

Sampling, identification, and screening of chiggers as the vector of scrub typhus in Tumpat district, Kelantan from 2019 - 2023

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ABSTRACT

Introduction: Scrub typhus is an acute febrile illness caused by the bacterium *Orientia tsutsugamushi* that is transmitted to humans through the bite of infected larval chiggers. The symptoms of scrub typhus typically appear 5–14 days after being bitten by chiggers, with manifestations of infection such as fever, rash, myalgia, lymphadenopathy, nausea, vomiting, eschar, abdominal pain, and non-specific flu-like symptoms. Two positive cases of scrub typhus were recorded between 2019 to 2023 in Kampung Alor Durian and Kampung Jal Kechik, Tumpat, Kelantan. The study aims to identify and determine the presence of *Orientia tsutsugamushi* in on-host chiggers collected from positive scrub typhus localities in Tumpat, Kelantan. **Materials and Methods:** Sampling was conducted by placing 30 wire-traps in the patient settlement and working area for five consecutive days in Kampung Alor Durian and Kampung Jal Kechik. Small mammals caught in the traps were removed, anaesthetists using diethyl-ether and processed immediately in the field lab. The mammals were then identified morphologically, prior to collecting on-host chiggers from the ears using sterile fine forceps and applicator sticks under the stereomicroscope. The collected chiggers were placed in a universal bottle containing 70% ethanol and labelled individually according to a specific number assigned to each mammal. The labelled bottles were then sent to the Acarology Unit, Institute for Medical Research for morphological identification of chiggers and screening for the bacteria *Orientia tsutsugamushi* using nested PCR. **Results:** A total of 20 (Alor Durian n=10; Jal Kechik n=10) small mammals were captured from both localities comprising five *Tupaia spp*, four *Rattus rattus*, and two *Suncus murinus*, six *Rattus tiomanicus*, two *Rattus exulans*, and one *Rattus argentiventer*. Of these, 16 (80%) mammals were infested with chiggers, mainly in both ears. A total of 780 chiggers (Alor Durian n=401; Jal Kechik n=379) were collected, and two species were identified as *Leptotrombidium deliense* and *Ascoshengastia spp* in Alor Durian, while six species belonging to *Leptotrombidium deliense*, *Leptotrombidium spp*, *Garhlepia walchia*, *Schoengastia spp*, *Ascoshengastia spp* and *Blankartia spp* were identified from Jal Kechik. Out of eight pools, two pools of *Leptotrombidium deliense* (25%) recovered from *Tupaia spp* collected from the orchard of the patient in Alor Durian were positive with *Orientia tsutsugamushi*. All samples tested for PCR in Jal Kechik were negative. **Conclusion:** *Leptotrombidium deliense*, a vector for scrub typhus with positive *Orientia tsutsugamushi* was found in close proximity to human settlements and surrounding habitat such as paddy fields and orchards. These baseline data highlight the risk of contracting scrub typhus infections in Kelantan, particularly among rural residents.