

**BREEDING AND SEED PRODUCTION OF GREEN BACK MULLET,  
*CHELON SUBVIRIDIS* (VAL. 1836)**

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Green back mullet, *Chelon subviridis* (Val. 1836), earlier known as *Liza subviridis* is a brackishwater mugilid fish with a tropical Indo-pacific distribution. It is a euryhaline and eurythermal fish. This fish is locally known as Parse or Bata and commonly available in shallow coastal waters, estuaries and mangrove swamps of Bangladesh. The quality of flesh, high economic value and wide temperature and salinity tolerance capacity make this species popular for aquaculture in the intertidal ponds (Nlewadin and Deekae 1997). This fish is traditionally cultured with shrimp in the coastal impoundments (locally called *ghers*) of Bangladesh. At present, the farmers depend upon the wild seed for stocking to their *ghers*. Due to indiscriminate harvest from natural habitat and some environmental reasons, the abundance of this fish in nature is decreasing day by day. There is no alternate of supply of seed from artificial sources to conserve the natural biodiversity and increase production of this fish. This fish migrate to the sea during breeding period and again back towards coastal water where they pass their whole young life until the spawning period. Preliminary study on the breeding of *Liza subviridis* was conducted by Das (1992) in the south-west region of Bangladesh. After that, attempt was undertaken by no sector for developing breeding and seed production technology of this commercially important fish. Hsu *et al.* (2007) reported that mullets are winter breeder and the suitable breeding temperature is 20-23°C. Age, growth, length-weight relationship, sex ratio, stages of maturity and fecundity of the greenback mullet were studied by Al-Daham and Wahab (1991) and Rahman *et al.* (2013). Studies on the biology emphasizing length weight relationship, fecundity, reproductive characteristics and spawning of some other mullet species were conducted by Ergene (2000), Rheman *et al.* (2002) and Cherif *et al.* (2007). Realizing the importance of artificial production of fry of *Chelon subviridis*, attempt has been made to develop breeding and seed production technology of the species. The present communication describes the findings of the same.

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The study was conducted in February 2014. For breeding, matured male and females of *Chelon subviridis* were collected from on-station brackishwater ponds (water salinity, 4-10‰) of Bangladesh Fisheries Research Institute, Brackishwater Station, Paikgacha, Khulna. The body weight of collected male fishes were ranged from 42-50 g and that of female fishes were from 50-58 g. After collection of broods, they were transported to the hatchery with pond water having 20°C temperature. Salinity of water was increased gradually to 30 ppt by adding brine (100‰) for a period of 48 hrs and temperature of water was gradually increased up to 24°C using submersible heater fitted with thermostat to avoid stress. Both male and female fishes were administered with synthetic gonadotropin releasing hormone analogue (S-GnRH), commercially known as 'Ovupin' (Ningbo Sansheng Pharmaceutical Co. Ltd., Ningbo, China) at a single dose of 20 mg/kg body weight of fish. The hormone was injected in deep muscle at the base of the dorsal fin of the fish. The injected male and female fish were released at the ratio of 2:1 in 30‰ saline water in fibre glass tanks (Cap. 400 liters) provided with gentle aeration. The temperature of water of the tanks was maintained at a level of 24-25°C. The fish spawned in the tank water.

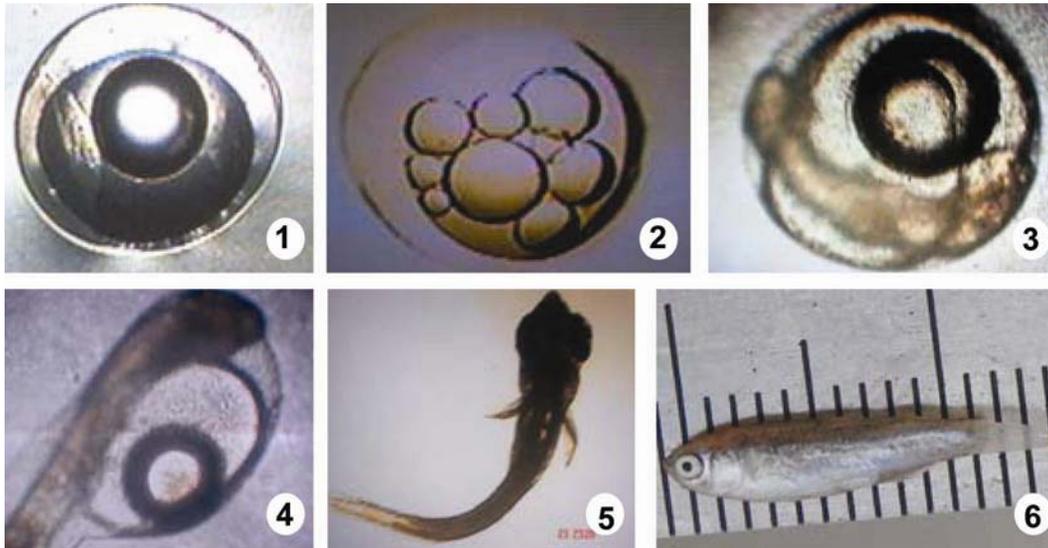
After 32-36 hr. of administering hormone, the fishes showed spawning activity. At this stage, male and female fishes started pairing. The female release huge eggs with a jerk of its body and the male released spermatozoa and fertilized the eggs. The fertilized eggs were non-adhesive, spherical, transparent and shiny. The diameter of the fertilized eggs varied from 750-850µ with a single oil globule (Fig. 1) which made the eggs buoyant on the surface of water. The unfertilized eggs became opaque and whitish in colour.

After spawning, the fertilized eggs were transferred to separate tanks with water having same salinity and temperature for incubation. After 25 minutes of fertilization, a small perivitelline space was formed in the fertilized eggs. This space gradually disappeared and cell division was started. The eggs attained gastrula stage (Fig. 2) after 6.00-7.00 hours and characteristics of narula stage (Fig. 3) appeared after 12.00-13.00 hours of fertilization. After 19-21 hours of fertilization, the fertilized eggs were hatched out in incubation tank. The newly hatched larvae (Fig. 4) with yolk sac and oil globule were black in colour and planktonic in nature showing jerking movement. The length of the newly hatched larvae was 2.00-2.50 mm. After 3<sup>rd</sup> day of hatching, the yolk sac was absorbed and mouth opening became visible. At this stage feed was supplied to the fry.

After hatching and yolk sac absorption, a portion of fries were fed with boiled and smashed egg yolk. For feeding larvae, *Brachionus rotundiformes* were cultured using *Nannochloropsis* and yeast as feed. *Nannochloropsis* was

cultured in mass using Gillard's modified f/2 media (Gillard and Ryther, 1962) in the algal culture laboratory of Brackishwater Station. When the fries mouth opening became larger, nauplii of *Artemia* were supplied as feed.

The fries fed with egg yolk did not respond and died at 3<sup>rd</sup> day of feeding. But the fries which were fed with rotifer grew well. Initially, rotifer was supplied at a density 5-6 ind./ml water and gradually increased by 2-3 ind./ml daily with the growth of the fry. After 7 days, oil globule disappeared completely. The larvae appeared fish like appearance after 9<sup>th</sup> day of hatching with pectoral fin (Fig. 5). After 12 days, when the mouth opening of the fries became larger, the *Artemia* nauplii were supplied as feed at a density of 6-7 ind./ml water. After 20 days of rearing, other fins like dorsal, anal and caudal became very distinct and the fries attained the shape of adult fish (Fig. 6). As the fries grew to adult shape, they swam very actively in school.



Figs.1-6: 1 Fertilized egg, 2: Gastrula stage, 3. Nerula stage, 4. Newly hatched larvae, 5. 12 days old fry, 6. 20 days old fry.

To maintain a congenial water quality level for the growth of larvae, 10-15% water of the larval rearing tank was exchanged daily with fresh saline water with same salinity and temperature. Egg and fries were collected from the incubation tank periodically to observe the development under microscope.

Depending on the present encouraging findings, further research will be conducted on efficacy of different hormones with different doses, feeding and impact of water quality management on the breeding performance of *Chelon*

*subviridis* in the next winter season for the development of complete technology of breeding and seed production of this fish. The findings of these researches will pave the way of conservation of natural stock and increasing production of this fish through aquaculture in the coastal *ghers*.

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