



*Cultivable indigenous and exotic
ornamental fishes*

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World History.....



- Captive fish have been important to mankind since prehistoric times.
- Ancient Egyptians - First humans known to keep fish not only for *food purposes* but as *an entertainment*.
- **Goldfish** - First ornamental fish to be kept.
- Goldfish bred in China since at least the 10th century.

Fish Keeping

- The reasons for the increasing popularity of the hobby,
 - Environmental awareness (live with nature),
 - Can keep them even in smaller container
 - The great variety of species,
 - Relative ease of care of fish.

- An aquarium decorates the room.





- Health benefits - lowered blood pressure, reduced stress, and controlled pulse rate
- Mentally challenged children - accelerate their learning process

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

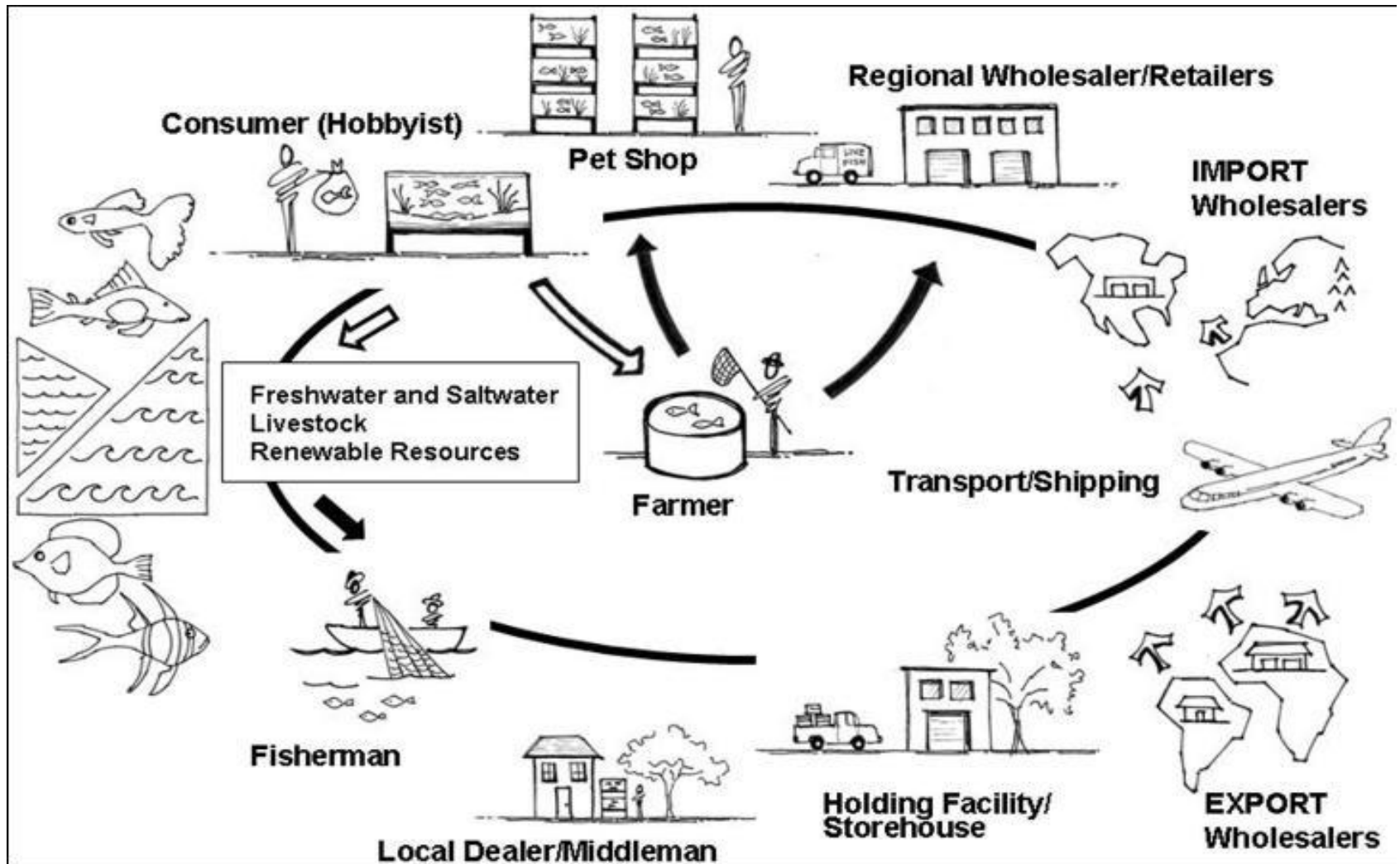
➤ The entire industry, including accessories and fish feed is estimated to be worth US \$ 14 Billion

➤ 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

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

<i>Species</i>	<i>Water Quality</i>	<i>Breeding Season</i>	<i>Breeding Type</i>	<i>Parental Care</i>
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
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

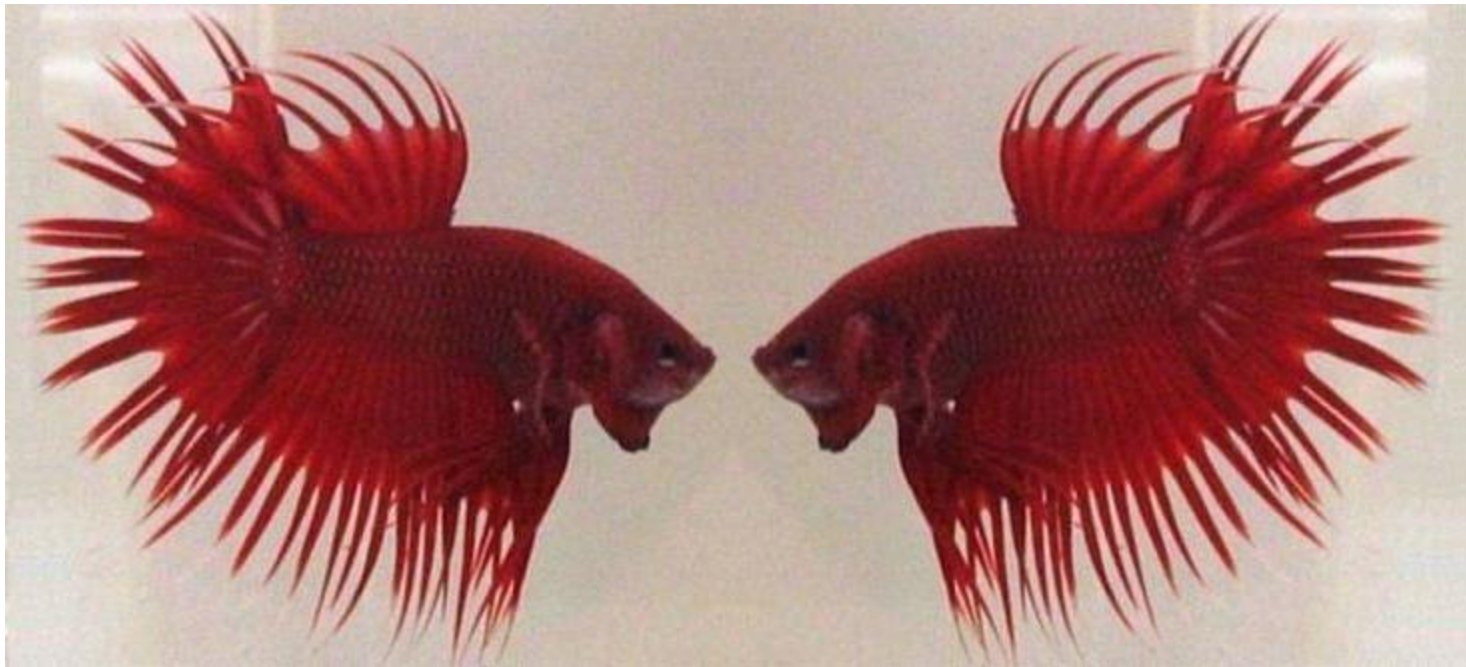
SPECIES SELECTION FACTOR I

- **Temperature** – tropical vs temperate
- **Salinity** – freshwater, brackish, or saltwater
- **Reproduction** – livebearers, egg-layers
- **Size** – size of fish needs to match the tank
- **Feeding habits** –
 - Carnivores
 - Herbivores
 - Omnivores



SPECIES SELECTION FACTOR II

- Behavior – some species are aggressive
- Physical appearance – some species are “fancy” (unusual color, shape, etc.)





SPECIES SELECTION FACTOR III

EASY-TO-GROW SPECIES



SPECIES SELECTION FACTORS III

MEDIUM-CARE SPECIES



Silver dollar, Discus, Angels

SPECIES SELECTION FACTORS III

DIFFICULT-TO-GROW SPECIES

Glass catfish, Bleeding heart tetra, Neon tetra, Marbled hatchetfish



EXOTIC FISHES

GUPPIES

- **Origin:** South-America, north of Amazon
- **Size:** male – 3.5 cm & female – 6 cm
- **Identification characteristics:**
 - Basic colouration is brownish olive but wide variation in colour of iridescent lateral scales.
 - Cross breeding of various strains has produced guppies of almost very conceivable colour pattern.
 - Now appears in a bewildering variety of shapes and colour patterns

- **Water quality:**
 - Prefer moderately hard water
 - pH- 6.8 to 7.4
 - Temperature- 20°C to 30°C
- **Fecundity:** 80 to 150 fry/female
- **Reproduction behaviour:** live bearer

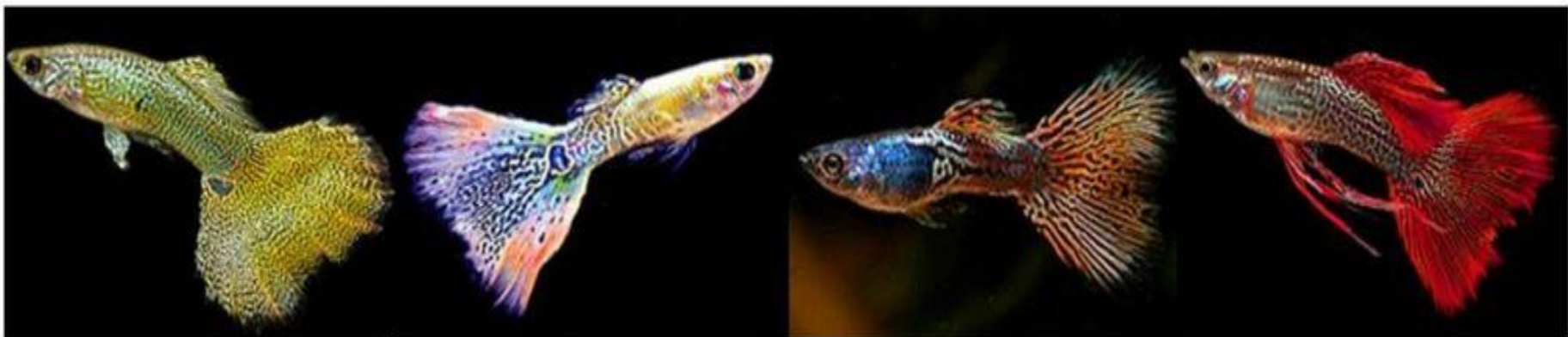


1. Silver Grass

2. Blue Grass Guppy

3. Blue Grass Variation

4. Red Grass



5. Gold Lace Snakeskin

6. Meduza Snakeskin

7. Metal Red Lace Snakeskin

8. Red Lace Snakeskin



9. Platinum Solid

10. Moscow Blue Solid

11. Moscow Fire Tail Solid

12. Black Ribbon Solid

Pointed mouth molly & short finned molly

- **Origin:** North - South-America, Texas to Columbia.
- **Size:** male –8 cm & female –12 cm
- **Identification characteristics:**
 - Body resembles that of related species but the dorsal fin is significantly smaller.
 - Mouth slightly more pointed
 - Many variety of this species as black spotted variety, completely black called black molly
 - Varieties shows as the upper half of the body is a grayish blue, flanks are vivid bluish green with rows of blue or green iridescent spots

- **Water quality:**
 - Normal water
 - pH- 6.8 to 7.5
 - Temperature: 20°C to 30°C
- **Fecundity:** 60 to 150 fry/female
- **Reproduction behaviour:** live bearer

Sword Tail

- **Origin:** Central America
- **Size:** male –7.5 cm & female –11.5 cm
- **Identification characteristics:**
 - Body is slender & laterally compressed.
 - Dorsal & caudal long.
 - Gonopodium has well developed hooks.
 - Basic colouration is pale olive brown.
 - Belly is silver.
 - The centre may be green, yellow, orange or red.
 - There is no significant difference between colour patterns of male and female

- **Feeding habitat:**
 - Both live and dried food
- **Water quality:**
 - Prefer moderately hard water
 - pH- 6.8 to 7.4
 - Temperature- : 20°C to 30°C
- **Fecundity:** 50 to 60 fry/ female
- **Reproduction behaviour:** live bearer



Variegated platy, variable platy fish

Origin: Mexico

Size: male –10 cm & female –12 cm

Identification characteristics:

- Body shape closely resembles that of *Xiphophorus **helleri helleri***.
-
- Basic colouration in wild specimens is yellowish green & olive green towards tail.
-
- Irregular black flanks.
-
- Some specimens carry 6-8 dark transverse bands.
-
- Females are paler in colour

Feeding habitat:

Both live and dried food

Water quality:

- Prefer moderately hard water
-
- pH- 6.8 to 7.4
-
- Temperature- 21°C to 24°C

Fecundity: 60 to 100fry/ female

Reproductive behaviour: live bearer

Gold Fish

Origin: Southern China

Size: about 23 cm

Characteristics:

- It has an evenly proportioned body and fins
- The pelvic fins just before the start of the dorsal fin
- It has a shallow fork to its short caudal fin
- A good specimen has metallic scales over the whole body. Yellow, red, orange, silver and even variegated fishes are common

Feeding habitat:

- Both live and dried food

Water quality:

- Prefer cold water
- pH- 6.5 to 8.5
- Temperature- 18°C to 20°C

Fecundity: 2000-4000 eggs/ female

Reproductive behaviour: egg layers



KINGUIO COMUM



KINGUIO VÉU

Ojos de Burbuja



Cabeza de Leon



Celestia



Cometa



Demekin



Dragon Ey



KINGUIO PÉROLA



KINGUIO TELESCÓPIO

Escama de Perla



Cola de abanico



Hamanishiki



KINGUIO BOLHA

Comun



Jikin



Oranda



KINGUIO CABEÇA DE LEÃO



KINGUIO ORANDA



KINGUIO CELESTIAL

Phoenix



Pompón



Ranchu



Ryukin



Shubunkin



Telescopio



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Rosy barb

- **Origin:** North India, Bengal, Assam.
- **Size:** - max. 14 cm in wild.
- **Identification Characteristics:** -
 - Body is fairly deep and some what laterally compressed.
 - The back is shiny, olive green, the rest of body is mainly silvery, shiny and tinged with soft red.
 - Dorsal and anal fin have dark pigmentation.
- **Feeding habitat:**
Both live and dried food
- **Water quality:**
 - Prefer old soft water
 - pH- 7
 - Temperature- 25°C to 28°C

Fecundity: 200 to 250 eggs/female

Reproductive behaviour: Egg- layers



Tiger barb, Sumatra barb

- **Origin:** South Asia, Sumatra & Java
- **Size:** approximately 7.5 cm
- **Identification character:**
 - Basic colouration is silvery white
 - Upper body is brownish with green tinge
 - Four bluish black Transverse band running across body
 - Dorsal fin is black with the upper border nearly trimmed in red. Upper and lower lobes of tail and veil tail fins are red with the scales with golden shining
 - Males have bright red nose
- **Feeding habitat:** Both live and dried food
- **Water quality:**
 - Prefer old soft water
 - pH- 7
 - Temperature- 25°C to 28°C
- **Fecundity:** 200 to 250eggs/female
- **Reproductive behaviour:** Egg layers



Spanner barb

Origin: South Asia, Singapore, Thailand, Sumatra and Java

Size: Maximum: 7 cm

Identification character:

- Body is fairly deep and somewhat laterally compressed
- Golden yellow flanks and vivid orange bellies, two cone-shaped transverse bands stretch across whole width of front part of the body
- From second transverse bands a dark bluish zigzag lines runs to caudal peduncle.
- The fins are reddish and transparent
- Female have soft red and transparent dorsal fin

Feeding habitat:

Both live and dried food

Water quality:

- Prefer old soft water
- pH- 7
- Temperature- 25°C to 28°C

Reproductive behaviour: Egg lay



Zebra Danio

Origin: Eastern India and Bangladesh

Size: - approximately 4 to 5 cm

Identification Characteristics: -

- Body is slender and laterally compressed with two pairs of barbells
- The body is silvery, tinted with gold, with 7-9 blue horizontal strips
- Females have more rounded belly profile and larger than males
- The male have golden strips between two strips while female have silver

Feeding habitat:

Both live and dried food

Water quality:

- Prefer old soft water
- pH- 6.6 to 7.2
- Temperature- 23.8°C to 25°C

Fecundity: 200 eggs/female

Reproductive behaviour: Egg- layers



Paracheirodon innesi

Neon tetra

Origin: Amazon and basin of Negro river

Size: 4.5 cm

Identification characteristics:

- Body is typically scaled
- An attractive blue-green iridescent stripe runs back from the top of the eye up to or beyond the adipose fin
- Fins colourless & transparent
- Mostly having adipose fin

Feeding habitat:

Both live and dried food

Water quality:

- Soft acidic water
- pH - 5.5 to 6
- Temperature: 21°C to 24°C

Fecundity: 80 to 150 eggs/female

Reproductive behaviour: egg layers



Gymnocorymbus ternetzi

Black tetra, Petticoat fish

Origin: Central America

Size: Approx. 5cm

Identification character:

- Body deep and laterally compressed
- Black olive green, belly white with silvery tinge
- Vertical black bands appear on snout and cross the eye
- Wider bands found behind operculum and under dorsal fin
- Posterior half of body is black and also dorsal, adipose and anal fin are black
- Other fins transparent and colourless

Feeding habitat:

- Both live and dried food

Water quality:

- Soft acidic water
- pH – 6 to 6.5
- Temperature: 23°C to 28°C

Fecundity: 80 to 150 eggs/female



Pygocentrus piraya

Piranha

Origin: From Orinoco and Amazon river.

Size: - max. 35 cm in wild, less in captivity.

Identification Characteristics: -

- Body is deep, stocky and very compressed.
- Head large with high forehead, keel of belly is separated from pectoral fin .
- Anal fin long and sickle shaped.
- Toughened adipose fin
- Body vermilion or dark red. Dorsal and caudal fin dark and latter with lighter patch in middle.
- Anal fin red with black edge.
- Pectoral and ventral fins are vermilion

Water quality:

- Soft acidic water
- pH – 6 to 7.5
- Temperature: 24°C to 27°C

Reproductive behaviour: Egg- layers



Betta splendens

Siamese fighting fish.

Origin: Far East Malaya and Thailand

Size: - approximately 6 cm.

Identification Characteristics: -

- Body is deep and laterally compressed
- Dark marks 1st below center of dorsal fin and 2nd on caudal peduncle
- Pelvic fins are hair like
- Male large with pointed dorsal fin, female with rounded dorsal fin
- Female show white genital papilla, rounded belly
- Male larger , more pronounced finnage , more colourful than female

Water quality:

- Soft water
- pH –7
- Temperature: 24°C to 28°C

Fecundity:300-500 eggs.

Reproductive behaviour: Egg- layers (bubble nest builder).

TYPES OF BETTA

Vail Tail



Crown Tail



Full moon



Dumbo



Tricogaster trichopterus

Three spotted gourami

Origin: South Vietnam, Thailand, Malaysia

Size: - Maximum 15 cm in wild but remains considerably mature at 8-10 cm.

Identification Characteristics: -

- Body is deep and laterally compressed
- Dark marks 1st below center of dorsal fin and 2nd on caudal peduncle
- Pelvic fins are hair like
- Male large with pointed dorsal fin, female with rounded dorsal fin and rounded belly

Water quality:

- Soft water
- pH –7
- Temperature: 23°C to 28°C

Fecundity: 500-800 eggs.

Reproductive behaviour: Egg- layers.



Astronotus ocellatus

Oscar velvet cichlid & Peacock eye cichlid.

Origin: Northern South America.

Size: Maximum 35 cm.

Identification characteristics:

- Body is fairly slender & laterally compressed.
- The head is blunt, mouth large with a protruding lower jaw.
- Usually a dark olive green to chocolate colour on flanks black-bordered ivory or reddish strips.
- Fins are olive green, flecked with black & gold.
- Females have often 2 or 3 dark patches at the base of the dorsal fin.

Water quality:

- Soft water
- pH –7
- Temperature: 25°C to 28°C

Reproductive behaviour: Egg layers



Pterophyllum scalare

Angel fish

Origin: The Amazon basin

Size: Maximum 15 cm

Identification characteristics:

- Body is slightly longer & it is deep.
- The snout is slightly protuberant & fore head rise3 much more sharply.
- The basic colouration is grayish green with a silvery sheen.
- Back is olive green; belly lighter 4 prominent & 3 less prominent dark bands lie on flanks.
- The dorsal fin bluish grey & white, anal fin is darker.

Water quality:

- Soft water
- pH –7
- Temperature: 24°C to 28°C

Reproductive behaviour: Egg layers

Albino Pearl Scale Angelfish



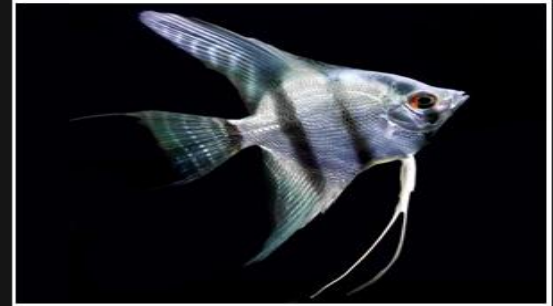
Pterophyllum Scalare var.

Gold Pearl Scale Angelfish



Pterophyllum Scalare var.

Striped Angel fish



Pterophyllum Scalare var.

Blue Blushing Angelfish



Pterophyllum Scalare var.

Altum Angelfish



Pterophyllum Scalare var.

Marbled Angelfish



Pterophyllum Scalare var.

Koi Angelfish



Pterophyllum Scalare var.

Platinum Blushing Angelfish



Pterophyllum Scalare var.

Black Lace Angelfish



Pterophyllum Scalare var.

Symphysodon discus

Discus

Origin: The Amazon region

Size: Maximum 15 cm.

Identification characteristics:

- Basic colouration is reddish brown.
- Nine dark vertical bands across the body, bluish- green horizontal lines found on a head, body & the fins.
- The red-edges dorsal fin & anal fins are reddish brown.
- The ventral fins are elongated & taper to a point.
- There is no known external characteristic.

Water quality:

- Soft water
- pH –7
- Temperature: 25°C to 31°C

Reproductive behaviour: Egg layers



INDIGENOUS VARIETIES

Kerala Queen

Puntius denisonii

- Native: western Ghats
- Egg layer
- Sensitive
- High demand in export market
- Endangered
- Captive breeding
 - not commercialised



Filamentous barb

Dawkinsia filamentosa

- Native-Western Ghats

India (Andhra Pradesh, Goa, Karnataka, Kerala, Maharashtra, Tamil Nadu)

- Good market value
 - Captive breeding-
- Not commercialized



Puntius tamaraparniei

- **Native:** India (Tamil Nadu)
- Populations of the species are known to be declining
- **Habitat and Ecology :** Found in moderate flowing streams and rivers with bed rock and sandy bottom.

Attains a total length of 9.2 cm.



Puntius sophore

- **Native:** Bangladesh; China; India; Myanmar; Nepal; Pakistan; Thailand
- It is used as an aquarium fish. This barb is considered as having medicinal value in Tamil Nadu.



Other Indigenous fishes

Scientific name	Common name	Place of collection
<i>Puntius phutunio</i>	Dwarf barb/ pigmy barb	Rudrasagar lake
<i>Puntius manipurensis</i>	Manipur barb	Udaipur fish market
<i>Parluciosoma daniconius</i>	Black line rasbora	Udaipur fish market
<i>Lepidocephalichthys guntea</i>	Panther/platinum line loach	Hurijala area
<i>Erethistes pussilus</i>	Gangetic erethistes	Rudrasagar lake
<i>Sisor rhabdophorus</i>	Whiptail catfish	Rudrasagar lake
<i>Megarasbora elanga</i>	Bengal barb	Hurijala area
<i>Puntius gelius</i>	Golden dwarf barb	Rudrasagar lake



Hatchery Infrastructure

□ *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

✓ **Breeding unit**

Glass tanks

Tank Size

- 12"x 9"x7"
- 18"x12"x9"
- 24"x12"x12"
- 36"x12"x12"
- 48"x18"x1.25feet
- 8feet x 2feetx 1.5feet

✓ **Rearing unit**

➤Cement tank

Size: 12x 15x3.5 cubic feet

➤FRP tank

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*

<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



T H A N K Y O U