Research Communications

First report on induced spawning of *Siganus vermiculatus* in India

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Abstract

Siganids are widely distributed to Indo-West Pacific region and the *Siganus vermiculatus* (Maze rabbit fish/ Vermiculated spinefoot) can reach sizes that weigh up 2.3 kg each. It is a species of great aquaculture importance and hence breeding and seed production protocols are necessary. A major breakthrough in the seed production of *Siganus vermiculatus* by inducing the fishes to spawn under controlled conditions with Human Chorionic Gonadotropin (hCG) during the first quarter of the lunar cycle is reported. The hatchery processes and early larval stages are described.

***Keywords**: Rabbitfish, Siganus vermiculatus, induced spawning, India*

Introduction

Among Rabbit fishes or siganids (family Siganidae) the *Siganus vermiculatus* (Maze rabbit fish/Vermiculated spinefoot) can reach sizes that weigh up 2.3 kg each. *S. vermiculatus* has good aquaculture potential due to their fast growth, tolerance to fluctuating environmental conditions, crowding and handling. A major breakthrough was achieved on 15.3.2019 in the seed production of *Siganus vermiculatus* by inducing the fishes to spawn under controlled conditions with Human Chorionic Gonadotropin (hCG) injection for first time in India as a part of All India Network Project on Mariculture. The process of broodstock development and rearing of the early larval stages is described.

Broodstock development and larval rearing

The wild collected *Siganus vermiculatus* (150-800 g) from Ratnagiri were reared in broodstock development cages of the marine cage farm of ICAR-CMFRI in Karwar, over a 4 month holding period prior to induced breeding. The fishes were fed with formulated pellet feed enriched with cod liver oil and Vitamin E during this period. A breeding pair consisting of female fish (31 cm, 750 g) with egg diameter above 400 microns and male fish (32 cm, 800g) with thick oozing milt were maintained in 3 ton FRP tanks in the hatchery and treated with a similar feeding regime as in the cage farm site.

Fig. 1. *Siganus vermiculatus*

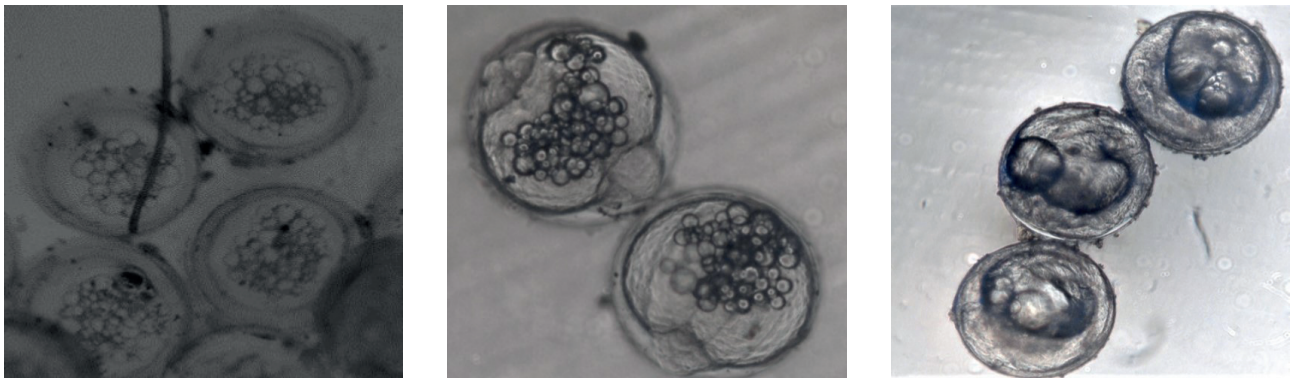

Fig. 2. Embryonic developmental stages of *S.vermiculatus*

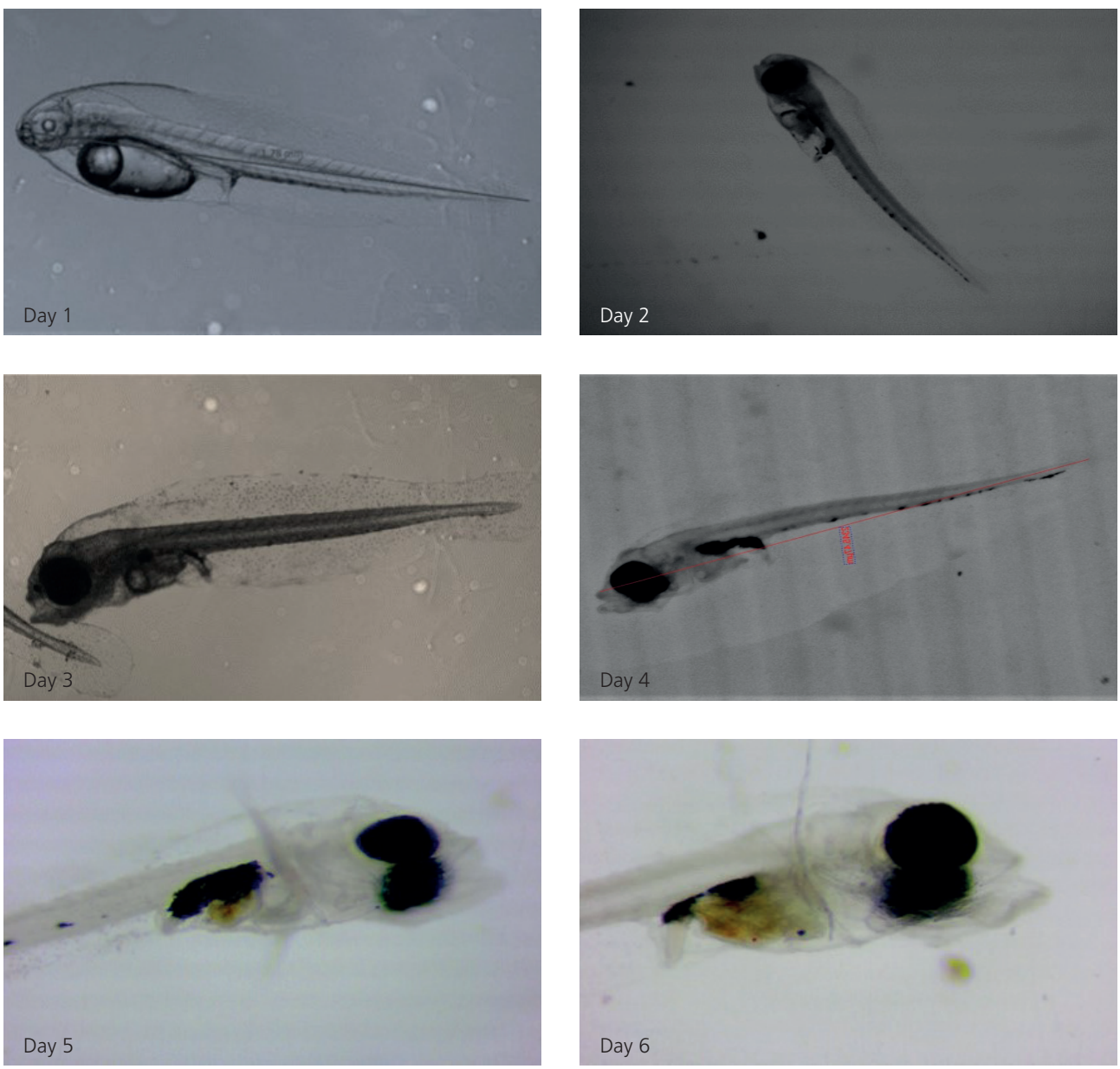

Fig. 3. Larval developmental stages (Day 1-6) of *S.vermiculatus*

The breeding pair was intramuscularly injected with hCG @ 500 IU and 200 IU for female and male respectively, at 16:00hrs for 3 days during the first quarter of lunar cycle following a 24 hour interval. As the eggs of *Siganus* are demersal and adhesive, after the third injection fishes were released back inside the nylon hapa in FRP tank for egg attachment. Spawning was observed after 21 hours and 30 minutes of the final dose of injection. The adhesive demersal spherical fertilized eggs (average egg size: 560 μ) were found attached to the walls of the hapa. The nylon hapa with fertilized eggs were shifted to another 3 ton FRP tank filled with seawater of 28 ppt salinity and 27-29°C temperature for embryonic development (Fig. 2). The initial hatchlings were observed inside the nylon hapa after 25 hours and 30 minutes of spawning. The newly hatched larvae measured 1.713 mm to 1.783 mm in size with yolk sac (420 μ) and oil globule (220 μ). Mouth opening (120 μ) was observed on third day after hatching. Larval rearing (Fig. 3) was done upto 8 day post hatching (8DPH) using pure cultures of marine microalgae, copepods and rotifers (Table 1).

S. vermiculatus fetch higher market price than other siganids due to their consumer preference. They can be fed low protein feeds due to their herbivorous feeding behaviour and also be used to control net fouling in sea cages due their grazing behaviour on algae. After the successful development of a complete larval rearing protocol for *S. vermiculatus* described here, it could emerge as a valuable candidate species for cage culture.

Table 1. Feeding schedule followed for the larval rearing