



Ag Testing - Consulting

Account No. : 24409

Biological Soil Analysis Report

NEBRASKA MUSHROOM LLC
1982 E CITATION WAY
GRAND ISLAND NE 68801

Invoice No. : 1212203
Date Received : 07/19/2016
Date Reported : 07/21/2016
Lab No. : 5659

Results For : NEBRASKA MUSHROOM LLC
Sample ID 1 : RED HAWK PLOT 1
Sample ID 2 : 2

PLFA Soil Microbial Community Analysis

Functional Group Biomass & Diversity

Total Living Microbial Biomass, Phospholipid Fatty Acid (PLFA) ng/g **2931.32**
Functional Group Diversity Index **1.575**

Total Biomass	Diversity	Rating
< 500	< 1.0	Very Poor
500+ - 1000	1.0+ - 1.1	Poor
1000+ - 1500	1.1+ - 1.2	Slightly Below Average
1500+ - 2500	1.2+ - 1.3	Average
2500+ - 3000	1.3+ - 1.4	Slightly Above Average
3000+ - 3500	1.4+ - 1.5	Good
3500+ - 4000	1.5+ - 1.6	Very Good
> 4000	> 1.6	Excellent

Functional Group	Biomass, PLFA ng/g	% of Total Biomass
Total Bacteria	1491.87	50.89
Gram (+)	969.30	33.07
Actinomycetes	251.56	8.58
Gram (-)	522.57	17.83
Rhizobia	35.82	1.22
Total Fungi	319.61	10.90
Arbuscular Mycorrhizal	114.39	3.90
Saprophytes	205.22	7.00
Protozoa	48.37	1.65
Undifferentiated	1071.48	36.55

Community Composition Ratios

Fungi:Bacteria 0.2142

Bacteria tend to dominate in systems with fewer organic inputs or residues possibly leading to a lower C:N ratio. In addition, bacteria can be more prominent in the early spring or late fall as soil temperatures are usually cooler and vegetation is less active or absent. Dry conditions, slightly alkaline to alkaline pH values, or increased land disturbance through prolonged and extensive tillage, grazing, or compaction may also favor bacteria. While bacteria are important and needed in the soil ecosystem, fungi are desired and more often considered indicators of good soil health. Increased use of cover crops and/or other organic inputs and less soil disturbance should help the soil support more fungi. Adjustments to pH may also be recommended in some more extreme circumstances.

Scale	Rating
< 0.05	Very Poor
0.05+ - 0.1	Poor
0.1+ - 0.15	Slightly Below Average
0.15+ - 0.2	Average
0.2+ - 0.25	Slightly Above Average
0.25+ - 0.3	Good
0.3+ - 0.35	Very Good
> 0.35	Excellent

Predator:Prey 0.0324

This ratio is also expressed as protozoa to bacteria. Protozoa feed on bacteria which helps release nutrients, especially nitrogen. A higher ratio indicates an active community where base level nutrients are sufficient to support higher trophic levels or predators. However, this ratio will always be a relatively low number because the prey will greatly outnumber the predators.

Scale	Rating
< 0.002	Very Poor
0.002+ - 0.005	Poor
0.005+ - 0.008	Slightly Below Average
0.008+ - 0.01	Average
0.01+ - 0.013	Slightly Above Average
0.013+ - 0.016	Good
0.016+ - 0.02	Very Good
> 0.02	Excellent

Gram (+):Gram (-) 1.8549

Gram (+) bacteria typically dominate early in the growing season and/or following a fallow period. They also survive better under certain environmental conditions or stressors such as drought or extreme temperatures due to their ability to form spores. Therefore, it is common to see higher values when the community is coming out of dormancy or is stressed. These values will typically begin to approach those of a more balanced bacterial community as the soil conditions become more favorable throughout the growing season. A gram (-) dominated soil may be due to anaerobic conditions or other stressors such as pesticide application or heavy metal contamination.

Scale	Rating
< 0.5	Gram (-) Dominated
0.5+ - 1.0	Slightly Gram (-) Dominated
1.0+ - 2.0	Balanced Bacterial Community
2.0+ - 3.0	Slightly Gram(+) Dominated
3.0+ - 4.0	Gram(+) Dominated
> 4.0	Very Gram(+) Dominated

Stress and Community Activity Ratios

Sat:Unsat 1.9203

Bacteria alter their membranes under various environmental conditions in order to maintain optimal fluidity for nutrient and waste transport into and out of the cell. Saturated fatty acids may reflect a better adapted community to current environmental conditions. Communities under stressed conditions will increase their proportion of unsaturated fatty acids. This will likely occur most often as a result of low soil moisture or drastic changes in temperature. In general, a higher number indicates a healthier and more stable community.

Mono:Poly 8.2951

The ratio of monounsaturated to polyunsaturated fatty acids is used along with the sat:unsat ratio to further indicate the degree of community stress. A higher ratio indicates less stress, while a lower ratio would depict higher levels of prolonged stress due to conditions such as temperature, moisture, pH, or nutrient availability (starvation).

Pre 16:1w7c:cy17:0 14.1750

Cyclo (cy) fatty acids are more prominent during stationary phases of growth or under high stress conditions that influence membrane fluidity and growth rates such as temperature, pH, moisture, and nutrient availability. In general, a higher number or all Pre16/Pre18 is better and indicates an actively growing community experiencing fewer stressors. These values are typically higher early in the growing season (planting) when the community is becoming active and experiencing fast growth. The values may begin to drop towards the end of the growing season (harvest) following a decrease in plant growth activity or as the community approaches a stationary growth phase as the temperature/moisture changes between the seasons.

Pre 18:1w7c:cy19:0 7.7771

All ratios should be looked at separately, but should also be taken into context and compared with one another to better understand the big picture. These are general guidelines and statements regarding soil microbial communities. In addition, the scales and ranges presented here are specific for the type of extraction and analytical methods used for PLFA analysis at Ward Laboratories, Inc. They will not necessarily reflect ranges derived from other methods of analysis or the literature. The scales can and should be adjusted slightly depending on the time of year and conditions at sampling along with the climate and soil type of specific regions where comparisons are being made. Conditions such as time of year, past and present crop, moisture, pH, and fertility should be noted or measured close to sampling for PLFA analysis for a more in depth interpretation of results.



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Results For : NEBRASKA MUSHROOM LLC
Sample ID 1 : RED HAWK PLOT 1
Sample ID 2 : 2
Lab No. : 5659

Sample ID 3 :
Sample ID 4 :

Haney - Soil Health Analysis

1:1 Soil pH	7.0	ICAP Aluminum, ppm Al	559.90
1:1 Soluble Salts, mmho/cm	0.14	ICAP Iron, ppm Fe	368.5
Excess Lime Rating	1		
Organic Matter, %LOI	5.8	Calculations	
		Organic C:Organic N	8.2
		Nitrogen mineralization, ppm N	29.1
Solvita CO2 Burst		Organic Nitrogen Release, ppm N	29.1
CO2-C, ppm C	169.0	Organic Nitrogen Reserve, ppm N	0.0
Water Extract		Phosphorus mineralization, ppm P	25.1
Total Nitrogen, ppm N	31.5	Organic Phosphorus Reserve, ppm P	< 0.1
Organic Nitrogen, ppm N	29.1	Phosphorus Saturation Al/ Fe, %	14.5
Total Organic Carbon, ppm C	240	Phosphorus Saturation Ca, %	21.4
H3A Extract		Soil Health	
Nitrate, ppm NO3-N	2.5	Soil Health Calculation	25.87
Ammonium, ppm NH4-N	1.6	Cover Crop Suggestion	10% Legume 90% Grass
Inorganic Nitrogen, ppm N	4.1		
Inorganic (FIA) Phosphorus, ppm P	109.5		
Total (ICAP) Phosphorus, ppm P	135		
Organic Phosphorus, ppm P	25.1		
ICAP Potassium, ppm K	179		
ICAP Calcium, ppm Ca	630		

Reviewed By : Lance Gunderson

7/21/2016

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Kearney, Nebraska 68848-0788



Ag Testing - Consulting

Haney - Soil Health Analysis Contd.

Lab No. : 5659

Nutrient Quantity Available for Next Crop

Nitrogen, lbs N/A	66.5
Phosphorus, lbs P2O5/A	324.0
Potassium, lbs K2O/A	214.7
Nutrient Value, \$/A	276.24

Nitrogen Savings by using the Haney Test

Traditional evaluation, lbs N/A	4.9
Haney Test N evaluation, lbs N/A	66.5
Nitrogen Difference, lbs N/A	61.6
N savings, \$/A	39.39

Fertilizer Recommendations, lbs/A

<u>Crop</u>	<u>Yield Goal</u>	<u>Nitrogen N</u>	<u>Phosphorus P2O5</u>	<u>Potassium K2O</u>	<u>Lime, ECC T/A</u>
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Invoice No. : 1212203
Date Received : 07/19/2016
Date Reported : 07/21/2016
Lab No. : 5660

Results For : NEBRASKA MUSHROOM LLC
Sample ID 1 : RED HAWK PLOT 2
Sample ID 2 : 2

PLFA Soil Microbial Community Analysis

Functional Group Biomass & Diversity

Total Living Microbial Biomass, Phospholipid Fatty Acid (PLFA) ng/g **5037.12**
Functional Group Diversity Index **1.568**

Total Biomass	Diversity	Rating
< 500	< 1.0	Very Poor
500+ - 1000	1.0+ - 1.1	Poor
1000+ - 1500	1.1+ - 1.2	Slightly Below Average
1500+ - 2500	1.2+ - 1.3	Average
2500+ - 3000	1.3+ - 1.4	Slightly Above Average
3000+ - 3500	1.4+ - 1.5	Good
3500+ - 4000	1.5+ - 1.6	Very Good
> 4000	> 1.6	Excellent

Functional Group	Biomass, PLFA ng/g	% of Total Biomass
Total Bacteria	2046.18	40.62
Gram (+)	1270.24	25.22
Actinomycetes	338.92	6.73
Gram (-)	775.94	15.40
Rhizobia	34.11	0.68
Total Fungi	400.83	7.96
Arbuscular Mycorrhizal	133.89	2.66
Saprophytes	266.94	5.30
Protozoa	94.92	1.88
Undifferentiated	2495.20	49.54

Community Composition Ratios

Fungi:Bacteria 0.1959

Bacteria tend to dominate in systems with fewer organic inputs or residues possibly leading to a lower C:N ratio. In addition, bacteria can be more prominent in the early spring or late fall as soil temperatures are usually cooler and vegetation is less active or absent. Dry conditions, slightly alkaline to alkaline pH values, or increased land disturbance through prolonged and extensive tillage, grazing, or compaction may also favor bacteria. While bacteria are important and needed in the soil ecosystem, fungi are desired and more often considered indicators of good soil health. Increased use of cover crops and/or other organic inputs and less soil disturbance should help the soil support more fungi. Adjustments to pH may also be recommended in some more extreme circumstances.

Scale	Rating
< 0.05	Very Poor
0.05+ - 0.1	Poor
0.1+ - 0.15	Slightly Below Average
0.15+ - 0.2	Average
0.2+ - 0.25	Slightly Above Average
0.25+ - 0.3	Good
0.3+ - 0.35	Very Good
> 0.35	Excellent

Predator:Prey 0.0464

This ratio is also expressed as protozoa to bacteria. Protozoa feed on bacteria which helps release nutrients, especially nitrogen. A higher ratio indicates an active community where base level nutrients are sufficient to support higher trophic levels or predators. However, this ratio will always be a relatively low number because the prey will greatly outnumber the predators.

Scale	Rating
< 0.002	Very Poor
0.002+ - 0.005	Poor
0.005+ - 0.008	Slightly Below Average
0.008+ - 0.01	Average
0.01+ - 0.013	Slightly Above Average
0.013+ - 0.016	Good
0.016+ - 0.02	Very Good
> 0.02	Excellent

Gram (+):Gram (-) 1.6370

Gram (+) bacteria typically dominate early in the growing season and/or following a fallow period. They also survive better under certain environmental conditions or stressors such as drought or extreme temperatures due to their ability to form spores. Therefore, it is common to see higher values when the community is coming out of dormancy or is stressed. These values will typically begin to approach those of a more balanced bacterial community as the soil conditions become more favorable throughout the growing season. A gram (-) dominated soil may be due to anaerobic conditions or other stressors such as pesticide application or heavy metal contamination.

Scale	Rating
< 0.5	Gram (-) Dominated
0.5+ - 1.0	Slightly Gram (-) Dominated
1.0+ - 2.0	Balanced Bacterial Community
2.0+ - 3.0	Slightly Gram(+) Dominated
3.0+ - 4.0	Gram(+) Dominated
> 4.0	Very Gram(+) Dominated

Stress and Community Activity Ratios

Sat:Unsat 1.5028

Bacteria alter their membranes under various environmental conditions in order to maintain optimal fluidity for nutrient and waste transport into and out of the cell. Saturated fatty acids may reflect a better adapted community to current environmental conditions. Communities under stressed conditions will increase their proportion of unsaturated fatty acids. This will likely occur most often as a result of low soil moisture or drastic changes in temperature. In general, a higher number indicates a healthier and more stable community.

Mono:Poly 3.7032

The ratio of monounsaturated to polyunsaturated fatty acids is used along with the sat:unsat ratio to further indicate the degree of community stress. A higher ratio indicates less stress, while a lower ratio would depict higher levels of prolonged stress due to conditions such as temperature, moisture, pH, or nutrient availability (starvation).

Pre 16:1w7c:cy17:0 ALL PRE 16:1

Cyclo (cy) fatty acids are more prominent during stationary phases of growth or under high stress conditions that influence membrane fluidity and growth rates such as temperature, pH, moisture, and nutrient availability. In general, a higher number or all Pre16/Pre18 is better and indicates an actively growing community experiencing fewer stressors. These values are typically higher early in the growing season (planting) when the community is becoming active and experiencing fast growth. The values may begin to drop towards the end of the growing season (harvest) following a decrease in plant growth activity or as the community approaches a stationary growth phase as the temperature/moisture changes between the seasons.

Pre 18:1w7c:cy19:0 14.5392

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Sample ID 1 : RED HAWK PLOT 2
Sample ID 2 : 2
Lab No. : 5660

Sample ID 3 :
Sample ID 4 :

Haney - Soil Health Analysis

1:1 Soil pH	7.1	ICAP Aluminum, ppm Al	558.70
1:1 Soluble Salts, mmho/cm	0.15	ICAP Iron, ppm Fe	397.1
Excess Lime Rating	1		
Organic Matter, %LOI	8.2	Calculations	
		Organic C:Organic N	8.7
		Nitrogen mineralization, ppm N	32.4
Solvita CO2 Burst		Organic Nitrogen Release, ppm N	32.4
CO2-C, ppm C	162.0	Organic Nitrogen Reserve, ppm N	0.0
Water Extract		Phosphorus mineralization, ppm P	28.5
Total Nitrogen, ppm N	35.0	Organic Phosphorus Reserve, ppm P	6.4
Organic Nitrogen, ppm N	32.4	Phosphorus Saturation Al/ Fe, %	18.5
Total Organic Carbon, ppm C	283	Phosphorus Saturation Ca, %	26.9
H3A Extract		Soil Health	
Nitrate, ppm NO3-N	2.5	Soil Health Calculation	24.66
Ammonium, ppm NH4-N	2.5	Cover Crop Suggestion	10% Legume 90% Grass
Inorganic Nitrogen, ppm N	4.9		
Inorganic (FIA) Phosphorus, ppm P	141.5		
Total (ICAP) Phosphorus, ppm P	176		
Organic Phosphorus, ppm P	34.9		
ICAP Potassium, ppm K	200		
ICAP Calcium, ppm Ca	656		

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Haney - Soil Health Analysis Contd.

Lab No. : 5660

Nutrient Quantity Available for Next Crop

Nitrogen, lbs N/A	74.8
Phosphorus, lbs P2O5/A	390.9
Potassium, lbs K2O/A	239.6
Nutrient Value, \$/A	320.12

Nitrogen Savings by using the Haney Test

Traditional evaluation, lbs N/A	4.9
Haney Test N evaluation, lbs N/A	74.8
Nitrogen Difference, lbs N/A	69.8
N savings, \$/A	44.70

Fertilizer Recommendations, lbs/A

<u>Crop</u>	<u>Yield Goal</u>	<u>Nitrogen N</u>	<u>Phosphorus P2O5</u>	<u>Potassium K2O</u>	<u>Lime, ECC T/A</u>
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Invoice No. : 1212203
Date Received : 07/19/2016
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Lab No. : 5661

Results For : NEBRASKA MUSHROOM LLC
Sample ID 1 : RED HAWK CONTROL
Sample ID 2 : 2

PLFA Soil Microbial Community Analysis

Functional Group Biomass & Diversity

Total Living Microbial Biomass, Phospholipid Fatty Acid (PLFA) ng/g **3901.04**
Functional Group Diversity Index **1.335**

Total Biomass	Diversity	Rating
< 500	< 1.0	Very Poor
500+ - 1000	1.0+ - 1.1	Poor
1000+ - 1500	1.1+ - 1.2	Slightly Below Average
1500+ - 2500	1.2+ - 1.3	Average
2500+ - 3000	1.3+ - 1.4	Slightly Above Average
3000+ - 3500	1.4+ - 1.5	Good
3500+ - 4000	1.5+ - 1.6	Very Good
> 4000	> 1.6	Excellent

Functional Group	Biomass, PLFA ng/g	% of Total Biomass
Total Bacteria	1548.19	39.69
Gram (+)	1012.79	25.96
Actinomycetes	236.93	6.07
Gram (-)	535.40	13.72
Rhizobia	5.22	0.13
Total Fungi	200.78	5.15
Arbuscular Mycorrhizal	75.41	1.93
Saprophytes	125.37	3.21
Protozoa	0.00	0.00
Undifferentiated	2152.06	55.17

Community Composition Ratios

Fungi:Bacteria 0.1297

Bacteria tend to dominate in systems with fewer organic inputs or residues possibly leading to a lower C:N ratio. In addition, bacteria can be more prominent in the early spring or late fall as soil temperatures are usually cooler and vegetation is less active or absent. Dry conditions, slightly alkaline to alkaline pH values, or increased land disturbance through prolonged and extensive tillage, grazing, or compaction may also favor bacteria. While bacteria are important and needed in the soil ecosystem, fungi are desired and more often considered indicators of good soil health. Increased use of cover crops and/or other organic inputs and less soil disturbance should help the soil support more fungi. Adjustments to pH may also be recommended in some more extreme circumstances.

Scale	Rating
< 0.05	Very Poor
0.05+ - 0.1	Poor
0.1+ - 0.15	Slightly Below Average
0.15+ - 0.2	Average
0.2+ - 0.25	Slightly Above Average
0.25+ - 0.3	Good
0.3+ - 0.35	Very Good
> 0.35	Excellent

Predator:Prey ALL PREY

This ratio is also expressed as protozoa to bacteria. Protozoa feed on bacteria which helps release nutrients, especially nitrogen. A higher ratio indicates an active community where base level nutrients are sufficient to support higher trophic levels or predators. However, this ratio will always be a relatively low number because the prey will greatly outnumber the predators.

Scale	Rating
< 0.002	Very Poor
0.002+ - 0.005	Poor
0.005+ - 0.008	Slightly Below Average
0.008+ - 0.01	Average
0.01+ - 0.013	Slightly Above Average
0.013+ - 0.016	Good
0.016+ - 0.02	Very Good
> 0.02	Excellent

Gram (+):Gram (-) 1.8917

Gram (+) bacteria typically dominate early in the growing season and/or following a fallow period. They also survive better under certain environmental conditions or stressors such as drought or extreme temperatures due to their ability to form spores. Therefore, it is common to see higher values when the community is coming out of dormancy or is stressed. These values will typically begin to approach those of a more balanced bacterial community as the soil conditions become more favorable throughout the growing season. A gram (-) dominated soil may be due to anaerobic conditions or other stressors such as pesticide application or heavy metal contamination.

Scale	Rating
< 0.5	Gram (-) Dominated
0.5+ - 1.0	Slightly Gram (-) Dominated
1.0+ - 2.0	Balanced Bacterial Community
2.0+ - 3.0	Slightly Gram(+) Dominated
3.0+ - 4.0	Gram(+) Dominated
> 4.0	Very Gram(+) Dominated

Stress and Community Activity Ratios

Sat:Unsat 2.8483 Bacteria alter their membranes under various environmental conditions in order to maintain optimal fluidity for nutrient and waste transport into and out of the cell. Saturated fatty acids may reflect a better adapted community to current environmental conditions. Communities under stressed conditions will increase their proportion of unsaturated fatty acids. This will likely occur most often as a result of low soil moisture or drastic changes in temperature. In general, a higher number indicates a healthier and more stable community.

Mono:Poly 7.7400 The ratio of monounsaturated to polyunsaturated fatty acids is used along with the sat:unsat ratio to further indicate the degree of community stress. A higher ratio indicates less stress, while a lower ratio would depict higher levels of prolonged stress due to conditions such as temperature, moisture, pH, or nutrient availability (starvation).

Pre 16:1w7c:cy17:0 NONE FOUND Cyclo (cy) fatty acids are more prominent during stationary phases of growth or under high stress conditions that influence membrane fluidity and growth rates such as temperature, pH, moisture, and nutrient availability. In general, a higher number or all Pre16/Pre18 is better and indicates an actively growing community experiencing fewer stressors. These values are typically higher early in the growing season (planting) when the community is becoming active and experiencing fast growth. The values may begin to drop towards the end of the growing season (harvest) following a decrease in plant growth activity or as the community approaches a stationary growth phase as the temperature/moisture changes between the seasons.

Pre 18:1w7c:cy19:0 88.6172

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Sample ID 2 : 2
Lab No. : 5661

Sample ID 3 :
Sample ID 4 :

Haney - Soil Health Analysis

1:1 Soil pH	7.4	ICAP Aluminum, ppm Al	301.60
1:1 Soluble Salts, mmho/cm	0.13	ICAP Iron, ppm Fe	196.4
Excess Lime Rating	1		
Organic Matter, %LOI	6.3	Calculations	
		Organic C:Organic N	8.5
		Nitrogen mineralization, ppm N	18.9
Solvita CO2 Burst		Organic Nitrogen Release, ppm N	18.9
CO2-C, ppm C	141.0	Organic Nitrogen Reserve, ppm N	0.0
Water Extract		Phosphorus mineralization, ppm P	19.9
Total Nitrogen, ppm N	22.2	Organic Phosphorus Reserve, ppm P	< 0.1
Organic Nitrogen, ppm N	18.9	Phosphorus Saturation Al/ Fe, %	20.6
Total Organic Carbon, ppm C	161	Phosphorus Saturation Ca, %	15.3
H3A Extract		Soil Health	
Nitrate, ppm NO3-N	2.9	Soil Health Calculation	20.04
Ammonium, ppm NH4-N	2.3	Cover Crop Suggestion	10% Legume 90% Grass
Inorganic Nitrogen, ppm N	5.2		
Inorganic (FIA) Phosphorus, ppm P	82.9		
Total (ICAP) Phosphorus, ppm P	103		
Organic Phosphorus, ppm P	19.9		
ICAP Potassium, ppm K	113		
ICAP Calcium, ppm Ca	672		

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Haney - Soil Health Analysis Contd.

Lab No. : 5661

Nutrient Quantity Available for Next Crop

Nitrogen, lbs N/A	48.3
Phosphorus, lbs P2O5/A	248.9
Potassium, lbs K2O/A	136.0
Nutrient Value, \$/A	195.93

Nitrogen Savings by using the Haney Test

Traditional evaluation, lbs N/A	5.8
Haney Test N evaluation, lbs N/A	48.3
Nitrogen Difference, lbs N/A	42.4
N savings, \$/A	27.15

Fertilizer Recommendations, lbs/A

<u>Crop</u>	<u>Yield Goal</u>	<u>Nitrogen N</u>	<u>Phosphorus P2O5</u>	<u>Potassium K2O</u>	<u>Lime, ECC T/A</u>
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Lab No. : 5662

Results For : NEBRASKA MUSHROOM LLC

Sample ID 1 : CROPS PLOT 1

Sample ID 2 :

PLFA Soil Microbial Community Analysis

Functional Group Biomass & Diversity

Total Living Microbial Biomass, Phospholipid Fatty Acid (PLFA) ng/g **1889.21**
Functional Group Diversity Index **1.102**

Total Biomass	Diversity	Rating
< 500	< 1.0	Very Poor
500+ - 1000	1.0+ - 1.1	Poor
1000+ - 1500	1.1+ - 1.2	Slightly Below Average
1500+ - 2500	1.2+ - 1.3	Average
2500+ - 3000	1.3+ - 1.4	Slightly Above Average
3000+ - 3500	1.4+ - 1.5	Good
3500+ - 4000	1.5+ - 1.6	Very Good
> 4000	> 1.6	Excellent

Functional Group	Biomass, PLFA ng/g	% of Total Biomass
Total Bacteria	1057.22	55.96
Gram (+)	868.90	45.99
Actinomycetes	232.67	12.32
Gram (-)	188.32	9.97
Rhizobia	0.00	0.00
Total Fungi	49.62	2.63
Arbuscular Mycorrhizal	5.15	0.27
Saprophytes	44.47	2.35
Protozoa	0.00	0.00
Undifferentiated	782.37	41.41

Community Composition Ratios

Fungi:Bacteria **0.0469**

Bacteria tend to dominate in systems with fewer organic inputs or residues possibly leading to a lower C:N ratio. In addition, bacteria can be more prominent in the early spring or late fall as soil temperatures are usually cooler and vegetation is less active or absent. Dry conditions, slightly alkaline to alkaline pH values, or increased land disturbance through prolonged and extensive tillage, grazing, or compaction may also favor bacteria. While bacteria are important and needed in the soil ecosystem, fungi are desired and more often considered indicators of good soil health. Increased use of cover crops and/or other organic inputs and less soil disturbance should help the soil support more fungi. Adjustments to pH may also be recommended in some more extreme circumstances.

Scale	Rating
< 0.05	Very Poor
0.05+ - 0.1	Poor
0.1+ - 0.15	Slightly Below Average
0.15+ - 0.2	Average
0.2+ - 0.25	Slightly Above Average
0.25+ - 0.3	Good
0.3+ - 0.35	Very Good
> 0.35	Excellent

Predator:Prey **ALL PREY**

This ratio is also expressed as protozoa to bacteria. Protozoa feed on bacteria which helps release nutrients, especially nitrogen. A higher ratio indicates an active community where base level nutrients are sufficient to support higher trophic levels or predators. However, this ratio will always be a relatively low number because the prey will greatly outnumber the predators.

Scale	Rating
< 0.002	Very Poor
0.002+ - 0.005	Poor
0.005+ - 0.008	Slightly Below Average
0.008+ - 0.01	Average
0.01+ - 0.013	Slightly Above Average
0.013+ - 0.016	Good
0.016+ - 0.02	Very Good
> 0.02	Excellent

Gram (+):Gram (-) **4.6140**

Gram (+) bacteria typically dominate early in the growing season and/or following a fallow period. They also survive better under certain environmental conditions or stressors such as drought or extreme temperatures due to their ability to form spores. Therefore, it is common to see higher values when the community is coming out of dormancy or is stressed. These values will typically begin to approach those of a more balanced bacterial community as the soil conditions become more favorable throughout the growing season. A gram (-) dominated soil may be due to anaerobic conditions or other stressors such as pesticide application or heavy metal contamination.

Scale	Rating
< 0.5	Gram (-) Dominated
0.5+ - 1.0	Slightly Gram (-) Dominated
1.0+ - 2.0	Balanced Bacterial Community
2.0+ - 3.0	Slightly Gram(+) Dominated
3.0+ - 4.0	Gram(+) Dominated
> 4.0	Very Gram(+) Dominated

Stress and Community Activity Ratios

Sat:Unsat **4.615**

Bacteria alter their membranes under various environmental conditions in order to maintain optimal fluidity for nutrient and waste transport into and out of the cell. Saturated fatty acids may reflect a better adapted community to current environmental conditions. Communities under stressed conditions will increase their proportion of unsaturated fatty acids. This will likely occur most often as a result of low soil moisture or drastic changes in temperature. In general, a higher number indicates a healthier and more stable community.

Mono:Poly **ALL MONO**

The ratio of monounsaturated to polyunsaturated fatty acids is used along with the sat:unsat ratio to further indicate the degree of community stress. A higher ratio indicates less stress, while a lower ratio would depict higher levels of prolonged stress due to conditions such as temperature, moisture, pH, or nutrient availability (starvation).

Pre 16:1w7c:cy17:0 **NONE FOUND**

Cyclo (cy) fatty acids are more prominent during stationary phases of growth or under high stress conditions that influence membrane fluidity and growth rates such as temperature, pH, moisture, and nutrient availability. In general, a higher number or all Pre16/Pre18 is better and indicates an actively growing community experiencing fewer stressors. These values are typically higher early in the growing season (planting) when the community is becoming active and experiencing fast growth. The values may begin to drop towards the end of the growing season (harvest) following a decrease in plant growth activity or as the community approaches a stationary growth phase as the temperature/moisture changes between the seasons.

Pre 18:1w7c:cy19:0 **37.8798**

All ratios should be looked at separately, but should also be taken into context and compared with one another to better understand the big picture. These are general guidelines and statements regarding soil microbial communities. In addition, the scales and ranges presented here are specific for the type of extraction and analytical methods used for PLFA analysis at Ward Laboratories, Inc. They will not necessarily reflect ranges derived from other methods of analysis or the literature. The scales can and should be adjusted slightly depending on the time of year and conditions at sampling along with the climate and soil type of specific regions where comparisons are being made. Conditions such as time of year, past and present crop, moisture, pH, and fertility should be noted or measured close to sampling for PLFA analysis for a more in depth interpretation of results.



Ag Testing - Consulting

Account No. : 24409

Biological Soil Analysis Report

NEBRASKA MUSHROOM LLC
1982 E CITATION WAY
GRAND ISLAND NE 68801

Invoice No. : 1212203
Date Received : 07/19/2016
Date Reported : 07/21/2016

Results For : NEBRASKA MUSHROOM LLC
Sample ID 1 : CROPS PLOT 1
Sample ID 2 :
Lab No. : 5662

Sample ID 3 :
Sample ID 4 :

Haney - Soil Health Analysis

1:1 Soil pH	6.2	ICAP Aluminum, ppm Al	216.90
1:1 Soluble Salts, mmho/cm	0.10	ICAP Iron, ppm Fe	146.3
Excess Lime Rating	1		
Organic Matter, %LOI	6.0	Calculations	
WDRF Buffer pH	6.7	Organic C:Organic N	9.0
Solvita CO2 Burst		Nitrogen mineralization, ppm N	12.2
CO2-C, ppm C	155.0	Organic Nitrogen Release, ppm N	12.2
		Organic Nitrogen Reserve, ppm N	0.0
Water Extract		Phosphorus mineralization, ppm P	9.2
Total Nitrogen, ppm N	15.3	Organic Phosphorus Reserve, ppm P	< 0.1
Organic Nitrogen, ppm N	12.2	Phosphorus Saturation Al/ Fe, %	6.9
Total Organic Carbon, ppm C	110	Phosphorus Saturation Ca, %	8.2
H3A Extract		Soil Health	
Nitrate, ppm NO3-N	1.9	Soil Health Calculation	19.58
Ammonium, ppm NH4-N	1.7	Cover Crop Suggestion	20% Legume 80% Grass
Inorganic Nitrogen, ppm N	3.6		
Inorganic (FIA) Phosphorus, ppm P	16.0		
Total (ICAP) Phosphorus, ppm P	25		
Organic Phosphorus, ppm P	9.2		
ICAP Potassium, ppm K	92		
ICAP Calcium, ppm Ca	307		

Reviewed By : Lance Gunderson

7/21/2016

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web site
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Kearney, Nebraska 68848-0788



Laboratories, Inc.

Ag Testing - Consulting

Haney - Soil Health Analysis Contd.

Lab No. : 5662

Nutrient Quantity Available for Next Crop

Nitrogen Savings by using the Haney Test

Nitrogen, lbs N/A	31.7	Traditional evaluation, lbs N/A	3.9
Phosphorus, lbs P2O5/A	97.5	Haney Test N evaluation, lbs N/A	31.7
Potassium, lbs K2O/A	110.1	Nitrogen Difference, lbs N/A	27.8
Nutrient Value, \$/A	113.40	N savings, \$/A	17.80

<u>Crop</u>	<u>Yield Goal</u>	<u>Nitrogen N</u>	<u>Phosphorus P2O5</u>	<u>Potassium K2O</u>	<u>Lime, ECC T/A</u>
					1.2



Ag Testing - Consulting

Account No. : 24409

Biological Soil Analysis Report

NEBRASKA MUSHROOM LLC
 1982 E CITATION WAY
 GRAND ISLAND NE 68801

Invoice No. : 1212203
 Date Received : 07/19/2016
 Date Reported : 07/21/2016
 Lab No. : 5663

Results For : NEBRASKA MUSHROOM LLC
 Sample ID 1 : CROPS PLOT 2
 Sample ID 2 :

PLFA Soil Microbial Community Analysis

Functional Group Biomass & Diversity

Total Living Microbial Biomass, Phospholipid Fatty Acid (PLFA) ng/g 2618.77
 Functional Group Diversity Index 1.608

Total Biomass	Diversity	Rating
< 500	< 1.0	Very Poor
500+ - 1000	1.0+ - 1.1	Poor
1000+ - 1500	1.1+ - 1.2	Slightly Below Average
1500+ - 2500	1.2+ - 1.3	Average
2500+ - 3000	1.3+ - 1.4	Slightly Above Average
3000+ - 3500	1.4+ - 1.5	Good
3500+ - 4000	1.5+ - 1.6	Very Good
> 4000	> 1.6	Excellent

Functional Group	Biomass, PLFA ng/g	% of Total Biomass
Total Bacteria	1363.69	52.07
Gram (+)	930.70	35.54
Actinomycetes	258.61	9.88
Gram (-)	432.99	16.53
Rhizobia	73.17	2.79
Total Fungi	376.86	14.39
Arbuscular Mycorrhizal	82.26	3.14
Saprophytes	294.59	11.25
Protozoa	25.69	0.98
Undifferentiated	852.54	32.55

Community Composition Ratios

Fungi:Bacteria 0.2763

Bacteria tend to dominate in systems with fewer organic inputs or residues possibly leading to a lower C:N ratio. In addition, bacteria can be more prominent in the early spring or late fall as soil temperatures are usually cooler and vegetation is less active or absent. Dry conditions, slightly alkaline to alkaline pH values, or increased land disturbance through prolonged and extensive tillage, grazing, or compaction may also favor bacteria. While bacteria are important and needed in the soil ecosystem, fungi are desired and more often considered indicators of good soil health. Increased use of cover crops and/or other organic inputs and less soil disturbance should help the soil support more fungi. Adjustments to pH may also be recommended in some more extreme circumstances.

Scale	Rating
< 0.05	Very Poor
0.05+ - 0.1	Poor
0.1+ - 0.15	Slightly Below Average
0.15+ - 0.2	Average
0.2+ - 0.25	Slightly Above Average
0.25+ - 0.3	Good
0.3+ - 0.35	Very Good
> 0.35	Excellent

Predator:Prey 0.0188

This ratio is also expressed as protozoa to bacteria. Protozoa feed on bacteria which helps release nutrients, especially nitrogen. A higher ratio indicates an active community where base level nutrients are sufficient to support higher trophic levels or predators. However, this ratio will always be a relatively low number because the prey will greatly outnumber the predators.

Scale	Rating
< 0.002	Very Poor
0.002+ - 0.005	Poor
0.005+ - 0.008	Slightly Below Average
0.008+ - 0.01	Average
0.01+ - 0.013	Slightly Above Average
0.013+ - 0.016	Good
0.016+ - 0.02	Very Good
> 0.02	Excellent

Gram (+):Gram (-) 2.1495

Gram (+) bacteria typically dominate early in the growing season and/or following a fallow period. They also survive better under certain environmental conditions or stressors such as drought or extreme temperatures due to their ability to form spores. Therefore, it is common to see higher values when the community is coming out of dormancy or is stressed. These values will typically begin to approach those of a more balanced bacterial community as the soil conditions become more favorable throughout the growing season. A gram (-) dominated soil may be due to anaerobic conditions or other stressors such as pesticide application or heavy metal contamination.

Scale	Rating
< 0.5	Gram (-) Dominated
0.5+ - 1.0	Slightly Gram (-) Dominated
1.0+ - 2.0	Balanced Bacterial Community
2.0+ - 3.0	Slightly Gram(+) Dominated
3.0+ - 4.0	Gram(+) Dominated
> 4.0	Very Gram(+) Dominated

Stress and Community Activity Ratios

Sat:Unsat 1.9035 Bacteria alter their membranes under various environmental conditions in order to maintain optimal fluidity for nutrient and waste transport into and out of the cell. Saturated fatty acids may reflect a better adapted community to current environmental conditions. Communities under stressed conditions will increase their proportion of unsaturated fatty acids. This will likely occur most often as a result of low soil moisture or drastic changes in temperature. In general, a higher number indicates a healthier and more stable community.

Mono:Poly 5.0665 The ratio of monounsaturated to polyunsaturated fatty acids is used along with the sat:unsat ratio to further indicate the degree of community stress. A higher ratio indicates less stress, while a lower ratio would depict higher levels of prolonged stress due to conditions such as temperature, moisture, pH, or nutrient availability (starvation).

Pre 16:1w7c:cy17:0 3.7625 Cyclo (cy) fatty acids are more prominent during stationary phases of growth or under high stress conditions that influence membrane fluidity and growth rates such as temperature, pH, moisture, and nutrient availability.

Pre 18:1w7c:cy19:0 2.8807 In general, a higher number or all Pre16/Pre18 is better and indicates an actively growing community experiencing fewer stressors. These values are typically higher early in the growing season (planting) when the community is becoming active and experiencing fast growth. The values may begin to drop towards the end of the growing season (harvest) following a decrease in plant growth activity or as the community approaches a stationary growth phase as the temperature/moisture changes between the seasons.

All ratios should be looked at separately, but should also be taken into context and compared with one another to better understand the big picture. These are general guidelines and statements regarding soil microbial communities. In addition, the scales and ranges presented here are specific for the type of extraction and analytical methods used for PLFA analysis at Ward Laboratories, Inc. They will not necessarily reflect ranges derived from other methods of analysis or the literature. The scales can and should be adjusted slightly depending on the time of year and conditions at sampling along with the climate and soil type of specific regions where comparisons are being made. Conditions such as time of year, past and present crop, moisture, pH, and fertility should be noted or measured close to sampling for PLFA analysis for a more in depth interpretation of results.



Ag Testing - Consulting

Account No. : 24409

Biological Soil Analysis Report

NEBRASKA MUSHROOM LLC
1982 E CITATION WAY
GRAND ISLAND NE 68801

Invoice No. : 1212203
Date Received : 07/19/2016
Date Reported : 07/21/2016

Results For : NEBRASKA MUSHROOM LLC
Sample ID 1 : CROPS PLOT 2
Sample ID 2 :
Lab No. : 5663

Sample ID 3 :
Sample ID 4 :

Haney - Soil Health Analysis

1:1 Soil pH	6.1	ICAP Aluminum, ppm Al	204.20
1:1 Soluble Salts, mmho/cm	0.10	ICAP Iron, ppm Fe	135.2
Excess Lime Rating	1		
Organic Matter, %LOI	5.6	Calculations	
WDRF Buffer pH	6.7	Organic C:Organic N	9.4
Solvita CO2 Burst		Nitrogen mineralization, ppm N	12.4
CO2-C, ppm C	134.0	Organic Nitrogen Release, ppm N	12.4
		Organic Nitrogen Reserve, ppm N	0.0
Water Extract		Phosphorus mineralization, ppm P	9.4
Total Nitrogen, ppm N	14.0	Organic Phosphorus Reserve, ppm P	< 0.1
Organic Nitrogen, ppm N	12.4	Phosphorus Saturation Al/ Fe, %	8.8
Total Organic Carbon, ppm C	116	Phosphorus Saturation Ca, %	10.2
H3A Extract		Soil Health	
Nitrate, ppm NO3-N	1.6	Soil Health Calculation	16.72
Ammonium, ppm NH4-N	1.4	Cover Crop Suggestion	30% Legume 70% Grass
Inorganic Nitrogen, ppm N	3.0		
Inorganic (FIA) Phosphorus, ppm P	20.6		
Total (ICAP) Phosphorus, ppm P	30		
Organic Phosphorus, ppm P	9.4		
ICAP Potassium, ppm K	88		
ICAP Calcium, ppm Ca	295		

Reviewed By : Lance Gunderson

7/21/2016

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Ag Testing - Consulting

Haney - Soil Health Analysis Contd.

Lab No. : 5663

Nutrient Quantity Available for Next Crop

Nitrogen Savings by using the Haney Test

Nitrogen, lbs N/A	30.8	Traditional evaluation, lbs N/A	3.2
Phosphorus, lbs P2O5/A	97.6	Haney Test N evaluation, lbs N/A	30.8
Potassium, lbs K2O/A	105.7	Nitrogen Difference, lbs N/A	27.6
Nutrient Value, \$/A	110.60	N savings, \$/A	17.64

<u>Crop</u>	<u>Yield Goal</u>	<u>Nitrogen N</u>	<u>Phosphorus P2O5</u>	<u>Potassium K2O</u>	<u>Lime, ECC T/A</u>
					1.2



LABORATORIES, INC.

Ag Testing - Consulting

Account No. : 24409

Biological Soil Analysis Report

NEBRASKA MUSHROOM LLC
1982 E CITATION WAY
GRAND ISLAND NE 68801

Invoice No. : 1212203
Date Received : 07/19/2016
Date Reported : 07/21/2016
Lab No. : 5664

Results For : NEBRASKA MUSHROOM LLC
Sample ID 1 : CROPS CONTROL
Sample ID 2 :

PLFA Soil Microbial Community Analysis

Functional Group Biomass & Diversity

Total Living Microbial Biomass, Phospholipid Fatty Acid (PLFA) ng/g 2177.76
Functional Group Diversity Index 1.345

Table with 3 columns: Total Biomass, Diversity, Rating. Rows include ranges like < 500, 500+ - 1000, etc., with corresponding diversity and rating values.

Main data table with 3 columns: Functional Group, Biomass, PLFA ng/g, % of Total Biomass. Rows include Total Bacteria, Gram (+), Actinomycetes, Gram (-), Rhizobia, Total Fungi, Arbuscular Mycorrhizal, Saprophytes, Protozoa, and Undifferentiated.

Community Composition Ratios

Fungi:Bacteria 0.1271

Bacteria tend to dominate in systems with fewer organic inputs or residues possibly leading to a lower C:N ratio. In addition, bacteria can be more prominent in the early spring or late fall as soil temperatures are usually cooler and vegetation is less active or absent. Dry conditions, slightly alkaline to alkaline pH values, or increased land disturbance through prolonged and extensive tillage, grazing, or compaction may also favor bacteria. While bacteria are important and needed in the soil ecosystem, fungi are desired and more often considered indicators of good soil health. Increased use of cover crops and/or other organic inputs and less soil disturbance should help the soil support more fungi. Adjustments to pH may also be recommended in some more extreme circumstances.

Scale	Rating
< 0.05	Very Poor
0.05+ - 0.1	Poor
0.1+ - 0.15	Slightly Below Average
0.15+ - 0.2	Average
0.2+ - 0.25	Slightly Above Average
0.25+ - 0.3	Good
0.3+ - 0.35	Very Good
> 0.35	Excellent

Predator:Prey 0.0150

This ratio is also expressed as protozoa to bacteria. Protozoa feed on bacteria which helps release nutrients, especially nitrogen. A higher ratio indicates an active community where base level nutrients are sufficient to support higher trophic levels or predators. However, this ratio will always be a relatively low number because the prey will greatly outnumber the predators.

Scale	Rating
< 0.002	Very Poor
0.002+ - 0.005	Poor
0.005+ - 0.008	Slightly Below Average
0.008+ - 0.01	Average
0.01+ - 0.013	Slightly Above Average
0.013+ - 0.016	Good
0.016+ - 0.02	Very Good
> 0.02	Excellent

Gram (+):Gram (-) 3.6985

Gram (+) bacteria typically dominate early in the growing season and/or following a fallow period. They also survive better under certain environmental conditions or stressors such as drought or extreme temperatures due to their ability to form spores. Therefore, it is common to see higher values when the community is coming out of dormancy or is stressed. These values will typically begin to approach those of a more balanced bacterial community as the soil conditions become more favorable throughout the growing season. A gram (-) dominated soil may be due to anaerobic conditions or other stressors such as pesticide application or heavy metal contamination.

Scale	Rating
< 0.5	Gram (-) Dominated
0.5+ - 1.0	Slightly Gram (-) Dominated
1.0+ - 2.0	Balanced Bacterial Community
2.0+ - 3.0	Slightly Gram(+) Dominated
3.0+ - 4.0	Gram(+) Dominated
> 4.0	Very Gram(+) Dominated

Stress and Community Activity Ratios

Sat:Unsat 2.5667

Bacteria alter their membranes under various environmental conditions in order to maintain optimal fluidity for nutrient and waste transport into and out of the cell. Saturated fatty acids may reflect a better adapted community to current environmental conditions. Communities under stressed conditions will increase their proportion of unsaturated fatty acids. This will likely occur most often as a result of low soil moisture or drastic changes in temperature. In general, a higher number indicates a healthier and more stable community.

Mono:Poly 15.3712

The ratio of monounsaturated to polyunsaturated fatty acids is used along with the sat:unsat ratio to further indicate the degree of community stress. A higher ratio indicates less stress, while a lower ratio would depict higher levels of prolonged stress due to conditions such as temperature, moisture, pH, or nutrient availability (starvation).

Pre 16:1w7c:cy17:0 NONE FOUND

Cyclo (cy) fatty acids are more prominent during stationary phases of growth or under high stress conditions that influence membrane fluidity and growth rates such as temperature, pH, moisture, and nutrient availability. In general, a higher number or all Pre16/Pre18 is better and indicates an actively growing community experiencing fewer stressors. These values are typically higher early in the growing season (planting) when the community is becoming active and experiencing fast growth. The values may begin to drop towards the end of the growing season (harvest) following a decrease in plant growth activity or as the community approaches a stationary growth phase as the temperature/moisture changes between the seasons.

Pre 18:1w7c:cy19:0 25.3527

All ratios should be looked at separately, but should also be taken into context and compared with one another to better understand the big picture. These are general guidelines and statements regarding soil microbial communities. In addition, the scales and ranges presented here are specific for the type of extraction and analytical methods used for PLFA analysis at Ward Laboratories, Inc. They will not necessarily reflect ranges derived from other methods of analysis or the literature. The scales can and should be adjusted slightly depending on the time of year and conditions at sampling along with the climate and soil type of specific regions where comparisons are being made. Conditions such as time of year, past and present crop, moisture, pH, and fertility should be noted or measured close to sampling for PLFA analysis for a more in depth interpretation of results.



Ag Testing - Consulting

Account No. : 24409

Biological Soil Analysis Report

NEBRASKA MUSHROOM LLC
1982 E CITATION WAY
GRAND ISLAND NE 68801

Invoice No. : 1212203
Date Received : 07/19/2016
Date Reported : 07/21/2016

Results For : NEBRASKA MUSHROOM LLC
Sample ID 1 : CROPS CONTROL
Sample ID 2 :
Lab No. : 5664

Sample ID 3 :
Sample ID 4 :

Haney - Soil Health Analysis

1:1 Soil pH	6.2	ICAP Aluminum, ppm Al	175.90
1:1 Soluble Salts, mmho/cm	0.12	ICAP Iron, ppm Fe	116.3
Excess Lime Rating	1		
Organic Matter, %LOI	4.8	Calculations	
WDRF Buffer pH	6.6	Organic C:Organic N	9.4
Solvita CO2 Burst		Nitrogen mineralization, ppm N	10.6
CO2-C, ppm C	141.0	Organic Nitrogen Release, ppm N	10.6
		Organic Nitrogen Reserve, ppm N	0.0
Water Extract		Phosphorus mineralization, ppm P	8.0
Total Nitrogen, ppm N	12.4	Organic Phosphorus Reserve, ppm P	< 0.1
Organic Nitrogen, ppm N	10.6	Phosphorus Saturation Al/ Fe, %	5.5
Total Organic Carbon, ppm C	100	Phosphorus Saturation Ca, %	4.5
H3A Extract		Soil Health	
Nitrate, ppm NO3-N	1.7	Soil Health Calculation	17.04
Ammonium, ppm NH4-N	1.6	Cover Crop Suggestion	30% Legume 70% Grass
Inorganic Nitrogen, ppm N	3.3		
Inorganic (FIA) Phosphorus, ppm P	8.0		
Total (ICAP) Phosphorus, ppm P	16		
Organic Phosphorus, ppm P	8.0		
ICAP Potassium, ppm K	61		
ICAP Calcium, ppm Ca	356		

Reviewed By : Lance Gunderson

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Ag Testing - Consulting

Haney - Soil Health Analysis Contd.

Lab No. : 5664

Nutrient Quantity Available for Next Crop

Nitrogen Savings by using the Haney Test

Nitrogen, lbs N/A	27.8	Traditional evaluation, lbs N/A	3.4
Phosphorus, lbs P2O5/A	70.9	Haney Test N evaluation, lbs N/A	27.8
Potassium, lbs K2O/A	73.7	Nitrogen Difference, lbs N/A	24.4
Nutrient Value, \$/A	82.30	N savings, \$/A	15.61

<u>Crop</u>	<u>Yield Goal</u>	<u>Nitrogen N</u>	<u>Phosphorus P2O5</u>	<u>Potassium K2O</u>	<u>Lime, ECC T/A</u>
					1.6