Marine tunicates from Sangkarang Archipelago Indonesia: recent finding and bio-prospecting

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Abstract. Tunicate belongs to urochordata that inhabit benthic area of coral reefs. This paper attempts to compile result of several studies on diversity of marine tunicates from Sangkarang Archipelago of South Sulawesi Indonesia. Method for tunicates sample collection was line transect method that applied at two 3 and 7 m depth. A 50 m line transect was applied parallel to a shore line in each depth and was done in duplicate. A 2.5 m plot was places side by side of transect, in which all tunicate inside plot was counted, identified, and photographed, respectively. Tunicates identification was based on morphological characteristics. The latest finding shows that eighteen species of tunicates were recorded in Samalona waters as also the same number of species in Barrang Caddi waters. The result from this finding was compared to previous studies done at other part of Sangkarang area. This study concluded that this archipelago is rich in tunicates and these resources can be utilized for various purposes. Bio-prospect of marine tunicates is also discus in the present study.

1. Introduction

Coral reefs are known as tropical marine natural resources, hence habitat for various marine biotas. An annual review by expert on tropical natural resourced argued that this unique ecosystem is source for bioactive compound origin from its associated biotas such as sponge, acsidians, molluscs, bryozoans, cnidarian [1]. Marine invertebrates as major group living at coral reefs of Indo-Pacific region rich for secondary metabolite and are targeted for studying lead compound as marine drug discovery [2].

Amongst marine invertebrates, sponge is better known for their secondary metabolite and extensively studied [3-11]. Other invertebrate that may have potential in producing active compound is far less studied compared to sponge. Biodiversity of marine biotas has pushed discovery marine natural material that can be developed as a therapeutics candidate [11]. Some examples of marine natural product, tarabine, Ara-C and vidarabine Ara-A have been used to cure human diseases [12].

In order to explore bio-prospecting of marine biota, a basic research to know species diversity and distribution is needed. Sangkarang archipelago which is also known as Spermonde archipelago is located in South-west of Makassar, capital city of South Sulawesi province of Indonesia. In comparison with previous funding in marine biodiversity in Sangkarang area [13-19], diversity of marine tunicates in the Sangkarang region is less studied [20-23]. Information on biodiversity and distribution of tunicate in this region will provide useful baseline data to support sustainable use of

marine resources. This article aims to update information on marine tunicates from this area based on a recent finding and literature review from several sources.

2. Materials and Methods

2.1 Data Sources

Data was obtained from the result from different studies in Sangkarang Archipelago (figure 1). A similar method was applied for sample collection in all studied. SCUBA was using to collect sample and LIT method combination with plot was applied at 3 m and 7 m depth at three stations (figure 2). In each station, a 50 line transect was placed parallel to shore line and plot size 2.5 m x 2.5 m was applied side by side of transects (figure 2). All tunicates inside plot was noted, identified, counted and photographed. Sub-sample was taken and brought to laboratory for further study. Environmental parameters were measured in situ. Underwater camera was used to obtain images of species and habitat [24,25]. LIT method combination with plot was similar with one applied by [20-21] and [22-23]. Identification of tunicates was based on a main morphological character according to [26-28].

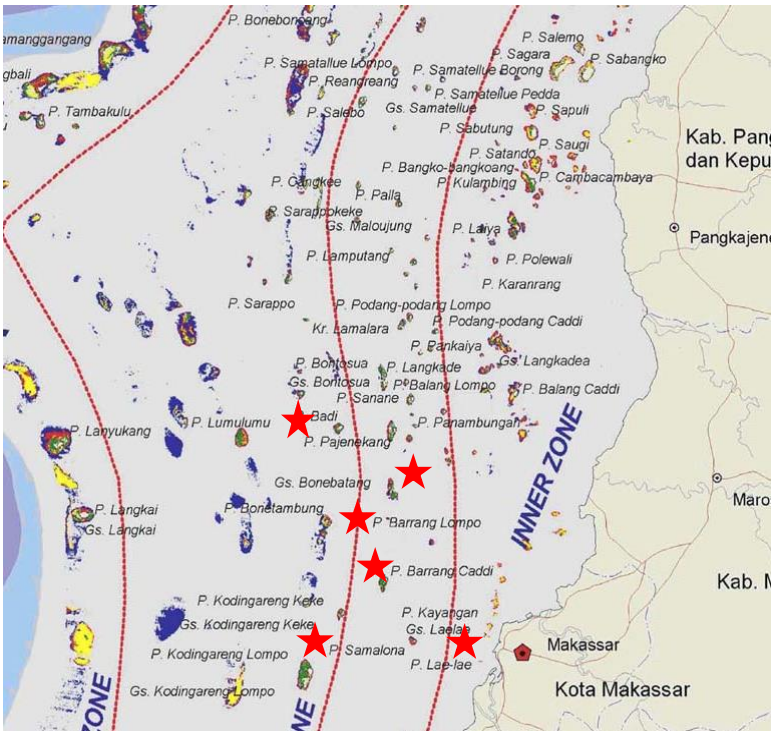

Figure 1. Sangkarang Archipelago South Sulawesi Indonesia (★location of data sources)

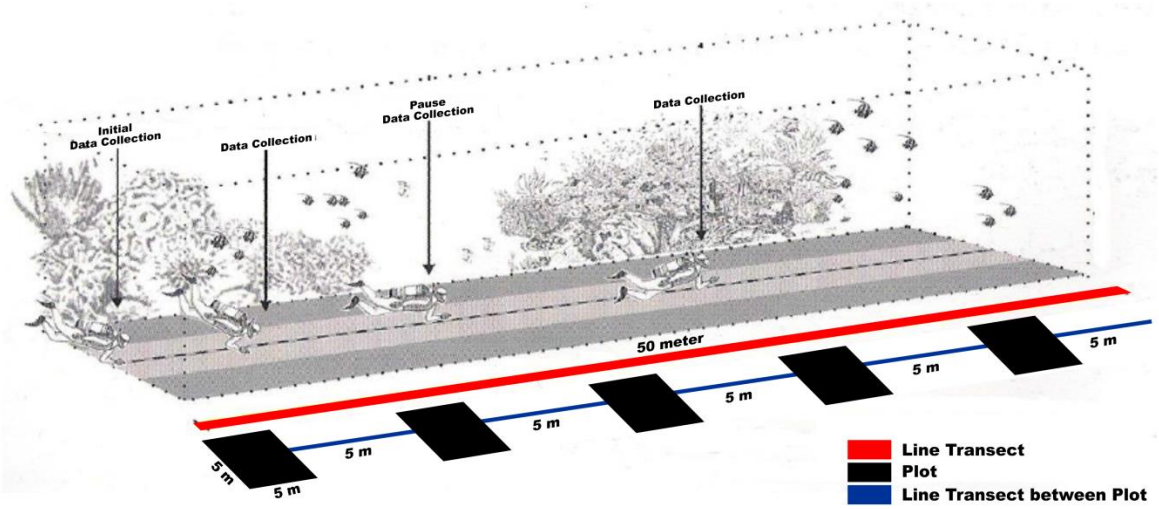

Figure 2. Line intercept transect method used for data collection

3. Result and Discussion

3.1 Distribution of marine tunicate

The latest finding on tunicate species composition in Sangkarang Archipelago indicates that number of species found as follows Samalona (18) [23], Barrang Caddi (18) [22]; Barranglompo (23) [21]; Lae-lae (7), Bone Batang (9), and Badi (10) [20] (table 1). In comparison with neighbor region, [29] has reported the number of ascidian records for Singapore to a total of 50. They also reported that 155 species were recorded from the South China Sea. [30] has documented close to 3000 species of ascidian worldwide. Furthermore, [31] have estimated there may be as many as 1500-2000 ascidian species worldwide still to be discovered and named. In the present study, as described in table 1, even though Sangkarang area is rich in marine tunicates, more studied still need to be carried out.

Table 1. List of Tunicates from different location in Sangkarang Archipelago Indonesia.

No.	Tunicate	Samalona [a)]	Barrang Caddi [b)]	Barrang Lompo [c)]	Lae-lae [d)]	Bone-Batang [e)]	Badi [f)]
1	*Clavelina robusta* Kott 1990 (white spot)	√	-	√	-	-	-
2	*Clavelina lepadiformis* Muller, 1776	√	√	-	-	-	-
3	*Clavelina sp.*	-	√	√	-	√	√
4	*Clavelina arafuensis*	-	-	√	-	-	-
5	*Clavelina moluccensis*	-	-	√	-	-	-
6	*Eudistoma sp.*	-	-	√	-	-	-
7	*Eudistoma gilboviride*	-	-	√	-	-	-
8	*Eudistoma reginum*	-	-	√	-	-	-
9	*Oxycornia fascicularis* Drasche, 1882	√	√	-	-	-	-
10	*Nephtheis fasicularis*	-	-	√	-	-	-
11	*Didemnid sp*. (brown white)	-	-	√	-	-	-
12	*Didemnid sp*. (purple)	-	-	√	-	-	-
13	*Didemnum molle* Hermann, 1986	√	√	√	√	√	√
14	*Didemnid sp*.	-	-	√	-	-	-
15	*Didemnid sp*. (white)	-	-	√	-	-	-
16	*Didemnum sp.*	-	-	√	-	-	-
17	*Trididemnum della* Ritter & Forsyth, 1917	√	-	-	-	-	-
18	*Trididemnum sp.*	-	√	-	-	-	-
19	*Lissoclinum patella* Gottschaldt 1989	√	-	√	-	-	-
20	*Diplosoma simile*	-	-	√	-	-	-

21	*Diplosoma sp.*	-	-	√	-	-	-
22	*Polycarpa aurata* Quoys & Gaimard, 1834	√	√	√	√	√	√
23	*Polycarpa captiosa*	-	-	√	-	-	-
24	*Polycarpa contecta*	-	-	√	-	-	-
25	*Polycarpa sp.*	-	-	√	-	-	-
26	*Polycarpa sp*. (brown)	-	-	√	-	-	-
27	*Polycarpa sp*. (white dots)	-	-	√	-	-	-
28	*Polycarpa papillata* Sluiter, 1886	√	√	-	-	√	√
29	*Polycarpa nigricans* Heller, 1878	√	√	-	-	-	-
30	*Polycarpa spongiabilis* Traustedt 1898	√		-	-	-	-
31	*Ascidia sp*. (brown)	-	-	√	-	-	-
32	*Ascidia kreagran*	-	-	√	-	-	-
33	*Ascidia sp*. (blue)	-	-	√	√	√	√
34	*Ascidia sp.*	-	√	-	-	-	√
35	*Ascidia ornate*	-	√	√	-	-	-
36	*Ascidia sydneinsis* Monniot F. 1898	√	-	-	-	-	-
37	*Diazona sp.*	-	-	√	-	-	-
38	*Nephtheis fasicularis*	-	-	√	-	-	-
39	*Rhopalaea sp*. (blue)	-	-	√	-	-	-
40	*Rhopalaea sp*. (yellow spot)	-	-	√	-	-	-
41	*Rhopalaea sp.*	-	√	-	√	-	√
42	*Rhopalaea crassa*	√	-	-	√	√	√
43	*Rhopalaea abdominalis*	-	-	-	√	-	-
44	*Herdmania momus*	-	-	√	-	√	√
45	*Pyura molina* Blainville, 1824	√	-	-	-	-	-
46	*Pyura sp.*	-	√	√	-	-	-
47	*Halocynthia verril* Dumosa Simpson, 1885	√	-	-	-	-	-
48	*Halocynthia sp.*	-	√	-	-	-	-
49	*Microcosmus juinii* Drasche 1884	√	-	-	-	-	-
50	*Plurella sp.*	-	-	√	-	-	-
51	*Atriolum robustum*	-	-	-	-	√	√
52	*Botryllus sp.*	-	√	-	√	√	-
53	*Pherophora sp.* (soft blue)	√	-	-	-	-	-
54	*Pherophora sp*. (orange)	√	-	-	-	-	-
55	*Perophora annectens* Ritter, 1893	√	-	-	-	-	-

Note: [a] [23]; [b] [22]; [c] [21]; [d] [20].
√ = present - = absent

3.2 Bioprospecting of marine tunicates

Sangkarang Archipelago is located South West off Makassar, consisting more than hundred islands, hence having abundant marine natural resources. This area hold importing role as habitat for various marine biotas including tunicates. Previous studies indicates that marine tunicates were potency for inoculum source for endo-symbiontic bacteria that can produce anti-bacterial and anti-fungi [7,32,33]; [34-36]. Other studies has also indicated that tunicates are also had a potency as antiviral [37], anticancer [38], inhibit and induces apoptosis of breast (MCF-7; MDA-MB) cancer cells and also used for phase II cancer treatment [39-41], as inhibits breast cancer cells by JNK dependent apoptosis [42], breast and prostate cancer [43]. Yondelin one of bioactive compound produced by tunicate is use to cure refractory soft-tissue sarcomas [44].

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