Final Report

December 2002 to March 31 2006

PEI Taking Charge Team's

GHGMP Demonstration Sites and Awareness Activities

Submitted by: PEI Soil and Crop Improvement Association
April 2006

Introduction:

The PEI Taking Charge Team was established in 1999 for the Taking Charge program – an awareness initiative under the Climate Change Skills and Knowledge Transfer Program. The Team included four PEI Soil and Crop Improvement Association directors who were dairy, beef and potato producers, and one non-director who was a hog and potato producer.

In September of 2002, PEI Soil and Crop Improvement Association brought together the Taking Charge Team during a visit to PEI by Doug McKell, Executive Director of the Soil Conservation Council of Canada. Mr McKell was invited by the Taking Charge Team to introduce the Green House Gas Mitigation Program (GHGMP), a program funded under Agriculture and Agri Food Canada's Agriculture Policy Framework. The program is delivered by four national industry groups (NIGs): Soil Conservation Council of Canada, Canadian Pork Council, Canadian Cattlemens Association and the Dairy Farmers of Canada. The GHGMP has three components: soils, nutrients and livestock.

After being introduced to the program, the Taking Charge Team (TCT) met again in December and January to develop a plan for demonstrations in the next three field seasons that either reduce or remove green house gases from the atmosphere. The original Taking Charge Team was also expanded to include more producers, and to include agrologists, engineers and research scientists who could provide further expertise, especially in nutrient management. Also the PEI Soil and Crop Improvement Association's Agri Conservation Club Coordinators joined the TCT. The Team now includes members from PEI Agriculture Fisheries Aquaculture and Forestry, Agriculture and Agri Food Canada, Ducks Unlimited Canada, and Eastern Canada Soil and Water Conservation Centre. The TCT consists of nineteen members, eight of which are farmers.

Through the facilitated planning sessions, the PEI TCT identified the following priorities for the GHGMP demonstrations over the next few years:

1. Nutrient Management Planning with crops grown in our province (i.e. Potatoes, cereals, corn, etc)
2. Tree planting or agroforestry on riparian and marginal lands
3. Soil conservation improvements to existing one-pass potato hilling techniques
4. Rotational crops to improve soil tilth while increasing revenues for the producer
5. Improvements in pasture management
6. Increasing the use of fall rye as a fall cover crop
7. No-till cereal and corn production
8. Manure injection

The TCT submitted their proposal each year to the NIG for approval. Almost every year the demonstrations included nutrient management planning, minimum tillage for potato production and agroforestry. Each year the proposal also included communication and awareness activities and TCT development activities. The Field Coordinator, William MacNeill, began working for the PEI TCT in late February of 2003. Prior to Mr. MacNeill beginning with PEISCIA, the Coordinator role was shared between three staff

from PEISCIA: Shauna Mellish, Justin Rogers, and Tyler Wright. Team members are kept up-to-date during the year with meeting notices, etc.

As of March 31st, 2006, the PEI TCT has established thirty-eight (38) demonstration sites under the GHGMP, in where we either have ongoing demos, or have demonstrated a practice for one of the three years at that site. Many of these sites were identified through the Agri Conservation Club Pilot Project that had been running concurrently with the GHGMP.

A number of workshops, conferences, trade shows and tours were planned and held over the 3-year program.

In general the following objectives were developed:

1. Consult with GHGMP Project Coordinators, Taking Charge team members, researchers and producer groups.
2. Expand the knowledge of Taking Charge team members regarding Greenhouse Gas Reduction/Mitigation strategies and climate change.
3. Identify and prioritize Beneficial Management Practices (BMPs) for soils and nutrient management as related to greenhouse gas (GHGs) reduction or mitigation.
4. Establish partnerships with other organizations that lead to cooperative ventures related to the program.
5. Organize/facilitate establishment of BMP demonstration sites that reduce GHGs or increase carbon sinks.
6. Monitor BMP demonstration sites and collect relevant information to validate the environmental sustainability and economic viability.
7. To provide venues (e.g. workshops, seminars, tours, field days) for producers and partners to discuss the benefits and challenges of BMPs identified in objective #4.
8. Distribute information through news articles, fact sheets, displays, presentations, websites, etc.

Budget: Revenue and Expense:

The total revenue for this 3-year project is $ 428,867.09. The project received some private non-government funding from PEI Soil and Crop Improvement Association (members and agri-businesses) in the amount of $4,055 to support a number of conferences and workshops.

Agriculture and AgriFood Canada PFRA Atlantic supported a December 2005 agro forestry conference in the amount of $ 5,000. The Atlantic Swine Research Partnership supported the manure injection trials with $ 3,500 in funding. The account also earned $ 72.09 in interest.

The balance of the revenue ($ 416,240) was from the Soil Conservation Council of Canada and the Greenhouse Gas Mitigation Program.

At the time of this report, not all expenses had been received nor entered. As of March 17, 2006, the expenses would total $ 392,132.85. The budget forecast for March 31st, 2006 would expect perhaps a small surplus ($ 1,000) of the GHGMP funds ($ 416,240), and the balance of the bank account to be spent in April and May 2006 in wrapping up the 3-year program. Throughout the report, details of budgets will be provided for by activity.

Management and Planning Activities: Team Development:

The general planning for the PEI demonstrations is the responsibility of the PEI Taking Charge Team, a committee of the PEI Soil and Crop Improvement Association. The Team also had a number of sub-committees that oversaw individual demonstrations such as residue management. Table 1 lists most of those planning and update sessions the Team had over the three years.

Table 1: Taking Charge Planning Sessions and Meetings

Date	Group	Activity
July 2002	Soil Conservation Council of Canada (SCCC)	Meeting in Montreal - early planning of the GHGMP and renewal of the Taking Charge Teams
September 2002	PEI Soil and Crop – PEI Taking Charge Team	Doug McKell and the PEITCT had a joint planning session in Charlottetown
December 2002	Soil Conservation Council of Canada (SCCC)	Shauna Mellish and Tyler Wright attends an introductory workshop in Edmonton
January 2003	PEI Taking Charge Team	Strategic planning session
February 2003	Proposal sub-committee	Development of a proposal for PEI
February 2003	Coordinator interview committee	Selection of coordinator
March 2003	PEI Taking Charge Team	Project implementation and planning meeting
April 1- March 31, 2003	Nutrient Management sub-committee	Meet every 2 weeks for three months and occasionally after that to discuss next steps and progress made
April 1- March 31, 2003	Communications sub-committee	Several meetings throughout the year to discuss strategy and implementation
December 2003	PEI Taking Charge Team	Project implementation and planning meeting
January 2004	PEI Taking Charge Team	Project implementation and planning meeting
January 2004	Proposal sub-committee	Development of a second proposal for PEI
February 2004	Proposal sub-committee	Development of a second proposal for PEI
April 1- March 31, 2004 and 2005	Communications sub-committee	Several meetings throughout the year to discuss strategy and implementation
April 1- March 31, 2004 and 2005	Residue management sub-committee	Several meetings throughout the year to discuss strategy and implementation
April 1- March 31, 2004 and 2005	Agroforestry sub-committee	Several meetings throughout the year to discuss strategy and implementation
April 1- March 31, 2004 and 2005	Nutrient Management sub-committee	Met occasionally to discuss next steps and progress made
2003, 2004, 2005	Fact sheets development	Met often with partners to develop fact sheets
2003, 2004, 2005	Numerous conference planning committees	Endless meetings and conference calls for planning 8 events
April 2006	PEI Taking Charge Team	Wrap-up meeting and next steps

To assist developing the TCT knowledge in communications, and agriculture and BMPs as it all relates to GHGs, Team members attended workshops, conferences, trade shows, tours and events. Table 2 lists most of those events the PEITCT attended over the three years and the number of the PEITCT who attended the event. Participation at these capacity building events was quite high, ranging from 6 % to 88 % of the PEITCT, averaging to be 25 % at each event.

Table 2: Taking Charge Events for Capacity Building of Team

Event	Team #'s	Event	Team #'s
2002/03		Eastern Canada GHG TCT meeting - Moncton	9
Tour Maple Plains Agro-Environmental site	5	National GHGMP workshop, Ottawa	1
2 Workshops on NMPing, 1 Media training workshop on PEI	12	PEISCIA 'Taking Charge – New Initiatives...' conference, Charlottetown	10
2003/04		Farm Mechanization Show, Moncton	1
NSAC workshop on GHGs	2	Germany tour of experimental farm and preformed fall potato drills winter covered with mustard	1
NFLD SCCC GHG delivery update meeting	2	Presentations at the provincial Standing Committee on Climate Change	2
Tour to N.S. with Clubs to see GHG BMPs	5	Quebec City, SCCC GHG delivery update meeting	2
NSAC NMP training & certification course	2	**2005/06**	
Eastern Canada GHG Conference and TCT meeting - Moncton	15	Shelter belt training course (Green Cover), first session - Moncton	2
Meeting with Dr Ross of AAFC to discuss economic analysis - Moncton	2	Shelter belt training course (Green Cover), second session - Charlottetown	2
NMP Conference as part of the PEI potato Expo - Charlottetown	7	Executive SCCC meeting with Hon Wayne Easter	3
NBSCIA 'Farmers on the Environment' Conference - Moncton	2	Agro Forestry Conference, Charlottetown	8
Manure management conference in London, Ontario (ISTMM)	1	Atlantic Agronomy Workshop, Charlottetown	5
PEISCIA 'Taking Charge – New Initiatives...' conference, Summerside	11	PEISCIA 'Taking Charge – New Initiatives...' conference, Summerside	11
Victoria, B.C. SCCC GHG delivery update meeting	2	NBSCIA BMP Conference - Miramichi	2
2004/05		PEI ADAPT Council AGM	1
Tour to Quebec with Clubs to see GHG BMPs	3	'Farmers Taking Charge Improving Income and Mitigating Greenhouse Gases' Conference - Moncton	7
Hamilton, Ont., SCCC GHG delivery update meeting	2	Ottawa, Ont., SCCC GHG delivery update and wrap up meeting	2

All of these capacity building events provided the PEITCT with much needed information. This report cannot begin to summarize details of each event nor the information obtained. But to illustrate the information available at these events, an agenda for one conference is attached to the appendix of this report.

Total three (3) year expenditure on Team Development and Team Planning is estimated to be $41,158.78 or 9.6 % of the budget. Not all expenses were reported at the time of this report, but this is a very close forecast.

Communications:

The PEI Taking Charge Team communications strategy throughout the program consisted of field signage, twilight field tours, farm tours, conferences, workshops, trade shows, articles, web page, mail outs, fact sheets and advertisements. These efforts either

highlighted the demonstration sites on PEI, or discussed general Beneficial Management Practices that either reduced or removed greenhouse gases. The total three (3) year expenditure for these communication or extension activities was approximately $12,417 (2.9%) for tours, $70,411.53 (16.4%) for workshops, and $25,218 (5.9%) for awareness materials and tools such as a booth displays ($3,989), LCD projector ($4,348), digital camera ($1,304), signage and fact sheets ($14,124) and so on. This represents a total of 25.2 % of the budget. Not all expenses were reported at the time of this report, but this is a very close forecast.

This report will review the efforts made to reach all PEI producers on the topic of greenhouse gases and agriculture.

Signage: Most demonstration sites had a sign installed for general awareness in the community. The signage was purchased in 2003 and 2005. Efforts were made to select the best demonstration sites, but with the limited time available to launch the project in 2002, unfortunately not every demonstration site had the best visibility. In 2003 the Canadian Pork Council coordinated production of template GHGMP signs with a number of livestock and soil groups, including PEI TCT. PEI received 20-30" x 48" signs in late July 2003 and installed about ten. PEI customized them for each demo site. The remaining signs had been used in 2004 and 2005, with seven (7) further signs produced in the fall of 2005. The Maple Plains site also installed some signage. For the one-year demonstration sites, those signs were reused on new sites in following years.

The PEI SCIA recognizes PEI livestock and cash crop farmers who are leaders or innovators in soil conservation and sustainable agriculture. Twenty-four "Soil and Water conservation" signs were produced, and fourteen of these had been installed in 2003, 2004 an 2005.

Figure 1: Soil Conservation Farm Gate Sign and GHGMP Demonstration Sign

Conferences, Trade Shows, Tours and Workshops: Great effort and thought over the past three years went into events such as conferences, workshops, trade shows and farm tours. Table 3 lists most of these events that were well publicized in the general farming community. Some of these events are the same as was described earlier by the Taking Charge Team capacity building initiatives.

Table 3: Taking Charge Sponsored Events for Education and Awareness in the General Community

Event	Row Call
2002/03	
Tour Maple Plains Agro-Environmental site	50
Two **Workshops** on NMPing, instructed by Lise LeBlanc	30
PEISCIA 'Taking Charge – Proactive Producer Approaches' **Conference**, Charlottetown	138
2003/04	
Eleven or more **tours** at Maple Plains Agro Environmental site	281
Three twilight **tours** at the PEI TCT NMP Potato sites on PEI	66
Two day **tour** to N.S. with Clubs to see GHG BMPs	35
Climate Change Fair **Trade Show**, Charlottetown, hosted by PEI Climate Change Hub	50
'Beneficial Ag Practices in Soil, Manure, and Nutrient Management' **Trade Show** hosted by eastern Canada TCTs,Moncton	150
'Beneficial Ag Practices in Soil, Manure, and Nutrient Management' **Conference** hosted by eastern Canada TCTs,Moncton	150
PEI Fed of Agriculture **Trade Show**, Summerside	100
PEI Potato Expo **Trade Show**, Charlottetown	2,900
Stanley/Hope Watershed **Trade Show**	50
PEISCIA 'Taking Charge – New Initiatives...' **Trade Show**, Summerside	102
PEISCIA 'Taking Charge – New Initiatives...' **Conference**, Summerside	102
Eastern Canada GHG **Conference** and TCT meeting - Moncton	150
ACCW & ACCE **Workshop** on soil health, biology and nutrient balancing	20
2004/05	
Two twilight summer **tours** at the PEI TCT NMP Potato sites on PEI	10
Tour to Quebec with Agri Conservation Clubs to see GHG BMPs	22
Eleven or more **tours** at Maple Plains Agro Environmental site, including Open Farm Day	158

Event	Row Call
PEISCIA 'Taking Charge – New Initiatives...' **Conference**, Charlottetown	112
PEISCIA 'Taking Charge – New Initiatives...' **Trade Show**,Charlottetown	112
Eastern Canada GHG TCT **meeting** and **workshop** - Moncton	40
Atlantic Farm Mechanization **Trade Show**, Moncton	2,000
2005/06	
Agri Conservation Club member **meeting** -GHGMP NMP results to date	15
PEI ADAPT Council **Trade Show** and AGM	30
Joint **tour** with the National Water Program (Irrigation) with our Potato NMP plots	95
Joint **workshop** with the National Water Program (Irrigation) and our Potato NMP plots	95
Afternoon **tour** at one of the manure injection sites in Hampshire	5
Agro Forestry **Conference**, Charlottetown	110
Tours at Maple Plains Agro Environmental site, including Open Farm Day	125 e
Atlantic Agronomy **Trade Show**, Charlottetown	100 e
PEI Fed of Agriculture **Trade Show**, Summerside	90
PEI Potato Expo **Trade Show**, Charlottetown	2,500
PEISCIA 'Taking Charge – New Initiatives...' **Conference**, Summerside	165
PEISCIA 'Taking Charge – New Initiatives...' **Trade Show**, Summerside	165
'Farmers Taking Charge Improving Income and Mitigating Greenhouse Gases' **Conference** - Moncton	110
'Farmers Taking Charge Improving Income and Mitigating Greenhouse Gases' **Trade Show** - Moncton	110
PEISCIA **AGM** had speakers on BMPs for riparian areas, and the new BMP funding program	25
Total attendance at conferences, workshops and meetings: 1262	
Total attendance at, **Trade Shows: 8,459** **Tours: 847**	

Most events such as tours, conferences and workshops, were very well publicized through mass mail out to producers (600 to 1,000) with either a focus on a specific commodity or just producers in general. In addition farmers were invited to these events through ads often in La Voix Acadienne, Journal and Guardian, Island Farmer, Island Harvest, and Farm Focus papers. Also agendas were hosted on web pages too.

It did soon become apparent however that twilight tours of the NMP plots alone were not large enough of a draw to get many producers attending (3 to 12 per event). In 2005, the PEITCT successfully partnered with the National Water Program and attracted near 100 potato produces to a summer tour.

The PEI Taking Charge Team developed a trade show booth for the GHGMP in 2003 and received excellent exposure to producers and the general public as illustrated in Table 3 (8,459 people). In total about 15-trade show events were attended. At each one of these trade show events, fact sheets from the program and demonstration sites were available as handouts. The PEITCT also purchased a TV/VCR combination to show the national Taking Charge BMPs and GHG video produced by the Soil Conservation Council of Canada

Figure 2: PEI TCT Table Top Display for Trade Shows

Fact Sheets: To assist in disseminating information to producers and others, all of the demonstration activities and available results were summarized into fact sheets. For example one fact sheet was developed for NMPing in potato production. Each one of these fact sheets evolved as the program progressed and more information became available. None of the original fact sheets are in circulation. Table 4 summarizes the fact sheets produced over the program. A mail out to producers of these fact sheets is planned in April.

Over the life of the program, a series of 10 fact sheets were developed, and with all of the various versions of each one, produced a total of 20 fact sheets inclusive of all versions. The current versions if these fact sheets are located in the Appendix.

The PEITCT also adopted two fact sheets developed by NB Soil and Crop Improvement Association and their Team, including Bernie Zebarth with AAFC. These fact sheets can be found in the Appendix: Nitrogen Management for Corn: General Fertilizer Recommendations; and Nitrogen Management for Corn: Pre-side Dress Soil Nitrate Test (PSNT).

Table 4: Summary of Fact Sheets Developed for the Program

Fact Sheet	Current Version	2003/04	2004/05	2005/06
1. Introductory to GHG and the GHGMP	2	2	0	0
2. General or consolidated data results on NMP in potato production	3	1	1	1
3. Site specific NMP in potato production	1	5	0	0
4. General or consolidated data results on NMP and manure injection	2	1	0	1
5. Site specific NMP and manure injection	1	1	0	0
6. Maple Plains Agro Environmental Site and NMP	1	1	0	0
7. Agro Forestry demonstrations	3	1	1	1
8. Nitrogen Management for Corn: General Fertilizer Recommendations	1	0	0	1
9. Nitrogen Management for Corn: Pre-side Dress Soil Nitrate Test (PSNT)	1	0	0	1
10. Residue Management in Potato Production: Long Term Common Scab and Yield Study	1	0	0	1
	16			

DVD Video: The presentations at the December 6th and 7th, 2005 Agroforestry conference was video taped and transferred to DVD with all the LCD overhead presentations superimposed into the video. To date all sixty (60) copies of the DVD has been distributed to farmers and others with interest in the topic.

Other Awareness Initiatives: The PEITCT also engaged other means of education and awareness, and these are summarized in Table 5. These were mostly specific events where results from the demonstration sites were discussed. Most of these events, and number of participants have already been provided in an earlier table.

Demonstrations:

The PEI Taking Charge Team had demonstrations in the Nutrient and Soil components of the Greenhouse Gas Mitigation program. The program areas were:

A. Nutrient Management Planning, riparian and sensitive land management, and soil conservation: Maple Plains Agro Environmental Demonstration site,
B. Nutrient Management Planning: Potato Grain Hay Rotation,
C. Nutrient Management Planning: Livestock Operations and Manure Injection/Incorporation
D. Agro Forestry
E. Minimum Tillage and Residue Management in Potato Rotations

Table 5: Other Awareness Activities

Year	Initiative
Winters of 2003, 2004 and 2005	Presentations of the Soil Conservationist of the Year Award to both a cash crop and a livestock producer
March/April 2004 & 2005	Announcement of Cash Crop and Livestock producers as recipients of the Soil Conservationist of the Year Award during the sitting of the spring session of the legislature by MLAs
Dec 2003	PEITCT Field Coordinator and a potato producer each presenting field results from the 2003 field season at a two-day Atlantic Canada Taking Charge Team workshop and farm conference in Moncton
March 2003	PEITCT Field Coordinator present field results from the 2003 field season at the PEI SCIA conference in Summerside
August 2004	PEI Potato Board inserts a coloured/glossy feature highlighting two cooperating GHGMP farms and the demo farm sign
October 2004 and 2003	Maple Plains Agro Environmental and GHGMP site participates in open farm day
December 2004	PEITCT Field Coordinator presenting field results from the 2003 and 2004 field seasons at a one day Atlantic Canada Taking Charge Team workshop in Moncton
January 2005	Meeting with the Hon Wayne Easter and Executive Committee of SCCC regarding the GHGMP
February 2005	PEITCT Field Coordinator present field results from the 2003 and 2004 field seasons at the PEI SCIA conference in Charlottetown
March 2005	The Taking Charge Team made a presentation to the Special Committee on Climate Change. Presentation was on agriculture, greenhouse gases, the Greenhouse Gas Mitigation Program, Soil Conservation Council of Canada, PEI Soil and Crop, and adaptation to climate change. Special Committee consisted of 8 local members of the provincial legislature. Transcript of presentation can be found at www.assembly.pe.ca
April 2005	PEITCT Field Coordinator present field results from the 2003 and 2004 field seasons at the PEI SCIA ACCW AGM in Summerside
September 2005	PEITCT Field Coordinator, Shauna Mellish and Barry Thompson present field results from the 2003 and 2004 field seasons at an irrigation event in Kensington
December 2005	Past President of PEISCIA summarized the agro forestry demonstration sites during the PEISCIA and AAFC-PFRA agro forestry conference in Charlottetown
February 2006	PEITCT Field Coordinator present field results from the 2003, 2004 and 2005field seasons at the PEI SCIA conference in Summerside
February 2006	PEITCT Team Member from PEIDAF present field results from the 2003, 2004 and 2005 field seasons at the PEI SCIA conference in Summerside
February 2006	PEITCT potato producer presented his field results from the 2005 field season during the PEISCIA conference in Summerside
February 2006	PEITCT pork, beef and corn producer presented his field results from the 2005 field season during the PEISCIA conference in Summerside
March 2006	PEITCT potato producer presented his field results from the 2005 field season during the Atlantic Canada BMP TCT conference in Moncton
March 2006	PEITCT Team Leader presented field results from the 2004 and 2005 field seasons during the Atlantic Canada BMP TCT conference in Moncton

The launch of this program was in the winter of 2003. Fortunately finding the demonstration sites was not a problem. In fact it was very easy with the help of the PEISCIA Agri Conservation Clubs. By middle of April, all of the 2003 sites were confirmed. Table 6 summarizes all of the sites established under the first GHGMP between 2003 and 2005.

Table 6: Number of GHGMP Demonstrations Sites on PEI

Demonstration	Number of Sites
NMP: Potato 3-year rotation study	12
NMP: Livestock feed crop; injection; incorporation	8
BBEMA Maple Plains Agro Environmental demo site	1
Residue Management	6
Agro Forestry	11
Total	38

A. Nutrient Management Planning, Riparian and Sensitive Land Management, and Soil Conservation Practices: Maple Plains Agro-Environmental Demonstration Site

The Maple Plains Agro-Environmental Demonstration Site, a 174-acre active potato farm managed by George Webster in partnership with the Bedeque Bay Environmental Management Association (BBEMA) since the late 1990's, is promoting agriculture in harmony with nature. This Demonstration site is a focal point for: education, research, monitoring, innovation and agri-tourism. "Maple Plains" is a communication vehicle for the organization, allowing it to highlight issues crucial to BBEMA's mandate namely: soil erosion, surface and groundwater quality, wildlife habitat conservation, public education and climate change.

Each year from approximately May through to October, a number of visitors come to the Demonstration Site to learn more about agri-environmental issues. These visitors are from a wide spectrum of society and include school groups, 4-H clubs, farm organizations, governments, agri-tourists, general public and conference participants etc. This makes it an ideal location to demonstrate, promote and interpret best management practices, such as nutrient management planning that mitigates or reduces greenhouse gases and protects Island water and soil.

During the summers of 2003, 2004 and 2005, with the assistance of the Greenhouse Gas Mitigation Program (GHGMP) George Webster and BBEMA, a Nutrient Management Plan (NMP) was initiated for the Demonstration Site. In summary, a number of soil samples were collected for nutrient analysis at specific points within each field. These sample points were located by GPS and subsequently mapped. George Webster has utilized this information in assessing farm input requirements. On certain fields where soils were acidic, he added lime to increase soil pH.

In 2005 George designed and implemented a NMP for his potato production at Maple Plains. There were no split treatments in this field and thus no data to compare conventional to NMP practices. However the field did produce an acceptable yield and quality product.

George had also evaluated a new potato variety in partnership with McCain Foods that requires significantly lower nitrogen and fungicide inputs in comparison to some conventional varieties.

There have been many other concurrent activities relating to BMPs occurring at Maple plains, that the GHGMP did not provide funds directly too (i.e. Buffer strip grass study, strip cropping, diversion terraces, peat bog preservation, crop rotation, etc). However the GHGMP did support tours and dissemination of information on all the BMPs at Maple Plains. The staff at BBEMA received training on NMP and soil health. A PowerPoint presentation has been developed as part of staff orientation and training for all future employees that work at Maple Plains as tour guides. Fact sheets, signage, poster displays and tours were all part of the communication activities in this project. No data or research was conducted under the GHGMP at Maple Plains: it was strictly a demonstration, education and awareness site.

A series of Soil Touch Boxes were created to provide visitors with a better appreciation of soil type differences through tactile experience. Basically samples of several common soil types for PEI were dug both on site and elsewhere with assistance of soil scientists at Agriculture and Agri-food Canada. These soils were placed in portable rectangular plastic containers (soil touch boxes), labeled with name of the soil type and general soil features and then carried to the site when there was a tour.

BBEMA also wanted to introduce visitors to the Maple Plains site to the concept of Nutrient Management Planning on PEI and demonstrate that there is considerable variation of individual nutrients within fields. BBEMA staff took their GPS unit to specific sites within a particular field where soil sample analysis showed greatest variation in a particular nutrient. The staff flagged those spots with either a blue flag (indicating a high level of that nutrient) or a red flag (indicating a low level of that nutrient). The actual nutrient levels were noted during the tour and discussion with visitors took place. In the case where soil pH was acidic they noted that George could modify this by the use of lime, which he did.

Figure 3: Agri Conservation Club Tour at Maple Plains

The total three (3) year expenditure for the activities at Maple Plains was approximately $ 11,748. They also purchased a GPS unit, self-supporting poster display, fact sheets and other supplies. This represents a total of 2.7 % of the budget. Not all expenses were reported at the time of this report, but this is a very close forecast.

B. Nutrient Management Planning: Potato Grain Hay Rotation

By far the largest cash crop in PEI would be potatoes. Producers are encouraged to maintain a minimum 3-year crop rotation with grain and forage. Typically most farmers follow this rotation. Nitrogen requirements in potato production are generally very high (120 to 200 units of N per acre). Potato production ranges between 100,000 to 110,000 acres each year, utilizing about 18 % of the available farm land. Often times the proper credits are not given to green manure plough downs or manure applications.

Improved fertility inputs will not only lead to reduced GHGs, but also improved surface and ground water quality. Nutrient Management Planning (NMP), in many ways, is a new BMP for Prince Edward Island. Generally manure has rarely been analyzed nor properly accredited for nutrients to determine additional fertility requirements. The same can be said for plough down legume crops. Liquid manure injection has never been demonstrated on-farm either.

Unfortunately research data on potato nutrient requirements for Prince Edward Island is often out-dated, unavailable, or unconsolidated. Researchers in both government and industry circles, and producers have some information, but a widely available and up-to-date database for PEI has not been produced. To help address this, PEI Soil and Crop had setup some demonstration sites with assistance from farmers, PEI Department of Agriculture Fisheries and Aquaculture and other individuals.

Twelve demonstration and evaluation sites were to be selected across PEI for the Nutrient Management Planning: Potato-grain-hay rotation component. Each of these sites was in various stages of a 3-year crop rotation of potatoes, cereals and forages (i.e. four sites for each crop type). Plans were developed and implemented for each of these 12-fields and the results were compared to their conventional nutrient and agronomic practices. The nutrient requirements and crop yield and quality were being studied. The focus will remain on each of these fields for a total of three years as the farmer goes through the complete rotation. In the end only eleven sites were actually secured; one hay site was not available in 2003. In 2004 a potato site was added that involved manure injection. In 2005 the number of sites was scaled back to ten.

Table 7 outlines the cooperators and the demonstration crop each year of the 3-year program. In total there were 12 sites established with 10 of them being established for all of three years.

The majority of the data collected was in the potato year of the rotation. The amount of data collected from the 12 sites varied from year-to-year, with more data collection in the last year. The layout involved each field being split into two treatments: conventional fertility program and a NMP program. Often times the difference in plans were very small while other times they were very significant. Within each treatment, four or so sample zones were established for the purpose of statistical analysis. Data collected included such items as spring and fall soil samples; potato petioles; rainfall; general agronomic information; hay, grain, and potato yields; square meter grain counts; potato tuber quality and sizing; manure nutrient analysis; nitrous oxide and ammonia samples;

etc. The NMP fertility recommendation was based on a practical approach to commercially available blends and what the farmer typically would use.

Table 7: Cooperators in the NMP vs Conventional Fertility Potato-Grain-Hay Trials

Cooperator	Community	2003/04	2004/05	2005/06
		Crop under Comparison		
Peter Townshend	St Charles	Hay	Potatoes	N/A
Blaine Diamond	Winsloe	Hay	Potatoes	Grain
Gordon Waugh	North Bedeque	Hay	Potatoes	Grain
Kevin MacAulay	Souris Line Road	Grain	Hay	Potatoes
Abe Buttimer and Randall Nieuwhof	South Rustico	Grain	Hay	Potatoes
Barry Adams and Wade Caseley	Kensington	Grain	Hay	Potatoes
Dana Collicutt and Merle Ellis	Burton	Grain	Hay	Potatoes
Colin MacAulay	Souris River	Potatoes	Grain	Hay
Randall Nieuwhof	South Rustico	Potatoes	Grain	Hay
Ray Arsenault and Linkletter Farms	Muddy Creek	Potatoes	Grain	Hay
John Griffin	Mill River east	Potatoes	Grain	Hay
Eric Murray and hog manure injection	Carleton Siding	N/A	Potatoes	N/A

After the fall and spring soil sampling was completed and with help from the Field Coordinator, the Clubs and Department staff, the farmer implemented his conventional plan and the enhanced plan. During the rest of the field season the farmer applied the same agronomic practices across the entire site. The project staff would collect various data and monitor progress until near harvest when total and marketable yields were taken.

In the first year the data collected was summarized farm-by-farm with no real statistical analysis done. In the last two years all three years of data was consolidated and statistically studied to better reflect differences in data variability. Some of the results from the data collected are shown in the Appendix in a fact sheet titled “Nutrient Management Planning: Potato Rotation”.

In general the results had shown that many of the co-operators had been implementing a fertility plan close to what would have been prescribed by a NMP. Producers could realize a savings of $ 10 to $ 110 in fertility costs in the potato year of the rotation by implementing all recommendations. The co-operators in the GHGMP’s NM demos are generally leaders in sustainable agriculture and are astute when it comes to crop fertility.

The total average amount of nitrogen applied to the forage, grain and potato plots over the three year study was lower in the NMP plot as opposed to the conventional plot: 87 lbs per acre versus 88 lbs per acre. Averaged over three years for all the crops produced, the amount of nitrogen reduction does not amount to a large number, however the reduction had occurred primarily in the potato year of the rotation, which becomes very significant for that year.

The total three (3) year expenditure for this activity, excluding field coordination costs, was approximately $69,760. This represents a total of 16.3 % of the budget. The Team purchased a GPS unit used to sample in the sample zones. Not all expenses were reported at the time of this report, but this is a very close forecast.

C. Nutrient Management Planning: Livestock Operations and Manure Injection/Incorporation

As of 2006, the livestock industry on PEI consists of 83,000 beef and dairy cattle, 125,000 hogs, and 365,000 hens and chickens. Efficient use of fertility inputs will not only lead to reduced GHGs, but also improved surface and ground water quality. Nutrient Management Planning (NMP), in many ways, is a new BMP for Prince Edward Island. Generally manure has rarely been analyzed nor properly accredited for nutrients to determine additional fertility requirements. The same can be said for plough down legume crops. Liquid manure injection has never been demonstrated on-farm either.

The PEITCT wanted to demonstrate BMPs to livestock producers that would provide more value in manure and manure injection/incorporation practices, while at the same time reduce emissions of GHGs.

In the winter of 2003, the PEI Taking Charge Team (TCT) received $ 3,500 from the Atlantic Swine Research Partnership, Canada Pork Council, and the Green House Gas Mitigation Program (GHGMP) to lease a manure injection unit, and to demonstrate and evaluate nutrient management planning and injection of hog and dairy manure with small cereals and corn crops. This partnership was developed with the TCT in February of 2003. The PEI TCT GHGMP funding provided the balance of funding for the manure injection demonstrations.

In April 2003 the TCT leased a new style NUHN manure injection with nine teeth on a toolbar complete with coulters. The injector applies the manure at approximately a twelve-inch spacing and several inches deep prior to planting the crop. In two instances the farmer had his own spreader with injector or had a custom operator who did, therefore the TCT did not need to use their own unit in these cases.

Nine demonstration and evaluation sites were established across PEI for the Nutrient Management Planning in livestock operations. Crops were either cereal grain or silage corn. Plans were developed and implemented for each of these nine fields and the results were sometimes compared to conventional nutrient and agronomic practices. Table 8 outlines the cooperators and the demonstration each year of the 3-year program.

Table 8: Demonstrations Involving NMP on Livestock Operations and Injection/Incorporation Trials

Cooperator	Community	2003/04	2004/05	2005/06
		Mgmt Under Comparison		
Barry Cudmore	Brackley Point	Quick incorporation of liquid hog manure for cereal production	N/A	N/A
Follie Dykstra	Cymbria	Injection of dairy manure for silage corn	N/A	N/A
Michael Richardson	Grand River	Quick incorporation of liquid hog manure for silage corn production	N/A	N/A
Wayne MacDonald	Newtown Cross	Injection of dairy manure for silage corn production	N/A	N/A
Eric Murray ***	Carleton Siding	N/A	Injection of hog manure in potato production	N/A
David Lank	Hampshire	N/A	N/A	Injection of hog manure in silage corn production
Jamie Whalen	Avondale	N/A	N/A	Injection of hog manure in silage corn production
Ray Arsenault	St Nicholas	N/A	N/A	NMP for solid dairy manure and corn production
Erwin Maynard	Port Hill	N/A	N/A	NMP for solid & liquid dairy manure and corn production

***** Note: 1: This site was also listed in Table 6 for NMP: Potato Production**

The amount of data collected from the nine sites varied from year-to-year, with more data collected in the last year. The layout involved each field being split into two treatments. Sometimes the only difference was the timing of manure being incorporated while others involved a full nutrient balancing and comparison of a NMP to the conventional fertility program. Often times the land was very rich in manure, thus making implementing a comparison between practices difficult. Within each treatment, four or so sample zones were established for the purpose of statistical analysis. Data collected included such items as spring and fall soil samples; potato petioles; total digestible nutrients; general agronomic information; hay, grain, corn and potato yields; potato tuber quality and sizing; manure nutrient analysis; nitrous oxide and ammonia samples; etc. The NMP fertility recommendation was based on a practical approach to commercially available blends and what the farmer typically would use.

After the fall and spring soil sampling was completed and with help from the Field Coordinator, the Clubs and Department staff, the farmer implemented his conventional plan and the enhanced plan. During the rest of the field season the farmer applied the same agronomic practices across the entire site. The project staff would collect various data and monitor progress until near harvest when total and marketable yields were taken.

In the first year the data collected was summarized farm-by-farm. In the last year the data was consolidated and statistically studied to better reflect differences in data variability. Results from the data collected in 2005 on silage corn with manure injection comparison are shown in the Appendix in a fact sheet titled “Liquid Manure Injection”.

In general the 2005 results showed an increase in both total dry matter (DM) and total digestible nutrients (TDN) in favour of manure injection and a nutrient management plan.

In 2004 and 2005, staff collected a total of 66 gas chamber tube samples from a potato and a corn site injected with liquid hog manure. These samples were sent to NSAC for analysis. The PEI TCT is waiting for those samples to be analyzed for nitrous oxide.

Figure 4: PEITCT Nuhn Injector

Barry Cudmore is a pork and potato producer from Brackley Point. His hog manure incorporation demonstration trial was established to demonstrate the effect of immediate versus delayed incorporation of liquid hog manure with a subsequent barley crop. The field selected was potatoes in 2002 and received 3000 gal per acre of liquid hog manure in the fall of 2002. In the spring of 2003, soil and manure analysis were conducted and a NMP was established based upon immediate incorporation. Based upon the crop requirements and nutrients available, no starter fertilizer was used in this field. Liquid hog manure was spread evenly over the entire field. Four alternating 30 m strips were chisel-plowed the same day as the application. The manure on the 4 remaining 30 m strips was then incorporated 5 days later creating 8 plots of 2.1 acres each. The various plots were mapped using GPS. The barley crop was planted and then top-dressed with 100 lb/ac of 34-0-0 fertilizer at ZGS 30. A yield increase of 65 % was recorded as a result of immediate incorporation of liquid hog manure versus delayed incorporation on this field. The plots not incorporated immediately will result in more ammonia loss and less available nitrogen.

Michael Richardson is a pork and beef producer from Grand River. He established a demonstration trial to illustrate the effect of immediate versus delayed incorporation of liquid hog manure on corn silage. The field selected was potatoes in 2002. In the spring of 2003 soil and manure analyses were conducted. The field was split into two plots. Liquid hog manure was spread evenly over the entire field. The manure was incorporated immediately after application on one side of the field and the remainder of the field was incorporated the next day. The results of this demonstration did show some increase in yield on the side of the field where the hog manure was incorporated immediately. However, due to drainage problems and low pH, the corn crop was generally very uneven with low yields. With the late launch of the GHGMP, the window for field selection was

very small and as a result this field may not have been the best one to select from this farm in Grand River.

Follie Dykstra is a dairy producer from Oyster Bed Bridge. In this case the PEI TCT hired a custom manure applicator with a manure injection unit to directly incorporate the liquid manure into his corn field. Two strips were then broadcasted and incorporated the next day. Due to time limitations a nutrient management plan was not followed for this field and high rates of manure were applied. As a result there was no difference in yield between the injected and broadcast applications.

Wayne and Jane MacDonald are dairy producers from Newtown Cross. Their plots were demonstrating liquid manure injection for corn production. While waiting for the injector to arrive, the MacDonalds broadcasted most of the liquid manure from their storage. The MacDonalds also use wood chips as bedding. Because of plugging problems with the injector, the manure was broadcasted and incorporated either immediately or several days later. The MacDonalds did not contact the TCT before harvesting their corn; no yield or quality data was available for this demonstration.

Results from the 2005 injection trials into silage corn are shown in the appendix. There was evidence of improved yields by rapid incorporation versus waiting a number of days to incorporate. This reduces ammonia losses; the NMP also possibly reduces the total amount of nitrogen units needed, ultimately reducing nitrous oxide. Testimonial evidence can conclude that injection significantly reduces odour production.

The total three (3) year expenditure for this activity, excluding field coordination costs, was approximately $ 33,200, representing a total of 7.7 % of the budget. Not all expenses were reported at the time of this report, but this is a very close forecast. The Team purchased a GPS unit used to sample in the sample zones. The farmers, AAFC and PEISCIA also provided in-kind support.

D. Agro-Forestry

In some areas of the province, 60 to 70 percent of the land base has been cleared of forests. There is significant amount of marginal and fragile land across the province that is either too high of slope for row crop production or too wet to work. The provincial buffer zone law now requires 10 to 20 meter buffers on all watercourses from agriculture. In addition many farmers are looking for new opportunities away from the commodity treadmill. This provides opportunity for land retirement, thus sequestering carbon in the soil and in the tree or shrub, thus reducing nitrous oxide emissions.

The PEI Taking Charge Team had established eleven agroforestry demonstration sites since 2003. The demonstrations range from trees to shrubs producing anything from wildlife habitat to timber products to nuts and berries to neutraceuticals to floral cuttings, and so on. Table 9 summarizes all of the sites so far.

Table 9: Agro Forestry Demonstrations

Cooperator	Trees/Shrubs Demonstration	Community	Date Established
Eric C Robinson	Red oak, Black Walnut, Butternut, Norway Spruce, White Spruce, Douglas Fir, White Pine, Blue Spruce	Augustine Cove	Spring 2003
MacPhails Woods Forestry Project	Elderberry, Service Berry, Choke Cherry	Orwell Cove	Spring 2004
MacPhails Woods Forestry Project	Hybrid Hazelnut and Native Beaked Hazelnut	Orwell Cove	Spring 2005
Maple Plains Agro Environmental Demo Site	Highbush Cranberry, Beaked Hazelnut, Red Osier Dogwood, Red Oak, White Birch, Elm	Maple Plains	Spring 2005
Barry Clohossey	Serviceberry, Saskatoons	Nail Pond	Spring 2005
Rodney MacWilliams	Apple, Red Maple, White Ash, Red Oak, White Birch, Mountain Ash, Eastern Larch, Black Spruce, White Spruce, White Cedar	Burton	Spring 2005
Anonymous landowners (2)	Ground Hemlock transplanting trials	Central and eastern PEI	Spring 2005
Gary Renkema	Swiss Stone Pine Nuts, Korean Pine Nuts, White Pine	Wheatley River	Fall 2005/Spring 2006
Stewart MacRae	Swiss Stone Pine Nuts, Korean Pine Nuts, White Pine	Ebenezer	Fall 2005/Spring 2006
Dan MacLean	American Chesnut, Hybrid American Chestnut, Red Oak	Tyne Valley	Fall 2005/Spring 2006
Don Northcott	Dwarf Hybrid Hazelnuts (4 varieties)	Clyde River	Fall 2005/Spring 2006

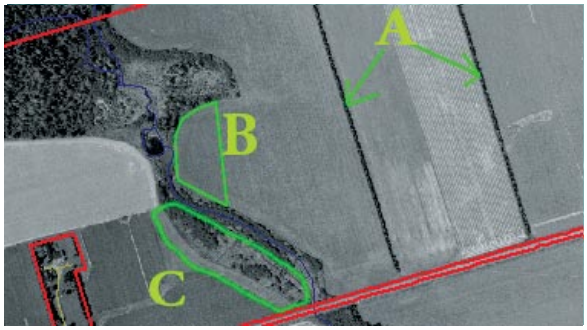


Figure 5: Red Oak Seedling and Planting Area at Eric C Robinson Inc

Figure 6: Serviceberry at Nail Pond

The total three (3) year expenditure for this activity, excluding field coordination costs, was approximately $ 25,283, representing a total of 5.9 % of the budget. Not all expenses were reported at the time of this report, but this is a very close forecast. The farmers, AAFC and PEISCIA also provided in-kind support.

E. Minimum Tillage and Residue Management in Potato Rotations

By far the largest cash crop in PEI would be potatoes. Potato production ranges between 100,000 to 110,000 acres each year, utilizing about 18 % of the farmable land base. Historically tillage would include mouldboard ploughing in the fall, then in the spring one or two-disc harrow passes and two-field cultivator passes. The use of glyphosate in the fall has become very common in recent years, with almost the same amount of tillage. These practices can aggravate wind and water soil erosion over the course of the year, release increased carbon dioxide emissions, and slow building-up carbon in the soil.

Minimum tillage and residue management (RM) was introduced to the province in 1993, and within 5 or 6 years nearly 20,000 acres of potato production utilized this management systems. The benefits being seen by producers included:

Increased soil moisture retention and decreased need for irrigation
Decreased soil loss from wind and water (by 18 to 27 times)
Often increased total and marketable yields
Decreased fuel consumption and GHGs
Decreased need for equipment and tractors
Improved or increased soil structure, tilth, microbial activity, and carbon sequestration.

Unfortunately producers began to identify a possible link between common scab and RM and saw the need to have a long-term study here. Table 10 lists the six demonstration sites established under the GHGMP between 2004 and 2005.

Table 10: Cooperators in Residue Management Common Scab Trials

Cooperator	Potato Variety Demonstration	Community	Date Established
Eric C Robinson	Yukon Gold	Albany	2004
Gordon Waugh	Russet Burbank	Wilmot Valley	2004
Myles Rose	Goldrush	Lakeville	2005
Brian Ching	Fabula	Little Harbour	2005
Alan Rennie	To be determined	Alma	Fall 2005
Jonathon MacLennan	To be determined	Haliburton	Fall 2005

On these demonstration sites, three tillage treatments were studied: fall plowed, spring plowed and residue managed. All tillage treatments had glyphosate applied to the forage the fall before potatoes. Each tillage treatment was replicated four times in each field, making for 12 plots per site, randomly arranged across one small section of the farm. Each replication would be approximately 30 feet wide and 120 feet long.

After the tillage treatments were established, the remaining agronomic practices were the same on all of the 12 plots per farm. The crop residue levels were measured after potatoes were planted. In the fall before harvest, two 10-plant samples per replicated plot were taken and analyzed for total yield, marketable yield, common scab, and other possible disease analyses. The soil was sampled for analysis in each of the plots. Statistically there were no significant differences in the common scab severity among 3 of the 4 sites that data is available for so far. The other two sites will have data available later in 2006. The Appendix summarizes all of the research and statistics to date on the project in a fact sheet entitled "Residue Management in Potato Production: Long Term Common Scab and Yield Study".

Assistance in research designs, harvesting, and data analysis was provided by AAFC Research Branch in Charlottetown.

Figure 7: Planting Potatoes into 25 to 30 % Crop Residue

The total three (3) year expenditure for this activity, excluding field coordination costs, was approximately $15,625. This represents a total of 3.6 % of the budget. Not all expenses were reported at the time of this report, but this is a very close forecast.

Partnerships

Over the course of the past three-and-a-half years, PEI TCT has developed a diversified and valuable partnership with a number of research scientists, agronomists, engineers, wildlife biologists and so on. Table 11 demonstrates some of the people who assisted us in our demonstrations and research since 2003.

Table 11: Partners in Demonstrations

Name	Organization	Title	Demonstration
Dr Rick Peters	AAFC Research - Charlottetown	Plant Pathologist	Residue Management
Delmar Holmstrom	AAFC Research - Charlottetown	Soil Scientist	Agro Forestry
Dr John MacLeod	AAFC Research - Charlottetown	Soil Scientist	Nutrient Management
Barry Thompson	PEIAFA	Nutrient Specialist	Nutrient Management
Shauna Mellish	PEIAFA	Nutrient Specialist	Nutrient Management
Ron DeHaan	PEIAFA	Soil and Water Engineer	Nutrient Management, Residue Management
Patti Ann Baird	PEISCIA	Club Coordinator	Various
Justin Rogers	PEISCIA	Club Coordinator	Various
Tom Duffy	DUC	Program Coordinator	Various
Chris Pharo	AAFC - PFRA		Various

Lessons Learned

The first year was a learning process for all involved in the GHGMP. The second and third years were much easier in the planning and implementation stages. Not all the demonstrations went as planned; for example two of the demonstration sites were harvested before the project staff could collect yield samples. Very useful data and information was collected on most sites nevertheless. Some demonstration sites were strictly for demonstrations and awareness only.

One strength PEI had in the beginning was the contacts through the PEI Soil and Crop's Agri Conservation Clubs. The Clubs had made it easy to identify willing cooperators in a hurry, especially when the Clubs had identified nutrient management planning as a key priority for the staff and members.

The PEI Team needs to continue to develop creative ideas to increase attendance at future twilight demonstration tours. It seems difficult to get producers out to see something like a nutrient trial. Combining it with other tours, such as the Irrigation Tour in 2005, really made a difference. The other point to remember, mail outs, conferences, workshops and trade shows are probably the best way to get information out to producers.

Appendices

Appendix 1	Taking Charge New Initiatives New Directions PEISCIA 2006 Conference Agenda
Appendix 2	Table 12: PEI Taking Charge Team Members
Appendix 3	Fact Sheet - General GHGMP
Appendix 4	Fact Sheet - Nutrient Management Planning: Potato Rotation
Appendix 5	Fact Sheet - Liquid Manure Injection
Appendix 6	Fact Sheet - Nitrogen Management for Corn: General Recommendations
Appendix 7	Fact Sheet - Nitrogen Management for Corn: Pre-sidedress Soil Nitrate Test
Appendix 8	Fact Sheet - Agro Forestry Demonstrations
Appendix 9	Fact Sheet - Residue Management in Potato Production

Appendix 1: Taking Charge New Initiatives New Directions PEISCIA 2006 Conference Agenda

Taking Charge…

New Initiatives – New Directions

Wednesday, February 22, 2006

8:15 REGISTRATION CENTER OPENS

8:30 TRADE SHOW OPENS

Visit the Trade Show in the Lancaster Room and talk to the exhibitors

Coffee & Muffins available

MORNING PROGRAM

Heritage Room

Chairperson: Ivan Johnson

9:00 – 9:10
Presidents Welcome
Gerard Wood

9:10 – 9:30
Keeping Effective Records for Field Management & Opportunities for Participation – West Prince Soil & Crop Improvement Association
Justin Rogers
Agri-Conservation Club Co-ordinator

9:30 – 10:00
Pesticides Control Act
Understanding the Revised Regulations
Don Reeves – Pesticide Regulatory Program Manager; PEIDEE&F

10:00 – 10:20

Nutrient Management Demonstrations
Nutrient Management on our Farm
Shauna Mellish; PEIDAFA
Wade Caseley; W. D. Caseley

10:20 – 10:40

Manure Injection Trials
Utilizing Manure Injection on our Farm
Will MacNeill; PEISCIA Field Coordinator
Jamie Whalen; Whalen Farms

10:40 – 11:30
Making the Most of "Scented Fertilizer" on the Farm
Capturing economic and environmental benefits through manure's soil building and fertilizing power
Mitchell Timmerman
Nutrient Management Specialist
Manitoba Agriculture, Food and Rural Initiatives

11:30 – 12:00 TRADE SHOW

Lancaster Room

12:00 – 1:45 FARMERS FEAST

Lancaster Room

12:40 – 12:50
Presentation of proposed Bylaw Ammendments

12:50 – 1:00
Introduction of Special Guests

1:00 – 1:20
Awards Presentation
Soil Conservationists of the Year

1:20 – 1:45
Guest Speaker:
Wayne Easter; Malpeque MP

WTO and Canadian Agriculture

AFTERNOON PROGRAM

Heritage Room

Chairperson: Justin Rogers

1:45 – 2:30
Understanding and Managing Key Horsepower and Equipment Performance Issues to Improve Tillage Efficiencies
Chuck Everett
former Agricultural Mechanization Extension Engineer; NB Department of Agriculture

2:30 – 3:00

Sourcing Assistance
Where to find Provincial or Federal programs that can help your farm
Lynda MacSwain; PEIDAFA
Rose Halliday; AAFC

3:00 – 3:15
Occupational Health & Safety Act
Understanding the New Regulations and Promoting safety standards through the Code of Practice
Marilyn Affleck
PEI Federation of Agriculture

3:15 – 3:25
Water Management Options for your Farm
National Water Program
Scott Anderson; PEIDAFA

3:25 – 3:35
Updating Your EFP Made Easier
Electronic Environmental Farm Plan
Jérome Damboise; Eastern Canada Soil & Water Conservation Centre

CONFERENCE INFORMATION

When: February 22, 2006

Where: Slemon Park Hotel
St Eleanors, P.E.I.

CONFERENCE SCHEDULE

Registration:	8:15 – 12:30
Conference:	9:00 – 3:30
Trade Show	8:30 – 3:30

COST AND PRE-REGISTRATION

The cost to attend the entire day is **$25.00** if not pre-registered

For those who pre-register by **Monday, February 20, 2006** the cost is only **$20.00**. (payable on the day of the conference).
The registration fee includes all seminars, the Farmers Feast noon meal (hip of beef buffet) and the nutrition breaks.

The cost to attend only the afternoon session is **$10.00.** (noon meal not included).
Tax receipts are available on request

TO PRE-REGISTER OR FOR ADDITIONAL INFORMATION:

Margaret Butcher 675-4640

PEISCIA's office 887-2535 (messages only)

or

1 – 866 – PEI – FARM

1 – 866 – 734 – 3276

Conference agenda also available at:
www.gov.pe.ca/af/agweb
Click on 'calendar of events'
Select February 22 from the calendar

Keynote Presentations

Making the Most of "Scented Fertilizer" on the Farm

Mitchell Timmerman, Nutrient Management Specialist, Manitoba Agriculture, Food and Rural Initiatives will discuss the economic and environmental benefits of manure utilization both as a nutrient source and for it's soil improvement capabilities. As a key component of this discussion, Mitchell will provide guidelines to help producers determine the economic value of manure utilization within either a livestock or cash crop operation. In addition, Mitchell will discuss the issues of timing of manure application for maximum utilization by crops and the variations between manure type and the resulting effects on manure analysis, nutrient availability and nutrient release.

Understanding and Managing Key Horsepower and Equipment Performance Issues to Improve Tillage Efficiencies

Chuck Everett, recently retired Agricultural Mechanization Extension Engineer from the NB Department of Agriculture will discuss various considerations important for improving the economic efficiencies of tillage operations. These factors include a comparison of generic types of equipment for horsepower requirements, efficiencies of operation, including work being carried out in western Canada by the Praire Agricultural Machinery Institute , the gearup / throttle down concept and Dsi Fuel quality and alternatives. Tire "management" will be discussed through a comparison of Radial and Bias tires for tractor efficiency as well as the importance of ballasting and tire pressure combinations. Chuck will also present an economic comparison of Minimum tillage, Zero tillage and a combination tillage vs. multiple pass.

Conference Highlights

Keeping Effective Records - ideas for managing field history and cropping practices

On-farm Nutrient Management and Manure Injection Trial results and comments from participating producers

Pesticides Control Act – understanding the revised regulations

Sourcing Assistance - review of agricultural and human resource programs whch can benefit your farm operation

Occupational Health and Safety Act – understanding the revised regulations and promoting farm safety

National Water Program - Water management options

EFP - updating made easy with electronic version

Taking Charge

PEISCIA

New Initiatives – New Directions

The Prince Edward Island Soil & Crop Improvement Association

25th Annual Conference

Wednesday, February 22, 2006

Slemon Park Hotel & Conference Centre
St Eleanors, P.E.I.

Supported by:
The P.E.I. Soil & Crop Improvement Association
Taking Charge Team
Greenhouse Gas Mitigation Program
Soil Conservation Council of Canada
Canadian Cattlemen's Association
Canadian Pork Council
Dairy Farmers of Canada
Agriculture & Agri-food Canada
PEI Department of Agriculture, Fisheries and Aquaculture

Appendix 2:

Table 12: PEI Taking Charge Team Members: December 2002 to March 2006

PEITCT Member	Personal Association
Stewart MacRae	PEISCIA Director, cash crop and beef producer in Ebenezer
Barry Clohossey	Past PEISCIA director, beef and cole crop producer in nail pond
Gerard Wood	PEISCIA Director, beef producer in Lake Verde
Myles Rose	PEISCIA Director, Potato producer in Lakeville
Rodney MacWilliams	Past PEISCIA director, beef and dairy crop producer in West Cape
Alan Rennie	PEISCIA Director, potato and beef producer in Alma
Justin Rogers	ACCW Club Coordinator, beef and potato producer in Brae
Barry Cudmore	Pork and potato producer in Brackley Point
Patti Ann Baird	ACCE Club Coordinator
Rick Peters	AAFC Research Branch Charlottetown
Delmar Holmstrom	AAFC Research Branch Charlottetown
John MacLeod	AAFC Research Branch Charlottetown
Ron DeHaan	PEIDAFA Sustainable Agriculture Section
Barry Thompson	PEIDAFA Sustainable Agriculture Section
Shauna Mellish	PEIDAFA Sustainable Agriculture Section
Tom Duffy	Ducks Unlimited Canada - Charlottetown
Jerome Damboise	Eastern Canada GHGMP Coordinator with ECSWCC
William MacNeill	GHGMP Field Coordinator and field and cole crop producer
Tyler Wright	Taking Charge Team Leader, volunteer Manager PEISCIA, and PEIDAFA Sustainable Agriculture Section

PEI SOIL & CROP IMPROVEMENT ASSOCIATION

P.O. Box 21012, Charlottetown, PE C1A 9H6 Tel/fax: (902) 887-2535

Farm Demonstration Sites on PEI: Reduce/Remove GHGs

October 3, 2003

In 2003, the PEI Soil and Crop Improvement Association undertook a project of demonstrating and evaluating Beneficial Management Practices (BMPs) in agriculture that either reduce or remove greenhouse gas (GHGs). Many BMPs are already being practiced by many farmers: new ones are always emerging.

The Greenhouse Gas Mitigation Program is a national program funded by Agriculture and Agri-Food Canada. Nationally the program is delivered by the Soil Conservation Council of Canada, Dairy Farmers of Canada, Canadian Pork Council, and Canadian Cattlemen's Association. The focus of the program is to demonstrate and evaluate BMPs relating to carbon dioxide, nitrous oxide, and methane. PEI Soil and Crop's focus is on two GHGs: carbon dioxide and nitrous oxide. Other groups are involved in methane related demonstrations.

Agroforestry in Augustine Cove: Agroforestry is the production of trees or shrubs for the purpose of providing wind shelter, wildlife habitat, and a sink for carbon dioxide, to name only a few. Typical shelter belt trees each contains 162 to 544 kg Carbon, with poplar trees having the most. One-kilometre long mature white spruce shelter belts can sequester 80 tonnes of carbon

Ingleside Farms of Albany have established an agroforestry site in Augustine Cove, PEI. A stream riparian area has been planted to cedar and juniper seedlings. And adjacent land has been planted to a variety of seedlings that may have significant wood lot value in the years ahead. The seedlings include Red Oak, Black Walnut, Butternut, Douglas Fir, White Pine Norway Spruce and Blue Spruce.

The project will demonstrate and evaluate the potential value in these trees and suitability as agroforestry species for farmers.

***Nutrient Management Planning - various sites across PEI**:* Efficient use of fertility inputs will not only lead to reduced GHGs, but also improved surface and ground water quality. Nutrient Management Planning (NMP), in many ways, is a new BMP for Prince Edward Island. Generally manure has rarely been analyzed nor properly accredited for nutrients to determine additional fertility requirements. The same can be said for plough down legume crops. Liquid manure injection has never been demonstrated on-farm either.

Unfortunately research data on potato plant nutrient requirements for Prince Edward Island is often out-dated, unavailable, or unconsolidated. Researchers in both government and industry circles, and producers have some information, but a widely available and up-to-date data base for PEI has not been produced. To help address this, PEI Soil and Crop has setup some demonstration sites with assistance from farmers, PEI Agriculture and Forestry, and other individuals.

OVER ☛

2003 NMP Demonstrations:

A. Twelve sites were selected across PEI. Each of these sites were in various stages in a 3-year crop rotation of potatoes, cereals, and forages (ie four sites for each crop type). Plans were developed and implemented for each of these 12-fields and the results will be compared to conventional practices. The nutrient requirements and crop yield will be studied. The focus will remain on each of these fields for a total of three years as the farmer goes through the complete rotation.

B. This project will assist George Webster, Maple Plains Agro Environmental Demonstration site and Bedeque Bay Environmental Management Association in developing a Nutrient Management Plan. This sustainable agriculture site has been an excellent location for demonstrating BMPs to farmers and general public. George is also evaluating a new potato variety that requires lower nitrogen and fungicide inputs.

C. Four livestock farms are demonstrating and evaluating manure injection during land application. This will be compared to conventional manure broadcasting techniques on two dairy and two pork farms. Canadian Pork Council is providing direct support to this project through the Atlantic Swine Research Partnership.

Future Activities - 2004 and 2005

A. Residue management trials for potatoes
B. Further Agroforestry sites
C. Continuation of Nutrient Management Planning sites
D. Tours, workshops, articles, fact sheets, presentations, website, etc.

PEI Soil & Crop Improvement Association - Taking Charge Team

P.O. Box 21012, Charlottetown, PE C1A 9H6 Tel/fax: (902) 887-2535

Nutrient Management Planning: Potato Rotation

What is a Nutrient Management Plan ?

A Nutrient Management Plan (NMP) is a document that describes the production practices that a farm manager currently uses and/or will implement to sustain livestock and/or crop production in a manner that is both environmentally and economically sound.

Nutrient management planning is about making sure that crop nutrient needs are met without over fertilizing. It aims to optimize crop yield and quality, minimize input costs, and protect soil and water quality.

Tour of nutrient management potato demonstration (2005)

Benefits of Nutrient Management Planning

- optimizes use of on-farm nutrients
- prevents excessive nutrient build-up
- reduces fertilizer costs
- maintains soil health for successful crop production
- reduces environmental risks to water and air
- reduced greenhouse gas emissions (N2O)

Nutrient Management Planning in P.E.I.

Prince Edward Island is encouraging the development of nutrient management plans by Island producers through research and demonstration with the cooperation of federal/provincial research, agri-business, farm organizations and individual producers. The goal of Nutrient Management in P.E.I. is to obtain input from these groups and organizations for the development of nutrient management recommendations and practices that achieve producer and environmental objectives.

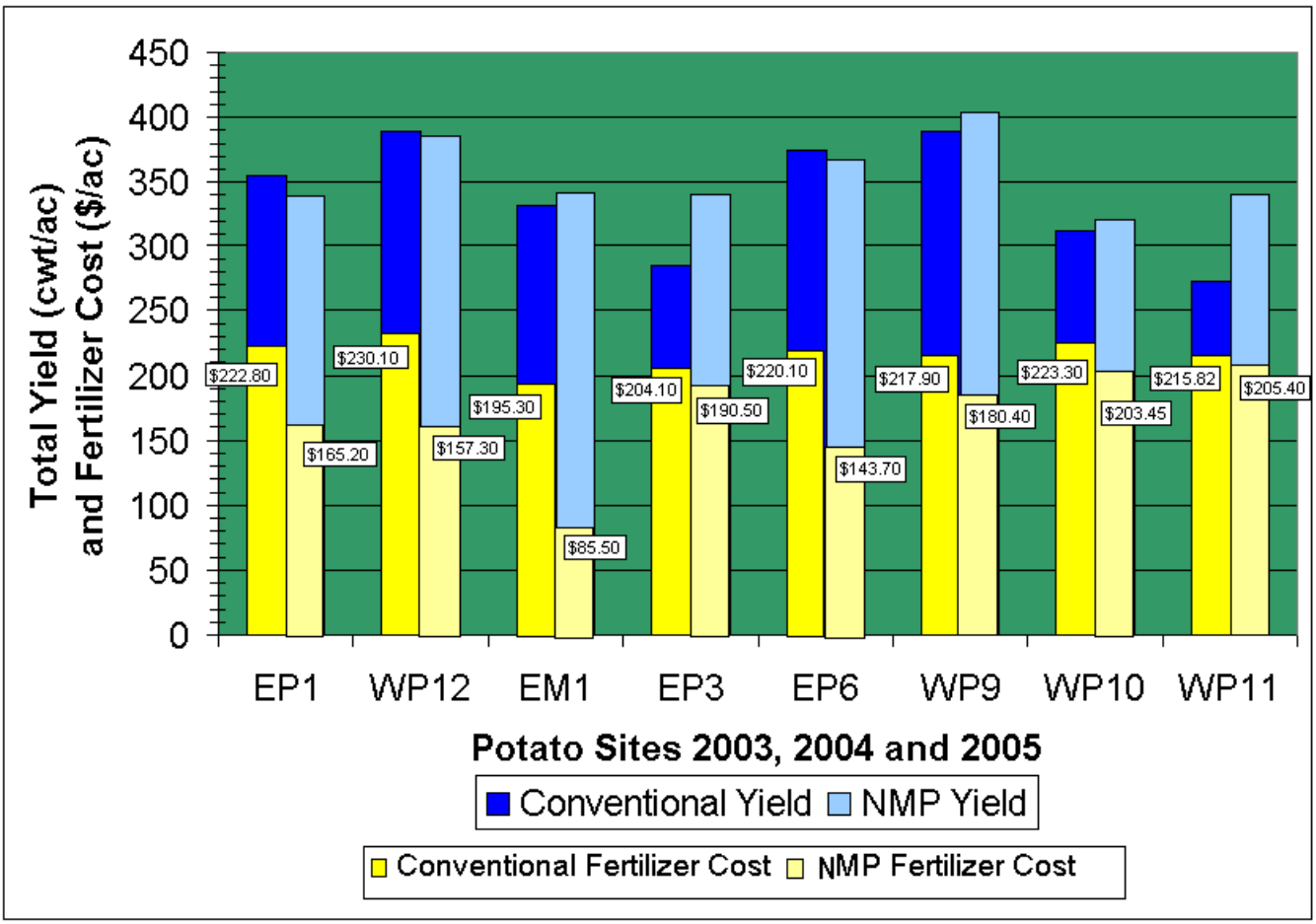
In 2003, the P.E.I. Soil and Crop Improvement Association (PEISCIA) established twelve demonstration plots across P.E.I., comparing producers traditional fertility practices with recommended nutrient management practices in field-scale demonstrations over a three year potato rotation. In each year of the demo, four locations are potatoes, four locations are grain, and four locations are forage. Fertility inputs, cropping records, yields and economic data are collected and analyzed for each location.

Three Year Observations From Potato Demonstration Sites

Results to date are based on eight demonstration sites over a three year period using russet type potatoes. Sites EP3(2004) and WP11(2005) showed a significantly

greater total yield under the nutrient management program. All other sites showed 'no' significant difference in the total yield between the farmers conventional practice and a fertility plan developed under a Nutrient Management program. In these demonstration sites the farmers realized a saving in fertilizer between $10 to $110 per acre under the NMP plan versus the farmers conventional plan. The chart below shows total yield and fertilizer cost per acre.

For more information on developing a plan for your farm, contact the PEI Soil and Crop Improvement Association at (902) 887-2535



PEI Soil & Crop Improvement Association - Taking Charge Team

P.O. Box 21012, Charlottetown, PE C1A 9H6 Tel/fax: (902) 887-2535

February 16, 2006

Liquid Manure Injection

Why Liquid Manure Injection

Liquid Manure Injection involves injecting liquid hog or dairy manure directly into the soil with a standard liquid manure tanker equipped with a full tillage manure injector. This practice has potential to increase crop yields, reduce input costs and benefit the environment.

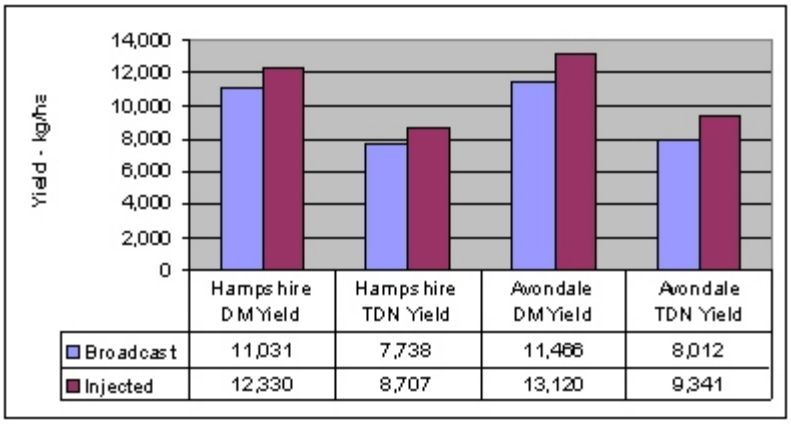
The goal is to demonstrate the value of manure injection over traditional broadcast application. The main drawbacks of surface application is the odour produced and the amount of ammonia nitrogen lost to the air.

Benefits of Liquid Manure Injection

- optimizes use of on-farm nutrients
- reduces fertilizer costs
- minimizes the release of unpleasant odours
- prevents rapid loss of nitrogen compounds into the air
- as part of a nutrient management plan, manure injection may reduce nitrous oxide production, a greenhouse gas

Observations from Manure Injection Demonstrations

Two Liquid manure injection Demonstration Trials were conducted in 2005. Both trials used liquid hog manure injected prior to planting silage corn. On each site a Nutrient Management Plan was developed based upon soil and manure tests. Fields were split into strips where manure was either injected directly into the soil or broadcasted and then later incorporated into the soil with tillage. All other management and fertilizer practices remained the same between treatments.



	Hampshire DM Yield	Hampshire TDN Yield	Avondale DM Yield	Avondale TDN Yield
Broadcast	11,031	7,738	11,466	8,012
Injected	12,330	8,707	13,120	9,341

Results from these trials showed an increase in both total dry matter (DM) yield and total digestible nutrients (TDN) yield in favor of manure injection, with the Hampshire site being statistically significantly different. The yields within the injected treatments were also more consistent showing less variation compared to the broadcast treatment.

For more information on manure injection or this study please contact the PEI Soil & Crop Improvement Association at (902)887-2535.

The Soil Conservation Council of Canada

Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada

Canadian Pork Council / Conseil canadien du porc

Canadian Cattlemen's Association

Dairy Farmers of Canada / Les Producteurs laitiers du Canada

Nitrogen Management for Corn: General Fertilizer Recommendations

GHG Taking Charge Team Factsheet

Why do we need good nitrogen management?

Sound nitrogen management for corn makes good economic sense. Optimal nitrogen fertilization is essential for achieving a successful, high yielding corn crop. Inadequate nitrogen inputs result in loss of silage or grain yield. Excessive nitrogen inputs reduce profitability and can delay maturity for grain corn. Applying the optimal fertilizer nitrogen rate achieves good crop yield and results in maximum economic return.

Good nitrogen management also makes good environmental sense. Excess fertilizer nitrogen application increases environmental losses of nitrogen, including nitrate leaching to groundwater and emissions of nitrous oxide, a greenhouse gas. Good nitrogen management represents an effective and practical means for producers to reduce greenhouse gas emissions.

Optimizing nitrogen management for corn

Our goal in optimizing crop nitrogen management is to match the nitrogen supply to the crop nitrogen demand. The amount of nitrogen required by the crop is dictated by the level of crop growth – the greater the growth, the higher the crop demand for nitrogen. Crop growth is influenced by management practices such as hybrid selection and planting date, and also by soil and climatic conditions.

The nitrogen supply for a corn crop comes from fertilizer, but also from manure and mineralization.

Mineralization is the release of plant available nitrogen from soil organic matter and crop residues as a result of soil microbial activity. The optimal amount of nitrogen inputs for a crop varies from field-to-field and from year-to-year due to variation in both crop nitrogen demand and soil nitrogen supply.

General nitrogen recommendations for corn

This factsheet provides general fertilizer nitrogen recommendations for grain and silage corn. These recommendations require a soil test for organic matter content and a manure analysis. If no manure analysis is available, typical values for different types of manure can be used.

If you require assistance in estimating your general fertilizer nitrogen recommendation for corn from this factsheet, or if you need to obtain typical values for manure, contact your local Crop Development Officer or Nutrient Management Specialist with the New Brunswick Department of Agriculture, Fisheries, and Aquaculture or your agri-environmental club coordinator.

How much fertilizer nitrogen to apply?

The general recommendation for fertilizer nitrogen rate (F_N) in kg N/ha is estimated by:

$$\mathbf{F_N = 150 - M_{AMM} - M_{ORG} - C - S - YP}$$

where M_{AMM} is a credit for manure ammonium, M_{ORG} is a credit for organic nitrogen in manure, C is a credit for the crop grown in the previous year, S is a credit based on soil organic matter content, and YP is a reduction in the recommendation for fields with reduced yield potential.

This factsheet provides a series of six steps to calculate the fertilizer nitrogen recommendation using the General Nitrogen Recommendation Worksheet on page 3. Complete Table 1 to calculate the information you need from your manure analysis before you begin. The worksheet considers manure applied in the spring before planting, and manure applied in the previous fall. Complete steps 1 and 2 for each manure application.

Step 1: Credit for manure ammonium (M_{AMM})

Manure contains nitrogen in ammonium (NH_4) and organic forms. Nitrogen in ammonium form is readily available to the corn crop. The amount of ammonium in manure varies with animal species, animal diet and manure storage conditions and therefore a manure analysis is recommended. Nitrogen loss through ammonia volatilization can occur very rapidly following field application of manure. Ammonia loss occurs most rapidly when manure is applied and not incorporated in dry, warm conditions. Ammonia losses are reduced if application is followed by rainfall or cool, damp weather. The availability of the ammonium in the manure is estimated from Table 2 based on the method of application and time until incorporation. These are average values which are sensitive to climatic conditions.

Table 1. Manure analysis calculation table.

Enter values from your manure analysis on an "as received" basis:

NH4-N (ppm) = _____ (101)

Nitrogen (%) = _____ (102)

Carbon (%) = _____ (103)

Calculate the following:

Organic N (ppm) = [(line 102) x 10,000] - (line 101) = _____ (104)

C:N ratio = (line 103) ÷ (line 102) = _____ (105)

Step 2: Credit for manure organic nitrogen (M_{ORG})

Organic nitrogen in manure is not readily available to the corn crop. Some of the organic nitrogen is converted to plant available forms of nitrogen through mineralization. The amount of organic nitrogen which becomes plant available depends on the animal type and on the amount and type of bedding. The availability of organic nitrogen in manure is estimated from Table 3 based on the time of manure application and the carbon to nitrogen (C:N) ratio of the manure.

Step 3: Credit for previous crop (C)

The previous crop grown can affect the availability of nitrogen for the corn crop. Legume crops have the ability to fix nitrogen from the atmosphere in their root systems. Plant available nitrogen is released to the corn crop through the decomposition of crop residues. The credit varies with the proportion of legume, legume species and age of stand in the previous cropping year. Incorporation of annual ryegrass may reduce plant available soil nitrogen supply to the corn crop.

Step 4: Credit for soil organic matter content (S).

The contribution of nitrogen from soil organic matter can be substantial. It will depend on soil and climatic conditions, past manure applications, and previous crop rotations. Currently the amount of soil nitrogen mineralization which will occur during the growing season cannot be predicted accurately. Soils with high organic matter content generally have higher soil nitrogen mineralization than soils with low soil organic matter content.

Table 2. Manure ammonium nitrogen availability coefficients

	Liquid /semi-solid manure		Solid manure	
Application	Spring / Summer	Fall	Spring / Summer	Fall
Injected	1.00	0.80	1.00	0.90
Incorporated 1 day	0.75	0.60	0.85	0.77
Incorporated 2 days	0.70	0.56	0.75	0.68
Incorporated 3 days	0.65	0.52	0.65	0.59
Incorporated 4 days	0.60	0.48	0.60	0.54
Incorporated 5 days	0.55	0.44	0.55	0.50
Not incorporated- bare soils	0.34	0.27	0.50	0.45
Not incorporated- pretilled soils	0.70	0.56	0.70	0.63
Not incorporated- crop residues	0.50	0.40	0.70	0.63
Not incorporated- standing crops	0.70	0.56	0.60	0.54
Not incorporated- late fall	---	0.60	---	0.68

General Nitrogen Recommendation Worksheet

Base value 150 (1)

Step 1: Credit manure ammonium nitrogen (M_{AMM}) in kg N/ha

Enter manure application rate:

in gallons/acre	_____ (a)	and (b) = 89,000
OR in m^3/ha	_____ (a)	and (b) = 1,000
OR in tons/acre	_____ (a)	and (b) = 445
OR in tonnes/ha	_____ (a)	and (b) = 1,000

Enter manure ammonium concentration in ppm (line 101 from **Table 1**) _____ (c)

Enter manure ammonium availability coefficient (from **Table 2**) _____ (d)

M_{AMM} in kg N/ha **=** _____ (a) x _____ (c) x _____ (d) ÷ _____ (b) = ... _____ **(2)**

Step 2: Credit manure organic nitrogen (M_{ORG}) in kg N/ha

Enter (a) and (b) from Step 1: _____ (a) _____ (b)

Enter manure organic N concentration in ppm (line 104 from **Table 1**)_____ (c)

Enter manure organic N availability coefficient (from **Table 3**) _____ (d)

M_{ORG} in kg N/ha **=** _____ (a) x _____ (c) x _____ (d) ÷ _____ (b) = ... _____ **(3)**

Step 3: Credit crop grown in the previous year (C)

	Alfalfa	Red clover (2nd yr)	Red Clover (seeding yr)	Soybean	Annual ryegrass
Less than 1/3 stand:	0	0	0	0	0
Between 1/3 and 2/3 stand:	40	20	10	0	0
More than 2/3 Stand:	80	40	20	10	-15

C in kg N/ha **=** (enter appropriate value from above) = ... _____ **(4)**

Step 4: Credit soil organic matter content (S)

Soil organic matter greater than or equal to 3.5%	15
Soil organic matter between 2.5% and 3.5%	0
Soil organic matter less than 2.5%	-15

S in kg N/ha **=** (enter appropriate value from above) = ... _____ **(5)**

Step 5: Fertilizer N rate reduction for fields with reduced yield potential (YP)

Field with high yield potential	0
Field with reduced yield potential (choose a value between 10 and 50 in discussion with your local Crop Development Officer, Nutrient Management Specialist or club coordinator)	_____

YP in kg N/ha **=** (enter appropriate value from above) = ... _____ **(6)**

Step 6: Calculate general fertilizer nitrogen recommendation (F_N) in kg N/ha

(Multiply F_N by 0.89 to get fertilizer nitrogen recommendation in units of lb N/ac)

F_N in kg N/ha = **(1) - (2) - (3) - (4) - (5) - (6) =** .....

Table 3. Manure organic nitrogen availability coefficients

Manure Type	Spring applied	Fall applied
Poultry:	0.30	0.30
Other livestock:		
C:N < 15	0.20	0.30
C:N 15 to 25 (high in bedding)	0.10	0.10
C:N > 25 (very high in bedding)	-0.20	0.10

Step 5: Fertilizer N rate reduction for fields with reduced yield potential (YP)

The yield potential of a field can be reduced by poor drainage, soil compaction, poor soil conditions, late planting, poor crop stand or other factors. Fields with lower corn yield potential have a lower requirement for fertilizer nitrogen. It is important to identify factors which may be limiting crop yield.

Step 6: Calculate general fertilizer nitrogen recommendation.

The fertilizer nitrogen recommendation is in units of kg N/ha. This is the total amount of fertilizer nitrogen required by the corn crop, including nitrogen applied in starter fertilizer. If recommendation is zero, no fertilizer N is required.

When to apply the fertilizer nitrogen?

The corn crop uses very little nitrogen before the corn six-leaf stage. Application of fertilizer nitrogen before this time increases the risk of nitrogen loss by leaching and denitrification. The following is recommended for the timing of fertilizer nitrogen application for corn:

- Apply no more than 50 kg N/ha with the planter (no more than 25 kg N/ha if a urea-based fertilizer is banded)
- Apply the remainder of fertilizer nitrogen at approximately the corn six-leaf stage (crop about 8 to 10" high). If possible, band or incorporate fertilizer applied at this time

Soil and plant nitrogen tests for corn

This factsheet can be used to choose a general fertilizer nitrogen recommendation for corn. You can improve your general fertilizer nitrogen recommendations through use of the Pre-sidedress Soil Nitrate Test (PSNT) and the Stalk Nitrate Test (SNT).

The PSNT uses a soil sample taken at the corn six-leaf stage to predict plant available soil nitrogen supply. The SNT at harvest can be used as a "report card" to assess nitrogen management of the corn crop in that year.

Good agronomy is an important part of good nitrogen management. It is also recommended that you do an annual soil test for phosphorus and potassium and soil pH (soil acidity). Soil pH should be maintained between 6.0 and 6.5. It is also important to use adapted corn hybrids, establish a uniform crop stand and plant in soil conditions that will allow for maximum germination (soil temperature at 10 °C or higher). It is important to identify the factors limiting yield in fields with poor crop performance.

Contacts:

For further information on these general fertilizer nitrogen recommendations, or on the PSNT or the SNT, contact the Soil and Feed Testing Laboratory, P.E.I. Dept. of Agriculture, Fisheries and Aquaculture (902) 368-5628 or Nutrient Management Specialists at (902) 894-0392 or (902) 368-6366 with the Prince Edward Island Department of Agriculture, Fisheries, and Aquaculture.

This factsheet was prepared by Bernie Zebarth (Agriculture and Agri-Food Canada), Walter Brown, and Charles Karemangingo (New Brunswick Department of Agriculture, Fisheries and Aquaculture), March, 2006.

Greenhouse Gas Mitigation Program for Canadian Agriculture
Programme d'atténuation des gaz à effet de serre pour l'agriculture canadienne

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Nitrogen Management for Corn: Pre-Sidedress Soil Nitrate Test (PSNT)

GHG Taking Charge Team Factsheet

The Pre-sidedress Soil Nitrate Test (PSNT) can be used to improve fertilizer nitrogen recommendations for silage or grain corn production. The factsheet Nitrogen Management for Corn: General Fertilizer Recommendations can be used to estimate the corn fertilizer nitrogen requirement using average values for manure, crop and soil nitrogen credits. However, the actual nitrogen benefits from these sources can vary from field-to-field and year-to-year. The PSNT uses a soil sample taken when the corn is at the six-leaf stage (about 8 to 10" high) to decide how much sidedress nitrogen fertilizer to apply on an individual field. This factsheet outlines preliminary recommendations for fertilizer nitrogen management for corn based on the PSNT.

Why good nitrogen management?

Sound nitrogen management makes good economic and environmental sense. Good nitrogen management allows manure and fertilizer nitrogen applications to be tailored to meet the nitrogen requirement of the crop. As a result, fertilizer nitrogen input costs are minimized with no loss in yield. In addition, proper nitrogen management reduces the risk of nitrate leaching to groundwater, and reduces the risk of nitrous oxide emissions, a greenhouse gas.

How does the PSNT work?

The main sources of the plant available nitrogen for a corn crop include fertilizer, manure, mineralization, and carry-over of nitrogen from the previous growing season. Mineralization is the release of nitrogen from the soil organic matter and crop residues through soil microbial activity. The PSNT takes some of the guesswork out of making fertilizer nitrogen recommendations by providing better estimates of the plant available nitrogen supplied by manure, mineralization and carry-over of nitrogen from the previous growing season.

A soil sample is taken at the corn six-leaf stage, just prior to the period of rapid corn growth and nitrogen uptake, and tested for nitrate concentration. Corn nitrogen uptake is small until this time. A low rate of nitrogen (20 to 30 kg N/ha) applied with the planter plus soil mineralization will supply sufficient nitrogen to meet the crop nitrogen requirement until this time. A sidedress application of fertilizer nitrogen is then chosen based on the PSNT.

How should I use the PSNT?

To get the most out of the PSNT, it should be used as part of a nitrogen management system with the following steps:

- ✓ Manage manure according to the environmental guidelines.
- ✓ Do not apply a pre-plant broadcast of nitrogen. The corn does not require nitrogen early in the growing season. The fertilizer application may also interfere with the test result.

The PSNT test is taken when the corn plant is at the six-leaf stage, or approximately 8 to 10” high

- ✓ Apply a low rate of nitrogen (20 to 30 kg N/ha) banded with the planter. Nitrogen banded by the planter is not measured by the PSNT.
- ✓ Use the PSNT to decide how much, if any, fertilizer nitrogen to apply at sidedress.

Cautionary Note: Nitrogen mineralization is delayed in soils that experience flooding conditions or are unusually cool and wet in spring. These soils have been found to have lower than expected PSNT values, and the rate of fertilizer nitrogen required at sidedress may be overestimated.

How do I soil sample for the PSNT?

- ✓ Sample to 30 cm (1 ft) depth midway between corn rows to avoid fertilizer banded with the planter.
- ✓ Take more than 10 soil cores per field when the corn is at the six-leaf stage (approximately 8 to 10" tall).
- ✓ Keep the sample cool until it reaches the lab - a picnic cooler is a handy way to do this. The sample can also be frozen. If stored warm, nitrate concentration in the sample will increase and give a fertilizer nitrogen recommendation which is lower than required. Have the sample analysed for nitrate-N concentration in ppm.

How do I use the PSNT to decide how much nitrogen fertilizer to apply?

- ✓ No yield response to sidedress nitrogen application is expected for corn fields that have a PSNT value greater than 25 ppm.
- ✓ For PSNT test values less than 25 ppm, use Table 1 to decide how much fertilizer nitrogen to apply at sidedress.

Table 1. Sidedress fertilizer nitrogen recommendations based on the PSNT.

PSNT test value (ppm)	Sidedress N rate (kg N/ha)
25 or higher	0
20 - 24	30
15 - 19	60
10 - 14	90
less than 10	120

- ✓ No test is perfect, and the PSNT is no exception. The recommendations should make sense given the manure and cropping history, the soil texture and organic matter content, and the spring conditions.

Cautionary Note: The PSNT recommendations in Table 1 are preliminary recommendations based on information adapted from regions with similar soil and climatic conditions and based on some local field testing.

Contacts:

For further information on these general fertilizer nitrogen recommendations, or on the PSNT or the SNT, contact the Soil and Feed Testing Laboratory, P.E.I. Dept. of Agriculture, Fisheries and Aquaculture (902) 368-5628 or Nutrient Management Specialists at (902) 894-0392 or (902) 368-6366 with the Prince Edward Island Department of Agriculture, Fisheries, and Aquaculture.

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Greenhouse Gas Mitigation Program for Canadian Agriculture

Agro Forestry Demonstrations

Agro forestry is new in this region; we are beginning to explore options that could provide an economic return to producers, improve the environment and also act as a carbon sink. Trees and shrubs, like traditional field crops, remove CO_2 from the air and store it as carbon in trunks, branches, leaves and roots. Agro forestry practices sequester carbon for many decades.

The dry solid matter of a tree or shrub is 50 % carbon and the carbon dioxide equivalent is 3.667 times the value of carbon in the tree. So every dry tonne of dry wood in the forest has removed 3.667 tonnes of carbon dioxide from the atmosphere.

Agro forestry, as we are defining it, involves afforestation as opposed to reforestation. Native and non-native trees and shrubs are being evaluated by the PEI Soil and Crop Improvement Association Taking Charge Team and other partners. These demonstration sites have been supported by the Greenhouse Gas Mitigation Program through the Soil Conservation Council of Canada, three national industry groups and Agriculture and Agri-Food Canada.

Currently seven sites have been established as a start in agro forestry. Local business often exist to purchase and process of these products (preserves, fruit, nuts, lumber, nutraceuticals, pharmaceuticals, floral etc).

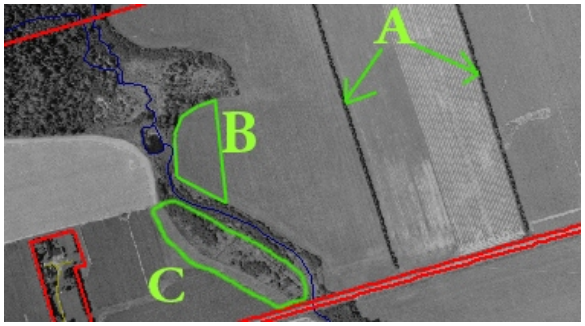
The Following parameters will be evaluated on some or all of these sites:

1. Survival rate and planting method
2. Carbon sequestration values
3. Insect and disease issues
4. Years to production (fruit, timber, nuts, wood products, etc.)
5. Production levels
6. Marketability
7. Financial returns

The following briefly describes the seven demonstration sites supported by the PEI Taking Charge Team and the PEI Soil and Crop Improvement Association.

SITE 1: Hedgerows, afforestation and riparian zones - Wood Products and Biodiversity:
Cooperator: Eric C. Robinson Inc, Augustine Cove

Over the past number of years Eric C. Robinson Inc has been establishing trees on a number of their farms. In the mid to late 80's they established about 9 miles of double row white spruce hedgerows. Recently Robinsons' purchased 2,100 tree seedlings, planting them into a nursery on the farm. The farm wanted to try tree species, although some are non-native, that might provide value for future generations. The species included Red Oak, Black Walnut, Butternut, Norway Spruce, Douglas Fir, White Pine, and Blue Spruce; these tree species have since been transplanted in 2003. Site preparation included micro site tillage and mulched with composted wood bark. The survival rate in the second year is estimated to be 80 to 90% for the hardwoods and 40 to 75% for the softwoods. They also have a number of riparian areas and other marginal areas that benefited from tree planting.



A- 4,650 feet 2-row white spruce. When mature, these trees will sequester more than 225-tons of carbon

B- 1,800 hardwood and softwood species - afforestation on 2-acres

C- 2,742 larch and cedar seedlings planted in the riparian zone

SITE 2: Use of Native Fruit Shrubs in Agriculture for fruit, preserves, wine, etc.
Cooperators: MacPhail Woods Forestry Project, Orwell

The feasibility of converting land from traditional agriculture to production of fruit from native shrubs is being investigated at Orwell. The project will look at three native shrubs - common elder [1] , serviceberry [2] , and chokecherry [3] . Established in 2004, the project will evaluate native fruit bearing shrubs in combination with white clover in an organic system. After a period of time additional plants such as ostrich ferns (fiddle heads) and high value trees could be considered. Shrubs will be evaluated for vigor, growth and productivity. Once production is stabilized, fruit will be test marketed by local businesses to determine potential markets. In addition to the potential development of an industry based on organic fruit production from native shrubs, environmental benefits such an increased biodiversity and carbon sequestration can be demonstrated.

SITE 3: Evaluation of hybrid hazelnut with native beaked hazelnut [4]
Cooperators: MacPhail Woods Forestry Project, Orwell

This 2005 project was initiated to evaluate the native beaked hazelnut and hybrid dwarf hazelnut varieties to determine feasibility of producing hazelnuts under an organic system. The project was designed as a research project with 3 hybrid dwarf hazelnut varieties and a native beaked hazelnut [4] . Shrubs will be evaluated for survival, vigor, growth and productivity.

[1,2,3,4,5,6] - See Definitions page

SITE 4: Trees and shrubs on Diversion Terraces - Wood products, fruit, preserves, nuts, floral, etc. Cooperators:Bedeque Bay Environmental Association and George Webster and family, Maple Plains

A common soil conservation practices in potato production is to construct berms or diversion terraces. This 2005 project is examining the benefits or problems of growing native shrubs (highbush cranberry [5], beaked hazelnut [4] and red osier dogwood [6]) and trees (red oak, white birch and elm) on these berms. The survival, growth rate, effect on adjacent agricultural crops (potatoes, grain and hay), insect populations and level of carbon sequestration will be evaluated.

SITE 5:Evaluation of service berry [2] varieties on poorly drained agricultural land - Fruit, Preserves, etc. Cooperators: Barry Clohossay, Nail Pond

This 2005 project was initiated to evaluate two varieties of Saskatoon varieties from western Canada, and four species of service berry [2] from New Brunswick and Prince Edward Island. Their vigor, flowering time, time to production and production levels will be evaluated. Fruit produced will then be test marketed through a local farm market. In addition, local blueberry producers are looking for a shrub/tree which flowers earlier than the native blueberry. This project will also monitor flowering times to determine if one or more are suitable to improve blueberry pollination.

SITE 6: Evaluation of afforestation of poorly drained agricultural land - Wood products, Biodiversity Cooperators: Ronnie and Rodney MacWilliams, Burton

Land considered marginal for agricultural crop production now has the potential to be converted either to productive forests or a combination of forest/agricultural crops. This 2005 project was initiated to evaluate several native trees planted on poorly drained forage land to determine if tree production or a combination of tree/forage production was feasible. The native trees planted include apple, red maple, white ash, red oak, white birch, mountain ash, eastern larch, black spruce, white spruce, white cedar.

SITE 7: Under planting Ground Hemlock in different forest covers - Nutraceuticals

Ground Hemlock (*Taxus Canadensis*) is a slow growing shrub with flat needle like foliage that grows best in the shade. It has low spreading branches which are usually between 50 - 100 cm in length but may reach 200 cm or more.Two sites (one in Central PEI and in one in Eastern PEI) were established in 2005. In the central PEI site hemlock was planted under three different forest covers. One is mixed hardwood and softwood with low light level, one pure hardwood medium light level, and one mixed hardwood with high light condition). In eastern PEI Ground Hemlock was planted under two mixed hardwood covers with medium and low light conditions. Growth rate and productivity will be monitored.

[1,2,3,4,5,6] - See Definitions page

Definitions

[1] **Common Elder** ***(Sambucus Canadensis)***
A small shrub, usually with many stems arising from the base, that can grow up to 5 feet (1.5 m) high. Flat clusters of creamy white flowers contrast with lush, compound leaves containing 5 to 15 leaflets. The dark purple, almost black fruit, about 1/4 inch (6 mm) in diameter, ripens during late August and September. Elder leaves exude an unpleasant odour when crushed. The tips of twigs die back and branches often break off over the winter. Buds are opposite and large, although though not as big as those of red-berried elder. Bark is pale deep green, changing to light brown as the plant grows older.

[2] **Serviceberry** ***(Amelanchier spp.)***
Service berry :There are many names (Saskatoon, Indian pear, shadbush) and varieties of this species. Hybrids can also form when two varieties interbreed. Height can vary from a 2 foot (60 cm) spreading shrub to a 25 foot (7.6 m) or more tree. Bark is light gray streaked with darker vertical lines. The smooth young bark becomes more flaked with age. Serviceberry flowers in May before the leaves have fully developed. In July and August, edible berries turn dark purple and are sweet and juicy. Leaves are oval to round and usually toothed. Slender twigs bear long, pointed buds.

[3] **Choke Cherry** ***(Prunus virginiana)***
Commonly a shrub 6-20 feet (1.8-6.1 m) tall, with gray bark marked by small pale spots. Leaves are dark green and finely-toothed. Although the shape is oval, choke cherry leaves are broader near the tip than at the base, making them easy to recognize. Clusters of red cherries turn dark purple in late August and September. These fruits are very sour but are edible, and contain a single seed. Twigs are stout and when the bark is scraped, give off an unpleasant odour. Buds are alternate, pale brown and pointed.

[4] **Beaked Hazelnut** ***(Corylus cornuta)***
This small shrub grows up to 10 feet (3 m) under good conditions. Male flowers appear in the form of small catkins in fall, pollinating tiny red female flowers in the spring producing large round nuts, covered with bright green bristly husks that form a long "beak". The nuts may grow singly, but more often are found in clumps of 2-3. Leaves are alternate, toothed and bright green. Buds are small and round, on slender twigs. The bark is light brown, often with a white striping.

[5] **High Bush Cranberry** ***(Viburnum trilobum)***
High Bush Cranberry it is not a true cranberry and has a European cousin (Viburnum opulus) that is quite common locally. High Bush Cranberry grows up to 15 feet (4.6 m) high, with clusters of white flowers in late June. Fruits are cranberry-size and bright red, often hanging on throughout the winter. Leaves are three-lobed and maple-like, but vary considerably even on the same shrub. Buds are opposite and the tips of twigs die back during the winter. Bark is smooth and gray to light brown. The European variety is generally found around homesteads and parks and produces bitter fruit often totally ignored by wildlife. The native variety is more at home along streams, swamps and low, open woods. Its berries are tastier and seldom last through winter.

[6] **Red Osier Dogwood** ***(Cornus stolonifera)***
This low spreading shrub, seldom reaching more than 4 feet (1.2 m) in height, is easily identified by its red bark. It has small flat clusters of white flowers, producing white berries. Leaves are typical of dogwoods, with distinct veins running towards the tip, while buds are small and opposite

Definitions Source
Schneider, Gary. 1994. *Native Shrubs of Prince Edward Island*. Environmental Coalition of P.E.I., Charlottetown.

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Residue Management in Potato Production
Long Term Common Scab and Yield Study

What is Residue Management?

By modifying tillage practices, producers are able to obtain 20 to 30 % soil surface cover from the previous crop's residue after potatoes are planted. The previous crop could be a cereal or a forage treated with glyphosate. Residue Management (RM) in potato production was introduced to PEI in 1993, and within 5 or 6 years nearly 20,000 acres of potato production utilized this management system.

Benefits of Residue Management (RM)

- Increased soil moisture retention
- Decreased need for irrigation
- Decreased soil loss from water and wind erosion
- Often, increased total and marketable yields
- Decreased fuel consumption and greenhouse gases
- Decreased need for equipment and tractors
- Improved soil structure and tilth
- Increased carbon sequestration
- Increased soil microbial activity
- Decreased severity of some potato diseases, including Rhizoctonia canker and black scurf.

Previous Research

Research conducted by Agriculture and Agri-Food Canada, and the PEI Department of Agriculture Fisheries and Aquaculture since the early 1990's had demonstrated many benefits to this practice over conventional tillage.

- almost no wind or water erosion the winter prior to potato planting
- soil erosion loss by water to be 18 to 27-times lower between potato planting and hilling operations
- improved plant moisture conditions from reduced runoff and evapotranspiration.
- improved average potato yield of 10 %
- no significant effect on the incidence of common scab or rhizoctonia
- decreased tillage costs of $ 35 to $ 50/acre

Need for this Long Term Study

Producers saw the need to have a long term on-farm field study on the effect of RM tillage on the incidence and severity of common scab in their crop, since observations suggested there was a possible link. In this study, both spring and fall plowing (SP and FP) are being compared to RM tillage for several crop rotations. Each time potatoes are planted on these farms, tillage treatments will be repeated in exactly the same plot, to see if long term RM treatments will affect disease incidence or severity. Other data collected include potato yield and quality, surface residue levels, and soil nutrients and organic matter.

Description of Plots

This study started in 2004 and two sites are being established each year. Each tillage treatment (SP, FP and RM) is replicated four times for a total of 12 plots per farm or site. Each plot is approximately 30 feet wide and 120 feet in length. Potato varieties have included Russet Burbank and Yukon Gold in 2004, and Fabula and Goldrush in 2005. Typically Russet Burbank, Fabula and Goldrush are reported to be somewhat resistant to common scab while Yukon Gold is reported to be susceptible.

Observations

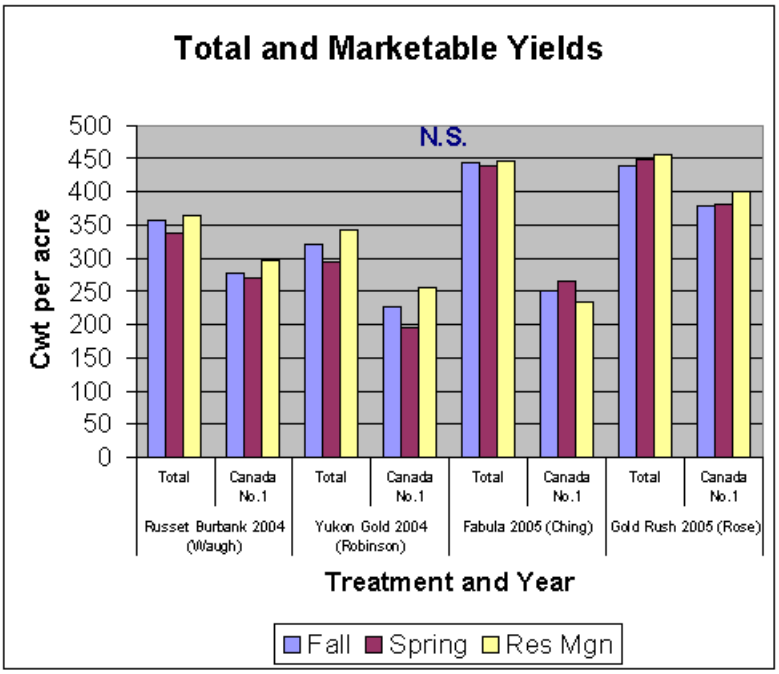
Yield:
Yield samples were collected approximately a week before harvest and were based on the mean tuber weight arising from 10 plants harvested from each of two rows in each plot.

Statistically, there were no significant (n.s.) differences in tuber yields at any of the four sites. In three of the four sites, the marketable yields in the RM plots were higher (6 % to 20 %) than the SP and FP plots; the total mean yields in RM plots at all four sites were higher (2 % to 16 %) than the SP and FP plots. The Robinson (2004) site did not have FP plots - all plots that year were SP or RM.

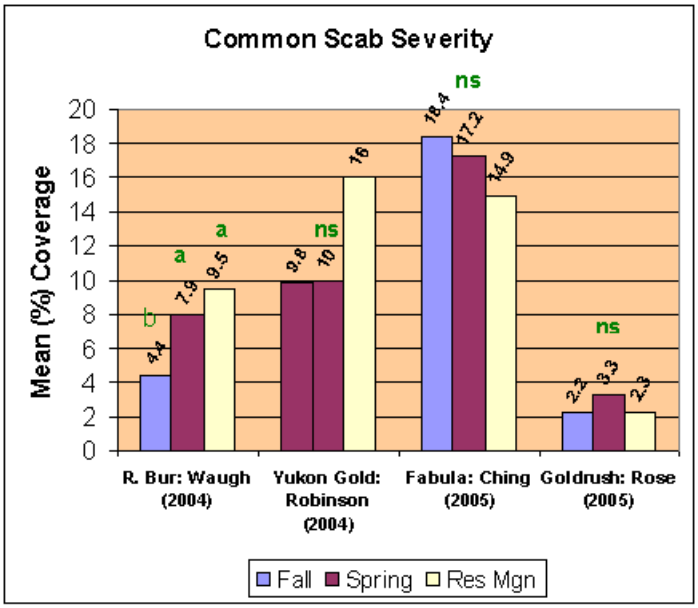
Common Scab:
Tubers obtained from each of the 12 plots per farm were rated for common scab. In the graph, the disease severity values represent the mean percent of tuber surface covered with scab lesions based on rating 50 Canada No.1 tubers from each of 12 plots per farm.

Statistically there were no significant differences (n.s.) in the common scab severity among tillage treatments at the Robinson (2004), Ching (2005) or Rose (2005) sites. The Robinson (2004) site did not have FP plots - all plots that year were SP or RM. There was however a significant difference among treatments at the Waugh 2004 site; tubers from FP plots had significantly less disease than tubers from SP or RM plots.

None of the rated potatoes had deep pitted or powdery scab lesions or black scurf.



Culls: < 38.1 mm or > 114.3 mm
Small: 38.1 mm to 50.8 mm
Canada No.1: 50.8 mm to 88.9 mm
Large: 88.9 mm to 114.3 mm



Conclusion

Studies will continue to determine the long-term impact of residue management on the severity of common scab in potatoes.

For more information on residue management or this study, please contact the PEI Soil and Crop Improvement Association at (902) 887-2535.