

**DEPARTMENT OF FISHERIES  
THUA THIEN HUE PROVINCE**  
THE FISHERIES EXTENSION CENTRE OF THUA THIEN HUE PROVINCE  
(FEC)

**REPORT ON THE RESULTS OF  
THE PILOT MODEL IMPLEMENTATION NAMELY  
THE POLYCULTURE OF TIGER SHRIMP, RABBIT FISH AND  
GRACILARIA.**

*Venue:* Huong Phong, Huong Tra, Thua Thien Hue  
province  
*Affiliation:* Fisheries Extension of Thua Thien Hue  
province  
*Sponsored by:* IMOLA Hue  
*Extensionist:* Le Thi Bich Thuy

Department of Fisheries  
of Thua Thien Hue province

Socialist Republic of Vietnam  
Independence – Freedom- Happiness

The Fisheries Extension Centre  
of Thua Thien Hue province

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Hue, November 20<sup>th</sup> 2007

## REPORT ON THE RESULTS OF THE PILOT MODEL IMPLEMENTATION NAMEDLY THE POLYCULTURE OF TIGER SHRIMP, RABBIT FISH AND GRACILARIA.

### PART I:

1. **Pilot model names:** report on the results of the pilot model conduction namely the polyculture of tiger shrimp, rabbit fish and gracilaria
2. **Affiliation:**
  - *Sponsored organization:* IMOLA project and the FEC
  - *Host organization:* Fisheries Extension Centre (FEC)
3. **Venue:** Huong Phong commune, Huong Tra district, Thua Thien Hue province
4. **Project proponent:** Le Thi Bich Thuy
5. **Household involved:** Mr. Phan Nghia
6. **Objective:** Report on the results of the pilot model implementation namely the polyculture of tiger shrimp, rabbit fish and gracilaria in the contaminated-bottom pond will contribute to improving the condition of the pond and reducing the disease risks.
7. **Methodology:**

### 8. General evaluation:

*8.1 Implementation plan:* The pilot was conducted behind the expected stocking calendar. The performance; therefore, was inefficient. The delayed stocking accompanied by the impact of the flood occurring at the end of the crop caused loss to the green-spotted rabbit fish that had not yet been harvested.

*8.2 Environmental aspects:*

The implementation of this poly-culture in general has improved the environmental condition in the pond; environmental parameters seemed to be constant. Additionally, disease signals did not appear.

*8.3 Outcomes from the model implementation:*

As can be seen from this polyculture model, shrimps grew fast while the survival rate of the green-spotted rabbit fish was not high. Diseases did not appear in the culture pond and the water quality was good. All of these derived from the climatic characters of Thua Thien Hue province that is constantly prone to the flood influence.

*8.4 Feasibility of extension for the pilot:* This pilot can be applicable in the pollution infected low-tide area.

### 9. Conclusion:

The results achieved from the implementation of the model namely “the polyculture of tiger shrimp, rabbit fish and gracilaria in the polluted pond with the organically contaminated bottom has proved it a socio-economically meaningful and practical pilot that supports the farmers of contaminated low-tide area to find the alternative direction that helps to improve their economic condition and restoration of the farming area. The pilot also contributes to diversifying the

cultured species and getting the farmers out the interminable shrimp venture risks in some local regions. Given this background, the pilot can be multiplied in medium-scale in the region.

#### **10. Proposal:**

Currently, farmers can not be active in finding out the fingerling source for green-spotted rabbit fish. Furthermore, the price of the fingerlings is high. Therefore, we propose the IMOLA project, the Fisheries Extension centre of Thua Thien Hue and other related agencies to build the investment schedule working towards the production of green-spotted rabbit fish fingerlings via the artificial generation and nursery of natural fingerling source over the flood season. The purpose is to supply the fingerlings to the affected low-tide areas which was converted to the poly-culture to improve the environmental condition in Thua Thien Hue province.

The pilot seems to be efficient for flood-prone Thua Thien Hue province. To assist the farmers to start the stocking at the due time, IMOLA project, the FEC and related organization should distribute the appropriate schedule (March-April solar calendar) for starting the pilot.

## **PART II: CONTENT**

### **I. Preface:**

For the past years, the aquaculture is facing great challenges including the blooming of the shrimp diseases, the deterioration of the shrimp breed, the partial contaminated farming area and constantly changing-price market for the shrimp products that adversely impact the fisherman. Apart from some fish farmers who can get profit from their shrimp farming venture, other face the constant loss over the years. In many communes, farmers impossibly return the loaned money from the bank from year to year, especially those living in communes including Huong Phong, Hai Duong, Quang An, Quang Thanh, Quang Phuoc, Phu An, Vinh Giang, etc.

To find out the culture model and species with the capacity to improve the bottom condition and bring about the economic efficiency. We have conducted the pilot namely the polyculture of tiger shrimp, rabbit fish and gracilaria in the polluted pond with the contaminated bottom to minimize the organic pollution in the low-tide ponds in Huong Phong commune, Huong Tra district, Thua Thien Hue province.

### **II. Content of the pilot:**

#### **1. Venue and implementation scale:**

<b>No.</b>	<b>Involved household</b>	<b>Venue</b>	<b>Area (m<sup>2</sup>)</b>	<b>Pilot proponent</b>
1	Phan Nghia	Huong Phong commune, Huong Tra district	2,000	Le Thi Bich Thuy

#### **2. Sponsored by:** IMOLA project.

#### **3. Objective:**

The polyculture of Gracilaria, green-spotted rabbit fish and tiger prawn in the contaminated low-tide ponds that are unadaptable for the shrimps is to improve the ecological condition of the pond.

#### **4. Implementation related information:**

<b>NO</b>	<b>ITEM</b>	<b>PLAN</b>	<b>IN PRACTICE</b>
1	Mr. Phan Nghia	1 household	1 household
2	Area	0.2 ha	0.2 ha
3	Quantity of stocked fingerlings	Gracilaria: 1 ton units Green-spotted rabbit fish: 1,000 units Tiger prawn:6,000 units	Gracilaria: 1 ton units Green-spotted rabbit fish: 1,000 units Tiger prawn:6,000 units
4	Stocking density	Gracilaria: 1 kilo/m <sup>2</sup> Green-spotted rabbit fish: 0.5 unit/m <sup>2</sup> Tiger prawn: 3 units/m <sup>2</sup>	Gracilaria: 1 kilo/m <sup>2</sup> Green-spotted rabbit fish: 0.5 unit/m <sup>2</sup> Tiger prawn: 3 units/m <sup>2</sup>

### III. OUTCOMES:

#### 1. *Duration:*

NO.	DURATION	CONTENT
1	04/05 - 15/05/2007	Household selection and venue selection
2	15/05 – 03/06/2007	Primary instruction on the culture techniques, pond preparation and improvement.
3	06/06 – 07/07/2007	Stocking of shrimps and gracilaria
3	14/07–11/2007	Stocking, culture and harvest.

#### 2.1 Fingerling stocking

No.	Species name	Area	Stocking date	Quantity	Size
1	gracilaria	2,000 m <sup>2</sup>	04/06/07	1 ton	5-15cm
2	Green-spotted rabbit fish		14/07/07	1,000 units	8-10 cm
3	Tiger prawn		24/06/07	6,000 units	4-6 cm

#### 2.2 Environmental parameters:

Environmental parameters were measured every ten days, including:

No.	Checking date	pH	KH	S(‰)	PO <sub>4</sub>	NH <sub>3</sub>	NO <sub>3</sub>
1	04/06/07	7.0	72	11	0	0.03	0
2	14/06/07	7.0	72	12	0	0.03	0
3	24/06/07	7.5	108	15	0	0.03	0
4	04/07/07	7.8	108	15	0	0.02	0
5	14/07/07	8.0	100	12	0	0.03	0
6	24/07/07	8.0	116	20	0	0	0
7	04/08/07	7.7	116	24	0	0	0
8	14/8/07	7.8	108	15	0	0	0
9	24/8/07	7.8	108	15	0	0	0
10	04/9/07	8.0	100	12	0	0	0
11	14/9/07	8.1	100	17	0	0	0
12	24/9/07	7.8	90	18	0	0	0
13	04/10/07	7.0	72	0	0.1	0.03	0

Over the investigation process of the water quality parameters in the pond, pH, S (%), PO<sub>4</sub>, NH<sub>3</sub>, NO<sub>3</sub> and alkalinity lied within the tolerable line. Lime Zeolite 7ppm was distributed on June 10<sup>th</sup>, 2007. Between June 12<sup>th</sup> and September 24<sup>th</sup> 2007, the parameters in the pond were relatively stable; that was the reason why we only made the treatment to the pond when it was going to rain.

In addition, salinity together with the alkalinity in the pond were continuously monitored so that we could determine a necessary amount of water to be added to the pond.

### 2.3 Care taking and pond management:

Gracilaria performs as the food for the green-spotted rabbit fish. Additionally, it grows by absorbing  $\text{NO}_3$  and  $\text{PO}_4$  in the habitation. Furthermore, it also contributes to filtering the water, which leads to frequent change of the pond color. For that reason, the insurance of the suitable transparency to the pond to guarantee the hydraulic and chemical features to minimize the great changes influencing the shrimp pond, the combination between lime and fertilizer distribution was adopted.

#### \* Feeding:

- Feeding:

Use the gracilaria as the feed for the green-spotted rabbit fish. In addition, between July 21<sup>st</sup> and August 14<sup>th</sup>, we had to give the supplementary industrial feed to the fish.

- For the giant tiger prawn, Vitamin C was added to the industrial feed to intensify the resistant capacity to the shrimps.

- Feeding frequency: 4 times per day (6 a.m, 10.30 a.m, 8 p.m).

Morning feeding: 30 % of the daily amount

Second feeding: 20 % of the daily amount

Afternoon feeding: 30 % of the daily amount

Last feeding: 20 % of the daily amount

#### Disease treatment:

- Disease prevention plays a vital role in aquaculture in general because it is extremely difficult to treat affected fish and shrimps; high cost is involved and the effectiveness is not high. Ensuring the environmental factors within the appropriate level and maintaining the water quality, transparency and depth is the assurance for fish smooth development. For this poly-culture model, the clean pond bottom and stable water environment was always insured thanks to the poly-culture of gracilaria and green-spotted rabbit fish that are the two species able to clean the water and eat the organic humus.

However, due to the comparatively low alkalinity outside the pond in this region and the variable pond color as a result of high amount of gracilaria in the pond, we distributed fertilizers, Dominite and zeolite.

### 2.4 Investigating the growth speed of fish and shrimps after the culture period:

No.	Checking date	Species	Result	
			Average weight	Expected survival rate (%)
1	04/06/07	Gracilaria	Grow well	
2	14/06/07	Gracilaria	Grow well	
3	24/06/07	Gracilaria	Grow well	
		Tiger prawn	3-5 cm	95
4	04/07/07	Shrimp	Not yet measurable	90
5	14/07/07	Green-spotted	24 g	100

		rabbit fish		
		Tiger shrimp	5 g	85
6	24/07/07	Tiger prawn shrimp	52 g	87
		Shrimp	7g	81
7	04/08/07	Green-spotted rabbit fish	72 g	80
		Shrimp	11.5 g	77
8	14/8/07	Green-spotted rabbit fish	105 g	76
		Shrimp	20.5 g	73
9	24/8/07	Green-spotted rabbit fish	138 g	73
		Shrimp	25 g	70
10	04/9/07	Green-spotted rabbit fish	157	70
11	14/9/07	Shrimp	250 g (sold)	70
12	24/9/07	Green-spotted rabbit fish	177 g	70
13	04/10/07	Green-spotted rabbit fish	Loss as a result of flood	

### **Comment:**

Over the investigation for the growth of gracilaria, green-spotted rabbit fish and shrimp, the following comments have been drawn:

- Gracilaria is the most suitable feed for the green-spotted rabbit fish.
- The stocking density of Gracilaria of 1 kilo/ m<sup>2</sup> did not meet the feed demand for the green-spotted rabbit fish with the density of 0.5 unit/ m<sup>2</sup>. The density should be over 1.5 kilo/ m<sup>2</sup>.
- The stocking of shrimps and green-spotted rabbit fish are appropriate.
- From the outcomes of the poly-culture of Gracilaria with green-spotted rabbit fish and tiger prawn in Huong Phong commune, Huong Tra district; some practical conclusions can be mentioned including:
  - + The survival rate of tiger prawn was high (70%)
  - + The survival rate of green-spotted rabbit fish was low (30 %). As a result of the flood influence, 300 units were partially harvested on September 30<sup>th</sup> 2007 (the average weight of the fish is 200 g/ unit). The price of each kilo was 90,000 VND.

The remaining was estimated to be 400 units of green spotted rabbit fish and 30 kilos of shrimps , which were lost due to the flood occurring on April 10<sup>th</sup> 2007.

In this poly-culture the shrimp grew fast and helped to improve the pond condition and reduce the risk of shrimp loss.

### **2.5 Operation cost:**

- Fingerling purchase:
- + Tiger prawn: 6,000 units x 100 VND/ unit = 600,000 VND.
- + Green-tiger prawn: 1,000 units x 5,000 VND/unit = 5,000,000 VND.
- + Gracilaria 1,000 kilo x 1.500 VND/kilo = 1,500,000 VND.

- Feed : 180 kilo x 18,000 VND/ kilo = 3,240,000 VND
- Chemical = 2,000,000 VND.
- Total: 12,340,000 VND**

## 2.6 Harvest:

### - Harvested outcomes

No.	Species	Survival rate	Size	Productivity
1	Tiger prawn	70%	25 g	105 kilos
2	Cá Dìa	30%	200 g	60 kilos

### - Economic accounting:

Revenue:

- + Tiger prawn 105 kilo x 80.000 VND/kilo: 8,400,000 VND.
- + Green-spotted rabbit fish: 60 kilos x 90,000 VND/unit = 5,400,000 VND.

**Profit: total revenue – total expenditure = 13,800,000 VND – 12,340,000 VND = 1,560,000 VND.**

In case the weather is favorable, the model will be conducted to ensure the efficient culture time, the profit will be higher than the above-mentioned level.

The loss caused by the flood is 7,200,000 VND.

## IV. Experience from the model:

- *Implementation plan:* The pilot model was conducted behind the regulated schedule leading to the ineffectiveness. The late stocking followed by the influence of the flood caused loss to the nearly-harvested rabbit fish.

- *Environmental aspects:* The procedure of the model in general improved the polluted environment in the pond. Environmental parameters lied within the allowed limit (temperature: 25-31°C; salinity: 10-22; pH: 7.7-8.2); no diseases appeared.

- *Pilot results:* In general, shrimps had a fast growth speed with the high survival rate (70%) while this rate was not high in rabbit fish (30 %). The reason was because of the accompanying of late stocking and flood influence that caused the loss to the fish quantity; no disease appeared and the water parameters were constant. During the checking process, no mud was seen.

- *Expansion extension:* Due to the unstable consumption market in Thua Thien Hue and the rabbit fish source was mainly exploited from the naturee, the price for the fingerlings was high. Therefore, this pilot should be multiplied in the contaminated low-tide area with the purpose to improve the pond bottom condition.

### \* Evaluation on the causes leading to the low efficiency:

- On October 3<sup>rd</sup> 2007, Thua Thien Hue faced a huge flood; pond was flooded, the remaining rabbit fish that had not been harvested were swept away; the remaining was expected to be 20 % and deep buried in the mud to death.

### \* Recovery measures:

- The stocking time should be earlier (in March and April every yearly lunar calendar)

## **V. CONCLUSION:**

The results achieved from the implementation of the model namely “the polyculture of tiger shrimp, rabbit fish and gracilaria in the polluted pond with the organically contaminated bottom has proved it a socio-economically meaningful and practical pilot that supports the farmers of contaminated low-tide area to find the alternative direction and helps to improve their economic condition and restoration of the farming area. The pilot also contributes to diversifying the cultured species and getting the farmers out the interminable shrimp venture risks in some local regions. Given this background, the pilot can be multiplied in medium-scale in the region.

Currently, farmers can not be active in finding out the fingerling source for green-spotted rabbit fish. Furthermore, the price of the fingerlings is high. Therefore, we propose the IMOLA project, the Fisheries Extension centre of Thua Thien Hue and other related agencies to build the investment schedule working towards the production of green-spotted rabbit fish fingerlings via the artificial generation and nursery of natural fingerling source over the flood season. The purpose is to supply the fingerlings to the affected low-tide areas which are converted to the poly-culture to improve the environmental condition in Thua Thien Hue province.

The pilot seems to be efficient for flood-prone Thua Thien Hue province. To assist the farmers to start the stocking at the due time, IMOLA project, the FEC and related organization should distribute the appropriate schedule (March-April solar calendar) for starting the pilot.

**Director of FEC**

**Written by**

**Le Thi Bich Thuy**