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Seasonal and Daily Variations of Mugger Crocodile (*Crocodylus palustris*) Behaviors in Wilpattu National Park

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Abstract

Out of two crocodile species present in Sri Lanka, the Mugger crocodile (*Crocodylus palustris*) is a Near Threatened freshwater crocodile species, inhabiting freshwater bodies, ponds, and irrigation canals around the island. These large carnivorous reptiles play a crucial role in maintaining their natural ecosystems. The present study aimed to assess all behaviors of muggers across the dry and wet seasons and times of the day. Areas in and around the Wilpattu national park were selected as study sites. The crocodile survey was conducted from September 2024 to August 2025, covering wet (October-February) and dry (March-September) seasons. Point counts along road transects were conducted using a jeep. An ethogram was created after thoroughly observing the behaviors. All the behaviors were documented at the first site during morning, midday, and evening. Eight different behaviors (basking, feeding, floating, gaping, high walk, resting on land, submerged, swimming) were analyzed to examine the significant differences using the chi-squared test across time of the day and between two seasons. Throughout the year, 231 crocodile sightings were recorded, and wet season sightings (150) were higher than the dry season (81). The reason might be the decline in water levels and the confinement of crocodiles to a small area during the dry season. Activity budget of each behavior was recorded as basking (21.40%), feeding (0.87%), floating (24.89%), gaping (9.17%), high walk (3.06%), resting on land (13.10%), submerged (5.24%), and swimming (22.27%). There was a significant difference (p=0.003) in mugger behaviors during the time of day due to environmental variations, as ectotherms. Behavioral patterns also showed significant seasonal differences (p=0.04). When both seasons and time of the day were considered simultaneously, there was a significant difference (p=0.01) in all behaviors, as they had changed their behaviors with preferable environmental conditions. The results highlight the shifting of behaviors strongly influenced by seasonal changes and times of the day. These findings provide pivotal insights that guide future management and conservation strategies for crocodiles by highlighting how their behavioral responses are shaped by environmental changes. Such knowledge is important for mitigating human-crocodile conflict and safeguarding the crocodile population under changing environmental conditions.

Keywords: *Mugger crocodile, Behavioral patterns, Wilpattu, Crocodylidae, Activity*