

# Artificial breeding of Greater bony lipped barb (*Osteochilus melanopleura*)



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# Introduction

- ❖ Greater bony lipped barb belonged to *Osteochilus* specie.
- ❖ Widely distributed in different countries, e.g. Indonesia, Thailand, Malaysia, Laos, Cambodia and Vietnam.
- ❖ In Vietnam, greater bony lipped barb often appears at the end of the flooding season, from Oct. to Dec.
- ❖ It is a herbivorous specie, with algae and aquatic plants as the main feeds. Therefore, it possessed high potentials for small scale freshwater aquaculture.

# Introduction (cont.)

## Objective:

To identify the artificial breeding and nursing process for greater bony lipped barb (*Osteochilus melanopleura*) farming.

## Research activities:

- ❖ Maturation growing of broodstock in earthen pond.
- ❖ Induced artificial breeding with hormone.
- ❖ Development of nursing techniques for fries.

# Research methodology

**Monitor several hydro-physical and chemical parameters in the broodstock growing ponds:**

- ❖ Temperature: is measured daily at 7hrs and 14hrs.
- ❖ Dissolved oxygen: is measured weekly at 14hrs and 22hrs.
- ❖ pH: is measured once a week at 14hrs.
- ❖ COD: is measured once a week at 7hrs.

## Maturation growing of broodstock in earthen ponds:

Table 1. Growing time of greater bony lipped barb

	2002	2003	2004
Active growing	From Dec. 02 - Mar. 03	From Jan. – Mar.	
Maturation growing	From Apr. – Sep.	From Apr. – Sep.	From Apr. – Sep.

Pond area: 700m<sup>2</sup>

Farming density: 9 kg/100m<sup>2</sup> (11 individuals/100m<sup>2</sup>).

Table 2. Feed composition for growing greater bony lipped barb

	Active growing	Maturation growing
Bran (%)	40	40
Fish powder (%)	50	50
Blood meal (%)	10	10
Fish oil and vitamin E (%)	1	1
Protein (%)	32	30
Portion (%)	4	2

# Management of the farming environment

- Aeration is carried out in the growing ponds every day, from 23hrs to 6hrs of the next day in order to maintain the dissolved oxygen volume greater than 2.5mg/l.
- Water supply is carried out in order to maintain the pond depth of 1-1.2m. Water is changed 1-2 times/month, for about 20-30% of the pond water volume.
- Water is pump for 2 hours/day in the morning for fish stimulation during the maturation growing period.

## **Study of the sexual system and breeding criteria**

- Survey of the breeding criteria: breeding season, maturation rate, maturation coefficient, absolute breeding capacity, relative breeding capacity, ovulation rate, fertilization rate, hatching rate.





Photo 1. Checking matured broodstocks



Photo 2. Monitoring egg development

## Induced artificial breeding with hormone

**Table 3.** Stimulators used for artificial breeding of greater bony lipped barb

	PG (mg/kg)		LH-Rha ( $\mu\text{g/kg}$ )		DOM (mg/kg)
	Preliminary	Decisive	Preliminary	Decisive	Decisive
2002	2.3	4.6		100	10
2003	1.4	2		100	10
2004	1.7	2		100	10

The injection dosage for male fish is equal to a half of that for the female fish

## Method for sperm sowing and egg incubation:

- ❖ Sperm is sowed by dry method. Eggs are incubated in glass funnel or plastic tank with aeration and running water at low speed.
- ❖ Monitoring fish embryo development with optical microscope .



Photo 3. Egg incubation in Wayne tank



Photo 4. Egg incubation in a tank with aeration

# Fry nursing

- ❖ Part 1: Fries are nursed in a cement tank of 12.5m<sup>2</sup>, with density of 1,000-1,200 individuals/m<sup>2</sup> until they get 20 days of age. Juveniles are then moved to earthen pond of 200m<sup>2</sup> for further nursing to be fingerlings.
- ❖ Part 2: Fries are nursed to become fingerlings in earthen pond of 700m<sup>2</sup>, with density of 50 individuals/m<sup>2</sup>.





Photo 5. Fry nursing in cement tank

**Table 4.** Feeds used for nursing stages

Days of age	Feeds
1-10	Milk powder + moina
11-20	Broken pellet feeds
21-60	Fish powder + bran



# Results and discussion

## Hydro-physical and chemical criteria of the growing pond

- ❖ Temperature is changed from 29.5 – 36.50C, which turned to be the highest in March and April.
- ❖ COD is changed from 6.2 – 13.5 mg/l, which turned to be the highest in Feb., 18.2mg/l
- ❖ Dissolved oxygen reached 1.3 – 1.9mg/l in the early morning and 6.8 – 8.2mg/l at the noon time.



Photo 6. Environmental monitoring for the growing pond

## Biological breeding characteristics

**Photo 5.** Several biological breeding characteristics of greater bony lipped barb

Maturation rate (%)	65
Absolute breeding capacity (egg/female fish)	106,700 – 177,975
Relative breeding capacity (egg/kg female fish)	73,586 – 114,823
Number of breeding times per year	1-2
Time for re-maturation	30-120

## Feeds used for broodstock growing

**Table 6.** Compositions of feeds used for growing greater bony lipped barb

	Active growing	Maturation growing
Bran (%)	40	40
Fish powder (%)	50	50
Blood meal (%)	10	10
Fish oil and vitamin E (%)	1	1
Protein (%)	35	30
Portion (%)	4	2

# Results of artificial breeding of greater bony lipped barb

**Table 7.** Results of artificial breeding of greater bony lipped barb

	2002	2003	2004
Effectiveness time (hour)	6-8	5.3 – 6.5	6-7
Actual absolute breeding capacity (egg/kg)	30,874 – 56,472	40,385– 67,550	39,854 – 36,717
Fertilization rate (%)	10.4 – 45.7	40.0 – 64.3	31
Hatching rate (%)	58.9 – 98	49.0 – 50.3	40.59

## Results of nursing fries to fingerlings

**Table 8.** Results of nursing fries to fingerlings with 2-stage method

Day of age	Growth		Survival rate (%)
	Weight (g)	Length (cm)	
10	0.08 ±0.02	0.7± 0.2	
20	0.14± 0.06	1.6± 0.5	
30	0.51± 0.31	3.2 ±1.2	
40	1.02 ±0.84	4.5± 1.5	
50	1.71± 0.78	5.2± 1.1	
60	2.48 ±1.24	5.76 ±1.5	43.15

**Table 9.** Results of fry nursing in earthen pond

Day of age	Growth		Survival rate (%)
	Weight (g)	Length (cm)	
10	0.15 ±0.06	1.50± 0.10	
20	0.40± 0.18	1.83± 0.33	
30	1.01± 0.67	4.02 ±0.34	
40	1.4 ±0.9	5.35± 0.51	
50	2.73± 1.21	6.03± 0.38	
60	2.82 ±1.42	6.86 ±0.93	10.3



Photo 7. Fingerlings



# Conclusions and Recommendations

## • 6.1. Conclusions

- ❖ Breeding season of greater bony lipped barb lasts from April to September, concentrating mostly from May to July.
- ❖ The combination of PG stimulator + LH-Rha and DOM gives high and stable results of breeding.
- ❖ The relative breeding capacity was not high for the first generation.
- ❖ Survival rate, weight, and length of fingerlings nursed with 2-stage method are higher than that of direct nursing in earthen pond.

# Conclusions and Recommendations (cont.)

- **6.2 Recommendations**

- ❖ To continue study for improving the seed production process, enhancing maturation coefficient and rate of broodstocks, as well as increasing survival rate and weight of fries.
- ❖ To implement training and demonstration model for introducing and disseminating this specie.

*Thank you very much!*