

**ALLERGENIC DERMATOPHAGOIDES MITES CAUSING ASTHMA
AMONG SCHOOLCHILDREN AT AIN-SHAMS DISTRICT,
CAIRO, EGYPT**

By

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Abstract

The present study was performed on house dust samples collected from ten homes of schoolchildren suffering from asthma at Ain-Shams district, over a period of two years (2008 & 2009). The data revealed that the total annual density of the two allergenic mites (*Dermatophagoides pteronyssinus* (Trouessart) & *Dermatophagoides farinae* (Hughes)) was 202 individual mites with 22 asthmatic children in the first year, and individual mites increased to 268 with 36 asthmatic children in the second year. The two house dust mites were more abundant in bedrooms than in living ones (292 & 187 mites, respectively). The prevalence of the house dust mites on the mattresses and furniture were higher in bedrooms and living rooms than on the floors (340 & 140 mite, respectively). Winter season recorded the highest prevalence for both mites in the first and second year (87 & 110, respectively). Summer represented the lowest values (19 & 25, respectively).

Key words: Cairo, House dust mites, asthmatic children, seasonal and indoor abundance.

Introduction

House dust is composed of complex organic and inorganic constituents. The organic components originate from many sources such as: molds, bacteria, pollen, food particles, and human and animal dander. They represented the source of nourishment for a variety of mites and other arthropod-vectors of diseases are quite abundant in this ha-

bitat (Richard *et al.*, 2006). After declaration of existence of pyroglyphid mites' in house dust, both *Dermatophagoides pteronyssinus* and *D. farinae* top of house mites as main sources of environmental pollutants (Voorhorst *et al.*, 1967; Miyamoto *et al.*, 1969). Population trend of house dust mites' in house dust of floors and mattresses were studied in 11 houses in Colombia by Laurence *et al.* (1978). Epidemio-

logical studies on house dust mites as source of environmental pollution with mite allergens in Kuwait were carried out by (Gamal-Eddin *et al.*, 1992).

The prevalence of asthma, rhinitis, contact dermatitis and/or allergy individuals susceptible or sensitive to house dust mites has increased worldwide, especially among pre-school and school aged children (National Academy Press, 2000). Many causes have been proposed for this increase including changes in the standard of living, fever infections during early childhood, exposure to cigarette smoking and other irritants and outdoors and indoors allergens, damp housing and the presence of moulds in the home (Smedje *et al.*, 1997).

There is a sufficient evidence of a causal relationship between exposures to house dust mite allergen and the development of asthma in susceptible children. The feasibility and effectiveness of physical interventions to the house dust mite allergens in low-income, urban homes environments remain elusive (Patrick *et al.*, 2001)

The indoor air exposures are more strongly linked to the increase of asthma prevalence than either outdoor air exposures or violence. Specifically, dust mite and tobacco smoke exposure are identified as both risk factors for the development of asthma, as well as factors that may exacerbate existing asthma (Ruth, 2003).

Nadchatram, (2005) found that house dust mites lived in human contact from time immemorial. Human dander or dead skin constitutes the major organic component of the house dust ecosystem. They feed on dander, dust mites and human association will continue to co-exist as part of our environment. Efficient house-keeping practice reduces infestation.

The relationship between the development of sensitization and asthma and exposure to house-dust mite allergen concluded that in addition to genetic factors, exposure in early childhood to house-dust mite allergens is an important determinant of the subsequent development of asthma.

This study aimed to evaluate the abundance of house dust mites and asthmatic children over two successive years ((2009 & 2010) in Ain-Shams District as one of the most crowded urban area in Cairo Governorate..

Subjects, Materials and Methods

The Ain- Shams district was selected for the following reasons: 1- Densely populated district. 2- Narrow streets and presence of faithful animals. 3- Low hygienic level. 4- Many old style houses. 5- Tags pens for domestic and farm animals.

Forty samples of house dust were collected using a portable electric vacuum machine (GM Model#mv-1) cleaner from 10 homes of 22 children (aged from 6 to14 years

old) suffering from Asthma. Samples were taken seasonally, every 3 months, for two years (2008 and 2009).

The house dust samples were collected from each home (2 samples from floors and mattresses of the bed rooms and 2 from fuuritures and

floors of living rooms). A volume of house dust was about 5 gm prepared (Furumizo, 1975).

The mite fauna in the samples were isolated and mounted on microscopic slides in Hoyer's medium for examination, identification and counting.

Results

Table 1: Seasonal prevalence of allergenic mites in 1st year.

Allergenic mite species	Seasons				Totals	Asthmatic children
	Autumn	Winter	Spring	Summer		
<i>D. pteronyssinus</i>	38	45	22	10	115	22
<i>D. farinae</i>	18	42	18	9	87	
Totals	56	87	40	19	202	
Mean temper° C	26.0	19.5	23.0	33.1		
Mean RH %	48.1	46.3	44.0	41.5		

** = P<0.01 (highly significant)

Fig. 1: Seasonal prevalence of allergenic mites in 1st year.

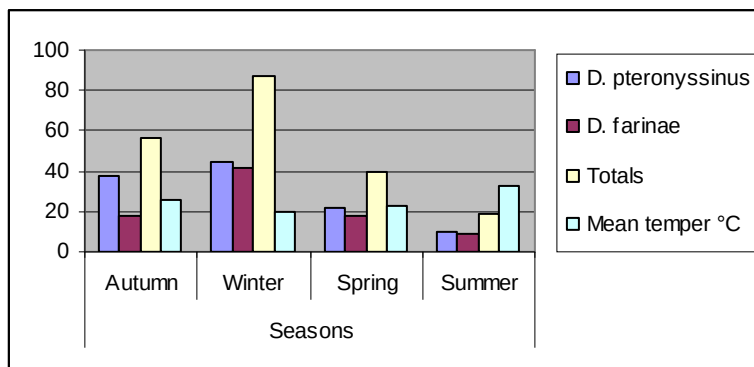


Table 2: Seasonal prevalence of allergenic mites2nd year.

Allergenic Species	Seasons				Totals	Asthmatic children
	Autumn	Winter	Spring	Summer		
<i>D. pteronyssinus</i>	50	60	25	13	148	36
<i>D. farinae</i>	37	50	21	12	120	
Totals	87	110	46	25	268	
Mean temper.° C	25.1	20.2	23.1	34.0	----	----
Mean RH %	49.0	46.4	43.0	42.7	----	----

** = P<0.01 (highly significant)

Fig. 2: Seasonal Prevalence of allergenic mites2nd year.

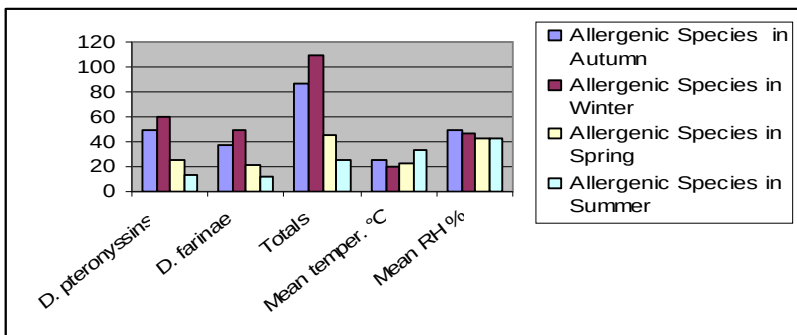


Table 3: Distribution of mites in bed and living rooms in 1st year.

Allergenic mite species	Bed rooms		Living rooms		Totals
	Mattresses	Floors	Furniture	Floors	
<i>D. pteronyssinus</i>	45	22	38	10	115
<i>D. farinae</i>	42	18	18	9	87
Totals	87	40	56	19	202
	127		75		

Fig. 3: Distribution of mites in bed and living rooms in 1st year.

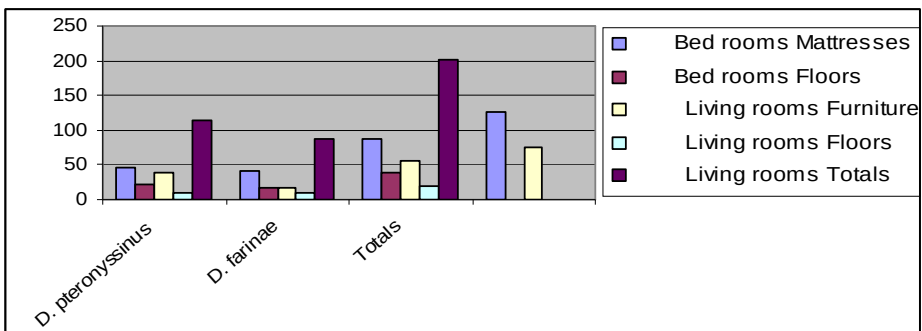


Table 4: Distribution of mites in bed and living rooms in 2nd year.

Allergenic species	Bed rooms		Living rooms		Totals
	Mattresses	Floors	Furniture	Floors	
<i>D. pteronyssinus</i>	60	25	50	13	148
<i>D. farinae</i>	50	21	37	12	120
Totals	110	46	87	25	268
	156		112		

Fig. 3: Distribution of mites in bed and living rooms in 2nd year.

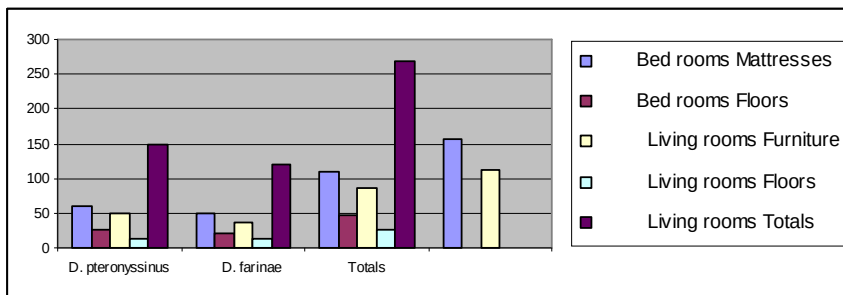


Table 5: Distribution of mites on mattresses, furniture and floors of bed and living rooms in 1st year.

Rooms	Mattresses& Furniture		Floors		Totals
	<i>D. pt.</i>	<i>D. far.</i>	<i>D. pt.</i>	<i>D. far.</i>	
Bed	45	42	22	18	127
Living	38	18	10	9	75
Totals	83	60	32	27	202
	143		59		

** = P<0.01 (highly significant)

Fig. 5: Distribution of mites on mattresses, furniture and floors of bed and living rooms in 1st year.

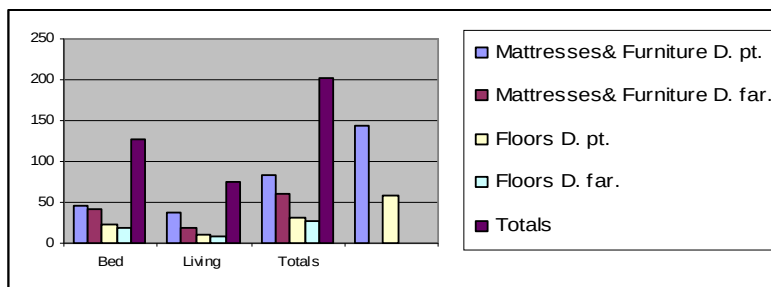
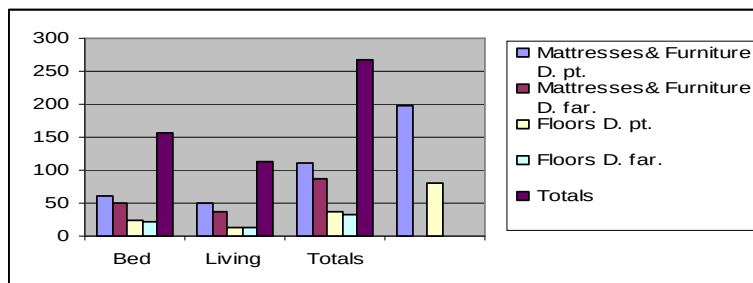


Table 6: Distribution of mites on mattresses, furniture and floors of bed and living rooms in 2nd year.

Rooms	Mattresses& Furniture		Floors		Totals
	<i>D. pt.</i>	<i>D. far.</i>	<i>D. pt.</i>	<i>D. far.</i>	
Bed	60	50	25	21	156
Living	50	37	13	12	112
Totals	110	87	38	33	268
	197		81		

** = P<0.01 (highly significant)

Fig. 6: Distribution of mites on mattresses, furniture and floors of bed and living rooms in 2nd year.



Discussion

In the present study, 340 samples of house dust were examined and revealed that the two allergenic mite species; *Dermatophagoides pteronyssinus* (Trouessart) & *Dermatophagoides farinae* (Hughes) (family Pyroglyphidae) were found in all the asthmatic children homes at Ain-Shams district in Cairo Governorate. The total annual numbers of the two allergenic mites were 115 and 87 mite individuals, respectively and the asthmatic children were 22 in the first year, while increased to 148 and 120 mite individuals, respectively and the asthmatic children became 36 in the second year. No doubt, the increase exposure of subjects sensitive to house dust mites increase the disease prevalence and incidence (Elsheikha *et al.*, 2009).

Winter seasons recorded the highest prevalence in first and second year (87 & 110 mite spp., respectively), Autumn (56 & 87 mite individuals) and (40 & 46 mite spp) in Spring, while Summer gave the

lowest values (19 & 25 mite spp) in the 1st and 2nd year, respectively.

The thermo per random zone for the two mites were between 19.5-26°C and optimum thermal value was 20.2°C, hygropreferandum zone was between 43-49 % & optimum value was 46.3% in the two years.

The present study revealed that bed rooms recorded the highest density (127 mite spp.) in the first year and increased to (156 mite spp.) in the second year. The living rooms came second (75 mite spp.) in the first year and (112 mite spp.) in the second year.

The mites between mattress, furniture and floors showed that the prevalence of *D. pteronyssinus* and *D. farinae* on mattresses & furniture was (143 & 197 mite spp.) in bed and living rooms in the 1st & 2nd years, respectively while floors showed (59 & 81 mite spp.).

This may be due to the abundance of nourishment as the moulds and human dander in addition to different characteristics of the home building, the fittings and furniture, pollutants in the room air, psy-

chosocial factors in the home environment, personal factors and exposures in home, which are main source of variation in prevalence.

Asthmatic children in 2nd year were 36 instead of 22 in 1st year due to mite density in the second year.

In Egypt, Morsy *et al.* (1994a,b) reported atopic dermatitis and asthmatic bronchitis and children in Qualyobia Governorate. Abou-Senna (1995) recorded mites of stored-hay from houses of atopic dermatitis patient in Al-Gharbia Governorate. Bakr *et al.* (1995) in Menoufia reported marked elevation of IgM in asthmatic children due to exposure to house dust mites. Sadaka *et al.* (2000) in Alexandria isolated *D. pteronyssinus* from house dust of allergic patients. Abou-Gamra *et al.* (2005) found that immunopathogenic role of IgG and RANTES in house dust mite-induced chronic bronchitis. Mazyad and Mohammad (2006) studied the effect of insect growth regulators on protein pattern of *D. farinae* and its validity on inducing human allergens. El-Sherbiny *et al.* (2010) in North Sinai governorate reported high prevalence of house dust mites.

Conclusion

Generally speaking, house dust mites are a health problem worldwide. Children are the main risk group particularly in rural areas as well as in crowded poorly hygienic dust samples in California, USA. Vector Views 22:19- 27.

urban. No doubt, cleanliness is a must particularly indoors. The use of powerful vacuum cleaners adds in the suction and eradication of mites in permanent fixed carpets.

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