PRAWN CULTURE WITH EM TECHNO LOGY

INTRODUCTION

The term prawn and shrimp are often used interchangeably depending on which part of the globe you are in. Prawns and shrimps may belong to the freshwater, egg-bearing family *Palaemonidae* or the marine, non-egg bearing Family Penaeidae. The UN Food and Agriculture Organization has adopted the convention of referring to all *palaemonids* as prawns and all *penaeids* as shrimps.

However, both the SEAFDEC AQD and the local farmers and hatchery operators use prawn to refer to *Penaeus monodon* or sugpo and prawn or shrimp interchangeably for the smaller penaeids.

Prospects

Fishponds and prawn farms are exempted from the coverage of the Comprehensive Agrarian Reform Law. This is an incentive to those who intend to venture in prawn farming, who have to catch up in the world market and strengthen their position in existing markets, especially Japan (48% of world market).

The United States accounts for about 28% of the world market for prawns and shrimps, followed by Europe (17%). India, China and Indonesia are the biggest producers of Black Tiger prawns, accounting for about 54% of global trade.

It is expected that the supply and demand gap to be 450,000 metric tons until the year 2000.

The South Korean quota system for prawns will soon be lifted. This market opportunity is more on head-on shrimps which is considered a semi-1uxury product.

China, due to its ever expanding population, has become a net importer of shrimps. It intends to concentrate on its white shrimp production to satisfy its expanding local market. This is a big opportunity for the Philippine shrimp and prawn industry to diversify and overcome its dependence on only one species-the Black Tiger.

Kinds of Prawns and Shrimps

Among the 300 species of penaeid prawns and shrimps recorded worldwide, only around 80 are commercially important in terms of capture and culture fisheries. In the Philippines, the following are the most economically important in terms of pond culture:

a) **Penaeus monodon** - giant tiger prawn or sugpo, Iukon or pansat in the native tongue. The biggest of the penaeid group (500-600 gms. offshore catch) or 30-60gm./ piece at intensive farming. Characterized by high survival rates of up to 90'/o in grow-out ponds. Survives a wide range of temperature and salinity levels and can tolerate over-crowding for a short time.

b) ***Penaeus indicus*** **and P.** ***merguiensis*** (white shrimp or banana shrimp), known as hipong puti or putian. Fries and adults of these two species resemble each other. They are fast growing. They range from 10-20g at high density and 20-30g at low density stocking within 3 months. Both can tolerate high salinity but cannot withstand rough handling.

c) *Metapenaeus ensis* (Greasyback shrimp), or the hipong suwahe/pasayan has a short growing period in ponds (2-3 months). Sizes range from 10-15g and are more resistant to handling.

Environmental Requirements of Prawns.

a. **Salinity.** A salinity range of 10-25ppt. is recommended for sugpo, Putian can tolerate up to 40ppt.

b. **Temperature.** The recommended optimum temperature range for good growth and survival rates of prawn is 25-300C. At lower temperatures, feeding stops and growth is affected, whereas at higher temperatures. DO level decreases and mortality increases.

c. **DO level.** The minimum acceptable DO level is 3-4ppm. Below 2ppm., prawns exhibit hyperactivity followed by swimming at the surface then death.

d. **pH level.** Optimum pH is 7-8.5. pH of 5 and below are lethal to prawns.

e. **Microflora.** The population of microorganisms in the pond is equally important in prawn cultures. Phytoplanktons are microscopic plants used as foods for prawn and shrimp larvae. The pond must have optimum population of these planktons. Studies have shown that up to 70% of the total oxygen used up by shrimps and fishes are due to phytoplanktons, bacteria and other microorganisms present near or on the pond bottom. With these regards, we recommend the use of EM technology in prawn farming. EM Technology EM stands for "effective microorganisms" which is a group of coexisting beneficial and non-pathogenic microorganisms of both aerobic and anaerobic types, such as, lactic acid bacteria, photosynthetic bacteria, yeasts and actinomyces. The major function of EM is "regeneration, without harming nature, including human beings, plants and animals." Microorganisms which have strong oxidizing effects are generally harmful to men, but those which have strong antioxidation effects are beneficial to men. Everything in nature is oxidized and putrefied. Antioxidants prevent oxidation and decay and helps maintain health by the elimination of excessive free radicals generated in the form of energy needed during the growth process.

Major functions of EM.

- Eliminate harmful viruses and insects and enrich soil microflora when applied to soil, resulting in improvement of crop production.
- Eliminate foul odor and diseases, and promote growth for livestock animals and aquaculture. Also, improve quality of eggs, dairy and meats.
- Treat effectively organic wastes and waste water, reduce sludge, and recycle resources at low cost and with high quality.

EM technology therefore, is a system wherein these microorganisms are utilized to attain good results from whatever purpose, which, in this case is prawn farming. The objectives of incorporating EM Technology in prawn farming are:

1. To decrease the capital outlay;
2. To raise them until they are 120-140 day old without any problem;
3. To improve the quality and increase the yield per unit area;
4. And to conserve nature and the environment.

Traditional science is incapable of resenting a viable explanation as to how EM makes all these possible. But when one accepts the fact all is deteriorated in the process of oxidation, the role of EM as antioxidant becomes self-explanatory.

CLOSED-CULTURE PRAWN FARMING WITH EM TECHNOLOGY

The scope of this recommendations includes only soil and water improvement. Efforts are concentrated on bringing the pond ecosystem to its natural balance by improving the pond microflora. Cultural practices in prawn operations are not included here

Land Preparation

After harvesting prawns, scrape the mud to remove the prawn excreta apply lime, cultivate and crack dry the soil.

Apply EM Bokashi-Aqua at the rate of 350 kg./ha. after 7 days and spray 1,000 liters/ha. EM-1 Activated Solution and dry for 14 days..

Improvement of Water Quality

Allow water intake up to 1.5-1.8 m high and while doing this, seed EM-1 Activated Solution at 1,500 liters/ha. and leave for 7 days before seeding prawn fries. Activate aerators 4-5 hours daily until stocking of fries.

Improving Artemia Population

To improve the population density of Artemia, spread EM-Bokashi-Aqua at the rate of 200 kg./ha. 7 days before seeding fries.

Fry Input/Stocking

Input fries at a stocking density of 30-50 pieces per square meter (300,000-500,000 fries). They should be launched in the early morning or in the evening. Be sure to acclimatise the fries (especially with the water salinity and temperature), to avoid early mortality. Stop aerators while stocking.

Growing and Rearing

At 10 days after stocking (DAS), seed EM-1 Activated Solution at 1,500 liters/ha. every 7 days until they are 2 months old.

At 60 DAS seed EM-1 Activated Solution at 1,500 liters/ha. alternately with EM-5, at the rate of 50 liters per hectare. The frequency of application is every 5 days.

At 75 DAS, seed EM-1 Activated Solution at 1,500 liters/ha. every 3 days until harvesting.

During the growing and rearing stage, if change in the normal color of the water is observed, apply Bokashi at 350 kgs./ha. using Bokashi bags. Hang Bokashi bags on strategic places in the pond.

Feed Preparation

Mix EM-1 Activated Solution at 1.5 liters per 10 kgs. of feeds. Leave the treated feeds for 4 hours before feeding.

Feed 5 times a day. Stop aerators while feeding.

CAUTION: DO NOT GIVE EXCESS FEDDS. Decomposing feeds at the bottom of the pond will produce noxious gases that are very detrimental to the prawns. Even very low levels of H_2S (0.1ppm) are toxic to prawns.

Tamarind and Garlic Extracts must be mixed to the feeds as Vitamin C supplements. (300 grms. and 200 gnns. Respectively for every 10 kgs. feeds.)

Water Monitoring

The pH of the water must be checked twice daily, morning and later afternoon. It should not be lower than 7.4. The difference in pH between morning and late afternoon should not be higher than 0.5. If ever, apply EM-1

Activated Solution at the rate of 1,500 liters per hectare.

If the color of the water becomes dark green, Apply EM-5 at the rate of 50 liters/ha. and wait for 4-5 days.

If the water drops to a very low level, apply 100 kgs./ha. of Bokashi Aqua. It must be broadcasted on the pond evenly.

The salinity of the pond water must not be lower than 5 ppt. P. *Monodon* grows well at 10-20 ppm. salinity.

Check ammonia and H2S level daily. Apply 3-4,000 liters/ha. EM-1 Activated Solution if ammonia level is high. This can be detected due to the black color of the soil and its characteristic foul odor.

Diseases

Disease outbreak may occur when the conditions in the pond becomes unfavorable to the prawns. It may be due to high levels of noxious gases, extreme temperatures, pH and/or salinity which will give pathogenic microorganisms a chance to infect. In which case EM-1 Activated Solution must be applied at 1,500 liters/ha. at the first sign of disorders.

Some *protozoans* and algae if present in sufficient amounts may inhibit molting. Apply EM-5 at 50 liters/ha. to induce molting.

In cases of presence of excess algae in the pond due to excessive feeding, aerators must be stopped at daytime and resumed at nighttime. Algae will then die and float. Remove them as soon as possible.

Recommendations

1. With the use of this technology, no chemicals such as lime, fertilizers, pesticides, etc. shall be used in the pond.
2. In cases of some problems related to growth and health conditions, increase seeding rate of EM- I Activated Solution/EM-5 but not more than 3,000 liters per hectare.
3. Monitoring of pond water must be done daily. Sampling must be done regularly to .be able to compute the estimated feed consumption. Sampling must be done early in the morning or at nighttime.
4. It is recommended that there be no water change throughout the whole cycle to establish the population of the Effective Microorganisms in the pond. Water change may be done only if it is the only and last resort.

Expected Benefits from EM Technology

With the use of EM Technology in prawn farming, healthy, clean and good uniformity of the harvest are expected. The consumers are supplied with prawns free from chemical residues. The prawns have longer shelf life also.

The incidence of diseases also decreases. As the population of the Effective Microorganisms in the pond increases, the population of the pathogenic microorganisms decreases. The conditions in the pond becomes very conducive to the growth of the prawns. Stresses due to noxious gases are greatly reduced, thus the prawns are less prone to diseases.

At four months, the expected weight is 30 grams per prawn.

Since this is high density stocking, monitoring is highly intensified. All aspects of production must be checked and supervised closely. Any mistake could be detrimental to our purpose. However, the risks are lowered with EM Technology incorporated in the system due to its efficiency in bringing balance in the pond ecosystem.

I. Projected Gross Sales/Crop/hectare

10,000 m^2 x 30 fries/m^2 = 300,000 fries x 0.80 survival = 240,000 prawns

240,000 prawns x 30 grns./prawn = 7,200,000 gms. = 7,200 kgs.

7,200 kgs. x P 450.00/kg. = P 3,240,000.00

II. EM Products Consumption Per Hectare - Prawn Closed Culture

	EM-1 A/S (1i)	EM-Bokashi(kg.)	EM-5 (li)
1. Pond preparation-	2,500	550	
2. Growing/Rearing-	25,500		450
3. Feeds	3,060		
	31,060	550	450

Cost o EM Products Crop hectare:

a) EM-1	: 155.3 li. x P 660.00/1i.	=	P 102,498.00
b) EM-Bokashi	: 550 kgs. x P 42.001li	=	P 23,100.00
c) EM-5	: 450 li. x P 300.00/li.	=	P 135,000.00
			P 260,598.00/crop/ha.

Average consumption per month:

P 260,598.00 = P 65,149.50/month

4 months

III. EM-Bokashi-Aqua

EM-Bokashi-Aqua is prepared using the following ingredients:

a. chicken manure – 40%

b. rice bran – 20%

c. charcoal – 10%

d. coco peat – 30%

EM Activated Solution - l:1:28 EM-1, molasses, and water respectively. Five liters of activated solution must be mixed with 25 kgs. of Bokashi materials. The moisture content is 30-320/0. age for one week or longer.

If the preparation is intended to be stored for a longer period of time,

Air Dry……in a shed for a maximum of 3 days, then

Sun dry……for I - 2 days.

For dry season, double up water volume (96 lit.), and apply double of solution for same weight of Bokashi.

For use of different organic substances, please consult with sales consultant.