

## Note

# Captive breeding and rearing of grey bamboo shark, *Chiloscyllium griseum* (Muller & Henle, 1839)

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## ABSTRACT

Grey bamboo shark, *Chiloscyllium griseum* was studied for maturity, development of egg case and hatching under captive condition. The live sharks were fed with a diet of chopped sardines. The female shark laid 27 egg cases over a period of 3 months. The egg cases were mostly released in pairs. They were almost oval in shape and equal in size. The time taken for successive release of egg cases ranged from 2 to 9 days. Duration of development of young ones inside the egg cases varied between 67-85 days. Sixty percent of the egg cases hatched. Male: Female ratio of the juvenile shark was 1:0.9. The mean length and weight of the shark at birth were 112mm and 5.0g respectively. The average monthly growth rate observed for the initial 60 days of rearing period was 25.0mm/8.35g.

Hemiscylliids are a group of oviparous sharks represented by two genera *Chiloscyllium* and *Hemiscyllium* (Compagno, 1984) and often caught in nets operated in the inshore waters. Out of the six species recorded from the western Indian Ocean, *Chiloscyllium indicum* and *C. griseum* are from Indian waters (Fisher and Bianchi, 1984). They grow up to a maximum length of 750mm. Iyer and Nalini (1938) have described the reproductive system and development of egg case of these sharks collected from the commercial catches of Madras coast and maintained live in laboratory. Nalini (1940) has studied in detail the structure and function of nidamental glands. The reproductive system and egg case structure have been reported by Setna and Sarangdhar (1948) in Bombay waters.

Devadoss (1988) has given description of *C. griseum* along with its biology. The following account deals with the collection and maintenance of adult sharks, egg case release, development, release of juvenile shark and their initial growth and survival under captive condition.

Live sharks caught in a Kannika valai (a type of gill net) operated in Gulf of Mannar side of Mandapam were collected on 3rd September 2001 and transported to the Marine Aquarium of the Regional Centre and maintained in 5.0-ton RCC cement tanks. A female and two males (size/weight -530/800; 570/950 and 600 mm/750g) were maintained throughout the observation period. Water quality was maintained by water exchange and aeration. The water quality of the

rearing tank was as follows: water temperature from 26.5 to 28.5 C, Salinity from 30.0 to 34.5ppt and pH from 7.9 to 8.4. At the time of capture and stocking, the belly of the female shark was flat and physical examination did not show any sign of developed ovary and was not brooding. Bottom of the tank had few boulders and dead corals as substratum. The sharks were maintained on a daily diet of freshly chopped sardine fish. Few egg cases were cut open to understand the state of development of embryo at the time of release. Egg cases collected from different time of release were tagged batch wise and maintained in separate FRP tank with filtered seawater and aeration. The egg cases were observed periodically for the growth of embryo and decayed egg cases removed. Release of egg cases was observed daily and the period taken for each release and the size of egg case were recorded. Newly released young sharks were collected, measured and maintained separately in FRP tanks and fed with crushed fish meat for studying the initial juvenile growth and survival.

Chiloscyllids are oviparous sharks. Few female sharks ranging from 490 to 600 mm were cut open and the anatomy of the reproductive organs, egg development and egg case formations studied. It was observed that in all cases only the right ovary was functional in full state of development with wide ranging sized eggs (2 to 20 mm diameter.) as clusters and also a pair of egg cases placed opposite in the uteri suggesting a continuous spawning habit. (Fig.1) The functional ovaries from different sharks observed varied in lengths ranging from 117-121mm. The nidamental glands were well developed. The ovary had a common oviducal opening through which the egg case release is facilitated.

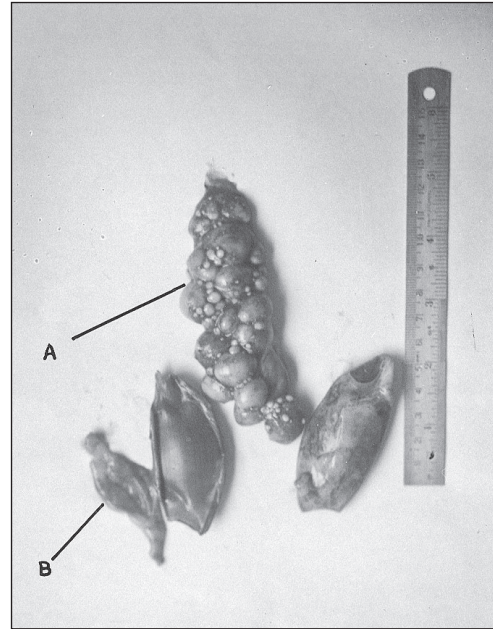


Fig.1 A. Ovary with various sized eggs  
B. Uterus cut open to show egg case

Egg laying was observed after a period of 119 days of maintenance. The brooding female shark started releasing individual egg cases. Examination of the female's belly revealed that few more egg cases were still inside. The egg cases were dark brown in colour and oval shaped ranging from 68-72mm in length and 48-52mm in width and 17-18mm in thickness. Two egg cases were released together and the duration between successive releases ranged from 2 to 9 with an average of 6 days. In the last instance only one egg case was laid. The egg case release continued till 25.03.2002 (ie. 84 days after the first release) and a total of 27 egg cases were released. The egg cases showed physical similarity at the time of release.

The egg case (length 67mm, breadth 48mm and 16mm thick) from the uteri prior to release was cut open, examined and it contained jelly like mass inside. No trace of embryonic development could be found except a pale dot like blasto-

derm.

The just released egg case had a developing pale white embryo and a yellow coloured spherical yolk sac. The embryo was attached with the yolk sac through a fine duct through which nutrient transfer takes place. The yolk sac measured 31 mm in diameter when the embryo measured a length of 25mm. The embryo was active and was twitching continuously. The embryo had both first and second dorsal fins and pectoral fin. Gill opening was also seen (Fig.2).

Regular monitoring of the egg cases under rearing in the FRP tank was continued. The release of juvenile sharks from various batches of egg cases occurred at intervals ranging from 67-85 days and the mean incubation period inside the egg case was 74 days (Table.1). The length at birth ranged from 107 to 118 mm and the weight from 4.5 to 5.5g. The juvenile sharks were light yellow in

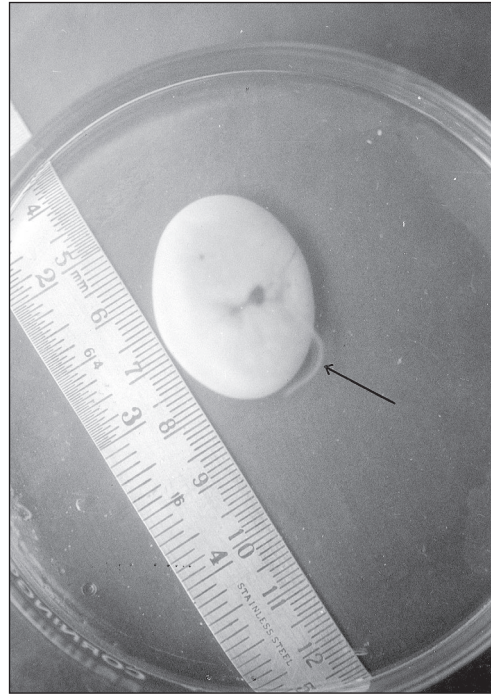


Fig. 2. Embryo from a just released egg case

TABLE 1: Details of egg case rearing and release of juvenile shark

Batch No.	Date egg case release	Number of egg case	Date of release of juvenile	Length of juvenile (mm)	Duration for development (days)	Remarks
1	31.12.01	2	17.03.02	111	75	1 hatched
2	08.01.02	2	-	-	-	2 decayed
3	11.01.02	2	06.04.02	107	85	1 hatched
4	19.01.02	2	01/07.04.02	108/115	75/81	2 hatched
5	25.01.02	2	06.04.02	110	72	1 hatched
6	31.01.02	2	12.04.02	114-116	72	2 hatched
7	07.02.02	2	16/17/04.02	113-118	68/69	2 hatched
8	13.02.02	2	01.05.02	112	76	1 hatched
9	18.02.02	2	26.04.02.	109-118	67	2 hatched
10	24.01.02	2	04.05.02	108-110	69	2 hatched
11	07.03.02	2	-	-	-	2 decayed
12	17.03.02	2	31.05.02-	110	75	1 hatched
13	25.03.02	1	-	-	-	1 decayed
Total/Ave. length & days		25		112	74	15

colour with 10 distinct brown bands over its body. They had well developed fins and were actively swimming at the bottom of the tanks. Out of the 25 egg cases maintained live to study the incubation, only 15 embryos (60%) developed into juvenile sharks (8 male + 7 female). The rest of the egg cases decayed at various stages of development. Of the 15 live sharks released, three juvenile sharks got entangled into the fibrous outgrowth of the egg case and died in the process of hatching out. The remaining 12 live juvenile sharks were monitored for their growth and survival.

The juvenile sharks were monitored for growth (60 days) in well-aerated FRP tank fed with finely chopped fish meat. The juvenile sharks accepted the feed and remained healthy. During the period they had grown from an initial length/weight of 112mm/. 5.0g to 162 mm/21.7 g. The pattern of growth of juveniles was observed to be slow up to 30th day registering an average growth rate of 0.5mm/day and for the next 30 days it was doubled to 1.1mm/day. The mean monthly growth rate was worked out to be 25.0mm/8.35g.

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### **References**

- Aiyar, R.G. and K.P. Nalini 1938. Observations on the reproductive system, egg cases, embryos and breeding habits of *Chiloscyllium griseum*. *Proc. Indian Acad. Sci. (B)*, VII, p 252-269.
- Compagno, L.J.V 1984. *FAO species catalogue. Vol.4. Sharks of the world. Part I.* 249 pp
- Devadoss, P. 1988. Studies on the cat shark, *C. griseum* (M & H) from Indian waters. *J. mar. biol. Ass. India*, **28** (1&2) : 192-198
- Fisher, W and G. Bianchi 1984. *FAO species identification sheets for fishery purposes. Western Indian Ocean. Vol. V*
- Nalini, K.P. 1940. Structure and function of the nidamental gland of *Chiloscyllium griseum* (M&H). *Proc. Indian Acad. Sci.*, **12** : 189-214.
- Setna, S.B and P.N. Sarangdhar 1948. Observations on the development of *Chiloscyllium griseum* (M & H), *Pristis cuspidatus* (Lath) and *Rhynchobatus djiddensis* (Forsk). *Rec. Indian Mus. Vol XLVI*, p 1-24.