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Diversity of fish of Shnebaye Stream with new record of *Barilius bendelisis* for the first time in district Karak and their water, soil physiochemical analysis with respect to fish breed from district Karak, Khyber Pakhtunkhwa Pakistan

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Abstract

The aim of the present research work was to find out the diversity of fish fauna and their physiochemical study during their breeding season. Shnebaye stream is present in the hilly area and high range of hills around the stream is present. The fresh water stream Shnebaye also contains different microscopic plants in which spirogyra is very important because it is used as a food component. During the present study five species of the family cyprinidae were *Bariliusbendelisis*, *Labeorohita*, *Cirrhiniusmrigala*, *Catlacatla*, and *Hypophthalmichthys molitrix*, were belonging to kingdom animalia, phylum chordate, class actinopterygii and order cypriniforms were identified upto species level. The soil and water of shnebaye stream were analyzed for physiochemical and found satisfactory for the survival of aquatic organism.

Keywords: Water, Soil, Shnebayestream, Fishes, Physicochemical analysis.

Introduction

Shnebaye Stream is a fresh water stream present in Handai Karak in the east of Karak city. This stream started from the Handai Karak and ends in the small village Charpara Karak the local people of this area use the water of this stream for their daily need. This fresh water stream is present in the hilly area and high range of hills around the stream is present. The fresh water stream Shnebaye also contains different microscopic plants especially spirogyra which is very important because it is used as a food component [1]. Pakistan has a diverse climatic and vegetation zones within even a small area. Extensive water management programs were started to ensure regular supply of water after independence in 1947, In this regard three water storage reservoirs, sixteen barrages, twelve interlink canals, two siphons and forty three main channels were built to prosper the agro based economy of the country by IUCN (1989). Butt and Nawaz, 1978; Butt and Mirza, 1981; Day, 1887; Mirza, 1990; Mirza, 2003; Mirza, 1993; Mirza, 1994; Akhtar, 1991 and Akhtar, 1992 have worked on the diversity of fish in Pakistan [2-10]. Fish are cold-blooded animals with a backbone (vertebrates), gills for breathing underwater, and paired fins for swimming. They live underwater and are dependent on water for dissolved oxygen, support, food, and shelter. Marine mammals (whales, dolphins, seals, sea otters), reptiles (turtles), amphibians (frogs and salamanders), shellfish (oysters, clams, and mussels), and aquatic invertebrates (crayfish, starfish, lobster) are not fish [11]. Fish plays an important role in the development of a nation. Besides being a cheap source of highly nutritive protein, it also contains essential nutrients required by the human body [12]. There are more than 186 freshwater fish species described from freshwater bodies of Pakistan [13]. Substantial quantities of commercially important fish are caught from rivers annually. The inland commercially significant native fish fauna comprises about 30 species of which the economically important species are: *Labeorohita*, *Gibelioncatla*, *Cirrhiniusmrigala*, *Cirrhiniusreba*, *Channastraita*, *Channamarulius*, *Speratasarwari*, *Wallago attu*, *Rita rita*, *Bagarius bagarius*, *Tenulosailisha*, *Notopterusnotopterus*, *Nemacheilus spp.*, *Tor macrolepis*, *Schizothorax spp.* and *Clupisoma naziri* [13]. A number of analyses have been conducted to

study the physicochemical properties of water from different Rivers, Dams, Wells and Tube wells etc. [14, 19].

Dams, Wells, Rivers etc. Play a vital and extraordinary role in agriculture, fishery, and electricity, industries along with its huge use for domestic and drinking purpose. Contamination of water primarily influences its chemical nature and also damages the community alarming the delicate food web. Miscellaneous uses of water reservoirs are seriously diminished because of contamination and pollution. Pollution of water is a universal problem, so its active ensuring is required [20].

Materials and Methods

Fish samples were collected from the different regions of Shnebaye Stream, i.e., middle, southern, eastern and western sides of the dam by using small meshed cast nets, hooks and scoop nets. Samples were collected during the month of July 2014 to June 2015.

Fish Identification and Preservation: After collection, samples were preserved and then there were transferred to the Laboratory for proper identification. Fishes were properly identified in laboratory by using keys of fish identification. All the samples were preserved for long term preservation in separate plastic jar while using 10% formalin solution [21, 22].

Soil and water Samples Collection:

Soil and water samples were collected from Shnebaye stream and then the soils were separately mixed to get a composite sample of 2.0 kg. It was then put in tight polyethylene bags and shifted to the laboratory. In the laboratory, samples were oven dried at 60 °C, broken into smaller size particles with mortar and pestle and sieved through a 2.0 mm sieve.

Conductivity and Total Dissolve Solids (TDS) of Soil:

Soil and water sample was analyzed by Conductivity meter JENWAY model no.4520. Conductivity meter calibrated by 0.1 KCl (potassium chloride) solutions and washed electrode of conductivity meter with distal water and dried. Now electrode dipped in soil and water of shnebaye stream solution and checked conductivity of soil and water solution and also checked TDS of soil and water solution.

Soil PH: pH meter JENWAY model no.3505 calibrated with Buffer solution of 4 and 10 pH. Now pH meter electrodes were washed with distal water dried and dipped pH electrode in soil and water sample.

Results and discussion

The taxonomic representation of shnebaye stream fishes were given in table 1. And their soil and water physicochemical were given in table 2.

Table1: Taxonomic representation of Shnebaye stream fishes

Fish name	Kingdom	Phylum	Class	Order	Family	Genus	Specie
Bendelisis	Animalia	chordata	Actinopterygii	Cypriniformes	Cyprinidae	Barilius	<i>B.bendelisis</i>
Mori	Animalia	chordata	Actinopterygii	Cypriniformes	Cyprinidae	Cirrhinus	<i>C.mrigala</i>
Silver carp	Animalia	chordata	Actinopterygii	Cypriniformes	Cyprinidae	Hypophthalmichthys	<i>H.molitrix</i>
Rohu	Animalia	chordata	Actinopterygii	Cypriniformes	Cyprinidae	Labeo	<i>L.rohita</i>
Theila	Animalia	chordata	Actinopterygii	Cypriniformes	Cyprinidae	Catla	<i>C.catla</i>

Streams conserve a variety of fish fauna which is the most important and is directly or indirectly responsible for human health and wealth. For this purpose present study was conducted on Shnebaye stream district Karak, KPK, Pakistan. During the shnebaye stream survey, five species were collected and identified properly, which were belongs to same orders, same families, same genus and five species. Among them all the five species were belongs to family cyprinidae. (Tables1). These five species of family cyprinidae are *Barilius bendelisis*, *Labeorohita*, *Cirrhiniusmrigala*, *Catla catla*, and

Hypophthalmichthys molitrix, were belongs to kingdom animalia, phylum chordate, class actinopterygii and order cypriniformes. The result of the present study revealed that all of the species in Shnebaye stream district Karak were belongs to a single family cyprinidae. There are total five different fish species present in the Shnebaye stream but the fish *Barilius bendelisis* is present in large numbers due to which the local people of this area called this stream as the home of *Barilius bendelisis*.

Table2: Physicochemical study of water and soil of shnebaye stream district Karak.

Samples	pH	Conductance	TDS	TS	Color	Odour	Taste	Elasticity	Temperature
Water	7.89	0.56	75mg\50ml	28mg\50ml	Colourless	Odourless	Tasteless	Nil	29.32 °C
Soil	8.11	0.40	145mg\50ml	70mg\50ml	Black brown	Odourless	Tasteless	Nil	29.32 °C

Although colour of water varies place to place, these colors lay down whether the water is suitable for the growth and survival of organisms beneath it or not, for example greenish and light greenish colored water is suitable for survival, while dark green and brown colored water is deadly for growth and survival [23, 24]. The water and soil of shnebaye stream is odourless. The optimum range of conductivity varies from 15-500 µs/ml [25]. Current research showed that the EC value of water and soil of shnebaye stream was 0.56 and 0.40 respectively.

The optimum pH of water, supporting the growth varies from 6.5-9.5 and 6.5 to 8.4 correspondingly [26, 27]. From recorded data it has been shown that the pH value of water and soil of shnebaye stream district Karak was 7.89 and 8.11 correspondingly. As pronounced temperature greatly affect the

ecosystem. Life either directly or indirectly depends on the temperature of water. The crucial temperature ranges from 26-32 °C [28]. The temperature beyond this range might increase the growth of microorganism which definitely increases the chance of hazardous effect upon life. From present research it can be concluded that the temperature is suitable for the growth. The temperature of water and soil is given in table 2. which are 29.32 of both soil and water of shnebaye stream. The permitted limits of TDS in water are shown in (Table and Fig. 1). All values lies within permissible limits suggested by WHO (i.e. 500-1000mg/l) [29]. It is safe for drinking purpose and other domestic and commercial uses. Present research showed that the recorded value of TDS of water and soil of shnebaye stream was 75mg, 145mg per 50ml and the Total solid was 28,70mg per 50ml respectively. The taste of water

and soil was tasteless and the elasticity of soil and water of shenbaye stream are non-elastic.

Conclusion

From the diversity of fish of shenbaye stream it may be concluded that it is suitable for cyprinidae species. From the physicochemical analysis of samples it can be concluded that the water of studied areas is suitable in all respects as the values of all parameters are within the permissible range.

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