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## Article

### New report of *Glycycometus malaysiensis* (Acari: Aeroglyphidae) in Cuba

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#### ABSTRACT

Mites are the allergens most implicated in the etiology of allergic respiratory diseases. They are frequent in humid and warm areas and are usually found in household dust. The objective of this work is to report the presence of a new species of domestic mite in Cuba found in the homes of the country's capital. The samples, consisting of mattress dust, were taken in the municipalities of Plaza and Habana del Este. The species *Glycycometus malaysiensis* (Fain & Nadchatram) was identified from a female and a nymph. The diagnostic characters and their allergenic importance are discussed.

**KEY WORDS:** Allergenic importance; Astigmata; diagnosis; house dust mite; mattress.

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#### INTRODUCTION

House dust is considered by many authors as an ecosystem that provides food and shelter to a wide community of arthropods, fungi and bacteria. This powder is a heterogeneous mixture that includes synthetic and natural fibers, dander, minerals, salts, ash, pollen, fungi, insect fragments, food remains, etc., which constitutes a suitable substrate for the growth and development of countless microscopic mites, thus becoming the ideal vehicle, which, in addition to conserving these arachnids, is capable of transporting the sensitizing molecules produced by them (Hyde 1973). Mites are the main biological component of dust due to their abundance and it has been shown that both the proteins contained in their body and those excreted or secreted contain allergens (Colloff 1991).

House mite allergens are the main etiological agents of the most important allergic diseases in tropical climatic conditions. Its dominant role in household dust is described in the 1960s. Since then, the knowledge about the biology and ecology of some species has been deepened, especially those with the highest incidence and prevalence (Sánchez-Borges *et al.* 2017).

Dust and warehouse mites are a group of synanthropic habits which are distributed throughout the world, sometimes in large numbers (Chew *et al.* 1999b; Arlian and Morgan 2003; Colloff

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2009). The greatest importance of these mites is the allergens that they produce and release into the environment as part of their waste (Colloff 2009).

Sensitization to mites is relevant not only because of its association with diseases such as asthma, rhinitis or atopic dermatitis, but also because of the high percentage of the population that is sensitized to them. It is estimated that in areas with tropical or subtropical climates, approximately 30% of the population was sensitized to mites (Arlian and Platts-Mills 2001; Larsen *et al.* 2016).

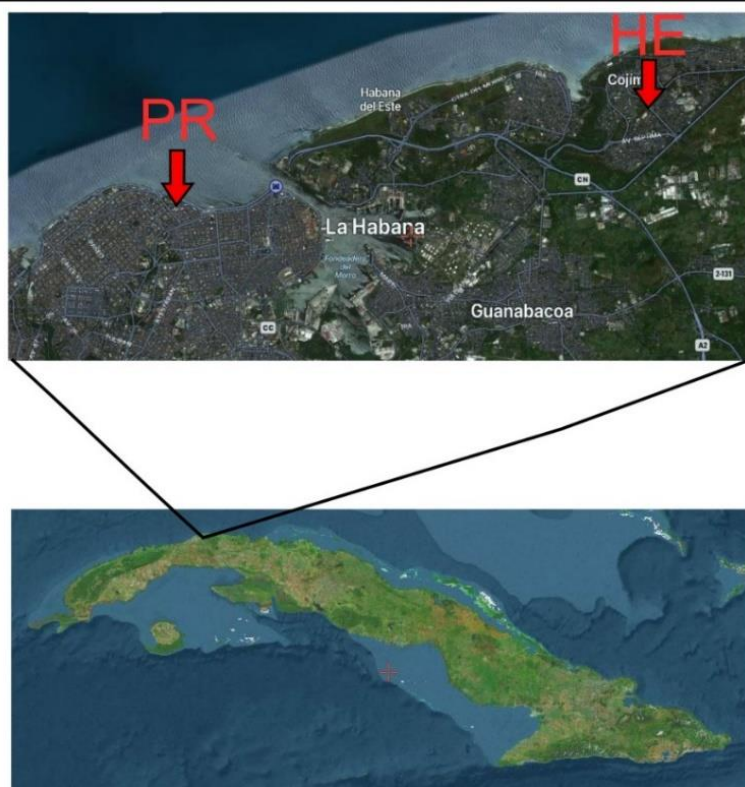
In Cuba, studies on house dust began between 1980 and 1983, where 25 locations throughout the country were studied. These investigations led to the finding of *Dermatophagoides pteronyssinus* (Trouessart) and *Blomia tropicalis* van Bronswick, Cock & Oshima as the predominant species in house dust (Cuervo *et al.* 1983). In addition, a new species was identified to science: *Dermatophagoides siboney* Dusbabek, Cuervo & Cruz (Dusbabek *et al.* 1982).

These three species have been identified as of great allergological importance, *D. pteronyssinus*, the most abundant worldwide; *B. tropicalis*, typical of tropical areas and *D. siboney* reported in other tropical areas of America and Asia (Sun *et al.* 2013; Hashimoto *et al.* 2017). Around 80% of Cuban asthmatics are sensitized to one or more of these species (Ferrández *et al.* 1996; Martínez *et al.* 1997). A high number, estimated between 30% and 40%, show simultaneous sensitization (Castro Almarales 2009).

There is little data on the acarological fauna of domestic dust in Cuba and the previous studies were published approximately three decades ago. The aim of this work is to report the presence of one not yet reported species of domestic mites in houses of the Cuba's capital.

## MATERIAL AND METHODS

The samples were taken from mattresses in the Plaza de la Revolución (PR) and Habana del Este (HE) municipalities in Havana province (Fig. 1) The sweeping and aspiration methods described by Torralba-Averoff *et al.* (2021) were used.



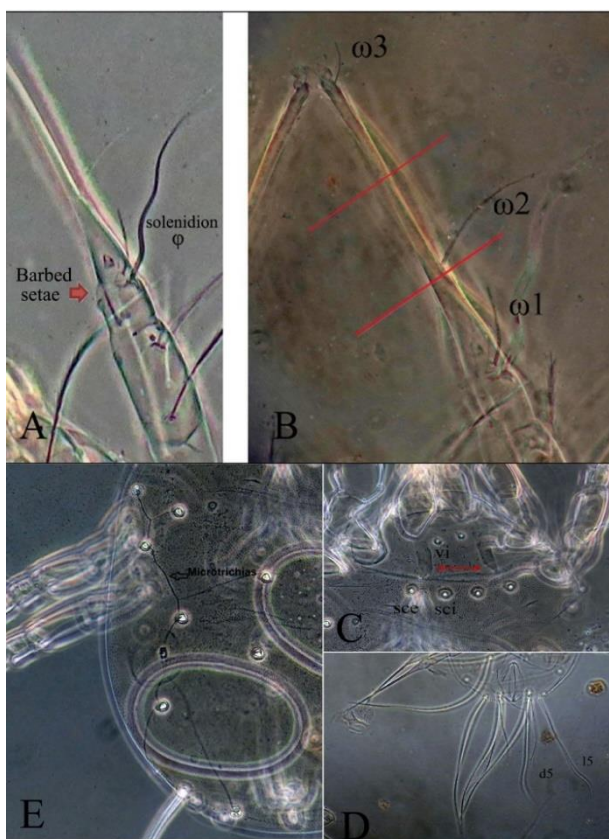
**Figure 1.** Dust mite collection areas.

The samples were processed at the Laboratorio Central de Cuarentena Vegetal (LCCV). The dust collected from both the vial and the filter paper was washed and passed through a sieve with a 1 mm opening and a lower one of 0.063 mm. The remainder was moved with water from a wash bottle and poured into several watch glasses that were subsequently observed in a Zeiss Stemi DB 4 stereomicroscope. The mites were taken with a sleeved needle and mounted in Hoyer's medium. For taxonomic identification, the description of Ling *et al.* (2019) with the aid of a phase contrast ZEISS model Axioscop 40 microscope was used. The specimens are deposited in the acarology collection of the LCCV.

## RESULTS

The species *Glycycometus malaysiensis* (Fain & Nadchatram, 1980) (Aeroglyphidae) was detected. The specimens observed were a female in Alamar, HE municipality, on February 9, 2020 collected by the sweeping method and a nymph in PR municipality on February 29, 2020 gathered by the aspiration method.

In our samples, the morphological characters match what was reported in the study carried out by Ling *et al.* (2019) on this species. The morphological characters that identify it are the following: tibia I and II with a solenidion  $\phi$  and barbed setae (Fig. 2A); tarsus I with solenidion  $\omega 2$  located at junction of 1/3 basal and 2/3 apical of tarsus I (Fig. 2B); opisthosoma not striated but covered by reticular projections; presence of two narrow, rectangular paramedian bands on the propodosoma in a lateral position; sci setae slightly posterior or in cross line with sce setae (Fig. 2C). Other distinctive morphological characters of *G. malaysiensis* are the d5 and l5 silks which are very long (Fig. 2D).



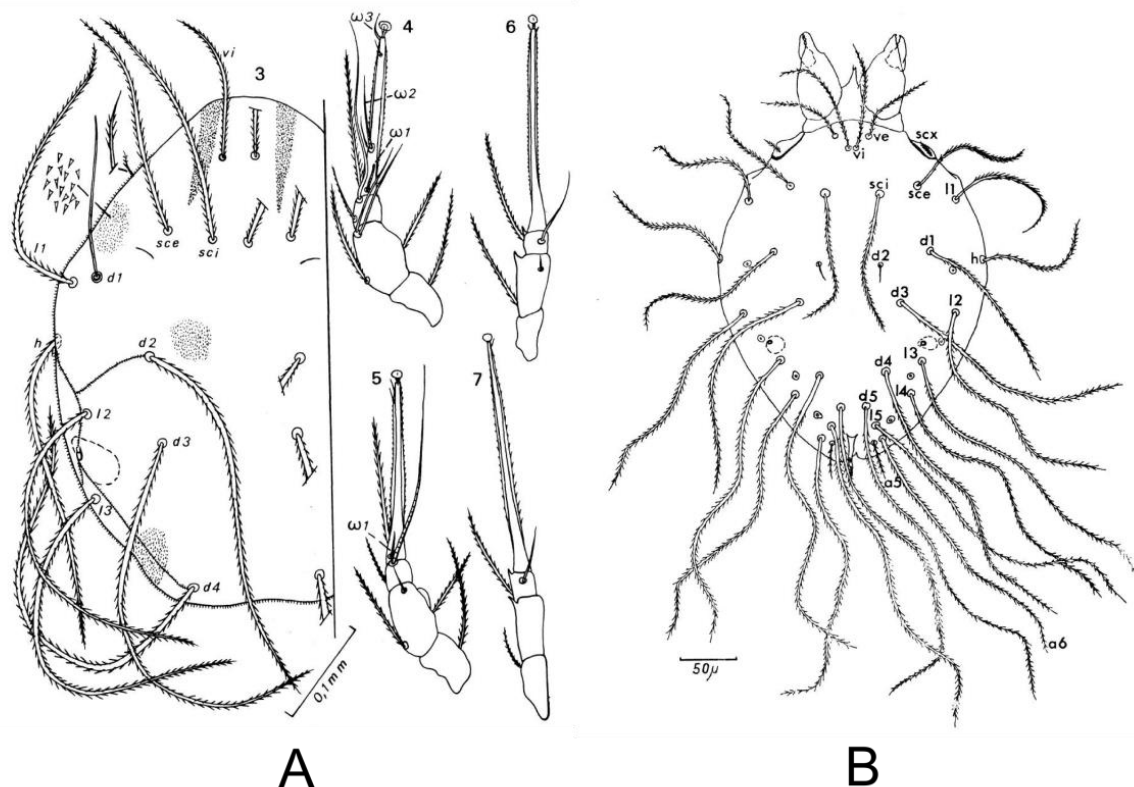
**Figure 2.** Detail of *Glycycometus malaysiensis* – **A.** Tibia I; **B.** Relative position of solenidion  $\omega 2$  in tarsus I; **C.** Propodosoma showing the paramedian bands (arrow) and the location of setae vi, sce and sci; **D.** Details of idiosomal posterior setae d5 and l5; **E.** Line of microtrichia in the idiosoma (original magnification: A and B 1000 $\times$ , C–E: 400 $\times$ , D: 200 $\times$ ).

This species was identified for the first time by Fain and Nadchatram (1980) as *Austroglycyphagus malaysiensis*. The genus, described by Fain and Lowry (1974) was synonymized by O'Connor (1982) with *Glycycometus* and located within the Aeroglyphidae family. To date, 14 species of *Glycycometus* have been identified as being associated with insects (bees and flies), nests of small mammals (bats and rodents), nests of birds, and dust in human dwellings (Ling *et al.* 2019).

Other species found in the samples were *D. pteronyssinus* (9 in HE; 111 in PR), *Dermatophagoides* sp. (2 in HE; 5 in PR), *B. tropicalis* (1 in HE; 2 in PR), *Cheyletus malaccensis* (13 in PR), *Suidasia pontifica* (2 in PR), *Malayoglyphus intermedius* (1 in PR), and *Ameroseius* sp. (1 in PR).

## DISCUSSION

*Glycycometus malaysiensis* differs from the closer species *G. spieksmai* in the sci setae are located posterior or in line to the sce while the latter is slightly anterior (Ling *et al.* 2019). The diagnostic characters to differentiate *G. malaysiensis* from *B. tropicalis* are explained by Ling *et al.* (2019). However, an important character not considered by these authors to identify this species is the presence of a lateral band of specialized microtrichia that join the idiosomal lateral setae (Fig. 2E). This feature characterizes the Aeroglyphidae family and is absent in Echimiopodidae, a family to which *B. tropicalis* belongs, which was also found in the samples (Fig. 3).



**Figure 3.** Dorsal view of female – **A.** *Glycycometus malaysiensis* (Fain & Nadchatram, 1980); **B.** *Blomia tropicalis* (Bronswijk *et al.*, 1973).

In a Singapore dust mite study, Chew *et al.* (1999a) found *G. malaysiensis* (named *Austroglycyphagus malaysiensis*) in 20–54% of dust samples and 50–70% in patient cases sensitive

to this species. It was observed that it was the fourth in importance for the frequency of reactivity in patients.

Although *G. malaysiensis* is not a common mite species of this genus, it is found in house dust in the tropics. However, Colloff (2009) suggests that *Glycycometus* has probably been confused with *Blomia* (Glycyphagoidea: Echimyopodidae), the better-known genus. Therefore, it could be much more abundant and dispersed than reported. Of the 14 species reported within the genus *Glycycometus*, only *G. malaysiensis* is known to have allergenic potential (Colloff 2009).

In addition to its presence in Asia, Miranda *et al.* (2002) also report the occurrence of the species in La Chorrera, Panama, which was its first detection in the Neotropics. Later, it was detected in Panama in the districts of Boquete and David with 6.9 and 3.3% relative abundance, respectively. This sample was taken by sweeping the dust under the bed with a brush (Estribí *et al.* 2018). Also, it was detected in the same country with an abundance of 0–0.17% in mattresses and 0.83–6.37% on floors (Lezcano *et al.* 2020)

The medical significance of *G. malaysiensis* has not been ruled out, although with limited studies. To date, several publications provide evidence that this species potentially contributes to occupational and non-occupational allergies (Baratawidjaja *et al.* 1999; Chew *et al.* 1999b; Mariana *et al.* 2000; Tang *et al.* 2011). Greater importance could be associated with the probable cross-reactivity with other domestic mites, particularly with *B. tropicalis* (Chew *et al.* 1999a).

Cuervo and Almaguel (2004) reported the taxonomic composition of the domestic mites of Cuba in which they mentioned 23 species of the Astigmata. In this work a family and a new species are added.

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## گزارش جدید *Glycycometus malaysiensis* (Acari: Aeroglyphidae) در کوبا

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### چکیده

کنه‌ها حساسیت‌زاهایی هستند که بیشترین نقش را در علت بیماری‌های آلرژیک تنفسی دارند. این کنه‌ها در مناطق مرطوب و گرم فراوان هستند و به طور معمول در گرد و غبار خانگی یافت می‌شوند. هدف از این مقاله گزارش حضور گونه جدیدی از کنه‌های خانگی در کوبا است که در خانه‌های پایتخت این کشور یافت می‌شود. نمونه‌هایی متشکل از گرد و غبار تشک در شهرداری‌های پلازا و هابانا دل استه برداشته شدند. یک ماده و یک پوره گونه *Glycycometus malaysiensis* (Fain & Nadchatram) شناسایی شدند. ویژگی‌های تشخیصی و اهمیت حساسیت‌زایی آنها مورد بحث قرار می‌گیرد.

**واژگان کلیدی:** اهمیت آلرژی‌زایی؛ بی‌استیگمایان؛ وجه مشخصه؛ کنه گرد و غبار خانگی؛ تشک.

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