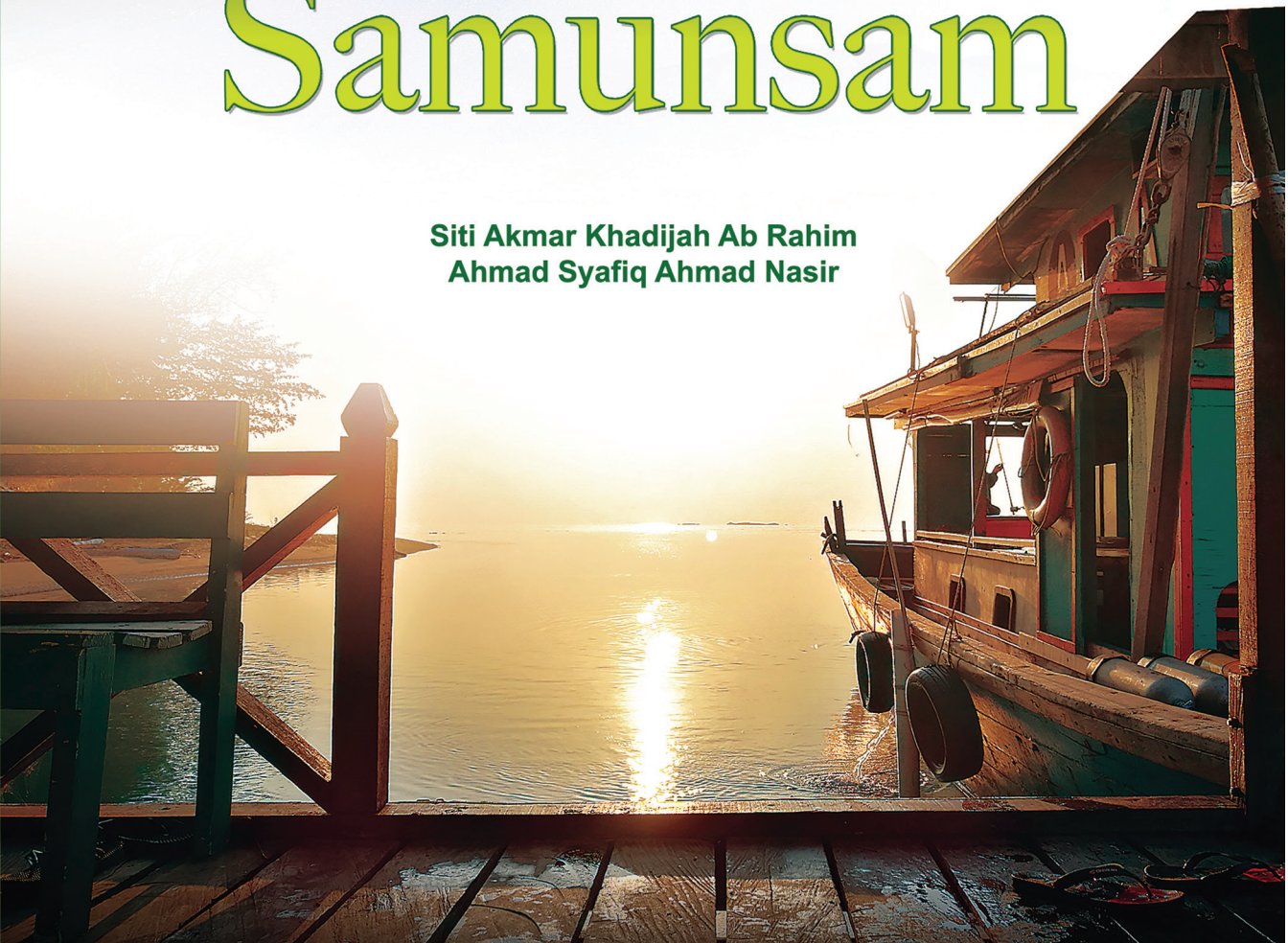


Proceeding of  
Aquatic Science Colloquium 2019 (AQUAColl 2019)  
Experience Sharing in Aquatic Science Research V

# Tanjung Datu — National Park — to Samunsam

Siti Akmar Khadijah Ab Rahim  
Ahmad Syafiq Ahmad Nasir





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—— National Park ——  
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# Tanjung Datu

National Park

# to Samunsam

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# Preface

The articles published in this proceeding are the research outcome of a joint scientific expedition in 2018 between the Programme of Aquatic Resource Science and Management, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak (UNIMAS) and Sarawak Forestry Corporation Sdn Bhd (SFCSB) entitled Tanjung Datu National Park – Samunsam Wildlife Sanctuary Marine and Coastal Resources Expedition: Biodiversity Conservation and Sustainable Utilization’. The expedition was the second research collaboration between UNIMAS and SFCSB after the first ‘Pulau Sampadi Marine Life Expedition’ in 2012. The objectives of this expedition are: (1) to collect information and establish baseline data on the aquatic environments and its available resources from Tanjung Datu National Park to Samunsam Wildlife Sanctuary areas; (2) to contribute to the development of Sarawak Marine and Coastal Conservation Master Plan and also (3) to identify and recommend potential sustainable economic activities for the local communities.

This expedition’s findings were presented during the Aquatic Science Colloquium 2019 (AQUAColl 2019) which is the fifth series of a biennial academic event that acts as a scientific platform for researchers to update, exchange and sharing of research information and findings explicitly obtained from the scientific expedition.

This AQUAColl 2019 proceeding comprises 18 research papers which reflect the aquatic and terrestrial biodiversity, physical oceanography, the status of marine pollution and socio-economic activities occurring inside or surrounding the Tanjung Datu National Park – Samunsam Wildlife Sanctuary. It is hoped that these scientific data may provide important baseline information and be beneficial towards future fisheries, oceanographic surveys and ecotourism activities in these areas.

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UNIMAS



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Ms. Cindy Peter (UNIMAS)  
Mr. Oswald Braken Tisen (SFC)

Last but not least, we thank everyone for their hard work and dedication, and we look forward to future continuous collaboration. Well done and thank you to SFC and UNIMAS!



# Marine Macromollusc Fauna along Coastal Area of Tanjung Datu National Park-Samunsam Wildlife Sanctuary

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## Abstract

*The diverse composition of seashells (Mollusca) is one of main attractions for tourists visiting sandy beaches along Tanjung Datu National Park (TDNP) to Samunsam Wildlife Sanctuary (SWS). However, information on marine macromollusc fauna along these beaches is still lacking. The stretch of coastline between TDNP and SWS is an emerging ecotourism hot spot in Sarawak, thus biodiversity information is crucial to ensure sustainable utilisation of this area. In 2018, macromolluscs samplings were performed on four sandy beaches along TDNP-SWS. Both live individuals and seashells were collected and identified up to species level using standard identification keys. A total of 37 species from 21 families of two classes were obtained, with only seven collected species were live specimens. The majority of macromolluscs found along TDNP-SWS were in the form of seashells, reflecting the high diversity of the Mollusca living in the nearby sea. Teluk Serabang had the highest number of species (24), followed by Teluk Melano (19), SWS (6) and finally TDNP (4). It is hoped that the baseline data obtained in this study are useful in*

*helping Sarawak state in formulating strategies to carry out sustainable utilisation of beaches along TDNP-SWS coastline.*

*Keywords:* molluscs, seashells, diversity

## **Introduction**

Mollusca is the second largest phylum after Arthropoda with about 117,358 living species inhabiting land, mountain, river, sea and ocean (Zhang, 2011). The phylum can be divided into three main groups, namely gastropods (Class Gastropoda), bivalves (Class Bivalvia) and the squids (Class Cephalopoda). Edible species of molluscs such as clams, mussels, oysters, scallops, snails, squids and octopuses, are global food source. In addition, to enhance local economic value, molluscs are used: (i) to create jewellery (such as pearls produced by oysters), and (ii) as important raw materials for roadbed, poultry feeds, cement production and fertilisers (Paul *et al.*, 2014). In the marine ecosystems, majority of molluscs are secondary consumers and form a part of the complex marine food web. They could also act as bioindicators, useful in monitoring changes in the marine ecosystem.

Wong and Arshad (2011) reported that a total of 581 Mollusca species (Gastropoda = 384, Bivalvia = 206) in Malaysia. In Sarawak, researchers had sampled and reported the diversity of molluscs from the mangrove areas, sandy beaches, the deep sea off Sarawak coast as well as from wet markets. Shabdin *et al.* (2014) reported that Pulau Sampadi, Sarawak has approximately 40 species of macromolluscs (7 Bivalvia, 33 Gastropoda).

This paper describes the species checklist of macromolluscs found on beaches along TDNP-SWS coastline in August 2018. This baseline data highlights the biodiversity of the studied area and it is hoped that the information will support sustainable utilisation of the area.

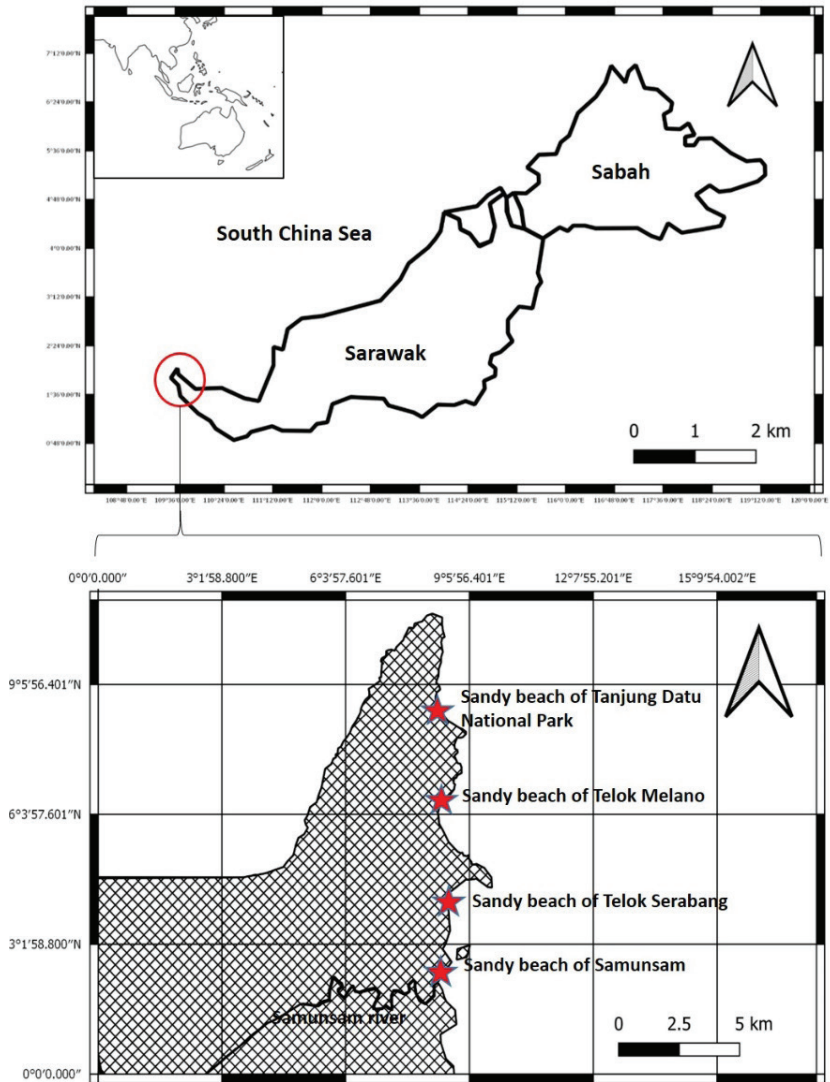
## **Materials and Methods**

### ***Field sampling***

This study was conducted on four sandy beaches located between TDNP and SWS (Figure 1 and Table 1) on 10<sup>th</sup> and 11<sup>th</sup> August 2018. Samplings were done during ebbing tide and the weather was hot, humid and sunny, common characters of the southwest monsoon season

(www.met. gov. my). Specimens were collected in the field, processed and stored following standard protocols as suggested by Throp and Rogers (2016).

Specimens were kept in safe containers and brought back to the laboratory. Upon reaching the laboratory, all specimens were washed, dried at room temperature and applied standard treatment for storage purposes (Throp and Rogers, 2016). Photographs were captured for records. Identification of species followed keys provided by Abbott & Dance (1982), Lamprell and Healy, (1998), Poppe (2008), and website <http://www.borneomolluscs.com/home.php>.



**Figure 1 :** Four sampling stations involved in this study.

**Table 1 :** Details of the sandy beaches involved in this study. SWS = Samunsam Wildlife Sanctuary, TDNP = Tanjung Datu National Park

Study site	Date	Coordinates	Remarks
TDNP	11/8/2018	N 02° 02' 29.5" E 109° 38' 59.1"	Located in a National Park
Telok Melano		N 01° 58' 57.5" E 109° 38' 49.1"	Adjacent to Kampung Telok Melano Near an abandon old jetty Boats could be seen anchored in nearby area
Telok Serabang	10/8/2018	N 01° 58' 39.8" E 109° 38' 45.4"	Adjacent to Kampung Telok Serabang. Various shells types were seen abundant on the beach. Characters of a cove
SWS		N 01° 57' 41.5" E 109° 39' 15.1"	Located in SWS Beach area is located near Samunsam River mouth Found nest of terrapin during sampling

### ***Data analyses***

The occurrence for each taxon was noted according to locations (present /absent). This study also noted unique and common species for each location.

## **Results and Discussion**

In this study, a total of 37 species from 21 families of two classes were obtained (Table 2). In a nearby island, Pulau Sampadi, Shabdin *et al.* (2014) had recorded approximately 40 species of macromolluscs (7 Bivalvia, 33 Gastropoda). In the current study, only seven species were captured alive, and they were found inhabiting tide pools, whilst the other 30 collected species were found in the form of seashells. In 2015, a total of 41 marine molluscs from 21 families were obtained from the nearby sea when a research cruise scoured the South China Sea continental shelf of depth about 20 m to 200 m off Sarawak coast



(Morni, 2018). Morni *et al.* (2017) also reported that 23 species representing 15 families of gastropods were living in the nearby continental shelf area. Moss *et al.* (2016) stated that the majority of Mollusca are short lived, with approximate lifespan of 3 years. Once died, the shells will be washed ashore, decorating the beaches and providing aesthetical value of the landscapes. From an ecological point of view, shell debris provide sand decomposition and maintain the right amount of alkaline to the seawater from the shells' carbonate content (Casado-Coy *et al.*, 2017). Seashells are commonly found in beach drift, which is natural detritus deposited along strandlines on beaches by the waves and the tides. These washed-up shells are often empty and clean, as the original inhabitants (*e.g.* clams and snails) had already died. Empty seashells are commonly picked up by beachcombers, and majority of seashells are also offered for sale commercially.

Teluk Serabang had the highest number of species found (24) followed by Teluk Melano (19), SWS (6) and finally TDNP (4). This result suggests the abundance of Mollusca is higher in the non-protected areas, compared to the national park and sanctuary. It is possible that the character of the area and the ecological processes happening over a long period of time influence the diversity and abundance of Mollusca in the area. It is noted that Teluk Serabang and Teluk Melano are sheltered bays with calm water – lacking of strong waves or rapid currents. In addition, the water circulation is relatively low, thus trapping seashells debris.

Gastropod *Luria lurida* was found in all locations, making it as the common species of this area. The edible dog conch *Laevistrombus canarium* had been found in all locations except SWS. Moreover, *Polinices mammilla* was found in all stations, except TDNP. Teluk Serabang has the highest number of unique species (13) and followed by Teluk Melano (9). SWS had two unique species whereas TDNP has only one unique species. Seven live macromolluscs (Gastropoda) in this study were collected in tide pools of the beaches. They were: the mangrove periwinkle *Littoraria scabra*, humped rocksnail *Menathais tuberosa*, grape drupe sea snail *Morula uva*, marine gastropod *Reishia luteostoma*, chameleon nerite *Nerita chamaeleon*, waved nerite snail *N. undata* and nassa mud snails *Nassarius gruneri*.

**Table 2:** Checklist of macromollusc fauna found on beaches of TDNP-SWS. SWS = Samunsam Wildlife Sanctuary, TS = Teluk Serabang, TM = Teluk Melano, TDNP = Tanjung Datu National Park. \* = live specimen

Family	Species	Location			
		SWS	TS	TM	TDNP
Cassidae	<i>Semicassis glabrata</i> (Dunker, 1852)	+	+	-	-
Cerithiidae	<i>Cerithium litteratum</i> (Born, 1778)	-	-	+	-
Columbellidae	<i>Pictocolumbella ocellata</i> (Link, 1807)	-	-	+	-
Conidae	<i>Conus anemone</i> (Lamarck, 1810)	-	+	-	-
	<i>Conus furvus</i> (Reeve, 1843)	-	+	-	-
	<i>Conus virgo</i> (Linnaeus, 1758)	-	-	+	-
Cymatiidae	<i>Gyrineum natator</i> (Röding, 1798)	-	+	-	-
	<i>Monoplex gemmatus</i> (Reeve, 1844)	-	-	+	-
Cypraeidae	<i>Erronea erronea</i> (Linnaeus, 1758)	+	+	-	-
	<i>Luria lurida</i> (Linnaeus, 1758)	+	+	+	+
Ellobiidae	<i>Pythia plicata</i> (Férussac, 1821)	-	+	-	-
Littorinidae	<i>Littoraria scabra</i> (Linnaeus, 1758)	-	+	+	-
Melongenidae	<i>Hemifusus tuba</i> (Gmelin, 1791)	-	+	-	-
Mitridae	<i>Strigatella aurantia</i> (Gmelin, 1791)	-	-	+	-
Muricidae	<i>Menathais tuberosa</i> (Röding, 1798)	-	+	-	-
	<i>Morula uva</i> (Röding, 1798)	-	+	+	-
	<i>Reishia luteostoma</i> (Holten, 1803)	-	-	+	-
Naticidae	<i>Notocochlis tigrina</i> (Röding, 1798)	-	+	-	-
	<i>Polinices hepaticus</i> (Röding, 1798)	-	+	+	-
	<i>Polinices mammilla</i> (Linnaeus, 1758)	+	+	+	-
Neritidae	<i>Nerita chamaeleon</i> (Linnaeus, 1758)	-	+	+	-
	<i>Nerita plicata</i> (Linnaeus, 1758)	-	-	+	+
	<i>Nerita undata</i> (Linnaeus, 1758)	-	+	+	-

**Table 2 :** (continued from previous page)

Family	Species	Location			
		SWS	TS	TM	TDNP
Nassariidae	<i>Nassarius crematus</i> (Hinds, 1844)	-	+	-	-
	<i>Nassarius gruneri</i> (Dunker, 1846)	-	+*	-	-
Olividae	<i>Agaronia gibbosa</i> (Born, 1778)	-	+	+	-
	<i>Oliva caerulea</i> (Röding, 1798)	+	-	-	-
Psammobiidae (Bivalvia)	<i>Hiatula lunulata</i> (Deshayes, 1855)	-	-	+	-
Strombidae	<i>Dolomena plicata</i> (Röding, 1798)	-	+	-	-
	<i>Gibberulus gibberulus</i> (Linnaeus, 1758)	-	-	+	-
	<i>Laevistrombus canarium</i> (Linnaeus, 1758)	-	+	+	+
	<i>Strombus</i> sp.	-	+	-	-
Trochidae	<i>Trochus stellatus</i> (Gmelin, 1791)	-	+	-	-
Turbinidae	<i>Turbo setosus</i> (Gmelin, 1791)	-	-	+	-
Turritellidae	<i>Turritella terebra</i> (Linnaeus, 1758)	-	+	-	-
Veneridae (Bivalvia)	<i>Circe scripta</i> (Linnaeus, 1758)	-	-	-	+
	<i>Sunetta concinna</i> (Dunker, 1865)	+	-	-	-
Total number of species		6	24	19	4

Majority of the macromolluscs found in this study were gastropods. Wong and Arshad (2011) reported higher abundance of Gastropoda was found in Malaysian waters compared to Bivalvia. Gastropoda found in this study were either herbivore grazers or predatory gastropods, thus their ecological roles in maintaining the health of the ecosystem is important (Pechenik, 2016). The shining sunset shell *Hiatula lunulata* and Venus shells *Circe scripta* and *Sunetta concinna* were the only Bivalvia found in this study.

### Summary


In this short survey, 37 species of macromollusc fauna were found along TDNP-SWS beaches. However, only seven species were live specimens, collected from the tide pools. The majority of macromolluscs found along TDNP-SWS were in the form of seashells and from Class Gastropoda. Telok Serabang had the highest number of species followed by Teluk Melano, SWS and finally TDNP. Gastropod *Luria lurida*, *Polinices mammilla* and *Laevistrombus canarium* were the common species of this area.

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# Tanjung Datu

— National Park —

to

# Samunsam

This proceeding contains an overview of inventory works performed at Tanjung Datu National Park to Samunsam Sanctuary in the year 2018 to 2019, encompassing the organisms of terrestrial and aquatic ecosystems. Simultaneously, the status of local ecotourism, fisheries and pollution were also reported. This wide coverage of findings is very useful to complement the current and future development of the Tanjung Datu – Santubong Marine and Coastal Conservation Master Plan. With the construction of the Pan Borneo coastal highway, the impacts on marine environment and socio-economic are very important to be monitored. Thus, this book can be used as the main reference for future research in that area by scientists, policymakers and stakeholders, especially the relevant state and federal agencies in Sarawak. Environmental consultancy companies can also use the baseline data for Environmental Impact Assessment purposes.



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