

OBSERVATIONS ON THE BEHAVIOUR AND OTHER
BIOLOGICAL ASPECTS OF THE GANGES SUSU,
PLATANISTA GANGETICA

A.K.M. AMINUL HAQUE

Faculty of Fisheries, Bangladesh Agricultural University, Mymensingh, Bangladesh

MASAHIRO NISHIWAKI

University of the Ryukyus, Naha, Okinawa

TOSHIO KASUYA

Ocean Research Institute, University of Tokyo, Tokyo

AND

TERUO TOBAYAMA

Kamogawa Sea World, Awa-gun, Chiba

ABSTRACT

Observations on the behaviour of the Ganges susu, *Platanista gangetica* (Roxburgh, 1801), indicated that these animals frequent the confluence of a smaller stream with the main river, even with over-flooded banks, for food fishes. The most satisfactory method so far tried for capture of these animals was the use of 'jagatberh'. With a little care these could be easily transported over long distances. Though they are known to be side-swimming, the Ganges susu cruised in normal fish-like movement with the body in normal, upright position. Rate of breathing showed individual and diurnal variations, the rate being more for younger specimens, and again during day-time. One susu was seen chasing a big fish at a tremendous speed, another attacked a goose, and a third one attacked a fish caught in the hook and thereby itself got caught in a locked-jaw condition. Two others reportedly were seen in the act of mating about an hour after sunset in August 1959. Parturition in these animals appears to occur around May, with another peak possibly around December.

INTRODUCTION

Thirteen live specimens of the Ganges susu, *Platanista gangetica* (Roxburgh, 1801), collected at different times from the Brahmaputra-Jamuna-Meghna river-systems during the period from January 1970 to May 1973 were each maintained for a time in ornamental pool, civil-work ponds, and/or in portable swimming pool in the Agricultural University Campus at Mymensingh, Bangladesh. These were among a total of 44 specimens collected and studied during investigations on the

biology of the Ganges susu. Various aspects of their behaviour during captivity in these small, artificial waterbodies as well as on land and in the river were studied.

METHOD OF CAPTURE

The Ganges susu were found to avoid fast-moving boats, and seemed to be able to sense the presence of nets set in the vicinity. Various methods were tried for capture of these animals. The most satisfactory method was, however, found to be the use of a special type of seine-net, locally called 'jagatberh' used for catching bigger carps and other fishes in the river when the water-level was low. A row of such nets mounted on specially constructed rafts is placed across the river at two points each usually several kilometers apart. Dolphins are found to frequent the confluence of a smaller stream with the main river evidently for food-fishes (Kasuya and Aminul Haque, 1972). This was true even with over-flooded bank of the river. If the two components of the jagatberh were placed in the river enclosing such confluences, chances are that several specimens of dolphin would be rounded up towards the end of the jagatberh operation. Care has to be taken to remove the dolphins from the net as quickly as possible, as otherwise the dolphins may get entangled in the net, and get drowned.

Harpooning may be possible at the confluence of two streams frequented by dolphins, but this was not tried.

HANDLING

On land the dolphins were relatively calm, showing not much of visible distress. When picked up, they would struggle, within manageable limits, trying to wriggle out of hands. An interesting thing noted in a number of cases was that supported on one hand placed just below the throat-region, the dolphins became calm and still, stopping all strugglings. This was most pronounced in a calf about three weeks old (No. 33, 76 cm, ♀) that had been held in the swimming pool for 30 days since 8 June 1970.

一般財団法人 日本鯨類研究所
THE INSTITUTE OF JAPANESE WHALE RESEARCH
TRANSPORTATION

Transportation on land from the place of capture to Mymensingh was easily done on a stretcher by two men, or on the lap by one man—longer distances being covered by rickshaws or trains with the animal left on the footboard or on the floor of the train compartment, as the case may be. The animal was loosely wrapped up with a length of rug leaving the blow-hole uncovered, the rug being kept wet by occasional sprinkling of water so as to keep the skin moist and cool. When released in artificial waterbodies, like ponds, the animals recovered in no time, without any apparent ill-effects. The breathing rate stabilised slowly from little under 500 times per hour on land to about 65 times per hour in water.

For really long distances covering several thousand kilometers (Mymensingh-Dacca, 200 km by truck; Dacca-Bangkok-Manila-Tokyo, 5,000 km by plane; and in some cases, Tokyo-Kamogawa, 100 km by truck again) the animals, duly wrapped up with wet rug, were placed in wooden crates of suitable size lined with polyethylene sheets and with 7–10 cm of water added. The animals stood the long journeys, in some cases, of about 21 continuous hours, surprisingly well, and recovered from the shock of the unusual journey fairly quickly.

SWIMMING

In confined, shallow waters—for example, in ornamental pool ($865 \times 360 \times 45$ cm deep, with a fountain-base, 65×65 cm, in the middle), small pond ($960 \times 725 \times 80$ cm deep), or swimming pool (450 cm dia. \times 105 cm deep)—the dolphins swam on one side nodding the head continuously in ‘yes’ motion. One remarkable thing noted is that, of the thirteen specimens observed in shallow waters, all except one swam in anti-clockwise direction, that is, on the right side, while only one swam in clockwise direction or on the left side. This ‘right- or ‘left-handedness’ may well be controlled genetically, so that occasional individuals with left side-swimming may not be unexpected.

The Indus susu, *P. minor* Owen, 1853, has also been reported to be a side-swimming cetacean with individuals moving either clockwise or anti-clockwise (Herald *et al.*, 1969). We are, however, inclined to believe that side-swimming in the Ganges susu is only one aspect of its swimming behaviour under specific environmental conditions—like small, confined area and depth of the waterbody. Further, contrary to popular explanation for side-swimming, this may not have anything to do with food-seeking or food-catching.

On one occasion, as described elsewhere in this paper (*vide infra*), a specimen of the Ganges susu was seen chasing a big fish in the river at a tremendous speed. This was a normal, fish-like swimming movement, with the body in normal, upright position.

TERRITORY FORMING

Ganges susu are non-gregarious creatures (Kasuya and Aminul Haque, 1972), although occasional two—most probably mother and calf as suggested by size-difference—have been seen swimming up or down the river.

Two specimens (No. 31, 138 cm, ♀; and No. 32, 123 cm, ♂) maintained in a pond during the period from 17 May to 21 August 1970, established themselves in two mutually exclusive areas in the pond, never crossing—as far as could be ascertained from their surfacings—into each other’s territory. Also, they were observed never fighting with, or chasing, each other in the pond. These observations were true of two other specimens (No. 22, 188 cm, ♂; No. 24, 166 cm, ♂) similarly maintained in another pond.

BREATHING RATE

The 'blowing' of the Ganges susu is a composite act—exhalation, quickly followed by inhalation—both done so quickly within a fraction of a second that the two sounds appear to be of one single action. It is interesting to note, however, that on one occasion on 15 May 1973 a specimen (No. 38, 91 cm, ♂) placed on a table in the Laboratory was found to have missed inhalation in one blowing, which was followed after only two seconds by another blowing, this time only inhalation taking place, so that for all practical purposes there were two separate blowings for exhalation and inhalation with a two-second interval between the two.

There were individual and diurnal variations in the rates of breathing of these animals. Record of breathing as kept for different specimens maintained in artificial waterbodies as well as on land has been summarised in Table 1 below. It may be noted from the Table that the minimum breathing rates for any individuals

TABLE 1. RATES OF BREATHING OF SEVEN SPECIMENS OF *PLATANISTA GANGETICA* UNDER DIFFERENT CONDITIONS

(Unless otherwise stated, breathing rate was recorded for 60 continuous minutes each time within the hours mentioned.)

Specimen No.	Sex	Size (cm)	Date	Rate of breathing per hour							
				On land				In water			
				0600 to 1000 hrs.	1200 to 1600 hrs.	1900 to 1830 hrs.	0600 to 1000 hrs.	1200 to 1600 hrs.	1700 to 1830 hrs.	0000 to 0100 hrs.	
22	♂	188	27-4-'70	—	—	—	53	52	58	—	
			8-5-'70	—	—	—	43	42	—	—	
24	♂	166	8-5-'70	—	—	—	58	54	—	—	
31	♀	138	15-5-'70	—	—	—	121/2 ^{a)}	129/2 ^{a)}	—	—	
			16-5-'70	—	—	—	127/2 ^{a)}	—	—	—	
			17-5-'70	—	492 ^{b)}	348 ^{b)}	—	—	—	—	
			26-5-'70	—	—	—	—	64	—	—	
			21-8-'70	—	—	—	40	—	—	—	
32	♂	123	15-5-'70	—	—	—	121/2 ^{a)}	129/2 ^{a)}	—	—	
			16-5-'70	—	—	—	127/2 ^{a)}	—	—	—	
			17-5-'70	—	444 ^{b)}	204 ^{b)}	—	—	—	—	
			26-5-'70	—	—	—	—	67	—	—	
			21-8-'70	—	—	—	88	—	—	—	
33	♀	76	9/10-6-'70	—	—	—	—	—	—	106 ^{c)}	
			24-6-'70	—	—	—	88	68	—	40	
36	♀	130.5	30-9-'70	—	—	—	96	92	—	58	
38	♂	91.0	15-5-'73	156 ^{d)}	—	—	—	—	—	—	

^{a)} Combined data for two specimens (Nos. 31 & 32.)

^{b)} Breathing recorded for 15 minutes (and multiplied by 4) while being transported in a railway compartment.

^{c)} Breathing recorded one day after capture.

^{d)} Breathing recorded for 10 minutes (and multiplied by 6) in the laboratory half an hour after arrival by road.

were recorded for two specimens (Nos. 33 and 36) at nights, and the same could indicate their hours of sleeping. Two other specimens (Nos. 31 and 32) also recorded low breathing rates (on 21 August 1970) when they had in fact become very much emaciated due apparently to starvation. One of these latter two specimens (No. 31) died some 10 hours after the minimum breathing rate of 40 per hour had been recorded, and the other specimen was sacrificed the next day.

During transportation, the breathing rate of these animals was, for obvious reasons, significantly higher than under acclimatised state in water.

FEEDING HABITS

(a) *Acceptance or rejection of food:* While specimens of the Ganges susu readily accepted food (small fishes) from the handler in the ornamental pool and in the oceanarium, those kept in the pond did not accept food offered to them, nor did they seem to take any food from the pond which had previously been stocked with an assortment of fishes of various sizes. Specimens left in ponds seemed to have slowly starved to death as the general emaciated state of health and post-mortem examination of the stomach would indicate.

(b) *Attack on a goose:* Specimen No. 22, while in a pond, once bit the neck of a domestic goose, *Anser cygnopsis cygnoides*, while the latter was, in its characteristic manner, probing the pond-bottom for food. The dolphin, however, loosened its grip and the goose managed to come out of the water. The injured goose was then slaughtered, and on examination the neck and part of head were found to have rows of tooth-marks on both the sides, establishing that the goose had really been bitten by the dolphin (Plate I, Fig. 1).

(c) *Dolphin caught in a hook:* An unusual case of a dolphin getting caught in a hook was brought to light on 28 September 1970. On the preceding night two anglers had placed a series of hooks each hanging from a bamboo rod, and fixed near the bank of the river. There were live baits (small fish or frog) hooked to the line, the hooks just touching the surface of water. This was a common local method of catching such predatory fishes as freshwater shark (*Wallago attu*, a kind of Teleostomi), featherback (*Notopterus chitala*) and snakeheads (*Channa striatus* and *C. marulius*).

At about 0200 hours, local time, the anglers were attracted by violent splashing sounds from the direction of one of the hooks. They took this to be caused by an extra-large freshwater shark, and hauled it up with a push-net. They were, however, shocked to see a Ganges susu instead, and decided to present the curious specimen to the Faculty of Fisheries across the river. When the specimen was brought to us early in the morning, we were bewildered to understand the circumstances under which the dolphin got caught in the hook. As stated above, the hook had a live bait of a frog or small fish, which lured to the hook a 36 cm freshwater shark, which, in its turn, attracted the dolphin. On examination the hook at the end of a length of string, was found deep into the oesophagus of the fish, which, in its turn got caught in the jaws of the mammal, the hook nowhere

even touching the jaws of the latter. Apparently, the dolphin found itself in a 'locked-jaw' condition, in which condition it was still fixed to the fish in the latter's abdomen and tail region that bore on the dorsal side distinct tooth-marks of the dolphin (Plate I, Figs. 2-4). The 130.5 cm dolphin (No. 36) was still alive, and after being maintained for 9 days in a swimming pool, was transferred to Kamogawa Sea World in Japan to start a new life in the oceanarium there.

CHASING A BIG FISH

On 17 October 1969, when the river old Brahmaputra was in half spate, a big (approximately 45 cm) carp, *Labeo rohita*, was seen being chased by a Ganges susu close to the surface of the water, to almost where one of the present authors with several friends had been standing near the edge of the water. Both the fish and the mammal were cruising at tremendous speeds, the latter continuing to chase the former to some 10 meters beyond the amazed on-lookers after which they both swam deeper down in water beyond sight.

MATING

Judging by the date of capture of very young, untoothed and teething calves, it appears safe to say that parturition in the Ganges susu in the river-system in Bangladesh takes place around May. According to Anderson (1878) parturition in

TABLE 2. PARTICULARS OF 13 YOUNG SPECIMENS OF GANGES SUSU,
PLATANISTA GANGETICA, ALL LESS THAN 120 CM IN LENGTH

Specimen No. at BAU	Specimen No. at ORI	Sex	Size (cm)	Date of collection or capture	River*	Remarks
—	14	♀	27	28- 8-67	M	Foetus
33	21	♀	67.4	8- 6-70	B	Hair follicles very prominent;
			76	8- 7-70**		Teeth not erupted
38	—	♂	91	15- 5-73	B	Hair follicles prominent;
						Only 10 or 11 teeth on each side of the jaws erupted;
						Curdy substance found in mouth
3	2	♂	100.5	?- 6-69	B	
2	1	♂	105	?- 6-69	B	
7	5	♀	110	20-10-69	B	
11	7	♂	113	6- 1-70	B	
15	11	♀	113	26- 1-70	J	
4	3	♂	115	23- 8-69	B	
16	13	♂	115	26- 1-70	J	
9	6	♂	117	20-12-69	B	
17	15	♀	118	26- 1-70	J	
—	KS-76-5	♂	118	13- 9-76	B	

* River-names: M—Meghna; B—Brahmaputra; J—Jamuna

** Date of taking second measurement.

the Ganges susu may occur in two seasons—between April and July, and November and December. Harrison (1972), however, believes that parturition in this animal probably occurs in April, and he gives the length of neonates as 70–75 cm. From details of 13 young specimens, all measuring less than 120 cm (Table 2), it may reasonably be concluded that parturition in the Ganges susu takes place around May. Whether a second season for parturition exists for this animal cannot be confirmed from available data. The capture of 5 of the 13 specimens listed in the Table, all belonging to the same size-group (113–118 cm), in December-January, indicates that these were all born about the same time of the year. Since the age of these individuals was estimated with dentinal growth layers as 1.0 year (Kasuya 1972), it seems possible to expect another parturition peak around December.

There is no reliable information to estimate the period of gestation in the Ganges susu. Assuming that the period of gestation in these animals is 9 months (Anderson, *op. cit.*), mating would appear to take place around July/August. The collection of a 27 cm foetus on 28 August 1967 at Chandpur (R. Meghna) would lend support to this assumption.*

One first-hand report from a Professor, an M.A. in Bengali language, and having no biological background, describes an incident involving two dolphins (Prof. M.A. Nawaz, BAU; pers. comm.). It was about an hour after sunset on 14 August 1959. The gentleman, while crossing the river Burhiganga at Dacca on board a small country-boat, was alarmed at violent splashings in the water of two huge struggling creatures, locked in embrace, and rolling and almost shooting out of water. Both the Professor and the boatman watched in horror this 'struggle' that was apparently an act of mating of two dolphins. The boatman was, however, categorical that it was actually so.

ACKNOWLEDGMENT

The authors wish to thank the authorities at the Bangladesh Agricultural University, Mymensingh, Bangladesh, at the Ocean Research Institute, University of Tokyo, Japan, and at the Kamogawa Sea World, Chiba, Japan, for the generous help and co-operation received at different times during the period of study reported in the present paper.

THE INSTITUTE OF CETACEAN RESEARCH

* Since the paper was sent to the press, a second foetus, 30 cm, has been collected on 13 October 1977 from the river Meghna.

REFERENCES

- ANDERSON, J., 1878. *Anatomical and zoological researches: comprising an account of the zoological result of the two expeditions to Western Yunnan in 1868 and 1875, and a monograph of the two cetacean genera Platanista and Orcella*, vol. 1. B. Quaritch, London, 564 p.
- HARRISON, R. J., 1972. Reproduction and reproductive organs in *Platanista indi* and *Platanista gangetica*. In : *Investigations on Cetacea* Vol. IV, ed. G. Pilleri, 71-82, Berne.
- HERALD, E. S., R. L. BROWNELL, JR., F. L. FRYE, E. J. MORRIS, W. E. EVANS, and A. B. SCOTT, 1969. Blind river dolphin: First side-swimming cetacean. *Science*, 166 : 1408:1410.
- KASUYA, T., 1972. Some information on the growth of the Ganges dolphin with a comment on the Indus dolphin. *Sci. Rep. Whales Res. Inst.*, 24 : 87-108.
- KASUYA, T., and A.K.M. AMINUL HAQUE, 1972. Some information on distribution and seasonal movement of the Ganges dolphin. *Sci. Rep. Whales Res. Inst.*, 24 : 109-115.

EXPLANATION OF PLATE

PLATE I

Fig. 1. Head of a goose with rows of tooth-marks of a Ganges susu.

Figs. 2-4. Specimen of a freshwater shark (*Wallago attu*) with tooth-marks of a Ganges susu on its body.

一般財団法人 日本鯨類研究所
THE INSTITUTE OF CETACEAN RESEARCH

