



August 31, 2020

Client Name and Address:

MAC Services, LLC
21 Mill Pond Drive
Rochester, MA 02770

Re: Microbial Analytical Results from: Chace Elementary School; Beverly St; Somerset, MA

H2O Laboratory Number:03537

Dear Joseph Cooney,

We at H2O EnviroComp would like to thank you for your recent business. Samples were received on 8/24/2020 from a job located at Chace Elementary School; Beverly St; Somerset, MA. The final report is enclosed for the following samples: 1-12.

Please note that environmental conditions should be taken into account when interpreting the associated data and sampling at any other time period may produce differing results. H2O EnviroComp follows prescribed procedures for the analysis of air cassettes and direct samples to identify and quantify particulate and microbiological contamination.

These results only pertain to this job and should not be used in the interpretation of any other job. This report may be reproduced only in its entirety.

If you have any questions please do not hesitate to call me at the number below.

Regards,

A handwritten signature in black ink, appearing to read 'Steven Grevelis', is written over a light blue horizontal line.

Steven Grevelis
Laboratory Director

Enclosures:

- Analytical results
- Chain of Custody
- Fungal glossary



Company: MAC Services, LLC **Inspector:** Joseph Cooney **Date Sampled:** 8/20/2020
Contact: Joseph Cooney **Project Name:** Chace Elementary School; Beverly St; Somerset, MA **Date Received:** 8/24/2020
Address: 21 Mill Pond Drive **Project Notes:** Project Number: 2020-211 **Date Analyzed:** 8/31/2020
City, ST, Zip: Rochester, MA 02770 **Lab No:** 03537 **Date Reported:** 8/31/2020
Phone: 508-789-0983 **Report Status:** Version 1

Mold Identification by Samples

Sample Number: 03537-01 **Sample Medium:** Allergenco-D
Client Sample ID: 4112124 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Outdoor @ Front of Building

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	16	674	Smuts	1	42
Basidiospores, Non-specified	52	2189	Rusts	1	42
Aspergillus/Penicillium-Like	1	42	Spegazzinia	ND	ND
Cladosporium	11	463	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	3	126	Coprinus	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	1	42	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Memnoniella	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1	
Background Density; 1 (Low) to 5 (Overloaded):	1	
Total Fungal Raw Count:	86	
Analytical Sensitivity (Spore/Cubic Meter):	42	
Number of Traverses:	12	
Total Fungal Count (Spore/Cubic Meter):	3621	

Reporting Notes: N/A = Not Applicable
 ND = None Detected
 * = Type detected observed in clumps

Analyzed by: Steven Grevelis
Analyzed Date: 8/31/2020



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Mold Identification by Samples

Sample Number: 03537-02 **Sample Medium:** Allergenco-D
Client Sample ID: 4112134 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Center of Kitchen

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	2	84	Smuts	1	42
Basidiospores, Non-specified	5	211	Rusts	ND	ND
Aspergillus/Penicillium-Like	ND	ND	Spegazzinia	ND	ND
Cladosporium	1	42	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	ND	ND	Nigrospora	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1
Total Fungal Raw Count:	9
Analytical Sensitivity (Spore/Cubic Meter):	42
Number of Traverses:	12

Total Fungal Count (Spore/Cubic Meter): 379

Reporting Notes: N/A = Not Applicable
ND = None Detected
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Mold Identification by Samples

Sample Number: 03537-03 **Sample Medium:** Allergenco-D
Client Sample ID: 4112129 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Cafetorium on Stage

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	1	42	Smuts	ND	ND
Basidiospores, Non-specified	10	421	Rusts	ND	ND
Aspergillus/Penicillium-Like	ND	ND	Spegazzinia	ND	ND
Cladosporium	3	126	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	ND	ND	Nigrospora	ND	ND
Pithomyces	1	42	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1

Total Fungal Raw Count: 15
Analytical Sensitivity (Spore/Cubic Meter): 42
Number of Traverses: 12
Total Fungal Count (Spore/Cubic Meter): 632

Reporting Notes: N/A = Not Applicable
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Mold Identification by Samples

Sample Number: 03537-04 **Sample Medium:** Allergenco-D
Client Sample ID: 4112133 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Bathroom off Kitchen

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	ND	ND	Smuts	ND	ND
Basidiospores, Non-specified	2	84	Rusts	ND	ND
Aspergillus/Penicillium-Like	40	1684	Spegazzinia	ND	ND
Cladosporium	ND	ND	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	ND	ND	Nigrospora	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1

Total Fungal Raw Count: 42
Analytical Sensitivity (Spore/Cubic Meter): 42
Number of Traverses: 12
Total Fungal Count (Spore/Cubic Meter): 1768

Reporting Notes: N/A = Not Applicable
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Mold Identification by Samples

Sample Number: 03537-05 **Sample Medium:** Allergenco-D
Client Sample ID: 4112123 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Room 12 Next to Sink

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	1	42	Smuts	ND	ND
Basidiospores, Non-specified	6	253	Rusts	ND	ND
Aspergillus/Penicillium-Like	332	13979	Spegazzinia	ND	ND
Cladosporium	1	42	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	ND	ND	Nigrospora	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1

Total Fungal Raw Count: 340
Analytical Sensitivity (Spore/Cubic Meter): 42
Number of Traverses: 12
Total Fungal Count (Spore/Cubic Meter): 14316

Reporting Notes: N/A = Not Applicable
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Mold Identification by Samples

Sample Number: 03537-06 **Sample Medium:** Allergenco-D
Client Sample ID: 4112122 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Room 7 Next to Sink

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	1	42	Smuts	ND	ND
Basidiospores, Non-specified	8	337	Rusts	ND	ND
Aspergillus/Penicillium-Like	424	17853	Spegazzinia	ND	ND
Cladosporium	1	42	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	2	84	Nigrospora	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1

Total Fungal Raw Count: 436
Analytical Sensitivity (Spore/Cubic Meter): 42
Number of Traverses: 12
Total Fungal Count (Spore/Cubic Meter): 18358

Reporting Notes: N/A = Not Applicable
ND = None Detected
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Mold Identification by Samples

Sample Number: 03537-07 **Sample Medium:** Allergenco-D
Client Sample ID: 4112120 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Room 18 Next to Sink

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	ND	ND	Smuts	ND	ND
Basidiospores, Non-specified	4	168	Rusts	ND	ND
Aspergillus/Penicillium-Like	127	5347	Spegazzinia	ND	ND
Cladosporium	ND	ND	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	ND	ND	Nigrospora	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1

Total Fungal Raw Count: 131
Analytical Sensitivity (Spore/Cubic Meter): 42
Number of Traverses: 12
Total Fungal Count (Spore/Cubic Meter): 5516

Reporting Notes: N/A = Not Applicable
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Mold Identification by Samples

Sample Number: 03537-08 **Sample Medium:** Allergenco-D
Client Sample ID: 4112128 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Girls Bathroom Next to Maintenance Closet on Mohawk Hallway

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	2	84	Smuts	ND	ND
Basidiospores, Non-specified	2	84	Rusts	ND	ND
Aspergillus/Penicillium-Like	46	1937	Spegazzinia	ND	ND
Cladosporium	ND	ND	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	ND	ND	Nigrospora	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1
Total Fungal Raw Count:	50
Analytical Sensitivity (Spore/Cubic Meter):	42
Number of Traverses:	12
Total Fungal Count (Spore/Cubic Meter):	2105

Reporting Notes: N/A = Not Applicable
ND = None Detected
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Phone: 508-789-0983 **Report Status:** Version 1

Mold Identification by Samples

Sample Number: 03537-09 **Sample Medium:** Allergenco-D
Client Sample ID: 4112121 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Library in Center

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	1	42	Smuts	ND	ND
Basidiospores, Non-specified	4	168	Rusts	ND	ND
Aspergillus/Penicillium-Like	15	632	Spegazzinia	ND	ND
Cladosporium	ND	ND	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	ND	ND	Nigrospora	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1

Total Fungal Raw Count: 20
Analytical Sensitivity (Spore/Cubic Meter): 42
Number of Traverses: 12
Total Fungal Count (Spore/Cubic Meter): 842

Reporting Notes: N/A = Not Applicable
ND = None Detected
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Analyzed Date: 8/31/2020



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Phone: 508-789-0983 **Report Status:** Version 1

Mold Identification by Samples

Sample Number: 03537-10 **Sample Medium:** Allergenco-D
Client Sample ID: 4112125 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Teachers Lounge under Stained Ceiling Tile

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	ND	ND	Smuts	ND	ND
Basidiospores, Non-specified	1	42	Rusts	ND	ND
Aspergillus/Penicillium-Like	12	505	Spegazzinia	ND	ND
Cladosporium	ND	ND	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	ND	ND	Nigrospora	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1

Total Fungal Raw Count: 13
Analytical Sensitivity (Spore/Cubic Meter): 42
Number of Traverses: 12
Total Fungal Count (Spore/Cubic Meter): 547

Reporting Notes: N/A = Not Applicable
ND = None Detected
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Mold Identification by Samples

Sample Number: 03537-11 **Sample Medium:** Allergenco-D
Client Sample ID: 4112131 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Room 25 Next to Exterior Door

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	3	126	Smuts	ND	ND
Basidiospores, Non-specified	12	505	Rusts	ND	ND
Aspergillus/Penicillium-Like	2	84	Spegazzinia	ND	ND
Cladosporium	4	168	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	ND	ND	Nigrospora	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1

Total Fungal Raw Count: 21
Analytical Sensitivity (Spore/Cubic Meter): 42
Number of Traverses: 12
Total Fungal Count (Spore/Cubic Meter): 884

Reporting Notes: N/A = Not Applicable
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Mold Identification by Samples

Sample Number: 03537-12 **Sample Medium:** Allergenco-D
Client Sample ID: 4112132 **Sampling Rate:** 15L/Min for 5 Minutes
Magnification: 600 X **Total Liters:** 75
Location: Room 24 Next to Exterior Door

Sample Data:

Type:	Raw Count	Count/ Cubic Meter	Type:	Raw Count	Count/ Cubic Meter
Ascospores, Non-specified	3	126	Smuts	ND	ND
Basidiospores, Non-specified	8	337	Rusts	ND	ND
Aspergillus/Penicillium-Like	69	2905	Spegazzinia	ND	ND
Cladosporium	40	1684	Stachybotrys	ND	ND
Chaetomium	ND	ND	Ulocladium	ND	ND
Ganoderma	ND	ND	Nigrospora	ND	ND
Pithomyces	ND	ND	Un-ID Spore	ND	ND
Alternaria	ND	ND	Pollen	ND	ND
Cercospora-like	ND	ND	Hyphal Frags	ND	ND
Curvularia	ND	ND	Insect Frags	ND	ND
Epicoccum	ND	ND			
Oidium	ND	ND			

Sample Data Comments:

Skin Fragment Prevalence; 1 (Low) to 4 (High):	1
Background Density; 1 (Low) to 5 (Overloaded):	1

Total Fungal Raw Count: 120
Analytical Sensitivity (Spore/Cubic Meter): 42
Number of Traverses: 12
Total Fungal Count (Spore/Cubic Meter): 5053

Reporting Notes: N/A = Not Applicable
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Analyzed Date: 8/31/2020



H2O EnviroComp
24 School Street
P.O. Box 444
West Dennis, MA 02670

Microbial Chain of Cust.
Version 1.0
4/9/2012

Client: MAC Services, LLC Phone: 508-789-0983 Client Address: 21 Mill Pond Drive Rochester, MA
 Project Name: Chace Elementary School Project Number: 2020.211
 Proj. Address: Beverly St. Town: Somerset State: MA Zip Code: _____

Sampled By: Joseph Cooney Email Address(es) to Send Report to: _____ H2O Lab ID: **03537**
 Date: 8-20-20 Project Manager: Joseph Cooney Email 1: jcooney@macmoldandmore.com
 Turn Around Time: Rush 24 Hour 48 Hour 3 Day 5 Day Email 2: _____

SAMPLE ID	LOCATION	Sample Type (Air, Tape Lift, Bulk)	Volume Data			Sample Media (Air-O-Cell, Allergenco-D, etc)
			Rate (l/min)	Time (min)	Volume	
4112124	Outdoor @ front of building	Air	15	5	75	Allergenco-D
4112134	Center of Kitchen	Air	15	5	75	Allergenco-D
4112129	Cafetorium on stage	Air	15	5	75	Allergenco-D
4112133	Bathroom off Kitchen	Air	15	5	75	Allergenco-D
4112123	Room 12 next to sink	Air	15	5	75	Allergenco-D
4112122	Room 7 next to sink	Air	15	5	75	Allergenco-D
4112120	Room 18 next to sink	Air	15	5	75	Allergenco-D
4112128	Girls Bathroom next to maintenance closet on Mohawk hallway	Air	15	5	75	Allergenco-D
4112121	Library in center	Air	15	5	75	Allergenco-D
4112125	Teachers Lounge under stained ceiling tile	Air	15	5	75	Allergenco-D

Relinquished by: Joseph Cooney
 Received by: Adam Guli

Date/Time: _____ Page 1 of 12
 Date/Time: 8/24/2020 VIA PICKUP



H2O EnviroComp
 24 School Street
 P.O. Box 444
 West Dennis, MA 02670

Microbial Chain of Custody
 Version 1.0
 4/9/2012

Client: MAC Services, LLC Phone: 508-789-0983 Client Address: 21 Mill Pond Drive Rochester, MA
 Project Name: Chace Elementary School Project Number: 2020.211
 Proj. Address: Beverly St. Town: Somerset State: MA Zip Code: _____

Sampled By: Joseph Cooney Email Address(es) to Send Report to:
 Date: 8-20-20 Project Manager: Joseph Cooney Email 1: jcooney@macmoldandmore.com H2O Lab ID:
 Turn Around Time: Rush 24 Hour 48 Hour 3 Day 5 Day Email 2: _____ **03537**

SAMPLE ID	LOCATION	Sample Type (Air, Tape, Lft, Bulk)	Volume Data			Sample Media (Air-O-Cell, Allergenco-D, etc)
			Rate (l/min)	Time (min)	Volume	
4112131	Room 25 next to exterior door	Air	15	5	75	Allergenco-D
4112132	Room 24 next to exterior door	Air	15	5	75	Allergenco-D
		Air	15	5	75	Allergenco-D
		Air	15	5	75	Allergenco-D
		Air	15	5	75	Allergenco-D
		Air	15	5	75	Allergenco-D
		Air	15	5	75	Allergenco-D
		Air	15	5	75	Allergenco-D
		Air	15	5	75	Allergenco-D
		Air	15	5	75	Allergenco-D

Relinquished by: Joseph Cooney
 Received by: [Signature]

Date/Time: _____ Page 2 of 2
 Date/Time: 8/24/2020 VIA PICKUP



H2O EnviroComp Fungal Glossary

Note: The following list is not inclusive of all molds and fungi.

Absidia: Found outdoors in soil and decaying vegetation. Found indoors in stored grains and other foods. Absidia is recognized as an allergen. In immunocompromised patients pulmonary invasions, the meninges (brain or spinal cord), and kidney infections can result from exposure.

Acromonium: Found outdoors in decaying or dead plant materials. Found indoors in food and wet, cellulose based building materials. Grows well indoors when there is a high water content (>0.90 Aw). Type I (hay fever, asthma) and Type III (hypersensitivity pneumonitis) allergen. Known to cause infections in immunodeficient patients and persons with wound injuries. There are 100 known species.

Alternaria: Common saprobe and pathogen of plants. Typically found on plant tissue, decaying wood, and foods, soil and air outdoors. Indoors it is found near condensation (window frames, showers), house dust (in carpets, and air). It also colonizes building supplies, computer disks, cosmetics, leather, optical instruments, paper, sewage, stone monuments, textiles, wood pulp, and jet fuel. Type I allergies (hay fever, asthma) and Type III (hypersensitivity pneumonitis). Alternaria spores are one of the most common and potent indoor and outdoor airborne allergens. Additionally, Alternaria sensitization has been determined to be one of the most important factors in the onset of childhood asthma. Synergy with Cladosporium or Ulocladium may increase the severity of symptoms.

Arthrinium: Found outdoors in decaying plant material and soil. Found indoors on cellulose containing materials. *Arthrinium sphaerospermum* is recognized as an allergen.

Ascospores: Ascospores are found everywhere in nature. Ascospores are the result of sexual reproduction and produced in a saclike structure called an ascus. All ascospores belong to members of the Phylum Ascomycota, which encompasses a plethora of genera worldwide.

Aspergillus/Penicillium: These species are common contaminants on various substances. This organism causes food spoilage and is an indicated organism for dampness indoors. Some of these species are known to produce mycotoxins. If health effects are noticed by occupants or workers, in an environment that evidences an amplification of Penicillium, identification of species is helpful. These especially opportunistic pathogens may cause respiratory infections. Some varieties produce mycotoxins and aflatoxins.

Basidiospores: Found outdoors in gardens forests and woodlands. Plant pathogen. Indoors it is the agent of “dry rot” and other fungi causing white and brown wood rot. Grow and destroy the structural wood of buildings. *Poria incrassata* causes a particularly destructive dry rot in buildings. A probably common allergen. Type I allergies (hay fever, asthma).

Bipolaris: Found outdoors in plant debris and soil. Found indoors on houseplants and indoor building materials. Type I allergies (hay fever, asthma). Most commonly reported cause of allergic and chronic invasive sinusitis.

Botrytis: Plant pathogen responsible for causing gray mold (*B. cinerea*) on grapes, strawberries, raspberries, blackberries, low bush blueberries, lettuce, cabbage and onion. Indoors it is found on houseplants fruits and vegetables. Type I (hay fever, asthma) and type III (hypersensitivity) allergies.



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Candida: Found in leaves, flowers, soil, water and is an inhabitant of the skin, mouth and vagina. It is unknown what suitable substrates are in the indoor environment. Has been reported as an allergen. Occurs in patients taking drugs such as oral contraceptives and antibiotics.

Cercospora: Found outdoors on plants. It is a plant parasite causing leaf spot. It is unknown what substrates it prefers indoors. Thrives in moderate to high humidity its allergenic potential is unknown.

Chaetomium: Found outdoors in soil, seeds, dung, woody and straw materials. Indoors found on damp sheet rock paper. Type I allergies (hay fever, asthma).

Coprinus: Found outdoors in wood, dung, litter and soil. Industrial uses: Popular experimental organism in genetic research

Cladosporium: Found outdoors in soil of many different types. Indoors it is found on many substrates including textiles, wood, and moist windowsills. Cladosporium grows at 0degrees C, and so is associated with refrigerated foods. It is a common and important allergen. Type I allergies (hay fever, asthma).

Cladophialophora (form of Cladosporium): Phialophora: Found outdoors in wood roots, stems and leaves of plants and grasses, and soil. It is a water loving fungus. Allergenicity has not been studied.

Coprinus: Found outdoors in wood, dung, litter and soil. Industrial uses: Popular experimental organism in genetic research

Curvularia: found outdoors in plant saprobe and pathogen to cereal plants and soil. Found indoors in paper and wood products. Type I allergies (asthma and hay fever) A relatively common cause of allergic fungal sinusitis.

Dactylaria: Found outdoors in decaying soil and leaves. Dactylaria species comprise a very small proportion of the fungal biota. There have been several reports of opportunistic infections caused by these genera but a true pathogenic role has not been firmly established. No information is available regarding upper respiratory health effects, or toxicity. Allergenicity has not been studied.

Epicoccum: Found outdoors in plant debris and soil. Found indoors in paper and textiles. Type I allergies (asthma and hay fever).

Fusarium: Found outdoors in soil. Occasionally found on a variety of substrates. Fusarium requires very wet conditions. Aw=0.86-0.91 (minimum for various species). . Type I allergies (asthma and hay fever).

Ganoderma: Found outdoors on conifers and hardwoods worldwide, causing white rot, root rot, and stem rot. Ganoderma species are known to cause allergies in people on a worldwide scale.

Memmoniella: Found outdoors in plant litter soil and many types of plants and trees. Found indoors on a variety of substrates (cellulolytic). Allergens are unknown. Very closely related to Stachybotrys.

Myxomycetes: Found outdoors in decaying logs and stumps, particularly in forested areas. Only found occasionally indoors. Type I allergies (hay fever, asthma)



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Nigrospora: Found outdoors in decaying plants and soil. Rarely found indoors. Type I allergies (asthma and hay fever).

Pithomyces: Found outdoors in bark, leaf litter and soils. Indoors it is found in paper and requires high levels of moisture for spore germination. Its allergenic potential is unknown.

Rust: Rusts are parasitic to many types of plants. Rust fungi require a living plant host for growth. Type I allergens (hay fever, asthma). There are 5000 known species of rusts belonging to at least 150 different genera. Rusts are the cause of great economic losses on many cultivated plants.

Scopulariopsis (Hyphomycetes) Teleomorph: *Microascus* (Ascomycetes) Mainly soil-borne, but also frequently isolated from wood, grain, fruit, paper, and food such as meat and dairy products. Also isolated from indoor environments. ***Most species can liberate arsenic gaseous compounds that can lead to arsenic poisoning. Has recently been associated with invasive human infections.***

Spegazzinia: Found outdoors in plants and soil. It is unknown what substrates it is found on indoors. Allergenic properties are unknown.

Stachybotrys: Stachybotrys grows on wet materials that contain cellulose and low nitrogen content. Usually but not limited to building materials such as wallboard paper (unfinished drywall) that has a high water activity over a long period of time. It produces several types of toxic metabolites and mycotoxins that can irritate skin and mucous membranes. One of the mycotoxins it produces called satratoxin is also toxic when inhaled. ***Extreme care should be taken when this organism is amplified indoors.*** Individuals with chronic exposure to the toxin produced by this fungus reported cold and flu symptoms, sore throat, diarrhea, headaches, fatigue, dermatitis, intermittent local hair loss, and generalized malaise. The toxins produced by this fungus will suppress the immune system affecting the lymphoid tissue and the bone marrow.

Stemphylium: Found outdoors in soil, wood, decaying vegetation. Some species found on leaves are plant pathogens. Indoors growth is rare. Known allergen. Shares allergens with Alternaria. Type I allergies (hay fever, asthma).

Trichoderma: Found outdoors in soil, wood, decaying vegetation. Some species found on leaves are plant pathogens. Indoors growth on paper, textiles, and wet wood. Known allergen. Type I allergies (hay fever, asthma), Type III allergies (hypersensitivity), and has occasionally been associated with disease in immunocompromised individuals.

Torula: Found outdoors in leaves, plant roots, plant litter, soil and wood. Indoors it is found in paper, wicker furniture and wood. Type I allergies (hay fever, asthma).

Ulocladium: Found outdoors in soil, dung, paint, grasses, fibers, wood, decaying plant material, paper and textiles. Indoors it is found in gypsum board, paper, paint, tapestries, jute and other straw materials. Ulocladium has a high water requirement. As an allergen it is major with type I allergies (hay fever, asthma) and it cross reacts with Alternaria, adding to the burden of Alternaria-sensitive patients.

Wallemia: Found outdoors in hay and soil. Found indoors in jams, salted fish, mattresses, textiles and wood in crawl spaces. It is a Type I (hay fever and asthma) allergen.

Zygomycetes: Found outdoors in decaying plant and animal matter. Found indoors in fruits and vegetables. It is a Type I (hay fever, asthma) and Type III (hypersensitivity) allergen. Many zygomycetes are extremely fast growing and can inhibit other fungi when competing for food and space.