1989

Aqua Farm News Volume 07(05) September - October 1989

Aquaculture Department, Southeast Asian Fisheries Development Center

ISSN 0116-6573

AQUA FARM NEWS

Produced by the Publications Section
Information Division, SEAFDEC Aquaculture Department
as a production aid for fish farmers and extension workers

Vol. VII No. 5
September-October 1989

IN THIS ISSUE:

SEAFDEC "Better life through aquaculture"

Aqua Farm News is published bimonthly by the
Publications Section
Aquaculture Department
Southeast Asian Fisheries Development Center
P.O. Box 256, Iloilo City, Philippines

ISSN 0116-6573

In citing information from AFN, please cite the institutional source which, in some articles, is not necessarily SEAFDEC Aquaculture Department. Mention of trade names in this publication is not necessarily an endorsement.

Subscription rates:

Local - ₱40.00 per year
Foreign - US$26.00 per year (including air mail postage)

Please make remittances in Postal Money Order/Bank Draft/Demand Draft payable to **SEAFDEC Aquaculture Department.**

MARINE ENVIRONMENT: CONSERVATION AND UTILIZATION

Man's wanton use of his environment has taken its toll in the rapid dwindling of resources. In this issue, we focus on marine waters - how the same have been disabused through cyanide fishing, dumping of organic and industrial wastes, and the destruction of coral reefs brought about by **muro-ami**.

Man himself could hasten the restoration of his marine environment through proper conservation and utilization. Starting with the young, SEAFDEC/AQD sought to instill this in children aged 10 or below in its "Save-the-Fish" poster-slogan contest (Item One). On the other hand, the International Marinelife Alliance Philippines tries to combat cyanide fishing through its net-training program (Item Two). The deadly red tide phenomenon is a stern warning not to pollute the seas (Item Three) while representatives of ten government and non-governmental organizations have appealed for the continuous banning of the destructive **muro-ami** fishing method (Item Four). Meanwhile, the drive goes on for the installation of concrete artificial reefs (Item Five) needed to "ensure permanent habitats for marine organisms that will be the basis for a food chain to support new fish populations." And sustenance fishermen along the coastline get protection of their fishing grounds from a **Bantay Dagat** resolution (Item Six).

Item One: Conservation from the Children's Viewpoint

A total of 529 children from the five provinces in Region VI expressed their idea of conserving fisheries and aquatic resources in entries submitted to the **"Save-the-Fish" Poster-Slogan Contest** sponsored by the SEAFDEC Aquaculture Department (AQD).

The slogans ran the gamut of the degradation of the environment and the consequent depletion of fish harvest. The unifying theme of all the entries was ecological concern.

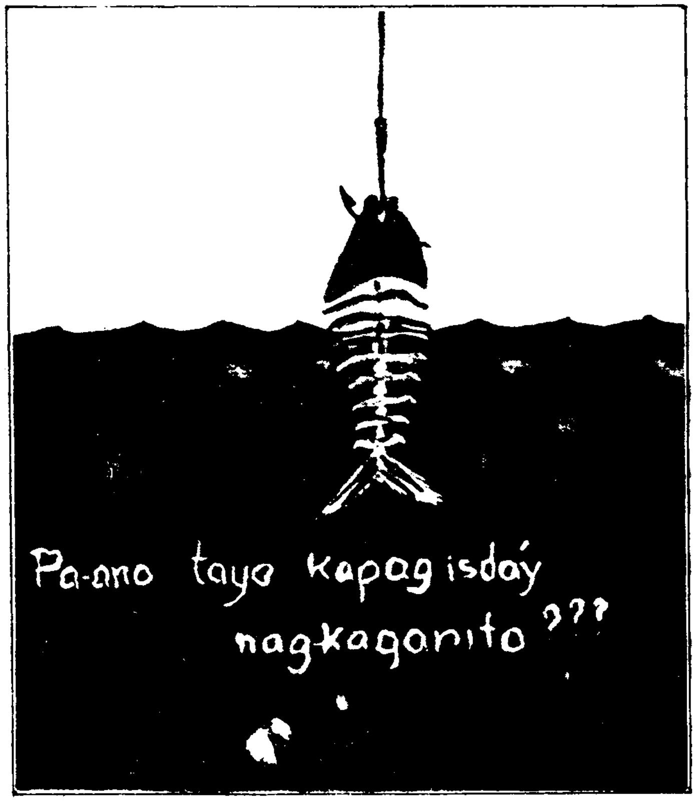
Lariza P. Duenas of Jaro, Iloilo City won the first place with her slogan **"Paano tayo kapag isda'y nagkaganito?"** A third grader at the West Visayas State University, she received the first prize of P10,000 at the awarding ceremonies last October 18, 1989.

Stanley Rey Gallermo of Rizal Elementary School, Bacolod City and Febray G. Lapidante of Jaro II Elementary School, Iloilo City tied for second place and got P7,000 each. Their slogans are **"Tama na! Isda'y unti-unting napupuksa"** and **"Ikaw... ako magtulungan ... Isda'y ingatan,"** respectively.

Third place with a cash prize of P5,000 went to Christy Jill Marie Roquero of Alimodian, Iloilo with the slogan **"Dumi't dinamita ibasura . . . Isda'y sasagana."** Trophies were added to the cash prizes of the major winners.

Ten consolation prizes of P1,000 each were won by the following with their respective slogans: Ramil Barcelona of Neg. Occ., **"Plant Trees, Save Fish;"** Nino Milan J. Andrade of Aklan, **"Bawa't punong pinapatay isda'y nadadamay;"** Kinda N. Ello of Sibalom, Antique, **"Bawa't isdang mailigtas,**

mapapakinabangan bukas;" John Victor Villareal of Arevalo, Iloilo City, **"Set free tomorrow's bounty;"** Sheryll E. Gildore of Sara, Iloilo, **"Huwag! Madadamay isdang walang malay;"** Raphael M. Palacios of Bacolod City, **"Save fish, save the world;"** Deddah Desiree Tarol of Oton, Iloilo, **"Huwag ngayon ... buntis ako!;"** Pamela Joy B. Zoluaga of Jaro, Iloilo City, **"Isda't puno pangalagaan, handog pangkinabukasan;"** Pampelo Custodio of Pres. Roxas, Capiz, **"Bigyan laya maliit na isda;"** and Ryan D. Orig of Dumangas, Iloilo **"Isda'y tulungan, iligtas sa kasamaan."**



First place won by Lariza P. Duenas, West Visayas State University, Iloilo City.

Launched last July 7, 1989 during AQD's 16th Anniversary Celebration, the contest was part of the research institution's contribution to the national drive to protect and conserve fishery resources. It was aimed at educating children aged 10 and below on the negative results of improper utilization of fisheries and aquatic resources. With the parent-child partnership in the preparation of entries, the value of resource conservation was hoped to be inculcated.

Item Two: Cyanide Fishing and the International Marinelife Alliance Net-training Program

Cyanide Fishing

The use of sodium cyanide (NaCN) for the capture of marine aquarium fish started in the Philippines in 1962, and the use has grown. About 80-90% of such fish exported are captured using NaCN. About 80% of the marine aquarium fish sold worldwide come from the Philippines. The International Marinelife Alliance (IMA) estimated that the export of marine fish is worth about US$10 million to the Philippine economy. Philippine export statistics underestimated the value because of underdeclaration by exporters of the number of fish and their weight.

An unpublished study by the Coral Reef Research Section of the Bureau of Fisheries and Aquatic Resources (BFAR) found that repeated exposure to cyanide kills corals. Destructive fishing methods such as blast fishing, **muro-ami, kayakas** and illegal trawling are also destroying the reefs. It is estimated that 10% or more of the 600,000 small-scale fishermen use explosives in the Philippines. According to BFAR's Conservation and Law Enforcement Division, it is difficult to keep tab on the number of blast fishermen, for it can go as high as 50% of the total municipal marine fishermen depending on the season and the demand for food fish. About 2,500 fishermen use NaCN to capture aquarium and food fish. There is an illegal trade in live groupers caught with NaCN to supply Hong Kong restaurants.

Danger to man and fish. Cyanide is rapidly absorbed across the skin of collectors who routinely handle cyanide tablets. During 1986 and 1987, this author had the opportunity to interview fish collectors from Bolinao, Pangasinan. They had dry skin lesions which are indicative of cyanide-induced dermatitis. They also complained about fatigue. Some of them had red hair, which may have resulted from cyanide exposure. The long-term effects on human health of diving in clouds of cyanide and eating cyanide-poisoned fish need to be studied by medical experts.

Cyanide causes liver and kidney damage and degeneration of the reproductive organs of the fish. Fish gametes are also damaged. Marine fish exposed to cyanide exhibit higher rates of respiration, intensified coloration and often appear to be blind. It is likely that cyanide in the blood blocks the action of enzymes involved in respiratory metabolism and causes neurological damage similar to the effects documented in cyanide-exposed mammals. When NaCN dissolves in water, it dissociates to form hydrocyanic acid (HCN). The HCN damages the lining of the anterior intestine and stomach. Marine fish eat ravenously, but they often slowly starve to death. The destruction of the lining of the anterior intestine and stomach prevents the digestion of food. Marine fish which escape capture after cyanide exposure may also die on the reef. Most of the aquarist's fish collected with cyanide die within two months.

IMA Net-Training Program

IMA is a nonprofit conservation organization concerned with protecting biological diversity and protecting marine environments for the benefit of local people. IMA has developed a village-level program to train Filipino fish collectors to use fine-mesh nylon barrier and hand nets. This alternative method has been shown to be more efficient, more cost-effective and environmentally acceptable. The program involves above-water training in basic reef ecology, conservation and management, diver safety, proper methods for handling and packing aquarium fish, and discussion of fish capture methods.

IMA is concerned about the need to implement marine conservation and management programs in the Philippines. A number of nonformal education and conservation programs at the village level have shown that protection of coral reefs and their fisheries requires the participation of local people. After all, protecting these resources is for their benefit.

IMA Philippines is interested in working with government and other non-government agencies to obtain funding to implement village-level coral reef management. This will involve education programs for fishermen to help halt destructive fishing methods. It will also involve mariculture and other alternative livelihood projects to create jobs, while reducing fishing pressure on the reefs.

Source: Peter J. Rubec, "Cyanide Fishing and the International Marinelife Alliance Net-Training Program," **Tropical Coastal Area Management,** April 1988.

Item Three: The Red Tide Scare

What really is the Red Tide?

Red tide is a biological phenomenon, a seasonal bloom of flora in the ocean composed of unicellular algae, mainly of the genera **Pyrodinium, Peridinium, Ceratium, Gonyaulax** and **Gymnodinium.** These species may multiply rapidly reaching population levels of several hundreds per milliliter of seawater, thus tinting the water red or dark brown. Intense sunlight in summer, lasting for several months, enhances a high rate of photosynthesis in these organisms. Higher metabolic rate speeds up population increase through repeated cell division. Such conditions also favor the resting or dormant cells to become activated.

The warming of the upper layer of the sea, the relatively high salinity and stability of the water are ideal conditions for algal bloom.

Abundance of organic detritus which are effuents of rivers and canals, including other wastes that are dumped into the sea, directly and indirectly provide food nutrients to red tide algae contributing to a large extent to the sudden increase of population. Foremost of these are nitrates and phosphates.

Cut off from the ocean currents, bays and coves become the abode of red tide. Here, shellfish, crustaceans, and various pelagic fishes feed heavily on the phytoplankton, accumulating the toxin in their bodies in the process.

The Department of Health (DOH) and the Department of Agriculture (DA) declassified the following marine species as potential PSP (paralytic shellfish poisoning) carriers: green bay mussel (**tahong**), oysters (**talaba**), saltwater shrimp (**sugpo**), saltwater crabs (**alimasag**), fairy shrimp (**alamang**), anchovies (**dilis**), and **halaan** fish.

The DOH and DA announced that cultured (fishpond-grown) fish, prawns, shrimps, and crabs are safe. Likewise, saltwater fishes, as long as their gills and intestines are removed, are safe to eat.

What happens when one eats a PSP-carrying fish, say tahong?

Generally, by weight, the body can tolerate mild quantities of PSP, but even then the symptoms are quite alarming.

For chronic cases, according to Dr. Willy Pastor, field epidemiologist of DOH, the first sign of PSP poisoning is tingling of the lips, tongue and gums, gradually turning into numbness starting with the mouth, extending out to the neck, arms, fingers, and down to the legs, and toes. Parasthesia turns to numbness, and in severe cases, to ataxia and general motor incoordination. There is a feeling of lightness as if one is "floating in air." Voluntary movements become increasingly difficult and speech becomes incoherent.

In extreme severe cases the victim suffers stiffness and general weakness. Breathing becomes difficult and pulse rate increases. In twelve hours the victim suffers muscular paralysis, respiratory paralysis and cardio-vascular collapse which become the ultimate cause of death. Also, there is dysthesia which is reverse cold and hot sensation. This is experienced with ataxia and other acute symptoms.

Is there an antidote to PSP?

There is no known antidote once PSP has reached the blood stream. However, at earliest indication, the poison should be flushed out, emptying the stomach to prevent further absorption. In Samar, it is simple folk remedy of the fresh coconut milk, or coconut oil immediately upon the discovery of poisoning in order to induce vomiting and discharge.

PSP attacks the nerves thus causing paralysis. The toxin is acid-stable and cannot be destroyed by cooking since it can tolerate temperature as high as 250^{o}C. It cannot be destroyed by salting or fermentation either, so that it can persist in dried fish and **bagoong**. It is believed that PSP can be neutralized by basic drugs, possibly sodium bicarbonate, but this is subject to extensive research and evaluation.

Dr. Pastor recommends the complete removal of the intestinal parts of the fish, including the gills. For shrimps, the cephalothorax or "head" should be removed. In the case of crabs, the **aligi** or fat, and gills should be discarded. These parts contain high concentration of PSP and should not be given to pets and other animals.

How is red tide controlled?

Nature provides the answer although man has an important responsibility to minimize its occurrence and lessen its effects. A strong, continuous rain is claimed to "wash" out the red tide from the bay. Partly so, but the discharge of freshwater will reduce salinity which checks population growth. Also, turbidity of water brought about by the rain reduces sunlight penetration in the photic layer of the water thus reducing rate of photosynthesis, and metabolism and population growth as a consequence. As the intertropical convergent zone moves downward with the coming of autumnal solstice, cloudiness progressively increases, reducing sunlight intensity. Soon the cold season arrives and the warm upper layer of the sea mixes through convection and upwelling. These unknown mysterious ways of nature put the red tide to rest.

But the millions of cells will not entirely perish or die. Some turn into resistant resting cells, encysted in cell wall. They remain in a state of turpor buried in soft mud at the continental slope of the sea waiting for another opportunity the next year.

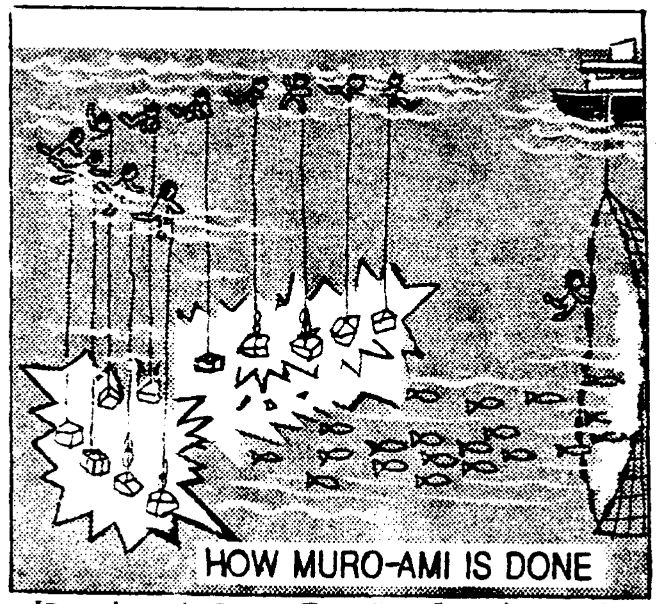
Meantime, man continues to dump organic and industrial wastes into the sea, fouls up the rivers, unloads tons of silt through the waterways, converts mangrove forest into fishponds, continues to build a "jungle" of traps and shellfish beds, and pushes farther his economic plans to "farm the sea."

Man's effort to tap the resources of the sea is often done indiscriminately and unwittingly. His gains may be obliterated by just one natural phenomenon. The paradox of achievement and failure is best illustrated by thousands and thousands of people who derive their living from marine resources and lamently find themselves in the proverbial shoes of the old mariner. Then, too, the terrible agony of poisoning and of death of many can only be equalled by those in ancient times.

Indeed the red tide is a grim reminder of Nature's reactionary power against man's folly and ignorance.

Source: Abercio Rotor, "Red Tide Scare - Deadly Algal Bloom Spawned by Indiscriminate Seafarming," **Gintong Butil,** Vol. XV, No. 7, 1988.

Item Four: Muro-Ami - Destroying the Bounty of the Sea



(Reprinted from The Manila Chronicle, Oct. 11, 1989)

Muro-ami is a Japanese method of fishing introduced by Okinawan fishermen in the Philippines in the 1930s. It is an efficient way of catching difficult-to-harvest reef fish - such as **labahita (Acanthurus bleakeri** or surgeon fish) and **dalagang-bukid** (**Caesio chrysozonus** or golden Caesio) - using hundreds of swimmers and divers and a movable bag net with two detachable wings.

Data show that from 1960 to 1975, among the commercial fishing methods, **muro-ami** has consistently yielded the largest catch competing with trawl fishing for efficiency. However, annual fish catch has declined because of damage to coral reefs, siltation due to forest denudation, pollution, and overfishing.

In **muro-ami**, divers, without gear except goggles, set the nets at the bottom of the sea in the shape of an arc. A cordon of swimmers or "mangangabog" then encircles the reef area and jigs their scarelines - polyethylene ropes, tied with white plastic strips, and weighted with two-link chains or rocks - to drive the fish toward the nets.

Muro-ami is harmful on two counts: it destroys coral reefs and exploits labor. Many times, marine biologists and conservationists say, the scarelines hit the corals, chip them and, because of the frequency of **muro-ami** fishing, eventually damage them. Scientific estimates show that it takes 35 to 50 years for a levelled coral reef to recover - but only by 50 per cent.

The more visible harm, however, is done to the work force. The **pescadores** (fishermen some younger than 14) put in long working days

(12 hours is common) and take a lot of risk. They dive to as deep as 80 feet with only their wooden goggles. Some end up with ruptured ear-drums, pneumonia, and bronchitis. Deaths due to drowning have been reported. An International Labor Organization (ILO) official estimated in 1986 an average of four deaths per fishing season.

Source: Marites Danguilan-Vitug, "**Muro-ami** goes on amid a sea of troubles," **The Manila Chronicle,** March 16, 1989.

STOP MURO-AMI!

Reprinted below is an appeal to stop **muro-ami** signed by representatives of ten government and non-governmental organizations:

There is a sinister move to revive this destructive method of fishing.

The Senate, thru one of its Committees, is scheduling a hearing in Samboan, southern Cebu where the **muro-ami** workers come from. The hearings are a farce, since only the side of the **muro-ami** operators will be aired.

But the people of Palawan, whose corals are being destroyed and the people of Metro Manila who will be deprived of the fish from Palawan are not given the chance to present their side.

The **muro-ami** proponents argue that banning this destructive method of fishing wll deprive the workers of their livelihood. It is like stating that we should allow robbery to continue since putting a stop to it would deprive the robbers of their livelihood.

The crucial issue is that **muro-ami** destroys corals and will threaten the fish supply of all Filipinos. That is far more important than the few hundred workers in **muro-ami**. Besides, the Department of Agriculture is funding alternative livelihood for those displaced by the ban.

Another important issue is that **muro-ami** enslaves minors and exposes them to grave danger in violation of law. Many dozens have died in graves in Palawan, far away from their loved ones in Cebu.

It takes coral polyps 50 years to grow to the size of a man's head. It takes but a split second to destroy that coral head through **muro-ami**. As a veteran **muro-ami** fisherman said, they have to pound the corals with weights, otherwise the fish will not run towards the nets.

The time to save the corals is before it is destroyed. Now is the time to act! Let us not repeat the tragedy of our ravaged forests and mangrove swamps.

We appeal to President Corazon C. Aquino and all members of Congress to pass legislation to ban **muro-ami** NOW! Let us dismantle the **muro-ami** base in Palawan. Let us not license **muro-ami** fishing boats. Let us not buy fish caught by **muro-ami**.

LET US SAVE OURSELVES.

Source: **Philippine Daily Inquirer,** October 6, 1989.

Item Five: Applications of Artificial Reefs

Artificial reefs (AR) are used in many parts of the world. Japan is the pioneer and leading builder, followed by the United States. Japan has over 200 years of traditional and later sophisticated AR experience, while American anglers have used artificial reefs for more than 100 years.

In the US, the technique is popular mainly because it improves the catch of sports fishermen. This differs from the socio-economic value of artificial reefs in southern Japan were emphasis is on development of coastal fisheries for commercial purpose, extensive aquaculture, and rehabilitation of degraded marine areas.

Our own artificial reef program therefore parallels that of tropical Japan from which we have much to gain in techniques, design, site selection, and other vital considerations. We can put the Japanese experience to good use, but we have certain limitations. Our economy, for example, cannot match the massive capital investment Japan allots to artificial reefs, but at least we should give our AR program higher priority and more funding support.

The Japanese government began subsidizing the construction of artificial reefs in 1952. The support increased with the launching of the 1976-1982 national plan for coastal zone enhancement with a budget of US$870 million. Of this amount, $326 million was alloted for artificial reefs, $435 million for the development of mariculture areas, $44 million for environmental rehabilitation, and $65 million for research and planning. These projects have been extended to the present with subsidies from the national and local governments.

The long-range goal of Japan's coastal zone enhancement program arose from realization that the fishing industry must inevitably shift from capture to culture technology and from deep-sea to near-shore fisheries. The latter has many advantages (particularly for an archipelagic country like the Philippines), including production on a sustainable-yield basis and greater social benefits especially to our underprivileged small fishermen. To achieve these, we must develop and enrich our near-shore fishing grounds through such mechanisms as appropriate applications of artificial reefs. With our depleted coastal resources, we need artificial reefs **not as a fishing device but as a fishery management tool.**

Reef design

The following factors must be considered in AR design and construction: (1) unit design, (2) overall reef size and configuration, and (3) orientation and spacing of the units within a reef.

For our artificial reef program, open concrete cubes 1-2 meters in size, and discarded concrete pipes 0.5-2 meters in diameter and length are among the simplest designs. We should avoid using tire or bamboo modules because they only serve as fish aggregating devices which encourage overfishing. Furthermore, tires release toxic chemicals, bamboos easily deteriorate, and both are unstable for habitat development.

The best approach presently held by most experts is to construct artificial reefs that will provide the intended application. Our scheme, using scrap materials to recreate the features of natural reefs, does not in fact improve the habitat conditions nor achieve the coastal enhancement we like to promote. Thailand has already recognized this error, and has recently abandoned using tires in its four-year (1988-91) coastal enhancement program using concrete modules 1 to 2-meter cubes.

An inhibiting factor is, of course, the cost of designed reefs. However, once all costs and benefits are identified and prorated over expected functions and life span of the reef, this factor may not be as restrictive as it appears.

Site selection

An even more important consideration than the design is the reef site. Most suitable is one with firm sand bottom that is flat or gently sloping. Light should penetrate the reef because the basis of biological productivity is photosynthesis. The following locations should be avoided: (1) areas with strong tidal currents which will cause erosion around the reef, (2) mouths of rivers where siltation may bury the reef or prevent coral growth, (3) soft bottoms, and (4) areas that are already biologically productive.

The relative position of artificial reefs vis-a-vis natural reefs must be considered to avoid overlapping of their enhancing effects. The modules should be placed in predetermined patterns, intervals, and orientations. The aim is to create an ideal artificial reef that conforms to the coastal enhancement purpose but is governed by site-specific oceanographic characteristics, engineering considerations, and cost factors.

If we aim to achieve a semblance of the Japanese AR success, however, we should refrain from using a trial-and-error approach in design and site selection, especially in view of the high cost of materials involved. A careful study should be made both for the most cost-effective reef designs and suitable sites before we go into large-scale implementation of this long-range program. Present scientific literature provides adequate information on how to correctly build and site artificial reefs. Right evaluation of designs, cost-benefit factors, and other parameters should be incorporated into our AR program. A planning team of engineers, marine scientists, and socio-economists should be tasked to conduct this study.

We should not treat artificial reefs as "fun projects" for anybody to do . Artificial reefs should not be used as public relation gimmicks to promote resource enhancement. We must realize that this technology, if not properly used, can cause more harm than good.

Need for coastal enhancement

The seriously depleted state of our fish resources demands an effective nationwide coastal enhancement program that will restore our fish stock to a sustainable level. The present artificial reef program is a step in this direction as it presumes to establish fish habitats that will increase fish productivity. However, the design and materials of our local artificial reefs (scrap tires and bamboos) make them effective only in aggregating fishes but not in developing fish habitats. Changing the design to one characterized by high density, durability, and stability under water, therefore, would ensure permanent habitats for marine organisms that will be the basis for a food chain to support new fish populations.

We have to consider that our primary aim is to compensate for lost fish habitats or to mitigate the degradation of coastal fishing grounds. This process takes time and thus our AR program must be planned along such long-term consideration.

Searanching should be an integral part of the artificial reef program for coastal enhancement. In searanching, the reefs if correctly designed will improve the initial survival rate and growth of stocked fish juveniles. This integrates fish stocking with habitat improvement which has been shown to effectively increase fish biomass.

The program also implies the necessity of instituting catch regulations, as concrete reefs will also attract fishes. We believe that positive or more forceful implementation of such regulations can only be done by the coastal fishermen themselves, if organized into associations or cooperatives and granted exclusive territorial use rights over municipal waters.

Source: Paper presented by Dr. Flor Lacanilao, SEAFDEC AQD Chief, for the Fisheries Congress, Iloilo City, 24-25 October 1989.

Item Six: Readmeasurement of all Fishing Vessels Recommended

The Regional Coordinating Group for Operation **Bantay Dagat** of Region VI has passed Resolution No. 5, Series of 1989, requesting the readmeasurement of all fishing vessels in the region and for other purposes, to wit:

"WHEREAS, the Regional Coordinating Group for Operation **Bantay Dagat** has noted that large fishing vessels intrude into municipal waters thereby adversely affecting the fish catch of sustenance fishermen;

"WHEREAS, these particular fishing vessels have been observed to be under-admeasured;

"WHEREAS, there is a need to readmeasure all fishing vessels with tonnage of three (3) gross and below;

"NOW, THEREFORE upon motion duly moved and seconded, BE IT RESOLVED as it is hereby RESOLVED, to readmeasure all fishing vessels three gross tons or less in the region; to determine the exact tonnage.

"RESOLVED FINALLY, that this Resolution No. 5 be indorsed to the Regional Development Council, Regin VI through its Economic Development Committee for enforcement by the Philippine Coast Guard in the Region.

"UNANIMOUSLY APPROVED during the regular meeting of the Regional Coordinating Group for Operation **Bantay Dagat**. Region VI, held at the Department of Agriculture on August 22, 1989.

"I hereby certify to the correctness of the above-resolution."

(Sgd.) SONIA V. SEVILLE

Chief, Regulatory Division, Department of Agriculture Region VI

This regulation is intended for large fishing vessels declaring a lower tonnage for three gross tons and below which enables them to fish in municipal waters (seven kilometers from the coastline) thereby competing with municipal fishermen.

SEAFDEC/AQD WINS BEST PAPER AWARD

The SEAFDEC Aquaculture Department won the best paper award in the Fisheries and Aquatic Resources Category in the national research symposium of the Bureau of Agricultural Research, DA.

Entitled "Luminous Bacterial Disease of **Penaeus monodon** Larvae in the Philippines" by C.L. Pitogo, M.C.L. Baticados, E.R. Cruz, and L. de la Pena, all of the Fish Health Section, SEAFDEC/AQD, the paper earned a cash award of P3,000 and a plaque. It was presented in the symposium held August 2, 1989 in Diliman, Quezon City.

Following is the abstract of the winning paper:

"Larvae mortalities associated with luminescence occurred in epizootic proportions in black tiger prawn (**Penaeus monodon**) hatcheries in Panay Island, Philippines. Luminescent vibrios, identified as **Vibrio harveyi** and **V. splendidus**, were isolated from infected larvae but not from uninfected ones. These bacteria were also recovered readily from seawater samples from nearshore areas, the main source of hatchery rearing water. Thus, it is possible that the nearshore seawater is the source of infection.

"Pathogenicity tests with **V. harveyi** resulted in significant mortalities of larvae and postlarvae of **P. monodon** within 48 h of challenge. Scanning electron microscopy showed bacterial colonization of the feeding apparatus and oral cavity of the larvae, suggesting an oral route of entry for the initiation of infection."

CONTROLLING LUMINOUS BACTERIA IN PRAWN HATCHERIES

The control of luminous bacterial infection in prawn larvae, as in other microbial infections, consists primarily of environmental, biological, and chemical methods. It is always best to prevent the entry of the pathogen or disease agent into the hatchery. Applying treatment when the disease is already present is a difficult process, especially when the prawn larvae are already too weak.

The following are some guidelines which may help prevent and control the occurrence of luminous bacteria in prawn hatcheries:

1. Water for spawning must be kept clean. Remove scum after spawning as these may attach to eggs and could encourage bacterial growth. Eggs may be disinfected with 20 ppm (mg/l or g/ton) Tide detergent for two hours and rinsed thoroughly before hatching to remove surface bacteria, fungi, and debris.

2. Stock healthy, clean, and uninfected nauplii only. Healthy nauplii are phototactic, i.e., they are attracted to light. Water containing the nauplii must also be changed before stocking the larvae in rearing tanks.

3. The rearing water must always be kept clean and free from sediments and debris. This may be done by using physical methods (through sand filters, ultraviolet sterilization, cartridge filters, filter bags, etc.) or chemical means (disinfection with 10 ppm chlorine).

4. Siphon out and wipe off sediments/debris/algal growth and wastes from bottom and sides of rearing tanks since these could serve as substrates for bacteria to grow on.

5. Always disinfect infected batches of prawn with 200 ppm chlorine for one hour before discarding these. It is important that discarded water/dirt/larvae from the hatchery do not drain directly into the sea to avoid polluting the source of rearing water as well as the environment.

6. Provide the larvae with adequate food, i.e., the right quantity of good quality food at the right time. The ability of the prawn to resist disease depends largely on its nutritional state.

7. Avoid the indiscriminate use of antibiotics/drugs in prawn culture. Drug resistant strains of luminous bacteria have been isolated in areas where commonly used antibiotics such as chloramphenicol, penicillin, erythromycin, kanamycin, oxytetracycline, polymyxin, streptomycin, and sulfa drugs have been regularly used as part of the rearing process. So far, some degree of success has been met only with nitrofurans, e.g., furazolidone. Infected larvae (protozoeae, mysis) may be treated with 10 ppm pure furazolidone for twelve hours for 4-5 consecutive days. Treatment is best conducted at nighttime when the temperature is cooler (28-29^{o}C) with almost complete water change (80-100%) after twelve hours. Infected nauplii may be exposed to the drug for only six hours. It is important that this procedure be strictly followed only in cases of infection; otherwise, regular exposure to the drug at low levels could result again in the development of resistant strains of bacteria. Continued exposure to the drug at the recommended level but beyond the recommended period could result in morphological deformities in the larvae.

Other chemicals are being screened at the Fish Health Section of SEAFDEC/AQD for possible therapeutic use in luminous bacterial infections of larvae.

Source: Ma. Cecilia L. Baticados, "Control of Luminous Bacterial Infection in Prawn Hatcheries," **SEAFDEC Asian Aquaculture**, Vol. X, No. 1, March 1989.

AQUA FARM NEWS is produced bimonthly by the Publications Section, Information Division of the **Aquaculture Department, Southeast Asian Fisheries Development Center**, P.O. Box 256, Iloilo City, Philippines.

SEAFDEC

Entered as second class mail matter at the Iloilo City Post Office on August 3, 1984.