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**Resource Partitioning and Niche Overlap in Three Sympatric Species of Dragonflies (Anisoptera: Libellulidae) in Anuradhapura District, Sri Lanka**

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**Abstract**

Resource partitioning in ecological communities bears profound connection with the co-existence of closely related species. As a mechanism, it assists species with similar characteristics to thrive in the environments where they can utilise resources in different levels in spatial and temporal scale via niche partitioning. As ecologically important insects, dragonflies are well-studied in many aspects globally but poorly assessed locally. The current study was conducted under the main objective of identifying the mechanism of resource partitioning in three sympatric most common skimmer species; *Brachythemis contaminata*, *Crocothemis servilia servilia* and *Rhyothemis variegata variegata* in two tank ecosystems in Anuradhapura district, Sri Lanka.

The study was conducted from May-August 2014 simultaneously in Nabadagaswewa tank (NW) and Mihintale tank (MT). Data collection was carried out 08:00 to 10:00 hrs in the morning and 13:00 to 15:00 hrs in the evening. Land-water interface at the tank was used for the study in both sites. Scan sampling was used to obtain data on resource utilisation by the three skimmer species. Randomly selected individuals were observed for 30 seconds in each observation point. Vegetation variables (bank vegetation density and height, aquatic vegetation density and height) were measured using two belt transects (25×1 m<sup>2</sup>) in both habitats.

The three species were more active in the morning hours (08:00 to 10:00 hrs) and shows different levels of perch and fly heights in the morning and evening hours. *R.v. variegata* was recorded using heights of <100 cm in both habitats. *B. contaminata* and *C.s. servilia* showed high spatial niche overlap ( $O_{ij}=0.716$ ) in NW and in MT highest spatial niche overlap was observed between *C.s. servilia* and *R.v. variegata* ( $O_{ij}=0.473$ ). The broadest niche breadth was exhibited by *C.s. servilia* ( $B=0.46$ ) in NW while *B. contaminata* showed the highest ( $B=0.23$ ) in MT. *R.v. variegata* showed the lowest niche breadth in both habitats (NW:  $B = 0.39$ , MT:  $B=0.09$ ). Relationship between the species abundance and vegetation heights and densities shows that vegetation height and bank vegetation densities were negatively correlated with the abundance of the three skimmer species.

This study depicts ways of resource partitioning among the three sympatric skimmer species minimising interspecific competition and favoring their co-existence. Further, it highlights the extent of spatial niche overlap is influenced by the habitat characteristics especially the vegetation structure and resource availability.

**Keywords:** Resource partitioning, Niche overlap, Libellulidae