

Status of Pisces, Amphibia and Reptilia in Prashar area of Mandi District (Himachal Pradesh), India

Jaswant Singh, Murari Lal Thakur*, H.S. Banyal

Abhilashi University, Chailchowk, Distt. Mandi 175028, H.P., India

* HP State Biodiversity Board, Shimla

E-mail : hsbanyal@yahoo.co.in

Submitted : 14.02.2015

Accepted : 15.03.2015

Published : 30.08.2015

Abstract

Present investigations revealed the presence of 3 species of reptiles, and 1 species each of fish and amphibian in Prashar area of Mandi district (Himachal Pradesh). The area supports a good population of species like Common Carp (*Cyprinus carpio*), Himalayan Toad (*Duttaphrynus himalayanus*) and Agama Lizard (*Laudakia tuberculata*). The fish i.e. Common Carp (*Cyprinus carpio*) introduced some 30 years back in the Prashar lake has been declared as vulnerable by IUCN and Indian Rat Snake (*Ptyas mucosus*) has been placed under Schedule IV of the Indian Wildlife Protection Act.

Key words : Amphibia, Himachal Pradesh, Mandi, Pisces, Prashar Lake, Reptilia

INTRODUCTION

Biodiversity, product of 3.5 billion years of evolution is crucial to human welfare, sustainable development and poverty reduction. It is a major component to global food security and nutrition. Genetic variation, as represented by livestock breeds or strains of plants, reduces risk from diseases and increases the chances of survival in harsh environment. In the long terms, the value of services, if lost, may greatly exceed the short-term economic benefits that are gained from transforming ecosystems. The enhanced rate of species extinction shows that the biodiversity cannot support the current pressure that humanity is placing on the planet.

Prashar area situated at 31° 45' 15" N latitude and 77° 6' 5" E longitude, and around 49 km north of the town of Mandi (Himachal Pradesh, India) (Fig. 1) was explored for the presence of vertebrates in the meadow and surrounding forests. A three storeyed pagoda-style temple dedicated to the sage Prashar and a lake is located at a height of 2,730 m above sea level approximately in the centre of a large high altitude alpine meadow. The lake is holomictic and has a floating island in it. Surrounded by snow-capped peaks and looking down on the fast flowing river Beas, the lake can be approached after crossing thick forests of oaks, rhododendrons, pines and deodar. Weather in Prashar area is unpredictable, experiencing untimely rains and snow mostly due to the dense belt of forest all around the area. Temperature ranges from -9° C to 23° C in a year. In the winter there is a heavy snowfall at Prashar area and cut off from outside world for some months. Prashar area is one of the most favoured alpine meadows for animal graziers and receives flood of animals during summer and monsoon months.

Although many investigators have conducted studies on diversity of different vertebrates groups like fish, amphibia and reptiles in different parts of Himachal Pradesh¹⁻¹⁷ but present study area of Prashar has not attracted the attention of field biologists. In addition, faunal resources of Prashar area, a part of the fragile Himalayan ecosystem are under severe pressure due to

heavy tourist influx and animal grazing, therefore, need urgent attention of the field biologists.

Study Area and Methodology

Various habitats like lake, forest/types, pasture, human habitations and agriculture fields in Prashar area were selected for the present study. The main habitats sampled were, i) Area around the lake which is a typical alpine meadow (Fig. 2 A), ii) A small patch of oak forest on a hill top situated on the south of the lake, iii) Some roads constructed in the fragile meadow area (Fig. 2 B), iv) A few human settlements especially around the lake and two rest houses alongwith a few summer transit camps in the meadow area, v) Forests of pine on lower sides of the meadow (Fig. 2 C) and vi) Some villages around the Prashar area supporting some agriculture. Forests of the Prashar area are divided into different zones like forests of higher areas, the typical alpine forests of deodar, blue pine etc. A little lower, forests of oak-rhododendron are found. Forests on the lowest altitudes are dominated by chir pine. There is heavy grazing pressure on Prashar meadow (Fig. 2 D).

Following methods have been employed for study of different animal groups during present study:

COLLECTION OF DATA

1. Pisces

Fish fauna of the lake has been estimated by periodic netting using drag nets. Measurements of the specimens were taken, these were photographed for identification and were transferred back to the lake. No specimen was brought to laboratory due to the mythological belief of the local people.

2. Amphibia

Amphibian species were sampled using a combination of adaptive cluster sampling, visual encounters surveys, audio surveys and opportunistic records. The adaptive sampling has been done along small streams and on forest floors to sample the amphibians. In addition, amphibians were sampled by turning the leaf litter, rocks, as well as by prodding the cavities on the forest

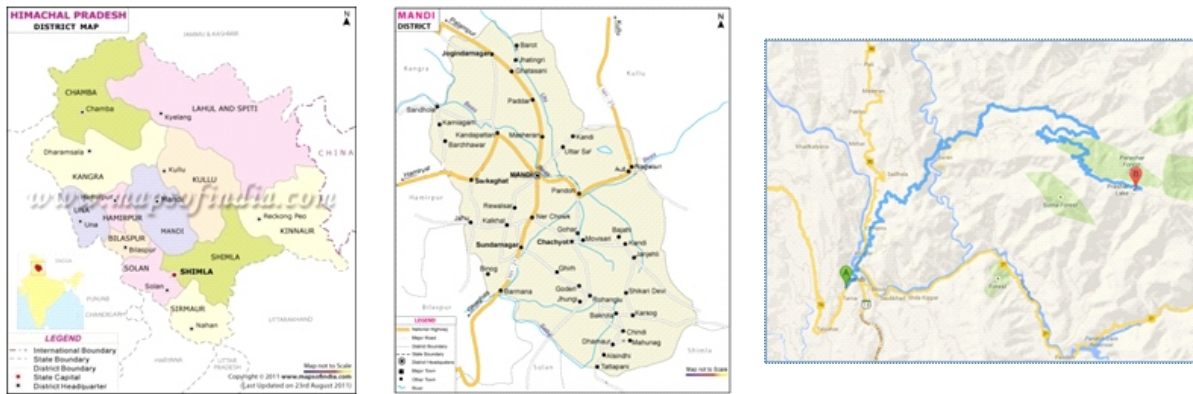
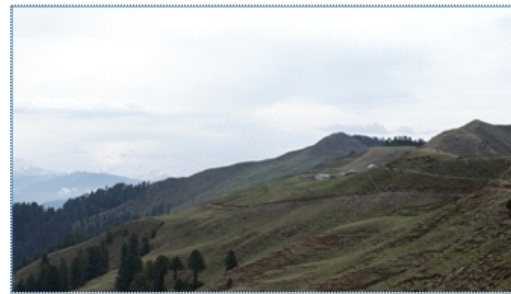


Figure 1: Map of Himachal Pradesh and Mandi showing location of Prashar area

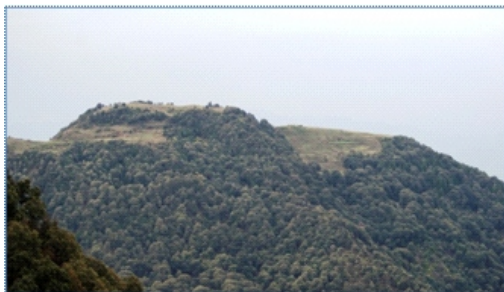
(Courtesy: <http://www.mapsofindia.com/maps/himachalpradesh/districts/mandi.htm> & <http://www.distancesfrom.com/map-from-district-mandi-to-Prashar-Lake-D.P.F.-Parashar-Dhar/MapHistory/5325042.aspx>)



A. Holy lake of Prashar



B. Meadow and forest habitat



C. Oak forest on little lower parts



D. Heavy grazing pressure

floor¹⁸.

3. Reptilia

The reptiles were sampled using the method described by Ishwar *et al*¹⁹. In addition to general sampling, targeted forests and stream sampling were also done for recording the presence of reptiles.

RESULTS

During present investigation presence of 3 species of reptiles, and 1 species each of fish and amphibian have been observed (Table 1). Prashar area supports a good population of species like Common Carp (*Cyprinus carpio*), Himalayan Toad (*Duttaphrynus himalayanus*) and Agama Lizard (*Laudakia tuberculata*). The fish i.e. Common Carp (*Cyprinus carpio*) introduced some 30 years back in the Prashar lake has been declared as vulnerable by IUCN and Indian Rat Snake (*Ptyas mucosus*) has been placed under Schedule IV of the Indian

Wildlife Protection Act.

I. Pisces

A single species of fish i.e. Common Carp (*Cyprinus carpio*) has been recorded in waters of the Prashar lake (Table 1). According to the locals the fish was introduced some 30 years back and has adapted very well to this land locked holy lake. It has become an imperative part of the lake ecosystem. No fishing is done but a few times Black Kite has been sighted to prey upon the fish from the lake.

Sub-Class: Actinopterygii

Order: Cypriniformes

Family: Cyprinidae

Mouth oblique extending from the eyes, jaws toothless but pharyngeal teeth present which help in chewing, barbels present on either side of the mouth, stout spine present on dorsal fin, snout

Table 1: Systematic list of fish, amphibian and reptiles of Prashar area, Mandi (H.P.)

Group/Taxon	Status	
	WPA-1972	IUCN
Pisces		
Order: Cypriniformes		
Family: Cyprinidae		
1. Common Carp <i>Cyprinus carpio</i> , Linnaeus, 1758	---	Vulnerable
Amphibia		
Order: Anura		
Family: Bufonidae		
1. Himalayan Toad <i>Duttaphrynus himalayanus</i> (Gunther, 1864)	---	Least Concern
Reptilia		
Order: Squamata		
Family: Agamidae		
1. Agama Lizard <i>Laudakia tuberculata</i> (Gray, 1827)	---	Not Assessed
Family: Scincidae		
2. Himalayan Ground Skink <i>Scincella himalayanus</i> (Gunther, 1864)	---	Not Assessed
Family: Colubridae		
3. Indian Rat Snake <i>Ptyas mucosus</i> (Linnaeus, 1758)	IV	Not Assessed

rounded or triangular in shape and scales are small and crowded.

Genus: *Cyprinus* Linnaeus 1758

1758. *Cyprinus* Linnaeus, *Syst. Nat.* 10th ed.: 320

Dorsal fin single and long, with 21 soft rays. Snout rounded or triangular in shape, a stout saw-toothed spine in front of the dorsal and anal fins. Lateral line complete, with about 35 scales.

1. Common Carp *Cyprinus carpio* Linnaeus, 1758 (Fig. 3, A)

1758. *Cyprinus carpio* Linnaeus, *Syst. Nat.* 10th ed.: 320

Diagnostic Characters: Body moderately elongate, laterally compressed and covered with large cycloid scales. Mouth large and inferior, with two pairs of small barbels, snout blunt, lips thick, mouth toothless. Lateral line complete, with about 35 scales. One long dorsal fin present with 21 soft rays, a stout saw-toothed spine in front of the dorsal and anal fins. A pair of pectoral fins each with 14 rays, pelvic fins thoracic of 8 rays, one anal fin with 5 branched rays. Body generally dark coloured on the back and golden on sides, caudal fin gray with orange shade.

Distribution: Worldwide, the native populations mainly found in Black, Caspian and Aral Sea basins. Introduced throughout the world and cultivated in large quantities for human food and sport fishing. Found throughout India in the rivers and streams, natural lakes, and farm ponds.

Habits and Habitat: Prefers stagnant and slowly flowing waters. Feeds at temperature above 8^o-10^o C, reproduces at temperature above 15^oC. Feeding on zooplanktons, detritus,

zoobenthos, macrophytes etc. The feeding habits change with age depending on food supply in the water body. Young fish feed on plankton and colonial green algae. Adults feed more on molluscs and aquatic plants.

Observations: A good healthy population of this species has been recorded in Prashar lake. Declared as Vulnerable by IUCN²⁰ but the population at Parashar lake is totally protected due to religious sentiments of the locals.

II. Amphibia

Only one species of Amphibia belonging to family Bufonidae has been recorded from Prashar area (Table 1). A good population of *Bufo himalayanus* has been recorded from the lake and surrounding areas only during monsoon season.

Order: Anura

Family: Bufonidae

Known as true toads, characterized by squat, plump bodies with short legs and rough-warty skin. Toad species are widespread and occur on every continent except Australia.

Genus: *Duttaphrynus* Frost *et al.* 2006 2006. *Duttaphrynus* Frost *et al.*, *Bull. American Museum of Natural History* 297: 364-365

They have large parotid glands. They also lack an anterior breastbone and do not possess teeth. Males develop dark nuptial pads on the thumbs and inner fingers that assist in amplexus. In most species, breeding males develop a dark throat.

A. *Cyprinus carpio*

B. Himalayan Toad



C. Agama Lizard



D. Himalayan Ground Skink

Figure 3: Fish, Amphibian and Reptiles recorded in Prashar area

1. Himalayan Toad *Duttaphrynus himalayanus* (Gunther, 1864) (Fig. 3, B)

1864. *Bufo melanostictus* var. *himalayanus* Gunther, *Reptiles of British India*, pp. 422

Diagnostic Characters: Brown coloured body with irregular, distinctly porous warts on dorsal side; parotids prominent, large, elongate; crown deeply concave, with low, blunt supra-orbital ridges; snout blunt but short; inter-orbital space broader than the upper eyelid, tympanum small and indistinct; fingers free; toes half to two-third webbed, with single subarticular tubercle; inner and outer metatarsal tubercles present; without tarsal fold. Vocal sacs absent in males.

Distribution: This species is widely distributed throughout the Himalayan mountains from the Hazara (Pakistan), through northern India to Nepal between around 1,000-3,500 m altitudes.

Habits and Habitat: Generally found in high-altitude areas and in the evergreen forests of the foothills. It is largely a terrestrial species inhabiting mountain forests, shrubs near streams and in cultivated fields. The species shows defensive behaviour, secretes a corrosive fluid both from the parotids and warts on the dorsum.

Observations: According to IUCN²⁰ it is a species of least concern and during present study recorded in good number from Prashar and surrounding forest areas.

III. Reptiles

Present explorations revealed the presence of 3 species of reptiles from 3 different families, all belonging to order Squamata in Prashar area of Mandi district, Himachal Pradesh. Species recorded were Agama Lizard (*Laudakia tuberculata*), Himalayan Ground Skink (*Scincella himalayanus*) and Indian Rat Snake (*Ptyas mucosus*) (Table 1). Good populations of Agama Lizard and Himalayan Ground Skink were recorded from some patches

of the study area.

Order: Squamata

Family: Agamidae

These are scaly bodied reptiles with well-developed legs and a moderately long tail which cannot shed their tails and regenerate. Teeth are borne on the outer rim of the mouth. Many species are capable of limited change of their colours to regulate their body temperature. Males in some species are more brightly coloured than females which play role in signalling and reproductive behaviours.

Genus: *Laudakia* Gray, 1845

1845. *Laudakia* Gray, *Cat. Liz. Brit. Mus.* p. 254

Throat and chest brownish, profusely spotted dark blue; upper side of head light brown. Head and body depressed; scales on head and gular area smooth; no gular pouch; vertebrate scales enlarged; tail segment of two to four whorls, usually three to four.

1. Kashmir Rock Agama *Laudakia tuberculata* (Gray, 1827) (Fig. 3, C)

1827. *Agama tuberculata* Gray, *Zool. Jour.* 3: 218

Diagnostic Characters: Head depressed and elongated, tympanum large and distinct, otherwise overall body sturdy with a flat head. Dorsal side of the body dark-olive brown with numerous dark-brown spots. Belly, whitish with an elongated patch of enlarged scales. Limbs strong and toes longer, fifth toe extends beyond the first. Tail depressed, longer than the head and body combined. Upper portion of the tail strongly keeled. Adult males have bluish tinge on the dorsal side; upper side of head light brown; throat and chest brownish, with dark blue spots.

Distribution: Found in Afghanistan, Pakistan, Nepal and almost whole of the western Himalaya from Kashmir eastwards

to Uttarakhand through Northern Punjab and Himachal Pradesh. Found throughout Himachal Pradesh.

Habits and Habitat: A diurnal and terrestrial species inhabits the holes, crevices and other rocky structures. Omnivorous in feeding habits. Feeds on insects like ants, small orthopterans, lepidopterns etc. Breeding season varies from May to August, lays 7-20 eggs in a single clutch.

Observations: Some individuals have been observed in suitable habitat types of Prashar area mainly during the months of May to August.

Family: Scincidae

The individuals of this family are generally called skinks. Most species have no pronounced neck. The head usually covered with enlarged plates; snout long and skull flattened. Some genera have reduced limbs and lack forelegs. Locomotion in some species resembles that of snakes more than that of lizards. Most species have long, tapering tails that can be shed during pursuit of life.

Genus: *Scincella* Mittleman, 1950

1950. *Scincella* Mittleman, *Herpetologica* 6 (2): 17-20.

2. Himalayan Ground Skink *Scincella himalayanus* (Gunther, 1864) (Fig. 3, D)

1864. *Eumeces himalayanus* Gunther, *The Reptiles of British India*, 452 pp.

Diagnostic Characters: Body small, a bronze dorsum with dark brown broad, dorsal, dark-brown vertebral stripe emerging from snout and reaches up to the proximal part of tail through eye and upper side of the forelimbs. Lateral stripe of brass colour with irregular margins. Another, lower, broad stripe bordered below by a narrow, irregular, white stripe edged with black. Top of the head and upperside of the limbs bronzy, with dark dots all over; belly bluish-white, snout small and pointed, ear-openings oval, smaller than eyes. Distal body colour bronzy, with numerous light and dark-brown spots. Tail one and half times as long as the head and body.

Distribution: Found in areas from southern Turkistan through Pakistan and India to Nepal. In India, found from Kashmir through Himachal Pradesh to Uttar Pradesh.

Habits and Habitat: Mainly found in damp areas or open grasslands. Prefers lake sides, banks of rivers and gardens. Insectivorous in feeding habits. It is a viviparous species and produces 3 or 4 young ones at a time.

Observations: Recorded in good numbers in Prashar meadow area.

Family: Colubridae

Characteristic dentition, comprising of solid teeth on the maxilla, palatine, pterygoid and dentary, but never on the premaxilla. A few species have enlarged and/or grooved posterior maxillary teeth for channelling the venom from the supralabials. Ventral scales enlarged in a single row; a more or less cylindrical tail with all divided sub-caudals.

Genus: *Ptyas* Fitzinger, 1843

1843. *Ptyas* Fitzinger, *Systema Reptilium. Amblyglossae*, pp 106.

3. Indian Rat Snake *Ptyas mucosus* (Linnaeus, 1758)

1758. *Coluber mucosus* Linnaeus, *Mus. Ad. Frid.*, 37, pl. 23

Diagnostic Characters: A large slender olive green to brown snake with distinctly broader head. Colouration in living individuals is olive green to brown, yellowish or greyish above, with irregular and strongly marked black cross-bars on the posterior half of the body; yellowish-white below, the posterior ventrals and sub-caudals edged with black; lips and throat white, the scales edged with black.

Distribution: Found in India, Sri Lanka, Pakistan, Afghanistan, Nepal, Bangladesh, Myanmar and southern China. In Himachal Pradesh reported from all parts of the state except the Trans-Himalayan region.

Habits and Habitat: A relatively fast snake, feeds mainly on small mammals, toads and birds.

Observations: Recorded only a few times from the Prashar meadow.

DISCUSSION

India, a mega diverse country with only 2.4 per cent of world's land area, accounts for around 8 % of the recorded species of the world, including 45,500 plants and 91,000 animals. Of the 2,546 fish species, 240 amphibian species, 460 reptile species, 1,232 bird species and 397 mammal species found in India, 18.4 % are endemic and 10.8 % are threatened²¹.

Currently, 4 classes of living fish are known from the world, of which 2 viz., those with cartilaginous skeleton (Chondrichthyes) and those with bony skeleton (Osteichthyes) are found in India. This group represents about half the total number of vertebrate species found in the world but during present study a single species, *Common Carp*, has been recorded from the Prashar area and according to locals it has been introduced in the lake. This species has been reported from some districts of Himachal Pradesh, including Mandi¹⁰. Similarly, the presence of 6 species of fish belonging to 3 orders and 3 families from river Beas at Kullu have been reported²².

A total of 17 species of amphibians belonging to 4 families has been recorded from Himachal Pradesh which constitutes only 7.8% of the total Indian species²³. In the present study in alpine meadow of Prashar the presence of only one species, *Bufo himalayanus*, belonging to family Bufonidae and good population of this species has been recorded from the lake and surrounding areas especially during monsoon season. During present study good populations of Agama Lizard and Himalayan Ground Skink were recorded from some patches of the study area. Present study gets the support from previous work in which 17 species of reptiles belonging to 10 families from Simbalbara Wildlife Sanctuary were reported¹⁴. Recently *Bufo himalayanus* has been reported from Khajjiar area of Chamba¹⁷.

CONCLUSION

Prashar lake situated in the Himalayan mountain ranges is inhabitable to a very limited number of piscian and herpetofauna. The earlier studies by this group on vertebrate fauna of other water reservoirs situated in these mountain ranges, Khajjiar Lake and Chandertal Lake, and now Prasher Lake firmly suggest that the presence and density of vertebrate fauna decreases as we move up the mountain region from plains. Agama lizard reported only from Himachal Pradesh and a couple of hilly states in the region.

REFERENCES

1. McClelland, J. Indian Cyprinidae. Asiatic Research 1839: 19: 262-450.
2. McClelland, J. On the freshwater fishes collection by William Griffith. Calcutta Journal of Natural History 1842: 2: 560-589.
3. Annandale, N. The distribution of *Bufo andersonii*. Rec. Indian Mus. 1907: 1: 171-172.
4. Boulenger, G.A. A monograph of the South Asian, Papuan, Melanesian and Australian frogs of the genus *Rana*. Rec. Indian Mus. 1920: 20: 1-226.
5. Kriplani, M. On Indian tadpoles with suctorial disc. Records of Indian Museum 1952: 50: 359-366.
6. Dubois, A. Un nouveau sous-genre (*Paa*) et trois nouvelles especes du genera *Rana*. Remarques sur la phylogenie des Ranides (Amphibiens, Anoures). Bull. Mus. Natn. Hist. nat. (3) 324, zool. 1975: 231: 1093-1145.
7. Tilak, R. Husain, H. A checklist of fishes of Himachal Pradesh. Zool. Jb. Syst. Bd. 1977: 104: 265-301.
8. Tilak, R. Mehta, H.S. On a collection of amphibians of the Sirmour District (Himachal Pradesh). Research Bulletin of Panjab University 1983: 34: 157-166.
9. Dhanze, R. Dhanze, J.R. Fish diversity of Himachal Pradesh. In: Fish diversity in protected habitats. 2004: NATCON, Publication, U.P.
10. Mehta, H.S. Uniyal, D.P. 2005. Pisces. In: Fauna of Western Himalaya (Part 2). Zoological Survey of India, Kolkata, 255-268.
11. Saikia, U., Sharma, D.K. Sharma, R.M. Checklist of reptilian fauna of Himachal Pradesh India. Reptile Rap 2007: 8: 6-9.
12. Mehta, H.S. Sharma, I. Pisces. In: Fauna of Pin Valley National Park. Zoological survey of India, Kolkata 2008: 34: 75-84.
13. Mehta, H.S. Fauna of the Indian Cold Desert (Ladakh)-An Overview. ENVIS Newsletter 2009: 15: 2-4.
14. Saikia U. Sharma D.K. Faunal Biodiversity of Simbalbara wildlife Sanctuary. Zoological Survey of India, Kolkata 2009: 41: 65-79.
15. Saikia, U., Mehta, H.S. Sharma, D.K. New distributional record of Eastern Black Turtle *Melanochelys trijuga indopeninsularis* from Simbalbara WLS, Sirmour district, H.P. The Indian Forester 2010: 136: 273-275.
16. Saikia, U., Thakur, M. L., Bawri, M. Bhattacharjee, P.C. An inventory of the Chiropteran fauna of Himachal Pradesh, northwestern India with some ecological observations. Journal of Threatened Taxa 2011: 3: 1637-1655.
17. Singh, V. Banyal, H.S. Study of Herpetofauna of Khajjiar lake of Chamba district, Himachal Pradesh, India. International Journal of Plant, Animal and Environmental Sciences 2013: 3 (2): 1-8.
18. Vasudevan, K., Kumar, A. Chellam, R. Structure and composition of rain forest amphibian communities in Kalalad-Mundanthurai Tiger Reserve. Current Science 2001: 80: 406-412.
19. Ishwar, N.M., Chellam, R. Kumar, A. Distribution of forest floor reptiles in the rainforest of Kalakad-Mundanthurai Tiger Reserve, South India. Current Science 2001: 80: 413-418.
20. IUCN. IUCN Red list of threatened species, 2013. International Union for Conservation of Nature, Switzerland. (www.iucnredlist.org).
21. Varughese, G.C., Vijyalakhhmi, K., Kumar, A. Rana, N. State of environment report, India. ENVIS, Ministry of Environment and Forestry, Government of India 2009: 1-73.
22. Kumar, A. Hydrological conditions of River Beas and its fish fauna in Kullu Valley, Himachal Pradesh, India. Environment Conservation Journal 2010: 11: 7-10.
23. Mehta, H.S. Fauna Western Himalaya (Part-2). Zoological Survey of India, Kolkata 2005: 359 pp.