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DIVERSITY AND DISTRIBUTION OF MOLLUSCA FROM RATNAGIRI COAST (MS) INDIA OF ARABIAN SEA

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ABSTRACT
A total 45 species were identified representing 2 classes, 14 orders and 23 families recorded from Ratnagiri coast. Gastropods exhibited highest contribution with 33 species and bivalve contributed 12 species. Order wise distribution of gastropods showed Neogastropoda contributed 10 species with 31%, Caenogastropoda 9 species with 27%, Trochida 5 species with 15%, Littorinimorpha 2 species with 6%, Cycloneritida 4 species with 12%, Seguenziida 1 species with 3%, Cycloneritimorpha 1 species with 3% and Patellogasteopoda 1 species with 3% of the total diversity of gastropods. Bivalve showed Venerida 6 species with 50%, Cardiida 2 species with 17%, Arcida 1 species with 9%, Imparidentia 1 species with 8% and Mytilida 1 species with 8% of the total diversity of bivalve.

KEYWORDS: Diversity, Intertidal zone, Gastropods, Bivalve, Molluscan assemblage, Ratnagiri Coast.

INTRODUCTION

The intertidal zone of any ecological area is considered as the most productive with the greatest diversity of plant and animal life. Because of its accessibility, the intertidal zone remain highly explored than any other area (Vaghela, *et al.*, 2010). Rocky shores are the most extensive littoral habitats exposed to eroding waves and thus are ecologically very important (Crowe, *et al.*, 2000). Ratnagiri district is one of the most important maritime districts of the state with the coastal belt extending to about 200 Km. Ratnagiri is an important coastal area of Maharashtra with average rainfall about 2500 mm. Coastal marine environments are reported to have greater biodiversity than open ocean regions and majority of world's most productive marine ecosystems are found within coastal environments (Bierman, *et al.*, 2009). In India the marine molluscs are recorded from the diverse habitats. They occur in different habitats such as mangroves, coral reef, rocky coasts, sandy beaches, sea grass beds and also at greater depth in the sea, they are more diverse and abundant in the rocky intertidal zone along the coast, sandy stones, inter tidal flats, mangrove areas (Day,). Mangroves are one of the biologically diverse ecosystems in the world, rich in organic matter, nutrients and support very large biomass of flora and fauna (Pawar, 2012). An oysters, mussels and clams serve the nutritional needs of the coastal population they are good source of minerals, protein, and glycogen and easily digestible compared to other animal food (Suryavanshi, *et al.*, 2012).

In India, till today, 5,070 species of molluscs have been recorded of which, 3,370 are from marine habitats (Vsubha Rao, 1991). Mollusca is the second largest phylum with a global estimated diversity of around 0.2 million species, of which, 85,000 species have been described, including 52,525 species from marine, 24,000 from terrestrial and 7,000 from freshwater ecosystems (Chapman, 2009). The gastropods such as sacred chank, *Trochus*, *Turbo* are exploited from the Indian marine region (Venkataraman and Wafar, 2005). Several species of Veneridae family clams that occur along the coast of Maharashtra *Placenta placenta* one is important for its food value. It contributes about 80% to the total production of clams landed annually mainly from Kalbadevi (Shirgaon creek) and (Kajali, Bhatye creek) estuaries along Ratnagiri coast, Maharashtra (Mohite and Mohite, 2009). Molluscan shells have been found to be important raw material for various commercial products as poultry feeds, fertilizers, tooth powder, tooth pest etc. India exports seashells and cuttle fish bones to various countries (Sarvaiya, 1988). The planet has always been changing: current patterns of biodiversity are the result of past environmental conditions and ecological and evolutionary constraints (Benton, 2010; Clarke and Crame 2010; Lyons, *et al.*, 2010). The Arabian Sea is considered as one of the most productive zones in the world oceans (Qasim, 1997; De Sousa, 1996). This coastline is known for its rich marine life especially intertidal biota in its extended intertidal and subtidal areas (Shukla and Misra, 1977). The present study evaluates the ecological status of various molluscan species of the rocky intertidal areas at Ratnagiri coastline of the Arabian Sea.

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MATERIALS AND METHODS

The entire intertidal belt of the selected sites on the Ratnagiri coastline of the Arabian Sea was thoroughly surveyed for molluscan diversity and intertidal assemblages. The study was conducted on three different stations of Ratnagiri coast, at Undi (17° 13'38.29 N, 73° 14'16.93 E), Alawa (17° 01'29.32 N, 73° 16'08.89 E), Wayangani (16° 55'42.12 N, 73° 16'57.01 E). The intertidal zones of the sites were visited regularly during the lowest tide and the molluscs were recorded. The study was conducted during March 2015 to February 2017. During present study intertidal zones of three different coasts like Undi, Alawa and Wayangani were intensively surveyed to check the present status of intertidal molluscan diversity. The structural attributes of the intertidal fauna were studies by transect method (Misra, 1968). Quadrates of 1 m^2 were laid on transect. The identification of molluscs from MBRC Chennai, the identification keys, literature available in the form of books, journals reports and checklist of molluscs was prepared.

RESULTS AND DISCUSSION

Intertidal zone of Ratnagiri coastline shows a great deal of molluscs diversity in marine ecosystem. A total 45 species were identified representing 2 classes, belonging to 14 orders and 23 families were recorded from Ratnagiri coast (Table 1). Results showed that class Gastropods exhibited highest contribution with 33 species and class bivalve with 12 species. Order wise distribution of gastropods showed Neogastropoda contributed 10 species with 31%, Caenogastropoda contributed 9 species with 27% of the total diversity, Trochida 5 species with 15%, Littorinimorpha 2 species with 6%, Cycloneritida 4 species with 12%, Seguenziida 1 species with 3%, Cycloneritimorpha 1 species with 3%, Patellogasteopoda 1 species with 3% of the total diversity of gastropods table 1 and fig. 1. Order wise distribution of bivalve showed Venerida 6 species with 50% of the total diversity, Cardiida 2 species with 17%, Arcida contributed 1 species with 9% of the total bivalve diversity, Imparidentia 1 species with 8%, Mytilida 1 species with 8% of the total diversity table 1 and fig. 2.

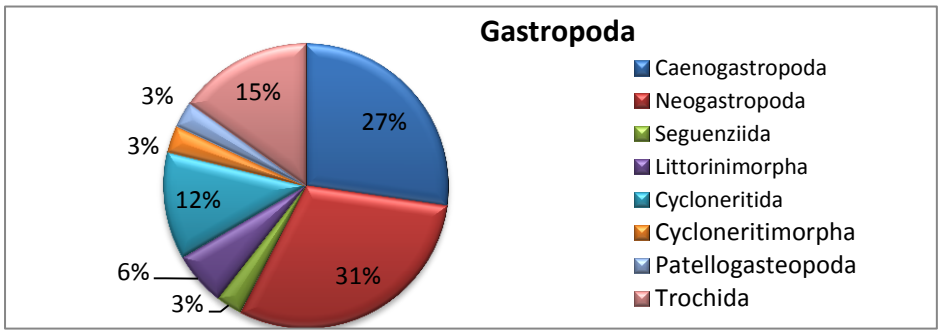

Fig. 1: Percentage representation of Gastropods molluscan diversity in Ratnagiri Coast.

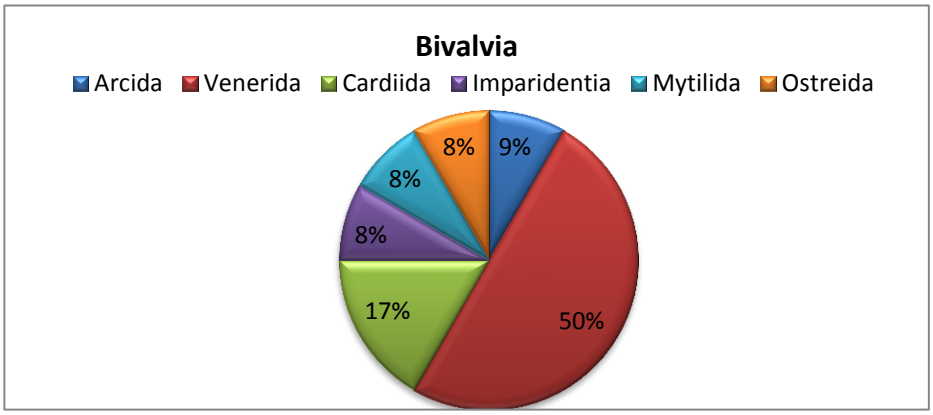

Fig. 2: Percentage representation of Bivalve molluscan diversity in Ratnagiri Coast.

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Table 1- The Checklist of the Intertidal Molluscs species collected from Ratnagiri Coastlines of Maharashtra, India.

Phylum	Class	Order	Family	Genus/Species
Molluscs	Gastropoda	Caenogastropoda	Cerithiidae	*Cerithium coralium* (Kiener, 1841)
				Clypeomorus monilifercus (Kiener, 1841)
				Cerithium tenellum (Sowerby II, 1855)
				Cerithium trailli (Sowerby,1855)
				Cerithium caeruleum (Sowerby II, 1855)
			Planaxidae	*Planaxis sulcatus* (Born, 1778)
				Supplanaxis niger (Quoy & Gaimard, 1833)
			Epitoniidae	*Acrilla acuminate* (Sowerby II, 1844)
			Nacellidae	*Cellana radiata* (Born, 1778)
		Neogastropoda	Muricidae	*Tenguella granulata* (Duclos, 1832)
				Perpura punama (Roding, 1798)
				Semiricinula konkanensis (Melvill, 1893)
				Muricopsis zeteki (Hertlein and Strong, 1951)
				Purpura bufo (Lamarck, 1822)
			Babyloniidae	*Babylonia spirata* (Linnaeus, 1758)
			Pisaniidae	*Gemophos auritulus* (Link, 1807)
				Gemophos gemmatus (Reeve, 1846)
				Cantharus dorbignyi (Payraudeau, 1826)
			Conidae	*Conus ebraeus* (Linnaeus, 1758)
		Seguenziida	Chilodontaidae	*Euchelus asper* (Gmelin, 1791)
		Littorinimorpha	Ranellidae	*Gyrineum natator* (Röding, 1798)
			Littorinidae	*Littoraria undulata* (Gray, 1839)
		Cycloneritida	Neritidae	*Nerita oryzarum* (Récluz, 1841)
				Nerita albicilla (Linnaeus, 1758)
				Nerita histrio (Linnaeus, 1758)
				Nerita fragum (Reeve, 1855)
		Cycloneritimorpha	Neritidae	*Nerita chamaeleon* (Linnaeus, 1958)
		Patellogasteopoda	Lottiidae	*Lottia pelta* (Rathke, 1833)
		Trochida	Tegulidae	*Tectus niloticus* (Linnaeus, 1767)
			Turbinidae	*Turbo bruneus* (Röding, 1798)
				Turbo intercostalis (Menke, 1846)
				Astralium semicostatum (Kiener, 1850)
			Trochidae	*Trochus radiatus* (Gmelin, 1791)
	Bivalvia	Arcida	Arcidae	*Barbatia novaezealandiae* (Smitt, 1915)
		Venerida	Veneridae	*Gafrarium divaricatum* (Roding, 1798)
				Marcia japonica (Gmelin, 1791)
				Venerupis philippinarum (Adams & Reeve 1850)
				Circe tumefacta (Sowerby, 1851)
				Gafrarium aequivocum (Holten, 1802)
			Cyrenidae	*Geloina erosa* (Lightfoot, 1786)
		Cardiida	Cardiidae	*Laevicardium crassum* (Gmelin, 1791)
			Semelidae	*Semele cordiformis* (Holten, 1802)
		Imparidentia	Mactridae	*Mactra maculata* (Gmelin,1791)
		Mytilida	Mytilidae	*Mytilus trossulus* (Gould, 1850)
		Ostreida	Ostreidae	*Ostrea conchaphila* (Carpenter, 1857)

Gastropods and bivalves are generally benthos organisms and they are regularly used as bio-indicators of aquatic health. This study agreement with previous similar data was carried out at intertidal zone of Ratnagiri coast, Maharashtra, were a great species diversity and distribution of 127 gastropods species observed and identified (Kurhe, 2014). It was also suggested that the specific seaweed association of molluscs play considerable role in their abundance and distribution in the intertidal zone (Newell, 1976; Purchon, 1968; Underwood, 1992; Misra and Kundu, 2005; Vaghela, *et al.,* 2010). Similarly work done at Sundarban recorded 56 species of molluscs including 31 gastropods and 25 bivalves (Day, 2006). Similar kind of work documented at Ratnagiri, Maharashtra, India recorded 12 species of bivalve and 13 species of gastropod mangrove associated molluscs (Khade and Mane, 2012) and the total 19 bivalves belongs 9 families while 39 gastropods belongs 15 families from selected sites of Raigad district coast (Khade and Mane, 2012). Similar study was carried out at some of the localities from Raigad district, Maharashtra West Coast of India (Khade and Mane, 2012).

The marine animals from the intertidal area protect themselves against high salinity, desiccation and against the predators. Thus they achieve through taking shelter under the bushy canopy of the seaweeds which grow better on the lower littoral zone (Misra and Kundu, 2005). The diversity of the macrofauna at the selected shore occupy different

levels of the intertidal zone, each species were dominated at the particular zone where the conditions are most favourable for them. However, the nature of substratum type such as pools, cups and channels and availability of food also play significant role for the distribution of different species.

Similarly 25 species of molluscs (13 gastropods and 12 bivalves) were recorded from Krangad estuary, South East Coast of India (Venkatesan, 2010). The biodiversity study of marine molluscs of Thanjavur district in Tamil Nadu, observed about 20 species of class Gastropoda and 20 species of class Bivalvia (Anandaraj, *et al.,* 2012). Similarly 41 species of Gastropods and 5 species of Bivalves were reported in intertidal beaches of Mumbai coast (Datta, *et al.,* 2010). 30 species of gastropods from Cuddalore coast was recorded in the year 1998 (Murugan, 1998) and among them *Babylonia spirata* is the maximum numbers in the coastline. A total of 51 species of molluscs were associated with corals in Gulf of Mannar and Gastropods represented the numerically dominant group with 34 species (Mohanraj, *et al.,* 2011). Similarly work done at eight Locations of Andhra pradesh coast recorded 70 species of Mollusc were identified which includes 44 species of gastropods, 23 species of bivalves and 3 species of Cephalopods. Similarly 21 species each of gastropods and bivalves were reported from Coringa mangroves, Kakinad bay of Andhra Pradesh coast (CHIS, 1978).

Gastropods are typically one of the dominant and most conspicuous macrofauna in mangrove systems, and occupy wide range of ecological niches. Similarly total 23 molluscs species recorded from the mangrove forest in Hong Kong (Wells, 1986). 29 bivalves recorded from the mangrove root systems on the Atlantic coast of Colombia and Wood-boring bivalves are also common in the mangrove forest (Alvarez, 1983).

CONCLUSION

Present studies report the diversity of intertidal molluscs from rocky substrata of Ratnagiri coastlines. Class gastropods exhibited highest contribution probably is influenced by their habitat and geographical condition suitable to support rich diversity of gastropods. The presence of such diverse life forms indicates the higher productivity and healthy ecosystem of Ratnagiri coast. The diversity of gastropods and bivalve group in prevalence of different habitats a wide chance of research to further explore on the possibility of ecological value and there conservation.

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ENVIRONMENTAL EFFECT ON REPRODUCTION OF BIVALVE *LAMELLIDIENS MARGINALIS*

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ABSTRACT
Due to the commercial importance and edibility value of number of species of bivalves the aspect of energy metabolism has been reported by a number of workers but the relative influence of gonad development on the distribution in different body parts has been examined in only a few cases. The present investigation to study evaluate the effect of homeopathic drugs on lipid content of Bivales *Lamellidiens marginalis.*

KEY WORDS: bivalves, lipids, *Lamellidiens marginalis.*

INTRODUCTION

The Environmental constituents shown cyclic changes in reproducstion due to great amount of energy to be canalized to the gonad during reproduction (Muley, 1988). This is reflected in the deposition of depletion of the nutrients with the advent or departure of Reproductive period (Lambert and Dehnel, 1974). Bivalves can be considered to be polysaccharide oriented. On bio-chemical changes in bivalves mollusca particularly with reference to the carbohydrates metabolism. Kulkarni *et.al.* (2005) reported that the no significant change in total lipid content in foot for each exposure period was observed when compared with control and no significant changes in total lipid cointent in hepatopancrease also at each exposure period was control and same results was observed in gills. Hence in the present investigation to study evaluate the effect of homeopathic drugs on lipid content of Bivales *Lamellidiens marginalis.*

MATERIALS AND METHODS

The fresh water bivalve molluses Bivales *Lamellidiens marginalis* 65-70 mm in size collected from Godavari river 8km away from Gangapur, Aurangabad Maharashtra. All the collected animals were brangh in to laboratory and washed to remove fouling biomass and acclimatize. After 24 hours of acclimatization animals were numbered in four sets, containing 10 animals first set is served as control and remaining 3 are experimental for respiration studied. *Lamellidiens marginalis*. In control group animals were while experimental in 2, 3 and 4th sets. Animal from control and experimented groups also scarified for estimation of glycogen from different soft body parts. The body parts of 10 animals from each group were used and mantle gills, hepatopancreas. Every time samples were pooled from 5 different animals for each group to estimate lipid by using gravimetric method according to Bila and Dyer, 1959 and percentage differences were also calculated between control and experimental groups in every season. The estimations were done on 1st day and 15th day of experiment. All the bivalves of each biochemical content of each tissue were subjected to statistical analysis for significant difference among the control and experimental groups.

RESULTS AND DISCUSSION

The seasonal variation of lipid content in *Lamellidiens marginalis* are expressed in table No. 1, 2 and 3.In the present investigation on 1st Day Lipid content in mantle, in summer decreased in both the groups compared to control . In it decreased (non-significant)by 8.72 % (10.22$\pm$-0.25) and in II nd set significantly by 2.36 % (9.18$\pm$1.07), there was 8.31 % decreased in content of control group (non-significant). In Monsoon also the content showed significant decreased trend in both the the content increased by 31.59 % (12.15$\pm$1.2) and in 0.2ppm by 23.38 % (13.94$\pm$1.64) compared to control. Thus there was 20.60 % increase in the content in 0.5ppm (14.45$\pm$1.38). In winter also the content significantly decreased in both there was 19.37 % (12.2$\pm$0.2) and in IInd 27.00 % (12.98$\pm$1.81) decrease I stcontent giving 29.3 % (10.25$\pm$0.4). On 15th day the Lipid content in mantle, in summer decreased in both the groups compared to control. In ist set it decreased (non-significant) by 8.82 (10.88 $\pm$1.49) and inII nd significantly by 5.94% (11.51 $\pm$0.58), there was 79.7 % decreased in content of 05ppm compared to control group (non-significant). In Monsoon also the content showed significant decreased trend in both the content increased by 5.79 % (14.17 $\pm$8.86) and in 2nd set by 2.88 % (13.78 $\pm$0.53) compared to control. Thus there was 9.74 % increase in the content in IIIrd (14.70 $\pm$1.02). In winter also the content significantly decreased in both compared to control there was 20.40 % (12.85 $\pm$ 0.59) and in 16.22 % (12.40 $\pm$10.72) decrease in content giving 11.9 % (10.66 $\pm$0.87).

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In the present investigation the lipid content on 1st Day the Lipid content in Hepaopancreas , in summer decreased in both the groups compared to control. In fist set it decreased (non-significant) by 13.33 % (7.28 ±0.70) and in 0.2ppm

Table 1. Effect Environment on the Lipid content of *Lamellidiens marginalis* during Monsoon Season. (Bracket Values represent percentage differences)

On 1stset					On 15th			
	Control	Ist	IInd	IIIrd	Control	Ist	IInd	IIIrd
Mantle	9.40 ±0.8	10.22 ±0.25 (-8.7230) -1.694	9.1833 ±1.075 (2.3653) 0.2809	10.8400 ±1.0759 (-8.3191) -0.74095	10.8833 ±0.5943	10.8833 ±1.4972 (-8.824) -0.440	11.513 ±0.58711 (-5.9421) -1.325	10.84 ±1.103 (0.3978) 0.82627
Hepato Pancreas	8.40 ±0.9	7.28 ±0.700 (13.33) 7.701	6.24 ±0.93 (25.714) 2.8908	9.2 ±0.9300 (9.090) +1.3432	8.81 ±0.5458	7.9166 ±0.5697 (10.415) 2.02770	6.8433 ±1.50878 (22.587) 2.0270	9.15 ±0.97015 (-3.5062) -3.1369
Gonad	9.12 ±0.25	9.22 ±1.12 (-1.31868) -0.7150	8.28 ±0.76 (9.0198) 1.8185	10.2366 ±1.3510	10.85 ±0.5884 (-6.0606) 0.895227	10.2 ±0.98015 (0.29325) 0.04446	10.2033 ±0.9890056 (0.26099) 0.19605	10.2033 ±0.9890056 (0.26099) 0.19605
Gill	3.1 ±0.3	2.25 ±0.5339 (27.4193) 2.4039	2.30 ±0.53 (25.8064) 2.2752	3.10 ±0.15 (0) 0	3.5 ±0.3464	2.96 ±0.49 (-15.5862) 1.55862	3.24 ±0.4435 (7.4285) 0.80157	3.81 ±8.5714

Table 2. Effect of Environment on the Lipid content of *Lamelliderns marginalis*, during Monsoon Season. (Bracket Values represent percentage differences)

On 1st					On 15th			
	Control	Ist	IInd	IIIrd	Control	Ist	IInd	IIIrd
Mantle	10.22 ±0.4	12.2 ±0.22 (-19.375) -7.523	12.98 ±1.81 (-27.0058) -2.578	10.25 ±0.4 (-0.2935) -029939	10.6761 ±0.7001	12.85 ±0.5919 (-20.409) -4.195	12.40 ±10.7252 (-16.225) -2988	10.6633 ±0.87386 (0.11989) 82612
Hepato Pancreas	11.26 ±0.44	10.12 ±0.92 (13.574) 1.93671	12.40 ±0.5715 (6.1518) -273490	10.20 ±0.25311 (39.92) -20043	11.6966 ±0.4800	9.6366 ±0.3992 (17.61436) 5.78467	11.4566 ±0.922 (2.0242) 0.39490	10.89 ±03637 (-9.43531) -3.31346
Gonad	15.83 ±0.56	13.43 ±0.885 (-13.574) 3.3413	14.34 ±0.36 (6.1518) 2.4456	9.18 ±0.37 (39.9214)	14.60 ±0.4972	14.2533 ±0.96027 (2.39671) 1.033413	15.19 ±1.00 (-40117) 0.905600)	9.606 ±0.69787 (34.21624) -1.7730
Gill	4.2 ±0.4	3.1 ±0.3 (26.1906) -3.1141	3.2 ±0.7 (23.8095) -2.1483	3.4 ±0.9 (19.047) -0.2247	4.0 ±0.4	3.5 ±0.2 (12.5) 1.93648	3.5 ±0.3 (12.5) 1.93648	3.6 ±0.11 (10) -7.8087

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significantly by 25.71 % (6.24 ±0.93) , there was 9.09 % decreased in content compared to control group (non-significant) . In Monsoon also the content showed significant decreased trend in both the Ist & IInd. In I*st* the content increased by 13.50 % (12.30 ±0.4) and in 0.2ppy by 5.41 % (13.45 ±0.7) compared to control. Thus there was 21.09 % increase in the content in I st set (14.25 ±1.75). In winter also the content significantly decreased in both compared to control. In Ist set there was 13.57 % (10.12 ±0.92) and in IInd set 6.15 A% (12.40 ±0.57) decrease in content giving 39.92 % (10.20 ±0.25). On 15th day the Lipid content in Hepatopancreas, in summer decreased in both the group compared to control. In 0.1ppm it decreased (non-significant)by 10.44 % (7.91 ±0.56) and in IIind significantly by 22.58 A% (6.84 ±1.50), there was 3.50 % decreased in content of IIIrd compared to control group (non-significant). In monsoon also the content showed significant decreased trend in both the the content increase by 9.87 %A (12.49 ±0.97) and in II set by 11.31 % (15.41 ±0.70) compared to control. Thus there was 5.36 % increased in the content in IIIrd (13.10 ±0.84). In winter also the content significantly decreased in both compared to control. In ist set there was 17.61 % (9.63 ±0.39) and in 0.2ppm 2.02 % (11.45 ±0.92) decrease in content giving 9.43 % (10.89 ±0.36) .

Table 3. Effect of Environment on theLipid content of *Lamelliderns marginalis*, during Monsoon Season. (Bracket Values represent percentage differences)

On 1st					**On 15th**			
	Control	Ist	IInd	IIIrd	Control	Ist	IInd	IIIrd
Mantle	13.10 ±1.05	12.45 ±1.245 (-31.5934) 5.82322	13.9433 ±1.6460 (23.3884) -2.578	14.45 ±1.38 (20.6044) -0.74095	13.4 ±1.132	14.1776 ±0.8630 (-57955) 0.5827	13.786 ±0.5398 (-2.88059) -2.9763	14.706 ±1.0250 (-974826) 0.82627
Hepato Pancreas	14.22 ±0.6	12.30 ±0.4 (13.502) 4.61167	13.45 ±0.7 (5.4149) -2.7376	14.25 ±1.75 (-0.2109) -3.66621	13.85 ±1.6139	12.49 ±0.9727 (9.8794) 0.98445	15.4166 ±0.7015 (-11.3119) 39434	13.1066 ±0.8457 (5.3675) 31394
Gonad	16.22 ±0.92	14.20 ±0.5 (12.45) 3.3413	15.20 ±0.47 (2.44560) 6.288	13.48 ±0.56 (-2.0430) 16.8917	16.21 ±1.01	15.32 ±0.5631 (4.2560) 1.0330	16.1860 ±1.0052 (0.14435) -0.90991	13.22 ±0.9951 (18.4454) -2.1322
Gill	2.22 ±0.42	3.00 ±0.2 (-35.135) 2.9041884	2.9 ±1.73 (-30.630) 2.148335	2.5 ±0.67 (-12.6/12) 0.227485	2.773 ±0.563	2.153 ±0.1418 (-85.719) -1.78922	2.93 ±0.8265 (-5.6617) 1.73204	1.9266 ±0.6621 (30.4002) 1.604832

In the present study the lipid content on 1st day in Gonad, it is decreased in summer in both the groups compared to control. In Ist it decreased in both the groups compared to control. In Ist it decreased (non-significant) by 1.31 % (9.22 ±1.12) and in 0.2ppm significantly by 9.01 % (8.28 ±0.76) , there was 21.9 % decreased in content of IIIrd set compared to control group (non-significant). In monsoon also the content showed significant decreased trend in both the 0.ppm & Ist. in the content increased by 12.45 % (14.20 ±0.5) and in IInd by 2.44 % (15.20 ±0.47) compared to control. Thus there was 2.04% increase in content in 0.5ppm (13.48 +- 0.6). in winter also the content significantly decreased in both Ist & II nd compared to control. In Ist there was 13.57 % (13.43 ±0.88) and in IInd 6.15 % (14.34 ± 0.36 decrease in content giving 39.92 % (9.18±0.37). On 15th day the Lipid content in Gonad, in summer decreased in both the groups compared to control. In Ist decreased (non-significant) by 6.06 % (10.85 ±0.58) and in IInd significantly by 2.93 % (10.2 ±0.98), there was 26.09 % decreased in content IIIrd compared to control group (non-significant). In monsoon also the content showed significant decreased trend in both the. In Ist content increased by 4.25 % (15.32 ±0.56) and in IInd content increased by 4.25 % (15.32 ±0.56) and in 0.2ppm by 1.44 % (16.18 ±1.00) compared to control. Thus there was 18.44 % increased in the content in IIIrd (13.22 ±0.99). In winter also the content significantly decreased in both compared to control. In 0.1ppm there was 2.39 %(14.25 ±0.96) and in 0.2ppm 40.11 % (15.19 ±1.00) decrease in content giving 34.21 % ± 0.69).

On 1st Day the Lipid content in Gill, in summer decreased in both the groups compared to control. In Ist it decreased (non-significant) by 27.41 %(2.25 ±0.53) and in II nd by 25.80 % (2.30 ±0.53) , there was 0 % decreased in content of

0.5ppm compared to control group(non-significant). In Monsoon also the content showed significant decreased trend in both the by 30.63 % (2.9 ±1.73) compared to control. Thus there was 12.60 % increase in the content in IIIrd (205 ±0.67). In winter also the content significantly decreased in both 0.1ppm & 0.2ppm compared to control. In Ist there was 26.19 % (3.1 ±0.3) and in 0.2ppm 23.80 % (3.2 ±0.7) decrease in content giving 19.01 % (3.4 +-0.9). On 15th day the Lipid content in Gill, in summer decreased in both the groups compared to control. In Ist it decreased (non-significant) by 15.58 % (2.96 ±0.49) and in 0.2ppm significantly by 7.42 %(3.24 ±0.44), there was 10.5 % decreased in content of IIIrd compared to control groups (non-significant). In monsoon also the content showed significant decreased trend in both the. In Ist content increased by 85.71 % (2.15 +0.14) and in IInd set 5.66 % (2.93 ±0.82) compared to control. Thus there was 30.40 % increase in the content significantly decreased in both I & II compared to control. In Ist there was 12.5 %(3.5 ±0.29) and in IInd 12.5 % (3.5 ±0.2) decrease in content giving 10.0 % (3. ±0.11). In the present investigation the effect of homeopathic drugs on content of lipid in hepatopnacrease lipid content was high in summer and monsoon and low in winter. Similar observation were made by Sastry (1970), Sastry and Blake (1971), Kukkarni, *et.al.,* (2005), Vedpathak et.al. (1987) and Mane and Talikhedkar (1976).

CONCLUSION

In the present investigation the bio-chemical analysis were made for lipid content in different soft body parts like from mantle, hepato-pancreases, gonad and gill due to the effect of environment is occur in lipid in winter increases in caused due to decreased during summer than monsoon and winter.

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