

BRIEF NOTE

HOUSE DUST MITES IN COLUMBUS, OHIO¹

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This study is based on a small survey of Columbus, Ohio houses for mites. Previously, house dust from Columbus, Ohio has been found to contain the American house dust mite, *Dermatophagoides farinae* Hughes, 1961 (Larson *et al* 1968), the European house dust mite, *Dermatophagoides pteronyssinus* Troussart 1897 (Mitchell *et al* 1969), and a recently described species, *Hirstia domicola* (Fain *et al* 1974). In the summer of 1977, we examined 13 houses for house dust mites. We concentrated our efforts on that site indicated in previous surveys (Sesay and Dobson 1972) to be the most heavily infested, i.e., the head of the bed. Our objectives were three fold:

1. to determine the mite fauna characteristic of beds in Columbus, Ohio
2. to find the relative densities of mites at the head of the bed: surface, edge of the mattress, pillows, and blankets
3. to correlate numbers of mites with conditions of heat, humidity, light and availability of food-stuffs in each home

During the examination of each home, one of us collected dust from the pre-terminated bed while the other interviewed the residents, filling out a standard questionnaire (on file at the Acarology Laboratory, Ohio State University, Columbus, OH). Interview questions concerned conditions listed above, which we hypothesized could be relative to numbers of mites collected.

Dust for such surveys is frequently collected using small hand-held vacuum

cleaners (Nakada and Yoshikawa 1977). We used a small General Electric vacuum with a cone of porous paper inserted into the distal end of the vacuum hose and held in place by a collecting tool to serve as a repository for the dust. A fresh paper cone was used for each collection so that only the collecting tool required cleaning. A small plastic cone attached to a similar bag of porous paper was used for removing material from the edge of the mattress. An area of 0.5 m² on the surface of the mattress at the head of the bed and of the top of the blanket as well as the entire surface of each pillow and pillowcase was thoroughly vacuumed. Each sample consisted of the dust obtained from vacuuming an area for 5 minutes. Samples were kept in the paper collecting tubes and placed in individual plastic bags that were subsequently stored over a saturated NaCl solution at a relative humidity of 75% until examined for mites.

The dust from each sample was weighed and an aliquot of dust equal to 100 mg or all the dust if it weighed 100 mg or less was placed in the top of a nest of sieves (500, 250, 125 micron mesh). Glass beads were added to the top sieve to assist in breaking up the tangled particles of dust, and the sieves were tapped for 30 sec. on a rubber stopper. The contents of the 2 lower sieves were placed in separate 15 ml jars half filled with 70% ethanol and the jars were vigorously shaken to evenly suspend the dust. This fluid was then poured into a ridged plastic dish (Furumizo 1975), and lateral movement of the dish deposited the mites and dust evenly in the grooves. We examined each of the grooves, counting the mites with the aid of a dissecting

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TABLE 1
Mites collected from beds in Columbus, Ohio during August and September 1977.

Family and Species	No. Mites
Pyroglyphidae	
<i>Dermatophagoides farinae</i> Hughes, 1961	668
<i>D. pteronyssinus</i> Trouessart, 1897	269
<i>D. microceras</i> Griffiths & Cumington, 1971	3
<i>Euroglyphus maynei</i> Cooreman, 1950	1
Acaridae	
<i>Tyrophagus putrescentiae</i> Schrank, 1781	16
<i>Caloglyphus</i> sp.	1
Other	2
Histiogastromatidae	
<i>Histiogastromata</i> sp.	1
Oribatei	1
Phytoseiidae	
<i>Typhlodromus</i> sp.	1
Ameroseiidae	
<i>Klemania plumosus</i> Oudemans, 1902	1
Ascidae	
<i>Blattisocius dentriticus</i> Berlese, 1918	1
Tarsonemidae	6
Cheyletidae	
<i>Cheyletus malaccensis</i> Oudemans, 1903	1
<i>Cheyletus</i> sp.	3
Other	3
Other	1
TOTAL	979

microscope, and calculated the number of mites per 100 mg of dust.

In the dust examined, we found 979 mites. Of these, 96% were of the family Pyroglyphidae, or house dust mites; 1.6% were Acaridae; 1% mite predators; 0.6%

Tarsonemidae, with the remaining .08% probably accidental contaminants (table 1). At least 9 families, 13 genera, and 17 species were represented in our sample. Similar results in terms of kinds of mites collected have been reported by Mumcuoglu (1976), Amoli (1977) and Charlet *et al* (1978).

Mites of medical importance found included pyroglyphids (associated with allergy and dermatitis), cheyletids (implicated in dermatitis), and *Tyrophagus putrescentiae* Schrank, 1781, which may also cause dermatitis (Krantz 1978). Pyroglyphid species found were *Dermatophagoides farinae*, 65.4%; *D. pteronyssinus*, 34.5%; *D. microceras* Griffith and Cunnington 1971, 0.2%; and *Euroglyphus maynei* Cooreman 1950, 0.1% (table 2).

We found mites in 12 of the 13 homes examined. Three of the homes accounted for 58% of the mites found. Most mites were found on the mattress, intermediate numbers were collected from the blanket and fewest were found on pillows. Density of mites/100 mg of dust was dramatically higher in the collections from the mattress edge than from other head of the bed sites (table 2).

Ambient temperatures (23 °C to 29.5 °C) within the homes examined were in the optimum range for mite growth (Wharton 1976). We calculated a humidity index but found no correlation between the index and numbers of mites found. During the survey, Columbus, Ohio ambient humidity ranged from 62–84% and thus should not have been a limiting factor (Wharton 1976); in fact, the home with the lowest humidity index

TABLE 2
Distribution of Pyroglyphidae by species and site in terms of calculated totals per site vs. actual numbers in dust checked.

Species	Mattress		Mattress Edge		Pillow		Blanket		Total	
	C.T.*	Total**	C.T.	Total	C.T.	Total	C.T.	Total	C.T.	Total
<i>D. farinae</i>	737	146	564	382	113	73	170	67	1584	668
<i>D. pteronyssinus</i>	172	22	201	111	101	44	358	92	832	269
<i>D. microceras</i>	0	0	5	3	0	0	0	0	5	3
<i>E. maynei</i>	0	0	2	1	0	0	0	0	2	1
Total	909	168	772	497	214	117	528	159	2423	941

*C.T. = Calculated totals per site.

**Total = Mites/100 mg dust x 13 houses = mites/1300 mg total.

yielded the highest number of mites. We found a positive but non-significant correlation between numbers of mites collected and the available foodstuffs index.

The proportion of mites we found on blankets was consistent with Sesay and Dobson's 1972 study. The relative predominance of *D. farinae* in our collections corroborates results of studies by Sinha *et al* (1970), Wharton (1970) and Oshima *et al* (1972) in inland North America. *Dermatophagoides pteronyssinus* was found to be the most common species in coastal California (Furumizo 1975) as well as in western but not eastern Europe (van Bronswijk and Sinha 1971). Other species such as *Hirstia domicola* in Japan can be locally prevalent (Fain *et al* 1974) but on a world-wide basis, *D. farinae* and *D. pteronyssinus* predominate. Our survey substantiates the fact that houses in Columbus, Ohio are similar to houses elsewhere in their mite fauna.

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