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Future of Exotic Freshwater Aquarium Fishes In Terms of Trade in India: A Study

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Abstract

Due to the immense commercial value of the aquarium fishes these are rapidly gaining importance in world-wide. A deep introduction is required of these attractive species into area-wise in which they belong. The aim of this research is to study and provide details of 260 species of egg laying and 26 species of live bearing fishes found frequently in India.

Keywords: Exotic freshwater egg laying aquarium fishes, Commercial trade value.

Introduction

Before 1865 exotic fresh water fishes were used only as ornamental values. Between 1865 and 1969 sixteen exotic fresh water fish species of sport, food and public health importance were introduced into India, and their introduction bear valid records (Jhingran, 1983). Yet, three of these exotic species (*Osphronemus goramy, Gambusia affinis* and *Poecilia reticulate*) gained ornamental importance apart from their food and public health importance. There are no valid records on the introduction of exotic fish species of ornamental value. However, we come across several species of ornamental fishes and their varieties (strains or breeds). In the absence of valid records, it is very difficult to find out the very existence of fish species alien to our country. Probably, this is the reason for the absence of scientifically accepted documents, inspite of the fact that a vast number of aquarium fish species and their strains do exist in India. The present paper attempts to enlist most of the exotic freshwater aquarium fish species of India.

Aim of the Study

To provide details about 260 species of egg laying and 26 species of live bearing fishes found in India.

Materials and Methods

The occurrence of the exotic freshwater aquarium fish species and their strains in our country were identified with the help of Axelrod and Schultz (1978) and *Axelrod et al.* (1983, 1985).

Result and Discussion

A checklist of exotic freshwater aquarium fish species has been prepared (Table 1&2) based on the observations following Berg (1940). The exotic egg-laying freshwater aquarium fishes are represented by 260 species and their 53 strains, and 9 subspecies. They belong to 10 orders, 26 families, 123 genera and 1 subgenus. The order Cypriniformes is represented by 187 species and 3 subspecies (190 types), followed by the Order Perciformes (comprising 96 species and 2 subspecies-98 types). Strains are not represented by the Orders Lepidostreniformes, Clupeiformes, Mormyriformes, Beloniformes, Cyprinodontiformes, Mugiliformes, Mastacembeliformes and Tetrodontiformes. Maximum number of species are represented by the family Characidae of Order Cypriniformes (81). The maximum number of species and strains are represented by the family Cyprinidae of Cypriniformes (71) followed by the family Cichlidae of Perciformes (63) and family Anabantidae of Perciformes (24). Strains are represented by the families Cyprinidae Anabantidae and Cichlidae only. Of the families, the maximum number of strains are represented by Cyprinidae (30) followed by Cichlidae (15) and Anabantidae (8). 135 types breed in water, while 188 do not. Of the 135 types that breed, 57 species and their 51 strains and 1 sub-species (totaling 109 types) are common, whereas 22 species and their strains, and 2 subspecies (Totaling 26 types) are rare. Of the 188 types that do not breed,

13 species are common, whereas 169 species and 6 subspecies (totaling 175 types) are rare.

From Table 2 it is clear that there are 27 species of live bearers. They represented by 12 genera and 3 families (Goodeidae, Anablepidae and Poecilidae) of the order Cyprinodontiformes. The family Poecilidae is represented by the maximum number of species (25) and strains (50). Strains are represented by the family Poecilidae only. Similarly, the 2 subspecies are represented by the family Poecilidae only. All the 7 types breed in our waters. This clearly indicates that they have adapted themselves very well to our water. Of the 79 types, 30 are rare (comprising 15 species and 15 strains) and 49 are common (comprising 1 species and 35 strains, and 2 subspecies).

The current value of the annual global trade of tropical aquarium fishes has been estimated to be about 850 million US Dollars (Shenoy, 1987; Nopany 1987). The demand is growing steadily at the rate of 10-15% per year. Export from a few South-East Asian countries accounts for over 75% of the total export trade (Reddy, 1987). The aquarium fishes are thus rapidly gaining importance, not only because of the aesthetic value, but also due to their immense commercial value in the export trade the World over. The demand for good quality tropical fishes far exceeds the supply. The retail and wholesale turnover of aquarium fish trade in Chennai city alone is around INR 50 lakhs per annum and the country internal trade is above INR 5 crore annually (Reddy, 1987). This points to the fact that aquarium fishes are of immense commercial importance. Perhaps, this has triggered off many hobbyists, commercial breeders, exporters and importers systematically search for attractive species and varieties with persistent co-ordination for their introduction into places.

Due to ideal climatic conditions and availability of transportation facilities including National and International air terminals, Mumbai, Kolkata and Chennai have not only emerged as the major breeding centers but also as the major centers for importing aquarium fishes from Singapore and Bangkok. The quantum of export value of aquarium fishes from India had seldom exceeded INR half million per annum for the past 15 years (Nopany, 1987)

In India, since endemic egg-laying freshwater aquarium fish species are very limited in number, domestic aquarium fish trade is dominated by the exotic egg-laying freshwater aquarium fish species. They contribute to the extent of 85% of the country's trade, whereas endemic egg-laying species contribute the remaining meager 15%. However, in the export trade endemic egg-laying freshwater aquarium fish species contribute to 75%, while the exotic egg-laying freshwater aquarium fish species contribute the rest. Since the endemic live-bearing freshwater aquarium fish species are almost absent, the domestic trade is absolutely contributed by the exotic live-bearing freshwater aquarium fish species.

Table. 1 Checklist of exotic egg-laying fresh water aquarium fishes

1. **ORDER : LEPIDOSTRENFORMES**
   A.Family : Protopteridae
   Protopterus annectens (Owens)
2. **ORDER : CLUPEIFORMES**
   A.Family : Pantodontidae
   Pantodon buchholzi (Peters)
3. **ORDER : MORMYRIFORMES**
   A.Family : Mormyridae
   Gnathonemus moori
   G. petersi (Gunther)
4. **ORDER : CYPRINIFORMES**
   A.Family : Characidae
   Abramites microcephalus
   A.hypselonotus (Gunther)
   Anoptichthys jordani (Hubbs & Linnes)
   Anostomus anostomus (Linn.)
   A.trimaculatus (Kner)
   A.taeniatus (Kner)
   Aphyocharax rubropinnis (Pappenheim)
   A.rathboni
   Arnoldichthys spilopterus (Boulenger)
   Astyanax bimaculatus (Linnaeus)
   Axelrodia riesei (Gery)
   Brycinus chaperi (Sauvage)
   Carnegiella marthae (Myers)
   C.strigata strigata (Gunther)
   Charax gibbosus (Linnaeus)
   Cheirodon axelrodi (Schultz)
   C.kriegi (Schindler)
   Chilodus punctatus (Muller & Troschel)
   Coelurichthys microlepis (Staindachner)
   Copeina arnoldi (Regan)
   Corynopoma riisei (Gill)
   Creagrutus beni (Eigenmann)
   Crenuchus spilurus (Gunther)
   Ctenobrycon spilurus (Cuvier & Val.)
   Gymnocorymbus ternetzi (Boulenger)
   G.thayeri (Eigenmann)
   Hemibrycon guppyi (Regan)
   Hemigrammapetersius caudalis (Boulenger)
   Hemigrammus armstrongi (Schultz)
   H.caudovittatus (Ahl)
   H.erythrozonus (Durbin)
   H.gracilis(Reinhardt)
   H.nannus (Lutken)
   H.ocellifer(Steindachner)
   H.pulcher (Ladiges)
   H.rhodostomus (Ahl)
   H.rodwayi (Durbin)
   H.unilineatus (Gill)
   H.vorderwinkleri (Gery)
   Hyphe-sobrycon aqulha (Fowler)
   H.bentosi (Durbin)
   H.bifasciatus (Ellis)
   H.callistus (Boulenger)
   H.erythrostigma (Fowler)
   H.flammeus (Myers)
   H.herbertaxelrodi(Gery)
   H.haterorhabdus (Ulrey)
   H.metae (Eigenmann & Henn)
   H.peruvianus (Ladiges)

H.pulchripinnis (Ahl)
H.rosaceus (Durbin)
H.serape serape (Durbin)
H.simulans (Gery)
Laporinus affinis
L.fasciatus (Bloch)
L.melanopleura (Gunther)
L.striatus (Kner)
Megalamphodus axelrodi (Travassos)
M.megalopterus (Eigenmann)
Metynnis hypsauchen (Muller & Troschel)
M.maculatus (Kner)
M.roosevelti (Eigenmann)
Moenkhausia dichroura (kner)
Nannostomus anomalus (Steindachner)
N.beckfordi (Gunther)
N.bifasciatus (Hoedeman)
N.trifasciatus (Steindachner)
N.unifasciatus (Steindachner)
Nematobrycon lacortei (Weitzman & Fink)
N.pulmeri (Eigenmann)
Paracheirodon innesi (Myers)
Petitella geogiae (Grey & Bontiere)
Phenacogrammus interruptus (Boulenger)
Pristella maxillaris (Ulrey)
P.riddlei(Meek)
Schizodon fasciatus (Agassiz)
Serrasalmus nattereri (Knen)
S.niger
Thayeria bochikei (Weitzman)
T.oblique (Eigenmann)
T.sanctamariac (Ladiges)
Thoracocharax maculatus (Steindachner)
T.stellatus (Kner)

B.Family : Gymnotidae

Gymnotus carapo (Linn)

C.Family : Apteronotidae

Hypopomus artedlii (Kaup)
Steatogenys elegans (Steindachner)

D.Family : Cyprinidae

Balantocheilos melanopterus (Bleeker)
Barbodes binotatus (Cuvier & Val.)
B.dorsimaculatus (Ahl)
B. everetti (Boulenger)
B.fasciolatus (Gunther)
B.hexatona (Weber &De Beaufort)
B.holotaenia (Boulenger)
B.lateristriga (Cuvier & Val.)
B.pentazona (Boulenger)
B.schwanenfieidi (Bleeker)
B.unitaeniatus (Gunther)
B.usumbarae (Lonnberg)
Barbus schuberti
B.modesta (Bleeker)
B.sidthimunki (Klausewitz)
Capoeta olipolepis (Bleeker)
C.partipentazona (Fowler)
C.semifasciolatus (Gunther)
C.tetrazona (Bleeker)
C.titteya (Deraniyagala)
Carassius auratus (Linn.)
Cyprinus carpio (Linn.)
Cobitis taenia (Linn.)
Cyrinocheilus aymonieri (Tirant)
Epalzeorhynchus kalopterus (Bleeker)
E.siamensis (Smith)
Labeo bicolor (Smith)
L.erythrurus (Fowler)
L.flenatus
Lucisoma setigerum (Val.)
Morulius chysophekadion (Bleeker)
Noemachilus notostigma (Bleeker)

E.Family : Siluridae

Brochis coeruleus
Hoplostemeus linorale (Hancock)

F.Family : Pimelodidae

Pimelodus clarias (Bloch)
Sorubim lima (Bloch & Schneider)

G.Family : Callichthyidae

Callichthys callichthys (Linnaeus)
Corydoras aneus (Gill)
C. arcuatus (Elwin)
C.punctatus (Bloch)
C.paleatus (Jenyns)
C.reticulatus (Fraser-Brunner)
C.melanisters (Regan)

H.Family :Scheilbeidae

Parailia longifilis (boulenger)

I.Family : Machocidae

Syndontis nigriventris (David)
S.nigromaculatus (Boulenger)

J.Family : Loricariidae

Ancistrus temminki (Valenciennes)
Hemiancistrus niceforoi (Fowler)
Hypostomus plicostomus (Linnaeus)
H.rachovi (Regan)
Otocinclus arnoldi (Regan)
O.vittatus (Regan

5. ORDER : BELONIFOMES

A.Family : Hemiramphidae

Dermogeny purillus (Van Hasselt)

6. ORDER : CYPRINODONTIFORMES

A.Family : Cyprinodontidae

Aphyosemion australe (Rachow)
A.bivittatum hollyi (Myers)
A. bivittatum bivittatum (Lonnberg)
A.callirum callirum (Boulenger)
A.cognatum (Meinken)
A.gulare caerulem (Boulenger)
A.occidentails (Clausen)
A.petersi (Sauvage)
Aplocheilichthys flavipinnis (Meinken)
A. macrophthalmus (Meinken)
A.myersi (Poll)
Aplocheilus dayi (Steindachner)
A.siamensis
Cynolebias melanotaenia (Regan)
C.nigripinnis (Regan)
Fundulus cingulatus (Cuvier & Valenciennes)
F.grandis (Baird & Girard)
F.heteroclitus (Linnaeus)
F.notti (Agassiz)
F.sciadicus(Cope)
Jordanella floridae (Goode & Bean)
Nothobranchus guentheri (Pfeffer)
Pachypanchax hormalonotus (Dumeril)

7. ORDER : MUGILIFORMES

A.Family : Athrenidae

Melanotaenia bosemoni
M.fluviatilis
M.nigrais (Richrdson)
M.splendida (Peters)
M.incins (Weber)

8. ORDER : PERCIFORMES

A.Family : Centropomidae
Chanda buruensis (Bleeker)
Gynochanda filamentosa

B.Family : Anabantidae
Belontia signata (Gunther)
Betta bellica (Sauvage)
B.smaragdina (Ladiges)
B.splendenis (Regan)
Helostoma temmincki (Cuvier & Val.)
Macropodous chinensis (Bloch)
M.dayi (W.Kohler)
M.opercularis (Linnaeus)
Osphronemus goramy (Laceede)
Parosphrongmus deissneri (Bleeker)
Sphaerichthys osphromenoides (Canestrini)
Trichogaster leeri (Bleeker)
T.pectoralis (Regan)
T.trichopterus (Pallos)
T.trichopsis scalleri (Ladiges)
T.vittatis (Cuvier & Valenciennes)

C.Family : Centrarchidae
Elassoma zonatum (Jordan)
Enneacanthus gloriosus (Holbrook)
E.obasus (Girard)
Mesogonistius chaetodon (Baird)

D.Family : Nandidae
Polycentropsis abbreviate (Boulegar)

E.Family : Cichlidae
Acarnia nassa (Heckel)
Aequidens curviceps (Ahl)
A.mariae (Eigenmann)
A.maroni (Steindachner)
A.portalegrensis (Hensel)
A. pulcher (Gill)
Aulonocara nyassae (Regan)
Apistogramma agassizi (Steindachner)
A. pretense (Haseman)
A.pleurotaenia (Regan)
A. ramirezi (Myers & Harry)
A.retzigi (Ahl)
Astronotus ocellatus (Cuvier)
Cichla ocellaris (Bloch & Schneider)
Cichlasoma atromaculatum (Regan)
C. auream (Gunther)
C. vimaculatum (Linnaeus)
C. coryphaenodes (Heckel)
C.cyanoguttatum (Baird & Girard)
C.festivum (Heckel)
C.labiatum (Gunther)
C.maculicauda (Regan)
C.meeki (Brind)
C.nigrofasciatum (Gunther)
C.octofascitum (Regan)
C.salvini (Gunther)
Cynotilapia afra (Gunther)
Hapochromis callipterus (Gunther)
H.rostratus (Boulenger)
H.strigigena (Pfeffer)
Hemichromis bimaculatus (Gill)
H.fasciatus (Peters)
Lamprologus brichardi (Poll)
L.elongatus (Boulenger)
Melanochromis auratus (Boulenger)
M.johanni (Eccles)
Nannacara anomala (Regan)
N.taenic (Regan)
Pelmatochromis auratus
Pelvicachromis palcher (Boulenger)
Pseudotropheus zebra (Boulenger)
Petrophyllum scalare (Lichenstein)
Symphysodon aequifasciate (Schultz)
S.aequifasciata haraldi (Schultz)
S.discus (Heckel)
Tilapia macrocephala (Bleeker)
T.sparmanni (Smith)
Julidochromis ornatus
J.regani (Poll)

F.Family : Scatophagidae
Brachygobius aggregates (Herre)

9. ORDER : MASTACEMBELIFORMES

A.Family : Mastacembelidae
Mastacembelus zebrinus (Blyth)

10. ORDER : TETRODONTIFORMES

A.Family : Tetrodontidae
Tetradone fluviatilis

Table-2 Chec klist of exotic live-bearing fresh water aquarium fishes

ORDER: CYPRINODONTIFORMES

A.Family : Goodeidae
Xenotoca eiseni (Rutter)

B.Family : Anablepidae
Anableps anableps (Linnaeus)

C.Family : Poecilidae
Cnesterodon decemmaculatus (Jenyns)
Gambusia affinis affinis (Baird & Girard)
G.affinis holbrooki (Girard)
G.nicaraquenis (Gunther)
G.punctata (Poey)
Guardinus metallicus (Poey)
Heterandria formosa (Agassiz)
Limia heterandria (Regan)
Micropoecilia branneri (Eigenmann)
Poecilia cauacna (Steindachner)
P.latiplnna (Le Sueur)
P.mexicana (Steindachner)
P.nigrofasciata (Regan)
P.ornata (Regan)
P.parae (Eigenmann)
P.reticulata (Peters)
P. sphenops (Cuvier & Val.)
P. velifera (Regan)
P.vittata (Guichenot)
P.vivipara
Poeciliopsisgracilis (Heckel)
Priapella intermedia (Alvarez)
Xiphophorus helleri (Heckel)
X.maculatus (Gunther)
X.montezumae (Jordan &Snycer)
X.pygmaeus (Hubbs)
X.variatus (Meek)

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