



AQUARIUM TRADE AND HEALTH MANAGEMENT

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Aquarium Trade -Status

- Asia is the largest exporter of tropical ornamental fish.
- Its provides employment opportunities to rural area and also earner of foreign currencies.
- Over 1.5 million peoples are engaged in aquarium trade.
- Over 3.5 million hobbyist constitute the trade.
- More than 50 families consisting of 175 genera and 400 species are distributed in Indian seas.
- Asian coral reefs contain over 3,000 species of fish comprising around 20% of the world's marine fish species, and over 50% of the world's coral species.

Aquarium Trade -Status

- The fish keeping hobby turning it to a global industry.
- The live trade of the global aquarium fish industry was valued at US\$ 327 million in 2007 (FAO, 2009).
- The industry had a 4% compounded annual growth rate from 1998-2007.
- The value of freshwater aquarium fish traded in the international market constituted 85% of the total value in the late 1990s. Only 15% for marine origin.

Aquarium Trade -Status

- In 2007, the marine component of the trade in India reached 48% and the freshwater component 52% and the value of the brackishwater fish is negligible.
- During 2008, the export earnings was US\$344 million, while the import was US\$349 million. India had a small share in aquarium fish trade worth about US\$1.7 million during 2008.

Candidate species

- ❑ Salt water guppy 'Clown fishes' (Family: Pomacentridae).
- ❑ 'Damsel fishes' (Family: Pomacentridae).
- ❑ Moorish idol (Family: Zaclidae).
- ❑ Lion fish (Family: Scopaenidae).
- ❑ Parrot fish (Family: Scaridae).
- ❑ Angels (Family: Pomacanthidae).
- ❑ Butterflies (Family: Chaetodontidae).
- ❑ Wrasses (Family: Labridae).
- ❑ Cardinal fishes (Family: Apogonidae).
- ❑ Surgeon fishes (Family: Acanthuridae)

Candidate species

- Hawk fishes (Family: Cirrhitidae)
- Bat fishes (Family: Ephippidae)
- Puffer fishes (Family: Tetraodontidae)
- Seahorses & Pipe fishes (Family: Syngnathidae)
- Squirrel fish (Family: Holocentridae)
- Sweetlips (Family: Haemulidae)
- Trigger fishes (Family: Balistidae)
- Box fishes or trunk fishes (Family: Ostraciidae)
- Eye catching Tangs, Snappers, Banners, Groupers, Gobies, Moorish fishes etc.,

Captive Breeding and Larval Rearing

- ❑ Clown fish can grow from 2 to 5 inches long. In captivity, can live from 3 to 5 years, but in wild, they live 6 to 10 years.
- ❑ Clown fish live at the bottom of sea in sheltered reefs or in shallow lagoons usually in pairs.
- ❑ Distributed in the warmer waters of the Pacific Ocean and the Indian ocean. Also found in northwest Australia, Southeast Asia, Japan and Indo-Malaysian region.

Fish collection

- The healthy mature individuals pair will be selected for breeding. Clown fishes are protandrous hermaphrodite.
- Breeders and sea anemones will be collected from the wild and transfer to hatchery.
- Breeders and sea anemones will be accommodated in a two ton capacity tank, called **conditioning tank**.
- The filtered water through sand, charcoal and UV filters will be used. In addition, Eheim canister filter will be installed in the indoor water storage tank and same will be loaded with coarse fibre particle filter pad, activated carbon, bioballs, ceramic rings, and coral sands.
- The fishes and anemones will fed three times per day. After 2 months, one pair will be transferred to spawning tank

Feeding of fish

- The fishes will be fed thrice a day.
- The boiled clam meat, oyster, mussel, prawn, squid, egg mass and live *Acetes* and polychaetes will be given as feed.
- Good quality feed will be maintaining the health and reproductive capacity of fishes.

Water quality parameters

- Temperature: 26°C
- Salinity: 24-26PSU
- pH: 8.2-8.4
- DO: 4.5-6.5mg/lit.
- Ammonia, nitrite and bacterial load will be maintained at permissible level.

Brood stock development

- ❑ After pair formation occurred, the fishes along with their host anemone are shifted to the spawning tank.
- ❑ 1000 liter of FRP tanks will be used for spawning filled with 750 litre of treated seawater.
- ❑ The tanks fitted with biological filters reduce the aggression.
- ❑ Suitable environmental parameters will be maintained.

Brood stock development

- Artificial flurescent tube light will be given 12 hours /day or 14 hours/day based on climatic conditions.
- The brooders will be fed with 3 times a day.
- After 3 months period, each pair will start spawning.

Spawning

- A few days prior to spawning, the male attract the female by courting.
- The courting behaviours including chasing, biting and extending fins and on the day of spawning both the parents cleaning the egg laying site.
- The male clown fish build a nest near the anemone in order to provide protection from predators.
- Breeding will be starts with the male chasing the female to the nest where the eggs are released.
- Clown fish lays the eggs at two times per month.

Spawning

- 100 to 1000 nos. of eggs will be spawned depending upon the size of the female.
- The incubation period ranges from 6 to 8 days based on the environmental conditions.
- The male clown fishes guards and protects the eggs until they hatch.

Hatching

- The newly spawned eggs will be bright orange in colour. As the embryo develops, the colour of the eggs turns to black on 3rd to 6th day and later turns silver, which is the indication for hatching.

Larval rearing

- After hatching out, the larvae will be transferred carefully to the LRT.
- The larvae will be fed with microalgae such as *Chlorella marina* on the first and second days followed by algae enrich rotifer up to the 10th day.
- Then fed with newly hatched *Artemia* nauplii.

Metamorphosis

- The larvae will be measured on the first day or about 2 to 3mm and they get metamorphosed on 12 to 15 days.
- After metamorphosis, the length of the larvae is about 5 to 7mm.
- The metamorphosis larvae will be fed with *Artemia*.

Juvenile production

- During 15 to 20 days, the larvae become juvenile and shifted from pelagic to benthic, and look like miniature of adult fish.
- The diseases will be common when the larvae will change into juvenile.
- The juveniles will be fed with boiled clam meat, oyster, mussel, squid and prawn.
- The juveniles transferred to 500 l FRP tanks along with anemones.
- After rearing for 3 months, the juveniles will be grow into marketable size.
- The marketable size juveniles will be transferred to grow-out tank.



Dascyllus aruanus



Neopomacentrus cyanomus



Amphiprion nigripes



Amphiprion sebae



Amphiprion percula



Amphiprion ocellaris



Amphiprion akallopisos



Amphiprion clarkii



Premnas biaculeatus



Chromis viridis

Courtesy to Dr. T. T. Ajithkumar
Asst. Professor, CAS in MB

Diseases and Health Management

□ Infectious diseases:

Most are parasitic. Parasitic infestations are often accompanied or followed by secondary bacterial or fungal diseases.

Internal infections are more difficult to diagnose and treat.

Internal infections should be treated with antibiotics added to food.

Infectious diseases are broadly categorized as parasitic, bacterial, viral or fungal diseases.

Diseases and Health Management

Non-infectious diseases:

- Environmental diseases
- Nutritional diseases
- Genetic abnormalities

Diseases and Health Management

Tumors

Tumors can be caused by virus or a cancer. The genetic tumors may be caused from too much hybridization, common amongst professional breeders.

Symptoms and treatments:

Internal tumors caused the swollen, while external tumors are visible as swellings protruding from the body.

The diseases may be treated with a long duration bath of potassium iodide solution.

Diseases and Health Management

Physical injuries:

Some times a bully fish is the culprit or sharp décor.

Injury should be treated by touched with 2% Mercurochrome. Fish should be treated with slightly acid water (pH: 6.6) to tolerance condition

Diseases and Health Management

Gas bubble diseases:

Due to fine gas bubbles trapped within the fish body due to super saturation with oxygen.

The infection could be diagnosed by bubbles under the skin and a tendency for a large fish to make tiny creaking noises when netted.

Diseases and Health Management

□ Bacterial infection

Fin rot

Fish tuberculosis, wasting disease

Vibriosis, ulcer diseases

Pseudomonas bacterial diseases

Diseases and Health Management

□ Bacterial fin rot

Aeromonas sp. Pseudomonas sp. Vibrio sp.

Damage on the tail or fins or both. Erosion and rotting of the fins is the classical symptom of bacterial fin rot disease.

Maintenance of good water quality and temperature and other parameters. The use of ultra violet sterilizer to treat the water may help prevent outbreaks of this diseases.

Diseases and Health Management

- Fish tuberculosis, wasting diseases

Mycobacterium bacteria

There is no external sign. The fish may look fine from the outside. But it will be hard to recognize if it is internally infected.

Keep all the parameters under control. Exchange water at regular intervals and proper drying of vessels and utensils after washing is very much important.

Diseases and Health Management

□ Vibriosis Ulcer disease

Vibrio sp.

Lethargy, darkening of colour, anemia, ulcers on the skin and lower jaw, bleeding of gills, clouded eyes, loose scales, pale gills and sudden death.

Poor water quality crowding, excessive handling and copper treatments are common causes of stress in saltwater aquarium fish.

Diseases and Health Management

□ Pseudomonas bacterial diseases

Pseudomonas sp.

Reddened, frayed fins with open sores, rapid respiration, cloudy eyes, poor appetite, lethargy, weight loss, abdominal swelling.

Keep the parameters under control. Avoid sunlight on the aquarium tanks which allows algae to grow and paves ways for microbial growth.

General Prevention of Fish disease

- The best treatment for fish disease is prevention. A sick fish should be disposed off before the disease spreads.

To reduce the risk of disease, be sure to do the following:

Clean the filter on a regular basis

Don't over feed

Keep the chemical levels stabilized

Maintain a steady water temperature

Don't over crowd your tank

Major Exporters

- Singapore -39.3%
- Malaysia- 16.6
- Japan- 13.1
- Thailand- 8.4%
- Sri Lanka- 4.7%
- Indonesia- 4.6%
- Philippines- 4.5%
- China- 4.4%
- Taiwan-2.1%
- India- 0.9%

Major Importers

- United Kingdom,
- USA,
- Germany,
- Italy,
- France,
- Belgium,
- Switzerland