



Sustain Fish

Proceedings of the International symposium on
"Improved sustainability of fish production systems
and appropriate technologies for utilization"
held during 16-18 March, 2005
Cochin, India

Editors

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Sustainable trade of marine ornamental fishes

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Abstract

About Rs.3 crores worth of ornamental fishes are traded annually in India of which 85 % are from North Eastern Region. Recent studies have revealed that Kerala has a rich biodiversity of freshwater ornamental fish fauna represented by 125 species. The domestic freshwater market is also very promising and shows a good growth rate in recent years. More than 200 species of freshwater ornamental fishes are bred in India for domestic market. Except two or three species all other species bred and marketed within the country are exotic ornamental fishes. The absence of proper regulatory mechanisms regarding the introduction of exotics and GMOs, coupled with the absence of aquatic quarantine mechanisms in India, may increase the risk of exotic disease and threaten the indigenous populations. Recently the Ministry of Agriculture, Government of India entrusted the task of formulating the national strategic plan guidelines for Aquatic Exotics and Quarantine to National Bureau of fish Genetic Resources (NBFGR).

Keywords: *Ornamental fishes, Culture technology*

1. Introduction

The international trade of ornamental fishes has been expanding in recent years and the annual trade was worth US\$ 423.65 million (US\$ 234.16 million in import and US\$ 189.49 million in export) (FAO year book 2002). The contribution of freshwater cultured species, wild collected marine species and wild collected freshwater species were 80 %, 15 % and 5 % respectively. Singapore is the major exporter and USA is the major importer. Asian countries contribute more than 50 % of the total export turn over. Singapore is the biggest trading centre of ornamental fishes in the world which exports more than 22 % of the total export. Most of the fishes exported from Singapore are of freshwater origin. European countries occupy the second portion in the global ornamental fish trade. About 30 % of the cultured freshwater ornamental fishes are from United States, 35 % from Singapore, 20 % from other Asian countries, 10 % from Europe and 5 % from the rest of the world.

In India only about Rs.3 crores worth of ornamental fishes are traded annually and they are contributed mainly by indigenous freshwater species collected from rivers. About 85 % of ornamental fish exported from India are from North Eastern Region. Recent studies have revealed that Kerala has a rich biodiversity of freshwater

ornamental fish fauna represented by 125 species. The Western Ghats has 85 endemic taxa of ornamental fishes. It is evident that India can develop an export market of freshwater ornamental fishes only from indigenous species. The major constraint for developing an indigenous ornamental fish trade is the lack of proper technology for breeding and seed production of indigenous varieties. A wild collected indigenous freshwater ornamental fish trade will not be long term sustainable and can even lead to extinction of many species of high demand. Development of commercially viable hatchery production techniques for species which have good demand coupled with proper handling and transportation systems including domestic and overseas airline network and good market information system can pave the way for evolving a lucrative freshwater ornamental fish trade in India.

2. Freshwater ornamental fishes

The domestic freshwater market is also very promising and shows a good growth rate in recent years. More than 200 species of freshwater ornamental fishes are bred in India for domestic market. Except two or three species all other species bred and marketed within the country are exotic ornamental fishes. Different varieties of goldfish, guppy, platy, sword tail, molly, barbs, fighters, tetras, koi carp, angel, zebras, freshwater sharks, gouramis, oscars, discuss, and scats are the most common freshwater aquarium fishes in the domestic market. Recently due to the awareness created by the different agencies, indigenous ornamental fishes are getting popularized in the market. Breeding methodologies for a few indigenous species are also now available.

In the recent past, a lot of awareness has been created on the potential of ornamental fishes by organizing Aquashows in many parts of the country. But most aquarium shows have failed to demonstrate the technological advancements in aquarium keeping. It is felt that these shows should give more emphasis on the techniques of maintaining healthy aquarium in addition to exhibiting the different indigenous and exotic varieties of ornamentals. Fresh water ornamental research in the country should not be confined to survey and assessment of varieties and development of breeding technologies alone. The production of new varieties by biotechnological interventions is one of the most lucrative areas. There is a need to establish an aqua technology part in India for the production of new varieties which can compete in the international market. Research on ornamental fish biotechnology through genetic approaches can be focused at this centre. Research on induction of polyploidy, gene transfer technology, genetic enhancement programmes and production

of transgenic fish with unique features can be more promising in this sector in future years.

3. Marine ornamental fish

In recent years, the marine ornamental fish trade is a global multimillion dollar industry worth an estimated US\$ 200 – 330 million annually and operated throughout the tropics. The Philippines, Indonesia, Solomon Islands, Sri Lanka, Australia, Fiji, the Maldives and Palau supplied the major share of marine ornaments during the recent years. The United States, the United Kingdom, the Netherlands, France and Germany were the most important countries of destination.

The three keywords associated with marine ornamental trade are collection, culture and conservation. Unlike freshwater ornamental fishes, where the trade is mainly contributed by species that are farmed, the marine ornamental fishes are obtained from wild collections. Since the tropical marine aquarium fish and invertebrates in the trade are directly exploited from the coral reefs, long term sustainability of the aquarium industry is a controversial aspect. The damaging techniques such as the use of sodium cyanide used for wild collection, the over harvesting of target organisms and the high level of post harvest mortality are the major constraints associated with the trade of marine ornamentals based on wild collection. But if managed properly, the aquarium industry could support long term conservation and sustainable use of coral reefs. Management of marine ornamental fisheries has to be implemented in such a way that they are biologically sustainable, do not conflict with other resources and keep post harvest mortalities to the minimum. Habitat damage and negative impact to the ecosystem have to be avoided. Species that are unsuitable to aquaria should not be collected.

3. Certifications

In this context, establishment of an oceanarium in the country will be of much significance for the education, research and conservation of the marine biodiversity especially the coral reef ecosystem. The declaration of specified areas as marine reserves where the collection of marine ornamentals is made illegal is one of the effective conservation measures. Setting up quotas and size limits and restricting access to the ornamental fishery through the use of permits can also reduce exploitation pressure. Governments and industry itself can play an important role in supporting conservation initiatives and promoting best practice. The consumer can also be involved in the conservation programme. Third party certification of the trade, whereby the consumer is empowered to assist in the reduction of the environmental impact of the trade by selectively

purchasing ornamentals collected in an environmentally friendly manner, has been recommended as a possibility for improved conservation management. The Marine Aquarium Council (MAC) has developed a certification scheme that will track an animal from collector to hobbyist. With a network of 2600 stakeholders in more than 60 countries, it is recognized as the lead organisation for developing and co-ordinating efforts to ensure that the international trade in ornamental marine organisms is sustainable. Industry operators can be certified through an evaluation for compliance with the appropriate MAC standard for the certification of practices. The MAC core standards include the ecosystem and fishery management core standard, the collection, fishing and holding core standard and handling, husbandry and transport core standards. The core standards are accompanied by best practice guidance documents that provide advice to the industry operators on how they might be able to comply with the standards. Another important aspect of this certification programme is the establishment of a monitoring system within collection areas to ensure early detection of any changes to fish population resulting from collection for the trade.

4. Culture technologies

The ultimate answer to a long term sustainable trade of marine ornamental fishes can be achieved only through the development of culture technologies. At present tank reared species contribute only 1-2 % of the trade. Culture of marine ornamental fish is well accepted as an environmentally sound way to increase the supply of such organisms by reducing the pressure on wild populations and producing juvenile and market size of a wide variety of species year round. In addition, hatchery produced fish are hardier which fare better in captivity and survive longer. The list of marine ornamental fishes reared in captivity today the world over contains more than 84 species. But the species that can be reliably reared in large quantities include only a dozen anemone fishes, seven species of gobiids, five species of cardinal fishes and eight species of pseudochromids.

In India, the Central Marine Fisheries Research Institute has been focusing on breeding and seed production of marine ornamental fishes during the past few years. One of the milestones is the recent success in the hatchery technology of clownfish and sea horse. Experimental success was obtained on the broodstock development and larval rearing of five species of damselfishes. It is felt that research on breeding and seed production of marine ornamentals has to be intensified in future years. The culture of marine ornamental fish can prove to be more economically feasible than that of marine

food fish culture. This is because even though the market for ornamental fish is much smaller than that of food fish, the price per unit is far higher in the case of aquarium fish. Hence in future, hatchery reared fish will become a significant part of marine ornamental fish trade.

India is bestowed with vast marine ornamental resources in our island ecosystems of Lakshadweep and Andaman – Nicobar Islands besides many areas of mainland. It is felt that development of a marine ornamental trade entirely by culture may not be a realistic proposition in the immediate future. A wild collected trade can be initiated by strictly enforcing certain core standards for ecofriendly and long term sustainable exploitation by following guidelines similar to those developed by MAC. It is time to develop an organized marine aquarium fishery in India by formulating certain policies and management to ensure its sustainability. In the near future, India can emerge as a lead country for a sustainable marine ornamental trade by evolving suitable aquarium fisheries policies for wild collection as well as by developing culture technologies for selected species.

Regulations are in vogue in many countries regarding the introduction of exotics and GMOs. As the international trade of ornamental fishes is bound to increase in the coming years, to this issue is of prime importance. The absence of proper regulatory mechanisms regarding the introduction of exotics and GMOs, coupled with the absence of aquatic quarantine mechanisms in India, can increase the risks of exotic disease establishment and threaten the indigenous populations. Recently the Ministry of Agriculture entrusted the task of formulating the national strategic plan guidelines for Aquatic Exotics and Quarantine to National Bureau of Fish Genetic Resources (NBFGR). NBFGR has issued two special publications namely 'National Strategic plan for Aquatic Exotics and Quarantine' and 'Aquatic Exotics and Quarantine guidelines' for promoting introductions while safeguarding biodiversity and preventing economic loss. Evolving appropriate machinery for following these guidelines will be very much essential in future for the development of a safe and sustainable ornamental fish trade in India.