

NML-20190701-John Doe

Spore Analysis Completed for



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



Janna Komorowski
Laboratory Director, B.A. in Biological Sciences
PAACB Analyst ID Number: 04190170



810 Dutch Square Blvd Suite 204, Columbia, SC 29210

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



Property/Customer Name John Doe	Site Street Address 123 Main St	Site City Some City	Site State AA	Site Zip 12345
Company Email you@yourdomain.com	Company Phone Number 123-456-7890	Date Collected 7/2/2019	Date Received 07/01/2019	

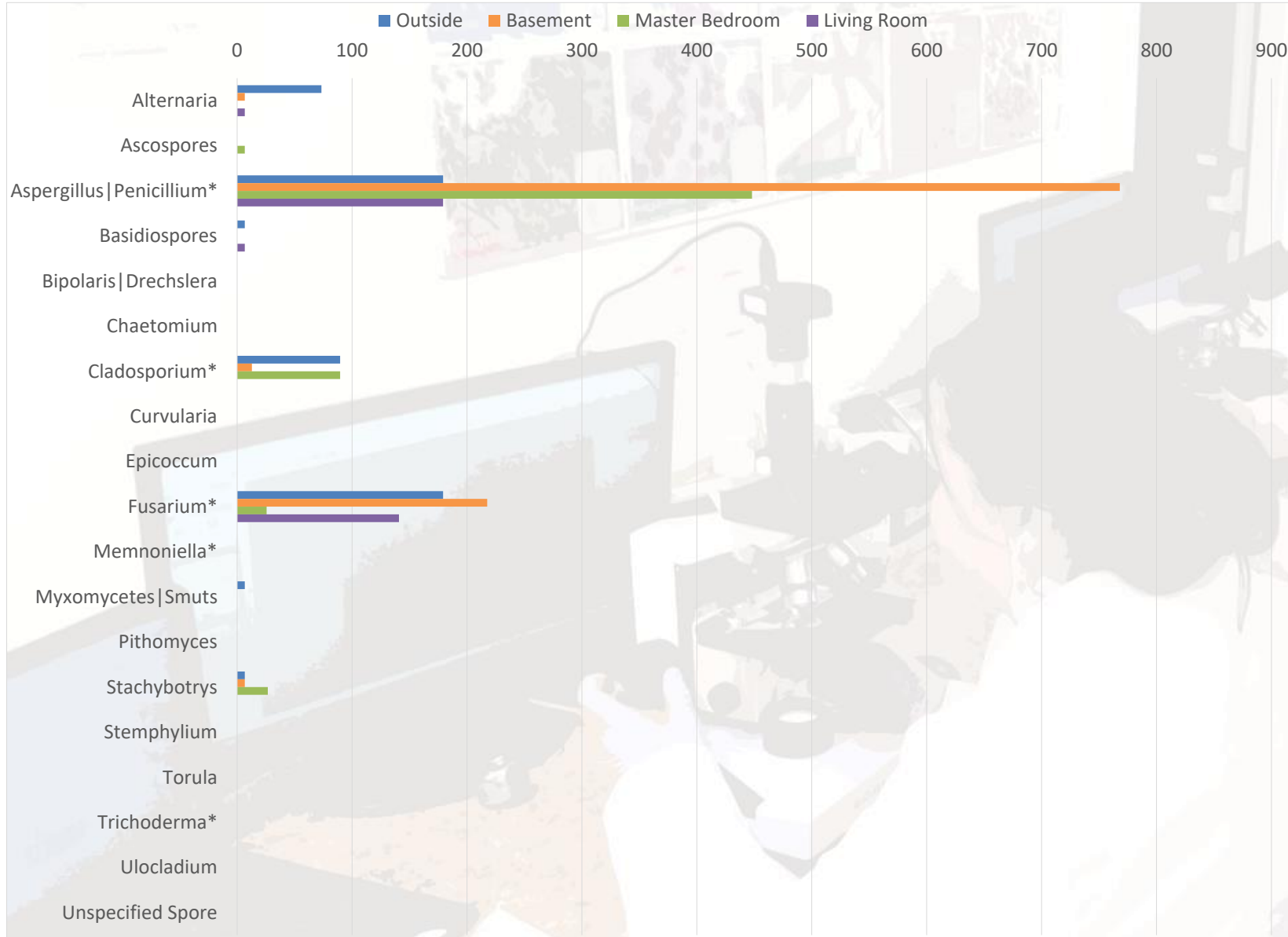
Company Address 123 Your Street, Your City, AA 12345	Company Name Your Company	Sample Collected by Your Inspector	Date Analyzed 07/01/2019
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Newton ML Sample ID	CAE20190701005S001AP	CAE20190701005S002AP	CAE20190701005S003AP	CAE20190701005S004AP
Sample Name/Location	Outside	Basement	Master Bedroom	Living Room
Volume (L)	150	150	150	150
Background	3	4	4	4
Analyt. Sensitivity 100X (Cts/M ³)	7	7	7	7
Analyt. Sensitivity 400X* (Cts/M ³)	13*	13*	13*	13*
Sample Type	Spore Trap +	Spore Trap +	Spore Trap +	Spore Trap +

Organism	Counted	Cts/M ³	% of Total	Counted	Cts/M ³	% of Total	Counted	Cts/M ³	% of Total	Counted	Cts/M ³	% of Total
Alternaria	11	73	13.55%	1	7	0.66%	Not Detected			1	7	2.00%
Ascospores	Not Detected			Not Detected			1	7	1.12%	Not Detected		
Aspergillus Penicillium*	14	179	33.10%	60	768	75.91%	35	448	75.10%	14	179	53.76%
Basidiospores	1	7	1.23%	Not Detected			Not Detected			1	7	2.00%
Bipolaris Drechslera	Not Detected			Not Detected			Not Detected			Not Detected		
Chaetomium	Not Detected			Not Detected			Not Detected			Not Detected		
Cladosporium*	7	90	16.55%	1	13	1.27%	7	90	15.02%	Not Detected		
Curvularia	Not Detected			Not Detected			Not Detected			Not Detected		
Epicoccum	Not Detected			Not Detected			Not Detected			Not Detected		
Fusarium*	14	179	33.10%	17	218	21.51%	2	26	4.29%	11	141	42.24%
Memnoniella*	Not Detected			Not Detected			Not Detected			Not Detected		
Myxomycetes Smuts	1	7	1.23%	Not Detected			Not Detected			Not Detected		
Pithomyces	Not Detected			Not Detected			Not Detected			Not Detected		
Stachybotrys	1	7	1.23%	1	7	0.66%	4	27	4.47%	Not Detected		
Stemphylium	Not Detected			Not Detected			Not Detected			Not Detected		
Torula	Not Detected			Not Detected			Not Detected			Not Detected		
Trichoderma*	Not Detected			Not Detected			Not Detected			Not Detected		
Ulocladium	Not Detected			Not Detected			Not Detected			Not Detected		
Unspecified Spore	Not Detected			Not Detected			Not Detected			Not Detected		
Total	49	541	100.00%	80	1,012	100.00%	49	597	100.00%	27	333	100.00%

Hyphal Fragment	Counted	Cts/M ³	% of Total	Counted	Cts/M ³	% of Total	Counted	Cts/M ³	% of Total	Counted	Cts/M ³	% of Total
Dander*	1	7	-	2	13	-	8	53	-	4	27	-
Fiber*	84	1,075	-	25	320	-	20	256	-	20	256	-
Pollen*	1	13	-	1	13	-	na	-	-	na	-	-

Color Code Common Outdoor Common Indoor Water Damage Indicator Elevated Counts



Newton Microbial Laboratory

Spore Trap Analysis Explanation

Volume	Flow Rate * Flow Rate Minute
Background	<p>None: Recollect</p> <p>1: <5%</p> <p>2: 5% ≤ Background Coverage < 25%</p> <p>3: 25% ≤ Background Coverage < 70%</p> <p>4: 70% ≤ Background Coverage < 90%</p> <p>5: 90% ≤ Background Coverage < 100%, Recollect</p>
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

Site Name	John Doe	Site Address	123 Main St	Site City	Some City	Site State	AA	Site Zip	12345
Company Email	you@yourdomain.com	Company Phone Number	123-456-7890	Date Collected	7/2/2019	Date Received	07/01/2019		
Company Address	123 Your Street, Your City, AA 12345		Company Na Company Name	Your Company	Sample Collected by	Your Inspector	Date Reported	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	Light	Med	High	Category	Trace	Light	Med	High								
		1-10	11-100	101-1000	1001+		1-10	11-100	101-1000	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													
Memmoniella	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

Hyphal Fragment	Light	Light		
Background Debris	Moderate	Moderate		
Comments				

Color Code Common Outdoor Common Indoor Water Damage Indicator Color Code



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 throughout 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

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••••••••••••••••••••

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.

Found in Sample(s)

() List of references can be found at <http://newtonlaboratory.com/glossary>

AIR	●●●Master Bedroom●●●●●●●●●●
DIRECT	●●Bathroom Ceiling●●●●●●●●●●

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

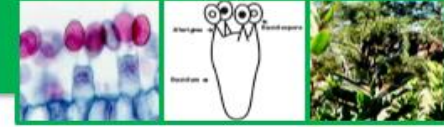
- **Allergen:**
 - Because these spores are so abundant, daily exposure to Aspergillus/Penicillium is very common in both indoor and outdoor environments. Often this exposure occurs without any noticeable reaction or symptoms. However, sensitivities may develop in some instances- especially with prolonged 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)

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

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:

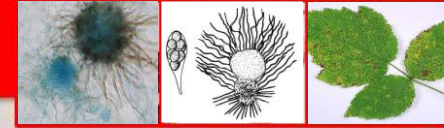
- **Allergenic:**
 - Exposure to these spores is commonplace in both indoor and outdoor environments. Nonetheless they are also potentially allergenic. Allergic responses may occur following inhalation, ingestion, or direct contact. Reactions due to inhalation may be increased following rain or high 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 include sinusitis, keratitis, phaeoophomycosis, & peritonitis.
- **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*

Found in Sample(s)

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AIR	•Outside••Living Room••••••••••
DIRECT	••••••••••••••••••••

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)

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AIR	●●●●●●●●●●
DIRECT	●Kitchen Cabinet●●●●●●●●●●

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. cladosporioides*) 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)

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

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 of 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), zearalenol, 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)

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

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)

AIR
Direct

•Outside••••••••••
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Stachybotrys



Growth & Distribution

- Stachybotrys is found worldwide. One species in particular, *Stachybotrys chartarum* (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)

Found in Sample(s)

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