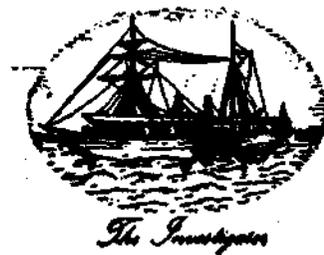


Proceedings of the Symposium on Endangered Marine Animals and Marine Parks

COCHIN, INDIA, 12—16 JANUARY, 1985

Edited by: E. G. SILAS

(Issued in October 1988)



MARINE BIOLOGICAL ASSOCIATION OF INDIA

POST BOX NO. 2673, COCHIN 682 031, INDIA.

OBSERVATIONS ON THE GREEN TURTLE *CHELONIA MYDAS* ALONG THE GUJARAT COAST

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ABSTRACT

The incidental catch of the green turtle *Chelonia mydas* by the bottom pair trawls operated by the Taiwanese Chartered Fishing Vessel *MFV HWA KUO No. 2* during the period December 26, 1983—March 27, 1984 along the continental shelf and the continental slope off Gujarat Coast is reported. Data on the area and time of capture, depth, weather and sea conditions, size composition, sex ratio length-weight relationship and food of *Chelonia mydas* are presented in this account.

INTRODUCTION

AT PRESENT Great interest has been evinced on the occurrence, migration, nesting, behaviour and conservation of sea turtles in India. As sea turtles are protected animals in Indian waters and placed in Schedule I of the Indian Wildlife Protection Act, 1972 their capture is prohibited and active efforts are underway to study their behaviour and biology. These studies are very essential for the conservation and management of sea turtle resources (Silas *et al.*, 1983 and Silas, 1984).

I express my sincere gratitude to Dr. E. G. Silas, Director, Central Marine Fisheries Research Institute for valuable advice and suggestions. I am very thankful to Dr. K. Satyanarayana Rao for help in the preparation of the paper and Shri M. Srinath for help in the statistical analysis.

MATERIAL AND METHODS

While participating in the Fishing Programme of the Chartered Taiwanese Fishing Vessel *HWA KUO No. 2*, the green turtle *Chelonia*

mydas was caught off Gujarat coast in trawl nets operated for demersal fishes on several occasions. A total of 70 green turtles *Chelonia mydas* were caught in 68 m long and 24 m wide trawl net operated at the bottom by *HWA KUO No. 2* by pair trawling off Okha and south of Diu between 20°-23°N and 68°-71°E.

RESULTS

Area of occurrence

A majority of the turtles (54% of the total catch) were captured off Okha at Lat. 23°N and Long. 68°E (Fig. 1). The turtles were netted in moderate numbers southwest of Porbandar (Lat. 21°, Long. 69° and Lat. 23°, Long. 67° off Sir Mouth) and in lesser numbers at 22°N, 68°E; 21°N, 70°E and 71°E West of Dwaraka, West of Veravel and south of Diu respectively (Table 1). One turtle with carapace length of 33 cm was found dead. It was cut open and its stomach contents were studied and given in a separate section here. The other turtles were released in the sea after noting particulars of size, sex and weight.

Depth and bottom conditions

The turtles were caught in areas ranging in depth from 42 to 280 m and they were most common in waters within the depth of 60 m. The sea bottom was muddy mixed with sand.

whereas in the females there was only one mode at 65 cm (Fig. 2). The width of carapace of males showed a range of 29.5 cm—78.2 cm and that of females the width ranged between 40 cm and 77.2 cm.

Time of capture

The turtles were captured at different times during the day and night but they were entangled

Weight of the turtles

The weight of the males ranged from 3.5 kg to 55 kg and the females ranged between

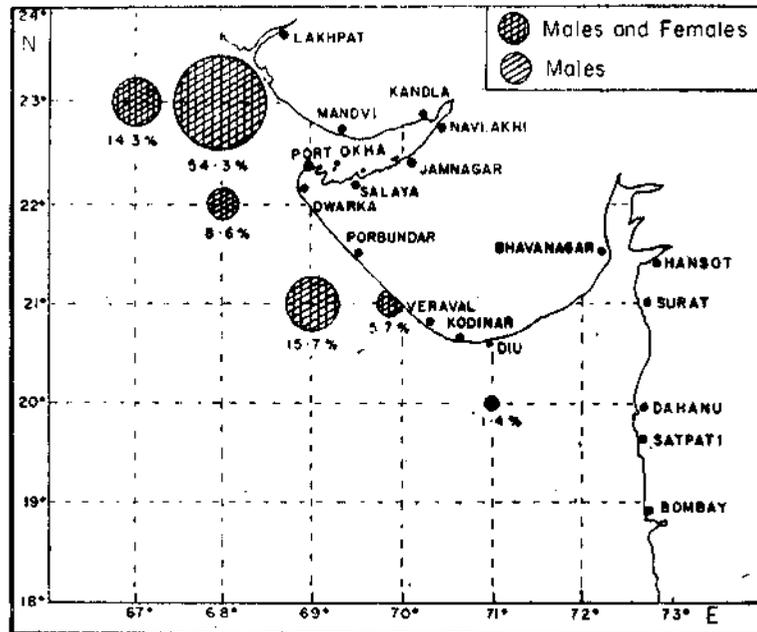


Fig. 1. Map showing the areas where the green turtle *Chelonia mydas* were caught off Gujarat Coast.

in the net in larger numbers between 0900 hours and 2100 hours (Table 2). The sea conditions were rough.

Size

The males ranged from 33 cm to 81.5 cm in carapace length and the most dominant size group was 65-75 cm carapace length. The females ranged between 41 cm and 80.5 cm in carapace length with the majority of the turtles being under the size range 65 cm—75 cm. The males showed 2 major modes, one in 65 cm and the other one in 75 cm;

6.5 kg and 51.5 kg. The dominant weight mode of both sexes was 40 kg. (Males 33% and females 31%). As in the case of size range, only one mode was observed in the weight range of females, whereas in males there were 2 dominant modes, one at 40 kg and the other at 50 kg (Fig. 3).

Sex ratio

In January-March, 1984, the female turtles were the dominant in the catches and formed 59-85% (Table 3). Only in December, 1983 males outnumbered females, but the tota

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TABLE 1. *Number of Chelonia mydas caught in different fishing areas off Gujarat Coast*

Positions	Males and females		Males		Females	
	No.	No.	(%)	No.	(%)	
20°N—71°E	..	1	1	(4.8)	—	—
21°N—69°E	..	11	6	(28.6)	5	(10.2)
21°N—70°E	..	4	3	(14.3)	1	(2.0)
22°N—68°E	..	6	2	(9.5)	4	(8.2)
23°N—67°E	..	10	1	(4.8)	9	(18.4)
23°N—68°E	..	38	8	(38.0)	30	(61.2)
Total Nos.	..	70	21		49	

TABLE 2. *Number of Chelonia mydas caught every three hours*

Hours	Males and females		Males		Females	
	No.	(%)	No.	(%)	No.	(%)
0300 +	6	8.6	1	(4.8)	5	(10.2)
0600 +	3	2.8	1	(4.8)	1	(2.1)
0900 +	20	28.6	5	(23.8)	15	(30.6)
1200 +	9	12.9	1	(4.8)	8	(16.3)
1500 +	10	14.3	4	(19.0)	6	(12.2)
1800 +	17	24.3	8	(38.0)	9	(18.4)
2100 +	2	2.8	—	—	2	(4.1)
2400 +	4	5.7	1	(4.8)	3	(6.1)
Total Nos.	70		21		49	

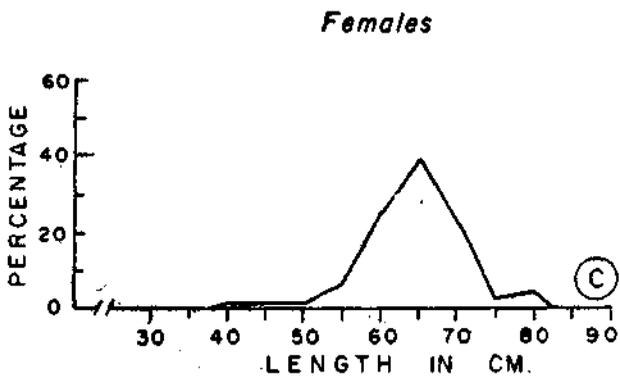
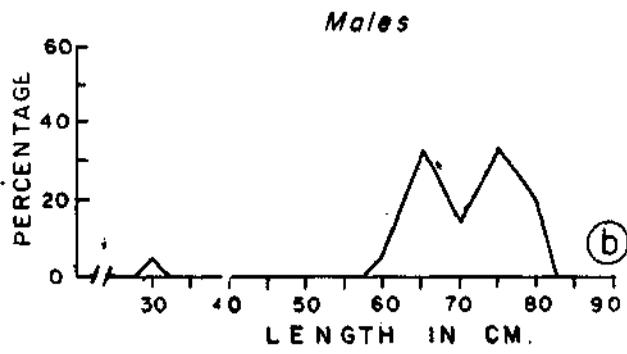
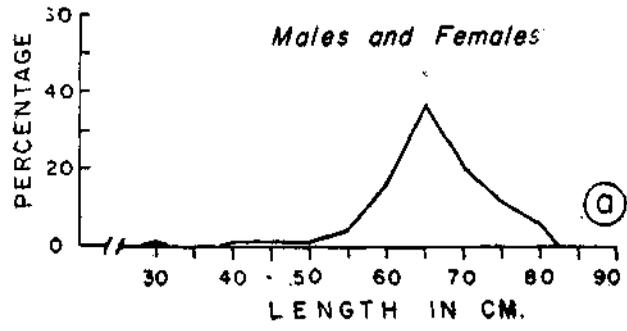


Fig. 2. Length frequency of *Chelonia mydas*—a. males and female, b. males and c. females.

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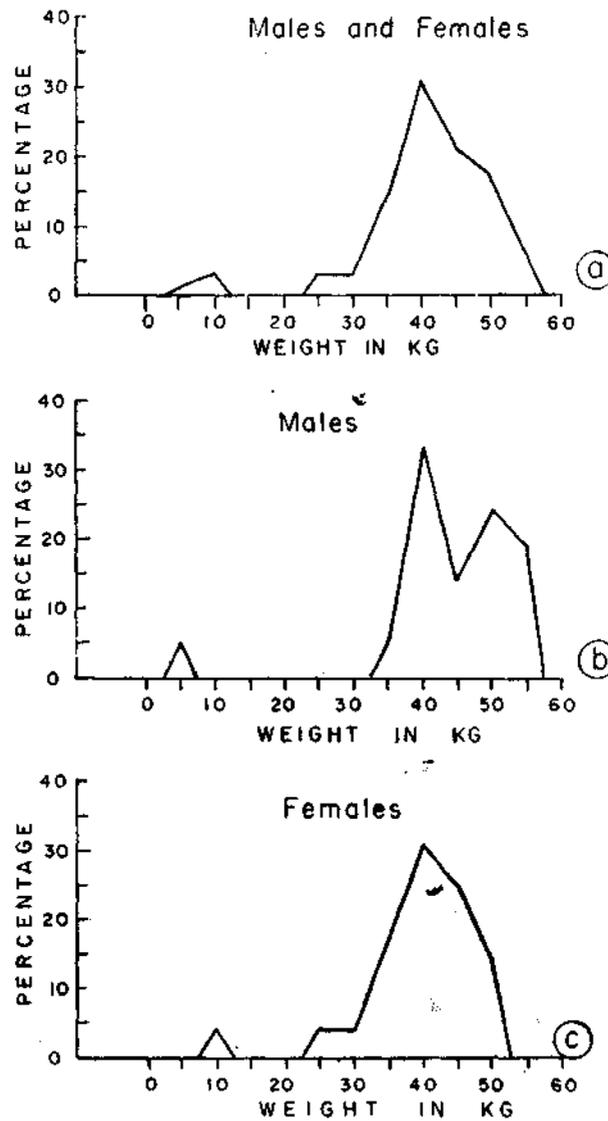


Fig. 3. Weight frequency of *Chelonia mydas*—a. males and females, b. males and c. females.

number of turtles caught in the month was very few.

Food

Seaweeds in advanced stage of digestion was the dominant item of food found in the stomach of a male turtle 33 cm in carapace length and 3.5 kg in weight. The seaweeds formed

79.3% of 66.3 ml of food in the stomach.

The rest consisted of a variety of organisms: zooplankters 11.3% fragments of molluscs 6.6%; leaves of sea grass 1.2% feathers of sea gull 0.6% and an unusual item found in the stomach was a small green coloured plastic tube with a nylon twine tied to it 8.9%. Among zooplankters, Amphipods 97 Nos.,

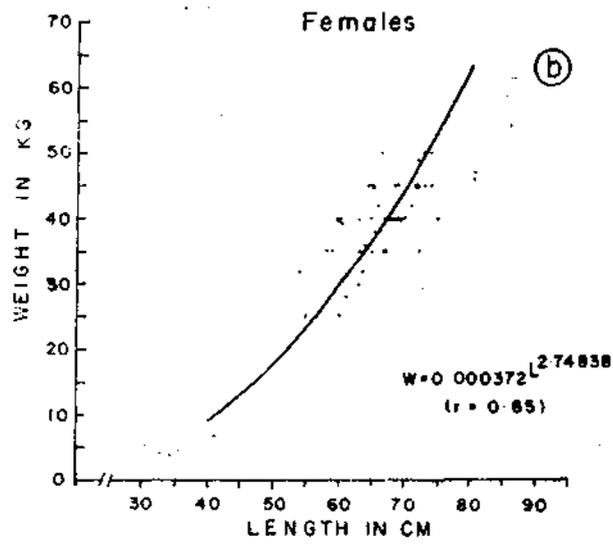
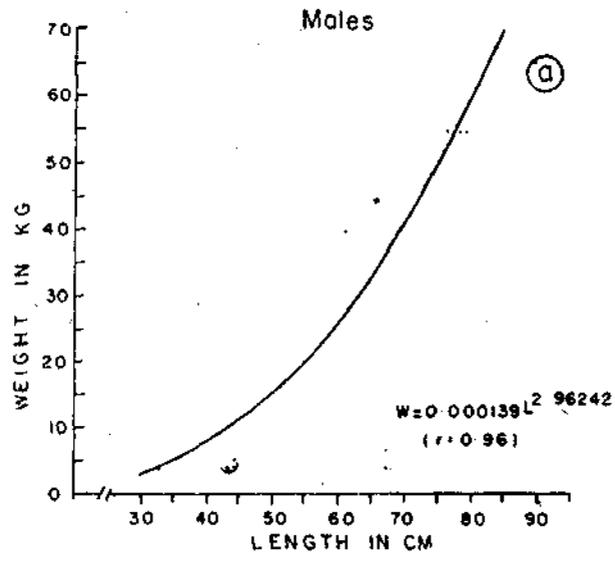


Fig. 4. Length-weight relationship of *Chelonia mydas*—a. males and b. females.

TABLE 3. Sex ratio of *Chelonia mydas* caught off Gujarat coast during December 1983—March 1984

Months	Males		Females	
	No.	%	No.	%
December, 1983	3	75.0	1	25.0
January, 1984	11	40.7	16	59.3
February, 1984	4	15.4	22	84.6
March, 1984	3	23.1	10	76.9
Total	21	30.0	49	70.0

Gastropod 8 Nos., Decapods 2 Nos., Phyllosoma 1 No. and 4 Nos. of unidentified zooplankters were found. The occurrence of these plankters might be accidental and these would have been

sexes (Fig. 5). The rate of increase in weight relation to carapace length has been found not to differ in the two sexes. The growth formula for males and females and also the combined sexes are as follows :

$$\text{In males, } W = 0.000139L^{2.96242} \\ (r = 0.96)$$

$$\text{In females, } W = 0.000372L^{2.74838} \\ (r = 0.85)$$

$$\text{Combined sexes, } W = 0.000282L^{2.80857} \\ (r = 0.90)$$

It is found that there is no significant difference among sexes with reference to length-weight relationship.

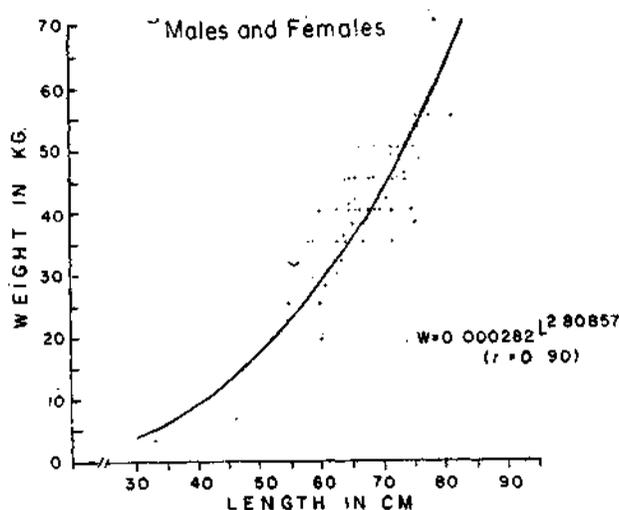


Fig. 5. Length-weight relationship of *Chelonia mydas*—both sexes combined.

consumed along with the plants to which these animals were attached.

Length-weight relationship

The carapace length-weight relationship of this species off Gujarat coast has been studied. The males, females and both the sexes are plotted and the line is fitted separately for males and females (Fig. 4) and also the combined

DISCUSSION

There is little information on the migration of turtles in Indian Seas. Records of turtle in the open sea are rather rare, although it is known that turtles occur in the coastal water in the feeding grounds or on their way for the purpose of nesting. In the present observation, *Chelonia mydas* has been recorded from the continental shelf waters and just

outside the shelf edge along the Gujarat Coast. The migration routes of these turtles are not known. Silas (1984) has reported the occurrence of *Chelonia mydas* at the edge of the continental shelf off the southwest coast of India and outside it at 11° 15'N, 74° 54'E and 11° 61'N 74° 50'E during day time around Elikalpeni Island in the months of October and November.

Chelonia mydas enjoys a wide distribution in the Indian and Pacific Oceans. In the present observations the maximum carapace length recorded is 81.5 cm. A still larger specimen 127.5 cm has been recorded by Pritchard (1979) and the largest individual with 139.7 cm was reported by the same author around Ascension Island. He has stated that in Indian Ocean the important green turtle nesting grounds are on the mainland coastal area of the Arabian Peninsula especially on the coast of South Yemen and east coast of Saudi Arabia. It is very likely that there are good nesting grounds of *Chelonia mydas* along the Gujarat coast. In the present

observation *Chelonia mydas* has been observed to swim on the surface off Okha and West of Veraval. Enquiries made at Okha showed that the green turtles are caught in trawl nets in good numbers off Okha Coast and they are secretly sent by lorries to Dwaraka. Meat of turtles obtained thus is consumed at Dwaraka and some turtles are transported to Bombay. As stated by Silas (1984), for the conservation and management of the turtle resources, intensive studies have to be carried out on the biology of the sea turtles, their breeding and nesting cycles, nesting grounds and seasons, migration to feeding and breeding areas and also the ecological factors influencing them. Steps should also be taken to prevent capture of the turtles for their meat and shells. The present observations made during commercial trawl fisheries in the 'winter' months December 1983-March 1984 along the Gujarat Coast points to the need for regular monitoring of commercial operations along the Gujarat-Maharashtra shelf waters for the occurrence of the green turtles.

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