C2021-0033-Y2: New Brunswick Forage 4R Nutrient Stewardship

The objectives of the project are to engage producers to use a 4R nutrient stewardship approach to forage production and determine the cost to grow a tonne of high-quality forage on NB livestock farms.

Project Deliverable(s):

- Compare forage yields using a farms standard practice to a 4R approach
- Compare forage quality using a farms standard practice to a 4R approach
- Compare the COP of a farms standard practice to a 4R approach
- Determine an average COP for a tonne of high quality forage on NB livestock farms.

New Brunswick Forage 4R Nutrient Stewardship – 4R fertilizer recommendations were provided to the six co-operators in the spring of 2021. Each co-operator was responsible for applying the prescribed rate to the ap-propriate side of the trial field. NBSCIA staff collected yield measurements and samples for quality analysis at the time of first and second harvest.

Dry matter yields varied between sites (Figure 1) but tended to favor the 4R treatment. When averaged across sites, there was 1.8 MT/ha of dry matter advantage with the 4R program. Since several factors contribute to yield, the research team will need to collect background information on the stand (ex. type of species and age of the stand) and examine the soil nutrient status of each site to fully understand the yield variation between sites and the fertilizer programs.

A simple cost comparison between the 4R program and the farms standard practice is shown in Figure 2. A modest value for the forage was assumed (10 cents per dry matter pound, the value used for the 2021 Hay West program). When averaged across sites, there was virtually no difference in the cost of the two programs.

It should be noted that the ROI shown for the Chignecto and Kings locations may be a bit skewed. A manure application was not account for at the Chignecto site which would have decreased the cost for fertilizer for the 4R treatment and improved the ROI. Due to a management change at the Kings site, a second fertilizer application was not made which should have been, and this would have decreased the ROI at this site. It is thought that if these slight changes had been made, that the average ROI would have stayed approximately the same.

C2021-0033-Y2: Gestion des éléments nutritifs 4R du Nouveau-Brunswick

Les objectifs du projet sont d'inciter les producteurs à utiliser une approche de gérance des nutriments 4R pour la production de fourrage et de déterminer le coût de la culture d'une tonne de fourrage de haute qualité dans les fermes d'élevage du Nouveau-Brunswick.

Livrable(s)du projet:

* Comparer les rendements fourragers en utilisant une pratique standard des fermes à une approche 4R
* Comparer la qualité du fourrage en utilisant une pratique standard des fermes à une approche 4R
* Comparer la COP d'une pratique standard des fermes à une approche 4R
* Déterminer un COP moyen pour une tonne de fourrage de haute qualité dans les fermes d'élevage du N.-B.

Intendance des éléments nutritifs du fourrage 4R du Nouveau-Brunswick - Les recommandations sur les engrais 4R ont été fournies aux six coopératives au printemps 2021. Chaque coopérateur était responsable d'appliquer le taux prescrit du côté approprié du champ d'essai. Le personnel de l'AASCNB a recueilli des mesures de rendement et des échantillons pour l'analyse de la qualité au moment de la première et de la deuxième récolte.

Les rendements en matière sèche variaient entre les sites (Figure 1), mais tendaient à favoriser le traitement 4R. Lorsqu'on fait la moyenne entre les sites, il y avait un avan-tage de 1,8 MT/ha de matière sèche avec le programme 4R. Étant donné que plusieurs facteurs contribuent au rendement, l'équipe de recherche devra recueillir des informa-tions générales sur le peuplement (ex. type d'espèce et âge du peuplement) et examiner l'état nutritif du sol de chaque site pour bien comprendre la variation du rendement entre les sites et les programmes d'engrais.

Une comparaison simple des coûts entre le programme 4R et la pratique courante des fermes est illustrée à la figure 2. Une valeur modeste pour le fourrage a été supposée (10 cents par livre de matière sèche, la valeur utilisée pour le programme Hay West 2021).

En faisant la moyenne entre les sites, il n'y avait pratiquement aucune différence dans le coût des deux programmes.

Il convient de noter que le retour sur investissement indiqué pour les emplacements Chignecto et Kings peut être un peu biaisé. Un épandage de fumier n'a pas été comptabilisé sur le site de Chignecto, ce qui aurait diminué le coût de l'engrais pour le traitement 4R et amélioré le retour sur investissement. En raison d'un changement de gestion sur le site de Kings, une deuxième application d'engrais n'a pas été effectuée, ce qui aurait dû l'être, ce qui aurait réduit le retour sur investissement sur ce site. On pense que si ces légers changements avaient été apportés, le retour sur investissement moyen se-rait resté à peu près le même.

New Brunswick Alfalfa Tissue Study

Amended Project Objectives: to ex-amine the sulfur status of New Bruns-wick alfalfa stands through tissue test-ing.
NBSCIA solicited 28 co-operators from across the province to participate in 2021. NBSCIA and DAAF staff col-lected corresponding alfalfa tissue and soil samples just prior to producers preforming first cut and again before second cut. An example of an alfalfa tissue report, and its corresponding soil sample report is shown in Appendix B.
Preliminary results show that New Brunswick alfalfa stands had tissue sulfur levels that were sufficient for proper crop growth and development even though soil sulfur levels varied. It is the hope of the project team that the survey will help identified trends in fertilizer practices that explain the data collected.
Boron (B) and Magnesium (Mg) again appeared as low or deficient in a large proportion of the alfalfa tissue sam-ples. Not as many of the samples were defi-cient in B as compared to 2020. It is believed that the increased precipita-tion received in 2021 compared to 2020 made the soil B pool more avail-able to the crop. The project team thinks that samples low in B in 2021 would have been deficient if dry condi-tions like 2020 had presented. Magne-sium, on the other hand, was low in a similar number of samples in both years. Soil Mg levels appeared suffi-cient for being able to provide ade-quate Mg to the crop, but it is evident from the tissue samples that this was not the case or possibly some other factor (i.e., nutrient interactions) lim-ited uptake. The project team will need to investigate the cause further.

Étude des Tissus de Luzerne du Nouveau-Brunswick

Objectifs modifiés du projet: examiner l'état en soufre des peuplements de luzerne du Nouveau-Brunswick par des ana-lyses tissulaires.
L'AASCNB a sollicité la participation de 28 coopérateurs de partout dans la province en 2021. Le personnel de l'AASCNB et de la FAANB a collecté les échantillons de tissus et de sol de luzernes correspondantes justes avant que les producteurs n'effectuent la première coupe et à nouveau avant la deuxième coupe. Un exemple de rapport sur les tis-sus de luzerne et son rapport d'échantillon de sol correspondant sont présentés à l'annexe B.
Les résultats préliminaires montrent que les peuplements de luzerne du Nouveau-Brunswick présentaient des niveaux de soufre tissulaire suffisants pour une croissance et un développement appropriés des cultures, même si les niveaux de soufre du sol variaient. L'équipe du projet espère que l'enquête aidera à identifier les tendances des pratiques en matière d'engrais qui expliquent les données collectées.
Le bore (B) et le magnésium (Mg) sont de nouveau apparus comme faibles ou déficients dans une grande proportion des échantillons de tissus de luzerne. Les niveaux de magnésium dans les tissus et le sol pour 2020 et 2021 sont illustrés à la figure 2.
Pas autant d'échantillons étaient déficients en B par rapport à 2020. On pense que l'augmentation des précipitations re-çues en 2021 par rapport à 2020 a rendu le pool de vitamines du sol plus disponible pour la culture. L'équipe du projet pense que les échantillons à faible teneur en B en 2021 auraient été déficients si des conditions sèches comme 2020 s'étaient présentées. Le magnésium, par contre, était faible dans un nombre similaire d'échantillons au cours des deux années. Les niveaux de Mg dans le sol semblaient suffisants pour pouvoir fournir suffisamment de Mg à la culture, mais il est évident à partir des échantillons de tissus que ce n'était pas le cas ou peut-être qu'un autre facteur (c.-à-d. interac-tions nutritionnelles) limitait l'absorption. L'équipe de projet devra enquêter davantage sur la cause.

Enabling Agricultural Research and Innovation

C2021-0033-Y2

New Brunswick Forage 4R Nutrient Stewardship

Interim Report
2021-2022

New Brunswick Soil & Crop Improvement Association
259 Brunswick Street, Suite 302
Fredericton, NB
E3B 1G8

Project Lead:
Jason Wells
Crop Development Specialist – Livestock Feed
New Brunswick Department of Agriculture, Aquaculture and Fisheries
701 Main Street
Sussex, NB
E4E 7H7

Note: Due to the restrictions imposed on NBSCIA and DAAF staff because of the covid-19 pandemic, project C2021-0033 was amended to include a New Brunswick Alfalfa Tissue Study.

***Project Objectives(s)*:** The objectives of the project are to engage producers to use a 4R nutrient stewardship approach to forage production and determine the cost to grow a tonne of high-quality forage on NB livestock farms.

Amended Project Objectives (s): to examine the sulfur status of New Brunswick alfalfa stands through tissue testing.

***Project Deliverable(s)*:** (a) Compare forage yields using a farms standard practice to a 4R approach, (b) Compare forage quality using a farms standard practice to a 4R approach, (c) Compare the COP of a farms standard practice to a 4R approach and (d) Determine an average COP for a tonne of high quality forage on NB livestock farms.

Amended Project Deliverable (s): (a) Sulfur status of New Brunswick alfalfa stands and (b) identification of other nutrient deficiencies in New Brunswick Alfalfa stands.

***Summary of Progress*:** Due to the restrictions imposed on NBSCIA and DAAF staff because of the covid-19 pandemic, project C2021-0033 was amended to include a New Brunswick Alfalfa Tissue Study.

New Brunswick Forage 4R Nutrient Stewardship – 4R fertilizer recommendations were provided to the six co-operators in the spring of 2021. Each co-operator was responsible for applying the prescribed rate to the appropriate side of the trial field. NBSCIA staff collected yield measurements and samples for quality analysis at the time of first and second harvest.

Dry matter yields varied between sites (Figure 1) but tended to favor the 4R treatment. When averaged across sites, there was 1.8 MT/ha of dry matter advantage with the 4R program. Since several factors contribute

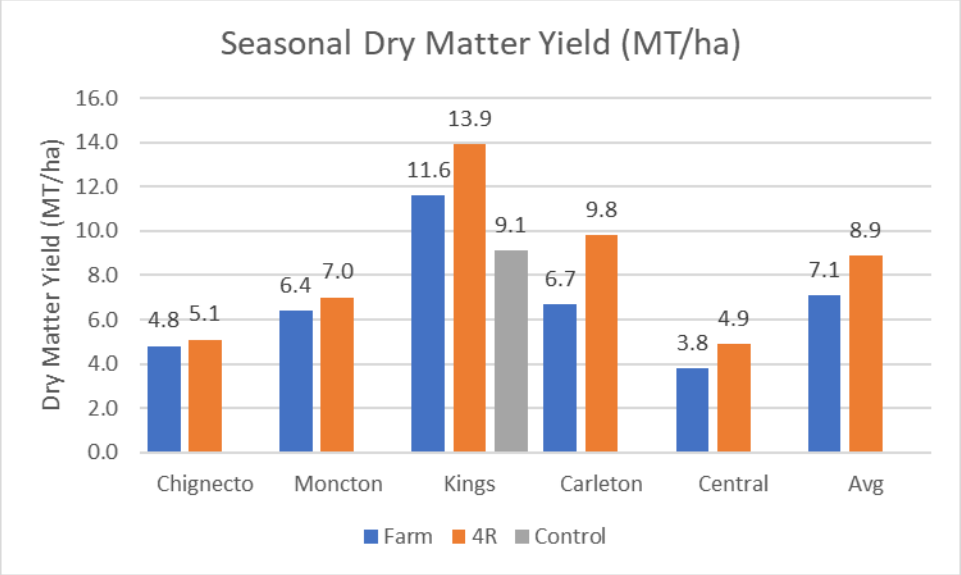


Figure 1. Dry Matter Yield

to yield, the research team will need to collect background information on the stand (ex. type of species and age of the stand) and examine the soil nutrient status of each site to fully understand the yield variation between sites and the fertilizer programs.

A simple cost comparison between the 4R program and the farms standard practice is shown in Figure 2. A modest value for the forage was assumed (10 cents per dry matter pound, the value used for the 2021

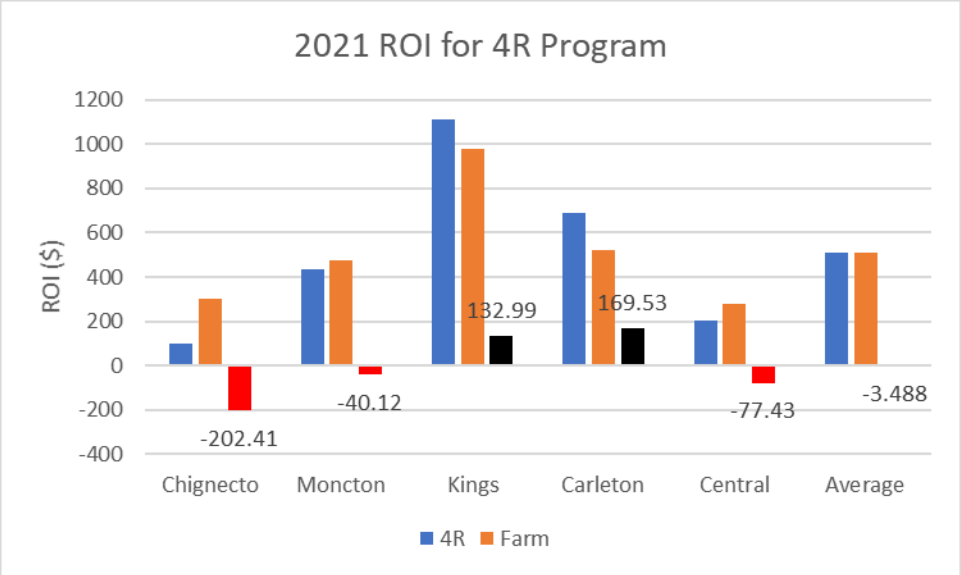


Figure 2. Return On Investment of 4R Program vs. Farm Standard Practice

Hay West program). When averaged across sites, there was virtually no difference in the cost of the 2 programs. It should be noted that the ROI shown for the Chignecto and Kings locations may be a bit skewed. A manure application was not account for at the Chignecto site which would have decreased the cost for fertilizer for the 4R treatment and improved the ROI. Due to a management change at the Kings site, a second fertilizer application was not made which should have been, and this would have decreased the ROI at this site. It is thought that if these slight changes had been made, that the average ROI would have stayed approximately the same.

New Brunswick Alfalfa Tissue Study – NBSCIA solicited 28 co-operators from across the province to participate in 2021. NBSCIA and DAAF staff collected corresponding alfalfa tissue and soil samples just prior to producers preforming first cut and again before second cut. An example of an alfalfa tissue report, and its corresponding soil sample report is shown in Appendix B.

The project team is in the process of surveying farmers as to their alfalfa management practices during the 2021 growing season to better explain the tissue and soil data that was collected. A copy of the survey is attached (Appendix C).

Preliminary results show that New Brunswick alfalfa stands had tissue sulfur levels that were sufficient for proper crop growth and development even though soil sulfur levels varied. It is the hope of the project team that the survey will help identified trends in fertilizer practices that explain the data collected.

Boron (B) and Magnesium (Mg) again appeared as low or deficient in a large proportion of the alfalfa tissue samples. Magnesium levels in the tissue and soil for 2020 and 2021 are shown in Figure 2. Not as many of the samples were deficient in B as compared to 2020. It is believed that the increased precipitation received in 2021 compared to 2020 made the soil B pool more available to the crop. The project team thinks that samples low in B in 2021 would have been deficient if dry conditions like 2020 had presented. Magnesium, on the other hand, was low in a similar number of samples in both years. Soil Mg levels appeared sufficient for being able to provide adequate Mg to the crop, but it is evident from the tissue samples that this was not the case or possibly some other factor (i.e. nutrient interactions) limited uptake. The project team will need to investigate the cause further.

The project team suggests that this work needs to be continued for at least another year, so sampling can occur under different growing conditions. Examining the data over multiples years will give a larger data set to examine and hopefully provide a clearer picture of what the trends are.

The project team is still examining the data for trends and trying to link it with survey data as seen in Figure 1.

2020 Results					2021 Results			
Sample ID	Local	Soil Mg (ppm)	Tissue Mg (%)		SampleID	Local	Soil Mg (ppm)	Tissue Mg (%)
ATS20JS1	North Shore	67	0.240		ATS21NM1	Chignecto	45	0.315
ATS20ML1	North West	90	0.268		ATS21JS1	North Shore	54	0.279
ATS20JR1	North Shore	97	0.216		ATS21ML1	North West	105	0.274
ATS20OD1	North West	98	0.334		ATS21CH1	Moncton	130	0.203
ATS20GM1	Moncton	118	0.336		ATS21CM1	Carleton	143	0.306
ATS20AB1	Central	122	0.361		ATS21GM1	Moncton	146	0.259
ATS20CD1	North West	123	0.246		ATS21MD1	North West	147	0.191
ATS20RC1	North West	123	0.319		ATS21MB1	Central	148	0.304
ATS20EW1	Kings	134	0.250		ATS21ND1	North Shore	150	0.291
ATS20TC1	Kings	142	0.262		ATS21CD1	North West	152	0.351
ATS20DW1	Moncton	145	0.215		ATS21RC1	North West	155	0.219
ATS20MB1	Central	147	0.304		ATS21DW1	Moncton	162	0.246
ATS20CML	Carleton	153	0.316		ATS21EW1	Kings	164	0.285
ATS20KG1	Carleton	163	0.344		ATS21RL1	North West	167	0.278
ATS20CH1	Moncton	168	0.307		ATS21JB1	Carleton	181	0.316
ATS20LP1	North West	175	0.423		ATS21NG1	Carleton	188	0.296
ATS20GL1	Moncton	192	0.294		ATS21MR1	Kings	190	0.355
ATS20JW1	Kings	192	0.311		ATS21JW1	Kings	194	0.329
ATS20WD1	Carleton	195	0.342		ATS21WD1	Carleton	214	0.320
ATS20KB1	North Shore	214	0.428		ATS1FW1	Kings	214	0.444
ATS20AWL	Central	218	0.356		ATS21JL1	North Shore	216	0.263
ATS20AJ1	Kings	227	0.339		ATS21AB1	Central	220	0.352
ATS20MR1	Kings	264	0.327		ATS21AW1	Central	229	0.467
ATS20JL1	North West	301	0.473		ATS21AJ1	Kings	262	0.390
ATS20EC1	Kings	323	0.393		ATS21ABnw1	North West	265	0.276
ATS20PL1	Central	341	0.350		ATS21EC1	Kings	365	0.368
ATS20AP1	Moncton	423	0.249		ATS21AP1	Chignecto	377	0.271
					ATS21PL1	Central	417	0.354

Nutrient Sufficiency Ratings (color coding)

Sufficient

Low

Deficient

Figure 2. 2020 and 2021 Soil and Tissue Magnesium Data.

***Adjustments*:** The project team asks that the same budget as Y2 be approved for Y3.

Appendix A

Soil Analysis Report
14-Oct-2020

NB Soil & Crop Imp Assoc
Ray Carmichael
2600 Route 560
Williamstown, NB
E7K 1S6

PEI Analytical Laboratories
PEI Department of Agriculture & Fisheries
23 Innovation Way
PO Box 2000, Charlottetown, PEI, C1A 7N8
Fax: (902) 368-6299
Telephone: (902) 620-3300

Client: 1607080016
Accession: S201001004
Samples Reported: 14-Oct-2020
Samples Received: 01-Oct-2020

Dean Acton

Sample Information			Soil Test Values and Ratings							
Lab Sample #	Field Number	Organic Matter (%)*	pH*	Phosphate P_2O_5 (ppm)*	Potash K_2O (ppm)*	Calcium Ca (ppm)*	Magnesium Mg (ppm)*	Boron B (ppm)*	Copper Cu (ppm)*	Salt mS/cm
1	4R20DA	3.6	7.2	91 M+	48 M	1986 H+	34 L	0.4	1.2	

Lab Sample #	Field Number	Zinc Zn (ppm)*	Sulfur S (ppm)*	Manganese Mn (ppm)*	Iron Fe (ppm)*	Sodium Na (ppm)*	Aluminum Al (ppm)*	Lime Index*	Nitrogen N (%)	Nitrate-N NO -N (ppm)
1	4R20DA	1.6	20	119	268	37	729	7.3		

L-: Low L: Low M: Medium M+: Above Medium H: High H+: Very High

To convert HECTARES into ACRES multiply by 2.47				To convert T/HECTARE into T/ACRE multiply by 0.45			To convert Kg/Ha into lbs/ACRE: multiply by 0.9		
Sample Information				Limestone application (T/Ha) to acheive			Required Applications (Kg/Ha)		
Lab Sample #	Field Number	Field Size (Ha)	Crop to be Grown	pH 5.5	pH 6.0	pH 6.5	Nitrogen N	Phosphate P_2O_5	Potash K_2O
1	4R20DA		Grass Forage - </= 50% legume				48	16	48

Lab Sample #	Field Number	% P/Al	Ratio Ca/Mg	Man	Sod	CEC (Meq/100g)	Base Saturation					Total % Base Saturation
							% K	% Mg	% Ca	% H	% Na	
1	4R20DA	5.45	58:1	0	0	11	0.9	2.6	90.3	4.7	1.5	93.8

The Soil Analysis Report result(s) relate only to the actual submitted and tested sample(s). Dates of analysis are available in Appendix A of this report.
Please take a moment to complete our client satisfaction survey at **https://www.surveymonkey.com/r/PEIAL**

Comments: All fertilizer recommendations are based on a pH of 6.0
To convert P2O5 to P, divide by 2.29. To convert K2O to K, divide by 1.2.

Copies To:
Moncton - Zoshia Fraser - NB Soil & Crop Imp Assoc

Approved By:
Laboratory Manager

Methods: SFL_22M - pH*
SFL_23M - Organic Matter*
SFL_24M - Nutrients*
SFL_29M - Nitrate/Ammonia
SFL_30M - Nitrogen
SFL_26M - Salt/Conductivity

* Accredited Methods & Parameters

Report Number:C21161-50031
Account Number:01778

A & L Canada Laboratories Inc

2136 Jetstream Road, London, Ontario, N5V 3P5
Telephone: (519) 457-2575 Fax: (519) 457-2664

Date Received:2021-06-10 Date Reported:

Date Printed:2021-06-11

PLANT ANALYSIS REPORT

To: NB SOIL & CROP IMPROVEMENT ASSOCIATION
2-150 WOODSIDE LANE
FREDERICTON, NB E3C 2R9

Attn: LEIGHA SANDWITH

For: C2021-0033-Y2

Farm: JOHN BEST

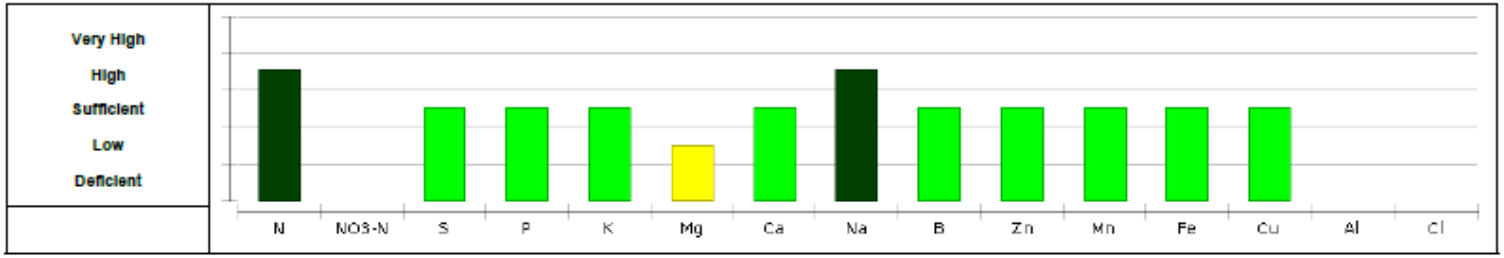
Sample ID: JB-ATS21-C1

Plant Type: Alfalfa
Growth Stage: Prior to flowering
Plant Part: Top 6"

Date Sampled	Lab Number	Nitrogen (%)	Nitrate Nitrogen (%)	Sulfur (%)	Phosphorus (%)	Potassium (%)	Magnesium (%)	Calcium (%)	Sodium (%)	Boron (ppm)	Zinc (ppm)	Manganese (ppm)	Iron (ppm)	Copper (ppm)	Aluminum (ppm)	Chloride (%)
2021-06-01	1610064	5.34		0.32	0.41	3.31	0.32	1.71	0.06	43.41	38	48	109	7.24	31	
Normal Range		3.80 5.00		0.20 0.48	0.30 0.80	2.50 5.00	0.35 0.50	1.00 3.00	0.01 0.03	30 80	20 80	30 150	30 250	5 30		

	N/S	N/K	P/S	P/Zn	K/Mg	K/Mn	Fe/Mn	Ca/B
Actual Ratio	16.5	1.6	1.3	108	10.5	684	2.3	394
Expected Ratio	12.0	1.1	1.7	100	9.0	460	1.9	400

Nutrient Sufficiency Ratings



- These plants are low in MAGNESIUM. This condition may be due to low soil magnesium, excess soil potassium, low soil pH or poor drainage. A&L recommends a foliar application at this time follow manufacturer specifications.
- A&L recommends an application when Mg, B, P, Zn or Mn are low or deficient at this plant stage. Follow the recommended product label rates.
- A&L Recommends a followup tissue sample 14 days after foliar treatment to monitor progress.

C21161-50031

Results Authorized By: Ian McLachlin, Vice President

The results of this report relate to the sample submitted and analyzed

Soil Analysis Report

14-Jun-2021

NB Soil & Crop Imp Assoc
Ray Carmichael
2600 Route 560
Williamstown, NB
E7K 1S6

PEI Analytical Laboratories
Department of Agriculture & Land
23 Innovation Way
PO Box 2000, Charlottetown, PE, C1A 7N8
Fax: (902) 368-6299
Tel: (902) 620-3300

Client: 1607080016
Accession No: S210609011
Samples Reported: 14-Jun-2021
Samples Received: 09-Jun-2021

C2021-0033-Y2

Sample Information		Soil Test Values and Ratings								
Lab Sample #	Field Number	Organic Matter (%)*	pH*	Phosphate P_2O_5 (ppm)*	Potassium K_2O (ppm)*	Calcium Ca (ppm)*	Magnesium Mg (ppm)*	Boron B (ppm)*	Copper Cu (ppm)*	Salt (mS/cm)
1	JB-ATS21-C1	3.7	6.2	487 H+	141 H	1352 H	181 H+	0.7	3.9	

Lab Sample #	Field Number	Zinc Zn (ppm)*	Sulfur S (ppm)*	Manganese Mn (ppm)*	Iron Fe (ppm)*	Sodium Na (ppm)*	Aluminum Al (ppm)*	Lime Index*	Nitrogen N (%)	Nitrate-N NO_3-N (ppm)
1	JB-ATS21-C1	4.3	15	70	227	20	1476	6.7		

L-: Low L: Low M: Medium M+: Above Medium H: High H+: Very High

To convert HECTARES into ACRES multiply by 2.47				To convert T/HECTARE into T/ACRE mulitply by 0.45			To convert HECTARES into ACRES multiply by 2.47		
Sample Information				Limestone application (T/Ha) to achieve			Required Applications (kg/Ha)		
Lab Sample #	Field Number	Field Size (Ha)	Crop to be Grown	pH 5.5	pH 6.0	pH 6.5	Nitrogen N	Phosphate P_2O_5	Potash K_2O
1	JB-ATS21-C1		Alfalfa - >/= 50% legume			2	28	30	50

Lab Sample #	Field Number	% P/Al	Ratio Ca/Mg	Man	Sod	CEC (Meq/100g)	Base Saturation					Total % Base Saturation
							% K	% Mg	% Ca	% H	% Na	
1	JB-ATS21-C1	14.41	7:1	0	0	12	2.5	12.3	55.2	30.0	0.7	70.0

The Soil Analysis Report result(s) relate only to the actual submitted and tested sample(s). Dates of analysis are available in Appendix A of this report. Please take a moment to complete our client satisfaction survey at **https://peial.questionpro.ca**

Comments: All fertilizer recommendations are based on a pH of 6.0.
To convert P2O5 to P, divide by 2.29. To convert K2O to K, divide by 1.2.

Copies To:
Central - Andrew Sytsma - NB Soil & Crop Imp Assoc

Approved By:
Laboratory Manager

Methods: SFL_22M - pH*
SFL_23M - Organic Matter*
SFL_24M - Nutrients*
SFL_30M - Nitrogen*

*Accredited Methods & Parameters

Invoice Number: 210609036

Appendix C

Follow-up Questions for the New Brunswick Alfalfa Tissue Survey

How old is the stand? _____

What is the percentage of alfalfa in the stand? _____

What was applied to the stand in the fall of 2020? (check all that apply and provide applicable details)

_ Lime	Type:	_ calcitic	_ high-Mag	Rate: _____
		_ dolomitic	_ low-Mag	
_ Manure	Type: _____			Rate: _____
	Analysis: please provide a copy of your most recent analysis			
_ Fertilizer	Analysis: _____			Rate: _____
_ Wood Ash	Source: _____	Analysis (if known): _____		Rate: _____
_ Other	Specify type, analysis and rate if known: _____			

Did you perform any other management practice (s) that you feel may have influenced this crop (ex. herbicide application, grazing, etc.)

_____

What was applied to the stand in the spring of 2021 (before 1st cut)? (check all that apply and provide applicable details)

_ Lime Type: _ calcitic _ high-Mag Rate: _____

_ dolomitic _ low-Mag

_ Manure Type: _____ Rate: _____

Analysis: please provide a copy of your most recent analysis

_ Fertilizer Analysis: _____ Rate: _____

_ Wood Ash Source: _____ Analysis (if known): _____ Rate: _____

_ Other Specify type, analysis and rate if known: _____

Did you perform any other management practice (s) that you feel may have influenced this crop (ex. herbicide application, grazing, etc.)

_____

What was applied to the stand before 2nd cut in 2021? (check all that apply and provide applicable details)

_ Lime Type: _ calcitic _ high-Mag Rate: _____

_ dolomitic _ low-Mag

_ Manure Type: _____ Rate: _____

Analysis: please provide a copy of your most recent analysis

_ Fertilizer Analysis: _____ Rate: _____

_ Wood Ash Source: _____ Analysis (if known): _____ Rate: _____

_ Other Specify type, analysis and rate if known: _____

Did you perform any other management practice (s) that you feel may have influenced this crop (ex. herbicide application, grazing, etc.)

_____

What was applied to the stand before 3rd cut in 2021? (check all that apply and provide applicable details)

_ Lime Type: _ calcitic _ high-Mag Rate: _____

_ dolomitic _ low-Mag

_ Manure Type: _____ Rate: _____

Analysis: please provide a copy of your most recent analysis

_ Fertilizer Analysis: _____ Rate: _____

_ Wood Ash Source: _____ Analysis (if known): _____ Rate: _____

_ Other Specify type, analysis and rate if known: _____

Did you perform any other management practice (s) that you feel may have influenced this crop (ex. herbicide application, grazing, etc.)

_____

Please list what you feel are your major challenges when growing alfalfa in New Brunswick.

1.

2.

3.

4.

5.

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