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NOTE

***AMBLYOMMA GERVAISI* (IXODIDA: IXODIDAE: AMBLYOMMA) INFESTATION IN A RAT SNAKE FROM NORTHWESTERN HIMALAYAN REGION: A CASE STUDY**

Aman D. Moudgil, Ankur Sharma, Adarsh Kumar, Amit Singla & Surender Bansal

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Amblyomma gervaisi (Ixodida: Ixodidae: *Amblyomma*) infestation in a Rat Snake from northwestern Himalayan region: a case study

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Climate change, especially climate warming not only governs the density variation of arthropods, but also population preponderance of their hosts, changes in periods of activity and variations in geographical distribution (Moudgil & Singla 2013). Ticks (Acari: Ixodidae) act as vectors for the transmission of a wide range of pathogens including bacteria, virus, rickettsia and protozoa (de la Fuente et al. 2008). Along with vertebrates, ticks can also infest reptiles and transmit ehrlichiosis, anaplasmosis and rickettsiosis. The presence of novel spotted fever group rickettsiae, *Anaplasma* and *Ehrlichia* species prevalent in wild snakes has been demonstrated by molecular evidences (Kho et al. 2015). The ticks infesting snakes are also responsible for transmission of zoonotic pathogens *Coxiella burnetii* and *Rickettsia honei* to humans in India (Pandit et al. 2011). In the past, *Amblyomma* (*Aponomma*) species have been reported from pythons, cobra and rat snakes in southern India (Soundararajan et al. 2013; Catherine et al. 2017), Western Ghats (Pandit et al. 2011), and eastern parts of India (Patra et al. 2017). Ticks are also responsible for transmitting various pathogens, which

result in pneumonia in snakes (Marcus 1971). Also, they are responsible for blood borne infections such as *Aeromonas* septicaemia, which had led to the deaths of snakes (Rosenthal 1997). The changes in climatic conditions especially climate warming have rendered many vectors including ticks to distribute in newer and naïve regions, i.e., species of tropical and subtropical regions become more vulnerable to expand their niche to temperate regions (Moudgil & Singla 2013). In case of arthropod vectors, along with abiotic environmental conditions, availability of hosts also plays an important role for preponderance. The present study thus reports the presence of *Amblyomma gervaisi* in the snakes of northwestern Himalayan region.

A Rat Snake *Ptyas mucosa* stuck into a basin pipe strainer was brought to the Teaching Veterinary Clinical Complex, Palampur (Himachal Pradesh), to get it released. On thorough examination, the snake was found infested with ticks. The ticks were collected carefully without damaging the body parts and were introduced to further processing for identification. The ticks were processed as per Jain & Jain (2011) and

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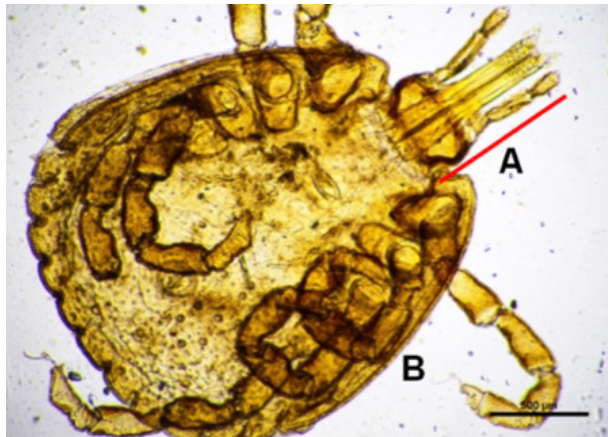


Image 1. Photomicrograph of male *Amblyomma gervaisi*, where A represents Gnathosoma and B represents rest of the body Idiosoma. © Moudgil, A.D.

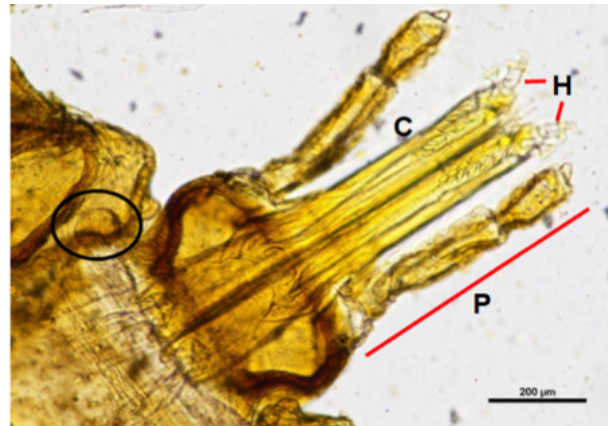


Image 2. Photomicrograph of basis capituli of *Amblyomma gervaisi*, along with comma shaped cervical grooves (encircled), pedipalps (P), chelicerae (C) and median hypostome (H). © Moudgil, A.D.

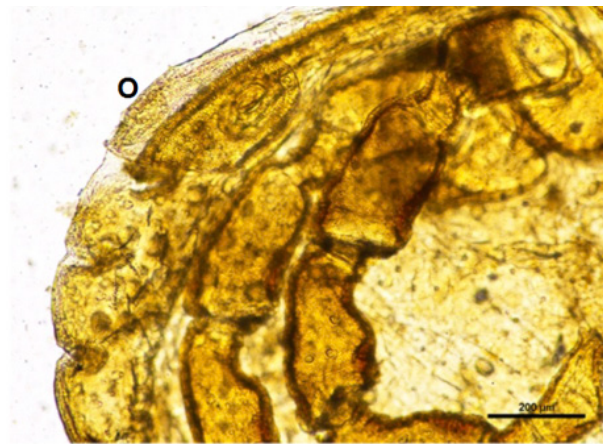


Image 3. Photomicrograph highlighting the oval spiracle (O) of *A. gervaisi*. © Moudgil, A.D.

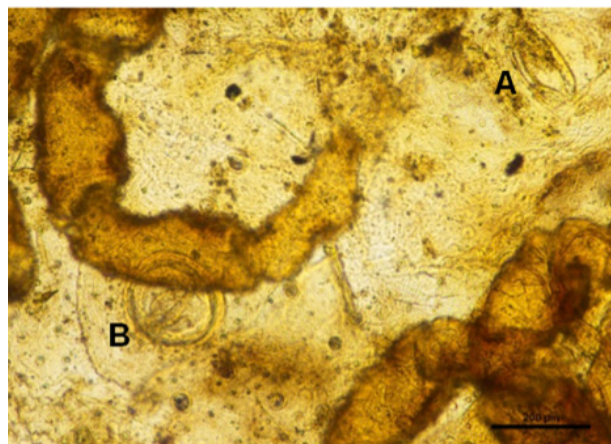


Image 4. Photomicrograph of genital orifice (A) and anus (B) of *A. gervaisi*. © Moudgil, A.D.

identified following the key of Georgi et al. (1990) and Barnard & Durden (2000). These were cleared in 10% potassium hydroxide, dehydrated in ascending grades of alcohol, again cleared in cedar wood oil, placed in xylene for one minute and then finally mounted in Canada balsam. The ticks were identified up to the species level based on the characters of whole male tick, basis capitulum, pedipalps, presence or absence of festoons, anal groove, and comma shaped cervical grooves.

Earlier, *Amblyomma gervaisi* was believed not to hold any zoonotic significance and Georgi et al. (1990) had suspected man, felids, canids, and domestic animals as its probable targets (Catherine et al. 2017). The tick was found responsible for transmission of zoonotic pathogens *Coxiella burnetii* and *Rickettsia honei* to humans in India (Pandit et al. 2011). The actual appearance of the male tick is like a tear drop (Image 1), as it is dorso-ventrally flattened and posterior extremity is wider than the

anterior. Generally, the morphology of the ixodid ticks provides them protection from external odds of the environment (Ghosh & Misra 2012). The capitulum or basis capituli of the tick retrieved was dorso-ventrally rounded flask-shaped (Image 2), consisted of intact mouth parts bearing mandible, hypostome and a pair of pedipalps. The observations were in concordance with the findings of Ghosh & Misra (2012); whereas the shapes of the basis capituli of other *Amblyomma* species vary from rectangular to trapezoid (Barros-Battesti et al. 2005a,b). The mandible was the extension of the dorsal capitulum and hypostome lying ventrally juxtapositioned to the mandibular sheath. The sensory palps originated from the base of the hypostome consisting of four articles, where the first two articles were fused (Image 2). The third article was the longest of all and about double the size of the fourth article. There was presence of comma-shaped cervical grooves (Image

2). The spiracles were oval in appearance with a round anterior end and a pointed posterior end (Image 3). The genital orifice, oval in appearance was situated in a median line just behind the basis capituli (Image 4), in between the second pair of coxa. Anus was present at the posterior end behind the genital opening, consisting of a posterior anal groove (Image 4). The tick was festooned with 11 distinct festoons (Image 1). All the observations in the present study were in line with the findings of Ghosh & Misra (2012), delineating the ticks to be of the *Amblyomma gervaisi* species.

Although in the present study the ticks were recovered from under the scales of the snake, which was in concordance with the observations of Catherine et al. (2017); in the earlier study, Rosenthal (1997) recovered the ticks from the blood swollen abdomen also. The previous studies (Mader 1996; Catherine et al. 2017) also highlighted the skin infections including dermatitis, dysecdysis, and lumps associated with the tick infestation in snakes, but no such observation was recorded in the present study. The observation could be attributed to low ectoparasitic infestation in the present case. All the previous reports of the tick *A. gervaisi* are restricted to the southern, eastern and western parts of India (Alwar 1960; Pandit et al. 2011; Soundararajan et al. 2013; Catherine et al. 2017; Patra et al. 2017) and the present study claims to be the first documented report of the ticks from a rat snake of the northwestern Himalayan region. The preponderance of the ticks and other vectors in naïve areas could be considered as an aftermath of climate change, most importantly climate warming.

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