# Successful mass production of Three spot damselfish through captive breeding

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## ABSTRACT

The captive breeding technology for the Three spot damselfish *Dascyllus trimaculatus* has been developed by ICAR CMFRI. This paper reports the protocols for mass production of this species through captive breeding. The brooders were conditioned in FRP tanks fitted with a biological filter and fed on special broodstock feed prepared by ICAR-CMFRI. Spawning occurred after four months of broodstock conditioning. Larval rearing was carried out using copepod nauplii (*Parvocalanus crassirostris*) as the first feed followed by rotifers (*Brachionus plicatilis, B rotundiformis*) and *Artemia* nauplii. Adequate microalgal density (*Isochrysis galbana* and *Nannochloropsis oculata*) was maintained in the larval rearing tanks during the entire live feed stage of the larvae. Weaning to formulated feed started from 30 DPH (Day Post Hatch). The nursery rearing to marketable size was completed within 60 days. Differential growth and non-uniform size in the juveniles was observed, which calls for extra care during nursery phase, through periodic size grading so as to ensure maximum survival. This is the first report on mass production of Three spot damselfish through captive breeding.

***Key words**: Three spot damselfish, Mass production, Parvocalanus crassirostris, Rotifers*

The captive breeding technology for twenty three marine ornamental species have been developed by ICAR-CMFRI, which includes Clownfishes, Damsels, Fire fish, Dotty back, Anthias etc. The breeding and larval rearing of clownfishes is comparatively easy while the same for damselfishes is difficult because of the difference in live feed requirements. Unlike the clownfish larvae, which are comparatively big and can be initially fed on rotifers (*Brachionus rotundiformis*, *B. plicatilis*), the damselfish larvae are smaller and requires a smaller sized zooplankton such as copepod nauplii as their live food. Thus the production of suitable sized live feed is the major bottleneck in the success of larval rearing of damselfishes. Only experimental level success has been reported so far in the case of captive breeding and seed production of damselfishes and reports on mass scale seed production is scanty in the Indian context. The Three spot damselfish, *Dascyllus trimaculatus* is one of the most sought after marine ornamental fish among the traders and hobbyists and its successful seed production technology was developed by ICAR CMFRI (Gopakumar *et al,* 2009). Hence, attempts were made for the mass production of juveniles of this fish through captive breeding.

The broodstock development of Three spot damselfish, *Dascyllus trimaculatus* was carried out in FRP (Fibre Reinforced Plastic) tanks of 2 ton capacity fitted with a biological filter. The brooders were conditioned in these tanks in which sufficient hideouts and shelters were

provided by using small pieces of PVC pipes (Fig.1). The brooders were fed on special marine ornamental fish broodstock feed prepared by the Marine Biotechnology Division of the institute. The conditioning of brooders to the captive environment, pairing and consequent natural spawning could be achieved after 4 months of introduction into the tanks. The eggs were deposited on the inner surfaces of PVC pipes or on the sides of the tank where they were maintained.

After spawning and before completion of incubation period, eggs along with the substratum were transferred to larval rearing tank which was already fortified with the copepod, *Parvocalanus crassirostris.* Copepods were added into the tank one week prior to introduction of the larvae and fed with *Isochrysis galbana* at a density of 1 x $10^5$ cells/ml. If the eggs are attached to the tank surface, the larval rearing was carried out in the same tank after removing the brooders. In such instances, addition of copepod was started well before hatching so as to maintain adequate copepod density. A nauplii density of around 5-8 numbers /ml was maintained during larval rearing so that the larvae could feed on copepod nauplii to satiation. As the tank was having enough quantity of nauplii and copepodites, the growing larvae got bigger sized prey (copepodites and early adults of copepods). The larval feeding was fully on copepods for the initial 20 days after which co feeding with *Artemia* nauplii started. Weaning to formulated feed started from 30 DPH (Day Post Hatch). During weaning period also co feeding with *Artemia* nauplii was continued so that the small sized larvae are not deprived of food as they cannot ingest the pellet feed. The nursery rearing to marketable size was completed within 60 days. The survival rate during this period ranged from 5 to 10%.

Another trial on larval rearing was attempted with slight modification of live feed combination (Figs. 2 & 3). Here, the larvae were fed with same copepod nauplii till 10 DPH, after which co-feeding with rotifers (*B. plicatilis* & *B. rotundiformis*) started. From 20 DPH onwards co-feeding was done with *Artemia* nauplii. The live feed stage of larval rearing was carried out under green water technique using *Isochrysis galbana* and *Nannochloropsis oculata*. The weaning to artificial feed was started from 30 DPH.

The successful mass production of Three spot damselfish, *Dascyllus trimaculatus* could be achieved by following

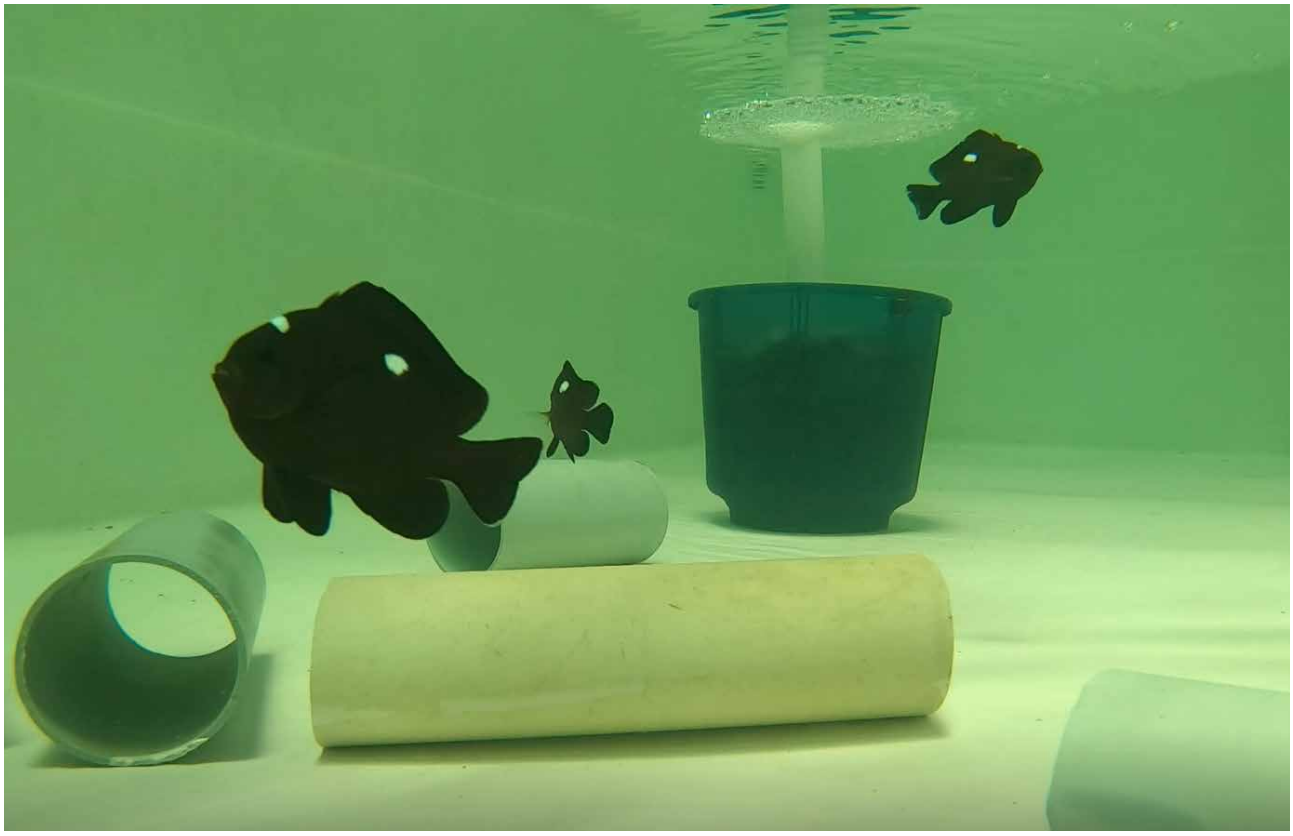

Fig.1. Brooders of *D. trimaculatus*

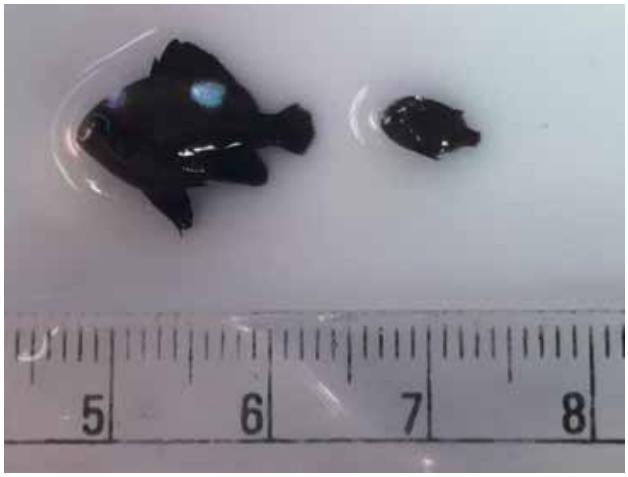


Fig.2. Size variation observed on 41 DPH; Live feed used: Copepod, Rotifer & *Artemia* naupli


Fig.3. Size variation observed on 41 DPH; Live feed used: Copepod & *Artemia* nauplii

Fig.4. Mass produced juveniles of Three spot damselfish through captive breeding

the protocols mentioned above (Fig.4). Salient features noticed during the entire life cycle was the differential growth due to which smaller juveniles were attacked by the bigger ones, thereby reducing the survival rate. Hence, size grading is very important for ensuring maximum survival. It was also observed that, co-feeding of rotifers from 10 DPH resulted in faster growth and better survival (around 30% higher) than the larvae fed on only copepod and *Artemia* nauplii.

## Reference

Gopakumar, G. *et al*., 2009. *Mar.Fish.Infor.Serv.T & E Ser.*, 201: 1-9