

PREVALENCE OF *STACHYBOTRYS* IN OUTDOOR AIR OF HOUSTON AREA RESIDENCES

KB Dotson* and JE Schneider, Jr.

DOTSON Group, LLC, Houston, Texas, USA

ABSTRACT

Outdoor ambient airborne concentrations of fungi were measured near 633 residences in the Houston, Texas metropolitan area. The samples were collected in conjunction with indoor air quality surveys conducted in response to occupant reports of internal water damage. Air samples were collected using *Air-O-Cell* cassettes and compatible *Zefon Air-O-Cell Mini-Pumps*. Samples were analyzed via light microscopy at 600X magnification. The genus of *Stachybotrys* was identified in approximately 4% of outdoor samples. This data suggests that the prevalence of *Stachybotrys*, while not a frequently detected constituent, can be occasionally detected in the outdoor air in the sub-tropical climate of the Houston metropolitan area.

INDEX TERMS

Stachybotrys, Outdoor Airborne Concentration, Indoor Air Quality, Toxic Mold, Fungi

INTRODUCTION

There is an increasing awareness of the importance of mold contamination in residential environments. Individual immune responses to these fungi may range from no symptoms to severe, depending on each person's susceptibility to the allergen. (Cooley JD, Wong WC, Jumper CA, *et al.* 1998). Annual variances in airborne concentrations, as well as seasonal variation, can be a significant factor in the symptoms experienced by the general population. (Nolard N, Beguin H, Chasseur C. 2001).

Increased media attention to the genus of *Stachybotrys* as the “toxic mold” has raised questions regarding the prevalence of *Stachybotrys* in outdoor ambient air. (Lyman F. 1999). The prevalence of *Stachybotrys* is a topic of debate among industrial hygienists. (Johanning E, Morey P. 1998). The Centers for Disease Control and Prevention National Center for Environmental Health reports simply that there is not “accurate information about how often *Stachybotrys* is found in buildings and homes [and] while it is less common than other mold species it is not rare.” (US CDC, 2002).

METHODS

Outdoor ambient airborne concentrations of fungi were measured near 633 residences in the Houston area. The samples were collected in conjunction with indoor air quality surveys conducted in response to occupant reports of moderate to severe internal water damage within the structure. In each case, one reference sample was collected outside of the building envelope of each residential building.

Air samples were collected utilizing *Air-O-Cell* cassettes and compatible *Zefon Air-O-Cell Mini-Pumps* operating at 15 liters per minute; a slit impaction sampling methodology that

* Contact authors email: kyle@dotsongroup.com

counts both viable and non-viable spores. Identification was to genus, including fungal spore count and identification, pollen and mycelial fragment count). The method cannot differentiate *Aspergillus/Penicillium* but is well suited for detection of *Stachybotrys*. Samples were analyzed via light microscopy at 600X magnification, with the entire slide (100% of the sample) being analyzed.

RESULTS

One reference sample was collected outside of the building envelope of 633 residential buildings. The resulting data is depicted in Table 1. *Stachybotrys* was detected in the outside air of 3.95 percent of the residences evaluated. Analysis of the outdoor samples indicated a mean ambient airborne concentration of *Stachybotrys* in the outdoor air of 57.7 spores per cubic meter with a standard deviation of 49.8.

Table 1. Observed concentration of *Stachybotrys* in outdoor air of Houston area residences

Reference #	Outdoor Airborne Concentration*	Month of Sampling
1	43	May
2	85	June
3	21	July
4	43	July
5	43	July
6	21	August
7	128	August
8	85	September
9	235	September
10	21	September
11	128	September
12	21	September
13	43	September
14	21	October
15	21	October
16	64	October
17	21	October
18	43	October
19	85	October
20	85	October
21	80	December
22	21	December
23	43	January
24	21	January
25	21	January
Average	57.7	
Std.Dev.	49.8	

*Mold levels are recorded as spores/m³.

DISCUSSION

The prevalence of viable and non-viable *Stachybotrys* in outdoor air near Houston area residences reported in this paper compares with 1% found in 2,407 viable-only outdoor samples from 1,717 locations from across the continental United States. Geographically, the authors of the comparison study concluded that areas with the highest fungal levels included the Southwest and Southeast areas of the US. (Shelton BG, Kirkland KH, Flanders WD, *et al.* 2002).

CONCLUSIONS

The genus of *Stachybotrys* was identified in approximately 4% of outdoor samples. This data suggests that the prevalence of *Stachybotrys*, while not a frequently detected constituent of outdoor air, can be occasionally found in the outdoor air in the sub-tropical climate of the Houston metropolitan area.

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