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## FRESHWATER AQUATIC INSECT DIVERSITY OF INGALE PAZAR LAKE, TALUKA-PALUS, DIST-SANGLI (MS), INDIA

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### ABSTRACT

In present investigation, reported about 16 species of aquatic insects belonging to 16 genera and 11 families distributed in 6 different orders namely Odonata, Hemiptera, Coleoptera, Orthoptera, Dermaptera and Trichoptera. The Odonata is dominant order represents 6 species, the order Hemiptera represent 5 species, order Coleoptera includes 2 species, order Orthoptera include 1 species and order Dermaptera represent 1 species.

**KEY WORDS:** Hemiptera , Aquatic insect, Diversity, Ingale Pazar Lake

## INTRODUCTION

Aquatic insects comprise an ecologically important group of organisms in fresh water systems. They belong to several special feeding groups such as filter feeders, deposit collectors, scrapers, shredders as well as predators Lamberti and Moore (1984). The fresh water insects plays an important role in ecosystem functioning that is nutrient cycle, primary producer, decomposition etc. The ponds, lakes and other stagnant water bodies are habitats of two great groups of aquatic insects i.e. the surface hunters and divers. They have high capacity of tolerance to environmental changes. Hence they are good indicators of any change in water quality Arimoro and Ikomi (2008). Aquatic insects are considered as water quality indicators. Their importance as biomonitor or indicators of freshwater pollution has also been amply demonstrated Wiederholm (1984); Metcalfe (1989). The change in the number and composition in the population at a given time and space may indicate a change in the water quality. Some of the aquatic insects are beneficial to humans and at the same time few of them may be quite harmful. The aquatic insect plays an important role in food chain and food web. They are also important as biomonitors, bioindicators, predators, and as biocontrol agents. This study becomes imperative to assess the diversity and richness of the insect species of the Ingale Pazar Lake.

## STUDY AREA

The Ingale Pazar Lake which is perennial lake located at Palus, Tahsil of

Sangli District, Maharashtra. It is situated at 17.10' N latitude and 74.44'E longitude.

## MATERIALS AND METHODS:

Aquatic insects were collected monthly interval during June 2017 to May 2018 between 7.00 am to 11.00 am. The aquatic insects were collected by handpicking method and with the help of insect collecting net made up of nylon cloth having mesh size 40-80cm<sup>2</sup>. Hard bodied insects were dried, pinned and preserved in 80% ethanol. Only one or two specimen of each kind of insects were used for identification in the laboratory and the remaining were returned to the respective sampling sites.

Collected samples were examined under a stereo zoom microscope (Stemi DV4) and identified using standard taxonomic literature. They were identified with the help of standard keys by (Kumar, 1973a, 1973b; Bal and Basu, 1994a, 1994b; Bouchard, 2004; Epler, 2010) and by other several authors (Dudgeon 1999, Wiggins 1996).

## RESULT AND DISSCUSSION

In present investigation reported about 16 species of aquatic insect belonging to 15 genera and 12 families distributed in 6 different orders viz. Odonata, Hemiptera, Coleoptera, Orthoptera, Trichoptera and Dermaptera. The Odonata is dominant order represents 6 species viz. *Brachythemiscontaminata*, *Bradinopygageminata*, *Pantalaflavice*, *Anax sp.*, *Epitheca sp.* and *Cordula sp.* These 6 species belongs to 3 families viz., Libellulidae, Aechnididae and Cordulidae. The order Hemiptera includes 5 species viz.,

*Metrocorissikkimensis*, *Ranatra* sp., *Diplonychusrusticus*, *Diplonychus* sp., *Hydrometra* sp., *Nepaciner* which belongs to 4 families namely Gerridae, Nepidae, Belostomatidae, and Hydrometridae. The order Coleoptera represents two species viz., *Hydrophilus* sp., and *Cybister* sp. which belong to 2 families, namely Hydrophilidae and Dytiscidae. The order Orthoptera, Trichoptera and Dermaptera includes one species each belongs to the families such as are Gryllidae, Lepidostomatidae and Forficulidae. Similar observations were reported by Choudhary and Gupta (2015) on studies of aquatic insects community of Deeporbeel, Assam. They reported 31 species belonging to 18 families of 5 orders and noticed that Hemiptera is dominant representing 17 species and 8 families. The Table No.1 shows the checklist of aquatic insects of Ingale Pazar Lake during June 2017 to May 2018.

In present investigation it has been found that the aquatic insect species diversity was higher during monsoon when rainfall was maximum. Optimum water temperature during rainy season also affects the species diversity and it becomes higher. During summer when water temperature was somewhat high the insect species diversity was minimum. Rao (1976) also opined that a heavy rainfall in monsoon period increases the diversity while the poor rainfall has adverse effect on the diversity index of hemipteran insects. Optimum aquatic insect diversity was reported during winter season. The above observations indicate that there was seasonal variation reported in aquatic insects diversity during the study period. Julka (1977) has suggested that in the complexes of interdependent factors governing the seasonal variations in diversity of aquatic bugs, temperature and rainfall appear to be the important factors.

**Table No. 1: Checklist of Aquatic Insects of Ingale Pazar Lake During June 2017 to May 2018**

| Order              | Family           | Genus               | Species            |
|--------------------|------------------|---------------------|--------------------|
| <b>Odonata</b>     | Libellulidae     | <i>Brachythemis</i> | <i>contaminata</i> |
|                    |                  | <i>Bradinopyga</i>  | <i>geminata</i>    |
|                    |                  | <i>Pantala</i>      | <i>flavicece</i>   |
|                    | Aechnidae        | <i>Anax</i>         | <i>sp.</i>         |
|                    | Cordulidae       | <i>Epitheca</i>     | <i>sp.</i>         |
| <i>Cordula</i>     |                  | <i>sp.</i>          |                    |
| <b>Hemiptera</b>   | Gerridae         | <i>Metrocoris</i>   | <i>sikkimensis</i> |
|                    | Nepidae          | <i>Ranatra</i>      | <i>sp</i>          |
|                    |                  | <i>Nepa</i>         | <i>cinerea</i>     |
|                    | Belostomatidae   | <i>Diplonychus</i>  | <i>rusticus</i>    |
|                    |                  | <i>Diplonychus</i>  | <i>sp</i>          |
| <b>Coleoptera</b>  | Hydrophilidae    | <i>Hydrophilus</i>  | <i>sp.</i>         |
|                    | Dytiscidae       | <i>Cybister</i>     | <i>sp.</i>         |
| <b>Orthoptera</b>  | Gryllidae        | <i>Gryllotalpa</i>  | <i>orientalis</i>  |
| <b>Trichoptera</b> | Lepidostomatidae | <i>Lepidostoma.</i> | <i>sp</i>          |
| <b>Dermaptera</b>  | Forficulidae     | <i>Forficula</i>    | <i>auricularia</i> |

Table No. 2: Seasonal Occurrence of Aquatic Insects During June 2017 to May 2018

| Sr. No. | Name of the Aquatic Insects Species | Seasonal presence or absence (- -) (+ +) |               |               |
|---------|-------------------------------------|--|---------------|---------------|
|         |                                     | Rainy Season                             | Winter Season | Summer Season |
| 1       | <i>Brachythemis contaminata</i>     | ++                                       | ++            | ++            |
| 2       | <i>Bradinopyga geminata</i>         | ++                                       | ++            | ++            |
| 3       | <i>Pantala flavicence</i>           | ++                                       | ++            | ++            |
| 4       | <i>Anax sp.</i>                     | ++                                       | ++            | --            |
| 5       | <i>Epitheca sp.</i>                 | ++                                       | ++            | --            |
| 6       | <i>Cordula sp.</i>                  | ++                                       | ++            | ++            |
| 7       | <i>Metrocoris sikkimensis</i>       | ++                                       | ++            | ++            |
| 8       | <i>Ranatra sp.</i>                  | ++                                       | ++            | ++            |
| 9       | <i>Nepa cinerea</i>                 | ++                                       | ++            | ++            |
| 10      | <i>Diplonychus rusticus</i>         | --                                       | ++            | ++            |
| 11      | <i>Diplonychus sp.</i>              | --                                       | ++            | ++            |
| 12      | <i>Hydrophilus sp.</i>              | ++                                       | ++            | ++            |
| 13      | <i>Cybister sp.</i>                 | --                                       | ++            | ++            |
| 14      | <i>Gryllotalpa orientalis</i>       | ++                                       | ++            | ++            |
| 15      | <i>Lepidostom sp.</i>               | ++                                       | ++            | ++            |
| 16      | <i>Forficula auricularia</i>        | ++                                       | ++            | ++            |

++ = Presence    -- = Absence

PLATE NO. 1

Photographs of Some Aquatic Insects Occurred During June 2017 to May 2018



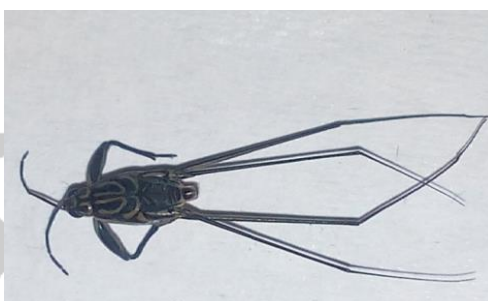
*Brachythemis contaminata*



*Brachythemis jaminata*



*Pantala favisance*



*Metrocon's Sikkimensis*



*Ranatra sp.*



*Diplonychus rusticus*



*Forficula auricularia*



*Nepa cinerea*

## CONCLUSION

The present study of aquatic insects shows the abundance and richness of commonly occurring aquatic insects fauna. Physicochemical and biological parameters affect the insect community directly or indirectly. The seasonal fluctuation in the insect diversity reported during the study period.

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## REFERENCES

Arimoro F.O, Ikomi R. B. (2008). Ecological integrity of upper Warri River, Niger Delta using aquatic insects as bioindicators. *Ecological Indicators.*; 395:1-7.

Bal A, Basu R. C. (1994a). Insecta: Hemiptera: Mesovelidae, Hydrometridae, Veliidae and Gerridae. In: State Fauna Series3: Fauna of West Bengal. Part 5. Calcutta, India: Zoological Survey of India, pp. 511-534.

Bal A, Basu R.C. (1994b). Insecta: Hemiptera: Belostomatidae, Nepidae, Notonectidae and Pleidae. In: State Fauna Series3: Fauna of West Bengal. Part 5. Calcutta, India: Zoological Survey of India, pp. 535-558.

Bouchard R. W. Jr (2004). Guide to Aquatic Invertebrates of the Upper Midwest. St. Paul, MN, USA: Water

Resources Center, University of Minnesota.

Choudhury D.and Gupta S. (2015). Aquatic insect community of Deeporbeel (Ramsar site), Assam, India. *J. Ento. and Zoology Studies.* E-ISSN: 2320-7078 p-ISSN: 2349-6800. 3(1): pp. 182-192.

Dudgeon D. (1999). Tropical Asian streams; zoo benthos. Ecology and conservation. Hong Kong University press. Hong Kong.

Epler J.H. (2010). The Water Beetles of Florida - An Identification Manual for the Families Chrysomelidae, Curculionidae, Dryopidae, Dytiscidae, Elmidae, Gyrinidae, Haliplidae, Helophoridae, Hydraenidae, Hydrochidae, Hydrophilidae, Noteridae, Psephenidae, Ptilodactylidae and Scirtidae. Tallahassee, FL, USA: Florida Department of Environmental Protection.

Julka J.M. (1977). On possible fluctuation in the population of aquatic bugs in a fish pond oriental insects. 11: 139-149.

Lamberti G. A. and Moor J.W. (1984). Aquatic insects as primary consumers. In : The Ecology of Aquatic Insects, (Eds.) Resh, V.H. and Rosenberg, D. M. Praeger Publishers, New York, P. 164-195.

Metcalfe J. L. (1989). Biological water quality assessment of running waters based on macroinvertebrate communities: History and present status in Europe. *Env. Poll.* 60: 101-139.

Rao T. K.R. (1976). Bioecological studies on some aquatic Hemiptera, Nepidae, Entomon. 1: 123-132.

Weiderholm T. (1984). Responses of Aquatic insects to Environmental pollution. In: The Ecology of Aquatic Insects, (Eds), V. H. Resh, V. H. and Rosenbery D. M. Praeger Publisher, New York P. 508-557.

Wiggins B. (1996). Larvae of the North American Caddisfly Genera (Trichoptera) 2nd edition. University of Toronto press. Toronto.pp 457.

Yen A, Butcher R. (1997). An overview of the conservation of non-marine invertebrates in Australia.' Environment Australia, Canberra.

