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(Crocodylus porosus) IN CAPTIVITY

by

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EGG-LAYING AND NEST-GUARDING BEHAVIOUR OF ESTUARINE CROCODILE
(*Crocodylus porosus*) IN CAPTIVITY

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ABSTRACT

The present communication deals with egg-laying and nest-guarding behaviour observed in an estuarine crocodile (*Crocodylus porosus*) at the Nandan Kanan Biological Park, Orissa.

The female estuarine crocodile laid eggs for the first time when she attained a length of 255 cm and at an estimated age of ten years. The number of eggs laid in four clutches was 29, 34, 35 and 34 eggs.

The nest-guarding behaviour in the crocodile was observed for a period of 2½ months, corresponding with the period of incubation.

In India, the estuarine or saltwater crocodile (*Crocodylus porosus*) is known to occur in the tidal mangrove forests of Sunderbans in West Bengal, Bhitarkanika in Orissa and in the Union Territory of the Andaman and Nicobar Islands. This communication presents data on egg-laying and nest-guarding behaviour of the estuarine crocodile observed at Nandan Kanan Biological Park, Orissa.

A female specimen of this species, measuring about one metre and with an estimated age of about 27 months, was received at the Park from Paradip area (adjacent to Bhitarkanika) on 19 November 1967. It is fed live fresh-water fish.

From early 1976 the female crocodile has been housed alone (there being no mate) in a 10.5 x 9.3 m enclosure of which approximately 1/3 (32.5 sq.m) is taken up by the pool.

RESULTS

Egg-laying

This female first laid on 30 May 1975, inside the pool, out of which one damaged egg was seen floating. This female has laid in each succeeding year. The dates of laying and clutch size are given in Table 1. This nest

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is constructed at a distance of about half a metre from the water's edge and consists of soil, sticks and dry leaves in a heap of about 30 cm high above. Although actual egg-laying was not observed, it is presumed that the eggs were laid very early in the morning on all four instances.

Table 1

Nesting date and clutch size in four successive years

Date of Laying		Number of Eggs
30 May 1975	..	29
4 June 1976	..	34
2 June 1977	..	35
22 May 1978	..	34

The mother crocodile laid eggs for the first time when it had attained a length of 2.55 m and at an estimated age of about ten years.

The oval, hard-shelled and white-coloured eggs measured 69-80 x 40-48 mm (N=50) and weighed 70.5-90 g (N=19).

Nest-guarding behaviour

In the first year the mother crocodile did not show any interest in the eggs as the eggs were laid inside the pool. But in the subsequent years it remained for most of the time very near the nest in a dug out wallow or inside the pool or sometimes partly over the nesting site, zealously guarding the nest. At the sign of the slightest disturbance, it used to reach the nest-site in one leap with open mouth.

The nest-guarding by the mother continued for a period of about 2½ months, corresponding with the period of incubation. Throughout the period she remained vicious and never allowed even the keeper to go inside the enclosure.

DISCUSSION

As there was no male, all the eggs were infertile but even then the mother crocodile exhibited the normal nest-guarding behaviour of the species. The egg laying season, at least in captivity, is restricted to late May and the first few days of June. The inter-egg-laying period observed numbers 370, 362, and 353 days respectively.

67 - 1 mts }
 75 - 2.55 mts }
 1.55 mts in 870
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According to Yangprapakoran (1971) this species reaches sexual maturity at the age of 12-15 years, clutch size is 30-50 eggs and the incubation period is 78-80 days. Smith (1931) states that the mother crocodile of this species remains in the vicinity until the young are hatched, possibly to assist them to water when they emerge from the shell. He further states that the clutch size of two nests from Java were 50 and 60 eggs and the eggs were about 85 x 55 mm in size. It is prone to attack human beings more especially in the breeding season which takes place during the months of June and July (Lydekker, 1896). The mother Crocodylus porosus digs two wallows wider than, but not so long as her body, close to the nest and one or the other crocodile remains there during the period of incubation (Loveridge, 1946). *Chand & Bustard*

Bustard & Choudhury 1979
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The clutch size of 775 nests of Nile crocodile (Crocodylus niloticus) is given as 25-95 eggs with an average of 60.4 per nest (Cott, 1961). He further states that very few females (less than 2%) of Nile crocodile were nesting before they had attained a length of 8 feet (2.44 m) and the largest number of breeding females occur in the length ranges between 9 feet 6 inches and 11 feet 6 inches (approximately 3-3½ m) [(mean length 10 feet 5 inches (3.2 m)].

Wild female gharial shows nest-guarding behaviour (Singh and Bustard, 1977). Nest-guarding behaviour in Nile crocodile (Crocodylus niloticus), American alligator (Alligator mississippiensis) and marsh crocodile (Crocodylus palustris) has been observed (Cott, 1971). Nest-guarding behaviour has also been observed in spectacled Caiman (Caiman crocodilus) in Mexico (Alvarez, 1969) and in the American crocodile (Crocodylus acutus) (Ogden and Singletary, 1973).

** Parental care in Crocodylians has also been reviewed by Bustard (1979).*

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REFERENCES

- Bustard, H.R. (1979). Parental care in crocodylia, with special reference to Indian crocodiles - a review. Indian Crocodiles - Conservation and Research. Occ. Publs. 1. Cen. Croc. Br. Mgmt. Trg. Inst., Hyderabad, India.
- Bustard, H.R. and B.C. Choudhury (1979). Parental care in Saltwater Crocodile (Crocodylus porosus, Schneider). Indian Crocodiles - Conservation and Research. Occ. Publs. 1. Cen. Croc. Br. Mgmt. Trg. Inst., Hyderabad, India.

- Choudhury, B.C. and H.R. Bustard (in press). Predation on Natural Nests of the Saltwater Crocodiles (Crocodylus porosus, Schneider) on North Andaman Island with Notes on the Crocodile Population. J. Bombay Nat. hist. Soc.
- Cott, H.B. (1961). Scientific results of an Enquiry into the ecology and economic status of the Nile Crocodile (Crocodylus niloticus) in Uganda and Northern Rhodesia. Trans. zool. Soc. Lond., 29, 211-358.
- Cott, H.B. (1971). Parental care in crocodilia with special reference to Crocodylus niloticus. Crocodyles, 1, I.U.C.N. Publs. N.S. Suppl. Pap. No. 32: 166-180.
- Loveridge, A. (1946). Reptiles of the Pacific World. New York, Macmillan.
- Lydekker, R. (1896). The Royal Natural History, 5, Frederick Warr & Co., London and New York.
- Ogden, J. and C. Singletary (1973). Night of the Crocodile. Audobon, 75(3): 32-37.
- Singh, L.A.K. and H.R. Bustard (1977). Studies on the Indian Gharial (Gavialis gangeticus, Gmelin) (Reptilia, crocodilia), V: preliminary observations on maternal behaviour. Ind. Forester, 103(10): 671-678.
- Smith, M.A. (1931), The Fauna of British India. Reptilia and Amphibia, 1. Taylor and Francis, London.
- Toro, Alvarez. M. del (1969). Breeding the spectacled caiman (Caiman crocodylus) at Tuxla Cutierrez Zoo. Intnl. Zoo. Yrbk. 9: 35-36.
- Webb, G.J.W., H. Messel and W. Magnusson (1977). The Nesting of Crocodylus porosus in Arnhem land. Northern Australia. Copeia 1977 (2): 238-249.
- Yangprapakorn, U. (1971). Captive breeding of crocodiles in Thailand. Crocodyles, 1, I.U.C.N. Publs. N.S. Suppl. Pap. No. 32: 98-101.