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Predation of Green Turtle (*Chelonia mydas*) Nests in Mauritania by the African Golden Wolf (*Canis anthus anthus*)

Jacques Fretey¹ & Feitoumatt Lematt Hama^{2,3}

¹ Centre de recherches sur les tortues marines – Chélonée, 46260 Beauregard, France
(email: jfretey@imatech.fr)

² Croatian Institute for Biodiversity, Lipovac I., br. 7. HR-10000 Zagreb, Croatia

³ Biota j.d.o.o., Braće Radića 128/A., HR-43290 Grubišno polje, Croatia

Mauritania is considered to be the northernmost nesting area for green turtles (*Chelonia mydas*) along the eastern Atlantic coast of Africa. Here, green turtle nests are mainly observed from the middle section of the beach all the way to the vegetation. However, some green turtle nests can occasionally be located on the sides of small sand dunes at the back of the beach.

Given the considerable length of the Mauritanian coastline (754 km), we relied on 4x4 terrain vehicles to conduct our study. From these slow-moving terrain vehicles, we were able to easily count the sea turtle nests located within the beach zone area. Fieldwork was conducted in October 2014 and October 2016 along the major part of the 754 km long Mauritanian coastline from Nouadhibou to Mamghar localities (Northern area), from Mamghar to PK28 localities (Central area) and from PK28 to N'diogo localities (Southern area).

Each observed bodypit and its surroundings were additionally closely inspected on foot. During these inspections, we noted the presence of various predator tracks and counted the number of eggshells visible on the sand surface in proximity to the bodypit (10 - 20 m). In October 2014, we recorded the highest concentration of green turtle nests ($n = 127$) in the area located 28 km south of Nouakchott, Mauritania's capital. Between 16 September 2016 and 3 October 2016, we recorded a total of 40 green turtle nesting activities. Among those, we identified three freshly laid nests. These nests were located in the 65 km area stretching

southwards from the Nouakchott port (N17° 59'.470" W16° 01'.299"). One nest located near the Nouakchott port was depredated three times by the African Golden Wolf (*Canis anthus anthus*) over a period of two days whereas the two other nests were depredated once by both the golden wolf and crabs (*Ocypode cursor*).

It is worth noting that this was the first instance of green turtle nesting being recorded in the area south of Nouakchott city as opposed to the previous reports of Maigret (1975) and Arvy (1995), which indicate nesting only to the north of Nouakchott within the Banc d'Arguin National Park area and its close surroundings (Hama *et al.* in press).

Numerous tracks of the African golden wolf were observed around 58 sea turtle nests with dry egg shells scattered in their vicinity. The highest number of nests depredated by wolves was located near the beach vegetation boundary (45.5%) followed by the upper beach zone (27.3%). Subsequently, lower numbers of depredated nests were located in the middle beach zone (9%) and the beach slope zone (18.2%). In addition, we observed tracks of other known predators such as crabs (*Ocypode cursor*) and mole crickets (Gryllotalpidae) in 4 identified green turtle nests. The remaining sea turtle nests were not disturbed and we did not find evidence of animal or human tracks.



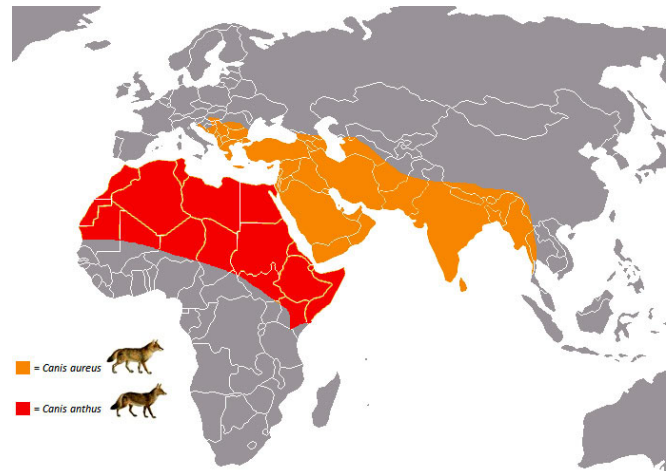
Drawing of the African Golden Wolf by Saint-Hilaire and Cuvier (1824).



The African Golden Wolf scared of our terrain vehicle, at a distance of 100 meters (Photo: F. Dovilliez).

Genetic studies dating between 2012 and 2015, on a large number of Canidae individuals from the Old World, showed that the African Canidae forms are closer to the gray wolf (*Canis lupus*) and the coyote (*C. latrans*) than to the Eurasian golden jackal (*C. aureus*). This is why the *C. anthus* species was “baptized” as the African golden wolf, not an African jackal (Gaubert *et al.* 2012; Bahlk 2015; Koepfli *et al.* 2015).

According to Rosevear (1974), the African golden wolf has a diet composed mainly of small prey such as rodents, lagomorphs, lizards, snakes, and birds nesting on the ground. It is also known to consume large



Current separation map of aureus and anthus taxa.

quantities of insects and their larvae, and can occasionally kill young gazelles. According to Kingdon (1988), it also feeds on fruits like its relative *C. aureus* (Lamprecht 1978; Radović and Kovačić 2010). In Senegal, the golden wolf was observed to attack flocks of lambs (Gaubert *et al.* 2012).

Various mammals (rats, armadillos, northern raccoons, white-nosed coatis, crab-eating raccoons, common opossums, etc.) are known to be predators of sea turtle nests on beaches worldwide (Fretey 1976, 1981; Cornelius 1986; Engeman *et al.* 2003; Chatto 2004; Meier and Varnham 2004; Barton and Roth 2006; Zeppelini *et al.* 2007; Escobar-Lasso *et al.* 2016). Among these mammals, the Canidae are considered to be the most destructive. On many nesting beaches close to villages, domestic dogs are viewed as a serious threat because they are known to destroy sea turtle nests and attack nesting sea turtles (Fretey and Frenay 1980; Drake 1996; Graff 1996; Santos and Godfrey 2001).

In many regions of the world, wild Canidae are known as major predators of sea turtle eggs. Durmuş *et al.* (2011) wrote that the lower hatching success observed in loggerheads (*Caretta caretta*) at the Goksu

Delta in Turkey is the result of jackal predation. Also, the golden jackal has been recognized as an important predator of olive ridley (*Lepidochelys olivacea*) nests in India (Bhupathy and Karunakaran 2003; Katdare



Tracks of an African (Senegalese) golden wolf (left). Green turtle nest depredated by the African golden wolf along with crabs (A: Dug out/disturbed nest; B: African golden wolf tracks; C: Crab tracks; D: Sea turtle egg shells; (Photo: J. Fretey).

and Mone 2003; Sivakumar *et al.* 2011). Drake *et al.* (2001) additionally reported that a coyote can eat olive ridley eggs and attack nesting individuals at the Playa Naranjo in Santa Rosa National Park, Costa Rica. Méndez-Rodríguez and Álvarez-Castañeda (2016) consider coyotes to be the most important predator of olive ridley nests in the Baja California Peninsula. In Brazil, the red fox (*Vulpes vulpes*) is considered an important sea turtle nest and hatchling predator (Kurz *et al.* 2011). Similarly, Margaritoulis (1989) reported that the main loggerhead nest predator in Greece is the red fox. Furthermore, dingoes (*Canis lupus dingo*), wild dogs (*Canis lupus familiaris*) and the red fox are known to be egg predators of the flatback turtle (*Natator depressus*) in

Australia (Limpus 1971; Chatto 2004; Welicky *et al.* 2012).

To our knowledge, this is the first instance that the predation of sea turtle nests by the African golden wolf is reported in Africa. The natural populations of the African golden wolves do not seem to increase due to human presence. Therefore their predation upon the sea turtle nests is also natural and probably does not have a significant negative impact on the hatching success of sea turtle nests in Mauritania. During the 2016 nesting season, we tried to protect a few sea turtle nests with a rigid metal mesh, imitating examples in Brazil and the USA (Addison and Henricy 1994; Longo *et al.* 2009; Kurz *et al.* 2011). However, even though there was no subsequent evidence of golden wolf predation, we should note that there were crab tracks, and because the nests were close to the vegetation the nest chambers were filled with plant roots. Consequently, the incubation of those nests was not successful which raises the question about the need to specifically reduce nest predation by the African golden wolf. In conclusion, we need more data to further verify the true impact of predation by the African golden wolf on sea turtle nests in Mauritania. Until more is known about this type of predation, protecting sea turtle nests using the above described method is still the best course of action.

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In memoriam Louis Aba'a Aba'a

Jacques Fretey

*Centre de recherches sur les tortues marines – Chélonée, 46260 Beauregard, France
(email: jfretey@imatech.fr)*

Il ne faudrait pas croire qu'un projet environnemental ne peut bien fonctionner qu'avec un chef de projet scientifique performant. Avoir un bon logisticien dans un projet est primordial.

J'ai connu Louis Aba'a Aba'a à la fin des années 90 au Cameroun lors de la création du Parc national de Campo Ma'an. Il était alors simple chauffeur. Un très bon chauffeur. Ce qui est déjà beaucoup au Cameroun quand on connaît les difficultés à sortir un véhicule 4x4 du borbier d'une piste, s'y retrouver dans les dédales de rues bloquées par des embouteillages à Douala ou éviter des gendarmes raketteurs! Dès le début des années 2000, Louis est devenu le chauffeur de notre projet au sud de Kribi de suivi des pontes des tortues marines. Puis, par son expérience et son réseau, il est devenu rapidement un très efficace logisticien capable de résoudre tous nos problèmes techniques. Cet homme bourru était d'une gentillesse extrême et nous faisions partie de sa famille. Ces dernières années, Louis s'était beaucoup investi pour la création du premier parc national marin du Cameroun. Il était un membre actif du bureau de l'association Tube Awù (= Notre océan).

Louis vient de mourir brutalement, laissant tous ses amis désespérés. C'est une grande perte pour notre microcosme des turtle warriors.

