

# First record of saucer scallop *Ylistrum balloti* (Bernardi, 1861) from equatorial South China Sea

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Morni, W. Z. W., Abit, L. Y., Latif, K., Nerurkar, S., Hassan, R., Al–Asif, A., 2022. First record of saucer scallop *Ylistrum balloti* (Bernardi, 1861) from equatorial South China Sea. *Arxius de Miscel·lània Zoològica*, 20: 103–110, Doi: <https://doi.org/10.32800/amz.2022.20.0103>

## Abstract

*First record of saucer scallop Ylistrum balloti (Bernardi, 1861) from equatorial South China Sea. Ylistrum balloti is one of the Pectinidae species distributed within the Indo–Pacific region. Recently, 15 live specimens of Y. balloti were recorded from the continental shelf of Sarawak, Malaysia. The main morphological characteristics were displayed on the outer valve, these being a brown–red colour and a clear concentric pattern of thin brown lines. The prominent internal ribbing numbers on both valves also helped species identification. The preliminary report of Y. balloti revealed that the species is present in Sarawak waters and can be further explored in the future.*

Key words: Saucer scallop, By–catch, Alpha biodiversity, Distributions, Range extension, Malaysian Borneo

## Resumen

*Primer registro de la vieira platillo de Ballot Ylistrum balloti (Bernardi, 1861) en el mar de China meridional ecuatorial. Ylistrum balloti es una de las especies de Pectinidae distribuidas en la región del Indo–Pacífico. Recientemente se registraron 15 especímenes vivos de Y. balloti en la plataforma continental de Sarawak, Malasia. Las principales características morfológicas de Ylistrum balloti se localizan en la valva exterior de color marrón rojizo con un claro patrón de finas líneas marrones concéntricas. Además, el destacado número de nervaduras internas en ambas valvas ayuda a identificar las especies. El informe preliminar de Y. balloti reveló que la especie está presente en las aguas de Sarawak y que puede ser estudiada más a fondo en el futuro.*

Palabras clave: Vieira platillo, Captura incidental, Biodiversidad alfa, Extensión de la distribución, Borneo malayo

## Resum

*Primer registre de la petxina de pelegrí platet de Ballot Ylistrum balloti (Bernardi, 1861) al mar de la Xina meridional ecuatorial. Ylistrum balloti és una de les espècies de Pectinidae distribuïdes a la regió de l'Indopacífic. Recentment es van registrar 15 espècimens vius d'Y. balloti a la plataforma continental de Sarawak, Malàisia. Les principals característiques*

morfològiques de *Ylistrum balloti* es localitzen a la valva exterior de color marró vermellós amb un clar patró de fines línies marrons concèntriques. A més, el destacat nombre de nervadures internes a les dues valves ajuda a identificar les espècies. L'informe preliminar d'*Y. balloti* va revelar que l'espècie és present a les aigües de Sarawak i que pot ser estudiada més a fons en el futur.

Paraules clau: Petxina de pelegrí platet, Captura incidental, Biodiversitat alfa, Extensió de la distribució, Borneo malai

Received: 13/09/2022; Conditional acceptance: 19/10/2022; Final acceptance: 15/11/2022

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## Introduction

The genus *Ylistrum* was described in detail by Mynhardt et al. (2014). It comprises two species, namely, *Ylistrum japonicum* (Gmelin, 1791) and *Ylistrum balloti* (Bernardi, 1861). *Ylistrum* comes from the Greek verb 'ylistro' which is defined as 'to glide', thereby describing the gliding life habit of members of this genus (Mynhardt et al., 2014). Gliding is a type of swimming behaviour whereby scallops propel themselves forward by clapping their valves (Tremblay et al., 2015). They are able to maintain a near horizontal trajectory above the substrate (Joll, 1989).

*Y. balloti* is commonly distributed from southern and eastern Australia to New Caledonia (Abbott and Dance, 1982; Carpenter and Niem, 1998) and was reported for the first time in the Indonesian Archipelago by Dijkstra (1991). It is a commercially important species trawled in Australia (Dredge, 1988; Joll, 1994, Dichmont et al., 2000). However, recently in Yeppoon and Hervey Bay, Australia, the annual harvest of this species has decreased due to over fishing (Wortmann, 2021).

In Sarawak, *Y. balloti* has not been identified or recorded to date. Previous captures of *Y. balloti*, without sufficient photography or documentation in Sarawak waters, were most likely classified under the genus name, *Amusium* sp. Apart from this, species verification has also been conducted on the collections deposited at Sarawak Museum (Kuching), and no *Y. balloti* was found in the Mollusca sections. The current report presents the first report of *Y. balloti* from the Sarawak coast, South China Sea, Malaysia.

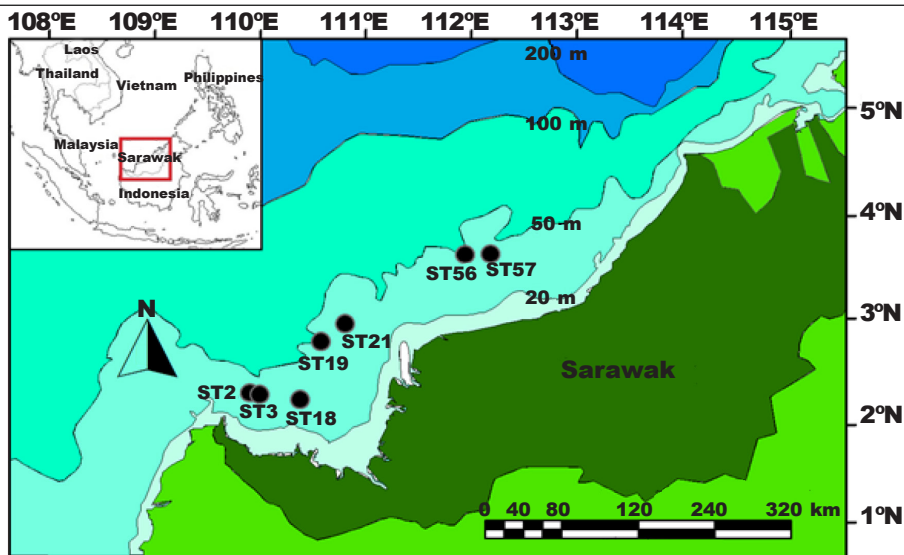


Fig. 1. Sampling stations of *Y. balloti* during the surveys in Sarawak EEZ 2015.

Fig. 1. Puntos de muestreo de *Y. balloti* en los estudios realizados en Sarawak ZEE 2015.

## Material and methods

### Sampling methods and data collection

In Sarawak, scallops are not specifically targeted and thus no specific gear are used to capture or trawl scallop species. They are commonly trapped together with finfish groups during trawling activities and are sorted immediately to be marketed locally. The scallop samples were collected from by-catch of trawling activities from NDFRS (National Demersal Fish Resource Survey) in Sarawak waters (fig. 1). The details of the study areas were mentioned by Morni et al. (2017a) and the survey was conducted from August to October 2015. Scallops that were trapped together with fish inside the net were collected, sorted, and measured. Specimens obtained from the by-catch sections were kept for identification. Otter trawl net (mesh size 38 mm at the cod end) was used and the surveyed areas were beyond 12 nautical miles off the Sarawak coastline. Scallop shell heights were measured using a dial calliper ( $\pm 0.01$  mm) and internal radial ribs were counted to aid in species identification. The voucher specimens were kept inside the freezer ( $-20^{\circ}\text{C}$ ) during the field survey. Vouchers were deposited in the Aquatic Ecology Laboratory, Department of Animal Science and Fishery, University Putra Malaysia Bintulu Sarawak Campus.

## Results

*Ylistrum balloti* was identified among the bycatch of trawling activities in the NDFRS. The species was found at Sarawak continental shelf, situated at the southern part of the South China Sea at a distance of 30–49 nautical miles off the Sarawak coast and at a sea depth of 34–42 m.

Systematics

Order Pectinida Gray, 1854  
 Superfamily Pectinoidea Rafinesque, 1815  
 Family Pectinidae Rafinesque, 1815  
 Subfamily Pectininae Rafinesque, 1815  
 Tribe Amusiini Ridewood, 1903  
 Genus *Ylistrum* Mynhardt and Alejandrino, 2014  
 Species *Ylistrum balloti* (Bernardi, 1861)

History of taxonomic works  
 See table 1.

Type locality  
 New Caledonia, Australia.

## Examined material

Specimens were found (n=15) in seven of 153 stations trawled: ST2 (lat.: 2.28972222, long.: 109.8886111, sandy and muddy), ST3 (lat.: 2.27472222, long.: 109.9933333, sandy and muddy), ST18 (lat.: 2.22916667, long.: 110.3680556, no data), ST19 (lat.: 2.78944444, long.: 110.56, no data), ST21 (lat.: 2.95888889, long.: 110.7855556, muddy), ST56 (lat.: 3.62138889, long.: 111.9197222, sandy and muddy), ST57 (lat.: 3.63111111, long.: 112.1552778, sandy and coral) (fig. 1). No *Y. balloti* were recorded at the station with a depth of over than 50 m. Samples were identified as *Ylistrum balloti* following the description of Mynhardt et al. (2014) (deposition code: UPMKB–JSHP–03–2015–01).

## Description

*Y. balloti* has a thin and slightly convex shell. Valve size was less than 70 mm in height, averaging  $62.54 \pm 6.48$  mm (n=15). The external color of the left valve is reddish–brown, with numerous thin brown concentric lines of varying thickness and random spots of the same colors. In contrast, the exterior colors of the right valve are white with brown spots along concentric lines. In contrast for *Y. japonicum* the exterior color of the right valve is yellowish with dark brown spots along radial lines on the umbonal area. The interior part of the *Y. balloti* shell is white with yellow tints along the margins of one or both valves,

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Table 1. History of taxonomic works.

Tabla 1. Histórico de trabajos taxonómicos.

Years	List of taxonomic synonyms/changes	References
1861	<i>Pecten balloti</i> Bernardi	Bernardi (1861)
1861	<i>Amusium balloti</i> Bernardi	Bernardi (1861)
1939	<i>Amusium balloti</i> Iredale	Iredale (1939)
1964	<i>Amusium japonicum balloti</i> Habe	Habe (1964)
1988	<i>Amusium balloti</i> Dijkstra	Dijkstra (1988)
2014	<i>Ylistrum</i> Mynhardt and Alejandrino (new genus established)	Mynhardt et al. (2014)
2014	<i>Ylistrum balloti</i> Bernardi	Mynhardt et al. (2014)

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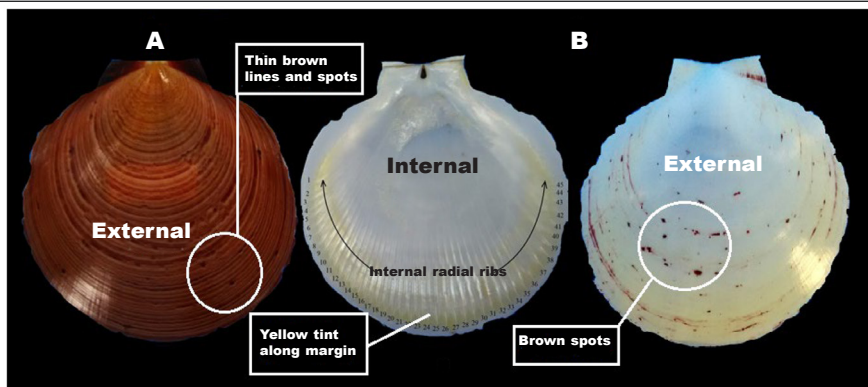


Fig. 2. Left valve (A, external) and right valve (B, internal and external) of *Y. balloti*.

Fig. 2. Valva izquierda (A, exterior) y valva derecha (B, interior y exterior) de *Y. balloti*.

while *Y. japonicum* is a glossy to pale yellow externally and internally. Internal ribbing on both valves observed averaged 35 (32–41 mm) on the left valve and 39 (35–46) on the right valve (fig. 2).

#### Remarks

The species is distinct from *Ylistrum japonicum*, with the external color of the left valve being dark red to reddish brown. The exterior parts of the right valve of *Y. balloti* are white, with concentric, irregularly sized brown spots. The right valve of the internal ribs in the present study were 35–46 (shell height < 70 mm), while previous findings by Carpenter and Niem (1998) and Mynhardt et al. (2014) found heights of 42–48 (shell height unknown) and 36–49 (shell height ~80 mm), respectively. In our study, the left valve of internal ribs was 32–41 mm, while it was 30–38 in the study of Mynhardt et al. (2014).

## Discussion

A previous study suggested *Ylistrum japonicum* (as *Y. japonicum taiwanicum*) occurs in the northern South China Sea in Taiwan (Habe, 1964, 1992). The known distribution of *Y. balloti* was eastern Australia to New Caledonia (Abbott and Dance, 1982; Carpenter and Niem, 1998), and one study suggested its occurrence in Indonesia (Dijkstra, 1991), but no records have been reported to date in equatorial South China Sea (fig. 3). To the best of our knowledge, the present observation is the first description of *Ylistrum balloti* from the equatorial South China Sea (Sarawak, Malaysia) (fig. 3).

Characteristics of the shell valve were used to define the similarity of the species found in Sarawak and Australia. The coloration of the left valve of Sarawak *Y. balloti* was slightly reddish compared to the specimen recorded from northern and southern Australia, and Sarawak *Y. balloti* was smaller (< 70 mm in shell height) than *Y. balloti* (> 80 mm in shell height) recorded from Australia. The general patterns (shape, coloration, linear structures, and internal ribs) of the shell valve in the present study were identical to those in the study of Carpenter and Niem (1998) and Mynhardt et al. (2014).

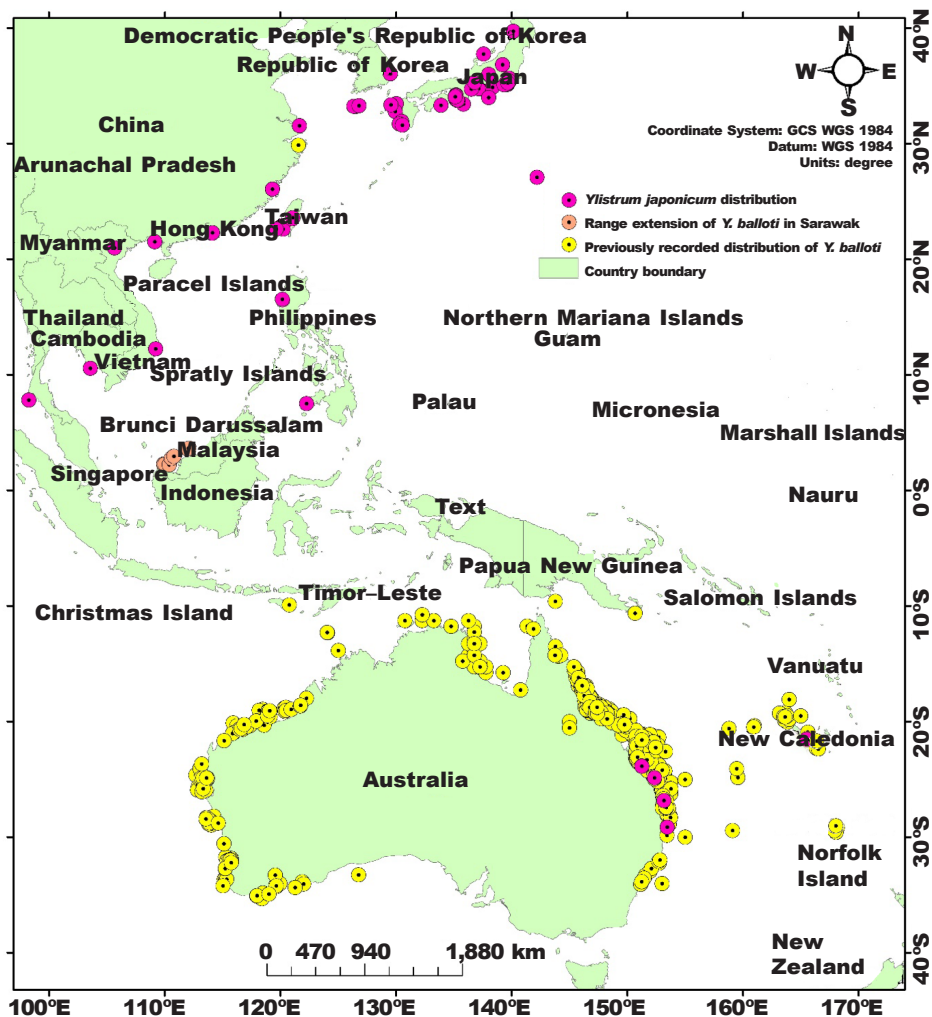


Fig. 3. World distribution of *Y. balloti* (GBIF, 2022a) and *Y. japonicum* (GBIF, 2022b) and the range extension of *Y. balloti* in the equatorial South China Sea.

Fig. 3. Distribución mundial de *Y. balloti* (GBIF, 2022a) y *Y. japonicum* (GBIF, 2022b) y extensión de la distribución de *Y. balloti* en el mar de China meridional ecuatorial.

*Y. balloti* can be found at depths of less than 15–60 m, as reported from various geographic regions (Dredge, 1988; Joll, 1989; Himmelman et al., 2009). The present study showed that the species was found on the seabed at a depth ranging from 34 to 42 m in the Sarawak. Unlike other species of scallop, *Y. balloti* are good swimmers and have been recorded to swim 30 m in a single swimming bout (Joll, 1989; Tremblay et al., 2015; Guderley and Tremblay, 2017). This data primarily involved scallops with two-valves, one muscle and a hinge ligament, which created a jet propulsion of hydrodynamic of *Y. balloti* (Tremblay et al., 2012; Guderley and Tremblay, 2017). In addition, it can withstand a wide range of

temperatures ranging, from 18–30°C (Dredge, 1988). However, the ranges of temperatures reported are still unclear in terms of whether these figures refer to water temperature at the bottom or at the surface. In the present study, the surface water temperatures ranged from 26–31°C throughout the survey.

The tropical waters of the South China Sea are well sheltered, making them a suitable habitat for a wide range of marine species (Hamli et al., 2012; Morni et al., 2017b; Al-Asif et al., 2020). However, information on the species diversity and distribution of scallops occurring in Malaysian waters is scarce, with only six species having been documented (Wong and Arshad, 2011). The landing figures for *Y. balloti* in Sarawak are still unknown due to the widespread and similar-looking *Amusium pleuronectes* that collected together in the same trawls (Matadamas et al., 2017). This thus illustrates the need for biodiversity studies as they are evidently lacking.

Apart from alien species, new records are available in most instances simply due to increased sampling and a greater number of studies. Nevertheless, there is still a lack of biodiversity studies. Very little information has been published on the Molluscs found in Sarawak in the first place. The preliminary report of *Y. balloti* revealed that the species existed in Sarawak waters and could be further explored in the future.

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## Acknowledgements

This work was supported by the Department of Fisheries, Ministry of Agriculture, Malaysia [grant numbers: P06–00100 (Malaysian Marine Fisheries Resource Assessments, 2014–2016). Special thanks to UNIMAS for land transportation, and laboratory facilities.

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