

Trophic ecology and resource partitioning of fish assemblages in brush-parks of Negombo estuary, Sri Lanka

M. Gammanpila^{1*}, U. S. Amarasinghe² and M. J. S. Wijeyaratne²

¹National Aquatic Resources Research and Development Agency, Regional
Research Centre, Kadolkele, Negombo, Sri Lanka

²Department of Zoology and Environmental Management,
Faculty of Science, University of Kelaniya, Sri Lanka.
menakegammanpila@gmail.com

The feeding ecology and trophic organization of 46 fish species in 64 brush parks in three major brush park fishing areas (Munnakkaraya, Katunayake and Dungalpitiya) in Negombo estuary, Sri Lanka were investigated during April 2014 - April 2016 to classify diet composition, evaluate trophic guilds structure, dietary breadths, interspecific dietary overlap and to determine the degree of food resource partitioning of the community. Fraction of food (proportion by volume) consumed by species was used to establish trophic guilds, applying dietary niche breadth, and the inter-specific food niche competition among species was evaluated using Horn's index.

A cluster analysis, based on Euclidean distance resulted in six trophic guilds on the basis of feeding preferences. Although many fishes fed on a diverse range of food items, diets of 15.2% of fish species, which were included in 'omnivore' trophic guild, were dominated by algae/macrophytes with less amount of animal matter (omnivores), 23.9% were detritivores, 2.2% were molluscivores, 2.2% were zooplantivores, 17.4% were macro-crustacean predators and 39.1% were piscivores. The trophic levels of the constituent species varied between 1.0 and 3.0 and the both extremes were occupied by about 60% of the species in the fish assemblage.

Standardized dietary niche breadth was highly variable. Species in the omnivorous feeding guild (e.g., *Gerres oblongus*) and those in the detritivorous feeding guild (e.g., *Liza subviridis*) showed higher dietary niche breadths (>0.82) showing occurrence of wide choices of food categories for them. The species of intermediate trophic class such as *Carangoides talamparoides* in macro-crustacean feeding guild and those which fed on macro-crustaceans and fish such as *Epinephelus* sp. and *Lutjanus fulviflamma* also had broader (>0.88) dietary breadths. The piscivores *Sphyraena jello* and *Terapon puta* with highly specialized feeding habits had the narrowest (0.0) dietary breadth.

Species which primarily fed on phytoplankton/macrophytes and detritus such as Mugilids and Siganids, and species such as *Acanthurus gahhm*, *Monodactylus argenteus*, *Scatophagus argus*, *Eetroplus suratensis*, *Oreochromis mossambicus* and *Oreochromis niloticus* indicated high dietary overlap ranging from 0.50 to 0.97. It was also evident that even majority of the species in the feeding guilds of macro-crustacean predators and piscivores exhibited relatively high dietary overlaps (range 0.1 - 1.0). The present study therefore illustrated that the fish assemblage in brush parks show both food resource partitioning and dietary competition, the former characterizing divergence of resource use to minimize competition for limited food resources and the latter reflecting resource abundance.

Keywords: Trophic guild, Feeding habits, Dietary Niche breadth, Resources partitioning