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Hyalomma rufipes (Koch, 1844) infesting cattle in the West Aegean region of Turkey

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Abstract: A total of 19,679 adult ticks were collected from 443 cattle in 9 villages in the West Aegean region of Turkey over 2 years (June 2006-May 2008). Thirteen out of the 19,679 adult ticks were identified as *Hyalomma rufipes* (12 adult males and 1 female). The ticks were identified according to their characteristic dark coloured conscutum and scutum along with the presence of small to medium but uniform and numerous punctations. Dimensions (length and width) of male and female H. rufipes ticks were 3075 and 1880 µm and 3213 and 2181 µm, respectively. The present study not only confirms previous observations demonstrating the presence of H. rufipes in cattle in Turkey, but also demonstrates for the first time its existence in the West Aegean region of the country.

Key words: *Hyalomma rufipes*, cattle, Turkey

Batı Ege bölgesindeki sığırlarda *Hyalomma rufipes*'in (Koch, 1844) varlığı

Özet: Batı Ege Bölgesinde Haziran 2006 – Mayıs 2008 yılları arasında 9 köyde yürütülen çalışmada 443 sığırdan 19,679 erişkin kene toplanmıştır. Toplanan bu erişkin kenelerden 13'ü (12 erkek 1 dişi) *Hyalomma rufipes* olarak teşhis edilmiştir. Skutum ve konskutum koyu renkli, sık ve küçük noktalı olan bu kenelerin boyutları ortalama erkeklerde 3075 – 1880 µm ve dişilerde 3213 – 2181 µm bulunmuştur. Bu çalışma Türkiye'de sığırlarda H. rufipes'in varlığı doğrulamakta ve ülkenin Batı Ege bölgesinde de H. rufipes'in varlığını ilk kez göstermektedir.

Anahtar sözcükler: *Hyalomma rufipes*, sığır, Türkiye

Introduction

Most species of the genus *Hyalomma* are known vectors of diseases transmitting a great variety of parasitic, bacterial, and viral pathogens to both humans and animals. There are 30 *Hyalomma* species known to exist worldwide (1). Among these, only 7 species have been identified in Turkey: *H. anatolicum*, *H. excavatum*, *H. marginatum*, *H. detritum*, *H. dromedarii*, *H. rufipes*, and *H. aegyptium* (2-4). However, the presence of *H. rufipes* has only been recorded in Turkey as rare in Eastern Anatolia (4).

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Hyalomma rufipes, also known as the hairy *Hyalomma* or the coarse-legged *Hyalomma*, was first recorded by Koch in 1844 (cited by 4,5). *H. rufipes* is widely distributed in much of Africa, the Near and Middle East, Russia, and Middle Asia. Adult *H. rufipes* was recorded to parasitise cattle, horses, sheep, goats, wild ruminants, and humans. On the other hand, the nymph and larval stages were recorded to feed on birds and hares (6-10). This tick species is the main vector of the virus causing Crimean-Congo haemorrhagic fever in South Africa (11). It also transmits the bacterium *Anaplasma marginale*, causing bovine anaplasmosis; the bacterium *Rickettsia conorii*, causing tick typhus in humans; and the protozoan *Babesia occultans*, causing a mild form of bovine babesiosis (4,5,12-15). The feeding of adults on cattle causes large lesions at the attachment sites, leading to the formation of severe abscesses (4).

Morphological criteria of *H. rufipes* are given by Hoogstraal (4), Walker et al. (5), and Apanaskevich and Horak (15). Accordingly, the scutum of female *H. rufipes* is dark coloured, and the posterior margin of the scutum is distinctly sinuous. Spiracle areas have dense setae. Legs have characteristic pale rings. Punctations are dense and small. In the genital aperture the anterior groove is deep, and its posterior lips have a broad "V" shape. The conscutum of males is dark coloured and lateral grooves are short. Posterior ridges and caudal depression are absent. Festoons are indistinct and the central festoon is dark coloured. A posteromedian groove and paramedian groove are absent.

In an attempt to define the distribution of ticks of the West Aegean region of Turkey, we identified ticks using morphological criteria established for *H. rufipes*. Although rare, the presence of *H. rufipes* has been previously reported by Hoogstraal (4) in Eastern Anatolia in Turkey. To the best of our knowledge, this is the first report demonstrating that *H. rufipes* does exist in the West Aegean region of Turkey.

Materials and methods

In order to identify tick species of cattle, their seasonal activity, and geographical distribution in Manisa, İzmir, and Aydın provinces, as well as their 9 villages, 75 barns were visited once a month over 24 months from June 2006 to May 2008. A total of 19,679 adult ticks were collected. The ticks were classified according to the morphological criteria described by Hoogstraal (4), Walker et al. (5), and Apanaskevich and Horak (15).

Results

Among the 19,679 adult ticks, 70.89% (13,951/19,679) were identified as *Hyalomma* spp. Five species were identified within this genus: *Hyalomma marginatum* (37.39%) (Koch 1844), *H. excavatum* (18.89%) (Koch 1844), *H. detritum* (13.68%) (Schulze 1919), *H. anatolicum* (0.86%) (Koch 1844), and *H. rufipes* (0.07%) (Koch 1844). These findings demonstrate that *H. rufipes* is present in cattle in the West Aegean region of Turkey, although in very low numbers. Pictures of male and female *H. rufipes* ticks are given in Figures 1-6. As indicated in Figures 1 and 6, dimensions of male and female *H. rufipes* ticks are 3075 and 1880 µm and 3213 and 2181 µm, respectively. The conscutum

Figure 1. Male dorsal area.

Figure 2. Male ventral area.

Figure 3. Female dorsal area.

Figure 4. Female ventral area.

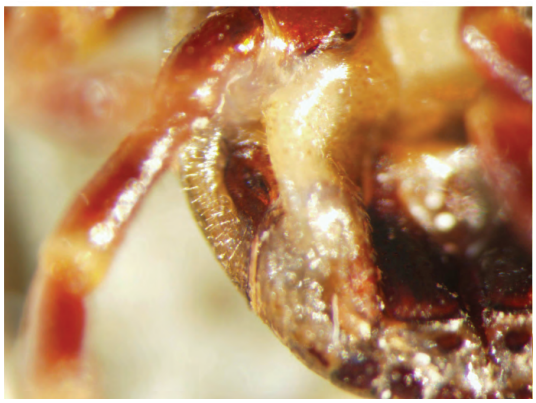

Figure 5. Male stigma area.

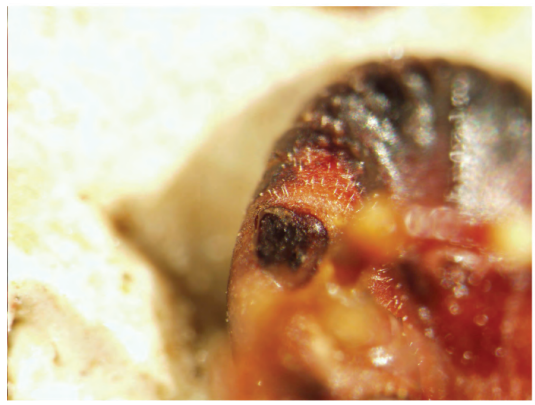

Figure 6. Female stigma area.

of male *H. rufipes* is dark coloured and its lateral grooves are short. A posteromedian groove and paramedian groove are absent. Punctations are dense and small. The scutum of female *H. rufipes* is dark coloured and the posterior margin of the scutum is distinctly sinuous. In addition, spiracle areas have dense setae. As in males, punctations are dense and small. The genital aperture has a deep anterior groove and its posterior lips have a broad "V" shape. These morphological criteria are in accordance with those described previously for *H. rufipes* (4,7).

Among the ticks collected throughout the study, *H. rufipes* was found between June and December (except September) in both 2006 and 2007 in İzmir and Manisa provinces in a total of 5 barns located in 4 villages. The Table shows the geographical distribution of adult *H. rufipes* ticks together with the time of collection. Thirteen out of the 19,679 adult ticks were identified as *H. rufipes* (12 males and 1 female). *H. rufipes* was not identified among 7381 adult ticks collected in Aydın province.

Discussion

H. rufipes was first recorded by Koch in 1844. It is widely distributed in much of Africa, and its existence in Yemen, Israel, Iraq, Russia, and Spain (one specimen) has been reported (6-10,15,16). *H. rufipes* was previously reported to exist as a rare tick species in Eastern Anatolia in Turkey (4). The evidence gathered in the present study indicates that this tick species also exists in the West Aegean region of Turkey, specifically in İzmir and Manisa provinces. *H. rufipes* was determined between June and December (except September) in both 2006 and 2007. It should be noted, however, that the number

Table. Geographical distribution of Hyalomma rufipes ticks in the West Aegean region of Turkey.

Province	Village	Sex	Barn no.	Date collected
İzmir	Çıtak	Male	1	13.11.2006
İzmir	Çıtak	Female	1	11.12.2006
İzmir	Çıtak	Male	1	12.06.2007
İzmir	Çıtak	Male	2	08.10.2007
İzmir	Karadere	Male	3	09.10.2006
Manisa	Gölmarmara	Male	4	08.08.2007
Manisa	Gölmarmara	Male	4	08.08.2007
Manisa	Gölmarmara	Male	4	08.08.2007
Manisa	Gölmarmara	Male	4	08.08.2007
Manisa	Gölmarmara	Male	4	09.10.2007
Manisa	Gürsu	Male	5	09.07.2006
Manisa	Gürsu	Male	5	09.07.2006
Manisa	Gürsu	Male	5	09.07.2006

of ticks identified as *H. rufipes* is rather low (12 males and 1 female). Therefore, no definite conclusions can be reached regarding their seasonal activity within the West Aegean region of Turkey.

Tick species preferentially feed on different parts of the body on their hosts. *Hyalomma rufipes* has been reported to prefer mainly the anal and peri-anal regions of hosts (4,5,14). In accordance with these observations, the female *H. rufipes* was found in the present study in the anal region, whereas males were found in the peri-anal region of the host.

In Spain, one *H. rufipes* tick was identified on a wild boar in the Guadiana river valley in October (6). As this region is only 500-700 km away from North Africa, it was suggested that this tick had been carried by migrating birds. In recent years, adult *H. rufipes* specimens have been reported as far north as the Netherlands (17). In addition, nymphs of this species are commonly found on birds migrating in spring from Africa to Europe (18). Therefore, the possibility of migrating birds playing a similar role as a way of natural entrance of exotic ticks to Turkey should be taken into account.

Hyalomma rufipes ticks have been recorded from every climatic region from deserts to rain forests (6-10,16). Likewise, *H. rufipes* was shown to exist in arid and semi-arid regions like the Guadiana river valley in Spain, and Africa (5,7). In the present study, ticks were collected from regions with 60% mean relative humidity and 7-29 °C of minimal and maximal temperature between June 2006 and May 2008 (Government Meteorology Central). These regions are known to be semi-arid climatic regions (hot and arid in summer and cool in winter) and provide a suitable environment for *H. rufipes*. Further epidemiological studies are therefore needed to follow up the distribution and prevalence of this tick species.

To the best of our knowledge, the existence of *H. rufipes* has not been reported previously in the West Aegean region of Turkey. This is most likely due to the absence of a long-term study aimed at determining the distribution of tick fauna in the West Anatolian region of Turkey. Larval and nymphal stages of *H. rufipes* ticks preferably feed on wild animals such as rabbits, boars, and especially birds. Adult *H. rufipes* ticks feed on a wide range of animals like herbivores and carnivores (6-10). It therefore appears very unlikely to detect any tick species, including *H. rufipes* found in the present study, on domestic ruminants for this wide range of host spectrum by sampling once or twice a year. This could also explain, at least in part, the failure of previous studies in detecting *H. rufipes* in this region and low numbers of *H. rufipes* detected in the present study. Larger and long-term studies

should be performed in order to better determine the distribution of *H. rufipes*, taking into account the wide range of host spectrum for this species. Only results obtained from these studies will enable us to determine if *H. rufipes* is an established species of the tick fauna present in the West Aegean region of Turkey, or if simply its presence is an incidental event as only one of the ticks was female.

Taken together, to the best of our knowledge, the present study not only confirms previous observations that *H. rufipes* exists in cattle in Turkey, but also demonstrates for the first time its existence in the West Aegean region. This also raises the possibility that this species might also exist in other parts of Turkey. Additional studies are needed to test this hypothesis.

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