

Fertility Tables for Potatoes

Daniel Savoie, Charles Karamangingo,
Walter Brown, Kyle MacKinley and Pat Toner

NB Soil & Crop AGM - Woodstock

Thursday, February 24th

- 1:00 pm** **WELCOME:**
*Maarten van Oord, President
 NBSCIA
 Cedric MacLeod, President
 Carleton Co. S&C*
- 1:15 pm** **What is on a Soil Analysis Report ?**
*Tom Bruulsema, Director,
 Northeast Region, International
 Plant Nutrition Institute*
- 2:15 pm** **Soil Health**
*Heather Darby, University of
 Vermont Extension*
-
- 3:00 pm** **BREAK & VISIT BOOTHS**
-
- 3:30 pm** **A look at Potassium Nutrition for Potatoes**
*Peter Sexton, South Dakota State
 University*
- 4:15 pm** **Effect of Liming on the soil P:Al Ratio and P Fertilizer Recommendation in Potato**
*Nicolas Samson, University of
 Laval*
- 4:45 pm** **Cover Crop Options for New Brunswick**
*Steve Groff, Tillage Radish
 Solutions*
- 5:15 pm** **QUESTIONS & WRAP UP**
- 6:00 pm** **HOSPITALITY SUITE**
- 7:00 pm** **NBSCIA FARM OF THE YEAR AWARD BANQUET**
Sponsored by: Pioneer

Friday, February 25th

- 8:30 am** **Door Prizes**
- 8:45 am** **Role of Nitrogen in Crop Production**
*Pat Toner & Walter Brown,
 NBDAAF*
- 9:30 am** **Tillage Options for Transitioning to a Reduced Tillage Production System**
Dave Dum, Brinkley and Hurst
-
- 10:15 am** **BREAK & VISIT BOOTHS**
-
- 10:45 am** **Role of Micro Nutrients in Crop Production**
Medhi Sharifi, NSAC
- 11:30 am** **New Brunswick New Fertility Table & Phosphorus Research Update**
*Daniel Savoie, Pat Toner, Walter
 Brown, NBDAAF*
-
- 12:00 pm** **LUNCH & VISIT BOOTHS**
-
- 1:15 pm** **Calcium and Phosphorous Management in Potatoes: McCain Research Farm Update**
*Gilles Moreau, McCain Research
 Farm*
- 2:00 pm** **Nutrient Alternatives**
Pat Toner, NBDAA
- 2:45 pm** **Wrap Up**

3:15 pm

NBSCIA Board of Directors'
 Meeting (if necessary)

Accommodations:

Best Western Woodstock

**1-888-580-1188 or
 328-2378**

*Please mention that you are with
 Soil & Crop*

Presentation Overview

- Changes to acceptable pH range for potatoes;
- Update of nitrogen recommendations for potatoes and potential credits;
- Soil testing as an index, it is not absolute ;
- Current recommendations for P and were most NB soils test;
- P chemistry in soil basics;
- Quebec P/Al ratio concept for P fertilizer recommendations;
- Potential relationship between P(ppm) & P/Al;
- How NB soil tests would look under a potential P/Al system;
- Examples of Maritime Provinces recommendations under P (ppm) for Russett Burbank and Shepody;
- More detailed look at P fertilizer recommendations as compared to other jurisdictions and NB's final recommendations after consultation;
- Typical crop removal rates assumptions for P used across jurisdictions;
and
- Next Steps.

Table 2. Optimum pH ranges for common New Brunswick crops (adapted from Atlantic Agriculture Publications No. 100 and 1400).

Crops	Optimum pH	Crops	Optimum pH	Crops	Optimum pH
<i>Fruits</i>		<i>Forages</i>		<i>Vegetables ct'd</i>	
Apples	5.5-6.5	Pasture	6.0-6.5	Celery	6.5-6.8
Blueberries	4.5-5.5	Grass	6.0-6.4	Cole Crops	6.0-6.5
Strawberries	4.5-5.5	Alfalfa	6.2-7.0	Sweet Corn	6.0-6.8
	5.0-6.5	Clover	6.2-7.0	Cucumbers	6.0-6.8
		Silage Corn	6.0-6.5	Lettuce	6.0-6.8
		Lupins	6.0-7.0	Onions	6.5-6.8
		Soybeans	6.0-7.0	Parsnips	6.5-7.0
				Peas	6.0-6.5
				Potatoes	5.5-6.0
				Pumpkins	6.0-7.0
				Radish	7.0
				Rhubarb	6.0-6.8
				Spinach	6.5-6.8
				Tomatoes	6.0-6.5
				Turnips	6.0-7.0
<i>Cereals</i>		<i>Vegetables</i>			
Wheat	6.0-7.0	Mixed Vegetables	6.0-6.5		
Barley	6.0-7.0	Asparagus	6.0-6.8		
Oats	6.0-7.0	Beans	6.0-6.8		
Buckwheat	5.5-7.0	Beets	6.2-6.8		
Canola	6.0-7.0	Carrots	6.0-6.8		

Editorial change to ph
for potatoes from 5.5
to 6 to 5.5 to 6.5, 21
Jan 11



AZOTE / NITROGEN:

Recommandation actuelle / Actual recommendation

Variété - utilisation	Taux (kg/ha)	Variété - utilisation	Taux (kg/ha)
Pomme de terre (en général)	135	Russet Burbank – transf.	185
Chieftain – semence	145	Russet Burbank – semence	165
Chieftain – table	145	Russet Norkota – semence	170
Green Mountain	145	Russet Norkota – table	195
Katahdin – semence	145	Sebago	145
Katahdin – table	145	Shepody – transformation	150
Kennebec – semence	145	Shepody – semence	135
Krantz – transformation	165	Snowden – transformation	200
Krantz – semence	165	Snowden – semence	168
Krantz – table	165	Snowden – table	200
Norland – semence	135	Superior – transformation	135
Norland – table	135	Superior – semence	135
Netted Gem	170	Superior – transformation	135
Red Pontiac	145	Yukon Gold	145

NOUVELLES GRILLES DE FERTILISATION/ NEW FERTILIZATION TABLES

AZOTE / NITROGEN: Nouvelle recommandation / New

Table 1. Base values for different potato varieties

<u>Variety</u>	<u>Base value kg N/ha (lb N/ac)</u>
Russet Burbank	208 (185)
Shepody	180 (160)
Russet Norkotah*	200 (180)
Superior	190 (170)
Snowden	200 (180)
Goldrush	190 (170)
Early table	135 (120)
Other mid-season	160-180 (140-160)
Other late season	180-200 (160-180)
Other low N requirement	135-160 (120-140)

*For standard clone, reduce value for new clonal selections

AZOTE / NITROGEN:

Nouvelle recommandation / New

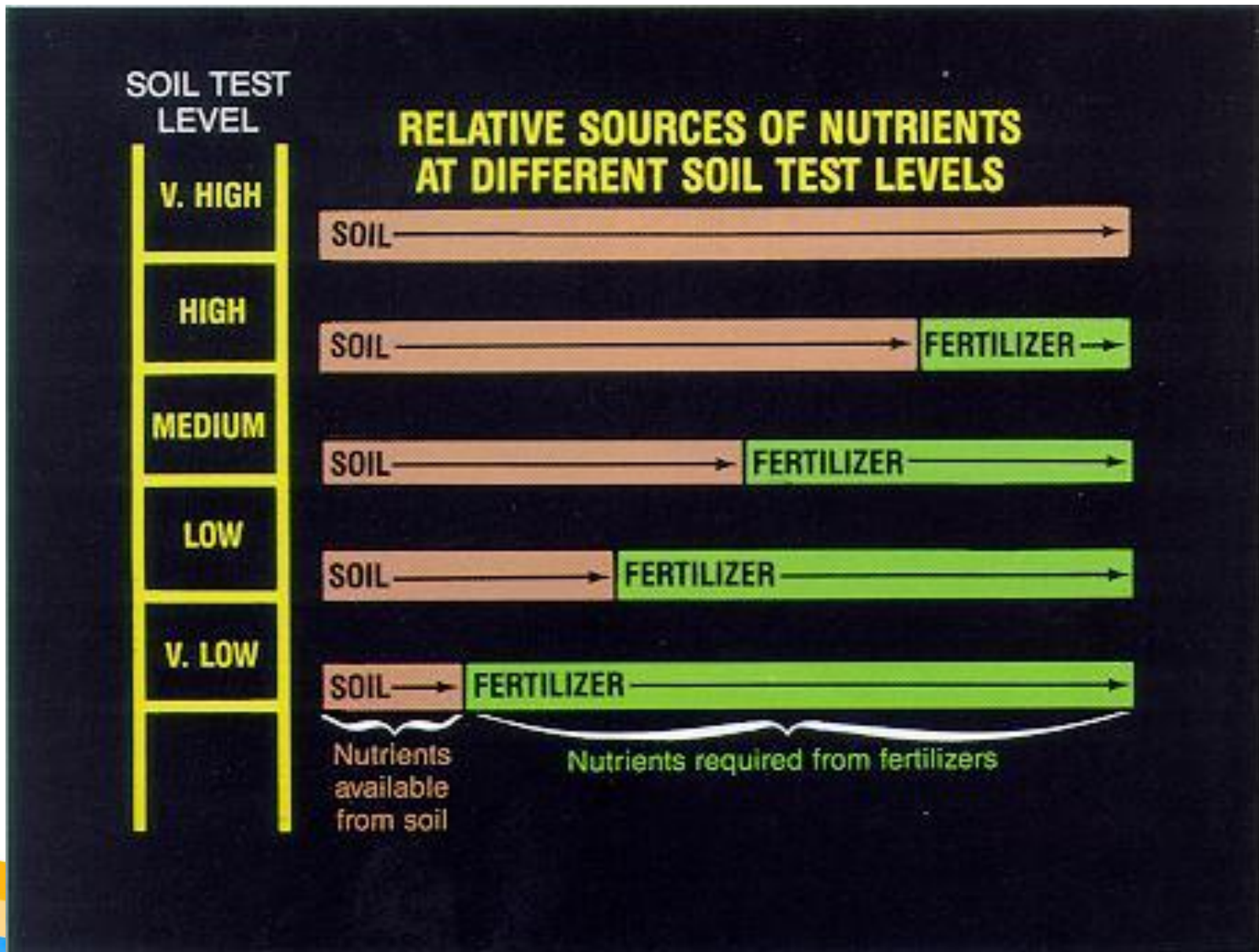
AJUSTE SELON:

- Crédit du fumier
- Crédit ou débit selon la culture précédente
- Crédit si matière organique > 3.5%
- Date de semis
- Semences

ADJUST ACCORDING

- Credit from manure
- Credit or debit from crop grown previous year
- Credit soil organic matter content if > 3.5%
- Seeding Date
- Seeds

Soil Testing is an index, not absolute

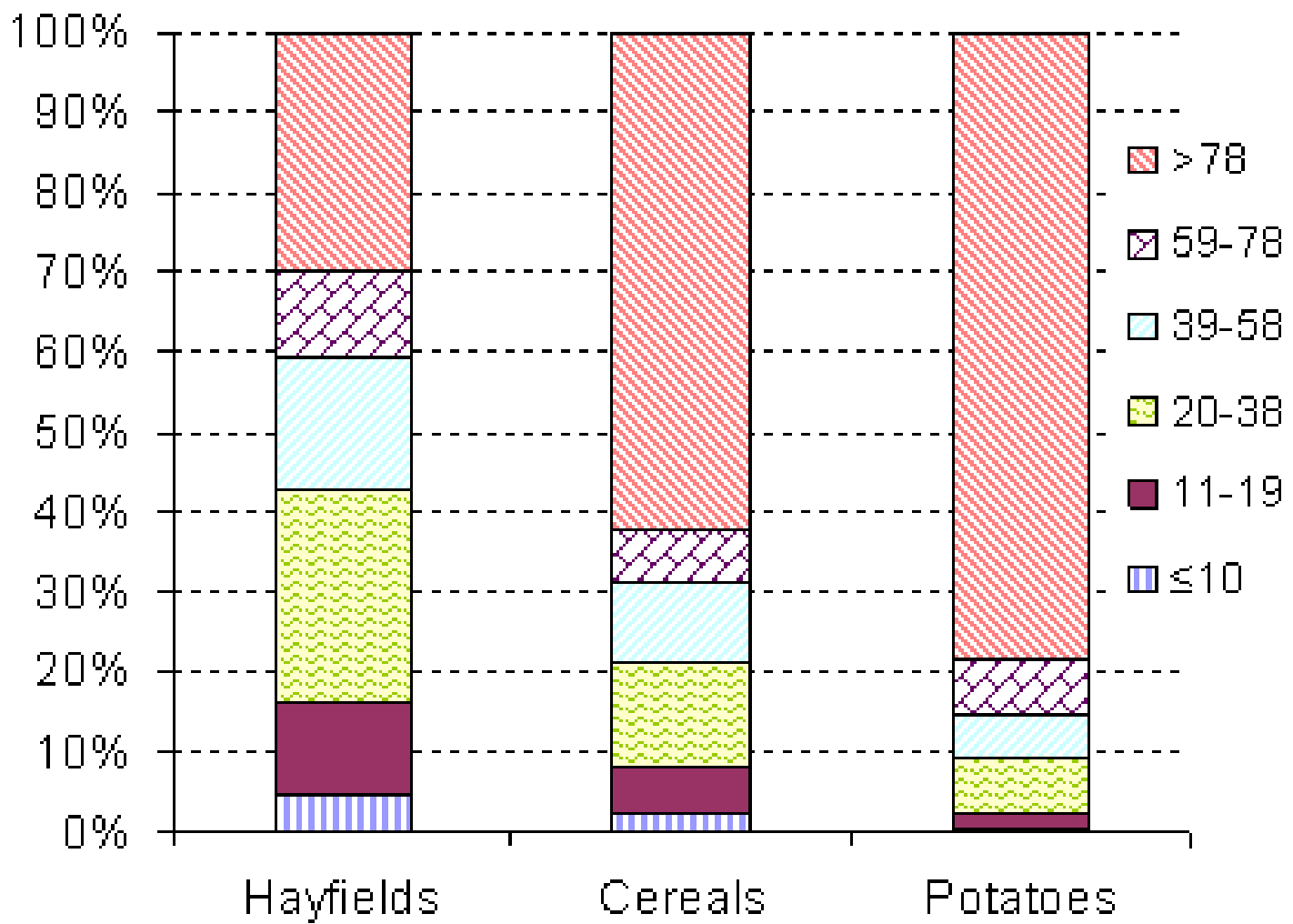


PHOSPHORE / PHOSPHORUS (P, P₂O₅): Recommandation actuelle / Actual recommendation:

Cote	Niveau de P dans le sol	Teneur du sol en P (ppm)	Recommandations (kg P ₂ O ₅ /ha)	
			Groupe I ⁽¹⁾	Groupe II
L-	Très faible	< 10	280	335
L	Faible	11 - 19	280	335
M	Moyen	20 - 39	220	270
M+	Moyennement élevé	40 - 58	160	210
H	Élevé	59 - 78	110	140
H+	Très élevé	> 78	97	114

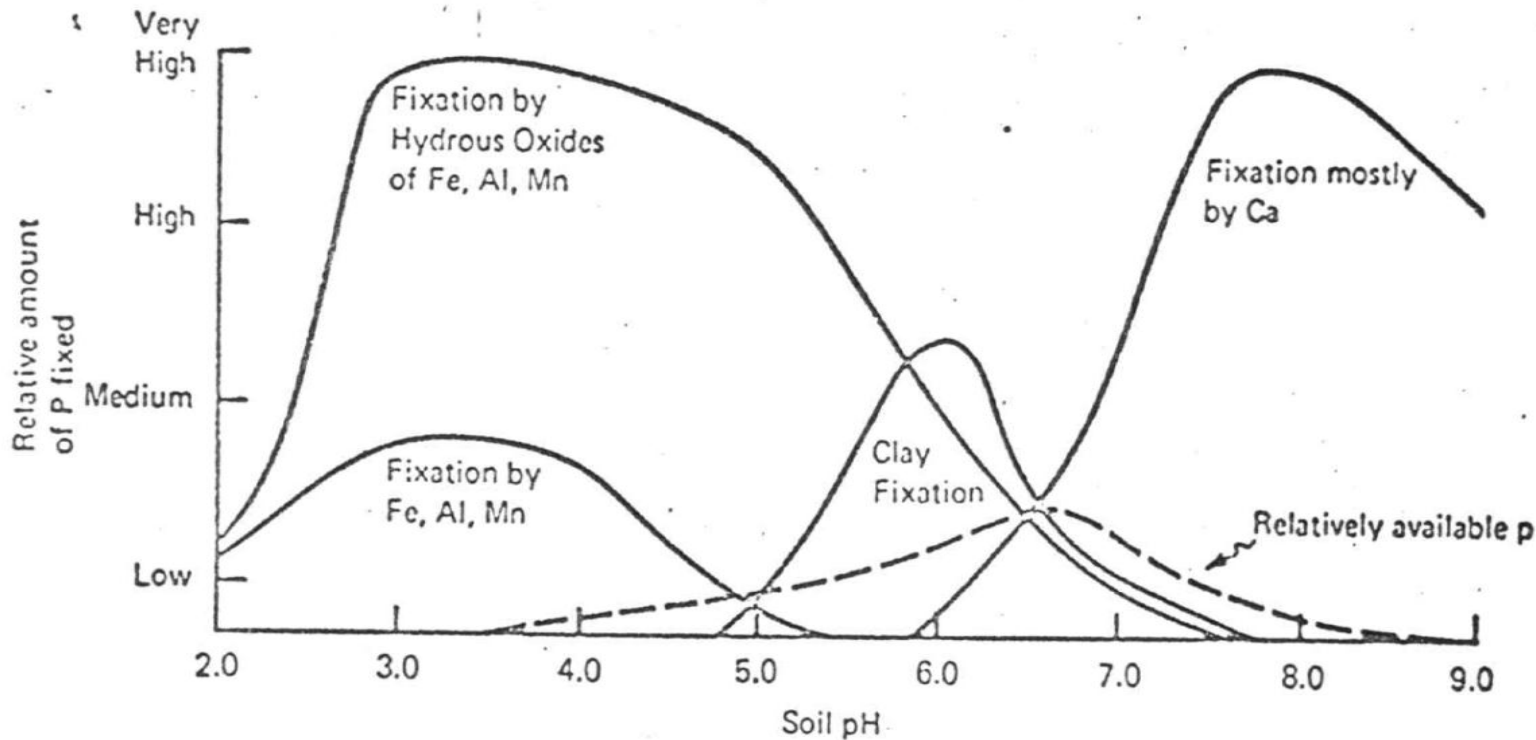
Editorial change - move to one Group of Recommendations for potatoes, 21 Jan 11


Cumulated frequencies of soils based on their phosphorus levels



Karemangingo et. Al, 2000

Some Background of P in soil



 Diagram showing the relative amount of inorganic fixation of added phosphorus at various soil pH values. This is a generalized scheme for soils as a group, and it is not to be inferred that any particular soil would have the distribution shown above.

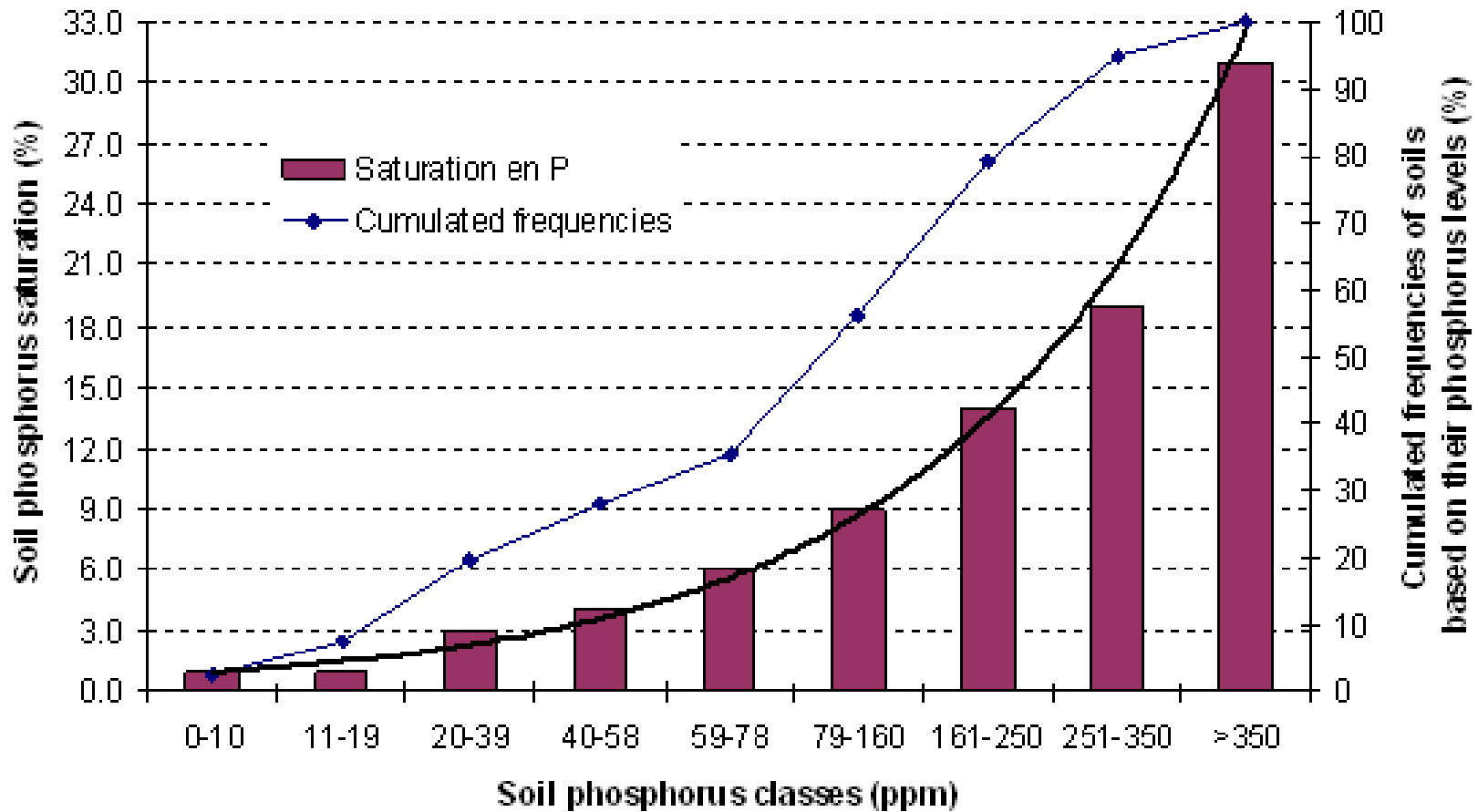
(From Lab Manual - Soils 87-200)

QUÉBEC

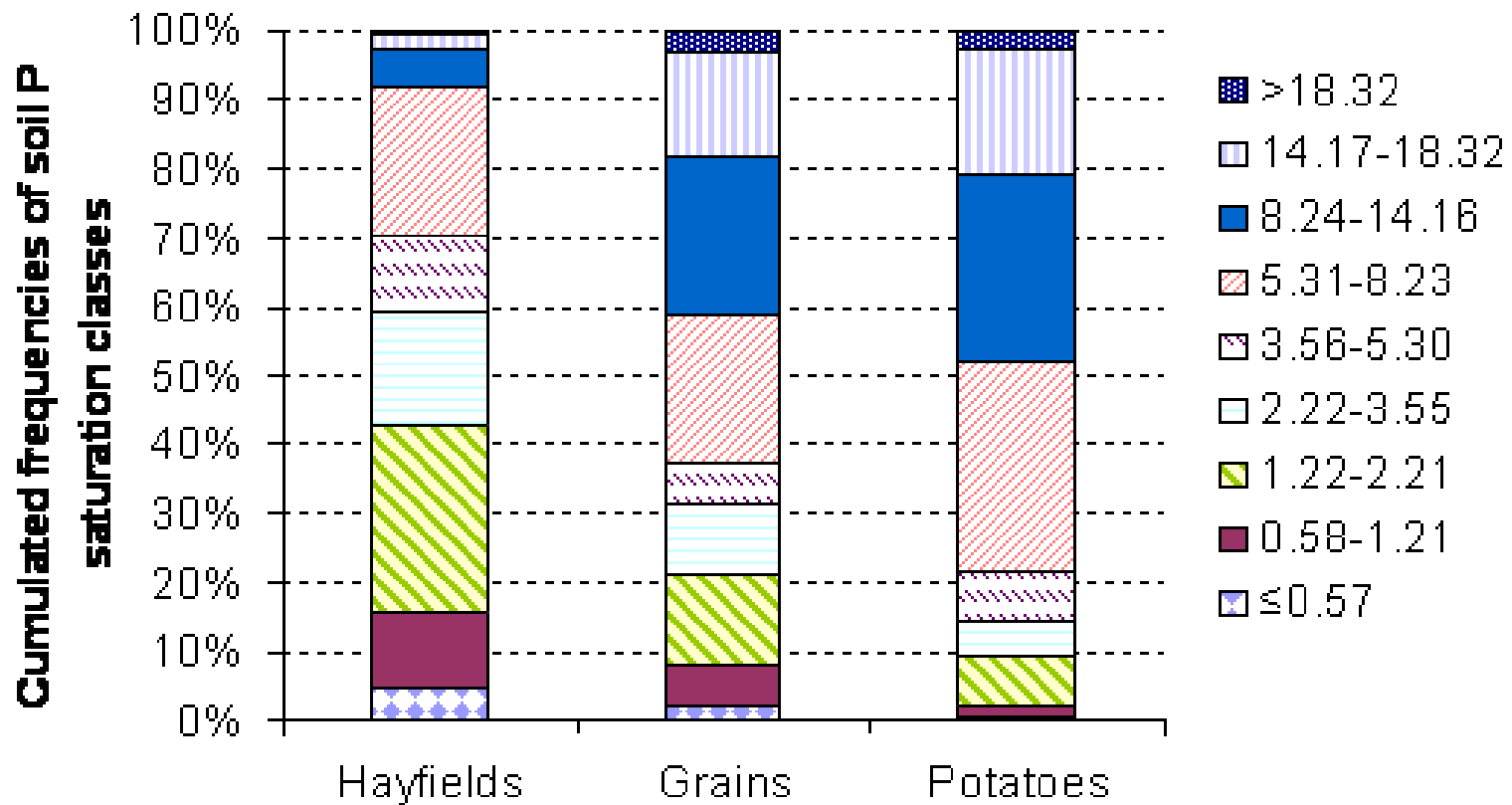
RECOMMANDATION D'ENGRAIS PHOSPHATÉ SELON LA CLASSE DE FERTILITÉ / PHOSPHORUS FERTILIZER RECOMMENDATION ACCORDING TO THE FERTILITY LEVEL

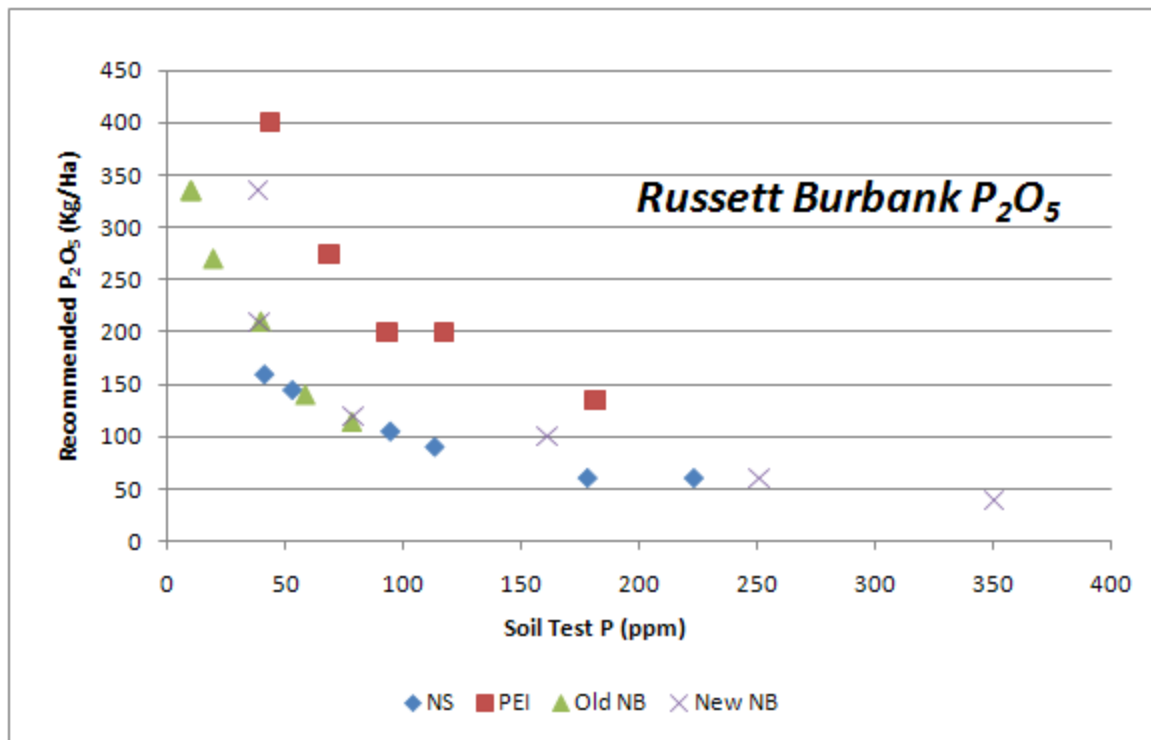
(P/AI) M-III	Recommandation (kg P ₂ O ₅ /ha)
0 - 1,4	200
1.5 - 2.9	170
3.0 - 5.9	150
6.0 - 11.9	130
12.0 - 14.9	100
15.0 - 19.9	45 - 90
20 +	30 - 45

Source: CRAAQ, 2008

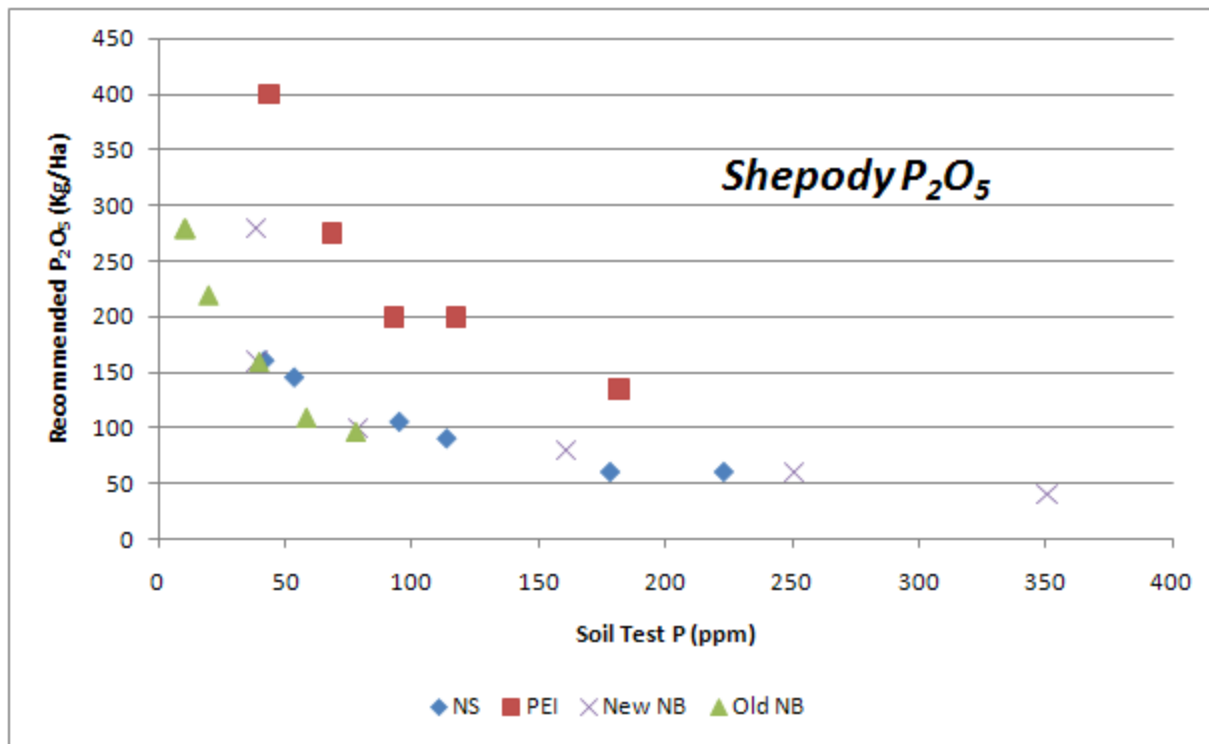


Karemangingo et. Al, 2000





Russett Burbank P ₂ O ₅										
Test	Province									
	NS		PEI		Old NB		New NB		PQ	
	Soil Test P (ppm)	Recommended P ₂ O ₅ (Kg/Ha)	Soil Test P (ppm)	Recommended P ₂ O ₅ (Kg/Ha)	Soil Test P (ppm)	Recommended P ₂ O ₅ (Kg/Ha)	Soil Test P (ppm)	Recommended P ₂ O ₅ (Kg/Ha)	Phosphorus/Aluminum Ratio (P/Al)	Recommended P ₂ O ₅ (Kg/Ha)
L- Test	42	160	44	400	10	335	38	335	0-1.4	200
L Test	53	145	69	275	10	335	39	210	1.5-2.9	170
M Test	95	105	93	200	20	270	79	120	3.0-5.9	150
M+ Test	114	90	118	200	40	210	161	100	6.0-11.9	130
H Test	178	60	181	135	59	140	251	60	12.0-14.9	100
H+ Test	223	60	182	135	78	114	350	40	15.0-19.9	45-90
									>20.0	30-45



Shepody P₂O₅

Test	Province									
	NS		PEI		Old NB		New NB		Phosphorus/ Aluminum Ratio (P/Al)	Recommended P ₂ O ₅ (Kg/Ha)
	Soil Test P (ppm)	Recommen- ded P ₂ O ₅ (Kg/Ha)	Soil Test P (ppm)	Recommen- ded P ₂ O ₅ (Kg/Ha)	Soil Test P (ppm)	Recommen- ded P ₂ O ₅ (Kg/Ha)	Soil Test P (ppm)	Recommended P ₂ O ₅ (Kg/Ha)		
L- Test	42	160	44	400	10	280	38	280	0-1.4	200
L Test	53	145	69	275	10	280	39	160	1.5-2.9	170
M Test	95	105	93	200	20	220	79	100	3.0-5.9	150
M+ Test	114	90	118	200	40	160	161	80	6.0-11.9	130
H Test	178	60	181	135	59	110	251	60	12.0-14.9	100
H+ Test	223	60	182	135	78	97	350	40	15.0-19.9	45-90
									>20.0	30-45

Jurisdictional Comparison of Soil Test Recommendations

Approx Ratings	Maine Morgan (ppm) 2011 kg/P ₂ O ₅ /ha	PEI M3 (ppm) 2011 kg/P ₂ O ₅ /ha	PQ M3 (ppm) 2003 kg/P ₂ O ₅ /ha	PQ M3 P/Al ratio 2008 % P/Al	PQ M3 P/Al ratio 2008 kg/P ₂ O ₅ /ha	PQ M3 P/Al ratio 2010 % P/Al	PQ P/Al 2010 kg/P ₂ O ₅ /ha	NB Meh3 (ppm) 2010 kg/P ₂ O ₅ /ha	NB M3 P/Al ratio 21-Jan-11 % P/Al	NB M3 P/Al ratio 21-Jan-11 kg/P ₂ O ₅ /ha
Poor-/L-	None given	400	230	0 to 1.4	200	None given	None given	335	None given	None given
Poor/L	291	275	215	1.5 to 2.9	170	0 to 2.5	200	335	0 to 3	210
M	168	200	190	3.0 to 5.9	150	2.6 to 5.0	150	270	3.01 to 6	180-210
M+	None given	200	145	6.0 to 11.9	130	5.1 to 10	150	210	6.01 to 10	150-180
Opt/Good/H	90	135	105	12.0 to 14.9	100	10.1 to 15	120	140	10.01 to 15	100-150
Abv Opt/Rich/H+	67	135	65	15.0 to 19.9	45 to 90	15.1 to 25	75	114	15.01 to 22	80-100
Excessive	None given	None given	30	20+	30 to 45	25.1+	50	n/a	22+	60-80

P/AL ratio 15% or greater = environmentally critical level on soil in PQ.

Range reason! - Regs

Crop Uptake Comparison

- PQ P/Al trials based on average yield of 375 cwt/ac tuber removal of 64 lbs P₂O₅/ac (Parent, et al, 2000);
- USDA tubers and vines 0.17 lbs/cwt or equivalent to PQ but including vines (Murrell, 2005); and
- Me yields from 350-400 cwt/ac 34-69 lbs P₂O₅/ac in both tubers and vines (Porter and Ocaya, 2010).
- Note all are very close in uptake.

Next Steps

1. Determine how new recommendations could be incorporated into soil test reports for Spring 2011;
2. Update industry on new general recommendations; and
3. Update fertility guide and info sheet to lab clients.