Air Sampling and Analysis for Mold in Hills Building UMass

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First Floor Hills North

Introduction

Upon request, all of the rooms on the first floor of Hills North occupied by CCPH were sampled for airborne mold on October 28, 2011.

Methods

Air samples were collected for mold analysis using a BioPump Plus sampler that operated at a verified flow rate of 15 L/min and a 5-minute sample (0.075 m^3 total volume) was collected in an Air-O-Cell cassette. Each day, one sample was taken outdoors for comparison with indoor air samples. Collection media in the cassettes were analyzed microscopically by PAACB certified spore analysts at 400X magnification. The whole trace was enumerated and counts were converted to concentration and expressed as the number of spores per cubic meter of air (spores/m^3). The lower limit of detection was 13.3 spores/m^3 of air

Results

Outdoors	
Basidiospores	1,386
Cladosporium	120
Penicillium/Aspergillus-like	107
Ascospores	40
Rust	13.3
Unknown	26.7
Hyphal fragments	26.7 * not included in total
Total	1,680 spores/m^3

Light particle trace with very little debris

Room 113 Classroom – distinct odor in room, water damage visible on 2 ceiling tiles (old); 71.7°F, 25% RH	
Basidiospores	560
Ascospores	53.3
Cladosporium	40
Smut	26.7
Unknown	13.3
Total	693.2 spores/m^3

Light particle trace with little debris

Room 114 – 3 potted plants; evidence of moisture damage (old) by radiator control, by window, & on window sill; 72.3°F, 38%RH

Basidiospores	160	
Penicillium/Aspergillus-like	66.7	
Ascospores	26.7	
Smut	26.7	
Unknown	53.3	
Hyphal fragments	53.3	* not included in total
Total	333.4	spores/m^3

Moderately heavy number of airborne particles with many skin scales

Room 115 – 7 potted plants; wood molding at floor looked to be rotting and had 3ft of tape – occupant reported old damage due to ants; loose paint on window sill; portable radiator on; 73.6°F, 34%RH

Basidiospores	360	
Penicillium/Aspergillus-like	200	
Smut	93.3	
Cladosporium	40	
Unknown	93.3	
Hyphal fragments	40	* not included in total
Total	786.6	spores/m^3

Moderately heavy number of airborne particles

Room 116 – 5 potted plants – 2 with no saucer; 71.5oF, 35%RH

Basidiospores	667	
Penicillium/Aspergillus-like	160	
Cladosporium	147	
Smut	107	
Ascospores	66.7	
Myxomycetes	40	
Curvularia	13.3	
Rust	13.3	
Unknown	26.7	
Hyphal fragments	120	* not included in total
Total	1,240	spores/m^3

Moderate number of airborne particles

Room 117 – 6 potted plants; has window A/C unit; evidence of mold growth on aluminum window frame (tape sample taken) – water source may be watering of plants; 73.8oF, 35%RH

Basidiospores	280
Smut	93.3
Penicillium/Aspergillus-like	80
Ascospores	66.6
Cladosporium	26.7
Pithomyces	26.7
Curvularia	13.3
Alternaria	13.3
Rust	13.3
Unknown	53.3
Hyphal fragments	13.3 * not included in total
Pollen	13.3 * not included in total
Total	666.3 spores/m^3

Moderately heavy number of airborne particles
Tape sample confirmed mold growth of *Penicillium/Aspergillus* and *Cladosporium*.

Room 118 – 1 potted plant; evidence of water leak on floor by radiator control; window A/C unit; 73.1^{o}F, 31%RH

Cladosporium	373
Penicillium/Aspergillus-like	213
Basidiospores	173
Ascospores	13.3
Smut	13.3
Rust	13.3
Pestalotia-like	13.3
Ulocladium	13.3
Hyphal fragments	13.3 * not included in total
Total	827 spores/m^3

Moderate number of airborne particles

Room 119 – 4 potted plants; water damage on wall by window A/C unit; water damage on wall by radiator control; 70.2^{o}F, 36%RH

Basidiospores	213
Penicillium/Aspergillus-like	66.7
Smut	66.7
Cladosporium	53.3
Ulocladium	13.3
Myxomycetes	13.3
Unknown	53.3
Hyphal fragments	13.3 * not included in total
Total	480 spores/m^3

Moderate number of airborne particles

Room 120 – 3 potted plants; evidence of water damage by A/C unit on wall and sill; 73.2°F, 30%RH

Basidiospores	267
Penicillium/Aspergillus-like	66.7
Smut	53.3
Ulocladium	13.3
Pestalotia-like	13.3
Unknown	40
Hyphal fragments	13.3 * not included in total
Total	453 spores/m^3

Moderate number of airborne particles

Room 121 – 6 potted plants; area rug over the carpet; portable radiator (not on); Bionaire HEPA filter unit (not on); 71.5°F, 25%RH

Penicillium/Aspergillus-like	1,413
Basidiospores	867
Smut	93.3
Ascospores	40
Cladosporium	26.7
Curvularia	26.7
Pithomyces	13.3
Unknown	107
Hyphal fragments	53.3 * not included in total
Total	2,587 spores/m^3

Moderately heavy number of airborne particles

Room 123 – 3 potted plants; area rug on carpet; moisture damage by window (old); window A/C unit; 72°F, 38%RH

Basidiospores	387
Penicillium/Aspergillus-like	93.3
Smut	93.3
Cladosporium	26.7
Ascospores	26.7
Curvularia	13.3
Alternaria/Ulocladium	13.3
Unknown	26.7
Hyphal fragments	133 * not included in total
Pollen	26.7 * not included in total
Total	680 spores/m^3

Moderate number of airborne particles

Room 125 waiting area – 5 potted plants; area rug on carpet; white noise machine on floor in corner; water damage on wall on both sides of window (old); window A/C unit; 72.2°F, 35%RH

Basidiospores	533	
Smut	173	
Penicillium/Aspergillus-like	147	
Ascospores	53.3	
Cladosporium	40	
Curvularia	26.7	
Alternaria	13.3	
Unknown	53.3	
Hyphal fragments	160	* not included in total
Total	1,040 spores/m^3	

Moderate number of airborne particles

Room 127 – 7 potted plants; water damage on wall on both sides of window (moisture meter indicates higher moisture level in these areas); evidence of moisture (efflorescence) on wall beside door (may be coming from radiator in hall); 72.5°F, 35%RH

Basidiospores	626	
Penicillium/Aspergillus-like	133	
Smut	120	
Cladosporium	107	
Ascospores	13.3	
Rust	13.3	
Unknown	80	
Hyphal fragments	240	* not included in total
Pollen	13.3	* not included in total
Total	1,092.6	

Moderately heavy number of airborne particles

Room 129 – 3 potted plants; area rug on carpet; visible condensation on inside of window; window A/C unit; 72.9°F, 38%RH

Penicillium/Aspergillus-like	1,147	
Basidiospores	920	
Smut	213	
Cladosporium	107	
Ascospores	80	
Alternaria	26.7	
Curvularia	13.3	
Rust	13.3	
Unknown	120	
Hyphal fragments	307	* not included in total
Pollen	26.7	* not included in total
Total	2,640	

Moderately heavy number of airborne particles

Room 131 – mold growth on window sill (previously reported); evidence of water damage on wall by window; 72.8°F, 35%RH

Basidiospores	307	
Penicillium/Aspergillus-like	280	
Smut	120	
Ascospores	26.7	
Pithomyces	26.7	
Curvularia	13.3	
Botrytis	13.3	
Unknown	40	
Hyphal fragments	13.3	* not included in total
Algae	26.7	* not included in total
Total	827 spores/m^3	

Moderately heavy number of airborne particles

Interpretation

At this time of year outdoor concentrations of airborne spores are decreasing and the outdoor sample shows lower levels of all taxa. Hence, comparison of indoor samples with outdoor levels must be made with absolute levels in mind because indoor concentrations may exceed outdoor levels but would not be considered "high" for normal indoor environments. All indoor samples except for two (rooms 121 and 129) would be considered normal with no elevationed spore concentrations of any taxa that would indicate moisture problems. Rooms 121 and 129 show elevated levels of *Penicillium/Aspergillus*-like spores. These levels do not indicate a health threat for normal healthy individuals but could exacerbate allergic symptoms in previously sensitized individuals. Moderately heavy amounts of airborne particles were observed in a number of rooms (114, 115, 117, 121, 127, 129, 131) and a possible source is the carpet in these rooms.

Recommendation

The two rooms (121 & 129) should be investigated further for a source of moisture and potential mold growth. If occupants are experiencing allergic symptoms they should be relocated until after correction of any issues identified during investigation and cleaning of the space. All other indoor air samples were reflective of natural ventilation of the building from open windows and influx of outdoor spores or normal accumulation of spores in the indoor space over time. Particle concentrations should decrease with steam cleaning of the carpet followed by strong HEPA vacuuming (already scheduled). The window frame in room 117 should be wiped clean with a damp cloth by the occupant.