The Role of Mathematics for Scenarios of Gastropod Diversity and Ecosystem Services

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ABSTRACT

A present study was carried out on marine gastropod accessibility among coastline to collection, taxonomical identification and diversity by using some mathematical methods Shannon Wiener Diversity Index, One-way ANOVA, α diversity, data obtained from rocky platform, boulder field, some sheltered areas sandy beaches, and muddy habitat, SCUBA used for sampling-data collection, The molluscan fauna is rich in prevalence of various habitats, so there is urgent need to taxonomical study of species and mathematical analysis for more accuracy for current status and future planning as well as sustainable utilization in the point of view of biodiversity conservation.

Keywords : Quadrat Method, Diversity, Shannon Wiener Index.

I. INTRODUCTION

These studies focus on the congruence of α diversity (the number of species found per sampling unit) between taxa rather than on β diversity (turnover of species assemblages between sampling units). Biologists are all passionate about conserving biological diversity. We are seldom as passionate about the math we use to guide us in this task, Yet what if the mathematical tools we have always used to measure diversity, [16], the belief (or superstition) of some ecologists that a diversity index provides a basis (or talisman) for reaching a full understanding of community structure is totally unfounded-Evelyn Pielou, A good measure of biodiversity should take two things into account, how abundant the various species are; but also, how different the species are, The general mathematical and ecosystem frameworks introduced in several case studies including the coastal fisheries in both French Guiana and Solomon Islands [18], Species found at greater depth in the sea, [1]. Mangroves are one of the biologically diverse ecosystems in the world, [2]. They are confined to microhabitats below mean high water [3]. An oysters, mussels and clams are good source of minerals, protein, and glycogen and easily digestible compared to other animal food [4]. In India, till today, 5,070 species of molluscs have been recorded of which, 3,370 are from marine habitats [5]. The gastropods such as sacred chank, Trochus, Turbo are exploited from the Indian marine region [6]. The present papers investigate the diversity of gastropod from open coast of Raigad district.

II. METHODS AND MATERIAL

the sampling and data analysis obtained from five stations namely (A) Awaas (Lat. 18°46.068"North and Long. 072°51.817'East), (B) Sasvane (Lat. 18°47.159" North Long. 072°51.760"East), (C) Kolgaon (Lat. 18°48.197" North Long. 072°52.660" East), (D) Mandva (Lat. 18°48.324" North and Long. 072°52.967" East), (E) Kopropli (Lat. North 18°47.669"and Long. 072°54.305"East), The coastline of Raigad district west coast of India, The sampling was collect randomly from intertidal region-deep sea, The five quadrates of nylon rope each 1-m² was used, twice in each season post- monsoon, winter and summer October 2016 to September 2017. Soon after collection of live animals, They were stocked in filtered seawater pumped in the laboratory from the estuaries for observation, then animal preserved in 70% alcohol for taxonomical identification of morphological characters of typical animal, especially, lunal, umbo, and operculum. Internal parts teeth. The shells were identified from Zoological Survey of India, Kolkata, also using the reference [15], special guidance taken for identification by Dr.Sherly Slack, Australia for identification.

III. RESULTS AND DISCUSSION

3.1: According to Shannon Wiener Diversity Index

| Stations	No. of sample	pi=sample/sum	ln (pi)	pi*ln (pi)
A	08	0.235	-1.448	-0.340
B	06	0.176	-1.737	-0.305
C	06	0.176	-2.737	-0.305
D	05	0.147	-1.917	-0.281
E	09	0.264	-1.331	-0.351
	sum=34			Sum = -1.582

H= 1.582

Hmax= ln(N) = ln(5)=1.609

Evenness = H/Hmax = 1.582/1.609 =0.983

Result: Shannon diversity index (H) = 1.582

Evenness = 0.983

Table Analyzed	One-way ANOVA data			
Data sets analyzed	A–C			
ANOVA summary				
F	0.09934			
P value	0.9057			
P value summary	ns			
Significant diff. among means (P < 0.05)?	No			
R squared	0.006579			
Brown-Forsythe test				
F (DFn, DFd)	0.09934 (2, 30)			
P value	0.9057			
P value summary	ns			
Are SDs significantly different (P < 0.05)?	No			
Bartlett's test				

Bartlett's statistic (corrected)	0.8640			
P value	0.6492			
P value summary	ns			
Are SDs significantly different (P < 0.05)?	No			
ANOVA table	SS	DF	MS	F (DFn, DFd)
Treatment (between columns)	0.1818	2	0.09091	F (2, 30) = 0.09934
Residual (within columns)	27.45	30	0.9152	
Total	27.64	32		
Data summary				
Number of treatments (columns)	3			
Number of values (total)	33			
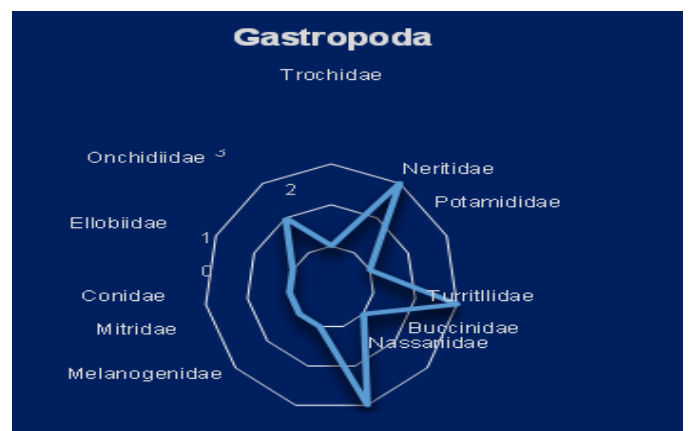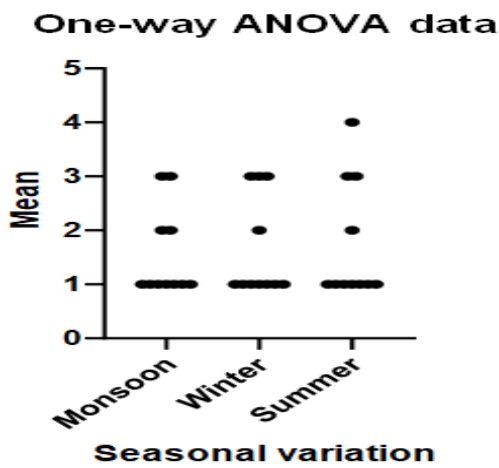
GRAPH NO.II. Obtained data families & gastropods.
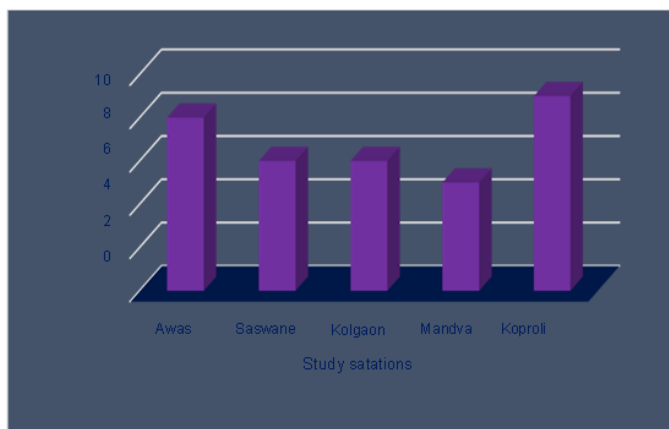
GRAPH NO.I. Obtained data according to fixed sites.
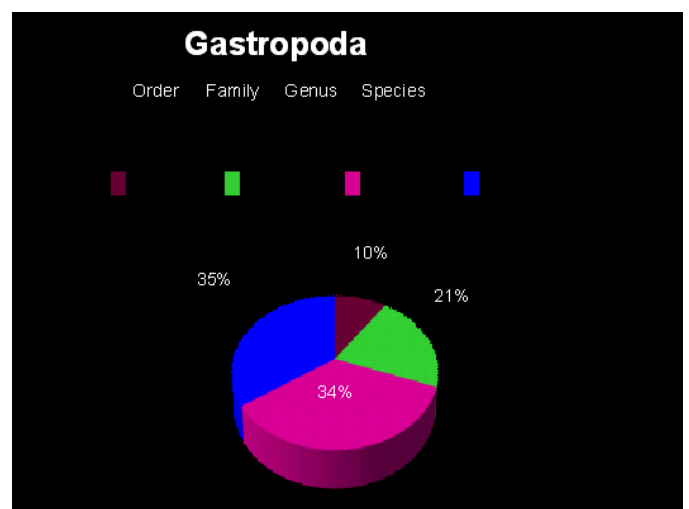
GRAPH NO.III. Total obtained of gastropods in percentage.

According Shannon diversity index (H) = **1.582** while Evenness is the **0.983** amongst the statons, according

to "graph 1" The station E more diversity according to "graph no 1" family Neritidae, Nassariidae and Turritellidae documented rich diversity. In the present study were obtained eighteen gastropods belonging to eighteen genera out of eleven families from the coast line of Raigad district, west coast of India. A study five stations respectively station A: eight species belonging eight genera out of six families, station B: six species belonging six genera out of four families, station C: six species belonging six genera out of four families, station D: five species belonging five genera out of three families, and at E: nine species belonging nine genera out of five families, obtained.

The diversity of gastropods molluscs at five stations varies significantly. The population density was at its peak in the month of November during post monsoon period. [7]. the observation of these species populations in mangrove ecosystem is important to evaluate their condition [8]. Alpha diversity at habitat level is the most widely used component in the characterization of communities. It has two components viz. species richness and equitability indices. [9]. Forty four sp., of Sematan mangrove forest of Malaysia recorded [10]. A total account of Sundarban fifty six species of molluscs thirty one gastropods & twenty five bivalves [11]. twelve bivalves & thirteen gastropods mangrove associated molluscs at Ratnagiri recorded [12] thirty-nine gastropods belongs fifteen families from Raigad district coast recorded [13]. The calcium concentration is varied in different gastropods shells, these shells can be used for preparation of calcium for the medicinal purpose [14]. Gastropods are typically one of the dominant and most conspicuous macrofauna in mangrove systems, and occupy wide range of ecological niches.

IV. CONCLUSION

According Shannon diversity index (H) = **1.582** while Evenness is the **0.983** amongst the stations, according to "graph 1" At E richness according to "graph no 1" alpha diversity obtained, Statistical analysis using Analysis of Variance One-way ANOVA F= 0.09934, P value is = 0.9057 level of significance with F-value of 0.09934 smaller than the P-value of 0.9057 This implies that there is no significant difference in the annual α- diversity of gastropods.

V. REFERENCES

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