

## To study molluscan shells diversity of two fun beaches of Mumbai, Maharashtra

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### Introduction

Mumbai being a metropolitan island city and the commercial capital of India, its ever increasing population and infrastructures tend to take a toll on the environment. The beaches of Mumbai have been used extensively for the recreational and holistic purposes. The Dadar beach in Central Mumbai and Juhu beach in northwestern Mumbai are the most famous and highly visited parts of the Mumbai coast.

The constant human interference, exploitation of the marine resources and water pollution make it a prime necessity that the health of the marine ecosystem be assessed. Molluscs are an important link in the food chain and also are the most diverse of all phyla. The comparison of the 2 beaches of Mumbai by studying the Molluscan diversity will help to determine the impact of pollution to some extent. Anthropogenic interference have damaged the marine biodiversity to such extent that immediate conservation measures are required.

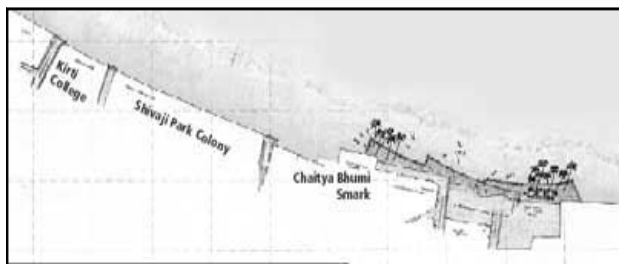
### Study location



Beach at Juhu



Beach at Dadar and sewage outlet



Location of Dadar beach



Location of Juhu

### Material and Method

The Dadar beach (19° 08' 78" N, 72° 82' 63" E) in Mumbai and Juhu beach (19° 08' 78" N, 72° 82' 63" E) in the suburban

region of Mumbai were studied to compare the Molluscan diversity for a period of one year from December 2011 to November 2012. The monthly observations were pooled season wise. The seasons are defined as follows:

December- January- February: Late Post Monsoon

March – April- May: Pre-Monsoon

June- July- August: Monsoon

September- October- November: Early Post Monsoon

The abundance of organisms were studied using a transect of 300 m and was calculated by point method wherein the organisms were rated on a scale of 1 to 10 where 10 indicated maximum abundance.

## Results and Discussions

Parameters	Late Post monsoon		Premonsoon		Monsoon		Early Post monsoon	
	Juhu	Dadar	Juhu	Dadar	Juhu	Dadar	Juhu	Dadar
Temp (°C)	24	24	25	25	24	24	24	24
pH	8.1	8	8.4	7.7	8	7.9	7.8	8.2
DO (mg/l)	4.9	3.2	4.55	3.25	5.02	3.8	5.4	4.4
Salinity ‰	32.5	30	36.03	29	29.7	28	30.1	29.4
Phosphates (mg/l)	17	6.2	17.1	0.7	14	4.2	11.2	4.7
Nitrates (mg/l)	17	21	23	8	19	15	13	16
Ammonia (mg/l)	7.1	8.5	8.8	3.7	4.2	5.8	3.4	7.3
TDS (gm/l)	18.77	19.32	24.82	25.24	25.42	26.8	17.64	20.45

The physico-chemical parameters of both the beaches didn't show much variation one another thereby justifying the similarity in the nature of water along the coast of Mumbai. The marked difference can be seen in the availability of oxygen which is lower in Dadar than in Juhu. However, the levels of oxygen are higher than the required limit of 3 mg/l to sustain life. All the remaining constituents were within the limits specified by WHO except ammonia which throughout the study period exceeds the prescribed limit of 10 mg/l. Ammonia is found in excess in these waters mainly due to the discharge of sewage in the sea.

Molluscs representing 19 genera and 14 families were found on both the coastlines. Of the recorded species, 7 were Bivalves and 12 were Gastropods. Most number of Bivalves belonged to the Cardidae family while maximum Gastropods were from Trochidae family.

**Table 1. The family- wise distribution of the molluscan diversity at both the coasts.**

Sr.no	Species	Family
<b>Bivalves</b>		
1	Arca	Arcidae
2	Cardium	Cardidae
3	Cardita antiquate	Cardidae
4	Donax	Donacidae
5	Siliquaradiata	Solenidae
6	Mactra	Mactridae
7	Pernaviridis	Mytilidae
<b>Gastropods</b>		
1	Babylonia spirata	Buccinidae
2	Cantharus	Buccinidae
3	Euchelus	Trochidae
4	Umbonium	Trochidae
5	Trochus	Trochidae
6	Murex	Muricidae
7	Nassa	Muricidae
8	Natica	Naticidae
9	Nerita	Neritidae
10	Oliva	Olividae
11	Telescopium	Potamididae
12	Turitella	Turritellidae

**Table 2. Specieswise abundance of Molluscs in Juhu and Dadar**

Sr No	Species	Late Post Monsoon		Pre Monsoon		Monsoon		Early post monsoon	
		Dadar	Juhu	Dadar	juhu	Dadar	juhu	dadar	juhu
1	Arca	2	2	1.67	1.67	0	0	2	2
2	Cardium	2	2	1	1	0	0	1	1
3	Cardita antiquata	1.33	1.67	1.33	1.33	0	0	1.33	2
4	Donax	2	2.67	1.67	1.67	0	0	2.33	2.67
5	Siliquaradiata	1	1	1	1	0	0	1	1
6	Mactra	2.33	2.67	1.67	1.67	0	0	2.67	3
7	Pernaviridis	0	0.33	0	0	0	0	0	0
8	Babylonia spirata	1	1.67	1	1	0	0	1.67	1.33

9	Cantharus	2	2	1.33	1.33	0	0	1.33	1.33
10	Euchelus	0	0	0	1	1	0	1	1
11	Murex	0.67	0.67	1	1	0	0	1	1
12	Nassa	2	2	1	1	0	0	1	1
13	Natica	2.67	2.67	1	1	0	0	0.33	0.33
14	Nerita	2.33	2.67	1.33	1.33	0	0	1.67	2
15	Oliva	1	1	1	1	1	0	1	1
16	Trochus	1.67	1.67	1.67	1.67	0	0	1.33	1.33
17	Telescopium	1	1.33	1.33	2	0	0	1.33	1.67
18	Turitella	0	0	0	0	0	0	0	0.33
19	Umbonium	4	4.67	4	4	0	0	4	4.67
	Total	26	32.66667	23	24.66667	0.66667	0	29	28.66667

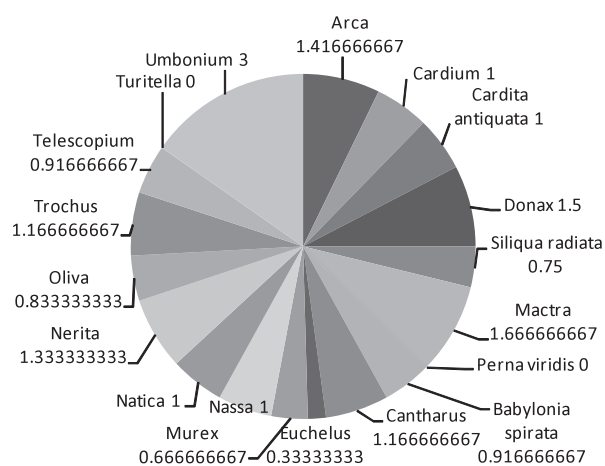


Fig.1 Representation of Molluscan diversity at Dadar coast

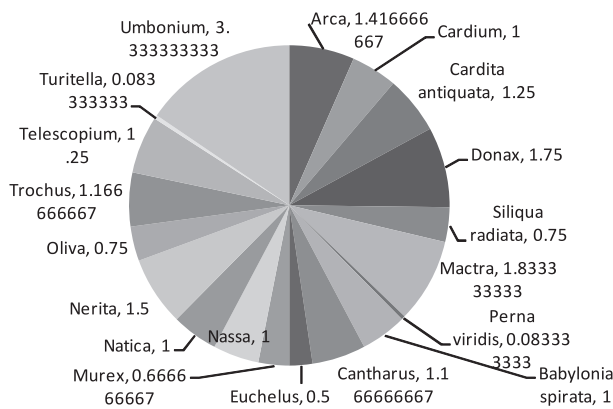


Fig.2 Representation of Molluscan Diversity at Juhu in a Pie Chart

Seasonal variations

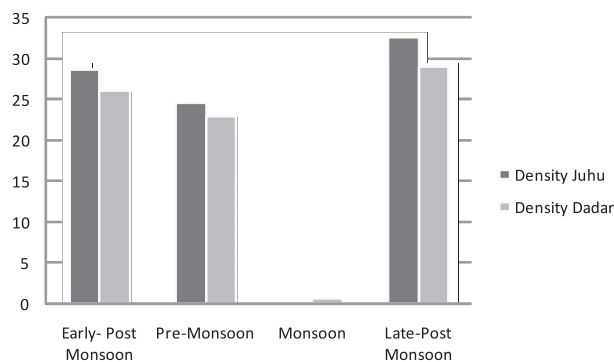


Fig. 3 Seasonal variations in the density of molluscan shells at Dadar and Juhu

The abundance of molluscs was minimal on Dadar beach and absent on Juhu beach as the shore was washed away due to the heavy rainfall in the monsoon season. The

abundance of all the molluscs was below 3 except for *Umbonium* spp. *Umbonium* spp. showed maximum abundance of 4.67. It has been already been stated that only Molluscan shells were collected as most of the organisms were empty. Only *Umbonium* spp. showed the presence of animals. The abundance of *Umbonium* spp. was common along the Mumbai Coast as the conditions there are suited for its growth and development. Also *Umbonium* spp are supposed to be the dominant organisms in the inter tidal zones on the west coast of India (Sivadas et. al, 2012).

Conclusions

The number of shells have decreased with time and most of the shells collected are in the broken form. Number of Shells having live organisms inside them was very low. The physico-chemical analysis of the sea water also shows that the water is slightly polluted and any further impact of pollution will damage the marine ecosystem thereby further hampering the abundance of molluscs.

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