NML-20190701-John Doe

Spore Analysis Completed for

YOUR LOGO HERE

123 Your Street, Your City, AA 12345
123-456-7890
you@yourdomain.com

Collected Date	7/2/2019
Collected Street Address	123 Main St
Collected & Relinquished by	Your Inspector
# of Sample Sent	6
# of Sample Received & Accepted	6
Sample/s Received & Accepted on	07/01/2019
Sample/s Received & Accepted by	Karmen Owen
Sample/s Analyzed on	07/01/2019
Sample/s Analyzed by	Crystal Hernandez
Report Approved by	Janna Komorowski
Report/Test Type	Standard

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Spore Analysis Completed by

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Crystal Hernandez
Operations Director, B.A. in Biology
PAACB Analyst ID Number: 07190171

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Property/Customer Name	Site Street Address	Site City	Site State	Site Zip
John Doe	123 Main St	Some City	AA	12345

Company Email	Company Phone Number	Date Collected	Date Received
you@yourdomain.com	123-456-7890	7/2/2019	07/01/2019

Company Address	Company Name	Sample Collected by	Date Analyzed
123 Your Street, Your City, AA 12345	Your Company	Your Inspector	07/01/2019

Newton ML Sample ID	CAE20190701005S001AP			CAE20190701005S002AP				CAE20190701005S003AP				CAE20190701005S004AP			
Sample Name/Location	Outside			Basement				Master Bedroom				Living Room			
Volume (L)	150			150				150				150			
Background	3			4				4				4			
Analyt. Sensitivity 100X (Cts/M³)	7			7				7				7			
Analyt. Sensitivity 400X* (Cts/M³)	13*			13*				13*				13*			
Sample Type	Spore Trap +			Spore Trap +				Spore Trap +				Spore Trap +			
Organism	Counted	Cts/M³	% of Total	Counted	Cts/M³	% of Total	Suggestive	Counted	Cts/M³	% of Total	Suggestive	Counted	Cts/M³	% of Total	Suggestive
Alternaria	11	73	14%	1	7	1%	Acceptable	ND				1	7	2%	Acceptable
Ascospores	ND			ND				1	7	1%	Acceptable	ND			
Aspergillus|Penicillium*	14	179	33%	60	768	76%	Elevated	35	448	75%	Slightly	14	179	54%	Acceptable
Basidiospores	1	7	1%	ND				ND				1	7	2%	Acceptable
Bipolaris|Drechslera	ND			ND				ND				ND			
Chaetomium	ND			ND				ND				ND			
Cladosporium*	7	90	17%	1	13	1%	Acceptable	7	90	15%	Acceptable	ND			
Curvularia	ND			ND				ND				ND			
Epicoccum	ND			ND				ND				ND			
Fusarium*	14	179	33%	17	218	22%	Slightly	2	26	4%	Acceptable	11	141	42%	Acceptable
Memnoniella*	ND			ND				ND				ND			
Myxomycetes|Smuts	1	7	1%	ND				ND				ND			
Pithomyces	ND			ND				ND				ND			
Stachybotrys	1	7	1%	1	7	1%	Acceptable	4	27	4%	Elevated	ND			
Stemphylium	ND			ND				ND				ND			
Torula	ND			ND				ND				ND			
Trichoderma*	ND			ND				ND				ND			
Ulocladium	ND			ND				ND				ND			
Unspecified Spore	ND			ND				ND				ND			
Total	49	541	100%	80	1,012	100%	Slightly	49	597	100%	Slightly	27	333	100%	Acceptable
Hyphal Fragment	1	7	-	2	13	-	-	8	53	-	-	4	27	-	-
Spore Trap + Dander*	1	13	-	166	2,125	-	Elevated	87	1,114	-	Elevated	50	640	-	Elevated
Spore Trap + Fiber*	84	1,075	-	25	320	-	Acceptable	20	256	-	Acceptable	20	256	-	Acceptable
Spore Trap + Pollen*	1	13	-	1	13	-	Acceptable	na		-	Acceptable	na		-	Acceptable
Comments															

Color Codes

Acceptable	Slightly Elevated	Elevated: 4 times or more greater than Control
Common Outdoor	Common Indoor	Water Damange Indicator

ND = Not Detected

The Suggestive Interpretation of Spore Count is based on the Criteria provided by the Inspection Company.

Additional Elevated: More than 13 Stachbortrys/Memnoniella found in Cts/M³

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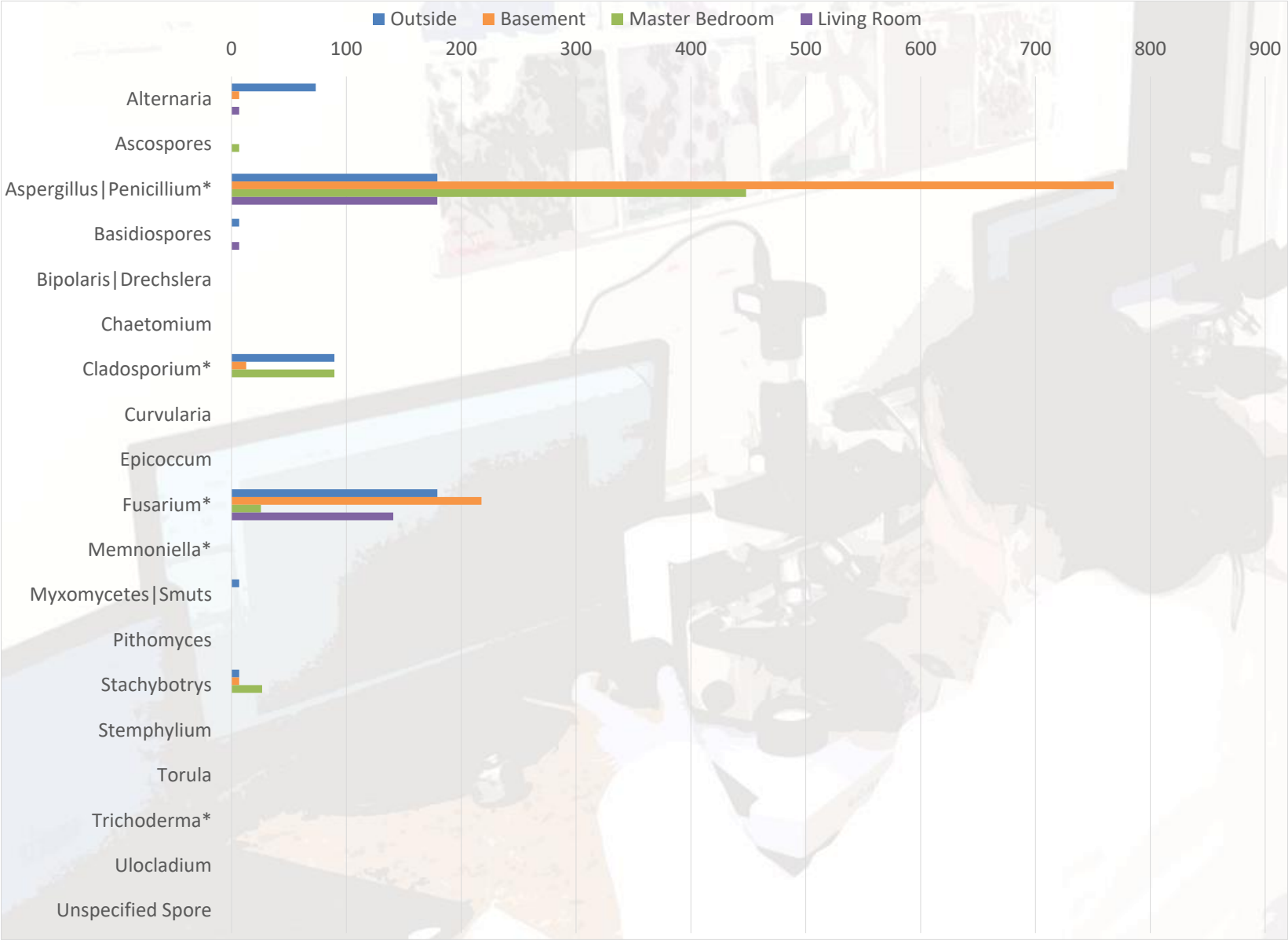

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Spore Trap Analysis Explanation

Volume Flow Rate * Flow Rate Minute

Background None: Recollect
1: <5%
2: 5% ≤ Background Coverage < 25%
3: 25% ≤ Background Coverage < 70%
4: 70% ≤ Background Coverage < 90%
5: 90% ≤ Background Coverage < 100%, Recollect

Cts/M³ Spore Counts per Cubic Meter

Hyphal Fragment Fragments of hyphae. Can be an additional indicator of possible mold presences

Unspecified Spore Less commonly identified spore types, other than those listed on the report

Limit of Detection 1 spore count per coverage examined area

Sample Type

Spore Count	Spore Trap Cassettes	Identification & Enumeration of Fungal Spores
Spore Count+	Spore Trap Cassettes	Identification & Enumeration of Fungal Spores + Total Dander, Fiber, and Pollen Count

Spore Trap Analytical Report Method
NML-SAM-1611, adapted from ASTM D7391-9

* Uncertainty available upon request

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Site Name	Site Address Site Address	Site City	Site State	Site Zip
John Doe	123 Main St	Some City	AA	12345

Company Email	Company Phone Number	Date Collected	Date Received
you@yourdomain.com	123-456-7890	7/2/2019	07/01/2019

Company Address	Company Na Company Name	Sample Collected by	Date Reported
123 Your Street, Your City, AA 12345	Your Company	Your Inspector	07/01/2019

Newton ML Sample ID	CAE20190701005S001TS	CAE20190701005S002TS		
Sample Name / Location	Kitchen Cabinet	Bathroom Ceiling		
Sample Type	Direct ID - Tape	Direct ID - Tape		

Organism	Category	Trace 1-10	Light 11-100	Med 101-1000	High 1001+	Category	Trace 1-10	Light 11-100	Med 101-1000	High 1001+										
Alternaria	Trace					ND														
Ascospores	ND					Medium														
Aspergillus|Penicillium	ND					High														
Basidiospores	ND					ND														
Bipolaris|Drechslera	ND					ND														
Chaetomium	High					ND														
Cladosporium	ND					ND														
Curvularia	ND					ND														
Epicoccum	ND					ND														
Fusarium	ND					ND														
Memnoniella	ND					ND														
Myxomycetes|Smuts	ND					ND														
Pithomyces	ND					ND														
Stachybotrys	ND					ND														
Stemphylium	ND					ND														
Torula	ND					ND														
Trichoderma	ND					ND														
Ulocladium	ND					ND														
Unspecified Spore	ND					ND														
	ND = Not Detected					ND = Not Detected														

Hyphal Fragment	Light	Light		
Background Debris	Moderate	Moderate		
Comments				
Color Codes	Common Outdoor	Common Indoor	Water Damage Indicator	Color Codes

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Direct Identification Explanation

Direct ID

Trace	Spore Count less than 10
Light	Estimated Spore Counts between 11 and 100
Medium	Estimated Spore Counts between 101 and 1000
High	Estimated Spore Counts above 1000

Hyphal Fragment/Background Debris

Not Detected	Not Found in the Sample
Light	Found Traces throughout the Sample
Moderate	Found Some throughout the Sample
Heavy	Found All throughtout the Sample

Unspecified Spore Less commonly identified spore types, other than those listed on the report

Sample Type

Direct ID-Swab	Swab for ID only	ID and Semi-Quantitative Enumeration of Spores
Direct ID-Swab+	Swab for ID + Spore Count	ID and Enumeration with Spore Count
Direct ID-Tape	Swab for ID only	ID and Semi-Quantitative Enumeration of Spores
Direct ID-Tape+	Swab for ID + Spore Count	ID and Enumeration with Spore Count
Direct ID-Bulk	Swab for ID only	ID and Semi-Quantitative Enumeration of Spores
Direct ID-Bulk+	Swab for ID + Spore Count	ID and Enumeration with Spore Count

Direct Analytical Report Method

NML-SAM-1611

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Alternaria

Growth & Distribution

- Alternaria is one of the most common and widely distributed molds on the planet (2). The reproductive spores become airborne easily and are prolific in the atmosphere worldwide.
- **Growth Rate:** Rapid Mature with 0.5 to 8 days (34)
- **Water activity:** 0.85-0.88 (1)
- **Outdoors:** In the outdoor environment, Alternaria is found in soil, water and plant material- it plays an important role in vegetable matter decomposition (1) . Airborne Alternaria spore counts are often higher around farming and agricultural operations, particularly during harvesting processes when spores are released into the air in large numbers. (3) It is well studied as a plant pathogen having saprophytic effects on a wide variety of vegetation and is often the source of early blights in crops (2). It reaches peak concentrations during late summer and fall (2).
- **Indoors:** Alternaria can be found growing indoors on textiles, dust, wood, carpeting, flooring, drywall or gypsum board, wall paper, furniture, and other cellulose materials. It can be found in humidifiers, heating and air conditioning units, inside of ductwork, and surrounding damp areas i.e. sinks, showers, and windows(1).

Health Effects

- **Allergenic**
  - Considered by some to be among the most common mold allergens in the US (1).
  - Alternaria can cause allergy symptoms following ingestion, inhalation, injection or direct contact.
  - Alternaria spores are airborne allergens (1). Reactions due to inhalation may increase during peak concentration times in late summer and early fall.
  - Inhalation of high concentrations by sensitive individuals may manifest in Type I and Type III hypersensitivity reactions. These include allergic asthma, conjunctivitis (redness of the eye), rhinitis (hay fever), anaphylaxis, angioedema (dermal swelling), urticarial (hives) or hypersensitivity pneumonitis (Type III).
- **Pathogen**
  - Invasion is rare but can occur, particularly in immunocompromised individuals. Cases of onychomycosis (nail infection), sinusitis, ulcerated cutaneous infections, keratitis, phaeohyphomycosis, as well as osteomyelitis and peritonitis in patients undergoing peritoneal dialysis have been reported (1,4).
  - Can occasionally cause phaeohyphomycosis (fungal infection), usually in subcutaneous tissue (6).
- **Toxins/ Metabolites**
  - Alternariol (antifungal uses), AME (alternariol monomethylether), tenuazonic acid, & altertoxins (1)

Found in Sample(s) ( ) List of references can be found at http://newtonlaboratory.com/glossary

AIR	•Outside•Basement••Living Room••••••••••
DIRECT	•Kitchen Cabinet•••••••••••••••••

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Ascospores

Growth and Distribution

Ascospores refers to spores produced in a sac-like structure known as an ascus (plural asci). These spores are specific to fungi of the phylum Ascomycota. Ascomycota is a broad division containing a large number of genera and individual species. Identification of the genus and/or species based on spore morphology alone is not always possible, therefore these spores are often given the more general classification of "Ascospores" in microscopic analysis.

- Ascospores are found worldwide with prevalence and distribution depending on particular genus and species.
- **Outdoors:** Ascospores are found ubiquitously in outdoor environments; often found on dead and decaying plant material. Many types are known to have pathogenic or parasitic properties in plants.
- **Indoors:** Common substrates include damp building materials such as gypsum or lumber, carpeting, dust, and other organic materials.

Health Effects

- **Allergen**
  - Ascospores can be allergenic to sensitive individuals, most often producing Type I or Type III hypersensitivity reactions. These include allergic asthma, conjunctivitis (redness of the eye), rhinitis (hay fever), anaphylaxis, angioedema (dermal swelling), urticarial (hives) or hypersensitivity pneumonitis (Type III). (5)
  - Reactions due to spore inhalation may increase following rain or high humidity. (5)
  - Unlike some fungi which rely on air currents for spore dispersal, ascomycetes are capable of a more active form of spore dispersal that utilizes water droplets to catapult their spores into the air. Various species of Ascospores are known to use this method to liberate spores every single day, regardless of air flow. Subsequently, exposure to ascospores may be more consistent from day to day than exposure to other spores which are only dispersed with adequate air currents. For this reason these spores may be of particular interest in cases of chronic respiratory disease such as asthma and rhinitis (5).
- **Pathogen**
  - Some types can be pathogenic; dependent upon genus and species.
- **Toxins\Metabolites**
  - Vary greatly depending on genus and species.

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AIR	•••Master Bedroom•••••••••••
DIRECT	••Bathroom Ceiling•••••••••••••••

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Aspergillus/Penicillium

Growth & Distribution (7):

- Aspergillus & Penicillium are incredibly adaptive and abundant organisms. Their distribution is world-wide with many species possessing abilities to tolerate environmental conditions that challenge other molds (i.e. extreme temperatures & pH levels, restricted water availability and exposure to radiation). Colony growth rates are rapid for many species. Mature colonies are capable of quickly producing large numbers of spores. Because of the morphological similarity of the spores, the two genera are typically grouped together as "Aspergillus-Penicillium."

- **Growth Rate:** Usually Rapid – Mature within 3-4 days; however, some species are slower(6).
- **Water Activity:** Aspergillus: 0.93-0.97 & Penicillium: 0.88 – 0.99 (33, 35)
- **Outdoors:** Both can be found outdoors on a variety of substrates- particularly plant materials such as cereals, grains, decaying wood, and soil (7).
- **Indoors:** Found indoors on organic materials such as wood, textiles, cellulose materials, carpeting, painted surfaces, and food stuffs such as cheeses, butter/margarine meats, breads, fruits and vegetables. Halotolerant species may be found growing on refrigerated foods (7). Penicillium is used in cheese production and is responsible for the veins in blue cheese.

Health Effects

- **Allergen:**
  - Because these spores are so abundant, daily exposure to Aspergillus/Penicillium is very common in both indoor and outdoor environments. Often this exposure occurs without any noticeable reaction or symptoms. However, sensitivities may develop in some instances- especially with prolonged exposure to high spore concentrations. This can result in allergic responses.
  - Spores may progress further into the respiratory system than other common spores due to their small aerodynamic diameter.
  - Penicillium is the mold from which the antibiotic Penicillin was first derived. Penicillin is now made synthetically. It does not contain the mold Penicillium. Allergy to one does not necessarily imply allergy to the other.
- **Pathogen** (6,7):
  - There are approximately 175 species of Aspergillus, only about 20 of which are known to cause disease in humans.
  - Diseases caused by Aspergillus are known as aspergillosis and include invasive infection, colonization, & toxicosis.
  - Certain species of Penicillium are considered pathogens. Infection may occur in skin, blood, bone marrow, internal organs or lymph nodes. (6). In the immunocompromised (particularly HIV patients or those who have recently been in Southeast Asia) | *P. marnefei* can cause severe infection capable of affecting respiratory, lymphatic, and nervous systems.
- **Toxins/Metabolites:**
  - Different species of Aspergillus/Penicillium are associate with an array of mycotoxins and metabolites, some of which are medically significant in humans. The importance of these toxins can vary from species to species and depends largely on the prevalence of that species.

Found in Sample(s) ( ) List of references can be found at http://newtonlaboratory.com/glossary

AIR	•Outside•Basement•Master Bedroom•Living Room••••••••••
DIRECT	••Bathroom Ceiling•••••••••••••••

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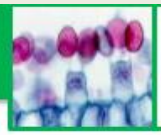
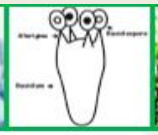
Basidiospores

Growth & Distribution:

- Basidiospores are spores produced by the division of Fungi known as Basidiomycota. These spores are unique for lacking septation, containing bilateral symmetry, and often having a visible pore at the site of detachment from the basidium (7). This is a large group of organisms consisting of a large number of individual genera & species. Distribution is world-wide with the prevalence in any given area varying for each genus and species. Like ascospores, basidiospores disperse using water droplets. Therefore, airborne spore concentrations are often higher following rain or high humidity. This division includes edible mushrooms.
- **Outdoors:** Basidiospores are found growing on plant material, organic debris, and soil. Many species of basidiospores are known to be plant pathogens.
- **Indoors:** Basidiospores may be found growing on damp materials. Colonies may grow given sufficient access to water (leaks, flooding, high humidity, or surrounding plumbing, heating/air conditioning components, appliances, house plants, etc.).

Health Effects:

- **Allergenic:**
  - Exposure to these spores is commonplace in both indoor and outdoor environments. Nonetheless they are also potentially allergenic. Allergic responses may occur following inhalation, ingestion, or direct contact. Reactions due to inhalation may be increased following rain or high humidity when spore concentrations are often elevated.
  - In sensitive individuals, typically manifest Type I or Type III hypersensitivity reactions. These include allergic asthma, conjunctivitis (redness of the eye), rhinitis (hay fever), anaphylaxis, angioedema (dermal swelling), urticarial (hives) or hypersensitivity pneumonitis & allergic sinusitis (Type III). (5)
- **Pathogenic:**
  - Invasion is not typical but can occur, particularly in the immunocompromised or immunosuppressed. These infections can includes sinitus, keratitis, phaeohyphomycosis, & peritonitist.
- **Toxins\Metabolites:**
  - Mycotoxins vary depending on genus and species. They are especially relevant in edible fungi of this division such as mushrooms.
    - Common sources of mushroom poisoning include *Amnita, Lepiota, Coprinus, & Psilocybe*

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AIR	•Outside•••Living Room•••••••••••
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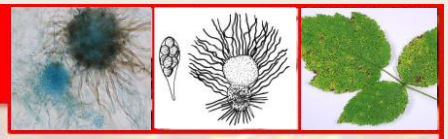
Chaetomium



Growth & Distribution

- Chaetomium is a common mold with worldwide distribution; however, airborne spore concentrations are generally low in outdoor air (1). Identification is usually successful due to unique spore morphology with spores exhibiting a distinctive lemon-shape & olive-brown color. (7) There are approximately 80-150 species described; taxonomic data varies greatly for the genus (1). Some species are thermotolerant or thermophilic (able to tolerate or thrive in high heat). Spores themselves can be highly resistant to dry circumstances and UV radiation (7).

- **Growth Rate:** Rapid – Mature within 5 days (6)
- **Water Activity:** 0.91-0.94 (1)
- **Outdoors:** These molds are found commonly in soil, on plant remains, and on softwood and hardwood timber (where it is known as "soft- rot fungus")(7).
- **Indoors:** These molds are often found on water damaged cellulosic materials such as wood, sheetrock paper, cardboard, wall paper, & textiles. Like many molds, Chaetomium is cellulolytic- it degrades cellulose materials. Growth may result in damage to building materials, paper documents, textiles, etc. (4)

Health Effects:

- **Allergen:**
  - Spores of these molds are somewhat less common in the air in but are considered to be allergenic (1).
  - In sensitive individuals, typically manifest Type I or Type III hypersensitivity reactions. These include allergic asthma, conjunctivitis (redness of the eye), rhinitis (hay fever), anaphylaxis, angioedema (dermal swelling), urticarial (hives) or hypersensitivity pneumonitis & allergic sinusitis (Type III)(5).
- **Pathogen:**
  - Very occasionally pathogenic in humans- mostly in the immunocompromised. Reportedly the cause of systemic and cutaneous phaeohyphomycosis (6), onychomycosis (nail infection), peritonitis, cutaneous lesions (2) and extremely rare cases of fatal disseminated cerebral disease in the immunocompromised and intravenous drug users (1).
  - Very rare cases of toenail or fingernail infection in people with normal immunity (2).
- **Toxins/Metabolites:**
  - Include chaetoglobosin, chetomin, chaetochromin, chaetosin, cochliodinol, sterigmatocystin (potentially carcinogenic) (12)
  - Several species do produce mycotoxins when growing on water damaged building materials in specific growth conditions (1).
  - Mycotoxicosis in humans is poorly studied; however, some animals studies have shown contaminated cereals to be toxic and even fatal in animals following ingestion of contaminated feed (1).
  - Toxicosis has been seen in mice spleen, liver, and kidney.(1)

Found in Sample(s) ( ) List of references can be found at http://newtonlaboratory.com/glossary

AIR	••••••••••••••
DIRECT	•Kitchen Cabinet•••••••••••••••••

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Cladosporium

Growth & Distribution:

- Cladosporium are found in air and soil worldwide. Cladosporium are among the most common airborne fungi (4). Spores are produced in abundance and easily disperse through the air. Extremely common on decaying organic matter. These mold are common plant pathogens. Molds of this genus are dematiaceous with over 40 named species (1).
- **Growth Rate:** Moderately Rapid – Mature within 7 days. (6)
- **Water Activity:** 0.85-0.88 (1)
- **Outdoors:** Cladosporium can be found on food sources such as cereals, fruit, vegetables. Commonly found on dead plants and shrubs in temperate regions. Halotolerant (salt tolerant) species exist. (7) The most common species isolated from plant materials & soils (*C. cladosporiodides*) experiences peak airborne spore concentrations between June/July and September/October in temperate climates (2).
- **Indoors:** Cladosporium can be found on water damaged materials (i.e. plaster, paint, textiles, gypsum, wall paper, wood, moist window sills). May affect food sources such as cheeses, butter/margarine, vegetables, fruits and vegetables(7). Often found on the surface of fiberglass duct liners, in bathroom showers, and on basement walls (2). Some studies have reported Cladosporium in 70% of homes examined in the US & 100% of homes examined in Canada (1).

Health Effects:

- **Allergen:**
  - Allergic reaction to airborne spores are of particular importance because these spores exist in in such high concentrations in the air. Symptoms may increase during peak concentrations from June-October. Sensitization may occur. (1)
  - In sensitive individuals typically manifest Type I or Type III hypersensitivity reactions. These include allergic asthma, conjunctivitis (redness of the eye), rhinitis (hay fever), anaphylaxis, angioedema (dermal swelling), urticarial (hives) or hypersensitivity pneumonitis & allergic sinusitis (Type III). (5)
- **Pathogen:**
  - Is pathogenic in humans very rarely, reported cases include skin lesions, keratitis, onychomycosis, sinusitis, pulmonary infections (1).
- **Mycotoxins/Metabolites:**
  - Cladosporic acid (12)
  - Gibberellin (hormone influencing developmental processes in plants) & ergosterol (precursor to vitamin D2 which may have anti-tumor properties). (1)
  - Toxic effects have been seen in animals (chicken embryos & horses) but not known to be reported in humans to date (1,2).

Found in Sample(s) ( ) List of references can be found at http://newtonlaboratory.com/glossary

AIR	•Outside•Basement•Master Bedroom••••••••••••
DIRECT	••••••••••••••••••

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Fusarium

Growth & Distribution

- Worldwide distribution. Spores are sickle-shaped and contain numerous cells. Spores are common in both indoor and outdoor air.

- **Growth Rate:** Rapid – Mature within 4 days (6)
- **Water Activity:** 0.86-0.91 (4)
- **Outdoors:** Fusarium is common on plant materials (particularly cereals such as grain) and in soil. Many species are pathogenic in plants and may cause root rot, stem rot, vascular wilt, or fruit rot (4). Can also cause rot and mycotoxin contamination of stored crops and grains (4). Spore concentrations are typically higher around water sources, agricultural areas, and during summer (1).
- **Indoors:** Fusarium spores are commonly found indoors as a result of normal air exchange from the outdoor environment. However, growth of Fusarium colonies indoors is rare & is typically a sign of high moisture. This mold may be found on water damaged cellulose, in heating & air conditioning units or ductwork, in stagnant dehumidifier water, in or around appliances such as dishwashers or washing machines, and in bathrooms or kitchens. (4)

Health Effects:

- **Allergen:**
  - One of the most common positive dermal tests in mold allergen panels (1).
  - Studies have shown that Fusarium can cause eye irritation and erythema (skin redness) (1).
  - In sensitive individuals, typically manifests Type I or Type III hypersensitivity reactions. These include allergic asthma, conjunctivitis (redness of the eye), rhinitis (hay fever), anaphylaxis, angioedema (dermal swelling), urticarial (hives) or hypersensitivity pneumonitis & allergic sinusitis (Type III). (5)
  - Reactions due to spore inhalation may be increased with proximity to agricultural/farming operations or during peak concentration in summer seasons.
- **Pathogen:**
  - Numerous species of Fusarium can cause infections including mycetoma, eye infections, sinusitis, septic arthritis, and nail infections (6). Typically seen in the immunocompromised.
  - Cause of disseminated systemic infections in severely neutropenic (neutrophil deficient) hosts (6). Unfortunately fatality rates in these instances are high, with the prognosis depending on the immune status of the host (1).
  - Agent of Hyalohyphomycoses (formation a colorless, septate hyphae in tissue; can cause acute inflammation & necrosis or invasion of blood vessels resulting in thrombosis & infarction)(6).
- **Toxins/Metabolites:**
  - Fumonisin, fusaric acid, fusarin, fusarochromanone, moniliformin, trichothecenes (deoxynivalinol, T2 toxin), zearlenol, Zearalenone (12)
  - Ingesting food prepared from grain contaminated with toxigenic species can result in disease (6) - Possible cytotoxic, nephrotoxic, tremorgenic, immunosuppressive, & carcinogenic effects in humans and animals (1).

Found in Sample(s) ( ) List of references can be found at http://newtonlaboratory.com/glossary

AIR	•Outside•Basement•Master Bedroom•Living Room••••••••••
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Myxomycetes

Growth & Distribution

- Myxomycetes is a large class with approximately 500 individual species and worldwide distribution (25). Interestingly, these organisms are no longer considered to be true fungi like other molds, but have been reclassified as protozoans. These organisms belong to group commonly called "slime molds" that exhibit an amoeba-like stage. Spores are common in both indoor and outdoor environments worldwide (15). Spores can be dispersed by air, arthropods and other animals due to their small size (4 – 20 µm)(25).

- **Growth Rate:** Generally Rapid – Mature within 2 to 4 day; however, specific growth rate does depend on species (24).
- **Water Activity:** 0.80 (this is a generalized number for common molds)(26).
- **Outdoors**
  - Found in soil, decaying plant material (especially damp wood), and dung. Species of Myxomycetes are not as geographically constricted as most organisms; most Myxomycetes species can be found world wide. (15)
- **Indoors**
  - Can be found growing indoors on damp building materials such as cardboard, wallpaper, gypsum board, wood, etc.

Health Effects:

- **Allergen:**
  - These spores are very common in both indoor and outdoor air. They are small, foreign particles which may be inhaled deep into the respiratory system and may cause allergic responses.
  - In sensitive individuals, typically manifests Type I or Type III hypersensitivity reactions. These include allergic asthma, conjunctivitis (redness of the eye), rhinitis (hay fever), anaphylaxis, angioedema (dermal swelling), urticarial (hives) or hypersensitivity pneumonitis & allergic sinusitis (Type III). (5)
- **Pathogen:**
  - Unknown
- **Toxins/Metabolites:**
  - Unknown

Founded in Samples(s) ( ) List of references can be found at http://newtonlaboratory.com/glossary

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Stachybotrys

Growth & Distribution

- Stachybotrys is found worldwide. One species in particular, *Stachybotrys chatarum* (sometimes called "black mold" or "toxic mold"), has gained attention recently following concerns about indoor air quality and mold contamination.

- **Growth Rate**: Moderately Rapid – Usually mature with 7 days. Growth may be slower on medias that are not high in cellulose.
- **Water Activity**: Minimal 0.94; Optimal >0.98 (1)
- **Outdoors**
  - Found on decaying plant material and in soil. May contaminate grains, tobacco, wood pulp, and other plant debris. Spore concentrations are generally low in outside air.
- **Indoors**
  - Typically found growing indoors on materials containing cellulose with high water content. This can include water damaged building materials such as wood, gypsum board, wall paper, textiles, carpeting, and cardboard. Stachybotrys does not generally grow without prolonged access to moisture, usually lasting days or weeks. It is also not well suited for competition against other molds. Spores do not become airborne easily and generally settle out of the air quickly. For this reason, airborne spores are often the result of recent physical disturbance of colonies. (1)

Health Effects:

- **Allergen:**
  - In sensitive individuals, typically manifests Type I or Type III hypersensitivity reactions. These include allergic asthma, conjunctivitis (redness of the eye), rhinitis (hay fever), anaphylaxis, angioedema (dermal swelling), urticarial (hives) or hypersensitivity pneumonitis & allergic sinusitis (Type III). (5)
- **Pathogen:**
  - No reported cases of human or animal infection (1).
- **Toxins/Metabolites:**
  - May be associated with pulmonary hemorrhage & hemosiderosis in infants (6).
  - Has frequently been suggested as a contributing agent in a variety of illnesses reported by occupants of water damaged buildings; however, establishing a firm causal relationship requires further study (6).
  - The species *S. chartarum* produces several mycotoxins that may affect humans and animals after ingestion, inhalation, or absorption (1).
  - Griseofulvin, trichothecenes (isosatratoxin, roridin, satratoxin, trichodermol, trichoverrol (12)

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