Canada News

Spring Newsletter 2011

Correlation

The first time I looked at the results generated from a zone sampled farm the first question that popped into my head was “how do you interpret all of this information? You can spend hours flipping back and forth between coloured images and the actual soil reports trying to find trends in the data. At the end of the day you might be more confused that when you started!

Correlation is a statistical measurement of the relationship between two variables. In your field the endgame is quite simple; what data that you possess on your field has the greatest relationship with yield? CEC? Phosphorus? K/Mg Ratio? By using a correlation coefficient we can start to rank the information based on its likelihood to influence yield and then use this info to make informed decisions on your operation.

Sources of information for correlation;

1) Yield data
2) Soil Data
3) Drone or Satellite Imagery
4) Veris or GreenSeeker Information

In the following example you can see the variation in yield is tremendous form 134 to 219 dry bushels in this field of corn. This won’t come as much of a shock to anyone who has watched a yield monitor in a combine. Where it gets more interesting is when you look at the corresponding soil data. On the correlation coefficient line (bottom) the numbers will range from 1 to -1, with a 1 being prefect correlation, -1 being perfectly inverse correlation and 0 indicates that there is no relationship between the variables.

Contact Names at A&L Canada Laboratories, Inc.

President:
Greg Patterson P.Ag. C.C.A.

Vice President:
Ian McLachlin P.Ag. C.C.A.

Technical Field Services:
Daryl Patterson

Systems Manager:
Jeff Toogood

Corporate Services Manager:
Don Castonguay

Customer Service Manager:
Julie Mollard

Maritime Representative:
Emmerson McMillan
Colby Callaghan
Patti Baird

Ontario Representative:
Chris Roelands

Western Canada Representatives:
Darren Bryant, SE Saskatchewan / Peace Region / BC
Craig Davidson, Manitoba
Mandy Huska, Saskatchewan
Luke Burton, Southwestern Saskatchewan/Southern Alberta
Leann Kruger Central Alberta / NW Saskatchewan

A&L Canada Laboratories, Inc.
2136 Jetstream Rd.
London, ON
N5P 3P5
Phone: (519) 457-2575
Fax: (519) 457-2664
www.alcanada.com

	Yield	OM	CEC	pH	Bray P1	Bicarb	K/Mg
	152	2.8	14.3	7.3	59	33	0.08
	151	3.3	14.5	7.4	46	27	0.06
	168	2.9	14.5	7.5	121	62	0.11
	199	3.4	15.1	7.4	87	32	0.11
	172	2.9	15.2	7.3	155	51	0.10
	141	2.9	15.3	7.6	135	46	0.10
	162	2.3	15.4	7.5	126	44	0.08
	156	3.3	16	7.5	58	29	0.07
	157	3.2	16	7.5	78	31	0.08
	183	3.3	16.2	7.1	80	40	0.09
	188	2.6	16.5	7.6	65	34	0.08
	151	3.2	16.6	7.7	86	31	0.09
	191	4.2	16.6	7.4	67	34	0.08
	190	3	16.8	7.2	68	27	0.08
	186	3.4	16.9	7.2	136	64	0.11
	143	2.9	17.2	7.6	89	37	0.08
	215	4.7	17.2	7.4	123	54	0.09
	226	3.8	17.3	7.2	97	34	0.09
	182	3.1	17.5	7.3	78	30	0.08
	148	2.6	17.7	7.7	209	58	0.09
	183	3.9	18.1	7.2	131	42	0.11
	160	2.7	18.3	7.6	93	42	0.08
	175	3.9	18.6	7.2	67	30	0.08
	164	3.1	19	7.6	79	33	0.10
	156	3.2	19.3	7.7	83	43	0.08
	157	2.6	19.4	7.6	108	46	0.09
	167	2.5	20.2	7.7	90	43	0.09
	177	2.8	20.3	7.6	133	62	0.11
	155	3.2	20.7	7.7	79	32	0.08
	134	2.9	20.8	7.6	161	56	0.10
	163	4.1	20.8	7	180	59	0.13
	167	2.7	22.1	7.8	53	27	0.08
	142	2.3	22.5	7.7	46	20	0.07
	151	2.2	23.3	7.7	69	40	0.10
Average	168	3.1	17.8	7.5	98.1	40.4	0.09
Correlation Coefficient		**0.57**	**-0.23**	**-0.54**	**-0.05**	**0.02**	**0.19**

In this example we can see that;

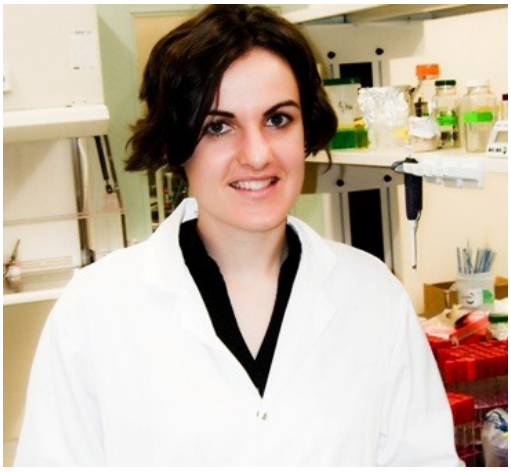
- Organic matter has a high correlation with yield (.57), which means that when the OM goes up so does the yield which makes sense.
- There is a strong inverse correlation between pH and yield (-.54). In other words when the pH is lower, we see an increase in yield.
- Because of the high Phosphorus levels there is no correlation between P levels and yield.
- We a slight correlation between yield and K/Mg although not as strong as you would expect. The reason is that there is not enough variation in the K/Mg ratio to show a significant difference.

If you are interested in doing more with correlation feel free to give us a call and we would be glad to help!

Meet the Staff

Amy Turnbull

Amy Turnbull has been a research scientist at A&L Biologicals since April 2010. She is working on bacterial contributions to soil health, focusing on potatoes and tomatoes. She has developed a program of screening for potential biofertilizer and biocontrol agents by combining in vitro (test tube and petri plate) methods with plant studies (in growth rooms and field studies). Using this approach, she has identified several species of bacteria that control fungal pathogens *Pythium* or *Rhizoctonia* in soil or promote potato growth. With the help of two UWO undergraduate students, they have characterized the behaviour of several hundred bacteria isolated from potato roots. These bacteria were tested for the ability to provide nutrients to the plant (fix atmospheric nitrogen or solubilize insoluble phosphate in soil), produce plant growth hormones or degrade stress hormones, and produce enzymes that degrade soil organic matter, among others. These bacteria are being further tested for their capability to act as biofertilizers. Currently, she is working on testing the contribution of single species of bacteria on the community of bacteria residing on plant roots, with the goal of identifying groups of bacteria that impact plant and soil health. This will lead to the use of indicator organisms for detecting the health of agricultural soils.



Amy went to the University of Guelph (B.Sc. in microbiology) and the University of Calgary (Ph.D. in microbiology and infectious diseases). She is from a farm near Melbourne, Ontario.

George Lazarovits

Dr. Lazarovits graduated from the Dept of Botany at the University of Toronto in 1977 and subsequently worked at Agriculture and Agrifood Canada until 2010 as a plant pathologist. His research focused on examining plant health from an ecological perspective where both beneficial and detrimental organisms in soil were considered to affect plant vigor. He developed innovative model systems for studying soil processes and interactions between microorganisms and plants, as well each other. He published extensively on identifying mechanism by which organic amendments control soilborne plant pathogens while increasing populations of soil microorganisms. In 2010 he became Director of Research at A&L Biologicals, a new company that has as its objective the creation of sustainable cropping systems based on ecological principles. Dr. Lazarovits is an adjunct professor at Department of Biology, University of Western Ontario where he supervised students at the Post-Doc., Ph.D., M.Sc. levels. He serves on committees of Environment Canada, NSERC, and as a member of the UN Ozone Secretariat regulating the phase out of methyl bromide (MBTOC). He has had numerous international and national collaborations. Dr. Lazarovits served as president of the Canadian Phytopathological Society and as organizer of national and international meetings.

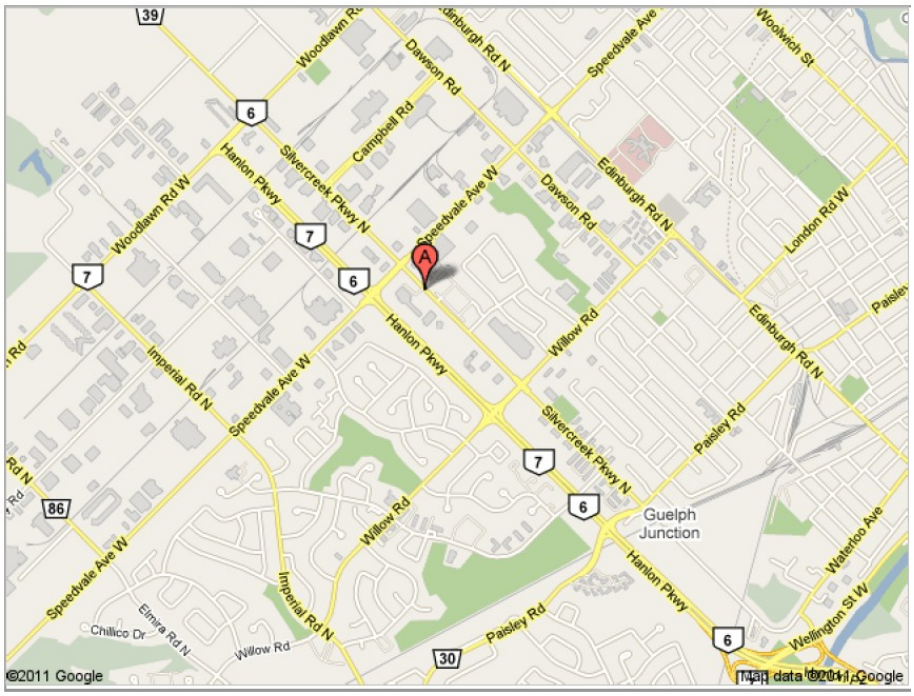
A&L Drop Box Locations!

We are pleased to announce that we have two drop box locations for the upcoming year. Feel free to drop the samples off and they will be delivered to the lab free of charge.

Location 1 — UPS Store, Guelph, Ontario

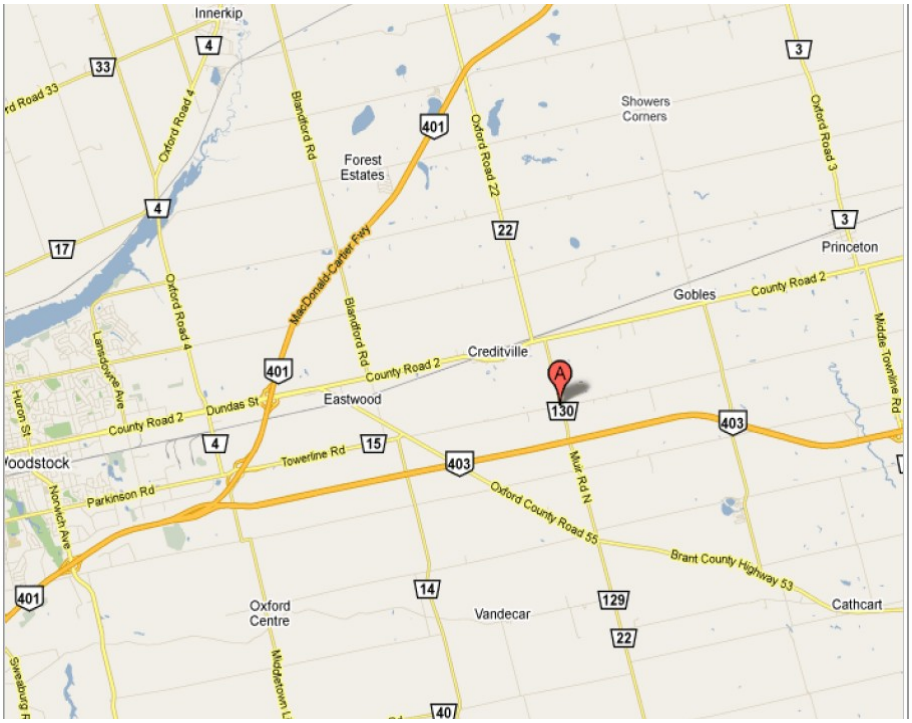
17A-218 Silver Creek Pkwy N, Guelph, ON N1H 7P8

Open Weekdays	8:30—6:30
Saturdays	9:00—5:00
Sundays	Closed



Location 2 — John & Jackie Korevaar, Woodstock, Ontario

566073 Towerline Rd, Princeton, N0J 1V0



Plant Monitoring Program

- Plant analysis is an important nutrient management tool.
- Monitoring of plant nutrient levels at critical crop growth stages through the growing season can help identify potential and existing nutritional problems that can affect crop quality and yield.
- In addition to our standard tissue program, we are pleased to offer a special Plant Monitoring Program (PMP) for the 2010 growing season. Following is a step-wise summary of the PMP.
- Evaluate your anticipated cropping plans prior to the growing season and select the fields to be monitored with the PMP.
- Enroll fields in the PMP by completing and submitting a PMP Enrollment Form.
- A unique Plant Monitoring ID (PMID) is assigned for each field.
- Plant samples are submitted with a PMP submittal form.
- Sample analyses are reported on our special PMP report form.
- There is no cost to enroll fields in the PMP; you only pay for each plant analysis.
- All plant analyses are reported the next business day after receiving. Providing your e-mail address will ensure prompt delivery of reports and data, thus minimizing delays in decision making.
- Our PMP is an important tool to enhance your plant analysis program.

PMP Program

A plant analysis-monitoring program can help identify nutrient management needs and opportunities throughout the season before they become yield and quality limiting. However, just as important, it can be a confirmation that a good soil fertility program is in place and that little adjustment is needed.

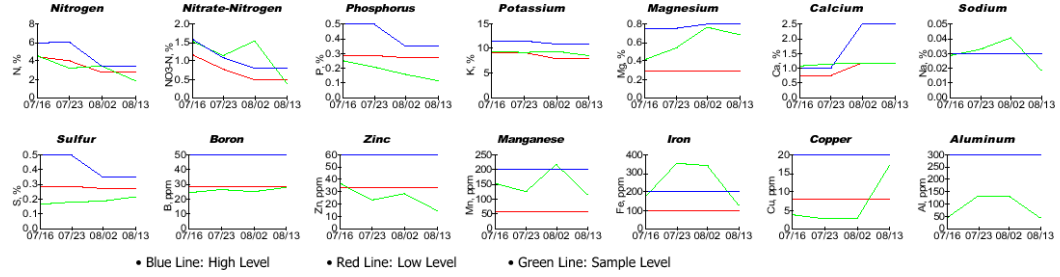
Report Number:
Account Number:

A & L Canada Laboratories Inc
2136 Jetstream Road, London, Ontario, N5V 3P5
Telephone: (519) 457-2575 Fax: (519) 457-2664

PLANT ANALYSIS MONITORING REPORT

To: For: Sample ID:
Grower Code: Plant Type:
Field: Plant Part:
Variety:
PMID: Date Received: Date Reported: Page: 1

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 (%)
07/16	199562	4.59	1.55	0.17	0.26	9.51	0.42	1.07	0.03	25	37	156	173	4	46	
07/23	208662	3.26	1.15	0.18	0.21	9.16	0.54	1.16	0.03	27	23	128	355	3	136	
08/02	220556	3.42	1.54	0.19	0.16	9.51	0.77	1.20	0.04	25	29	220	344	3	136	
08/13	227586	1.88	0.38	0.22	0.12	8.60	0.68	1.20	0.02	28	15	114	129	17	43	
Normal Range (Most Recent Sample)		2.79 – 3.50	0.49 – 0.80	0.27 – 0.35	0.27 – 0.35	8.00 – 11.00	0.29 – 0.80	1.20 – 2.50	0.03	29 – 50	34 – 60	60 – 200	99 – 200	8 – 20	300	



Using Plant Analysis to Monitor Crop Requirements In Season

Plant tissue analysis is generally known as a tool for diagnosis of nutrient deficiencies. Unfortunately, crop yield can already be affected by the time visual symptoms of nutrient deficiencies are present. Monitoring nutrient concentrations on a regular basis throughout the growing season provides multiple opportunities to evaluate the plant's nutritional condition to predict and "head off" nutrient deficiencies or identify "Hidden Hungers" that rob our crops of yield and quality. However, it is also an excellent tool to monitor and fine-tune crop nutrient supply during the growing season. For this reason we have developed our Plant Monitoring Program (PMP).

This type of monitoring of the nutrient status of traditionally high-value vegetable and fruit crops with plant tissue analysis is common. With current commodity and fertilizer prices, plant tissue monitoring has a greater economic potential to help fine-tune fertilizer nutrient programs for row crops, as long as a good soil testing and fertility program is already in place.

Analyzing a plant tissue sample provides an evaluation of a crop's nutrient status at the time the sample is taken. Soil physical and fertility status as well as weather conditions the crop has experienced up to the time of sampling may have influenced plant nutrient levels. However, a plant tissue analysis cannot be used to reliably predict whether nutrient supply and uptake will be adequate after the sample is taken. A plant's nutrient demand changes quickly in season as it goes from one stage of growth to another. A plant that was sufficient in the vegetative stage may become deficient in a nutrient as it transitions into the reproductive stage.

Crop demand also will change nutrient requirements year-to-year and field-to-field. A crop that has set up to produce huge yield potential may run out of nutrient supply simply because of the demand that it places on the soil and the soils ability to supply certain nutrients. A monitoring program will predict this and allow the grower to respond to that nutrient before it becomes yield limiting. In some years a soil may not have the potential to finish those huge crops.

A plant analysis monitoring program involves taking samples at multiple times during the growing season and accurately identifying the stage of growth so that we can match it to our data base of ranges. Individual tests results are evaluated for deficiencies, but particularly for nutrient trends over time. One nutrient may initially be sufficient, then trend low due to availability or demand that the crop is putting on the soil reserves.

If a nutrient need is identified, the corresponding question is whether an in-season application will effectively and economically correct the problem. If a correction is going to be effective it has to happen early is season and it must happen before the nutrient reaches critical thresholds. Once an element reaches these critical thresholds it is difficult to get a response. Keep in mind when using a monitoring program your largest crop will run out of nutrients the quickest. A poor or low tissue test does not always mean a poor crop; it usually means there is a lot of demand on nutrient supply because the crop is using the nutrients. In other words your best crop may have the poorest tissue test. Just make sure you identify this and respond with correctives before it is too late.

PMP Enrolment Form

A&L Canada Laboratories Inc.

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

Complete this form to enrol fields in the 2011 Plant Monitoring Program (PMP). Please submit one form for each grower. A Plant Monitoring ID (PMID) will be assigned for each field and will be shown on the report.

Submitted By

Sample Reference	
Grower Code	
Grower Name	
Address	

Email Address for data:	
Email Address for PDF reports:	

PMID* (Lab use only)	**Field Name**	**Crop Type**	**Variety**	**Sample ID**

PMP Submittal Form

A&L Canada Laboratories Inc.
2136 Jetstream Road · London, Ontario · N5V 3P5
Phone (519) 457-2575 · Fax (519) 457-2664

Submitted By

Sample Reference	
Grower Code	
Grower Name	
Address	

Lab Number (Lab use only)	PMID*	SAMPLE ID	Test(s)	Plant Code**	Crop Name	Plant Part Sampled	Date Sampled
							DD/MM/YY
							DD/MM/YY
							DD/MM/YY
							DD/MM/YY
							DD/MM/YY
							DD/MM/YY
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							DD/MM/YY

* Monitoring ID assigned by enrolling in the Plant Monitoring Program. Listed on the report.
** Plant Code – numeric code indicating plant type and growth stage. Contact the Lab for a list.

Plant Analysis Test Packages
PT1 Nitrogen, Phosphorus, Potassium, Magnesium, Calcium, Sodium, Boron, Zinc, Manganese, Iron, Copper, Aluminum.
PT2 PT1 with NO_3-N instead of total N.
PT4 PT1 for fruits and tubers.

Special Instructions