



Review of the ASEAN Ornamental Fish Industry

Production, Marketing Trends, Technological Developments and Risks

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Ornamental fishes are now being treated as consumer-based commodities. According to the World Trade Organization, the world's ornamental fish trade is worth more than 45 billion USD with an average annual growth rate of 8%, of which the Asian countries (Singapore, Thailand, Malaysia, Indonesia, Sri Lanka, Japan, China, Philippines, etc.) accounted for more than 60%. It is therefore becoming imperative that the region's production of ornamental fishes, whether from culture or collected from the wild should be made sustainable. Except for Indonesia and the Philippines, which also export marine aquarium fishes, the other countries produce and market mostly the freshwater fishes. In the world's ornamental fish trade (its importance is best appreciated in terms of the value instead of volume since the fishes are traded by the number of pieces), freshwater ornamental fishes represent about 90% while marine aquarium fishes contribute only about 10%.

While breeding and production of freshwater ornamental fishes in captivity in the ASEAN region is already mature, most marine aquarium fishes are still collected from the wild and the industry has been blamed for the massive destruction of the region's coral reef areas, i.e., in Indonesia and the Philippines. Very few fishers are involved in breeding marine aquarium fishes, for although profitable, it requires a good amount of capital outlay and modern culture

technologies. Unless technical and financial assistance are provided, only then can production of marine aquarium fishes in captivity become an alternative livelihood for the small-scale fishers (Pomeroy and Balboa, 2004).

Ornamental Fish Production

In spite of being major exporters of freshwater ornamental fishes, many countries in the ASEAN region (e.g., the Philippines) are still developing their respective ornamental fish industry. Thailand and Singapore however, have already turned the industry into a high-level dollar-earner sector at different stages of development concentrating in the freshwater sector. While Thailand is a major producer and exporter of ornamental fishes, Singapore is importing ornamental fishes from neighboring countries such as Indonesia, Thailand and Malaysia for breeding and re-export. Their high technology-based infrastructures have made Thailand and Singapore the region's leaders in the ornamental fish trade. The experiences of Thailand and Singapore serve as the other countries' examples in



developing their own ornamental fish industry as a supplemental livelihood for their respective fisherfolk.

Produced from “backyard” outdoor earthen or concrete ponds or in tanks as well as in indoor aquaria, ornamental fishes could be grouped into livebearers and egg layers. Livebearers include guppy, molly, platy, swordtail, while egg layers include barb, tetra, betta, gourami, cichlids, and are classified as either mouth brooders, bubble nest builders, substrate breeders, etc. The livebearers are usually cultured as hybrids to produce a variety of colors, unique body forms and body patterns, and when the desired colors, body forms, body patterns, e.g. with readable characters as in cichlids, finnage such as long flowing fins or lyre-tails, etc. are not attained, the fishes are discarded. Although most ornamental fishes spawn in earthen ponds, the larvae are reared in hatchery and nursery facilities for commercial production where their growth is closely monitored for the desired varieties, which could command very good prices in the trading arena. Thus, the good are reared and traded, while the bad and the ugly are discarded.

As in food fish, developed aquaculture technologies such as spawning through environmental manipulation using hormones are also adopted in the culture of ornamental fish in captivity. This allows the industry to produce fishes, which were previously available only from the wild, e.g., freshwater sharks, freshwater stingray, clownfish, etc. Feeding the larvae with live food such as rotifers, *Artemia nauplii*, etc. to improve survival rates during the larval stages, a technique developed for food fish aquaculture, has benefited the ornamental fish industry. High-protein feeds, e.g. larvae of insects and worms are also used for the bigger ornamental fish species.



Production of ornamental fishes also requires good farming management such as the use of aeration and other techniques, e.g. water filtration, flow-through, recirculating systems, etc. to maintain good water quality. Incidence of diseases common in food fish aquaculture could cause high mortalities in ornamental fishes, thus, fish health management is also very important in the industry. The very steep competition in the international market is a major concern and the region’s ornamental fish industry therefore, capitalizes on its much cheaper and sturdier fishes, trading mostly the most exquisite varieties to draw in more clients and get considerable profit as well as better return of investments.

Marketing Trends, Technological Developments , and Risks

Reports have indicated that Brunei Darussalam in 2003, exported ornamental fishes valued at 35,000 USD mostly varieties of Betta or Siamese fighting fish, but it also imported ornamental fishes valued at 218,000 USD (FAO Fishstat Plus 2006). The country has already developed the technology for breeding and seed production of the indigenous freshwater ornamental fish, *Betta macrostoma*.

The value of Cambodia’s export of ornamental fishes in 2003 was 83,000 USD, while its import in 2004 was valued at 5,000 USD (FAO Fishstat Plus 2006). Some Betta varieties, e.g. *Betta splendens* are indigenous in Cambodia, where the local name of this fish is “pla kat” (meaning biting fish). “Pla kat mhor” is more famous as the fighting fish while “pla kat cheen” is the ornamental fish. Another common hybrid is “pla kat kmer” or the Cambodian strain, and the best variety of the Siamese fighting fish in the international market is reported to be the cross between “pla kat cheen” and “pla kat kmer”. *Betta splendens* is indigenous to Thailand, Cambodia and Malaysia. Bettas are bubble nest builders and nest guards.

The most important ornamental fish produced and traded in Indonesia is the dragon fish or Arowana. The Silver Arowana (*Osteoglossum bicirrhosum*) belongs to Class Actinopterygii, Family Osteoglossidae, and Genus Osteoglossum. Since the Silver Arowana is not listed in the CITES Appendix, it is used as a substitute for the more expensive red and golden Asian Arowana (*Scleropages formosus*), which is listed in CITES Appendix I. Treasured as living dragons, Arowanas are believed to bring good luck and wealth to its owners, making Arowanas the most expensive among the ornamental fishes. Indonesia produces Arowanas in farms for export and conservation purposes, and recently molecular tools are used to manipulate their colors. Ornamental Fish Specialist, the Qian Hu Corporation of Singapore is supporting a study on the reproductive



Photo by courtesy of Tanapat Matchayakulawit

Mr. Tanapat Matchayakulawit (left) and Arowana culture farms in Indonesia (right)

genomics and DNA barcoding of the Arowanas in Indonesia. The Corporation foresees that their investment could be profitable as many buyers could not get enough dragon fish because the demand always exceeds supply.

During an interview with a Thai importer of Arowanas, Mr. Tanapat Matchayakulawit who runs an ornamental fish shop in Chatuchak, Bangkok, he said that legally, it usually takes two to three weeks to import Arowanas from Indonesia. While waiting for his orders to arrive, he keeps receiving orders from other countries such as Japan and China. He added that it does not take him 24 hours to dispatch his stocks especially that he also receives orders from the local hobbyists. He also said that the most expensive fishes are the red and golden Sumatera Arowanas.

In addition to breeding Arowanas, Indonesia has also developed the breeding technology for discus, *Symphysodon discus* and botia, *Botia macracantha*. While Indonesia imports mostly the Koi fish broodstock from Japan for breeding and for local marketing, it is also a major exporter of the Napoleon fish. However, since the Napoleon fish is listed in Appendix I of CITES, Indonesia has been granted an export quota of 8,000 Napoleon fish/year and the fish size allowed for export is 1-3 kg/fish. FAO Fishstat Plus 2006 has recorded that Indonesia's export of ornamental fishes in 2003 was valued at 4,644,000 USD (freshwater) and 8,728,000 USD for marine aquarium fishes. Its import also in 2003 was valued at 400,000 USD for freshwater ornamental fishes and 64,000 USD for the marine species.

Although not much information is reported on the ornamental fish industry of Lao PDR, FAO Fishstat Plus 2006 has indicated that in 2003 the export value of the country's ornamental fishes was 2,000 USD. The main species

cultured in Lao PDR are hybrids of the koi carp (*Cyprinus carpio*).

The Malaysian ornamental fish industry is fast growing, producing about 500 million pieces of ornamental fishes annually, of which 70% is exported to 30 countries worldwide. More than 250 local and exotic species are bred in the country for the domestic and export markets. Small- and medium-sized enterprises operate the country's ornamental fish industry utilizing about 456

farms located in Johore, Perak, Penang and Kedah, providing employment opportunities to more than 5,000 people. The country is very proud for being recognized as the world's leading producer of the Asian Arowana (*Scleropages formosus*) with seven CITES certified farms producing several varieties including the incomparable Malaysian Golden Arowana. Its discus variety (*Symphysodon discus*) has won Merit Certificates for Malaysia in open competitions in Germany.

Malaysia's export of ornamental fish in 2003 was valued at 14,147,000 USD and 18,361,000 USD in 2004 while import was valued at 3,971,000 USD in 2003 and 3,681,000 USD in 2004, with re-export valued at 4,754,000 USD in 2003 (FAO Fishstat Plus 2006). The ornamental fish industry of Malaysia has been recently highlighted because of the alleged dumping of undesired flowerhorn into the natural environment. Since many people believe that the flowerhorn can bring good luck, prosperity, protection and success in their businesses, a "Flowerhorn Craze" occurred in Malaysia from 2003 until 2004.



Flowerhorn, one of the most popular ornamental fishes

Produced from cross-breeding cichlid hybrids, the flowerhorn commanded very good prices in the local and export markets especially at the height of Malaysia's Flowerhorn Craze in 2003. When the craze ended in 2004, its price dropped together with the demand and many aquarium operators were left with unsold flowerhorn, most of which were either killed or thrown away or perhaps released into the wild. Once in the wild, the flowerhorn is believed to have adapted their new environment and feeding on other aquatic organisms, thus possibly wrecking havoc to the natural environment.

In Myanmar, keeping ornamental fish in homes, offices and restaurants is becoming very popular. It has been reported that there are more than five importers of ornamental fishes in Yangon City alone, trading a variety of Arowanas or the "lucky fish" as it is called in Myanmar, gold fish, flowerhorn and other fishes of the tetra family. Reports have also indicated that the cost of ornamental fish in Myanmar could range from Kyat 50 up to Kyat 2 million, the most expensive of which is the lucky fish with price ranging from thousands of Kyat up to millions, depending on the color.

Myanmar produces silver, green, gold, blue, red Arowanas as well as various other colors attained through crossbreeding. Many Burmese also believe that the flowerhorn with distinctive Chinese characters on its body, have brought them good fortune and financial successes. There is no data on the country's export of ornamental fishes although import in 2003 was valued at 11,000 USD (FAO Fishstat Plus 2006).

The Philippines is a major supplier of marine live ornamental fishes, trading more than 340 species and supplying 70% of the world's demand. In the USA, 80% of their marine ornamental fishes come from the Philippines (Mutia, 2007). BFAR Fisheries Profile 1978-2003 has indicated that for almost three decades, marine ornamental fishes have been one of the top fishery exports of the Philippines (Fig. 1).

(Note that in the FAO Fishstat Plus 2006, the export value of ornamental fishes for the Philippines has been recorded as a whole and not broken down into freshwater or marine fishes.)

Savaris (2007) reported that there are 4,000-7,000 marine aquarium fish collectors in the Philippines with 3,000-4,000 persons directly involved by the industry and its ancillaries. There are about 70 exporters or marine aquarium fishes, about 40 are based in Metro Manila while the rest are in Cebu (central Philippines). Despite the economic benefits derived from the industry, it is not regarded sustainable because of the perceived widespread use of destructive fishing methods, especially the use of cyanide for collecting the target aquarium fishes. Moreover, there are also other issues such as the absence of a management system for the industry which could result in over-fishing the species that are highly in demand, and social issues related to the health and safety of the collectors who use air compressors for diving without getting the proper dive safety training.

The country's marine aquarium fish industry has one of the most complicated supply chains (Savaris, 2007), involving a number of players from the collectors, middlemen, traders, exporters, airline companies, importers and the retailers before the fish gets to the end consumers, which are the marine aquarium fish hobbyists. Handling of the fish from the reef to the retailers and consumers is not very reliable resulting in rejected fishes.

In an effort to improve the processes involved in the entire supply chain, the Marine Aquarium Council (MAC) was organized by the Philippine Government in 1998 to develop and introduce practice and product standards throughout the supply chain from "reef to retail". The MAC standards comprise the criteria for best practices in all activities throughout the supply chain such as managing the collection area, collecting and holding, and handling and transport. MAC has also developed a certification system for those

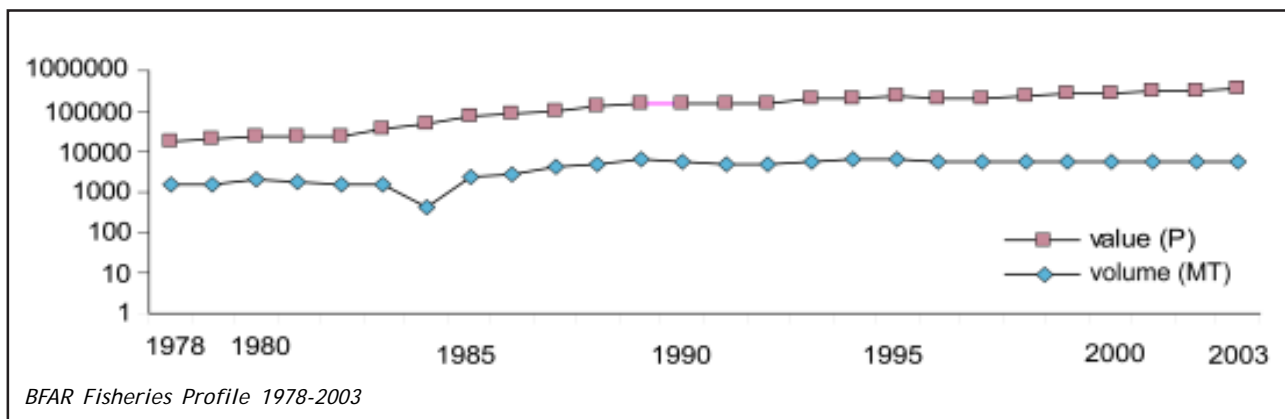


Figure 1 Ornamental Fish Export of the Philippines (1978-2003)

engaged in the collection and care of the marine aquarium fishes.

Clownfish or Anemonefish of the Family Pomacentridae and Genus *Amphiprion* is the most popular marine aquarium species collected or cultured and bred in the Philippines for more than 30 years, the important species are the False Percula (*Amphiprion ocellaris*), Yellowtail or African Clownfish (*A. clarkii*) and Tomato Clownfish (*A. frenatus*). The country's demand for the clownfish has significantly increased in 2003 after the movie "Finding Nemo" was shown in Philippine movie theaters.

Clownfish is collected from the coral reefs using sodium cyanide, where local fishermen squirt the cyanide solution towards the targeted fish inhabiting the top of coral heads. The target fishes, which become disoriented and semi-paralyzed, are easily gathered and kept alive in small onboard containers. Since cyanide damages the corals and other coral reef organisms causing total deterioration of the entire coral reef ecosystem, this collection method has been banned in the Philippines. Nonetheless, the small-scale fishers continue to use this illegal and destructive method because of the large demand and high prices offered by the ornamental fish industry. It has been reported that since the 60s, more than one million kilograms of cyanide has been squirted into Philippine reefs and the practice is believed to have spread in other Southeast Asian countries such as in Indonesia.

In order to address the damage inflicted on the coral reef ecosystems and fish stocks, culture in captivity of the important marine aquarium fishes, i.e. *Amphiprion* spp. is being promoted in the Philippines to reduce pressure on the coral reefs. The country's ornamental fish industry was given a special responsibility to educate the public on the effects of destructive fishing to the environment, promote the use of responsible fishing gear, i.e., fish nets instead of using cyanide, and to breed ornamental fishes in captivity.

The Philippines imports freshwater ornamental fishes from other countries such as Hong Kong, Thailand, Taiwan, Malaysia, and Japan, about 469,326 pc in 2003 (Mutia, 2006). The Philippine Government in collaboration with the private sector promoted since 2003 the breeding and production of freshwater ornamental fishes locally. With favorable weather conditions, available technology, sufficient manpower and related resources, the Philippines has the potentials to produce and supply the growing world market for freshwater ornamental fishes. Thus, in 2004 the Philippine Government through the Bureau of Fisheries and Aquatic Resources (BFAR) formulated the Roadmap for Ornamental Fish including a five-year development plan with the cooperation of the private sector. The National

Fisheries Research and Development Institute (NFRDI) being the research arm of BFAR, conducts R&D on ornamental fish culture at its National Fisheries Biological Center in Butong, Taal, Batangas. The Center implements research on breeding and culture of ornamental fishes, conducts national training sessions for fisherfolk, establishes pilot projects throughout the country, and organizes ornamental fish exhibitions. The Center has also been designated to be the focal point where all parent stocks are bred and the resulting quality breeders are dispersed to the regions for mass production and distribution to the fisherfolk and other clients. During the training sessions conducted by the Center, the participants are made to understand the danger of irresponsible introduction or release of alien species to the wild and encouraged to culture only the indigenous species instead.

Lessons have been learned by the country's ornamental fish industry when the "janitor fish" (*Hypostomus plecostomus*) found its way into Laguna de Bay, the biggest lake water body in the Philippines as well as its river systems like the Marikina River near Metro Manila. An imported freshwater catfish species native to South America, the "janitor fish" was introduced in the Philippines in the 90s. Its ability to clean an aquarium by feeding on algae growing on its sides made it known as janitor fish, and it was a craze for sometime in the Philippines. The irresponsible release of the janitor fish into the natural environment has caused havoc since the fish is reported to feed on algae growing on the net cages installed in the Lake, cutting the nets and resulting in massive breakout of the cultured fish. Although not valued as a food fish, the prolific-growing "janitor fish" is now being considered as source of fishmeal and fish skin leather.

In Singapore, freshwater aquaculture is monopolized by the production of ornamental fishes, which concentrates on the production of guppy (*Poecilia reticulata*), platys (*Xiphophorus maculatus*, *X. variatus*, *X. reticulata*), mollies (*P. velifera*, *P. sphenops*), swordtail (*X. helleri*), angelfish (*Pterophyllum scalare*) and dragon fish (*Sclerophagus formosus*) in ponds and tanks.

There are about 100 ornamental fish farms occupying an area of about 150 ha in the Singapore's Agrotechnology Park, where the ornamental fish cultured are mainly for export. Capitalizing on the fact that most ornamental fishes breed in tropical climate, the country's very meticulous fish breeders have been producing exquisite varieties of ornamental fishes. With good handling and packing capabilities of the exporters coupled with its strategic geographical location, Singapore has become one of the major centers for exporting ornamental fishes in the ASEAN region, making the country as the ornamental fish capital of

the world, with more than 24% share of the global export market. Reports have indicated that annually, Singapore exports some 500 species and varieties of ornamental fishes to about 70 countries. The country's excellent logistics hub (e.g. access to the internet) helps connect the local traders to the international markets.

Thailand's ornamental fish industry has now developed into a significant income-generating sector in the country's economy. There are more than three hundred different ornamental fish species produced in captivity, such as sharks, barbs, Siamese fighting fish, catfish, gold fish, eel, loach, gourami, botia, oscar, discus, carps, etc. The country's biggest ornamental fish market is located in Chatuchak Weekend Market in Bangkok, where there are about 150 shops selling specialized species such as Arowanas, bettas, cichlids, goldfish, fighting fish, etc. as well as aquatic plants, feeds and aquarium accessories. Other markets are also

located outside Bangkok, such as in Chiang Mai, Phuket, Nakorn Ratchasima, Khon Khaen, and Udon Thani (Saelee, 2005). Thailand's ornamental fish species for export are classified into 11 groups (Box 1).

The internet has also facilitated easy access to Thailand's information on fish varieties, producers, traders, etc. As reported, Thailand's ornamental fish industry involves more than 1,500 fish producers employing more than 350,000 workers. Fish producers usually restrict themselves to breeding limited fish varieties and are required to obtain breeding license from the Department of Fisheries of Thailand, which then sends their biologists to check the sanitary conditions of their fish rearing facilities, and recommends quarantine of fishes as and when deemed necessary.

Vietnam's ornamental fish export has generated about 8M USD in 2005 and has forecasted that this value will increase in the coming years. In 2006, there were 106 ornamental fish breeding farms in the Ho Chi Minh City alone, producing more than 36 million fish and exporting 3.5 million pieces to Singapore, Thailand, United States, China and other countries. The country's ornamental fish export includes

Box 1: Classification of ornamental fish species exported by Thailand (Saelee, 2005)

1. Siamese fighting fish
2. Native Thai freshwater fishes (e.g. *Epalzeorhynchus* sp.: red fin shark, red tail shark, silver shark, etc.)
3. Viviparous fish
 - 3.1 Guppy (*Poecilia reticulata*), given names according to body color, e.g. Neon tuxedo guppies, Golden tuxedo guppies, King Cobra guppies, etc.
 - 3.2 Mollies (*Poecilia latipinna*) including Balloon Platy (*Xiphophorus* sp.)
4. Gourami (*Colisa* sp.): Dwarf gourami, Blue dwarf gourami, Diamond gourami and etc.
5. Gold fish (*Carassius* sp.): Runchoo, Hollunda, Comate and etc.
6. Discus (*Symphysodon* sp.) given names according to body color: Brown discus, Red turquoise, Green and blue, Snake skin, Solid pigeon blood and Spotted discus.
7. Angel fish (*Pterophyllum* sp.): Half black angel fish, Marble angel fish
8. Oscar (*Astronotus* sp.) given names based on color: Tiger oscar, Golden oscar, Albino red oscar, etc.
9. Barb (*Puntius* sp.): Tiger bard, Red cheek barb, etc.
10. Peacock fish (*Aulonocara* sp.): Sunshine peacock, Red peacock, Blue peacock, etc.
11. Other fishes: some native freshwater species that are listed under CITES such as Jullian's brook (*Probarbus jullieni*), Mekong giant catfish (*Pangasius gigas*), Asian arowana (*Scleropages formosus*) are prohibited for export. In addition three native freshwater species such as Dwarf clown loach (*Botia sithimunkii*), freshwater batfish (*Oreoglania siamensis*), and Siamese tiger perch (*Colus microlepis*) are prohibited for export.



Shops in Chatuchak, largest ornamental fish market

the flowerhorn, red discus and carps, accounting for 15% of the country's total ornamental fish export. Concerned with the negative effects of introducing alien aquatic species, the Vietnamese Government has banned the importation of exotic species by the industry, after learning lessons from other ASEAN countries.

Conclusion and Way Forward

Having tropical climate ideal for breeding and growing wide varieties of ornamental fishes, many countries in the ASEAN region has the potentials to increase the supply of ornamental fishes in the world market. With breeding and culture technologies already available coupled with expert technicians, breeders and growers, the ASEAN region can easily achieve the goal of making the ornamental fish trade a multi-million dollar industry (Box 2). Contributing much to the region's economy, the region's ornamental fish industry could also improve the livelihood of the small-scale fishermen.

Being tropical in nature and sturdy, many ornamental fishes can be easily bred and produced in captivity. Captive breeding of marine ornamental fishes is also a means of

relieving too much pressure on the coral reefs due to the use of destructive collecting methods. However, the region's ornamental fish producers should be careful in breeding ornamental fishes and be responsible in their culture operations. The cases of the flowerhorn in Malaysia and the janitor fish in the Philippines should be considered classic examples of some alien species going wild. Another reported case of alien species in the wild is the presence of lionfishes in North and South American waters.

A member of the scorpion fish family (Scorpaenidae) and sub-family Pteroinae, the lionfish is native to the Indo-Pacific region from Australia to Malaysia, and from north to southern Japan and South Korea. It has venomous dorsal, pelvic and anal spines, and is highly carnivorous. The recent reported sighting of the Indo-Pacific lionfishes (*Pterois volitans*) along the east coast of the USA means that populations of the lionfish must have already established in the Western Atlantic, which could have an impact on biodiversity.

References

- BFAR. Philippine Fisheries Profile, 1978-2003
- Mutia, M.T. M. 2006. Overview of the Aquarium Fish Industry. Lecture presented during the National Training on the Breeding and Production of Freshwater Ornamental Fish for the Fisherfolk: Luzon, Visayas and Mindanao Clusters. National Fisheries Biological Center, Butong, Taal, Batangas, Philippines, 11-14 September 2006, and 12-16 November 2006.
- Mutia, M.T. M. 2007. Status of Freshwater Ornamental Fishes in the Philippines. Paper presented during the FishLink 2007, Iloilo Grand Hotel, Iloilo City, Philippines, 17-19 May 2007.
- Pomeroy R.S. and Balboa C. 2004. "The Financial Feasibility of Small-Scale Marine Ornamental Aquaculture in the Philippines." *Asian Fisheries Science* 17 (2004): 365-376. Asian Fisheries Society, Manila, Philippines.
- Saelee, W. 2005. "Production in Aquatic Peri-urban Systems in Southeast Asia: The Current State and Potential of Ornamental Fish Production in Bangkok, Thailand." PAPUSSA, ICA4-CT2002-10020, Bangkok, Thailand.
- Suvaris, J.P. 2007. The Trade in Marine Ornamentals. Paper presented during the FishLink 2007, Iloilo Grand Hotel, Iloilo City, Philippines, 17-19 May 2007.



Box 2: Trading of Ornamental Fishes in the ASEAN Region

Country	2000	2001	2002	2003	2004
Brunei Darussalam					
Export Value ('000 USD)	-	19	8	35	-
Import Value ('000 USD)	129	126	133	218	145
Re-Export Value ('000 USD)	-	162	-	-	-
Cambodia					
Export Value ('000 USD)	13	33	37	83	17
Import Value ('000 USD)	-	-	-	-	5
Indonesia					
<i>Freshwater fishes</i>					
Export Value ('000 USD)	3,917	5,836	4,624	4,644	6,591
Import Value ('000 USD)	205	382	212	400	712
<i>Marine fishes</i>					
Export Value ('000 USD)	8,924	7,886	8,024	8,728	6,798
Import Value ('000 USD)	-	20	24	64	35
Lao PDR					
Export Value ('000 USD)	-	-	-	2	-
Malaysia					
Export Value ('000 USD)	8,219	10,583	17,559	14,147	18,361
Import Value ('000 USD)	4,493	3,755	4,916	3,971	3,681
Re-Export Value ('000 USD)	3,301	3,790	-	4,754	20
Myanmar					
Import Value ('000 USD)	19	49	7	11	10
Philippines					
Export Value ('000 USD)	6,737	6,497	6,439	6,729	7,346
Import Value ('000 USD)	30	4	-	83	-
Singapore					
Export Value ('000 USD)	43,502	41,581	41,460	41,427	49,528
Import Value ('000 USD)	10,107	9,927	11,274	13,334	13,955
Thailand					
Export Value ('000 USD)	2,446	3,370	5,245	7,392	9,864
Import Value ('000 USD)	185	28	40	128	647
Vietnam					
Import Value ('000 USD)	142	40	58	40	43
TOTAL					
<i>Freshwater fishes</i>					
Export Value ('000 USD)	64,834	57,919	75,372	74,459	91,707
Import Value ('000 USD)	15,310	14,311	16,640	18,185	19,198
Re-Export Value ('000 USD)	3,301	3,952	-	4,754	20
<i>Marine fishes</i>					
Export Value ('000 USD)	8,924	7,886	8,024	8,728	6,798
Import Value ('000 USD)	-	20	24	64	35

Source: FAO Fishstat Plus 2006

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Virgilia T. Sulit is a member of the Editorial Team for *Fish for the People*. The initial results of a survey on the status of ornamental fish production in the ASEAN countries that she conducted in 2007 have been incorporated in this article.