iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** V **Month of publication:** May 2021

DOI: https://doi.org/10.22214/ijraset.2021.34327

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue V May 2021- Available at www.ijraset.com

Short-Term Assessment on the Species Composition of Marine Molluscan Fauna in Dharmadam Island, Kannur District, Kerala

Shilpa, P[1], J. Roopavathy[2]
[1]*M.Sc. Student, PG and Research Department of Zoology, Nirmala College for Women, Coimbatore-641 018, Tamil Nadu, India.*
[2]*Assistant Professor, PG and Research Department of Zoology, Nirmala College for Women, Coimbatore-641 018, Tamil Nadu, India*

***Abstract:** A survey on the species composition of molluscan fauna occurring in Dharmadam Island, Kannur District of Kerala, Southwest coast of India was attempted. A total of 50 species belonging to 13 orders and 28 families were recorded. Among these, Class Gastropoda represents 7 orders and 17 families whereas the Bivalvia represents with 6 orders and 11 families. Among the Gastropoda, order Neogastropoda recorded to be the largest order that holds 10 species belongs to 5 families such as Muricidae, Nassariidae, Olividae, Babyloniidae and Clavutulidae. The least number of gastropod species were recorded with order Lepetellida and Cycloneritida. In case of class Bivalvia the order Venerida holds 11 species and it is the largest order that contributes more bivalves from the study area. It belongs to 3 families such as Veneridae, Mactridae and Cyrenidae. The least number of bivalve species were recorded in family Mytilida and Ostreida.*
***Keywords:** Gastropoda, Babyloniidae, Cyrenidae, Veneridae, Mactridae, Ostreida.*

I. INTRODUCTION

Molluscans are the second largest phylum next to Arthropoda with estimates of 80,000-1,00,000 described species [1]. These animals are soft bodied and are extremely diversified in shape and colour. Among molluscs, the two major classes are Gastropoda and Bivalvia. Molluscs play a significant role in the ecosystem functions related to degradation of organic detritus as they consume living and decaying algae and plant materials [2, 3]. The gastropods as grazers can control ephiphyton and algal blooms [4, 5] whereas bivalves as filter feeders can help purify silted marine waters [6].

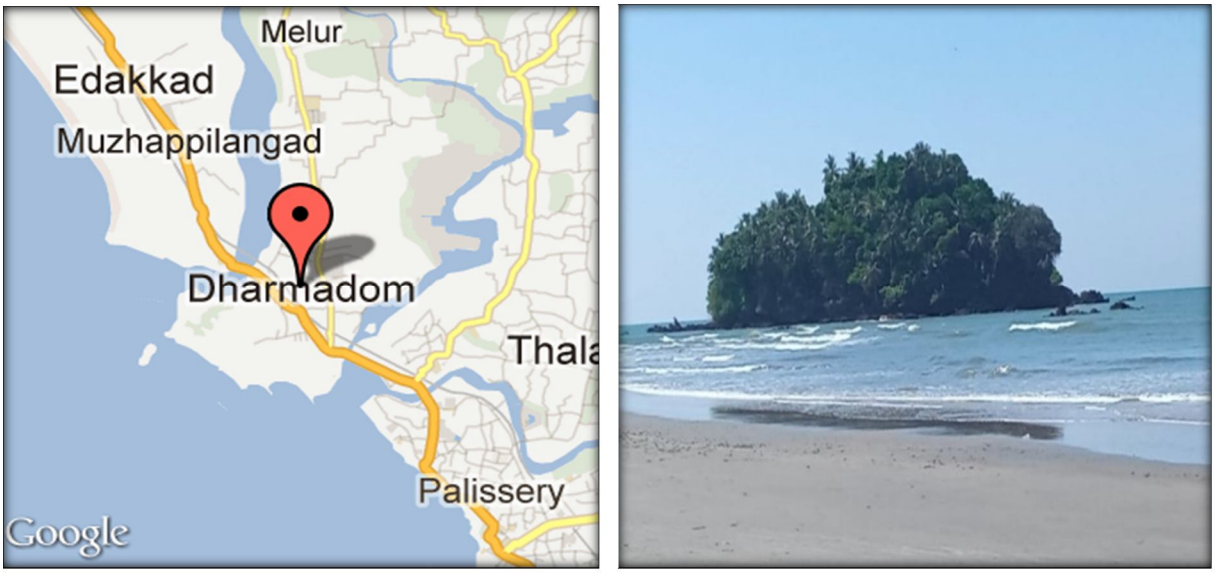
Molluscs have been broadly grouped under three categories including epifauna (living on mud or surface area of the land), infauna (burying themselves in the mud), arboreal (attached to stems and roots of the vegetation) and some live in overlapping habitats [7, 8, 9]. They occur in various habitats such as marine, brackish and freshwater as well as terrestrial. However, they are abundant in water bodies and perform a significant role in maintaining the aquatic ecosystems. They live in diverse habitats of sea environments including the mangroves, sandy shores, coral reefs, rocky beaches and sea grasses [10]. Molluscs occupy almost all levels of the food web as predators, herbivores, detritus and filter feeders [11]. Mollusc remains the valuable fishery resource along the coasts of India. These are essential for the sustenance of nature and used for edible purpose, ornaments, poultry and fish feed, for lime and pharmaceutical industry, etc. [12]. The present study is aimed to investigate the species composition of molluscan fauna in Dharmadam Island, Kannur district, Kerala.

II. MATERIALS AND METHODS

A. Study Area

Dharmadam Island also called as Green land (Latitude 11^0 46'35"N; Longitude 75^0 27' 23"E,) is a small 2- hectare private Island in Thalassery, Kannur District, Kerala. It is about 100 meters from the main land at Dharmadam. It is known earlier as Dharmapattanam. Dharmadan is located 4 km from the town of Thalassery. This stunning island is covered with a canopy of coconut palms and dense bushes, surrounded by rivers on three sides and the sea on the other. Dharmadam Island can be seen from the Muzhappilangad beach, from which permitted people can walk out to the island during low tide. The place gives a brilliant view of the confluence of the Anjarakandy and Thalassery rivers. In 1998, the Kerala Government took over this land for tourism development. The study was carried out for a period of 5 months from November 2020 to March 2021, to assess maximum molluscan species composition of selected region.

©IJRASET: All Rights are Reserved



B. Sample Collection

The study was under taken at low tide periods in clean weather and relatively calm sea conditions between November 2020 and March 2021. The regions of island were visited twice in a month. 2-3 hour search was conducted during each visit and a species list of Molluscan fauna were generated for every survey. Molluscan shells were easily collected by simple hand picking method, with the help of forceps and containers. The collected specimens were washed in water to remove mud and sand without damaging or altering the color of the shell. They are then dried. The dried specimens were stored in a clean dry bottle. The collected specimens were brought to the laboratory for identification. Variable species of Mollusca were identified from the selected area. Graph and Pie diagram was drawn on the basis of species richness.

C. Identification of Mollusca

The photographs of collected specimen were taken by using Camera (Canon 50D and Poco X2 mobile phone). The collected molluscan fauna was identified up to the lowest taxon possible with taxonomic keys and further confirmed by subject experts (Dr. Ravinesh R, Postdoctoral fellow, Department of Aquatic Biology and Fisheries, University of Kerala and Dr. Prasad B.O, Assistant Professor and Head of the Department of Zoology, Sree Narayana College, Kannur, Kerala). The bivalves were mainly identified based on the shell morphology, hinge, interlocking dentition etc., and the gastropods on the shape, size and spire length [13, 14, 15]. The validity of species names was also reviewed from the World Register of Marine Species (WoRMS) [16] database. A hand lens was used for observing shells. Details such as scientific name, common name, family, order, class and other relevant data were recorded.

III. RESULTS

During the study period totally 50 species of molluscs were recorded from Dharmadam Island, Kannur district, Kerala. They belongs to 1 phylum, 2 classes, 13 orders and 28 families. Among the different orders recorded, Venerida reported the maximum percentage composition with 22% followed by Neogastropoda (20%), Cardiida (14%), Littorinimorpha (8%), Caenogastropoda (8%), Trochida (6%), Arcida (6%), Seguenziida (4%), Pectinida (4%), Lepetellida (2%), Cycloneritida (2%), Mytiloida (2%) and Ostreida (2%)

A. Classification Based on Order

1) *Class: Gastropoda:* Class Gastropoda holds 7 orders and 17 families. Of all the gastropods which were identified, 10 are Neogastropoda (40%), 4 Littorinimorpha (16%), 4 Caenogastropoda (16%), 3 Trochida (12%), 2 Seguenziida (8%), 1 Lepetellida (4%) and 1 Cycloneritida (4%).
2) *Class: Bivalvia:* Class Bivalvia holds 6 orders and 11 families. Of all the bivalves which were identified, 11 are Venerida (44%), 7 Cardiida (28%), 3 Arcida (12%), 2 Pectinida (8%), 1 Mytililida (4%) and 1 Ostreida (4%).

©IJRASET: All Rights are Reserved

Table 1: Molluscan fauna belongs to class Gastropoda

Sl. No.	Common Name	Scientific Name	Class	Order	Family
1	Rock snail	*Purpura bufo*	Gastropoda	Neogastropoda	Muricidae
2	Carinate rock shell	*Indothais lacera*	Gastropoda	Neogastropoda	Muricidae
3	Murex snail	*Indothais blanfordi*	Gastropoda	Neogastropoda	Muricidae
4	Contracted rock shell	*Ergalatax contracta*	Gastropoda	Neogastropoda	Muricidae
5	Carbonnier's murex	*Murex carbonnieri*	Gastropoda	Neogastropoda	Muricidae
6	Rock shell	*Semiricinula tissoti*	Gastropoda	Neogastropoda	Muricidae
7	Dog whelk	*Bullia melanoides*	Gastropoda	Neogastropoda	Nassariidae
8	Gibbous olive	*Agaronia gibbosa*	Gastropoda	Neogastropoda	Olividae
9	Spiral babylon	*Babylonia spirata*	Gastropoda	Neogastropoda	Babyloniidae
10	Java turrid	*Turricula javana*	Gastropoda	Neogastropoda	Clavatulidae
11	Indian tibia	*Tibia curta*	Gastropoda	Littorinimorpha	Rostellariidae
12	Cowries	*Mauritia sp.*	Gastropoda	Littorinimorpha	Cypraeidae
13	Unknown	*Naria sp.*	Gastropoda	Littorinimorpha	Cypraeidae
14	Tuberculara gyre triton	*Gyrineum natator*	Gastropoda	Littorinimorpha	Cymatiidae
15	Turret shell	*Turritella attenuata*	Gastropoda	Caenogastropoda	Turritellidae
16	Screw shell	*Turritella acutangula*	Gastropoda	Caenogastropoda	Turritellidae
17	Spotted tun	*Tonna dolium*	Gastropoda	Caenogastropoda	Tonnidae
18	Sulcate planaxis	*Planaxis sulcatus*	Gastropoda	Caenogastropoda	Planaxidae
19	Radiate top shell	*Trochus radiatus*	Gastropoda	Trochida	Trochidae
20	The ribbed turban	*Turbo intercostalis*	Gastropoda	Trochida	Turbinidae
21	Brown turban	*Turbo bruneus*	Gastropoda	Trochida	Turbinidae
22	Four- keeled margarite	*Euchelus asper*	Gastropoda	Seguenziida	Chilodontaidae
23	Rayed wheel limpet	*Cellana radiata*	Gastropoda	Seguenziida	Nacellidae
24	Keyhole limpet	*Diodora aspera*	Gastropoda	Lepetellida	Fissurellidae
25	Unknown	*Neripteron sp.*	Gastropoda	Cycloneritida	Neritidae

Table 2: Molluscan fauna belongs to class Bivalvia

Sl. No.	Common Name	Scientific Name	Class	Order	Family
1	Forked divaricatum	*Gafrarium divaricatum*	Bivalvia	Venerida	Veneridae
2	Unknown	*Marcia recens*	Bivalvia	Venerida	Veneridae
3	Fertile venus	*Marcia opima*	Bivalvia	Venerida	Veneridae
4	Unknown	*Timoclea cochinensis*	Bivalvia	Venerida	Veneridae
5	Unknown	*Meretrix aurora*	Bivalvia	Venerida	Veneridae
6	Backwater hard clam	*Meretrix casta*	Bivalvia	Venerida	Veneridae
7	Script venus	*Sunetta scripta*	Bivalvia	Venerida	Veneridae
8	Unknown	*Dosinia sp.*	Bivalvia	Venerida	Veneridae
9	Duck clam	*Mactra sp.*	Bivalvia	Venerida	Mactridae
10	Unknown	*Mactra turgida*	Bivalvia	Venerida	Mactridae
11	Indian black clam	*Villorita sp.*	Bivalvia	Venerida	Cyrenidae
12	Unknown	*Donax spiculum*	Bivalvia	Cardiida	Donacidae
13	Leather donax	*Donax scortum*	Bivalvia	Cardiida	Donacidae
14	Pacific bean donax	*Donax faba*	Bivalvia	Cardiida	Donacidae
15	Cuneate donax	*Donax cuneatus*	Bivalvia	Cardiida	Donacidae
16	Unknown	*Semele carnicolor*	Bivalvia	Cardiida	Semelidae
17	Unknown	*Semele cordiformis*	Bivalvia	Cardiida	Semelidae
18	Unknown	*Gastrana multangula*	Bivalvia	Cardiida	Tellinidae
19	Ark clam	*Cunearca sp.*	Bivalvia	Arcida	Arcidae
20	Scapharca	*Anadara indica*	Bivalvia	Arcida	Arcidae
21	Inequivalve ark	*Anadara inequivalvis*	Bivalvia	Arcida	Arcidae
22	Jingle shell	*Anomia sp.*	Bivalvia	Pectinida	Anomiidae
23	Spiny oyster	*Spondylus sp.*	Bivalvia	Pectinida	Spondylidae
24	Asian green mussel	*Perna viridis*	Bivalvia	Mytilida	Mytilidae
25	Slipper oyster	*Megallana bilineata*	Bivalvia	Ostreida	Ostreidae

©IJRASET: All Rights are Reserved

Fig. 2 Percentage composition of Molluscan orders

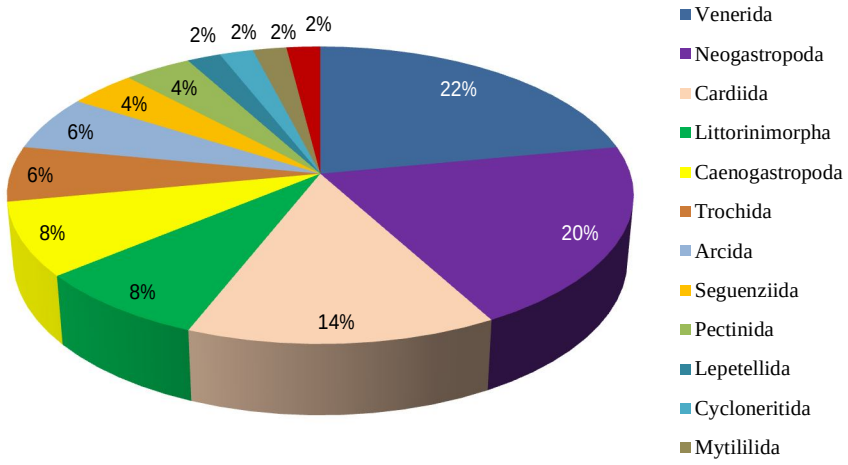


Fig. 3 Composition of Gastropod orders

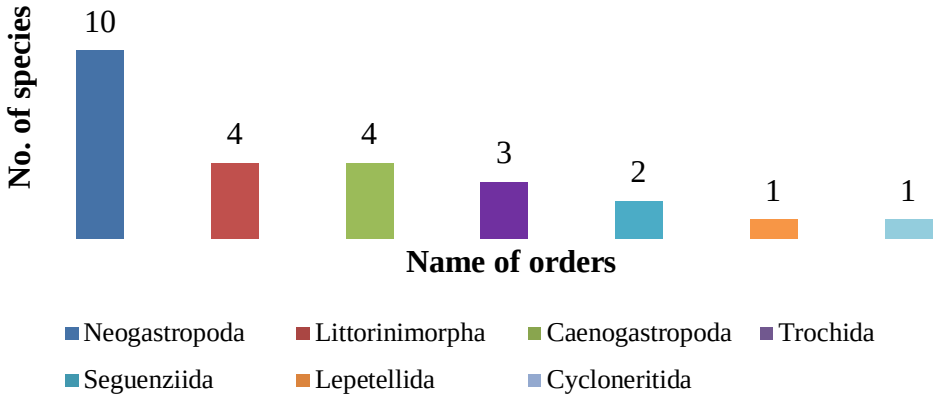
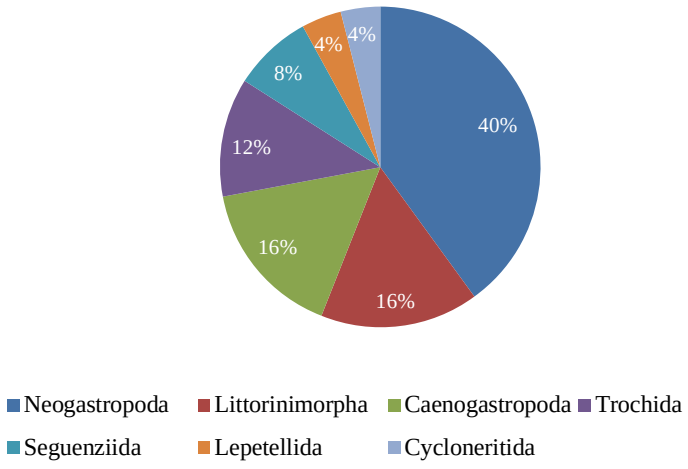


Fig. 4 Percentage of Orders in Class Gastropoda



©IJRASET: All Rights are Reserved

Fig. 5 Composition of Orders in class Bivalvia

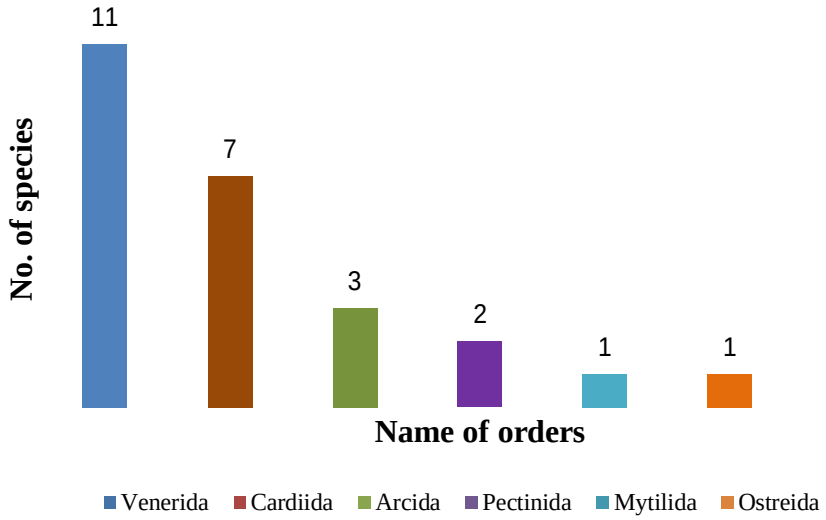
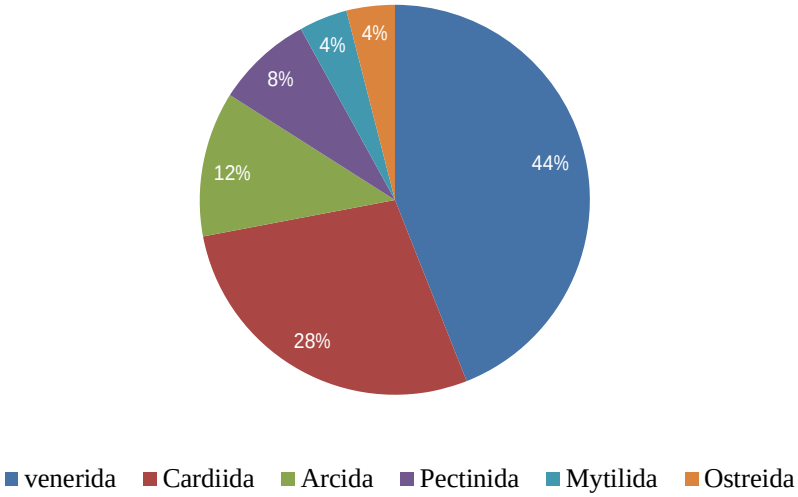


Fig. 6 Percentage of Orders in Class Bivalvia



IV. DISCUSSION

During the study period 50 species of molluscs were collected from Dharmadam Island, Kannur district, Kelara. They belongs to 1 phylum, 2 classes, 13 orders and 28 families. In the present study 25 species of gastropods belonging to 7 orders and 17 families and 25 species of bivalves belonging to 6 orders and 11 families were recorded.

Author [17] studied the biodiversity of marine mollusks along the coastal area of Thanjavur district, Tamil Nadu, India and documented 20 species of class gastropoda and 20 species of class bivalvia. Author [18] carried out a study on molluscan diversity and abundance among coastal habitats of Northern Brazil and identified a total of 30 species of bivalves and 19 species of gastropods. Author [19] recognized 17 species of molluscan fauna from Dwarka sea coast. Author [20] recorded 35 mollusc species from the coastal areas of Dwarka, Mangrol, Veraval and Kodinar. Author [21] reported a total of 44 species belonging to gastropod fauna of 17 families along the intertidal zone of ship breaking yard-Alang, Gujarat, India. Author [22] have studied the coral associated molluscan fauna of Gulf of Mannar and recorded 51 numbers of molluscan species with the predominance of gastropoda represents 34 species. Similar results have been observed in the present study.

©IJRASET: All Rights are Reserved

The present study reported 50 species of marine mollusc belonging to 25 species of each gastropods and bivalves. Less species composition of marine mollusc in the study area may be due to anthropogenic activities. Similarly, author [23] carried out a study on survey of marine mollusc diversity in the Southern Mergui Archipelago, Myanmar. A total of 279 marine macro-mollusc species were identified. Among which 181 species of gastropod belonging to 53 families, 97 species of bivalves belonging to 26 families and a single species of cephalopod were identified. Parts of the marine areas are less influenced by Man-made activities in Myanmar than in other countries in the region hence the study indicates a great marine mollusc diversity.

Authors [24] have surveyed the list of the marine molluscs of Lakshadweep, India. A comprehensive checklist of extant marine molluscs of Lakshadweep documented the presence of 768 species classified under 4 classes, 37 orders, 72 super families, 140 families and 377 genera. It consist of of 6 species Polyplacophora, 585 species of Gastropoda, 153 species of Bivalvia and 24 species of Cephalopoda. The present study on species composition of mollusc did not agree with the earlier study which might be due to short duration of low tide and limited availability of time for search.

Authors [25] have assessed the species composition of bivalves and gastropods of Tubbataha reefs natural park, Philippines. A total of 96 species including 17 species of bivalves (in seven families) and 76 species gastropods (in 29 families) were recorded. As per the results of the study gastropods are dominant over bivalves. Of these 64 species (8 bivalves and 56 gastropod species) were newly recorded. A total of 50 species belonging to the class gastropod and bivalve were collected during the course of study. 25 species of gastropods and bivalves belongs to 7 orders (17 families) and 6 orders (11 families) respectively. Both gastropods and bivalves were equally dominant in the present study, which may be due to sediment structure and physical factors.

The number of species identified in gastropods and bivalves were comparatively less in the present study. This may be due to shore morphology, tide, wind, pollution or rocky outcrops of Dharmadam seashore (study area). Sediment structure, physical factors, food resources and anthropogenic disturbances affect the water quality, beach ecosystem and food web and survival capacity of other faunal communities surviving there. Human consumption and other uses of molluscs (fish bait, shell consumptions and jewellery industry) also reduces the composition of molluscan fauna. In the absence of strict regulators and effective management to protect and conserve this area, there is a risk that the existing biodiversity will be substantially reduced. Long-term study, conservative methods and adding spat settlers may improve the molluscan diversity of Dharmadam Island. Data from the present study can be used as a baseline to further examine the marine mollusc diversity in Dharmadam Island, Kannur district of Kerala.

V. CONCLUSION

The findings of present study inferred that the Neogastropoda and Venerida under the classes such as Gastropoda and Bivalvia were found to be dominant which might be due to high reproductive potential of particular groups. The present short term study clearly indicate that the Dharmadam Island, Kannur district of Kerala was rich in molluscan diversity. Further, the long term continuous survey on molluscan diversity of the particular area is highly warranted to know the current status of biodiversity in general and molluscan fauna in particular.

VI. ACKNOWLEDGEMENT

Authors are gratefully acknowledge the Head, Department of Zoology, Principal and authorities of Nirmala College for Women (Autonomous), Coimbatore-18, Tamil Nadu, for the facility provided.

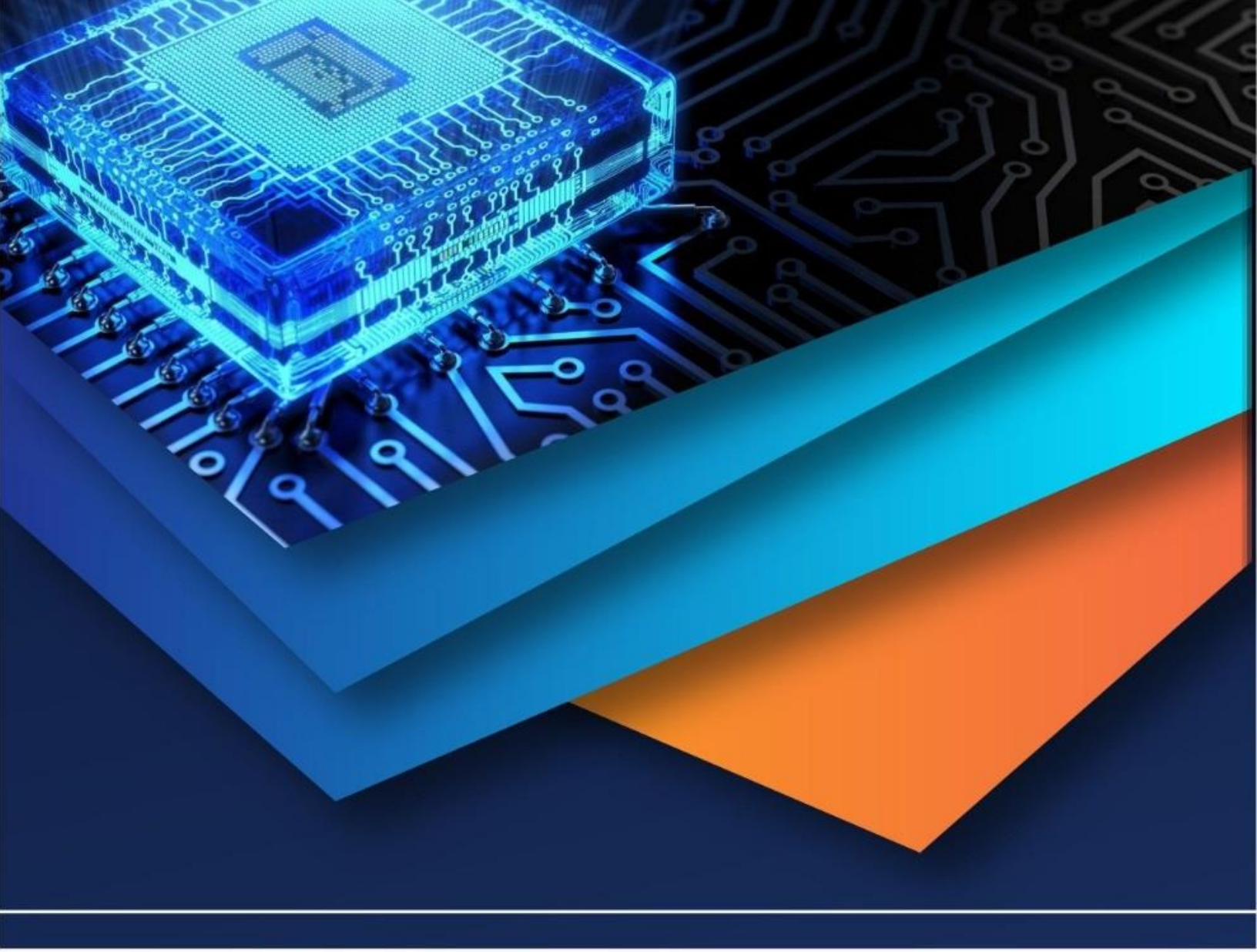
REFERENCES

[1] Ellen ES, Olivier Gargominy, Winston FP, Philippe Bouchet (2008) Global diversity of gastropods (Gastropoda; Mollusca) in freshwater. Hydrobiologica, 595: 149-166.
[2] Kelaher BD, Castilla JC, Prado L, York P, Schwindt E, Bortolus A (2007) Spatial variation in molluscan assemblages from coralline turfs of Argentinean Patagonia. Journal of Molluscan Studies, 73: 139-146.
[3] Nagelkerken I, Blaber, S. J. M., Bouillon. S., Green P., Haywood, M., and Kirton L G., Meynecke, J O, Pawlik J, Penrose HM, Sasekumar A, Somerfield PJ (2008) The habitat function of mangroves for terrestrial and marine fauna: A review. Aquatic Botany, 89: 155-185.
[4] Jenkins SR, Hartnoll RG (2001) Food supply, grazing activity and growth rate in the limpet Patella vulgate L.: A comparison between exposed and sheltered shores. Journal of Experimental Marine Biology and Ecology, 258(1): 123-139.
[5] Hily C, Connon S, Raffin C, Wyllie ES (2004) In vitro experimental assessment of the grazing pressure of two gastropods on Zostera marina L. epiphytic algae. Aquatic Botany, 78(2): 183-195.
[6] Greenberg P (2013) How mussel farming could help to clean foul waters, in Yale Environment 360. Yale School of Forestry and Environmental Studies. https://e360.yale.edu/features/how_mussel_farming_could_help_to_clean_fouled_water.
[7] Dey A (2006) Handbook on Mangrove Associate Molluscs of Sunderbans. (Eds. Director, ZSI, Kolkata), ZSI Publications, Kolkata, India.
[8] Kesavan K, Palpandi C, Shanmugam A (2009) A checklist of malacofauna of the Vellar Estuarine Mangroves, India. Journal of Threatened Taxa, 1(7): 382-384.

©IJRASET: All Rights are Reserved

[9] Shanmugam A, Vairamani S (2009) Molluscs in Mangroves: A Case Study. In Training Course on Mangroves and Biodiversity. In: Kathiresan et al., (Eds.), C.A.S. in Marine Biology, Annamalai University Publications, Parangipettai, India.
[10] Ramakrishna, Dey A (2010) Annotated Checklist of Indian Marine Molluscs (Cephalopoda, Bivalvia and Scaphopoda): Part-I. Rec. zool. Surv. India, Occ. (Published by the Director, Zool. Surv. India, Kolkata), 320: 1-357.
[11] Boominathan M, Ravikumar G, Chandran MDS, Ramachandra TV (2012) Mangrove associated molluscs of India. In: National Conference on Conservation and Management of Wetland Ecosystems, Lake, http://ces.iisc.ernet.in/energy.
[12] Jaiswar AK, Kulkarni BG (2005) Conservation of molluscan biodiversity from intertidal area of Mumbai coast. J. Natcon, 17(1): 93-105.
[13] Vannucci M (2002) Indo-west Pacific mangroves, In Lacerda L.D. (Eds.) Mangrove ecosystems, (Springer), Berlin.
[14] Apte D (1992) The Book of Indian Shells. BNHS. Oxford University Press, Oxford, England.
[15] Ramakrishna, Dey A (2003) Manual on the Identification of Scheduled molluscs from India. Director, ZSI (Eds.), Zoological Survey of India Publications, Kolkata, India.
[16] WoRMS Editorial Board. World Registration of Marine Species. Available from http://www.marinespecies.org at VLIZ.
[17] Anandaraj T, Balasubramanian U, Murugesan P, Muthuvelu S, (2012) Biodiversity of Marine Mollusks in East Coastal Area of Thanjavur District, Tamil Nadu, India. International Journal of Pharmaceutical and Biological Archives, 3(1): 131-133.
[18] Beasley, CR, Carlos M, Fernandes, Cleidson P, Gomes, Bethania A, Brito, Sonia M, Lima dos Santos, Claudia H Tagliaro (2005) Molluscan Diversity and Abundance among Coastal Habitats of Northern Brazil. ECOTROPICA, 11: 9-20.
[19] Gohil B, Poriya P, Kundu R (2011) Status of intertidal macro faunal and floral diversity of Dwarka Sea coast in prospects of some environmental factor. Bionanofrontier, 4 (2): 290-293.
[20] Bhadja P, Poriya P, Kundu R (2014) Community Structure and Distribution Pattern of Intertidal Invertebrate Macrofauna at Some Anthropogenically Influenced Coasts of Kathiawar Peninsula (India). Advances in Ecological Research, 2014: 1-11, http://dx.doi.org/10.1155/2014/547395.
[21] Baxi KD, Kundu RS, Beleem IB, Poriya PU, Gohil BM (2017) Diversity and Distribution of marine Gastropods (Mollusca) along the intertidal zone of ship breaking yard-Alang, Gujarat, India. Adv. Biores., 8(4): 51-59.
[22] Mohanraj T, Jagadis I, Sivanesh H (2011) Association of molluscan fauna with the coral reef of Gulf of Mannar. European Journal of Experimental Biology, 1(3): 44-48.
[23] Sanpanich K, Teerapong Duangdee (2018) A Survey of Marine Mollusc Diversity in the Southern Mergui Archipelago, Myanmar. Phuket Marine Biological Centre Research Bulletin, 75: 45–60.
[24] Ravinesh R, Biju Kumar A (2015) A Checklist of the Marine Molluscs of Lakshadweep, India. Journal of Aquatic Biology and Fisheries, 3: 15-55.
[25] Donald M (1980) Encyclopedia of Shells. Macdonald and Company, London and Sydney.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)