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- **Right Product**
- **Right Rate**
- **Right Time**
- **Right Place**
- **Closely related to Nutrient Management Planning, etc**

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May not always be

- **Most convenient**
- **Least expensive (on a per acre basis)**

Should always be

- **Softer on environmental footprint**

Might be….more profitable?

Objective – to demonstrate 4R approach to profitable and sustainable potato production on PEI

Note: No “current” template to work from

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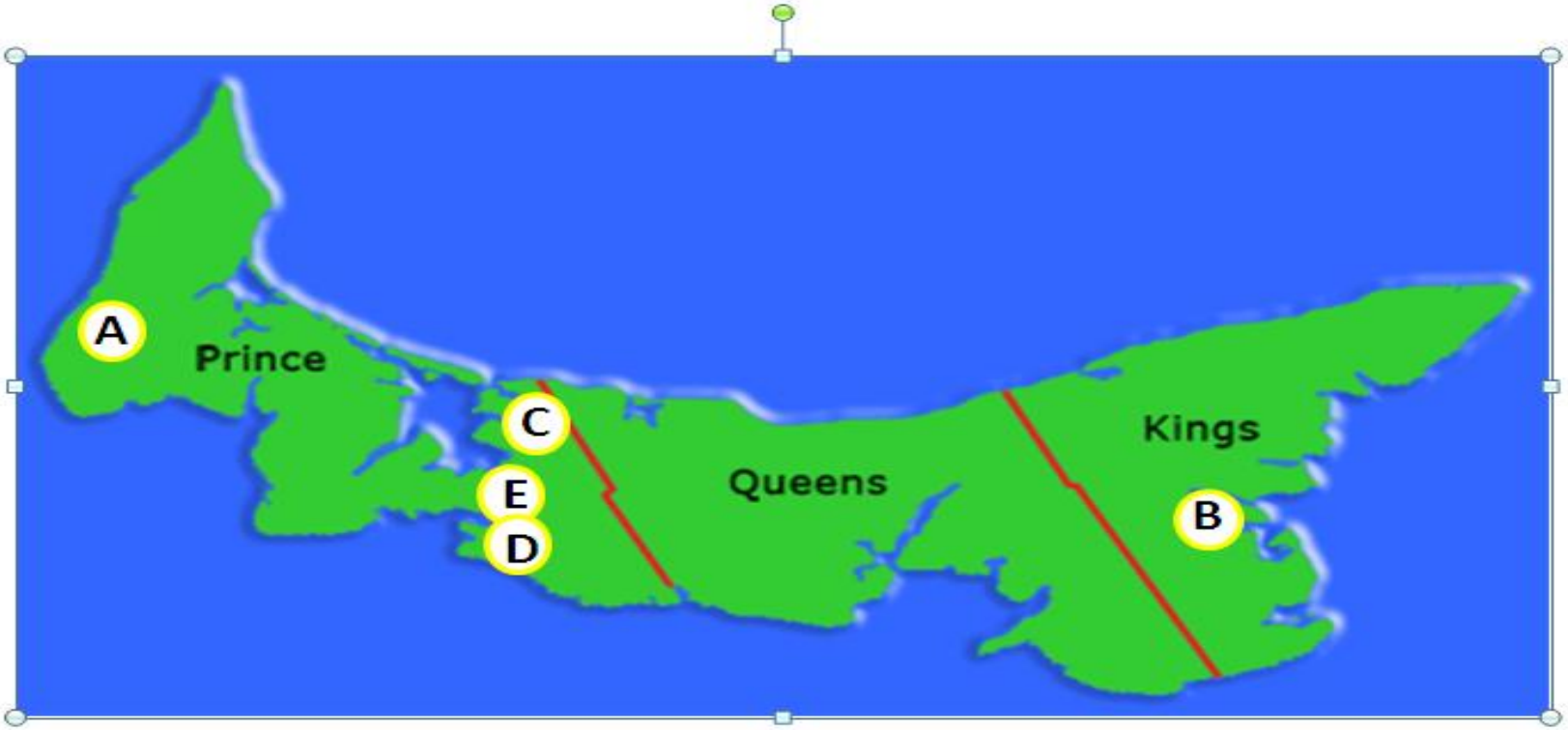
In 2013….5 Sites Across PEI



2 Russet Burbank – irrigated
2 Shepody, 1 Ranger Russet

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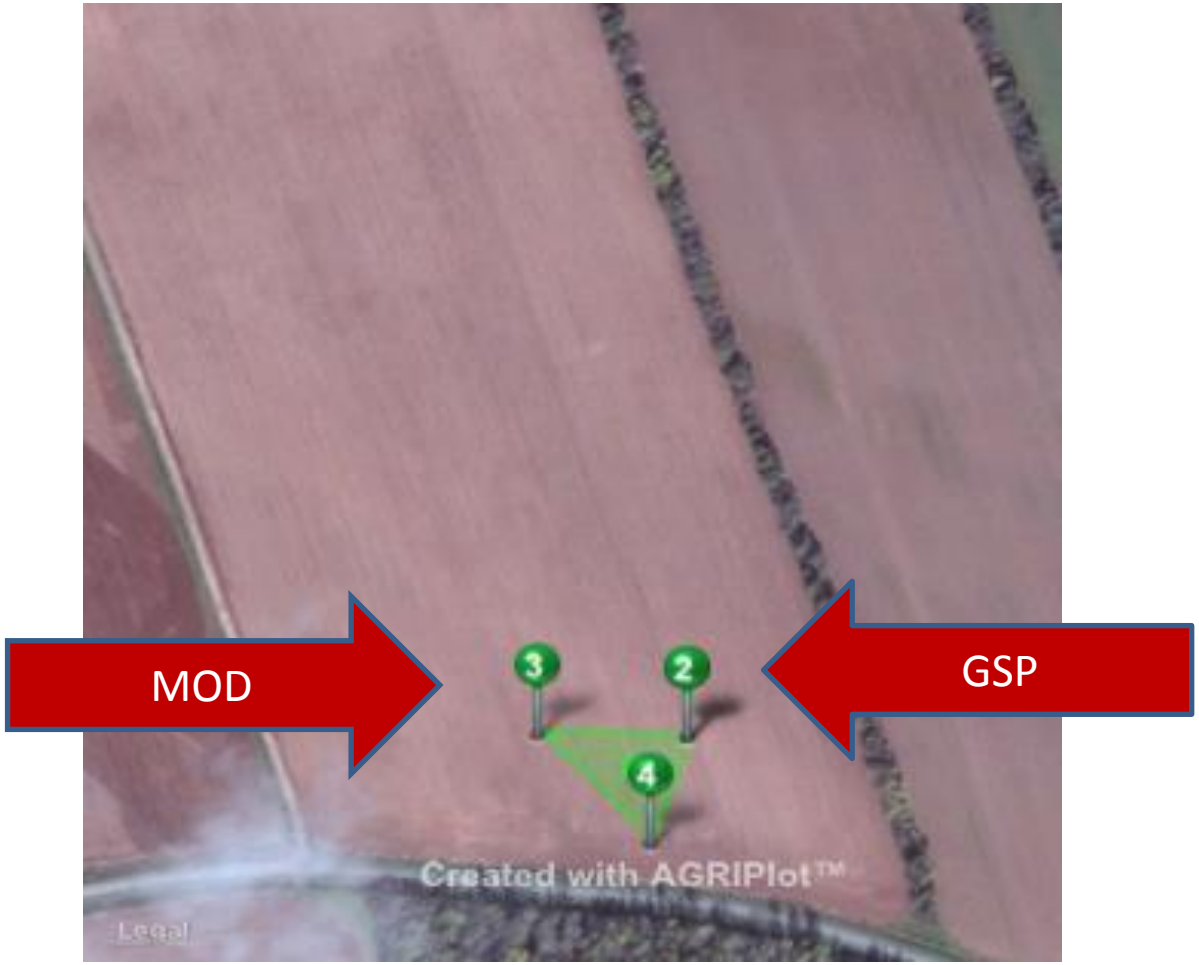
What was done….

- Identify participating growers
- Review field inventory & select field > 25 acres in size – grower selected variety (min 10 acre Mod)
- Review current soil test report
- Prepare “Modified” fertilizer program to compare with the growers’ GSP (grower standard program) fertilizer strategy and review with grower
- Prior to planting, establish GPS sites in close proximity to each other and collect soil samples at 6, 12 and 18” depths from areas where the Mod and GSP programs will be implemented to establish benchmark soil fertility information

2013 CFI4R Site
Brian & Scott Annear
Brudenell PE



Features of Mod programs

- Reduction in N at three sites – N remained similar at other two.
- N was split applied as two or three (RB) applications and sourced from various products including Urea, Ammonium Nitrate, Calcium Ammonium Nitrate and the two P2O5 sources (DAP or MAP)
- Reductions of P2O5 at all sites (31-65 lbs/acre)
- K2O adjusted up 16-96 lbs or down 42-78 lbs depending on soil test values
- Portion of N (from urea) and K20 (from KCl) broadcast and incorporated prior to planting

Features of Mod programs (cont'd)

- All KCl removed from planter mix – replaced with SOP
- Mg levels increased to deliver additional Mg to crop – all via planter mix
- B and Zn added as deemed necessary from soil test report
- Growers were encouraged not to use any foliar fertilizer products without prior consultation

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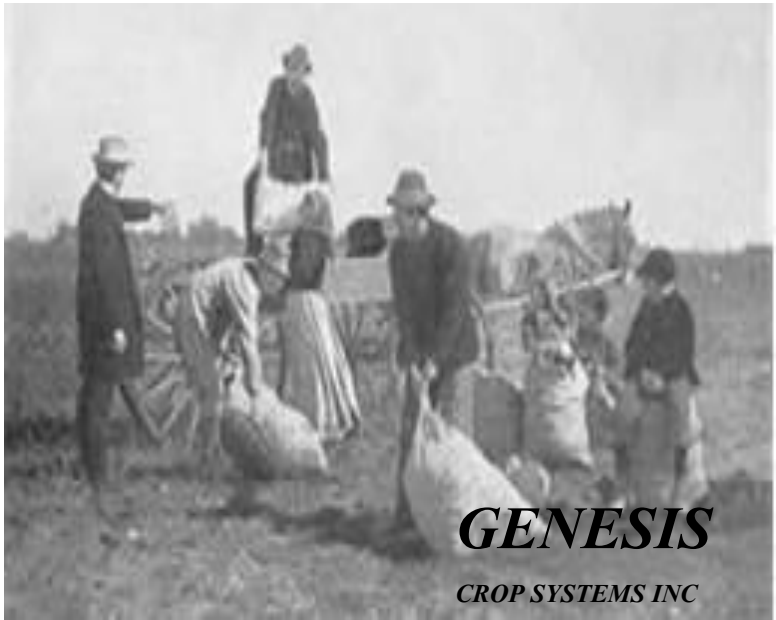
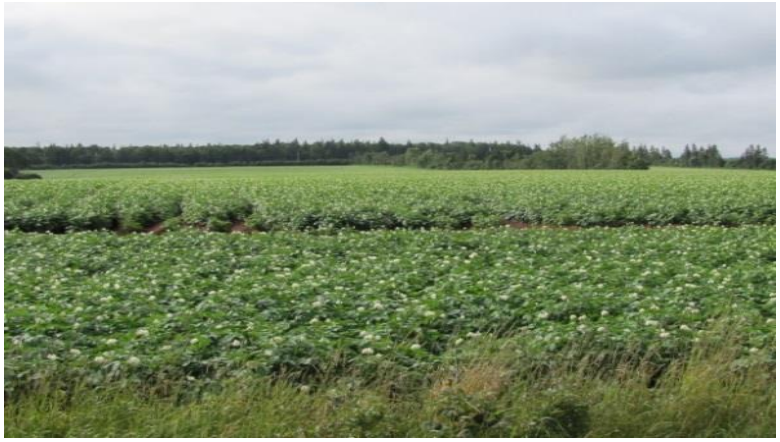
What was done….

- Lab services provided by PEI Soils Lab
- Grower arranged for supply/application of all nutrition products
- At time of full row closure…return to GPS sites and repeat soil sampling at the three depths for each treatment. Also, collect petiole and “whole plant” foliar samples for laboratory analysis
- Prior to commercial harvest, hand harvest 6 X 15’ strips from each treatment in each field – same amount of plants harvested each time



What was done….

- Two 6-8 tubers were collected from each plot and combined to form a composite 12 tuber sample, then submitted to the lab for NO3 and mineral analysis
- Remaining tubers were delivered to the Central Grading facility at Cavendish Farms for yield and french fry quality assessment and establishment of gross crop values
- Crop values were then adjusted to reflect the incremental (or negative) change in the cost of the fertilizer program for each treatment at each location



What was done….

- Post harvest soil sampling similar to the pre plant and mid season events
- Nutrient balance sheets were constructed for each treatment at each location reviewing total N, P_2O_5 and K_2O added, amount removed in tubers during harvest and amount left in the soil for ???? (subsequent crop use, leaching, etc)

SO WHAT???

- In Shepody* and Ranger, no noticeable difference in crop emergence, vigor, foliage color or days to senescence from either treatment
- In Burbank, however, Mod treated plants were slower to reach full canopy, remained paler green in color for majority of the growing season and senesced earlier than the GSP treated plants at both sites
- No consistent differences observed regarding mid season petiole/whole plant nutrient content values from either treatment at any site

Shepody
Brudenell Site
July 8, 2013

Shepody*
Springfield
West site
Sept 5, 2013

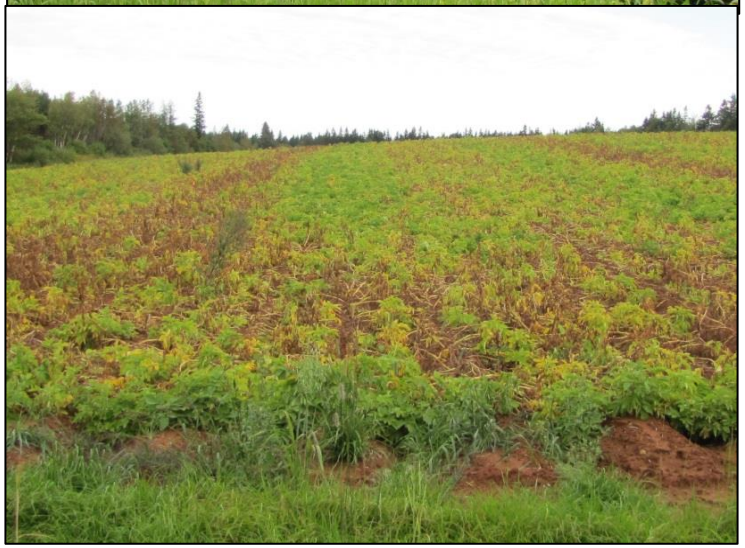


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Table 1. 2013 PEI CFI 4R Potato Fertility Trials: Yield and Crop Return Summary

Grower	Variety	Fertility Program	Total Yield	Smalls	> 10 oz	URK[1]	Total Defects	Pay Weight	Specific Gravity	Gross Return[2]	Incremental Cost	Net Change Crop Value
			(cwt /acre)	%				(cwt/ acre)		($/acre)		
A[3]	Shep	GSP	310	14.7	29	0.9	9.1	295	1.085	2764	-	-
A	Shep	Mod	274	14.3	28	0.7	9.2	263	1.089	2439	64	-389
B	Shep	GSP	276	19.1	20	0.5	4.2	273	1.088	2441	-	-
B	Shep	Mod	300	14.5	32	0.8	6.3	293	1.089	2797	54	302
C	RR	GSP	279	17	36	0.3	5.2	276	1.083	2485	-	-
C	RR	Mod	314*	19.5	29	0	4	309	1.087	2829	-28	372
D	RB	GSP	312	27.3	25	5.4	7.5	300	1.079	2290	-	-
D	RB	Mod	334*	31.5	15	1.3	3	331	1.083	2549	-63	322
E	RB	GSP	271	20.2	30	6.1	12.4	257	1.076	2161	-	-
E	RB	Mod	320*	19	31	4.3	9.3	303	1.081	2592	45	386

[1] Unusable roughs and knobs

[2] Gross return value is based on period 11D delivery price.

[3] Grower A data is for crop production information only. Fertilizer application variability on part of the modified section of the field does not allow for a balanced comparison of fertilizer program treatments

[4] Approximate incremental fertilizer cost

* denotes a mean total yield significantly greater between treatments, at a 90% significance level (p-value =0.1).

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Table 3. 2013 PEI CFI 4R Potato Fertility Trials: Nutrient balance sheet.

Grower	Variety	Fertility Program	Total Yield (lbs/acre)	Nutrients applied (lbs)			Nutrients removed (lbs)			Nutrient Balance (lbs)		
				N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
A[1] # 1	Shep	GSP	31000	156	168	204	112	33	167	44	135	37
A # 2	Shep	Mod	27400	160	120	300	104	32	154	56	88	146
B # 9	Shep	GSP	27600	182	161	206	116	33	139	66	128	67
B # 10	Shep	Mod	30000	180	120	222	115	48	172	65	72	50
C # 7	RR	GSP	27900	183	209	302	96	30	156	87	179	146
C # 8	RR	Mod	31400	164	144	224	107	32	168	57	112	56
D # 5	RB	GSP	31200	200	196	315	109	30	148	91	166	167
D # 6	RB	Mod	33400	180	150	250	107	30	155	73	120	95
E # 3	RB	GSP	27100	203	151	242	100	30	142	103	121	100
E # 4	RB	Mod	32000	180	120	200	107	30	174	73	90	26

[1] Grower A data is for crop production information only. Fertilizer application variability on part of the modified section of the field does not allow for a balanced comparison of fertilizer program treatments

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2013 CFI 4R Fertilizer Trials

Change in parameter Vs GSP

Site	Total Yield	Defects	Sp Gr	Pay Wgt	Net Return	Residual NPK
A					↓	
B	↑	↑	↑	↑	↑	↓
C	↑	↓	↑	↑	↑	↓
D	↑	↓	↑	↑	↑	↓
E	↑	↓	↑	↑	↑	↓

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2013 CFI 4R Fry Colors

Site	GSP	Modified	
A	59 0	59 0	
	1 1	1 3	
B	50 0	56 0	
	8 1	4 1	
	2 2		
C	60 0	60 0	
D	60 0	58 0	
		2 1	
E	54 0	54 0	
	5 1	6 2	
	1 4		

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Going forward……

- Continue work in 2014; looking for repeatable results
- Additional sites
- Is the way we feed our crop having a negative effect on crop performance?

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Thanks to……

Staff from PEIDAF

Cavendish Farms Research Division

Cavendish Farms Central Grading

Barry Murray

Hunter Farms

Brian Annear

Willard Waugh & Sons

MacLennan Propertries

Birch Farms

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