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Received: 10 January 1997

Reviewed: 24 August 1997

Revised and Accepted: 10 October 1997

Chelonian Conservation and Biology, 1997, 2(4):615-616
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Observations of Reproductive Behavior of Male Green Turtles (*Chelonia mydas*) at a Nesting Beach in Cyprus

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Relatively little is known of the mating behavior of marine turtles, although many anecdotal accounts have been recorded (see Ehrhart, 1982). All of these observed matings have been of turtles at sea. Studies have suggested that mating in marine turtles occurs prior to the oviposition of a female's initial clutch of the season, when she can mate with several different males and sperm are stored for the fertilization of subsequent clutches of the season (Owens, 1980; Gist and Jones, 1989; Galbraith, 1993).

In this study we report incidental observations of green turtles (*Chelonia mydas*) mating at a nesting beach in Cyprus. Observations were made during June 1995, between 2 and 4 weeks after the onset of the nesting season, while conducting night surveys at Alagadi Beach, a major marine turtle nesting site in northern Cyprus (Broderick and Godley, 1996). Although continual night work has taken place at this study site over six successive nesting seasons, observations of this unusual mating behavior only took place in 1995.

We observed mating green turtles on four separate occasions. On one occasion the mating pair was in the sea, about 5 m from the shore, while on another, a mating pair appeared to have been washed onto the beach in stormy weather. Both pairs separated after approximately five minutes of observation. However, on two other occasions, during calm weather, the female crawled onto the beach with the male still attached in amplexus. In both cases, after the female ascended approximately 5-10 m up the beach, the male detached, appeared disoriented, and returned to the water. Both females went on to attempt nesting, one laying a clutch which hatched successfully. In the final case, the male was measured to have a curved carapace length (CCL) of 85 cm.

Similar published records of mating by marine turtles at or on nesting beaches do not appear to exist. The closest available record is some 1947 film footage of huge numbers of Kemp's ridley turtles (*Lepidochelys kempi*) nesting in an *arribada* at Rancho Nuevo, Mexico, which shows a nesting female on the beach with a male on top (P.C.H. Pritchard, pers. comm.).

Since these observations were made during the first 2 to 4 weeks of the nesting season it is possible that they occurred

prior to the deposition of the first clutch by the females concerned. Two of the occurrences may have been a result of the mating pair being incidentally washed ashore as a result of stormy weather. However, on the other two occasions the females went on to attempt or complete the nesting process, suggesting they were making a concerted effort to nest. Mating at this late stage is unlikely to result in the fertilization of any eggs of the proximate clutch. However, the male involved may still have had a chance of fertilizing at least some eggs of future clutches, assuming that oviposition would not flush out all the deposited sperm.

Without further supportive data, it is only possible to hypothesize as to the actual causes of this behavior. We speculate that two possible causes, in addition to stormy weather, may have been the reproductive behavioral strategies known as "sneaking" and "mate guarding" (Krebs and Davies, 1987). It is possible that the male, perhaps unable to compete with other males for matings prior to the onset of the season, was sneaking copulations with females as they approached the beach to nest. In other animal groups sneaking strategies are undertaken by small males. We measured only one male, but because no regional data regarding adult male sizes are available, it is not possible to ascertain whether this was a small individual. However, with a CCL of 85 cm, the measured male was smaller than the average female recorded at this nesting site (mean CCL = 92.0 ± 0.74 cm, $n = 69$; Broderick and Godley, 1996). Alternatively, the male may have already mated with the female and may have been guarding his mate until she reached the beach, reducing the chance of further copulations. These possibilities remain pure speculation, but future observations of this unusual behavior should concentrate on attempting to elucidate the behavioral mechanisms involved.

Acknowledgments. — This work was carried out with the assistance of members of Glasgow University Turtle Conservation Project. The authors were funded by University of Glasgow post-graduate scholarships.

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Received: 21 April 1997

Reviewed: 26 August 1997

Revised and Accepted: 20 November 1997

Kachuga sylhetensis Recorded from Northern Bengal, with Notes on Turtles of Gorumara National Park, Eastern India

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Gorumara National Park (26°80'N; 88°60'E) in northern West Bengal, eastern India, is situated at the foothills of the eastern Himalayas. In terms of geofloristics, the area lies within the *bhabar* tract of moist deciduous forests (Mani, 1974), where snow-fed seepages originating from the mountains disappear under rocks, reappearing at a distance to form swamps and/or join larger rivers. Dominant vegetation includes mature sal, *Shorea robusta*, in association with *Schima wallachi*, *Terminalia* sp., *Lagerstromia* sp., *Premna* sp., *Amoora* sp., *Dillenia pentagyna*, *Ficus glomerata*, and *F. cunea*. The formation represented is Champion and Seth's (1968) East Himalayan lower *bhabar* sal (type 3C/C1b[ii]).

The site is important for several wetland species, including the great Indian one-horned rhinoceros (*Rhinoceros unicornis*). Shaw (1931) wrote about the turtles of the entire district, recording only *Cyclemys dentata* (as *Cyclemys dhor*) and possibly *Geoclemys hamiltonii* (as "near to *Damonina hamiltoni*"). There are no records of turtles specifically from Gorumara in the literature, although several species (including *Indotestudo elongata*, *Aspideretes hurum*, *Chitra indica*, *Kachuga tecta*, *Melanochelys tricarinata*, and *M. trijuga*) have been collected from Baradighi Tea Estate, which abuts the National Park (Das, 1995).

Turtle surveys were conducted at Gorumara National Park between 12-16 March 1997. Visits were made to

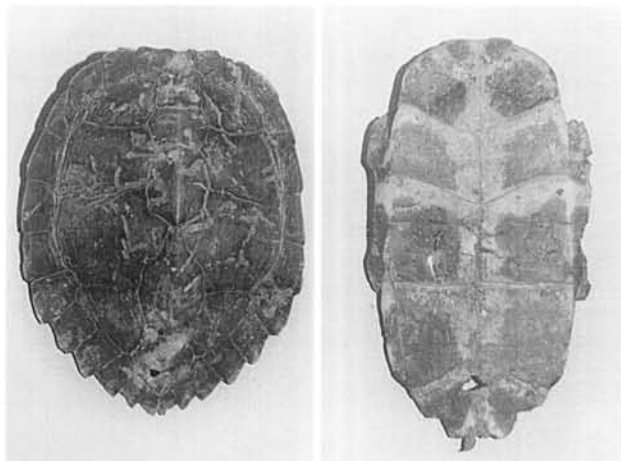


Figure 1. Shell of *Kachuga sylhetensis* (ZSI 25130) in dorsal and ventral views.