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A study of the statistical indices of the freshwater lentic molluscs of the genus *Bellamya,* of Jamshedpur

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Abstract : Statistical analysis of any population of organisms in an ecosystem is an important tool for measuring different parameters for assessing species diversity. The abundant and rareness of organism helps to assign different characters of the ecosystem. The present study has been carried out to investigate the statistical data of the different species of Bellamya in Jamshedpur, Jharkhand.

Key words : Statistical analysis, Lentic mollusca, *Bellamya*.

INTRODUCTION

Statistical indices are very good method for assessing the various parameters that are needed for quantifying the species diversity of any given habitat. The numerical strength of organism effect the functioning of any ecosystem. In a biotic communities usually contains a few common species which are represented by large number of individual while some members are fewer in number. Under stress conditions, the number of rare species usually reduces.

The gastropod molluscs *Bellamya* is represented by 5 subspecies in Jharkhand viz *B.bengalensis f.typica*, *B.bengalensis f. mandiesis, B. bengalensis f.eburnea*, *B. variata* & *B.dissimillis*. The present study was carried out in the permanent perennial ponds, dams etc.

MATERIALS & METHODS

The present investigation was carried out in the freshwater lentic habitats of Jamshedpur i.e, dams, perrenials, ponds etc., covering Dimna, Baridih lake, Jyanti

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Quadrate method was used at the sampling site during collection.

Sampling Method:-

The molluscs were collected either by careful hand picking or by sieve & hand nets. Live snails were then preserved at 4% formalin solution . Dry shells were also collected during collection and they were then cleaned and put in wooden boxes for further study.

Collection was done for a period of one year from February 2012 to January 2013 during the morning hours during 7:30 am to 9:00 am. Midday sampling was avoided as the molluscs bury themselves in the mud making their collection difficult.

All the live individuals collected were preserved in 4% formalin solutions in different vials bearing tags regarding their site, date and time of collection. The individuals were then identified using standard literature and keys of ZSI, Kolkatta and authors Tonapi (1971), Rao & Mitra (1976), Mahata (1988)[3].

Statistical Analysis:-

Statistical analysis of molluscs collected has been done by the following statistical indices :-

a) **Alpha (á) diversity Shannon Weiner index: -**

$H = \sum pi \log pi$

Where,

H = α – diversity,

Pi = mean of individual species procured by the formula n/N, and logpi is the log product of pi (mean of individual species).

logpi = log value conversion of pi

(b) Relative abundance

RA= ni/N*100

Where,

ni = number of individual of a species

N = Number of individual of total number of species.

RA = pi * 100 (where ,pi =ni/N)

(c) Community Dominance

In present case, the community dominance index put forth by M.C Naughter (1968)was used.

Community dominance = 100 * $\frac{y1+y2}{Y}$

y1 = abundant of most dominant species

y2 = abundant of 2ⁿᵈ most dominant species

Y = Total abundance in a community

(d) Species Richness (SR)

SR is number of species occurring at a place (Franz 1976)

OBSERVATION

The sampling of the molluscs of *Bellamya* species in different sites & quadrates of the selected area revealed the given finding which are recorded in the table 1.

5 species of *Bellamya* was recorded from the sampling area as identified by ZSI ,Kolkata as well as confirmed by various taxonomic keys and authors as well.

All the *molluscs* were of fairly medium size except *Bellamya variata* ,which is considerably smaller in size than other species . The 5 species showed numerical variation in different months of the sampling period

which ranged from febrary 2012 to janvary 2013 . The species showing highest numerical strength is *B. bengalensis f.typica* (84) followed by *Bellamya dissimillis* (60), *B.bengalensis f. mandiensis* (52), *B.bengalensis f. eburnea* (42) & *B.variata* (11), f. *B.bengalensis f. typica* showed the numerical dominance taken together at all sampling site throughout the sampling period while *B.variata* remained at the lowest level at all the areas.

The S-W a' diversity index value of the *Bellamya* species on the account of the sampled population of 5 species throughout the sapling period has been obtained as 0:69592 whereas the community dominance value was 5.86614.

DISCUSSIONS

The above investigation of the sampled population of *Bellamya* species showed a less significant value of diversity , relative abundance, community dominance and species richness.

However, the observation is only restricted to a selected locality and thus, no firm conclusion can be drawn yet it definitely shows a specific trend. It is found that the disturbed site specially where the water-bodies sewage disposal & other domestic activities takes place, lesser to nil *B.variata* is found. But the undisturbed water-bodies with good growth of aquatic plants showed a good population of *B.variata* and other 4 species. The main cause behind this has been the alteration of the chemistry of water, availability of food or growth of unwanted weeds choking the water-bodies hindering the growth of the *Bellamya* species.

According to the above facts & by values of alpha diversity "Shannon- Weiner" index , relative abundance, species richness and community domination calculated , it is clearly established that *B.bengalensis f. typica* is the most dominant species while *B.variata* is the rarest one. The relative abundance of *Bellamya bengalensis f.typica* is 35.039% amongst all the remaining species and thus making it a dominant member in the sampled site.

Table:- Statistical analysis of Bellamya species of Jamshedpur, Jharkhand.
9 S-W £ Diversity index =H, RA =Relative abundance, DC= Community Dominance, SR= Species Richness).

Name of organism n	No. of individual collected	pi	Log pi	RA=100*pi	DC=100 x y1+y2 Y	£ ,a' Diversity (H)	SR
B.*bengalensis* f.*typica*	89	0.35039	-0.45544	35.039			
B. *bengalensis* f.*mandi*	52	0.20472	-0.68883	20.472			
B.*bengalensis* f. *eburnea*	42	0.16535	-0.78159	16.535			
B.*dissimillis*	60	0.23622	-0.62668	23.622			
B.*variata*	11	0.04330	-1.36351	4.330			
Total	254				58.6614	0.69592	5

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