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Impact of parasite load on host health status & immune defences: investigations using the Fulvous fruit bat (*Rousettus leschenaulti*) model

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Ecological immunology focuses on describing and explaining the natural variation in immune functions with respect to biotic and abiotic factors in the environment. This study examined the relationships among the health status, parasite load and immune defences of animals, using the Fulvous fruit bat (*Rousettus leschenaulti*), a megachiropteran found abundantly throughout Sri Lanka. The study site in Maha Induruwa was a temple cave that contained a single species colony of *R. leschenaulti* with approximately 500 bats.

Fifty bats (male, N = 44; female, N = 6; adult, N = 43; juvenile, N = 7) were captured using a hand net and their weights and forearm lengths were measured. Ectoparasites and faecal samples (when available) were collected and stored according to standard methodology. Blood samples were collected from venepuncture of the cardiac vein of the propatagium or major vein of the interfemoral membrane. Haemoglobin (Hb) content, packed cell volume (PCV), and red blood cell (RBC), platelet, white blood cell (WBC), and WBC differential counts were determined. The collected data were used to calculate the body condition index (BCI), mean cell haemoglobin content (MCHC) and mean corpuscular volume (MCV). Parasites were detected using standard methodology. Mainly ectoparasites were found while haemo- and gastrointestinal parasites were virtually absent. Thus, only the ectoparasites were considered to quantify the parasite load using the Shannon-Wiener diversity index. Six species of mites, *Oncoscelus kanheri*, *Meristaspis lateralis*, *Ancystropus* sp. and three unidentified species (N = 1951), a nycteribiid fly, *Eucampsipoda latisterna* (N = 288), and a flea species (N = 7) were recorded.

To objectively assess the relationships, a health status score (range 1 – 6) was developed for each bat, using the health status indices, *i.e.* BCI (1 – 4), MCHC (0 – 1) and MCV (0 – 1). Similarly, a score was developed for the immune defences using total WBC and platelet counts, and percentages of different WBCs (range 0 – 7). The Shannon-Wiener index was used as the score for the parasite load. From analyses of these scores, it was revealed that there were no significant relationships among health status, parasite load and immune defences in *R. leschenaulti*. Thus, this study demonstrated that ectoparasites do not have a significant effect on the health status or immune defences, in *Rousettus leschenaulti*. This is a prototype study based on Ecological Immunology in Sri Lanka and the outcome of which will serve as a baseline for future studies in this field.

Keywords: Ecological immunology, host health status, immune defences, parasite load, *Rousettus leschenaultia*

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