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Journal of Threatened Taxa
Building evidence for conservation globally

www.threatenedtaxa.org
ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

SHORT COMMUNICATIONS
A CHECKLIST OF THE ORNAMENTAL FISHES OF HIMACHAL PRADESH, THE WESTERN HIMALAYA, INDIA

Indu Sharma & Rani Dhanze

26 July 2018 | Vol. 10 | No. 8 | Pages: 12108–12116
10.11609/jott.3716.10.8.12108-12116

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A Checklist of the Ornamental Fishes of Himachal Pradesh, the Western Himalaya, India

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Abstract: Fifty-eight ornamental fish species belonging to five orders, 13 families and 36 genera occur in Himachal Pradesh. The dominant family is Cyprinidae (46.55%) followed by Nemacheilidae (15.51%); Sisoridae, Poeciliidae, Osphronemidae (9.89%); Cobitidae (5.17%); Amblycipitidae, Ambassidae, Badidae, Gobiidae, Helostomatidae, Cichlidae and Characidae (1.72%). Of the 58 species, 27.58% are exotic and have been mainly imported for aquarium keeping. The exotic species are being introduced in the region without any regulation, subsequently turning invasive and threatening the indigenous fauna. Thus, there is a need for developing scientific guidelines and regulatory mechanisms for importing exotic aquarium fishes. On the other hand, the breeding and culture of indigenous fishes can be a profitable venture, provided there is an availability of a standardized breeding technology. Such an enterprise will go a long way in conservation of native fishes, improving livelihoods as well as raising the socio-economic status of local communities.

Keywords: Aquarium trade, conservation, enterprise, socio-economic.

Aquarium fish keeping is one of the oldest hobbies in the world and next only to photography in popularity (Das et al. 2005; Singh & Ahmed 2005). The high demand for ornamental fishes has made them an important component of the world fish trade (Andrews 1990; Singh & Ahmed 2005). The high demand for ornamental fishes has made them an important component of the world fish trade (Andrews 1990; Singh & Ahmed 2005). The aquarium industry is sighted as both positively (socio-economic and livelihood benefits) and negatively (over-harvest, habitat destruction, alien species invasions) influential (Watson & Moreau 2006).

Himachal Pradesh is located in the western Himalaya between 30.3667°–30.2° N and 75.7833°–79.0667° E and altitudes ranging from 320–7,000 m. It has four physiographic zones (i) Shiwalik, (ii) Lower Himalayan, (iii) Higher Himalayan, and (iv) Trans Himalayan zone. The state has enormous potential for fishery in terms of aquatic resources with approximately 300km of perennial rivers, 775km of seasonal rivers (Satluj, Beas, Ravi and Yamuna), 60,000ha reservoirs and 2,000ha, lakes and ponds including two Ramsar Sites, Pong Dam and Renuka Wetland.

A review of literature reveals that although much work has been undertaken on the general fish resources of Himachal Pradesh (Day 1875–1878; Hora 1937; Menon 1962, 1987, 1999; Bhatnagar 1973; Seghal 1974; Tilak & Hussain 1977; Sharma & Tandon 1990; Johal et al. 2002, 2003; Dhanze & Dhanze 2004; Mehta & Uniyal 2005; Mehta & Sharma 2008; Sharma 2014), no information is available on the potential aquarium fishes. For the first time, an attempt has been made to produce a comprehensive list of ornamental fishes recorded from the waters of Himachal Pradesh.
**Material and Methods**

Fishes were collected from the Beas, Yamuna, Satluj, Ravi and Chandra Bhaga rivers in Himachal Pradesh and their tributaries using a combination of gears including cast net, scoop net and hand net. Fish specimens were preserved in 4% formalin solution and deposited in the High Altitude Regional Centre, Zoological Survey of India (ZSI), Solan, and identified using standard literature (Talwar & Jhingran 1991; Jayaram 2010). Conservation status of the fish species is based on the IUCN Red List of Threatened Species (2017) and nomenclature is as per Eschmeyer et al. (2016). Six fish species viz. *Barilius modestus* Day, 1872, *B. sacra* Hamilton, 1822, *Raiamas bola* (Hamilton, 1822), *Schistura himachalensis* Menon, 1967, *Paraschistura punjabensis* (Hora, 1923) and *Triplophysa microps* (Steindachner, 1866) which were not collected in the present study have been included based on records in published literature (Tilak & Hussain, 1977; Dhanze & Dhanze, 2004; Mehta & Uniyal 2005; Sharma 2014).

**Results and Discussion**

A systematic list of 58 ornamental fish species belonging to five orders, 13 families and 36 genera from various ecosystem of the state is summarized in Tables 1 and 2, of which 42 are native and 16 imported for the aquarium trade (Figs. 1 & 2; Images 1–27). Besides, two exotic species, *Cyprinus carpio* var. *communis* and *Cyprinus carpio* var. *specularis* are also used for aquaculture practices in the state. Cyprinidae is the most dominant family of native ichthyofauna with 22 species, followed by Nemacheilidae with nine species, Sisoridae with four species, Cobitidae with three species and Amblycipitidae, Ambassidae, Badidae & Gobiidae represented by one species each. The exotic fauna comprises five species of Cyprinidae, four species of Poeciliidae and Osphronemidae and one species each under Helostomatidae, Cichlidae and Characidae. As per the criteria of Ghosh et al. (2003), all fish species come under classified Aquarium fishes (CA) except three exotic varieties of *Cyprinus* species (*Cyprinus carpio* var. *communis*, *Cyprinus carpio* var. *specularis*, *Cyprinus carpio* var. *nudas*) and two *Carassius* species (*Carassius auratus* and *carassius carassius*) which are non-classified aquarium (NCA) fishes. The exotic *Cyprinus* spp. has commercial value but due to its hardy nature, beautiful colour and disease resistance are used as aquarium fishes till they reach their fingering stage. These exotic fishes have also entered the various natural water bodies (streams of Beas and Satluj River) of the region and are well established in the Pong dam, Govind Sagar Reservoir and Pandoh Dam.

Native fishes recorded as ornamental (Table 1) are hillstream species that are threatened by various anthropogenic stresses, viz., over exploitation, illegal fishing, invasive species, habitat loss and destruction due to channelization of water, and upcoming hydroelectric projects. Breeding and farming of these ornamental fish species can help in the restoration and conservation of indigenous fish fauna. Further, it will be a promising alternate livelihood for the farmers of the region. Thus the ornamental fish trade will go a long way to provide employment in the region.

The conservation status following the IUCN Red List of Threatened Species (2017) has revealed that among the 42 native fish species, 30 species (71.4%) come under the ‘Least Concern’ (LC) category; two species (4.8%) under ‘Data Deficient’ (DD) category and 10 species (23.8%) under ‘Not Evaluated’ (NE) category.

About 90% of the freshwater ornamental fish exported from India are wild caught indigenous species (Silas et al. 2011). Raghavan et al. (2013) stated that more than 1.5 million freshwater fish belonging to 30 threatened species were exported from India to Europe, US and other Asian countries from 2005 to 2012. Without any focus on conservation and sustainable use, freshwater fishes are collected from nature as an open access resource for the...
### Table 1. A systematic list of indigenous ornamental freshwater fishes of Himachal Pradesh along with their distribution and conservation status

<table>
<thead>
<tr>
<th>Species name</th>
<th>Common name</th>
<th>Distribution</th>
<th>IUCN status</th>
<th>Records</th>
<th>Voucher No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Order: Cypriniformes</strong></td>
<td><strong>Family: Cyprinidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Subfamily: Cyprininae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td><em>Barilius modestus</em> Day, 1872</td>
<td>Indus Baril</td>
<td>Satluj: Bilaspur</td>
<td>NE</td>
<td>Tilak &amp; Hussain 1977; Mehta &amp; Uniyal (2005); Sharma (2014)</td>
</tr>
<tr>
<td>14</td>
<td><em>Rasomos bole</em> (Hamilton, 1822)</td>
<td>Indian Trout</td>
<td>Yamuna: Sirmour</td>
<td>LC</td>
<td>Tilak &amp; Hussain 1977; Mehta &amp; Uniyal (2005); Sharma (2014)</td>
</tr>
<tr>
<td>Species name</td>
<td>Common name</td>
<td>Distribution</td>
<td>IUCN status</td>
<td>Records</td>
<td>Voucher No.</td>
</tr>
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<td>----------------------------------------------</td>
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</tr>
</tbody>
</table>

**Family: Nemacheilidae**

<table>
<thead>
<tr>
<th>Species name</th>
<th>Common name</th>
<th>Distribution</th>
<th>IUCN status</th>
<th>Records</th>
<th>Voucher No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Parachistura punjabensis (Hora, 1923)</td>
<td>-</td>
<td>Satluj: Bilaspur</td>
<td>NE</td>
<td>Tilak &amp; Hussain 1977; Mehta &amp; Uniyal (2005)</td>
<td>Recorded from literature</td>
</tr>
<tr>
<td>25 Schistura denisoni (Day, 1867)</td>
<td>-</td>
<td>Yamuna: Sirmour</td>
<td>NE</td>
<td>Tilak &amp; Hussain 1977</td>
<td>F-639 (ZSI Solan)</td>
</tr>
<tr>
<td>29 Schistura himachalensis (Menon, 1987)</td>
<td>-</td>
<td>Beas: Kangra</td>
<td>NE</td>
<td>Tilak &amp; Hussain 1977; Dhanze &amp; Dhanze (2004); Mehta &amp; Uniyal (2005); Sharma (2014)</td>
<td>Recorded from literature</td>
</tr>
<tr>
<td>30 Triplophysa stoliczkae (Steindacher, 1866)</td>
<td>Stoliczkae</td>
<td>Chanderbhaga: Lahaul &amp; Spiti</td>
<td>NE</td>
<td>Tilak &amp; Hussain 1977; Mehta &amp; Uniyal (2005)</td>
<td>F-756 (ZSI Solan)</td>
</tr>
<tr>
<td>31 Triplophysa microps (Steindacher, 1866)</td>
<td>Leh</td>
<td>Chanderbhaga: Lahaul &amp; Spiti</td>
<td>LC</td>
<td>Sharma (2014)</td>
<td>Recorded from Literature</td>
</tr>
</tbody>
</table>

**Family: Cobitidae**

<table>
<thead>
<tr>
<th>Species name</th>
<th>Common name</th>
<th>Distribution</th>
<th>IUCN status</th>
<th>Records</th>
<th>Voucher No.</th>
</tr>
</thead>
</table>

**Order: Siluriformes**

**Family: Amblynchidae**

<table>
<thead>
<tr>
<th>Species name</th>
<th>Common name</th>
<th>Distribution</th>
<th>IUCN status</th>
<th>Records</th>
<th>Voucher No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>34 Amblyiceps mangois (Hamilton, 1822)</td>
<td>India Torrent Catfish</td>
<td>Beas: Kangra, Mandi</td>
<td>LC</td>
<td>Tilak &amp; Hussain 1977; Dhanze &amp; Dhanze (2004); Mehta &amp; Uniyal (2005); Sharma (2014)</td>
<td>F-409 (ZSI Solan)</td>
</tr>
</tbody>
</table>

**Family: Sisoridae**

<table>
<thead>
<tr>
<th>Species name</th>
<th>Common name</th>
<th>Distribution</th>
<th>IUCN status</th>
<th>Records</th>
<th>Voucher No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 Glyptothorax brevipennis Hora, 1923</td>
<td>Mountain Catfish</td>
<td>Yamuna: Sirmour</td>
<td>DD</td>
<td>Tilak &amp; Hussain 1977</td>
<td>F-594 (ZSI Solan)</td>
</tr>
</tbody>
</table>
aquarium trade (Raghavan et al. 2013), resulting in their population decline and general decline of the state of freshwater biodiversity (Allen et al. 2010; Molur et al. 2011). Marine Products Export Development Authority of India has developed a document on green certification, which is the first of its kind in the freshwater ornamental fish sector (Ramachandran 2012) with the intention to maintain socio-economic sustainability. This approach stresses on reducing the dependence on wild stocks and ensures that the fish collection is managed as per access and benefit sharing practices. Iyer et al. (2016) stated that there are 101 valid fish species under the green certification guide lines and suggested the development of captive breeding technology for the potential export species.

Currently, there is neither a domestic ornamental fish market nor documentation of export of ornamental fish in Himachal Pradesh. Ornamental fish trade can be a lucrative business for local communities to improve their livelihood but requires the development and standardization of captive breeding techniques. Besides, the economic upliftment related to freshwater ornamental fish trade, proper emphasis must also be given to the sustainable maintenance of critical ecosystems and conservation of endemic fish diversity. Further, the import of exotic ornamental fishes to the state is increasing day by day as a result of growing popularity of aquarium fish keeping, but without any regulations, which may lead to negative impacts on native fish fauna. Captive breeding of indigenous fishes should be attempted for export and no wild caught fish should be used for the aquarium trade.

REFERENCES


### Table 2. Introduced fishes used for aquarium purpose

<table>
<thead>
<tr>
<th>Order</th>
<th>Family &amp; Species name</th>
<th>Common name</th>
<th>Distribution</th>
<th>IUCN status</th>
<th>Voucher No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Cyprinidae</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td><em>Carassius auratus</em></td>
<td>Goldfish</td>
<td>Beas: Kangra, Mandi, Kullu, Hamirpur Satluj: Bilaspur, Shimla, Una Yamuna: Solan, Sirmour Ravi: Chamba</td>
<td>Observed in aquarium at Chaudhary Sarwan Kumar H. P. Agricultural University Farm, Palampur, district Kangra (H. P.)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td><em>Carassius carassius</em></td>
<td>Crucian Carp</td>
<td>Beas: Kangra, Mandi, Kullu, Hamirpur Satluj: Shimla, Una, Yamuna: Solan, Sirmour Ravi: Chamba</td>
<td>Observed in aquarium at Chaudhary Sarwan Kumar H. P. Agricultural University Farm, Palampur, district Kangra (H. P.)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td><em>Cyprinus carpio</em></td>
<td>Scale Carp</td>
<td>Beas: Kangra, Mandi, Kullu, Hamirpur Satluj: Bilaspur, Una, Shimla, Yamuna: Solan, Sirmour Ravi: Chamba</td>
<td>Observed in aquarium at Chaudhary Sarwan Kumar H. P. Agricultural University Farm, Palampur, district Kangra (H. P.)</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td><em>Poeecilia reticulata</em></td>
<td>Guppy</td>
<td>Only in aquarium</td>
<td>NE</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
<tr>
<td>7.</td>
<td><em>Poeecilia reticulata</em></td>
<td>Guppy</td>
<td>Only in aquarium</td>
<td>NE</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
<tr>
<td>8.</td>
<td><em>Gambusia holbrooki</em></td>
<td>Eastern Fish</td>
<td>Only in aquarium</td>
<td>LC</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
<tr>
<td>9.</td>
<td><em>Xiphophorus hellerii</em></td>
<td>Green Sword Tail</td>
<td>Only in aquarium</td>
<td>NE</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
<tr>
<td>10.</td>
<td><em>Betta splendens</em></td>
<td>Siamese Fighting Fish</td>
<td>Only in aquarium</td>
<td>VU</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
<tr>
<td>11.</td>
<td><em>Macropodus opercularis</em></td>
<td>Paradise Fish</td>
<td>Only in aquarium</td>
<td>LC</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
<tr>
<td>12.</td>
<td><em>Trichogaster fasciatus</em></td>
<td>Three Spot Gourami</td>
<td>Only in aquarium</td>
<td>LC</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
<tr>
<td>13.</td>
<td><em>Trichogaster fasciatus</em></td>
<td>Three Spot Gourami</td>
<td>Only in aquarium</td>
<td>LC</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
<tr>
<td>14.</td>
<td><em>Helostoma temminckii</em></td>
<td>Kissing Gourami</td>
<td>Only in aquarium</td>
<td>LC</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
<tr>
<td>15.</td>
<td><em>Ptetroglyphum scalare</em></td>
<td>Angel Fish</td>
<td>Only in aquarium</td>
<td>NE</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
<tr>
<td>16.</td>
<td><em>Gymnocorymbus ternetzi</em></td>
<td>Black Tetra</td>
<td>Only in aquarium</td>
<td>NE</td>
<td>Observed in aquarium at H. P. State Fisheries Department</td>
</tr>
</tbody>
</table>


Image 1. *Pethia ticto* (Hamilton, 1822)

Image 2. *Puntius sophore* (Hamilton, 1822)

Image 3. *Pethia conchonius* (Hamilton, 1822)

Image 4. *Puntius chola* (Hamilton, 1822)

Image 5. *Salmostoma bacaila* (Hamilton, 1822)

Image 6. *Barilius bendelisis* (Hamilton, 1807)

Image 7. *Barilius barila* (Hamilton, 1822)

Image 8. *Barilius vagro* (Hamilton, 1822)

Image 9. *Barilius barna* (Hamilton, 1822)
Image 10. *Danio rerio* (Hamilton, 1822)

Image 11. *Esomus danrica* (Hamilton, 1822)


Image 13. *Tariqilabeo latius* (Hamilton, 1822)

Image 14. *Garra gotyla* (Gray, 1830)

Image 15. *Paracanthocobitis botia* (Hamilton, 1822)

Image 16. *Schistura montana* McClelland, 1838

Image 17. *Lepidocephalichthys guntea* (Hamilton, 1822)

Image 18. *Botia dario* (Hamilton, 1822)

Image 19. *Botia birdi* Chaudhuri, 1909
Image 20. *Glyptothorax conirostris* (Steindachner, 1867)

Image 21. *Glyptothorax brevipinnis* Hora, 1923

Image 22. *Parambassis baculis* (Hamilton, 1822)

Image 23. *Badis badis* (Hamilton, 1822)

Image 24. *Carassius auratus* (Linnaeus, 1758) & *Carassius carassius* (Linnaeus, 1758)

Image 25. *Cyprinus carpio* var. *communis* (Linnaeus, 1758)

Image 26. *Cyprinus carpio* var. *specularis* (Lacepède, 1803)

Image 27. *Trichogaster fasciata* Bloch & Schneider, 1801


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