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Courtship and mating observation of olive ridley sea turtle (*Lepidochelys olivacea*)

Sea turtles spend most of their time below the water surface, making it difficult to observe their reproductive behaviour, particularly in open ocean habitats. Olive ridley sea turtles, *Lepidochelys olivacea* (Eschscholtz, 1829), and Kemp's ridley sea turtle, *Lepidochelys kempii* (Garman, 1880), are the only species of the genus *Lepidochelys*, and tend to form large aggregations at nesting sites (Bernando & Plotkin 2007). Olive ridley sea turtles are unique in that some populations nest en mass (Bezy *et al.* 2020, Poornima *et al.* 2021, Mishra *et al.* 2022), while others are solitary nesters (Dornfeld *et al.* 2014, Bomfim *et al.* 2021, Hochscheid *et al.* 2022). Irruptive nesting events are known as *arribadas*, where thousands of females come ashore to nest simultaneously (Bernando & Plotkin 2007). While other sea turtle species are also present in marine areas near nesting grounds, olive ridleys are distinctive in forming large aggregations during *arribadas*, while spending inter-nesting time in the open ocean. These nearshore areas provide rare opportunities for observation and facilitate research on their reproductive behaviour. However, studying their behaviour in offshore waters remains challenging, as mating events are typically brief and infrequent, making detailed studies of their mating rituals difficult (Tripathy 2008, Hudgins *et al.* 2017).

During a marine mammal stock assessment survey aboard the *Matsya Drushti* off the Northeast coast of India in December 2022, we observed courtship behavior between two olive ridley sea turtles. The sighting took place approximately 85 km offshore from Visakhapatnam at 17°58.86'N; 85°17.72'E where

the seafloor depth was 2441 m (Fig. 1). A breeding pair of olive ridley sea turtles was observed from approximately 25–30 m, providing a rare opportunity to document their behaviour in offshore waters (Fig. 2). Notably, Visakhapatnam is home to a known olive ridley nesting site at Ramakrishna Beach, 85 km away, suggesting the potential importance of this region for the life cycle of the species. Photos and videos were taken using a Nikon (D850) camera for further analysis. The footage confirmed mating behaviour as described by Comuzzi & Owens (1990). The male sea turtle was seen climbing over the female's shell by gripping her carapace with the claws on its front flippers and biting the back of the female's head. The male then used its rear flippers to pursue the female and folded its tail under her shell during mating. While we did not enter the water, we were still able to see the distinct tail lengths to confirm their sexes.

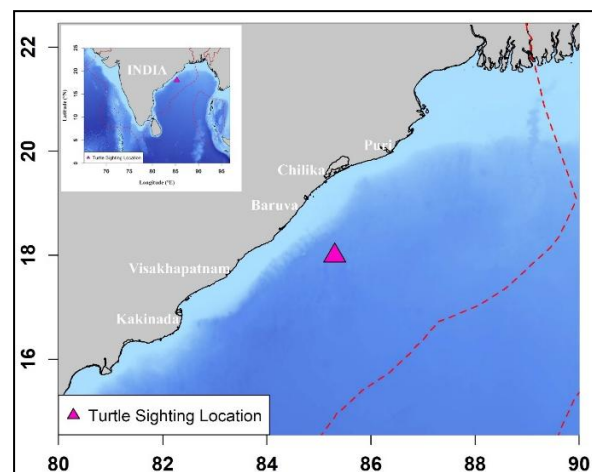


Figure 1. Map showing the location of olive ridley sea turtle (*Lepidochelys olivacea*) courtship behaviour

Observing courtship and mating approximately 85 km from shore challenges

existing assumptions about the typical proximity of mating activities to coastal areas. The distance suggests that olive ridley turtles may engage in mating behavior in deeper, more offshore waters than previously documented, which could have important implications for our understanding of their reproductive ecology. Additionally, the observed behaviors reaffirm the complex and aggressive nature of their courtship rituals (Comuzzi & Owens 1990). Sea turtle courtship, particularly among olive ridley turtles, is often aggressive. The male frequently bites the female's neck, flippers, and tail while using his forelimb claws to grip her shell tightly. In response, the female initially resists mounting attempts by raising her body vertically, shaking vigorously, and even attempting to dislodge the male. Struggles can last for extended periods, with males sometimes competing for access to a female, leading to further aggression (Plotkin & Bernardo 2007).



Figure 2. A breeding pair of olive ridley sea turtles (*Lepidochelys olivacea*) courtship behaviour

Mating in olive ridley turtles is commonly reported near nesting beaches and in nearshore waters (Shanker *et al.* 2003, Plotkin 2007). However, the present observation of mating occurring in offshore waters suggests that some populations may utilize deeper waters for reproduction. Other sea turtle species, such as loggerhead sea turtle (*Caretta caretta*), have also been recorded mating in offshore waters (Hays *et al.* 2010), although most studies emphasize mating near nesting sites. A closely related species, Kemp's ridley sea turtle, exhibits similar nearshore mating behaviour in the Gulf of Mexico, reinforcing the idea that offshore mating in olive ridley turtles may be an exception rather than the norm (Shaver *et al.* 2005). The observed offshore mating behaviour suggests that olive ridley turtles may exhibit greater plasticity in mating site selection than previously recognized.

This finding has a significant conservation implication, as most protection efforts focus on nesting beaches and nearshore waters, potentially overlooking critical offshore habitats. Furthermore, this study underscores the need for further research to explore the environmental factors influencing mating site selection and to consider the protection of offshore habitats as critical to the conservation of this species.

Acknowledgements. We thank K.R. Sreenath (Director General of Fishery Survey of India, Mumbai), Govt. of India, Ministry of Fisheries, Animal Husbandry & Dairying, Department of Fisheries, for providing the necessary permission and facilities; officers and staff of the vessels of the Matsya Drushti for their cooperation and data collection during the cruise programmes at sea. Finally, we would like to thank Elizabeth L.-Estrada (National Autonomous University of Mexico), Christian D. O.-Ortiz (University of Colima, Mexico), Nathan J. Robinson (Institut de Ciències del Mar, Spain), and Leandro Bugoni (University of Rio Grande, Brazil) for reviewing the manuscript.

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Submitted: 2 Aug 2024, Accepted: 21 Apr 2025
Section Editor: Leandro Bugoni

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