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Status of fishery versus exotic fauna in Gobind Sagar Dam Wetland (H.P. & Punjab), India

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Abstract

Gobind Sagar Dam, one of the large man made reservoir is constituted on the river Satluj. 46 species referable, 27 genera, 08 families and 05 orders have been recorded from reservoir and the tributaries, which are draining into the Dam. Three exotic fishes *Cyprinus carpio*, *Ctenopharyngodon idella*, *Hypophthalmichthys molitrix* are found in the reservoir. During the present studies, it was observed that the population of the *Mahseer* has declined. The exotic fish species as well as the lacustrine condition of the reservoir have influenced the habitat of indigenous fauna. It is pertinent to mention here that stocking/culturing of the indigenous fauna can go a long way for the conservation of fish diversity.

Keywords: Reservoir, lacustrine, indigenous, mahseer

Introduction

The fisheries resources of the Himachal Pradesh are reservoirs, rivers, lakes, and village ponds. Gobind Sagar, Pong (Maharana Pratap Sagar), Chamera, Ranjeet Sagar and Kol Dam with mean water spread of 43,785 ha constitute an important fishery reserve of the State. Gobind Sagar Dam is one of the large man made reservoir created in 1976. It is one of the world's highest gravity Dam. It is constituted on the river Satluj created by the huge hydel dam at Bhakra. The total length of the reservoir is 168 km with an area of 16,000 ha. The average water spread area is 10,000 hectares. It is located in latitude N 31° 25' and longitude E 76° 25' at an altitude of 226m asl. It is spread in district Bilaspur, Hamirpur and Una of state in the upstream while in the downstream it is extended in district Ropar (Roopnagar) Punjab due to the construction of the Nangal Dam. It is a multipurpose river valley project primarily constructed for the generation of electricity, irrigation and flood control. It constitutes an important fishery resource for the state and has lead to great socio-economic change in the region. The various aspects of the fishery viz. fish yield catch efforts, inventory data on fishermen, gear & craft and revenue from the reservoir has been worked out by Himachal Pradesh Fishery Department ^[1]. *Tor putitora* (Mahasheer), *Labeo dero* (Gid), *Mystus seenghala* (Singhara) and exotic carps are some of the common species found in the Dam. The information on the diversity of the Dam is not updated. Thus, during the present studies an attempt has been made to know the diversity of the species and impact of exotic fauna on the indigenous fauna.

Materials and Methods

The fishes were collected with the help of Cast Net and Drag Net from the reservoir as well as the tributaries which are draining into the dam as per the collections deposited in High Altitude Regional Centre, Zoological Survey of India, Solan during the various surveys undertaken from 2004 to 2014. The fish specimens were preserved in 4% formalin solution. The fishes were identified using standard literature ^[2, 3].

Results and Discussion

The Commercially important fishes of the reservoir are *Hypophthalmichthys molitrix*, *Catla catla*, *Cyprinus carpio*, *Cirrhina mrigala*, *Labeo rohita*, *Labeo dero*, *Mystus seenghala*, *Ctenopharyngodon idella*, *Labeo calbasu*, *Tor putitora*. To enhance the production of the reservoir, lacustrine habitat of the Dam is stocked with Mirror carps (*Cyprinus carpio*) and IMC (*Labeo rohita*, *Cirrhinus mrigala*, *Catla catla* and *Labeo calbasu*) regularly.

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These fishes have been well established in the Dam. The three Chinese carps viz. *Silver*, *Grass* and *Common carps* constitute the exotic fauna of the reservoir. Mirror carp (*Cyprinus carpio*) contributed significantly among the fish catches of Gobind Sagar. The minor carps in the reservoir are represented mainly by hill stream species *Labeo dero*, *Labeo dyocheilus*, *Labeo bata*, *Cirrhinus reba* and *Puntius sarana*. The major carnivore fishes in reservoir are *Mahseer* and *Mystus seenghala*. *Tor putitora* which was a dominant fishery of Sutlej River prior to impoundment of the dam has noticeably declined. The fish fauna of the Reservoir as well as its tributaries is represented by 46 species referable, 27 genera, 08 families and 05 orders. The systematic list is as follows:

Class: Osteichthyes
Subclass: Actinopterygii
Infraclass: Teleostei
Order: Cypriniformes
Family: Cyprinidae

Barilius bendelisis (Hamilton), *Barilius vagra* (Hamilton), *Barilius barila* (Hamilton), *Barilius modestus* Day, *Salmostoma bacaila* (Hamilton), *Parlucisoma daniconius* (Hamilton), *Danio rerio* (Hamilton), *Crassius auratus auratus* (Linnaeus), *Cirrhinus reba* (Hamilton), *Cirrhinus mrigala* (Hamilton), *Crossocheilus latius latius* (Hamilton), *Catla catla* (Hamilton), *Labeo dero* (Hamilton), *Labeo dyocheilus* (McClelland), *Labeo bata* (Hamilton), *Labeo calbasu* (Hamilton), *Labeo rohita* (Hamilton), *Cyprinus carpio* var. *communis* Linnaeus, *Cyprinus carpio* var. *nudus* Bloch, *Cyprinus carpio* var. *specularis* Lacepedes, *Schizothorax richardsonii* (Gray), *Ctenopharyngodon idella* (Valenciennes), *Hypthalmichthys molitrix* (Valenciennes), *Tor putitora* (Hamilton), *Garra gotyla* (Gray), *Garra lamta* (Hamilton), *Systemus sarana* (Hamilton), *Pethia ticto* (Hamilton), *Puntius chola* (Hamilton) and *Puntius sophore* (Hamilton).

Family: Nemacheilidae

Botia dario (Hamilton), *Botia birdi* Chaudhuri, *Botia lohachata* Chaudhari, *Paracanthocobitis botia* (Hamilton), *Schistura rupecula* (McClelland), *Schistura montana*

McClelland and *Schistura horai* (Menon).

Family: Cobitidae

Lepidocephalichthys guntea (Hamilton)

Order: Siluriformes
Family: Bagridae

Sperata seenghala (Sykes) and *Sperata aor* (Hamilton)

Family: Schilbidae

Clupisoma garua (Hamilton)

Family: Sisoridae

Glyptothorax pectinopterus (McClelland)

Order: Beloniformes
Family: Belonidae

Xenentodon cancila (Hamilton)

Order: Perciformes

Family: Channidae
Channa gachua (Bloch & Schneider) and *Channa punctatus* (Bloch)

Order: Synbranchiformes
Family: Mastacembelidae

Mastacembalus armatus (Lacepede)

Impact of exotic fishes in the reservoir

(i) *Common Carp*: This species get well established in the reservoir. It constituted 16.30% of the total reservoir fishery in 2016-17^[1]. Because higher fecundity, auto stocking, higher growth rate, competition for food with snow trout. It is one of the bottom dweller species. It is omnivorous in feeding habit, bottom feeder and feed on the detritus. This species has digging habit which increases the turbidity of water and therefore leads to the eutrophication of water body.

(ii) *Grass Carp*: This is one of the column feeder species and feed from the middle column of the pond and feeds on planktons and aquatic macrophytes and can provide ready food for the omnivorous fish species and act as the fertilizer. This species could not much thrive in the reservoir, as it contributes 0.90% of the total lading of the reservoir^[1]. This may be due to the lack of the riparian vegetation, urbanization, construction of barrage, roads etc. near the reservoir.

(iii) *Silver Carp*: This is surface feeder fish and feeds on plankton, especially on phytoplankton. This species is not affected due to even more silt in the Dam, may be due to up surface feeding habit. *Silver carp* got an inadvertent entry in the reservoir during 1971 by flooding of one of the fish farms of the department when 47 *silver carp* specimen were washed out^[1]. Thus, the species started emerging in the catches and specimens of 300 mm size were recorded in 1976. During, 1977 the catch of 10 tones of was recorded from the reservoir and it contributes 1.4% of the total reservoir landings. Afterwards, due to amiable water qualities, wide feeding spectrum to this species and high fecundity, the *silver carp* continued to proliferate and during 2016-17 the landing reached to a level of 506.128 tonnes which alone contributes maximum of 67.17% of the total reservoir fishery^[1]. The population of native *Catla* and *Mahseer* were depleted considerably in the Govind Sagar Reservoir after the introduction of *Silver carp*^[4, 5]. Thus, the exotic fish species as well as the lacustrine condition of the reservoir have affected the biota of the reservoir and eradicate the habitat of indigenous fauna. During the last several decades, over 300 species of exotic fishes have been brought in India for experimental aquaculture, sport fishing, mosquito control and aquarium keeping. Several exotic fishes have been well established in the natural water bodies of India^[6]. With the introduction of the exotic carps during the mid-fifties in the valley lake Kashmir decline in the commercial catches of the endemic *Schizothoracid*^[7, 8]. The introduction of alien species could lead to irreversible changes in the aquatic ecosystem and may result in extinction of species^[9]. The introduction of *Tilapia*, *Common carp* and *Silver carp* have greater adverse impact on aquatic ecosystem. The introductions of alien species results in competition for limited food, space, ecological niches and may result in genetic erosion, predation and pathogen entry. The need of the hour is to protect the existing indigenous fish fauna and take steps for enhancing the quality of the cultivable species rather than go in for

indiscriminate introduction of exotic species. Suitable and judicious measures should be employed to sustain the indigenous fish diversity. The entry and trading of aquatic organisms should be strictly monitored ^[10].

Conclusion

It is concluded that the lacustrine condition of the reservoir as well as exotic species has affected the diversity of indigenous fauna. The attention, research, development should be taken care for native fishes, which would go in a long way for the conservation of the diversity of the indigenous fishes

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