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A record of live corals along the Saurashtra coast of Gujarat, Arabian Sea

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The occurrence of live corals along the Saurashtra coast of Gujarat was recorded. Five species of corals, viz. *Gorgonium* sp., *Polycyathus verrilli*, *Porites lutea*, *Tubastrea aurea* and *Turbinaria crater* were recorded from four different places along this coast. The mean numerical density of polyps comprising all species ranged from 53 to 500/m^2 and their biomass 195 to 1000 g/m^2. Among the different physico-chemical parameters of sea water analysed from the study area, the total suspended solids steadily increased from Dwarka to Mahuva. It registered 305 mg/l for the former and 763 mg/l for the latter respectively. The concentration of petroleum hydrocarbons showed higher value (23.28 μg/l) at Veraval and lower value (9.38 μg/l) at Mahuva. The primary and secondary productivities of the coastal waters from the study region were also estimated. The phytoplankton cell count ranged from 14.59×10^2/l at Mahuva to 75.8×10^2/l at Diu, whereas zooplankton numerical density varied between 7288 and 15,600/100 m^3 at Dwarka and Diu respectively. Coral-associated macrobenthic fauna from the Saurashtra coast were predominantly predatory gastropods, which may cause severe pressure to these coral communities. This study suggests the possibility for the existence of coral reefs along the sub-tidal region of this coast.

CONSIDERABLE published literature pertaining to classification, distribution and diversity of coral reefs in Gujarat waters since the turn of the twentieth century is available[1–10]. However, all these studies indicated the presence of either live or dead corals in Gujarat, restricted to the Gulf of Kachchh only. Hence the present attempt has been made as a part of the survey along the intertidal zone of Saurashtra coast of Gujarat along the open Arabian Sea. Occurrence of some species of live coral (Coelenterates) patches along certain pockets of Saurashtra coast has been recorded.

An extensive survey was carried out along the open Saurashtra coast of the Arabian Sea from Dwarka to Bhavnagar during 10–13 March 2004. Since the occurrence of some species of coral patches recorded from the intertidal region at a depth of about 2–5 m from the mean sea level of Dwarka (lat 22°14.536′ N, long 68°57.385′E), Veraval (lat 20°52.945′N, long 70°20.234′E), Diu (lat

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20°42.730′N, long 70°55.485′E) and Mahuva (lat 21°02.337′N, long 71°48.318′E), detailed study has been conducted in these areas (Figure 1). The density of coral polyps was determined by line transect intersect method by employing a 0.25 m^2 quadrant at every 10 m interval starting from 1.08 m (Dwarka), 0.21 m (Veraval), 0.25 m (Diu) and 0.14 m (Mahuva), above the zero of the chart datum to the highest high-tide mark of the intertidal belt. In order to calculate the biomass of corals, a portion of coral patches was randomly scrapped out from different colonies of each species. The density in terms of numerical abundance of polyps and biomass was expressed per m^2 area of the intertidal zone. All the coral species were identified up to species level by following standard references and published literature[8,11]. The identification of coral species was further confirmed by Mr M. I. Patel, formerly of Commissionerate of Fisheries, Government of Gujarat. The associated fauna along the vicinity of coral patches and adjoining areas was also recorded. The surface sea water samples from the overlying water column of intertidal region were collected from the aforesaid stations to assess the coastal water quality by estimating some physico-chemical parameters. Salinity, pH, total suspended solids (TSS), dissolved oxygen (DO) and biochemical oxygen demand (BOD) were estimated by the methods outlined in Strickland and Parsons[12], while micronutrients such as phosphate-phosphorous (PO_4-P), total phosphorous (TP), nitrate-nitrogen (NO_3-N), nitrite-nitrogen (NO_2-N) and total nitrogen, SiO_3 were analysed following Grasshoff *et al.*[13]. Petroleum hydrocarbons (PHCs) were also estimated using a UV–visible spectrophotometer[14].

As the corals feed on small organisms, including plankton using their nematocysts, the primary and secondary productivities of the study region were also evaluated. Phytoplankton samples were collected by filtering a known volume of sea water through 30 μ mesh net, whereas zooplankton were collected by surface haul using Heron–Tranter plankton net (300 μm mesh) for 10 min at 2 knots speed. The plankton samples were preserved in 4% formalin, identified up to species level and their numerical density and biomass were also studied. The species diversity of phytoplankton, zooplankton and corals was calculated according to the Shannon–Weiner formula,

$$H' = \sum P_i \log e p_i,$$

where P_i is the proportion of the ith species in the collection and H' is the diversity of a theoretically infinite population. The species similarity index between stations was calculated using the formula[15],

$$S = (2C/a + b) \times 100,$$

where C is the number of species common at any two stations, a is the number of species at one station and b the number of species at the other station.

The present observation on the occurrence of live corals along Saurashtra coast of Gujarat during March 2004, recorded five species of live corals from the intertidal region at four places along the coast. Among them, three species (*Porites lutea*, *Tubastrea aurea* and *Turbinaria crater*) were recorded from Dwarka, one (*Tubastrea aurea*) from both Veraval and Diu, while two species

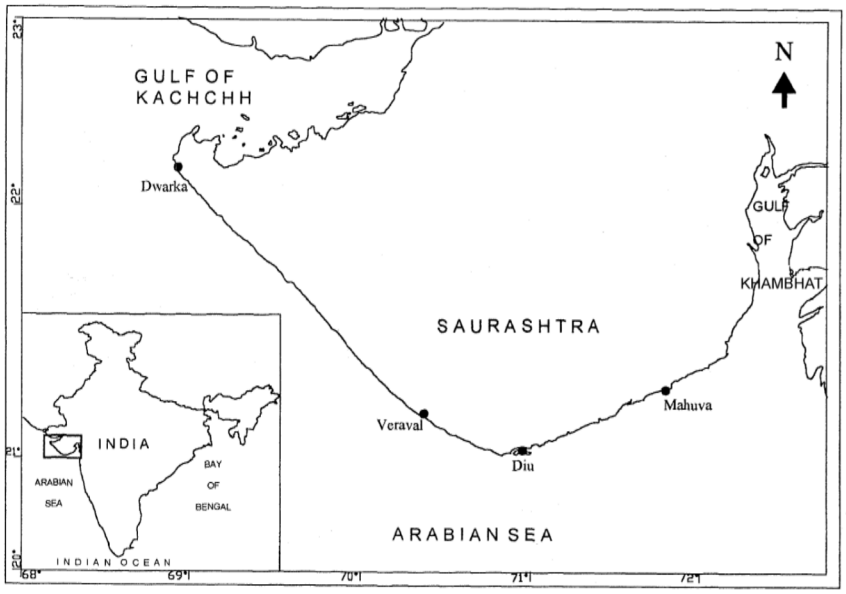

Figure 1. Map showing the study area.

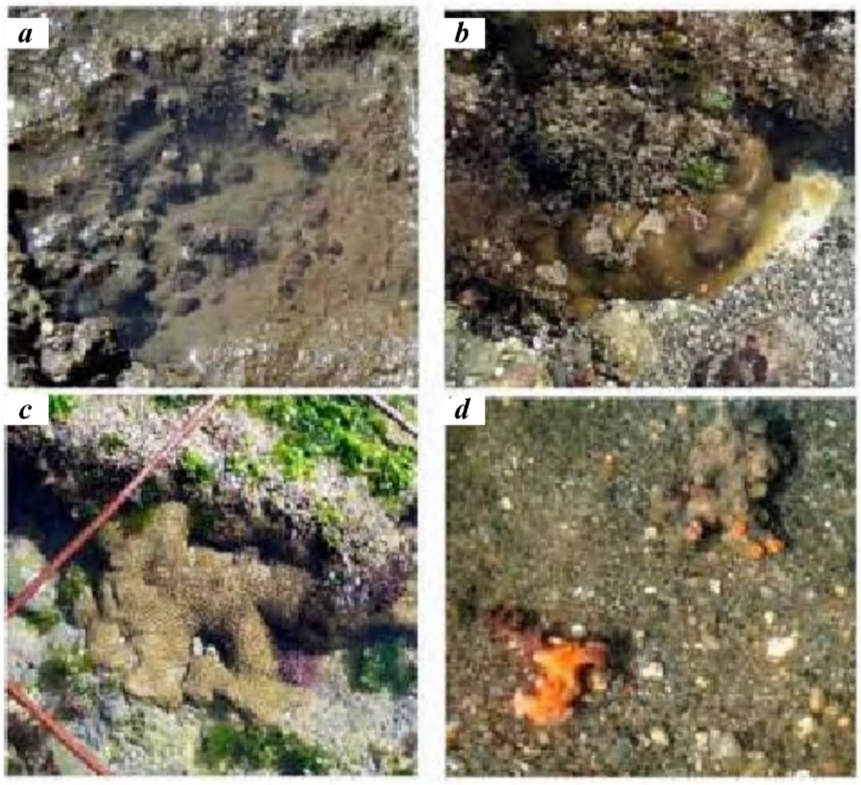

Figure 2. Live corals along Saurashtra coast. ***a***. *Polycyathus verrilli* at Mahuva; ***b***, ***c***, *Porites lutea* and *Turbinaria crater* at Dwarka; and ***d***, *Tubastrea aurea* at Veraval.

(*Polycyathus verrilli* and a *Gorgonium* sp.) were observed at Mahuva (Figure 2). However, all these coral species have a patchy distribution along the rocky intertidal coast at all the places of study. The entire intertidal zone is covered by milliolitic limestone. The occurrence of these corals in the intertidal zone is restricted between infra-littoral and mid-littoral zones. Species like *T. aurea*, *T. crater* and *P. lutea* were always encountered only in rock pools with the existence of water during low tide. *T. aurea* is the only species which occurred at all the places of study except Mahuva. Incidentally, this is a species of ahermatypic or non-reef building coral.

The numerical abundance of coral polyps and their biomass and species diversity at every 10 m interval starting from the low-tide mark to the highest high-tide mark at different places is depicted in Table 1. The mean numerical density of polyps comprising all species recorded and their biomass ranged from 52.73 to 500.00/m^2 and 194.91 to 1100.00 g/m^2 respectively. However, species diversity showed a maximum (0.45) at Dwarka and a minimum (0.00) at the remaining stations.

Results for the physico-chemical features of sea water collected from coral-inhabited regions are presented in Table 2. A scrutiny of the results indicated that except TSS, no significant variation on the physico-chemical properties of sea water could be noted at different stations. The sea water temperature ranged between 28.0 (Diu) and 30°C (Veraval), while salinity varied from 32.68 to 36.92‰ at Mahuva and Dwarka respectively. However, pH did not show any significant trend of variation among the stations. TSS in sea water steadily increased from Dwarka (305 mg/l) to Mahuva (763 mg/l). DO was above 5.16 mg/l at all the stations, whereas BOD showed a low value (0.37 mg/l) at Dwarka. NO_2-N recorded a minimum (0.001 mg/l) at both Dwarka and Mahuva and a maximum (0.002 mg/l) at both Veraval and Diu. NO_3-N increased from Dwarka (0.078 mg/l) to Mahuva (0.228 mg/l). The composition of phosphorous species such as PO_4-P, TP and organic phosphorous (Org-P) was high at Diu and low at Dwarka, Org-P which was minimum at Mahuva. High Org-P at Dwarka and Veraval could be due to anthropogenic influence. The values of silicates ranged between 5.86 and 9.89 µg/l at Diu and Dwarka respectively. The concentration of PHCs was also estimated from sea water. It showed a high value (23.28 µg/l) at Veraval and a low value (9.38 µg/l) at Mahuva, because of more fishing trawler movements. Veraval harbour was originally designed for 1200 fishing trawlers, but now it accommodates over 3500 trawlers. Suffering from capacity overutilization of 300% with concomitant problems of over-

Table 1. Density of live coral species at different places along the Saurashtra coast

Distance (m)*	Species	Dwarka			Veraval			Diu			Mahuva		
		Polyp (no./m^2)	Biomass (g/m^2)	Species diversity	Polyp (no./m^2)	Biomass (g/m^2)	Species diversity	Polyp (no./m^2)	Biomass (g/m^2)	Species diversity	Polyp (no./m^2)	Biomass (g/m^2)	Species diversity
0	*Gorgonium* sp.										16	48	
	Tubastrea aurea	20	40										
	Turbinaria crater	24	72					200	600				
	Total	44	112	0.99				200	600	0	16	48	0
10	*T. aurea*							800	1600				
	T. crater	208	424										
	Polycyathus verrilli										120	360	
	Total	208	424	0.00				800	1600	0	120	360	0
20	*Porites lutea*	160	180										
	T. aurea				36	72							
	T. crater	40	80										
	P. verrilli										280	1120	
	Total	200	260	0.72	36	72	0				280	1120	0
30	*P. verrilli*										64	320	
	T. crater	40	80										
	Total	40	80	0.00							64	320	0
40	*P. lutea*	800	1000										
	P. verrilli										40	120	
	T. aurea				420	840							
	T .crater	100	200										
	Total	900	1200	0.50	420	840	0				40	120	0
60	*P. lutea*	20	40										
	P. verrilli										12	48	
	T. aurea	8	16										
	Total	28	56	0.86							12	48	0
70	*P. lutea*	40	40										
	P. verrilli										20	60	
	Total	40	40	0.00							20	60	0
80	*P. verrilli*										8	16	
	T. aurea	80	120										
	T. crater	80	80										
	Total	160	200	1.00							8	16	0
90	*P. verrilli*										4	8	
	T. crater	80	160										
	Total	80	160	0.00							4	8	0
100	*P. verrilli*										4	8	
	Total										4	8	0
120	*P. verrilli*										12	36	
	Total										12	36	0
Transect mean		188.89	281.33	0.45	228.00	456.00	0.00	500.00	1100.00	0.00	52.73	194.91	0.00
Intertidal exposure during the study (m)			115			75			55			220	

*Distance from low-tide mark to highest high-tide mark.

crowding and pollution, it is said to be the most polluted water body along the Gujarat coast. Corals are, however, thriving south of the fishing harbour on a rocky coast.

The qualitative and quantitative estimation of phytoplankton collected from the coastal waters of study area is shown in Table 3. A total of 42 species of phytoplankton belonging to 37 genera were recorded during the study period at different stations along Saurashtra coast. Total cell count of phytoplankton encountered was high (75.8×10^2/l) at Diu and low (14.59×10^2/l) at Mahuva. The total number of species was maximum (22) at Diu and minimum (11) at Dwarka. Most of the species of phytoplankton were restricted to a particular station of the study. However, *Coscinodiscus eccentricus*, *Coscinodiscus ooculus iridis*, *Nitzschia sigma*, *Thalassiothrix ntizschioides* were the dominant species at these stations. The species diversity of phytoplankton ranged from 2.99 at Dwarka to 3.77 at Veraval, while chlorophyll *a* (phaeophytin) varied between 0.15 (0.14) and 1.35 mg/m^3 (1.90 mg/m^3) at the same stations respectively.

Results of the study made for zooplankton at different stations are presented in Tables 4 and 5. Twenty-eight species of zooplankton belonging to 12 groups were recorded from different stations. However, the total number of groups and species between stations ranged from 3 (Veraval) to 8 (Diu) and from 9 (Dwarka) to 21 (Diu) respectively. Among zooplankton, Foraminiferans were the dominant group at all the stations as their composition ranged from 67.95 to 95.65%. Appendicularians, Chaetognaths and Salpids were noticed only at Mahuva, while fish eggs were found only at Veraval. The biomass of zooplankton in terms of fresh weight, dry weight and volume recorded minimum values of 1712 mg/100 m^3, 560 mg/100 m^3 and 5.1 ml/100 m^3 at Dwarka and maximum values of 2750 mg/100 m^3, 861 mg/100 m^3 and 8.1 ml/100 m^3 at Diu. The numerical density also followed the similar trend as mentioned for biomass, it ranged from 7288 to 15,600/100 m^3.

Table 2. Physico-chemical parameters of sea water collected from different stations along Saurashtra coast

Parameter	Dwarka	Veraval	Diu	Mahuva
Temperature (°C)	28.0	30.0	28.0	28.5
Salinity (ppt)	36.92	34.09	35.11	32.68
pH	8.58	8.85	8.61	8.55
TSS (mg l^{-1})	305	333	504	763
DO (mg l^{-1})	5.97	5.16	6.70	6.44
BOD (mg l^{-1})	0.37	2.44	2.04	1.76
NO_2-N (mg l^{-1})	0.001	0.002	0.002	0.001
NO_3-N (mg l^{-1})	0.078	0.086	0.138	0.228
PO_4-P (mg l^{-1})	0.010	0.021	0.141	0.030
TP (mg l^{-1})	0.046	0.058	0.230	0.050
Org-P (mg l^{-1})	0.035	0.037	0.089	0.020
SiO_3 (µg l^{-1})	9.89	6.96	5.86	8.46
PHC (µg l^{-1})	17.96	23.28	16.42	9.38

Among zooplankton species encountered in the present study, 18 species were represented by Foraminiferans, while six belonged to Copepods. It is to be noted that *Globigerinoides ruber* was the only species distributed at all the stations. The species diversity of zooplankton also showed higher value (1.53) at Diu and lower value (0.65) at Veraval (Table 5).

Table 3. Qualitative and quantitative estimation of phytoplankton, chlorophyll *a* and phaeophytin at different stations along the Saurashtra coast

	Dwarka	Veraval	Diu	Mahuva
Species	Cell count (no. × 10^2/l)			
Actinastrum hantzchii	–	0.44	–	–
Actinotychus undulatus	–	3.09	2.80	0.29
Amphora lineolata	–	–	3.20	1.14
Asteronella japonica	–	–	3.20	–
Auliscus sculptus	–	–	–	0.57
Bacillaria paradoxa	–	–	17.60	–
Bellerochea malleus	–	–	2.00	–
Biddulphia heteroceros	–	0.88	–	–
Campylodiscus iyengarii	1.56	3.54	–	–
Ceratium furca	–	0.44	–	–
Climacosphenia moniligera	5.20	10.17	–	–
Closterium sp.	0.52	–	0.40	–
Coelosphaericum kuetzingianum	–	–	1.20	–
Coscinodiscus eccentricus	1.04	–	8.00	2.00
Coscinodiscus jonesianus	–	–	0.40	–
Coscinodiscus oculus iridis	–	2.21	3.20	0.86
Coscinodiscus sp.	–	2.65	–	1.72
Cyclotella stelligera	0.52	–	–	–
Diatoma anceps	–	–	1.20	–
Diploneis weissylogii	–	0.44	–	–
Fragillaria crotonensis	–		14.00	–
Goniaulax birostris	–	–	–	0.57
Gyrosigma balticum	–	1.77	–	–
Hemiculus hauckii	–	–	0.40	–
Lauderia annulata	–	–	–	0.29
Leptocylindrus donicus	–	4.86	–	–
Lyngbya confervoides	0.52	–	1.20	–
Merismopedia sp.	–	–	–	4.58
Nitzschia sigma	1.04	2.65	0.40	–
Oscillatoria limosa	–	–	3.80	–
Pediastrum simplex	–	–	–	0.57
Prorocentrum maximum	–	–	1.20	–
Surirella flaminensis	–	–	1.20	0.86
Surirella maximum	–	1.77	–	–
Tabellaria sp.	–	–	5.60	–
Tetraedron trigonum	–	1.77	–	–
Thalassiothrix frauenfeldii	2.60	2.21	–	–
Thalassiothrix longissima	0.52	5.75	2.80	–
Thalassiothrix nitzschioides	–	4.42	1.60	1.14
Trachyneis aspera	1.04	–	–	–
Treubaria varia	1.04	4.86	–	–
Umbilicosphaera mirabilis	–	–	0.40	–
Total cell count	15.60	53.92	75.80	14.59
Total number of species	11	18	22	12
Species diversity	2.99	3.77	3.66	3.11
Chlorophyll *a* (mg/m^3)	0.15	1.35	0.67	0.74
Pheaophytin (mg/m^3)	0.14	1.90	0.78	0.78

–, Absent.

The macrobenthic faunal species associated with the live coral patches and their vicinity at different stations along the Saurashtra coast are depicted in Table 6. Altogether 57 species of macrobenthic fauna belonging to 14 groups were recorded from the intertidal belt at the four stations. The number of species observed between stations varied from 27 at Mahuva to 35 at Veraval. Gastropods are the dominant group comprising 27 species followed by crabs (8 species) and bivalves (7 species). Observation of species belonging to cephalopods, pisces, shrimps, nudibranchs and sponges is worth mentioning; particularly the rare and endangered *Aplysia* sp. (sea hare), a nudibranchs and *Chiton* sp., some of which are pharmacologically active organisms.

The species similarity index of corals, phytoplankton, zooplankton and coral-associated macrobenthic fauna between different stations are shown in Table 7. Among these four biological variables, corals showed cent per cent similarity at Veraval vs Diu and were dissimilar at Dwarka vs Mahuva, Veraval vs Mahuva and Diu vs Mahuva, where the index was 0.00. Coral-associated macrofauna showed maximum species similarity between different stations as its index varied from 27.12 to 70.18 at Diu vs Mahuva and Dwarka vs Diu respectively. However, the index for phytoplankton ranged from 8.70 at Dwarka vs Mahuva to 41.38 at Dwarka vs Veraval and that for zooplankton ranged from 19.05 at Dwarka vs Veraval to 54.55 at Veraval vs Diu.

Although coral reefs are geographically restricted to tropical seas and their occurrence is limited to 0.2% of the ocean area on the earth's surface[16], they have globally

Table 4. Qualitative and quantitative estimation of zooplankton at different stations along Saurashtra coast

Parameter	Dwarka	Veraval	Diu	Mahuva
Fresh wt (mg/100 m^3)	1712	2250	2812	2750
Dry wt (mg/100 m^3)	560	813	1108	861
Volume (ml/100 m^3)	5.1	5.9	8.8	8.5
Numerical density (no./100 m^3)	7280	10166	15600	15301
Group	Percentage of occurrence			
Annelid larva	–	–	2.56	0.93
Appendicularian	–	–	–	1.87
Bivalve juvenile	3.57	–	8.97	–
Chaetognath	–	–	–	0.93
Copepod	3.57	–	2.56	10.28
Decapod larva	21.43	–	1.28	–
Fish eggs	–	2.17	–	–
Foraminiferan	71.43	95.65	67.95	80.37
Gastropod juvenile	–	–	3.85	–
Ostracod	–	2.17	1.28	–
Salpid	–	–	–	3.74
Tintinnid	–	–	11.54	1.87
Total number of groups	4	3	8	7

–, Absent.

Table 5. Distribution of different species and species diversity of zooplankton at different stations along Saurashtra coast

Group and species	Dwarka	Veraval	Diu	Mahuva
Foraminiferans				
Amhistegina lessonii	–	–	P	–
Bolivinita quadrilatera	–	–	–	P
B. rhomboidatis	–	–	P	–
Calcarinas calcar	–	P	P	–
Cyclogyra involvens	P	P	P	–
Globigerinoides ruber	P	P	P	P
G. sacculifer	–	P	P	P
Loxostomum limbatum	–	–	–	P
Nonion depressulum	–	P	P	P
Peneroplis pertusus	–	P	P	P
Quinqueloculina crassa subcuneata	P	–	–	P
Q. curta	–	P	P	–
Q. laevigata	–	–	P	–
Q. polygona	–	–	–	P
Q. rhodiensis	–	P	–	–
Rosalina bradyi	–	P	P	–
R. globularis	P	–	–	–
Spiroloculina antillarum	P	–	–	–
Tintinnids				
Tintinnopsis cylindra	–	–	P	P
T. tubulosa	–	–	P	P
Annelids				
Setiger larva	–	–	P	–
Spirorbis larva	–	–	P	P
Chaetognaths				
Sagitta enflata	–	–	–	P
Ostracods				
Conchoecia indica	–	P	P	–
Copepods				
Acartia spinicauda	–	–	–	P
Macrosetella gracilis	–	–	P	–
Metis jousseamei	–	–	P	P
Microsetella gracilis	P	–	–	P
Nannocalanus minor	–	–	–	P
Paracalanus parvus	–	–		P
Decapod larvae				
Nauplii	P	–	–	–
Bivalves				
Crassostrea cuculata	–	–	P	–
Sunetta effosa	P	–	P	–
Tellina tellina	–	–	P	–
Gastropods				
Umbonium vestarium	–	–	P	–
Appendicularians				
Oikopleura dioica	–	–	–	P
Salpids				
Salpa maxima	–	–	–	P
Pisces				
Fish eggs	–	P	–	–
Total number of species	9	12	21	19
Species diversity	0.91	0.65	1.53	1.13

P, Present, –, Absent.

Table 6. Coral-associated macrofaunal species at different stations along the intertidal zone of Saurashtra coast

Species/group	Dwarka	Veraval	Diu	Mahuva
Sea anemone				
Heteractis crispa	P	P	P	–
Sponge				
Dasychalina cyathina	P	P	P	–
Polychaete				
Neries versicolar	P	P	P	–
Tubicolous polychaete	P	–	P	–
Amphipod				
Hyperia medusarum	P	P	P	–
Parathemisto sp.	–	P	–	–
Cirripede				
Balanus amphitrite	P	P	P	P
B. balanoides	–	P	P	P
Hermit crab				
Clibanarius clibanarius	P	P	–	P
C. longitarus	–	P	P	P
Brachyuran crab				
Charybdis feriata	–	P	P	–
Doclea ovalis	–	–	P	–
Ocypoda macrocera	–	–	P	–
Podopthalmus vigil	–	–	P	–
Portunus pelagicus	P	P	P	P
P. sanguinolentus	–	–	–	P
Shrimp				
Oratasquilla sp.	–	P	–	–
Penaeus indicus	–	–	–	P
Nudibranch				
Aplysia dactylomela	P	–	–	–
A. parvula	–	P	P	P
Cephalopod				
Octopus vulgaris	P	–	–	–
Bivalve				
Agropecten flabellum	–	P	–	–
Anadara granosa	–	P	–	–
Crassostrea cuculata	–	–	P	P
C. madrasensis	–	P	P	P
Modiolus metcalfei	P	–	P	–
Sunetta effosa	–	–	–	P
Tellina angulata	–	–	–	P
Polyplacophora				
Chiton tuberculatus	P	P	P	P
Gastropod				
Astraea semicostata	–	–	–	P
Bursa rana	–	–	–	P
B. spinosa	–	–	P	P
Cerithedia fluviatilis	–	P	–	–
C. morus	–	–	–	–
Chicoreus adustus	P	P	P	P
C. virgeneus	–	–	–	P
Conus figulinus	P	P	P	–
Cymatium perryi	–	P	–	–
Cypraea arabica	P	P	–	–
Drupa konkanensis	P	P	P	P
Littorina littorea	P	P	P	P
L. scabra	P	P	P	P
Murex bruneus	–	–	–	P
Nerita albicilla	P	P	–	–
Ocenebra bombayana	–	P	P	–
Oliva oliva	–	P	–	–
Patella vulgata	P	P	P	P
Thais bufo	–	–	–	P
T. rudolphi	P	P	P	–
T. rugosa	–	P	–	–
T. tissoti	P	P	P	–
Tibia curta	P	–	P	–
Tona dolium	–	–	–	P
Trochus radiatus	P	P	P	P
Turbo canalliculatus	P	P	P	P
Turitella turitella	–	P	–	–
Pisces				
Anguilla anguilla	–	–	P	–
Total number of species	25	35	32	27

P, Present, –, Absent.

Table 7. Species similarity index of corals, phytoplankton, zooplankton and coral-associated benthic macro fauna between different stations

Station	Coral	Phyto-plankton	Zoo-plankton	Macro-benthos
Dwarka vs Veraval	50.00	41.38	19.05	63.33
Dwarka vs Diu	50.00	30.30	20.00	70.18
Dwarka vs Mahuva	0.00	8.70	21.43	37.93
Veraval vs Diu	100.00	20.00	54.55	62.69
Veraval vs Mahuva	0.00	26.67	24.24	45.16
Diu vs Mahuva	0.00	35.29	40.00	27.12

important implication for marine biodiversity. Coral reefs are an oasis of high primary productivity in tropical seas and reef-building organisms have changed the face of the earth by creating entire archipelagos of islands. The distribution and diversity of coral reefs along Gujarat coastal waters have been well documented by various authors.

The essence of these reports clearly indicates that the coral forms are restricted to the Gulf of Kachchh and they extended from the interior Gulf, i.e. Pirotan island to the Poshitra point and Okha, located on the southwestern extremity of the Gulf[9]. The present study reports the occurrence of live corals on the intertidal regions of Dwarka, Veraval, Diu and Mahuva located along the Saurashtra coast. It is also evident that these coelenterate species recorded from Saurashtra coast are commonly found in the Gulf of Kachchh reef environment. Though Saurashtra region is facing the open Arabian Sea coast, the intertidal rocky beaches coupled with seaweed meadow might be a conducive environment for the settlement of planulae larvae. The observation of most of the coral colonies from the present study was restricted to rock pools of infralittoral and mid-littoral zone. It enables the species to minimize the desiccation with shorter period of exposure during low tide.

The numerical density and biomass of coral polyps were high at Diu (Table 1). The formation of more coral colonies in this region is significantly correlated with the maximum record of phytoplankton and zooplankton density (Tables 3–5), which may provide adequate supply of prey for the corals. Coral polyps are typically omnivorous, feeding on small planktonic organisms suspended in the water. However, endosymbiotic algae, known as zooxanthellae, provide an important source of nutrition and characteristic colours to hermatypic corals. In the present study the species diversity of corals gradually reduced from Dwarka to Mahuva, as the concentration of TSS increased. The lowest biomass, density and diversity of corals observed at Mahuva might be due to higher concentration of TSS (763 mg/l) in the water column. The higher concentration of TSS in this region is due to siltation caused by the large river run-off along the Gulf of Khambhat. The observation of three species of live corals at Dwarka was due to the close proximity of this region to the Gulf of Kachchh. Coral-reef organisms are stenotype in nature and can tolerate a narrow range of environmental conditions and are sensitive to environmental changes. The growth rate of corals depends on factors such as light intensity, water temperature, salinity, turbidity, food availability, competition for space and predation. *T. aurea* was the only species recorded from all the places of the study, except Mahuva (Table 1). Despite high degree of TSS in the southeastern coastal waters of Saurashtra (Mahuva), the new settlement of *Polycyathus verrilli* colonies in that region shows the ability of this ahermatypic coral to thrive in muddy coastal waters. Other species of corals can also be studied through transplantation methods to assess their stability and existence in the turbid waters.

In conclusion, the occurrence and extension of live corals along the intertidal belt of the open Arabian Sea coast of Saurashtra peninsula must be a welcome addition to the opulence of Gujarat maritime areas. Further, this study suggests the possibility for the formation of coral reefs along the sub-tidal region of this coast. Hence a detailed underwater study on the sub-tidal region of this coast, to understand the entire scenario, needs to be encouraged by funding agencies.

Subsequent to this study, another set of observations was carried out at all the stations during the first week of July 2004 showing the existence of the same species of corals and other organisms.

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