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A new species of *Ammothea* (Pycnogonida) and other pycnogonids from Livingston Island and surrounding waters (South Shetland Islands, Antarctica)

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Abstract: Fifty-nine species of pycnogonids belonging to sixteen genera and eight families were collected during a cruise near Livingston Island and surrounding waters, from depths between 0 and 1019 m. The new species *Ammothea bentartica* is described fully, illustrated and compared with similar species. The family Nymphonidae had both the greatest number of species (20) and number of specimens (67% of 1201). The most abundant species were *Nymphon charcoti* and *N. australe*. *Nymphon paucidens* and *Pallenopsis buphtalmus* were collected for a second time. The collections increased the geographical distribution of five species and the depth range of seven species. This collection appears typical of the West Antarctic zone.

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Key words: Ammothea, Antarctic, Bentart-95 Cruise, Livingston Island, pycnogonids

Introduction

The most recent reports on pycnogonids from Antarctic and sub-Antarctic waters are those of Munilla (2000, Scotia Sea), Pushkin (1993, various zones), Stiboy-Risch (1992, 1993, South Atlantic and Weddell Sea), Bamber (1995, Falkland Islands and South Shetland Islands) and Child (1987, 1994a, 1994b, 1995a, 1995b, 1995c, diverse zones). These authors (especially Child) collate many references and much historical background of previous work from this area. Other ecological works (Arntz *et al.* 1990, Galeron *et al.* 1992) provide only qualitative data about the occurrence of pycnogonids at 27 stations in the Weddell Sea, between 200 and 2000 m depth. Gerdes *et al.* (1992) have provided quantitative data for this and others groups, sampled with multibox-corer, including biomass and abundance at 36 stations (170–2037 m) from south-eastern Weddell Sea.

Some species from Livingston Island and surrounding waters (South Shetland Islands, Drake Passage, Bransfield Strait) have been documented previously, mainly by Gordon (1932), Fry & Hedgpeth (1969), Pushkin (1993), papers by Child and Bamber previously mentioned. This paper provides additional information for this area of the Southern Ocean.

Material and methods

The specimens were collected during the "Bentart-95" cruise (16 January–4 February 1995) aboard the *Hesperides* oceanographic vessel of the Spanish Navy. Waters off Livingston Island, Deception Island and Drake and Bransfield passages were sampled with diverse gear (mainly Agassiz dredge and suprabenthic sledge) from shallow to moderate depths (0–1019 m). The specimens were fixed in 4% neutral formalin solution and stored in 70° ethanol in the author's collection.

Detailed data for the pycnogonids from 42 stations can be obtained from the author on request. The main bottom substrate is mud (29 of the 42 stations) and the stations sampled were between 62°37.7'S–63°58.5'S and 60°22.8'W–60°58.1'W.

Results

The 1201 specimens captured belonging to 59 species, 16 genera and eight families. Their abundance and the type of gear used to make the collection are presented in Table I. At only 42 of 79 stations (53%) were pycnogonids collected. The most abundant family was Nymphonidae, with 20 species and 800 specimens (67%), the genus *Nymphon* being the most abundant, with 18 species and 767 individuals. *Nymphon charcoti* (32%) and *N. australe* (20%) were the most abundant species. The second richest family in species was Ammotheidae, with 15 species, nine belonging to the genus *Ammothea*, and including a new species. *Nymphon paucidens* and *Pallenopsis buphtalmus* were collected for only the second time. Five species have increased their geographical distribution and seven their depth range (Table I).

In terms of geographical distribution patterns circumpolarity (Fry & Hegdpeth, 1969, p. 128) is the most frequent, shown by 31 of the 59 species present.

The Agassiz dredge was the most effective gear (see bottom of Table I) since its large aperture allowed it to collect more specimens and species at a sampling in a number of comparable stations.

Table I. Number of specimens collected by each gear type, their geographical distribution and depth range. (continued opposite)

Species	Sledge	Agassiz	R-D-BC	Total	%	Distribution	Depth (m)	N.D.
Nymphon adareanum Hodgson, 1907		1 (1)	1 (1)	2 (2)	0.17	S, P, R, E	1–903	
N. australe Hodgson, 1902	52 (9)	185 (11)	9 (5)	246 (25)	20.50	C	8–3000	
N. banzare Gordon, 1944		1 (1)		1 (1)	0.08	C	130–1555	
N. biarticulatum Hodgson, 1907	9 (3)	7 (2)		16 (5)	1.33	C	35–548	649
N. bouvieri, Gordon, 1932	8 (3)	7 (3)		15 (6)	1.25	S	245–583	649
N. brevicaudatum Miers, 1875	4 (1)			4 (1)	0.33	C	27–1100	
N. clarencei Gordon, 1932			1 (1)	1 (1)	0.08	S, E	65–342	600
N. charcoti Boubier, 1911	7 (2)	375 (10)	5 (1)	387 (13)	32.25	C	3–1200	
N. hiemale Hodgson 1907	1 (1)	3 (2)		4 (3)	0.33	C	30–1435	
N. lanare Hodgson, 1907*	1 (1)	2 (1)		3 (2)	0.25	R, E	60-546	
N. longicoxa Hoek, 1881	7 (2)			7 (2)	0.58	S, R	318–2998	242
N. multituberculatum Gordon, 1944*	8 (2)			8 (2)	0.67	E	180–640	
N. neumayeri Gordon, 1932		2 (2)		2 (2)	0.17	S, P	160–403	429
N. paucidens Gordon, 1932			1 (1)	1 (1)	0.08	S	22–334	
N. proceroides Bouvier, 1913	23 (7)	32 (8)		55 (15)	4.58	S, P, E	91–1180	
N. proximum Calman, 1915*	1 (1)	1 (1)		2 (2)	0.17	P, R, E	40–1138	
N. tenuipes Bouvier, 1911	3 (1)			3 (1)	0.25	C	122–1180	
N. unguiculatum Hodgson, 1927	6 (2)			6 (2)	0.50	S	168–450	
Nymphon sp.	4 (3)	1 (1)		5 (4)	0.42			
Heteronymphon exiguum (Hodgson, 1927)	5 (1)	3 (2)		8 (3)	0.66	C	3–415	
Pentanymphon antarcticum Hodgson, 1904	9 (3)	16 (5)		25 (8)	2.08	C	3–3227	
Total Nymphonidae	148	635	17	800	66.67			
Achelia communis (Bouvier, 1906)	2 (1)	3 (1)	1 (1)	6 (3)	0.50	C	0–714	
A. hoekii (Pfeffer, 1889)	2 (1)	1 (1)		3 (2)	0.25	S, B	5–256	
A. serratipalpis (Bouvier, 1911)	1 (1)	12 (3)		13 (4)	1.08	S, P, B, E	64–361	427
A. spicata (Hodgson, 1915)	3 (3)	1 (1)		4 (4)	0.33	C	0–1138	
Ammothea allopodes Fry & Hedgpeth, 1969	3 (2)	3 (2)	2 (1)	8 (3)	0.66	C	210–2000	
A. bentartica n. sp.		3 (3)		3 (3)	0.25	S	167–325	
A. carolinensis Leach, 1814		1 (1)	1 (1)	2 (2)	0.17	C	3–670	
A. clausi Pfeffer, 1889	4 (4)	6 (5)		10 (9)	0.83	C	3–860	
A. calmani Gordon 1932		1 (1)		1 (1)	0.08	S, P, B, R	99–1408	
A. hesperidensis Munilla, 2000		1 (1)		1 (1)	0.08	S	30–439	
A. meridionalis (Hodgson, 1915)		1 (1)		1 (1)	0.08	C	10–454	
A. spinosa Hodgson, 1902		2 (1)		2 (2)	0.17	S, P, R	76–1679	
A. striata Möbius, 1902		1 (1)		1 (1)	0.08	C	72–567	
Ammothea sp.		2 (2)		2 (2)	0.17			
Austroraptus sicarius Fry & Hedgpeth, 1969		2 (1)		2 (1)	0.17	S, R	220–380	
Cilunculus cactoides Fry & Hedgpeth, 1969	2 (2)	16 (2)		18 (4)	1.50	S	38–550	
Total Ammotheidae	17	56	4	77	6.41			
Austrodecus glaciale Hodgson, 1907*	15 (5)	71 (5)		86 (10)	7.17	P, B, R, E	0–2100	
A. crenatum Child, 1994b		3 (1)		3 (1)	0.25	S, P	1–360	
Total Austrodecidae	15	74		89	7.41			

( ) = number of stations. R = rock dredge, D = diving, BC = box-corer, * = species with new geographical zones. N.D. = new depth. Geographical distributions and depths after Munilla 2000. Zones: S = Scotia Sea, P = Antarctic Peninsula, R = Ross Sea, W = Weddell Sea, B = Bellingshausen Sea, E = East Antarctic zone, C = Circumpolar species.

Ammothea bentartica *n. sp. (Figs 1 & 2)*

Material examined: *O/V Hesperides.* Station 15A (one male, holotype). St. 12A (one male, paratype). St. 4A (one gravid female, paratype)

Description of holotype: Proboscis almost cylindrical and vertical, smooth, moderately long and slender, with flat oral surface; slightly down curved with a feeble constriction at mid-length, near to A:2:E" type (see Fry & Hedgpeth 1969).

Trunk oval (in dorsal view) and fully segmented, with lateral processes separated by half of their diameters, each with pair of low broad smooth dorsodistal bumps. Dorsomedian trunk tubercles pointed, shorter than ocular tubercle and abdomen (the second tubercle is taller); tubercles located on narrow transverse ridges at posterior zone of trunk segments. Ocular tubercle conical, with pigmented eyes, taller than its basal diameter.

Chelifores curved in dorsal view, less than half proboscis length, with very short spines. Chelae small, knobs with atrophied fingers; scapes with a dorsodistal hump.

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Table I. (continued) Number of specimens collected by each gear type, their geographical distribution and depth range.

Species	Sledge	Agassiz	R-D-BC	Total	%	Distribution	Depth (m)	N.D.
Austropallene brachyura Bouvier, 1913	1 (1)			1 (1)	0.08	C	85–920	
A. calmani Gordon, 1944	1 (1)	3 (2)		4 (3)	0.33	C	163-1966	89
A. cornigera Möbius, 1902	11 (6)	27 (7)	1 (1)	39 (14)	3.25	C	3–1180	
A. tcherniai Fage, 1952*		6 (2)		6 (2)	0.50	P, R, E	50–580	
Pallenopsis boehmi Schimkewitsch, 1930	1 (1)			1 (1)	0.08	S	35–383	
P. buphtalmus Pushkin, 1993		1 (1)		1 (1)	0.08	S, E	106–830	
P. hodgsoni Gordon, 1938		16 (7)		16 (7)	1.33	C	120–2450	
P. macronix Bouvier, 1911	2 (2)	53 (6)		55 (8)	4.58	S, P, R, W	185–1138	
P. patagonica (Hoek, 1881)		2 (2)	1 (1)	3 (3)	0.25	C	3–4540	
P. pilosa (Hoek, 1881)	1 (1)			1 (1)	0.08	C	25–3650	
P. spicata Hodgson, 1914	1 (1)	3 (1)		4 (2)	0.33	C	25–549	
Total Callipallenidae	18	111	2	131	10.91			
Pycnogonum gaini Bouvier, 1910		3 (2)		3 (2)	0.25	C	24–2495	
Pentapycnon charcoti Bouvier, 1910		1 (1)	1 (1)	2 (2)	0.17	S, P, R	240–1420	
Total Pycnogonidae		4	1	5	0.42			
Rhynchothorax australis Hodgson, 1907	2 (2)			2 (2)	0.17	C	60–900	
Total Rhynchothoraxidae	2 (2)			2 (2)	0.17			
Endeis australis (Hodgson, 1907)		1 (1)		1 (1)	0.08	C	3–1570	
Total Endeidae		1 (1)		1 (1)	0.08			
Colossendeis australis Hodgson, 1907		4 (2)		4 (2)	0.33	C	15–3935	
C. drakei Calman, 1915		3 (3)	2 (2)	5 (5)	0.42	S, P, R, E	3–3000	
C. megalonix Hoek, 1881	3 (1)	54 (6)	5 (1)	62 (8)	5.17	C	7–4900	
C. robusta Hoek, 1881		2 (2)	1 (1)	3 (3)	0.25	C	0–3610	
C. scotti Calman, 1915	1 (1)	3 (1)		4 (2)	0.33	C	35-345	
C. tortipalpis Gordon, 1932		6 (2)	5 (1)	11 (3)	0.92	C	160–4026	
Decolopoda australis Eights, 1835		4 (4)		4 (4)	0.33	S, P, R	0–1890	
Total Colossendeidae	4	76	13	93	7.74			
Total Cruise	205	959	37	1201	100.00			
%	17.0	79.9	3.1	100				
Mean Individuals/sample	13.6	50.5	4.6	28.3				
Mean species/sample	4.8	7.6	3.3					
Number of stations sampled	24	24	9-1-21	79				
Number of stations with pycnogonids	15	19	6-1-1	42				

( ) = number of stations. R = rock dredge, D = diving, BC = box-corer, * = species with new geographical zones. N.D. = new depth. Geographical distributions and depths after Munilla 2000. Zones: S = Scotia Sea, P = Antarctic Peninsula, R = Ross Sea, W = Weddell Sea, B = Bellingshausen Sea, E = East Antarctic zone, C = Circumpolar species.

Palps 9-segmented, slender, longer than proboscis. Second and fourth segments subequal in length. Segments 5, 6 and 7 flattened and more broad than long. Fourth segment slightly curved and connected sinaxially with the fifth. The very short spines are more abundant in the terminal five segments, the ninth being twice the length of the eighth.

Ovigers conventional with longer segments slightly curved (Fig. 1c); seventh and eighth articles with smooth and curved setae. Ninth and tenth articles smooth on the outer side, the tenth having thirteen endal compound spines denticulate by one or two side. Strigilis with anaxial connections between segments (Fig. 2a)

Legs glabrous except for very short setae in lateral line of long segments. Second coxa, which is the longest, with a dorsal small mound; those of the last two pairs of legs with a ventrodistal, round sexual pore. Femur very slightly curved, with a dorsodistal cement gland pore on a small mound. Second tibiae longer than first. Propodus straight, without heel, but with 8–9 stout spines along the entire sole (10 in the female), stronger centrally. Claw large, half propodal length, auxiliaries equal to or a little more than half of the main claw.

The female is little different from male except for the usual sexual differences in the sexual pore (two rounded pairs in the male, four oval pairs in the female) and the oviger which does not have the strigilis recurved, with 10, 7, 7 and 11 compound spines (Fig. 2b).

Measurements of holotype (in mm): Length of trunk (tip of cephalic segment to tip of fourth lateral processes): 5.6. Width of trunk across second lateral processes: 4.9. Length of

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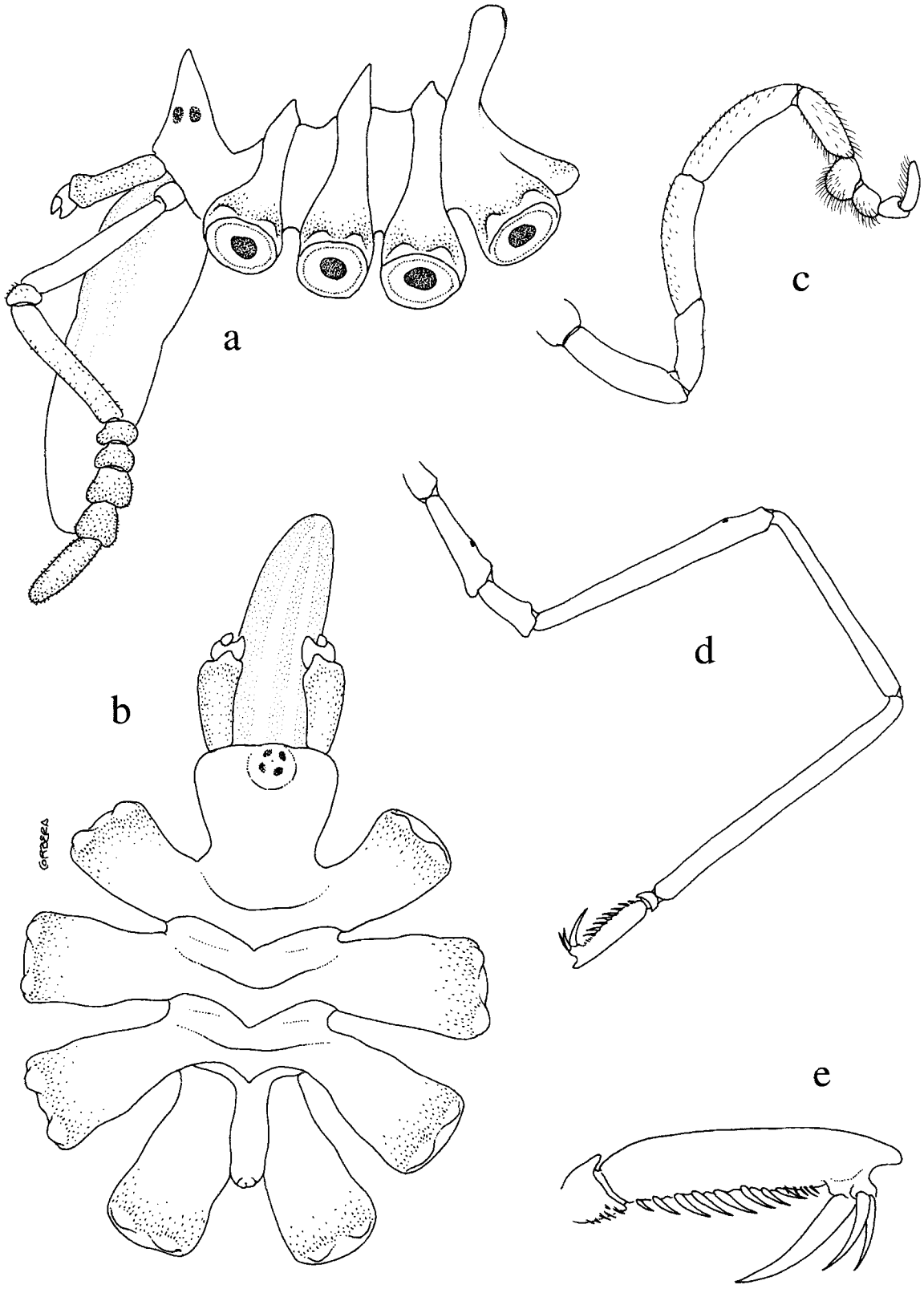

Fig. 1. Male of *Ammothea bentartica* (holotype). **a.** lateral view, **b.** dorsal view, **c.** oviger, **d.** third leg, **e.** propodus and claws.

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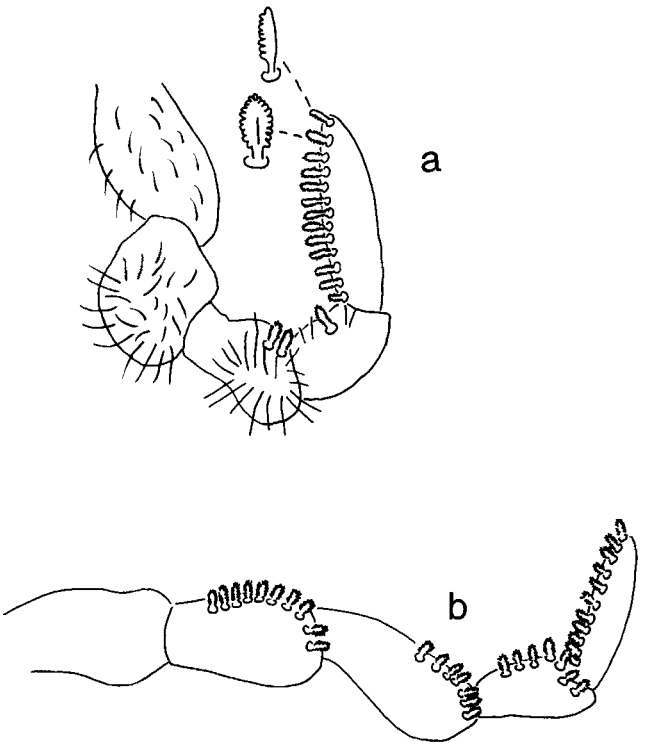

Fig. 2. Oviger strigilis of the *Ammothea bentartica*. **a.** male, **b.** female with compound spine detailed.

proboscis: 3.5. Greatest diameter of proboscis: 1.0. Length of abdomen: 1.6. Length of chelifore: 1.5. Length of scape: 1.1. Length of chelae and palm: 0.4. Length palp: 7.0; articles of palp: 1-0.4, 2-2.1, 3-0.3, 4-1.7, 5-0.4, 6-0.3, 7-0.4, 8-0.4, 9-1.0. Length of second leg: 41.8; articles of leg: coxa1-1.5, coxa2-2.7, coxa3-1.6, femur-10.5, tibia1-8.7, tibia2-11.5, tarsus-0.3, propodus-2.3, main claw-1.2, auxiliary claws-0.6. Length of oviger: 7.2; articles of oviger: 1-0.7, 2-1.1, 3-0.9, 4-1.5, 5-1.8, five last segments-1.2.

Etymology: The name of this species is dedicated to the Spanish name of the "*Bentart*" cruises.

Remarks: This new species has some similarities to existing species, especially to *Ammothea profunda* Losina-Loinsky, 1961 (palps, ovigers, propodus, cephalon). Table II shows the main differences between these species.

The trunk habitus of *A. bentartica* is similar to *A. tetrapora* Gordon, 1932, to *A. minor* Hodgson, 1907 and to *A. gordonae* Child, 1994a, but their distal segments of palp and the spinulation of propodus are very different. Furthermore, the proboscis of *A. minor* is fusiform, and the proboscis of *A. gordonae* is distally rounded, with the constriction near to end; dorsomedian tubercles of the trunk are absent in this last species (only present transversal edges). *Ammothea bentartica* would key to couplet 15 of Child's key (Child 1994a).

This new species is the first Antarctic one with denticulate spines on the strigilis. The same feature occurs in six species from New Zealand and Australia (Clark 1977).

In short, the diagnostic features of *Ammothea bentartica* are: proboscis vertical with a feeble constriction at the middle, no functional chelifores, palps with segments 5, 6 and 7 more broad than long, trunk with three pointed dorsal tubercles, leg glabrous, propodus with 8–9 stout spines and auxiliaries about half of the main claw. The strigilis has denticulate spines in both sexual forms.

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Table II. Differences between *Ammothea profunda* and *A. bentartica*.

Features	*A. profunda*	*A. bentartica*
ocular tubercle	short, rounded	tall, conical
proboscis	C:2:E type, with basal bulge, end rounded	A:2:E" type, without bulge, end flat
chelae	functional	no functional
palp	smooth	with very short spines
distal segments of palp	sixth the broader	seventh
lateral processes	without distal humps	with distal humps
length palp: length proboscis	0.6	1.3
abdomen	inclined	vertical
length legs in mm	67.2	41.8
length trunk in mm	11.0	5.6
spines of propodus	12, two strong	8–9, all strong
article 10 of oviger	smooth	with 11–13 compound spines
habitus specimen	teratological	normal
distribution	Kurile Islands (NW Pacific)	Livingston Island (Antarctic)
depth (in m)	1500	167–335

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