

## **Growth and reproduction of tropical seahorse *Hippocampus kuda* in captivity**

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### **ABSTRACT**

An attempt was made to maintain a brood stock of seahorse, spawn them under controlled conditions and rear the young ones to maturity. The spawning yielded about 300 baby seahorses with a mean length of 9.0mm. The young ones reared under controlled condition using copepods and rotifers as feed showed steady increase in the body length and weight. Over a period of 176 days they had grown to a size of 78.0 mm in length and 1.6 g in weight. The size at first maturity of male was estimated as 65mm. The number of babies released at first spawning was found to be 60-70. Development of pouch and their size does not seem to have any relevance to the possible mating and impregnation in the males but is dependent only on the subsequent pairing of seahorse. A description of the developing embryo obtained from 70mm sized seahorse is detailed.

### **Introduction**

Information on the biology, captive spawning, growth and reproduction of tropical syngnathid fishes from Indian waters is very scanty. Of late the scale of exploitation of various seahorse species for medicinal and aphrodisiac purposes is on an increasing trend worldwide. Since these fishes have sparse distribution, highly structured population, mate fidelity, low fecundity, lengthy parental care and restricted mating behaviour they are more vulnerable to overexploitation (Amanda Vincent, 1995a). Hence, any information on its biology, larval rearing and controlled reproduction assumes greater importance. Captive spawning and larval rearing has already

been reported (Anil *et al.*, 1999 and Boby Ignatius *et al.*, 2000). Encouraged by the success achieved in rearing of baby seahorse, an attempt was made to rear the young ones to maturity, mating and spawning to complete the cycle under captive condition.

### **Materials and methods**

#### ***Parent stock***

Twenty-five adult seahorses (*Hippocampus kuda*) were collected from the inshore waters of Gulf of Mannar and stocked in a glass aquarium (8'x2'x2') fitted with inbuilt recirculation system. From the young ones produced, 150 babies of mean size of 9mm were separated and used for the present study.

### **Culture system**

A 10 ton circular FRP tank filled with raw seawater was allowed to get conditioned and develop natural fauna and flora. After some time, the sides and bottom of the tanks had developed thick film of algal mat. Within the inter spaces of the algal mat a variety of phytoplankton, zooplankton, gammarids and small worms were developed. The tank was provided with appropriate partial covering to curtail the direct sunlight. Within the rearing tank necessary substrata were provided for the seahorse to cling with their prehensile tail. The sea horse babies were released into this prepared tank. Extreme care was taken to avoid exposure to bright sunlight and physical injury, while transferring. They were reared with a diet of copepods and rotifers cultured *in situ* (Boby Ignatius *et al.*, 2000). The health of the juveniles was checked and if needed treated with antibiotics for bacterial/fungal diseases.

Regular measurements on the length and weight were taken apart from making specific observations on the development of brood pouch and monitoring water parameters. In the current experiment, the first appearance of the brood pouch was considered as the time of first maturity in males since the pouch is meant for receiving the matured eggs from the females. These brood pouches are nothing but modified pelvic fins. The pouch category of the juveniles was classified into 'small' (< 10mm), 'medium' (10-15mm) and 'large' (15-20mm) depending upon the length and nature of the brood pouch.

### **Results**

Water temperature in the tank ranged from 26.0 ° to 29.0 °C, salinity 30 to 34.0 ppt, pH 8.0 to 8.6 and dissolved oxygen 4.4 to 5.1 ml/l. The parameters

were observed to be in the normal range throughout the rearing.

The adult seahorses measuring 9.0 to 10.5 cm weighed 2.9 to 3.2 g. The conditions of the brood pouch showed different stages and varied from slightly developing state to fully gorged. A couple of days after transferring, one seahorse spawned and released 300 babies. The initial mean size/weight was 9.0mm/100mg and the babies resembled the adult. The body was pale yellow to light dark actively swimming in the water column.

Regular monthly sampling revealed the normal growth of juveniles attaining a size of 9.0 to 25.5mm, 40.5mm, 52.5mm and 63.0mm at the end of 1 - 4 months respectively and 69.1mm by 138th and 78.0 mm by 176th day of rearing. The average growth was 11.8.mm/month (Fig.1). The weight gain of the juveniles was also found to be steady and linear. They gained from an initial weight of 100 mg to 1.6g within 176 days registering a mean weight increase of 256mg/month. At this stage, the male to female ratio was found to be 1.0:0.9. The juvenile mortality was observed in the early period of rearing and could not be monitored regularly as the rearing container was too big to collect the dead seahorse babies in each sampling. Out of the 150 babies maintained for rearing experiments, 70 survived (46.7%) at the end of 176 days of rearing.

Seahorses exhibit marital bonds and the reproductive behaviour in this group is peculiar. Males brood the eggs transferred by the females into their brood pouch by oxygenating, osmoregulating and nourishing through a lengthy pregnancy (Amanda Vincent, 1995b). In order to ascertain the mating and deposition of eggs in the pouch, few juveniles in these different categories were sacri-

TABLE 1. Details of pouch size and developmental stages

Serial No.	Size/weight (mm/g)	Pouch size (mm) (length/width)	Condition of the pouch
1	60.0/1.5	0.8/0.3	No development/egg deposition
2	69.0/1.5	1.5/0.8	“”
3	67.0/1.5	1.5/0.8	“”
4	75.0/1.9	1.5/0.8	“”
5	70.0/1.7	1.6/0.8	63 developing embryos (5.95mm)

ficed to examine the condition of development on 176th day (Table 1). The size of the juveniles varied from 60-75 mm/ 1.5-1.9g. Of the 5 specimens cut open, only one measuring 70mm/1.7g with 'large' brood pouch category was found to have developing embryos. The rest had empty brood pouch and showed no sign of mating and egg deposition. The remaining juveniles were allowed to grow without further sacrifice since the number was less.

the body. Dorsal fin had developed and measured 0.71mm in length and 0.32 mm in width. A fully developed and yellow coloured round yolk sac measuring 1.75 mm dia was seen with each embryo. The functional heart and blood circulation was very clear and with each pumping of heart the blood was found to flow through the yolk sac and back to the embryo. The embryos showed no sign of mouth opening at this stage and when transferred to a watch glass with seawater, exhibited twitching of tail.

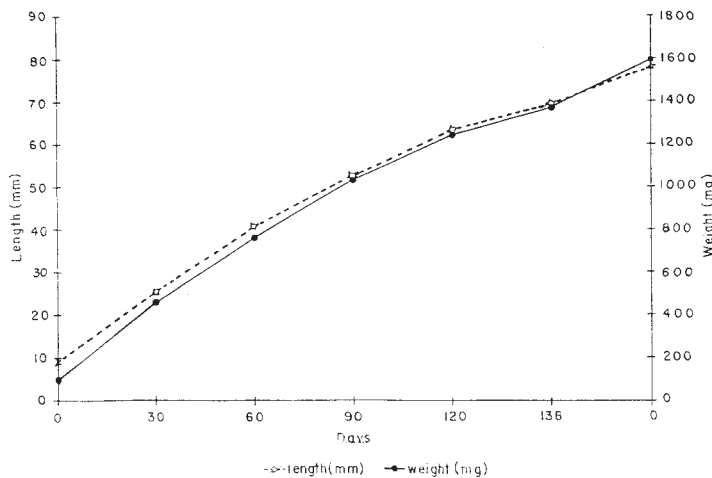


Fig. 1. Growth of seahorse under captive condition

The developing embryos were having a mean total length of 5.95 mm. The head length was 1.13 mm and showed well-developed prominent eyes (0.44mm dia.). The body of the developing embryo was pale yellow in colour and more transparent. Pigmentation was found all over

ance was at a size of 63 mm and 138 days of age. The number of baby seahorse released (fecundity) at first pregnancy was around 60-70 and as the seahorse grew in age and size, the fecundity was found to increase. The development of pouch in the male can be taken only as a sign of

**Discussion**

The observation is unique and first of its kind in India. The above finding confirms the possibility of growing baby seahorses through its maturity, spawning and production of first generation of young ones under controlled conditions. The growth of seahorse babies under laboratory condition was encouraging. The first brood pouch appear-

maturity and does not warrant any impregnation immediately as evidenced by the observation. It can be assumed that the size of animal (male) and brood pouch has no relevance to possible mating and state of pregnancy. It is concluded that the pouch develops at a particular size/age and the possible impregnation happens only when the female matures and finds its pair. Due to the lack of information on the female reproductive biology, mating and deposition of eggs, it was not possible to estimate the gestation period in this experiment. However, Amanda Vincent, (1994) observed that mating occurs on the third morning of courtship in unfamiliar pairs, pregnancy lasts for 13-14 days at laboratory temperatures and remating can occur within hours of parturition.

The results explores the possibility of developing a package for large scale culture of seahorse babies under captive condition.

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