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A Preliminary Study of the Macroinvertebrate Fauna of Sharki Dam, District Karak, K.P. Pakistan

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Abstract: A Preliminary survey of the macro-invertebrate fauna of Sharki Dam, District Karak was carried out from August to December 2011 with the aim to assess the health and productivity of the water body and to predict about its economic potential. A total of 10 species were identified belonging to phylum Arthropoda, Annelida and Mollusca. Two species each from genera Dytiscus and Gyrinus were identified from order Coleoptera. In Hemiptera, three species *Gerris lacustris, Buenoa margoritacae and Naucorid sp.* were identified. Order Odonta was represented by only one species *Libellula quadrimaculata*. Order Lepidoptera was also represented by only one species of *Moth larvae*. Among Annelids (Hirudinae) a single species *Hirudo medicinalis* was identified whereas phylum Mollusca was represented by only a single species, *Lymnaea glabra*, a common gastropod. It was concluded that the dam was quite productive and could harbour great density and variety of food fish and could help in uplifting the socio-economic conditions of the poor people of the area.

Keywords: Freshwater fauna, Mollusca, Insect, Hirudinae, Productivity

1. INTRODUCTION

Freshwater invertebrates are one of the most successful groups among the animal kingdom. Insects vary in habits, occur every where and an extremely large number is aquatic. All invertebrate animals are cold blooded and cannot regulate their body temperature. Their body temperature, therefore, remains approximately the same as their aquatic surroundings. Hence these animals occur in great number in ponds, streams and other freshwater bodies during the summer months, which favour their survival, reproduction and growth.

Assessing the biodiversity of macroinvertebrate fauna in freshwater ecosystems is an essential component of both basic ecological inquiry and applied ecological assessments. Aspects of taxonomic diversity and composition in freshwater communities are widely used to quantify water quality and measure the efficiency of remediation and restoration efforts (Pfrender *et al*, 2010).

Due to the importance of this work, identification of the diversity of freshwater fauna of different part of the world has remained an important field of study and has attracted the attention of many researchers. Some of the remarkable works are those of Pennak (1953) who described the freshwater invertebrate of the United States and Mellanby (1938) who described the freshwater fauna of United Kingdom.

In Pakistan there are different types of lentic and lotic water habitats in the form of rivers, streams, lakes, ponds, dams etc. Study of their macroinvertebrate faunal diversity is of utmost importance to gain an insight of the biodiversity of the area and to predict about the health of the water body. Ahmad (1963) made the first attempt in this regard and published the first work on the freshwater fauna of West Pakistan.

Invertebrates constitute about 95% of living species and are very diverse. They range in size from microscopic (250 to 300 microns in length) dust mites (Pyroglyphidae) to the giant squid, which is more than 46 feet in length. They include groups as diverse as sea stars, worms, jellyfishes and insects (Miller and Levine, 2006).

Sharki dam, the study area, is located on Teri Toi near Sharki village in District Karak some 22 Km west of Tehsil Banda Daud Shah. It is constructed on Shiesham Algada in 1995. The average annual inflow of this dam is 16992.30 acre ft. It is a clay core zoned having length and height 1660 ft and 130 ft respectively. The dam has a dead, live and total storage capacity of 5748, 9996 and 15744 acre ft respectively. The dam's outlet pipe diameter is 3.5 ft R.C.C pipe and pipe length is 632 ft. The dam has a total catchment area of 2918 acre. (Source: Report of Small Dams Directorate, Kohat).

Aim of this study was to identify the freshwater diversity of the dam to predict about its productivity and ability to support the fish fauna.

2. MATERIALS AND METHODS

The collection of aquatic macroinvertebrate fauna was made from August 2011 to January 2012.

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Simple planktonic and scrapper nets provided with long handle were used for collection. The banks of the pond were searched for the availability of invertebrate fauna. The organisms were captured and then preserved in 5 % formalin. During laboratory work, the material was transferred into a tray full of clean water for washing and the organisms were picked up with the help of fine forceps and camel hair brush. Before identification, the specimens were cleaned in 10% KOH by heating for 2-3 minutes.

3. RESULTS AND DISCUSSION

In the present survey most of the invertebrate fauna was collected during August and September and October while it was scare during December and January. Study of population dynamics of invertebrates especially insects is very complex as their whole life is temperature dependent. Their abundance and scarcity is directly under the control of the ambient temperature as discussed by Nebeker (1971) that many species which normally emerge in May or June may emerge in February or March if the air temperature is mild.

The number of animals in ponds and streams is greatest during summer months for two reasons; first with increase in temperature, the animals become more active, grow more rapidly and breed more quickly. Many of them are quick breeder, so that a few weeks of warm weather greatly increase their numbers. The second reason is that a large number of animals spend the winter months in cold resisting stage in the mud at the bottom of the pond. They are then very difficult to find (Mellanby, 1971).

The fauna such as Dragon fly, back swimmer and molluscs especially snails were present throughout the study period, while coleopteran were observed more commonly in August and September.

Table: 1 List of macro-invertebrate fauna of Sharki Dam, Karak

S/ No	Phylum	Class	Order	Species
1	Arthropoda	Insecta	Coleoptera	*Dytiscus adult*
2	"	"	"	*Gyrinus spp.*
3	"	"	Hemiptera	*Buenoa margaristaceae*
4	"	"	"	*Gerris lacustris*
5	"	"	"	*Naucoris species*
6	"	"	Odonta	*Libellula quadrimaculata*
7	"	"	Lepidoptera	*Moth larvae*
8	"	Arachnida	Araneae	*Argyronecta aquatica*
9	Annelida	Clitellata	Gnathobdellida/ Hirudinida	*Hirudo medicinalis*
10	Mollusca	Gastropoda	Pulmonata	*Lymnaea glabra/ Omphiscola glabra*

In the present survey fauna of 4 classes of macroinvertebrates belonging to Phylum Arthropoda, Mollusca and Annelida was collected.

Class Insecta proved to be the largest class represented by very large number of specimens. Among them insects belonging to order Hemiptera and order Coleoptera were abundantly present throughout the study period. In order Coleoptera the occurring species were *Dytiscus adult, Gyrinus species.* Among Hemiptera, species namely *Gerris lacustris, Buenoa margoritacae and Naucorid species* were identified. The Lepidoptera were represented by only one species *moth larvae.* This is in accordance with Burt (2003) who worked in Oman and Bass (2003) who worked in Tobago Island and found class insecta the most abundant among the macroinvertebrates.

The class Arachnida (Arthropoda) was represented by a single species *Argyronecta aquatica.*

The Odonta was also represented by only one species *Libellula quadrimaculata.*

Similarly a single species of Annelida (*Hirudo medicinalis*) was collected during study period. Gastropods were represented by a single species *Lymnaea glabra*. Gastropods population was also at the peak during the study period. As the temperature increases the solubility of dissolved Solids (Ca^{++} and Mg^{++}) also increases which in turn affects the occurrence and distribution of gastropods and other mollusks.

Ilyas (2004) worked on the macroinvertebrate fauna of Zebi Dam situated in district Karak and collected 18 species among which six species *Gerris lecustris, Buenoa margaristaceae, Libellula quadrimaculata, Dytiscus, Hirudo medicinalus, Lymnea glabra* have been reported in present survey.

Some species which are not found are *Ranatra linearis, Nepa cinera, Aeshna species, Baetis species, Ischura species, Chironomus, Anopheles, Tabanus, Hyphydrus ovatus species, Hydrobius fuscipes, Argyroneta, Lymnea auricularia.*

Wazir (2009) in a more recent study in Bargantu dam, FR Bannu found 7 species of freshwater macroinvertebrate fauna. According to his results he collected the species from the same three phyla as ours i.e. Arthropoda, Annelida and Mollusca. Among coleoptera 2 species i.e. *Hyphydrus ovatus* and *Hydrobius fuscipes* were identified. Among Hemiptera a single species i.e. *Lethocerus americanus* was found. Among Hirudinae (Annelida) a single species *Hirudo*

medicinalis was identified whereas among Gastropoda 3 species viz. *Viviparous contactus, Ena mainwaringiana* and *Tropcarbis haranensis* were described. It is very astonishing that except for *Hirudo medicinalis* no other species of mollusca and insecta matched with our collection although the two dams are not very far away and lie in the same geographical area.

4. CONCLUSION

It is concluded that the water of the dam is very productive. The abundance of macroinvertebrate fauna provides an evidence of the health of the water body and depicts the availability of the natural food and existance of sufficient food chains. Hence it could support a big density and variety of fish fauna. Food fish especially warm water carps like rohu, mori, grass, silver, thaila etc. could easily be introduced and cultured in the dam which not only provide fresh, cheap protein to the people of the area but will also support and enhance the economic activity in this poverty cuffed area.

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