

Molecular detection of the spotted fever group rickettsial DNA in ticks in the Central Province of Sri Lanka

S Ariyaratne^{1,2}, ME Eremeeva³, SAM Kularatne⁴, AM Nazeem⁵,
P Perera¹, A Dangolla⁶, R Rajakaruna¹

Introduction and Objectives: Spotted fever group (SFG) rickettsioses are caused by obligate, intracellular, Gram-negative bacteria, primarily transmitted by ticks. This study aimed to identify tick species carrying SFG rickettsial DNA in the Central Province of Sri Lanka.

Method: Sampling was carried out in Kandy, Matale, and Nuwara Eliya districts (2019–2022). Ticks were manually removed from domestic animals with owner assistance, and from peridomestic animals after sedation. They were captured using mouse cage traps. Ticks from a leopard were provided by a wildlife researcher. Tick DNA was extracted (Promega ReliaPrep™) and tested for *Rickettsia* using rOmpA gene via conventional PCR.

Results: A total of 222 ticks were collected with *Rhipicephalus haemaphysaloides* (n=75) being the most common species, followed by *Rhipicephalus sanguineus* (n=50), *Rhipicephalus microplus* (n=40), *Amblyomma integrum* (n=20) and *Dermacentor auratus* (n=9). Other species included *Hyalomma isaaci* (n=2), *Haemaphysalis bispinosa* (n=8), *Haemaphysalis turturis* (n=2) and *Haemaphysalis intermedia* (n=3), with 13 *Haemaphysalis* ticks identified only to genus level. *R. haemaphysaloides* was collected from dogs (n=35), cattle (n=22), pigs (n=3), mongoose (n=2), and leopard (n=1). Most *R. sanguineus* and all *D. auratus* were from dogs, while *Hy. isaaci* was collected from buffalo. No ticks were found on rats (n=9), bandicoots (n=5), or mice (n=14). Overall, 78.8% of the ticks tested positive for *Rickettsia* DNA, with a frequency of 90.5% in Matale, 77.6% in Kandy and 63.2% in Nuwara Eliya. *Rickettsia* DNA was detected in 8 out of 9 tick species, including 92.4% of *R. haemaphysaloides*, 88.9% of *D. auratus*, 84.6% of *R. sanguineus*, 65.0% of *A. integrum* and 57.5% of *R. microplus*. All *Hy. isaaci*, *H. turturis* and *H. intermedia* tested positive, while all *H. bispinosa* were negative. Among the domestic animals, 83.5% of ticks from dogs and 66.2% from cattle were positive. Among peridomestic animals (n=37), ticks were found only on mongooses (n=7) and squirrels (n=2), all of which were positive for *Rickettsia* DNA.

Conclusion: *Rickettsia* DNA was detected in ticks feeding on various mammals. Further research is needed to confirm if the *Rickettsia* are pathogenic, if they are present in questing ticks, and whether the detection reflects pathogens from the ticks' blood meals or independent infection.

Keywords: spotted fever, rickettsial DNA, *Rhipicephalus*, *Dermacentor*, *Hyalomma*

Acknowledgment: National Science Foundation, Sri Lanka (RG/2019/BT/01)

¹Department of Zoology, University of Peradeniya, Peradeniya, Sri Lanka

²Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka

³Department of Biostatistics, Epidemiology and Environmental Health Sciences, Georgia Southern University, USA

⁴Department of Medicine, Faculty of Medicine, Peradeniya

⁵19, Heerassagala road, Kandy

⁶Faculty of Veterinary Medicine & Animal Science, University of Peradeniya

Address for correspondence: Prof. R.S. Rajakaruna, 1Department of Zoology, University of Peradeniya, Peradeniya, Sri Lanka ; Telephone: 081 239 4481 Email: rupika.rajakaruna@sci.pdn.ac.lk

 <https://orcid.org/0000-0001-7939-947X>