'No' to cyanide fishing!

By **NJ Dagoon**

Very few marine ornamental fish breed in captivity (Dufour 1997). As such, the marine aquarium fish market is supplied through fish captured live in their natural environment.

About 100 tons worldwide is harvested annually, representing approximately 20% of the total world ornamental fish market worth three billion dollars (Andrews 1990 in Dufour 1997).

Dufour (1997) stated that since the 1980s, three main reasons have accounted for the aquarium fish trade increase. Farming techniques and aquarium equipment have been improved. The decorative and exotic aquarium ecosystem has become attractive to temperate city residents who spend long periods indoors. Increase in air traffic has been noted.

Barber and Pratt (1997) noted that as many as six million aquarium fish were exported in 1996. They valued Southeast Asian exports to Europe and North America at an estimated annual retail worth of US$200 million.

Trade in the Philippines has seemed to stagnate due to cyanide fishing (Hingco and Rivera 1991 in Dufour 1997). Probably around 4,000 hard-core cyanide fishers exist in the Philippines; for the whole Indo-Pacific region, the number appears not to exceed 20,000 (Barber and Pratt 1997).

Cyanide fishing

Since the 1960s, more than one million kg of deadly sodium cyanide have been squirted onto Philippine coral reefs to stun and capture aquarium fish (Barber and Pratt 1997). Though prohibited in the country, the chemical is still used in 80% of cases (Hingco and Rivera in Dufour 1997).

Cyanide use in fisheries originated in the Philippines. *The Economist* (1996) reported that it has now spread to Indonesia, Hongkong and the South Pacific.

Engelmann (1996) reported the diverse effects of cyanide in fish which include delayed mortality, pathology, impaired swimming ability, disrupted respiration, and altered growth patterns. Cyanide - induced pathology in fish includes subcutaneous haemorrhaging, liver necrosis and liver damage. Live fish die in transit due to a poison-weakened state (Barber and Pratt 1997).

Cyanide is also dangerous indirectly to the fishers themselves. With mouth-held hookah tubes attached to air compressors and hand-held squirt bottles, Southeast Asian fishers sometimes plunge to their deaths, succumbing to decompression sickness ("the bends").

Ramon Maloloy-on, 51, of Olango Island, Cebu lives to tell of such horrors at sea. Five of his comrades and close kin have lost their lives, lured into great depths by a fascinating and rare flame goby ("flame goodbye" as others call it), blue tang, or majestic angel. He himself has been unable to walk since 1987 because of a near fatal incident which rendered half of his body lifeless.

Ramon Maloloy-on shares his experiences with AQD staff

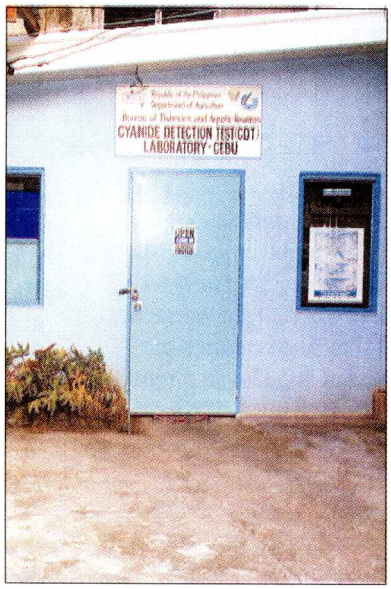
Experiments conducted by Jones (1997) at One-Tree Island in the Great Barrier Reef of Australia examined the effects of cyanide on coral. Fragments of hard coral *Pocillophora damicornis* were subjected to varying cyanide concentrations at different exposure times. At medium doses, corals lost their symbiotic algae (zooxanthellae) resulting in discoloration/bleaching. Zooxanthellae loss weakens the corals' phototrophic potential, growth, and reproductive ability. At large doses, corals died. Within 24 hours, corals exposed to 10 ppt of cyanide for longer than 10 minutes died.

Jones (1997) estimated cyanide concentration in a fisher's squirt bottle at approximately 20 ppt. If the concentration halves every minute after it has been squirted onto a coral thicket (decreasing to 2 ppt in around 25 minutes), the coral will be exposed to 40 ppt of cyanide. Given the results of the toxicity tests above, this should effect a significant loss of zooxanthellae.

Aiala et al. (in Engelmann 1997) maintained that the effect of cyanide on reefs may be even greater than the combined effect of blast fishing and anchor damage. World Wildlife Fund for Nature (WWF) likened dynamiting to chopping a limb of a tree—cutting does not kill the tree; cyaniding, on the other hand, kills the whole reef (*The Economist*, 1996).

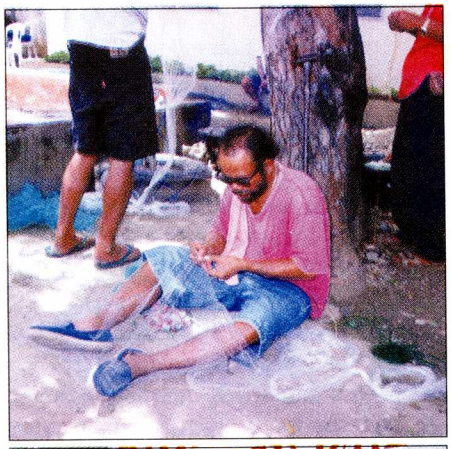
Poison fishing for 25 years in 1 km^2 of reef would amount to US$33,000 worth of net benefits to individuals, and

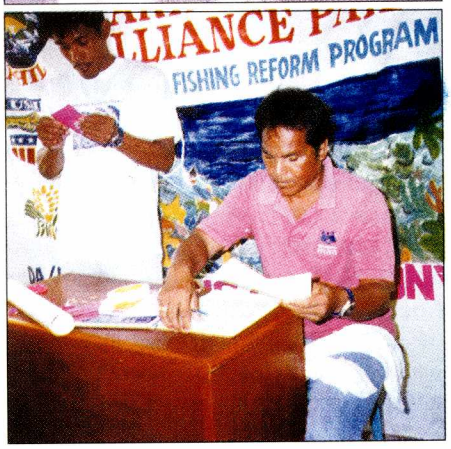
***Quick death**: fish caught using cyanide die quickly -- a loss to exporters, hobbyists, and the environment*



The Cyanide Detection Laboratory in Cebu City. There are six such laboratories operated nationwide by DA-BFAR and IMA

International MarineLife Alliance (IMA) is one of the institutions helping fishers dependent on the marine ornamental fish trade. IMA conducts training on coral-friendly fishing methods





PHOTOS COURTESY OF IMA-PHILIPPINES

US$42,800-475,000 worth of net losses to society (White and Cruz-Trinidad 1998).

What society pays for allowing poison fishing is a very great sum indeed.

Status of Southeast Asian reefs

The Indo-Pacific region, is the "Amazon of the Oceans" (Barber and Pratt 1997), containing coral reefs with the highest biodiversity in the world (Engelmann 1997).

But with population increase, reef degradation accelerates at approximately the same rate (Engelmann 1996).

Eleven percent of reefs in Southeast Asia have already **collapsed**, and 48% are in the **critical** category, with collapse likely in the next 20 years (Engelmann, 1996).

Of the Philippines' 27,000 km^2 of reefs, only 5% are considered in excellent condition (White and Cruz-Trinidad 1998).

Combatting cyanide fishing

Barber and Pratt (1997) maintained that when cyanide fishers are introduced to cyanide-free techniques for live-fish capture and ensured a fair price for their catch, they are willing and often eager to give up using the poison and to talk about ways to ensure the long-term sustainability of their local reefs fisheries.

This has been the experience of the International Marinelife Alliance (IMA)—Philippines since it started conducting local trainings in Cebu on coral-friendly fishing methods.

Founded in 1985, IMA is a non-profit, non-government organization whose primary concern is protection of living marine resources and conservation of their habitats.

Through its Destructive Fishing Reform Program, IMA has found the best strategy to combat the spread of cyanide fishing. Training fishers of foodfish on HALDT (hook and line decompression technique) and marine aquarium fish collectors on BNC (barrier net collection) has been the core of the program. Since starting in September 1997, the IMA office in Cebu has trained close to 1,000 fishers.

Barrier net collection (B N C). According to Dufour (1997) the barrier net is the best of all techniques for live fish capture. It is a 2 m high, 10-15 m long net with mesh size of under 2.5 cm (Randal 1987 in Dufour 1997). Other allowed accessories for use include: hand nets, dip nets, and scoop nets.

Barber and Cruz (1998) described the method. BNC "involves setting up a wall-like transparent net around the perimeter

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Feeding fish gather around the open fresh clam that was dropped into the aquarium. The uneaten portion should be immediately discarded

Resting brine shrimp cysts purchased from dealers may be hatched at home to adult size. Using rice bran as food, they may then be reared to reproduce to have a continuous supply of live food.

Diseases

Bacteria and protozoans are the most common causes of infection and the most troublesome in marine aquariums. Watch out for these signs of diseases in your fish: loss of appetite, loss of coordination, hemorrhaging of the skin, weight loss, loss of tissues in fin edges, inactivity, labored breathing, milky cloudiness of the body surfaces, open cuts that do not heal, and persistent red sores.

Generally, antibacterials and other chemicals are readily available. But be sure that you follow label directions in their application. Most fish that are infected must be separated from the rest of the stock in treatment aquaria. Remember that treatments that exceed 12 hours are stressful to fish and not recommended.

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of the target coral area. (When scared by sound or movement), the fish instinctively dart back in the direction of their coral refuge. The barrier net, however, denies the fish access ..., giving the collector enough time to harvest them with scoop nets and buckets. Unwanted fish are (then) released, and the reef is left virtually undamaged."

IMA gives the fisher enrollees the barrier nets initially for free and teaches them to make their own through an instruction manual. The one-week training course includes three days of inland "classroom" sessions on cyanide-free fishing technologies, post-harvest management of catches, cooperative marketing and safe diving techniques. The next four days in water are for the actual experiencing of how the different technologies work. Follow up continues for months or years on such activities as organizing local fishing associations and cooperatives and developing value-added livelihood schemes (Barber and Pratt 1997).

Cyanide detection tests (CDT). This computer-based test developed by IMA-USA accurately detects cyanide in fish tissues and organs. Managed by IMA and the Philippines' DA-BFAR (Department of Agriculture—Bureau of Fisheries and Aquatic Resources) office, six CDT laboratories are operational nationwide. CDT aims to be an enforcement tool to effectively curb cyanide misuse in fisheries.

IMA's success in implementing its Cyanide Fishing Reform Program is attributed to their development of effective partnerships with fishing communities, and to their advocation for policy reforms in both source and consumer countries.

Policy measures (Barber and Pratt, 1997) include: the banning/restriction of export of vulnerable species; regulation in the import, distribution and use of cyanide; a firmer legal framework (such as a mandatory licensing and certification system); public awareness campaigns in media and schools; strengthening consumer awareness; and establishment of a national system for monitoring the live fish trade.

Enterprise development. CRMP or the Coastal Resources Management Project is another non-profit, non-government organization whose work (though broader) closely aligns with that of IMA, in some aspects. A special project of the Philippines' Department of Environment and Natural Resources, it is funded by the United States Agency for International Development (the same organization that supports IMA).

AQD staff had a recent conversation in Cebu, with CRMP Enterprise Development Officer Monette Flores. She talked about the organization's current involvement with Central Visayan coastal livelihood projects which include mussel/oyster culture and *Eucheuma* seaweed farming in Bohol, and a pending mangrove project (for which she expressed she might need SEAFDEC assistance).

Contrasting Australia and the Philippines as aquarium fish exporters, she noted that the former has a well-managed marine ornamental fish industry, and practices sustainable fishing. Its fish collectors are themselves traders and exporters while getting higher prices for their products. Australians are even better buyers than the Americans.

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is not available but will compensate for the 12 h non-feeding period when food becomes available.

Preliminary simulated transport experiment on 33-day old *H. kuda* (stretched height, 16-38 mm) showed that seahorses at higher loading densities (10 and 20 juveniles per 500 ml) were grasping each other by the tail and had higher survival rates 48 h post-transport than those at lower loading density (5 juveniles per 500 ml). This result indicates the importance of providing a holdfast during transport at low loading densities.

Pairing trials to establish mating pairs among wild and hatchery-produced *H. barbouri* resulted in 30 successfully mated pairs but only six pairs have been regularly mating. A preliminary experiment on the feeding cycle of *H. barbouri* under natural photoperiod showed a distinct diurnal feeding behavior, that is, food consumption was significantly higher during daytime (about 3-7 times) than food consumption during nighttime.

Following improved techniques based on the above results, seahorse production in 1998 for both species has considerably increased compared with 1997 production. The total number of hatchery produced potential broodstock has almost doubled in *H. barbouri* (190 in 1997; 319 in 1998) and has increased by seven-fold in *H. kuda* (59 in 1997; 409 in 1998). The total number of broods (51) from 20 mating pairs of *H. barbouri* in 1997 increased to 103 broods from 30 mating pairs in 1998; broodsize remained within 1-287 but average broodsize increased from 39 in 1997 to 86 in 1998. Similarly, a total of 43 broods from six mating pairs of *H. kuda* increased to 74 broods from 7 pairs while broodsize range and average increased from 1-721 and 325 in 1997 to 44-1751 and 749 in 1998, respectively.

Broodstock development of panther fish and blue tang

The panther fish (*Cromileptis altivelis*) in its juvenile stage and blue tang (*Paracanthurus hepatus*) are among the highly-priced marine ornamental fishes. When grown, *C. altivelis* is one of the high-valued species in the live food fish industry. Hatchery propagation of these species will reduce dependence on wild populations, thus minimizing reef resource depletion and reef habitat degradation. Since very little is known on the biology and life history of these fishes, investigation of the reproductive biology was initiated. AQD will look into factors that trigger spawning, so these can be manipulated to enhance artificial propagation.

All panther fish broodstock were still in the female phase as shown by the presence of yolky oocytes (mean diameter, 0.38-0.45 mm).

Two of the 37 blue tang expressed milt in April, another 7 in August. In this group, 15 females were noted (mean weight, 145 g) as immature or maturing (mean oocyte diameter, 0.3 mm). No gonadal tissues were obtained from the rest.

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Fishery schools receive ... from page 3

Twelve fishery schools were from Regions II, VIII, IX and XI and one each from Regions IV and V. Among the titles received were the (1) *Proceedings of the first international conference on the culture of prawn/shrimps*, (2) *Prawn hatchery design and operation*, (3) *Milkfish breeding and hatchery fry production*, (4) *Prawn industry development in the Philippine*, (5) *Perspectives in aquaculture development in Southeast Asia and Japan*, (6) biennial / annual reports, (7) various issues of the *Aqua Farm News* and *SEAFDEC Asian Aquaculture*, and (8) AQD brochures.

Further, seven schools have reserved allotted publications to be picked up by their students who attend this year's summer classes at UPV. The schools that reserved were two each from Regions VII and IX and one each from Regions V, IV, and X. - *MBS*

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The Philippines has a different scenario. Here, she said, there is a wide gap between exporters and collectors, with some opportunistic middlemen in between."Exporters have pressures on them to improve quality and maintain market growth, but don't know how to deal with collectors."

Instead of advocating a ban, she stressed, there is a need to organize at the collectors' level. "There should be an effort to manage collection grounds, otherwise, the problem can't be resolved."

Certification (for fish caught without the use of cyanide) works up to a certain point, she said. "It is important to show that there is an existing market for certified products."

In Davao, Flores related, Badjao divers / fishers had been organized by an NGO and were taught coral-friendly fish collection skills by IMA. They now have investors who are willing to give access to a responsible market. The Badjao community can take a step further, into eco-tourism. An eco-tour of fishing and diving sites, wild-life sanctuaries, villages, etc. may be organized; thus, earning jobs and incomes for, and boosting local pride and morale of, everyone in the community. Pleased and delighted by the engaging treat, the visiting traders would be persuaded to take or ship out only a few spectacular species, which they would come to prize and value highly.

Net benefits of coral reef protection

White and Cruz-Trinidad (1998) noted that currently, the average yield of a Philippine reef is 15.6 tons per km^2 per yr. Healthy coral reefs can supply up to 35 tons per km^2 per yr of economically valuable fish and invertebrates.

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A healthy reef ecosystem can contribute tourism and recreation revenues, shoreline protection and recruitment of fish and invertebrates. Besides its aesthetic value, the reef is also a source of construction materials such as lime and sand and of pharmaceutical and industrial products.

White and Cruz-Trinidad showed that 1 km^2 of healthy reef with no overfishing and some moderate level of tourism has a potential annual revenue of US$31,900-113,000.

They noted that if 50% of the Philippines' 27,000 km^2 of coral reefs were in a healthy state, around US$1 billion would accrue annually to the country's economy.

The total gain for protecting the coral reef ecosystem is truly substantial.

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Fishers / Sagarin ... from page 24

Floriano Sagarin

FISHER - TRAINOR, OLANGO ISLAND

Floriano Sagarin, 23, is a fisher-IMA trainor like his cousin. A fisher since 18, he also captures food fishes.

An unforgettable fishing experience? When a fisheries expert came aboard their boat at sea to inspect if they brought with them some cyanide.

His fears? Plunging into the depths, "*dahil maraming kati*" (because the water is itchy).

Does he know of 60- to 70-year-old fishers? Yes and they're "*masigla pa*" (healthy). "*Pero walang asenso*" (no progress).

Why? "*Pinatatakbo ng* boss *ang presyo*" (Prices are dictated by the boss). He averages 2-3 *dayo* per month.

Does he expect any help from government authorities or fisheries experts? "*Matulungan kami sa pagpasok sa bawal na lugar*" (Help fishers like us to gain entry into areas that are controlled by local governments). However, this may not be feasible as it would mean going against the Fisheries Code.

He wants to venture into the business of live food fish capture someday, but said he didn't have a *lambat* or net.

- BY NJ DAGOON

Rabanal donates ... from page 3

cil, the Texas Agricultural Extension Office, the Philippine Journal of Science, Fish Diseases Leaflet, General Information Series of the BFAR 1983 and many others. Numerous reports are also available from the Philippines' government agencies and other countries.

Dr. Rabanal studied at UP Diliman (1940), Harvard University (1948), and Auburn University (1960). His field of specialization is aquaculture, especially tropical brackishwater or coastal aquaculture; project formulation and evaluation, and fisheries development planning. He authored 150 (1940-1998) technical, semi-technical, and popular papers on aquaculture, fisheries biology, and related subjects.

He has received many awards, foremost of which is the John Guggenheim Foundation Science Fellowship Award 1958 and Honorary Life Member Award of the World Aquaculture Society 1987.

Dr. Rabanal is at present Chairman Emeritus and Senior Technical Adviser, Aquafarming Development Foundation, Inc. with address at 26 Katipunan Rd, White Plains, Quezon City, Philippines. He was born on September 20, 1917 in Alaminos, Pangasinan; is married; and has a son and daughter.

Everyone is invited to see his collection at the AQD library. - *MBS*

Henry Young ... from page 28

customers and he makes it a point to tell his divers to avoid it. Once caught, the fish are placed in a holding tank and then individually packed (with aeration) in plastic bags just enough for their size. The plastic bags are then placed one on top of the other with ice in styropore boxes 22 x 1 5x 15 inches to maintain 25°C temperature. His sister started exporting live ornamental fish in 1970 and he says that business is thriving . She encounters 2% mortality but doesn't complain about it. "In this business, volume is not as important as the variety of fish," he says. The buyers usually identify the fish they want and arrangements vary with each customer.

-- BY MB SURTIDA