The First Investigation of Ectoparasites on Rodents from the 'Asir Region of Saudi Arabia

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Abstract

Background: Rodents have become increasingly recognised as hosts of ectoparasites and reservoirs of numerous human diseases including scrub typhus (*Orientia* spp.), bartonellosis (*Bartonella* spp.), hantaviruses, Lyme disease (*Borrelia burgdorferi* complex), and plague (*Yersinia pestis*).

Objectives: This study aimed to define the taxonomic diversity and bacterial microbiome of ectoparasites collected from wild rodents in the 'Asir Region of southwestern Saudi Arabia, with a main focus on chigger mites (family Trombiculidae), the vectors of scrub typhus.

Methods*:* Wild rodents were trapped in scrubland across one site on the slopes of the Asir Mountains in 2016 (Al Ous') and four sites in 2017 (Al Ous', Al Jarf, Alogl and Wosanib). Rodents were euthanized prior to examination and all ectoparasites were collected and stored in absolute ethanol. A 10% subsample of ectoparasites was selected from each rodent for mounting in Berlese fluid and morphometric examination.

Results: A total of 7,802 ectoparasites were obtained from 74 rodent specimens, comprising 6,135 chigger mites, 119 fleas in one species (*Parapulex chephrenis)*, 770 ticks of at least two species *(Haemaphysalis erinacei* and *Rhipicephalus spp.),* 589 lice in two species *(Polyplax brachyrrhyncha* and *Polyplax oxyrrhyncha),* and 189 gamasid mites (species to be determined). The rodents belonged to three species: *Acomys dimidiatus*, *Myomys yemeni* and *Meriones rex*. Based on the morphology of the scutum (or dorsal shield), chiggers were assigned to subgenera and provisionally into 17 species, including three putative new species: *Neotrombicula* sp. n., *Microtrombicula* aff. *machadoi*, and *Schoutedenichia* sp. n. The most abundant chigger species were *Ericotrombidium kazeruni*, *Schoutedenichia* aff. *geckobia* and *Ascoschoengastia browni*. The site with the highest mean chigger infestation (139) was Al Ous', and the host species with the greatest mean infestation rate (114) was the Eastern spiny mouse (*A. dimidiatus*).

Conclusion: This is the first survey of rodent ectoparasite diversity performed in the ‘Asir Region of Saudi Arabia. Following DNA extractions, 16S rRNA amplicon sequencing will be applied to pools of different chigger species and other ectoparasites to identify potentially zoonotic bacteria and other arthropod symbionts that may be circulating within the ‘Asir region.