

House-dust mites on wall surfaces of damp dwellings belong to storage mite genus

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Mite-avoidance program do not include investigation and treatment of wall surfaces because house-dust mites (HDM) are not be expected to be found on wall surfaces. Indeed, pyroglyphids mite such as *Dermatophagoides pteronyssinus* and *D. farinae*, the most common domestic mites, need to survive and reproduce high humidity and temperature, food and darkness, conditions which are not usually met on wall surfaces. Moreover two papers looking at the *Dermatophagoides* allergen level on wall surfaces from houses of asthmatic patients (1, 2) failed to find significant allergenic levels. However, as house-dust mites and hydrophilic molds share very similar environmental needs, i.e. high water activity and temperature, both aero-contaminants are expected to be found together in damp dwellings. To test this hypothesis, we performed a semi-quantitative evaluation of HDM density on moldy and non moldy wall surfaces.

Sixty-six damp dwellings were visited. In order to insure adequate sampling material, houses were selected if the moldy wall surface was at least equal to 50 cm². There were 50 such dwellings.

Sampling was performed by the adhesive tape technique. An adhesive tape was gently applied onto the moldy surface,

then removed and transferred on a microscopic slide which was then stained using lacto phenol cotton blue. When detected, molds were classified into coarse taxonomic groups.

Sampling was performed on the moldy wall surface and, on the same wall surface, on a non moldy area, 20 cm away from the external limit of the moldy surface. Samples were obtained by using a swab gently pressed over the moldy or non moldy wall surface. HDM were thereafter extracted using the floting centrifugation method, then mounted on a slide and identified under a light microscope at 100 × magnification, using several taxonomic keys. Results were expressed on a semi-quantitative scale

– : No HDM
+ : Few HDM
++ : Few HDM and mite faeces
+++ : Many HDM, eggs, larva and faeces
++++ : Pullulation of HDM, very many faeces, eggs and larva.

Statistical analysis used a chi-square test for trends. Prevalence (percentage) of molds species identified were as follows: *Cladosporium* ($n = 26$, 52%), *Aspergillus* ($n = 13$, 26%), *Ulocladium* ($n = 5$, 9%), *Alternaria* ($n = 3$, 7%),

Penicillium ($n = 2$, 4%) and *Acremonium* ($n = 1$, 2%).

Figure 1 provides the distribution of HDM infestation according to the semi-quantitative scale, on moldy and non moldy wall surfaces ($P < 0.0001$).

This study demonstrated a strong association between HDM and molds on wall surfaces. Most HDM identified belonged to the storage mite species. Storage mites genus need higher environmental water activity than *Dermatophagoides* genus to develop (3). Storage mites such as *Glycyphagus* spp. and *Tyrophagus putrescentiae* lack enzymes to digest chitin (insects) and cellulose (vegetables) and could utilize only the more readily assimilable part of food, such as molds (4). Previous papers measuring HDM allergens on wall surface provided low levels first because HDM presumably did not belong to the *Dermatophagoides* genus, second because the dwellings were not selected on the basis of mold infestation. Storage mites do have an allergenic potency, quite different from the one of *Dermatophagoides* genus (5) so that their occurrence cannot be assessed using *Der p 1* or *Der f 1* monoclonal antibodies, nor using guanine excretion quantification.

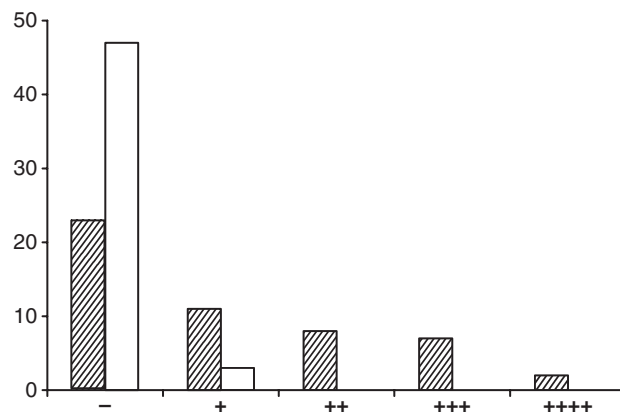


Figure 1. Semi-quantitative analysis of mite infestation on moldy (hatched bars) and non moldy (white bars) wall surfaces. The y abscissa displays the number of dwellings.

Allergens from storage mites, together with those from *Dermatophagoides* genus and molds, glucans, endotoxins, mycotoxins and microbial volatile organic compounds constitute a large array of aero-contaminants which could also play a role in triggering inflammatory symptoms in individuals living in unhealthy dwellings.

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