

## Preliminary report on Echinoidea and Asteroidea (Echinodermata) of the Joint Chilean-German-Italian Magellan "Victor Hensen" Campaign, 17 October - 25 November 1994\*

ALBERTO LARRAÍN<sup>1</sup>, ERIKA MUTSCHKE<sup>2</sup>, ANY RIVEROS<sup>1</sup> and ELVIRA SOLAR<sup>1</sup>

<sup>1</sup>Department of Zoology, University of Concepción, Concepción, Chile.

<sup>2</sup>Instituto de la Patagonia, University of Magallanes, Punta Arenas, Chile.

**SUMMARY:** Part of the echinoderm material (Echinoidea and Asteroidea) sampled by 59 Agassiz trawls during the "Victor Hensen" Campaign 1994 is summarized in a preliminary species list. In total, 7 echinoids and 21 asteroids have been determined to species from the area between Paso Ancho and Cape Horn. All of them were known from the area before.

**Key words:** Echinoidea, Asteroidea, Straits of Magellan.

**RESUMEN:** INFORME PRELIMINAR DE ECHINOIDEA Y ASTEROIDEA (ECHINODERMATA) DE LA CAMPAÑA CONJUNTA CHILENO-ALEMANA-ITALIANA "VICTOR HENSEN", 17 DE OCTUBRE - 25 DE NOVIEMBRE DE 1994. - Se resume en forma de un listado preliminar de especies una parte del material de los equinodermos (Echinoidea y Asteroidea) capturados a través de 59 arrastres tipo Agassiz tomados durante la Campaña "Victor Hensen" en 1994. Se han identificado un total de 7 especies de equinoideos y 21 de asteroideos en el área entre Paso Ancho y Cabo de Hornos. Todas estas especies eran ya conocidas en dicha área.

**Palabras clave:** Echinoidea, Asteroidea, Estrecho de Magallanes.

### INTRODUCTION

Some of the echinoderms of the Straits of Magellan and neighbouring areas were first mentioned by Feuillee in 1707. After that, several expedition reports through the 19th century added to the knowledge of the species composition of this interesting fauna. It was not until Agassiz (1879, 1881), Carpenter (1884, 1888), Lyman (1878, 1879, 1882), Sladen (1889) and Théel (1882, 1886) reported on the specimens collected by the "Challenger" expedition, that

the abundance and endemic character of it was recognized. A great part of the about 350 species of echinoderms inhabiting the south-eastern Pacific and Antarctica (Larraín, 1995) belong to the Magellanic Province, which extends at greater depths into lower latitudes (Codoceo and Andrade, 1987).

This report is a preliminary account of echinoids and asteroids collected from a total of 59 Agassiz trawl (AGT) stations in the area from the Straits of Magellan and neighbouring areas, at depths between 15 and 670 m. The small AGT used had a width of 1.5 m and 10 mm mesh in the codend (for further details on exact position of stations and methodolo-

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TABLE 1. – Preliminary list of echinoids and asteroids collected during the “Victor Hensen” Campaign 1994 in the Straits of Magellan.

Station no.	Depth (m)	AGT no.	Species	Specimens	Station no.	Depth (m)	AGT no.	Species	Specimens
806	117	2	Asteroidea					<i>Porania antarctica</i>	38
			<i>Labidiaster radiosus</i>	1				Asteroidea gen. sp.	3
			<i>Pseudechinus magellanicus</i>	120					
812	115	3	Echinoidea		881	56	13	Echinoidea	
			<i>Pseudechinus magellanicus</i>	22				<i>Arbacia dufresnei</i>	3
			<i>Tripylaster philippii</i>	7				<i>Tripylaster philippii</i>	5
			Asteroidea					Asteroidea	
			<i>Cosmasterias lurida</i>	1				<i>Asterodon granulosis</i>	3
			<i>Labidiaster radiosus</i>	2				<i>Cosmasterias lurida</i>	15
			<i>Porania antarctica</i>	1				<i>Porania antarctica</i>	37
			Asteroidea gen. sp. indet.	2				<i>Solaster regularis</i>	2
								Asteroidea gen. sp. indet	11
816	57	4	Echinoidea		888	104	14	Echinoidea	
			<i>Pseudechinus magellanicus</i>	5				<i>Austrocidaris canaliculata</i>	3
			Asteroidea					<i>Brisaster moseleyi</i>	19
			<i>Ganeria falklandica</i>	1				<i>Pseudechinus magellanicus</i>	2
								<i>Tripylaster philippii</i>	14
821	57	5	Asteroidea					Asteroidea	
			<i>Bathybiaster loripes</i>	22				<i>Henricia obesa</i>	2
			<i>Ctenodiscus procurator</i>	28				<i>Labidiaster radiosus</i>	1
								<i>Odontaster penicillatus</i>	1
834	9	6	Echinoidea					<i>Porania antarctica</i>	61
			<i>Brisaster moseleyi</i>	2				<i>Solaster regularis</i>	1
			<i>Tripylaster philippii</i>	46				Asteroidea gen. sp. indet	4
846	120	7	Asteroidea		920	18	15	Asteroidea	
			<i>Bathybiaster loripes</i>	1				<i>Cosmasterias lurida</i>	1
			<i>Ctenodiscus procurator</i>	1				Asteroidea gen. sp. indet	2
			<i>Hippasterias hyadesi</i>	1					
			<i>Odontaster penicillatus</i>	1	926	49	16	Echinoidea	
			<i>Solaster regularis</i>	2				<i>Arbacia dufresnei</i>	2
			Asteroidea gen. sp. indet.	1				<i>Pseudechinus magellanicus</i>	26
861	195	8	Echinoidea					Asteroidea	
			<i>Arbacia dufresnei</i>	3				<i>Cosmasterias lurida</i>	1
			<i>Austrocidaris canaliculata</i>	1				Asteroidea gen. sp. indet	2
			Asteroidea		949	24	17	Echinoidea	
			<i>Cosmasterias lurida</i>	1				<i>Arbacia dufresnei</i>	4
			<i>Porania antarctica</i>	1				<i>Pseudechinus magellanicus</i>	1
			Asteroidea gen. sp. indet	6					
863	25	9	Asteroidea					Asteroidea	
			<i>Bathybiaster loripes</i>	85				<i>Cosmasterias lurida</i>	16
			<i>Ctenodiscus procurator</i>	117				<i>Porania antarctica</i>	72
								Asteroidea gen. sp. ident	10
865	527	10	Echinoidea		952	73	18	Echinoidea	
			<i>Brisaster moseleyi</i>	parts				<i>Pseudechinus magellanicus</i>	40
			Asteroidea					Asteroidea	
			<i>Bathybiaster loripes</i>	118				<i>Asterodon granulosis</i>	1
			<i>Ctenodiscus procurator</i>	237				<i>Cosmasterias lurida</i>	3
			<i>Porania antarctica</i>	3				Asteroidea gen. sp. indet	2
870	335	11	Asteroidea		960	960	19	Echinoidea	
			<i>Bathybiaster loripes</i>	118				<i>Pseudechinus magellanicus</i>	27
			<i>Ctenodiscus procurator</i>	265					
			<i>Porania antarctica</i>	4				Asteroidea	
								<i>Cosmasterias lurida</i>	2
875	244	12	Echinoidea					Asteroidea gen. sp. indet	4
			<i>Brisaster moseleyi</i>	40					
			<i>Tripylaster philippii</i>	19	969	38	20	Asteroidea	
			<i>Abatus philippii</i>	1				<i>Calyptaster tenuissimus</i>	2
			Asteroidea					<i>Cosmasterias lurida</i>	2
			<i>Bathybiaster loripes</i>	56				<i>Porania antarctica</i>	58
			<i>Cheiraster (Luidiaster) planeta</i>	2				Asteroidea gen. sp. indet	10
			<i>Cosmasterias lurida</i>	8	976	460	21	Echinoidea	
			<i>Ctenodiscus procurator</i>	92				<i>Brisaster moseleyi</i>	4

TABLE 1. (Cont.) – Preliminary list of echinoids and asteroids collected during the “Victor Hensen” Campaign 1994 in the Straits of Magellan.

Station no.	Depth (m)	AGT no.	Species	Specimens	Station no.	Depth (m)	AGT no.	Species	Specimens						
1036	30	23	Asteroidea		1120	97	31	<i>Cosmasterias lurida</i>	2						
			<i>Bathybiaster loripes</i>	37				<i>Henricia obesa</i>	3						
			<i>Cheiraster (Luidiaster) planeta</i>	21				<i>Hippasterias falklandica</i>	2						
			<i>Ctenodiscus procurator</i>	58											
			<i>Porania antarctica</i>	4				<i>Porania antarctica</i>	1						
			Echinoidea					1121	215	32	Echinoidea				
			<i>Pseudechinus magellanicus</i>	1							<i>Tripylaster philippii</i>	5			
			<i>Tripylaster philippii</i>	11											
			Asteroidea								1133	258	33	Asteroidea	
			<i>Ceramaster patagonicus</i>	3										<i>Porania antarctica</i>	2
<i>Cosmasterias lurida</i>	14	Echinoidea													
<i>Solaster regularis</i>	48	<i>Tripylaster philippii</i>	23												
Asteroidea gen. sp. indet	25														
Echinoidea		1137	320	34	Asteroidea										
<i>Tripylaster philippii</i>	13				<i>Bathybiaster loripes</i>	7									
Asteroidea					<i>Ctenodiscus procurator</i>	160									
<i>Calyptaster tenuissimus</i>	1				<i>Porania antarctica</i>	5									
<i>Cosmasterias lurida</i>	1				Echinoidea										
<i>Henricia obesa</i>	1				<i>Tripylaster philippii</i>	24									
<i>Lophaster stellans</i>	1														
<i>Patiria obesa</i>	1				Asteroidea										
<i>Porania antarctica</i>	2				<i>Bathybiaster loripes</i>	24									
Echinoidea					<i>Ctenodiscus procurator</i>	22									
1046	78	25	Asteroidea		1149	15	36	<i>Porania antarctica</i>	1						
			<i>Cosmasterias lurida</i>	3				Asteroidea gen. sp. indet.	4						
			<i>Odontaster meridionalis</i>	1											
1074	336	26	Echinoidea		1153	37	37	Echinoidea							
			<i>Brisaster moseleyi</i>	20				<i>Arbacia dufresnei</i>	1						
			Asteroidea					<i>Pseudechinus magellanicus</i>	2						
1080	76	27	<i>Bathybiaster loripes</i>	40				Asteroidea							
			<i>Ctenodiscus procurator</i>	82	<i>Asterodon granulatus</i>	1									
			Echinoidea		<i>Cosmasterias lurida</i>	1									
			<i>Tripylaster philippii</i>	2	Asteroidea gen. sp. indet	17									
			Asteroidea		1158	35	38	Echinoidea							
			<i>Bathybiaster loripes</i>	2				<i>Pseudechinus magellanicus</i>	2						
<i>Ctenodiscus procurator</i>	2	Asteroidea													
<i>Lophaster stellans</i>	2	<i>Asterodon granulatus</i>	1												
<i>Porania antarctica</i>	1	<i>Cosmasterias lurida</i>	2												
Asteroidea gen. sp. indet	4	<i>Odontaster penicillatus</i>	1												
1086	268	28	Echinoidea		1162	25	39	Asteroidea gen. sp. indet	35						
			<i>Brisaster moseleyi</i>	24				<i>Cosmasterias lurida</i>	6						
			<i>Pseudechinus magellanicus</i>	7											
			<i>Tripylaster philippii</i>	18				Echinoidea							
1107	100	29	Asteroidea		1175	25	40	<i>Arbacia dufresnei</i>	16						
			<i>Bathybiaster loripes</i>	9				<i>Pseudechinus magellanicus</i>	9						
			<i>Ctenodiscus procurator</i>	230				Asteroidea							
			<i>Pseudarchaster discus</i>	1				<i>Cosmasterias lurida</i>	15						
			Echinoidea					<i>Odontaster penicillatus</i>	1						
			<i>Brisaster moseleyi</i>	12				Asteroidea gen. sp. indet	40						
<i>Pseudechinus magellanicus</i>	2	1182	110	41	Asteroidea gen. sp. indet	3									
<i>Tripylaster philippii</i>	59														
Echinoidea gen. sp. indet	28				Asteroidea										
Asteroidea					<i>Cosmasterias lurida</i>	1									
<i>Bathybiaster loripes</i>	22				<i>Asterodon granulatus</i>	5									
<i>Cosmasterias lurida</i>	1				Asteroidea gen. sp. indet	11									
<i>Ctenodiscus procurator</i>	18	1191	46	42	Asteroidea										
1115	210				30	Asteroidea		<i>Cosmasterias lurida</i>	1						
						<i>Bathybiaster loripes</i>	1	<i>Cosmasterias lurida</i>	5						
				Asteroidea gen. sp. indet		11									
				1203	40	43	Echinoidea								

TABLE 1. (Cont.) – Preliminary list of echinoids and asteroids collected during the “Victor Hensen” Campaign 1994 in the Straits of Magellan.

Station no.	Depth (m)	AGT no.	Species	Specimens	Station no.	Depth (m)	AGT no.	Species	Specimens
			<i>Arbacia dufresnei</i>	3				Asteroidea gen. sp. indet.	1
			Asteroidea					FROM PHOTO:	
			<i>Cosmasterias lurida</i>	2				Echinoidea	
			Asteroidea gen. sp. indet	3				<i>Pseudechinus?</i> ( <i>Dermechinus?</i> )	1
1209	65	44	Echinoidea					Spatangoida gen.sp.indet.	11
			<i>Arbacia dufresnei</i>	3				Asteroidea	
			Asteroidea					<i>Bathybiaster loripes</i>	5
			<i>Cosmasterias lurida</i>	4				<i>Bathybiaster loripes</i> (?)	7
								<i>Ctenodiscus procurator</i>	43
								<i>T. philippii</i> (?) <i>B. moseleyi</i> (?)	30
1215	65	45	Echinoidea		1286	33	57	(only photograph)	
			<i>Arbacia dufresnei</i>	35				FROM PHOTO:	
			<i>Loxechinus albus</i>	1				Echinoidea	
			<i>Pseudechinus magellanicus</i>	8				<i>Loxechinus albus</i>	2
			Asteroidea					<i>Pseudechinus magellanicus</i>	45
			<i>Cosmasterias lurida</i>	1				Asteroidea	
			<i>Henricia obesa</i>	16				<i>Cosmasterias lurida</i>	3
			<i>Odontaster penicillatus</i>	5				<i>Porania antarctica</i>	3
			Asteroidea gen. sp. indet	21					
1223	35	46	Echinoidea		1290	480	58	Echinoidea	
			<i>Pseudechinus magellanicus</i>	2				<i>Pseudechinus magellanicus</i>	14
			Asteroidea					Asteroidea	
			<i>Asterodon granulosus</i>	1				<i>Diplopteraster semireticulatus</i>	1
			<i>Henricia obesa</i>	4				<i>Henricia obesa</i>	2
			Asteroidea gen. sp. indet	6				<i>Porania antarctica</i>	3
								Asteroidea gen. sp.indet	1
1228	30	48	Echinoidea					FROM PHOTO:	
			<i>Arbacia dufresnei</i>	1				Asteroidea	
			Asteroidea					<i>Cosmasterias lurida</i>	2
			<i>Cosmasterias lurida</i>	1				<i>Porania antarctica</i>	3
			<i>Porania antarctica</i>	1					
1242	31	50	Echinoidea		1300	350	60	Echinoidea	
			<i>Arbacia dufresnei</i>	3				<i>Pseudechinus magellanicus</i>	3
			<i>Pseudechinus magellanicus</i>	3				<i>Tripylaster philippii</i>	6
			Asteroidea					Asteroidea	
			<i>Asterodon granulosus</i>	2				<i>Cosmasterias lurida</i>	1
			<i>Henricia obesa</i>	3				<i>Odontaster meridionalis</i>	1
			Asteroidea gen.sp. indet	40				<i>Porania antarctica</i>	1
1264	653	51	Asteroidea		1306	274	61	Echinoidea	
			<i>Bathybiaster loripes</i>	32				<i>Brisaster moseleyi</i>	20
			<i>Ctenodiscus procurator</i>	2				<i>Pseudechinus magellanicus</i>	5
								<i>Tripylaster philippi</i>	30
1269	648	52	Asteroidea					Asteroidea	
			<i>Bathybiaster loripes</i>	10				<i>Bathybiaster loripes</i>	3
			<i>Ctenodiscus procurator</i>	6				<i>Porania antarctica</i>	2
								FROM PHOTO:	
1275	20	54	Echinoidea					Asteroidea	
			<i>Arbacia dufresnei</i>	1				<i>Solaster</i> sp.	1
			Asteroidea		1316	360	62	Echinoidea	
			<i>Calyptaster tenuissimus</i>	1				<i>Pseudechinus magellanicus</i>	10
			<i>Cosmasterias lurida</i>	12				<i>Tripylaster philippii</i>	2
			<i>Henricia obesa</i>	1				Asteroidea	
			<i>Henricia studeri</i>	1				<i>Asterodon granulosus</i>	3
1277	634	55-56	Echinoidea					<i>Ceramaster patagonicus</i>	2
			<i>Pseudechinus magellanicus</i>	1				<i>Labidiaster radius</i>	1
			<i>Tripylaster philippi</i>	19				<i>Lophaster stellans</i>	1
								<i>Patiria</i> sp.	1
								<i>Solaster regularis</i>	1
			Asteroidea		1319	214	63	Echinoidea	
			<i>Bathybiaster loripes</i>	7				<i>Austrocidaris canaliculata</i>	16
			<i>Cheiraster (Luidiaster) planeta</i>	1				<i>Brisaster moseleyi</i>	7
			<i>Ctenodiscus procurator</i>	43				<i>Pseudechinus magellanicus</i>	39

TABLE 1. (Cont.) – Preliminary list of echinoids and asteroids collected during the “Victor Hensen” Campaign 1994 in the Straits of Magellan.

Station no.	Depth (m)	AGT no.	Species	Specimens
			<i>Tripylaster philippii</i>	1
			Asteroidea	
			<i>Ceramaster patagonicus</i>	7
			<i>Henricia obesa</i>	4
			<i>Odontaster meridionalis</i>	3
			<i>Porania antarctica</i>	7
			<i>Pseudarchaster discus</i>	1
			Asteroidea gen. sp. indet	26

gy cf. Arntz and Gorny, 1996). Information has also been gathered from the photographs taken on deck, some of which exhibit specimens that can be identified with reasonable certainty but were not present in the samples analyzed. Unfortunately, several of these photos correspond to stations with echinoderms that were not included in the samples sent to the authors.

## DISCUSSION

The 28 species identified (Table 1 and 2) are well known members of the Subantarctic echinoid and asteroid fauna. Notably, two genera among the irregular echinoids are endemic to the area (*Brisaster*, *Tripylaster*), one (*Abatus*) is more widespread, with Antarctic, Subantarctic and South Atlantic representatives. Of the regular echinoids, one is circumpolar (*Pseudechinus*) with most of its species living in New Zealand and Australia, one (*Austrocidaris*) is endemic, with representatives in the Patagonian and Antarctic fauna, and two other species are distributed along the Chilean coast up to Ecuador (*Loxechinus*) and further north (*Arbacia*), reaching around the tip of South America into the Atlantic. Unfortunately no specimens of the two most interesting genera present in the area (*Sterechinus*, *Dermechinus*) were collected.

The same pattern is found among the Asteroidea, with endemic genera (*Ceramaster*), typically Patagonian genera with Antarctic connections (*Cosmasterias*, *Odontaster*, *Solaster*), circumpolar and Antarctic connections (*Porania*), and genera of more northern and widespread distribution (*Patiria*, *Henricia*), reaching into the South Atlantic, east to the Falkland-Malvinas area (*Hippasterias*, *Ganeria*).

Overall, the recorded echinoderm fauna shows no significant novelties or depth or range extensions.

TABLE 2. – List of echinoids and asteroids collected during the “Victor Hensen” Campaign 1994 in the Straits of Magellan.

Echinoidea	
<i>Abatus philippii</i>	Loven, 1871
<i>Arbacia dufresnei</i>	(Blainville, 1825)
<i>Austrocidaris canaliculata</i>	(A. Agassiz, 1863)
<i>Brisaster moseleyi</i>	(A. Agassiz, 1881)
<i>Loxechinus albus</i>	(Molina, 1782)
<i>Pseudechinus magellanicus</i>	(Philippi, 1857)
<i>Tripylaster philippii</i>	(Gray, 1851)
Asteroidea	
<i>Asterodon granulosus</i>	Perrier, 1891
<i>Bathybiaster loripes</i>	Sladen, 1889
<i>Calyptaster tenuissimus</i>	Bernasconi, 1966
<i>Ceramaster patagonicus</i>	(Sladen, 1889)
<i>Cheiraster (Luidiaster) planeta</i>	(Sladen, 1889)
<i>Cosmasterias lurida</i>	(Philippi, 1858)
<i>Ctenodiscus procurator</i>	Sladen, 1889
<i>Diplopteraster semireticulatus</i>	(Sladen, 1882)
<i>Ganeria falklandica</i>	Gray, 1847
<i>Henricia obesa</i>	(Sladen, 1889)
<i>Henricia studeri</i>	(Perrier, 1891)
<i>Hippasterias falklandica</i>	Fisher, 1940
<i>Hippasterias hyadesi</i>	Verrill, 1899
<i>Labidiaster radiosus</i>	Lutke, 1871
<i>Lophaster stellans</i>	Sladen, 1889
<i>Odontaster meridionalis</i>	(Smith, 1876)
<i>Odontaster penicillatus</i>	(Philippi, 1870)
<i>Patiria obesa</i>	(H.L. Clark, 1910)
<i>Porania antarctica</i>	Smith, 1876
<i>Pseudarchaster discus</i>	Sladen, 1889
<i>Solaster regularis</i>	Sladen, 1889

However, the specimens represent a most valuable reference collection, deposited both at the Museo de Zoología, Universidad de Concepción, and at the Universidad de Magallanes (Punta Arenas).

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## REFERENCES

- Agassiz, A. – 1879. Preliminary report on the Echini of HMS “Challenger”. *Proc. Amer. Acad.*, 14: 189-212.  
 Agassiz, A. – 1881. Report on the Echinoidea dredged by H.M.S.

- “Challenger” during the years 1873-1876. Voyage of H.M.S. “Challenger” *Rep. Scient. Res., Zool.*, 3(9): 1-321.
- Arntz, W. and M. Gorny (eds.). – 1996. Cruise report of the Joint Chilean-German-Italian Magellan “Victor Hensen” Campaign in 1994. *Ber. Polarforsch.*, 190: 1-113.
- Carpenter, P.H. – 1888. Report on the Crinoidea dredged by H.M.S. “Challenger” during the years 1873-1876. Voyage of H.M.S. “Challenger” *Rep. Scient. Res. Part II, The Comatulæ, Zool.*, 26(60): 1-401.
- Carpenter, P.H. – 1884. Report on the Crinoidea dredged by H.M.S. “Challenger” during the years 1873-1876. Voyage of H.M.S. “Challenger”. *Rep. Scient. Res., Part Y, The Stalked Crinoids. Zool.*, 11(32): 1-442.
- Codoceo, M. and H. Andrade. – 1987. Distribución batimétrica y geográfica de macroinvertebrados del talud continental de Chile *Central. Cien. y Tec. del Mar CONA*, 11: 61-94.
- Feuillée, L. – 1714. Journal des observations physiques, mathématiques et botaniques faites par l’ordre du Roi sur les côtes orientales de l’Amérique Méridionale et dans les Indes Occidentales depuis l’année 1707 jusque en 1712. P. Giffart, Paris. T. 1: 1-504, 2: 503-768.
- Larraín, A. – 1995. Biodiversidad de los equinodermos chilenos. Estado actual del conocimiento y sinopsis biosistemática. *Gayana, Zool.*, 59 (1). 73-96.
- Lyman, Th. – 1878. Ophiuroidea and Astrophytidae of the exploring voyage of HMS “Challenger” under Prof. Sir Wyville Thomson FRS. Part I. *Bull. Mus. Comp. Zool. Harvard*, 5(7): 65-158.
- Lyman, Th. – 1879. Ophiuroidea and Astrophytidae of the exploring voyage of HMS “Challenger” under Prof. Sir Wyville Thomson FRS. Part II. *Bull. Mus. Comp. Zool., Harvard*, 6: 17-84.
- Lyman, Th. - 1882. Report on the Ophiuroidea dredged by H.M.S. “Challenger” during the years 1873-1876. Voyage of the H.M.S. “Challenger” *Rep. Scient. Res., Zool.*, 5(1): 1-386.
- Sladen, P.W. – 1889. Report on the Asteroidea dredged by H.M.S. “Challenger” during the years 1873-1876. Voyage of H.M.S. “Challenger” *Rep. Scient. Res., Zool.*, 30(51): 1-893.
- Théel, H. – 1882. Report on the Holothurioidea dredged by H.M.S. “Challenger” during the years 1873-1876. Part I. Voyage of H.M.S. “Challenger” *Rep. Scient. Res., Zool.*, 4(13): 1-176.
- Théel, H. – 1886. Report on the Holothurioidea dredged by H.M.S. “Challenger” during the years 1873-1876. Part II. Voyage of H.M.S. “Challenger” *Rep. Scient. Res., Zool.*, 14(39): 1-290.