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## Predation of Sea Turtle Nests by Armadillos in the Northern Coast of Bahia, Brazil

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The northern coast of Bahia hosts over 50 percent of the total nests monitored along the mainland coast of Brazil (Marcovaldi & Laurent 1996; Marcovaldi & Chaloupka 2007). The loggerhead turtle (*Caretta caretta*) is the most common species nesting in Bahia, followed by hawksbills (*Eretmochelys imbricata*) and olive ridleys (*Lepidochelys olivacea*) (Marcovaldi & Chaloupka 2007; Castilhos *et al.* 2011; Marcovaldi *et al.* 2011; Santos *et al.* 2011).

On the nesting grounds, TAMAR (National Marine Turtle Conservation Program in Brazil) is responsible for monitoring all sea turtle nesting activities. The monitoring program consists of marking all nests (Marcovaldi & Marcovaldi 1999) and protecting them against human exploitation, animal predation and habitat destruction (Marcovaldi & Chaloupka 2007). The area monitored by the Costa do Sauípe Station consists of 56 km of continuous coastline in the northern part of Bahia, which is divided into an Intensive Study Area (ISA) of 16 km and a Protection Area (PA) of 40 km. In the ISA, collection of data with full coverage is required, so that all the information regarding nesting activities (i.e. incubation parameters, species identification and hatching success) is fully captured (Paes e Lima *et al.* 2012). The ISA is located in the southern part of the monitored area and it is patrolled by TAMAR staff at least once daily during each nesting season. The PA is patrolled daily by “tartarugueiros” (residents hired and trained by TAMAR, working under direct supervision of the TAMAR staff (Marcovaldi & Marcovaldi 1999).

Natural predation by foxes, crabs, and ants can occur in sea turtle nests. In order to reduce predation by foxes (*Cerdocyon thous*), all

nests are protected with metal wire mesh grids, which are buried 10 cm below the surface of the sand, above the eggs. The metal mesh size is large enough to allow hatchlings to exit (Marcovaldi & Marcovaldi 1999). Additionally, in some places along the northern coast of Bahia, flags made from 1.20 m wooden sticks with 50 x 80 cm resistant textile were used over the nests, as an alternative to try to reduce the predation by foxes (Longo *et al.* 2009). Recently, there was a substantial increase in the predation rate of incubating eggs by armadillos. Among 526 nests laid between 2009 and 2012, 167 were predated and armadillos were responsible for 153 nest predation events (Table 1). Coastal development may be linked to greater armadillo predation of sea turtle nests, as natural habitat and prey for armadillos are negatively affected by construction and human inhabitation of coastal areas, forcing the armadillos to expand their range into the sandy nesting beach.

Most of the nests were predated more than once, and frequently during the first 15 days of incubation. Predation usually occurred at

Predator	2009-2010	2010-2011	2011-2012
Armadillo	58 (89.2%)	46 (95.8%)	49 (90.7%)
Fox	7 (10.8%)	2 (4.2%)	5 (9.3%)
Total	65 (100%)	48 (100 %)	54 (100%)

**Table 1.** Number (percent) of predated nests by armadillos and foxes along the three nesting seasons in Costa do Sauípe station, Bahia, Brazil.



**Figure 1.** Left panel: armadillo burrow next to marked sea turtle nest. Right panel: fox burrow next to a marked sea turtle nest

night, with no direct observation of the predators. However, based on the characteristic shape the burrows dug by armadillos vs. foxes, we were able to distinguish between the two predators using only the tracks found in the sand each morning (Figure 1). Two species of armadillos have been identified in the coastal Bahia region: the nine-banded armadillo (*Dasypus novemcinctus* L.) and the six-banded armadillo (*Euphractus sexcinctus* L.). We were unable to distinguish which species were involved with the predation events. Data concerning ecological information of the two species are scarce (Anacleto & Diniz - Filho 2008).

The predation of sea turtle nests by nine-banded armadillos (*Dasypus novemcinctus* L.) has been documented in Florida, USA (Drennen *et al.* 1989). To our knowledge this study represents the first report on sea turtle nest predation by armadillos in Bahia. The presence of six-banded armadillos (*Euphractus sexcinctus* L.) close to sea turtle nests was reported by Neto *et al.* 2010 using camera traps at the Barreira do Inferno beach, in Rio Grande do Norte state, Brazil, however no predation was documented. The use of metal wire mesh above the clutches of eggs does not appear to be an effective means of eliminating predation by armadillos. More work is needed to reduce egg destruction by this newly documented sea turtle egg predator in Brazil.

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