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.

Literature Cited

BRODERICK, A.C., AND GODLEY, B.J. 1996. Population and nesting ecology of the green turtle, *Chelonia mydas*, and loggerhead turtle, *Caretta caretta*, in northern Cyprus. Zool. Middle East. 13:27-46.

EHRHART, L.M. 1982. A review of sea turtle reproduction. In: Bjorndal, K.A. (Ed.). Biology and Conservation of Sea Turtles. Washington, DC: Smithsonian Institution Press, pp. 29-38.

GALBRAITH, D.A. 1993. Multiple paternity and sperm storage in turtles. Herpetol. Journal 3:117-123.

GIST, D.H., AND JONES, J.M. 1989. Sperm storage within the oviduct of turtles. J. Morph. 199:379-384.

KREBS, J.R., AND DAVIES, N.B. 1987. Introduction to Behavioural Ecology. 2nd edition. Blackwell Scientific Publications, pp. 221-242.

OWENS, D.W. 1980. The comparative reproductive physiology of sea turtles. Amer. Zool. 20:549-563.

Received: 21 April 1997
Reviewed: 26 August 1997
Revised and Accepted: 20 November 1997

Chelonian Conservation and Biology, 1997, 2(4):616–617

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

INDRANEIL DAS[1]

[1]*Centre for Herpetology, Madras Crocodile Bank Trust, Post Bag 4, Mamallapuram, Tamil Nadu 603 104 India*

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 *Damonia 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

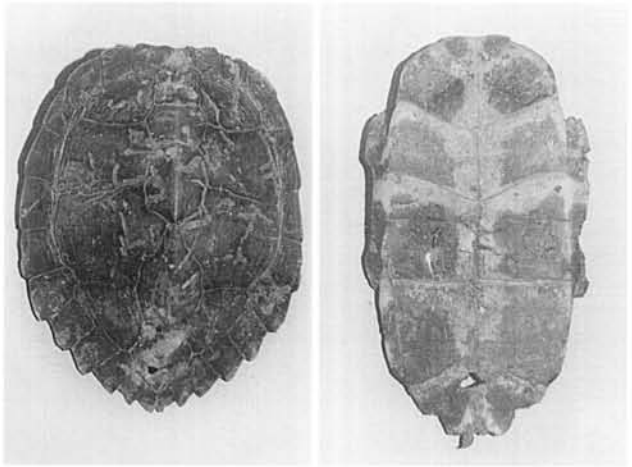

Figure 1. Shell of *Kachuga sylhetensis* (ZSI 25130) in dorsal and ventral views.

villages inside the forested area, and shells of several locally collected species were observed. A shell of *Kachuga sylhetensis* (Jerdon, 1870) was collected from Budhram village, Kalipur Forest, Gorumara National Park, Jalpaiguri District (ZSI 25130, Fig. 1). This extends the known range of the species by ca. 210 km to the west. The species was known to occur from the Manas Biosphere Reserve in Kamrup District, Assam, through Sylhet District of Bangladesh (the type locality) to Meghalaya and Arunachal Pradesh states of northeastern India (Iverson, 1992; Das, 1995).

The following characteristics of the shell were noted (straight measurements with dial vernier calipers, to the nearest 0.1 mm): shell elevated, with a spike in the region of vertebral 3; 13 pairs of marginals; the posterior carapace serrated; straight carapace length 176.8 mm; straight plastron length (median) 167.1 mm; straight plastron length (greatest) 172.4 mm; shell height 79.5 mm; anterior lobe width 78.0 mm; posterior lobe width 84.0 mm; length of left bridge 68.3 mm; length of right bridge 65.4 mm. Seam contact formula: (L) 1< 4 < 6 < 8 > 11 < / (R) 1 < 4 < 6 < 8 < 11 <. Plastral seam measurements (right seams, anterior to posterior; in mm): 18.0, 23.0, 30.7, 32.7, 32.2, 30.6.

The turtle was reportedly taken alive in November from a nearby stream, and was possibly washed downstream during the monsoon flooding that typically takes place between August and October. The Nepalese name for the species is *thoteru* (from *thot* = beak) in allusion to the beak-like projection on the third vertebral scute.

Along with *Kachuga sylhetensis*, the shells of five other species of freshwater turtles were found at Budhram. These were *Aspideretes* sp.($n = 4$), *Kachuga tecta* ($n = 1$), *Lissemys punctata* ($n = 1$), *Melanochelys tricarinata* ($n = 1$), and *M. trijuga* ($n = 6$). Additionally, a shell of *Cyclemys dentata* was found in Baradighi forest village, also within the park. Of these, two species, *M. tricarinata* (ZSI 25131) and *C. dentata* (ZSI 25132) were collected. Turtle shells are kept in the belief that they prevent hoof and other infections in cattle, a practice widespread in the region. Locally occurring turtle species (see Frazier, 1986; Das, 1995) unrepresented in the sample included *Chitra indica, Geoclemys hamiltonii,* and *Indotestudo elongata,* which may be a reflection of rarity. The flesh of all turtles was reportedly consumed, either as food or for purported medicinal qualities. An educational program to wean the local human population from its heavy utilization of turtles is recommended.

Acknowledgments. — I thank the West Bengal Forest Department for support, A.B. Choudhury, formerly of the Forest Survey of India, for hospitality and information on vegetation, and Ed Moll for comments.

Literature Cited

CHAMPION, H.G., AND SETH, S.K. 1968. A Revised Survey of the Forest Types of India. Manager of Publications, Government of India, New Delhi, 404 pp.

DAS, I. 1995. Turtles and Tortoises of India. Oxford University Press, Bombay, 179 pp.

FRAZIER, J. 1986. Chelonians of North Bengal and Sikkim. J. Bengal Nat. Hist. Soc. n.s. 5(2):167-171.

IVERSON, J.B. 1992. A Revised Checklist with Distribution Maps of the Turtles of the World. Privately Published, Richmond, Indiana, 363 pp.

JERDON, T.C. 1870. Notes on Indian herpetology. Proc. Asiatic Soc. Bengal 1870(3):66-85.

MANI, M.S. 1974. Biogeography of the Indo-Gangetic plain. In: Mani, M.S. (Ed.). Biogeography and Ecology in India. Junk Publishers, The Hague, pp. 689-697.

SHAW, G.E. 1931. Tortoises in the Darjeeling District. J. Darjeeling Nat. Hist. Soc. 5(3):74.

Received: 5 May 1997
Reviewed: 26 August 1997
Revised and Accepted: 18 September 1997