Journal of the Andaman Science Association Vol. 18(2):152-156 (2013)
ISSN 0970-4183, Printed in India

www.asapb.org

DIVERSITY OF SYMBIOTIC CRABS IN THE RANI JHANSI MARINE NATIONAL PARK, SOUTH ANDAMAN

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ABSTRACT

In the present study 14 species of symbiotic crabs belonging to 5 genera, and 3 families under Order Decapoda in the Class Malacostraca were identified from the coral reef ecosystem of Rani Jhansi Marine National Park. Species diversity indices were high in Outram Island (2.24) and low at Henry Lawrence Island (2.22). The number of species were high in the Outram Island (22) followed by John Lawrence Island (20). Maximum similarity was observed between Henry Lawrence Island and Outram (0.73) and least similarity was observed between Henry Lawrence Island and John Lawrence Island (0.56).

Key words: Symbiotic crabs, Rani Jhansi Marine National Park, Diversity Index, Andaman

INTRODUCTION

The Rani Jhansi Marine National Park, one of the 4 Marine National Parks designated in India, is located in Andaman and Nicobar Islands. And its cover area of 256.14k km². Biodiversity, community structure and morphology of the coral host are related with the abundance of associated crabs (Tsai, 1999). Earlier studies carried out on the association between coral and epifauna. Previous Research on reef-associated decapods is limited (Alejandro and roger, 1984). The minor studies were conducted on the diversity of cryptofaunal groups and their habitat selection on coral reefs (Hutchings, 1983; Robert, 1983; Lewis and Snelgrove, 1990; Juan *et al*., 2004).In general symbiotic crabs associated with a variety of coral species (Tuschiya and Yonaha, 1992). Associated crabs were observed in *Acropora* spp. (Alejandro and Roger, 1984; Galil, 1985, 1988; Castro, 1990, 1999a, b; Tsuchiya *et al*., 1992; Patton, 1994; Tsai, 1999), *Stylopra* spp. (Alejandro and Roger, 1984; Castro, 1990), *Seriatopora* spp. (Galil, 1988; Castro, 1990) and in *Pocillopora* spp. Studies of crabs from coral reef ecosystem of Indian coasts were initiated with a record of 17 species from the Gulf of Mannar by Henderson (1893). Recently, crab fauna from reef ecosystem of Great Nicobar has been studied by Kariathil *et al*. (2002) and recorded as many as 20 species. Dev Roy and Das (2000) reported 51 species of crabs in mangrove environment of Andaman Islands, of which 19 were coral associated crabs. The present study describes the diversity of the symbiotic crabs from Rani Jhansi Marine National Park, South Andaman with special reference to their distribution according to habitat in fringing reef areas.

STUDY AREA

Rani Jhansi Marine National Park (RJMNP) is one of the two Marine National Parks of Andaman and Nicobar Islands, and Located in Ritchie's Archipelago, south Andaman. RJMNP is composed of three islands viz. Henry Lawrence, John Lawrence and Outram Island.

Henry Lawrence Island

Henry Lawrence Island is expansive inter-tidal zone in the south-east (50 m wide) at 12°05'-12°12' N Lat and 93°03'-93°06' E Long. Maximum elevation 138 m. Narrow sandy beach. Live corals up to 10 m depth. Mangrove bushes here and there along shore. Steep rocks occur in intertidal zone. Water deep close to island, current swift.

John Lawrence Island

Area of this island is about 9 sq km at 12°03'-12°10' N Lat and 93°00'-93°01' E Long. Maximum elevation 172 m. Shore packed with coral rocks. Thin strip sandy beach devoid of rocks. Live coral patches even in shallow areas. Water is very deep close by North-west swampy with mangroves and rocks.

Outram Island

Area of the Outram Island is about 10 sq km at 12°12'-12°16' N Lat and 93°04'-93°07' E Long. Maximum elevation 70 m with limited sandy beach, otherwise mangrove. Steep rocks characterize the nearby sea bed upto about 3 m depth. Live coral reef beyond 8 m depth.

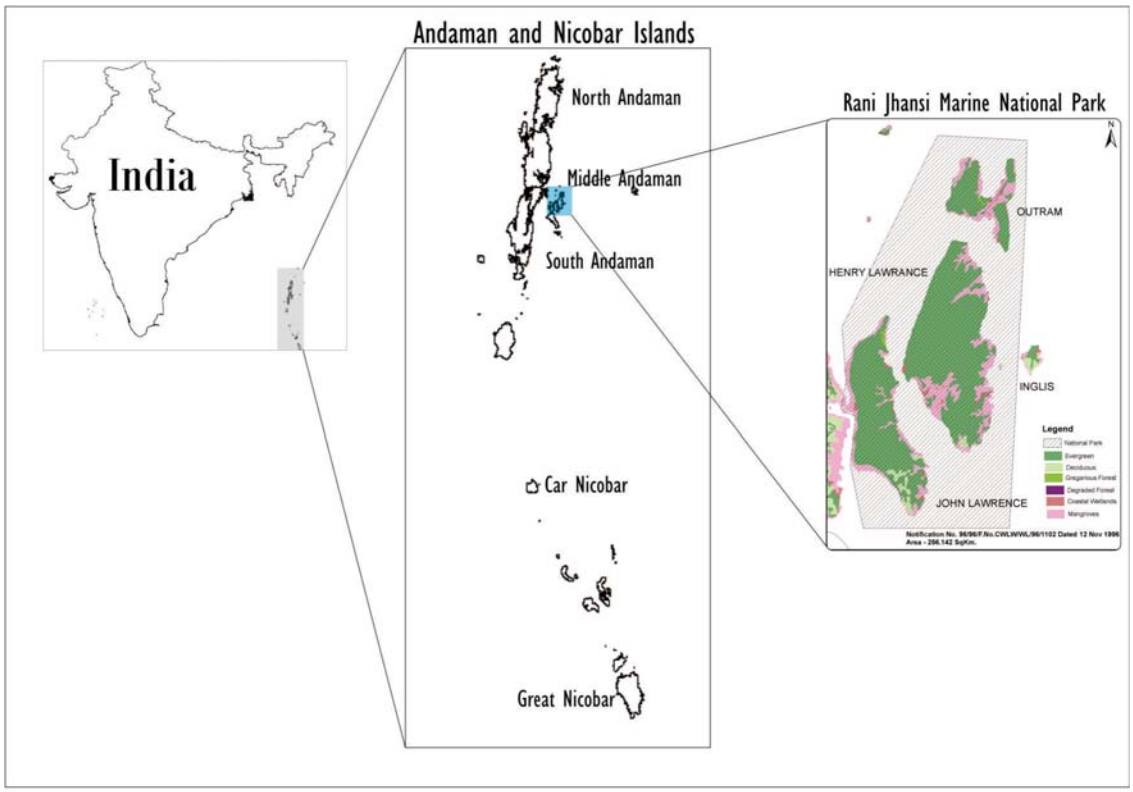

Figure 1: Map showing the study area in Rani Jhansi Marine National Park

MATERIALS AND METHODS

The study was carried out in RJMNP during January 2011 to January 2012. The crabs inhabiting the coral reefs were collected by employing SCUBA diving and snorkeling. The collected crabs were preserved in 5 to 6 % formalin. Later the specimens were examined in detail and identified using standard systematic characteristic (Chhapgar, 1957; Tsune Sakai, 1976; Jeyabaskaran, *et al*., 2000).data on the density of symbiotic crabs collected by laying quadrat along with Line Intercept Transect on the reef area. The numerical density of crabs was calculated for 100 × 100m area of the fringing reef. The species diversity of symbiotic crabs was evaluated following Shannon-Weaver diversity index formula as described below (Shannon, 1948).the statistical analysis of data was made with Similarity Index, Sørensen index, (Sørensen, 1948), Simpson's diversity index (Edward H. Simpson, 1949), Pielou's Evenness Index (Pielou, 1966).

RESULTS AND DISCUSSION

In the present study 14 species of symbiotic crabs belonging to 5 genera, 3 families under the Order Decapoda in the Class Malacostraca were recorded from Rani Jhansi Marine National Park (Table.1) High number of species recorded from Outram (22), followed by John Lawrence (20) and Henry Lawrence (15). The species richness and

abundance of symbiotic crabs observed in the different islands an presented in Fig.2. The maximum species richness (11) and abundance (22) was recorded from Outram Island followed by Henry Lawrence and John Lawrence Island.

Table 1. Distribution of symbiotic crabs of Rani Jhansi Marine National Park

S. No.	Species name	IS-1	IS-2	IS-3
1	*Trapezia cymodoce* (Herbst, 1801)	√	√	√
2	*Trapezia ferruginea* Latreille, 1828	√		√
3	*Trapezia areolata*		√	√
4	*Trapezia Formosa* Smith, 1869	√	√	√
5	*Trapezia guttata* Ruppell, 1830		√	√
6	*Trapezia tigrina* Eydoux et Souleyet, 1842			√
7	*Trapezia digitalis* Latreille, 1828	√	√	√
8	*Trapezia rufopunctata* (Herbst, 1799)	√		√
9	*Tetralia fulva* serene, 1984		√	
10	*Tetraloides nigrifrons* (Dana, 1852)	√		√
11	*Tetralia rubridactyla* Garth, 1971		√	
12	*Tetraloides heterodactyla* (Heller, 1861)	√	√	
13	*Chlorodiella nigra* (Forskål, 1775)	√	√	√
14	*pillumnus vespertillio* (Fabricius, 1793)		√	√
	Total species	8	10	11
	Total no of Individuals	15	20	22

IS- Henry Lawrence Island; IS-2 John Lawrence Island; IS-3 Outram Island.

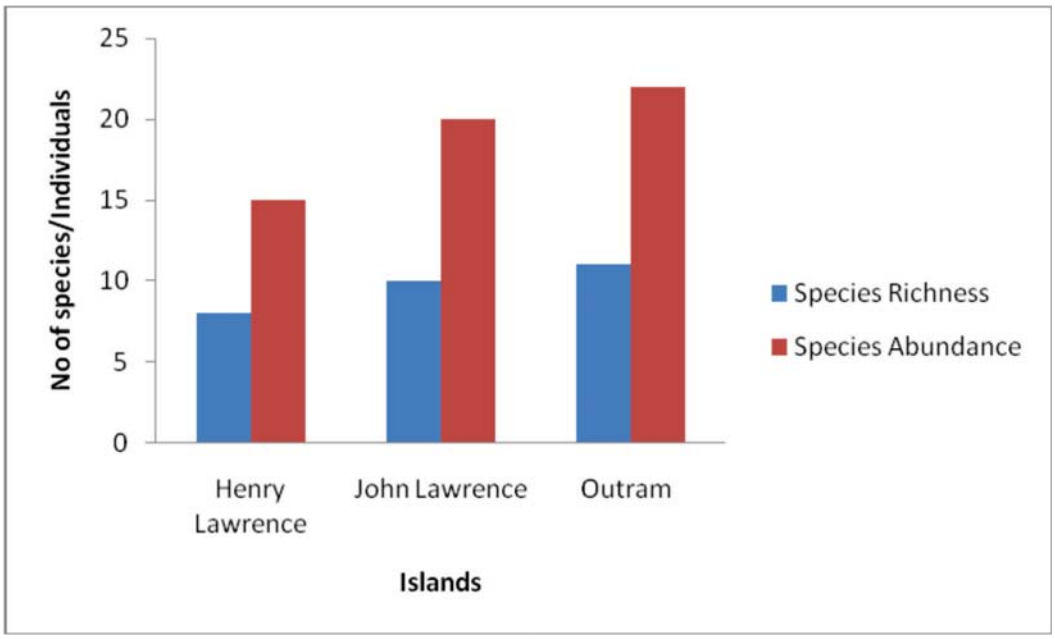

Fig. 2. Species richness and abundance of symbiotic crabs in RJMNP

The Shannon diversity index (H') (Table 2) ranged from highest species diversity in Outram Island (**2.24**), and lowest species diversity Henry Lawrence (2.02). Similarity index between the different islands were compared using qualitative data (Table 3).The closest similarity found between Henry Lawrence and Outram Islands (0.73) and least similarity was occurred in Henry Lawrence and John Lawrence Island (0.56).The D value obtained by using the method the Simpson index of species richness showed maximum in Outram Island (0.88) and in Henry Lawrence Island (0.85) (Table 2). Pielou's evenness index also indicated a maximum in Outram Island **(**0.93) followed by John Lawrence (0.96) and a minimum value in Henry Lawrence Island (0.97) (Table. 2).

Table 2. Diversity indices of symbiotic crabs in different islands of RJMNP

Diversity Indices	IS-1	IS-2	IS-3
Shannon-Wiener Diversity Index	2.02	2.22	2.24
Simpson Diversity Index	0.85	0.86	0.88
Pielou's Evenness Index	0.97	0.96	0.93

Table 3. Similarity index of crabs between different islands in RJMNP

	Henry Lawrence Island	John Lawrence Island	Outram Island
Henry Lawrence Island		55.55	73.68
John Lawrence Island			66.66
Outram Island			

During the present survey period, totally 14 species of symbiotic crabs were recorded from RJMNP. Highest numbers of brachyurans crabs were observed from Outam and John Lawrence Islands. These two islands have long coral reef area. Among the recorded species *Trapezia cymodoce, Trapezia formosa, Chlorodiella nigra,* were observed in all the islands. *Trapezid* crabs known to be associated with the live coral colonies of the *Acropora* and *Pocillopora* species, indicating the nature of corals in the coral reef area (Vytopil and Willis, 2001). *Xanthid* crabs were found to be highly associated with the coral colonies (Garth, 1971; Castro 1976; Coles, 1980).According to Cornell and Karlson (2000) the species richness in communities capacity vary with the habitat area, productivity, intensity of species interactions. The highest species diversity index showed in Outram Island and least diversity index in Henry Lawrence Island. Both the Shannon and Weaver and Simpson indices were widely used in faunistic research (Trojan, 2000). The closest similarity index community in-between Outram and Henry Lawrence Islands and least similarity index between John and Henry Lawrence Island. Variation in the similarity values of brachyuran's crabs observed in different islands may be due to the stress caused in the coral reef areas (Sergio *et al*., 2003) The present information on symbiotic crabs diversity and density in the RJMNP, is a baseline data useful for further advanced work on this cryptofauna.

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