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Predator-prey and Commensal Association of Rufous Woodpecker (*Micropternus brachyurus jerdonii*) and *Crematogaster* Ants in Sri Lanka

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Abstract

Nesting within the arthropod nests is rare but can be found in several lineages of birds. In Asia, only the Rufous Woodpecker (*Micropternus brachyurus*) (RUWP) shows this peculiar nesting behavior where it breeds inside the nest of the *Crematogaster* ant. This study focused on the symbiotic relationship between RUWP in Sri Lanka (*M. b. jerdonii*) and *Crematogaster* ants. We looked at the RUWP feeding habits and feather odor, and the comparative density distribution of RUWP and *Crematogaster* across Sri Lanka to understand the underline mechanics of this association between the bird and the ant. This association is studied in the context of ants' diversity and colony size. All the observed ants associated with RUWP belong to the *Crematogaster* (*Crematogaster) rogenhoferi* species group. We exposed RUWP feathers (treatment), feathers of other birds (negative control), ant insect repellents, and attractants (positive controls), to wild-caught *Crematogaster* ants in an experiment chamber to test the affinity of RUWP feathers on ants. There was a significant positive attraction (One-way Anova:FDF5=24.85, p-value<2e-16) of *Crematogaster* ants towards RUWP feathers. RUWP feces contained 100% *Crematogaster* ants (n=5 individuals). Variable line transects with a fixed 20 m distance for either side were taken in known locations of RUWP to determine RUWP and ant nest density. The density information was put together in heatmaps using the equation (H opt=(2/3n)(1/4)×σ) to calculate the kernels using the mean center and standard distance in QGIS software. This shows a restricted density of RUWP with respect to ant nest colonies. Linear regression analysis revealed a significant positive correlation (Adjusted R-squared=0.2573, p-value:0.00933) between RUWP and ant nest density. These results indicate commensalism between the RUWP and *Crematogaster* ants, within which a predator-prey relationship also exists.

Keywords: Commensalism, Feather odor, Kernel density analysis, Predator-prey relationship