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State of knowledge of ascidian diversity in South China Sea and new records for Singapore

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Abstract. This is the first checklist of ascidians for the South China Sea and surrounding regions of Southeast Asian nations. Some 381 species of ascidians from 17 families (Clavelinidae, Diazonidae, Didemnidae, Holozoidae, Polycitoridae, Polyclinidae, Pseudodistomidae, Stomozoidae, Ascidiidae, Cionidae, Ciallusiidae, Corellidae, Perophoridae, Plurellidae, Molgulidae, Pyuridae and Styelidae) and 68 genera are documented in this paper. Only 155 species were recorded specifically from the South China Sea but the ascidian fauna of this area is poorly known. Records from the Philippines and Indonesia are somewhat better and are included. The ascidian fauna of major coastlines that border the South China Sea such as those of China, Vietnam and East and West Malaysia Peninsula are poorly studied and published data are lacking. A total of 13 new records of ascidians collected during the 2013 Singapore Straits Expedition are also listed, bringing the number of ascidian records for Singapore to a total of 50.

Key words. South China Sea, ascidian, biodiversity, distribution

INTRODUCTION

Commonly known as tunicates due to their cellulose-based tunic, ascidians belong to the phylum Chordata (subphylum: Tunicata, Class Ascidiacea). For a very brief period in the life history of ascidians, the free-swimming tadpole larva carries a notochord, which is lost during metamorphosis into the adult form. Under Class Ascidiacea, ascidians are further divided into three orders based on the structure of the adult branchial sac: Aplousobranchia (with simple slits), Phlebobranchia (with vessels) and Stolidobranchia (with folds). Kott (1985, 2005b) and Shenkar & Swalla (2011) reviewed the establishment and taxonomic systematics of ascidians.

All ascidians are sessile, strictly marine and range in organisation from solitary animals to aggregates to complex colonial systems. Size of individuals varies from a few millimeters to tens of centimeters. They are found from shallow coastal seas to deep waters (Millar, 1971, 1988; Monniot et al., 1991; Monniot, 1993, 1998; Young & Vázquez, 1997; Sanamyan & Sanamyan, 1998, 2002; Lambert, 2005; Kott, 2008a, b) and thrive in warm tropical regions to the cold oceans of the Arctic (Trason, 1964) and Antarctic (Primo & Vázquez, 2007; Monniot et al., 2011) Oceans. The majority of ascidians are filter feeders, capturing bacteria, phytoplankton and particulate matter in the water with a mucous net lining the inside of the branchial sac. Some deep-water species however are carnivorous, having to adapt and cope with the lack of food in the harsh environment they inhabit (Monniot & Monniot, 1990; Lescano et al., 2011; Tatián et al., 2011; Mecho et al., 2014).

The South China Sea (SCS) covers a vast area of 3.3 million km^2 with a myriad of habitats ranging from coastal mangroves, seagrass meadows, reefs to atolls and depths ranging from shallow coastal fringe to over 5000 m deep in the Manila Trench. The SCS is a marginal sea (Fig. 1) connected to the Pacific Ocean, the Sulu Sea, the Java Sea and Indian Ocean through the Luzon, Balabac, Karimata and Malacca Straits respectively. The surface currents of the SCS are generated by the summer southwest and winter northeast monsoon winds (Morton & Blackmore, 2001). During the summer months (May-September), water entering the SCS from the Java Sea sweeps through the central area before leaving via the Taiwan Straits. The winter Northeast Monsoon sends cooler water through the Taiwan Straits to the coasts of China and Vietnam; the water then either exits via the Karimata Straits or turns northeasterly along Borneo and Palawan, returning to the northern edge of the SCS.

More than 3000 species of fishes (Randall & Lim, 2000), over 1500 species of sponges (Hooper et al*.,* 2000) and 193 species of nudibranchs (Sachidhanandam et al., 2000) have been documented in this region. While Shenkar & Swalla (2011) documented close to 3000 species of ascidians worldwide, very little is known about the diversity of ascidians within the South China Sea as what little work that has been in the region and published is scattered across the literature. Appeltans et al., (2012) have estimated there may be as many as 1500–2000 ascidian species worldwide still to be discovered and named. This paper attempts to consolidate

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the available data and provide a checklist of ascidian species to reflect the actual diversity within this area.

MATERIAL AND METHODS

The following list of cited species and distribution data was compiled from 43 publications comprising detailed monographs, checklists, and chemistry and natural products research papers from within the last century. Major publications referenced in this paper include Van Name (1918), Millar (1975), Kott (1985, 1990, 1992, 2001) and Monniot & Monniot (1996, 2001), many of which include important data from 19th century publications. Although we were unable to verify the accuracy of published data, the validity of cited species was checked against The Ascidiacea World Database (Shenkar et al., 2016), on which our classification scheme is based. As much as possible, the most recent entries providing synonymy and monographs were chosen for presentation in this checklist. In many cases, exact locations of collections were not provided. Therefore, it is to be noted that species presented in this paper are not necessarily confined within the South China Sea but also include records found elsewhere around the seas of Southeast Asian nations.

New records of ascidians from Singapore were collected during the Singapore Straits Expedition in May 2013 as part of the Comprehensive Marine Biodiversity Survey (CMBS) and were identified by Gretchen Lambert.

RESULTS

Three hundred and eighty one species of ascidians from 17 families (Clavelinidae, Diazonidae, Didemnidae, Holozoidae, Polycitoridae, Polyclinidae, Pseudodistomidae, Stomozoidae, Ascidiidae, Cionidae, Ciallusiidae, Corellidae, Perophoridae, Plurellidae, Molgulidae, Pyuridae and Styelidae) and 68 genera are documented in this paper (Table 1). However only 155 species were specifically recorded from the South China Sea (see Fig. 1). Morphological characteristics of each family (arranged alphabetically under respective orders) are briefly summarised below.

Order Aplousobranchia Lahille, 1887

Family Clavelinidae Forbes & Hanley, 1848 consists of colonial species with partially or completely embedded zooids in a soft and transparent tunic. In all species, body is divided into thorax and abdomen, siphons have smooth margins, branchial sac has more than three rows of stigmata and larvae are incubated in the atrial cavity. The gonads are in the posterior part of the abdomen.

Family Diazonidae Seeliger, 1906 has both solitary and colonial species. The latter are either partially or completely embedded. Members of this family have a gelatinous and translucent tunic, six-lobed siphons, large branchial sac with numerous rows of stigmata and vertical abdomen posterior to the thorax. Replication is carried out vegetatively and reproduction is by external fertilisation.

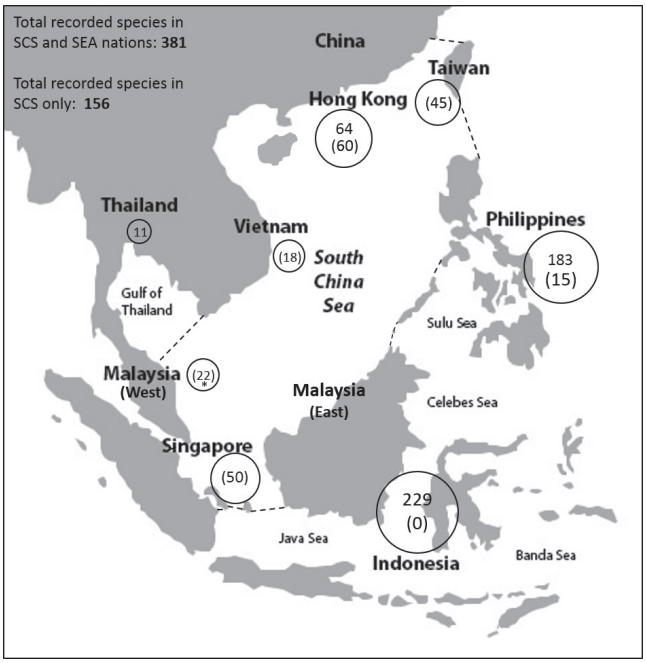

Fig. 1. Ascidian species richness of South East Asia (SEA) nations and the South China Sea (SCS). Numbers indicate total documented ascidian records of species for each country; numbers in parentheses refer to records from within SCS. * Malaysia (East and west combined) has a total of 23 records but only 22 were listed from SCS. Dotted line demarcates the limit of SCS.

Family Didemnidae Giard, 1872 consists of colonials with extensive cloacal systems. Colonies are often thin and encrusting although some species are cushion or sheet-like. Most species have calcareous spicules embedded within the tunic with the exception of *Diplosoma* and a select few species from other genera. The small zooids are divided into thorax and abdomen; branchial sac has three or four rows of stigmata. The colonies replicate through oesophageal budding; fertilisation is carried out internally and larvae are brooded in the base or centre of colony.

Family Holozoidae Berrill, 1950 is made up of members with soft and fleshy colonies. These colonies may be stalked or form sessile cushions or sheets. Zooids are divided into thorax and abdomen, are completely embedded in the tunic and are usually arranged in circular systems around common cloacal openings; branchial siphons are six-lobed while atrial siphons are either six-lobed or have large sessile openings with anterior lip. There are usually three to four rows of stigmata. Internally fertilised eggs are incubated in a thoracic pouch.

Family Polycitoridae Michaelsen, 1904 consists of colonial species, usually with completely embedded zooids. The firm tunic may contain embedded sand or particles. Zooids in most species are long and narrow, divided into short thorax and usually elongated abdomen; zooids may be arranged in somewhat circular systems though the atrial siphons open separately to the surface. The colonies replicate through strobilation of the abdomen. Fertilisation is carried out internally.

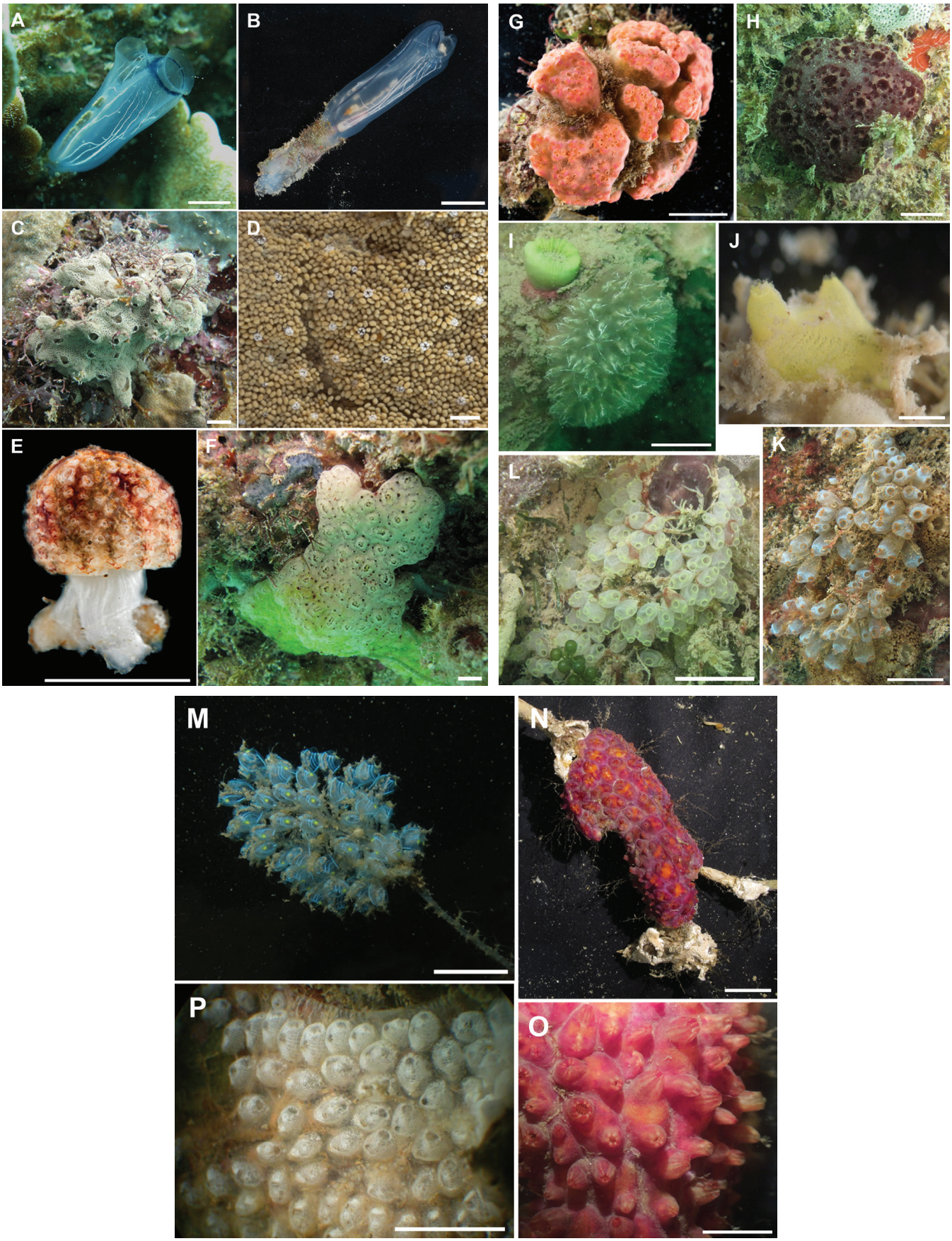

Fig. 2. New records of ascidians from Singapore: photographs of living specimens. (A, B) *Rhopalaea macrothorax* (A, in situ; B, after removal from substratum); (C, D) *Didemnum psammatodes*; (C, in situ; D, close-up view of fecal pellets and oral siphons marked with rings of spicules on the surface of colony); (E) *Distaplia mikropnoa*; (F) *Eudistoma amplum*; (G) *Eudistoma laysani*; (H) *Eudistoma reginum*; (I) *Pseudodistoma fragile*; (J) *Ecteinascidia nexa*; (K) *Ecteinascidia thurstoni*; (L) *Perophora modificata*; (M) *Perophora namei*; (N, O) *Eusynstyela hartmeyeri* (N, colony; O, close up of individual zooids); (P) *Symplegma brakenhielmi*. Scale bars = 1 cm (A–C, E–I, K–N); 5 mm (O, P); 1 mm (D, J).

Table 1. List of ascidian species documented from the South China Sea, with locality data and references (families within each order are arranged alphabetically). Records specific to South China Sea are indicated as (**SCS**) under the Reference column. Symbols used: ^ a taxonomic reference whereby in that particular instance, author(s) presented the listed species in a checklist or with short remarks, without detailed descriptions. # publication of non-taxonomic nature in which no taxonomist(s) were acknowledged for specimen identification. ## publication of non taxonomic nature with acknowledgement of taxonomist(s) for specimen identification. * unpublished doctorate thesis.

Taxon	Taxonomic Authority	Country	Reference
Order APLOUSOBRANCHIA	Lahille, 1887		
Family CLAVELINIDAE	Forbes & Hanley, 1848		
Genus *Clavelina*	Savigny, 1816		
Clavelina arafurensis	Tokioka, 1952	Philippines	Kott, 1990; Monniot & Monniot, 2001
Clavelina cyclus	Tokioka & Nishikawa, 1975	Thailand (Andaman Sea)	Chavanich et al., 2009 ##
		Taiwan	Su, 2013* (**SCS**)
Clavelina detorta	(Sluiter, 1904)	Indonesia	Monniot & Monniot, 2001
		Philippines	Van Name, 1918; Millar, 1975; Monniot & Monniot, 2001
Clavelina fecunda	(Sluiter, 1904)	Indonesia	Kott, 1990; Monniot & Monniot, 2001
		Malaysia (Pulau Langkawi)	Monniot & Monniot, 2001
		Philippines	Kott, 1990; Monniot & Monniot, 2001
		Taiwan	Su, 2013* (**SCS**)
Clavelina maculata	Monniot & Monniot, 2001	Philippines	Monniot & Monniot, 2001
Clavelina meridionalis	(Herdman, 1891)	Indonesia	Kott, 1990; 2008; Monniot & Monniot, 1996
Clavelina moluccensis	(Sluiter, 1904)	Indonesia	Kott, 1990; Monniot & Monniot, 2001
		Philippines	Kott, 1990; Monniot & Monniot, 2001
		Singapore	Kott, 1990 (SCS)
		Taiwan	Su, 2013* **(SCS)**
Clavelina obesa	Nishikawa & Tokioka, 1976	Indonesia	Gittenberger et al., 2014 ##
		Taiwan	Su, 2013* (**SCS**)
Clavelina oliva	Kott, 1990	Philippines	Kott, 1990
Clavelina picta	(Verrill, 1900)	Malaysia	Hussein et al., 2002 # (**SCS**)
Clavelina robusta	Kott, 1990	Indonesia	Kott, 1990; Monniot & Monniot, 1996
		Philippines	Kott, 1990; Monniot & Monniot, 2001
Clavelina viola	Tokioka & Nishikawa, 1976	Taiwan	Su, 2013* (**SCS**)
Genus *Nephtheis*	Gould, 1856		
Nephtheis fascicularis	(Drasche, 1882)	Indonesia	Kott, 1990; Monniot & Monniot, 1996; 2001
		Philippines	Kott, 1990; Monniot & Monniot, 1996; 2001 (**SCS**)
Genus *Pycnoclavella*	Garstang, 1891		
Pycnoclavella detorta	(Sluiter, 1904)	Indonesia	Kott, 1990
		Philippines	Kott, 1990
Pycnoclavella diminuta	(Kott, 1957)	Philippines	Kott, 1990
		Taiwan	Su, 2013* (**SCS**)
Family DIAZONIDAE	Seeliger, 1906		
Genus *Diazona*	Savigny, 1816		
Diazona angulata	Monniot & Monniot, 1996	Indonesia	Monniot, 2009
		Philippines	Monniot & Monniot, 1996
Diazona carnosa	Monniot & Monniot, 1996	Philippines	Monniot & Monniot, 1996

Taxon	Taxonomic Authority	Country	Reference
Diazona chinensis	(Tokioka, 1955)	China	Monniot & Monniot, 2001
		Indonesia	Monniot & Monniot, 1996, 2001 ^
		Philippines	Monniot & Monniot, 1989; 1996; 2001 ^
Diazona formosa	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996
		Philippines	Monniot & Monniot, 2001 ^ (**SCS**)
Diazona grandis	(Oka, 1906)	China-Eastern Sea	Monniot & Monniot, 1996 (see remarks p. 216)
Diazona labyrinthea	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996
Diazona tenera	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996
		Philippines	Monniot & Monniot, 2001 ^
Diazona textura	Monniot, 1987	Indonesia	Kott, 2009
		Philippines	Kott, 2009
		Taiwan	Su, 2013* (**SCS**)
Genus *Pseudorhopalaea*	Millar, 1975		
Pseudorhopalaea solitaris	Millar, 1975	Singapore	Millar, 1975 (**SCS**)
Genus *Rhopalaea*	Philippi, 1843		
Rhopalaea crassa	(Herdman, 1880)	Hong Kong	Kott, 1990 (**SCS**)
		Indonesia	Kott, 1990; 2003; 2008a ^
		Philippines	Kott, 1990; Monniot & Monniot, 2001
		Singapore	Lee et al., 2013 (**SCS**)
Rhopalaea fusca	(Herdman, 1880)	Indonesia	Monniot & Monniot, 2001
		Philippines	Monniot & Monniot, 2001
Rhopalaea macrothorax	Tokioka, 1953	Indonesia	Monniot & Monniot, 2008
		Malaysia	Monniot & Monniot, 2008 (**SCS**)
		Singapore	Lambert, G. pers. obs. 2014 (SCS)
Rhopalaea respiciens	Monniot, 1991	Taiwan	Su, 2013* (**SCS**)
Rhopalaea tenuis	(Sluiter, 1904)	Indonesia	Kott, 1990
Family DIDEMNIDAE	Giard, 1872		
Genus *Atriolum*	Kott, 1983		
Atriolum robustum	Kott, 1983	Malaysia	Hussein et al., 2002 # (**SCS**)
Genus *Didemnum*	Savigny, 1816		
Didemnum ahu	Monniot & Monniot, 1987	Indonesia	Monniot, 2009
Didemnum aspersum	Tokioka, 1953	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott & Goodbody, 1982 (**SCS**)
Didemnum albopunctatum	Sluiter, 1909	Indonesia	Kott, 2001
Didemnum areolatum	(Herdman, 1906)	China	Zheng, 1995 ^ (**SCS**)
Didemnum caesium	Sluiter, 1909	Indonesia	Kott, 2001
Didemnum candidum	Savigny, 1816	Philippines	Tokioka, 1970 (**SCS**)
Didemnum chartaceum	Sluiter, 1909	Indonesia	Kott, 2001
		Philippines	Kott, 2001
Didemnum clavum	(Kott, 2001)	Indonesia	Kott, 2001
Didemnum cuculliferum	(Sluiter, 1909)	Indonesia	Kott, 2001; Monniot & Monniot, 2001
Didemnum dealbatum	Sluiter, 1909	Indonesia	Kott, 2001 ^
Didemnum digestum	Sluiter, 1909	Indonesia	Kott, 2001 ^
		Philippines	Van Name, 1918 ^
Didemnum elongatum	Sluiter, 1909	Indonesia	Kott, 2001
Didemnum etiolum	Kott, 1982	Philippines	Kott, 2001
Didemnum fragile	Sluiter, 1909	Indonesia	Kott, 2001
		Malaysia	Monniot & Monniot, 1996
Didemnum fucatum	Sluiter, 1909	Indonesia	Kott, 2001
Didemnum fuscum	(Oka, 1931)	China	Zheng 1995 ^ (**SCS**)
		Indonesia	Kott, 2001

Taxon	Taxonomic Authority	Country	Reference
Didemnum grande	(Herdman, 1886)	Indonesia	Kott, 2001
		Philippines	Van Name, 1918; Kott, 2001
Didemnum granulatum	Tokioka, 1954	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott & Goodbody, 1982 (**SCS**)
		Philippines	Monniot & Monniot, 2001 ^
		Taiwan	Su, 2013* (**SCS**)
Didemnum guttatum	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996; Kott, 2001
		Philippines	Monniot & Monniot, 2001 ^
Didemnum jedanense	Sluiter, 1909	Indonesia	Kott, 2001; 2008a
Didemnum linguiferum	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996, 2001 ^
		Philippines	Monniot & Monniot, 2001 ^
Didemnum membranaceum	Sluiter, 1909	Hong Kong	Kott, 2001 (**SCS**)
		Indonesia	Kott, 2001
		Malaysia	Monniot & Monniot, 2008 (**SCS**)
		Taiwan	Su, 2013* (**SCS**)
Didemnum misakiense	(Oka & Willey, 1892)	Philippines	Tokioka, 1967b
Didemnum molle	(Herdman, 1886)	Indonesia	Monniot & Monniot, 1996; Kott, 2001; Hirose et al., 2014
		Malaysia	Hussein et al., 2002 # (**SCS**)
		Philippines	Kott, 2001
		Taiwan	Hirose & Nozawa, 2010 (**SCS**)
Didemnum moseleyi	(Herdman, 1886)	Hong Kong	Kott & Goodbody, 1982 (**SCS**); Monniot & Monniot, 1996 (**SCS**)
		Indonesia	Kott, 2001
		Philippines	Tokioka, 1970 (**SCS**); Monniot & Monniot, 1996; Kott, 2001
Didemnum multispirale	Kott, 2001	Indonesia	Kott, 2001
Didemnum nekozita	Tokioka, 1967	Philippines	Kott, 2004b
Didemnum nivale	Monniot & Monniot, 2008	Malaysia	Monniot & Monniot, 2008 (**SCS**)
Didemnum nigrum	Monniot & Monniot, 1996	Philippines	Monniot & Monniot, 1996
Didemnum ossium	Kott, 2001	Philippines	Kott, 2001
Didemnum parau	Monniot & Monniot, 1987	Philippines	Monniot & Monniot, 2001 ^; Kott, 2001 ^
Didemnum pardum	Tokioka, 1962	Taiwan	Su, 2013* (**SCS**)
Didemnum perlucidum	F. Monniot, 1983	Indonesia	Monniot & Monniot, 1996
		Philippines	Monniot & Monniot, 2001 ^
Didemnum perplexum	Kott, 2001	Indonesia	Kott, 2001
		Taiwan	Su, 2013* (**SCS**)
Didemnum poecilomorpha	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996; Kott, 2001
		Philippines	Monniot & Monniot, 1996; Kott, 2001
Didemnum psammatodes	(Sluiter, 1895)	China	Tokioka, 1967b [=*Didemnum dorotubu*]; Kott, 2001
		Indonesia	Kott, 2001
		Philippines	Tokioka, 1967b [=*Didemnum dorotubu*]; Kott, 2001
		Singapore	Lambert, G. pers. obs. 2013 (**SCS**)
Didemnum recurvatum	Sluiter, 1909	Indonesia	Millar, 1975; Kott, 2001 ^
Didemnum rodriguesi	Rocha & Monniot, 1993	Vietnam	Monniot, 2010 (**SCS**)
Didemnum rubeum	Monniot & Monniot, 1996	Indonesia	Monniot, 2009
Didemnum sordidum	Kott, 2001	Hong Kong	Kott, 2001 (**SCS**)
		Philippines	Kott, 2001
Didemnum spongiodes	Sluiter, 1909	Indonesia	Kott, 2001
		Philippines	Millar, 1975
Didemnum stercoratum	Monniot & Monniot, 1996	Philippines	Monniot & Monniot, 1996; Kott, 2001 ^
Didemnum stragulum	Kott, 2001	Indonesia	Kott, 2001
Didemnum tabulatum	Sluiter, 1909	Indonesia	Kott, 2001
Didemnum tonga	(Herdman, 1886)	Hong Kong	Kott & Goodbody, 1982 (**SCS**)
Didemnum viride	(Herdman, 1906)	Philippines	Kott, 2001

Taxon	Taxonomic Authority	Country	Reference
Genus *Diplosoma*	Macdonald, 1859		
Diplosoma aggregatum	Hirose & Hirose, 2009	Taiwan	Hirose & Nozawa, 2010 (**SCS**)
Diplosoma gumavirens	Hirose & Oka, 2009	Indonesia	Hirose et al., 2014
		Taiwan	Hirose & Nozawa, 2010 (**SCS**)
Diplosoma listerianum	(Milne-Edwards, 1841)	China	Zheng, 1995 ^ (**SCS**) [=*Leptoclinum mitsukurii*]
		Hong Kong	Tokioka & Nishikawa, 1975 ^ (**SCS**) [=*Diplosoma mitsukurii*]
		Indonesia	Millar, 1975 [=*Diplosoma macdonaldi*]; Kott, 2001
		Philippines	Tokioka, 1970 (**SCS**) [=*Diplosoma macdonaldi*]
		Thailand	Millar, 1975 [=*Diplosoma macdonaldi*]
Diplosoma marsupiale	Monniot & Monniot, 2001	Philippines	Monniot & Monniot, 2001
Diplosoma ooru	Hirose & Suetsugu, in Oka, Suetsugu & Hirosa (2005)	Taiwan	Hirose & Nozawa, 2010 (**SCS**)
Diplosoma pannosum	Monniot & Monniot, 2001	Philippines	Monniot & Monniot, 2001
Diplosoma simile	(Sluiter, 1909)	Indonesia	Kott, 2001; Hirose et al., 2014
		Philippines	Kott, 2001
		Singapore	Kott, 2001; Su et al., 2013 (**SCS**)
		Taiwan	Hirose & Nozawa, 2010 (**SCS**)
Diplosoma simileguwa	Oka, Suetsuga & Hirose, 2005	Indonesia	Hirose et al., 2014
		Taiwan	Hirose & Su, 2011 (**SCS**)
Diplosoma translucidum	(Hartmeyer, 1909)	Indonesia	Kott, 2001
Diplosoma versicolor	Monniot, 1994	Malaysia	Monniot, 2010 (**SCS**)
		Philippines	Monniot & Monniot, 2001; Kott, 2004a
Diplosoma virens	(Hartmeyer, 1909)	Indonesia	Kott, 2001; Hirose et al, 2014
		Philippines	Kott, 2001
		Taiwan	Hirose & Nozawa, 2010 (**SCS**)
Genus *Leptoclinides*	Bjerkan, 1905		
Leptoclinides aciculus	Kott, 2001	Philippines	Kott, 2002b
Leptoclinides cuspidatus	(Sluiter, 1909)	Indonesia	Kott, 2001
Leptoclinides dubius	(Sluiter, 1909)	Indonesia	Kott, 2001
		Philippines	Kott, 2001
Leptoclinides madara	Tokioka, 1953	Hong Kong	Kott & Goodbody, 1982 (**SCS**)
		Philippines	Monniot & Monniot, 2001
Leptoclinides marmoratus	(Sluiter, 1909)	Indonesia	Millar, 1975; Kott, 2001
		Philippines	Millar, 1975
		Thailand	Millar, 1975
Leptoclinides oscitans	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996
Leptoclinides reticulatus	(Sluiter, 1909)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott & Goodbody, 1982 (**SCS**)
		Indonesia	Monniot & Monniot, 1996
Leptoclinides rufus	(Sluiter, 1909)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott & Goodbody, 1982 (**SCS**)
		Indonesia	Kott, 2001
Leptoclinides subviridis	(Sluiter, 1909)	Indonesia	Monniot & Monniot, 2001
		Philippines	Monniot & Monniot, 2001
Leptoclinides sulawesii	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996; Kott, 2001
		Philippines	Monniot & Monniot, 2001 ^
Leptoclinides variegatus	Kott, 2001	Taiwan	Su, 2013* (**SCS**)
Genus *Lissoclinum*	Verrill, 1871		
Lissoclinum badium	Monniot & Monniot, 1996	Indonesia	Wang et al., 2009 #
		Taiwan	Su, 2013* (**SCS**)

Taxon	Taxonomic Authority	Country	Reference
Lissoclinum bistratum	(Sluiter, 1905)	Malaysia	Monniot, 2010 (**SCS**)
		Philippines	Kott, 2001
		Singapore	Kott, 2001; Su et al., 2013 (**SCS**)
		Taiwan	Hirose & Nozawa, 2010 (**SCS**)
Lissoclinum fragile	(Van Name, 1902)	Philippines	Tokioka, 1967b
Lissoclinum multifidum	(Sluiter, 1909)	Indonesia	Kott, 2001
		Thailand	Kott, 2001
Lissoclinum patella	(Gottschaldt, 1898)	Indonesia	Kott, 2001; Hirose et al., 2014
		Philippines	Kott, 2001
		Singapore	Macdonald & Ireland, 1992 ## (**SCS**)
Lissoclinum punctatum	Kott, 1977	Indonesia	Hirose et al., 2014
		Singapore	Kott, 2001; Su et al., 2013 (**SCS**)
Lissoclinum reginum	Kott, 2001	Taiwan	Su, 2013* (**SCS**)
Lissoclinum roseum	Kott, 2001	Malaysia	Monniot, 2010 (**SCS**)
Lissoclinum taratara	Monniot & Monniot, 1987	Indonesia	Kott, 2001
Lissoclinum timorense	(Sluiter, 1909)	Indonesia	Kott, 2001; Hirose et al., 2014
		Philippines	Kott, 2001
		Singapore	Su et al., 2013 (**SCS**)
		Taiwan	Su, 2013* (**SCS**)
		Vietnam	Monniot, 2010 (**SCS**)
Lissoclinum triangulum	(Sluiter, 1909)	Indonesia	Millar, 1975 [=*Echinoclinum triangulum*]; Kott, 2001
		Philippines	Kott, 2001
Genus *Polysyncraton*	Nott, 1892		
Polysyncraton arafurensis	Tokioka, 1952	Taiwan	Su, 2013* (**SCS**)
Polysyncraton aspiculatum	Tokioka, 1949	Philippines	Monniot & Monniot, 2001 (**SCS**)
Polysyncraton cuculliferum	(Sluiter, 1909)	Indonesia	Kott, 2002b
Polysyncraton millepore	Vasseur, 1968	Philippines	Kott, 2004b
Polysyncraton nigropunctatum	Sluiter, 1909	Indonesia	Kott, 2001
Polysyncraton purou	Monniot & Monniot, 1987	Philippines	Kott, 2002b
Polysyncraton thallomorpha	Monniot F., 1993	Philippines	Monniot & Monniot, 2001 ^
Genus *Tridemnum*	Della Valle, 1881		
Tridemnum clinides	Kott, 1977	Phillippines	Kott, 1980; 2001
		Taiwan	Hirose & Nozawa, 2010 (**SCS**)
Tridemnum cyclops	Michaelsen, 1921	Indonesia	Monniot & Monniot, 1996 ^
		Philippines	Kott, 2001
		Singapore	Su et al., 2013 (**SCS**)
		Taiwan	Hirose & Nozawa, 2010 (**SCS**)
Tridemnum discrepans	(Sluiter, 1909)	Indonesia	Kott, 2001; Monniot & Monniot, 2001
		Philippines	Kott, 2001; Monniot & Monniot, 2001
		Thailand	Kott, 2001
Tridemnum dispersum	(Sluiter, 1909)	Indonesia	Kott, 2001
Tridemnum granosum	Sluiter 1909	Indonesia	Kott, 2001 ^
		Philippines	Tokioka, 1970 ^
Tridemnum maratuae	Monniot & Monniot, 2008	Indonesia	Monniot & Monniot, 2008
Tridemnum marmoratum	(Sluiter, 1909)	Indonesia	Kott, 2002b
Tridemnum miniatum	Kott, 1977	Indonesia	Kott, 2001; Hirose et al., 2014
		Philippines	Kott, 1980; 2001
Tridemnum nubilum	Kott, 1980	Philippines	Kott, 2001
Tridemnum orbiculatum	(Van Name, 1902)	Taiwan	Su, 2013* (**SCS**)
Tridemnum paracyclops	Kott, 1980	Philippines	Kott, 2001
Tridemnum pigmentatum	Kott, 2001	Indonesia	Kott, 2001
Tridemnum planum	Sluiter, 1909	Indonesia	Kott, 2001
Tridemnum polyorchis	Monniot & Monniot, 1996	Philippines	Monniot & Monniot, 2001 ^

Taxon	Taxonomic Authority	Country	Reference
Tridemnum savignii	(Herdman, 1886)	Indonesia	Kott, 2001
		Philippines	Tokioka, 1967b
Tridemnum sibogae	(Hartmeyer, 1910)	Indonesia	Kott, 2001; 2002b
Tridemnum strigosum	Kott, 1980	Philippines	Monniot & Monniot, 2001
Tridemnum tenebricosum	(Sluiter, 1909)	Indonesia	Monniot & Monniot, 2008
		Malaysia	Monniot & Monniot, 2008 (**SCS**)
Tridemnum tomarahi	Monniot & Monniot, 1987	Philippines	Kott, 2001
Family HOLOZOIDAE	Berrill, 1950		
Genus *Distaplia*	Della Valle, 1881		
Distaplia cuscina	Kott, 1990	Philippines	Kott, 1990
Distaplia mikropnoa	(Sluiter, 1909)	Indonesia	Monniot & Monniot, 2001
		Singapore	Lambert, G. pers. obs. 2013 (**SCS**)
Distaplia stylifera	(Kowalevsky, 1874)	Philippines	Kott, 1990; Monniot & Monniot, 2001
Distaplia vallii	Herdman, 1886	Philippines	Van Name, 1918 [=*Holozoa vallii*]; Millar, 1975
Genus *Hypodistoma*	Tokioka, 1967		
Hypodistoma deerratum	(Sluiter, 1895)	Philippines	Kott, 1990
Genus *Sigillina*	Savigny, 1816		
Sigillina signifera	(Sluiter, 1909)	Indonesia	Kott, 1990
		Philippines	Monniot & Monniot, 1996 ^
Genus *Sycozoa*	Lesson, 1832		
Sycozoa pulchra	(Herdman, 1886)	Indonesia	Kott, 1990
		Philippines	Van Name, 1918
Sycozoa seiziwadai	Tokioka, 1952	Indonesia	Kott, 2008a ^
		Philippines	Kott, 1990; 2008a ^
Family POLYCITORIDAE	Michaelsen, 1904		
Genus *Cystodytes*	Drasche, 1884		
Cystodytes dellachiajei	(Della Valle, 1877)	Indonesia	Millar, 1975 ^
		Philippines	Kott, 1990; 2008a ^
Cystodytes philippinensis	Herdman, 1886	Philippines	Van Name, 1918
Cystodytes rufus	(Sluiter, 1909)	Philippines	Van Name, 1918 ^
Cystodytes semicataphractus	(Sluiter, 1909)	Philippines	Van Name, 1918 ^
Genus *Eucoelium*	Savigny, 1816		
Eucoelium pallidus	(Millar, 1962)	Taiwan	Su, 2013* (**SCS**)
Genus *Eudistoma*	Caullery, 1909		
Eudistoma amplum	(Sluiter, 1909)	Indonesia	Kott, 1990
		Philippines	Kott, 1990; Monniot & Monniot, 1996; 2001 ^
		Singapore	Lambert, G. pers. obs. 2014 (**SCS**)
		Vietnam	Monniot, 2010 ^ (**SCS**)
Eudistoma angolanum	(Michaelsen, 1915)	Vietnam	Tokioka, 1967a (**SCS**)
Eudistoma diasterum	Monniot & Monniot, 2008	Malaysia	Monniot & Monniot, 2008 (**SCS**)
Eudistoma fasciculum	Monniot & Monniot, 1996	Indonesia	Gittenberger et al., 2014 ##
Eudistoma fluorescens	Monniot & Monniot, 2001	Philippines	Monniot & Monniot, 2001
Eudistoma gilboviride	(Sluiter, 1909)	Indonesia	Kott, 1990; Monniot & Monniot, 1996
		Philippines	Monniot & Monniot, 2001 ^
Eudistoma glaucum	(Sluiter, 1909)	Indonesia	Kott, 1990
Eudistoma incrustatum	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996

Taxon	Taxonomic Authority	Country	Reference
Eudistoma laysani	(Sluiter, 1900)	China	Zheng, 1995 ^ (**SCS**)
		Indonesia	Kott, 1990; Monniot, 2009
		Philippines	Kott, 1990
		Singapore	Lambert, G. pers. obs. 2014 (**SCS**)
		Vietnam	Tokioka, 1967a (**SCS**)
Eudistoma loricatum	(Sluiter, 1909)	Indonesia	Kott, 1990 ^
Eudistoma miniacum	(Sluiter, 1909)	Indonesia	Kott, 1990 ^
Eudistoma multiperforatum	(Sluiter, 1909)	Indonesia	Van Name, 1918 ^ [=*Polycitor multiperforatus*]; Kott, 1990 ^
Eudistoma obscuratum	(Van Name, 1902)	Malaysia	Hussein et al., 2002 # (**SCS**)
Eudistoma ovatum	(Herdman, 1886)	Indonesia	Kott, 1990
Eudistoma partitum	Monniot & Monniot, 2008	Indonesia	Monniot & Monniot, 2008
Eudistoma reginum	Kott, 1990	Indonesia	Monniot & Monniot, 1996
		Singapore	Lambert, G. pers. obs. 2013 (**SCS**)
Eudistoma rubiginosum	Monniot & Monniot, 1996	Indonesia	Gittenberger et al., 2014 ##
Eudistoma segmentatum	(Sluiter, 1909)	Indonesia	Kott, 1990
Eudistoma snakabri	Tokioka, 1954	Malaysia	Monniot & Monniot, 2008 (**SCS**)
Eudistoma sluiteri	Hartmeyer, 1909	Indonesia	Kott, 2004a
Eudistoma toealensis	Millar, 1975	Indonesia	Monniot & Monniot, 1996
?Eudistoma tokarae	Tokioka, 1954	Philippines	Tokioka, 1967b
Eudistoma tumidum	Kott, 1990	Philippines	Monniot & Monniot, 2001
Eudistoma viride	Tokioka, 1955	Indonesia	Monniot, 2009
		Philippines	Millar, 1975
Genus *Exostoma*	Kott, 1990		
Exostoma ianthinum	(Sluiter, 1909)	Indonesia	Kott, 1990
		Philippines	Kott, 1990
Genus *Polycitor*	Reiner, 1804		
Polycitor circes	Michaelsen, 1930	Indonesia	Monniot & Monniot, 1996
		Philippines	Kott, 1990
Polycitor proliferus	(Oka, 1933)	Taiwan	Su, 2013* (**SCS**)
Polycitor translucidus	Kott, 1957	Philippines	Kott, 1990
Polycitor violaceus	Sluiter, 1909	Indonensia	Van Name, 1918 ^
Family POLYCLINIDAE	Milne-Edwards, 1841		
Genus *Aplidiopsis*	Lahille, 1890		
Aplidiopsis ocellatus	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996
Genus *Aplidium*	Savigny, 1816		
Aplidium altarium	(Sluiter, 1909)	Indonesia	Kott, 1992
Aplidium constrictum	(Sluiter, 1900)	Philippines	Van Name, 1918 [=*Amaroucium constrictum*]
Aplidium controversum	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 2001 ^
Aplidium crateriferum	(Sluiter, 1909)	Philippines	Kott, 1992; Monniot & Monniot, 2001
Aplidium depressum	Sluiter, 1909	Hong Kong	Kott, 1992 (**SCS**)
		Indonesia	Kott, 1992
		Philippines	Millar, 1975
Aplidium fumigatum	Herdman, 1886	Philippines	Tokioka, 1970 ^
Aplidium intextum	Monniot & Monniot, 2001	Philippines	Monniot & Monniot, 2001
Aplidium lineatum	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996
Aplidium multipapillatum	Millar, 1975	Hong Kong	Millar, 1975 (**SCS**)
Aplidium multiplicatum	Sluiter, 1909	Hong Kong	Kott, 1992 (**SCS**)
		Indonesia	Millar, 1975
		Philippines	Kott, 1992
Aplidium nadaense	(Nishikawa, 1980)	Taiwan	Su, 2013* (**SCS**)
Aplidium petrense	Michaelsen, 1916	Indonesia	Monniot, 2009
Aplidium ritteri	(Sluiter, 1895)	Indonesia	Kott, 2004a
Aplidium sarasinorum	(Fiedler, 1889)	Indonesia	Millar, 1975

Taxon	Taxonomic Authority	Country	Reference
Aplidium venosum	Monniot & Monniot, 2008	Malaysia	Monniot & Monniot, 2008 (**SCS**)
Genus *Polyclinum*	Savigny, 1816		
Polyclinum circulatum	Sluiter, 1909	Indonesia	Kott, 1992 ^
Polyclinum constellatum	Savigny, 1816	China	Zheng, 1995 ^ (**SCS**)
Polyclinum crater	Sluiter, 1909	Indonesia	Kott, 1992 ^
Polyclinum festum	Hartmeyer, 1905	Hong Kong	Kott & Goodbody, 1982 (**SCS**)
		Philippines	Van Name, 1918
Polyclinum glabrum	Sluiter, 1895	Indonesia	Kott, 1992
Polyclinum psammiferum	Hartmeyer, 1911	Indonesia	Monniot & Monniot, 2001; Kott, 2004a
Polyclinum saturnium	Savigny, 1816	Philippines	Kott, 1992
Polyclinum sundaicum	(Sluiter, 1909)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott & Goodbody, 1982 (**SCS**)
		Indonesia	Kott & Goodbody, 1982
		Philippines	Kott & Goodbody, 1982
Polyclinum tsutsuii	Tokioka, 1954	Philippines	Tokioka, 1967b; Kott, 2004a
Polyclinum vasculosum	Pizon, 1908	Indonesia	Kott, 1992
		Philippines	Tokioka, 1967b; Kott, 1992
		Vietnam	Tokioka, 1967a (**SCS**)
Genus *Polydistoma*	Kott, 1990		
Polydistoma oculeum	Monniot & Monniot, 2001	Philippines	Monniot & Monniot, 2001
Genus *Sidneioides*	Kesteven, 1909		
Sidneioides japonense	Redikorzev, 1913	Indonesia	Monniot & Monniot, 2006; Monniot, 2009
Genus *Synoicum*	Phipps, 1774		
Synoicum? clavatum	(Oka, 1927)	Indonesia	Millar, 1975
Synoicum intercedens	(Sluiter, 1909)	Philippines	Kott, 1992 (Holotype was collected from Philippines, not Indonesia)
Synoicum suarenum	Kott, 1992	Indonesia	Kott, 1992
Synoicum tropicum	(Sluiter, 1909)	Philippines	Kott, 1992 (Holotype was collected from Philippines, not Indonesia)
Family PSEUDODISTOMIDAE	Harrant, 1931		
Genus *Pseudodistoma*	Michaelsen, 1924		
Pseudodistoma arborescens	Millar, 1967	Philippines	Kott, 1992 ^
Pseudodistoma fragile	Tokioka, 1958	Philippines	Monniot & Monniot, 2001
		Taiwan	Su, 2013* (**SCS**)
		Singapore	Lambert, G. pers. obs. 2013 (**SCS**)
Pseudodistoma megalarva	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996
Family STOMOZOIDAE	Kott, 1990		
Genus *Stomozoa*	Kott, 1957		
Stomozoa roseola	(Millar, 1955)	Indonesia	Monniot & Monniot, 1996
Order PHLEBOBRANCHIA	Lahille, 1887		
Family ASCIDIIDAE	Herdman, 1882		
Genus *Ascidia*	Linnaeus, 1767		
Ascidia alpha	Tokioka, 1953	China	Zheng, 1995 ^ (**SCS**)
Ascidia archaia	Sluiter, 1890	China	Zheng, 1995 ^ (**SCS**)
		Indonesia	Kott, 1985
		Philippines	Kott, 1985
		Taiwan	Su, 2013* (**SCS**)
Ascidia armata	Hartmeyer, 1906	China	Zheng, 1995 ^ (**SCS**)

Taxon	Taxonomic Authority	Country	Reference
Ascidia azurea	Monniot & Monniot, 1996	Indonesia	Monniot & Monniot, 1996
Ascidia capillata	Sluiter, 1887	Indonesia	Kott, 1985
Ascidia conifera	(Hartmeyer, 1911)	Indonesia	Kott, 2009
		Philippines	Kott, 2009
Ascidia empheres	Sluiter, 1895	Indonesia	Kott, 1985
Ascidia gemmata	Sluiter, 1895	China	Zheng, 1995 ^ (**SCS**)
		Indonesia	Kott, 1985; Monniot & Monniot, 2001; 2008
		Singapore	Lee et al., 2013 (**SCS**)
		Taiwan	Su, 2013* (**SCS**)
Ascidia kreagra	Sluiter, 1895	Indonesia	Kott, 1985
		Philippines	Van Name, 1918 ^ [=*Phallusia kreagra*]
		Taiwan	Su, 2013* (**SCS**)
Ascidia liberata	Sluiter, 1887	Indonesia	Kott, 1985
		Taiwan	Su, 2013* (**SCS**)
Ascidia longistriata	Hartmeyer, 1906	China	Zhai et al., 2011 # (**SCS**)
		Hong Kong	Kott & Goodbody, 1982 (**SCS**)
Ascidia melanostoma	Sluiter, 1885	Philippines	Tokioka, 1970^
Ascidia munda	Sluiter, 1898	Indonesia	Kott, 1985
Ascidia ornata	Monniot & Monniot, 2001	Philippines	Monniot & Monniot, 2001
		Taiwan	Su, 2013* (**SCS**)
Ascidia pacifica	Tokioka, 1967	China	Zheng, 1995 ^ (**SCS**)
		Vietnam	Tokioka, 1967a (**SCS**)
Ascidia papillosa	Tokioka, 1967	China	Zheng, 1995 ^ (**SCS**)
Ascidia scaevola	(Sluiter, 1904)	Indonesia	Kott, 1985
Ascidia subterranea	Kneer, Monniot, Stach & Christianen, 2013	Indonesia	Kneer et al., 2013
Ascidia tapuni	Monniot C. & Monniot F., 1987	Indonesia	Monniot & Monniot, 2008
Ascidia sydneiensis	Stimpson, 1855	Hong Kong	Kott & Goodbody, 1982 (**SCS**)
		Indonesia	Kott, 1985
		Philippines	Millar, 1975; Tokioka, 1970 (**SCS**)
		Singapore	Millar, 1975; Lee et al., 2013 (**SCS**)
Ascidia zara	Oka, 1935	Taiwan	Su, 2013* (**SCS**)
Genus *Fimbrora*	Monniot & Monniot, 1991		
Fimbrora calsubia	Monniot & Monniot, 1991	Indonesia	Monniot, 1993
Genus *Phallusia*	Savigny, 1816		
Phallusia aperta	(Sluiter, 1904)	Philippines	Van Name, 1918
Phallusia arabica	Savigny, 1816	Indonesia	Monniot & Monniot, 1996
		Philippines	Kott, 1985
		Singapore	Lee et al., 2013 (**SCS**)
		Taiwan	Su, 2013* (**SCS**)
		Vietnam	Monniot, 2010 (**SCS**)
Phallusia depressiuscula	(Heller, 1878)	Philippines	Van Name, 1918; Tokioka, 1970 (**SCS**)
Phallusia julinea	Sluiter, 1915	Indonesia	Kott, 1985
Phallusia millari	Kott, 1985	Philippines	Kott, 1985
		Singapore	Kott, 1985 (**SCS**)
Phallusia nigra	Savigny, 1816	Singapore	Lee et al., 2013 (**SCS**)
Phallusia philippinensis	Millar, 1975	Indonesia	Millar, 1975
		Philippines	Monniot & Monniot, 2001
		Singapore	Millar, 1975; Lee et al., 2013 (**SCS**)

Taxon	Taxonomic Authority	Country	Reference
Family CIALLUSIIDAE	Huus, 1937		See Kott, 2008b
Genus *Pterygascidia*	Sluiter, 1904		
Pterygascidia mirabilis	Sluiter, 1904	Indonesia	Kott, 2008b
		Philippines	Kott, 2008b
Family CIONIDAE	Lahille, 1887		
Genus *Ciona*	Fleming, 1822		
Ciona intestinalis	(Linnaeus, 1767)	Hong Kong	Kott, 1990 (**SCS**)
		Indonesia	Kott, 1990
Ciona savignyi	Herdman, 1882	Hong Kong	Kott, 1990 ^ (**SCS**)
Family CORELLIDAE	Lahille, 1888		
Genus *Chelyosoma*	Broderip & Sowerby, 1830		
Chelyosoma sibogae	Sluiter, 1904	Philippines	Tokioka, 1970 ^
Genus *Corella*	Alder & Hancock, 1870 in Hancock (1870)		
Corella aequabilis	Sluiter, 1904	Indonesia	Van Name, 1918 ^
Corella japonica	Herdman, 1880	Hong Kong	Kott & Goodbody, 1982 ^ (**SCS**)
Genus *Rhodosoma*	Ehrenberg, 1828		
Rhodosoma turcicum	(Savigny, 1816)	China	Kott, 1985
		Indonesia	Kott, 1985
		Philippines	Kott, 1985
		Singapore	Lee et al., 2013 (**SCS**)
		Thailand	Kott, 1985
Family PEROPHORIDAE	Giard, 1872		
Genus *Ecteinascidia*	Herdman, 1880		
Ecteinascidia bandaensis	Millar, 1975	Indonesia	Monniot, 2009
		Philippines	Monniot & Monniot, 2001
Ecteinascidia diaphanis	Sluiter, 1885	Indonesia	Kott, 1985; Monniot & Monniot, 1996; Monniot, 2009
		Philippines	Tokioka, 1970 ^
Ecteinascidia diligens	Sluiter, 1900	Philippines	Kott, 1985 ^
Ecteinascidia garstangi	Sluiter, 1898	Philippines	Tokioka, 1970 ^
Ecteinascidia nexa	Sluiter, 1904	Indonesia	Kott, 1985; Monniot & Monniot, 2008
		Singapore	Lambert, G. pers. obs. 2014 (**SCS**)
Ecteinascidia rubricollis	Sluiter, 1885	Indonesia	Kott, 1985
Ecteinascidia sluiteri	Herdman, 1906	Indonesia	Monniot, 2009
		Singapore	Kott, 1985 (**SCS**)
Ecteinascidia thurstoni	Herdman, 1890	Singapore	Lambert, G. pers. obs. 2014 (**SCS**)
		Thailand (Gulf of Thailand)	Chavanich et al., 2009 ##
Genus *Perophora*	Wiegmann, 1835		
Perophora euphues	(Sluiter, 1895)	Indonesia	Kott, 1985 ^
Perophora hutchisoni	Macdonald, 1859	Philippines	Van Name, 1918
Perophora modificata	Kott, 1985	Philippines	Kott, 2004a
		Singapore	Lambert, G. pers. obs. 2013 (**SCS**)
Perophora multiclathrata	(Sluiter, 1904)	Indonesia	Monniot, 2009
Perophora namei	Hartmeyer & Michaelsen, 1928	Indonesia	Gittenberger et al., 2014 ##
		Philippines	Kott, 1985; Monniot & Monniot, 2001 ^
		Singapore	Lambert, G. pers. obs. 2014 (**SCS**)
		Vietnam	Monniot, 2010 (**SCS**)
Perophora psammodes	(Sluiter, 1895)	Indonesia	Kott, 1985 ^

Taxon	Taxonomic Authority	Country	Reference
Family PLURELLIDAE	Kott, 1973		
Genus *Microgastra*	Kott, 1985		
Microgastra granosa	(Sluiter, 1904)	Indonesia	Kott, 1985
Genus *Plurella*	Kott, 1973		
Plurella kottae	Monniot & Monniot, 1996	Philippines	Monniot & Monniot, 1996
Order STOLIDOBRANCHIA	Lahille, 1887		
Family MOLGULIDAE	Lacaze-Duthiers, 1877		
Genus *Asajirus*	Kott, 1989		
Asajirus indicus	(Oka, 1913)	Indonesia	Kott, 1992
Genus *Eugyra*	Alder & Hancock, 1870 in Hancock (1870)		
Eugyra bilabiata	Sluiter, 1887	Indonesia	Millar, 1975
Eugyra malayensis	Millar, 1975	Singapore	Millar, 1975 (**SCS**)
Eugyra pellucida	(Macdonald, 1859)	Indonesia	Kott, 1985
Genus *Molgula*	Forbes, 1848		
Molgula calvata	Sluiter, 1904	Indonesia	Kott, 1985; Millar, 1975
		Philippines	Millar, 1975
Molgula celebensis	Millar, 1975	Indonesia	Millar, 1975
Molgula discogona	Millar, 1975	Singapore	Millar, 1975 (**SCS**)
Molgula diversa	Kott, 1972	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott, 1985 (**SCS**)
Molgula ficus	(Macdonald, 1859)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott, 1985 (**SCS**)
		Indonesia	Monniot & Monniot, 2008
		Singapore	Kott, 1985 (**SCS**)
		Thailand	Kott, 1985
Molgula manhattensis	(De Kay, 1843)	China	Zheng, 1995 ^ (**SCS**); Shenkar & Swalla, 2011^
Molgula sphaera	Kott, 1972	Singapore	Kott, 1985 (**SCS**)
Genus *Molguloides*	Huntsman, 1922		
Molguloides vitrea	(Sluiter, 1904)	Indonesia	Monniot & Monniot, 1989
		Philippines	Monniot & Monniot, 1989
Genus *Oligotrema*	Bourne, 1903		
Oligotrema psammites	Bourne, 1903	Indonesia	Kott, 2009
Genus *Pareugyrioides*	Hartmeyer, 1914		
Pareugyrioides exigua	(Kott, 1972)	Indonesia	Kott, 1985
Family PYURIDAE	Hartmeyer, 1908		
Genus *Ctenyura*	Van Name, 1918		
Ctenyura intermedia	Van Name, 1918	Philippines	Van Name, 1918
Genus *Culeolus*	Herdman, 1881		
Culeolus herdmani	Sluiter, 1904	Indonesia	Kott, 2002c; 2009
		Philippines	Kott, 2002c; 2009
Culeolus thysanotus	Sluiter, 1904	Philippines	Tokioka, 1970 ^
Genus *Hartmeyeria*	Ritter, 1913		
Hartmeyeria chinensis	Tokioka, 1967	China	Tokioka, 1967b (**SCS**)
Genus *Herdmania*	Lahille, 1888		
Herdmania inflata	(Van Name, 1918)	Philippines	Van Name, 1918 [= *Pyura inflata*]

Taxon	Taxonomic Authority	Country	Reference
Herdmania insolita	Monniot & Monniot, 2001	Indonesia	Monniot & Monniot, 2001
		Philippines	Monniot & Monniot, 2001
Herdmania momus	(Savigny, 1816)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott & Goodbody, 1982 (**SCS**)
		Indonesia	Millar, 1975; Kott, 1985; Monniot & Monniot, 1996 ^
		Philippines	Tokioka, 1970 ^; Kott, 2002a
		Singapore	Millar, 1975 (**SCS**)
		Vietnam	Cole & Vorontsova, 1998 (**SCS**)
Herdmania pallida	(Heller, 1878)	Hong Kong	Kott, 2002a; Van Name, 1918 (**SCS**)
		Indonesia	Kott, 2002a
		Philippines	Kott, 2002a
		Singapore	Lee et al., 2013 (**SCS**)
Herdmania polyducta	(Monniot & Monniot, 1989)	Philippines	Monniot & Monniot, 2001
Genus *Microcosmus*	Heller, 1877		
Microcosmus australis	Herdman, 1898	China	Kott, 1985; Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott, 1985 (**SCS**)
		Philippines	Kott, 1985
Microcosmus bitunicatus	Monniot & Monniot, 2001	Philippines	Monniot & Monniot, 2001
Microcosmus exasperatus	Heller, 1878	China	Zheng, 1995 ^ (**SCS**); Cole & Vorontsova, 1998 (**SCS**)
		Indonesia	Kott, 1985
		Philippines	Van Name, 1918
		Singapore	Lee et al., 2013 (**SCS**)
Microcosmus helleri	Herdman, 1881	Indonesia	Kott, 1985
		Singapore	Kott, 1985 (**SCS**)
Microcosmus pacificus	Monniot & Monniot, 2001	Philippines	Monniot & Monniot, 2001
Genus *Pyura*	Molina, 1782		
Pyura ambonensis	Millar, 1975	Indonesia	Millar, 1975
Pyura arenosa	(Herdman, 1882)	Indonesia	Kott, 1985
		Philippines	Tokioka, 1970 ^ [= *Pyura jacatrensis*]
		Vietnam	Monniot, 2010 (**SCS**)
Pyura baliensis	Millar, 1975	Indonesia	Millar, 1975
Pyura breviramosa	(Sluiter, 1906)	Indonesia	Kott, 1985 ^
Pyura camranica	Vorontsova & Cole, 1995	Vietnam	Vorontsova & Cole, 1995; Cole & Vorontsova, 1998 ^ (**SCS**)
Pyura curvigona	Tokioka, 1950	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott & Goodbody, 1982 (**SCS**)
		Indonesia	Kott, 1985; Monniot, 2009
		Singapore	Lee et al., 2013 (**SCS**)
		Vietnam	Cole & Vorontsova, 1998 (**SCS**)
Pyura duplicata	Van Name, 1918	Philippines	Van Name, 1918
Pyura elongata	Tokioka, 1952	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott, 1985 (**SCS**)
		Indonesia	Kott, 1985; Monniot, 2009
Pyura sp. aff. *lignosa*	Michaelsen, 1908	China	Zheng, 1995 ^ (**SCS**)
		Philippines	Tokioka, 1970 (**SCS**)
Pyura mirabilis	(Drasche, 1884)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott & Goodbody, 1982 (**SCS**)
Pyura polycarpa	(Sluiter, 1904)	Indonesia	Kott, 1985 ^
Pyura shiinoi	Tokioka, 1949	Vietnam	Cole & Vorontsova, 1998 (**SCS**)
Pyura vittata	(Stimpson, 1852)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott & Goodbody, 1982 (**SCS**)
		Indonesia	Monniot, 2009

Taxon	Taxonomic Authority	Country	Reference
Family STYELIDAE	Sluiter, 1895		
Genus *Alloeocarpa*	Michaelsen, 1900		
Alloeocarpa incrustans	(Herdman, 1886)	Philippines	Van Name, 1918 ^
Genus *Botryllocarpa*			
Botryllocarpa viridis	(Pizon, 1908)	Indonesia	Kott, 1985 ^
Genus *Botrylloides*	Milne-Ewards, 1841		
Botrylloides leachii	(Savigny, 1816)	Indonesia	Kott, 1985 (Note: many spp. synonymized probably incorrectly; See Monniot, 1988)
		Philippines	Van Name, 1918 [= *Botrylloides tyreum*]; Millar, 1975 [=*Botrylloides tyreum*]
Botrylloides magnicoecum	(Hartmeyer, 1912)	China	Kott, 1985
Botrylloides perspicuum	(Herdman, 1886)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott, 1985 (**SCS**)
		Indonesia	Kott, 1985
		Philippines	Kott, 1985
Genus *Botryllus*	Gaertner, 1774		
Botryllus primigenus	Oka, 1928	China	Zheng, 1995 ^ (**SCS**)
Botryllus schlosseri	(Pallas, 1766)	Hong Kong	Kott, 1985 (**SCS**)
Botryllus separatus	Sluiter, 1909	Indonesia	Van Name, 1918 ^
Botryllus tuberatus	Ritter & Forsyth, 1917	China	Zheng, 1995 ^ (**SCS**)
		Indonesia	Kott, 1985
Genus *Chorizocarpa*	Michaelsen, 1904		
Chorizocarpa sydneyensis	(Herdman, 1891)	Indonesia	Kott, 1985
Genus *Cnemidocarpa*	Huntsman, 1913		
Cnemidocarpa areolata	(Heller, 1878)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott, 1985 (**SCS**)
		Philippines	Kott, 1985
Cnemidocarpa javensis	Millar, 1975	Indonesia	Millar, 1975
Cnemidocarpa oligocarpa	(Sluiter, 1885)	Indonesia	Kott, 1985
Cnemidocarpa pedata	(Herdman, 1881)	Indonesia	Kott, 1985
		Philippines	Kott, 1985; Monniot & Monniot, 2001
Cnemidocarpa quadrata	(Herdman, 1881)	Philippines	Van Name, 1918 [=*Pandocia quadrata*]; Tokioka, 1970 ^ [= *Polycarpa quadrata*]
Cnemidocarpa reticulata	Millar, 1975	Indonesia	Millar, 1975
Cnemidocarpa tinaktae	(Van Name, 1918)	Philippines	Van Name, 1918 [= *Styela tinaktae*]; Millar, 1975
Genus *Eusynstyela*	Michaelsen, 1904		
Eusynstyela latericius	(Sluiter, 1904)	China	Zheng, 1995 ^ (**SCS**)
		Indonesia	Millar, 1975; Kott, 1985; Monniot & Monniot, 1996
		Malaysia	Monniot & Monniot, 2008 ^ (**SCS**)
		Philippines	Millar, 1975
		Thailand	Millar, 1975
		Vietnam	Tokioka, 1967a (**SCS**); Kott, 1985
Eusynstyela hartmeyeri	Michaelsen, 1904	Hong Kong	Monniot & Monniot, 2001 (**SCS**)
		Singapore	Lambert, G. pers. obs. 2014 (**SCS**)

Taxon	Taxonomic Authority	Country	Reference
Genus *Monandrocarpa*	Michaelsen, 1904		
Monandrocarpa plana	(Kott, 1972)	Philippines	Kott, 1985
Genus *Polyandrocarpa*	Michaelsen, 1904		
Polyandrocarpa anguinea	(Sluiter, 1898)	Indonesia	Kott, 1985 ^ [= *Polyandrocarpa maxima*]
		Philippines	Van Name, 1918 [= *Polyandrocarpa maxima*]
Polyandrocarpa colligata	Sluiter, 1913	Indonesia	Kott, 1985 ^; 2005a
Polyandrocarpa misakiensis	Watanabe & Tokioka, 1972	Taiwan	Su, 2013* (**SCS**)
Polyandrocarpa robusta	Sluiter, 1919	Indonesia	Kott, 1985 ^
Polyandrocarpa sagamiensis	Tokioka, 1953	China	Zheng, 1995 ^ (**SCS**)
Genus *Polycarpa*	Heller, 1877		
Polycarpa albopunctata	(Sluiter, 1904)	Indonesia	Kott, 1985 ^
Polycarpa ambonensis	(Sluiter, 1904)	Indonesia	Kott, 1985 ^
Polycarpa argentata	(Sluiter, 1890)	Indonesia	Kott, 1985; 2008a
		Philippines	Tokioka, 1970 (**SCS**) [=*Polycarpa iwayamae*]; Monniot & Monniot, 2001 ^
		Singapore	Lee et al., 2013 (**SCS**)
		Taiwan	Su, 2013* (**SCS**)
		Vietnam	Monniot, 2010 (**SCS**)
Polycarpa aurata	(Quoy & Gaimard, 1834)	Indonesia	Kott, 1985
		Philippines	Tokioka, 1970 (**SCS**); Kott, 1985
Polycarpa aurita	(Sluiter, 1890)	China	Zheng, 1995 ^ (**SCS**)
		Indonesia	Kott, 1985; 2008a
		Philippines	Kott, 1985; 2008a
		Singapore	Lee et al., 2013 (**SCS**)
Polycarpa biforis	(Sluiter, 1904)	Indonesia	Kott, 1985
		Philippines	Kott, 1985
Polycarpa captiosa	(Sluiter, 1885)	Indonesia	Millar, 1975
		Malaysia	Monniot & Monniot, 2008 (**SCS**)
		Philippines	Monniot & Monniot, 2001
		Singapore	Lee et al., 2013 (**SCS**)
Polycarpa chinensis	(Tokioka, 1967)	China	Kott, 1985; 2008a (**SCS**)
		Vietnam	Kott, 1985; 2008a (**SCS**)
Polycarpa contecta	(Sluiter, 1904)	Indonesia	Kott, 1985
Polycarpa cryptocarpa	(Sluiter, 1885)	Indonesia	Millar, 1975; Monniot & Monniot, 2001
		Malaysia	Monniot & Monniot, 2008
		Philippines	Tokioka, 1970 (**SCS**); Millar, 1975
		Singapore	Millar, 1975 (**SCS**)
		Taiwan	Su, 2013* (**SCS**)
Polycarpa cylindrocarpa	Tokioka, 1970	Philippines	Tokioka, 1970 (**SCS**)
Polycarpa decipiens	Herdman, 1906	Singapore	Kott, 1985; 2008a (**SCS**)
Polycarpa glebosa	(Sluiter, 1904)	Indonesia	Kott, 1985 ^
Polycarpa insulsa	(Sluiter, 1898)	Indonesia	Monniot, 2009
Polycarpa irregularis	Herdman, 1881	China	Zheng, 1995 ^ (**SCS**)
		Philippines	Van Name, 1918 ^ [=*Pandocia irregularis*]
Polycarpa nigricans	Heller, 1878	Philippines	Tokioka, 1970 (**SCS**) [= *Polyandrocarpa nigricans*]; Kott, 1985; Monniot & Monniot, 1989
Polycarpa obscura	Heller, 1878	Indonesia	Kott, 1985
Polycarpa olitoria	(Sluiter, 1890)	Indonesia	Kott, 1985
		Singapore	Lee et al., 2013 (**SCS**)

Taxon	Taxonomic Authority	Country	Reference
Polycarpa ovata	Pizon, 1908	Philippines	Van Name, 1918 [= *Pandocia ovata*]
Polycarpa palinorosa	(Sluiter, 1895)	Indonesia	Kott, 1985 ^
Polycarpa papillata	Sluiter, 1885	Indonesia	Kott, 1985; Monniot & Monniot, 2001
		Philippines	Tokioka, 1970 (**SCS**)
		Singapore	Millar, 1975; Lee et al., 2013 (**SCS**)
Polycarpa patens	(Sluiter, 1885)	Indonesia	Kott, 1985 ^
Polycarpa pigmentata	(Herdman, 1906)	Indonesia	Kott, 1985
		Philippines	Kott, 1985
Polycarpa procera	(Sluiter, 1885)	Indonesia	Millar, 1975; Kott, 1985
		Philippines	Tokioka, 1970 ^
		Singapore	Millar, 1975; Kott, 1985 (**SCS**)
Polycarpa psammodes	(Sluiter, 1904)	Indonesia	Kott, 1985 ^
Polycarpa reniformis	(Sluiter, 1904)	Indonesia	Kott, 1985
		Taiwan	Su, 2013* (**SCS**)
Polycarpa rima	Monniot & Monniot, 1996	Taiwan	Su, 2013* (**SCS**)
Polycarpa simplicigona	Millar, 1975	Philippines	Millar, 1975
Polycarpa sobria	(Sluiter, 1904)	Indonesia	Kott, 1985
Polycarpa stirpes	Kott, 1985	Indonesia	Kott, 1985
		Philippines	Kott, 1985; Monniot & Monniot, 2001 (**SCS**)
Polycarpa thelyphanes	(Sluiter, 1904)	Philippines	Tokioka, 1970 ^; Kott, 1985
Polycarpa tokiokai	Monniot & Monniot, 1996	Philippines	Monniot & Monniot, 2001 ^
		Malaysia	Monniot & Monniot, 2008 ^ (**SCS**)
Polycarpa vankampeni	Sluiter, 1919	Indonesia	Kott, 1985 ^
Polycarpa urmeli	Sanamyan & Hissman, 2008	Indonesia	Sanayam & Hissman, 2008
Genus *Seriocarpa*	Diehl, 1969		
Seriocarpa cristata	Millar, 1975	Indonesia	Millar, 1975
Seriocarpa littoralis	Millar, 1975	Singapore	Millar, 1975 (**SCS**)
Seriocarpa rhizoides	Dielh, 1969	Indonesia	Millar, 1975
		Philippines	Monniot & Monniot, 1989
Genus *Stolonica*	Lacaze-Duthiers & Délage, 1892		
Stolonica agnata	Kott, 1985	Indonesia	Monniot & Monniot, 2008 ^ [=*Amphicarpa agnata*]
		Malaysia	Monniot & Monniot, 2008 ^ (**SCS**) [=*Amphicarpa agnata*]
Stolonica duploplicata	Sluiter, 1913	Malaysia	Monniot, 2010 (**SCS**) [= *Amphicarpa duploplicata*]
		Philippines	Kott, 1985 [= *Amphicarpa duploplicata*]; Kott, 2005a
		Vietnam	Monniot, 2010 (**SCS**) [= *Amphicarpa duploplicata*]
Stolonica reducta	(Sluiter, 1904)	Indonesia	Kott, 1985
Stolonica vesicularis	Van Name, 1918	Philippines	Kott, 1985
Genus *Styela*	Fleming, 1822		
Styela asterogama	Millar, 1975	Indonesia	Millar, 1975
Styela canopus	(Savigny, 1816)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott, 1985 (**SCS**)
		Indonesia	Kott, 1985
		Philippines	Kott, 1985
		Singapore	Lee et al., 2013 (**SCS**)
		Taiwan	Su, 2013* (**SCS**)
		Thailand	Kott, 1985
Styela complexa	Kott, 1995	Indonesia	Kott, 1995; Monniot & Monniot, 2008

Taxon	Taxonomic Authority	Country	Reference
Styela maeandria	Sluiter, 1904	Philippines	Van Name, 1918 Tokioka, 1970 ^ [= *Cnemidocarpa maeandria*]
Styela plicata	(Lesueur, 1823)	China	Zheng, 1995 ^ (**SCS**)
		Hong Kong	Kott, 1985 (**SCS**)
Styela squamosa	Herdman, 1881	Indonesia	Monniot, 1993
Genus *Symplegma*	Herdman, 1886		
Symplegma reptans	(Oka, 1927)	Hong Kong	Kott, 1985 (**SCS**)
Symplegma brakenhielmi	(Michaelsen, 1904)	Hong Kong	Kott, 1985 (**SCS**) [= *Symplegma oceania*]; Monniot & Monniot, 1997; Also see Kott, 2004a
		Indonesia	Kott, 1985 [= *Symplegma oceania*]; Monniot & Monniot, 1997; Also see Kott, 2004a
		Thailand	Kott, 1985 [= *Symplegma oceania*]; Monniot & Monniot, 1997; Also see Kott, 2004a
		Singapore	Lambert, G. pers. obs. 2014 (**SCS**)
Symplegma viride	Herdman, 1886	Philippines	Millar, 1975
		Singapore	Millar, 1975 (**SCS**)

Family Polyclinidae Milne-Edwards, 1841 consists of colonial species with various forms – sheet-like, upright branched, lobed and convoluted, all with embedded zooids. The zooids are divided into thorax, abdomen and post abdomen (containing gonads), have 6-lobed branchial siphon (sometimes 8 lobed) and smooth-rimmed atrial opening with anterior lip and are organised around cloacal systems that are circular or with extensive branching. Internal fertilisation occurs in the atrial cavity and incubation takes place either in atrial cavity or within a thoracic brood pouch.

Family Pseudodistomidae Harant, 1931 consists of only one genus, *Pseudodistoma*, but many species. Colonies with completely embedded zooids are often stalked although sessile forms are also present. The zooids have siphons opening separately to the surface and are divided into thorax with only three rows of stigmata, abdomen (stomach with 4 lobes) and a long narrow post abdomen (containing gonads). Fertilisation is internal and embryos are incubated in a distal portion of the oviduct. Larvae are large with a long trunk (≥ 1.0mm long).

Family Stomozoidae Kott, 1990 also has only a single genus, *Stomozoa*. Large colonies may be fleshy and cushion-like, though in small colonies the zooids may only be partially embedded. The zooids consist of thorax and abdomen; the siphons have fringed lobes that open separately to the surface; pigment spots alternating with the lobes are also present. Inside each siphon, a velum projects outwards to form the actual opening. Larvae have large triradially arranged adhesive organs.

Order Phlebobranchia Lahille, 1887

Family Ascidiidae Herdman, 1882 consists of only solitary species often with firm, gelatinous and translucent tunic. The branchial sac is relatively flat, without folds but with longitundinal vessels and numerous rows of straight stigmata. The gonads (branching follicles of testis joined to a common vas deferens, and a tubular ovary) are enclosed in the the gut loop on the left side of the body. Musculature tends to be irregular and cover most or all of the right side of the body and sometimes anterior to the gut on the left. Species are mostly broadcast spawners though one species broods its embryos.

Family Ciallusiidae Van Name, 1918 consists only of the genus *Pterygascidia* with a single deepwater solitary species. The long branchial sac has numerous internal longitudinal vessels and many rows of regular oval stigmata. Dorsal languets instead of a lamina are present. A relatively straight gut with internally folded stomach wall is placed on the left of the body; gonads are closely associated with the gut. Musculature is made up of rows of short parallel muscle bands. See Kott (2008b) for more details.

Family Cionidae Lahille, 1887 are all solitary with a soft translucent tunic. Species have six- to eight-lobed oral siphons, six-lobed atrial siphon, simple branchial tentacles and flat branchial sac with longitudinal vessels. Gonads are enclosed within the horizontal gut loop which is placed below the branchial sac. The distinctive musculature consists of widely placed broad longitudinal bands crossed by irregular transverse bands.

Family Corellidae Lahille, 1888 contains solitary members with firm gelatinous tunic. The branchial sac is large and flat and has either straight or coiled stigmata. Members of this family are the only phlebobranch ascidians with gut placed on the right side of the body.

Family Perophoridae Giard, 1872 consists of colonial species joined by basal stolons. Each small zooid is separate (not embedded in a common tunic) and with a single body part (abdomen alongside thorax, not below it). Siphons may have up to 14 lobes though usually fewer. Branchial sac is flat with longitudinal vessels that are mostly incomplete, and between 4–25 rows of stigmata. Gonads are located in the gut loop, which is placed on the left side of body. The oviduct is modified into a brood pouch but mature embryos may be found in the atrial cavity. Larvae are large and resemble those of aplousobranch ascidians, as does the sperm, but molecular sequencing places them clearly with the phlebobranchs (Turon & López-Legentil 2004).

Family Plurellidae Kott, 1973 has solitary and colonial species. Both forms are held in thin and fragile tunics, which are further made brittle with the inclusions of sand. This family is characterised by parts of the body wall along the dorsal mid-line, including the neural complex, gonads and heart, being embedded in the tunic. Except in *Plurella*, numerous ciliated pits opening to the atrial cavity are found along the length of the neural duct. Musculature is made up of parallel transverse bands along the ventral half of body on the right.

Order Stolidobranchia Lahille, 1887

Family Molgulidae Lacaze-Duthiers, 1877 consists of solitary members with (usually) thin tunic that are usually found on hard surfaces but some species are embedded in sand or cobble, sometimes interstitially. Species have a six-lobed oral siphon and a four-lobed atrial siphon, branched branchial tentacles and coiled or curved stigmata that may form projecting cones on the branchial folds. This is also the only family with a closed "kidney" present only on the right body wall. There is one gonad on each side of the body; on the left it is usually in the secondary gut loop. Musculature is usually limited to around the siphons. A number of species are brooders.

Family Pyuridae Hartmeyer, 1908 consists of solitary members with tough leathery tunic that may have tunic spines or papillae, and usually siphonal spines or scales inside the siphons. Both siphons are four-lobed, branchial tentacles are branched, the dorsal lamina is either whole or divided into languets, and there are more than four branchial folds on each side of body. A single lobed or partially divided ovotestis is found on each side of the body. Musculature is arranged into strong bands radiating from siphons and crossing over the sides of the body. Most species are broadcast spawners, though a few are brooders.

Family Styelidae Sluiter, 1895 is diverse with many genera, comprising both solitary and colonial members. Species in this family have unbranched branchial tentacles, four branchial folds on each side of the body (except colonial species, which either lack folds or have very reduced folds), smooth dorsal lamina, internal folds in the stomach wall and no gastric diverticulum. There is usually more than one gonad on each side of body. Most solitary species are broadcast spawners, though a few are brooders; all the colonial species are brooders. The zooids of colonial species have a single body part (abdomen alongside the branchial sac).

DISCUSSION

This is the first time a checklist of ascidians for the South China Sea and surrounding regions has been prepared. Many of the ascidian records were obtained from publications covering a larger area than the South China Sea (Millar, 1975; Monniot & Monniot, 1996, 2001, 2008; Monniot, 2010). As evident from the records, there is limited knowledge of ascidian diversity in the literature with regard to major coastlines bordering the South China Sea. Sixty-four species of ascidians were recorded along the China coast including Hong Kong; Singapore has 50 records and Taiwan has 45 records, while the much longer coastlines of Malaysia (4675 km, inclusive of peninsular and East Malaysia combined) and Vietnam (3444 km) only have 22 and 18 records, respectively (Fig. 1). Higher diversities have been reported from smaller areas: some 117 species are known from Guam, and 317 species from New Caledonia (Shenkar & Swalla, 2011). Elsewhere, 229 species are documented from the Mediterranean Sea (Coll et al., 2010), and 62 species in São Sebastião, Brazil (Dias et al., 2013), whilst 29 species of ascidians were recorded in just two days of survey from a 30km^2 national park in Venezuela (Rocha et al., 2010).

Of the 50 species of ascidians recorded from Singapore, 13 were new records (*Rhopalaea macrothorax*, *Didemnum psammatodes*, *Distaplia mikropnoa*, *Eudistoma amplum*, *Eudistoma laysani*, *Eudistoma reginum*, *Pseudodistoma fragile*, *Ecteinascidia nexa*, *Ecteinascidia thurstoni*, *Perophora modificata*, *Perophora namei*, *Eusynstyela hartmeyeri* and *Symplegma brakenhielmi*; see Fig. 2) and all were collected from the Strait of Singapore during the Comprehensive Marine Biodiversity workshop held in 2013 (see Tan et al., this volume). Furthermore, of these 13 species, seven species (*Didemnum psammatodes*, *Distaplia mikropnoa*, *Eudistoma amplum*, *Eudistoma reginum*, *Ecteinascidia nexa*, *Ecteinascidia thurstoni* and *Perophora modificata*) were recorded for the first time in the South China Sea. While these species listed above have been previously reported from Southeast Asia, the regions from which specimens were documented were outside of the South China Sea; an example being *Ecteinascidia thurstoni* which was previously only recorded from the Gulf of Thailand.

Colonial ascidians comprised a significant component of the ascidians from the Singapore Strait, and identification work is still ongoing. We consider the current number of known species as probably just the tip of the iceberg (if we consider all the morphotypes which are not included in this checklist), therefore it is expected that the number of new records of

ascidians for Singapore alone will increase over time with more effort invested in surveys and taxonomic studies.

The majority of the species in this checklist were recorded from Indonesia (229 species) and the Philippines (183 species, of which 15 are from the South China Sea). This could perhaps be attributed to early explorations in the two regions starting from the late 1800s. Within a span of 40 years, three major expeditions explored the shores and deeper waters of the Malay Archipelago (comprising modern-day nations of Indonesia, Malaysia, Singapore, Brunei, East Timor and the Philippines). These efforts marked the start of the rapid rise in discovery of new ascidian species globally (Shenkar & Swalla, 2011). The Challenger Expedition (1873–1876), an ambitious attempt to investigate the deep sea, especially added to ascidian collections from across the globe including the Malay archipelago, Hong Kong and China (Herdman, 1882, 1886). The Dutch Siboga Expedition (1899–1900) surveyed the many islands of Indonesia and also collected specimens from Sulu Archipelago and Celebes Sea in the Philippines (Sluiter, 1904, 1905, 1909). The Albatross Philippine Expedition (1907–1910) was carried out by the United States to assess the natural resources of the islands after it gained control of the Philippines (Van Name, 1918). Other smaller collections made in the seas of Indonesia were published in Sluiter (1885 - Billiton Island; 1890 - Java Sea; 1895 - Malay Archipelago; 1913 – Aru Islands) and Pizon (1908 – Ambon Island).

Although not all the species in this checklist were recorded within the South China Sea, it is likely that some species found in the surrounding seas of Indonesia and Philippines are present as well due to the dynamic current system in this region.

While we have attempted to compile all data currently available in the literature, the checklist is not exhaustive. Situated in the centre of the Indo-West Pacific, the South China Sea is probably the world's most diverse shallow water marine area. The most important offshore systems of coral reefs and the islands are all disputed, inevitably resulting in a lack of research in the region (Morton & Blackmore, 2001). With such a vast area poorly studied, it is thus crucial that more dedicated surveys and collections within the region are carried out to truly understand the diversity and the distributions of ascidians in the South China Sea.

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