatures continued to drop near to zero up until this point and effects on herbicide efficacy and crop tolerance were concerns. A bike sprayer with C02 propellant was used for applying the treatments. TeeJet XR8001 nozzles were used for the 99 litres of solution per hectare ('40 litres/acre') treatments and TeeJet XR 8002 nozzles were used for the 198 litres of solution per hectare ('80 litres/acre') treatments.

Treatments included the 1X rates of Pardner applied 7-10 days after Embutox, Embutox applied with Pardner, Basagran applied with Reflex – one treatment using Agral 90 non-ionic surfactant and one treatment using Assist oil-based adjuvant, Odyssey applied with Reflex – one treatment using Agral 90 non-ionic surfactant and one treatment using Assist oil-based adjuvant, and the 2X rate of Basagran Forte applied with a 3X rate of Solo. All treatments were applied at 198 litres solution per hectare from the Basagran Forte and Solo combination which was applied at 98 litres solution per hectare. This particular treatment was erroneously applied at 198 L/ha on the Rosenburg site resulting in reduced rates of active ingredient per acre. In this case, the relative herbicide rates would be 1X Basagran Forte and 1.5X Solo (see Table 1 for confirmation of application rates and solution amounts).

Crop tolerance and weed control ratings are done visually, are based on a scale of 0 to 100 and are normally taken approximately every 7 days after treatment (DAT). Visual crop tolerance ratings of '0%' indicate zero crop tolerance to the herbicide (complete kill of the crop) whereas a visual crop tolerance rating of '100%' indicates 100 percent crop tolerance (no visible negative herbicide effect on the crop). Visual weed control ratings of '0%' indicate zero weed control or 100 percent weed tolerance (no visible negative herbicide effect on the weed in question) whereas a visual weed control rating '100%' indicates zero percent weed tolerance to the herbicide (complete kill of the weed in question).

Initial intentions were to spray, rate, observe and harvest the plots, however the extreme adverse weather during the spring and summer of 2009 led to both producers abandoning seed production attempts and the field were designated to be cut for hay in July of 2009. While the visual crop tolerance and visual weed control ratings could not be completed and seed yield data were not collected, the Broad Valley site was cut around with flags left intact and spring 2010 re-growth observations will be taken to get some idea of how the alfalfa over wintered under the influence of the various treatments.

Table 1. Alfalfa herbicide trial - Products and rates.			
Treatment	**Product**	**Rate**	**Solution**
1*	**Embutox**	0.55 L/ac	198L/ha
	Pardner	0.48 L/ac	
	* applied ~5 days apart		
2**	**Embutox**	0.55 L/ac	198 L/ha
	Pardner	0.48 L/ac	
	** applied at the same time		
3	**Basagran**	0.71 L/ac	198L/ha
	Reflex	235 mL/ac	
	Agral 90	1L/1000L sol'n	
4	**Basagran**	0.71 L/ac	198 L/ha
	Reflex	235 mL/ac	
	Assist	0.5L/100L sol'n	
5	**Odyssey**	17 g/ac	198L/ha
	Reflex	235 mL/ac	
	Agral 90	1L/1000L sol'n	
6	**Odyssey**	17 g/ac	198 L/ha
	Reflex	235 mL/ac	
	Assist	0.5L/100L sol'n	
7	**Basagran Forte 2X**	1.42 L/ac	98 L/ha
	Solo 3X	35.1 g/ac	
8***	**Basagran Forte 1X**	0.71 L/ac	198 L/ha
	Solo 1.5X	17.6 g/ac	
	***applied erroneously, Rosenburg site only		

Results/Observations: This section includes non-statistically derived averages determined to give an indication of the overall effect of each treatment. These analyses are not typical, however due to the termination of both sites, not all data could be collected. The summaries below take into consideration the observations made from the date of application to 14 July 2009 only.

EMBUTOX FOLLOWED WITH PARDNER IN 7 DAYS. Visual crop tolerance ratings observed 8 and 14 days after treatment (DAT) indicate no evidence of injury above 6% at 94.0% and 94.4% respectively. Visual weed control ratings observed 8 DAT indicate 33.8% control of Canada thistle (CT) present while at 14 DAT visual weed control rating indicates 63.8% control of CT present. Since crop tolerance ratings, weed control ratings and yield collection could not be completed in 2009, no solid conclusions can be made at this time regarding neither the tolerance of established seed alfalfa to, nor the control of CT by, Embutox applied at the 1X rate, followed 5 days later by Pardner at the 1X rate.

EMBUTOX + PARDNER. Visual crop tolerance ratings observed 8 and 14 DAT indicate no evidence of injury above 15% at 87.3% and 85.6% respectively. Visual weed control ratings observed 8 DAT indicate 31.3% control of CT present while at 14 DAT visual weed control rating indicates 20.6% control of CT present. Since crop tolerance ratings, weed control ratings and yield collection could not be completed in 2009, no solid conclusions can be made at this time regarding neither the tolerance of established seed alfalfa to, nor the control of CT by, Embutox applied with Pardner, both at the 1X rate.

BASAGRAN + REFLEX WITH AGRAL 90. Visual crop tolerance ratings observed 8 and 14 DAT indicate substantial injury at 56.9% and 50.0% respectively. Visual weed control ratings observed 8 and 14 DAT indicate sufficient control of CT present at 48.8% and 49.0% respectively. Since crop tolerance ratings, weed control ratings and yield collection could not be completed in 2009, no solid conclusions can be made at this time regarding neither the tolerance of established seed alfalfa to, nor the control of CT by, Basagran and Reflex at the 1X rate applied with Agral 90 non-ionic surfactant at 1L/1000L solution.

BASAGRAN + REFLEX WITH ASSIST. Visual crop tolerance ratings observed 8 and 14 DAT indicate no evidence of injury above 9% at 91.4% and 95.0% respectively. Visual weed control ratings observed 8 DAT indicate 20.1% control of CT present while the 14 DAT visual weed control rating indicates only 5.3% control of CT present. Since crop tolerance ratings, weed control ratings and yield collection could not be completed in 2009, no solid conclusions can be made at this time regarding neither the tolerance of established seed alfalfa to, nor the control of CT by, Basagran and Reflex at the 1X rate applied with Assist oil-based adjuvant at 0.5L/100L solution.

ODYSSEY + REFLEX WITH AGRAL 90. Visual crop tolerance ratings observed 8 and 14 DAT indicate substantial injury at 30.6% and 23.8% respectively. Visual weed control ratings observed 8 and 14 DAT indicate moderate control of CT present at 26.9% and 29.0% respectively. Since crop tolerance ratings, weed control ratings and yield collection could not be completed in 2009, no solid conclusions can be made at this time regarding neither the tolerance of established seed alfalfa to, nor the control of CT by, Odyssey and Reflex at the 1X rate applied with Agral 90 non-ionic surfactant at 1L/1000L solution.

ODYSSEY + REFLEX WITH ASSIST. Visual crop tolerance ratings observed 8 and 14 DAT indicate substantial injury at 39.4% and 28.1% respectively. Visual weed control ratings observed 8 DAT indicate 33.1% control of CT present while the 14 DAT visual weed control rating indicates 23.8% control of CT present. Since crop tolerance ratings, weed control ratings and yield collection could not be completed in 2009, no solid conclusions can be made at this time regarding neither the tolerance of established seed alfalfa to, nor the control of CT by, Odyssey and Reflex at the 1X rate applied with Assist oil-based adjuvant at 0.5L/100L solution.

2X BASAGRAN FORTE + 3X SOLO. Recall that this treatment was only executed on the Broad Valley site. Visual crop tolerance ratings observed 8 DAT indicate substantial injury at 72.5%, however at 14 DAT crop tolerance observed was less than 8% at

92.5%. Visual weed control ratings observed 8 DAT indicate 23.8% control of CT present while the 14 DAT visual weed control rating indicates 11.3% control of CT present. Since crop tolerance ratings, weed control ratings and yield collection could not be completed in 2009, no solid conclusions can be made at this time regarding neither the tolerance of established seed alfalfa to, nor the control of CT by, Basagran Forte at the 2X rate applied with Solo at the 3X rate.

1X BASAGRAN FORTE + 1.5X SOLO. Recall that this treatment was erroneously executed on the Rosenburg site. Visual crop tolerance ratings observed 8 DAT indicate substantial injury at 51.3% and crop injury decreased somewhat by 14 DAT to 78.8%. Visual weed control ratings observed 8 DAT indicate 57.5% control of CT present while at 14 DAT visual weed control ratings indicate 28.8% control of CT present. Since crop tolerance ratings, weed control ratings and yield collection could not be completed in 2009, no solid conclusions can be made at this time regarding neither the tolerance of established seed alfalfa to, nor the control of CT by, Basagran Forte at the 1X rate applied with Solo at the 1.5X rate.

Conclusions/Recommendations: While these trials were conducted under non-ideal conditions, the results presented here may give us an idea of crop response during adverse years. However, since no yield data could be collected, we unfortunately cannot form a concrete opinion about the true effect of each herbicide in typical production conditions. As such, the MFSA will include these treatments in the 2010 trials to get a better understanding of the true potential of these herbicides for control of Canada thistle in seed alfalfa.

Acknowledgments: We would like to thank the producers who have agreed to let us conduct these trials on their land: Stuart Woloshyn and Richard Chomokovski. The MFSA could not carry out our research without the generous donations of our producers! Further, the MFSA would like to thank the chemical companies that have generously donated sample product for our 2009 timothy trials: thank you to Bayer Crop Sciences, Syngenta, BASF and Nufarm. Finally, thank you to Prairies East Sustainable Agriculture Initiative (PESAI) for providing funding for this project.

6.2: TOLERANCE OF SELECT HERBICIDES IN ESTABLISHED PERENNIAL RYEGRASS PRODUCED FOR SEED

Background/Objective: Japanese brome (JB) and downy brome (DB) are two relatively ‘new’ weeds which have recently become invasive in Canada, and more specifically in the Southern part of Manitoba. These winter annuals began as a problem in winter wheat fields in the United States and since they are very similar in appearance to winter wheat and are thus hard to identify, in some areas they proliferated rapidly. These types of massive infestations gave these brome weeds a good start and once they are harvested with the host crop, the seeds were easily transferred from field to field via harvest equipment, with reports of JB and DB showing up in many other cereal crops such as fall rye, barley and oats.

Given their highly competitive nature it was only a matter of time before these weeds started showing up in forages: the longevity of forage seed stands give the weedy bromes an advantage over traditional annual cereal crops since they are established for much longer, giving the weeds years to establish and reproduce. In legume forage seed crops such as birdsfoot trefoil and alfalfa, grassy weeds are easily identified and usually controlled with a regular management program regardless of their species, however in forage grass seed crops like perennial ryegrass, timothy and fescue, not only are there are little or no options for grass control, but physically spotting and identifying these grassy weeds is extremely difficult.

If suitable options are found through these trials, the Manitoba Forage Seed Association can present these efficacious herbicides for registration through the Canadian Pest Management Centre's (PMC) Minor Use Priority Setting Program (see http://www.agr.gc.ca/prrmup for more information) to ensure producers have the tools they need to properly manage their perennial ryegrass stands.

The objective of this report is to present the results from the 2009 Manitoba Forage Seed Association in-field perennial ryegrass seed herbicide trials and report the tolerance of perennial ryegrass grown for seed to herbicides Sencor (metribuzin: 75%), Axial (pinoxaden: 200 g/L), Velocity M3 (thiencarbazone-methyl: 10g/L + pyrasulfotole: 37.5 g/L + bromoxynil: 210 g/L) and Infinity (pyrasulfotole: 37.5 g/L + bromoxynil: 210 g/L) which have exhibited and or are registered for control or suppression of Japanese and or downy brome in other similar crops, when applied in early spring on an established perennial ryegrass seed stand.

Project Activities: In 2009 the herbicide trials on perennial ryegrass grown for seed consisted of 2m by 6m plots replicated four times in a random complete block design situated in producer fields. The trial was carried out in two locations, one just outside of Beausejour, Manitoba and one near Brokenhead, Manitoba. The Beausejour site was a first year production field with mainly imperfectly drained clayey soils and few small areas of high organic matter. The Brokenhead site was a first year production field with imperfectly drained organic soils and a few small coarse loamy areas.

Both areas experienced unseasonably cold temperatures and excess moisture for the entirety of the spring prior to herbicide application as well as the remainder of the summer and early fall. Local mean monthly temperatures recorded near Beausejour for the 2009 growing season were below historical normals for May (8.3°C versus 12.0°C), June (15.6°C versus 17.0°C), July (16.5°C versus 19.5°C), August (17.2°C versus 18.5°C) and October (3.3°C versus 5.3°C) with greater than normal precipitation in June (91.6 mm versus 90.8 mm), July (113.7 mm versus 70.4 mm), August (105.8 mm versus 74.8 mm) and October (63.2 mm versus 45.7 mm). Further, on 6 June 2009, there was a severe frost in several areas of eastern and south-eastern Manitoba, including the areas where these two plots were located, causing significant crop damage in some cases.

Treatments were applied on 18 June 2009. This was later than preferable based on the crop staging (perennial ryegrass: 6 to 10 inches), however night-time temperatures continued to drop near to zero up until this point and effects on herbicide efficacy and

crop tolerance were concerns. A bike sprayer with C02 propellant was used for applying the treatments with TeeJet XR8001 nozzles.

Treatments included the 1X and 2X rates of Sencor, Velocity M3 and Infinity and the 1X rates of Axial. All treatments were applied at 98 litres solution per hectare ("10 gallons/acre" or "40 litres/acre"). See Table 2 for confirmation of application rates and solution amounts.

Crop tolerance and weed control ratings are done visually, are based on a scale of 0 to 100 and are normally taken approximately every 7 days after treatment (DAT). Visual crop tolerance ratings of '0%' indicate zero crop tolerance to the herbicide (complete kill of the crop) whereas a visual crop tolerance rating of '100%' indicates 100 percent crop tolerance (no visible negative herbicide effect on the crop).

Initial intentions were to conduct this trial on both sites and treatments were applied to both the Beausejour and Brokenhead sites. However, the extreme adverse weather during the spring of 2009 along with underlying damage caused by the severe frost the first week of June 2009 left the Brokenhead site in an unusable state. This site was terminated at the time of the first tolerance rating, 25 June 2009 and work continued only on the Beausejour site.

Table 2. Perennial Reygrass herbicide trial - Products and rates.

Treatment	Product	Rate
1	**Sencor 1X**	111 g/ac
2	**Sencor 2X**	222 g/ac
3	**Axial 1X**	243 mL/ac
4	**Velocity MC 1X**	
	Velocity	0.2 L/ac
	Velocity 2	0.33L/ac
5	**Velocity MC 2X**	
	Velocity	0.4 L/ac
	Velocity 2	0.66 L/ac
6	**Infinity 1X**	0.33 L/ac
7	**Infinity 2X**	0.66 L/ac

NOTE: All treatments will be sprayed using 98 L solution per hectare.

Results/Observations: This section includes statistical yield analyses as determined by AgroBase 20 software, as well as non-statistically derived averages of crop tolerance and percent of check yields determined to give an indication of the overall effect of each treatment. The summaries below take into consideration the observations made and data collected from the date of application to the date of harvest on 11 August 2009 for the Beausejour site only.

SENCOR. Visual crop tolerance ratings observed 7 days after treatment (DAT) indicate substantial injury at the 1X and 2X rate of up to 25% (81.3% and 75.0% respectively). Ratings taken 14 DAT indicate somewhat reduced levels of injury at 85.0% and 87.5% respectively however injury levels decrease to less than 7% by 26 DAT at 93.8% and 98.8% respectively. Sencor at the 1X rate yielded 966.83 kilograms per hectare and at the 2X rate yielded 866.83 kg/ha which translates to 55.7% and 49.9% of check yield respectively, both of which are significantly lower (P=0.05) than the untreated weed free check yield of 1735.77 kg/ha. These results indicate that under the growing conditions experienced in Beausejour, Manitoba in 2009, established perennial ryegrass was not tolerant to spring applied Sencor.

VELOCITY M3. Visual crop tolerance ratings observed 7 DAT indicate substantial injury at the 1X and 2X rate of up to 23% (80.0% and 77.5% respectively). Ratings taken 14 DAT indicate substantial injury at 65.0% and 55.0% respectively and injury levels do not seem to increase past this point and 26 DAT where injury levels were observed at 66.3% and 56.3% respectively. Velocity M3 at the 1X rate yielded 82.27 kg/ha and at the 2X rate yielded 30.90 kg/ha which translates to 4.7% and 1.7% of check yield respectively, both of which are significantly lower (P=0.05) than the untreated weed free check yield of 1735.77 kg/ha. These results indicate that under the growing conditions experienced in Beausejour, Manitoba in 2009, established perennial ryegrass was not tolerant to spring applied Velocity M3.

INFINITY. Visual crop tolerance ratings observed 7 DAT indicate injury at the 1X and 2X rate of less than 10% (90.0% and 93.8% respectively). Ratings taken 14 DAT indicate further reduced levels of injury at 93.8% and 98.8% respectively. Injury levels decrease slightly for the 1X rate by 26 DAT to 96.3% and increase slightly for the 2X rate by 26 DAT to 95.0%. Infinity at the 1X rate yielded 1161.43 kg/ha and at the 2X rate yielded 1086.67 kg/ha which translates to 66.9% and 62.6% of check yield respectively, both of which are significantly lower (P=0.05) than the untreated weed free check yield of 1735.77 kg/ha. These results indicate that under the growing conditions experienced in Beausejour, Manitoba in 2009, established perennial ryegrass was not tolerant to spring applied Infinity.

AXIAL. Visual crop tolerance ratings observed 7 DAT indicate substantial injury of 25% at 75.0%. Injury increases dramatically to over 63% by 14 DAT (37.5%) but does decrease slightly with time by 26 DAT to 50%. Axial at the 1X rate yielded 20.07 kg/ha which translates to 1.2% of check yield, which is significantly lower (P=0.05) than the untreated weed free check yield of 1735.77 kg/ha. These results indicate that under the growing conditions experienced in Beausejour, Manitoba in 2009, established perennial ryegrass was not tolerant to spring applied Axial.

Conclusions/Recommendations: While these trials were conducted under non-ideal conditions, the results presented here may give us an idea of crop response during adverse years. However, the MFSA will include these treatments in the 2010 trials to get a better understanding of the true potential of these herbicides for use in perennial ryegrass grown for seed.

Acknowledgments: We would like to thank the producers who have agreed to let us conduct these trials on their land: Dean and Brad Mroz and Rod Strecker. The MFSA could not carry out our research without the generous donations of our producers! Further, the MFSA would like to thank the chemical companies that have generously donated sample product for our 2009 timothy trials: thank you to Bayer Crop Sciences and Syngenta. Finally, thank you to Prairies East Sustainable Agriculture Initiative (PESAI) for providing funding for this project.

6.3: TOLERANCE OF SELECT HERBICIDES IN ESTABLISHED TIMOTHY PRODUCED FOR SEED

Background/Objective: Night flowering catch fly (NFCF) is a broadleaf weed which produces a seed similar in shape and size to Timothy seed. The presence of NFCF in timothy reduces the value of the seed substantially and makes it extremely difficult to market.

Even though timothy and NFCF come from different physiological categories (grass versus broadleaf), the winter annual life cycle of NFCF makes it difficult to control in established timothy stands. Producers are often left searching for in-crop treatments of NFCF in order to avoid yield loss and quality reduction and to reduce the spread of NFCF within the field.

If suitable options are found through these trials, the Manitoba Forage Seed Association can present these efficacious herbicides for registration through the Canadian Pest Management Centre's (PMC) Minor Use Priority Setting Program (see http://www.agr.gc.ca/prrmup for more information) to ensure producers have the tools they need to properly manage their timothy stands.

The objective of this report is to present the results from the 2009 Manitoba Forage Seed Association in-field timothy seed herbicide trials and report the tolerance of seed timothy to herbicides Thumper (bromoxynil: 280 g/L +2,4 D ester: 280 g/L), Buctril M (bromoxynil: 280 g/L + MCPA ester: 280 g/L), Sencor (metribuzin: 75%), Estaprop Plus (dichloroprop: 300 g/L + 2,4-D ester: 282 g/L), Velocity M3 (thiencarbazone-methyl: 10g/L + pyrasulfotole: 37.5 g/L + bromoxynil: 210 g/L) and Infinity (pyrasulfotole: 37.5 g/L + bromoxynil: 210 g/L), which have exhibited and or are registered for control or suppression of Night Flowering Catch Fly (NFCF) in other crops, when applied in early spring on an established timothy seed stand.

Project Activities: In 2009 the herbicide trials on seed timothy consisted of 2m by 6m plots replicated four times in a random complete block design situated in producer fields. The trial was carried out in two locations, one near Hnausa, Manitoba and one near Fisherton, Manitoba. The Hnausa site was a fifth year production field with imperfectly drained clayey and organic soils. The Fisherton site is a second year production field with imperfectly drained clayey soils a few loamy sand and gravel ridges on the outskirts

of the field, as well as some low-lying areas of high organic content spread randomly within the field.

Both areas experienced unseasonably cold temperatures and excess moisture for the entirety of the spring prior to herbicide application as well as the remainder of the summer and early fall. Regarding the Hnausa site, local mean monthly temperatures recorded for the 2009 growing season were below historical normals for May (7.2°C versus 10.5°C), June (14.6°C versus 15.7°C), July (16.3°C versus 18.3°C) and August (17°C versus 17. 1°C) with greater than normal precipitation in May (60.8 mm versus 48.4 mm), June (117.2 mm versus 76.9 mm) and August (147.8 mm versus 79.7 mm). Regarding the Fisherton site, local mean monthly temperatures recorded for the 2009 growing season were below historical normals for May (6.7°C versus 10.0°C), June (14.3°C versus 15.2°C), July (15.4°C versus 17.8°C) and August (15.9°C versus 16.4°C) with greater than normal precipitation in May (82.5 mm versus 55.1 mm), June (105.8 mm versus 84.8 mm), July (97.8 mm versus 67.2 mm) and August (109.0 mm versus 75.7 mm).

Treatments were applied on 16 and 19 June 2009 respectively. This was later than preferable based on the crop staging (timothy 12 and 8 inches respectively), however night-time temperatures continued to drop near to zero up until this point and effects on herbicide efficacy and crop tolerance were concerns. A bike sprayer with C02 propellant was used for applying the treatments with TeeJet XR8001. Treatments included the 1X and 2X rates of Thumper, Estaprop Plus, Velocity M3 and Infinity and the 1X rates of Buctril M and Sencor. All treatments were applied at 98 litres solution per hectare (“10 gallons/acre” or “40 litres/acre”). See Table 3 for confirmation of application rates and solution amounts.

Crop tolerance and weed control ratings are done visually, are based on a scale of 0 to 100 and are normally taken approximately every 7 days after treatment application (DAT). Visual crop tolerance ratings of ‘0%’ indicate zero crop tolerance to the herbicide (complete kill of the crop) whereas a visual crop tolerance rating of ‘100%’ indicates 100 percent crop tolerance (no visible negative herbicide effect on the crop).

Table 3. Timothy herbicide trial - Products and rates.		
Treatment	**Product**	**Rate**
1	**Thumper 1X**	0.4 L/ac
2	**Thumper 2X**	0.8L/ac
3	**Buctril M**	0.4 L/ac
4	**Sencor**	111 g/ac
5	**Estaprop Plus 1X**	0.71 L/ac
6	**Estaprop Plus 2X**	1.42 L/ac
7	**Velocity MC 1X**	
	Velocity	0.2 L/ac
	Velocity 2	0.33L/ac
8	**Velocity MC 2X**	
	Velocity	0.4 L/ac
	Velocity 2	0.66 L/ac
9	**Infinity 1X**	0.33 L/ac
10	**Infinity 2X**	0.66 L/ac
NOTE: All treatments will be sprayed using 98 L solution per hectare.		

Results/Observations: This section includes statistical yield analyses as determined by AgroBase 20 software, as well as non-statistically derived averages of crop tolerance and percent of check yields determined to give an indication of the overall effect of each treatment. The summaries below take into consideration only the observations made and data collected from the date of application to the date of harvest on 25 August 2009 for the Hanusa site. The Fisherton site yielded extremely poorly and summaries on the observations made and data collected can be found in Appendix A: “Results & Observations – Fisherton Site only”.

THUMPER. Visual crop tolerance ratings observed 9 days after treatment (DAT) indicate moderate injury at the 1X and 2X rate of less than 23% (88.1% and 94.4% respectively). Ratings taken 17 DAT indicate slightly increased levels of injury at 81.3% and 91.3% respectively. Thumper at the 1X rate yielded 462.07 kilograms per hectare, which translates to 91.2% check yield and is statistically comparable to the untreated weed free check yield of 506.53 kg/ha. However Thumper at the 2X rate yielded 406.27 kg/ha, which translates to 80.2% of check yield, and is significantly lower (P=0.05) than the untreated weed free check yield of 506.53 kg/ha. These results indicate that under the growing conditions experienced in Hnausa, Manitoba in 2009, established timothy was tolerant to spring applied Thumper at the 1X rate, but not at the 2X rate.

ESTAPROP PLUS. Visual crop tolerance ratings observed 9 DAT indicate moderate injury at the 1X and 2X rate of less than 17% (90.0% and 83.1% respectively). Ratings taken 17 DAT indicate increased levels of injury at 85.0% and 73.8% respectively. Estaprop Plus at the 1X rate yielded 251.33 kg/ha and at the 2X rate yielded 245.47 kg/ha which translates to 49.6% and 48.5% of check yield respectively, both of which are

significantly lower (P=0.05) than the untreated weed free check yield of 506.53 kg/ha. These results indicate that under the growing conditions experienced in Hnausa, Manitoba in 2009, established timothy was not tolerant to spring applied Estaprop Plus.

VELOCITY M3. Visual crop tolerance ratings observed 9 DAT indicate substantial injury at the 1X and 2X rate of more than 33% (73.1% and 67.5% respectively). Ratings taken 17 DAT indicate unacceptable levels of injury at 17.5% and 16.3% respectively. Velocity M3 at the 1X rate yielded 3.87 kg/ha and at the 2X rate did not produce any seed, which translates to 0.76% and 0% of check yield respectively, both of which are significantly lower (P=0.05) than the untreated weed free check yield of 506.53 kg/ha. These results indicate that under the growing conditions experienced in Hnausa, Manitoba in 2009, established timothy was not tolerant to spring applied Velocity M3.

INFINITY. Visual crop tolerance ratings observed 9 DAT indicate moderate injury at the 1X and 2X rate of less than 11% (96.3% and 89.4% respectively). Ratings taken 17 DAT indicate slightly increased levels of injury at 95.0% and 88.8% respectively. Infinity at the 1X rate yielded 426.60 kg/ha, which translates to 84.2% check yield and is statistically comparable to the untreated weed free check yield of 506.53 kg/ha, however Infinity at the 2X rate yielded 405.50 kg/ha, which translates to 80.1% of check yield, and is significantly lower (P=0.05) than the untreated weed free check yield of 506.53 kg/ha. Infinity is already registered for use on timothy for labelled weeds and was primarily included in this trial as an industry standard. These results indicate that under the growing conditions experienced in Hnausa, Manitoba in 2009, established timothy was tolerant to spring applied Infinity at the 1X rate, but not at the 2X rate, which concurs with the product label application rates.

BUCTRIL M. Visual crop tolerance ratings observed 9 DAT indicate no evidence of injury over 5% at 96.3% and less than 7% injury at 17 DAT little injury at 93.8%. However, Buctril M (at the 1X rate) yielded only 334.17 kg/ha, which translates to 66.0% check yield and is significantly lower (P=0.05) than the untreated weed free check yield of 506.53 kg/ha. While Buctril M is already registered for use on established timothy for labelled weeds and was primarily included in this trial as an industry standard, label directions indicate spraying prior to flag leaf emergence is optimal and due to the late spring the flag leaf may have been exposed at the time of application. This may explain why these results indicate that under the growing conditions experienced in Hnausa, Manitoba in 2009, established timothy was not tolerant to spring applied Buctril M. even though it has been registered for this use. This scenario is a good example of why the MFSA will be repeating many of their herbicide treatments in 2010.

SENCOR. Visual crop tolerance ratings observed 9 DAT indicate virtually no injury at 98.1% and injury increases only slightly to 93.8% by 17 DAT. However, Sencor (at the 1X rate) yielded only 336.93 kg/ha which translates to 66.5% of check yield, which is significantly lower (P=0.05) than the untreated weed free check yield of 506.53 kg/ha. These results indicate that under the growing conditions experienced in Hnausa, Manitoba in 2009, established timothy was not tolerant to spring applied Sencor.

Conclusions/Recommendations: While these trials were conducted under non-ideal conditions, the results presented here may give us an idea of crop response during adverse years. However, the MFSA will include these treatments in the 2010 trials to get a better understanding of the true potential of these herbicides for use in seed timothy.

Acknowledgments: We would like to thank the producers who have agreed to let us conduct these trials on their land: Kelvin Einarson and Don Cymbalisty. The MFSA could not carry out our research without the generous donations of our producers! Further, the MFSA would like to thank the chemical companies that have generously donated sample product for our 2009 timothy trials: thank you to Bayer Crop Sciences and Nufarm. Finally, thank you to Prairies East Sustainable Agriculture Initiative (PESAI) for providing funding for this project.

APPENDIX A – RESULTS & OBSERVATIONS – FISHERTON SITE ONLY

This section includes statistical yield analyses as determined by AgroBase 20 software, as well as non-statistically derived percent of check yields determined to give an indication of the overall effect of each treatment. The summaries below take into consideration only the observations made and data collected from the date of application to the date of harvest on 31 August 2009 for the Fisherton site. Recall that this site yielded extremely poorly and is assumed to be non-representative of typical herbicide effect.

THUMPER. Thumper at the 1X rate yielded 130.00 kg per hectare and at the 2X rate yielded 112.50 kg/ha which translates to 125.8% and 108.9% check yield respectively, and is statistically comparable to the untreated weed free check yield of 103.33 kg/ha. These results indicate that under the growing conditions experienced in Fisherton, Manitoba in 2009, established timothy was tolerant to spring applied Thumper .

ESTAPROP PLUS. Estaprop Plus at the 1X rate yielded 84.17 kg/ha, which translates to 81.5% check yield and is statistically comparable to the untreated weed free check yield of 103.33 kg/ha. However Estaprop Plus at the 2X rate yielded 61.67 kg/ha, which translates to 59.7% of check yield, and is significantly lower (P=0.05) than the untreated weed free check yield of 103.33 kg/ha. These results indicate that under the growing conditions experienced in Fisherton, Manitoba in 2009, established timothy was tolerant to spring applied Estaprop Plus at the 1X rate, but not at the 2X rate.

VELOCITY M3. Velocity M3 at the 1X rate yielded 1.67 kg/ha and at the 2X rate did not produce any seed which translates to 1.6% and 0% check yield respectively, and is statistically lower (P=0.05) than the untreated weed free check yield of 103.33 kg/ha. These results indicate that under the growing conditions experienced in Fisherton, Manitoba in 2009, established timothy was not tolerant to spring applied Velocity M3.

INFINITY. Infinity at the 1X rate yielded 100.83 kg/ha and at the 2X rate yielded 98.33 kg/ha which translates to 97.6% and 95.2% check yield respectively, and are statistically comparable to the untreated weed free check yield of 103.33 kg/ha. Infinity is already registered for use on timothy for labelled weeds and was primarily included in this trial as an industry standard. These results indicate that under the growing conditions experienced in Fisherton, Manitoba in 2009, established timothy was tolerant to spring applied Infinity.

BUCTRIL M. Buctril M (at the 1X rate) yielded 77.5 kg/ha, which translates to 75.0% check yield and is statistically comparable to the untreated weed free check yield of 103.33 kg/ha. Buctril M is already registered for use on established timothy for labelled weeds and was primarily included in this trial as an industry standard. These results indicate that under the growing conditions experienced in Fisherton, Manitoba in 2009, established timothy was tolerant to spring applied Buctril M.

SENCOR. Sencor (at the 1X rate) yielded 91.67 kg/ha, which translates to 88.7% check yield and is statistically comparable to the untreated weed free check yield of 103.33 kg/ha. These results indicate that under the growing conditions experienced in Fisherton, Manitoba in 2009, established timothy was tolerant to spring applied Sencor.

PROJECT #7: 2009 MFSA SUMMER TOUR

Lead Partner: Manitoba Forage Seed Association (MFSA)

Allotted Funding from PESAI: $1150

PESAI Funding Spent: $1150

Total Project Cost: $7652

Contributors: MFSA Staff; Seed, Trade & Chemical Companies; Producers; Speakers

Background/Objective: To introduce producers to the various grass and legume seed crops that can be successfully grown in Manitoba and provide the opportunity to showcase the many agronomic benefits of incorporating them into crop rotations. Many farmers using forages seed crops have experience benefits such as increased soil quality; better water filtration and internal drainage; less disease in subsequent cereal crops and an increase in yields in subsequent crops. Numerous production systems and practices will be discussed. Participants will be given the opportunity to ask questions and interact with other growers, researchers and extension staff. Another component of the tour is to discuss current research being conducted in the industry. We will also feature speakers that will address current issues such as excessive moisture etc.

Results/Observations: Approximately 55 producers and industry partners joined the tour. The tour was very diversified, discussing production strategies for both grass seed and legume seed fields.

The tour was promoted through our industry magazine, “Forage Seed Association”, advertised in the MB Cooperator as well as a mail-out.

Conclusions/Recommendations: The summer tour is an excellent opportunity to bring producer and industry together to share information and discuss opportunities. It provides a vehicle for MFSA to discuss ongoing research and share results and possible solution to problems. In order for the forage seed industry to grow and reach its’ full potential it is important to provide a forum for both discussion and the sharing of ideas. The MFSA summer tour does just that.

PROJECT #8: ATTENDANCE AT MINOR USE REGISTRATION MEETINGS 2010

Lead Partner: Manitoba Forage Seed Association (MFSA)

Allotted Funding from PESAI: $1820

PESAI Funding Spent: $2472

Total Project Cost: $6050

Contributors: MFSA

Background/Objective: Each year the MFSA dedicates a portion of its research program towards the testing of potential pesticides on forage seed crops. The discovery of effective herbicides, insecticides and fungicides all for use in the forage seed industry helps to not only provide more management options for producers but also to reduce the use of less effective or unregistered products which producers may be forced to use due to a lack of better options. Since the forage see industry accounts for such a small part of the agriculture sector, chemicals companies often won't initiate the work required by the Canadian Pest Management Regulatory Agency in order to register these pesticide on forage seed crops in Canada as it is not worth their investment for the small percentage of producers who would benefit from this information.

The Annual Minor Use Priority Setting Meeting and Workshop is designed to alleviate this problem for small interest groups like forage seed producers and provide them with the resources necessary to make their needs heard. The meetings are held annually in Ottawa and provide a huge networking resource for small interest groups from across the country and allow them to connect with the appropriate government officials, respective chemical company representatives and researchers from across the country.

The MFSA attends each year, representing forage seed growers from Manitoba and in some cases forage growers as well, to defend their needs in the chemical industry for further research and registration of efficacious pesticides.

The objective of this report is to present the forage seed related achievements from the 2010 Annual Minor Use Pesticide Priority Setting meetings which took place in Ottawa, Ontario on March 22 to 26th 2010.

Project Activities: The Canadian Minor Use Pesticide Priority Setting Workshop is an annual conference put on by the Canadian Pest Management Centre (PMC) designed to bring government, industry and producers together to identify areas where more chemical pest control options are needed in low acreage and specialty crops (Minor Use areas). The meetings are held in Ottawa ON and run over the course of three days, with one day allotted each to herbicides, insecticides and fungicides.

The meetings begin with information sessions on program developments and changes from the PMC followed by presentations from industry on new products and current

research. The main portion of each meeting is allotted to designating the crop / pest entries into national 'A', 'B' and 'C' priorities. These crop / pest entries are submitted to PMC several months prior to these meetings by the Provincial Minor Use Coordinator from each province after they have met with producer groups and representatives to identify which management problems are a large concern and the solutions they want to submit for consideration.

As a group, the attendees work through the list to voice their concerns about each crop / pest combination, noting whether it is a priority to them. The goal is to try to keep the first round selections to about 65. Representatives in attendance for each crop group / organization will take responsibility for certain crop / pest combinations and will speak on its' behalf throughout the sessions.

Once the first round is complete, time is given to attendees to discuss the selected issues to see if Registrant based research is already underway or in the works (chemical company initiated research) or if similar projects have previously been submitted, started or completed in the United States (IR-4) and if they might have applicability here in Canada (PMC).

Following this discussion session, the 'C' and 'B' Priorities are designated. The 65 previous selections will be reviewed, one at a time and representatives will proclaim whether they are willing to let the selection remain as a 'C' or if the crop /pest combination is severe enough to be upgraded to a 'B' priority. The goal is to choose 25 of the first round selections to move up to 'B' priority, with the remaining 40 to be designated as 'C'. Another discussion session will ensue for representatives to determine other possible solutions for their selections and or other research available to further their case.

Finally, the 25 'B' priorities will be reviewed by all those in attendance and representatives will argue their case as to why their crop / pest combination is an 'A' priority and needs to be pursued by PMC. 10 crop / pest combinations will be selected in the end and will be entered into PMC's research schedule. These 10 crop / pest combination along with their 1st and 2nd choice solutions will be properly investigated by PMC and Minor Use registration will ensue once work is complete.

Along with the 10 'A' priorities, this process will bring to light a maximum of 2 possible 'A' Priority Without Solution (APWS) projects. The APWS selections will be investigated by PMC and if a solution is found, it will be automatically entered as an 'A' priority for the following year.

Results/Observations:

23 March 2010 – Insecticide Priority Setting

1. Manitoba Forage Seed Association (MFSA) with Prairie Region Forage Seed Association (PRFSA) reached 'A' priority without solution status for Clover looking at the control of Red Clover Casebearer Moth. No potential solutions

were provided as a requirement for APWS projects is for PMC to conduct a screening trial. Grower contact: Calvin Yoder, AAFRD. Company Contact: TBD. Section head: Sheryl Lonsbary. Project Lead: TBD.

2. MFSA reached 'B' priority status for annual ryegrass looking at control of army cutworm and 'C' priority status was also achieved for bromegrass, fescue and timothy for army cutworm. The pursuit of 'A' priority status was abandoned since even thought the controls we currently have for this pest are not as efficacious as they could be, there are multiple control options currently registered leaving our chances of priority upgrade very small.

    a. This priority has led to the initiation of a working group being developed to help forage seed producers cope with the removal of Lorsban (as well as Furadan) as they are going to be removed from the market in the near future. We are currently setting up a contact list for interested parties and are working with PMC Project Officer Rosa Aiello to find other potential controls and get registrations carried out on them.

3. A 'B' priority was achieved by Ontario's Provincial Minor Use Coordinator (PMUC) for control of European Crane Fly larvae in forage grasses.

4. Alberta's PMUC Jim Broatch achieved a 'C' priority for Bromegrass looking at control of the Silvertop vector. As in 2009, the pursuit of 'B' or 'A' status was abandoned as there is still a great amount of uncertainty as to the exact vector of Silvertop and without a definite pest, the problem cannot be submitted. Further research needs to be done in determining the exact vector before a submission can be made.

5. Alberta's PMUC Jim Broatch achieved a 'C' priority for Clover looking at control of Lesser Clover Weevil. Since there were many other more pressing priorities, the pursuit of 'B' or 'A' status was abandoned.

24 March 2010 – Fungicide Priority Setting

1. MFSA achieved 'B' priority status for alfalfa, including seed production, for control of spring black stem / sclerotinia. While pursuit of 'B' or 'A' status was abandoned, information was gathered from Tobias Laengle, a representative from PMC, about a new biopesticide, Contans, that has labeled control of sclerotinia. This is something that may be pursued to determine its efficacy in the future.

2. MFSA achieved 'C' priority status for perennial and annual ryegrass, tall fescue and timothy seed production for control of stem and leaf spot. BASF has indicated that some efficacy work has been done on grasses with Headline in the

US and there may be potential to transfer some data to Canada, shortening the time line substantially. This is something that may be pursued in the future.

3. MFSA achieved ‘C’ priority status for alfalfa for control of stem and crown rot however in the interest of achieving several ‘A’ priorities in the other disciplines, abandoned the pursuit of an ‘A’ or ‘B’ ranking.

25 March 2010 – Herbicide Priority Setting

1. Saskatchewan’s PMUC, Ray McVickar achieved ‘A’ priority for Perennial Ryegrass, seeding and established: control of broadleaf weeds including Group 2 resistant Kochia. 1st choice solution is Infinity (Bayer). Grower contact: Laura Grzenda, MFSA. Company Contact: Nancy Delaney. Project Lead: TBD. 2nd choice solution Frontline (Dow). Grower contact: Laura Grzenda, MFSA. Company Contact: Al McFadden. Project Lead: TBD.

2. Calvin Yoder (AAFRD) on behalf of the PRFSA achieved ‘A’ priority for Clover, seeding and established looking at control of grassy weeds. 1st choice solution of Assure II (DuPont). Grower contact: Calvin Yoder, MRFSA. Company Contact: Bill Summers. Project Lead: TBD. 2nd choice solution Select (Bayer). Grower contact: Laura Grzenda, MFSA. Calvin Yoder, PRFSA. Company Contact: Nancy Delaney. Project Lead: TBD.

3. MFSA achieved ‘B’ priority stsuas for Perennial Ryegrass looking at control of Foxtail Barley. Also, ‘C’ priorities were achieved for foxtail barely in Timothy, Bromegrass, Fescue and Wheatgrass (seedling and established for seed production). While an ‘A’ priority was not pursued, a speech was made to all those in attendance emphasizing the economic importance of this weed and the impact in all crops, not just forage seeds. A request was made that registrants be highly aware of the potential devastation this weed can cause and a plea was made to them to come forward with any and all suggestions that may have potential to control this weed. Two registrants were particularly interested and did come forward with suggestions and an offer to work together in the future. This will be investigated in the near future.

4. Marc Clément, Agronomist with Ministère de l'Argriculture, des Pêcheries et de l'Alimentation Québec (MAPAQ) (Quebec Department of Argriculture, the Fisheries and Food) achieved ‘B’ priority status for Switchgrass looking at control of control of grassy weeds, weeds and broadleaf weeds.

5. MFSA achieved ‘B’ priority status for Alfalfa looking at control of broadleaf weeds including Canada Thistle. This priority was based on the potential registration of Viper (BASF) for control of Canada thistle in Alfalfa however the rates of each component of Viper, which is a pre-packaged tank mix, are not ideal for control of this weed. BASF has indicated US data is available for Solo (the one component

that is not registered for use on Alfalfa) however until industry can determine which rates will work, we could not move this priority ahead to an ‘A’ or ‘B’.

6. Rudy Esau, on behalf of the Prairie Minor Use Consortium working in part with Wayne Goertzen form the Saskatchewan Alfalfa Seed Producers Association achieved a ‘B’ priority for alfalfa, established for seed production looking at growth regulators to enhance seed production and retard vegetative growth in cool wet years.

7. Calvin Yoder (AAFRD) on behalf of the PRFSA achieved ‘C’ priority for Clover, red and alsike, seedling and established for seed production: control of broadleaf and grassy weeds.

8. A ‘C’ priority was achieved by Ontario’s PMUC for:

    a. Hayland: control of Tall Buttercup

    b. Big Bluestem: control of grassy weeds

    c. Miscanthus: control of grassy weeds

Communications: This project will be publicized throughout the year in many different ways. Articles with project details will be submitted in each of the spring/summer, fall and winter 2010 editions of the Forage Seed News. This magazine is sent to hundreds of producers, industry representatives and research staff across Manitoba and neighbouring provinces and states.

A presentation will be given at the Annual Manitoba Forage Seed Association Conference in Winnipeg, Manitoba in 11 January 2011 including information on the progress of this project. The audience consisted mainly of producers along with trade and industry representatives as well as University researchers and various government officials.

Results and updates will be posted on the Manitoba Forage Seed Association website – www.forageseed.net – which can be viewed by anyone with access to the internet.

Conclusions/Recommendations: Representation at the Annual Minor Use Pesticide Priority Setting meetings is absolutely crucial to producers in our industry in that without someone in attendance willing to speak on their behalf, their concerns would not be addressed.

Through participation in this program, the Manitoba Forage Seed Association is able to ensure our producers will have efficacious pesticides to use, which are safe for the environment and conform with government regulation. We could not allow for this high level of responsible and sustainable production without attendance at and participation in these annual meetings.

PROJECT #9: ZERO TANNIN FABABEAN DEMONSTRATION

Lead Partner: South Interlake Crop Testing Committee (SICTC)

Allotted Funding from PESAI: $945

PESAI Funding Spent: $775

Total Project Cost: $775

Contributors: SICTC, MAFRI Staff, Producer-Cooperator

Background/Objectives: This demonstration was intended to demonstrate a new crop opportunity in zero-tannin fababeans. Zero-tannin lines offer a new opportunity to produce a local high performance protein source for inclusion in animal feed. The trial compared new zero-tannin type cultivars to standard tannin type lines to display local adaptation and uncover any differences in these new lines.

Project Activities: A replicated trial of 4 fababean varieties, two zero-tannin and two conventional types were seeded at the MCVET trial site at Warren. The plots were provided the same agronomic treatments as the surrounding field of fababeans including inoculation and herbicide treatments. The summer tour at the Warren MCVET site provided a forum for growers to inspect the varieties and receive some background information on producing the crop.

Results/Observations: Despite a late seeding the fababean trial produced an impressive stand that showcased the varietal differences including plant height and relative maturities. Of particular interest was the obvious structural advantage of the Snowbird zero-tannin line in terms of producing a stand suited to direct harvesting when compared to the taller, poorer standing tannin lines.

Communications: Approximately 40 growers attended the field day where this trial was presented and growers had a chance to observe the varieties first hand.

Considerations/Recommendations: The trial effectively displayed how zero-tannin fababeans are locally adapted and highlighted the agronomic benefits of the new zero-tannin lines.

PROJECT #10: FLAX CULTIVAR FOOD QUALITY EVALUATION

Lead Partner: Eric P. Klassen – SS Johnson Seeds

Allotted Funding from PESAI: $1350

PESAI Funding Spent: $1500

Total Project Cost: $3000

Contributors: SS Johnson Seeds, MCVET

Background/Objective: Johnson Seeds purchases human consumption flaxseed on the basis of samples sent from producers. Samples must contain less than 5 per cent dark and/or immature seeds to be selected. It is difficult for Manitoba flax producers to produce flax with less than 5 per cent of these visually distinquishable poor quality seeds. A large part of this situation is due to environmental conditions - heavy dues, rainfall on mature fields, etc, but a recent study conducted by Dr. Dave McAndrew of the AAFC Morden Reseach Centre has shown that the cultivar effect is also significant (personal communication). He did his study on only a few cultivars, so it was felt that it would be good to follow up by evaluating more recently released cultivars.

The human consumption (HC) food quality flax market pays a premium to producers who can meet the standard. If the probability of having Manitoba Interlake produced flaxseed selected for the HC market can be increased by recommending specific cultivars, it should earn more revenue for Interlake producers and make flax production in the Interlake region more attractive. It will also allow Johnson Seeds to be more competitive by saving on freight costs incurred from purchasing seed from regions further west. The objective of the trial was to evaluate harvested flaxseed for human consumption (HC) quality; measuring the effects of cultivar, planting date and test location on seed quality.

Project Activities: A small plot (1.2 x 3m), four replication trial was conducted by Johnson Seeds at Arborg, MB in 2008 and 2009 using 10 flax cultivars, planted on May 17 and May 27, in 2008 and on May 29, in 2009. In addition, flax harvest samples for eight genotypes across eight Manitoba locations were received from the Manitoba Crop Variety Evaluation Trials (MCVET), in 2008. In 2009, seed samples were received from MCVET trials conducted at six Manitoba locations on six flax genotypes. HC quality was determined through a visually subjective rating system where a rating of three or less was considered acceptable, four or more was definitely not acceptable; and through a more objective system where the unacceptable seeds in a 5 or 10 gram sample were picked out and reported as a percentage of the whole sample. A sample is considered unacceptable if it has 5% or more unacceptable seeds. Three different individuals - the Johnson Seeds agronomist, seed processor and trader each subjectively rated the seed samples from the Arborg trials, although only the agronomist evaluated samples from all reps, so no statistical analysis could be performed on the ratings by the processor and trader.

Results/Observations: The weather in 2008 was cool and wet with a delayed start to the season in the Manitoba Interlake Region. Other regions of Manitoba were also below normal for temperature, but the level of moisture varied considerably between regions. Most of the regions suffered from rainfall during the harvest season, which will have adversely affected seed quality. In 2009, the spring was again late due to cool and wet conditions. Most trials had to be seeded late, with the Arborg MCVET flax trial not seeded until the middle of June. The summer continued to be well bellow normal for temperature, which further delayed crop development. Some above normal temperatures, along with dry conditions were experienced in September allowing the crops to mature and be harvested under good conditions, with the exception of the Arborg, MCVET trial, which could not be harvested until the end of October.

In both years, the Johnson Seeds Arborg small plot trial produced good reliable data with significant variety and seeding date effects seen for seed yield and other agronomic characteristics; and for HC seed quality. For the purpose of this report, only the effects on HC seed quality will be presented and discussed. In 2008, the cultivar and seeding date effects for HC seed quality were significant although the cultivar effect was not consistent between seeding dates, so the results of each planting date should be examined separately. Figure 1 shows the results of the HC quality analysis of the 10 cultivars planted on May 17, while Figure 2 includes the results from the May 27 seeding date. The coefficient of variation (CV), which expresses the proportion of variation in the data that cannot be explained, was quite a bit higher for the objective measure of bad seeds (26.3%) than the subjective rating system (9.3%). In 2009, the trial using the same cultivars as in 2008 was planted at the end of May. Significant results for both percent bad seeds and the seed quality rating were observed. The CV was again higher for per cent bad seeds (51.6%) than for the seed quality rating (7.4%). In certain seed samples it was quite clear as to which seeds were good and which were poor, while in other samples the line between good and poor seeds was not as distinct. The varieties also differed in their shade of brown seed colour. The variety Prairie Grande, for example, produced seeds so dark that even the good seeds looked too dark. This colour factor also made it more difficult to pick out only the darkest seeds.

Figure 3 shows the seed quality assessment results of the 2009 trial. The harvest conditions in 2009 were excellent, generally producing human consumption quality seed, except for the poorest cultivar. Analysis of the three trials combined showed a significant interaction effect between cultivar and year/planting date. This means that the cultivars did not produce entirely consistent results for seed quality in the different trials, so only the individual trial data are presented here. Although in general, the cultivars CDC Sorrel, Lightning, Macbeth and Prairie Blue produced the best seed quality in 2008, with Prairie Grande consistently producing the poorest quality. In 2009, all that really can be said is that Prairie Grande rated the poorest for seed quality. In 2008, the subjective ratings made independently by three different individuals were not entirely consistent with each other or with the more objective bad seeds per cent, while in 2009 the ratings were more consistent. This is likely because most of the samples in 2008, were in the marginal area for seed quality, as is not uncommon for the Manitoba Interlake Region, while in 2009, with the better quality, the samples were easier to rate.

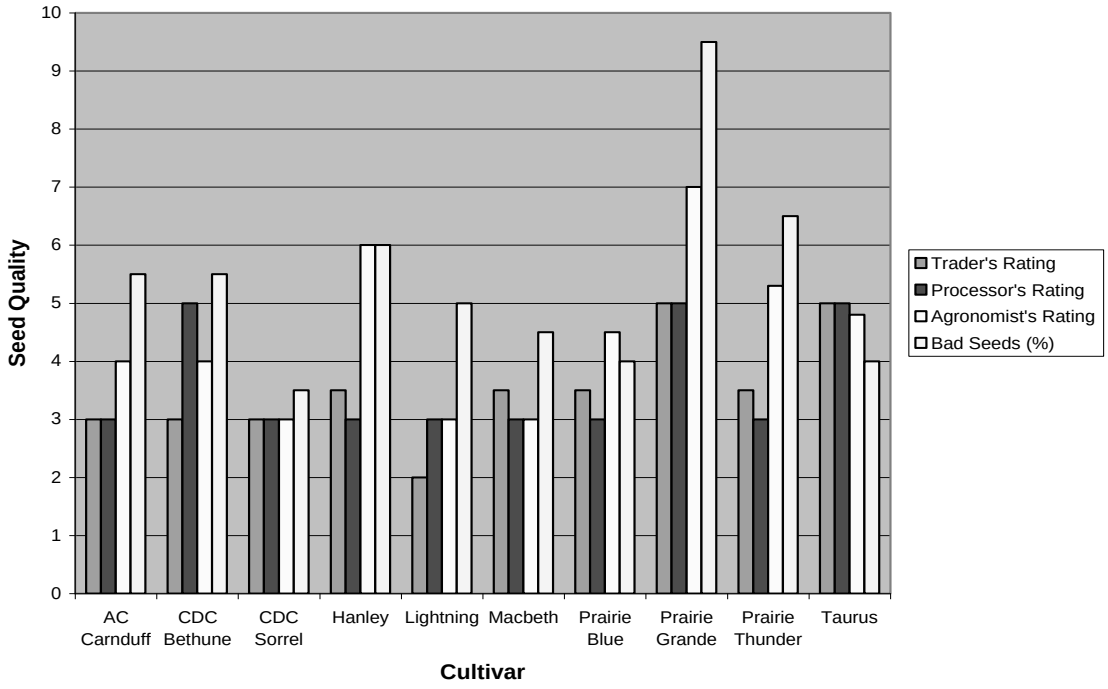

Figure 1: Flax Cultivar HC Seed Quality Analysis for May 17, 2008 Planting Date; Arborg

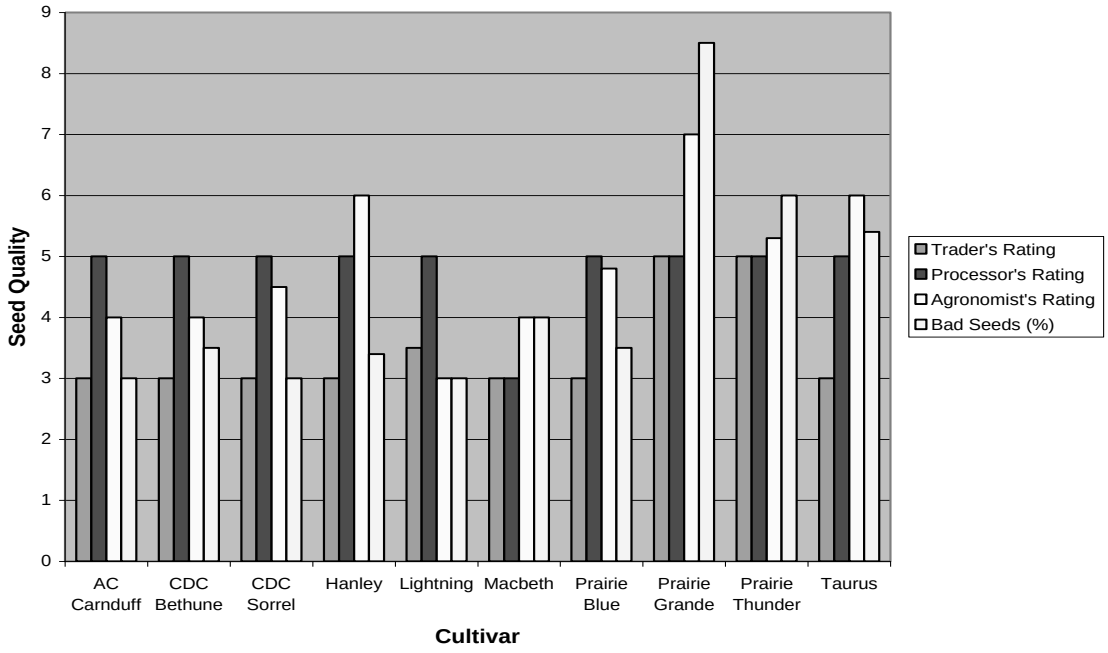

Figure 2: Flax Cultivar HC Seed Quality Analysis for May 27, 2008 Planting Date; Arborg

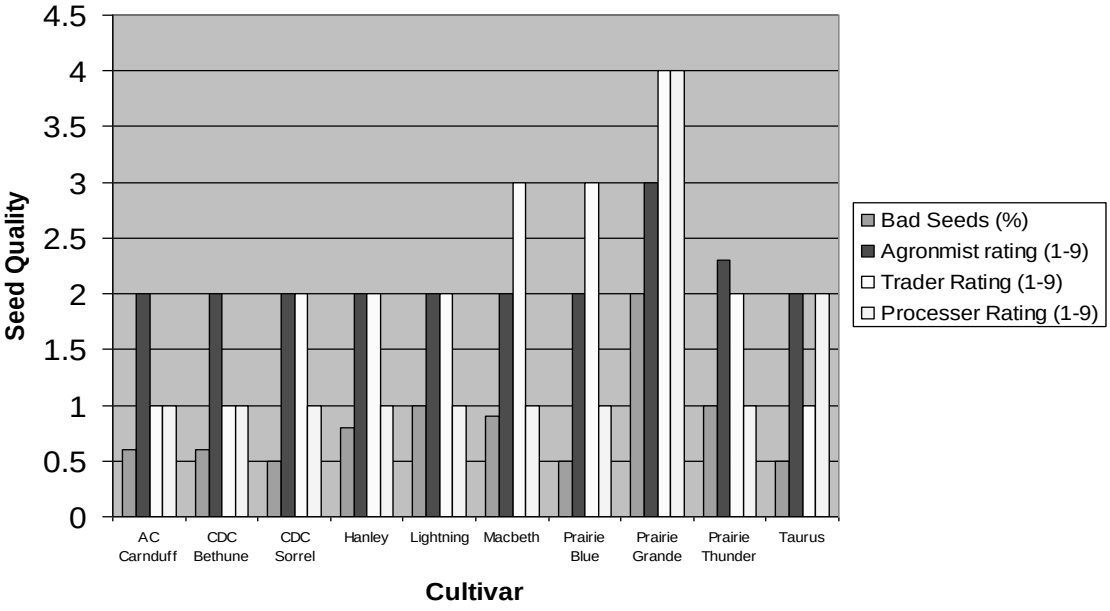

Figure 3: Flax Cultivar HC Seed Quality Analysis for May 29, 2009 Planting Date; Arborg

In 2008, flax harvest samples for eight genotypes across eight Manitoba locations were received from the Manitoba Crop Variety Evaluation Trials (MCVET) for HC seed quality

analysis. In 2009, flax harvest samples from six genotypes across six Manitoba MCVET locations were received. Both cultivar (Figure 4) and location (Figure 5) effects were significant with CDC Sorrel, Hanley, Prairie Blue and FP2214 producing the best seed quality, in 2008. CDC Bethune, Prairie Thunder, Prairie Grande and FP 2223 produced the poorest seed quality that same year. The Hamiota, Rosebank and Portage sites produced the best quality harvest samples, with the samples from the Dauphin, Melita, Stonewall and Thornhill sites being the poorest. In 2009, Prairie Grande again provided the poorest seed samples (Figure 6), with the Arborg, Boissevain and Dauphin sites producing the poorest quality seed (Figure 7).

As the seed quality rating analysis produced the lowest error variation (CV), the bad seeds (%) evaluation was not used to combine the two years of data. Figure 8 shows the variation of the five genotypes included in each of the two years of testing. Both the year effects and the genotype effects were significant for the seed quality rating, whereas the interaction effect between year and genotype was not significant, which indicates that the genotypes showed consistent relative seed quality both years. The cultivar Prairie Grande consistently produced the worst seed quality with CDC Sorrel, FP2214 and CDC Bethune significantly better seed quality. Prairie Thunder produced intermediate seed quality. Although genotype differences were significant, the variation between genotypes was small in comparison to the seed quality differences between locations/years. Figure 9 shows the variation between the five sites included in both years. Statistically, the year effect was not significant, but the location effect was, as was the interaction effect between location and year. This can definitely be seen in the Stonewall data; it produced the best seed quality in 2009, but only the third best in 2008.

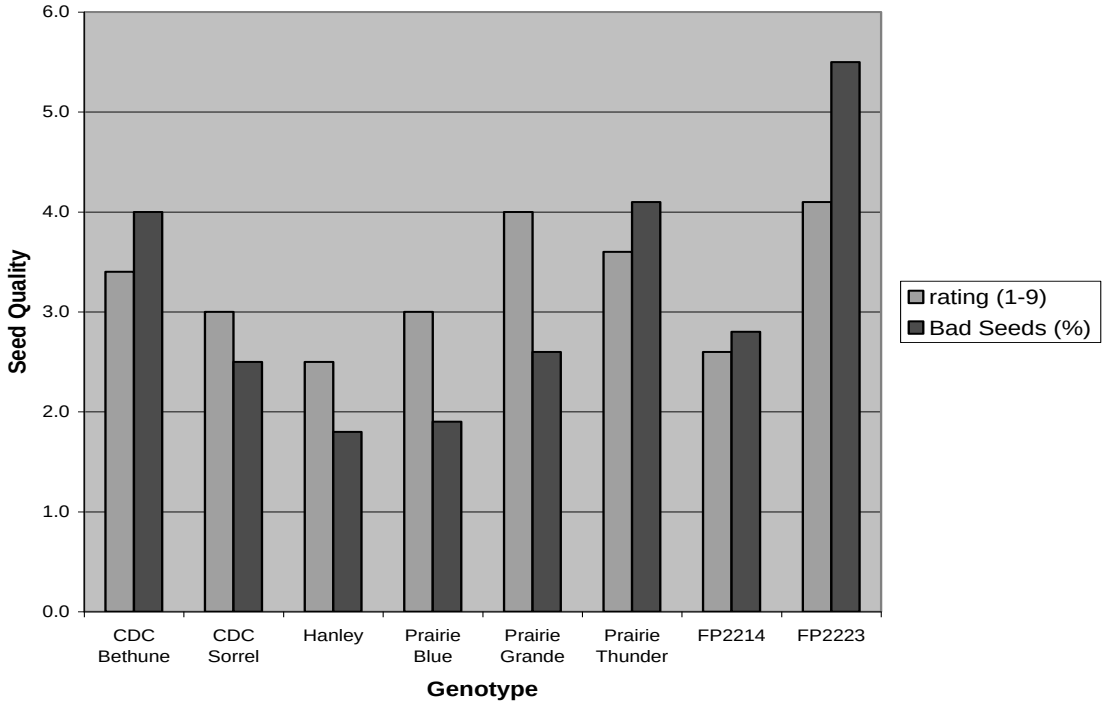

Figure 4: Means of the HC Seed Quality for Eight Flax Genotypes, MCVET, 2008

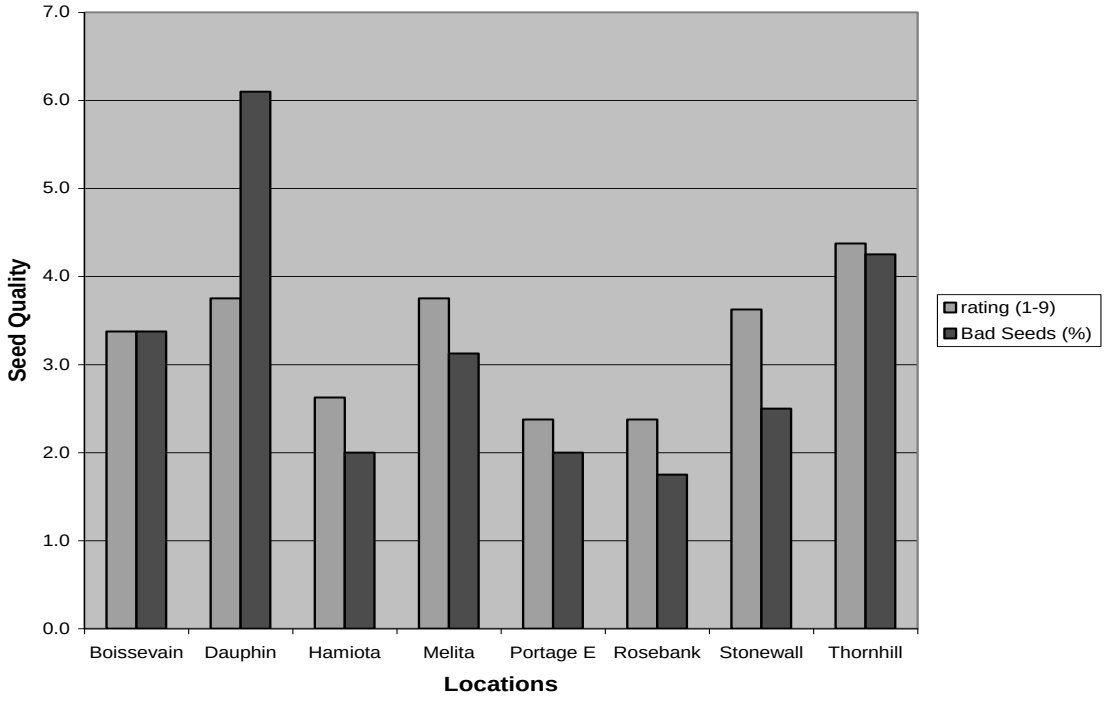

Figure 5: Means of the HC Seed Quality for Eight MCVET Locations, 2008

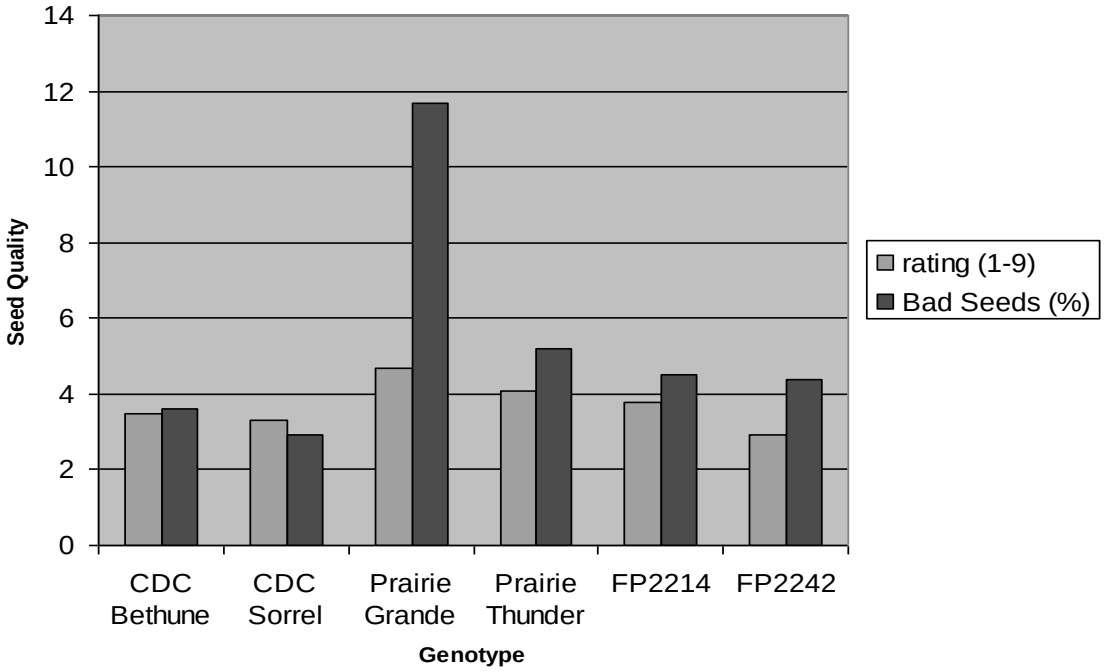

Figure 6: Means of the HC Seed Quality for Six Flax Genotypes, MCVET, 2009

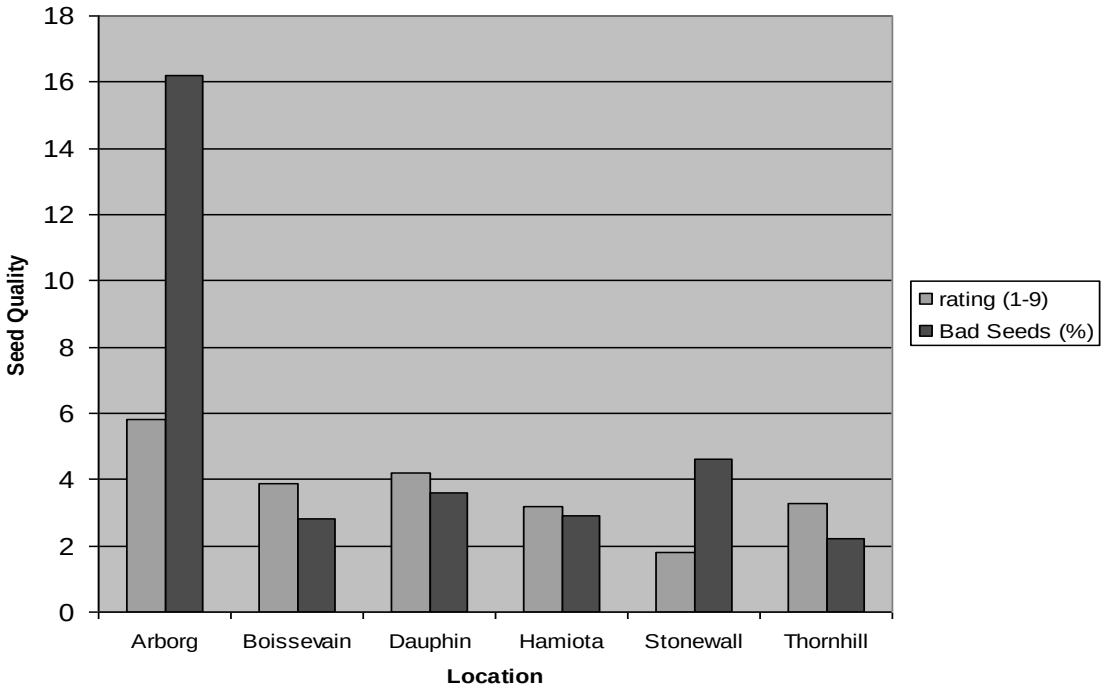

Figure 7: Means of the HC Seed Quality for Eight MCVET Locations, 2009

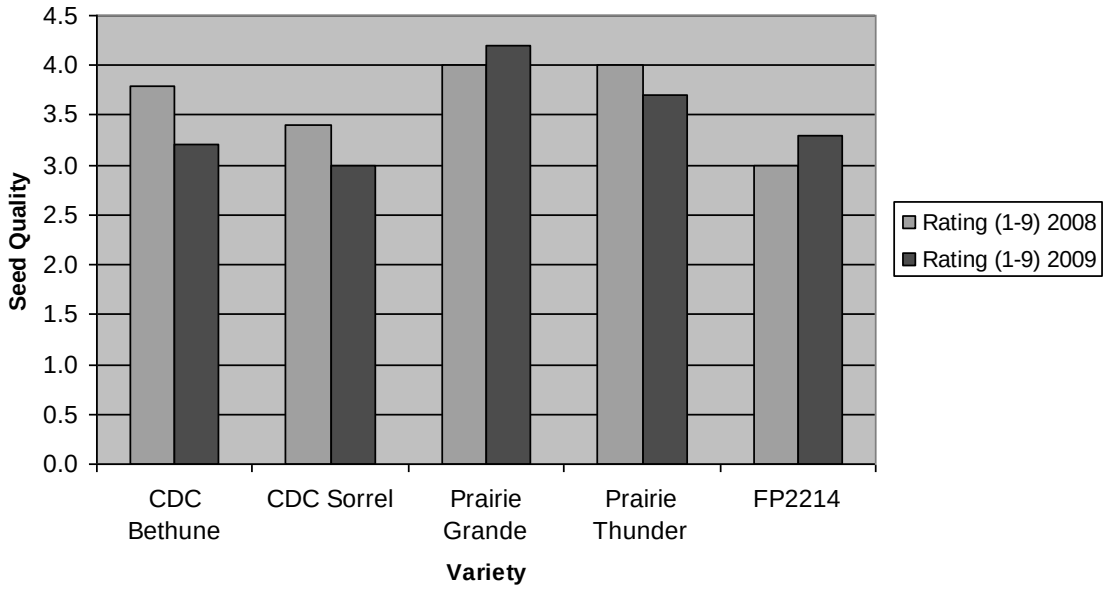

Figure 8: Means of the HC Seed Quality for Six Flax Genotypes Over Two Years, MCVET, 2008 and 2009

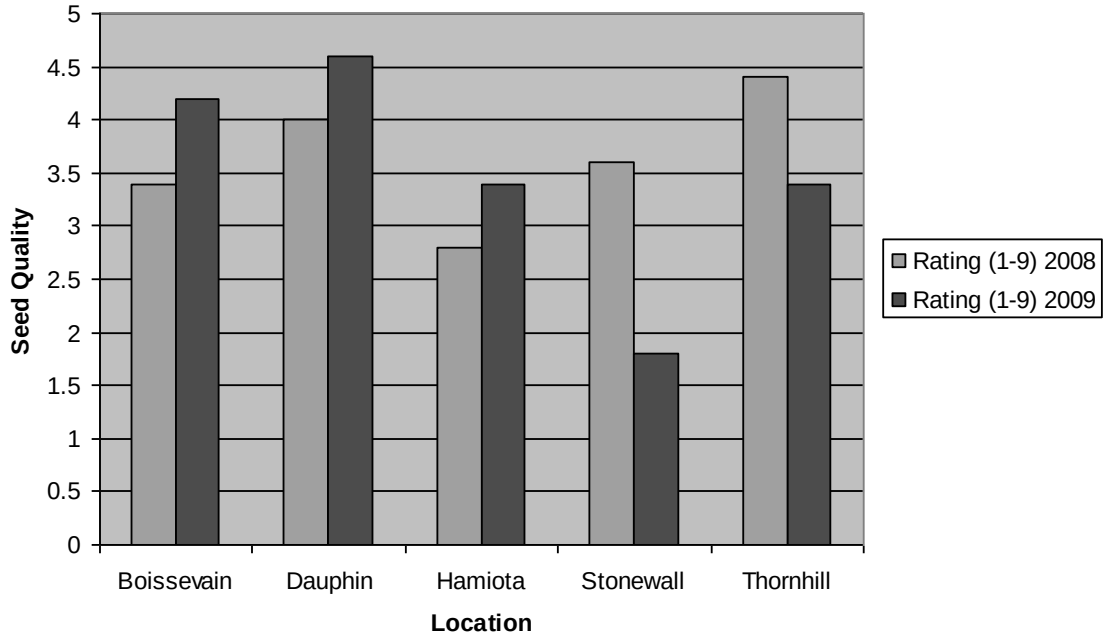

Figure 9: Means of the HC Seed Quality for Five MCVET Locations Over Two Years, 2008 and 2009.

Conclusions/Recommendations: These results indicate that the genetic make up of the flax does have an influence on the potential to produce human consumption quality seed, even in regions where HC quality seed is more difficult to obtain. There is enough of an effect due to genotype that it would be useful to have the varieties put forward for registration rated for HC quality - not as a basis to reject candidate varieties, but so more information would be available to producers. Although the effect of the genotype is significant, that influence is less than the influence of the environment. In some years and in some localized regions, HC quality will be difficult to obtain, regardless of the variety grown.

There will continue to be a tendency to prefer to select flax seed from the regions that produce the highest quality seed. Until most of the highest quality seed has been sold, there will be little interest in selecting from the more marginal areas. Commercial selections are made on a subjective basis, so the better the seed quality appears when originally selected, the better the chance of the final cleaned product being accepted at the next stage in the human consumption flaxseed market.

PROJECT #11: EXTENDING THE GRAZING SEASON WITH MILLET

Lead Partner: Producer-Cooperator Edwin Malenchak

Allotted Funding from PESAI: $4275

PESAI Funding Spent: $4275

Total Project Cost: $4950

Background/Objective: To demonstrate to cattle producers that the grazing season can be extended to December thus reducing cost of production and allowing producers to keep calves longer.

Project Activities: Three fields were seeded to millet on June 25, 2009 at a rate of 25 lbs/ac with 50 lbs N/ac.

- Field 1 - 22 acres
- Field 2 - 24 acres
- Field 3 - 18 acres

The intention was to graze the first field in September and October by cow-calf pairs. The second field was to be bale-grazed and the third was to be swath-grazed by cows after calves were weaned. The forage quality was to be tested and the three options compared with grazing period calculated.

Due to the cool wet summer, the millet did not grow well. It was cut and baled. The swathes were too thin to do swath-grazing. There was also not enough bales to make bale grazing worthwhile. The bales were feed to the cattle while on pasture.

- Field 1 yielded 15 bales, baled Sept 17, less than ½ bale/acre
- Field 2 yielded 46 bales, baled Sept 15, less than 2 bales/acre
- Field 3 yielded 37 bales, baled Sept 16, over 2 bales/acre
- Total 98 bales

Conclusions: Conditions in 2009 were not suitable to millet. However, in a warmer year, we believe this system could have proved a valuable demonstration.

PROJECT #12: PESAI PROMOTION & AWARENESS CAMPAIGN

PESAI Funding Spent: $10,200

Contributors: MAFRI Support Staff

Background/Objective: A PESAI Promotion and Awareness Campaign was started in 2005/06, expanded in 2006/07 and has been continued annually. This project continues the campaign, with similar objectives: (1) to raise awareness of PESAI in the Eastern and Interlake areas of Manitoba, including their mandate, capabilities, resources, partnership opportunities, and projects; and (2) to increase the membership in the PESAI group.

Project Activities: MAFRI staff assisted PESAI in all aspects of this project, including:

- PESAI's (summer, winter and spring) newsletters were designed and distributed. Newsletters followed the "look" developed in 2006/07 and included short articles about what PESAI is and how PESAI serves the industry, current group activities, project and meeting announcements, contact information, and a PESAI Membership Application Form.
- The PESAI sign developed in 2006/07 was erected at PESAI's field site located near Arborg, including PESAI's logo and a contact phone number. A secondary sign listing all the current projects at the site was also printed and erected.
- PESAI held its Annual Summer Research Tour July 20, 2009 in conjunction with other groups completing field research in the area (Manitoba Forage Seed Association, Manitoba Forage Council, Johnson Seeds – Eric Klassen). Speakers from MAFRI and industry spoke at the tour, and a BBQ, featuring local cuisine (forage fed beef burgers, Cavena nuda salad, hemp cookies, etc.) preceded the tour.
- PESAI manned a booth entitled "Manitoba's Diversification Centres" at Ag Days 2010, with its counter-parts from other areas of the province: Parkland Crop Diversification Foundation (PCDF) – Parkland Region, Westman Agriculture Diversification Organization (WADO) – Southwest Region and Canada-Manitoba Crop Diversification Centre (CMCDC) – Central Region. The "Manitoba's Diversification Centres" pamphlet was updated and printed for the event.
- An announcement of PESAI's project submission deadline and AGM was advertised in Eastern and Interlake local newspapers and radio for the AGM to be help April 8 in Selkirk.
- PESAI's Annual Report was compiled and printed by MAFRI support staff, to be distributed to PESAI Directors, Members, project partners and MAFRI extension staff.
- Shirts, hats, pens and wireless thermometer/barometers with the PESAI logo were distributed to increase awareness of the group. The promotional items will also be used in gift baskets and as door prizes at PESAI-attended events.

- PESAI set up its own e-mail address – prairies.east@gmail.com – and is working, in conjunction with the other Diversification Centres, to develop a website in 2010.

Results/Observations: PESAI's newsletters were distributed to over 5500 rural mail addresses in the North Interlake, South Interlake and Eastman GO Team areas in July, January and March. They were also mailed to all PESAI project partners (past and present), PESAI members and directors, MAFRI staff involved / interested in PESAI, and included in correspondence sent to MAFRI Executive. PESAI membership increased with the distribution of each newsletter.

The Arborg & District Field Research Tour & BBQ was held July 20, 2008 in the Arborg area. The tour was organized by PESAI, MAFRI support staff, and the organizations conducting field research in the Arborg area. The lunch preceding the tour was well attended, but being one of the warmest, driest days of the season, few producers were in attendance for the tour. PESAI would like to thank its collaborators (MFSA, MFC, Johnson Seeds, MAFRI) as well as the tour speakers and sponsors – MAFRI Specialists, Interlake Co-op, Prairie Grass Fed Meats, Integrity Foods and Paterson Global Foods.

Ag Days 2010 (January 20-22) was also a success for PESAI and the other Diversification Centres. Many people stopped by the Diversification Centre booth where we featured a display banner for each group (PESAI, WADO, PCDF, CMCDC), alternative crop seed samples and pamphlets, hemp products, and various other display material.

PESAI's Annual General Meeting will be held on April 8, 2010 in Selkirk. The 2006 and 2007 AGMs were held in Selkirk, the 2008 AGM in Steinbach, and the 2009 AGM in Beausejour in an attempt to cover more of the PESAI area.

Conclusions: PESAI's Promotion and Awareness Campaign has proven successful with positive attendance at PESAI events and the increase in membership. The promotion and awareness campaign will continue in 2010 with the launch of the Diversification Centre website, showcasing all of the innovative research being conducted in the province.

PROJECT #13: PESAI FIELD TRIALS

PESAI Funding Spent: $29,680

Contributors: MAFRI Support Staff, Lorne Johnson – Landowner, Johnson Seeds, Paterson Global Foods, Viterra, Manitoba Forage Seed Association

Meteorological Information: Data taken from MAFRI's Manitoba Ag Weather Program

http://tgs.gov.mb.ca/climate/SeasonalReport.aspx

http://www.gov.mb.ca/agriculture/climate/wad00s00/cropwxrep.pdf

Table 1 Growing season meteorological summary for Arborg Manitoba, April 15 – October 15, 2010

	Actual	Normal	% of Normal*
Number of Days	184		
Growing Degree Days	1702	1594	107
Crop Heat Units	2843	2715	105
Total Precipitation	490	358	137

*Normals are based on 30 year averages

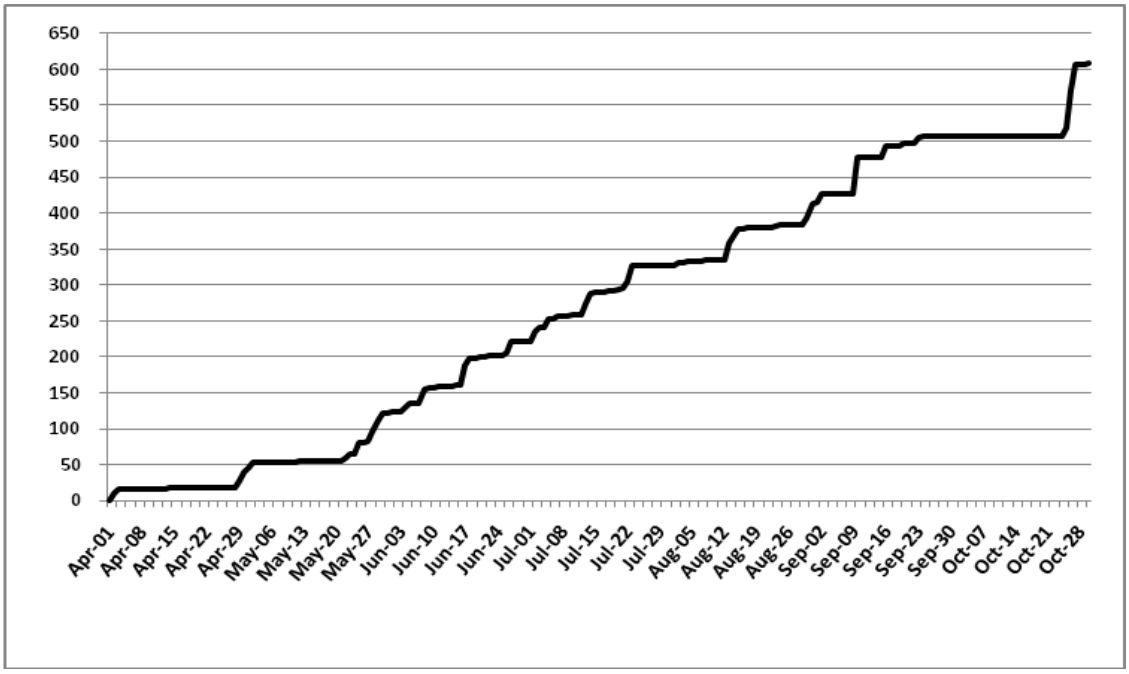

Figure 1 Accumulated 2010 growing seasonal rainfall for test site located at Arborg, MB

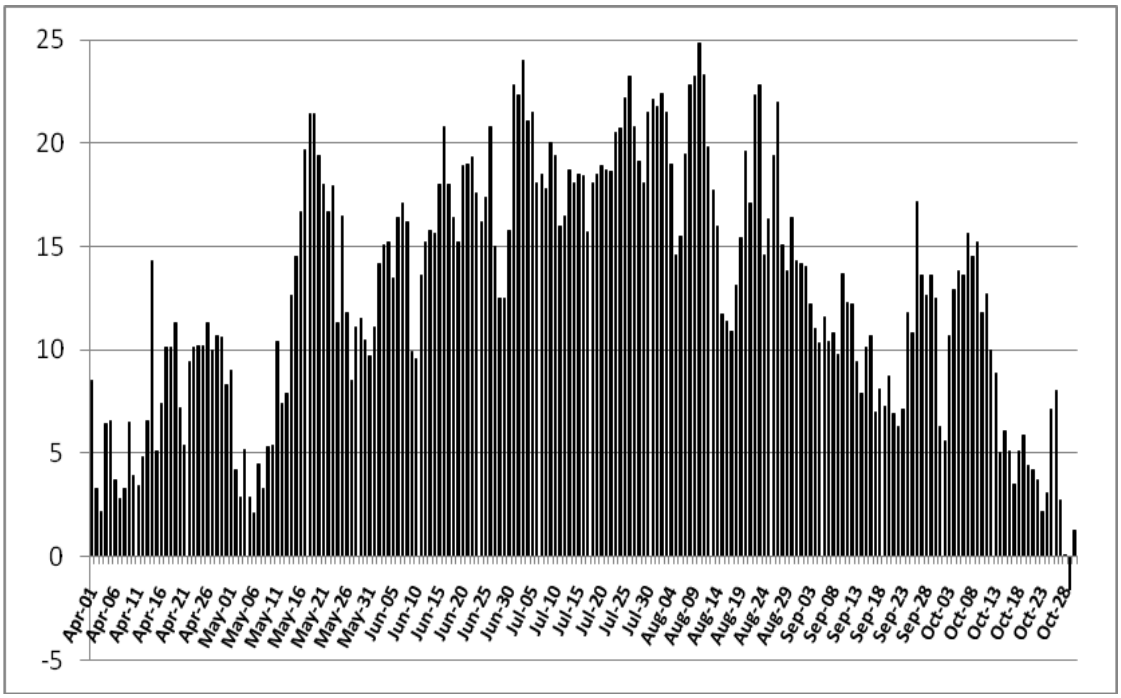

Figure 2 Summary of average temperature for Arborg, MB: Apr 01 – Oct 30, 2010

In 2009, the Arborg area of the North Interlake experienced cool temperatures and higher than average precipitation (Table 1, Figures 1 and 2). Soils were saturated in the spring and the area experience spring flooding. Wet soils and cool temperatures delayed seeding.

June and August had the most precipitation of the season, with approximately 28% (117 mm) of the seasonal rainfall occurring in June and 35% (148 mm) occurring in August. This led to exceptionally wet conditions and the drowning out of some crops early in the growing season, and the delay of harvest due to impassible fields. Early snowfall also prevented the harvest of some trials.

Field Site: The 2009 field site where all the cereal trials excluding camelina, hemp, flax and canola, were planted was located west of Arborg at NE RL2-22-2E. Soil at the site was a Peguis Till Clay, and canola was the previously harvested crop.

Soil Analyses: Composite soil samples were taken from the site in early May and sent to Agvise for analysis. Soil was sampled from 0-6", 6-18" depths, showing very low residual nitrogen levels. Residual potassium and sulphur nutrient levels at the site were high, with copper also being very high.

Table 2 2009 spring soil nutrient analysis from 0-18" depth at the PESAI field site (as analyzed by AgVise Laboratories).

Depth	*Nitrate N (lb/ac)*	*Olsen P (ppm)*	*Potassium (ppm)*	*Sulphur (lb/ac)*	*Organic Matter %*	pH
0-6"	17	11	442	78	n/a	7.8
6-18"	22			52		
0-18"	39					

Other Considerations: The constant rainfall in the Arborg area created some seeding issues, in most of the trials. Soils at seeding were generally damp and there were a limited number of good seeding days. Many of the trials were put in late as was the case in some other parts of the province. Tractor usage was kept to a minimum to prevent soil compaction in the trial areas. Wet conditions prevented ideal timings of herbicide and fungicide applications, so less than ideal yields were observed on many of the completed trials along with soil compaction and crop emergence issues.

Data Analyses: Data for most trials was subject to Analysis of Variance (ANOVA). Coefficients of variation (CV) and least significant difference (LSD) are usually reported. CV is a relative measure of variation within a trial, with lower numbers indicating less variability across replications. If differences in treatment group means (e.g. yields by variety) are greater than or equal to the LSD, those treatment group means are significantly different from each other.

PROJECT #13A: ANCIENT GRAINS DEMONSTRATION

Background: With the onset of an organic agriculture, food quality awareness, and health trends in society, the need for an ancient wheat demonstration in Manitoba was became a reality. A collection of ancient and/or forgotten grains was compiled from several sources and grown in various locations across the province including Arborg, Roblin, Melita, Carberry and Portage. These grains (mostly wheats) served as a demonstration backdrop during field tours as well as assessing their growth and form. Some are grown even today in parts of Manitoba as well as across the world. Markets and development for these wheats include organic products, wheat allergy food products, and breeding stock for future wheat lines.

DWARF INDIAN WHEAT

(T. sphaerococcum) – Dwarf Indian (AABBDD, 2n = 6x = 42) is a hexaploid land race of wheat known from the Indian subcontinent. Short and very upright, the heads are rather short and look like bottle brushes. The kernels are plump and almost round. It has several favorable characters including short and strong culms, hemispherical grains with a shallow crease (that may increase the yield of white flour), higher protein content compared to bread wheat (T. aestivum), and resistance to drought, and yellow rust caused by Puccinia striiformis. However, an unfavorable characteristic of T. sphaerococcum is its lower yield compared to bread wheat. Being a land race, the sphaerococcum wheat is poorly studied. According to recent evidence, it is possible that the origin of T. sphaerococcum was the result of a mutation in T. aestivum.

CLUB WHEAT

(T. aestivum subsp. compactum) – One of the more modern species of wheat, probably developed around 8,000 years ago as a result of a cross between T. dicoccum and Aegilops squarrosa. Club was widely grown for food before common bread wheat dominated wheat growing. The heads and beards are short, the yield is good, and it threshes easily, producing plump blonde kernels; it is considered as a soft white wheat. Club wheat is a hexaploid (AABBDD) with 2n=42 chromosomes, belonging to the same species as common bread wheat. The heads of this subspecies are more compact, but the difference can be attributed to changes in just two genes controlling spikelet density. Most of the commercial production of Club wheat occurs in the Pacific Northwest of the US (360,000 tonnes/yr), with limited production in Australia.

POLISH WHEAT

(T. polonicum) – this tetraploid (AABB) species has large bearded seed heads. The seeds are long and about twice the size of ordinary wheat and can be cooked. It is usually ground into flour and used as a cereal, which is high in gluten. The large seeds are suitable for making macaroni but not for bread. The grain falls readily from the ears, but it is of no value for milling. A rather primitive wheat, it probably arose through cultivation about 10,000 years ago following a cross between T. aethiopicum (the first primitive wheat) and Aegilops sp. It is sometimes cultivated for its edible seed, especially

in N. Africa and the Mediterranean, and it can be grown very successfully under garden conditions. There are some named varieties. 'Kamut' has very large kernels: 2 - 3 times the size of modern wheats. The seed contains significantly higher levels of protein and slightly higher levels of lipids and minerals. Polish wheat is reportedly less allergenic, though this has not been substantiated by controlled studies. The seed is said to have a superior flavor.

VAVILOV WHEAT

(T. vavilovii) – a hexaploid (AABBDD) species named after the great Russian plant scientist and collector, this old wheat has a very irregular seed head and is somewhat difficult to thresh. The straw has many uses: as a biomass for fuel etc, for thatching, as mulch in the garden etc. A fiber obtained from the stems is used for making paper. The stems are harvested in late summer after the seed has been harvested; they are cut into usable pieces and soaked in clear water for 24 hours. They are then cooked for 2 hours in lye or soda ash and beaten in a ball mill for 1½ hours. The fibers make a green-tan paper. The starch from the seed is used for laundering, sizing textiles etc. It can also be converted to alcohol for use as a fuel. It succeeds in most well-drained soils in a sunny position. Vavilov is one of the more modern species of wheat, probably developed in cultivation around 8,000 years ago, following a cross between T. dicoccum and Aegilops squarrosa. This cross contributed an extra protein gene to the seed, making much stronger flour for baking as bread. This species is still occasionally cultivated for its edible seed in Armenia.

RIVET WHEAT

(T. turgidum) – An old wheat species with large blonde grains that are used in the production of pasta, it is similar to Vavilovii except that the heads are bearded. An easily grown plant, it succeeds in most well-drained soils in a sunny position. One of the more primitive forms of wheat, it was probably developed in cultivation from T. dicoccoides about 10,000 years ago. It is still occasionally cultivated for its edible seed, there are some named varieties. It is not very high yielding. A tetraploid (AABB) species, it is grown mainly in Britain.

KAMUT

(T. turgidum) – a relative to modern durum, it is referred to as the “Sweet Wheat,” its origin in the fertile crescent of Mesopotamia (Iraq and Syria) and parts of Egypt. A rather large hard amber wheat with a humpacked kernel, it has rather low quality and yield but high nutritional value. Kamut contains more energy, minerals and antioxidants that other wheats. The high versatility of KAMUT® brand khorasan wheat makes it ideal for many uses: flour, bread, pasta, hot and cold breakfast cereals, pizza, cookies, crackers, cakes, snacks, pancakes, syrup, green foods and a delicious drink. Although it has hypo-allergenic and hypoglycemic properties, it also has a very low glycemic index which is great for diabetics, hypoglycemics, dieters, and athletes who look for foods that don’t stimulate insulin and fat storage. Research on patients with celiac disease (gluten intolerance) has not been completed and Kamut is not recommended for consumption

with this illness. The seed was obtained from PHS Organics Inc. in Radville, Saskatchewan. For more info visit: www.kamut.com

BLACK EINKORN

(T. monococcum) – is a diploid (AA) and most likely the earliest domesticated wheat, Einkorn has flat black heads that are not very long and resemble the heads of crested wheat grass. Einkorn matures later than common spring wheats. Suited for arid marginal land, it is now a relict in modern day, most commonly used to make bulgur (parboiled, dried, de-braned) or as animal feed, in mountainous areas of France, Morocco, the former Yugoslavia, Turkey and other countries. Einkorn is a diploid hulled wheat, with tough glumes ('husks') that tightly enclose the grains. The cultivated form is similar to the wild, except that the ear stays intact when ripe and the seeds are larger. Einkorn wheat was one of the earliest cultivated forms of wheat, alongside emmer wheat (T. dicoccon). Grains of wild einkorn have been found in Epi-Paleolithic sites of the Fertile Crescent. It was first domesticated approximately 9000 BP (9000 BP ≈ 7050 BCE), in the Pre-Pottery Neolithic A or B periods. In contrast with more modern forms of wheat, there is evidence that the gliadin protein of einkorn may not be as toxic to sufferers of celiac disease. It has yet to be recommended in any gluten-free diet.

SPELT

(T. aestivum spelta) – This hexaploid (AABBDD) wheat has long (up to 6") slim heads which break easily. Plants and heads bend over when ripe. It requires moderate amounts of nitrogen compared to common spring wheat (25-50% less) making it suitable for organic systems. Although most Spelts are fall seeded, this is a spring seeded variety. ‘CDC Nexon’ is the first registered spring Spelt wheat cultivar in North America, and in the OECD sphere. Small amounts of seed were made available directly from the CDC, starting in 2003. People with wheat allergies commonly report that spelt is easier to digest than other wheats, but for people with gluten allergies, this wheat offers no substitute. Winter Spelts offer a harvest advantage of 8 to 10 days earlier than common winter wheat varieties, providing potential to seed relay or catch crops for longer season growth late in the year. Common Spelt is susceptible to rusts, Fusarium, powdery mildew and loose smut, but during cool moist spring, Spelt can stave off soil born diseases because of its thick hull. The seed in the plot was obtained from Pollock Farms, near Brandon, MB.

TEFF

(Eragrostis tef (Zucc.) Trotter) – Teff is a warm season annual grass that resembles a similar morphology as a Proso Millet. Teff is grown primarily as a cereal crop in Ethiopia and is believed to have been developed from 4000 BC to 1000AD. The grain is ground into flour, fermented and made into enjera, a sour-dough type flat bread. Nutritionally teff consists mainly of bran and germ, and contains no gluten - a source of many food allergies. Teff is rich in calcium, phosphorous, iron, copper, aluminum, barium and thiamin, and is a good source of protein, amino acids (especially lysine), carbohydrates and fibre.Teff is eaten as porridge or used as an ingredient of home-brewed alcoholic

drinks. Teff is also grown for livestock forage. In Ethiopia teff straw from threshed grains are considered to be an excellent forage, superior to straws from other cereal species. Teff straw is also utilized to reinforce mud or plasters used in the construction of buildings. Teff is virtually unknown in North America and the cultivation that does exist is done by private entrepreneurs in the U.S.

Photos below were provided by the Westman Agricultural Diversification Organization (WADO), PESAI's counterpart in the southwest.

Dwarf Indian Wheat

Vavilov Wheat

Club Wheat

Polish Wheat

Black Einkorn Wheat

Rivet Wheat

Spelt

Kamut wheat

Teff

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Plants for a Future Database: Club Wheat, Polish Wheat, Rivet Wheat. Online: www.pfaf.org

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PROJECT #13B: CAMELINA SEED TREATMENT

Background: Camelina sativa (L.) Crantz., from the plant family Brassicaceae, commonly called camelina, false-flax, linseed dodder, or gold-of-pleasure, originated in the Mediterranean to Central Asia. It is an annual or winter annual that attains heights of 30 to 90 cm tall. Camelina is listed as being adapted to the flax-growing regions of the northern Midwest (Minnesota, North Dakota, South Dakota). It is primarily a minor weed in flax and is not often a problem in other crops and does not have seed dormancy. Similar to the other Cruciferous species, it is likely best adapted to cooler climates where excessive heat during flowering is not important. There are several winter annual biotypes available in the germplasm, and it is possible that camelina could be grown as a winter crop in areas with very mild winters. Camelina is short-seasoned (85 to 100 d), so it could be incorporated into double cropping systems during cool periods of growth, possibly in more tropical environments. (Putnam et al. 1993. Camelina: A promising low-input oilseed. p. 314-322. In: J. Janick and J.E. Simon (eds.), New crops. Wiley, New York.). It is speculated that camelina may play a significant role as a low input oil source for biodiesel production as well as have a role in the health food market for its omega-3 benefits. Oil content is about 38-42%, near to that of canola at 44%. Oil properties are similar to that of flax, with 34% being a source of Omega-3 fatty acids (linoleic and linolenic). Markets include that of the health foods area for enrichment of its omega-3 oil use, biodiesel production, soaps, cosmetics, bird seed and cooking qualities.

Currently there has been a great demand for bio-oils for biodiesel and biofuel additives. Industry is seeking lower cost bio-oil supply. Meanwhile, producers are seeking lower costs to production. Camelina has gained fame because of this market pull and has been deemed as a low input crop that can be produced with lower fertilizer and herbicide application.

Objective: During the 2008 research year a number of Camelina trials were conducted throughout the province. During the cool wet spring and summer a lot of Camelina died due to seedling disease. Since this is a minor crop and there are no registrations for seed treatments with Camelina, some of the diversification centers have shown interest in doing some small plot trials to determine if seed treatment is a viable option for camelina.

The pathogen(s) that we are targeting is somewhat unknown, but it was thought that Fusarium wilt may have been one of the factors that we may want to address in this trial, along with seedling blight and seed or root rot. The seed treatment trial was conducted at two research sites in the province of Manitoba.

Design, Materials & Operation:

Site Information #1

Location: Arborg, Manitoba
Cooperator: PESAI
Soil Type: Framnes (Clay Loam)
Plot size: 8.2 m square

Site Information #2

Location: Beausejour, Manitoba
Cooperator: Agassiz Soil & Crop Improvement Association
Soil Type: Clay Loam
Plot size: 8.2 m square

The trials consisted of Camelina seed treated with regular rate seed treatment products for canola and flax. The trials were conducted as RCBD with 3 reps. A total of 5 treatments were applied, including the untreated check.

Fertility:

Arborg: Broadcast 66kg/ha N and 15kg/ha P2O5, incorporated with cultivation. Then applied 15kg/ha P2O5 with the seed.

Beausejour: Applied 15kg/ha P2O5 with the seed as soil fertility levels were adequate.

Seeding:

Arborg: June 14, emerged June 19

Beausejour: June 15, emerged Jun 19

Treatment List:

Product	*Rate*
Helix	1500 ml / 100 kg seed
Maxim 480	10.4ml / 100 kg seed
Vitaflo 280	525 ml / 100 kg seed
Charter	200 ml / 100 kg seed
Untreated check	n/a

Results: The yield data was not collected for the Beausejour site due to an early season hail storm that rendered the trial severely damaged and the data unusable. There was no significant difference in yield seen in the Arborg trial this past year. It was noticed that there was also no visual difference between the untreated check and the treatments. There was a noticeable difference within the trial area mainly due to environmental issues and moisture concerns. However the cool season did not produce any disease issues with regards to the trial. As disappointing as this was, we do believe that seedling disease may be an issue that needs to be addressed with continued research in the future.

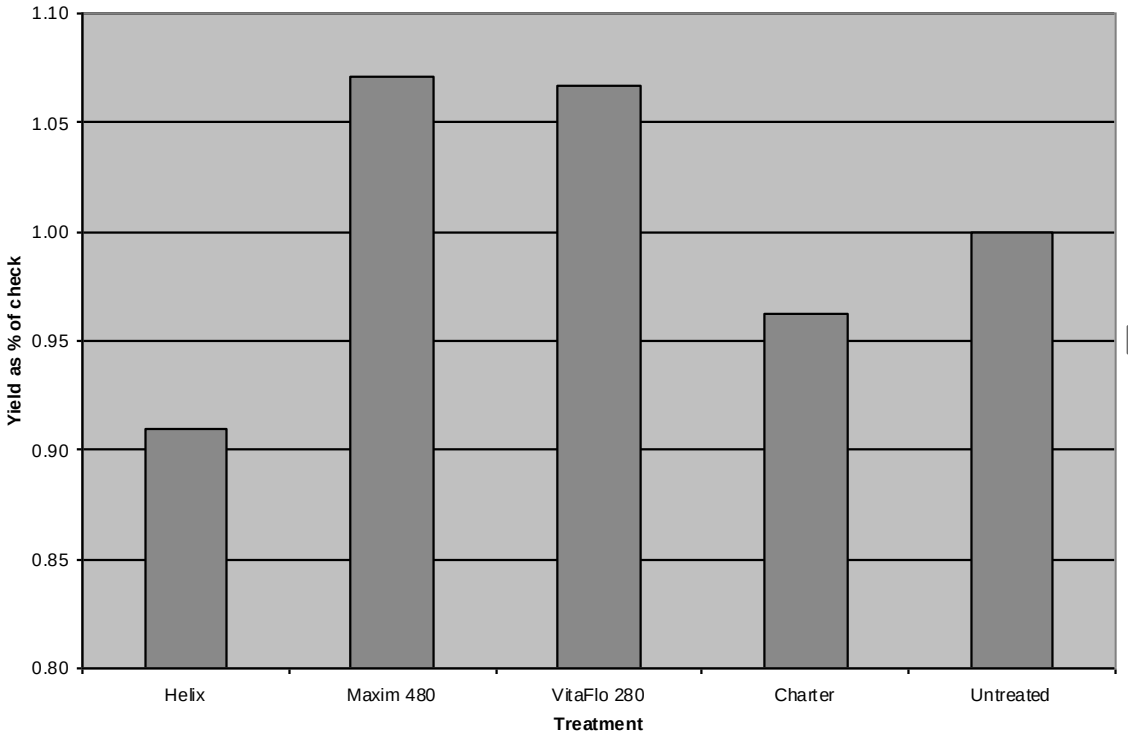

Figure 1. Camelina seed yield as a percent of check for the seed treatment trial conducted in Arborg, MB in 2009. CV 17.23, LSD 186.22

Discussion & Conclusions: It is unknown if the disease issue encountered in the previous years was not present this year due to environmental issues or seed selection. However, more work needs to be done to address the issue of seedling disease problems in this crop. Camelina continues to be a crop of interest by many industries and does have many more benefits that could be commercialized in the future.

PROJECT #13C: ETHANOL CEREAL SCREENING TRIAL

Cooperators:

Shannon Chant (Saskatchewan Ministry of Agriculture)
Sherrilyn Phelps (Saskatchewan Ministry of Agriculture)
Dr. Curtis Pozniak (University of Saskatchewan)
Scott Day and Scott Chalmers (MAFRI/WADO) – Melita, MB
Paula Halabicki, Roger Burak and Jamie Lindal (MAFRI/PESAI) – Arborg, MB
Jeff Kostuik and Keith Watson (MAFRI/PCDF) – Roblin, MB
Craig Linde, Curtis Cavers and Claude Durand (MAFRI/CMCDC) – Portage & Carberry,
Francis Kirigwi –Syngenta – Morden, MB

Background: Due to federal and provincial mandates currently being implemented for ethanol blended gasoline, there is now a demand for grain-based ethanol produced in Western Canada. While interest in ethanol has waned as of late there are new technologies being used in how ethanol is produced and how it is used. One such example is wet ethanol, which will significantly improve the efficiency of using ethanol compared to many other fuels. Given this current and increasing demand, the ethanol industry is continuing to seek high yielding ethanol wheat varieties with high test weights, low protein levels, and elevated seed starch content. These are the key characteristics needed in ethanol feedstocks, outside of the traditional corn growing regions across the Prairies. Most prairie farmers are producing wheat that is more suited for human consumption with greater emphasis on high protein content and specific kernel visual distinctions, but with less regard for starch content. With so much focus on human consumption qualities, little information is available on head-to-head comparisons of current wheat varieties and their traits more suited for the ethanol industry.

Objective: The objective of this trial is to demonstrate what wheat varieties and high starch cereal crops are currently best suited as a feedstock for ethanol production in a given region of the Prairies. It attempts to survey the yield and adaptability performance of specific varieties throughout the Province of Manitoba and across the Prairies. This trial includes varieties of wheat such as Soft White (CWSWS), Canada Prairie Spring (CPSR & W), and the new class of wheat called Canada Western General Purpose (CWGP). These are in comparison to the traditionally grown high protein spring wheats of Canada Western Red Spring (CWRS) and Canada Western Hard White (CWHW). Triticale was also included, as there is an increasing interest in using this crop as alternative ethanol feedstock due to its high yielding potential, its unique enzyme content for starch conversion, and its bountiful straw production. In previous years, Hulless Barley and Hulless Oats have also been included in this trial, and although they have good ethanol potential, they have been dropped in order to focus on the most likely contenders at this time.

Design, Materials & Operation: Identical ethanol screening trials were conducted at many sites across the Prairie Provinces. This report is concerned with those in the Province of Manitoba. Six sites were present in Manitoba near the towns of Melita, Arborg, Roblin, Carberry, Portage, and Rosebank. Sites were managed by their respective managers and affiliations listed above.

Table 1. Cereal Varieties and their corresponding description, along with the seed supplier.

Variety	Seed Type	Supplier
AC Ultima	Triticale	Farm Pure Seeds
Pronghorn	Triticale	Progressive Seeds Ltd.
Tyndal	Triticale	SeCan
AC ANDREW	Soft Wht Spring	SeCan
BHISHAJ	Soft Wht Spring	Crooymans
AC Sadash	Soft Wht Spring	SeCan
5700PR	CPS	Viterra
AC CRYSTAL	CPS	SeCan
SUPERB	CWRS	SeCan
Hoffman	CWGP	Hyland Seeds

Plots were arranged in a randomized complete block design. Each treatment was replicated three times. Soil fertility recommendations were estimated from current soil tests in order to optimize yield potential. Each site sampled fertility levels prior to seeding to determine residual soil fertility levels (Table 2).

Table 2. Residual soil fertility levels for two depths of the soil profile according to the specific site.

Site/Depth	0-6"			6-24"		
Nutrient (lbs/ac)	N	P	K	S	N	S
Melita	14	28	696	16	36	42
Roblin	50	70	180	20	77	14
Carberry	10	13	351	28	12	12
Portage	50	10	281	46	180	264
Rosebank	not available					

Plots were seeded, fertilized and custom maintained for each site (Table 3). Fungicides were not used at all Manitoba sites. Target seed rate was 300 plants/m2 for all treatments.

Table 3. Seeding date, fertility regimes, herbicide use and harvest dates according to each site.

	Seeding	Plot Size	Fertilizer (lbs/ac)		Herbicides		Harvest
Location	*Date*	m^2	*N*	*P*	*Product**	*Application Date*	*Date*
Roblin	19-May	5.00	46	30	Frontline & Axial	15-Jun	16-Sep
Melita	20-May	12.96	70	30	Everest, 2,4-D ester500	15-Jul	17-Sep
Carberry	20-May	7.20	120	50	Refine G	-	25-Sep
Portage	24-May	9.00	19	60	Frontline & Simplicity	-	24-Sep
Rosebank	28-May	3.50	4	19	Prestige, Axial, Achieve, Attain	June 22, July 8	06-Oct

*Herbicides applied at recommended rates

Precipitation values were derived from the Manitoba-Ag Weather Program and are summarized by site (Table 4). Rosebank accumulated the most precipitation between May 1 and Sept 30 while Roblin accumulated the least..

Table 4. Total monthly precipitation values between May 1 and September 30 for Rosebank, Roblin, Melita, Hamiota, Carberry, and Portage. Asterisk indicates that a nearby station was used in that location.

	Month Precipitation (mm)					
Site	May	June	July	August	September	Total
Rosebank*	69	127	68	53	18	335
Roblin	12	13	91	83	16	215
Melita**	15	41	106	40	69	271
Carberry	68	35	77	56	22	257
Portage	65	82	76	43	19	285

* data taken from Carman weather station

** data taken from Pierson weather station

For all sites, each plot was sampled for height (cm), leaf disease, and maturity (days after seeding), prior to harvest. Plots were harvested, entire dry straw weights and final grain yields were taken from each plot. Grain moisture, thousand kernel weight and test weight were collected and recorded. An analysis of variance was performed on individual site yield data. Coefficient of variation (CV%) and least significant difference (LSD) at a significance level of 5% was calculated. Individual grain samples have been sent to Dr. Curtis Pozniak at the University of Saskatchewan. Straw samples have been sent to Dr. Brian Beres of AAFC in Swift Current for analysis of various constituents such as lignin, cellulose and hemicellulose. These extractives and specific sugars will be looked at as part of conversion for energy or other products. This work will be done through an Agricultural Bioproducts Innovation Program project coordinated by Dr. Gruber and Dr. Laberge of AAFC. When cellulosic (straw based) ethanol becomes more possible we will already have the data from this trial to choose the cereal varieties best suited for this form of energy production.

Results: Grain, straw and total biomass yields are significantly different among varieties at all sites. Coefficient of variation is acceptably low among all sites, indicating a good data set. Grand mean for grain, straw, and total biomass varies among each site considerably. Data from Rosebank has the greatest grand mean on average for grain, straw and total biomass.

Grain

Variety performance was generally similar among all sites according to provincial average with only a few deviations (Table 5). Hoffman, the high yielding general purpose wheat and the three triticale varieties, Pronghorn, AC Ultima and Tyndal were highest yielding and generally hold these ranks for all sites. In Melita, these were slightly deviated, as varieties AC Andrew and Bhishaj were comparatively higher yielding than AC Ultima and Tyndal. The Rosebank plots produced exceptional yields in 5700PR and Superb wheats relative to provincial trends of these varieties.

Table 5. Mean grain yields across Manitoba including Roblin, Melita, Carberry, Portage and Rosebank. All grain yield "means" are combined into a provincial average and sorted from highest to lowest yielding variety compared to Superb, the varietal check.

		Grain Yield (kg/ha)					
Variety	Description	Roblin	Melita	Carberry	Portage	Rosebank	Provincial Average
Hoffman	CWGP	7587	2405.0	2605.6	1775.9	8267.9	4528.3
Pronghorn	Triticale	7653	2461.2	2463.2	1943.0	7235.8	4351.3
AC Ultima	Triticale	6813	2197.8	2686.8	1885.2	7876.7	4291.9
Tyndal	Triticale	6907	2155.6	1884.9	1531.7	7009.3	3897.7
AC Andrew	Soft White Spring	6187	2489.2	2050.7	1604.3	6645.7	3795.3
Bhishaj	Soft White Spring	5687	2524.4	1839.9	1584.3	7213.0	3769.7
AC Crystal	CPS	6180	2313.8	2159.7	1212.3	6676.8	3708.5
5700PR	CPS	5453	2120.3	1887.1	1169.1	7139.4	3553.8
AC Sadash	Soft White Spring	5873	2233.1	2101.1	1495.3	5924.5	3525.4
Superb	CWRS	4913	1935.1	2105.4	1611.2	6569.2	3426.8
CV%		4.38	6.6	6.9	3.5	10.4	
LSD (p<0.05)		474.8	259.9	259.3	95.8	1255.7	
GRAND MEAN		6325	2284	2178.4	1581.2	7055.8	

Table 5A. Mean grain yields in bushels per acre among all locations. Table 5A is the same data as Table 5 converted to bushels per acre.–Keep in mind that there are 36.744 bushels in a tonne of wheat and there are 42.396 bushels in a tonne of Triticale.

		Grain Yield (bu/ac)					
Variety	Description	Roblin	Melita	Carberry	Portage	Rosebank	Provincial Average
Pronghorn	Triticale	131.1	42.2	42.2	33.3	123.9	74.5
AC Ultima	Triticale	116.7	37.6	46.0	32.3	134.9	73.5
Hoffman	CWGP	112.6	35.7	38.7	26.4	122.7	67.2
Tyndal	Triticale	118.3	36.9	32.3	26.2	120.1	66.8
AC Andrew	Soft White Spring	91.8	37.0	30.4	23.8	98.7	56.3
Bhishaj	Soft White Spring	84.4	37.5	27.3	23.5	107.1	56.0
AC Crystal	CPS	91.7	34.3	32.1	18.0	99.1	55.1
5700PR	CPS	80.9	31.5	28.0	17.4	106.0	52.8
AC Sadash	Soft White Spring	87.2	33.1	31.2	22.2	87.9	52.3
Superb	CWRS	72.9	28.7	31.3	23.9	97.5	50.9
CV%		4.4	6.6	6.9	3.5	10.4	
LSD (p<0.05)		7.0	3.9	3.8	1.4	18.6	
GRAND MEAN		93.9	33.9	32.3	23.5	104.7	

Straw

Provincial straw yields are essentially similar in rank to provincial grain yields (Table 6). AC Altima, Pronghorn and Hoffman are generally the highest yielding straw varieties as well. AC Crystal, Superb and 5700PR are generally low yielding which is likely due to their short to medium stature.

Table 6. Mean straw across Manitoba, including Melita, Roblin, Carberry, Portage and Rosebank. All straw yields means are combined into a provincial average and sorted from highest to lowest yielding variety compared to Superb, the varietal check. Roblin did not take straw samples and is not included in this table.

		Straw Yield (kg/ha)				
Variety	Description	Melita	Carberry	Portage	Rosebank	Provincial Average
AC Ultima	Triticale	1927.0	1690.0	5121.7	7323.5	4015.5
Pronghorn	Triticale	2359.8	1577.6	4988.3	6855.8	3945.4
Hoffman	CWGP	2062.6	1577.6	3961.6	7385.1	3746.7
AC Sadash	Soft White Spring	1854.9	1701.2	4832.4	6549.3	3734.5
AC Andrew	Soft White Spring	1896.8	1425.8	5183.2	5941.5	3611.8
Tyndal	Triticale	2199.0	1409.0	4493.7	6226.2	3582.0
Bhishaj	Soft White Spring	1743.2	1330.3	5015.3	6113.8	3550.6
5700PR	CPS	1452.6	953.7	3969.1	6378.3	3188.4
Superb	CWRS	1697.4	1251.6	4184.9	5472.3	3151.5
AC Crystal	CPS	1505.4	1053.0	3612.3	5219.3	2847.5
CV%		8.5	18.8	8.0	10.1	
LSD (p<0.05)		274.0	450.4	623.6	1104.6	
GRAND MEAN		1869.9	1397.0	4536.2	6346.5	

Biomass

Straw and grain yields are combined by plot then analyzed by site for variance in means. Site variety “means” are created to form an overall total biomass provincial average (Table 7). Coefficient of variation was low and acceptable at each site.

Table 7. Mean dry matter biomass yields and respective CV%, LSD, and grand site means among locations across Manitoba including Melita, Portage, Rosebank and Carberry. All dry matter biomass yields means are combined into a provincial average and sorted from highest to lowest yielding variety compared to AC Barrie, the varietal check. Roblin did not take straw samples and is not included in this table.

		Total Biomass Yield (kg/ha)				
Variety	Description	Melita	Carberry	Portage	Rosebank	Provincial Average
AC Ultima	Triticale	4124.8	4376.8	7006.9	15200.2	7677.1
Hoffman	CWGP	4467.6	4183.2	5737.4	15653.0	7510.3
Pronghorn	Triticale	4821.0	4040.8	6931.3	14091.6	7471.2
Bhishaj	Soft White Spring	4267.6	3170.2	6599.6	13326.8	6841.0
AC Andrew	Soft White Spring	4386.0	3476.5	6787.4	12587.1	6809.3
Tyndal	Triticale	4354.6	3293.8	6025.4	13235.5	6727.3
AC Sadash	Soft White Spring	4088.0	3802.3	6327.7	12473.8	6673.0
5700PR	CPS	3573.0	2840.8	5138.2	13517.6	6267.4
Superb	CWRS	3632.5	3356.9	5796.1	12041.5	6206.8
AC Crystal	CPS	3819.2	3212.7	4824.6	11896.1	5938.1
CV%		6.8	10.0	5.8	8.2	
LSD (p<0.05)		482.9	610.8	608.2	1881.1	
GRAND MEAN		4153.4	6117.5	3575.4	13402.3	

Biomass yields are similar to grain and straw provincial ranking. AC Ultima, Hoffman and Pronghorn are generally the highest biomass producing varieties with a few exceptions depending on the site. Portage reports relatively high yields with AC Andrew and Bhishaj and lower yields with Hoffman. In Melita, Pronghorn produced biomass exceptionally well compared to all varieties.

Conclusions: Rosebank accumulated the greatest grain, straw, and total biomass among all sites which is likely due to timely heavy rains that occurred on June 8 (22.8mm), June 26 (59.2mm), and July 11 (33.4).

The current ethanol industry is reliant on seed based carbon from starch. However, a very major component of the ethanol industry in the future may be dealing with straw (cellulosic, lignin) based carbon. Despite the fact that straw production from any given crop or variety can be extremely variable, finding a valuable use for that crop residue gives more value to the crop as a whole. In places like Arborg, where wet weather induced Fusarium reduced final grain yields, straw yields were much higher. These higher straw yields could be used to buffer the grain losses to supply feedstock for ethanol production. In contrast, in areas like Melita, where it was much drier, grain yields were optimized with less than half of the plant's resources being devoted to straw production, therefore, boosting supply to the grain ethanol industry. In a province like Manitoba, where a great deal of variability occurs each year, an ethanol industry that can utilize both straw and grain will have a much more stable source of feedstock.

It is important to keep in mind that we are waiting on a more complete evaluation of these varieties in relation to their ethanol feedstock potential. These additional tests will establish starch content and quality and other traits that relate to their ethanol producing ability. For instance, AC Andrew might have a slightly higher grain yield per acre than Bhishaj, but Bhishaj usually has higher starch content and, therefore, could still produce more "ethanol per acre" despite a slightly lower yield. Tests are being completed at the U of S and, when completed, will include the quality test results from both the 2007, 2008 & 2009 ethanol screening trials.

PROJECT #13D: EXCEED CANOLA AND POD ANTI SHATTER PRODUCT EVALUATION

Objective: To verify the suitability of new canola quality Brassica juncea (XCEED) in Manitoba compared to a standard canola (Brassica napus) variety; and to verify the economic impact of pod sealant products on XCEED and canola for straight-cutting

Design, Materials & Operation:

Location:	Arborg, MB
Treatments:	12 treatments (Table 1)
Replication:	3
Plot size:	1.4m x 6m
Test design:	RCBD
Seeding date:	June 14, 2009
Fertilizer applied:	100kg/ha actual N (46-0-0), 20 kg/ha. actual P(11-52-0), 8.4kg/ha S(20-0-0-24)
Pesticide applied:	July 1 – Poast
Harvest date:	September 24, 2009

Prior to seeding, nitrogen, sulphur and a half rate of the phosphate was broadcast using a Valmar applicator and incorporated with tillage. The trial was seeded into wheat stubble with half rate seed placed phosphate. A herbicide application of Poast was made to control weed pressures.

- Plots to be seeded at 190 seeds/m2, adjust for %germination and plot size, to target 10 plants/ft2 final population.
- XCEED canola and B.napus canola will be CLEARFIELD tolerant. DO NOT spray with ABSOLUTE as the Lontrel in ABSOLUTE will damage the XCEED canola
- Swathed treatments – to be swathed at 60% seed color change
- Sealant products – to be applied at 30- 40 % seed color change

Treatment List:

X = XCEED canola quality Brassica juncea
C = canola Brassica napus
1 = swathed canola, no pod sealants applied
2 = swathed canola, Pod Stik applied
3 = swathed canola, Pod Ceal applied
4 = straight-cut canola, no pod sealants applied
5 = straight-cut canola, Pod Stik applied
6 = straight-cut canola, Pod Ceal applied

Table 2. Plot Randomization of Treatments

i.e X1= Exceed canola, swathed, no pod sealants
C5= Canola variety, straight cut, pod stik applied

X1	X2	X3	X4	X5	X6	C1	C2	C3	C4	C5	C6
C1	C2	C3	C4	C5	C6	X1	X2	X3	X4	X5	X6
X1	C1	X2	C2	X3	C3	X4	C4	X5	C5	X6	C6

Results: The Arborg site did not see significant differences in the treatments at this trial site. This may have been due to the location which was possibly too sheltered to be effective for such a test with respect to wind shattering. It was visually noted that the exceed canola did not shatter as much as some of the regular canola treatments. No measurements were taken to confirm this, and this was only noted visually.

Conclusions: More work needs to be done in this area as more producers are beginning to look at the idea of straight cutting their canola crop. Preliminary research has indicated that gains can be achieved with this process but the risk of losses from shatter is always a factor.

Contributors: Anastasia Kubinec, Oilseed Specialist, MAFRI

PROJECT #13E: ALTERNATIVE USE BARLEY DEMONSTRATION

Background: Not all areas in Manitoba are suited to growing high quality and malt barley.

This demonstration has a total of 15 barley varieties grown to demonstrate to producers new non-malting barley varieties. The varieties showcased in this demonstration give producers options to utilize barley on their farms.

Objective: A demonstration of the newest barley varieties from AAFC including 2 and 6 row hulless, forage, malt and grazing varieties.

Design, Materials & Operation:

Treatments:	15 varieties (Table 1)
Replication:	1
Plot size:	1.4m x 6m
Test design:	Simple plot demonstration – not replicated
Seeding date:	June 7, 2009
Fertilizer applied:	80 lbs. actual N (46-0-0) and 27 lbs. actual P(11-52-0)
Pesticide applied:	June 30 – Axial and Buctril M
Harvest date:	September 25, 2009
Product handling:	No data recorded – demonstration only

Prior to seeding, the plot was sprayed with a glyphosate burn-off and nitrogen was broadcast using a Valmar applicator and incorporated with tillage. The trial was direct seeded into canola stubble with seed placed phosphate. A herbicide application of Roundup was applied as a desiccant prior to harvesting.

Table 3. Barley Varieties and Description

Variety	***Description***
Alston	New six-row feed cultivar from Viterra
Champion	New two-row feed cultivar from Viterra
AC Ranger	Established six-row forage barley from AAFC Brandon - most widely grown
Desperado	Newest six-row forage cultivar from AAFC Brandon
CDC Cowboy	New two-row forage cultivar from the Crop Dev. Centre in Saskatoon
Binscarth	New specialized forage-grazing barley cultivar from AAFC Brandon
FB015	Unique extended grazing barley from AAFC Brandon in coop testing
Millhouse	Canada's first milling food barley
HB 122	Second-year entry in coop trials as two-row hulless food
HB 123	First-year entry in coop trials as two-row hulless food
HB 124	First-year entry in coop trials as two-row hulless food
CDC McGwire	Established two-row hulless feed cultivar - for use in poultry, mainly
HB 125	First-year HB Coop six-row hulless feed entry - for swine feed
Enduro	New two-row 'waxy' hulless food barley from Viterra
CDC Lophy-I	Specialized low phytate two-row hulless feed barley from CDC

Results: This was a demonstration where no data was taken. It is intended for general observation and visual comparison.

Important Considerations & Recommendations: This demonstration has barley varieties from every major class of barley intended for multiple uses and markets. Direct one-on-one comparisons may, therefore, not be valid

Conclusions: Demonstration of multiple types of barley can inform the producer of multiple uses and marketing options for barley and the general suitability for local production.

Contributors: Dr Mario Therrien, AAFC

PROJECT #13F: FRUIT TREE DEMONSTRATION

Location: Stonewall, Manitoba

Cooperators: University of Saskatchewan, Dept. of Plant Sciences, Breeding Program
Eastern Plains Saskatoon Inc, Stonewall, Manitoba
Erosion Control Blanket, Riverton, Manitoba

Background: *Opportunities for fruit production on the Prairies*
Submitted by Dr. Bob Bors, Plant Sciences Department, U. of S.

It may be surprising to some that fruit breeding and research has been ongoing at the University of Saskatchewan since the early 1920's. Fruit breeding takes at least a decade between generations, so improvement in both hardiness and fruit quality have taken a while to achieve. For some crops, notably apples and sour cherries, the quality of some of the new varieties equals or surpasses what is commonly found in grocery stores. These achievements as well as research done on producing native fruits have greatly reduced the risks a fruit farmer needs to take. With any crop there is always a risk. I get alarmed when someone asks, "What crop should I grow?" To grow only one crop is rather risky. A better question would be "What crops would be good to grow together?" Having a diversity of crops helps to make every year a good year. 2000 was a good year for strawberries and cherries, but a disaster for saskatoons. 2001 was a disaster for strawberries, good for cherries, but a bumper crop for saskatoons. Diversity also spreads the cost of equipment, labour and facilities. Fruit farms that have diversified are mainly pick-your-own farms or take produce to market. There are also a number of farms which specialize in native fruits which have wide appeal locally and make interesting products for niche markets internationally. Particularly exciting is the possibility of using the same harvesting and processing equipment on Haskap, Saskatoons, and Sour cherries. These 3 crops have different ripening seasons and can be made into similar products and marketed to the same customers!

Objective: A demonstration of haskap, and dwarf sour cherry fruit trees as a fruit crop and/or landscape opportunity. Included was an evaluation of plastic mulch verses degradable erosion control matting as seedling tree mulch products.

Design, Materials & Operation:

A small orchard was established at the EPSI model orchard site in the spring of 2009. The site was sprayed with glyphosate prior to tree planting. The plants were purchased from Prairie Plant Systems in Saskatoon Saskatchewan. Once planted the trees were watered weekly and mulched with a couple of products to provide a cover to retain moisture and inhibit weed growth. The erosion control blanket product was applied as a single layer and as a doubled layer in the seedling tree rows. The plot is for demonstration and is available for your observation by appointment with Stan Stadnyk at MAFRI in Stonewall.

Table 4. Fruit Varieties planted at the EPSI orchard in Stonewall, MB in 2009.

Haskap	***Dwarf Sour Cherry***
Tundra	Romeo
Borealis	Juliet
9-92	Cupid
9-15	Valentine
Berry Blue (pollinator)	Carmine Jewel

Results:

Fruit Tree Description

Haskap is the Japanese name for Lonicera caerulea, also known as 'Blue Honeysuckle'. It is estimated that there are 400,000 plants in the ground across Canada, with about 70% of new plants found in commercial fruit orchards in western Canada. These are new varieties developed by plant breeder Bob Bors at the University of Saskatchewan from crosses made in 2001. Ongoing breeding and research is aimed at developing a new fruit crop suitable for Canadian growers using cultivars from Asia and Europe and wild plants from Canada. Two varieties, Borealis and Tundra, were released in 2007 and branded 'Haskap' because the Japanese consider them to be of high enough quality for the Japanese market. Haskap plants are high yielding, extremely cold hardy, early maturing and have a long harvest window. (L. Stevenson, 2009). Haskap has a flavour commonly described as a combination of blueberries and raspberries and ripens in mid-June, weeks before strawberries. (Haskap Canada Association, 2009) However, late ripening varieties are being developed that could extend the harvest season into July and August.

Berry Blue TM is an older variety, bred in Czech Republic, that pollinates well with the parent plants of the new University of Saskatchewan varieties. It is one of the fastest

growing and tallest varieties so it will quickly make many flowers. Therefore, it has been recommended by Dr. Bors to be an option for a pollinator in a haskap orchard setting. It offers a high yield of berries, which are not as sweet as the U of S haskap. Pollinators should be 10 – 20% of commercially grown plants, although with Berry Blue it could be more like 10%. (Prairie Plant Systems Inc., 2009)

Dwarf sour cherry varieties are being developed by University of Saskatchewan breeders to combine the hardiness and dwarf stature of Mongolian cherries with the high quality of Northern European sour cherries. Some of the cherries even have a bit of sweet cherry in the lineage! These new dwarf sour cherries have many advantages, from their cold-hardiness, to the short stature of the bush. The first cultivar, developed by University of Saskatchewan breeders, was released in 1999 and named SK Carmine Jewel for its dark red colour. A principal advantage for growers of the new dwarf varieties is that they were developed to be machine-harvestable with small, over-the-row harvesters used for saskatoon berries. Compared to sweet cherries, the dwarf sour cherry varieties tend to hold their shape and texture better in cooking, and their tartness mellows into a deep, sweet flavour making them highly prized for all processed cherry products. Canada's average annual production between 1997 – 2006 was 5,844 tonnes. (A. Montgomery, Statistics Canada, April 2009)

Erosion Control Blanket Evaluation as a mulch product was conducted. It was determined that the single layer had very little effect on grass control. The doubled up layer had a greater effect but it was noticed that grassy weeds still penetrated the mesh material and were prominent by the end of the growing season.

Important Considerations & Recommendations: Although haskap trees do not seem to have very many disease issues and are a very hardy shrub, birds really enjoy the berries and consideration should be made to erect bird netting if planning on commercial production.

Along the same line, deer find the sour cherry trees particularly tasty and can also become a problem, and for this reason a fence was constructed around our trial area.

Conclusions: There are many options available to diversify with small fruit trees suitable for production on the prairies. For commercial production, just as important as good agronomic practices, developing a business plan and determining a solid marketing plan is essential to a successful business venture.

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Plant Sciences
51 Campus Drive
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http://www.fruit.usask.ca/index.html

Haskap Canada Association
P.O. Box 1449
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http://www.haskap.ca/index.html

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Haskap Fruit Set

Photos courtesy of University of Sasktchewan Fruit Program

http://www.fruit.usask.ca/Photos

PROJECT #13G: HULLESS OAT VARIETY EVALUATION TRIAL

Background: Hulless oats are an oat variety type that is well suited for animal feed and human food. Hulless oats are not actually hulless, they have a hull that is held on to the seed loosely and is removed during combining or through further processing. Traditional hulless oat varieties have as much as 30% hull retention after harvest and have a fine coating of hair (trichomes) on the groat that makes the oats very itchy to handle and prevents them from flowing freely in the bin.

Dr Vern Burrows, Research Scientist with Agriculture and Agri-Food Canada in Ottawa, has been developing hulless oat lines that overcome these two problems. He has developed VAO (value-added oat) lines that have only a trace of retained hulls in bin-run grain, as well as "bald" varieties that shed the trichomes along with the hulls at harvest. Dr Burrows has also been working with Semican International, Inc., a company based in Quebec that has developed "Equavena" hulless oats as a high quality diet for race horses.

Scott Sigvaldason, of Wedge Farms, is an Arborg-area producer who is processing hulless oats for human consumption markets worldwide under the trade name "Cavena Nuda" or Rice of the Prairies. Scott has been very successful in promoting the Cavena Nuda product into many of the health food markets due to its gluten free content. Scott has appeared on the CBC Dragon's Den program and has gained a lot of attention from food processors and larger food sales chains interested in selling the products to the public. The variety Gehl has been acquired by Wedge Farms as its proprietary variety for its marketing options at this time.

Objective: To evaluate the agronomics and yield of unregistered and registered hulless oat variety lines grown in Manitoba conditions.

Design, Materials & Operation:

Site #1 Information – North Interlake

Location:	Arborg, Manitoba	Seeded:	June 3
Cooperator:	PESAI	Harvested:	September 25
Land-Base:	SS Johnson Seeds	Plot Size:	8.2 m2

Site #2 Information – South Interlake

Location:	Warren, Manitoba	Seeded:	May 21
Cooperator:	PESAI	Harvested:	September 15
Land-Base:	Craig Riddell	Plot Size:	8.2 m^2

Site #3 Information - Eastman

Location:	Beausejour, Manitoba	Seeded:	June 15
Cooperator:	PESAI	Harvested:	October 19
Land-Base:	Viterra Agri-Center	Plot Size:	8.2 m^2

Site #4 Information - Southwest

Location:	Melita, Manitoba	Seeded:	May 21
Cooperator:	WADO	Harvested:	September 15

Land-Base: WADO Plots Size: 14 m^2

Site #5 Information - Parkland

Location: Roblin, Manitoba Seeded: May 21
Cooperator: PCDF Harvested: September 16
Land-Base: PCDF Plot Size: 5 m^2

The trial consisted of multiple hulless lines replicated 3 times in plots arranged in a randomized complete block design (RCBD) in five locations across Manitoba. Refer to site information above for plots sizes, seeding and harvesting dates. The target seeding rate was 220 plants/m2. Trials were fertilized (Table 1) according to soil test results and herbicides were applied as needed. The site at Beausejour was harvested, but due to hail damage and other factors beyond the researcher's control, the data could not be used in this report. There were a total of 18 varieties, however due to seed availability at planting, not all sites received all 18 varieties, or the same combination of varieties. The hulless oat variety Navan was included as a check in all the trials.

Table 1 Fertilizer Applications to 2009 Manitoba Hulless Oat Trials by Location.

Location	*Actual lb N/ac*	*N Application*	*Actual lb P/ac*	*P Application*
Arborg	90	granular, broadcast and incorporated	27	granular at seeding
Warren	90	NH_3 incorporated	27	granular at seeding
Beausejour	50	granular, broadcast and incorporated	27	granular at seeding
Melita	70	liquid at seeding	30	granular at seeding
Roblin	20	granular at seeding	30	granular at seeding

Results: Mean yields of varieties by site are shown in Table 2.

Least significant differences (LSD) for Arborg, Warren, Melita and Roblin, are 338.27, 352.51, 318.48 and 926.91 kg/ha, respectively. (If differences in yield between varieties within a site are greater than or equal to the LSD, those variety yields are significantly different from each other.)

The coefficients of variation (CV) at all sites were acceptable, at 6.39%, 6.55%, 6.86%, and 10.38% for Arborg, Warren Melita, and Roblin, respectively. (CV is a relative measure of variation within a trial, with lower numbers indicating less variability across reps.) The Roblin site had the highest grand mean yield (5323 kg/ha), followed by Warren (3179 kg/ha), Melita (2774 kg/ha) and Arborg (2509 kg/ha).

Table 2 Mean yields (kg/ha) and percent of check of hulless oat varieties planted across Manitoba in 2009. Not all varieties were planted at all sites. AC Navan was the check variety. Varieties are arranged by mean rank, with bolded values indicating the highest yielding varieties at individual sites.

Variety	*Arborg*		*Warren*		*Melita*		*Roblin*		*Variety Means Across Sites*	
	kg/ha	**%**	**kg/ha**	**%**	**kg/ha**	**%**	**kg/ha**	**%**	**kg/ha**	**%**
VAO-52	**3116**	**109**					6076	96	**4596**	**102**
VAO-50	2719	95			**3381**	**105**			3050	100
AC Navan	*2869*	*100*	*3362*	*100*	*3213*	*100*	***6341***	***100***	*3946*	*100*
VAO-49	2424	84	**3707**	**110**	3186	99	5780	91	3774	96
AC Gehl	2981	104	3492	104	2792	87	5674	89	3735	96
VAO-58	2961	103			2802	87			2882	95
VAO-46	2626	92	3118	93	3200	100	5067	80	3503	91
VAO-48	2519	88	3289	98	2802	87	5002	79	3403	88
VAO-60	2288	80	3366	100	2660	83	5316	84	3408	87
VAO-44	2427	85	3217	96	2818	88	4780	75	3311	86
VAO-1	2717	95	2997	89	2983	93	4123	65	3205	85
VAO-51	2826	99	2731	81	2323	72			2627	84
VAO-45	2059	72	3133	93	2923	91	4612	73	3182	82
VAO-10	1968	69	3355	100	2252	70	5557	88	3283	82
VAO-57	2227	78					5332	84	3780	81
VAO-53	2290	80							2290	80
VAO-54	2537	88			1964	61			2251	75
VAO-22	1617	56	2383	71	2316	72	5387	85	2926	71
c.v. %	6.39		6.55		6.86		10.38			
l.s.d.	338.27		352.51		318.48		926.91			
grand mean	2509.28		3179.25		2774.31		5323.14			

Hulless oat varieties can be expected to yield 20-25% less than hulled varieties, since the weight of the hulls are removed from hulless oats at harvest. In Arborg, the highest yielding variety, VAO-52, yielded 109% of the check, while in Warren, VAO-49 yielded 110% of the check, in Roblin, AC Navan (the check) yielded the greatest with VAO-52 at 96% of the check, and in Melita, VA0-50 yielded 105% of the check.

The variety yield rankings differed between sites, but overall, the top three yielding hulless oat varieties were VAO-52 (102%), VAO-50 (100%) and AC Navan (check).

Table 3 Mean lodging ratings for hulless oat varieties grown in Warren and Roblin in 2009. Lodging ratings on a 1-5 scale, where 1=0 % and 5=100% lodging.

Variety	*Warren*	*Roblin*	*Average*
VAO-1	1	1	1
AC Gehl	1	2	1.5
AC Navan	*1*	*2*	*1.5*
VAO-51	1	2	1.5
VAO-22	1	3	2
VAO-46	1	3	2
VAO-48	1	3	2
VAO-52		2	2
VAO-57		2	2
VAO-10	1	4	2.5
VAO-44	2	4	3
VAO-49	3	4	3.5
VAO-60	2	5	3.5
VAO-45	3	5	4
VAO-50			n/a
VAO-53			n/a
VAO-54			n/a
VAO-58			n/a
c.v. %	36.05	30.23	
l.s.d.	0.97	1.52	
grand mean	1.58	3.00	

Visual lodging ratings were taken at harvest on a scale of 1-5 (1=0% and 5=100% lodging) (Table 3). Ratings were not available for Melita or Arborg. Rating were taken in Roblin and Warren, however there were high C.V.'s at both sites, which can be expected with subjective ratings. Overall, VAO-1 showed better lodging than the check at both sites and VAO-51 and AC Gehl were equal to the check.

As indicated above, hulless oat varieties generally yield less than hulled varieties partly due to the weight of the hull. However, hulless oats test weights are often 20-25% greater on average than that of the hulled oats, since there are fewer hulls to add bulk to the grain volume. On average, the check, AC Navan had the lowest test weight, while VAO-22 and VAO-53 were the greatest. With regards to sites, test weights decreased in the order of Warren > Arborg > Melita > Roblin (Table 4).

Days to maturity ratings were only taken at the Melita location, where results of all varieties were similar, ranging from 95-99 days with a mean of 96.7 days for the varieties tested.

Table 4 Mean test weights (g/0.5L) of hulless oat varieties grown in four locations across Manitoba in 2009.

Variety	*Arborg*	*Warren*	*Melita*	*Roblin*	*Average*
VAO-22	324	347	328	294	323
VAO-53	322				322
VAO-54	322		305		314
VAO-51	331	334	290	289	311
VAO-50	310		311		311
VAO-1	318	323	302	288	308
VAO-44	313	332	302	277	306
VAO-46	311	338	294	280	306
VAO-49	315	326	308	268	304
AC Gehl	318	322	302	274	304
VAO-10	311	332	309	259	303
VAO-45	309	327	294	275	301
VAO-58	314		283		299
VAO-52	322			274	298
VAO-60	305	329	295	263	298
VAO-57	309			268	289
VAO-48	293	306	268	257	281
AC Navan	281	297	238	237	263
c.v. %	1.40	0.97	4.05	3.91	
l.s.d.	7.27	5.35	19.99	17.84	
grand mean	312.76	326.08	295.13	271.74	

Table 5 Protein and Oil concentrations of Hulless Oat varieties grown at four locations across Manitoba in 2009.

	Arborg		**Melita**		**Roblin**		**Stonewall**		**Mean**	**Mean**
Variety	Oil %	Protein%	Oil %	Protein%	Oil %	Protein%	Oil %	Protein%	Protein	Oil
AC Gehl	8.35	15	8.29	17.71	8.5	15.9	8.63	16.28	16.2	8.4
AC Navan	7.41	14.63	7.79	15.28	7.7	15	7.06	16.06	15.2	7.5
VAO-1	8.04	15.48	8.23	17.26	8.2	16.6	8.29	16.43	16.4	8.2
VAO-10	9.43	15.41	8.78	18.83	9.5	17.6	9.6	16.86	17.2	9.3
VAO-22	8.47	16.99	8.36	19.62	8.4	18.3	8.97	17.52	18.1	8.6
VAO-44	10.03	14.53	9.23	16.61	9.6	15.6	9.48	16.22	15.7	9.6
VAO-45	9.77	15.06	9.31	17.16	9.8	16.4	9.87	15.83	16.1	9.7
VAO-46	8.21	14.66	8.46	15.35	8.5	15.3	8.32	16.92	15.6	8.4
VAO-48	8.6	15.36	8.27	17.12	8.5	16.7	8.7	16.74	16.5	8.5
VAO-49	8.31	14.87	8.72	16.39	8.6	16.2	8.59	15.84	15.8	8.6
VAO-50	8.31	14.27	8.67	15.5					14.9	8.5
VAO-51	8.4	16.06	8.29	19.08	8.5	16.5	8.28	17.41	17.3	8.4
VAO-52	8.51	15.18			8.9	16.8			16.0	8.7
VAO-53	8.74	16.15							16.2	8.7
VAO-54	8.64	15.13	8.62	18.35					16.7	8.6
VAO-57	9.05	15.78			9.2	16.5			16.1	9.1
VAO-58	9.5	15.53	8.64	18.44					17.0	9.1
VAO-60	9.8	15.07			9.8	15.4	9.64	16.02	15.5	9.7

In Table 5, the % concentration of oil and protein contents are noted. With slight differences seen from location to location all of the mean protein levels are above the 15% range and some can be seen as high as 17%.

The oil contents have also been recorded in the 7.5 to 9.7 range for the Hulless oat varieties grown. With both protein and oil levels at these ranges Hulless oat cold provide a substantial nutritional value over the hulled oat counterparts.

Important Considerations & Recommendations: A new evolving market for the future is hulless oats. As with regular oat varieties, prospective hulless oats growers should clarify the management and marketing issues, prior to seeding these varieties. Many producers grow hulless oats under contract, for very specific markets with different marketing risks associated.

Since the hull does not protect the inner seed of hulless oats, the seed can be more prone to damage during handling and harvest. Thus, threshing cylinder speeds and concaves should be adjusted to prevent damage. Seeding rates should also be increased to account for potentially lower germination, and seed treatment is recommended. The higher oil content at the surface of the seed makes the seed more attractive to storage insects, and to prevent rancidity during storage, hulless oats need to be stored at a drier moisture content than hulled varieties (<12% moisture). Moisture tables for hulless oat varieties have been developed by the Canadian Grain Commission, which may make the storage of this product somewhat easier for producers. The link to the table has been listed below from the Canadian Grain Commission website.

http://www.grainscanada.gc.ca/guides-guides/moisture-teneur/table-tableau/ho-agn-1.pdf

Conclusions: As more varieties of hulless oats become available, growers will be able to choose those varieties with more favourable qualities for their targeted markets, as well as those which are more suited to their agronomic conditions. Future testing will continue as markets develop and alternative uses present themselves.

Dr Burrows touring the Arborg Hulless Oat trial, summer 2009.

PROJECT #13H: KENAF DEMONSTRATION

Background: Kenaf is a late maturing fiber plant that is being evaluated in Manitoba. Production and Marketing information is limited. Information below is gleaned from Research institutions in USA. Kenaf (Hibiscus canabinus L.) is an annual plant, native to central Africa, and related to hibiscus (Hibiscus hibiscum L), okra (Hibiscus esculentus), hollyhock (Althaea rosea) and cotton (Gossypium hirsutum L.).

Individual plants can grow up to 12 - 18 ft in 6 months with few side branches when grown in dense stands. Kenaf is being developed as a nonwood fiber crop. The bark, which contains long soft bast fibers, makes up 30 to 40% of the dry weight of the stem. The central core of the stem contains weakly disbursed pith cells surrounded by a thick cylinder of short woody fibers. The Kenaf plant has an ideal blend of long and short fibers for many paper and paperboard products. Kenaf is cultivated worldwide as a fiber crop, with the vast majority grown in China as a substitute for jute.

Most Kenaf cultivars are photoperiod sensitive. For example, the cultivars Everglades 41 and 71 don't flower until day length decreases to 12.5 hours. Some varieties begin to flower within 60 days of planting, produce seed and are dead at the end of 100 days. Later-maturing varieties produce higher yields. Leaf shape and stem color vary widely among varieties. Kenaf has two distinct leaf shapes, palmatified and entire. The palmatified-shaped leaf closely resembles hemp. The entire-leaf type looks much like okra and cotton. Stem color can be various shades of red, green, or purple. The plant has a long effective taproot system and a relatively deep, wide-ranging lateral root system making the plant drought tolerant.

Potential uses for Kenaf fibers

Early efforts to commercialize Kenaf centered on using Kenaf fibers to produce newsprint. Demonstration work has shown Kenaf newsprint to have many desirable qualities, including potentially lower costs than newsprint made from wood fiber. Additional efforts to build mills dedicated to making newsprint and other papers from Kenaf or Kenaf blended with other fibers have so far failed from a lack of financing.

Commercialization of Kenaf as a cash crop is just beginning. Bast fibers are used for speciality papers, tea bags, and grass mats (biodegradable mats impregnated with grass and/or flower seeds). The bast fibers may also be used as a fibreglass substitute, blended with plastic, or blended with cotton for fabrics. Core fibers are currently being marketed for animal bedding, cat litter, poultry litter, as an extrusion aid in plastics, an industrial absorbent (oil spill cleanup), a filter medium for fruit juices, as an additive in drilling mud and in "lite" bread dough, and for manufacture of particleboard (acoustic tiles)

Kenaf has also been investigated as a forage crop for cattle feed. When harvested at an immature stage of growth (about 6 ft). Crude protein in Kenaf leaves ranged from 21 to 34 percent, stalk crude protein ranged from 10 to 12 percent, and whole-plant crude protein ranged from 16 to 23 percent.

Potential for growing Kenaf

Kenaf is a tropical plant. Kenaf needs a soil temperature of around 12° C for germination and growth. Kenaf is adapted to a wide range of soils.

Cultural Practices

Planting depth, seeding rates, and plant population - Planting depth should be in the range of 1.5 to 2". Shallower depths are possible with good soil moisture and a fine-textured seedbed. Efforts should be made to get good seed-soil contact. With good soil conditions, optimal temperature, and moisture, plants will emerge in 3 to 6 days. Specific row spacing will likely be dictated by requirements of harvesting equipment. Kenaf has a deep taproot and an extensive lateral root system making the crop relatively drought tolerant. Kenaf is extremely sensitive to frost.

Seed counts average about 16,000 per pound. Taking into account germination rates and seedling losses, a planting rate in the range of 8 to 12 lb/A is recommended. Beginning plant counts of 100,000 to 150,000/A are desired. Kenaf is self-thinning and will reduce its population during the growing season. A final plant count of 80,000 to 100,000/A is desired. Lower plant populations result in undesirable branching and thicker trunks.

Varieties In the U.S., the varieties used most extensively are those developed by ARS researchers in Florida - 'Everglades 41' and 'Everglades 71'. Both varieties are resistant to anthracnose.

Fertilization – It is suggested Kenaf will need a rate of 120 to 140 lb/A actual N.

Weed control - A combination of chemical weed control and mechanical cultivation has been used for weed control in Kenaf. At the present time only Treflan®, a pre-emergent grass killer, is registered for use on Kenaf in Florida. Fusilade has been registered for use in Kenaf in Mississippi. Poast, Assure II, have been tried on Kenaf in Mississippi and look promising. Cobra, Goal*, Karmex, Lorox*, Bladex, Basagran, Scepter, Cadre, and Pursuit have been screened in Mississippi and show injury to the Kenaf.

Kenaf is a vigorously growing plant and under optimum growing conditions can form a canopy over the row middles in as little as 5 weeks. Once Kenaf shades the row middles, low growing weeds and grasses are shaded out and there is no need for additional weed control.

Insect pests - Most insect problems with Kenaf are likely to occur at seedling emergence and during young seedling growth. Cut worms, leaf miners, and other chewing/sucking insects are potential problems. Late in the season, the plant will tolerate a relatively high population of leaf-chewing insects

Diseases - Kenaf is resistant to most plant diseases. One serious disease of Kenaf, anthracnose, was reported in the U.S. in 1950. USDA plant breeders were successful in breeding and selecting Kenaf cultivars and accessions for resistance. Both Everglades 71

and 41 are highly resistant, as are Tainung varieties, and lines developed in Cuba and Guatemala.

Harvest methods - A number of harvest methods are possible. The USDA has developed a whole stalk harvesting system that cuts the stalks and lays them in an orderly fashion at right angles to the row. Stalks are allowed to dry for around two weeks and are then gathered by a machine that picks up the stalks and arranges them in large bundles; the bundles are transferred to field trailers. The tractor-drawn field trailers haul the bundles to the field margin where they are stacked for shredding

Another method is to use forage choppers to harvest the crop. This method can be used in colder areas where the crop is allowed to dry after being killed by frost or by a desiccant. This method has been used in Mississippi. The chopped Kenaf is stored and transported in cotton modules with the same equipment used for harvesting cotton

The crop may also be chopped and baled with forage equipment and, if covered, can be stored as large round or rectangular bales on field edges.

Use of sugarcane harvesting equipment on Kenaf is another harvesting method mentioned in the literature. Storage problems from high moisture content were cited when sugarcane harvesting equipment was used.

Kenaf must be “retted” in the field, a necessarily precise drying period in which the inner fiber begins to loosen from the outer bark.

Kenaf Facts

1. Kenaf is not related to hemp or marijuana, but there is a striking similarity in the leaf shape of some varieties.

2. Kenaf may yield 6 to 10 tons of dry fiber per acre per year. This is 3 to 5 times greater than the yield for Southern pine trees, which require seven to 40 years before they’re ready for harvest.

3. The outer fiber or bast makes up 40% of the stalk’s dry weight; the inner fiber or core makes up the other 60%.

4. In the right climate, Kenaf grows 14 feet tall in four to five months.

5. Kenaf flowers at the end of the growing season, producing showy hibiscus-like blossoms.

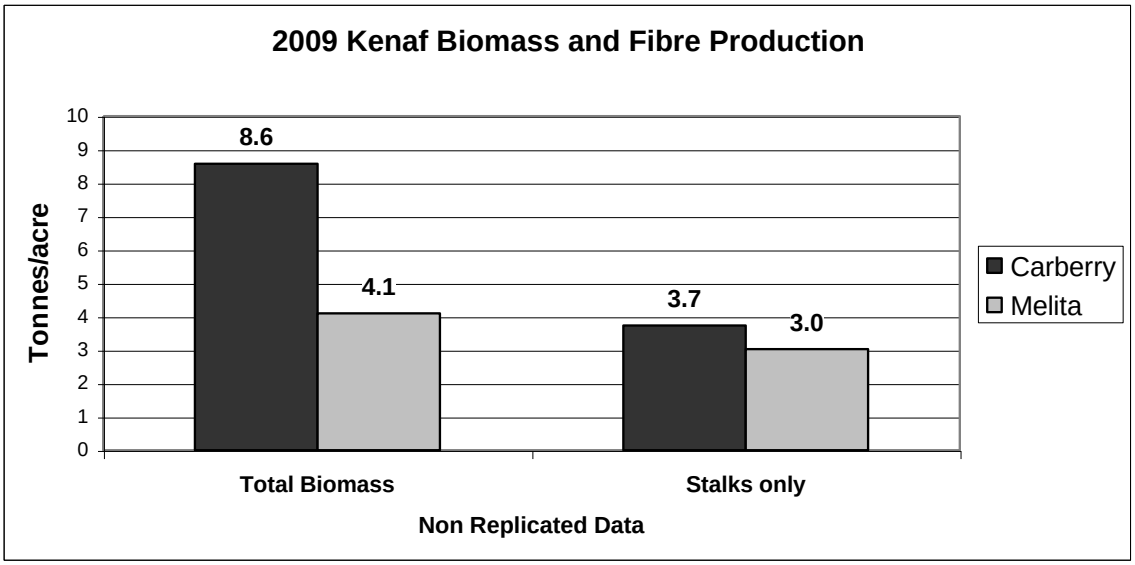
6. Kenaf has been cultivated for at least 4000 years, with its roots in Egypt.

7. Kenaf reportedly has more than 129 different names world wide.

8. Kenaf was introduced into America during World War II as a result of the disruption of the jute and abaca trade from Asia.

9. While the flowering can last 3 to 4 weeks, or more, per plant, each individual flower blooms for only one day.

Results:



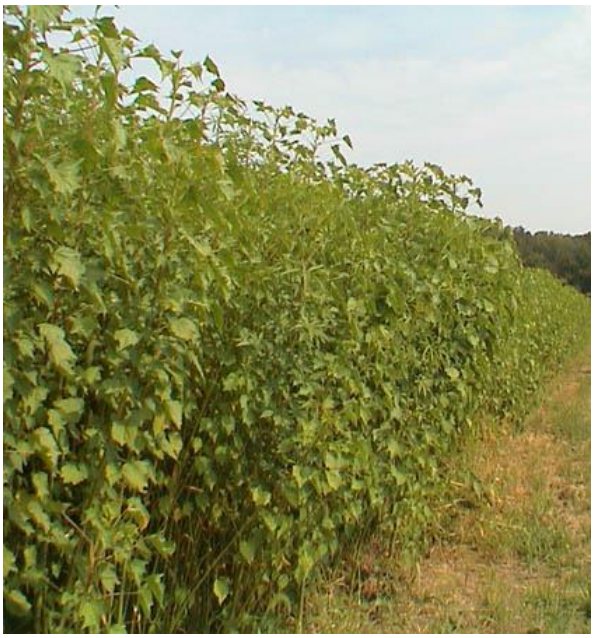
Kenaf was planted in 4 locations in Manitoba to observe growing characteristics to determine the need for further investigation. Yield data was only taken at the Carberry and Melita locations.

Conclusions: This first year of testing, the weather was cool which was unfavorable for proper growth. The yield range was unexpectedly high despite the conditions. Further evaluation is required to determine the potential as a bast crop in Manitoba.

Information Sources:

Mississippi State University, “A Summary of Kenaf Production and Product Development Research,” available at http://msucares.com/pubs/Variety/Kenaf/index.htm; Internet; accessed 03 December 2009.

Purdue University, “Alternative Field Crops Manual – Kenaf,” available at http://www.hort.purdue.edu/newcrop/afcm/kenaf.html; Internet; accessed 03 December 2009.



PROJECT #13I: WESTERN FEED GRAINS DEVELOPMENT CO-OPERATIVE TRIAL

Cooperators:

WADO - Westman Agricultural Diversification Organization – Melita

PESAI- Prairies East Sustainable Agriculture Initiative – Arborg

PCDF - Parkland Crop Diversification Foundation – Roblin

Ag-Quest Inc. – Minto

Background: (taken partially from WFGDC website: http://www.wfgd.ca)

The formation of this cooperative was initiated as an alternative approach to filling a void that existed in feed wheat varieties. For over forty years there have been attempts by both public and private groups to develop and license a feed wheat variety which, until recently, were unsuccessful. These failed attempts were largely due to the traditional approach taken by breeders that has stringent KVD requirements for variety licensing. Some of the cultivars developed by the cooperative will be exempt from licensing and KVD requirements, as seed will be supplied to members only. Grain will be sold only to members and will be used exclusively for livestock feed or ethanol production within a closed loop. Other cultivars developed by the Cooperative have been submitted for registration under the new Canada Western General Purpose wheat class.

Wheat as a feed grain has historically been supplied by default. Poor weather conditions and disease determine the availability of supply. By developing feed wheat cultivars, livestock producers will have a continuous, predictable supply of grain without compromising high value grain for feed. New high yielding cultivars with low FHB and low protein will increase feed value and farm gate revenues, lower feed costs, and reduce the reliance on imported feed grains, both provincially and internationally.

Development of these new cultivars will also create a better feedstock for the production of ethanol. This value-added opportunity will help satisfy the Provincial and Federal Government's objectives to increase the supply of ethanol-blended gasoline in Canada.

This newly formed WFGDC cooperative is currently offering memberships (through their website) to both grain producers and end users of the grain. Membership fees collected will finance the research necessary for such development. Feed wheat cultivar releases are anticipated in approximately five to seven years from the time the first crosses are made, and some varieties developed by the Co-op are very close to public release at this time.

Since some of the feed wheat varieties will not be registered, it is imperative that all members enter contracts which state clearly that any grain produced will not enter the export market, they will only sell to recognized members of the Co-op, and the grain will only be used for livestock feed and ethanol production.

Feed grain development is not limited only to feed wheat, as many feed grain varieties could be developed in the future through this cooperative.

In 2009, yield trials featuring the best lines currently being developed by the Co-op were evaluated against some of the current standards. Field Plot trials were conducted in Melita, Roblin, Hamiota, and Arborg. In addition to straight yield per acre they were also tested for higher than normal starch content. Some of the WFGDC varieties are being bred to fulfill this specific need for higher starch in addition to higher yields.

Design, Materials & Operation: A variety trial was located at four sites in Manitoba: Melita, Roblin, Hamiota, and Arborg. Plots were arranged in a randomized complete block design replicated three times. The Melita site was slightly different than other sites in that the trial replications were split in half so that one side would be sprayed with fungicide and the other not. Hamiota, Arborg and Roblin did not have fungicide applications. Melita site was planted into a loamy soil on a river bottom located on NE 36-3-27 W1, while the Hamiota site was planted on a Newdale Clay loam soil at SW 6-15-24 W1. Soils in Arborg and Roblin are clay and loamy textures, respectively. Seeding dates, seeding fertility, weed control, and harvest dates varied among sites (Table 1).

Table 1 Seeding date, fertility regime, weed control and harvest information for Arborg, Hamiota, Roblin and Melita sites.

Site	Seed Date	Fertility Regime	Weed Control*	Application Date	Harvest Date
Melita	21-May	70 lbs/ac N & 30 lbs/ac P	Everest, 2-4D ester500	15-Jul	16-Sep
Hamiota	27-May	80 lbs/ac N & 30 lbs/ac P	Attain A+B, Puma, Axial	20-Jul	29-Sep
Roblin	14-May	40 lbs/ac N & 30 lbs/ac P	Frontline, Axial	June 15 & 25	24-Sep
Arborg	03-Jun	90 lbs/ac N & 27 lbs/ac P	-	-	-

*Applied at recommended rates

Soil tests were taken prior to seeding at each site (Table 2). Considerable nitrate values were available at the Hamiota and Roblin sites compared to the Melita and Arborg sites.

Table 2 Soil nutrient profiles of Melita, Hamiota, Roblin and Arborg sites at 0-6" and 6-24" depths.

Site/Depth	0-6"				6-24"	
Nutrient	N	P	K	S	N	S
	lbs/ac	ppm	ppm	lbs/ac	lbs/ac	lbs/ac
Melita	13	13	358	14	36	54
Hamiota	37	7	220	18	60	54
Roblin	50	70	180	20	77	14
Arborg	17	11	442	-	22	-

In Melita, Tilt 250E, a propiconazaole formulation, was used as the fungicide to control leaf diseases at recommended rates. The fungicide was split into two applications. The first application was on July 2nd, and the second was on July 12th at the booting and flag leaf emergence stages, respectively.

Data collected included height, leaf disease severity, test weight and final yield. Disease ratings were taken in Melita before application of the fungicide. Final yields were adjusted for 14.5% moisture content. In Melita, disease was rated as one rating per plot based on the McFadden Scale (AAFC, McLaren, Brandon, MB). All site data was analyzed with a two-way analysis of variance (Analyze-it version 2.03 statistical software, Microsoft) to test data means for significance according to each location. A paired t-test was also performed to compare varietal response yield means to fungicide application versus without fungicide application.

Results: There were significant yield differences at both harvestable sites at the 0.05 level of significance according to the analysis of variance (Table 3). Coefficient of variation was low at all sites indicating a good data set. Grand mean for each site was 5396 kg/ha in Roblin, 4855 kg/ha in Melita (without fungicide), and 4611 kg/ha in Hamiota. There was no yield data developed at the Arborg site because of extensive flooding in that region once again in 2009.

Table 3 Shows the mean yields of the Hamiota, Roblin, and Melita wheat yields. Melita compares sprayed versus unsprayed yield means and its corresponding mean spray advantage as a percentage of yield. Both sites' means do not include the sprayed Melita values for yield, only unsprayed.

	Average Yield*	Hamiota	Roblin	Melita (kg/ha)		
Variety	kg/ha	kg/ha	kg/ha	Sprayed	Unsprayed	% Spray Adv.
WFT 503	5795.2	5579.7	6326.7	5723.2	5479.1	4.5
WFT 504	5633.0	5066.8	6260.0	5630.0	5572.2	1.0
WFT 510	5410.9	5411.6	6000.0	5387.9	4821.1	11.8
WFT 516	5392.0	5374.3	5433.3	5997.5	5368.4	11.7
AC Andrew	5355.5	4732.9	5673.3	6525.7	5660.1	15.3
WFT 514	5206.3	4837.9	5420.0	5922.9	5361.2	10.5
5702PR	5151.2	4999.3	5480.0	5558.9	4974.3	11.8
WFT 507	5138.4	5349.7	4906.7	5065.2	5158.9	-1.8
WFT 409	4998.3	4520.2	5326.7	5510.2	5148.0	7.0
WFT 517	4937.6	4706.6	5373.3	5369.6	4733.0	13.4
WFT 508	4763.4	4064.5	5846.7	4354.7	4379.0	-0.6
Unity	4759.7	4287.8	5240.0	5319.5	4751.3	12.0
WFT 502	4703.2	4426.5	4980.0	4893.3	4703.1	4.0
WFT 501	4530.5	4293.4	5093.3	4402.3	4204.7	4.7
WFT 411	4288.0	3689.8	4680.0	4996.0	4494.1	11.2
WFT 506	4094.9	3256.4	4920.0	3874.4	4108.4	-5.7
WFT 509	4064.1	3794.7	4780.0	3661.8	3617.6	1.2
	CV%	9.0	8.7	8.7	8.0	Sign. Adv.
	LSD (p<0.05)	688.0	777.4	749.2	647.2	p<0.003
	Grand Mean	4611.3	5396.5	5187.8	4855.0	6.9

*Average Yield between Hamiota and Melita (unsprayed)

Yields were not taken at the Arborg site due to overland flooding.

In Hamiota, yields were significantly different among varieties and generally followed the provincial average in rank. Varieties including WFT 503, WTF 516, WTF 504, WTF 507, WFT 510, and 5702PR were the highest yielding varieties.

In Roblin, yields were significantly different among varieties and generally followed the provincial average in rank. Varieties WFT 503, WFT 504, WFT 510, AC Andrew, and WFT 508 were the highest yielding varieties.

In Melita, plot replications were split in half with one side being sprayed with fungicide and the other not. Fungicide application significantly increased yield overall by 6.9% on average according to grand means ($p < 0.003$). The majority of varieties responded positively to a fungicide application ranging from 1.0% to 15.3% yield response whereas only three varieties responded negatively to fungicide application ranging from -5.7% to -0.6%. CV% for the trial was low for plots applied with fungicide as well as those without an application indicating a good data set. The most positive response to fungicide was AC Andrew, improving 865.6 kg/ha compared to unsprayed plots. This is not necessarily a positive attribute in a variety. Some of the WFT varieties such as WFT 504 and, to a lesser extent, 503 had much greater yield stability, in that the fungicide had little impact in increasing the already respectable yield. These “stable” varieties could be an option for keeping costs down by reducing fungicide use. In WADO’s trials at Melita, WFT 516, AC Andrew, and WFT 514 were the highest yielding varieties after the fungicide application. Without spraying, WFT 516, WFT 514, and AC Andrew are still the highest yielding varieties, but other varieties such as WFT 503, WFT 504, WFT 501, and WFT 409 are also among the top yielders. Lowest yielding varieties were WFT 509, WFT 506, and WFT 501 (both sprayed and unsprayed). In 2009 across the three locations, 503, then 504, then 510 and 516 were the highest yielding of all the varieties.

2009 was a good year for low disease pressure. So, based on this year’s results, it would be difficult to justify the extra application costs of a fungicide given the relatively small 6.9% yield advantage across all these varieties given the basic price of $4 to $5/bushel for this type of wheat. However for varieties which respond strongly to fungicides, applications could be worth while in a year like 2009, but especially in a year that would favor high disease pressures.

Representative samples of each plot were bagged and sent to AgQuest for further analysis of protein and Fusarium infection levels. For further information on data such as disease, height and test weight values, please contact WADO or the WFGDC / AgQuest.

PROJECT #13J: WINTER WHEAT INPUTS TRIAL

Background/Objective: With the increased use and interest in winter wheat production many agronomic questions have been raised. What inputs will get me the best crop and how can I as a producer grow this crop in the most economical way with maximizing returns.

A similar trial to this had been done in the past as a field tour as a demonstration of how different inputs have an effect on your end result of quality and yield. However this was only a demonstration and no data was generated to substantiate the claims being made and only visual observations were noticed. It was our intent to try and determine what input costs would get you the best end dollar for your product, whether that be higher yield, better quality or a combination of both, and the cost associated with doing so.

Design, Materials & Operation: Two sites were chosen in the Interlake area at Warren and at Arborg. The trials were set up as a replicated RCBD trial. The trials were seeded in the fall with the appropriate inputs being applied at the time of seeding. This trial had a lot of different treatments incorporated in it and those are outlined in the table below. The treatments involved fertilizer applications of 0 applied, 50% applied, and 100% applied. The fungicide treatments involved None applied, 1 treatment, 2 treatments, 3 treatments. As well there was a genetic component which placed one variety against the newer variety which should be of a genetic advantage and have better breeding characteristics incorporated within it. Herbicide treatments were also applied in the same manner of having none applied 50% applied and 100% of recommended rate applied.

Site Information #1

Location:	Arborg, Manitoba
Cooperator:	PESAI
Soil Type:	Framnes (Clay Loam)
Plot size:	8.2 m square
Seeded:	September 21, 2008
2 leaf stage:	October 19
Soil Conditions:	wet

Site Information #2

Location:	Warrren, Manitoba
Cooperator:	South Interlake Crop Testing Committee
Soil Type:	Clay Loam
Plot size:	8.2 m square
Seeded:	September 22, 2008
2 leaf stage:	October 20
Soil Conditions:	dry

Treatment List:

Treatment	*Inputs Applied*
Full (all inputs applied)	full rate fertilizer, 100% herbicide, 4 fungicide appplications, Buteo seed
Full (-genetics)Falcon	Inputs as above (minus Buteo seed and Falcon used)
Full (-50% fert)	Full Inputs (minus 50% of the fertilizer)
Full (-100% fert)	Full Inputs (minus 100% of the fertilizer)
Full (-50% herb)	Full Inputs (minus 50% of the herbicide)
Full (-100% herb)	Full Inputs (minus 100% of the herbicide)
Full (-1 fungicide)	Full Inputs (minus 1 fungicide application)
Full (-2 fungicides)	Full Inputs (minus 2 fungicide applications)
Full (-3 fungicides)	Full Inputs (minus 3 fungicide applications)
Full (-4 fungicides)	Full Inputs (no fungicides appplied)
Empty (nothing applied)	Falcon seed planted only, no inputs applied in season
Empty (+genetics) Buteo	Buteo seed planted only, no inputs applied in season
Empty (+50% fert)	Falcon seed planted (plus 50% of fertilizer applied only)
Empty (+100% fert)	Falcon seed, (plus 100% fertilzer applied only)
Empty (+50% herb)	Falcon seed, (plus 50% herbicide applied only)
Empty (+100% herb)	Falcon seed, (plus 100% herbicide applied only)
Empty (+1 fungicide)	Falcon seed, (plus 1 fungicide application only)
Empty (+2 fungicides)	Falcon seed, (plus 2 fungicide applications only)
Empty (+3 fungicides)	Falcon seed, (plus 3 fungicide applications only)
Empty (+4 fungicides)	Falcon seed, (plus 4 fungicide applications only)

The phosphate fertilizer was applied with the seed at seeding and the nitrogen wwas broadcast in the spring. Infinity herbicide applications were made at correct timings and plant stages.

The fungicide treatments consisted of:

(1) Half rate Tilt with the herbicide application,

(2) Half rate Tilt with Herbicide plus, full rate Stratego applied at flag leaf

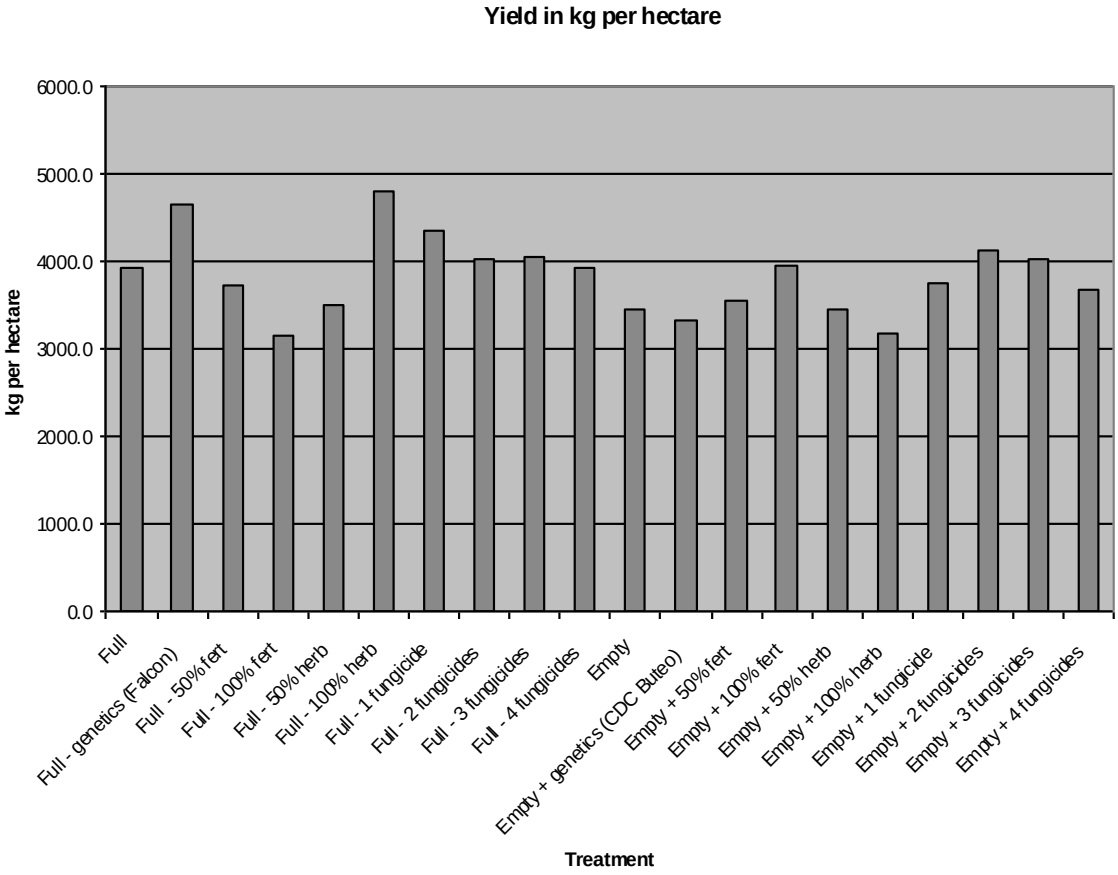
(3) Half rate Tilt with Herbicide plus, full rate Stratego applied at flag leaf, full rate Folicur at early flowering stage

(4) Half rate Tilt with Herbicide plus, full rate Stratego applied at flag leaf, full rate Folicur at early flowering stage full rate Folicur at late flowering stage.

The trial in Warren was terminated in the spring due to excessive winter kill in the trial area. The winter had been very hard on a lot of the winter wheat crops in Manitoba and this trial site was no exception. The trial in Arborg had survived the winter very well and little to no winter kill was observed. The following data is from only the Arborg site and the results can not be collaborated or verified with another site. It should also be stated that there was excessive rainfall during the growing season in the Arborg area.

Results/Observations: The treatments were analyzed at Intertec Labs in Winnipeg for grade, moisture, protein, ergot, thousand kernel weigh, grams per half litre, and fusarium damage. The treatments were submitted as a representative sample of all three reps and not as individual reps. This could then be interpreted as an average of the treatment rather than the results of each individual plot in the trial.

Sample ID	*Grade*	*Reason for Grade*	*Protein %*	*MST %*	*TWT (g/0.5l)*	*TWT (kg/hl)*	*Ergot %*	*FUS DMG %*
Full (all inputs applied)	CW FEED	4.6% FUS DMG	12	14	396	81.2	0.012	4.6
Full (- genetics)Falcon	SPLE AC FUS DMG	8.1% FUS DMG	13	14	388	79.5	0.008	8.1
Full (- 50% fert)	CW FEED	4.0% FUS DMG	12	14	394	80.7	0.01	4
Full (-100% fert)	CW FEED	3.9% FUS DMG	12	14	392	80.7	0.012	3.9
Full (-50% herb)	SPLE AC FUS DMG	5.3% FUS DMG	12	14	395	81	0.024	5.3
Full (-100% herb)	SPLE AC FUS DMG	7.1% FUS DMG	12	14	393	80.5	0.01	7.1
Full (-1 fungicide)	SPLE AC FUS DMG	6.7% FUS DMG	13	14	394	80.7	Nil	6.7
Full (-2 fungicides)	SPLE AC FUS DMG	9.1% FUS DMG	13	14	391	80.1	0.004	9.1
Full (-3 fungicides)	SPLE AC FUS DMG	6.8% FUS DMG	12	14	391	80.1	0.018	6.8
Full (-4 fungicides)	SPLE AC FUS DMG	5.9% FUS DMG	12	13	391	80.1	0.006	5.9
Empty (nothing applied)	COMMERCIAL SALVAGE	10.3% FUS DMG	12	14	377	77.3	Nil	10
Empty (+genetics) Buteo	SPLE AC FUS DMG	8.7% FUS DMG	12	14	392	80.3	Nil	8.7
Empty (+50% fert)	COMMERCIAL SALVAGE	10.4% FUS DMG	12	14	373	76.5	Nil	10
Empty (+100% fert)	COMMERCIAL SALVAGE	12.0% FUS DMG	12	14	373	76.5	Nil	12
Empty (+50% herb)	COMMERCIAL SALVAGE	10.3% FUS DMG	12	14	383	78.5	Nil	10
Empty (+100% herb)	SPLE AC FUS DMG	6.3% FUS DMG	12	14	382	78.3	Nil	6.3
Empty (+1 fungicide)	SPLE AC FUS DMG	8.9% FUS DMG	11	14	381	78.1	Nil	8.9
Empty (+2 fungicides)	SPLE AC FUS DMG	8.2% FUS DMG	11	14	383	78.5	0.004	8.2
Empty (+3 fungicides)	SPLE AC FUS DMG	6.0% FUS DMG	11	13	385	78.9	Nil	6
Empty (+4 fungicides)	SPLE AC FUS DMG	7.9% FUS DMG	11	14	384	78.7	Nil	7.9



Discussion/Conclusions: It was noted that the protein content was in general 0.5% to 1% higher with the Buteo treatments. The yield data indicated that the Falcon had out yielded the Buteo when all inputs were applied, however seed quality and fusarium counts were much less in the Buteo treatments over the Falcon treatments. In general the fungicide treatments were not statistically different when it came to yield, and rather that variety selection had a greater effect on grade as seen in the Arborg trial.

It should be noted that a definitive result cannot be derived from only one trial but the results are interesting in the fact that it indicates that variety selection is still a very important part of your inputs and could be one of your most limiting factors in your end result seed quality.

PROJECT #14: PESAI EQUIPMENT PURCHASES, UPGRADES & MODIFICATIONS

PESAI Funding Spent: $53,430

Background/Objective: In 2009/10, PESAI was provided with funding that could be used for capital purchases. As such, PESAI allocated significant funding to equipment purchases, upgrades and maintenance to improve its equipment inventory and efficiencies.

Seed Counter: A Seed Buro seed counter was purchased to be used for seed packaging, thousand kernel weights, etc.

Portable Cattle Handling System: The system was purchased to be used with PESAI's existing portable scale and to allow PESAI to include more livestock projects in the future.

Rototiller Upgrade: PESAI's existing rototiller was upgraded for a more suitable model.

Drill Modifications: PESAI's existing drill was modified to allow for fertilizer sand banding and zero-till disc openers that will increase efficiencies in spring seeding and allow for minimum tillage experiments. These openers will be compared to those being used by the other Diversification Centres.

Autosteer: GSP autosteer was purchased for the PESAI tractor to be used in all aspects throughout the field season (especially seeding and plot maintenance).

Tarp Building for cold storage: PESAI is currently raising funds to develop a permanent Diversification Centre consisting of land base and facilities for research. As such, a 30x72' tarp building was purchased as a temporary work area and for long-term cold storage at the new Centre.

Trailer with tilt deck: PESAI's current trailer is not suitable to haul the plot combine as the ramp is too steep, thus a smaller tilt-deck trailer was purchased.

3 pt Hitch Mower: In the past, PESAI has rented a 3pt hitch mower from the Manitoba Forage Seed Association to be used for plot maintenance.

F. CONTRACT FIELD REPORTS

PROJECT #1: MANITOBA FORAGE COUNCIL'S ANNUAL FORAGE EVALUATION TRIAL

PESAI was contracted by the Manitoba Forage Council to conduct Annual Forage evaluation trials in the Arborg area.

Project Partners: Manitoba Forage Council, Parkland Crop Diversification Foundation (PCDF), PESAI, Viterra in Rosebank and Westman Agricultural Diversification Organization (WADO).

Background: Each year livestock producers are faced with the challenge of securing an economic feed supply. Annual forages can be a beneficial forage supply, which can provide rest and recovery of perennial pastures from grazing or crop stress. They can provide a source of emergency feed when perennial crops are in short supply or can be a regular part of a planned feeding strategy. Although not typically perceived as a cheap feed source, if annual forages are managed properly they can yield more and provide higher quality feed than perennial forages.

The Manitoba Forage Council with the help of program partners has operated four demonstration sites from 2005 to 2010 with the purpose of testing registered varieties for forage yield and quality. Over the past six years a number of barley, oat, triticale and millet varieties have been tested at the following locations throughout Manitoba: Arborg, Melita, Roblin and Rosebank. At each site, plots are harvested and weighed to determine dry matter yields and composite samples are taken for each variety, which are analyzed for % moisture, Crude Protein (CP), Total Digestible Nutrients (TDN), Relative Feed Value (RFV), minerals (Calcium, Phosphorus, magnesium) and energy.

Results for trials prior to 2010 can be found in forage section of "Seed Manitoba".

Design, Materials & Operation: Barley, oat, triticale, Proso and Foxtail Millet trials were set up using a RCBD (Randomized Complete Block Design) with four replicates. All trials were established in late spring, at recommended seeding rates, when field conditions allowed it. Recommended agronomic practices were utilized at all sites including soil testing and fertility rates, as well as herbicide recommendations, rates and timing.

Individual plots were harvested utilizing small scale research equipment and weighed to determine yield kg/ha as fed. Subsamples from each plot were taken, dried down and weighed to determine % DM for all plots. Utilizing the following crop guidelines, trials were harvested at the following plant stages:

Barley - was harvested at the **early dough stage**. The early dough stage is when the kernels are formed, but the endosperm squeezes out with clear liquid and white solids that are described as "gritty".

Oats – are harvested at the **milk stage**. This stage occurs when the endosperm is milky in texture and color, with no starchy solids.

The barley trial consisted of ten varieties including AC Ranger as the check, there were seven oat varieties including Triple Crown as the check, and four triticale varieties including the check Banjo. In addition to the cereal trials a millet trial was also seeded at each location, which contained two Siberian Foxtail Millet varieties (Golden German and Siberian Red Foxtail) and three Proso Millet varieties (Red Proso - Cerise, Green Proso - Crown and Yellow Proso – AC Prairie Gold).

PROJECT #2: MCVET VARIETY TRIALS

PESAI was contracted by the Manitoba Crop Variety Evaluation Team (MCVET) to conduct variety evaluation trials in the Arborg area. PESAI seeded and harvested the winter wheat and fall rye, spring wheat, barley, oat, flax, canola, pea and fababean trials in Arborg.

Due to extreme moisture conditions many of the trails recorded high variances between varieties and some results were not used in the “Seed Manitoba”. Results from the remaining successful trials are reported in “Seed Manitoba”.

G. UNAUDITED FINANCIAL STATEMENTS

BALANCE SHEET TO MARCH 31, 2010

	31 Mar 10
ASSETS	
Current Assets	
Chequing/Savings	
Operating Account	40,144.51
Projects Account	1,854.31
Refunds and Dividends	48.00
Total Chequing/Savings	42,046.82
Accounts Receivable	
Accounts Receivable	31,567.67
Total Accounts Receivable	31,567.67
Total Current Assets	73,614.49
TOTAL ASSETS	**73,614.49**
LIABILITIES & EQUITY	
Equity	
Retained Earnings	25,413.15
Net Income	48,201.34
Total Equity	73,614.49
TOTAL LIABILITIES & EQUITY	**73,614.49**

PROFIT AND LOSS STATEMENTS APRIL 1, 2009 – MARCH 31, 2010

(note: Adjustments to 2008/09 financials were dated April 1, 2009)

	1 Apr 09
Income	
Equipment Rental	2,731.19
Grants	28,520.05
Reconcile Obsolete Transaction	0.00
Total Income	31,251.24
Expense	
Administration	1,198.15
Advertising & Promotion	-681.07
Contract Labour	1,158.29
Insurance	95.00
Reimbursed Expenses	101.42
Rental	1,013.61
Supplies	-178.20
Total Expense	2,707.20
Net Income	**28,544.04**

	2 Apr '09 - 31 Mar 10
Income	
Equipment Rental	3,682.15
Grants	150,000.00
Interest	6.77
Services Rendered	14,558.02
Total Income	168,246.94
Expense	
Administration	11,545.02
Advertising & Promotion	8,949.64
Banking	55.00
Contract Labour	16,452.22
Equipment Purchase	50,366.60
GST Expenses	-9.80
Insurance	6,100.00
Professional Fees	1,411.57
Rental	7,637.51
Repairs/Maintenance	6,071.33
Sponsorship	1,000.00
Supplies	25,505.72
Travel	13,504.83
Total Expense	148,589.64
Net Income	**19,657.30**