

The sipunculan fauna (Sipuncula) of Western Australia

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Abstract

Twenty-three species of sipunculans are here recorded from Western Australia. The record of *Sipunculus norvegicus* is new for Australia and the records of *Golfingia herdmani*, *Aspidosiphon elegans*, *Aspidosiphon cumingi*, *Aspidosiphon jukesi* and *Themiste cymodoceae* are new for Western Australia.

Introduction

The present study is based on about 350 sipunculans in the Western Australian Museum, collected from the coast of Western Australia between Cheyne Bay in the south and Admiralty Bay in the north and from a number of off-shore islands and reefs. All of the coast sampled, therefore, borders the Indian Ocean. Although it contains no new species, the collection, being a large one, provides information about the variability of some species, enables some corrections to be made to a number of earlier identifications and extends the known range of some species, previously thought to be confined to other shores of the continent.

The earliest reports of sipunculans from Western Australia are those of Fischer 1919, 1921 and 1927. Fischer 1919 and 1927 are almost the same report but published in different journals. Fischer's records are listed in Table 1.

Many of the specimens were found intertidally by collectors and some subtidally by divers. A few were washed up after heavy storms. Depths have been given for dredged specimens.

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Table 1 Early records of Western Australian sipunculans.

Species (Fischer's name)	Fischer's record	Locality	Present identity of species
<i>Siphonosoma crassum</i> Spengel	1919	Shark Bay	<i>Siphonosoma vastum</i>
<i>Siphonosoma cumanense</i> <i>vitreus</i> (Selenka, de Man and Bülow)	1921	Broome	<i>Siphonosoma cumanense</i>
<i>Physcosoma agassizi</i> Keferstein	1919	Shark Bay Fremantle	<i>Phascolosoma rotnesti</i>
<i>Physcosoma nigrescens</i> Keferstein	1919 1919 1921	Shark Bay Broome Cape Jaubert	<i>Phascolosoma nigrescens</i>
<i>Physcosoma nigritor-</i> <i>quartum</i> Sluiter	1919 1921	Shark Bay Cape Jaubert	probably <i>Phascolosoma</i> <i>rotnesti</i>
<i>Phascolosoma misa-</i> <i>kianum</i> Ikeda	1919	Shark Bay	<i>Apionsoma misakianum</i>
<i>Phascolosoma pellicu-</i> <i>cidum</i> Keferstein	1919	Fremantle	<i>Nephasoma</i> sp. near <i>schuettei</i>
<i>Phascolosoma semperi</i> Selenka, de Man and Bülow	1921	Cape Jaubert	<i>Themiste</i> sp.
<i>Dendrostomum signifer</i> Selenka, de Man and Bülow	1919	Albany	<i>Themiste huttoni</i>
<i>Aspidosiphon hart-</i> <i>meyeri</i> Fischer	1919	Shark Bay	<i>Aspidosiphon hart-</i> <i>meyeri</i>

More recent records are contained in Edmonds (1955, 1956 and 1980). Since the last of these papers was written several important changes have been made to the systematics of the phylum, chiefly by Cutler (1979), Cutler and Cutler (1981, 1982, 1983), Cutler, Cutler and Gibbs (1983), Cutler, Cutler and Nishikawa (1984), Cutler and Gibbs (1983) and Gibbs, Cutler and Cutler (1983). Attempts, therefore, have been made in the present paper to bring the nomenclature of the Western Australian fauna in line with the new findings.

Annotated list of sipunculans

Reasonably complete descriptions of all and illustrations of many of the species (excepting *Sipunculus norvegicus*, a new record for Australia) were given in Edmonds (1980). Since some of the species found in Western Australia also

occur in Japan, descriptions given in Cutler, Cutler and Nishikawa (1984) may be useful to Western Australian marine zoologists. The key to genera given in Cutler *et al.* (1984) includes the more recently established genera and consequently is more up-to-date.

Thanks are due to Mrs L. Marsh of the Western Australian Museum, who collected many of the specimens and was responsible for forwarding them for identification.

The following abbreviations are used throughout the paper: AMS = Australian Museum, Sydney; SAM = South Australian Museum, Adelaide; WAM = Western Australian Museum, Perth; NSW = New South Wales; NT = Northern Territory; NZ = New Zealand; Q = Queensland; SA = South Australia; T = Tasmania and V = Victoria.

1. *Sipunculus indicus* Peters, 1850
Sipunculus indicus – Edmonds 1980: 9.

Distribution

WA; mouth of Yardie Creek, west side of North West Cape (AMS W 9250) Australia; Coral Sea (AMS 5734). Elsewhere; Indo-Pacific.

Habitat

A burrowing species in sand or sandy mud; adult specimens may be very large (400 mm).

2. *Sipunculus norvegicus* (Danielssen, 1868)
Sipunculus norvegicus – Stephen and Edmonds 1972 fig. 3; – Cutler *et al.* 1984: 255.

Distribution

WA; Imperieuse Reef, Rowley Shoals, 17° 40' S, 118° 53' E (SAM E 1716); 16° 53' S, 119° 53' E at 339-458 m (WAM 52-85); Mermaid Sound, Dampier Archipelago (WAM 42-85, 48-85). This is the first record from Australia. The trunk of the specimen possesses 21-24 longitudinal muscle bands. The species is best known from the colder waters of the North Atlantic but is also reported from India, Japan, Hawaii and the South Pacific.

3. *Sipunculus robustus* Keferstein, 1865
Sipunculus robustus – Edmonds 1980: 9-10, figs 4, 18, 20-22.

Distribution

WA; Bremer Bay, 34° 23' S, 119° 25' E (WAM 30-85); Middleton Beach, Albany, 35° 00' S, 119° 55' E (WAM 34-85); Woodman Point (WAM 172-76); Safety Bay (WAM 197-76); west of Rottne I. at 200 m (WAM 125-76); north of Rottne I. at 137 m (WAM 11-73); north-west of Rottne I. at 170-174 m (WAM 12-73); Dampier Archipelago (WAM 32-85, 33-85). The specimens from Bremer Bay are excellent. The length of their trunk is up to 180 mm. Australia; Q, V, T, SA, WA. Elsewhere; Indo-Pacific.

Habitat

Burrows in sandy beaches below low tide level. Often washed up after storms.

4. *Xenosiphon mundanus* (Selenka, de Man and Bülow, 1883)

Xenosiphon mundanus — Edmonds 1980: 12-13, figs 5, 26-27..

Distribution

WA; Bremer Bay, 34°23'S, 119°25'E (WAM 322-85, 323-85); Cottesloe Beach (WAM 252-76). Australia; NSW, V, T, SA, WA. Elsewhere; NZ, New Britain, Chile.

Habitat

Burrows in sandy beaches or in sand-mud flats.

5. *Siphonosoma cumanense* (Keferstein, 1867)

Siphonosoma cumanense — Edmonds 1980: 16, fig. 28; — Cutler *et al.* 1984: 258.

Distribution

WA; Houtman Abrolhos (WAM 79-85); Cottesloe (WAM 153-76); Kwinana Beach, Cockburn Sound (WAM 196-76); Fisherman's Harbour, Fremantle (WAM 199-76). Australia; Q, NSW, WA. Elsewhere; circum-tropical and sub-tropical.

Habitat

Burrows in sand and sandy mud.

6. *Siphonosoma vastum* (Selenka, de Man and Bülow, 1883)

Siphonosoma vastum — Edmonds 1980: 16, fig. 31; — Cutler *et al.* 1984: 261.

Distribution

WA; Pt Cloates, 22°43'S, 113°40'E (WAM 4-73); Shark Bay (Fischer 1919), identified as *Siphonosoma crassum* but now considered to be *S. vastum* (Edmonds, 1955). Australia; Q, WA. Elsewhere; Indo-Pacific.

Habitat

Burrows in sand and sandy mud.

7. *Golfingia herdmani* (Shiple, 1903)

Golfingia herdmani — Edmonds 1980: 19, fig. 32, 36-38.

Distribution

WA; 79 km west of Cliff Head, 29°28'S, 114°11'E, at 183 m (WAM 70-85). A new record for WA. Australia; SA, WA. Elsewhere; Sri Lanka.

Habitat

In sand and debris at base of marine plant growth; also dredged.

8. *Nephasoma (?) schuettei* (Augener, 1903)

Golfingia schuettei — Edmonds 1980: 25-26, figs 35, 44-45.

Phascolosoma pellucidum — Fischer 1919.

Distribution

WA; Cockburn Sound (WAM 141-76); Fort Gregory, 28° 12'S, 114° 14'E (WAM 15-73); Cockatoo I. 16° 06'S, 123° 38'E (WAM 149-76). Another specimen from Cockatoo I. (WAM 160-76) previously identified by me as *Golfingia pellucida australiensis* is *Nephasoma schuettei*. Australia; NSW, WA.

Habitat

In sand and sandy mud.

Note

Whether *Nephasoma* is the appropriate genus for these large specimens with a trunk 100-160 mm long is not certain.

9. *Themiste cymodoceae* Edmonds, 1956

Themiste cymodoceae – Edmonds 1980: 38-40, figs 58, 63.

Distribution

WA; Leighton Beach (WAM 140-76). A new record for WA. Australia; SA. Elsewhere; no records.

Habitat

In tangled roots of marine angiosperm, *Amphibolis antarctica*.

10. *Themiste dehamata* Kesteven, 1903

Themiste dehamata – Edmonds 1980: 34-36, figs 53-57.

Distribution

WA; Bremer Bay (WAM 31-85, 29-85); Cottesloe (SAM E 1248). Australia; NSW, V, SA, T, WA. Elsewhere; no records.

Habitat

In sand and debris among roots of sea grasses.

11. *Themiste huttoni* (Benham, 1904)

Themiste huttoni – Edmonds 1980: 36-37, figs 60-64.

Distribution

WA; Trigg I. (WAM 242-76); Garden I. (WAM 179-76); Cockburn Sound (WAM 32-73); Albany (Fischer 1919). Australia; Q, NSW, T, WA. Elsewhere; NZ.

Habitat

In and under rocks.

12. *Themiste lageniformis* Baird, 1868

Themiste lageniformis – Edmonds 1980: 41, figs 59, 65-67; – Cutler *et al.* 1984: 283-384.

Distribution

WA; Dampier Archipelago (WAM 171-81); Broome (Hamburg Museum Collection). Australia; Q, NT, WA. Elsewhere; Indo-Pacific.

Habitat

Forms burrows in calcareous rock; also found under rocks.

13. *Phascolion collare* (Selenke, de Man and Bülow, 1883)

Phascolion collare — Edmonds 1980: 29-30, fig. 52.

Distribution

WA; Rosemary I., Dampier Archipelago (WAM 36-73); Phillip Pt, Dampier Archipelago (AMS W 5497). Australia; WA. Elsewhere; Indonesia, Phillipine Is.

Habitat

Normally in discarded shells of molluscs. The above specimens from solitary corals.

14. *Apionsoma misakianum* (Ikeda, 1904)

Apionsoma misakianum — Cutler *et al.* 1984: 301, figs 10J; 12B.

Golfingia misakiana — Edmonds 1980: 22-23.

Distribution

WA; Mermaid Sound, Dampier Archipelago (WAM 44-85); Mangrove Bay, North West Cape (WAM 138-81, 141-81); Shark Bay (Fischer 1919). Australia; NSW, WA. Elsewhere; Japan, Tanzania.

Habitat

In sand and debris at base of sea plants.

15. *Apionsoma trichocephalum* Sluiter, 1902

Apionsoma trichocephalum — Cutler *et al.* 1984: 301.

Golfingia trichocephala — Edmonds 1980: 23-24, figs 34, 40.

Distribution

WA; Mermaid Sound, Dampier Archipelago (WAM 45-85); Rottneest I. (AMS W 10565). Australia; Q, WA. Elsewhere; Indonesia, South and West Africa, West Atlantic, Coral Sea, Tasman Sea.

Habitat

In sand and debris under rocks.

16. *Aspidosiphon cumingi* Baird, 1868

Aspidosiphon cumingi — Stephen and Edmonds 1972: 243; — Edmonds, 1980: 50.

Distribution

WA; Ashmore Reef, 12° 15' S, 123° 03' E (WAM 136-81). A new record for WA. Australia; Q, WA. Elsewhere; Indo-Pacific.

Habitat

Associated with coral reefs.

17. *Aspidosiphon elegans* (Chamisso and Eysenhardt, 1821)

Aspidosiphon elegans — Edmonds 1980: 47, figs 71-76; — Cutler *et al.* 1984: 304.

Distribution

WA; Kendrew I., 20°28'30''S, 116°32'E (WAM 85-86, 86-85, 275-85).

A new record for WA. Australia; Q, WA. Elsewhere; Indo-Pacific.

Habitat

Associated with coral formations; specimens from WA collected from rock and amongst oysters.

18. *Aspidosiphon hartmeyeri* Fischer, 1919

Aspidosiphon hartmeyeri — Edmonds 1980: 47, fig. 80.

Distribution

WA; Shark Bay (Fischer, 1919); Rottneest I. (SAM E 1250). Australia;

WA, SA. Elsewhere; Kermadec, West Africa, Cuba.

Habitat

Calcareous rocks.

19. *Aspidosiphon jukesii* Baird, 1873

Aspidosiphon jukesii — Edmonds 1980: 49, fig. 97-99.

Distribution

WA; Houtman Abrolhos I. (WAM 49-85, 51-85). A new record for WA.

Australia; Q, WA. Elsewhere; Indo-Pacific.

Habitat

Lives in solitary corals, especially *Heteropsammia* and *Heterocyathus*.

20. *Phascolosoma arcuatum* (Gray, 1828).

Phascolosoma arcuatum — Edmonds 1980: 58-59, figs 109-111.

Distribution

WA; Port Warrender, Admiralty Gulf, 14°30'S, 125°50'E (WAM 137-

81, 146-81, 96 to 100-85); Derby (WAM 264-76, SAM E 1388, 1389).

Australia; Q, NT, WA. Elsewhere; Malaysia, Indonesia, Philippines.

Habitat

Always associated with mangroves.

21. *Phascolosoma nigrescens* Keferstein, 1865

Phascolosoma nigrescens — Edmonds 1980: 59-60, fig. 112; — Cutler *et al.* 1984: 296.

Distribution

WA; Clerke Reef, Rowley Shoals, 17°10'S, 119°20'E (WAM 55-85);

Scott Reef, 14°05'S, 121°51'E (WAM 58-85); 18 km north of Dongara

(WAM 69-85, 71-85); Rottneest I. (WAM 77-85); Kendrew I., Dampier

Archipelago (WAM 87-85, 324-85); Riddell Pt, Broome (WAM 92-85,

94-85); Gantheaume Pt, Broome (WAM 93-85); Montebello I. (WAM 95-85); Cape Jaubert, 18°56'S, 121°33'E (Fischer 1921); Shark Bay (Fischer 1919); Dampier Archipelago (WAM 132-76, 222-76); Port Denison, 29°16'S, 114°55'E (Edmonds 1956); Barrow I. (WAM 246-76); Cape Leveque (WAM 54-85). Australia; Q, NSW, NT, WA. Elsewhere; circum-tropical.

Habitat

In limestone and coral reefs: sometimes under rocks.

22. *Phascolosoma noduliferum* Stimpson, 1855

Phascolosoma noduliferum — Edmonds 1980: 62, figs 114-115.

Distribution

WA; Cape Naturaliste (WAM 62-85); 73 km off Dongara, 29°07.5'S, 114°10'E at 64 m (WAM 72-85); Houtman Abrolhos (WAM 81-85); Great Australian Bight, 35°15'S, 126°22'E at 164 m (WAM 145-76) and 33°19'S, 129°50'E (WAM 110-85); 16 km east of Hopetoun (WAM 225-76). Australia; NSW, V, T, SA, WA. Elsewhere; NZ, Philippines, New Guinea.

Habitat

In littoral collections under rocks; also dredged.

23. *Phascolosoma rotnnesti* Edmonds, 1956

Phascolosoma rotnnesti — Edmonds 1980: 64-65, figs 116, 124-126.

Distribution

WA; Kendrew I., Dampier Archipelago (WAM 139-76, 49-82, 88-85); near Passage Is, 20°25'S, 115°40'E, at 16 m (WAM 67-85); North West Cape Peninsula (WAM 91-85); Pt Cloates (WAM 16-73); Dorre I., Shark Bay (WAM 63, 65, 66-85); Dirk Hartog I., Shark Bay (WAM 64-85); Horrocks Beach (WAM 166-76); Houtman Abrolhos (WAM 130-76, 186-76, 188-76, 237-76, 241-76, 80-85); Little I., NW of Perth (WAM 84-85); Trigg I. (WAM 177-76); Cottesloe (WAM 68-75); Rottneest I. (WAM 128-76, 158-76, 165-76, 169-76, 176-76, 247-76, 181-76, 47-82, 48-82, 74 to 76-85); Garden I. (WAM 190-76, 234-76); Cockburn Sound (138-76); Cape Peron, 32°16'S, 115°41'E (WAM 180-76); Cape Naturaliste (WAM 239-76); Yallingup Beach (WAM 1990-11995, AMS W 9246); Fremantle Harbour (WAM 69-75, SAM E 1367). Known only from WA.

Habitat

Under rocks or in burrows in calcareous rocks.

Note

Edmonds (1980) considers that this species is very closely related to *Phascolosoma scolops* (Selenka, de Man and Bülow, 1883)

Comments on some of the species
named by other authors

1. *Golfingia pellucida* (Keferstein, 1865)

Golfingia pellucida – Cutler 1973: 159-161; – Edmonds 1980: 125.

Fischer (1919) reported this species from Cockburn Sound but gave no details about his specimens. Edmonds (1980) identified two sipunculans from Cockburn Sound as *Nephasoma schuettei*. Whether Fischer's specimens can be referred to *N. schuettei* is not known for sure.

2. *Golfingia semperi* Selenka, de Man and Bülow, 1883

Golfingia semperi – Edmonds 1980: 28.

Fischer's 1921 record occupies only three lines. The species has two retractor muscles. Gibbs, Cutler and Cutler (1983: 300) consider Fischer's specimens from WA to be *Themiste* sp.

3. *Phascolosoma agassizi* Keferstein, 1867

The only WA record is Shark Bay (Fischer 1919). Edmonds (1956) considered the specimen to be *Phascolosoma rotnesti*.

4. *Phascolosoma nigritorquatum* (Sluiter, 1882)

This species was recorded from Shark Bay and Rottnest I. by Fischer (1919, 1921). The present status of the species is not known with certainty (Edmonds 1980: 60); it is closely related to *P. rotnesti* and *P. scolops*.

Conclusions

Of the sipunculan species reported from Western Australia, 10 are Indo-Pacific in their distribution, four are Australian-Malaysian-Philippine, three are southern Australian and one endemic.

Collecting sipunculans usually requires slow and patient work. It involves digging in sand and in mud, turning over rocks, cracking and searching in limestone and coral reefs and in solitary corals, pulling apart the roots of marine angiosperms, examining the encrustations of serpulid worms, the discarded shells of small molluscs and dredging. It is most likely that more species will be found when other areas, especially in the north and north-west of the State, are sampled. So far no species of *Cloeosiphon* or of *Lithacrosiphon*, both inhabitants of coral reefs, have been found.

References

- Cutler, E.B. (1973). Sipuncula of the Western North Atlantic. *Bull. Amer. Mus. Nat. Hist.*, N.Y. 152 (3): 103-214.
- Cutler, E.B. (1979). A reconsideration of the *Golfingia* subgenera *Fisherana* Stephen, *Mitosiphon* Fisher and *Apionsoma* Sluiter (Sipuncula). *Zool. Jour. Linn. Soc.* 65: 367-384.
- Cutler, E.B. and Cutler, N.J. (1981). A reconsideration of Sipuncula named by I. Ikeda and H. Sato. *Publ. Seto. Mar. Biol. Lab.* 26: 51-93.
- Cutler, E.B. and Cutler, N.J. (1982). A revision of the genus *Siphonosoma* (Sipuncula). *Proc. Biol. Soc. Washington* 95: 248-262.
- Cutler, E.B. and Cutler, N.J. (1983). An examination of the *Phascolosoma* subgenera *Antillesoma*, *Rueppellisoma* and *Satonus* (Sipuncula). *Zool. Jour. Linn. Soc.* 77: 175-187.
- Cutler, E.B., Cutler, N.J. and Gibbs, P.E. (1983). A revision of the *Golfingia* subgenera *Golfingiella* Stephen, 1964 and *Siphonoides* Murina, 1967 (Sipuncula). *Proc. Biol. Soc. Washington*. 64: 669-674.
- Cutler, E.B., Cutler, N.J. and Nishikawa, T. (1984). The Sipuncula of Japan: their systematics and distribution. *Publ. Seto Mar. Biol. Lab.* 29: 249-322.
- Cutler, E.B. and Gibbs, P.E. (1985). A phylogenetic analysis of higher taxa in the phylum Sipuncula. *Syst. Zool.* 34: 162-173.
- Edmonds, S.J. (1955). Australian Sipunculoidea I The genera *Sipunculus*, *Xenosiphon* and *Siphonosoma*. *Aust. J. Mar. Freshw. Res.* 6: 82-97.
- Edmonds, S.J. (1956). Australian Sipunculoidea II The genera *Phascolosoma*, *Dendrostomum*, *Golfingia*, *Aspidosiphon* and *Cloeosiphon*. *Aust. J. Mar. Freshw. Res.* 7: 281-315.
- Edmonds, S.J. (1980). A revision of the systematics of Australian sipunculans (Sipuncula). *Rec. S. Aust. Mus.* 18: 1-74.
- Fischer, W. (1919). Gephyreen der Sudwestkuste Australiens. *Zool. Anz.* 50: 277-285.
- Fischer, W. (1921). The results of Dr E. Mjöberg's Swedish scientific expeditions to Australia in 1910-1913. 27. Gephyrea. *K. svenska Vetensk.-Akad. Handl.* 61: 1-8.
- Fischer, W. (1927). Sipunculoidea und Echiuroidea. In: *Die Fauna Sud-West Australiens* (eds Michaelsen and Hartmeyer) 5 (3): 197-216.
- Gibbs, P.E., Cutler, E.B. and Cutler, N.J. (1983). A review of the sipunculan genus *Thysanocardia* Fisher. *Zool. Scripta.* 12: 295-304.
- Stephen, A.C. and Edmonds, S.J. (1972). *The Phyla Sipuncula and Echiura*. Trustees Brit. Mus. (Nat. Hist.) London, 528 pp.