

Induced breeding of Silver Dollar (*Metynnis hypsauchen*) using ovaprim

K.A.J.L. Kodisinghe and S.C. Jayamanne

Faculty of Animal Science and Export Agriculture, Uva Wellassa University of Sri Lanka
and

A.H.M.S.S.K. Abeysinghe

National Zoological Gardens, Anagarika Dharmapala Mawatha, Dehiwala, Sri Lanka

Introduction

Production of ornamental fish is a rapidly growing sector of the aquaculture industry (Tlustý, 2001). Among the ornamental fish production in Sri Lanka, exotic ornamental fishes have a significant demand in the market. Silver Dollar (*Metynnis hypsauchen*) which was originated from South America is such kind of exotic ornamental fish in Sri Lanka that a higher demand has been achieved. Silver Dollar is not breeding very often in Sri Lanka since it takes a longer spawning period. To avoid that problem, the fish can be bred artificially. Among all the artificial breeding methods, induced breeding by hormone administration is the most reliable method (Yanong, *et al.*, 2013). In this study attempts were made to develop induced breeding of Silver Dollar (*Metynnis hypsauchen*) in Sri Lanka environment using inducing hormone “Ovaprim”.

Materials and method

Sexually matured and healthy Silver Dollar brooders were selected based on the external features. Eighteen pairs in same age were randomly collected and conditioned. Then Ovaprim as a single dose by intramuscular injection at a dosage of 0.2 ml/kg-1, 0.3 ml/kg-1, 0.4 ml/kg-1, 0.5 ml/kg-1 and 0.6 ml/kg-1 of body weight was administered to the brooders. Natural spawning was also allowed without inducing by Ovaprim as a control. After the hormonal injection, the best range of Ovaprim dose to have least response time and better breeding performance of Silver Dollar was determined based on response time (hours). Relative fecundity, post mortality rate of brooders and water quality parameters in experimental tanks were also monitored. Data analysis was done by one way ANOVA and Tukey test.

Results and Discussion

The effects of different doses on the breeding performance of Silver Dollar are shown in Table 1. Salmon gonadotropin releasing hormone analogue sGnRH_a (Ovaprim) successfully induced spawning in Silver Dollar (*Metynnis hypsauchen*). Five different Ovaprim doses supported the spawning activity and the breeding performance was favored by lower and middle inclusion level of Ovaprim dose in the experiment.

Ovaprim is a well-known commercial spawning aid which is mostly used in induced breeding of fish (Anonymous, 2012). It has been used in successful manner for several fish families (Hill *et al.*, 2005). In the present study, all the brooders spawned, except the brooders which were injected with 0.6 ml/kg-1 of body weight Ovaprim. Among those 6 treatments, the least response

time was recorded with 0.3 ml kg⁻¹ of body weight Ovaprim as 5.66 hours. The maximum response time was observed in naturally spawned pairs as 632 hours (27 days). According to the literature, 0.5 ml kg⁻¹ of body weight is the standard Ovaprim dose for fish (Hill *et al.*, 2005). However, in the case of Silver dollar, 0.3 ml kg⁻¹ of body weight is the best dose to have the minimum response time (Table 1).

Table 1: Breeding performance of Silver dollar induced with Ovaprim

| Parameter | Dose 1 (0 ml kg ⁻¹ OP) | Dose 2 (0.2 ml kg ⁻¹ OP) | Dose 3 (0.3 ml kg ⁻¹ OP) | Dose 4 (0.4 ml kg ⁻¹ OP) | Dose 5 (0.5 ml kg ⁻¹ OP) | Dose 6 (0.6 ml kg ⁻¹ OP) | P value |
|-----------------|--------------------------------------|--|--|--|--|--|---------|
| RT (hrs) | 632± 146.60 ^a | 6.33± 0.57 ^b | 5.66± 0.28 ^b | 9.50± 0.50 ^b | 7.00± 0.50 ^b | 0.00± 0.00 ^b | 0.000 |
| RF | 4.63± 1.86 ^{ab} | 3.61± 1.32 ^{ab} | 2.19± 1.20 ^{bc} | 5.22± 0.30 ^a | 6.43± 0.50 ^a | 0.00± 0.00 ^c | 0.000 |

[Values are presented as means ± S.D., means in each row with different superscripts are significantly different from each other. (OP: Ovaprim; RT: Response time; RF: Relative fecundity)]

The maximum relative fecundity was observed with 0.5 ml kg⁻¹ of body weight Ovaprim (Table 1). Dose range between 0.4ml kg⁻¹ - 0.5 ml kg⁻¹ of body weight could be identified as the better range to have a higher fecundity. Because of that, further studies should be followed to identify the best dosage which is occurred between 0.4 ml kg⁻¹ - 0.5 ml kg⁻¹ of body weight Ovaprim. Spawning has not occurred with 0.6 ml kg⁻¹ of body weight Ovaprim (Table 1). It indicates that, dosage beyond 0.5 ml kg⁻¹ of body weight Ovaprim might not be effective in breeding of Silver Dollar. The use of Ovaprim as a spawning aid in ornamental fish was surveyed in the United States, and they have found that some species may not be responsive to the GnRH α in Ovaprim or may require application under a different protocol (Hill *et al.*, 2005). Based on the literature and the obtained results of the present study, a comparatively medium level of Ovaprim dose (0.4ml kg⁻¹– 0.5 ml kg⁻¹) can be recommended for a higher relative fecundity.

The survival rate of brooders was 100 % after Ovaprim was injected. According to the observation, the hormone dosage range which was used for the present study might not be harmful and there was no negative effect to Silver Dollar. Achionye and Obaroh, (2012) have found that procedure of injection, quality of the hormone and degradation of water quality during holding and handling of fish affect to the post mortality of brooders. At the present study, conditioning and domesticating brooders before hormone injecting, maintaining water quality, supplying nutritious feeds, using quality hormone and reduced handlings of fish due to the single

dose administration to both sexes might have affected for this decreasing of post mortality of brood fish (More *et al.*, 2010). There was no any significant difference ($P > 0.05$) in water temperature, Dissolved oxygen and pH in six different treatment tanks.

Since a successful result could be obtained through the study, following further studies and providing the facilities for practicing induced breeding of Silver Dollar using Ovaprim can be done to make Silver Dollar available to breeders and producers for mass scale production. Because, considering the relatively simple technique involved, this activity has the potential to create adequate job opportunities, increase export earnings as well as develop the ornamental fish industry in Sri Lanka.

Conclusions

Minimum spawning time in Silver Dollar can be achieved by 0.3 ml kg⁻¹ of body weight and maximum relative fecundity can be obtained with 0.5 ml kg⁻¹ body weight Ovaprim.

References

Achionye, C. G. and Obaroh, I. 2012. Ovaprim doses effects on eggs of African mudfish *Clarias gariepinus*. *International Journal of Life Science and Pharma Research*. 2(2): 1-9.

Anonymous. 2012. *Induced Breeding with Ovaprim*. Available at: <<http://agropedia.iitk.ac.in/content/induced-breeding-fish-ovaprim>> [Accessed 12 May 2014].

Hill, J. E, Baldwin, J.D, Graves, J.S, Leonard, R, Powell, J. F. F. and Watson, C. A. 2005. Preliminary observations of topical gill application of reproductive hormones for induced spawning of a tropical ornamental fish. *North American Journal of Aquaculture*. 67:7–9.

More, P. R. 2010. Comparative Study of Synthetic Hormones Ovaprim and Carp Pituitary Extract Used in Induced Breeding of Indian Major Carps. *Libyan Agriculture Research Center Journal International*. 1(5): 288-295.

Thlusty, M. 2002. The benefits and risks of aquacultural production for the aquarium trade. *Aquaculture*. 205. 203– 219.

Yanong, R.P.E, Martinez, S. and Watson, C.A.2009. *Use of Ovaprim in Ornamental Fish Aquaculture*. Available at: <http://edis.ifas.ufl.edu> [Accessed 05 May 2014].