

Live bearers Breeding

Sambid Swain

Centurion University of Technology
and Management

Introduction

- Keeping colorful and fancy fishes known as ornamental fishes, aquarium fishes, or live jewels is one of the oldest and most popular hobbies in the world
- The growing interest in aquarium fishes has resulted in steady increase in aquarium fish trade globally
- The ornamental fish trade with a turnover of US \$ 6 Billion and an annual growth rate of 8 percent offers lot of scope for development
- About 600 Ornamental fish species have been reported worldwide from various aquatic environments
- Indian waters possess a rich diversity of ornamental fish, with over 100 indigenous varieties, in addition to a similar number of exotic species that are bred in captivity

➤ The entire industry, including accessories and fish feed is estimated to be worth US \$ 14 Billion

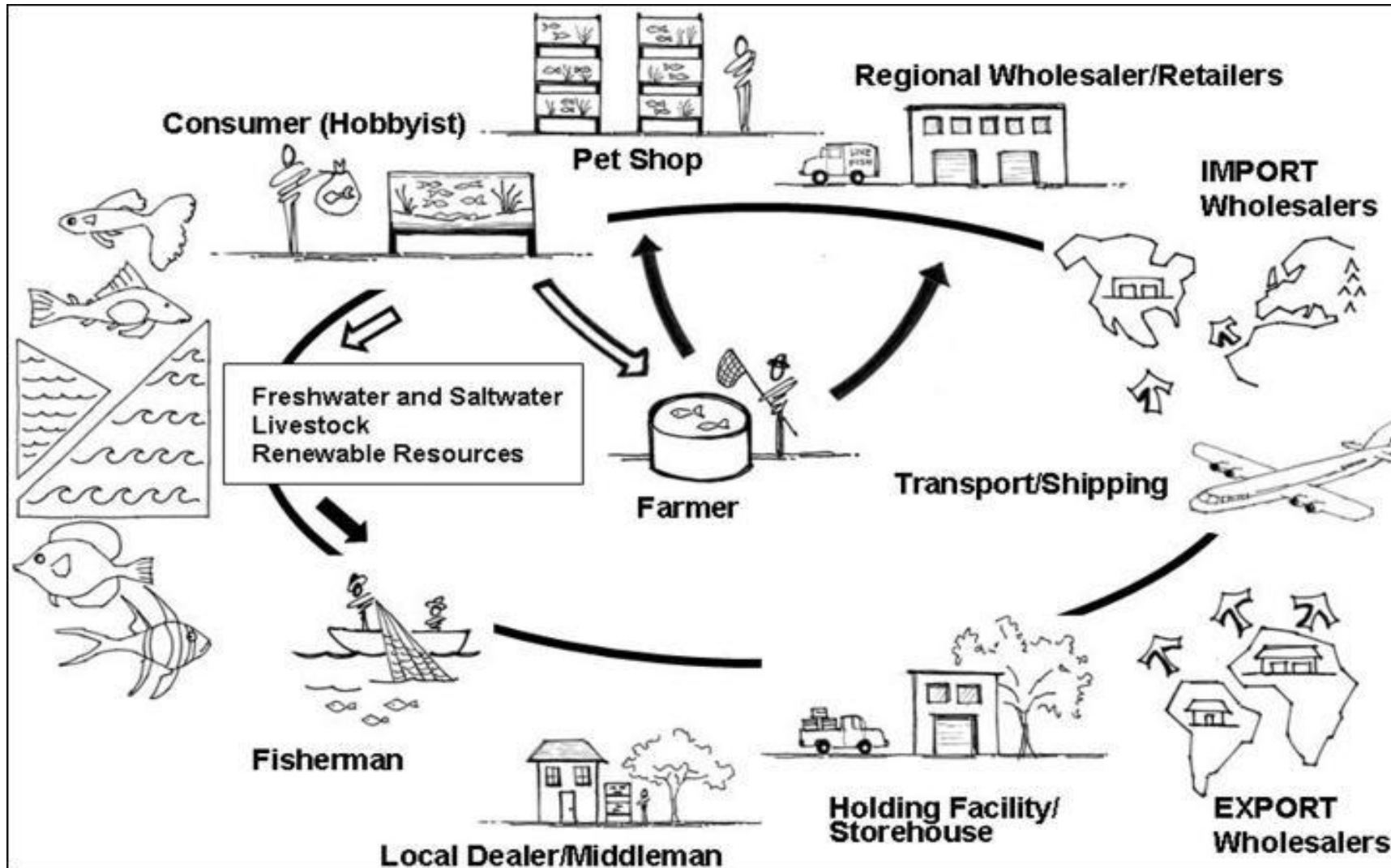
➤ The top exporting country (with percentage contribution to global trade) is

1. Singapore (19.8%)
2. Czech Republic (7.8%)
3. Japan (7.4%)
4. Malaysia (7.3%)
5. Indonesia (5.3%)
6. Israel (4.3%)
7. Thailand (3.9%)
8. Sri Lanka (2.9%) &
9. India (0.008%)

➤ The largest importer of ornamental fish is the USA followed by Europe and Japan. The emerging markets are China and South Africa

Source; www.nabard.org

Schematic representation of typical distribution/trade process for livestock (e.g., fishes, corals, and other invertebrates) destined for ornamental aquarium use



Ornamental Fishes

- ❖ Aquarium fishes are mainly grouped into two categories
 1. Oviparous (egg - layers)
 2. Viviparous (live-bearers)
- ❖ Further, the fresh water ornamental fish varieties can be broadly grouped into Tropical and Cold water species
- ❖ Management of these two categories are different in nature.
- ❖ According to water tolerance fishes are hard water tolerant, soft water tolerant species and those with wider tolerance

The common varieties of fishes and the details of grouping is given below

Species	Water Quality	Breeding Season	Breeding Type	Parental Care
Molly	Hard water Sp.	Summer/Monsoon	Live Bearer	Young Ones
Guppy	Hard water Sp.	Summer/Monsoon	Live Bearer	Young Ones
Platy	Hard water Sp.	Summer/Monsoon	Live Bearer	Young Ones
Swordtail	Hard water Sp.	Summer/Monsoon	Live Bearer	Young Ones
Blue Gourami	Wide Tolerance	Summer/Monsoon	Nest Builder	Male Guard eggs
Pearl Gourami	Wide Tolerance	Summer/Monsoon	Nest Builder	Male Guard eggs
Rosy Barb	Wide Tolerance	Summer/Monsoon	Egg Scatterer	Adhesive
Gold Fish	Wide Tolerance	Monsoon/Winter	Egg Scatterer	Adhesive
Z/P/VI Danio	Wide Tolerance	Summer/Monsoon	Egg Scatterer	Non Adhesive
S Fighter	Wide Tolerance	Summer/Monsoon	Nest Builder	Male Guard eggs
Catfish	Wide Tolerance	Monsoon/Winter	Egg depositor	Enclosures Reqd.
Angel	Soft Water	Summer/Monsoon	Egg depositor	Airing of eggs with fins
FM Cichlid	Soft Water	Summer/Monsoon	Egg Depositors	Enclosures Reqd.
R D Cichlid	Soft Water	Summer/Monsoon	Egg Depositors	Enclosures Reqd.
Bl W Tetra	Soft Water	Summer/Monsoon	Egg Scatterer	Adhesive
Monsoon – June to August, Summer – March to May, Winter – November to January				
B A Tetra	Soft Water	Summer/Monsoon	Egg Scatterer	Adhesive
Serpa Tetra	Soft Water	Summer/Monsoon	Egg Scatterer	Adhesive
Manila Carp	Soft Water	Monsoon/Winter	Egg Scatterer	Adhesive

<i>Species</i>	<i>Average Fecundity</i>	<i>Spawning/year</i>
Molly/Guppy /Sword tail	20	12
Blue gourami	3500	10
Pearl Gourami	800	10
Rosy Barb	700	10
Tiger Barb	500	10
Zebra/Pearl/Veil tail Danio	1000	10
Angel	800	12
B/W Tetra	3000	10
Serpae Tetra	800	10
Gold Fish	3000	3

Focus On Ornamental fish hatchery under Aquaculture division of CIFE - Mumbai

□ The main fish species whose breeding activities were going on are

1. Live bearers
 - a) Guppy (*Poecilia reticulata*)
 - b) Sword tail (*Xiphophorus hellerii*)
 - c) Platies (*Xiphophorus maculatus*)
2. Gold fish (*Carassius auratus*)
3. Angel fish (*Pterophyllum scallare*)
4. Red Zebra fish (*Danio rerio*)
5. Gourami (*Trichogaster tricopterus, Trichogaster leeri*)
6. Serpae tetra (*Hyphessobrycon eques*)
7. Tiger barb (*Barbus tetrazona*)
8. Rosy barb (*Puntius conchoni*)
9. Widow tetra (*Gymnocorymbus ternetzi*)
10. Fighter fish (*Betta splendens*)

□ *Infra structure facilities in the hatchery*

- 1) Water filtration unit
- 2) Air pump unit
- 3) Brood stock rearing unit
- 4) Ornamental fish Breeding unit
- 5) Ornamental fish Rearing unit
- 6) Live feed culture facility
- 7) Packing unit

✓ **Water filtration unit**

- Pressure pump, sand filter, UV and Reverse osmosis water filter unit
- Flow rate: 200 lit/hr

✓ **Air pump unit**

- Air Pump: 5HP air blower soundless turbine model

✓ **Brood stock rearing unit**

- Cement tank
- Size: 4x6x3 food
- Tank no. 8

✓ **Breeding unit**

Glass tanks

Tank Size	Tank No
➤ 12"x 9"x7"	14
➤ 18"x12"x9"	130
➤ 24"x12"x12"	12
➤ 36"x12"x12"	14
➤ 48"x18"x1.25feet	14
➤ 8feet x 2feetx 1.5feet	05

✓ **Rearing unit**

➤ Cement tank

Size: 12x 15x3.5 cubic feet

Tank no: 10

➤ FRP tank

Tank no:18

Capacity of each tank: 800 lit

✓ **Live feed culture facility**

Indoor: Artemia hatching unit

Outdoor: Daphnia culture unit

✓ **Packing unit**

Fish are sorted and counted into trays or buckets with adequate water and air flow.

The fish and water is then poured directly into the polythene bags, which saves time and minimizes handling

Polythene bags are used for packing:

Size: 24 x 16 inches

12x10 inches

Oxygen requirement = 3.1 (oxygen to water)

□ *Economics*

The market value of ornamental fishes depends on its size and demand. The whole sale price list of various fishes which are bred in the hatchery is given below

<i>Fish</i>	<i>Price</i>	
	Young (Rs/Piece)	Brooder (Rs/pair)
Gold fish	8-12	500-1000
Fighter fish	5-8	40-50
Angel fish	10-12	60-100
Zebra fish	4-12	30
Oscar	5-20	3000-3500
Widow tetra	5-7	25
Veli tail serape	12-15	40
Tiger barb	2-12	20-25
Rosy barb	2-12	20-25
Hockey stick	2-12	20-25
Sword tail	6	40-60
Guppy	3	6-8
Platy	5	10-15

□ *Estimated water quality parameters of different waters used in the hatchery*

<i>Parameters</i>	<i>Filtered Water</i>	<i>Tap Water</i>	<i>Bore well Water</i>
Temperature (°C)	23	24	23.5
pH	6.5	7	7.5
Alkalinity (mg/l)	8	31	242
Hardness (mg/l)	6	56	396

Breeding of live bearers

1) SWORD TAIL

SCIENTIFIC CLASSIFICATION

Order: Atheriniformes

Suborder: Cyprinodontoidei

Superfamily: Poecillioidea

Family: Poecilidae

Subfamily: Poecilinae

Genus: *Xiphophorus*

Species: *X. helleri*

- **Fish name:** *Xiphophorus hellerii*
- **Common name:** Sword tail
- **Temperament to its family:** Peaceful
- **Temperament to other fish species:** Peaceful
- **Place in the aquarium:** Top levels
- **The way of breeding:** Live – bearer
- **Fish origin:** Central America

Acceptable Parameter

- a) pH of water: 7.0-8.0
- b) Water hardness (dGH): 12.0-18.0 N
- c) Recommended temperature: 21.0-28.0 °C (69.8-82.4°F)
- d) Maximum size (min-max): 10.0-12.0 cm (3.9-4.7 inch)

❑ Sexual dimorphism

- The male's body is elongated with a sword in the adult age
- The fish's length with the sword is about 10-12 cm. The male's sexual organ is called gonopodium
- The male's sexual organ is called gonopodium
- The name Swordfish was given according to this organ rather than as a part of the caudal fin
- The female's body is bigger than male's and it is more robust than the male as well as not having any sword and gonopodium

❑ Colour variations

- The fish has some general colour variations. The wild form is olive green, with a red or brown lateral stripe and speckles on the dorsal and, sometimes, caudal fin
- The male's sword is yellow, the bottom edge is black. Captive breeding has produced many colour varieties, including black, red and lots of body patterns

□ Feeding

- We can feed with flakes,, live-frozen worms and other food designed for aquarium fish
- Like all fishes, they need varied food. Especially, they need green foods which contain algae
- We could install strong lighting in order to stimulate algae to grow in your tank thereby providing the Swordtails with what they demand and requires as the basic food element
- Beside this algae growth we provides tubifex to the brooder twice a day

□ Breeding

Conditioning

- Both male and female were put together in a FRP tank where they were feed with tubifex twice a day
- The FRP tanks were put outside algae were growth and then automatically zooplankton

Spawning

- Brooders were kept in a separate trap where small hole were provide to escape the young ones from parents
- Brooders were introduce into the trap and kept inside the tank
- Some aquatic pants to be provided to hide the young ones

- First, the male fertilize the female with the gonopodium
- The male inserts his sperms into the female
- Unusually though, the females are able to save some sperm for later fertilization
- The fry grow in the female where they consume the yolk stores
- The female's pregnancy can be identified by the dark body in front of the anal fin
- Young swordtails are bigger than other fry of non live-bearer fishes
- They immediately swim and can hide before predators
- They also grow quickly and can eat flakes soon after birth