

Dust mites at high altitude in a tropical climate

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In 1971, Spieksma et al.¹ reported that house dust from high mountainous areas of Switzerland contained very few house dust mites (HDMs). In 1977, two studies^{2,3} demonstrated the prevalence and ecology of acarids and Glycyphagus and Cryptostigmata species recovered from house dust in Bogotá, Colombia. In 1980 a countrywide⁴ publication established the trends of HDM in 57 Colombian cities and towns of altitudes ranging from 17 to 3150 m above sea level. In 1982, a French study⁵ on altitude and HDM indicated that the percentage of positive samples and the concentration of mites varied inversely with the altitude. Forty percent of samples were

Abbreviation used

HDM: House dust mite

positive, with 7 mites per 100 mg of dust at 110 m and 0% at altitudes higher than 1600 m. The authors concluded that other data were not available with which to compare their findings.

The purpose of this study was to determine the prevalence of HDMs in nine representative locations of Colombia, altitudes from 1318 to 3051 m above sea level, with different temperatures and relative humidities. Ninety homes were chosen at random during a period of 10 months; each home was sampled every month, from June 1992 to July 1993. Outside and inside temperatures were registered. There are no seasons in Colombia, only dry and rainy periods. Relative humidity data were provided by the National Institute "Agustin Codazzi."

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TABLE I. Mite monthly densities, sites, altitudes, range in percent relative humidity, and range in inside temperature

HDM/gm	Pitalito	Viso Elias	Tenza	Garagoa	Obonuco	Choconta	La Calera	Charta	Tuquerres
June 1992	694	234	86	238	204	252	220	290	113
July	751	232	109	247	199	265	213	289	112
August	629	213	105	151	211	259	220	241	128
September	694	234	86	238	204	252	220	290	113
October	694	234	86	238	204	252	220	290	113
November	661	250	110	249	215	266	235	295	118
December	636	266	102	259	225	280	251	299	127
January 1993	660	250	111	249	215	266	236	295	119
February	657	252	104	250	216	268	237	296	122
March	655	253	101	251	217	269	239	296	123
Average	673	242	100	237	211	263	229	288	119
SD	36	15	10	31	8	9	12	17	6
Altitude above sea level (m)	1318	1425	1523	1900	2527	2655	5820	2963	3051
Range % RH	52<->67	60<->75	58<->66	52<->65	60<->68	62<->86	50<->58	58<->70	48<->60
Inside range (°C)*	18<->23	18<->21	18<->22	15<->21	10<->17	10<->14	10<->5	9<->14	8<->12

*Inside and outside temperature differed by 2 to 3° C.

SD, Standard deviation; RH, relative humidity.

TABLE II. Species mite densities and sites

Species	Pitalito		Viso Elias		Tenza		Garagoa		Obonuco		Choconta		La Calera		Charta		Tuquerres	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
<i>Dermatophagoides pteronyssinus</i>	357	53	148	61	60	6	116	49	90	43	108	41	50	22	158	55	72	61
<i>D. farinae</i>	213	32	81	33	28	28	74	31	92	44	86	33	169	74	102	35	0	0
<i>Blomia tropicalis</i>	0	0	0	0	0	0	14	6	0	0	9	3	0	0	12	4	16	13
<i>Cheyletus eruditus</i>	45	7	0	0	8	8	6	3	0	0	0	0	5	2	4	1	2	2
<i>Chortoglyphus arquatus</i>	40	6	0	0	0	0	8	3	0	0	2	1	2	1	0	0	0	0
Unidentified species*	18	3	13	5	4	4	19	8	29	14	58	22	3	1	12	4	29	24
Total	673		242		100		237		211		263		229		288		119	
SD	142.3		61.4		23.7		45.2		44.7		46.9		66.9		66.1		28.0	
Altitude above sea level (m)	1318		1425		1523		1900		2527		2655		5820		2963		3051	

SD, Standard deviation.

**Glycyphagus* spp., *Acaris* spp., *Oripoidae* spp., *Oribatulidae* spp., *Carpoglyphus* spp., *Microtegaeidae* spp.

METHODS

Dust samples were collected by using a portable vacuum cleaner (model S1083; Hoover, North Canton, Ohio) for 10 minutes over a surface of 4 m², including the area under the bed and both sides of each mattress. HDM samples were stored in sealed plastic bags at -20°C until mite count and identification were performed. Preparation of HDM samples was carried out by Arlian's method.⁶ Mites were counted microscopically at ×250 by following the counting grids. Results were extrapolated to mites per gram. After 5 minutes of incubation and gentle shaking, all mites present were collected with a needle and placed in two drops of Hoyer's medium on a microscope slide with a coverslip for analysis and counting. To obtain accurate counts, on samples transported from distant sites, the numbers of live and dead mites were combined.

RESULTS AND DISCUSSION

From taking HDM samples during 10 months in nine different locations in Colombia, altitudes from 1318 to 3050 m above sea level—it is evident that prevalence of mites at high altitudes is not directly related to temperature, relative humidity, or altitude. Two facts are prominent: high popula-

tions of mites are prevalent at altitudes of 2625 m, 2680 m, 2820 m, 2963 m, and 3051 m above sea level—altitudes two times or higher than 1318 m above sea level in the French study. Elevations alone do not control the HDM population dynamics because climatic conditions also play a key role.

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