

Rearing of *Scatophagus argus* and *Etroplus suratensis* in coastal West Bengal, India

Subrato Ghosh and Tapan Maity*

122/1V, Monohar Pukur Road, P.O. Kalighat, Kolkata - 700026, West Bengal, India. *Prop. Joykrishna Hatchery, Vill. Shibkalinagar, PS Kakdwip, Dist. South 24 Pgs, West Bengal, India

Spotted scat *Scatophagus argus* - a valued ornamental fish

The spotted scat or leopard pomfret *Scatophagus argus* (Perciformes: Scatophagidae) is a commercially-important fish found in the marine zone of Hooghly estuary in lower West Bengal, India from Diamond Harbour to Bakkhali, in the lower portion of tidal rivers, in large brackishwater impoundments or 'bheri' connected to estuaries and in seven other estuaries of Indian Sundarbans. Early stages of wild-collected spotted scat survive and exhibit good growth in low-saline brackishwater ponds (12ppt). Habitats preferred by *S. argus* such as estuaries and mangrove forests are characterised by wide fluctuations in physico-chemical water parameters. This sturdy fish has adapted to such ever-changing aquatic conditions and this tolerance has endowed it with some biological characteristics desirable in a cultivable tropical brackishwater finfish.

The species *S. argus*, *Terapon jarbua*, *Monodactylus argenteus*, *Odonus niger* and *Epinephelus diacanthus* are considered as important wild-caught indigenous marine ornamental fishes in India. In the ornamental fish markets of India, *S. argus* is popularly sold as 'Indian discus'. *S. argus* is a suitable candidate species for promoting as ornamental fish. It has heavy demand for aquarium purposes throughout the world and has a good market particularly at smaller body sizes. Wild seed are available for further rearing to produce marketable sized fish¹. The common *S. argus* and red scat *S. argus arromaculatus* are the two colour morphs of *S. argus* which are popular among tropical fish-keeping enthusiasts. The Hooghly river spotted scat closely resembles normal *S. argus*. It was found to fetch higher price in the US aquarium trade. Boiled lettuce, soaked oatmeal porridge, aquarium plant *Nitella sp.*, algae, water fleas and worms can be fed to scats in aquaria, and they can be maintained both in fresh-water and marine aquaria. A brackishwater fish by nature, *S. argus* can easily adapt to freshwater aquarium conditions.



Scatophagus argus fry 10-12 mm. in length.



Close view of a pearl spot fry.

Like spotted scat, another brackishwater fish, pearl spot *Etroplus suratensis* (Perciformes: Cichlidae) commands high market value especially as an ornamental fish in West Bengal. The attractively coloured sub-adults of *E. suratensis* are sold in market as ornamental fish.

Pond rearing of spotted scat

Spotted scats sexually mature and breed in nearshore/ coastal waters. Advanced larvae migrate and enter estuaries during fry/early juvenile stage. The fry, black in colour, feed on microalgae and can be collected for stocking in culture ponds for the ornamental fish trade. Collection of fry and early juveniles of important brackishwater fishes such as spotted scat, Asian seabass and mullets from Hooghly and other estuaries in West Bengal is done using zero-mesh drag nets. *S. argus* fry 10-12mm (0.33 g; 15-20 days old) are available at Harwood Point (a ferry point on Hooghly River under Kakdwip PS) in the Hooghly estuary during March-September and again in November, with three peaks in March-April, June and November. At Ramnagar on the Ramnagar Canal in East Midnapore District, the two peak periods of its availability are April and September.

Joykrishna hatchery and fish seed farm, located on eastern bank of the Hooghly River estuarine zone is a unique site in West Bengal where juveniles and sub-adults of *S. argus* ('paayrachanda macchh' in local dialect) and *E. suratensis* ('muktogaccha macchh') are produced in brackishwater ponds for commercial utilisation as ornamental fishes. These are supplied to Hyderabad and other cities outside West Bengal and fetch high market price. The export price of *S. argus* and *E. suratensis* is US\$14.9 / piece and US\$8.25 / kg respectively.

In ponds, *E. suratensis* is mostly detritivorous and *S. argus* herbivorous in habit. *S. argus* fry are collected when the river water inflates during spring tide at times of full moon and new



Fry of *Etroplus suratensis* 24-36mm.

moon. In each of six properly-managed earthen chambers of 40 m² in area (8 m x 5 m) constructed in a series (salinity 10-14 ppt), 3,000-4,000 pieces of *S. argus* fry, procured @ Rs 0.50-0.80 / piece, are stocked. Water depth is maintained at 1.2-1.5 m. It takes 40-45 days to reach a harvestable size of 25-30 mm. If fry are stocked at a higher density, they will take 75 days to attain such a size, which are sold @ Rs 8-10 / piece. *S. argus* fry are also propagated in two brackishwater ponds of 440 m² each, where 12,000-15,000 pieces are stocked in each. After letting river water into the ponds and chambers during spring tide, it is treated with bleaching powder and other pre-stocking management measures are followed.

The '0' point 9904 CPF shrimp feed (dust) is fed to growing fry for the first thirty days @ 200-400 g/10,000 pieces daily. Thereafter boiled rice is used in small amounts. A formulated farm-made feed has been prepared, comprising rice bran 15%, mustard oil cake 20%, maize dust 20%, GNOC 10%, boiled pulses 5%, wheat flour 10%, rice dust 10%, fish meal 5%, vitamins B, C and minerals 5%. It feeds on periphyton deposited over palmyra leaves and bamboo poles. Every week, 2,000-2,500 pieces of *S. argus* juveniles of 'one rupee coin' size in local parlance, are sold from this hatchery to selected ornamental fish traders in Howrah District. The 45-48 mm stage, popular locally as 'nontaa (salty) snack biscuit' size, is also raised in ponds for sale.

Breeding and rearing of pearl spot

During March-April and June-July every year, breeding and seed production of *E. suratensis* is conducted in three brackishwater ponds 560-640 m² in area (16-18 ppt). Brooders of 50-100 g weight are stocked in the ratio 12 females : 15 males @ 600-700 fishes / pond. Palmyra leaves and broken asbestos sheets are placed in ponds for egg attachment. Fishes have been found to breed within 40 days of stocking; 500-1,000 progeny are produced from each female. Pulverised ground nut oil cake and CPF shrimp feed in dust form is fed to the early stages, which attain 24-36 mm in 45 days of rearing from birth. Mustard oil cake is used to enhance zooplankton production in ponds.

In this hatchery-cum-seed farm, in every 640 m² pond, 6,000-8,000 *E. suratensis* fry are reared and harvested at 65-70 mm size in about three months, which is a sub-adult stage. Thin



Joykrishna hatchery at Kakdip South 24 pgs West Bengal.

deposition of silt in pond bottom and partial growth of aquatic weeds is essential in *E. suratensis* ponds. In comparison to *S. argus*, *E. suratensis* are harvested at a larger size which is attractively coloured and fetches the best price in ornamental fish markets. In order to produce edible fishes, 900-1,000 fry are stocked / 640 m² pond and those attain 150-180 g at the end of one year. In every week, 250-500 pieces of *E. suratensis* fingerlings/sub-adults are sold from this site.

End note

Growing *E. suratensis* fry will not accept boiled rice as feed (unlike *S. argus*). Ornamental fishes like shubhangi, albino rengo and expensive varieties of gold fish and koi carp are also propagated in this hatchery in rectangular cement cisterns. Scientists at ICAR-Central Institute of Brackishwater Aquaculture, Kakdwip have helped in growth of this seed farm. One low saline pond (3-4 ppt) has been earmarked for polyculture of *E. suratensis* and Indian major carps, and another pond (6-8 ppt salinity) for culture of *Liza parsia*, *L. tade*, *S. argus* and *Penaeus monodon*. Giant prawn *Macrobrachium rosenbergii* juveniles must never be stocked in *E. suratensis* ponds. Brooders of *E. suratensis* and large-sized *S. argus* are maintained here in cement cisterns.

Recently few brackishwater fish farmers in Kakdwip and other coastal Blocks in South 24 Pgs District have endeavoured to produce juveniles/advanced juveniles of *S. argus* (30-48 mm size) for ornamental purposes. Juvenile spotted scat



Close view of a juvenile spotted scat.

can fetch Rs 10-20 in retail markets and fetch higher prices in international markets. A small-scale farmer or self-help group can earn Rs 8,000-12,000 / month from rearing of brackishwater ornamental fishes such as *S. argus*, *T. jarbua*, *E. suratensis* (Prof. R. K. Trivedi, WB University of Animal and Fishery Sciences; personal communication). Fry collected from nature is stocked and reared in brackishwater ponds.



Larger sized spotted scat 75-80 g.



Nursery chambers for spotted scat.

If practices such as juvenile production of *S. argus*, pond breeding and rearing of *E. suratensis* are established with wider acceptance, it is expected that it will be a sustainable source of income for farmers and ornamental fish producers in the poor rural estuarine zone of coastal West Bengal and considerably contribute to rural livelihoods. The Freight-on-Board price of a pearl spot is US\$0.35 in international markets. These fishes are yet to be fully exploited in aquaculture programmes. Freshwater pond aquaculture in the Indian Sundarbans and other regions in coastal West Bengal is often severely affected by cyclones and storm surges and the problem of saline water intrusion is encountered during the cyclonic depression period. In such situations, these ponds may be effectively utilised by farming of *S. argus*, *E. suratensis* and *M. rosenbergii*.

References

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Juvenile Scatophagus argus at 25-30 mm length.