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## Distribution of Teredinids (Mollusca: Teredinidae) in Papua New Guinea

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**ABSTRACT.** Thirty-eight species of Teredinidae, 2 of which may be new, were collected from the coasts and estuaries of Papua New Guinea. There was little difference in the occurrence of the majority of these species in the Bismarck, Solomon and Coral Seas. A few species restricted to the Bismarck and Solomon Seas have been found in the islands to the north of Papua New Guinea but not in Australia, and one species restricted to the Coral Sea has been previously reported only from north-east Australia.

There was a significant difference in the species composition in estuarine brackish waters compared with that in coastal marine waters. The teredinids may be put into 4 categories according to their occurrence in waters of different salinities: stenohaline marine species, euryhaline marine species, brackish water species and euryhaline brackish water species or marine and brackish water species.

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Species in the family Teredinidae, commonly called shipworms or teredos, are bivalve molluscs adapted to boring into wood. Their elongated bodies extend beyond the posterior margin of the shell valves, enabling them to bore deep within the timber while their siphons maintain contact with the seawater.

Prior to 1947 there was no published literature on the marine wood borers of Papua New Guinea. Schillinglaw and Moore (1947) investigated the Service harbour installations from March to July 1945 for the Scientific Liaison and Information Bureau, a war-time organization. They found that when non-resistant timber piling was used there was a general failure of wharves after twelve months. Generally attack was observed to be faster in estuarine conditions, and the rate of destruction in Port Moresby was seen to be markedly less than on the north coast of New Guinea, possibly due to the slightly lower water temperatures along the Papuan south coast. The greatest damage in the wharves was caused by the teredinids, of which 21 unidentified species in six genera were reported. The pholad *Martesia* was found mainly in the intertidal region while the isopods *Sphaeroma* and *Limnoria* were found to be restricted in distribution and of little importance in the destruction of Service structures.

From 1947 to 1970 the only other available literature relevant to marine borers in Papua New Guinea were

the report by Hartwell and Eddowes (1967) on the natural resistance of 22 indigenous timbers to marine wood borers and the reports by Wight (1969) and Tamblin (1970) on the resistance of treated timbers to marine wood borer attack.

From August to September 1970 I accompanied Dr R.D. Turner, of the Museum of Comparative Zoology, Harvard University, and Ms J.V. Marshall, a postgraduate student with the School of Zoology, University of New South Wales, on an extensive collecting trip to the major ports of Papua New Guinea. This was part of a combined C.S.I.R.O./U.N.S.W. project on a survey of marine wood borers in Australasian waters. Distribution data obtained during this survey are available in UNSW Project 12-045-15 publication 1970-1972 and are included in this paper.

### Methods and Materials

From 1971 to 1975 additional data on the occurrence of teredinids were collected through field collections in mangrove and driftwood, from fixed timbers and by the submersion of a large number of test panels in the major estuarine and marine harbours. (The term "mangrove" as used in this report refers to the roots and trunks of mangrove species such as *Rhizophora stylosa*, *Bruguiera*

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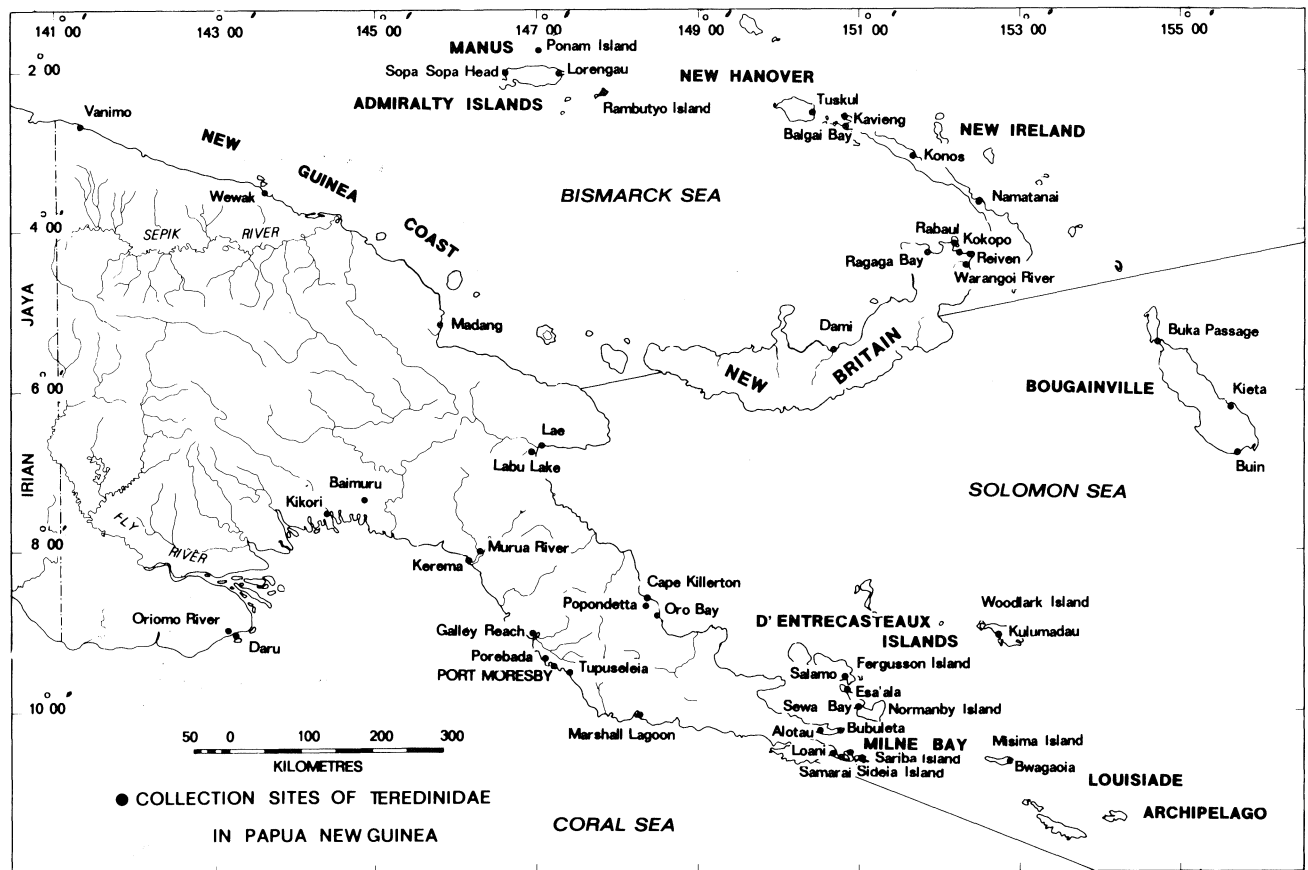


Fig. 1. Collection Sites of Teredinidae in Papua New Guinea.

*parviflora*, *Xylocarpus granatum*, and *Ceriops decandra* found growing along the coastline and at the mouths of estuaries and the trunks of timber species such as *Pterocarpus indicus*, *Hibiscus tiliaceus* and *Heritiera littoralis* which are found growing along the banks in the upper tidal reaches of rivers. "Fixed timber" refers to test panels, 7.5 x 2.5 x 25.4 cm and mostly of *Intsia bijuga*, preserved test panels and timber structures such as the fenders and piles of old wharves and jetties.) Collecting sites are shown on the map (Fig. 1).

As many whole specimens as possible were manually dissected with Stanley hand-knives from the wood samples. When teredinid attack was very heavy or when the borers had already died and decomposed at the time of the wood's collection only the hard calcareous pallets, which are used to seal off the burrow openings, could be extracted. The borers could still be determined, as identification of teredinid species is almost entirely based on the pallets. I identified each specimen as schooled by Dr Turner during her visit to Papua New Guinea in 1970, in accordance with her key to the wood-boring bivalves (1971). All specimens, preserved in 75% ethanol, are presently held at Forest Products Research Centre, Office of Forests. The Teredinidae collection will be lodged in the Mollusca collection at the Papua New Guinea National Museum in the event of the marine wood-borer programme terminating at the Office of Forests.

## Results

Of the 67 species of Teredinidae recognized by Turner (1971), 34 have been collected from the coasts and estuaries of mainland Papua New Guinea, New Ireland, New Britain, the Admiralty Islands, Bougainville and the D'Entrecasteaux Islands and the Louisiade Archipelago (Fig. 1). Two possible new species were found in 1970 by Turner, Marshall and Rayner, one a *Lyrodus*, the other a *Nausitora*. *Lyrodus tristis* Iredale (1936), which had been synonymized with *L. pedicellatus*, and *Nausitora globosa* Sivickis (1928), which had been synonymized with *N. dunlopei* by Turner (1966), are now considered valid species (Turner, pers. comm.). A list of all Teredinidae collected in Papua New Guinea is given in Appendix I, detailing their distribution within the Bismarck, Solomon and Coral Seas.

## Discussion

The majority of species range throughout all three seas, a reflection of the uniformity of water temperatures and of the effectiveness of the coastal surface currents, which are important in the dispersal of the adults in driftwood, and of the free-swimming larvae of oviparous and short-term larviparous species. These currents pass through the Vitiaz Straits from the Solomon Sea to the Bismarck Sea from April to October

and from the Solomon Sea to the Coral Sea from June to October during the south-easterly 'trade' winds. From November to March, when the winds are from a westerly direction, surface currents pass through the Vitiaz Straits from the Bismarck Sea to the Solomon Sea, with some current movement from the Solomon Sea to Coral Sea. During this season circular currents in the Coral Sea could allow for the intermixing of teredinid populations in north-east Australia and Papua (Wyrski, 1960, and Yamanaka, 1973). The native canoes used in long trading voyages are not dependent on surface currents and may have been important in the transportation of brackish water species from estuary to estuary, but this has not been documented.

A few species appear to have a restricted range and their distribution here is considered in relation to their known distribution in other waters. Only two species were found restricted to the Coral Sea, *Bankia campanellata*, a tropical world-wide species which is not important in the teredinid fauna here, and *Teredo poculifer*, a brackish water species previously reported only from the rivers of north-east Australia. Only one small population of *Teredo poculifer* was found in the Gonema River during an intensive three year study of the Teredinidae in the Marshall Lagoon Estuary. Intensive sampling in other estuaries may show *Teredo poculifer* to have a wider distribution. The two other species found in Papua New Guinea which have been reported previously only from Australia, *Bankia australis* and *Lyrodus tristi*, have been found in very small numbers in the Bismarck and Solomon Seas.

There are several species localized or in high concentrations in the waters of the Bismarck and Solomon Seas. Of these *Spathoteredo obtusa*, *Bankia johnsoni*, *Bankia philippinensis* and *Bankia bipennata* have been reported from the Philippines and the Malayan Peninsula but not Australia. *Nausitora hedleyi* and *Teredothyra smithii*, also known from the Philippines but not Australia, occur in all three Seas.

*Teredo somersi* and *Teredothyra dominicensis*, found in very small numbers, mainly in the Bismarck Sea, have previously been recorded from the Atlantic Ocean. They are probably a recent introduction and it is possible they could extend their range in the tropical and sub-tropical waters of the Indo-Pacific.

The five other species which are localized in the Bismarck and Solomon Seas are comparatively rare, but two of these are worth mentioning: a possible new *Nausitora* collected in the Huon Gulf near Lae and at Wewak, and *Bankia australis* previously reported only in the temperate to sub-tropical waters of Australia and New Zealand. *Bankia australis* was collected from *Pinus radiata* panels in Rabaul in 1970 and Turner (1971a) suggests that it could have been introduced during World War II and have survived, becoming part of the teredinid fauna there.

Small numbers of *B. australis* were collected in panels from Madang and Vanimo in 1970 and a few specimens were collected in driftwood at Cape Killerton, Sideia Island, and in mangrove at the mouth of a small estuary

at Kieta. *Bankia australis* has probably been introduced several times but undetermined environmental factors prevent the permanent establishment of this temperate sub-tropical species in the tropical waters here.

Three species (*Teredo bartschi* = (*fragilis*), *Teredo triangularis* and *Lyrodus medilobatus*) occurring in the tropical and sub-tropical waters of Australia and the Philippines have not yet been collected. All three could be expected to occur in Papua New Guinea waters.

There was a significant difference in the species composition of populations in estuarine brackish waters compared with coastal marine waters. Although small populations of marine species have been found in slightly brackish waters (20 to 30‰) only eight marine species are truly euryhaline and are commonly found in the mouths of estuaries, where they must tolerate salinities as low as 10‰ for long periods of time. These more tolerant species are *Lyrodus pedicellatus*, *Lyrodus bipartitus*, *Teredo furcifera*, *Nototeredo edax*, *Bankia gracilis*, *Bankia rochi*, *Bactronophorus thoracites* and *Dicyathifer manni*. Turner (1971) classified *Dicyathifer manni* as a marine and brackish water species, a category in which I feel *Bactronophorus thoracites*, *Bankia gracilis* and *Bankia rochi* should also be included, as these species are commonly found upstream to where the salinity is constantly as low as 10‰, as well as occurring in the marine waters along the coastline. *Dicyathifer manni* and *B. thoracites* are essentially found only in the mangrove stands growing along the coastlines and in the estuaries of Papua New Guinea. *Bactronophorus thoracites* has been found up to 52.6 cm in length by 2.0 cm in diameter, extending up the trunk and down the roots from the intertidal region where they settle. Only two very small specimens have been found in timber, one in a test panel tied to mangrove roots at Marshall Lagoon and one in a boat keel which had been moored alongside mangrove. *Dicyathifer manni* occasionally bores into timber structures occurring near mangrove but these specimens are much smaller than those in mangrove (34.7 x 0.9 cm maximum in mangrove compared with 18.6 x 0.9 cm maximum in timber).

Of the brackish water species, *Teredo poculifer* has only been found in estuarine waters and *Nausitora dunlopei* and *Nausitora globosa* are almost exclusively found in estuarine waters, with isolated specimens occasionally found in marine waters. *Nausitora hedleyi*, classified by Turner (1971) as a marine species, is included here as a brackish water species as it is also found almost exclusively in estuaries.

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### Appendix I

#### List of all Teredinidae collected in Papua New Guinea

Coll = number of collections made at that site

Spec = number of specimens collected at that site

	Fixed Timber		Mangrove		Driftwood	
	Coll	Spec	Coll	Spec	Coll	Spec
<i>Bactronophorus thoracites</i> (Gould) 1856 (marine and brackish water)						
BISMARCK SEA: Balgai Bay, River, New Ireland			1	2		
SOLOMON SEA: Labu Lakes, Lae			1	5		
Salamo, Fergusson I.			1	2		
Buka Passage, Bougainville I.			1	5		
Ieta River, Buka, Bougainville I.			2	4		
CORAL SEA: Paili Inlet, Marshall Lagoon			1	1		
Gonema River (4 sites), Marshall Lag.	1	1	8	16		
McFarlane Harbour, Marshall Lag.			1	4		
Bootless Bay, East Port Moresby			2	2		
Pari Village, Port Moresby			1	1		
Napa Napa, Port Moresby Harbour					1	1
Hourata Bay, Port Moresby Harbour			1	5		
Coglan Head, Fairfax Harbour			6	22		
Fairfax Harbour, Port Moresby			3	14		
Idler's Bay, West Port Moresby			1	1		
Laloki River, mouth, Galley Reach			1	23		
Galley Reach, upstream			1	4		
Petoi, Kerema Bay			1	15		
Murua River, Kerema Bay			1	9		
Mariapepia, Baimuru, Pie River			1	38		
Pie River, Gulf District			3	17		
Bristow I., West Papua			1	1		
Bristow I., estuary, West Papua			1	2		
Oriomo River, mouth, West Papua			1	4		

		Fixed Timber		Mangrove		Driftwood	
		Coll	Spec	Coll	Spec	Coll	Spec
<i>Dicyathifer manni</i> (Wright) 1866 (marine and brackish water)							
BISMARCK SEA:	Lorengau, estuary, Manus I.			1	6		
	Balgai Bay, estuary, New Ireland			1	1		
	Rabaul, New Britain	1	1				
	Wewak, estuary, Sepik			1	4		
	Wewak, beach, Sepik	1	1				
SOLOMON SEA:	Lake Labu, estuary, Lae			1	1		
	Salamo, Fergusson I.			1	3		
	Sewa Bay, Normanby I.			1	27		
	Kulumadau, Woodlark I.			2	33		
	Bubuleta, NE Milne Bay			2	27		
	Buka, estuary, Bougainville I.			1	8		
	Buka, coast, Bougainville I.			1	8		
	Sideia C.M., Sideia I., Milne Bay					1	1
CORAL SEA:	Kupiano Wharf, McFarlane Harbour	4	8				
	NE McFarlane Harbour, Marshall Lagoon			1	24		
	SW McFarlane Harbour, Marshall Lag.	15	148	4	34		
	Paili Inlet, Marshall Lag.			1	8		
	Wanigela Village, Marshall Lag.	6	34				
	Gonema River (3 sites), Marshall Lag.	7	65	4	22		
	Tupuseleia, Port Moresby			1	7		
	Bootless Bay, Port Moresby			6	281		
	Motupore I., Bootless Bay, Port Moresby			1	1		
	Coglan Head, Port Moresby Harbour			19	283		
	Kanudi, Port Moresby Harbour			3	29		
	Hourata Bay, Port Moresby Harbour			2	36		
	Fairfax Harbour, Port Moresby			5	104		
	Idler's Bay, Port Moresby			3	22		
	Boera, Port Moresby			1	7		
	Lealea, estuary, Port Moresby			1	8		
	Porebada, Port Moresby			1	1		
	Laloki River, mouth, Galley Reach			1	1		
	Galley Reach, upstream			1	2		
	Petoi, estuary, Kerema Bay			1	3		
	Oriomo River, mouth, West Papua	1	3	1	2		
	Bristow I., estuary, West Papua			1	2		
	Bristow I., coast, West Papua			1	1		
<i>Teredothyra smithii</i> (Bartsch) 1927 (marine)							
BISMARCK SEA:	Rabaul, New Britain			1	1		
CORAL SEA:	Napa Napa, Port Moresby Harbour	1	2				
<i>Teredothyra matocotana</i> (Bartsch) 1927 (marine)							
BISMARCK SEA:	Rabaul, New Britain	3	4				
	Pila Pila Beach, Rabaul					1	1
SOLOMON SEA:	Lae, main wharf, Huon Gulf	2	3				
	Cape Killerton, Morobe Coast					1	1
CORAL SEA:	Paili Inlet, Marshall Lag.			1	1		
	Wanigela Village, Marshall Lag.	1	3				

	Fixed Timber		Mangrove		Driftwood	
	Coll	Spec	Coll	Spec	Coll	Spec
<i>Teredothyra dominicensis</i> (Bartsch) 1921 (marine)						
BISMARCK SEA: Rabaul, New Britain	7	8				
SOLOMON SEA: Lae, main wharf, Huon Gulf	4	10				
CORAL SEA: Alotau, Milne Bay	2	6				
<i>Teredothyra excavata</i> (Jeffreys) 1860 (marine)						
BISMARCK SEA: Rabaul, New Britain	1	1				
SOLOMON SEA: Lae, main wharf, Huon Gulf	2	2				
<i>Teredora princesae</i> (Sivickis) 1928 (marine)						
BISMARCK SEA: Ponam I., Admiralty Is Madang Harbour, New Guinea coast	1	1			1	10
<i>Uperotus rehderi</i> (Nair) 1956 (marine)						
BISMARCK SEA: Ponam I., Admiralty Is					1	1
<i>Uperotus clavus</i> (Gmelin) 1791 (marine)						
CORAL SEA: Idler's Bay, Port Moresby					1	20
<i>Lyrodus pedicellatus</i> (Quatrefages) 1849 (euryhaline marine)						
BISMARCK SEA: Lorengau, Manus I., Admiralty Is	6	65				
Lorengau, river, Manus I.	1	16				
Langendrowa Village, Rambuyto I.			1	1		
SW Rambuyto I., Admiralty Is					1	3
Namatani, New Ireland	1	2				
Tuskul, New Hanover, New Ireland	2	13				
Rabaul, wharf, New Britain	14	1321				
Vulcan Point, Simpson's Harbour			1	1		
Dami, West New Britain	3	11				
Ragaga Bay, New Britain	2	76				
Warangoi River, NE, New Britain					1	1
Reivan, NE Britain					1	2
Madang, wharf, New Guinea coast	14	250		1	2	
Madang, beach, New Guinea coast					1	2
Vanimo, New Guinea coast	3	8				
SOLOMON SEA: Lae, main wharf, Huon Gulf	3	3				
Oro Bay, Morobe coast	3	101				
Alotau, Milne Bay	2	6				
Esa'ala, Normanby I.	3	7				
Sewa Bay, Normanby I.			1	30	1	6
Bwagaioia, Misima I.	3	42				
Buka Passage, Bougainville I.	6	50				
Kangu Beach, Buin, Bougainville I.	2	19				
Sideia C.M., Sideia I. East Papua					1	1

		Fixed Timber		Mangrove		Driftwood	
		Coll	Spec	Coll	Spec	Coll	Spec
CORAL SEA:	Kupiano Wharf, McFarlane Harbour	12	40				
	SW McFarlane Harbour, Marshall Lag.	5	24				
	Wanigela Village, Marshall Lag.	5	20				
	Gonema River (3 sites), Marshall Lag.	5	12				
	Motupore I., Bootless Bay			1	4		
	Ela Beach, Port Moresby					1	2
	Port Moresby, wharf	20	291				
	Napa Napa, Port Moresby Harbour	8	39				
	Coglan Head, Port Moresby Harbour			4	27		
	Port Moresby Harbour	4	22				
	Fairfax Harbour, Port Moresby			2	3		
Roku Bay, Port Moresby			1	2			
<i>Lyrodus bipartitus</i> (Jeffreys) 1860 (euryhaline marine)							
BISMARCK SEA:	Lorengau, wharf, Manus I.	5	31				
	Lorengau, river, Manus I.		1	3			
	Namatanai, New Ireland		1	3			
	Rabaul, New Britain		6	10			
	Ragaga Bay, New Britain		2	7			
	Dami, West New Britain		1	2			
	Madang, wharf, New Guinea coast		8	24			
	Madang, beach, New Guinea coast						1
Vanimo, New Guinea coast		2	3				
SOLOMON SEA:	Lae, wharf, Huon Gulf		6	10			
	Oro Bay, Morobe coast		1	10			
	Beama River, mouth, Oro Bay		1	5			
	Sewa Bay, Normanby I.					1	3
	Buka Passage, Bougainville I.		2	2			
CORAL SEA:	Kupiano Wharf, McFarlane Harbour	8	19				
	SW McFarlane Harbour, Marshall Lag.	8	59	1	1		
	Gonema River (2 sites), Marshall Lag.	5	32				
	Wanigela Village, Marshall Lag.	1	1				
	Tupuseleia, Port Moresby			1	1		
	Bootless Bay, Port Moresby			4	25		
	Port Moresby, main wharf	2	26				
	Coglan Head, Port Moresby Harbour			8	28		
	Fairfax Harbour, Port Moresby			1	5		
	Hourata Bay, Port Moresby Harbour			1	6		
	Roku Bay, Port Moresby			1	1		
Lealea, Port Moresby			1	1			
Kerema Bay, wharf, Gulf	1	1					
<i>Lyrodus tristis</i> (Iredale) 1936 (marine)							
BISMARCK SEA:	Madang, wharf, New Guinea coast		1	1			
	Vanimo, wharf, New Guinea		1	2			
SOLOMON SEA:	Oro Bay, Morobe coast		3	11			
<i>Lyrodus</i> n.sp. (undescribed, marine)							
BISMARCK SEA:	Lorengau, Manus I. Admiralty Is		6	41			
	Tuskul, New Hanover, New Ireland		1	1			
	Rabaul, New Britain		7	20			
	Ragaga Bay, New Britain		3	21			
	Madang wharf, New Guinea coast		8	28			



	Fixed Timber		Mangrove		Driftwood	
	Coll	Spec	Coll	Spec	Coll	Spec
SOLOMON SEA:						
	Oro Bay, Popondetta coast	2	3			
	Alotau, Milne Bay	3	20			
	Sewa Bay, Normanby I.					1 1
	Buka Passage, Bougainville I.	1	1			
CORAL SEA:						
	NE McFarlane Harbour, Marshall Lag.			1	1	
	Kupiano wharf, McFarlane Harbour	2	2			
	Wanigela Village, Marshall Lag.	2	2			
	Pari Village, Port Moresby			1	4	
	Port Moresby, wharf	19	62			
	Napa Napa, Port Moresby Harbour	6	10			
	Kerema Bay, estuary, Gulf	6	29			
	Daru, main wharf, West Papua	4	97			

*Lyrodus massa* (Lamy) 1923  
(marine)

BISMARCK SEA:						
	Sietche Bay, NW Manus I.			1	1	
	Lorengau, wharf, Manus I.	1	1			
	Tuskul, wharf, New Hanover	2	10			
	Namatanai, New Ireland	1	1			
	Rabaul, New Britain	3	4			
	Ragaga Bay, New Britain	1	7			
	Madang, wharf, New Guinea coast	4	7			
SOLOMON SEA:						
	Lae, Huon Gulf	2	2			
	Alotau, Milne Bay	1	1			
	Esa'ala, wharf, Normanby I.	2	2			
	Sewa Bay, Normanby I.			1	2	
	Sideia I. East Papua					1 14
	Buka Passage, Bougainville I.	2	6			
CORAL SEA:						
	Tupuseleia, Port Moresby			1	1	
	Bootless Bay, Port Moresby			3	6	
	Pari Village, Port Moresby			3	21	
	Port Moresby, wharf	23	104			
	Kanudi, Port Moresby Harbour			2	7	
	Napa Napa, Port Moresby Harbour	7	33			
	Coglan Head, Port Moresby Harbour			11	180	
	Fairfax Harbour, Port Moresby			2	27	
	Hourata Bay, Port Moresby Harbour			1	16	
	Roku, Port Moresby			1	11	
	Idler's Bay, Port Moresby			3	18	
	Boera, Port Moresby			1	1	
	Lealea, west Port Moresby			1	2	

*Teredo furcifera* (von Martens) 1894  
(euryhaline marine)

BISMARCK SEA:						
	Lorengau, Manus I.	2	4			
	Langendrowa Passage, Rambuyto I.					1 36
	SW Rambuyto I., Admiralty Is			1	5	
	Langendrowa Village, Rambuyto I.			1	2	
	Tuskul, New Hanover, New Ireland	3	27			
	Rabaul, wharf, New Britain	10	659			
	Ragaga Bay, New Britain	3	21			
	Dami, West New Britain	2	8			
	Madang, wharf, New Guinea coast	15	124			1 1
	Madang, beach, New Guinea coast			1	3	
	Vanimo, West Sepik	3	9			

		Fixed Timber		Mangrove		Driftwood	
		Coll	Spec	Coll	Spec	Coll	Spec
SOLOMON SEA:	Oro Bay, Morobe coast	3	21				
	Alotau, Milne Bay	2	4			1	1
	Esa'ala, Normanby I.	3	136				
	Bwagaioia, Misima I.	2	2				
	Buka Passage, Bougainville I.	7	38				
	Pok Pok I., Bougainville I.			1	1		
	Sideia I., Milne Bay					1	4
	Sariba I., Milne Bay	1	1				
CORAL SEA:	Kupiano wharf, McFarlane Harbour	20	406				
	SW McFarlane Harbour, Marshall Lag.	9	45	2	17		
	Wanigela Village, Marshall Lag.	7	51				
	Gonema River (2 sites), Marshall Lag.	2	12				
	Port Moresby, wharf	28	1151				
	Napa Napa, Port Moresby Harbour	1	6				
	Hourata Bay, Port Moresby Harbour			1	1		
	Coglan Head, Port Moresby Harbour			1	1		
	Kanudi, Port Moresby Harbour			1	1		
	Kerema Bay, Gulf	10	153				
Daru I., West Papua	2	9					
<i>Teredo clappi</i> (Bartsch) 1923							
(marine)							
BISMARCK SEA:	Langendrowa Village, Rambuyto I.			1	3		
	Tuskul, wharf, New Hanover	2	5				
	Madang, wharf, New Guinea coast	4	4				
SOLOMON SEA:	Buka Passage, Bougainville I.	2	2				
	Sideia I., East Papua					1	4
CORAL SEA:	Kupiano Wharf, McFarlane Harbour	1	1				
	Bootless Bay, Port Moresby			2	3		
	Port Moresby, Wharf	26	183				
	Port Moresby Harbour	1	2				
	Coglan Head, Port Moresby Harbour			2	10		
<i>Teredo mindanensis</i> (Bartsch) 1923							
(marine)							
BISMARCK SEA:	Langendrowa Village, Rambuyto I.					1	4
	Langendrowa Passage, Rambuyto I.			1	2		
	Rabaul, New Britain	11	39				
	Dami, West New Britain	1	4				
	Ragaga Bay, New Britain	2	7				
	Madang, wharf, New Guinea coast	1	1				
SOLOMON SEA:	Lae, wharf, Huon Gulf	3	8				
	Bubuleta, NE Milne Bay			1	2		
	Bwagaioia, wharf, Misima I.	1	1				
	Buka Passage, Bougainville I.	2	2				
	Sideia I. Milne Bay					1	2
CORAL SEA:	Bootless Bay, Port Moresby			3	8		
	Motupore I., Bootless Bay			1	11		
	Port Moresby, main wharf	7	18				
	Coglan Head, Port Moresby Harbour			13	91		
	Hourata Bay, Port Moresby Harbour			1	20		
	Kanudi, Port Moresby Harbour			2	7		
	Fairfax Harbour, Port Moresby			4	36		
	Idler's Bay, Port Moresby			1	1		
	Roku Bay, Port Moresby			1	5		
	Boera, Port Moresby			1	1		
	Porebada, Port Moresby			1	15		
	Daru, wharf, West Papua	1	2				

		Fixed Timber		Mangrove		Driftwood	
		Coll	Spec	Coll	Spec	Coll	Spec
<i>Teredo johnsoni</i> (Clapp) 1924 (marine)							
BISMARCK SEA:	Lorengau, Manus I.	5	115				
	Langendrowa Passage, Rambuyto I.					1	1
	Rabaul, New Britain	8	23				
	Ragaga Bay, New Britain	3	29				
	Dami, West New Britain	1	3				
	Madang, wharf, New Guinea coast	8	21				
	Vanimo, New Guinea coast	2	4				
SOLOMON SEA:	Oro Bay, Morobe coast	1	2				
	Alotau, Milne Bay	3	10				
	Buka Passage, Bougainville I.	2	2				
CORAL SEA:	Bootless Bay, Port Moresby			2	3		
	Pari, Port Moresby			1	2		
	Port Moresby, main wharf	19	47				
	Port Moresby Harbour			1	1		
	Coglan Head, Port Moresby Harbour	1	11	4	6		
	Napa Napa, Port Moresby Harbour	3	3				
	Fairfax Harbour, Port Moresby			2	2		
	Roku Bay, Port Moresby			1	3		
	Idler's Bay, Port Moresby			2	3		
<i>Teredo fulleri</i> (Clapp) 1924 (marine)							
BISMARCK SEA:	Namatanai, New Ireland	2	14				
	Tuskul, wharf, New Hanover I.	1	1				
	Vanimo, New Guinea coast	1	1				
SOLOMON SEA:	Buka Passage, Bougainville I.	3	28				
	Esa'ala, Normanby I.	3	27				
	Bwagaia, Misima I.	1	1				
CORAL SEA:	Napa Napa, Port Moresby Harbour	1	2				
<i>Teredo poculifer</i> (Iredale) 1936 (brackish water)							
CORAL SEA:	Gonema River (3 sites), Marshall Lag.	15	44				
<i>Teredo somersi</i> (Clapp) 1924 (marine)							
BISMARCK SEA:	Lorengau, wharf, Manus I.	1	1				
	Namatanai, New Ireland	1	4				
	Dami, West New Britain	1	1				
	Madang, wharf, New Guinea coast	3	13				
	Madang, beach, New Guinea coast					1	1
SOLOMON SEA:	Alotau, Milne Bay	1	3				
	Esa'ala, wharf, Normanby I.	2	2				
	Buka Passage, Bougainville I.	3	4				
CORAL SEA:	Port Moresby, wharf	2	4				

		Fixed Timber		Mangrove		Driftwood	
		Coll	Spec	Coll	Spec	Coll	Spec
<i>Spathoteredo obtusa</i> (Sivickis) 1928 (marine)							
BISMARCK SEA:	Lorengau, Manus I., Admiralty Is			1	7		
	Langendrowa Village, Rambuyto I.					1	8
	Sopa Sopa Head, Manus I.			1	7		
	Rambuyto I., Admiralty Is					1	216
	Tuskul, wharf, New Hanover	2	24				
	Dami, West New Britain	2	2				
	Madang, wharf, New Guinea coast	3	17				
	Wewak, beach, New Guinea coast			1	2		
	Wewak, wharf, New Guinea coast	1	5				
SOLOMON SEA:	Alotau, Milne Bay	1	1				
	Bwagaioia, wharf, Misima I.	2	2				
	Loaga Creek, Bwagaioia, Misima I.	1	5				
	Esa'ala, wharf, Normanby I.	1	1				
	Buka Passage, Bougainville I.	2	8				
	Kieta, Bougainville I.			1	5		
	Pok Pok I., beach, Kieta			1	19		
	Pok Pok I., Estuary, Kieta			1	8		
	Sideia I., Milne Bay					1	2
	Kwato I., China Straits, Milne Bay			1	8		
	Loani, China Straits, Milne Bay					1	2
<i>Nototeredo edax</i> (Hedley) 1895 (euryhaline marine)							
BISMARCK SEA:	Lorengau, estuary, Manus I.			1	1		
	Rabaul, New Britain	5	8				
	Warangoi River, NE New Britain					1	1
	Madang, wharf, New Guinea coast	7	22				
	Vanimo, New Guinea coast	1	2				
SOLOMON SEA:	Lae, wharf, Huon Gulf	1	1				
	Lake Labu, Lae, Huon Gulf			2	13		
	Beama River, mouth, Oro Bay	1	88				
	Alotau, Milne Bay	2	4				
	Kangu Beach, Buin, Bougainville I.	1	1				
	Sideia I., Milne Bay					1	2
CORAL SEA:	Kupiano Wharf, Marshall Lag.	1	1				
	SW McFarlane Harbour, Marshall Lag.			1	1		
	Gonema River (2 sites), Marshall Lag.			2	2		
	Bootless Bay, Port Moresby			1	1		
	Port Moresby, wharf	1	1				
	Coglan Head, Port Moresby Harbour			4	9		
	Napa Napa, Port Moresby Harbour	2	5				
	Hourata Bay, Port Moresby Harbour			1	5		
	Roku Bay, Port Moresby			3	4		
	Kerema Bay, wharf	1	2				
<i>Nausitora dunlopei</i> (Wright) 1864 (brackish water)							
BISMARCK SEA:	Lorengau, river, Manus I.			2	23		
	Escape Bay, Simpson's Harbour, Rabaul			1	10		
	Vulcan Point Lagoon, Rabaul			1	9		
	Wewak, estuary, New Guinea coast			1	2		

		Fixed Timber		Mangrove		Driftwood	
		Coll	Spec	Coll	Spec	Coll	Spec
SOLOMON SEA:	Lae, wharf, Huon Gulf	3	16				
	Labu Lake, Huon Gulf			1	2		
	Beama River, Oro Bay	1	30				
	Cape Killerton, Morobe coast					1	52
	Bubuleta, NE Milne Bay			1	2		
	Gumini River, Alotau, Milne Bay	1	2				
	Sewa Bay, Normanby I.					1	12
	Loaga Creek, Bwagaoia, Misima I.	1	1				
	Pok Pok I., river, Bougainville I.			1	8		
	Ieta River, Buka, Bougainville I.			1	1		
	Kangu Beach, Buin, Bougainville I.	1	11				
Sideia I., Milne Bay					1	2	
Loani, Milne Bay					1	1	
CORAL SEA:	Kupiano Wharf, McFarlane Harbour	2	2				
	SW McFarlane Harbour, Marshall Lag.	6	11	2	2		
	Wanigela Village, Marshall Lag.	2	3				
	Gonema River (8 sites), Marshall Lag.	80	2453	24	232		
	Idler's Bay, Port Moresby			2	2		
	Petoi, Kerema Bay			1	13		
	Kerema Bay, wharf	9	93				
	Mariapepia, Pie River, Gulf			1	1		
	Pie River, Gulf			4	13		
	Kikori, Kikori River	2	86				
	Oriomo River, West Papua	1	4	1	25		
<i>Nausitora</i> n.sp. (undescribed, marine)							
BISMARCK SEA:	Wewak, wharf, New Guinea coast	1	2				
	Wewak, beach, New Guinea coast					1	2
SOLOMON SEA:	Lae, Sugarloaf, Huon Gulf			1	32		
<i>Nausitora hedleyi</i> (Schepman) 1919 (brackish water)							
BISMARCK SEA:	Rabaul, New Britain	1	1				
	Wewak, Wom Point, New Guinea coast			1	1		
SOLOMON SEA:	Lae, wharf, Huon Gulf	5	358				
	Lake Labu, Lae, Huon Gulf			2	22		
	Pok Pok River, Kieta, Bougainville I.			1	2		
CORAL SEA:	SW McFarlane Harbour, Marshall Lag.	2	2	1	46		
	Kupiano Wharf, McFarlane Harbour	3	4				
	Wanigela Village, Marshall Lag.	3	4				
	Gonema River (6 sites), Marshall Lag.	62	697	11	34		
	Port Moresby, main wharf	1	1				
	Laloki River, mouth, Galley Reach			1	4		
	Galley Reach, upstream			1	2		
	Murua River, Kerema	1	82				
	Kerema Bay, wharf			1	4		
	Pie River, Baimuru, West Papua			2	12		
Oriomo River, West Papua	1	2	4	89			
<i>Nausitora globosa</i> (Sivickis) 1928 (brackish water)							
BISMARCK SEA:	Tuskul, New Hanover	1	2				
	Warangoi River, NE New Britain			1	15		
	Dami, West New Britain	1	1				
	Madang, wharf, New Guinea coast	2	2				

		Fixed Timber		Mangrove		Driftwood	
		Coll	Spec	Coll	Spec	Coll	Spec
SOLOMON SEA:	Lae, wharf, Huon Gulf	3	139				
	Lake Labu, Huon Gulf			1	2		
CORAL SEA:	Kupiano Wharf, McFarlane Harbour	13	74				
	SW McFarlane Harbour, Marshall Lag.	12	226	1	15		
	Wanigela Village, Marshall Lag.	3	17				
	Gonema River (5 sites), Marshall Lag.	24	146	1	2		
	Port Moresby, wharf	1	1				
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<i>Bankia carinata</i> (Gray) 1827							
(marine)							
BISMARCK SEA:	Ponam I., Admiralty Is					1	59
	Langendrowa Passage, Rambuyto I.					1	1
	Rabaul, New Britain	1	3				
	Madang, wharf, New Guinea coast	1	1				
	Madang, beach, New Guinea coast					1	2
	Vanimo, New Guinea coast	1	2				
SOLOMON SEA:	Lae, wharf, Huon Gulf	1	1				
	Alotau, Milne Bay	1	1				
	Esa'ala, Normanby I.	2	6				
	Buka Passage, Bougainville I.	1	2				
CORAL SEA:	Kupiano Wharf, McFarlane Harbour	4	10				
	SW McFarlane Harbour, Marshall Lag.	1	3	1	1		
	Bootless Bay, Port Moresby			1	1		
	Port Moresby Harbour	1	25			1	9
	Port Moresby, Main Wharf	16	36				
	Napa Napa, Port Moresby Harbour	3	31				
	Lealea, Port Moresby			1	1		
	Kerema Bay, Gulf	1	1				
	Daru I., wharf, West Papua	3	12				
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<i>Bankia campanellata</i> (Moll & Roch) 1931							
(marine)							
CORAL SEA:	Kerema Bay, Gulf	2	5				
	Daru I., wharf, West Papua	4	73				
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<i>Bankia barthelowi</i> (Bartsch) 1927							
(marine)							
BISMARCK SEA:	Lorengau, Admiralty Is	2	3				
	Namatanai, New Ireland	1	11				
	Rabaul, New Britain	10	149			1	3
	Pila Pila Beach, Rabaul					1	1
	Ragaga Bay, New Britain	1	1				
	Dami, West New Britain	1	1				
	Madang, wharf, New Guinea coast	4	10				
	Wewak, beach, New Guinea coast					1	2
	Vanimo, wharf, New Guinea coast	2	8				
SOLOMON SEA:	Lae, wharf, Huon Gulf	5	16				
	Oro Bay, Morobe coast	2	3				
	Alotau, Milne Bay	3	6			1	1
	Sideia I., Milne Bay					1	1

		Fixed Timber		Mangrove		Driftwood	
		Coll	Spec	Coll	Spec	Coll	Spec
<i>Bankia bipalmulata</i> (Lamarck) 1801 (marine)							
BISMARCK SEA:	Lorengau, Manus I.	4	21				
	Namatanai, New Ireland	2	33				
	Tuskul, New Hanover	1	1				
	Rabaul, New Britain	9	286				
	Pila Pila Beach, Rabaul					1	2
	Vulcan Point Lagoon, Rabaul			1	2		
	Kokopo, Blanche Bay, New Britain					1	2
	Warangoi River, NE New Britain					1	1
	Ragaga Bay, New Britain	3	127				
	Dami, West New Britain	3	60				
	Madang, beach, New Guinea coast					1	35
	Madang, wharf, New Guinea coast	12	169				
	Wewak, beach, New Guinea coast					1	1
	Vanimo, wharf, New Guinea coast	8	244				
SOLOMON SEA:	Lae, wharf, Huon Gulf	14	403				
	Oro Bay, Morobe coast	3	83				
	Alotau, Milne Bay	5	16				
	Esa'ala, Normanby I.	3	15				
	Bwagaoia, Misima I.	2	49				
	Buka Passage, Bougainville I.	3	3				
	Kangu Beach, Buin, Bougainville I.	1	4				
CORAL SEA:	Kupiano Wharf, McFarlane Harbour	2	3				
<i>Bankia johnsoni</i> (Bartsch) 1927 (marine)							
BISMARCK SEA:	Lorengau, Manus I., Admiralty Is	3	3				
	Rambuyto I., Admiralty Is					1	1
	Tuskul, New Hanover	1	1				
	Rabaul, New Britain	9	309				
	Dami, West New Britain	3	42				
	Ragaga Bay, West New Britain	2	34				
	Madang, wharf, New Guinea coast	4	15				
	Vanimo, New Guinea coast	5	12				
SOLOMON SEA:	Lae, wharf, Huon Gulf	1	6				
	Oro Bay, Morobe coast	1	1				
	Sewa Bay, Normanby I.					1	23
	Esa'ala, Normanby I.	1	1				
	Alotau, Milne Bay	2	29				
	Kangu Beach, Buin, Bougainville I.	1	2				
	Loani, Milne Bay			1	1		
CORAL SEA:	Kupiano Wharf, Marshall Lag.	5	5				
	Port Moresby, wharf	1	1				
<i>Bankia australis</i> (Calman) 1920 (marine)							
BISMARCK SEA:	Rabaul, New Britain	2	20				
	Madang, wharf, New Guinea coast	2	2				
	Vanimo, wharf, New Guinea coast	1	2				
SOLOMON SEA:	Cape Killerton, Morobe coast					1	3
	Sideia I., Milne Bay					1	16
	Pok Pok I., river, Bougainville I.			1	1		

		Fixed Timber		Mangrove		Driftwood	
		Coll	Spec	Coll	Spec	Coll	Spec
<i>Bankia gracilis</i> (Moll) 1935 (marine and brackish water)							
BISMARCK SEA:	Lorengau, estuary, Manus I.			1	1		
	Rabaul, New Britain	1	1				
	Madang, beach, New Guinea coast					1	1
	Wewak, beach, New Guinea coast					1	1
	Wewak, estuary, New Guinea coast			1	14		
	Vanimo, wharf, New Guinea coast	1	1				
SOLOMON SEA:	Lae, wharf, Huon Gulf	3	5				
	Lake Labu, Lae, Huon Gulf			1	1		
	Beama River, Oro Bay, Morobe coast	1	4				
	Sewa Bay, Normanby I.			1	1		
	Kangu Beach, Buin, Bougainville I.	1	1				
	Cape Killerton, Morobe coast					1	2
CORAL SEA:	Kupiano Wharf, Marshall Lag.	21	311				
	SW McFarlane Harbour, Marshall Lag.	20	97	4	21		
	Wanigela Village, Marshall Lag.	9	72				
	Gonema River (2 sites), Marshall Lag.	6	18				
	Bootless Bay, Port Moresby			3	28		
	Port Moresby, wharf	4	5				
	Coglan Head, Port Moresby Harbour			7	16		
	Hourata Bay, Port Moresby Harbour			1	2		
	Hanuabada Village, Port Moresby	1	1				
	Kanudi, Port Moresby Harbour			2	6		
	Fairfax Harbour, Port Moresby			2	6		
	Roku Bay, Port Moresby			1	4		
	Idler's Bay, Port Moresby			3	27		
	Galley Reach, upstream			1	30		
	Kerema Bay, wharf	10	124				
	Petoi, Kerema Bay			1	7		
	Daru I., West Papua	2	3				
<i>Bankia rochi</i> (Moll) 1931 (marine and brackish water)							
BISMARCK SEA:	Rabaul, New Britain	1	2				
	Warangoi River, NE New Britain					1	2
CORAL SEA:	Kupiano Wharf, McFarlane Harbour	1	1				
	SW McFarlane Harbour, Marshall Lag.	8	31	2	8		
	Gonema River (1 site), Marshall Lag.	2	4				
	Motupore I., Bootless Bay			1	1		
	Coglan Head, Port Moresby Harbour			1	1		
	Laloki River, mouth, Galley Reach			1	22		
	Galley Reach, upstream			1	1		
	Kerema Bay, wharf			1	4		
	Pie River, Gulf			4	26		
	Daru I., West Papua	3	17				
	Oriomo River, mouth, West Papua	1	12	1	3		
<i>Bankia bipennata</i> (Turton) 1819 (marine)							
BISMARCK SEA:	Ponam I., Admiralty Is					1	3
	Rabaul, New Britain	2	3				



		Fixed Timber		Mangrove		Driftwood	
		Coll	Spec	Coll	Spec	Coll	Spec
<i>Bankia philippinensis</i> (Bartsch) 1927 (marine)							
BISMARCK SEA:	Rabaul, New Britain	5	14				
	Warangoi River, NE New Britain					1	1
	Reiven, NE New Britain					1	1
	Kokopo, Blanche Bay, New Britain					1	1
	Ragaga Bay, New Britain	3	23				
	Dami, West New Britain	3	9				
	Madang, wharf, New Guinea coast	4	11				
	Vanimo, New Guinea coast	2	8				
SOLOMON SEA:	Oro Bay, Morobe coast	3	4				
	Alotau, Milne Bay	4	34				
CORAL SEA:	Kerema Bay, wharf	3	10				
	Daru I., West Papua	3	7				
	Oriomo River, mouth, West Papua	1	14				
<i>Bankia nordi</i> (Moll) 1935 (marine)							
BISMARCK SEA:	Rabaul, New Britain	1	1				
SOLOMON SEA:	Lae, Huon Gulf	2	2				