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The first report on the ectoparasitic genus *Tropilaelaps* (Acari: Mesostigmata: Laelapidae) in Russia

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Mites of the genus *Tropilaelaps* Delfinado & Baker (Acari: Laelapidae) are ectoparasites that damage brood and nests of social honey bees (*Apis* spp.). Anderson and Morgan (2007) reclassified the genus into four distinct species: *Tropilaelaps clareae* Delfinado & Baker, 1961, *T. koenigerum* Delfinado-Baker & Baker, 1982, *T. mercedesae* Anderson & Morgan, 2007, and *T. thaii* Anderson & Morgan, 2007 based on the results of molecular analysis. Anderson and Roberts (2013) presented methods for collecting species of the genus and supplementary descriptions to facilitate species delimitation. Anderson and Roberts (2013) also provided a key for distinguishing *Tropilaelaps* species. However, the key is not effective for separating species because it is not based on important diagnostic characters of each species and begins with information about the location and host bee from which the species was collected (Anderson and Roberts 2013). Despite extensive efforts to clarify the taxonomy of *Tropilaelaps*, the species are unfortunately still not satisfactorily defined based only on their morphological characters. Therefore, a further taxonomic analysis of the genus based on a re-examination of the type series of each species and based on newly collected specimens from additional locations is desirable and should be undertaken.

Tropilaelaps mercedesae was described based on specimens from Hanoi, Vietnam, where it was found in a colony of *Apis mellifera* (Hymenoptera: Apidae) (Anderson and Morgan 2007). The species has been previously recorded from South and Southeast Asia and more recently from Central Asia, Uzbekistan (Anderson and Roberts 2013; Joharchi *et al.* 2023; Mohamadzade Namin *et al.* 2024), and now for the first time from Western Siberia (Tyumen region), Russia. The descriptions provided by Anderson and Morgan (2007) is brief and both the description and illustrations lack many important details and do not provide enough information for accurate and consistent species identification. As a result, *T. mercedesae* has never been fully described, and our efforts to obtain type material for a detailed redescription of the species have not been successful.

Tropilaelaps mercedesae is very closely related to the type species of the genus, *T. clareae* Delfinado & Baker, 1961, which was described from specimens collected in a sample of dead honey

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bees from an apiary in Batangas, Philippines, and subsequently from field rats (Animalia: Rodentia) nesting near these beehives (Delfinado and Baker 1961). The similarity of these two species was noted by Anderson and Roberts (2013). They also pointed out that identifying specimens to species level based on morphology could be problematic.

During a survey of gamasid mites associated with honey bees in Armizonsky District, Tyumen Oblast, Western Siberia, Russia, two females and two males of *Tropilaelaps mercedesae* Anderson & Morgan were collected and identified in a hive of the Western honey bee, *Apis mellifera* L. (Hymenoptera: Apidae). Mites were cleared in lactic acid solution and mounted in Hoyer's medium (Walter and Krantz 2009). The examinations of the specimens were performed with Zeiss Axio Imager A2 compound microscope equipped with differential interference contrast optical systems, attached to camera Axio Cam ICc 5. Images were captured in stacks (with focal depth manually controlled). Selected images were combined using Helicon Focus 7.6.4 Pro (Helicon Soft Ltd 2000).

Our newly collected Russian specimens perfectly match the incomplete description and illustrations of Anderson and Morgan (2007), with all detailed morphological characteristics of the adult specimens (both female and male) shown in Figure 1.

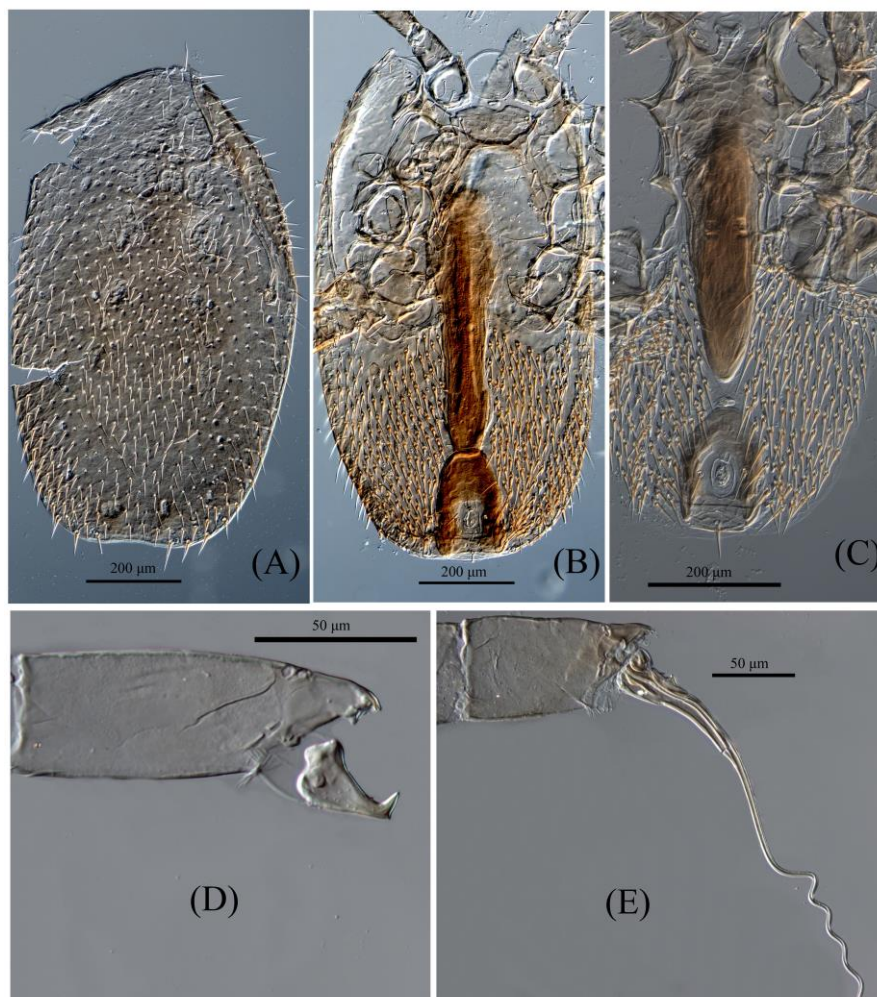


Figure 1. DIC micrographs of *Tropilaelaps mercedesae* – **A.** Female idiosoma, dorsal view, **B.** Female idiosoma, ventral view, **C.** Male idiosoma, ventral view, **D.** Female chelicera, **E.** Male chelicera.

Some morphological differences representing intraspecific variation in different geographic zones have already been discussed by Anderson and Morgan (2007) and Joharchi *et al.* (2023). All

examined specimens are deposited at the Acarological Collection of the Tyumen State University Museum of Zoology, Tyumen, Russia (TUMZ).

We now observe that the distribution of *Tropilaelaps* mites is no longer confined solely to Asia; it is gradually encroaching upon Europe. Several factors, including the movement of commercial bee colonies, international bee trade, natural expansion of bee populations, and ongoing climate warming, have created the conditions for *Tropilaelaps* mites to potentially spread further. To address this growing concern, it is essential to establish early warning systems and surveillance programs aimed at detecting and monitoring the presence of *T. mercedesae* in honey bee colonies. These programs aim to identify infestations at an early stage, enabling timely intervention and control measures to mitigate the impact on honey bee populations (Pettis *et al.* 2013; Cont *et al.* 2021). The threat posed by *Tropilaelaps* mites has gained global attention, with researchers, beekeepers, and authorities recognizing the potential consequences of infestations (Chantawannakul *et al.* 2018). Ongoing efforts are being made to raise awareness among beekeepers, promote best practices in hive management, and develop strategies to prevent the introduction and spread of *Tropilaelaps* mites in new areas (Guzman *et al.* 2017). Effectively addressing the challenges posed by *T. mercedesae* necessitates collaborative efforts on a global scale, involving research institutions, beekeeping associations, and regulatory bodies. Through cooperation, knowledge-sharing, and resource pooling, it is possible to develop and implement effective strategies to mitigate the threat posed by *Tropilaelaps* mites and safeguard honey bee populations worldwide.

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