Biosciences, Biotechnology Research Asia Vol. **3**(2), 417-419 (2005)

ENTOMOFAUNAL DIVERSITY OF BISHLERI STREAM OF BANIHAL, DISTRICT DODA (JAMMU & KASHMIR STATE) INDIA

F. A. Fayaz, T. A. Qureshi*, T. Angchook[1] and K. Borana

Department of Applied Aquaculture, Barkatullah University, Bhopal - 462 026 (India)
[1]Department of Fisheries, Government of Jammu & Kashmir (India)

(Received: October 08, 2005; Accepted: December 01, 2005)

ABSTRACT

The main drainage of the District Doda is the river *Chenab* formed by the confluence of *Chandra* and *Bhaga* streams. The other tributaries of the river *Chenab* are *Neeru* stream, *Kalnei* streams, *Chatroo* stream, *Bishleri* stream with a number of their tributaries. The present study was carried on *Bishleri* stream by dividing the stream into different stations; for a period of one year from January,2003 to December, 2003. The study on *Bishleri* stream has brought on record the occurrence of 31 genera of Entomofauna, either in the form of their larvae, nymphs or adult stages; out of which 7 to Diptera, 6 belong to Ephemeroptera, 5 to Odonata, 4 each to Trichoptera, Plecoptera and Coleoptera and 1 to Hemiptera.

Key words: Entomofauna, decimators, deceiving, Bishleri.

INTRODUCTION

The aquatic insects constitute a vital link in the food chain of an aquatic ecosystem. Some of them serves as food for fishes, while the others are predatory on fish larvae, fry act as food fish decimators. Considerable work has been done on different aspects of entomofauna of different water bodies. Relationship between stream insect and water quality has been highlighted by many workers like Needham (1930), Sprules (1947), Gaufin and Tarzwell (1952), Gaufin (1958), Tonapi (1959) Olive and Dambach (1973), Bist and Das (1985) and Sharma *et al.* (1990). Roback (1974) quoted the word "deceiving" for using insects as biological indicators as they are found in a great variety of habitats, nevertheless indicator species concept is getting pace considerably as it is an inexpensive tool in pollution detection and abatement of the widely used biological methods for estimating the water quality (Gaufin and Tarzwell, 1952 and Sharma *et al.* 1990). Craytons and Somrnerfeld (1979) reported that the insect density and diversity was reduced by high rated water currents, high turbidity and renewal of waters. However, the available literature reveals that no information is available on the entomofauna of Bishleri stream. The present study is an endeavour to determine the qualitative abundance of entomofauna of Bishleri stream.

MATERIAL AND METHODS

The insect fauna of the stream was collected by enclosing one sq.m of stream bottom with square meshed cloth and lso by using long hand net.

The bottom stones, gravels and sand were upturned to dislodge the benthic life, as a result all the benthic life was collected in the square meshed cloth and was picked up. After collection, the samples were preserved in 5% formalin and labelled properly. Field preserved samples, there after, were analysed in the laboratory with the help of guidelines given by Needham and Needham (1962) and Tonapi (1980). The results are represented as number / sq.m.

RESULTS AND DISCUSSION

Aquatic insects constitute a vital link in the food chain of an aquatic ecosystem, since many of them serves as food for fishes. The also play an important role in the purification of water by degrading pollutants and thus neutralizing their effect.

The study on Bishleri stream has brought on record the occurrence of 31 genera of entomofauna, either in the form of their larvae, nymphs or adult stages; out of which 7 to Diptera,6 belong to Ephemeroptera, 5 to Odonata, 4 each to Trichoptera, Plecoptera and Coleoptera and 1 to Hemiptera.

Dipterans (Two winged flies) were represented by the nymphs of *Anthrix, Antocha, Blepharocera, Chironomus, Simulium, pedicia* and *Tabanus*. Among dipterans, *Chironomus* larvae were recorded at station 2nd in June. The occurrence of larvae of *Chironomus* at 2nd station may be because of the influx of sewage from the nearby town, as they are termed as inhabitant of polluted water (Learner *et al.,* 1971; Olive and Damback 1973 and Hawkes 1979). The larvae of *Simulium* were recorded during the beginning of monsoon. This finding gets support from the work of Sharma *et al.* (1990), who recorded the abundance of *Simulium* with the onset of monsoon floods.

Ephemeropterans (May-flies) have been termed as “clean water forms” by Gaufin and Tarzwell (1952). MacKenthun, (1966) and Larimore (1974) have stated that May flies are pollution indicator. Either they decline in number or their complete absence in the area of stream indicates poor qualities of water. Ephemeropterans were represented by the nymphs of *Baetis, Caeni,. Ephemerella, Epeorus, Heptagenia* and *Rhithrogena*. Among the insect fauna, Ephemeropterans dominated all the groups at all the sampling stations. The maximum number of Ephemeropterans indicated that the stream water is nearly free from pollutants. This observation confirms with the finding of Mackenthun (1966) and Larimore (1974).

Odonates were represented by nymphs of *Anax, Argia, Cordulegaster* and *Enallagme* They are less abundant because of the scarcity of macrophytes, which provides shelter and breeding grounds for the odonates. Similar observation was also made by Sharma *et al.* (1990) who had observed the scarcity of Odonates due to the absence of macrophytes in Morar river of Gwalior.

Plecoptera (stone flies) were represented by the larvae of *Amphinemura, Chloperla, Nemoura* and *Nemurella*. The mean values revealed that their number increased during winter and decreased during summer. Similar observation was made by Sunder and Vass (1988) who assigned the higher density of stone flies during winter in the Kashmir lakes to high oxygen contents and low metabolic rate during the winter. The maximum number of plecopterans was also recorded by Kuldip and Bhagat (1978) in September and October while studying the ecology of two trout streams in Kashmir.

The larvae of Trichopterans collected from the stream are represented by *Hydrosyche, Mysticides, Rhacopohila* and *Philopotamus*. Like Plecopterans, the member of Trichopterans showed an increase during the months of winter seasons.

The larvae and adults of Coleoptera collected from the stream included *Dytiscus, Elmis,Hydrogobus* and *Hydrophilus.* They were less abundant at the sampling station 1st,3rd and 4th than the sampling station 2nd; because of slow water currents. This observation indicated that the occurrence of Coleoptera was affected by the water currents.

Hemipteran was represented by a single genus i.e *Ranatra*. Seasonally, their maximum number was recorded during the summer, when the water temperature was maximum. This finding gets support from the work of Tonapi (1959) who noted that temperature and rainfall affected the occurrence of hemipteran population. Bisht and Das (1985) have also reported that higher temperature is responsible for the abundance and diversification of entomofauna.

To conclude from the foregoing observations, different type of insects inhabiting the stream belonging to different groups, each with

different physiological responses and it is revealed that the entomofauna of the stream is affected by temperature, rainfall and in particular by the flow of water currents.

REFERENCES

1. Bisht, R.S. and Das, S.M. "Abiotic parameters and aquatic insects of two cold water Kumaun lake." *Indian J.Ecol*. **12**(2):365-369 (1985)
2. Crayton, W.M. and Sommerfeld M.R. "Composition and abundance of Phytoplanktons in tributaries of the lower Colorado River. Grand canyon region." *Hydrobiologial* **66**: 81 -93 (1979)
3. Gaufin ,A. R and Tarzwell, C. M. "Aquatic invertebrates as indicates of stream pollution." *Publ. Hlth Rep* **67:** 57 - 67 (1952)
4. Hawkes, H. A. "Invertebrates as indicators of river water quality*." In: Biological indicator of water quatities, Edited by A.James and Lilian Evisan* (1979)
5. Larimore, R.W. "Stream drift as an indicator of water quality." *Trans. Amer. Fish. Soc.* **103:** 507-515 (1974)
6. Learner, M. A; Willium, R; Harcup, M. and Hughes, B. D. "A survey on the macrofauna of the river Cynon, a polluted tributary of the river Taff (South wales)." *Fresh water biology*. **1:** 339-367 (1971)
7. Mackenthun, K. M. "Biological evolution of polluted streams." *J. water poll. Centr. Fed.* **30:** 241-247 (1966)
8. Needham, J.G. and Needham, P. R. "Fresh water Biology." *Holden Day Inc, San Francisco* (1962)
9. Olive, J. H. and Dambach, C. A. "Benthic macroinvertebrates as indexes of water quality in whetstone creek, Morrow Country, Ohio (Scioto river basin)." *Ohio, J. Sci*, **73:** 129 -149 (1973)
10. Pennak, R.W. "Fresh water invertebrates of United states." *John Wiley and Sens.* N.Y 803 (1978)
11. Roback, S. S. : "Insects In: Pollutional ecology of freshwater invertebrates." *Eds. C.W.Hart and S.L.H.Fuller . Academic Press*, New York, 318 (1974)
12. Sharma. S; Kaushik, S. and Saxena, M. N. "Pollutional ecology of Chironomids." *Geobios*, New Reporters **9:** 21 -24 (1990)
13. Sprules, W. M. "An ecological investigation of stream insects in Algonquin park."*Ontraio, Univ. Toronto Stud. Bio.Ser*. **56:**1-81 (1947)
14. Sunder, S. and Vass, K. K. "seasonal dynamics of benthos of some Kashmir lakes." *Proc. Nat. Acad.sci. India*. **58**B(11): 193-203 (1988)
15. Tonapi, G.T. " Fresh water animals of India (An ecological approach)." *Oxford and IBH Publshing Co.* New. Delhi, 341 (1980)
16. Tonapi, G.T. "Studies on aquatic insect fauna of Poona (Aquatic - Heteroptera)." *Proc. Nat. Inst.Sci*. India. 25b: 321 – 332 (1959)