

# Domestic Mite Prevalence in Germany

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## Abstract

Domestic mites are major sources of perennial indoor allergens and drivers of IgE mediated rhinitis and asthma. In Central Europe, house dust mites predominate, while storage mites are increasingly recognized as clinically relevant allergens with limited cross reactivity. Nationwide mattress dust analyses in Germany show widespread exposure in rural and urban settings. Notably, mite allergens persist at higher altitudes, supporting species specific diagnostics and perennial management.

## Background

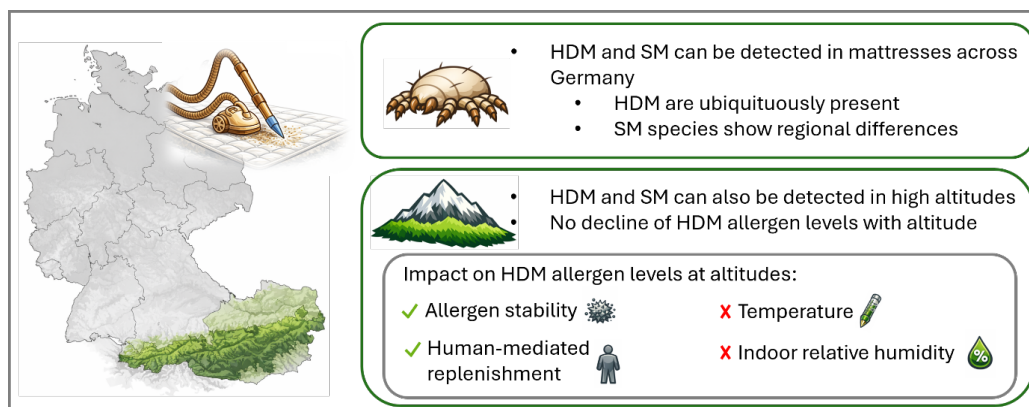
Domestic mites are ubiquitous cohabitants of human dwellings and drivers of IgE mediated rhinitis and asthma [1,2]. In Central Europe, house dust mites (HDM)-especially *D. pteronyssinus* and *D. farinae*-dominate the indoor acarofauna. Furthermore, certain species of storage mites (SM) have been observed to contribute to sensitisation, and co-sensitisation with HDM is common [3]. Moreover, SM species such as *Tyrophagus putrescentiae*, *Lepidoglyphus destructor* and *Acarus siro* can elicit allergic reactions, which was demonstrated by nasal provocation [4]. Their cross reactivity with HDM and among SM taxa is limited, which necessitates species specific diagnostic approaches and therapy decisions [5]. However, despite their clinical importance, little is known about the nationwide distribution of allergologically relevant domestic mites in Germany. For a considerable period, the recognition of SM as a significant allergen source was confined to specific geographical locations, such as rural areas or particular occupational settings, including meat production and laboratory animal care [6,7]. Likewise, long-standing assumptions posited declining HDM exposure at higher altitudes in the Alps due to relative humidity [8]. Here, we summarize data sets that now allow a more integrated assessment.

## Results

In the analysis recently published by Bergmann et al., dust samples were collected from mattresses across Germany using a vacuum cleaner attachment. The identification of mite species was conducted through microscopic analysis. Across 2,554 mattress dust samples, *D. farinae* and *D. pteronyssinus* predominated (about 57% and 45% of positive dust samples, respectively), with *Euroglyphus maynei* being

rare (in 1.1% of samples across Germany). Clinically relevant SM were consistently detected at lower frequencies, and with regional differences: *Glycyphagus domesticus* (in 3.6% of samples across Germany) in all states, *Tyrophagus putrescentiae* (in 2.9% of samples across Germany) in all states but Thuringia, and *Lepidoglyphus destructor* (in 2.0% of samples across Germany) in all states but Berlin/Brandenburg. *Blomia tropicalis* was very rarely detected (0.04%). The proportion of positive dust samples for *D. farinae* often exceeded *D. pteronyssinus* in eastern regions, whereas western states tended to show higher *D. pteronyssinus* representation; overall HDM levels were relatively lower in Bavaria and Saxony Anhalt with a balanced species ratio [9]. Seasonality in mite counts was modest in this nationwide analysis. Using the same method, cottages at different altitudes in the Alpine foothills were analysed. Here, also SM, such as *Tyrophagus putrescentiae*, could be detected at higher altitudes (> 1,600m) [unpublished data, LETI Pharma GmbH]. This finding is consistent with a previous study by Grafestätter et al., who demonstrated that, contrary to the classical paradigm, HDM allergens (Der p 1, mite group 2) do not decline with altitude. The authors explain this by the long-term stability of mite allergens, which remain detectable long after mites have died; freezing conditions may even preserve allergenic structures rather than eliminate them. During subsequent warmer periods, small mite populations can re-emerge, and renewed human activity may further reintroduce mites, leading to the deposition of newly produced allergens [10]. Der f 1 showed only a weak inverse association, largely driven by higher Der f 1 at <1,500m, with no difference above vs below this threshold for Der p 1 or group 2 proteins. Allergen levels were consistently higher in mattresses than floors (~2:1), and neither indoor relative humidity nor temperature correlated with allergen concentrations in this dataset [10].





**Figure 1:** Graphical abstract.

## Discussion

Studies from Germany and Austria show that clinically relevant HDM allergens persist even at higher altitudes, challenging the long-held assumption that elevation inherently limits exposure [8]. Allergen persistence appears to result from long-term allergen stability and repeated human-mediated replenishment rather than sustained mite viability. In parallel, the widespread detection of SM species such as *Glycyphagus domesticus*, *Tyrophagus putrescentiae*, and *Lepidoglyphus destructor* in dust from mattresses demonstrates that exposure is not confined to agricultural settings or food storage but also occurs in house dust of urban environments [9]. Together, these findings indicate that both HDM and clinically relevant SM are ubiquitous across diverse habitats, including lowland and high-mountain settings, which have several important implications for clinical practice.

From a diagnostic perspective, the limited cross reactivity between HDM and SM supports the use of targeted diagnostic panels that include prevalent SM species such as *Glycyphagus domesticus*, *Tyrophagus putrescentiae*, and *Lepidoglyphus destructor*, particularly when symptoms persist despite HDM focused management. This approach is relevant not only for rural populations but also for urban patients, where SM exposure is increasingly recognized. Environmental counselling should likewise be adapted: data from alpine regions indicate that clinically relevant mite allergen loads may persist even at higher altitudes, and potential symptomatic benefits of mountain stays are therefore unlikely to result solely from reduced HDM exposure, but rather from multifactorial environmental and physiological effects. Finally, national level analyses show only limited seasonal variation in mite occurrence, underscoring the need for perennial therapy strategies. Even though allergen immunotherapy (AIT) remains the sole disease-modifying therapy for allergies, patients in Germany continue to experience a lack of adequate treatment.<sup>1</sup> This situation reflects broader challenges in allergy recognition, diagnosis, and implementation of guideline-based care. In this regard, the significance of SM as relevant allergens remains underestimated, and clinically relevant sensitisation is frequently overlooked [5]. The data concerning the prevalence of mite species and their allergens can be utilised to establish a correlation between symptoms and their respective triggers, thereby facilitating an accurate diagnosis and disease-modifying therapy.

## Conclusion

Domestic mite exposure in Germany is widespread and not restricted to specific regions or lowland environments. The occurrence of both

HDM and clinically relevant SM has been documented across a variety of geographic settings, including alpine areas, with these factors contributing to the perpetuation of perennial allergen exposure. These findings underscore the necessity for comprehensive, species-specific diagnostic strategies and advocate for the implementation of year-round management approaches. To refine diagnostic and therapeutic approaches in the future, it would be beneficial to collect more data on the abundance of mite species and allergen levels in different areas.

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