

POPULATION DYNAMICS OF HOUSE DUST MITES (ACARI: PYROGLYPHIDAE) IN SANTIAGO DE COMPOSTELA (GALICIA, SPAIN)

BY J. M. AGRATORRES*, A. PEREIRA-LORENZO*
and I. FERNANDEZ-FERNANDEZ*

DUST MITES
PYROGLYPHIDAE
SPAIN
SEASONAL VARIATIONS

SUMMARY: Fifteen houses in three different areas of Santiago de Compostela (Galicia, Spain) were sampled during a year, in order to analyse the distribution and abundance of house dust mites. In each house, a mattress and living room were sampled. House dust mites were present in every house, with more than 100 mites per gram of dust. *Dermatophagoides pteronyssinus* was the most prevalent species (75 %), followed by *Euroglyphus maynei* (13 %) and *D. farinae* (6.2 %). *D. farinae* was better represented in the urban zone than in the rural zone. Differences in relative humidity levels recorded between these habitats might explain this distribution.

ACARIENS DES POUSSIÈRES
PYROGLYPHIDAE
ESPAGNE
VARIATIONS SAISONNIÈRES

RÉSUMÉ : Dans trois secteurs de la région de Santiago de Compostela (Espagne, Galice), 15 habitations sont suivies sur un an dans le but d'analyser la distribution et l'abondance des acariens des poussières. Dans chaque maison, le matelas et la pièce principale sont échantillonnés. Toutes les habitations montrent une faune de plus de 100 acariens par gramme de poussière. *Dermatophagoides pteronyssinus* est l'espèce la mieux représentée (75 %), puis *Euroglyphus maynei* (13 %) et *D. farinae* (6,2 %). *D. farinae* est mieux représenté dans les habitats urbains. Des différences de taux d'humidité relative entre habitat rural et urbain peuvent expliquer cette répartition.

ÁCAROS DEL POLVO
PYROGLYPHIDAE
ESPAÑA
DINÁMICA POBLACIONAL

RESUMEN: se ha efectuado el estudio faunístico y la dinámica poblacional de los ácaros del polvo en tres zonas diferentes de Santiago de Compostela (Galicia, España). Se han encontrado ácaros en todas las muestras examinadas y todas ellas presentaron una densidad de mas de 100 ácaros/g. de polvo. Se han identificado 3 especies de los propiamente denominados ácaros de polvo o domésticos, así como tres especies de los denominados ácaros del grano o productos almacenados y otras especies pertenecientes a otros grupos diferentes de ácaros. La especie mas abundante fue *Dermatophagoides pteronyssinus* (75 %).

* Laboratorio de Parasitología, Facultad de Farmacia, Universidad de Santiago de Compostela, 15706 Santiago de Compostela, España.

INTRODUCTION

House dust mites are one of the main causes of allergy in the world. Since the discovery that house dust mites (Acarina: Pyroglyphidae) cause allergic diseases (VOORHORST *et al.*, 1967), several studies on their distribution have been carried out in Spain. However, data on house-dust mite distribution and density are limited to areas of Cataluña (BLASCO & PORTUS, 1973, 1975; PORTUS *et al.*, 1976) and knowledge of house dust mites in Galicia is very limited (MARCOS *et al.*, 1994). We therefore carried out the present work in order to make a systematic survey of house dust mites in Santiago de Compostela, as well as their relative abundance and frequency.

MATERIAL AND METHODS

The dust samples were collected from fifteen randomly selected houses, classified as being from rural, urban or mixed zones. In each house, the mite populations were assessed for two sites—mattress and living room—with samples taken every three months for a year, in accordance with the seasons.

We examined 120 samples collected with a vacuum cleaner. The extraction unit of the vacuum cleaner was modified so that small samples of dust could be collected. A cloth filter was placed between the aspiration tube and the stem. The time and sampling area of vacuuming were standardised (2 min/m²) (PLATTS-MILLS *et al.*, 1989). The cloth filters were sealed in a plastic bag with a label showing the collection data, sample number, temperature and relative humidity. As soon as possible (the same day), samples were examined to isolate the mites, according to method described by FAIN *et al.*, (1986) and HART *et al.* (1987). The specimens were preserved in 70 % alcohol before being individually mounted in HOYER'S medium and identified.

RESULTS

Mites were present in all the houses examined. The mattress was the most infested site (72 %) compared to the living room (28 %).

The species identified are listed in Table 1. The majority of identified specimens were Astigmata of the families Pyroglyphidae (*Dermatophagoides* and *Euroglyphus*), Glycyphagidae (*Glycyphagus* and *Lepidoglyphus*) and Acaridae (*Tyrophagus*). Others species commonly found belonged to the Cheyletidae (*Cheyletus* sp.), Tarsonemidae (*Tarsonemus* sp.), Demodicidae (*Demodex* sp.), Oribatida and Mesostigmata.

Of the allergenic species, *D. pteronyssinus* was the most frequent (75 %), followed by *E. maynei* (13 %) and *D. farinae* (6.2 %). The predatory mite, *Cheyletus* sp. (2.9 %), was also observed in the samples that contained important populations of Pyroglyphidae and Glycyphagidae. Plant parasites, such as *Tarsoneurus* sp., (0.79 %), or the animal parasite *Demodex folliculorum* (0.02 %), were occasionally represented. With regard to the seasonal distribution of Pyroglyphidae (Figure 1), it was found that *D. farinae* and *E. maynei* were most often found during the spring, whereas *D. pteronyssinus*, was more abundant in the summer.

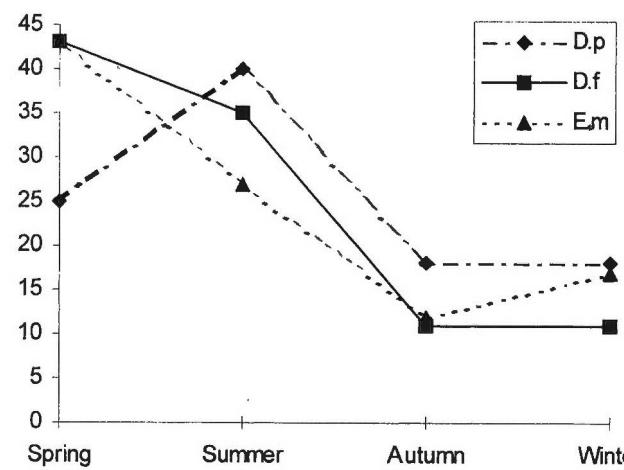


FIG. 1: Seasonal variations of Pyroglyphidae collected (D. p *Dermatophagoides pteronyssinus*; D.f *Dermatophagoides farinae*; E.m *Euroglyphus maynei*)

Figure 2 shows the distribution of pyroglyphid mites in the three area categories (urban, rural and mixed). *D. pteronyssinus* showed no significant differences between the different zones. Using the chi-square test, *E. maynei* showed a significant preference ($p<0.01$) for urban and mixed zones. The abundance

	% in sampled homes	no. mites/g of dust (%) mattress	no. mites/g of dust (%) living-room	%
ASTIGMATA				
Pyroglyphidae				
<i>Dermatophagooides pteronyssinus</i>	100	195100 (70)	82090(30)	75
<i>Dermatophagooides farinae</i>	53	16400 (72)	6350 (38)	6.2
<i>Euroglyphus maynei</i>	80	41220 (88)	5400 (12)	13
Glycyphagidae				
<i>Glycyphagus domesticus</i>	73	3 80 (38)	630 (62)	0.27
<i>Lepidoglyphus destructor</i>	47	260 (19)	1080 (81)	0.36
Acaridae				
<i>Tyrophagus putrescentiae</i>	40	130 (72)	50 (28)	0.05
spp.	80	1550 (54)	1330 (46)	0.78
PROSTIGMATA				
Cheyletidae				
<i>Cheyletus</i> spp.	100	6550 (62)	4080 (38)	2.9
Tarsonemidae				
<i>Tarsonemus</i> spp.	93	2390 (82)	540 (18)	0.79
Demodicidae				
<i>Demodex folliculorum</i>	20	20 (33)	40 (67)	0.02
ORIBATIDA	27	40 (80)	10 (20)	0.01
MESOSTIGMATA	33	40 (40)	60 (60)	0.03
Total		265850 (72)	103080 (28)	

TABLE 1: Occurrence of species in sampled homes.

DISCUSSION

In Galicia, 94 % of identified mites belong to three species: *D. pteronyssinus*, *D. farinae* and *E. maynei*. This result shows that the house dust fauna does not differ from that of other European countries. The bedrooms and beds supported high mite population densities, agreeing with the results of previous authors (MAUNSELL *et al.*, 1968; BRONSWIJK *et al.*, 1973; LANG *et al.*, 1978; MOSBECH *et al.*, 1991). The high frequency of mites in bedrooms stems from their direct and frequent association with humans, who provide food in the form of dead epidermal cells and other organic substances (MAUNSELL *et al.*, 1968; SESAY *et al.*, 1972; BRONSWIJK, 1973; MUNCUOGLU *et al.*, 1976).

D. pteronyssinus is the most abundant species in Santiago. This could be important from the immunological point of view for the prevention and therapy

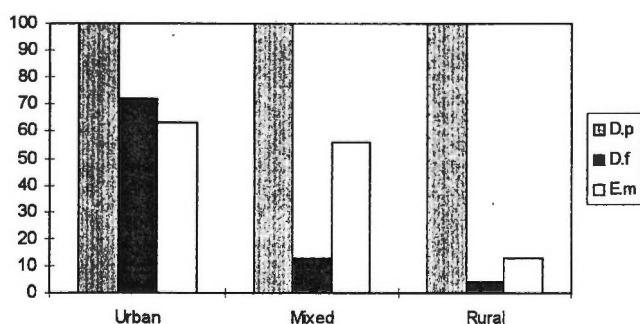


Fig 2: Distribution of Pyroglyphidae in the three areas (D. p *Dermatophagooides pteronyssinus*; D.f *Dermatophagooides farinae*; E.m *Euroglyphus maynei*).

of *D. farinae* in the urban zone was significantly different ($p<0.05$) (Fig. 2) than that in the other two zones, using the multiple range tests (ANOVA).

by hyposensitization of dust mite allergy. 100 % of the houses surveyed were infested with mites and all the infested houses showed densities greater than 100 mites/g. This is a risk factor for sensitization and development of asthma (KORSGARD, 1983; ANONYMOUS, 1988; ARLIAN *et al.*, 1990).

The seasonal variations in the concentration of mites were in agreement with previous studies. In temperate climates, the number of mites increases progressively in spring, reaching the highest value at the end of summer, after which it decreases in autumn and reaches the lowest value in winter (FAIN *et al.*, 1990; LEEUWEN & AALBERSE, 1991; LINTNER &

BRAME, 1993). During summer, *D. pteronyssinus* was the most frequent species.

Relative humidity variations influence the distribution of species: *D. pteronyssinus* is considered to be dominant in humid areas and *D. farinae* in the less humid areas (LANG & MULLA, 1977; ARLIAN *et al.*, 1981; SCHWARTZ *et al.*, 1987). According to our measurements of relative humidity, the highest values were recorded in rural zone (annual mean of 61 %) and the lowest in the urban zone (59 %) (Table 2). We suspect that the higher presence of *D. farinae* in urban houses is a consequence of this microclimatic difference between urban and rural habitats.

		Urban		Mixed		Rural	
		T	H	T	H	T	H
Spring	Mattress	21 ± 2.1	62 ± 5.2	18 ± 1.6	58 ± 9.1	21 ± 0.9	68 ± 7.3
	Living-room	20 ± 2.1	61 ± 8.3	19 ± 2.4	54 ± 5.6	22 ± 0	53 ± 1.9
Summer	Mattress	22 ± 2.5	57 ± 2.3	22 ± 1.5	59 ± 7.8	24 ± 0.8	42 ± 2.1
	Living-room	23 ± 2.5	57 ± 2.3	22 ± 1.4	58 ± 6.7	23 ± 0	46 ± 0.9
Autumn	Mattress	21 ± 1.5	65 ± 3.2	18 ± 1.7	62 ± 10.8	14 ± 1.4	75 ± 5.9
	Living-room	20 ± 2.3	66 ± 4.1	19 ± 1.7	62 ± 10.8	14 ± 0.9	72 ± 3.8
Winter	Mattress	19 ± 1.5	54 ± 7.1	18 ± 1.7	52 ± 13.1	14 ± 0	60 ± 0
	Living-room	19 ± 1.4	54 ± 13.7	18 ± 2.0	58 ± 13.1	13 ± 0.9	75 ± 10.4
mean		21 ± 1.7	59 ± 5	19 ± 1.5	58 ± 13	18 ± 4.8	61 ± 13

TABLE 2: Seasonal temperature (T) and relative humidity (H) in the mattress and living room in sampled homes (means).

In the associated domestic fauna, Acaridae and Glycyphagidae were the most frequent mites on the floors. These mites prefer humid habitats contaminated with food (COOREMAN, 1944) and cause very important allergic reactions.

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