Tạp chí Khoa học và Công nghệ biển T10 (2010). Số 4. Tr 39 - 49

SOFT CORALS (OCTOCORALLIA: ALCYONACEA) IN LY SON ISLANDS, THE CENTRAL OF VIETNAM

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Summary: *Ly Son district belongs to Quangngai province including Dao Lon and Dao Be islands. They were located in central of Vietnam far 20 km from mainland. The environment in Ly Son is considered so different that compare with the ecological environment of near shore reefs of Vietnam. The reefs exist in the turbidity but calm waters. Especially, the reefs which located far from the mainland coast are studied less interested than offshore. The total 85 specimens were collected. The results of examination are recorded 60 taxa including 10 genera and 5 families in this area. Among these presents, two genera and 33 species are firstly recorded in comparison with the octocoral fauna of Vietnam which fauna has been the subject of several studies. The result showed that 14 species of Sinularia, 9 species of Lobophytum, 6 species of Sarcophyton genera are newly recorded in Vietnam. Meanwhile, only one new species belonging to the Hicksonella, Paralemnalia, Nephthea, Xenia genera is firstly recorded in Vietnam.*

Key words: *Octocorallia, soft corals, new records, South China Sea, Vietnam.*

I. INTRODUCTION

The soft corals (Cnidaria: Octocorallia) have the ability to occupy the significant bottom areas belonging to the main components of the coral reef ecosystems of the tropics. The survey of the biodiversity in soft corals is needed for solving the important problem of the tropical marine ecosystems and contribution to predict the damaged and healthy coral reefs in the nearest future. The octocoral fauna of Vietnam has been the subject of several studies. An early collection of soft coral conducted by Hickson in 1919, resulted in the description of one new species *Alcyonium krempfi* in the central of Vietnam (Hickson, 1919). Subsequently, Stiasny determined 18 species of gorgonians listed for Southern of Vietnam. The author described two species *Eunicella dawydoffi* and *Junceella bifurcata* as the new species for science. In 1970 Tixier-Durivault listed 94 species of soft coral in Nha

Trang bay and this scientific research was considered the most significant for taxonomy of soft coral in Vietnam. Later, Malyutin (1991) described two new species *Sinularia mammifera* and *S. laminilobata* in Con Dao islands and Dautova & Savinkin (2009) determined two species *Eleutherobia nezdoliyi* and *Sinularia arctium* in Nha Trang bay.

Ly Son district belongs to Quangngai province including Dao Lon and Dao Be islands far 20 km from mainland. The status of coral reef in Ly Son islands have not almost studied even that include the biodiversity of coral reef. This result is firstly proved to the science that concern with the biodiversity of soft coral in Ly Son islands. By the way, the species composition of soft corals in Ly Son may be of the great interest in comparison with the data on the coastal soft corals of Vietnam.

II. MATERIALS AND METHODS

Table 1: The stations and positions where the samples were collected in Ly Son islands (showed in figure 1).

Stations	latitude	Longitude
I	$15^0 23' 50''$	$109^0 06' 33''$
II	$15^0 23' 05''$	$109^0 04' 59''$
III	$15^0 23' 51''$	$109^0 08' 16''$
IV	$15^0 25' 39''$	$109^0 05' 17''$

The samples of the colonial Octocorallia were collected during joint field expedition of the institutes of Far Eastern Branch of RAS (Vladivostok, Russia) and Institute of Oceanography (Nha Trang, Vietnam) on 23th – 25th May in 2007 using SCUBA diving. 85 samples were collected, encompassing the variety of species found on the reefs. The collection stations I, II and III belong to Dao Lon Island, the station IV belongs to Dao Be Island (table 1, fig. 1). All specimens were fixed in 4% formalin in the sea water, rinsed in the fresh water after 24h and then transferred to 70% ethyl alcohol. Sclerites were obtained by dissolving the tissues in 10% sodium hypochlorite. The tissue samples of different colony parts (polyp, surface layer of the colony top, interior of the colony top, surface layer of the colony base and interior of the base) were examined separately through dissolving of the organic matter in sodium hypochlorite and observations under optical microscope with magnifications x 40, x 100 and x 400. The samples are identified basing on the literature such as Verseveldt (1980, 1982, 1983), Ofwegen (1987, 1991,

1996, 2000, 2007, 2008), Tixier-Durivault (1956, 1958, 1970), Roxas (1930 I, 1930 II), Dautova (2009), Manuputty & Ofwegen (2007), Grasshoff (1999, 2000, 2001), Vennam (1996), Utinomy (1954).

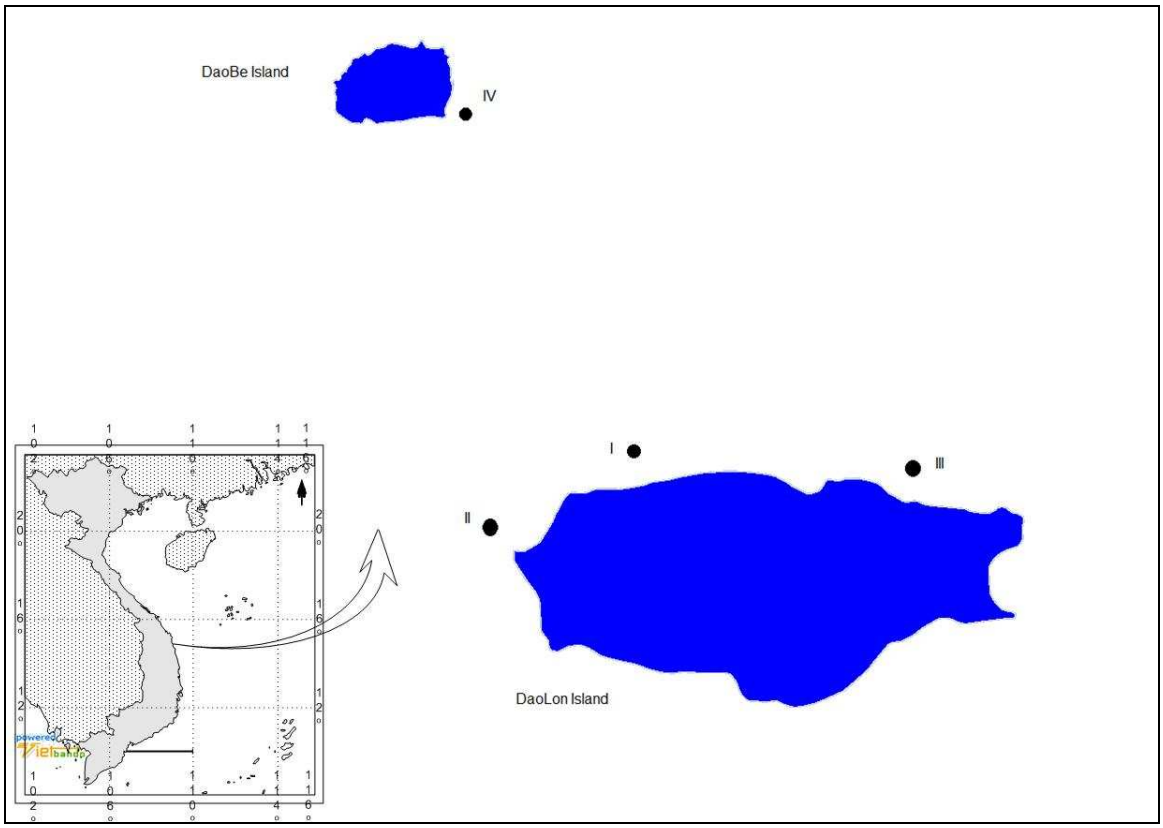

Figure 1: Sampling stations (●) in Ly Son islands.

III. RESULTS

1. The composition and distribution of soft corals recorded in Ly Son islands

The total 85 specimens were collected in Ly Son islands. The result of examinations is recorded with 60 taxa belonging to 10 genera and 5 families (see appendix I). The *Sinularia* genus is the most diverse with 24 species and *Lobophytum* 15 species and *Sarcophyton* 13 species. The eight specimens were identified only to genus level.

As it was displayed above, the Ly Son has separated two apart including Dao Lon and Dao Be islands. The 49 species recorded in Dao Lon Island meanwhile only 20 species recorded in Dao Be Island (table 2). The diversity of soft corals is the highest with

23 species at the station II and the diversity is low with 10 species at the station III. Some species as *Sinularia arctium, Sinularia cruciata, Lobophytum delectum, Sarcophyton birkelandi, Xenia umbellata* were only recorded at each station.

Table 2: Amount of families, genera and species recorded in Ly Son islands

Stations	Families	Genera	Species
I	4	5	21
II	3	4	23
III	3	6	10
IV	1	4	20
Total	5	8	60

2. The species firstly recorded in Vietnam

Considering for the fauna of coral reefs in Ly Son, the composition of soft corals is firstly recorded in this area. Among the samples collected in Ly Son, two genera, such as *Hicksonella* and *Briareum,* and 33 species were firstly recorded in Vietnam while we compared our results with the authors who studied the taxonomy and fauna of soft corals in Vietnam as Tixier-Durivault (1970), Malyutin (1990), Dautova & Savinkin (2009), Vo Si Tuan et al. (1994 & 1997). Among the newly recorded species there were 14 *Sinularia* species, 9 *Lobophytum* species and 6 *Sarcophyton* species. Meanwhile some genera as *Hicksonella, Paralemnalia, Nephthea, Xenia, Briareum* have got one species each. The results showed that 26 species were determined in Dao Lon Island and 11 species in Dao Be Island. The number of species is the highest in the station II with 13 species and the lowest in the station III with 4 species (table 3).

As discussed above, the soft coral has been studied very few in Vietnam. The one of sufficient literature for taxonomy of soft coral in Vietnam is the Tixier-Durivault' publication (1970). She described 94 species of soft corals in Nha Trang bay, but we think that this literature is not enough reflecting completive biodiversity of soft coral in Vietnam. So that, our recorded result of the 60 species soft corals in Ly Son islands will contribute to biodiversity knowledge on coral reefs in Vietnam. The present collection shares 27 species with previous records by Tixier-Durivault (1970) and Dautova & Savinkin (2009). On the other hand, the determination of 33 species and 2 genera as first records in Vietnam occupies more fifty percent of total species in Ly Son islands, and this

result indicates not only the rich diversity but also the potential of taxonomy studies of soft coral not discovered yet in Vietnam.

Table 3: Amount of genera and species recorded firstly in Ly Son in Vietnam

Stations	General	Species
I	1	11
II		13
III	1	4
IV		11
Total	2	33

IV. CONCLUSION

The biodiversity of soft coral has been firstly studied in Ly Son Islands with the composition of 60 taxa including 10 genera and 5 families recorded in Ly Son islands. The result showed that 49 species are recorded in the Dao Lon island, and 20 species were identified in the Dao Be island. Among the species were newly recorded in Vietnam, the *Sinularia* genus has 14 species, *Lobophytum* - 9 species, *Sarcophyton* - 6 species. Meanwhile, some genera - such as *Hicksonella, Paralemnalia*, *Nephthea*, *Xenia, Briareum* - have got one species each. This result showed that there are two genera *Hicksonella*, *Briareum* and 33 species firstly recorded and identified in Vietnam.

Acknowledgments: The field period of this study was funded totally by the joint project of the VAST and RAS institutes of 2007 *S/V* "Academician Oparin" scientific cruise. We would like to thank to the Institute of Oceanography and the Department of Marine Living Resources for the possibility and making good conditions for the first author to join to this expedition and to identify the collected specimens. We sent many thanks to Dr. Trinh The Hieu for his assistance in the collection of the samples during the expedition. The joint work on the species identification conducted in Nha Trang was supported financially for the trip of the Dr T. Dautova to ION Nha Trang by FEB RAS Foundation (Grant 09-III- A-06-195) and APN Grant ARCP2010-18NMY.

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THE LIST OF THE SOFT CORAL SPECIES AT THE STATIONS IN LY SON ISLANDS

No	Genera	Species	Stations				New record
			1	2	3	4	
1.	***Sinularia*** May, 1898	*Sinularia abhishiktae* Ofwegen & Vennam, 1991	+	+			+
2.		*S. arctium* Dautova & Savinkin, 2009	+				
3.		*S. capillosa* Tixier-Durivault, 1970	+	+			
4.		*S. ceramensis* Verseveldt, 1977		+			+
5.		*S. corpulentissima* Manuputty & van Ofwegen, 2007	+				+
6.		*S. compacta* Tixier-Durivault, 1970				+	+
7.		*S. conferta* (Dana,1846)		+			+
8.		*S. cristata* Tixier-Durivault, 1969				+	+
9.		*S. cruciata* Tixier-Durivault, 1970	+				
10.		*S. densa* (Whitelegge, 1897)				+	
11.		*S. erecta* Tixier-Durivault, 1945				+	+
12.		*S. facile* Tixier-Durivault, 1970				+	
13.		*S. fishelsoni* Verseveldt, 1970			+		+
14.		*S. flexuosa* Tixier-Durivault, 1945	+				+
15.		*S. granosa* Tixier-Durivault, 1970				+	
16.		*S. inexplicita* Tixier-Durivault, 1970	+				
17.		*S. minima* Verseveldt, 1971		+			+
18.		*S. mollis* Kolonko, 1926		+			+
19.		*S. nanolobata* Verseveldt, 1977	+				+
20.		*S. numerosa* Tixiter- Durivault, 1970		+			+
21.		*S. parva* Tixier-Durivault, 1970		+			
22.		*S. polydactyla* (Ehrenberg, 1834)		+			
23.		*S. querciformis* (Pratt, 1903)		+			
24.		*S. brassica* May, 1898	+				+

No	Genera	Species	Stations				New record
			1	2	3	4	
25.	***Lobophytum*** Marenzeller, 1886	*Lobophytum batarum* Moser, 1919	+	+	+		
26.		*L. compactum* Tixier-Durivault, 1956		+		+	
27.		*L. crassum* Von Marenzeller, 1886		+		+	+
28.		*L. delectum* Tixier-Durivault, 1966		+			+
29.		*L. jaeckeli* Tixier-Durivault, 1956		+			+
30.		*L. lighti* Moser, 1919				+	+
31.		*L. pauciflorum* (Ehrenberg, 1834)	+		+	+	
32.		*L. salvati*, Tixier-Durivault, 1970				+	+
33.		*L. sarcophytoides* Moser, 1919	+				+
34.		*L. schoedei* Moser, 1919				+	+
35.		*L. variatum* Tixier-Durivault, 1957				+	+
36.		*L. varium* Tixier Durivault, 1970				+	+
37.		*Lobophytum sp 1*		+			
38.		*Lobophytum sp 2*				+	
39.		*Lobophytum sp 3*				+	
40.	***Sarcophyton*** Lesson, 1834	*S. boletiforme* Tixier-Durivault, 1958		+		+	+
41.		*S. tenuispiculatum* Thomson & Dean, 1931	+				+
42.		*S. ehrenbergi* Von Marenzeller, 1886	+				
43.		*S. solidum* Tixier-Durivault, 1958	+				+
44.		*S. birkelandi* Verseveldt, 1978		+			+
45.		*S. cherbonnieri*, Tixier-Durivault, 1958	+			+	+
46.		*S. cinereum* Tixier-Durivault, 1946			+		
47.		*S. ehrenbergi* Von Marenzeller,			+		

No	Genera	Species	Stations				New record
			1	2	3	4	
		1886					
48.		*S. elegans* Moser, 1919		+			
49.		*S. glaucum* (Quoy & Gainmard, 1833)	+			+	
50.		*S. pulchellum* (Tixier-Durivault, 1957)		+			+
51.		*S. serenei* Tixier-Durivault, 1958		+			
52.		*Sarcophyton sp.*			+		
53.	***Cladiella*** Gray, 1869	*Cladiella sp*			+		
54.	***Xenia*** Lamarck, 1816	*Xenia umbellata* Lamarck, 1816		+			+
55.	***Tubipora*** Linnaeus, 1758	*Tubipora musica* Linnaeus, 1758	+				
56.	****Hicksonella*** Nutting, 1910	*Hicksonella princeps* Nutting, 1910	+				+
57.	***Paralemnalia*** Kukenthal, 1913	*Paralemnalia eburnea* Kukenthal, 1913	+		+		+
58.	***Nephthea*** Audouin, 1826	*Nephthea brassica* Kukenthal, 1903			+		+
59.		*Nephthea sp*	+	+		+	
60.	****Briareum*** Blainville, 1830	*Briareum sp*			+		
Total			21	23	10	20	33

**The genus is newly recorded in Vietnam*

SAN HÔ MỀM (OCTOCORALLIA: ALCYONACEA) Ở ĐẢO LÝ SƠN, MIỀN TRUNG VIỆT NAM

HOÀNG XUÂN BỀN, TATYANA N. DAUTOVA

Tóm tắt: *Lý Sơn là huyện đảo thuộc tỉnh Quảng Ngãi cách đất liền 20 km, bao gồm hai đảo là Đảo Lớn và Đảo Bé. Điều kiện môi trường ở đây được xem là khác biệt so với vùng nước ven bờ nơi mà môi trường nước không trong nhưng khá tĩnh lặng. Mặt khác, những vùng rạn xa bờ như Lý Sơn càng có ít các nghiên cứu về đa dạng sinh học trong hệ sinh thái rạn san hô. Trong số 85 mẫu thu thập đã xác định được 60 taxa thuộc 10 giống và 5 họ san hô mềm. So với các nghiên cứu trước đây ở vùng biển Việt Nam, kết quả phân tích đã xác định được 2 giống và 33 loài mới ghi nhận lần đầu cho vùng biển ven bờ Việt Nam. Trong đó giống Sinularia có số loài mới nhiều nhất là 14 loài, tiếp đến là Lobophytum 9 loài, Sarcophyton 6 loài. Bốn giống còn lại là Hicksonella, Paralemnalia, Nephthea, Xenia mỗi giống có một loài mới ghi nhận lần đầu tiên cho vùng biển Việt Nam.*

Ngày nhận bài: 14 - 06 - 2009

Người nhận xét: TS. Võ Sĩ Tuấn