



A & L CANADA

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April 2017

A&L Introduces New Soil Health Tests

Spring is here and with it comes soil analysis season.

The combination of biological, chemical and physical properties of soil used to be called Soil Quality but is now considered to be associated with “Soil Health”. These two terms however, will continue to overlap but there is now more emphasis on looking at soil not just as a lifeless inert growing medium, but more as a living, dynamic and continually changing ecological environment that supports most of the life on this planet.

Since its beginnings in 2010, **A&L Biological** has focused on identifying and understanding the soil microbiological-plant relationship and how it influences crop productivity. The initial focus of our research aimed to “identify which microbes populate the rhizosphere and its internal host tissues and how does the host select them as an associate”. Our second phase will be to identify what functions the microorganisms express to improve plant growth and productivity. From the chemical and physical perspective, it is essential that we create the optimal environment for the host plant to maintain the ideal equilibrium for their microbial partners required to maintain what we call Soil Health.

Overall Biological Soil Health Index of Good and Bad site of a Farm

Sl. No	Biological Soil health test- Farm Number 2; located near Melbourne, ON							
	Tests	Optimal	Non-Optimal	Actual Value		Maximum Score	Index	
				Good	Bad		Good	Bad
1	pH of the sap	5.5- 7.0	<5.5; >7.0	5.41	5.07	25	22	19
2	Sap brix measurements	>8.0	<8.0	7.4	6.2	25	22	18
3	Microbial plating (Colony forming Units of Gram positives)	<10 ⁴	>10 ⁴	10 ²	10 ⁵	25	25	12
4	Molecular finger printing	<10 ⁶	>10 ⁶	10 ⁴	10 ⁷	25	25	10
Overall Biological Index						100	94	59

A&L Canada Laboratories this season is introducing the first phase of a new suite of “Soil Health Tests” which will provide analysis that addresses the chemical, biological and physical components that impact Soil Health. The primary component of our Soil Health test will be a chemical analysis that measures the general fertility of a soil which A&L’s research has shown to be directly correlated to the plants ability to provide the necessary nutrients (carbon) that attract and support the organisms required to enhance plant growth.

Included in this test is the Solvita 1-day test that measures soil respiration of the soil microbes over a 24-hour period. The test also provides a new analysis of the “Reactive Carbon” demonstrated to be a more responsive test signaling the deterioration of physical, chemical, and biological properties. The soil factors that can cause a decline in “Reactive Carbon” include reduced aggregate stability, increased bulk density, reduced water infiltration and water holding capacity, microbial activity, and nutrient availability.



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Soil Health Continued...

A&L intends on continuing its research towards understanding factors of "Soil Health" and has an ongoing mandate to continually improve our analytical offerings to help the crop production practitioner understand the limitations of their production systems. Listed below is a Suite of tests we currently offer. Later this spring we will introduce novel tests that include microbial analysis of plants and rhizospheres providing an even greater understanding of factors that influence crop growth.

A&L Soil Health Suite of Analysis

O.M., pH, Buffer pH, Phosphorus, Potassium, Magnesium, Calcium, Sodium, Boron, Copper, Manganese, Iron, Zinc, Aluminum, C.E.C., % saturation of cations, K:Mg ratio, EC, %P, %Al³⁺, Solvita CO₂-C, PMN, Active C, Soil Health Index

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SOIL HEALTH TEST REPORT

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Sample ID	Lab Number	Organic Matter %	Phosphorous-P ppm		Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	Sodium Na ppm	Sulfur S ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Aluminum Al ppm
			Bicarb	Bray-P1											
GC 1-1	23466	3.7	70	179	282	255	1910	14	33	6.9	20	124	1.9	0.5	571

VL=Very Low, L=Low, M=Medium, G=Good, H=High

Parameter	Result	Optimum Level	Parameter	Result	Rating
CEC, meq/100g	13.6		pH	6.8	M
K/Mg Ratio	0.34	0.25-0.35	Buffer pH	6.9	
GFI	73	G	EC, ms/cm	0.8	L
%K	5.3	3-5	Saturation %P	40	H
%Mg	15.6	10-20	Saturation % Al	571	G
%Ca	70.1	65-72	Nitrate-N, ppm	70	H
%H	8.6	5-15	Chloride, ppm	72	G
%Na	0.4	<1	PMN, ppm	21.0	

Water Extracted Carbon Nitrogen

Organic C, ppm	21
Inorganic N, ppm	7
Organic N, ppm	14

■ Inorganic N ■ Organic N

Parameter	Result	Rating
Solvita CO ₂ -C, ppm	68.6	
Reactive C, ppm	568.6	
Soil Health Index	40	
Residual Soil Chemicals Index	8.6	

The results of this report relate to the sample submitted and analyzed. No guarantee or warranty concerning crop performance is made by A & L.

A&L Canada Laboratories Inc. is accredited by the Standards Council of Canada for specific tests as listed on www.scc.ca and by the Canadian Association for Laboratory Accreditation as listed on www.cala.ca

Results Authorized By: Ian McLachlin, Vice President



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Additional Soil Health Tests

Solvita Burst test

Solvita + NO₃

Solvita +NO₃ + NH₄

Residual Chemistry Profile Index

C:N ratio

Texture

Texture + Available Water holding capacity estimate

Available Water Holding Capacity

Heavy Metals

Beneficial Nematodes

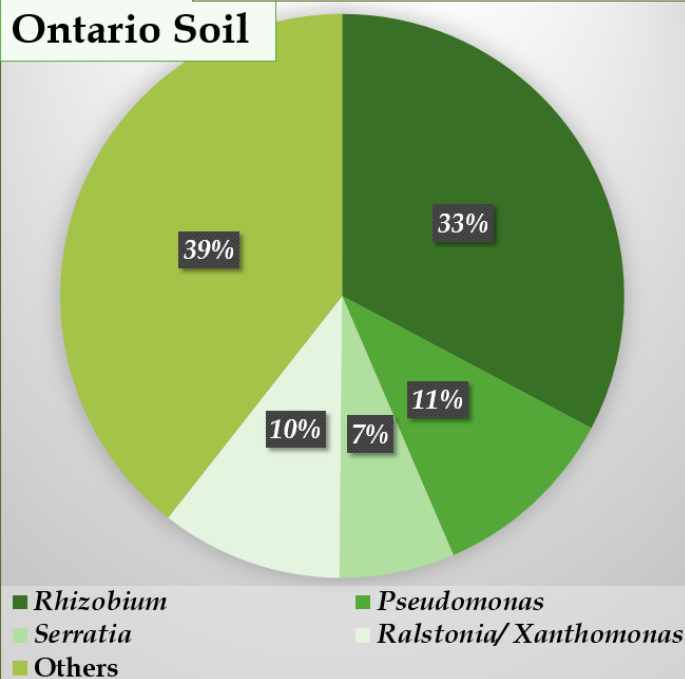
Nematodes

Root/ Soil Microbial Profile

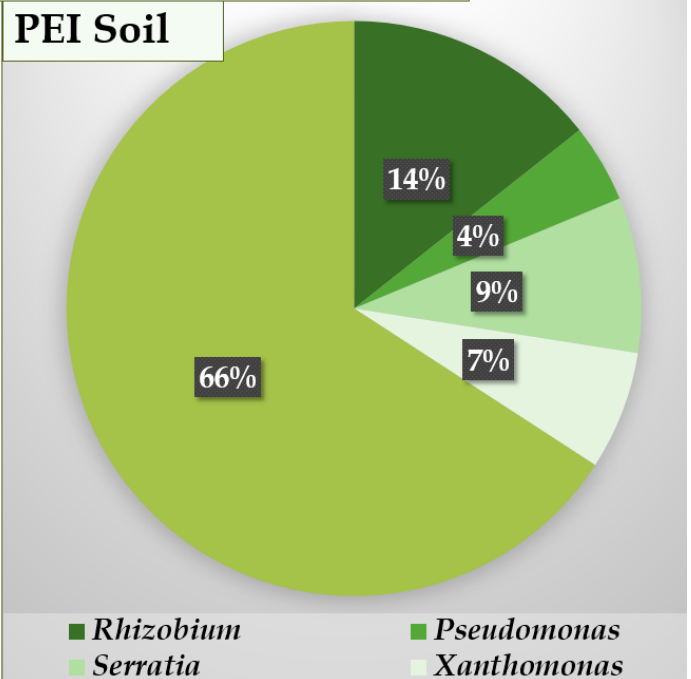
SAP Microbial Analysis – Analysis of Endophytes and Metabolites

The most common organisms on Potato roots

Ontario Soil



PEI Soil



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SOIL HEALTH SUBMITTAL FORM



SUBMITTED BY:	
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Province:	Postal Code:
Phone:	Fax:
Email:	
Account #:	

CLIENT/GROWER:	
Address:	
Province:	Postal Code:
Phone:	Fax:
Email:	Grower Code:
Farm:	Field:

SAMPLE NUMBER (MAX 6 DIGITS)	TEST PACKAGES						LAB USE ONLY
	SHTEST1	SHTEST2	SBT	SBT1	SBT2	OTHER	

EXPLANATION OF TEST PACKAGES			
SHTEST1	Soil Health Test Complete	OM, pH, BpH, P, K, Mg, Ca, Na, S, B, Cu, Mn, Fe, Zn, Al, CEC, % saturation of cations, K:MG, EC, %P, %AL, Solvita CO2-C, PMN, Active C, Soil Health Index	SHSCN C:N Ratio
			SHSTEXT Texture
SHTEST2	Soil Health Test Complete with Nitrogen Pool	SHTEST1 + NO ₃ -N & NH ₄ -N	SHSTEXT2 Texture/Available water holding capacity estimate
SBT	Solvita Burst	CO ₂ Burst Method	SHWHC Available water holding capacity
SBT1	Solvita Burst Test + NO ₃ -N	SBT + NO ₃ -N	SHEPD Heavy Metals – Ar, Cd, Cr, Cu, Pb, Hg, Mo, Ni, Se, Zn, Co
SBT2	Solvita Burst Test + NO ₃ -N & NH ₄ -N	SBT + NO ₃ -N & NH ₄ -N	SHNEM1 Nematode Complete Analysis
			SHNEM3 Beneficial Nematode Analysis
			SHERBINDEX Residual Chemistry Profile Index