Interpreting Your Lab Results

Every day our bodies come in contact with molds, some of which can be considered toxic and some of which can cause allergic reactions. These lab results are not an indication of how or if a mold will affect you or other occupants of these structures. Data is limited to the area where samples were collected and to the time and day of the sample collection. ERA Test, LLC is sometimes only able to determine the presence of mold, and not always the source of those mold spores. Further investigation may be required to determine the source of the spores.

Reactions to molds varies from individual to individual, however, there is general consensus in the scientific community that those who have compromised immune systems, infants and young children and the elderly more commonly experience reactions from exposure to mold spores.

These lab results show if there are spore levels significantly elevated beyond our natural environment.

Project: Stevensville Library, cellar. 208 Main Street, Stevensville, Montana

I was contacted by the library director, Denise Ard. The library is currently undergoing a remodeling and expansion project. Reportedly, during the project some probable mold was discovered in the cellar of the library. This cellar will be exposed during the rebuilding and strengthening of the library floor. I was asked to do an inspection of the cellar and to take samples to determine the extent of the mold infestation and make some recommendation for mold remediation if needed.

NOTE: This mold inspection was limited to the cellar of the library today only.

Date of Mold Investigation: September 29, 2015

Visual Inspection:

Currently, there is a plastic barrier blocking the public area of the library from the construction zone. Inside the plastic barrier there is an access hatch to the library cellar. There is a crude ladder/steps into the cellar. There is a strong musty odor in the cellar. There is a wooden floor over the soils in some areas and a lot of exposed soils are present as well. The west portion of the crawlspace is inaccessible due to the shallow nature of this area. It appears that there may be mold growth on these floor joists in areas as well. See photo below:

There is a lot of visible mold growth on the floor joists and plank sheeting.

The crawlspace is dry today but there is evidence of past water intrusion. There is very old plumbing present with visible signs of old leaks with a possibility for sewage contamination.

There is a small “room” in the cellar which may have been used for a meat locker or something similar in the past.

This room has its own floor, walls ceiling and doorway.

There is old wood scattered on the floor of the cellar. There are signs that the foundation has been wet in the past.

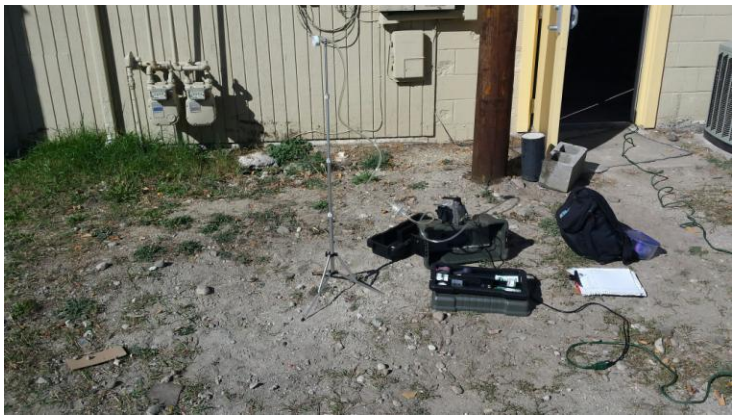
All structures are dry today with moisture content ranging from 8-10%. There is no apparent ventilation in the cellar and no outside vents were visible. Lighting is limited at best and inspection was done with the aid of a drop light and flashlight.

I took an air spore trap sample in the cellar and an outside air spore trap sample to use for baseline comparison. I did note that the gutter downspout in the alley empties adjacent toeh library foundation. This, in times of heavy precipitation or show melt could contribute to moisture in the cellar. See photo below:

Air Spore Trap Samples Taken:

SLA – 1: Cellar- Time: 10:52, 65 ○ F, 38% RH (3 minutes at 15 liters per minute)

SLA – 2: Outside- Time: 11:38, 68 ○ F, 21% RH (3 minutes at 15 liters per minute) samples was taken in alley behind library, Conditions were sunny with no breeze.



Lab Results and Conclusions

Detailed Environmental Microbiology/Aerotech lab results were provided by EMLab P&K and are attached for your review.

The lab results indicate very elevated levels of active mold spores are present in the cellar at this time. There were extremely high numbers of Penicillium/Aspergillus type spores present (19,000 spore/m3) . There were also high levels of Chaetomium and Stachybotrys spores present. Due to the high background debris associated with an unfinished space the actual mold spore counts could be even higher than reported.

Detailed information from EMLab P&K on specific mold types can be found at https://www.emlab.com/app/fungi/Fungi.po.

Based on the visual inspection and lab results I believe that there is very active mold growth in the cellar at this time. I believe that there may also be concern for Endotoxin exposure due to probable sewage leaks in the past.

Recommendations

Based on the extent of the mold, the types and amounts of mold spores present and the difficult work environment. I highly recommend using a professional mold remediation company be hired do the mold remediation in the cellar.

I also recommend that any person spending time in the cellar wear proper personal protective equipment and be trained in its' proper use.

Containment and negative air will need to be set up during remediation to insure that public areas of the library are not exposed to mold spores during the remediation.

The key to controlling and keeping a mold infestation from occurring or expanding in a structure is moisture management. Water intrusion, leaky pipes, or any event that can leave building materials damp for a period of time should be remedied as soon as possible.

If you have any questions or require further information, please do not hesitate to contact The Air Experts at ERA Test, LLC!

Best regards,

Lisa Philipps
The Air Experts – ERA Test, LLC

Inspection and lab analysis is limited to the visual inspection and sampling on this date and does not guarantee the presence or lack of presence of mold infestations in the past or future. All sampling and lab analysis was performed to American Council for Accredited Certification (ACAC) standards.

EMLab P&K
A TestAmerica Company

Report for:

Ms. Lisa Philipps
ERA Test, LLC: MT
840 North Shoshone Loop
Hamilton, MT 59840

Regarding: Project: Stevensville Library; Library Cellar
EML ID: 1432366

Approved by:

Technical Manager
Michelle Seidl

Dates of Analysis:
Spore trap analysis: 10-01-2015

Service SOPs: Spore trap analysis (EM-MY-S-1038)
AIHA-LAP, LLC accredited service, Lab ID #178599

EMLab P&K
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Client: ERA Test, LLC: MT
C/O: Ms. Lisa Philipps
Re: Stevensville Library; Library Cellar

Date of Sampling: 09-29-2015
Date of Receipt: 09-30-2015
Date of Report: 10-01-2015

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	SLA-1: Library Cellar		SLA-2: Outside	
Comments (see below)	None		None	
Lab ID-Version‡:	6602883-1		6602884-1	
Analysis Date:	10/01/2015		10/01/2015	
	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria	2	44	4	89
Ascospores	5	440	2	180
Basidiospores	6	530	8	710
Bipolaris/Drechslera group			1	22
Chaetomium	9	200		
Cladosporium	8	710	6	530
Epicoccum			1	22
Myrothecium				
Nigrospora				
Other brown	1	22		
Other colorless				
Penicillium/Aspergillus types†	209	19,000	8	710
Pithomyces			2	44
Rusts				
Smuts, Periconia, Myxomycetes	1	22	2	44
Stachybotrys	1	22		
Stemphylium				
Torula				
Ulocladium				
Zygomycetes				
Background debris (1-4+)††	4+		2+	
Hyphal fragments/m3	180		130	
Pollen/m3	< 22		22	
Skin cells (1-4+)	< 1+		< 1+	
Sample volume (liters)	45		45	
§ TOTAL SPORES/m3		21,000		2,400

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample.
† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium, Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.
††Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher then reported. It is important to account for samples volumes when evaluating dust levels.

The analytical sensitivity is the spores/m3 divided by the raw count. The limit of detection is the analytical sensitivity multiplied by the sample volume divided by 1000.

For more information regarding analytical sensitivity, please contact QA by calling the laboratory.
‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

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Re: Stevensville Library; Library Cellar

Date of Sampling: 09-29-2015
Date of Receipt: 09-30-2015
Date of Report: 10-01-2015

MoldRANGE™: Extended Outdoor Comparison

Outdoor Location: SLA-2, Outside

Fungi Identified	Outdoor data	Typical Outdoor Data for: September in Montana† (n‡=342)						Typical Outdoor Data for: The entire year in Montana† (n‡=2786)					
	spores/m3	very low	low	med	high	very high	freq %	very low	low	med	high	very high	freq %
Generally able to grow indoors*													
Alternaria	89	13	13	40	160	280	57	13	13	27	110	210	32
Bipolaris/Drechslera group	22	7	7	13	27	53	7	7	7	13	27	53	4
Chaetomium	-	-	-	-	-	-	6	7	11	13	27	67	5
Cladosporium	530	130	270	850	3,100	6,200	95	47	89	340	1,400	3,000	87
Curvularia	-	-	-	-	-	-	4	7	12	20	37	67	2
Epicoccum	22	11	13	27	80	110	31	7	13	22	53	93	17
Nigrospora	-	-	-	-	-	-	4	7	7	13	22	53	2
Other brown	-	7	13	22	49	89	29	7	13	22	53	67	27
Penicillium/Aspergillus types	710	27	53	160	480	710	85	27	47	120	400	640	80
Pithomyces	44	12	13	15	67	200	11	7	13	17	53	67	5
Stachybotrys	-	-	-	-	-	-	< 1	12	13	34	130	260	2
Torula	-	-	-	-	-	-	4	7	7	13	27	53	3
Seldom found growing indoors**													
Ascospores	180	47	93	320	960	1,700	93	22	53	180	730	1,400	77
Basidiospores	710	120	270	1,100	4,200	8,500	98	40	87	440	2,300	5,000	88
Rusts	-	7	13	25	110	160	30	7	13	22	53	110	14
Smuts, Periconia, Myxomycetes	44	22	44	150	480	790	82	13	22	110	480	1,100	64
§ TOTAL SPORES/m3	2,400												

†The 'Typical Outdoor Data' represents the typical outdoor spore levels for the location and time frame indicated. The last column represents the frequency of occurrence. The very low, low, med, high, and very high values represent the 10, 20, 50, 80, and 90 percentile values of the spore type when it is detected. For example, if the frequency of occurrence is 63% and the low value is 53, it would mean that the given spore type is detected 63% of the time and, when detected, 20% of the time it is present in levels above the detection limit and below 53 spores/m3. These values are updated periodically, and if enough data is not available to make a statistically meaningful assessment, it is indicated with a dash.

§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

* The spores in this category are generally capable of growing on wet building materials in addition to growing outdoors. Building related growth is dependent upon the fungal type, moisture level, type of material, and other factors. *Cladosporium* is one of the predominant spore types worldwide and is frequently present in high numbers. *Penicillium/Aspergillus* species colonize both outdoor and indoor wet surfaces rapidly and are very easily dispersed. Other genera are usually present in lesser numbers.

** These fungi are generally not found growing on wet building materials. For example, the rusts and smuts are obligate plant pathogens. However, in each group there are notable exceptions. For example, agents of wood decay are members of the basidiomycetes and high counts of a single morphological type of basidiospore on an inside sample should be considered significant.

‡n = number of samples used to calculate data.

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Date of Receipt: 09-30-2015
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MoldRANGE™, Local Climate; Extended Outdoor Comparison

Outdoor Location: SLA-2, Outside

Fungi Identified	Outdoor data	Typical Outdoor Data for: September in West North Central† EMLab Regional Climate code¹ A Annual Temp, A Elev., B Rain, B Temp. Range (n‡=65)						Typical Outdoor Data for: The entire year in West North Central† EMLab Regional Climate code¹ A Annual Temp, A Elev., B Rain, B Temp. Range (n‡=712)					
Project zip code 59870	spores/m3	very low	low	med	high	very high	freq %	very low	low	med	high	very high	freq %
Generally able to grow indoors*													
Alternaria	89	26	27	200	580	810	77	13	22	53	300	530	46
Bipolaris/Drechslera group	22	-	-	-	-	-	11	7	9	13	59	67	7
Chaetomium	-	-	-	-	-	-	6	9	13	22	67	130	7
Cladosporium	530	190	360	940	7,900	11,000	98	53	89	460	2,500	6,100	86
Curvularia	-	-	-	-	-	-	6	7	12	18	51	87	3
Epicoccum	22	12	13	40	130	200	51	8	13	27	67	130	21
Nigrospora	-	-	-	-	-	-	9	7	7	13	27	61	4
Other brown	-	11	13	67	220	270	38	9	13	22	53	92	32
Penicillium/Aspergillus types	710	67	89	180	800	1,700	78	40	53	150	370	800	78
Pithomyces	44	-	-	-	-	-	18	8	13	22	67	140	7
Stachybotrys	-	-	-	-	-	-	2	-	-	-	-	-	2
Torula	-	-	-	-	-	-	6	7	13	22	42	82	4
Seldom found growing indoors**													
Ascospores	180	75	96	280	640	1,200	85	27	53	160	600	1,400	69
Basidiospores	710	110	180	440	2,000	7,000	94	33	53	210	1,100	2,600	77
Rusts	-	13	20	25	67	67	34	8	13	22	53	67	13
Smuts, Periconia, Myxomycetes	44	40	58	270	3,600	16,000	92	13	27	110	760	3,000	72
§ TOTAL SPORES/m3	2,400												

¹EMLab Regional Climate codes are a climate classification scheme for regional geographic areas containing multiple states. The MoldRANGE™ Local Climate report uses the sampling location zip code to identify the EMLab Regional Climate code in that area. Using information available from the NOAA weather database, the EMLab Regional Climate code sharpens the precision of the MoldRANGE™reporting system, providing more reliable estimates of the range and average concentrations of the different airborne fungal spore types for each region. Additional information on the EMLab Regional Climate code system can be found on the last page of this report.

†The Typical Outdoor Data represents the typical outdoor spore levels across the region's group of states for the time period and EMLab Regional Climate code indicated. The last column represents the frequency of occurrence. The very low, low, med, high, and very high values represent the 10, 20, 50, 80, and 90 percentile values of the spore type when it is detected. For example, if the frequency of occurrence is 63% and the low value is 53, it would mean that the given spore type is detected 63% of the time and, when detected, 20% of the time it is present in levels above the detection limit and below 53 spores/m3. These values are updated periodically and if not enough data is available to make a statistically meaningful assessment, it is indicated with a dash.

‡ n is the sample size used to calculate the MoldRANGE™ Local Climate data summarized in the table.

* The spores in this category are generally capable of growing on wet building materials in addition to growing outdoors. Building related growth is dependent upon the fungal type, moisture level, type of material, and other factors. *Cladosporium* is one of the predominant spore types worldwide and is frequently present in high numbers. *Penicillium/Aspergillus* species colonize both outdoor and indoor wet surfaces rapidly and are very easily dispersed. Other genera are usually present in lesser numbers.

** These fungi are generally not found growing on wet building materials. For example, the rusts and smuts are obligate plant pathogens. However, in each group there are notable exceptions. For example, agents of wood decay are members of the basidiomycetes and high counts of a single morphological type of basidiospore on an inside sample should be considered significant.

§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

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C/O: Ms. Lisa Philipps
Re: Stevensville Library; Library Cellar

Date of Sampling: 09-29-2015
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Understanding EMLab Regional Climate Codes

Outdoor airborne spore concentrations are strongly influenced by climate and weather patterns, often resulting in pronounced seasonal and diurnal cycles (Burge 1995). The seasonal climatic changes directly affect the growth cycle of plants, thereby influencing fungal growth, spore maturation, and release cycles. By evaluating outdoor spore concentrations across similar climatic zones rather than for the state as a whole, it is possible to provide a more representative estimate of typical outdoor spore levels and frequency of occurrence for different airborne fungal spore types in a given area.

The EMLab Regional Climate code system is a novel and patent pending classification system that uses data from the NOAA - National Oceanic and Atmospheric Administration database to define unique climate zones. The following climate variables, for each regional zip code, are obtained from NOAA and assigned a letter code of A (above the regional average for that variable) or B (below the regional average for that variable):

1. Annual High Temperature
2. Elevation
3. Rainfall/Precipitation
4. Monthly Temperature Range

The result is a 4-character code assigned to each statewide zip code, referred to as the Regional Climate Code. Below are some examples of decoded Regional Climate Codes:

AAAA = Above avg. Annual High Temperature, Above avg. Elevation, Above avg. Rainfall/Precipitation, Above avg. Monthly Temperature Range
AABB = Above avg. Annual High Temperature, Above avg. Elevation, Below avg. Rainfall/Precipitation, Below avg. Monthly Temperature Range
BBAA = Below avg. Annual High Temperature, Below avg. Elevation, Above avg. Rainfall/Precipitation, Above avg. Monthly Temperature Range

The actual outdoor air sample data from matching regional climate codes in each group of states are then compiled in a manner relating typical spore concentrations and frequency of occurrence.

The data presented in this report is from the West North Central Region which includes the states of: MT, ND, NE, SD, and WY

The NOAA regional climate variables were selected by mapping data points from a subset of approximately 145,000 weather and geographic database entries to over 80,000 outdoor spore trap samples with known zip codes and assessing them using orthogonal array experimental design techniques. The results were then compared to the typical ranges of spore types found when grouping zip codes using the Koppen-Geiger climatic classification system; a commonly used climatic system that provides an objective numerical definition in terms of climatic elements such as temperature, rainfall, and other seasonal characteristics . The EMLab Regional Climate codes showed improved granularity and refinement of the zip code groupings, implying a better representation of the expected range of spore types to be found within an individual zip code.

The values on this report were calculated by obtaining the four variables listed above from the over 585 million data points of weather and geographic information available in the NOAA database, and determining the frequencies and percentile values of spore types by utilizing over 180,000 EMLab P&K outdoor spore trap samples with known zip codes.

This report groups regional zip codes in relation to these EMLab Regional Climate codes and summarizes MoldRANGE™ data by month and year within each EMLab Regional Climate code.

References:
Burge, Harriet, A. Bioaerosols: Boca Raton: Lewis Publishers, pp. 163-171, 1995.

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MoldSTAT™: Supplementary Statistical Spore Trap Report

Outdoor Summary: SLA-2: Outside

Species detected	Outdoor sample spores/m3 <100 1K 10K >100K	Typical outdoor ranges (North America)	Freq. %
Alternaria	89	7 - 40 - 590	45
Ascospores	180	13 - 210 - 6,100	76
Basidiospores	710	13 - 430 - 24,000	92
Bipolaris/Drechslera group	22	7 - 13 - 240	16
Cladosporium	530	27 - 480 - 10,000	90
Epicoccum	22	7 - 22 - 330	24
Penicillium/Aspergillus types	710	13 - 170 - 2,700	68
Pithomyces	44	7 - 20 - 540	15
Smuts, Periconia, Myxomycetes	44	7 - 53 - 940	64
Total	2,400		

The "Typical outdoor ranges" and "Freq. %" columns show the typical low, medium, and high spore counts per cubic meter and the frequency of occurrence for the given spore type. The low, medium, and high values represent the 2.5, 50, and 97.5 percentile values when the spore type is detected. For example, if the low value is 53 and the frequency of occurence is 63%, it would mean that we typically detect the given spore type on 63 percent of all outdoor samples and, when detected, 2.5% of the time it is present in levels below 53 spores/m3.

Indoor Samples

Location: SLA-1: Library Cellar

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 892%	dF: N/A Result: N/A Critical value: N/A Inside Similar: N/A	Result: 0.6667	dF: 12 Result: 0.6731 Critical value: 0.4965 Outside Similar: Yes	Score: 300 Result: High

Species Detected	Spores/m3 <100 1K 10K >100K
Alternaria	44
Ascospores	440
Basidiospores	530
Chaetomium	200
Cladosporium	710
Other brown	22
Penicillium/Aspergillus types	19,000
Smuts, Periconia, Myxomycetes	22
Stachybotrys	22
Total	21,000

* The Friedman chi-square statistic is a non-parametric test that examines variation in a set of data (in this case, all indoor spore counts). The null hypothesis (H0) being tested is that there is no meaningful difference in the data for all indoor locations. The alternative hypothesis (used if the test disproves the null hypothesis) is that there is a difference between the indoor locations. The null hypothesis is rejected when the result of the test is greater than the critical value. The critical value that is displayed is based on the degrees of freedom (dF) of the test and a significance level of 0.05.

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MoldSTAT™: Supplementary Statistical Spore Trap Report

** An agreement ratio is a simple method for assessing the similarity of two samples (in this case the indoor sample and the outdoor summary) based on the spore types present. A score of one indicates that the types detected in one location are the same as that in the other. A score of zero indicates that none of the types detected indoors are present outdoors. Typically, an agreement of 0.8 or higher is considered high.

*** The Spearman rank correlation is a non-parametric test that examines correlation between two sets of data (in this case the indoor location and the outdoor summary). The null hypothesis (H0) being tested is that the indoor and outdoor samples are unrelated. The alternative hypothesis (used if the test disproves the null hypothesis) is that the samples are similar. The null hypothesis is rejected when the result of the test is greater than the critical value. The critical value that is displayed is based on the degrees of freedom (dF) of the test and a significance level of 0.05.

**** MoldSCORE™ is a specialized method for examining air sampling data. It is a score between 100 and 300, with 100 indicating a greater likelihood that the airborne indoor spores originated from the outside, and 300 indicating a greater likelihood that they originated from an inside source. The Result displayed is based on the numeric score given and will be either Low, Medium, or High, indicating a low, medium, or high likelihood that the spores detected originated from an indoor source. EMLab P&Kreserves the right to, and may at anytime, modify or change the MoldScore algorithm without notice.

Interpretation of the data contained in this report is left to the client or the persons who conducted the field work. This report is provided for informational and comparative purposes only and should not be relied upon for any other purpose. "Typical outdoor ranges" are based on the results of the analysis of samples delivered to and analyzed by EMLab P&K and assumptions regarding the origins of those samples. Sampling techniques, contaminants infecting samples, unrepresentative samples and other similar or dissimilar factors may affect these results. With the statistical analysis provided, as with all statistical comparisons and analyses, false-positive and false-negative results can and do occur. EMLab P&K hereby disclaims any liability for any and all direct, indirect, punitive, incidental, special or consequential damages arising out of the data contained in, or any actions taken or omitted in reliance upon, this report.

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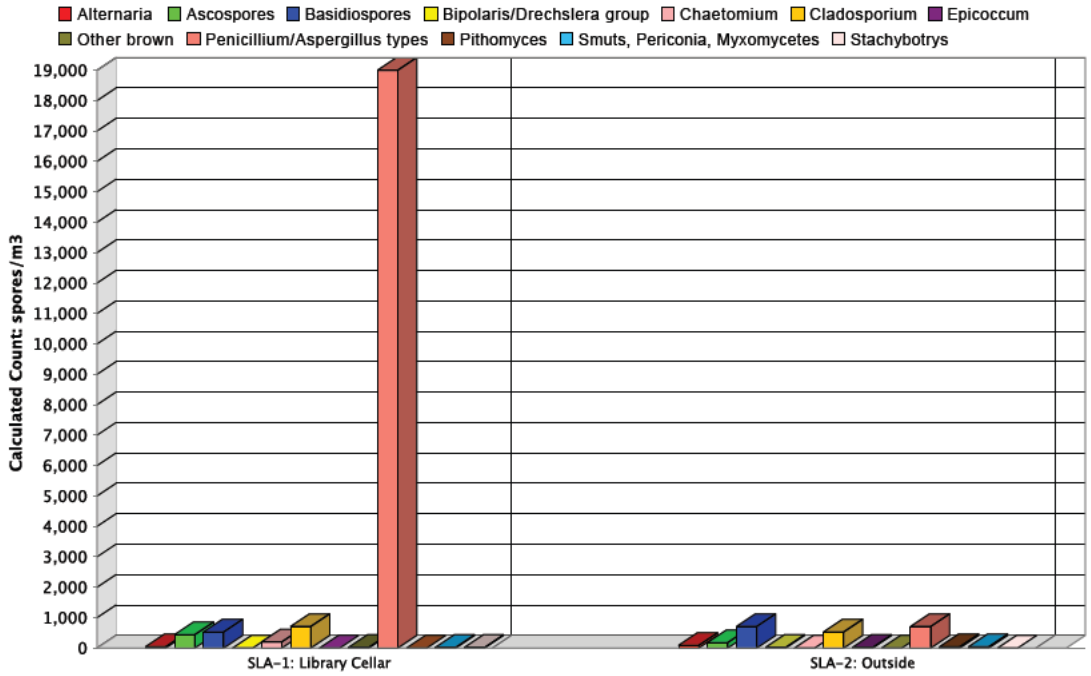
SPORE TRAP REPORT: NON-VIABLE METHODOLOGY



Comments:

Note: Graphical output may understate the importance of certain "marker" genera.
EMLab P&K, LLC