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Pseudonesting behaviour by the olive ridley sea turtle *Lepidochelys olivacea* (Eschscholtz, 1829) during mass nesting at Rushikulya, Orissa, India.

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Olive Ridley sea turtles *Lepidochelys olivacea* (Eschscholtz,1829) are globally distributed and are well known for their synchronised nesting behaviour, also known as *arribada* (Spanish for "arrival"), in which several hundred thousands of female Olive Ridleys nest '*en masse'* (Bernardo and Plotkin, 2007). They nest solitarily as well and prefer to nest on tropical sandy beaches, while the major mass nesting phenomenon occurs in the beaches of Pacific Mexico (Marquez, 1990), Costa Rica (Hughes and Richard, 1974) and Orissa coast in India (James et al., 1991; Pandav and Choudhury, 2000). Orissa has three mass nesting rookeries, namely Gahirmatha, Devi and Rushikulya. The southernmost mass nesting beach, the Rushikulya rookery (19°22.58'' N, 85°05.01'' E) was discovered in 1994 (Pandav, Choudhury and Kar, 1994).

The nesting behaviour of Olive Ridleys and other marine turtles has been documented extensively (Ehrhart, 1982; Mortimer, 1982; Hendrickson, 1982). Here we introduce a behaviour previously unreported exhibited by *arribada* Olive Ridley's, which we have termed pseudonesting. We define pseudonesting as a nesting behaviour where a female turtle after excavating a nest chamber takes the ovipositing position, but does not lay eggs, yet goes through the ritual of covering the nest chamber with sand, and camouflaging it before heading back to the sea. We distinguish pseudonesting from false crawls and nest abandonment, where the turtle returns back to sea without nesting or may stop the process of egg laying and abandon the nest due to anthropogenic and natural causes (e.g., site unsuitability) (Mortimer, 1990; Al-Kindi et al., 2006). False crawling turtles either go back to the sea without laying eggs or try nesting a few metres away from the previously excavated nest whereas abandoned nests are left unfinished. During pseudonesting, all the eight steps for a successful nesting mentioned by Hendrickson (1958) or the 11 steps by Carr and Ogren (1960) were followed by turtles, except egg laying.

2010 *arribada* was from 15th to 19th March, on the 3500 m beach stretch, north of Rushikulya river mouth. The *arribada* population assessment was between 18.00 hrs to 06.00 hrs (IST) using modified strip transects (Shanker, Pandav and Choudhury, 2004), and an estimated 138741 ± 20349 (SD) turtles were recorded nesting during the *arribada*. We recorded 42 pseudonesters from 2500 m (500 m ×5 days) beach stretch while documenting ovipositing duration (OPD) and clutch size of the nesting turtles. Most of the pseudonesting behaviour (83%) was observed between 00.00 hrs and 06.00 hrs (Table.1). Out of these 42 turtles, 39 turtles covered and camouflaged the nest without laying a single egg and returned directly to the sea. Other three turtles attempted to nest (after pseudonesting) in another site, a few meters away from the previous nesting location. However, none of these turtles oviposited even during the second attempt.

The duration for which the turtle remained in nesting position (with out laying eggs) after completion of the nest chamber excavation ranged from 11 seconds to 25 minutes (Mean=11.81 minutes, SD=5.99, n=21). The maximum number (n=17) of pseudonesting turtles was observed on 17th March between 00.00 hrs and 03.00 hrs. We observed increased surface sand moisture on that night, due to lower atmospheric temperature (23°C) than the average (25°C) and thick fog. However, these factors cannot be identified as the cause of pseudonesting with the current limited data. All the observed pseudonesters were well above the high tide line and had mean curved carapace length (CCL) (Mean=69.53 cm, SD=2.42, n=21) above the estimated mean CCL of 60 cm at sexual maturity (Dash and Kar, 1990).

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Table 1. Number of pseudonesting Olive Ridley Turtles encountered during 2010 *arribada* in Rushikulya, Orissa, India.

		24.00 hrs - 06.00 hrs (IST)		18.00 hrs - 24.00 hrs (IST)	
Date	Total pseudo nesters	From 24.00 hrs - 03.00 hrs	From 03.00 hrs - 06.00 hrs	From 18.00 hrs - 21.00 hrs	From 21.00 hrs - 24.00 hrs
15/03/2010	2	0*	0*	0	2
16/03/2010	10	7	1	0	2
17/03/2010	24	17	6	1	0*
18/03/2010	2	0*	0*	0	2
19/03/2010	4	3	1	0	0
	42	27	8	1	6

* Not sampled

A number of Olive Ridley's were observed displaying something like pseudonesting in Costa Rica, but they were typically observed only towards the end of the *arribada* and refer to obviously paraplegic turtles (Pers. Comm. Roldán Valverde). The 42 individuals that we observed showed no signs of paraplegia or any external injuries or bruises. Allard (1948) and Kipp (2003) recorded a behaviour almost similar to pseudonesting in the terrestrial Eastern Box Turtle *Terrapene carolina carolina* (Linnaeus, 1758). However, reasons for this behaviour were not discussed. One explanation for this pseudonesting behaviour can be attributed to the "Predator Satiation Hypothesis", an evolutionary strategy for nesting synchrony or *arribadas*, to maximally satiate/swamp local predators **(**Eckrich and David, 1995**)**. So far we have not observed any solitary nesting Olive Ridley's performing pseudonesting.

Earlier workers (Sahoo et al., 1996; Sahoo, Mahapatra and Dutta, 2009) have reported the presence of abnormal Olive Ridley eggs from Gahirmatha (320 Km North of Rushikulya). However any sort of abnormal nesting behaviour was not recorded earlier. More research needs to be carried out in order to determine if the pseudonesting turtles contained oviductal eggs or not. Whatever the cause, whether climatic, physiological or behavioural; factors that trigger pseudonesting during arriIbadas need further investigation and are a matter of scientific interest.

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