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INDOOR POLLEN AND MOLD CHARACTERIZATION FROM HOMES IN TUCSON, ARIZONA, U.S.A.

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Four mini-Burkard samples were collected from each of 31 homes during the spring of 1988 in Tucson, Az. Indoor and outdoor samples were collected under calm and turbulent conditions. The indoor samples were significantly correlated with each other for 45% of the homes; outdoor samples were correlated for 65% of the homes. Indoor samples were generally not significantly correlated with outdoor samples except for small ubiquitous taxa, i.e., Cladosporium. Total pollen was significantly correlated for indoor samples, indoor:outdoor samples, and local outdoor:regional outdoor samples. The variability was more extensive for mold spores.

INTRODUCTION

Past studies indicate that pollen and mold (aerobiological) prevalence is directly and indirectly related to respiratory disease symptoms (1,2,3). Most studies relate symptom reports to numbers of aerobiologicals collected regionally from outdoor environments (3,4,5) and assume indoor exposure is an undefined fraction of outdoor exposure. Independent contractors sometimes examine aerobiologicals in the workplace, but few studies examine aerobiological concentrations from home environments (6,7,8,9). Aerobiological concentrations from inside homes and from local, as well as regional, outdoor environments must be accurately assessed to determine human exposure to common aerobiologicals.

This study examined the relationship among indoor aerobiological concentrations and those collected outdoors (locally and regionally). We hypothesize that, spring pollen and mold infiltrate homes resulting in similar indoor:outdoor pollen and mold by type, but greater pollen and mold concentrations in outdoor environments. We examined 31 single story homes during a spring pollen peak in NW Tucson (Ina Cluster; 8,9) to control for temporal and spatial variation (10,11).

reflect the views of the Agency, and no official endorsement should be inferred.

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Table I. The 10 most common pollen (total taxa = 32) and mold (total taxa = 54) taxa collected. (* Sum of all mold taxa not identifiable, ** Aspergillus-Penicillium spore type, *** Chenopodiaceae-Amaranthus pollen type.)

POLLEN		MOLD	
Indoor	Local Outdoor	Indoor	Local Outdoor
Morus	Morus	Cladosporium	Cladosporium
Cupressaceae	Ambrosia	Ustilago	Ustilago
Ambrosia	Cupressaceae	Misc. Others*	Misc. Others
Gramineae	Gramineae	Asper-Pen**	Asper-Pen
Plantago	Plantago	Misc. Ascomycetes	Misc. Ascomycetes
Olea	Simmondsia	Misc. Basidiomycetes	Misc. Basidiomycetes
Eucalyptus	Fraxinus	Myxomycetes	Myxomycetes
Fraxinus	Olea	Periconia	Periconia
Prosopis	Prosopis	Alternaria	Alternaria
Cheno-am***	Leguminosae	Dreschlera	Dreschlera

Table II. Comparison of outdoor vs. indoor pollen and spore concentrations using multiple regression (*Aspergillus-Penicillium spore type).

TAXON	CORRELATION COEFF.	LEVEL OF SIGNIFICANCE	REGRESSION EQUATION
Pollen			
Morus	.28	.26	y = .58 x + 74.50
Ambrosia	-.12	.56	y = -.59 x + 19.90
Cupressaceae	-.54	.04	y = -2.42 x + 14.30
Gramineae	-.32	.21	y = -.41 x + 7.09
Mold			
Cladosporium	.62	.00	y = 1.27 x + 1.14
Ustilago	.44	.02	y = 1.39 x + 34.58
Asper-Pen	.18	.54	y = .26 x + 36.33
Alternaria	.20	.21	y = .61 x + 6.14

Table III. Total concentrations of each "class" (pollen and mold) for multiple cpmparisons.

COMPARISON	CLASS	CORRELATION COEFF.	LEVEL OF SIGNIFICANCE	REGRESSION EQUATION
Calm vs. Turbulent				
Indoor	pollen	.76	.00	y = .71 x + .78
"	mold	.22	.10	y = .21 x + 3.99
Outdoor	pollen	.74	.00	y = .74 x + 1.06
"	mold	.53	.00	y = .62 x + 2.02
Mean Indoor vs. Outdoor	pollen	.41	.01	y = .31 x + 1.47
	mold	.20	.14	y = .14 x + 4.39
Local outdoor vs. Regional Outdoor	pollen	.46	.01	y = .54 x + 1.78