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AQUA FARM NEWS



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"Better life through aquaculture"

IDENTIFYING SHRIMP FRY

The fry of penaeid shrimps are the postlarval or early juvenile stages of the life cycle. There are four groups of shrimp fry that occur in shore waters in considerable abundance. These may be quickly identified by their general pigmentation patterns (Fig. 1). The number of pigment cells on the sixth abdominal segment (here called PSAS) is an important and easily ascertained character for identification.

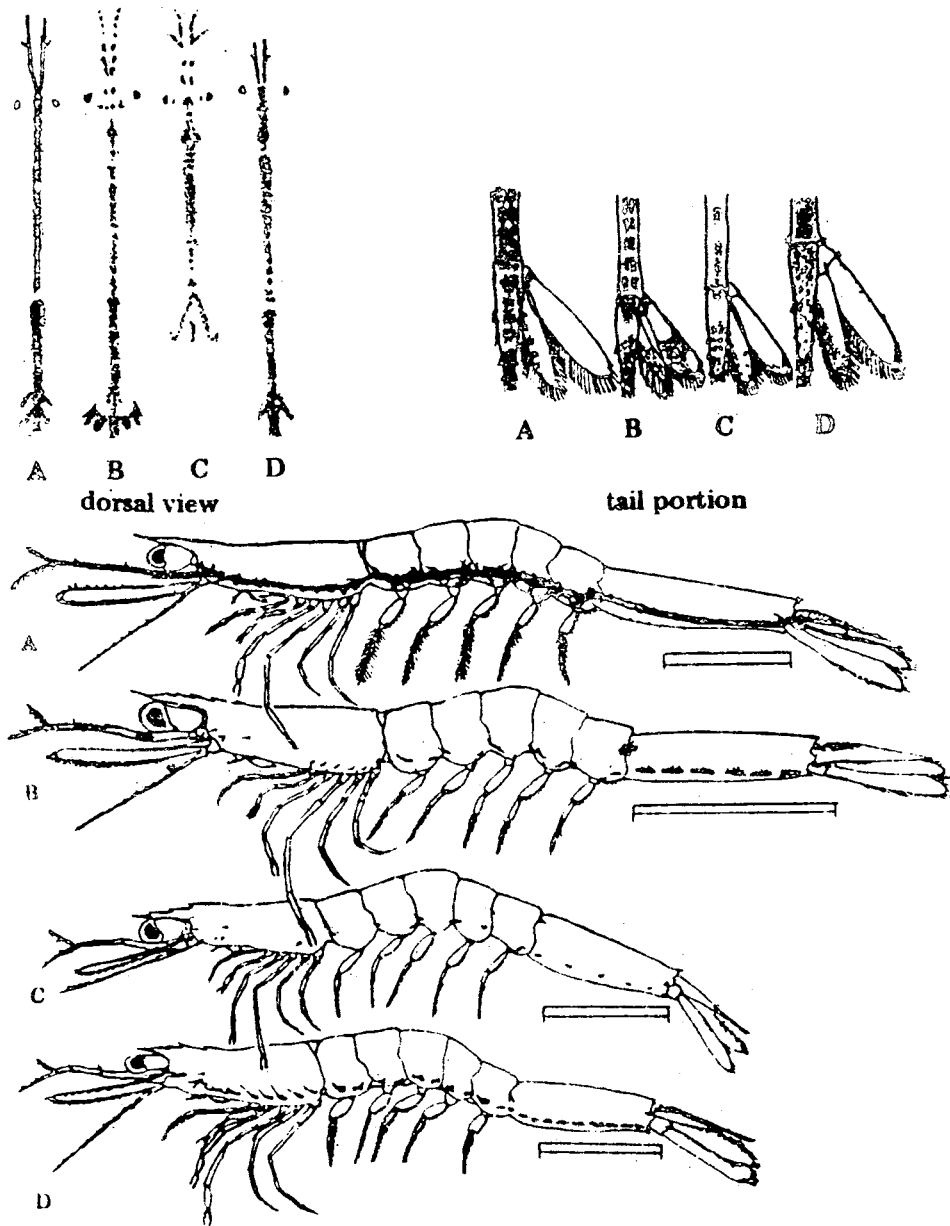


Fig. 1. Fry of different species of penaeid shrimps. A. *P. monodon*; B. *P. semisulcatus*; C. *P. indicus/merguensis*; D. *P. japonicus* group. Note pigmentation patterns on body and tail. Scales are 2 mm.

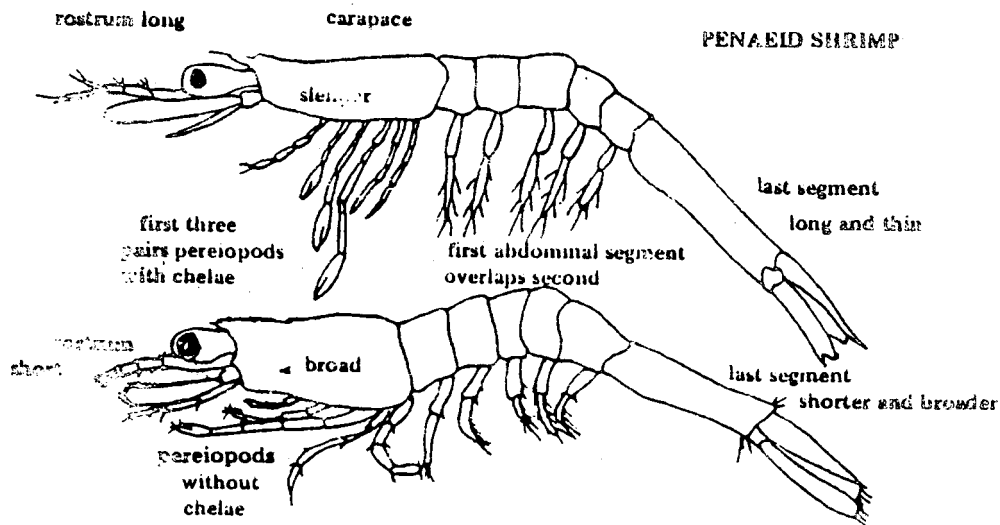
Penaeus monodon fry, while not so abundant in natural waters, is the most sought-after. They are the largest (1.4-3.1 mm in carapace length CL, average 2.6 mm) among all shrimp fry and can easily be picked out because of their dark brown-red streak along the entire body from the tip of the inner antennular flagellum to the tip of the telson. The rostrum is slender and straight or very slightly curved, 0.4-0.5 x CL in length. PSAS is greater than 13, dense and continuous.

P. semisulcatus fry are relatively smaller (1.2-3.0 mm CL, average 1.8 mm), and closely resemble **P. monodon** fry in general pigmentation, except that there is mid-way break in the pigmentation of the telson and the uropods. The rostrum is upturned, 0.5-0.8 x CL in length. PSAS is from 6 to 12.

P. indicus/P. latisulcatus fry also resemble **P. monodon** fry in having the continuous longitudinal streak or dark-brown or dull-green chromatophores. They are relatively shorter (1.2-3.0 mm CL, average 2.0 mm) but stouter. The rostrum is short, 0.2-0.3 x CL length, not reaching the tip of the eye.

Relative abundance of these four groups in shore waters may differ in place and time. In Iloilo, Philippines the rank of abundance was found to be: **P. indicus/P. merguensis** (65%), **P. japonicus/Platisulcatus** (18.5%), **P. semisulcatus** (11%), and **P. monodon** (5.5%).

Catches during fry collection include other crustaceans larvae that may be mistaken for penaeid shrimp larvae, such as the metapenaeid shrimps, caridean shrimps, mysids, and the sergestid shrimps (e.g. **Lucifer** and **Acetes**) (Fig. 2). Other species are easily distinguished, e.g., crab zoea and megalopa, and mantis shrimp (Fig. 2).



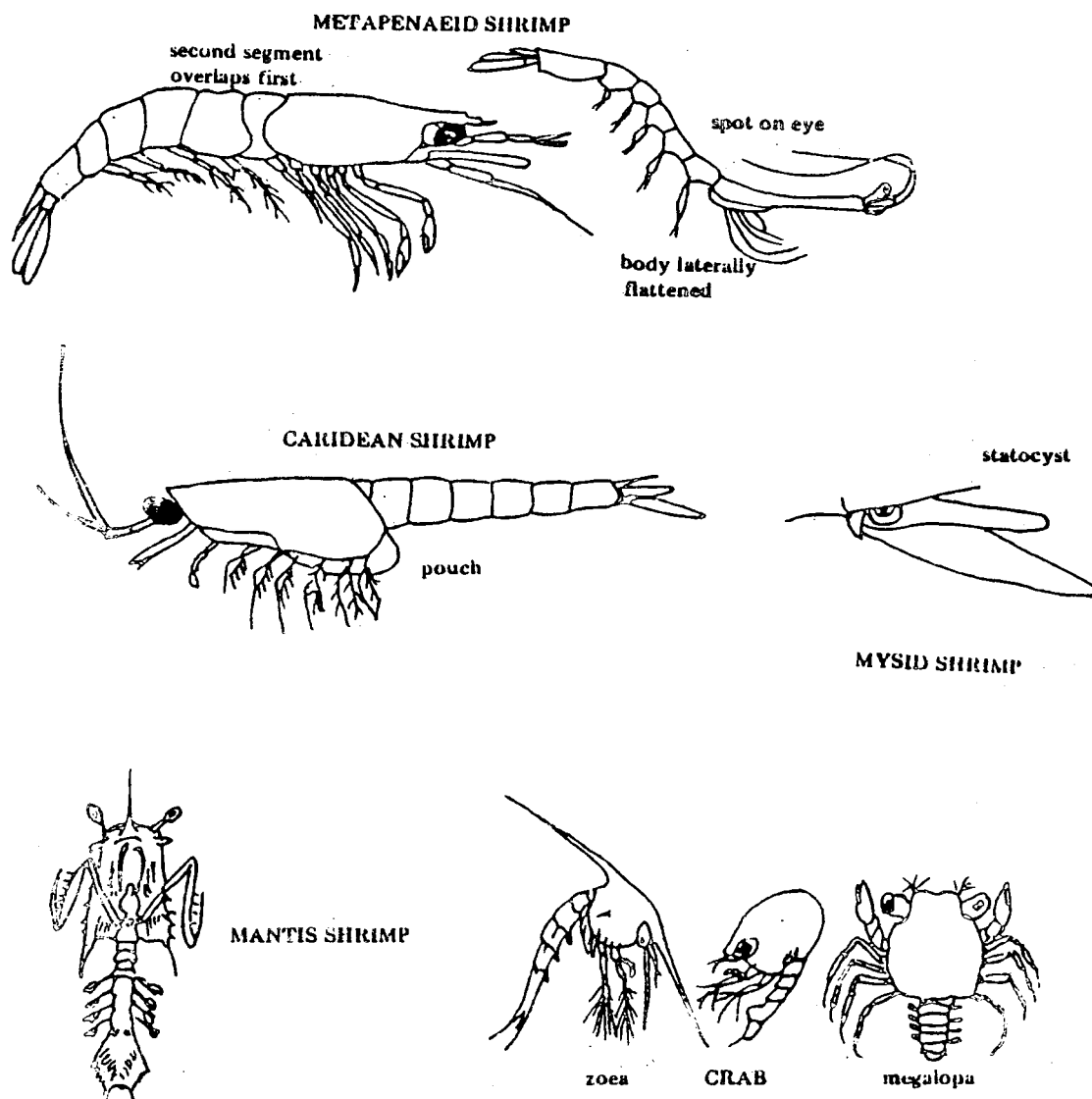


Fig. 2. Larvae of other crustaceans that co-occur and may be mistaken for penaeid shrimp fry.

Source: Bagarinao TU, Solis NB, Villaver WR, Villaluz AC. 1986. Important Fish and Shrimp Fry in Philippine Coastal Waters: Identification, Collection, and Handling. Aquaculture Extension Manual No. 10, SEAFDEC Aquaculture Department, Tigbauan, Iloilo.

PRAWNS NEED NUTRIENTS

Like any other living organism, prawns need essential nutrients or substances that will make them grow, regulate their body functions, and increase resistance to diseases.

The five major nutrients needed by prawns are (1) protein - 35-45%, (2) fats - 10%, (3) carbohydrates - 25%, (4) vitamins, and (5) minerals.

Protein and Amino Acids

Protein is primarily necessary for growth. It also contributes heat and energy. About 35-45% protein is needed by prawns in their diets.

Amino acids are building blocks for protein formation. There are around eighteen amino acids needed to form protein, but only ten are considered essential in the prawn diet. When one amino acid is lacking or insufficient in the diet, protein formation can be delayed or decreased resulting in a lower efficiency of the diet.

Some protein sources from animals and plants are:

Animal Sources

1. fish meal, both white and brown
2. shrimp meal
3. shrimp head meal
4. earthworm meal
5. squid meal
6. chicken entrails
7. mussel meat
8. meat and bone meal
9. toads
10. snails

Vegetable Sources

1. yeast
2. soybean meal
(defatted or full fat)
3. peanut meal

Fats or Lipids

Fats or lipids are necessary for prawns not only for their energy value, but also for the presence of fatty acids that are essential to their growth and survival.

Some fat or lipid sources are:

1. cod liver oil and other fish liver oils
2. squid oil
3. beef tallow
4. purified soybean oil
5. crude degummed soybean oil
6. peanut oil
7. corn oil
8. sunflower oil
9. red palm oil

Carbohydrates

Carbohydrates like sugars and starches are useful for their energy value. Aside from providing energy, they act as binders in the diet because of their "sticky" property. Cornstarch, potato starch, sago palm starch, wheat flour, agar or gulaman, and carrageenan are good binders.

Rice bran, corn meal, etc., aside from helping as binders, contain other nutrients needed by the prawn.

When used as ingredients, carbohydrate sources must be fresh and dry, not rancid and moldy.

Some carbohydrate sources are:

- | | |
|------------------------------|---------------------|
| 1. wheat flour (bread flour) | 5. sago palm starch |
| 2. rice flour | 6. rice bran |
| 3. cassava flour | 7. corn meal |
| 4. potato starch | 8. copra meal |

Vitamins and Mineral

Vitamins and minerals are important regulators of body processes. Although the exact amounts of vitamins and minerals required by prawns are not yet known, certain levels must be included in the diet.

So far, there are around 16 vitamins and 13 minerals included in the premix. Their functions are interrelated and each one meets a definite need. For example:

<u>General Types</u>	<u>General Functions</u>
o Water Soluble Vitamins such as C, B ₁ , B ₂ , biotin, choline chloride, inositol, p-amino-benzôic acid, niacin, and folic acid.	- For proper utilization of protein, carbohydrates, and fats.
o Fat Soluble Vitamins such as A, D, E, and K.	- For building resistance to infection
o The minerals calcium and phosphorus	- For the formation of prawn exoskeleton or shell and prevention of "soft-shelling"

Source: Lecture Notes of Dr. F.P. Pascual, Head of Farming Systems Section, SEAFDEC Aquaculture Department, Tigbauan, Iloilo. 1987.

WHAT IS THE BEST SPECIES TO CULTURE?

Would-be aquaculturists usually ask the question: What is the best species to culture? Whether it's freshwater, saltwater or estuarine species will depend on several factors. If the location of the farm is far from the sea and salt water is not available, then a freshwater species should be chosen. The following are desirable characteristics an organism must possess to be considered a suitable species for aquaculture:

Short life cycle

Adult size is attained within one culture season, thus income from sales will balance the budget and profits are expected sooner than with species that require several seasons to attain commercial size. The risk of diseases is also reduced and genetic selection is quicker. General examples could be tilapia, carp, catfish, some freshwater prawns, etc.

Food Habits

Herbivorous species (e.g., mullet) have the edge over carnivorous species (e.g., bass) because feeding requirements are less demanding. Detritivorous species like prawn and crayfish are easy to maintain since they will eat almost anything and will also feed on decomposing matter and natural productivity of the pond.

Environmental requirements

A species with a wide tolerance to changes in environmental parameters is desirable, allowing for a less intensive (less expensive) control of the water quality. Yabbie, catfish, and mullet are examples of hardy species.

Food

Food should be easy to obtain and of low cost. (Crayfish can be fed carrots, potatoes, chicken pellets). Other species have more specific requirements, thus increasing cost of production.

Predators and diseases

Species with few predators and diseases should be preferred.

Density of Culture

A successful aquaculture venture usually relies on culture with high densities. Schooling species such as mullet should be preferred over cannibalistic species such as prawns.

Activity

Inactive species (i.e., oysters, clams) or semi-active species (crayfish, prawn) should be preferred over active species (most fish species) since the energy provided by the food is then mostly utilized for growth.

Reproduction

Reproduction should be simple and fecundity high. Species with several and/or long larval stages should be avoided (i.e., **Macrobrachium rosenbergii**).

Harvesting

Harvesting must be simple and not very labor intensive.

Information

Species which have been widely studied should be preferred.

Acceptance

A reliable market (attractive prices and constant demand), is very desirable. Trout and prawns fall into this category for the local market. Crayfish, oysters, clams, etc. are well accepted overseas.

Source: Austasia Aquaculture Magazine, Vol. 1, No. 7, February 1987.

OPPORTUNITIES FOR GOLDFISH FARMING

Many fish farmers think that food fish are the only kind of fish worth growing but nothing could be further from the truth. Dollars that come from farming goldfish are as good as those that come from food fish.

Unlike food fish, people buy goldfish for their beauty and novelty. Monetary return is to the number and quality of a fish's appearance and not its weight. Usually, fish are sold at lengths between two and ten centimeters. Fish this small do not take long to grow. Feeding and operational costs are the big killers in most types of aquaculture so the quicker the fish becomes saleable, the better the return on your outlay.

Goldfish are cheap to grow. They grow well in ponds with a few water changes and thrive in water conditions that would kill other species. They are scavengers that will eat almost anything. Their wide temperature tolerance allows them to survive just about anywhere south of the tropic.

Breeding goldfish does not require high technology. If you are keen, suitably conditioned fish in aquaria can be induced to spawn at any time of the year by slightly heating the water. Fancy hormone treatment is not required. The fish will lay adhesive eggs on removable substrates such as bunches of weed or mops which can be transferred to other aquaria to prevent the adults from eating the young. Just about every aquarium shop has several books for sale that detail the breeding process.

Sale price is determined by the bloodline. A good quality, fancy strain will command a much higher price than a common mongrel but, as with most animals, the fancier strains are more delicate and require the most attention. If you want to grow fancy strains, it is important to remember that standards set for good quality bloodlines are as strict as for any livestock. Always start off with a good quality fish and once breeding starts, cull remorseless. Inbreeding can be a problem so judicious introduction of new blood is important.

As in all business, profit margins are influenced by the volume of turnover. A farmer producing a couple of thousand fish can sell his stock direct to aquarium shops and can expect a high unit price for his fish. A big producer may not find it worthwhile to go from shop to shop and will probably prefer to sell his fish to one of the big wholesalers. In this case margins are smaller.

Source: Austasia Aquaculture Magazine, Vol. 1, No. 11, June 1987.

P500 MILLION FUND FOR AGRI-EDUCATION

The agricultural technology education project, with a total cost of US \$24.75 million (roughly P500 million), will seek to rationalize and upgrade the country's agricultural education and training system, and improve the program's relevance to national development needs. The Asian Development Bank (ADB) has just approved a \$15.86 million loan of the Philippine Government for the project. The OPEC Fund for International Development has reportedly agreed in principle to lend \$6.5 million. The Philippine Government will shoulder the remainder of the project cost.

With the Education Development Projects Implementing Task Force (EDPITAF) as executing agency, the project will put up the first phase of an envisioned National Agricultural Education System (NAES), as well as an accreditation scheme and new agricultural technology education and non-formal training programs.

The target is to upgrade 21 selected agricultural schools and develop national agricultural universities, 3 zonal agricultural institutions, 4 pilot regional agricultural colleges, and 13 pilot provincial technical institutes of agriculture. In addition, the project will establish 11 farmer training centers attached to provincial technical institutes of agriculture as a pilot phase of the NAES. Provisions will be made for an optimum level of training equipment, consummable materials, consultancy services, staff development fellowships, and student scholarships, among others. About 6,400 man-months of fellowships will be awarded domestically to some 1,000 selected teaching and non-teaching staff to attend relevant staff development programs for improving their competence. In addition, about 180 man-months will be given to some 60 teaching and administrative staff for overseas fellowships. Other details of the project are being prepared by the EDPITAF. Estimated date of project completion is March 31, 1994.

With this agricultural education boost, the country's fishery, trade, and craftsman education programs are expected to improve to round off a total technical vocational enhancement scheme through schools and other training centers.

Source: DEPTHNews, Agribusiness Weekly, Mr. & Ms. Special Edition, June 3-9, 1988.

"ANG BINHI" - A NEW AGRI TV SHOW

A new TV program on agriculture went on the air May 28, 1988. Thus announced Roman Floresca, president of the Philippine Agricultural Journalists Inc. (PAJ).

The new TV show is "Ang Binhi" (The Seed). It goes on the air 9:00 to 10:00 every Saturday morning on Channel 13 (Channel 12 in Iloilo) and in five provincial stations.

The program's major sponsors are the Department of Agriculture, Philippine Crop Insurance Corporation (PCIC), and the Land Bank of the Philippines. San Miguel Corporation, the Department of Agrarian Reform, and the Department of Environment and Natural Resources will also sponsor the show.

The PAJ produces "ANG BINHI" while the Philippine Children's Television Foundation Inc. (PCTV), producer of the successful kiddie show, "Batibot," acts as line producer. The new program's primary aim is to disseminate information for agricultural and rural development. Each show consists of five or six segments - news analysis, price watch and market linkages, success stories and profiles in agriculture, a do-it yourself portion, special features, and the PAJ forum.

An editorial committee of PAJ officers is responsible for the program's content. Floresca is committee chairman. Members are Michael Alunan, Mon Banal, Noel Reyes, and Tony Rodriguez.

Source: Agribusiness Weekly, Mr. & Ms. Special Edition, May 27-June 2, 1988.

FISHERY EXPORTS EARN P6.4B IN '87

Fish and fishery products earned for the country a total amount of P6.4 billion in 1987 - 33% higher than the P4.8 billion exports receipts of 1986, reports the Bureau of Fisheries and Aquatic Resources (BFAR).

According to the BFAR Report, the 1987 export volume grew over the 1986 figure by a low 11%. This was due to the small - 2.4% - hike in domestic production which hit only 2.1 billion tons compared to the 1986 output of 2.08 billion tons.

In the breakdown of exports, shrimp and prawn topped the list with P3.2 billion. Tuna, seaweed, and shellcraft articles followed with P1.4 billion, P487.9 million, and P302.4 million, respectively.

Cuttlefish or squid contributed P214.3 million, fresh live fish P107.2 million, sea clamshell P97.3 million, bangus or milkfish P80.2 million, Capiz shells P63.5 million, sea cucumber P51.6 million, and other commodities P425.9 million.

Source: Agribusiness Weekly, Mr. & Ms. Special Edition, Vol. 11, No. 17, May 6-12, 1988.

LIST OF PRAWN PROCESSORS AND EXPORTERS

For the benefit of AFN readers who are into the shrimp industry, below is a list of prawn processors and exporters.

AA EXPORT AND IMPORT CORPORATION

Mr. George Tan
Sony Bldg., Churucca St.
Cor. UN Avenue, Ermita, Manila
Tel. 521-27-11 to 12

Buying Stations/Processing Plants

Mr. Rafael del Rosario
Bgy. Culasi, Roxas City
Tel. 21-11-16; 21-11-17
Cebu City
Tel. 5-41-45

Singcang, Bacolod City
Tel. 2-67-71

AGRIBASE VENTURES, INC.

Mr. Jesus Maglutac/Mr. Alberto Maglutac
Philbanking Bldg., Rm. 601
Ayala Makati, Metro Manila
P.O. Box 884, Makati, 03117
Tel. 815-06-58; 815-09-82

Buying Station/Processing Plant

Mr. Joseph Chan
Boilo Fishing Port Complex
Tanza, Boilo City
Tel. 7-62-31

AGRIMARINE FOOD PRODUCTS

Mr. Gerard A. Reyes
3rd Flr., The Plaza Bldg.
Greenbelt Center, Makati, Metro Manila
P.O. Box 2890 Manila
Tel. 817-22-06; 819-37-04 to 07

AGRO-MARINE MANPOWER CORPORATION

Mr. Arthur Ponce
Boilo Fishing Port Complex
Tanza, Boilo City
Tel. 7-34-04; 7-53-40

ALC FISHING ENTERPRISES

Mr. Renato Cicat
102 Pililia St.
Maypajo, Caloocan City, Metro Manila
Tel. 23-09-45; 22-39-16

AQUATIC MARINE BARTER CENTER, INC.

Mr. Abelardo Lagtapon
Singcang, Bacolod City
Tel. 2-04-31

AZURE PACIFIC TRADING CORPORATION

Ms. Wallace Wuthrich
251-A Gen. Hughes St.
Boilo City
Tel. 7-10-53

ERMA INDUSTRIES, INC.

Mr. Ernesto Marcelo
115 Northbay Blvd.
Navotas, Metro Manila
Tel. 23-30-40; 23-17-65;
22-27-57; 24-68-42

FARRAGUZ COMMERCIAL ENTERPRISES

Mr. Dick Farrales
4 St., Joseph Milton Hills
Diliman, Quezon City
P.O. Box 1, U.P. Post Office 3004
Quezon City
Tel. 95-13-90; 98-15-11

FILIPINAS SYNTHETIC FIBER CORPORATION

Ms. Ana Marie Coruna
14th Flr., BA Lepanto Bldg.
Paseo de Roxas, Makati, Metro Manila
Tel. 815-93-19

FIRST FARMERS TRADING CORPORATION

Mandalagan, Bacolod City
Tel. 2-10-21

FOOD TERMINAL, INC.

INTERNATIONAL TRADE DEPARTMENT

Mr. Rodolfo S. Ayaide
FTI Complex, Taguig, Metro Manila
Administration Bldg.
Tel. 828-00-81; 820-15-24
828-00-84; 820-14-72

INTEGRATED MARINE PRODUCTS AND TRADING CORPORATION

Mr. Gerry Ty
1702-1710 Taft Ave. Cor.
13 de Agosto St.
Pasay City, Metro Manila
Tel. 521-46-35; 57-10-62

INTER-BLOCK ENTERPRISES

Mr. Rafael S. Barrozo
MCS P.O. Box 9019
Makati, Metro Manila
Tel. 85-74-21; 815-15-72

ISLAND KING AQUAVENTURES CORPORATION

Mr. Cesar Concio, Jr./ Mr. Leo Gonzales
12/F BA-Lepanto Bldg.
Paseo de Roxas, Makati, Metro Manila
Tel. 815-93-19 loc. 252

JONES SEAFOODS SUPPLY

Mr. Singa Uy
37 Data St., Quezon City
Tel. 712-06-87; 732-03-29

JPV COMMERCIAL, INC.

Mr. Vicente Kua
703 Enterprise Bldg.
525 Q. Paredes
Binondo, Manila
Tel. 40-79-22

LAND SEA WEALTH COMPANY LTD.

Mr. Fermin Zabala
Rm. 704 Madrigal Bldg.
Ayala Ave., Makati, Metro Manila
Tel. 810-38-74; 810-22-04

LORENZANA FOOD CORPORATION

Mr. Noel L. Bagaloy
551 M. Naval St.
Navotas, Metro Manila
Tel. 23-07-61 to 63, 22-18-89

NEGROS PRAWN PRODUCERS COOP. MKTG. ASSN.

Mr. Edgardo Sarrosa
3rd Flr., MBL Bldg.
25th Lacson St., Bacolod City
Tel. 2-44-26

OCEAN LIGHT EXPORT AND IMPORT CORP.

Mr. Mariano Qua
1108 State Center Bldg.
333 Juan Luna St.
Binondo, Manila
Tel. 49-73-44; 49-73-77
Buying Stations:
Purok Ylac, 308 Sto. Nino St.
Bacolod City
Tel. 2-46-08
Arnaldo Blvd., Roxas City
Tel. 21-08-88
Mandalagan City
Tel. 8-13-27

ORIENT MARINE AND FISHING RESOURCES

Mr. Roberto Ordoñez
9th Flr., Tytana Plaza Bldg.
Binondo, Manila
Tel. 49-44-62; 26-11-29
20-03-10

Buying Stations:
Narra St., Cor. Hilado St.
Bacolod City
Tel. 2-26-56; 2-27-93
Cebu City
Tel. 7-40-01; 9-44-12

PACIFIC MARINE CORPORATION

Mr. Raul Custodio
247 Amapolo St.
Palm Village, Makati, Metro Manila
Tel. 815-35-70; 85-43-63

PHILIPPINE NARISCO CORPORATION

Mr. George Obashigawa
505 Northbay Boulevard
Navotas, Metro Manila
Tel. 22-18-67; 23-18-54

PUREFOODS CORPORATION

Mr. Rolando Cabredo
3rd Floor Green Top Bldg.
Ortigas Ave., Greenhills
San Juan, Metro Manila
Tel. 721-61-71 to 74

Processing Plant:
Iloilo Fishing Port Complex
Tanza, Iloilo City
Tel. 7-82-24

SAN MIGUEL BAY TRADING CORPORATION

Atty. William Enrile
116 Abella St., Naga City
Tel. 26-45

SAN MIGUEL CORPORATION

Mr. Reynaldo Mascardo
ANSCOR BLDG., Paseo de Roxas
Cor. Ayala Ave., Makati, Metro Manila
Tel. 819-45-12; 722-35-22

Processing Plant/Buying Station:
Sto. Nino St., Bacolod City
Tel. 2-99-87

Calatrava, Negros Occidental

SEATRADE INTERNATIONAL, INC.

Mr. Efren Vasquez
6/F Chempul Bldg.
851 Pasay Road
Makati, Metro Manila
Tel. 817-54-14; 817-54-38

Processing Plant:
Stall 629-630
Sirioin Road, Bldg. 6
FTI Complex, Taguig, Metro Manila
Tel. 817-04-23

SHRIMPLEX INTERNATIONAL CORPORATION

Sto. Nino St.
Bacolod City
Tel. 8-21-06
Rizal St., Lapuz
Iloilo City
Tel. 7-38-67
P. Gomez St.
Roxas City
Tel. 21-06-58

SMI FISH INDUSTRIES, INC.

Mr. Amado Santero, Jr.
2614 Suez St., Cor. Kakarong St.
Makati, Metro Manila
Tel. 85-10-91 to 95

Buying Station/Processing Plant:
Talisay, Cebu
Tel. 7-13-20
Bacolod City
Tel. 2-22-31

SUGECO-CEBU EXPORT CORPORATION

Mr. Manuel Frondoso
6 Jose Tiosejo St., Mandaluyong, Metro Manila
Tel. 78-49-86

Buying Stations:
Mandaue City
Tel. 8-18-81
Singcang, Bacolod City
Tel. 2-32-12

UNIFISH EXPORT AND IMPORT CORPORATION

135 7th St., F.B. Harrison
Pasay, Metro Manila
Tel. 831-39-29; 831-24-49
831-62-24

UNIMARINE RESOURCES CORPORATION

Mr. John Tiong/Mr. Virgilio Gonzales
2272 Pasong Tamo Ext.
Makati, Metro Manila
Tel. 85-73-21; 85-17-19
815-41-10

VMC FISH PROCESSING PLANT

Victorias Milling Company, Inc.
Victorias, Negros Occidental
Tel. 89-77-01

Source: Souvenir Program: 2nd National Seminar on Technical Considerations for the Management and Operation of Intensive Prawn Farming, April 28-May 1, 1988, Sugarland Hotel, Bacolod City.

PRODUCTS AND SERVICES EXEMPT FROM VAT

This memo from Secretary Carlos G. Dominguez of the Department of Agriculture is being reprinted for the benefit of AFN readers:

15 January 1988

DA MEMORANDUM

TO : All DA Officials and Employees

SUBJECT : Description of Agricultural Products and Services
Exempt from the Value-Added Tax

Section 103 of Executive Order 273, introducing the value-added tax (VAT) effective January, 1988, transactions involving the sale of agricultural products and services as described below are exempt from the VAT:

1. Sale of nonfood agricultural marine forest products in their original state by the primary producer or the owner of the land where the same are produced.

2. Sale (at all levels of transaction) or importation in their original state of agricultural and marine food, products; livestock and poultry of a kind generally used as, or yielding or producing food for human consumption; and breeding stock and genetic materials thereof.

Products shall be considered in their original state even if they have undergone the single processes of preparation for the market, such as freezing, drying, salting, smoking or stripping. Polished and/or husked rice, corn grits and raw cane sugar shall be considered in their original state for purposes of exemption.

3. Sale or importation of fertilizers, pesticides and herbicides; chemicals for the formulation of pesticides; seeds, seedlings and fingerlings; fish, animal and poultry feeds, and soya bean and fish meals.

4. Services by agricultural contract growers and milling for others of palay into rice, corn into grits, and sugarcane into raw sugar.

5. Sales and/or services performed by persons other than those mentioned above whose aggregate annual gross sales and/or receipts do not exceed P200,000.

All Officials and employees of this Department and its Bureaus and attached agencies are directed to disseminate the above information for the guidance and benefit of the general public.

Your cooperation is hereby enjoined.

(Sgd.)

CARLOS G. DOMINGUEZ
Secretary

ATOP SUMS UP ONE-YEAR ACCOMPLISHMENTS

ATOP, a convenient acronym for Aquaculture Technology Outreach Program, sums up its accomplishments after one-year of existence. A joint undertaking of SEAFDEC AQD and the Technology and Livelihood Resource Center (TLRC), ATOP was one-year old last May 4, 1988. The Memo of Agreement was signed by Mr. Jose M. Kalaw, Jr. for TLRC and Dr. Veravat Hongskul, SEAFDEC Secretary-General, for SEAFDEC and AQD on May 4, 1987. However, its implementation was not carried out until the signing of the Supplemental Agreement by Mr. Kalaw and Dr. Lacanilao on July 4, 1987.

ATOP, was conceived to come up with the following outputs: technology communication materials for all forms of media; technology publications, correspondence, films and video; trainings/seminars/forums/workshops; information management and data banking activities; and financing program for aquaculture technology livelihood projects.

The one-year accomplishment of ATOP (July 1987-June 1988) includes the following:

1. Technology Training

Aquaculture Seminars conducted in Metro Manila. These were Prawn Hatchery and Nursery Operations (4 sessions); Prawn Culture (Grow-Out) and Management (4 sessions), Marine Finfish Hatchery (3 sessions, 1 was cancelled), and Freshwater Aquaculture (1 session).

Aquaculture Outreach Seminars in the Region (Alay Palaisdaan). Seven regions have been served involving 16 sessions: Region II (Tuguegarao, Cagayan); Region IV (Sta. Cruz, Marinduque), Region V (Mercedes, Camarines Norte; Magallanes, Sorsogon); Region VI (Pototan, Iloilo; Roxas City; Kalibo, Aklan; San Jose, Antique; Iloilo City); Region VII (Cebu City; Calape, Bohol); Region VIII (Catarman, Northern Samar; Tacloban City); and Region IX (Pagadian City; Isabela, Basilan).

Seminar/Workshop for AQD Staff. Three sessions were conducted for AQD staff: Popularization and Utilization of Aquaculture Technology (11-13 June 1987, TRS); Effective Teaching (24-28 August 1987, TRS); Effective Teaching (02-05 September 1987, BFS).

2. Technology Publications

Three kinds of publications are in various stages of production: leaflets (one spread, covering one subject matter, highly illustrated and written in popular style); pamphlets (carry more details, 8-25 pages, include more distinct topics with specific examples, written in popular form); manuals (more than 25 pages, include more technical information and content of the subject matter).

3. Technology Films/Video

These are complete training courses recorded in video tapes (maximum of 15 hours) with background footages on specific aquaculture activity. Twelve video course titles were submitted by AOD for production by TLRC.

4. Technology Correspondence

Aquaculture correspondence coursewares are also going to be used as materials in outreach training programs through the postal communications system. The materials are self-contained. Five coursewares are being readied for dissemination.

5. Technology Data Banking and Promotions

Aquaculture technologies are popularized through the tri-media system. For this, TLRC was provided with copies of Asian Aquaculture and Aqua Farm News. Exchange of information through existing publications is being carried out.

Source: AquaDept News, internal newsletter of the SEAFDEC Aquaculture Department, June 15, 1988.

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