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Ectoparasitic Bat Flies *(Eucampsipoda hyrtlii)* Detected on the Egyptian Fruit Bat *(Rousettus aegyptiacus)* in Antalya, Turkey

Antalya, Türkiye'de Meyve Yarasası (Rousettus aegyptiacus) Üzerinde Tespit Edilen Ektoparazit Yarasa Sinekleri

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ABSTRACT

The aim of this study was to report on bat flies collected from a fruit bat (*Rousettus aegyptiacus* Geoffroy) which was found on the ground for an unknown reason, and was brought to a private veterinary clinic in Antalya. Bat flies on the bat that were brought to the clinic were sampled during examination of the bat. Fly samples were stored in glass tubes containing 70% alcohol and then refrigerated (+4 °C). Species identification was made by using morphological characters under a stereo microscope. A total of 4 adult female bat flies were collected. The species was identified as *Eucampsipoda hyrtlii* (Kolenati, 1856). This report substantially expands the known distribution of the species. Bats may be infected with different types of parasitic arthropods, and should be examined for the presence of parasites.
Keywords: *Eucampsipoda*, fruit bat, parasite, bat flies

ÖZ

Bu araştırmanın amacı Antalya şehir merkezinde, yerde hareketsiz olarak bulunan ve veteriner kliniğine kontrol amacıyla getirilen bir meyve yarasası (*Rousettus aegyptiacus* Geoffroy) üzerinde tespit edilen yarasa sineklerinin ne olduğunun rapor edilmesidir. Kliniğe getirilen meyve yarasası üzerindeki sinekler örneklenmiş ve içerisinde %70 alkol bulunan tüpe alınarak teşhisleri yapılana kadar buzdolabında (+4 °C) saklanmıştır. Örneklerin tür teşhisleri sterio mikroskop altında morfolojik karakterler kullanılarak yapılmıştır. Toplam dört adet dişi yarasa sineği örneğinin *Eucampsipoda hyrtlii* (Kolenati, 1856) olduğu belirlenmiş ve bu raporla türün bilinen dağılımı büyük ölçüde genişlemiştir. Yarasalar farklı tiplerde parazit sineklerle enfekte olabilir ve parazit varlığı açısından incelenmelidir.
Anahtar Kelimeler: *Eucampsipoda*, meyve yarasası, parazit, yarasa sinekleri

INTRODUCTION

Within the class Mammalia, bats (Chiroptera) have the highest number of species after rodents, and are represented in Turkey by 39 species (1). Bats utilize a wide variety of roosting structures such as caves, abandoned buildings, rooftops, rock crevices, trees and crevices. The duration and protection offered to bats by these various roosts are correlated with measures of parasitism (2). Many species of bats are important for controlling insect pests of agriculture, forest and public health in both urban and natural ecosystems. Bats also contribute to the pollination and seed dispersal of myriad plants worldwide (3). Bats are used for educational and touristic purposes and economic gains are obtained from their fertilizers (guano) (4).

Currently, 39 bat species are known from Turkey. Of these, all but one species are Microchiroptera. The

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single Turkish pteropodid species is the Egyptian fruit bat or Egyptian rousette *Rousettus aegyptiacus* Geoffroy. This species is generally found in coastal areas of the country where it is associated with orchards and fruit trees, and often roosts in caves and abandoned buildings (5). *Rousettus aegyptiacus* is widespread, with disjunct distributions ranging from Iran and Pakistan in the east, to South Africa, to Guinea and Sierra Leone in the west. The southern coast of Turkey represents the northernmost distribution of this species (6).

Some species of bats are important to human and veterinary health. Bat feces and carcasses may contain fungi and viruses that cause lung infections in humans (7). Moreover, bats may play a role in the transport of some zoonoses, such as rabies. Bats are known to host a wide variety of endo- and ectoparasites including mites, ticks, fleas, bugs and flies (8).

Bat flies (Diptera: Hippoboscoidea) are ectoparasites and only associate with bats. The eggs and three larval stages are held inside the females of bat flies. The female deposits the third-instar larva onto the roosting substrate and then it immediately pupates. The pupal stage lasts approximately three weeks, and then the adult emerges and finds a host bat. Of the dipteran ectoparasites, two families are known, the Nycteribiidae and the Streblidae (9).

The Nycteribiidae are represented worldwide by 276 species in 11 genera and three sub-families (10). Species of these bat flies are distributed globally, but are most diverse in the tropics and sub-tropics of the eastern hemisphere. Eleven species of Nycteribiidae have been recorded in Turkey (11,12).

In this study, bat flies were collected and identified from an Egyptian rousette from the Karaalioğlu Park in Antalya, Turkey.

CASE REPORT

The Egyptian rousette, which was found to be grounded for an unknown reason, was brought to a private veterinary clinic in Antalya, Muratpaşa district for general condition control (Figure 1). Determination of the bat was made by Devrim Yetkin (Akdeniz University Faculty of Science, Department of Biology, Antalya, Turkey). Bat flies were sampled during examination of the bat. Fly samples were stored in glass tubes containing 70% alcohol and then refrigerated (+4 °C). Species level identification was made by the third author of this publication using morphological characters under a stereo microscope.

Figure 1. Egyptian fruit bat or Egyptian rousette *Rousettus aegyptiacus*

Bat flies were photographed with a Sony A77 Mark 2 camera with a Tamron 90 mm f2.8 1:1 macro lens.

RESULTS

A total of four female bat flies were collected. The species was identified as *Eucampsipoda hyrtlii* (Kolenati, 1856) (Figures 2a, 2b, 3).

DISCUSSION

Bat flies (Nycteribiidae and Streblidae) have been the subject of many studies focused on host specificities and relationships,

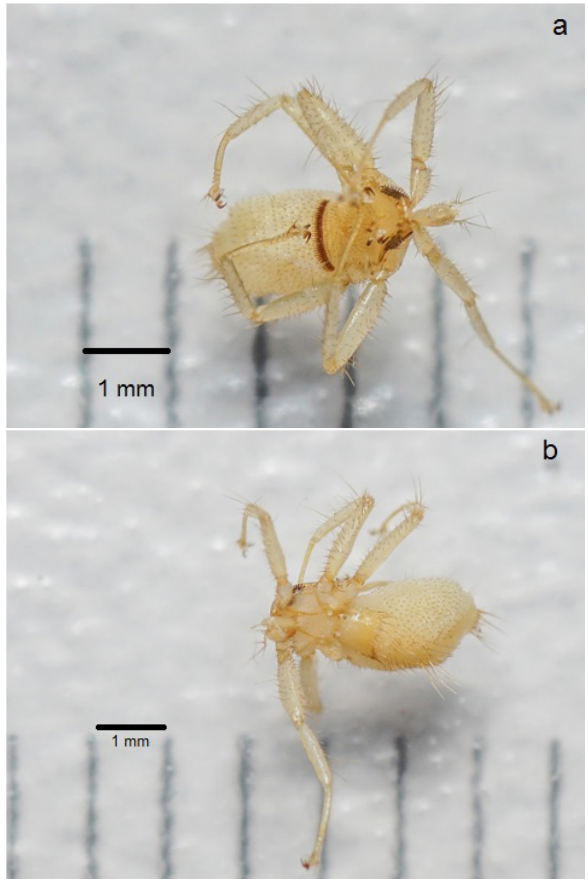

Figure 2a, b. Ectoparasitic female bat flies *(Eucampsipoda hyrtlii)* (A-dorsal, B-ventral)

Figure 3. Sampled female adult bat flies *(Eucampsipoda hyrtlii)* on Egyptian rousette

parasitic life and morphology. Bat species can often be infected with various types of bat flies. Because of their blood-feeding behavior, bat flies may vector certain zoonotic agents (13,14). Recent research shows that bats can contain Ebola virus (15). Bat flies may be effective in transporting viruses between bats, and human exposure to bat bites causes human transmission to be theoretically possible.

Little is known about the distribution and biology of bat flies, including species in Turkey. The only available records of *Eucampsipoda hyrtlii* from Turkey were reported by Theodor (16). He stated that the northernmost record for the species was "Antioch (Antakya) in southern Turkey which geographically belongs to northern Syria." Previous records for the species had been more numerous from Egypt, Saudi Arabia, Israel, and Syria. Thus, specimens of *Eucampsipoda hyrtlii* from Turkey are exceedingly rare and have not been sampled in many decades. Antalya lies approximately 800 km west of Antakya, so the specimens reported here represent a significant range expansion westward in southern coastal Turkey. We believe that this report may spur new studies in this field.

CONCLUSION

Bats should be protected in view of their ecological importance, including their host associations with parasites such as ticks, fleas and flies. Bats and their parasites should be the focus of future research activity.

* *Ethics

Informed Consent: Flies used in the research were sampled on a fruit bat. Therefore, patient consent is not required.

Peer-review: Externally and internally peer-reviewed.

* Authorship Contributions

Concept: H.C., C.W.D., Design: H.C., G.C., C.W.D., Data Collection or Processing: G.C., Literature Search: H.C., C.W.D., Writing: H.C., C.W.D.

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