

# Hybrid catfish *Clarias batrachus* x *Heteropneustes fossilis* produced by farmers in West Bengal, India

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Among the freshwater catfishes, magur (*Clarias batrachus*) is in great demand in eastern and north-eastern India; it is revered as highly nutritious and therapeutic in nature. It contains higher percentage of protein and iron compared to most other edible freshwater fishes. Stinging catfish *Heteropneustes fossilis* or 'singhi' is also commercially significant, known for its invigorating quality that includes taste and nutritional values. Its muscle contains high amounts of protein and iron (226 mg/100 g). These two fishes are very useful for people during recovery from an illness or medical treatment. Both have relatively high haemoglobin content (11.58%), better palatability, medicinal values and live out of water for several hours if their skin is kept moist.

During May-June 2016, Sri Sayer Mohammad Sarkar, an experienced Mmagur breeder and seed producer, has achieved success in producing induced-bred hybrid seed of *Heteropneustes fossilis* and *Clarias batrachus*. His residence and magur hatchery is at Vill. Kholomba, Deotala Gram Panchayat, P.O. Dhaoel, Block and PS Gazole, Dist. Malda, West Bengal. Initially he purchased 10-12.5 cm sized *H. fossilis* from market, reared them for eight months in properly-managed ditches of 120-160m<sup>2</sup> area. Floating pelleted feed (2 mm diameter) of Charoen Pokphand (CP) Group was fed to them twice a day. A mixture of minced snail/mussel meat and rice bran can also be used for *H. fossilis*, Sri Sayer stated. The fish attained 20-25 cm in length and weighed 80-90 g. He purchased 7.5-8 cm sized *C. batrachus* fingerlings, reared them for ten months in 360-400 m<sup>2</sup> earthen ponds until they attained 150-220 g weight (22.5-25 cm) individually. Initially he used a non-pelleted mixture of rice bran, mustard oil cake, soybean meal/wheat flour and fish meal as supplementary feed (animal matter : plant matter = 3:1), but later on continued with CP brand pellet-type feed (2 mm diameter). Prior to induced breeding, matured *C. batrachus* were harvested from pond and maintained in cemented rectangular



*Clarias batrachus* broodstock.

tanks, having a 7.5-10cm thick layer of clay-rich soil on bottom. Sri Sayer provided a soft bottom to protect magur brooders from injury.

To produce the hybrid variety, Sri Sayer used *H. fossilis* females and *C. batrachus* males in the ratio 3 *H. fossilis* : 1 *C. batrachus* during hand stripping. He believed that one testis of a matured *C. batrachus* male (150-180 g) can fertilise the ovulated eggs of three mature *H. fossilis*. Ovary of a 80-90 g mature *H. fossilis* female (2+ years in age) weigh 9-12 g. For induced breeding, he used 0.08ml of WOVA-FH hormone injection to each of *C. batrachus* males (i.e., @ 0.4ml/kg body weight) and 0.1 ml of the hormone to each of *H. fossilis* females (@ 0.9ml/kg body weight). After a latency period of 10-11 hours, when optimum time for stripping was reached, abdomen of male *C. batrachus* was cut open, two milkfish-white testis lobes were scooped out, cleaned and quickly macerated/homogenised using mortar-pestle in 0.85%



Magur x singhi egg incubation-cum-hatching chamber.



Two year old singhi female brooder.



One year old hybrid variety.

NaCl (physiological saline) solution to prepare sperm suspension (about 3ml). Spermatozoa/milt of magur is temporarily preserved in NaCl; spermatozoa remain viable and survive only for 3-4 minutes. Injected *H. fossilis* females were stripped for spawning into a clean and dry enamel tray, eggs were released smoothly. Sri Sayer spread sperm suspension of magur, which was prepared prior to stripping of female singhi, over the stripped eggs. A little freshwater was added to reactivate the spermatozoa; stripped eggs of *H. fossilis* were fertilised artificially within 3-4 minutes with sperm suspension made with macerating the testis of male *C. batrachus*. Freshwater was poured and the tray was tilted for 2-3 minutes to ensure effective fertilisation.

As egg incubation-cum-hatching chamber, Sri Sayer used dug out rectangular earthen enclosures (more than one) of 10-12 m<sup>2</sup> area (2.1 x 1.5 m), over which durable black polythene sheet (waterproof tarpaulin sheet 1-2 mm thick) was lined. Water level in the chamber was maintained at 10-15 cm, sticky demersal-type fertilised eggs were uniformly spread in a single layer. According to Sri Sayer, fertilisation rate was 70-75%. In order to maintain eggs under flowing condition and well-aerated water, a PVC pipe of 2.5-3.25 cm diameter and 1.5 m in length, having 10 drilled pores was fixed at one end of each chamber along its width, 30 cm above from bottom level, and used as water sprinkler into the chamber. Through perforated pipes, the water was divided evenly over water surface in chamber. A slight current of water was maintained to maintain optimum oxygen level. Additionally

aeration was provided in each chamber by means of two sets of air tubes and air stones, and a constant stream of air bubbles in the chamber was created. From three female singhi, he could obtain 6,000-7,000 fertilised eggs.

In such a condition, within 25-26 hours, eggs hatched out. Unfertilised eggs and dead egg shells were removed quickly by siphoning. Larvae of the novel hybrid variety produced did not accept feed for the first three days. In the next two



Sri Sayer Md. Sarkar left.

days, for every 5,000 hatchlings, he used two boiled egg yolk as feed daily, in morning and afternoon, crushed by fingers and applied. He also used tubifex cake, a processed, commercially-available solidified form of mass of finely chopped tubifex worms. Sri Sayer then transferred the larvae into a properly-managed 60-120 m<sup>2</sup> pit-type earthen chamber of 30-45 cm depth, having mild shower facilities, at a stocking density of 1,800-2,000 larvae/m<sup>2</sup>. For every 5,000 larvae, he used 200 g powder-type floating fish feed daily, in morning and in afternoon. In one month, the hybrid variety reached 1.5 cm (Note: The indigenous pure *C. batrachus* fry reach 1.5-2.0 cm in 14-15 days). These were further stocked in 40-460 m<sup>2</sup> earthen ponds, properly fenced on four sides.

In farm conditions, growth of *C. batrachus* is very rapid in comparison to *H. fossilis*. Sri Sayer mentioned that this hybrid variety has a slower growth rate than *C. batrachus*, but improved growth rate than *H. fossilis*. In six months, it reached 7-8 cm, whereas *C. batrachus* fry reach fingerling stage of 7-8 cm in three months from hatchling stage. For the hybrid variety, he used floating pellet feed of 0.2-0.5 mm size and like *C. batrachus*, it accepts 75% of the feed during night

time. Sri Sayer further stated that *H. fossilis* fry reach 3-4 cm in 30-45 days under controlled conditions and at the end of one year, male and female *H. fossilis* reach to size of 8 cm and 12cm respectively. Author Subrato Ghosh met Sri Sayer at his hatchery site on 29th May, 2017 and almost at the end of one year, the hybrids were found to be of 16-17.5 cm size (hatchlings of which produced in June 2016).

In simple terms, Sri Sayer stated that head of the newly produced hybrid in adult form is similar to that of *C. batrachus*; somewhat blackish, broad, not as much depressed like that of *H. fossilis*; but the body is similar to that of *H. fossilis*, elongated, having reddish tinge and a short dorsal fin (unlike magur). At Sri Sayer's hatchery, water replacement in brood stock tanks, aeration facilities in tanks and egg incubation-cum-hatching chambers are electricity-operated; frequently power cut occurs in this remote village and this is a major problem for conducting induced breeding trials. In *C. batrachus* breeding, he experienced that female brooders of 1+ year in age give good response, a high fertilisation rate of eggs is obtained, but at higher water temperature, hatching rate declines to its minimum.