



# Bay of Bengal Large Marine Ecosystem Project



Report of the  
Present status of the marine fish hatchery in Pyin Htet Aw Marine Fish  
Research Station and recommendations for its successful operation  
5-9 June 2013 • Pyin Htet Aw Myanmar

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# The Present Status of the Marine Fish Hatchery in PyinHtet Aw Marine Fish Research Station, Department of Fisheries of Myanmar and Recommendations for its Successful Operation

by

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## Introduction

The Department of Fisheries (DOF) of Myanmar has put the production of high value marine fish species as one of the priorities for aquaculture production. Among the high value marine fish species that are cultivated at present, the groupers have been identified as top priority. In order to develop this industry, there is a need to have a regular and abundant supply of seeds for the growers. Although at present grouper fry can be sourced from the natural environment, the supply is not constant and is not reliable. The mass production of grouper seeds in fish hatcheries is seen as the long-term solution to ensure the availability of large number of fry on a regular basis to support the industry. Currently, the DOF lacks the technical capability on grouper breeding and hatchery production and has requested for technical assistance on these aspects from SEAFDEC/AQD in the Philippines. The visit of technical staff from SEAFDEC/AQD to DOF Myanmar on 5-9 June 2013 was therefore undertaken with the following objectives; (1) to assess the present facilities of the marine fish hatchery in PyinHtet Aw Marine Fish Research Station, (2) to assess the situation of the grouper breeders, and (3) to evaluate the technical capability of the present staff working in the fish hatchery.

## The Present Situation in the Fish Hatchery

**The facilities** The marine fish hatchery of DOF is located in Ka Tam Island, in PyinHtet Aw Marine Fish Research Station, in Kyun Su township, Myeik District. It can be reached after about 1-2 hours boat ride from mainland Myeik. The tank facilities in the hatchery are the following:

Water treatment tanks	2 units	15 tons capacity (concrete)
Algal culture tanks	2 units	15 tons capacity (concrete)
	4 units	10 tons capacity (concrete)
Larval rearing tanks	10 units	10 tons capacity (concrete) (5 units of these are to be used as rotifer culture tanks)
	6 units	2 tons capacity (blue plastic tanks)
Egg incubation tanks	7 units	200 liters capacity
Spawning tank	1 unit	100 tons capacity (concrete)
Reservoir	1 unit	300 tons capacity
Fiberglass tanks	several units	various volume (for various purposes)
Small algal room		
Power/pump house		

All of these facilities are in good conditions.

**The grouper breeders** The grouper breeders currently available are owned by a private farm. They are a mixture of several species of groupers and are of various sizes. They are giant grouper (*Epinephelus lanceolatus*), malabar grouper (*E. malabaricus*), orange-spotted or the green grouper (*E. coioides*) and tiger grouper (*E. fuscoguttatus*). These different species of groupers are also stocked or mixed together in 4 different fish cages measuring 5x5x2 m (LxWxH) set in the sea and are fed chopped trash fish. The present location of the cages containing the breeders is not that ideal considering that the area is exposed to strong wave action and considerably strong water current.

The DOF hatchery staff makes use of the breeders from this private farm for breeding purposes. During attempts of induced spawning, selected breeders are transported to the land-based spawning tank in the fish hatchery. The approximate travel time by boat for the breeders to reach the hatchery from the cages is 45 minutes. These breeders are then returned to the cages after the spawning trials/attempts.

It was learned that three induced spawning trials were made by the DOF staff during the past. Of the 3 attempts, only one attempt resulted in the successful release of eggs, however, no hatching took place. After a lengthy discussion on the procedures used during the trials, several possibilities for the failure to release eggs and for hatching to occur were suspected. These are addressed in the recommendation section.

**The hatchery staff** At present, there are 9 people assigned in the fish hatchery. It seems that the technical capability of the staff are probably adequate to operate the fish hatchery considering that 2 of them have attended the Marine Fish Hatchery Operations and Management Training Course in SEAFDEC/AQD in the Philippines in 2001 and 2009. Another member of the team is scheduled to attend the same Training Course in SEAFDEC/AQD starting middle of this month. The actual capability of the staff to operate a marine fish hatchery especially those who have been trained, however, are not tested yet since they have not actually participated in actual fish hatchery operation in the station except this month when they tried rearing seabass larvae in the hatchery. Aside from the 3 staff who have been trained on Marine Fish Hatchery Operations and Management, 3 other members of the team have undergone training on Brackishwater Aquaculture Management in Malaysia indicating the technical preparedness of the staff to do aquaculture activities.

## Some Recommendations

### For the facilities

1. *Install pre-filtration system to improve the water quality* – It was observed during our visit that the water in the reservoir was turbid. Indeed this was so because water is pumped directly from the source to the reservoir without passing through a filter (like sand filter). After inspection of the suction area for the water inlet, we found out that the suction pipe is just in the water column. This being the case, a pre-filtration system should be installed in the suction area to improve the quality of the water. The details of the pre-filtration set-up were already described to the staff in the hatchery.

2. *Improve the algal room* – The maintenance of pure cultures of microalgae as food for the rotifers and as water conditioner in the larval rearing tanks during larval rearing of marine fish is very important. In the hatchery, there is a small room that is intended as a small laboratory and as an algal room. It is strongly recommended that this algal room be set-up properly and should be functional as soon as possible. For this purpose, one of the present staff in the hatchery should be sent for a short technical training on the culture of natural food (phytoplankton and zooplankton) to make this unit functional. A specialized training course for this purpose can be arranged at SEAFDEC/AQD in the Philippines. As a consequence of the non-functioning of the algal room and the absence of the pure culture of microalgae, it was found out that the microalgae used at present in the hatchery are of mixed species since the starter cultures were taken just from an open pond. This practice will lead to problems of the collapse of the algal culture or the abundance of other microalgal species (like diatoms) that are not needed. When this happens, the mass production of rotifers, the main food of the fish larvae during the early larval rearing period, will suffer. The absence of adequate supply of rotifers during larval rearing will result to starvation of the larvae, hence mortalities.

An alternative to the above is to get pure culture of the microalgae (*Nannochlorum* or *Chlorella*) from other nearby research station in the country, if this are available and used this pure stock as the starter in its mass propagation. In the event that pure cultures of the microalgae are not available within the country, they can be easily secured from neighboring countries like in Thailand and Vietnam.

3. *Reduce lighting in the area for the larval rearing tanks since it is too bright* - Marine fish larvae are sensitive to light during the early larval stages. Too bright an environment is not good for them. At present, the larval rearing tanks are bright because the roofing is made of transparent plastic and the sides are also covered with transparent plastic sheets that reflect the light. It is better to remove the transparent plastic sheets on the sides during summer and install a black sack cloth in some areas under the roof to reduce a little the light around the larval rearing tanks. The black sack cloth cover may be removed during the colder months of the year when light penetration is not that much. In addition, the plastic sheets on the sides may be installed during the colder months of the year to make the environment warmer during these cold months.

#### **For the breeders**

1. *Provide appropriate holding systems for the breeders, better location for the cages and good nutrition to the selected spawners* -As mentioned above, the grouper breeders were not owned by the DOF but by a private farm and the various grouper species are also stocked together as mixed species in cages. It is strongly suggested that the breeders that will be used for spawning will be identified, separated and stocked in another separate cage. They should be of the same species and not of mixed species. In addition, they should be provided regularly with the appropriate food, mixed species of small fish and not only pure sardines that are still of good quality. Furthermore, the cages should be located in an area that is not subjected to too much wave action and strong water current to avoid unnecessary stress to the fish.

2. *For the staff to understand the reproductive biology of the grouper species of interest*-It must be understood that groupers are protogynous hermaphrodites unlike in many fish species where the sexes are separate. As such, groupers change sex as they grow older. Being protogynous hermaphrodites, they mature first as females and later turns into a male as they grow older. This has implications in the proper broodstock management of the species – that stocks of different ages/sizes should always be available to ensure the availability of both sexes for breeding purposes. During induced spawning trials, the staff should be aware of the specific differences in the reproductive physiology of each grouper species. Gonadal development in groupers follows a specific lunar rhythm. For instance, maturation of *E. fuscoguttatus* oocytes falls around the new moon phase whereas that of *E. coioides* is around the first lunar quarter. That of *E. malabaricus* and *E. lanceolatus* are on xxxx and xxx, respectively. These specific characteristics should be taken into consideration in planning when to do induced spawning of the species. For example, if the plan is to do induced spawning for *E. coioides*, sampling of the stocks to select a good male and female should be done during the first lunar quarter. Only females with oocytes (obtained after cannulation and oocytes easily separate from each other after shaking in a tube) that are in advanced state of maturity, and males that are in the appropriate stage of spermiation (milt easily oozes out of the urogenital opening when slight pressure is applied on the abdomen) should be selected for hormone injection. Human chorionic gonadotropin (hCG) and luteinizing hormone releasing hormone (LHRH) are the 2 most common hormones used. Both are easily available in the market.

Groupers are also successive spawners. They spawn for 3-4 days during the spawning season. Generally, eggs from the first and the fourth days of spawning are not of good quality. Eggs from the second and third days of spawning are usually of good quality and hence are used for stocking in the hatchery.

#### **For general operation**

1. *Provide the necessary support systems*– The necessary support systems have to be in place before the actual operation of the hatchery commences. The necessary supplies and materials should all be provided to ensure the smooth operation of the hatchery. They have to be provided in a timely manner in order to avoid inconveniences during the operation. In addition, the appropriate or the recommended kind/type of the material or supply should be purchased if possible. Proper planning is very important in this regard and everything can be facilitated only if funds are committed for the whole operation.





Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand are working together through the Bay of Bengal Large Marine Ecosystem (BOBLME) Project to lay the foundations for a coordinated programme of action designed to better the lives of the coastal populations through improved regional management of the Bay of Bengal environment and its fisheries.

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