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### Redescription of *Harmothoe spinosa* Kinberg, (Polychaeta: Polynoidae) and related species from Subantarctic and Antarctic waters, with the erection of a new genus

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# Redescription of *Harmothoe spinosa* Kinberg, 1856 (Polychaeta: Polynoidae) and related species from Subantarctic and Antarctic waters, with the erection of a new genus

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## Abstract

During the expeditions ANT XIII/3 (1996) and ANT XV/3 (1998) to the Weddell Sea, a number of polynoid specimens resembling *Harmothoe spinosa* Kinberg, 1856 were collected. Due to contradictory information in the literature regarding the differentiating characters of *H. spinosa* and other related species, the type material of the former and of 27 nominal, similar species had to be examined in order to allow the correct identification of the specimens from the Weddell Sea. As a result of this study the validity of *H. spinosa* is confirmed, but this species has not been recorded in the Antarctic or Subantarctic region. Of the 27 similar species only nine are considered valid and redescribed herein, i.e. *H. exanthema* (Grube, 1858), *H. fuliginum*\* (Baird, 1865), *H. fullo*\* (Grube, 1878), *H. antarctica*\* (McIntosh, 1885), *H. magellanica*\* (McIntosh, 1885), *H. crosetensis* (McIntosh, 1885), *H. acuminata*\* Willey, 1902, *Antarctinoe* gen. nov. *ferox*\* (Baird, 1865), and *A. spicoides*\* (Hartmann-Schröder, 1986), with *Antarctinoe* being a new genus established herein. Species marked by an asterisk were also present in the collection of polynoids from the Weddell Sea. All records and geographical ranges given in the literature for *H. spinosa* and the other species not confirmed herein remain doubtful.

**Keywords:** *Antarctinoe* gen. nov., *Harmothoe spinosa*, *Polynoidae*, *Southern Ocean*, *Weddell Sea*

## Introduction

During the cruises ANT XIII/3 (EASIZ I, 1996) and ANT XV/3 (EASIZ II, 1998) with R/V *Polarstern* to the Weddell Sea (Arntz and Gutt 1997, 1999), a number of polynoids resembling *Harmothoe spinosa* Kinberg, 1856 were collected among other polychaetes. Although Hartman (1964) stated that *H. spinosa* is the first and best known polychaete, present in all sectors of Antarctica, the identification of the above-mentioned polynoids proved to be difficult. This is due to the fact that characters of *H. spinosa* are insufficiently

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described and figured in Kinberg (1856) and that early authors, like Ehlers (1897, 1901a, 1901b, 1901c, 1913), Willey (1902), and Bergström (1916) among others, did not agree on the synonymy of *H. spinosa* and a number of other morphologically similar species (e.g. *Polynoe fullo* Grube, 1878; *Polynoe vesiculosa* Grube, 1878; *Lagisca antarctica* McIntosh, 1885; *Lagisca magellanica* McIntosh, 1885 etc.). Augener (1932a) noted that correct identification of Antarctic specimens is only possible after having studied the type material of every *Harmothoe* described from Antarctica. Since such a revision has not been undertaken until now, the situation in the literature became more and more confused and the diagnostic elytral characters of *H. spinosa* were commonly described as polymorphic or variable (see e.g. Uschakov 1962; Averincev 1972; Hartmann-Schröder and Rosenfeldt 1988; Stiller 1996; Knox and Cameron 1998). This is a strong indication that a revision of the group is needed, especially since *H. spinosa* is the type species of the genus *Harmothoe* Kinberg, 1856.

Preliminary results on part of the material examined here have been published by Gambi (1997, 1999). After the paper by Barnich and Fiege (2000) on the Mediterranean *Harmothoe* species, the present study is a further step towards a complete revision of the genus *Harmothoe*.

## Material and methods

The type material investigated herein has been sent on loan by the following institutions and museums: The Natural History Museum, London (BMNH); Museum für Naturkunde, Berlin (ZMB); Swedish Museum of Natural History, Stockholm (SMNH); Zoologisches Institut und Museum der Universität Hamburg (ZMH); Zoological Institute of the Russian Academy of Science, St Petersburg (ZISP); Zoological Museum of the University of Copenhagen (ZMUC). Ruth Barnich checked the type material, except for the holotype of *Eunoe spica* Hartman, 1978, which was investigated by Kristian Fauchald (USNM).

Specimens from the Weddell Sea are still under study by M. C. Gambi (Ischia, Naples) or were deposited in the Senckenberg Museum Frankfurt, Germany (SMF). These specimens were sampled during the two expeditions ANT XIII/3 and ANT XV/3 with R/V *Polarstern* (see Tables I, II).

Abbreviations for the gear used in both expeditions are: AGT, Agassiz trawl; BPN, benthopelagic trawl; EBS, epibenthic sledge; GKG, large boxcorer; GSN, large bottom trawl.

In the “Material examined” section, complete specimens are indicated by “cs”, while “af”, “mf”, and “pf” refer to anterior, middle, and posterior fragments, respectively.

Specimens were studied using a stereomicroscope and a compound microscope equipped with Normaski interference contrast. Drawings were made using a camera lucida. In figures of anterior ends, anteriormost elytra were either removed or already missing. Pigmentation of cirri, elytra, or dorsum was only visible in well-preserved material and should only be used in combination with other characters for identification.

For the measurements, the length (L) is measured from the anterior margin of the prostomium to the posterior border of the last segment (pharynx not included, if extended), while the width (W) is taken at approximately the largest segment, including parapodia but excluding chaetae.

The “Distribution” section is restricted to the checked type and additional material and completed only by reliable literature records which are also listed in the synonymy section. The specimens related to these literature records were usually not checked, since

Table I. List of stations from the ANT XIII/3 (EASIZ I) expedition (26 January to 15 March 1996).

Station	Location	Position	Depth (m)
39/001, GSN	NE K. Norvegia	71°03.10'S, 11°25.50'W–71°02.10'S, 11°19.30'W	462–481
39/005, EBS	SW K. Norvegia	71°40.49'S, 12°41.70'W–71°40.87'S, 12°43.26'W	254–239
39/006, AGT	W K. Norvegia	71°31.80'S, 13°34.50'W–71°31.86'S, 13°35.50'W	254–261
39/007, EBS	W K. Norvegia	71°26.50'S, 13°42.40'W–71°26.20'S, 13°42.20'W	223–224
39/009, AGT	W K. Norvegia	71°34.70'S, 12°26.60'W–71°34.80'S, 12°25.90'W	560–571
39/011, GSN	Between Vestkap and Halley	73°22.60'S, 21°10.60'W–73°23.00'S, 21°12.90'W	338–333
39/012, GSN	Between Vestkap and Halley	73°18.10'S, 21°10.10'W–73°17.70'S, 21°08.20'W	459–457
39/013, GSN	Between Vestkap and Halley	73°36.60'S, 22°19.00'W–73°36.00'S, 22°16.60'W	620–640
39/015, GSN	Between Vestkap and Halley	73°42.00'S, 22°30.50'W–73°41.40'S, 22°28.50'W	446–428
39/016, GSN	Between Vestkap and Halley	73°53.40'S, 22°26.90'W–73°52,70'S, 22°25.30'W	246–242
39/017, GSN	Between Vestkap and Halley	73°18.00'S, 21°09.90'W–73°19.10'S, 21°14.90'W	468–465
39/018, AGT	Between Vestkap and Halley	73°16.70'S, 21°25.50'W–73°16.10'S, 21°24.70'W	1538–1543
39/024, AGT	NE K. Norvegia	71°08.15'S, 11°32.25'W–71°08.16'S, 11°31.62'W	123–118
39/025, AGT	NE K. Norvegia	71°23.10'S, 14°19.80'W–71°23.00'S, 14°19.40'W	634–615
39/029, BPN	W K. Norvegia	71°31.50'S, 12°25.50'W–71°30.30'S, 12°27.80'W	504–529
39/029, GK G	W K. Norvegia	71°30.70'S, 12°26.40'W	494

descriptions and figures are clear and leave no doubt as to the identity of the considered species. The names of the biogeographical regions used are defined according to Briggs (1996): Antarctic region comprising the Antarctic continent together with the South Georgia, Bouvet, South Sandwich, South Orkney, and South Shetland Islands; Subantarctic region comprising the Marion, Prince Edward, Crozet, Kerguelen, MacDonald, Heard, and Macquarie Islands.

### Systematic part

#### POLYNOIDAE Kinberg, 1856

#### *Harmothoe* Kinberg, 1856

*Type species. Harmothoe spinosa* Kinberg, 1856.

#### Diagnosis

Body dorsoventrally flattened, short, with up to about 50 segments; dorsum more or less covered by elytra or short tail uncovered (in large specimens). Fifteen pairs of elytra on

Table II. List of stations from the ANT XV/3 (EASIZ II) expedition (13 January to 26 March 1998).

Station	Location	Position	Depth (m)
48/049, AGT	N K. Norvegia	70°52.2'S, 10°29.0'W	246
48/197, AGT	K. Norvegia	71°16.4'S, 12°36.5'W	406
48/277, AGT	K. Norvegia	71°18.2'S, 12°16.4'W	177

segments 2, 4, 5, 7, on alternate segments to 23, 26, 29, and 32; first pair rounded, the following kidney-shaped, becoming oval more posteriorly; elytral margin with or without papillae; elytral surface with or without micro- and macrotubercles; anterior, inner part of surface (where elytra overlap) without tubercles; number of papillae and tubercles usually diminishing from anterior to posterior part of body. Dorsal cirri with cylindrical cirrophore and long style on segments lacking elytra; nodular dorsal tubercle on cirriferous segments. Ventral cirri short (except on second segment), consisting of cirrophore and style on all segments.

Prostomium bilobed, with distinct cephalic peaks and three antennae; ceratophore of median antenna in anterior notch, lateral antennae with ceratophores inserted ventrally to median antenna; a pair of palps present; two pairs of eyes, anterior pair situated anteroventrally beneath cephalic peaks or dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; pharynx with nine pairs of border papillae and two pairs of hooked jaws. Facial tubercle present.

First or tentacular segment with a pair of tentaculophores inserted laterally to prostomium, each bearing a dorsal and a ventral tentacular cirrus and one or two chaetae. Second or buccal segment with first pair of elytra, biramous parapodia, long ventral cirri, and a nuchal lobe.

Parapodia biramous, both rami with elongate acicular lobe; notopodia shorter and on anterodorsal side of larger neuropodia; neuropodia with digitiform supra-acicular process; tips of noto- and neuroacicula penetrating epidermis. Bases of neuropodia ventrally without tubercles between ventral cirrus and body wall. Notochaetae as stout as or stouter than neurochaetae, short and long notochaetae with distinct rows of spines and blunt tip; neurochaetae usually more numerous, with distinct rows of spines only distally; neurochaetae either all with bidentate tip with secondary tooth subdistally (tooth may be abraded, especially in older, larger animals) or some neurochaetae with bidentate tip and others with unidentate tip.

Nephridial papillae usually distinct from segment 5 to the end of the body. Pygidium with one pair of anal cirri similar in shape to dorsal cirri.

### Remarks

Some species assigned herein to the genus *Harmothoe* Kinberg, 1856 have often been considered to belong to *Hermadion* Kinberg, 1856 in the past [see e.g. *Hermadion fuligineum* Baird, 1865, now considered as *Harmothoe fuligineum*, and *Hermadion molluscum* Ehlers, 1897 and *Hermadion ambiguum* Ehlers, 1901, both synonyms of *Harmothoe magellanica* (McIntosh, 1885)]. We checked the type species of *Hermadion*, i.e. the syntypes of *Hermadion magalhaensi* Kinberg, 1856 [SMNH-532 (one specimen) and SMNH-401 (three specimens)], and we can confirm that *Harmothoe* and *Hermadion* are two different genera, the main differentiating characters of *Hermadion* being the absence of cephalic peaks on the prostomium and neuropodia without a distal supra-acicular process.

As already pointed out by Pettibone (1953, 1963), the genus *Lagisca* Malmgren, 1865 is a junior synonym of *Harmothoe*, with the type species of *Lagisca*, i.e. *Lagisca rarispina* Malmgren, 1865 being synonymous with *Harmothoe extenuata* (Grube, 1840). According to Malmgren (1865), *Lagisca* differs from *Harmothoe* in its last segments, which are uncovered by the elytra. But large specimens of *Harmothoe* often show an uncovered “tail” (see also Barnich and Fiege 2000).

Differences between *Harmothoe* and the new genus *Antarctinoe* gen. nov. established herein are discussed below in the “Remarks” section related to this genus.

***Harmothoe spinosa* Kinberg, 1856**

(Figure 1A–L; Table III)

*Harmothoe spinosa* Kinberg 1856, p 386; Kinberg 1857, Plate 6 Figure 31; Kinberg 1858, p 21.

*Type material*

*Harmothoe spinosa*: SMNH-type-409, lectotype (cs in two fragments; designated, described, and figured herein; chosen by M. Pettibone in 1971, but not published), includes one slide with separate elytron and parapodium (mounted by A. I. Muir), and two paralectotypes (in bad shape, without elytra), “Eugenie” Expedition, 1851–53, St. 420, S Atlantic, South America, Magellan Strait, Buketten, on floating algae.

*Diagnosis*

Elytral margin with scattered, digitiform papillae; elytral surface with conical microtubercles with blunt tip; near posterior margin few elongate, conical macrotubercles with blunt tip.

*Description (based on lectotype)*

Body with 38 segments. At anterior end (Figure 1A), prostomium bilobed, with cephalic peaks; ceratophore of median antenna in anterior notch, lateral antennae inserted ventrally, styles of antennae missing in lectotype; anterior pair of eyes situated dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; palps missing.

Tentaculophores inserted laterally to prostomium, each with a single notochaeta and a dorsal and ventral tentacular cirrus with styles of cirri missing. Second segment with first pair of elytra (missing in lectotype), biramous parapodia, and long buccal cirri.

Fifteen pairs of elytra, covering dorsum, on segments 2, 4, 5, 7, then on every second segment to 23, 26, 29, 32; last six segments cirriferous; outer lateral margin of elytra with scattered, digitiform papillae, posterior margin with few shorter papillae; elytral surface with conical microtubercles with blunt tip; near posterior margin few elongate, conical macrotubercles with blunt tip (Figure 1B–D). Cirriferous segments with distinct dorsal tubercles; dorsal cirri with cylindrical cirrophore, style papillate, tapering (styles all missing on lectotype, but single style separate in vial).

Parapodia biramous; notopodia with elongate acicular lobe; neuropodia with elongate prechaetal acicular lobe with digitiform supra-acicular process; neuropodial postchaetal lobe shorter than prechaetal lobe, rounded; tips of noto- and neuroacicula penetrating epidermis (Figure 1E). Notochaetae stouter than neurochaetae; notochaetae with distinct rows of spines and more or less blunt tip (Figure 1F–H); neurochaetae falcate, with rows of spines distally, uppermost row with one or two stout spines; tip of neurochaetae bidentate with stout secondary tooth, some upper and lower neurochaetae with unidentate tip (Figure 1I–L).

Nephridial papillae distinct from segment 7.

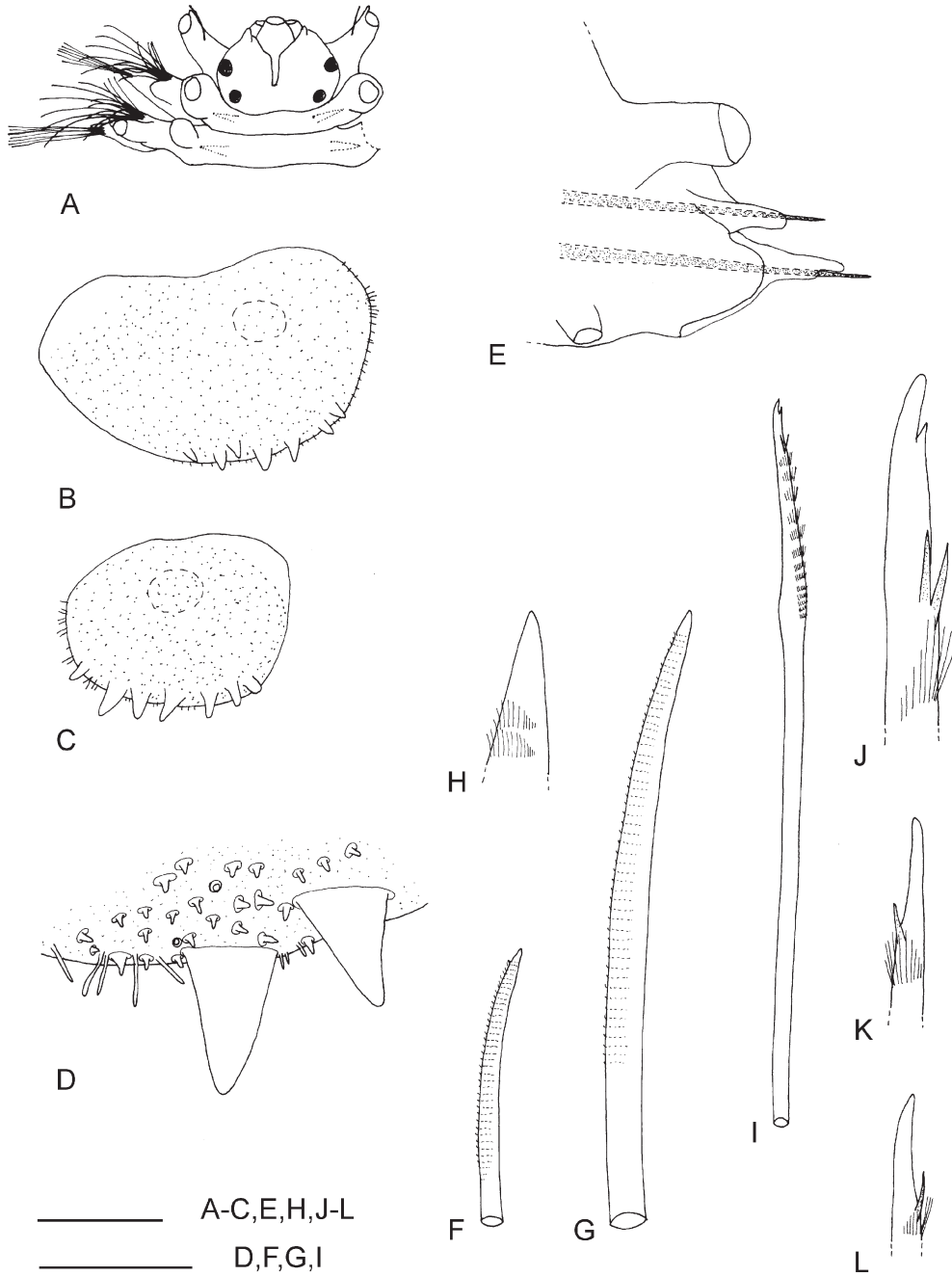


Figure 1. *Harmothoe spinosa* (holotype, SMNH-type-409). (A) Anterior end; palps and styles of antennae and cirri missing, right 2nd and 3rd parapodia cut off; (B) right elytron from anterior body region; (C) left elytron from segment 2; (D) detail of posterior margin of same; (E) right cirriferous parapodium of segment 16, posterior view, style of dorsal cirrus missing; (F) short notochaeta; (G) long notochaeta; (H) tip of same; (I) middle neurochaeta; (J) tip of same; (K) tip of upper neurochaeta; (L) tip of lower neurochaeta. Scale bars: 1 mm (A–C); 250  $\mu$ m (D, F, G, I); 500  $\mu$ m (E); 50  $\mu$ m (H, J–L).



Table III. Distinctive elytral characters of the *Harmothoe* species covered herein.

Elytral character	<i>H. spinosa</i> Kinberg, 1856	<i>H. exanthema</i> (Grube, 1858)	<i>H. fuligineum</i> (Baird, 1865)	<i>H. fullo</i> (Grube, 1878)	<i>H. antarctica</i> (McIntosh, 1885)	<i>H. magellanica</i> (McIntosh, 1885)	<i>H. crosetensis</i> (McIntosh, 1885)	<i>H. acuminata</i> Willey, 1902
Mound at posterior margin	Absent	Absent	Absent	Present	Present	Absent	Absent	Absent
Papillae at mound	–	–	–	Very long, filiform	Short, digitiform	–	–	–
Marginal papillae	Scattered, digitiform	Scattered, digitiform	Long, filiform at outer margin, becoming shorter towards posterior margin	Long and short, digitiform	Short, digitiform	Only very few, digitiform	Digitiform	Digitiform
Shape and position of microtubercles	Conical; on surface	Conical; on surface	Conical; on surface	Conical; on surface	Conical; on surface	Conical; only in anterior part	Conical blunt in anterior half, becoming larger towards posterior margin with blunt to slightly multifid tip	Conical pointed or blunt; near anterior margin
Shape and position of macrotubercles	Conical, elongate; near posterior margin	Pyriform to globose, some with distal papilla; at outer and posterior margin	Globular to conical; in posterior half	Conical to cylindrical; near posterior margin	Spherical; at centre and near posterior margin	Absent	Absent	Numerous thorn- to spine-shaped; at centre and in posterior part

*Measurements*

Lectotype of *H. spinosa* (SMNH-type-409), cs in two fragments (Figure 1): L 18 mm, W 4.5 mm for 38 segments.

*Remarks*

*Harmothoe spinosa* with its elongate, conical macrotubercles is rather easily distinguishable from the other *Harmothoe* species described herein. The fact that the original description and figures by Kinberg (1856) were insufficient and that earlier authors (e.g. Ehlers 1897, 1901a, 1901b, 1901c, 1913; Willey 1902; Bergström 1916) did not agree on the synonymy of this and related species created much confusion in the literature. Differences of *H. spinosa* and other morphologically similar species treated in this study are given in the “Remarks” section related to these species.

*Distribution*

So far only confirmed from the type locality, i.e. Magellan Strait (Magellan region, which is considered to be a cold-temperate region by Briggs 1996); not found among the material from Antarctic and Subantarctic origin examined herein.

***Harmothoe exanthema*** (Grube, 1858)

(Figure 2A–K; Table III)

*Polynoe exanthema* Grube 1858, p 46.

*Harmothoe exanthema*: Bergström 1916, p 287, Plate 3 Figure 5; Monro 1930, p 57; Augener 1932a, p 99; Monro 1936, p 85; Hartman 1964, p 28, Plate 7 Figure 7.

*Harmothoe exanthema bergströmi* Monro 1936, p 85, Figure 4a–c. [new synonymy]

*Polynoe vesiculosa* Grube 1878, p 514.

*Lagisca vesiculosa*: Ehlers 1897, p 14 (part); Ehlers 1901a, p 209 (part); Ehlers 1901b, p 42 (part); Ehlers 1901c, p 256 (part); Willey 1902, p 266 (part).

*Harmothoe spinosa*: Ehlers 1913, p 438 (part); Bergström 1916, p 284 (part); Benham 1921, p 35 (part); Benham 1927, p 71 (part). [not *H. spinosa* Kinberg, 1856]

*Lagisca globulosa* Hartmann-Schröder 1962, p 62, Figures 9–15. [new synonymy]

*Type material*

*Polynoe exanthema*: ZMUC Pol 1671, holotype (cs), SE Pacific, Valparaiso, 21 September 1841, leg. Krøyer.

*Polynoe vesiculosa*: ZMB 877, holotype (cs, dry, in bad shape; and one slide), “Gazelle” Expedition, Magellan Strait, 14 February 1876, 30 fathoms.

*Harmothoe exanthema bergströmi*: BMNH 1936.2.8.104, syntype (cs), “William Scoresby” Expedition, St. 221, 48°23’S, 65°10’W, East coast of Patagonia, 4 June 1928, 76–91 m, gear OTC, brown sand, mud, pebbles, large stones and shell. BMNH 1936.2.8.105–109, six syntypes (5 cs, 1 af), “William Scoresby” Expedition, St. 834, 52°57’45’’S, 68°08’15’’W, Magellan Strait, 2 February 1932, 27–38 m, gear OTC, NCS-T, dark brown and grey stones, mud, and sand. BMNH 1936.2.8.110, syntype (af), “William

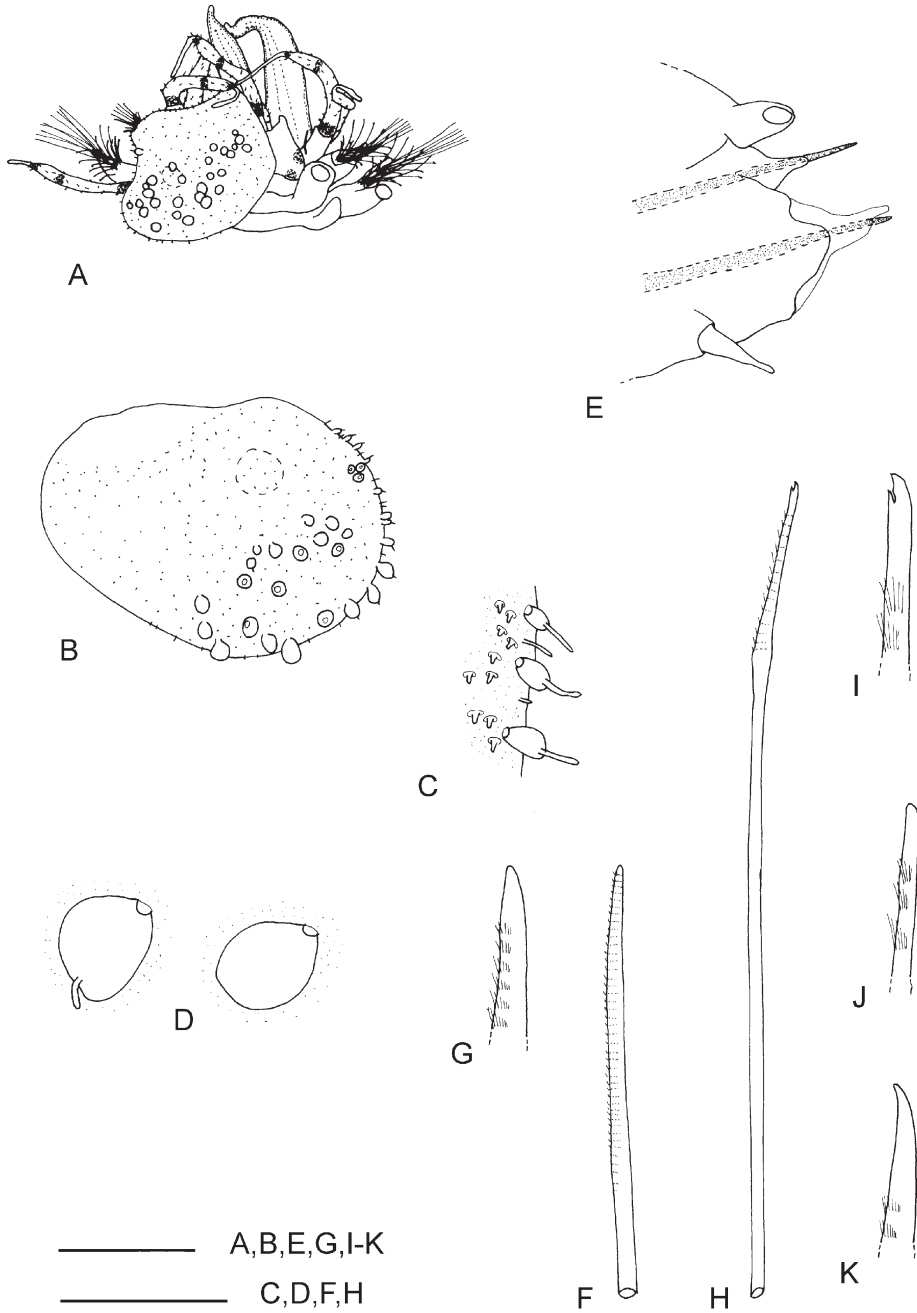


Figure 2. *Harmothoe exanthema* (holotype; ZMUC POL 1671). (A) Anterior end; style of right dorsal cirrus of segment 3 missing; (B) right elytron from mid-body region; (C) detail of outer lateral margin of same; (D) macro-tubercles from posterior part of elytron; (E) right cirriferous parapodium of unknown segment, posterior view, style of dorsal cirrus missing; (F) long notochoeta; (G) tip of same; (H) middle neurochaeta; (I) tip of same; (J) tip of upper neurochaeta; (K) tip of lower neurochaeta. Scale bars: 1 mm (A, B); 250 µm (C, D, F, H); 500 µm (E); 50 µm (G, I-K).

Scoresby'' Expedition, St. 583, 53°39'S, 70°54'30"W, Magellan Strait, 2 May 1931, 14–78 m, gear BTS, sand and stones.

*Lagisca globulosa*: ZMH P-13995, holotype (cs), South Chile, Isla James, Puerto Laganas, 12 August 1958, leg. Stuardo, on *Macrocystis pyrifera*. ZMH P-15461: nine paratypes (9 af, 4 pf), South Chile, Puerto Aguirre, 21 June 1958, leg. Stuardo.

### Diagnosis

Elytral margin with scattered, digitiform papillae; elytral surface with conical micro-tubercles; near outer lateral and posterior margin pyriform to globose macrotubercles with or without distal papilla.

### Description (based on holotype of *Polynoe exanthema*)

Body with 40 segments. At anterior end (Figure 2A), prostomium bilobed, with cephalic peaks; ceratophore of median antenna in anterior notch, lateral antennae inserted ventrally, styles of antennae papillate, abruptly tapering subdistally; anterior pair of eyes situated dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; palps papillate, tapering.

Tentaculophores inserted laterally to prostomium, each with a single notochaeta and a dorsal and ventral tentacular cirrus with styles of cirri papillate, abruptly tapering subdistally. Second segment with first pair of elytra, biramous parapodia, and long buccal cirri.

Fifteen pairs of elytra, covering dorsum, on segments 2, 4, 5, 7, then on every second segment to 23, 26, 29, 32; last eight segments cirriferous; outer lateral and posterior margin of elytra with scattered, digitiform papillae; elytral surface with conical microtubercles; near outer lateral and posterior margin pyriform to globose macrotubercles with or without distal papilla (the latter not always distinct or sometimes broken) (Figure 2B–D). Cirriferous segments with distinct dorsal tubercles; dorsal cirri with cylindrical cirrophore, style papillate, abruptly tapering subdistally.

Parapodia biramous; notopodia with elongate acicular lobe; neuropodia with elongate prechaetal acicular lobe with digitiform supra-acicular process; neuropodial postchaetal lobe shorter than prechaetal lobe, rounded; tips of noto- and neuroacicula penetrating epidermis (Figure 2E). Notochaetae of about same width as neurochaetae; notochaetae with distinct rows of spines and blunt tip (Figure 2F, G); neurochaetae falcate, with rows of spines distally, most neurochaetae with bidentate tip with short secondary tooth, some upper and lower neurochaetae with unidentate tip (Figure 2H–K).

Nephridial papillae distinct from segment 6.

### Measurements

Holotype of *Polynoe exanthema* (ZMUC Pol 1671) figured herein, cs (Figure 2): L 13 mm, W 3.5 mm for 40 segments. Further measurements: syntype of *H. exanthema bergströmi* (BMNH 1936.2.8.104), cs: L 23 mm, W 5 mm for 41 segments; syntypes of same (BMNH 1936.2.8.105–109), 5 cs, ranging from L 24 mm, W 4 mm for 41 segments to L 35 mm, W 10 mm for 42 segments; holotype of *Lagisca globulosa* (ZMH P-13995), cs: L 25 mm, W 6 mm for 41 segments.

### Remarks

Augener (1932a) was the first to recognize that *Polynoe vesiculosa* Grube, 1878 is a synonym of *Harmothoe exanthema* (Grube, 1858). Our study of the respective type material confirms this

opinion and demonstrates also that Ehlers (1913) was wrong in synonymizing these two species with *H. spinosa*. *Harmothoe exanthema* clearly differs from *H. spinosa* in the shape of its macrotubercles. While the macrotubercles of *H. exanthema* are pyriform to globose with or without distal papilla, those of *H. spinosa* are elongate, conical with blunt tip.

#### *Distribution*

Western South America region: Valparaiso (type locality); Magellan region: Magellan Strait, East coast of Patagonia, S Chile, and Falkland Islands (Bergström 1916; Monro 1930).

#### ***Harmothoe fuligineum*** (Baird, 1865) comb. nov.

(Figures 3A–J, 13A; Table III)

*Hermadion fuligineum* Baird 1865, p 198; Monro 1929, p 163.

*Harmothoe spinosa typica* Willey 1902, p 265, Plate 41 Figures 1–3, Plate 43 Figure 2 (part); Uschakov 1962, p 155, Plate 2 Figure C, Plate 4 Figures A–C. [new synonymy]

*Harmothoe spinosa*: Averincev 1972, p 116, Plate 6 Figures 8–11, Plate 8 Figures 1–8, Table 1 (part); Stiller 1996, p 38, Plate 19 (part). [not *H. spinosa* Kinberg, 1856]

*Harmothoe* (*Harmothoe*) *spinosa* Gruppe C: Hartmann-Schröder and Rosenfeldt 1988, p 31, Plate 3 Figures 1–5. [not *H. spinosa* Kinberg, 1856]

#### *Type material*

*Hermadion fuligineum*: BMNH ZB.1971:243, lectotype (cs, in bad shape; designated and described by Monro 1929), Antarctic Expedition, 74.5°S, 175.5°E, Ross Sea, 300 fathoms.

*Harmothoe spinosa typica*: BMNH 1902.1.8.88–90, lectotype (cs, dry, in bad shape; designated herein, see “Remarks” section) and three further specimens (indeterminable), “Southern Cross” Expedition, 1898–1900, Ross Sea, Cape Adare, dredge.

*Additional material*. One specimen (spm.) (cs), ANT XIII/3, 39/001, GSN; one spm. (af), ANT XIII/3, 39/005, EBS; three spms (cs), ANT XIII/3, 39/007, EBS; two spms (1 cs, 1 pf), ANT XIII/3, 39/013, GSN; one spm. (cs), SMF 15162, ANT XIII/3, 39/013, GSN; one spm. (cs), ANT XIII/3, 39/015, GSN; one spm. (cs), ANT XIII/3, 39/016, GSN; two spms (cs), ANT XIII/3, 39/016, GSN; six spms (3 cs, 3 af), ANT XIII/3, 39/016, GSN; three spms (cs), ANT XIII/3, 39/024, AGT.

#### *Diagnosis*

Outer elytral margin densely set with filiform papillae, posterior margin without, or with few digitiform papillae; elytral surface with conical microtubercles, posterior half of elytra with numerous, globular to conical macrotubercles.

#### *Description*

The description is based on an additional specimen from the Weddell Sea (SMF 15162), since the lectotype of *Hermadion fuligineum* is in bad shape, although the diagnostic elytral characters are still visible.

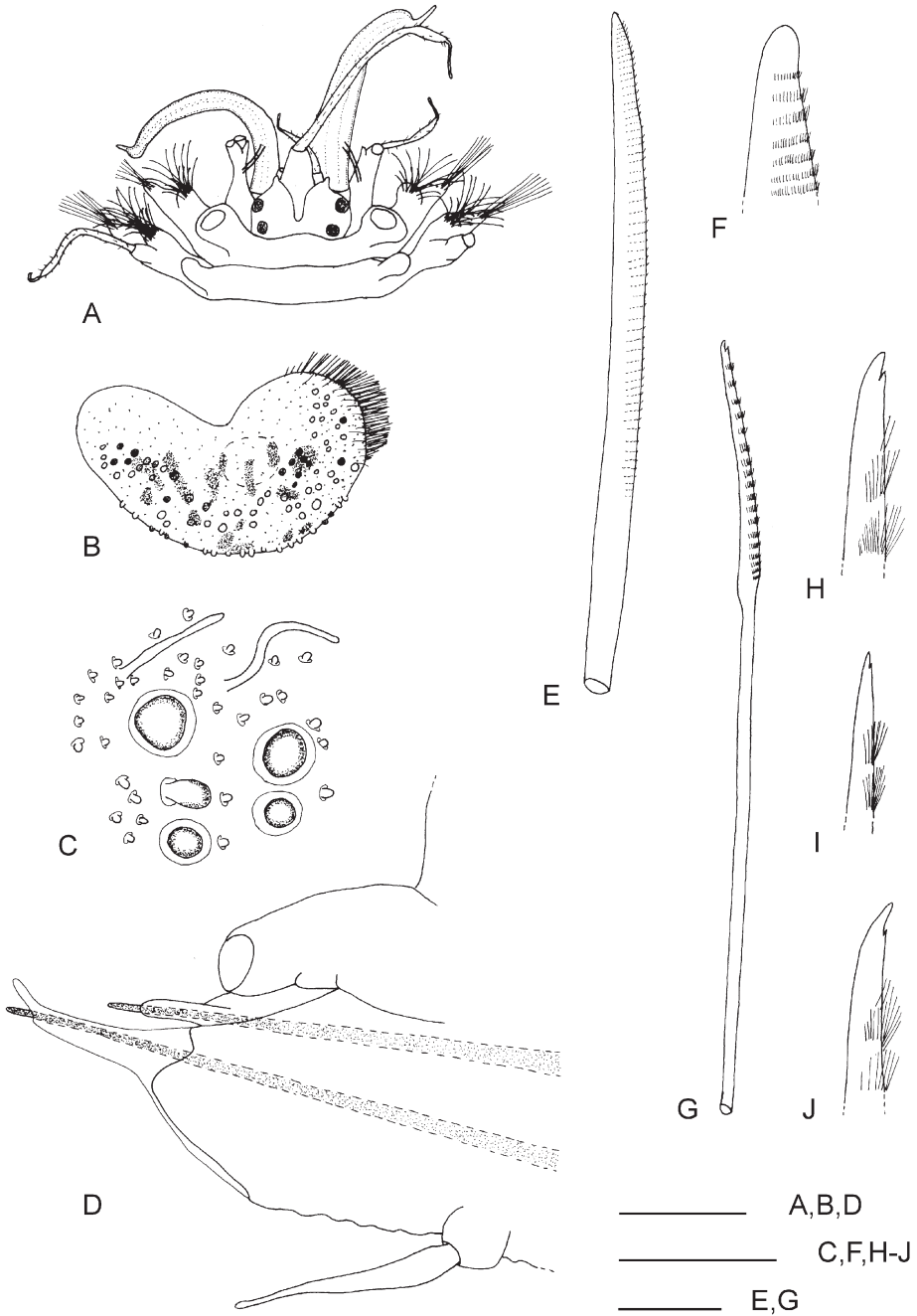


Figure 3. *Harmothoe fuligineum* (SMF 15162). (A) Anterior end; styles of left lateral antenna, left and right dorsal and left ventral tentacular cirri, and right dorsal cirrus of segment 3 missing; (B) right elytron of segment 5; (C) detail of area near outer lateral margin of same; (D) left cirriferous parapodium of segment 12, posterior view, style of dorsal cirrus missing; (E) long notochaeta; (F) tip of same; (G) middle neurochaeta; (H) tip of same; (I) tip of upper neurochaeta; (J) tip of lower neurochaeta. Scale bars: 2 mm (A, B); 250  $\mu$ m (C); 500  $\mu$ m (D); 250  $\mu$ m (E, G); 100  $\mu$ m (F, H-J).

Body with 37 segments. At anterior end (Figure 3A), prostomium bilobed, with cephalic peaks; ceratophore of median antenna in anterior notch, style of median antenna papillate, slightly inflated subdistally, then abruptly tapering; lateral antennae inserted ventrally with styles papillate, tapering; anterior pair of eyes situated dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; palps papillate, tapering.

Tentaculophores inserted laterally to prostomium, each with two notochaetae and a dorsal and ventral tentacular cirrus with styles of cirri missing. Second segment with first pair of elytra, biramous parapodia, and long buccal cirri.

Fifteen pairs of elytra, covering dorsum, on segments 2, 4, 5, 7, then on every second segment to 23, 26, 29, 32; last five segments cirriferous; outer lateral margin and adjacent surface of elytra with dense fringe of long, filiform papillae, posterior margin without or with few, digitiform papillae; elytral surface covered with conical microtubercles, posterior half of elytra with numerous, globular to conical macrotubercles and some dark, pigmented patches (Figure 3B, C). Cirriferous segments with distinct dorsal tubercles; dorsal cirri with cylindrical cirrophore, style papillate, tapering. Ventral cirri with smooth, tapering style.

Parapodia biramous; notopodia with elongate acicular lobe; neuropodia with elongate prechaetal acicular lobe with digitiform supra-acicular process; neuropodial postchaetal lobe shorter than prechaetal lobe, rounded; tips of noto- and neuroacicula penetrating epidermis (Figure 3D). Notochaetae stouter than neurochaetae; notochaetae with distinct rows of spines and blunt tip (Figure 3E, F); neurochaetae falcate, with rows of spines distally; tip of neurochaetae bidentate with small secondary tooth (often abraded) (Figure 3G–J).

Nephridial papillae distinct from segment 6.

#### Measurements

Lectotype of *Hermadion fuligineum* (BMNH ZB.1971:243), cs: L 22 mm, W 7 mm for 34 segments (segments 30–34 regenerating); lectotype of *Harmothoe spinosa typica* BMNH (1902.1.8.88–90): L 23 mm, W 8 mm for 37 segments; specimen figured herein (SMF 15162), cs (Figure 3): L 29 mm, W 9 mm for 37 segments.

#### Remarks

Monro (1929) revised the type material of *Hermadion fuligineum* Baird, 1865 and designated a lectotype. He considered this species to be a synonym of *Harmothoe spinosa*. Our comparison of the types of both species showed that Baird's species in fact belongs to *Harmothoe* (for differentiating characters between *Hermadion* and *Harmothoe*, see "Remarks" section related to the genus *Harmothoe* above), but that *Harmothoe fuligineum* is distinct from *H. spinosa*. *Harmothoe fuligineum* is characterized by a very dense fringe of papillae at the outer lateral elytral margin and by numerous globular to conical macrotubercles scattered in the posterior half of the elytron. In contrast, *H. spinosa* has only few papillae at the outer elytral margin and few elongate, conical macrotubercles occur near the posterior margin.

The type material of *Harmothoe spinosa typica* Willey, 1902 consists of four syntypes originally labelled "spm. 1 to 4", all in bad shape. The lectotype chosen herein and synonymized with *H. fuligineum* corresponds to "spm. 2"; the three remaining syntypes are in very bad condition and thus indeterminable ("spms 1, 3, and 4").

Among the additional material examined light and dark specimens could be distinguished, a phenomenon which had first been noted by Stiller (1996). Gambi et al.

(2001) identified these specimens preliminarily as *H. spinosa*. According to the latter authors, the dark animals, while still alive, were characterized by a brownish to almost black body and iridescent elytra. Among the light animals, one specimen was found to brood eggs under its elytra, but dissection of the gonads of several specimens gave no clear evidence whether the dark or light morph is due to sexual dimorphism, since no difference could be noted in size and shape of the sexual products.

#### *Distribution*

Antarctic region: Antarctic Peninsula (Hartmann-Schröder and Rosenfeldt 1988), Weddell Sea (cf. also Stiller 1996), Enderby Land (Uschakov 1962), and Ross Sea (type locality).

#### ***Harmothoe fullo*** (Grube, 1878) comb. nov.

(Figure 4A–K; Table III)

*Polynoe fullo* Grube 1878, p 515.

*Harmothoe gourdoni* Gravier 1911a, p 312; Gravier 1911b, p 96, Plate 4 Figure 52–53, Plate 7 Figure 75–79; Averincev 1972, p 121, Table 1. [new synonymy]

*Harmothoe monroi* Uschakov 1962, p 163, Plate 5 Figures A–B, Plate 6 Figures A–C; Stiller 1996, p 37, Plate 18. [new synonymy]

*Harmothoe spinosa*: Augener 1932a, p 98; Monro 1939, p 95, Figure 1 (part). [not *H. spinosa* Kinberg, 1856]

*Harmothoe (Harmothoe) spinosa* Gruppe A: Hartmann-Schröder and Rosenfeldt 1988, p 30, Figures 1–5, Plates 1–3. [not *H. spinosa* Kinberg, 1856]

#### *Type material*

*Polynoe fullo*: ZMB 685, lectotype (cs; designated, described, and figured herein), “Gazelle” Expedition 1875–76, Kerguelen, Successful Bay. ZMB 1139, paralectotype (cs, dry, in bad shape), “Gazelle” Expedition 1875–76, Magellan Strait, Tuesday Harbour, 12 February 1876, 60 fathoms, coll. Grube.

*Harmothoe monroi*: ZISP 2/10203, one paratype (out of 15), First Complex Antarctic Expedition 1956, RV *Ob*, St. 121, Kerguelen, 141 m, leg. Uschakov.

*Additional material*. Three spms (2 cs, 1 af), ANT XIII/3, 39/007, EBS; one spm. (af), ANT XIII/3, 39/009, AGT; four spms (1 cs, 3 af), ANT XIII/3, 39/024, AGT.

#### *Diagnosis*

Elytral margin with long and short digitiform papillae; elytral surface with conical microtubercles; few conical to cylindrical macrotubercles scattered near posterior margin; inner posterior margin with mound with very long, filiform papillae and some microtubercles, occasionally with few macrotubercles (mound less distinct in posterior elytra, but very long papillae still present).

#### *Description (based on lectotype of Polynoe fullo)*

Body with 38 segments. At anterior end (Figure 4A), prostomium bilobed, with cephalic peaks; ceratophore of median antenna in anterior notch, style of median antenna papillate,



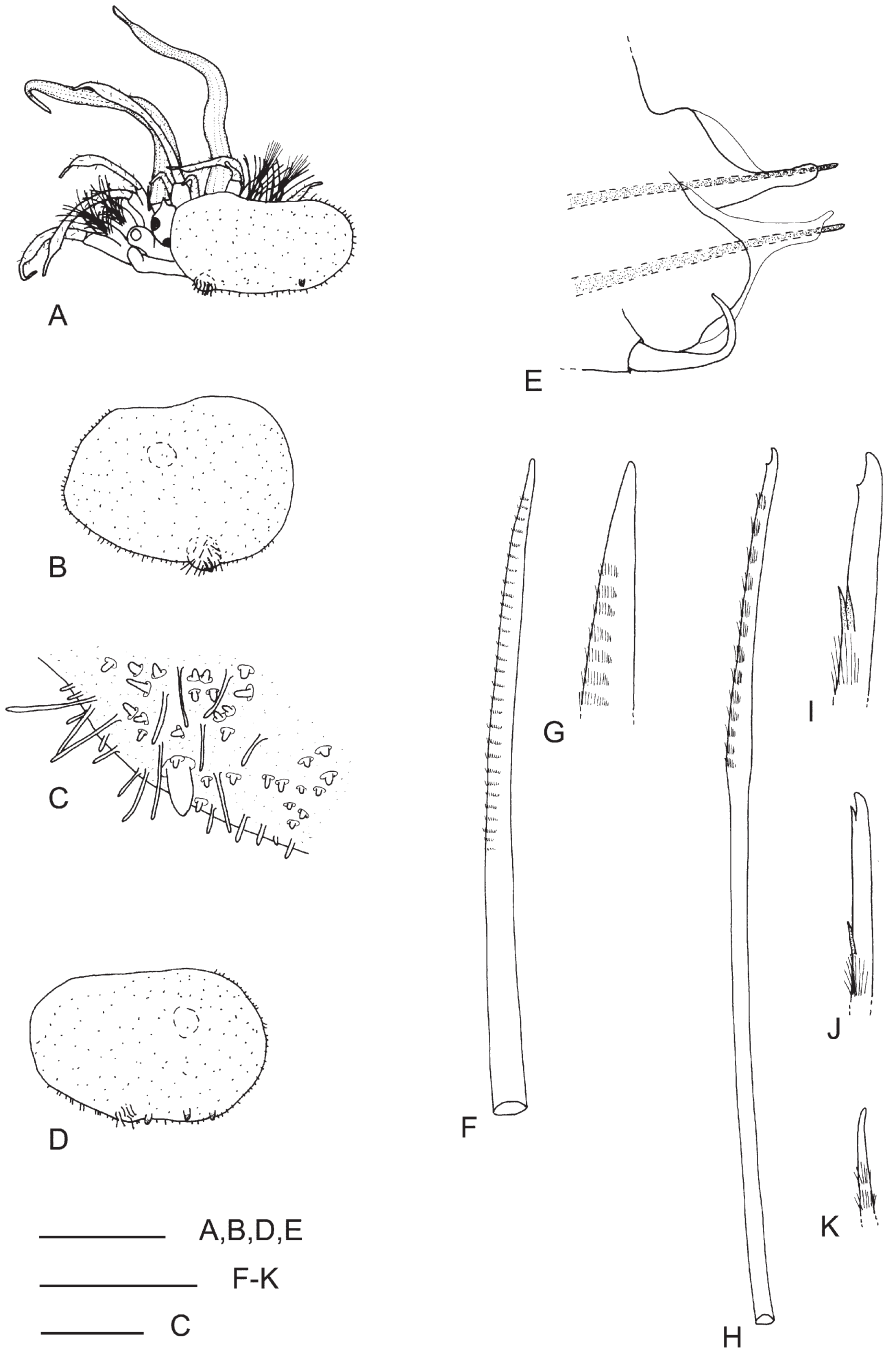


Figure 4. *Harmothoe fullo* (lectotype, ZMB 685). (A) Anterior end; style of right dorsal tentacular cirrus regenerating; (B) left elytron from unknown segment in mid-body region; (C) detail of mound of same; (D) right elytron from unknown segment in mid-body region; (E) right elytragerous parapodium of segment 11, posterior view; (F) long notochaeta; (G) tip of same; (H) middle neurochaeta; (I) tip of same; (J) tip of upper neurochaeta; (K) tip of lower neurochaeta. Scale bars: 2 mm (A, B, D); 250  $\mu$ m (C); 500  $\mu$ m (E); 250  $\mu$ m (F, H); 100  $\mu$ m (G, I-K).

slightly inflated subdistally, then abruptly tapering; lateral antennae inserted ventrally with styles papillate, tapering; anterior pair of eyes situated dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; palps papillate, abruptly tapering subdistally.

Tentaculophores inserted laterally to prostomium, each with a single notochaeta and a dorsal and ventral tentacular cirrus with styles of cirri papillate, slightly inflated subdistally, then abruptly tapering. Second segment with first pair of elytra, biramous parapodia, and long buccal cirri.

Fifteen pairs of elytra, covering dorsum, on segments 2, 4, 5, 7, then on every second segment to 23, 26, 29, 32; last six segments cirriferous; outer lateral and posterior margin of elytra with long and short digitiform papillae; elytral surface covered by conical microtubercles, few conical to cylindrical macro-tubercles scattered near posterior margin; inner posterior margin with a mound with very long, filiform papillae and some microtubercles, occasionally also with few macro-tubercles (mound becoming less distinct from anterior to posterior elytra, but group of long, filiform papillae still present on posterior elytra) (Figure 4B–D). Cirriferous segments with distinct dorsal tubercles; dorsal cirri with cylindrical cirrophore, style papillate, abruptly tapering subdistally. Ventral cirri with smooth, tapering style.

Parapodia biramous; notopodia with elongate acicular lobe; neuropodia with elongate prechaetal acicular lobe with digitiform supra-acicular process; neuropodial postchaetal lobe shorter than prechaetal lobe, rounded; tips of noto- and neuroacicula penetrating epidermis (Figure 4E). Notochaetae stouter than neurochaetae; notochaetae with distinct rows of spines and more or less blunt tip (Figure 4F, G); neurochaetae falcate, with rows of spines distally, uppermost row with one or two stout spines; tip of neurochaetae bidentate with slender secondary tooth (often abraded), some lower neurochaetae with unidentate tip (Figure 4H–K).

Nephridial papillae distinct from segment 6.

### Measurements

Lectotype of *Polynoe fullo* (ZMB 685) figured herein, cs (Figure 4): L 18 mm, W 5 mm for 38 segments; paratype of *Harmothoe monroi* (ZISP 2/10203): L 14 mm, W 4 mm for 37 segments; additional specimen measured from ANT XIII/3, 39/024, cs: L 23 mm, W 5 mm for 38 segments.

### Remarks

We re-examined the syntypes of *Polynoe fullo* Grube, 1878 which were also checked by Augener (1932a). The specimens are present in three vials. The first vial with one syntype labelled ZMB 685 was considered to be *H. spinosa* by Augener (designated as lectotype of *Polynoe fullo* herein and moved to the genus *Harmothoe*). The second vial labelled ZMB 1139 with another syntype was considered to be unidentifiable by Augener, since the specimen is dry and in poor condition (designated as paralectotype of *Polynoe fullo* herein, since the elytral characters are still distinct). Regarding the third vial labelled ZMB 853, we agree with Augener and consider the two specimens indeterminable. Both Ehlers (1897) and Augener (1932a) regarded *Polynoe fullo* as a synonym of *H. spinosa*. But our investigations of the type material revealed that both species are clearly different with *Harmothoe fullo* having elytra with few conical to cylindrical macro-tubercles scattered near

the posterior margin and with a very characteristic mound at the inner posterior margin with very long, filiform papillae and some microtubercles, occasionally with few macro-tubercles. *Harmothoe spinosa* in contrast never shows such a mound and is characterized by few elongate, conical macro-tubercles with blunt tip near the posterior margin.

Although the type material of *Harmothoe gourdoni* Gravier, 1911 was not available in the MNHN in Paris and is probably lost (cf. F. Pleijel, personal communication), the description and figures given by Gravier (1911a, 1911b) are clear and leave no doubt that this species is a junior synonym of *Harmothoe fullo* (Grube, 1878). Bergström (1916) suggested that *Harmothoe gourdoni* might be synonymous with *Harmothoe spinosa*, which at that time consisted already of a mixture of different species, among them *Polynoe fullo*.

*Harmothoe fullo* might be confused with *Harmothoe antarctica* (McIntosh, 1885), both species sharing elytra with a characteristic mound at the inner posterior margin. But the spherical macro-tubercles present at the centre of the elytron and near the posterior margin together with the always short papillae on the mound are characteristic for *H. antarctica*, while *H. fullo* shows very long, filiform papillae on the mound and less numerous, conical to cylindrical macro-tubercles which occur only near the posterior margin.

#### *Distribution*

Subantarctic region: Kerguelen Islands (type locality); Antarctic region: Marguerite Bay (Gravier 1911a, 1911b), Antarctic Peninsula (Hartmann-Schröder and Rosenfeldt 1988), Weddell Sea (cf. also Stiller 1996), and Davis Sea (Ushakov 1962).

#### ***Harmothoe antarctica*** (McIntosh, 1885) comb. nov.

(Figure 5A–J; Table III)

*Lagisca antarctica* McIntosh 1885, p 80, Plate 13 Figure 1, Plate 16 Figure 3, Plate 18 Figure 1, Plate 6A Figures 10, 11.

#### *Type material*

BMNH 1885.12.1.59, lectotype (cs; designated, described, and figured herein); BMNH 2005.2456–2461, six paralectotypes (3cs, 3 af, 1pf); BMNH 1885.12.1.59A–B, two slides (with elytra and parapodia); “Challenger” Expedition, St. 144A, 46°48’S, 37°49’30”E, off Marion Island, 26 December 1873, 50–75 fathoms, volcanic sands.

*Additional material.* One spm. (cs), ANT XIII/3, 39/015, GSN.

#### *Diagnosis*

Elytral margin with digitiform papillae; elytral surface with conical microtubercles; patch of smaller, spherical macro-tubercles present centrally and numerous, larger, spherical macro-tubercles near posterior margin; inner posterior margin with a mound with micro- and macro-tubercles and short papillae (mound becoming less distinct in posterior elytra).

#### *Description (based on lectotype of Lagisca antarctica)*

Body with 38 segments. At anterior end (Figure 5A), prostomium bilobed, with cephalic peaks; ceratophore of median antenna in anterior notch, style of median antenna missing;

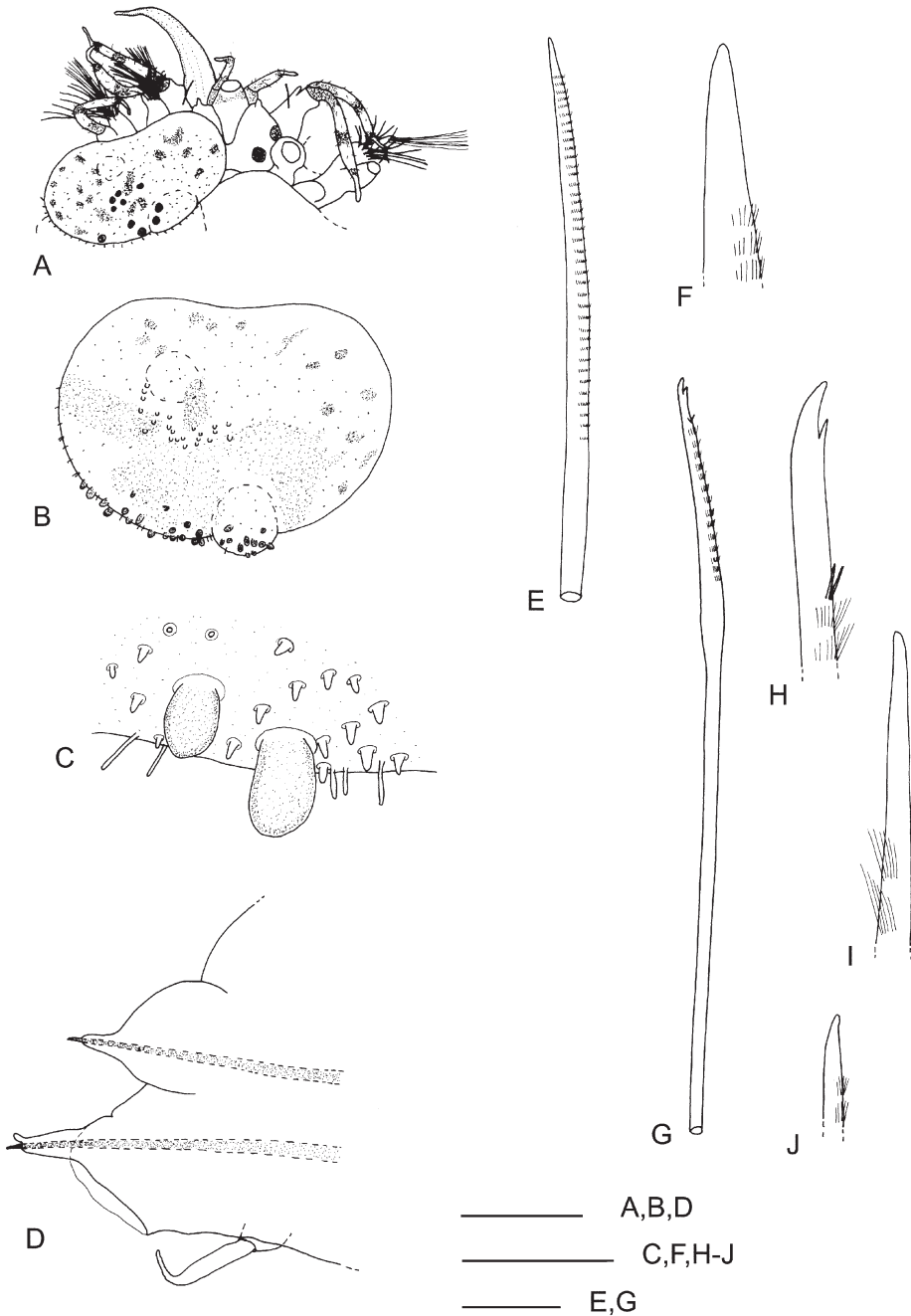


Figure 5. *Harmothoe antarctica* (lectotype, BMNH 1885.12.1.59). (A) Anterior end; right palp and style of median antenna missing; (B) left elytron from unknown segment in mid-body region; (C) detail from posterior margin of same; (D) right elytragerous parapodium from unknown segment, anterior view; (E) long notochaeta; (F) tip of same; (G) middle neurochaeta; (H) tip of same; (I) tip of upper neurochaeta; (J) tip of lower neurochaeta. Scale bars: 2 mm (A, B); 250  $\mu$ m (C, E, G); 1 mm (D); 100  $\mu$ m (F, H–J).

lateral antennae inserted ventrally with styles papillate, tapering; anterior pair of eyes situated dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; palps papillate, tapering (right palp missing).

Tentaculophores inserted laterally to prostomium, each with a single notochaeta and a dorsal and ventral tentacular cirrus with styles of cirri papillate, abruptly tapering subdistally. Second segment with first pair of elytra, biramous parapodia, and long buccal cirri.

Fifteen pairs of elytra, covering dorsum, on segments 2, 4, 5, 7, then on every second segment to 23, 26, 29, 32; last six segments cirriferous; outer lateral and posterior margin of elytra with digitiform papillae; elytral surface covered by conical microtubercles, patch of smaller, spherical macrotubercles centrally on elytral surface and numerous, larger, spherical macrotubercles near posterior margin; inner posterior margin with a mound with micro- and large macrotubercles and short papillae (mound becoming less distinct from anterior to posterior elytra) (Figure 5B, C). Cirriferous segments with distinct dorsal tubercles; dorsal cirri with cylindrical cirrophore, style papillate, abruptly tapering subdistally. Ventral cirri with smooth, tapering style.

Parapodia biramous; notopodia with elongate acicular lobe; neuropodia with elongate prechaetal acicular lobe with digitiform supra-acicular process; neuropodial postchaetal lobe shorter than prechaetal lobe, rounded; tips of noto- and neuroacicula penetrating epidermis (Figure 5D). Notochaetae stouter than neurochaetae; notochaetae with distinct rows of spines and blunt tip (Figure 5E, F); neurochaetae falcate, with rows of spines distally, uppermost row with one or two stout spines; tip of neurochaetae bidentate with stout secondary tooth, some upper and lower neurochaetae with unidentate tip (Figure 5G–J).

Nephridial papillae distinct from segment 7.

#### Measurements

Lectotype of *Lagisca antarctica* (BMNH 1885.12.1.59) figured herein, cs (Figure 5): L 28 mm, W 9 mm for 38 segments; three paralectotypes (cs) of *L. antarctica* (BMNH 2005.2456–2461), ranging from L 30–31 mm, W 9–10 mm for 35–38 segments (remaining three paralectotypes (af) not measured since incomplete); additional specimen measured from ANT XIII/3, 39/015: L 24 mm, W 7 mm for 36 segments.

#### Remarks

Since *Harmothoe antarctica* (McIntosh, 1885), originally assigned to *Lagisca*, was synonymized with *H. spinosa* by Ehlers (1913), this species is probably also hidden in the subsequent descriptions of *H. spinosa* of many authors. But, in contrast to other species confused with *H. spinosa*, the characteristic features of *H. antarctica* have either never been explicitly described or otherwise figured as a variety within *H. spinosa*.

As for *H. fullo*, *H. antarctica* is clearly distinguished from *H. spinosa* due to the presence of its posterior elytral mound. Furthermore, the spherical macrotubercles of *H. antarctica* differ from those of *H. spinosa* which are elongate, conical. For further differences between *H. antarctica* and *H. fullo* see remarks related to *H. fullo* above.

#### Distribution

Subantarctic region: Marion Island (type locality); Antarctic region: Weddell Sea (new record).

***Harmothoe magellanica*** (McIntosh, 1885)

(Figures 6A–L, 7A, B; Table III)

*Lagisca magellanica* McIntosh 1885, p 82, Plate 13 Figure 5, Plate 18 Figures 3, 4, Plate 7A Figures 1, 2.*Harmothoe magellanica*: Bergström 1916, p 280, Plate 4 Figures 1–3; Uschakov 1962, p 150, Plate 2 Figures A, B, Plate 3 Figure H; Averincev 1972, p 117, Plate 9 Figures 1–5.*Harmothoe* cf. *magellanica*: Stiller 1996, p 36, Plate 17.*Lagisca magellanica murrayi* McIntosh 1885, p 83, Plate 19 Figure 1, Plate 9A Figures 13, 14.*Lagisca magellanica grubei* McIntosh 1885, p 84, Plate 3 Figure 5, Plate 18 Figure 2, Plate 7A Figures 14–16.*Hermadion molluscum* Ehlers 1897, p 16, Plate 1 Figures 1–8.*Harmothoe molluscum*: Averincev 1972, p 118, Plate 9 Figures 6–9.*Hermadion ambiguum* Ehlers 1901a, p 209.*Harmothoe brevipalpa* Bergström 1916, p 277, Plate 2 Figure 1, Plate 4 Figures 4–7; Augener 1932a, p 100; Monro 1936, p 86, Figure 5. [new synonymy]*Harmothoe impar notialis* Monro 1930, p 58, Figure 13a–d; Hartman 1964, p 31, Plate 7 Figures 9–10.*Harmothoe (Harmothoe) spinosa* Gruppe B: Hartmann-Schröder and Rosenfeldt 1988, p 31, Plate 2 Figures 3–8. [not *H. spinosa* Kinberg, 1856]*Type material**Lagisca magellanica*: BMNH 85.12.1.69, lectotype (cs in two fragments; designated, described, and figured herein), “Challenger” Expedition, St. 149H, 48°45’S, 69°14’E, Kerguelen, off Christmas Harbour, 29 January 1874, 127 fathoms, volcanic mud. BMNH 85.12.1.74, five paralectotypes (4 af, 2 mf, 1 pf), “Challenger” Expedition, St. 308, 50°8’30’S, 74°41’W, Magellan Strait, 5 January 1876, 175 fathoms, blue mud.*Lagisca magellanica murrayi*: BMNH 85.12.1.62, one syntype (af, 2 mf), “Challenger” Expedition, St. 310, 51°27’30’S, 74°3’W, Magellan Strait, 10 January 1876, 400 fathoms, blue mud.*Lagisca magellanica grubei*: BMNH 85.12.1.64, six syntypes (6 af, 3 pf), “Challenger” Expedition, St. 145A, 46°41’S, 38°10’E, off Prince Edward Island, 27 December 1873, 310 fathoms, volcanic sand.*Hermadion molluscum*: ZMH V 1192, holotype (cs), South Georgia, on stones.*Hermadion ambiguum*: SMNH-type-2471, three syntypes (3 cs), SMNH-type-2472, two syntypes (1 cs, 1 af), SMNH-type-2473, two syntypes (2 cs), Argentina, Patagonia, Puerto Madryn, 8 and 9 November 1895, 1–5 fathoms, sandy bottom, at low tide, leg. Nordenskjöld.*Harmothoe brevipalpa*: SMNH-type-591, holotype (af, juvenile), Swedish South Polar Expedition 1901–03, St. 13, 54°50’S, 68°16’W, South America, Patagonia archipelago, off Ushuaia, 15 March 1902, 8 m, shells, debris, and algae.*Additional published material**Harmothoe (Harmothoe) spinosa* Gruppe B (published in Hartmann-Schröder and Rosenfeldt 1988; only specimens with elytra considered): two spms ZMH P-19291, Antarktis ANT III/2 Expedition, RV *Polarstern/Polarfuchs*, St. PF-001, Arctowsky, off Shag

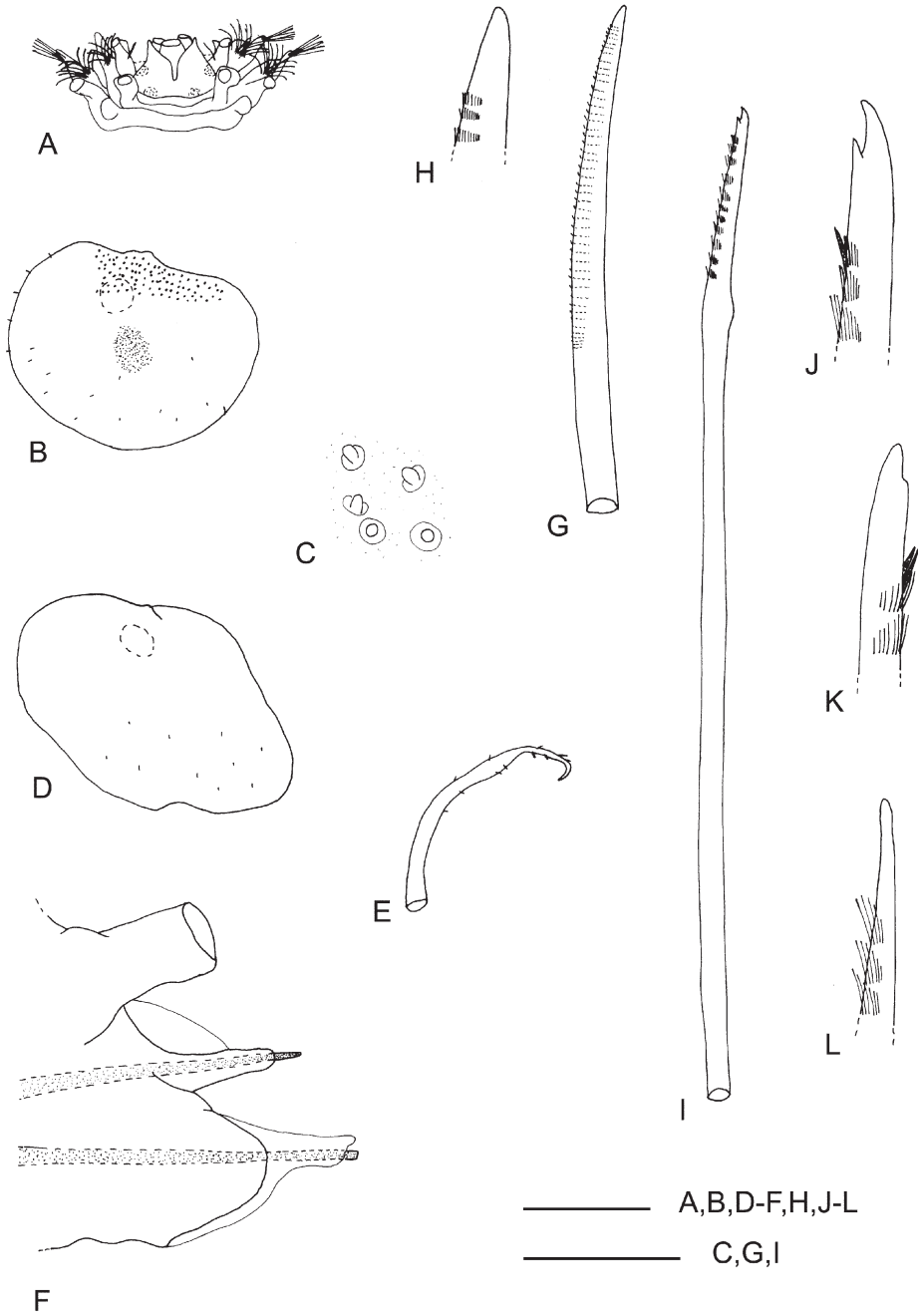


Figure 6. *Harmothoe magellanica* (lectotype, BMNH 1885.12.1.69). (A) Anterior end; palps and styles of antennae and cirri missing; (B) left elytron from unknown segment in mid-body region; (C) microtubercles from same; (D) left elytron from unknown segment in posterior body region; (E) dorsal cirrus from unknown segment; (F) right cirriferous parapodium from unknown segment, posterior view, style of dorsal cirrus missing; (G) long notochaeta; (H) tip of same; (I) middle neurochaeta; (J) tip of same; (K) tip of upper neurochaeta; (L) tip of lower neurochaeta. Scale bars: 2 mm (A, B, D); 100 μm (C); 1 mm (E); 500 μm (F); 250 μm (G, I); 50 μm (H, J-L).

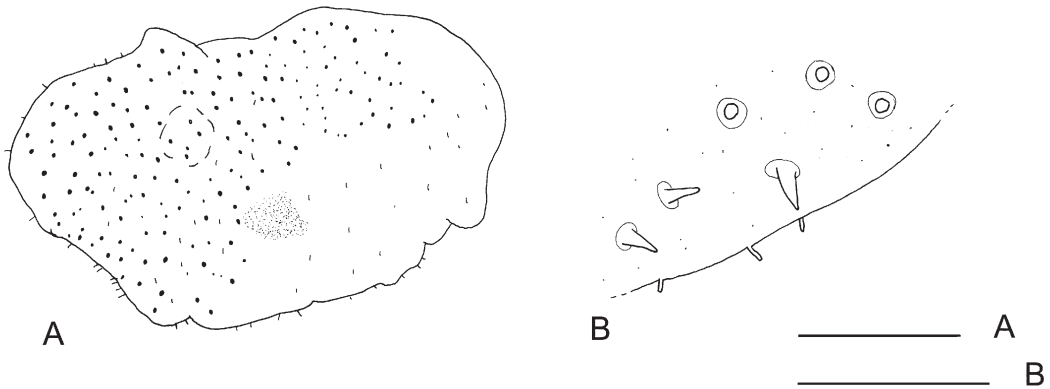


Figure 7. *Harmothoe magellanica* (SMF 15163). (A) Left elytron of segment 7; (B) detail of outer lateral margin of same. Scale bars: 1 mm (A); 100  $\mu$ m (B).

Point/Ragusa, 1984, 20 m; 15 spms ZMH P-19309, Antarktis ANT III/2 Expedition, RV *Polarstern*, St. PS-06/207, 62°59'S, 57°05'W, Bransfield Strait, 3 December 1984, 68 m.

*Additional material.* One spm., SMF 15163 (cs), ANT XIII/3, 39/005, EBS; one spm. (cs), ANT XIII/3, 39/005 EBS; one spm. (af), ANT XIII/3, 39/005, EBS; two spms (cs) ANT XIII/3, 39/005, EBS; one spm. (af, mf), ANT XIII/3, 39/007, EBS; four spms (3 cs, 1 af), ANT XIII/3, 39/007, EBS; one spm. (af, pf, several mf missing), ANT XIII/3, 39/009, AGT; nine spms (2 cs, 7 af), ANT XIII/3, 39/011, GSN; five spms (cs), ANT XIII/3, 39/024, AGT.

#### *Diagnosis*

Outer lateral elytral margin and posterior half of surface with few digitiform papillae; anterior half of elytra covered with conical microtubercles, number of microtubercles and surface covered variable (papillae and microtubercles missing in posterior elytra).

#### *Description (based on lectotype of Lagisca magellanica)*

Body with 42 segments. At anterior end (Figure 6A), prostomium bilobed, with cephalic peaks; ceratophore of median antenna in anterior notch, lateral antennae inserted ventrally, styles of antennae missing in lectotype; anterior pair of eyes situated dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; palps missing. [Prostomial and tentacular appendages present in some of the paralectotypes: styles of antennae and tentacular cirri papillate, abruptly tapering subdistally; palps papillate, tapering.]

Tentaculophores inserted laterally to prostomium, each with a single notochaeta and a dorsal and ventral tentacular cirrus with styles of cirri missing. Second segment with first pair of elytra (missing in lectotype), biramous parapodia, and long buccal cirri.

Fifteen pairs of elytra, covering dorsum, on segments 2, 4, 5, 7, then on every second segment to 23, 26, 29, 32; last 10 segments cirriferous; few digitiform papillae present at outer lateral margin of elytra and on posterior half of elytral surface, in posterior elytra papillae missing at margin; anterior half of elytra covered with conical microtubercles; number of microtubercles and surface covered variable, diminishing from anterior to



posterior elytra; posteriormost elytra without microtubercles (Figure 6B–D, 7A, B). Cirriferous segments with distinct dorsal tubercles; dorsal cirri with cylindrical cirrophore, style papillate, abruptly tapering subdistally (Figure 6E).

Parapodia biramous; notopodia with elongate acicular lobe; neuropodia with elongate prechaetal acicular lobe with digitiform supra-acicular process; neuropodial postchaetal lobe shorter than prechaetal lobe, rounded; tips of noto- and neuroacicula penetrating epidermis (Figure 6F). Notochaetae of about same width as neurochaetae; notochaetae with distinct rows of spines and blunt tip (Figure 6G, H); neurochaetae falcate, with rows of spines distally, uppermost row with one or two stout spines; tip of neurochaetae bidentate with stout secondary tooth, some lower neurochaetae with unidentate tip (Figure 6I–L).

Nephridial papillae distinct from segment 12 (in other investigated specimens distinct generally from segment 6).

### Measurements

Lectotype of *Lagisca magellanica* (BMNH 85.12.1.69), figured herein, cs in two fragments (Figure 6): L 23 mm, W 5.5 mm for 42 segments. Additional specimen from the Weddell Sea (SMF 15163) figured herein, cs (Figure 7): L 26 mm, W 7 mm for 39 segments. Further measurements: paralectotype of *L. magellanica* (BMNH 85.12.1.74), af: L 17 mm, W 6 mm for 25 segments; syntype of *L. magellanica murrayi* (BMNH 85.12.1.62), af: L 7 mm, W 8 mm for 11 segments; largest syntype of *L. magellanica grubei* (BMNH 85.12.1.64), cs in two fragments: L 48 mm, W 7 mm for 47 segments; holotype of *Hermadion molluscum* (ZMH V 1192), cs: L 35 mm, W 7 mm for 52 segments; largest syntype of *Hermadion ambiguum* (SMNH-type-2471), cs: L 24 mm, W 9 mm for 41 segments.

### Remarks

As described above for the lectotype of *L. magellanica*, the area covered by the microtubercles on the elytral surface and by the papillae at the elytral margin varies depending on the position of the elytron on the body. Furthermore, we observed also an individual variability regarding these characters in the investigated type and additional material, some specimens showing a larger area covered by the tubercles in anterior elytra, while in others the area covered is reduced to an anterior patch.

Having studied the type material listed above we confirm the opinion of Bergström (1916) that *Lagisca magellanica murrayi* McIntosh, 1885, *L. magellanica grubei* McIntosh, 1885, *Hermadion molluscum* Ehlers, 1897, and *H. ambiguum* Ehlers, 1901 are junior synonyms of *Harmothoe magellanica*.

Ehlers (1897) considered *L. magellanica* and the two subspecies *murrayi* and *grubei* to be junior synonyms of *H. spinosa* Kinberg, 1856. But, as we demonstrated above, *H. spinosa* mainly differs from *H. magellanica* in the presence of elongate, conical macro-tubercles near the posterior elytral margin and microtubercles covering more or less the complete elytral surface, while in *H. magellanica* macro-tubercles are missing, and microtubercles are present only in the anterior half of the elytron.

### Distribution

Magellan region: Magellan Strait and South Patagonia; Subantarctic region: Kerguelen Islands (type locality) and Prince Edward Island; Antarctic region: South Georgia, Antarctic Peninsula, and Weddell Sea (cf. also Stiller 1996).

***Harmothoe crosetensis*** (McIntosh, 1885)

(Figure 8A–I; Table III)

*Lagisca crosetensis* McIntosh 1885, p 88, Plate 8 Figure 6, Plate 13 Figure 2, Plate 18 Figure 7, Plate 11A Figures 4–6.*Harmothoe crosetensis laciniata* Willey 1902, p 267. [new synonymy]*Harmothoe crosetensis* type A: Uschakov 1962, p 159.*Evarne kerguelensis* McIntosh 1885, p 97, Plate 6 Figure 4, Plate 19 Figure 6, Plate 6A Figures 12–14.*Harmothoe spinosa fullo* Willey 1902, p 265, Plate 43 Figures 1, 4, 7. [new synonymy]*Harmothoe spinosa fullo lagiscoides* Willey 1902, p 265, Plate 43 Figure 6.*Harmothoe spinosa lagiscoides*: Gravier 1911b, p 92, Plate 6 Figures 64–69.*Harmothoe lagiscoides*: Bergström 1916, p 282, Plate 2 Figures 2, 3; Uschakov 1962, p 157, Plate Figures D–E; Day 1963, p 389.*Harmothoe gruzovi* Averincev 1972, p 120, Plate 1 Figures 1–7. [new synonymy]*Type material**Lagisca crosetensis*: BMNH 1885.12.1.68, lectotype (cs in two fragments, right half of pf cut off; designated, described, and figured herein) and BMNH 2005.2454, paralectotype (af), “Challenger” Expedition, St. 147, 46°16’S, 48°27’E, near the Crozet Islands, 30 December 1873, 1600 fathoms, diatom ooze.*Evarne kerguelensis*: BMNH 1885.12.1.77, syntypes (numerous specimens, juveniles), “Challenger” Expedition, Kerguelen, off Christmas Harbour, 120 fathoms. BMNH 1885.12.1.80, syntype (af), “Challenger” Expedition, Kerguelen, Cape MacLear. BMNH 1921.5.1.490, six syntypes (3 cs, 3 af, 1 pf), “Challenger” Expedition, Kerguelen, harbour, 120 fathoms.*Harmothoe spinosa fullo*: BMNH 1902.1.8.86, holotype (af), “Southern Cross” Expedition 1898–1900, Cape Adare.*Harmothoe spinosa fullo lagiscoides*: BMNH 1902.1.8.97, holotype (cs), “Southern Cross” Expedition 1898–1900, Cape Adare, 13 November 1899, 8.5 fathoms.*Harmothoe crosetensis acuminata*: BMNH 1902.1.8.93–4, lectotype (cs in two fragments) and BMNH 2005.2455, paralectotype (cs, strongly bent), “Southern Cross” Expedition, Cape Adare, 9 January 1900, 26 fathoms (see description of *Harmothoe acuminata* below).*Harmothoe gruzovi*: ZISP 5, paratype (cs), 11. Complex Antarctic Expedition, St. G, Davis Sea, 1 February 1966, 45 m, rocks, qualitative sample.*Diagnosis*

Elytral margin with digitiform papillae getting shorter towards posterior margin; elytral surface densely covered by microtubercles, being conical, elongate with blunt tip in anterior half, becoming gradually larger towards posterior margin, with blunt to slightly multifid tip.

*Description (based on lectotype of Lagisca crosetensis)*

Body with 36 segments. At anterior end (Figure 8A), prostomium bilobed, with cephalic peaks; ceratophore of median antenna in anterior notch, style of median antenna missing; lateral antennae inserted ventrally with styles missing; anterior pair of eyes situated

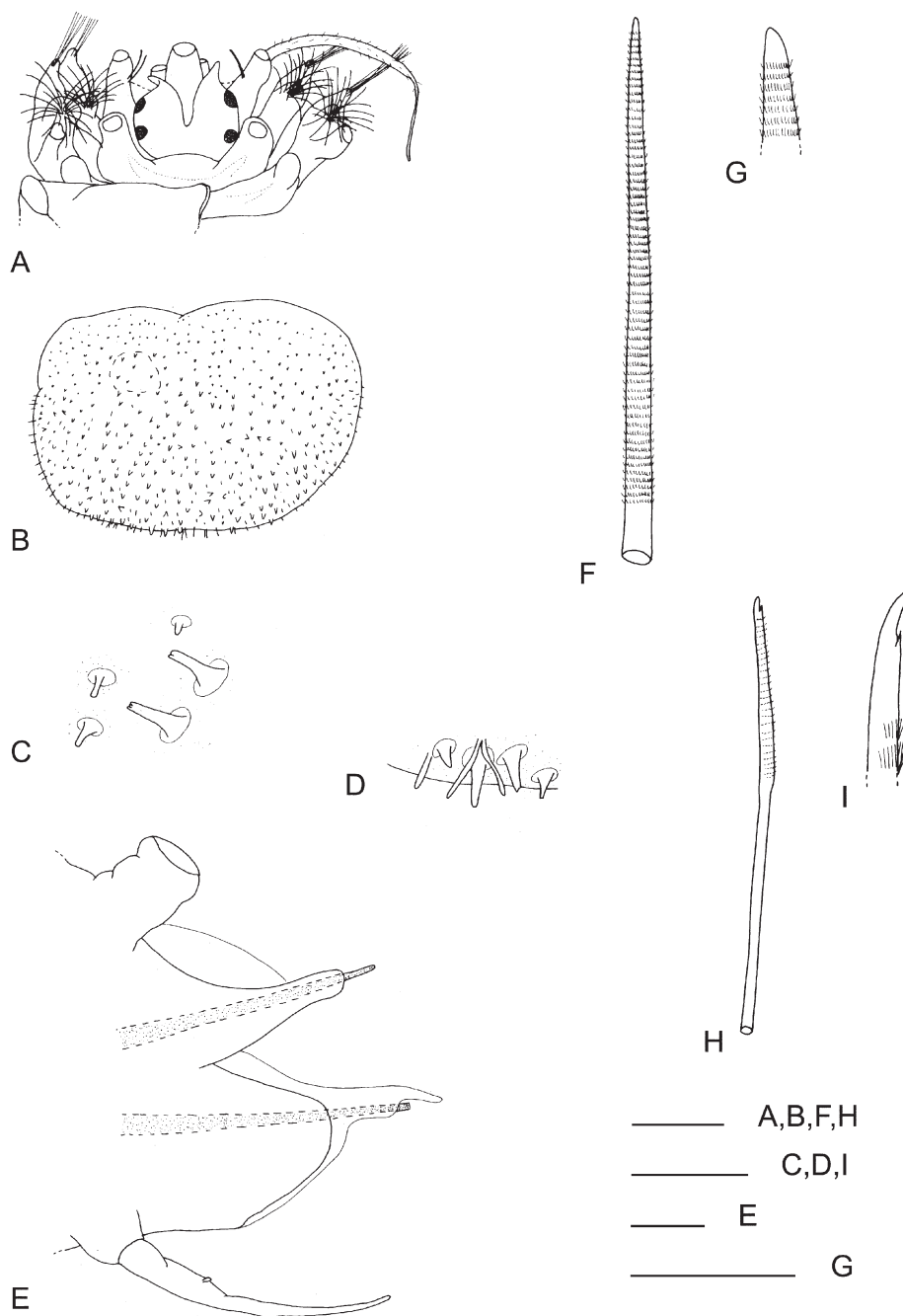


Figure 8. *Harmothoe crosetensis* (lectotype, BMNH 1885.12.1.68). (A) Anterior end; palps and styles of antennae and cirri missing, except for right ventral tentacular one; (B) left elytron from unknown segment in mid-body region; (C) various microtubercles of same; (D) detail of posterior margin of same; (E) right cirriferous parapodium from unknown segment, posterior view, style of dorsal cirrus missing; (F) long notochaeta; (G) tip of same; (H) middle neurochaeta; (I) tip of same. Scale bars: 1 mm (A, B); 250  $\mu$ m (C, D); 250  $\mu$ m (E, F, H); 100  $\mu$ m (G); 50  $\mu$ m (I).

dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; palps missing.

Tentaculophores inserted laterally to prostomium, each with one or two notochaetae and a dorsal and ventral tentacular cirrus with styles of cirri papillate, abruptly tapering subdistally (style of left and right dorsal and left ventral tentacular cirri missing). Second segment with first pair of elytra, biramous parapodia, and long buccal cirri.

Fifteen pairs of elytra, covering dorsum, on segments 2, 4, 5, 7, then on every second segment to 23, 26, 29, 32; last four segments cirriferous; outer lateral margin of elytra with digitiform papillae getting shorter towards posterior margin; posterior half of elytral surface also covered by papillae; elytral surface densely covered by microtubercles, being conical, elongate with blunt tip in anterior half, becoming gradually larger towards posterior margin, with blunt to slightly multifid tip (Figure 8B–D). Cirriferous segments with distinct dorsal tubercles; dorsal cirri with cylindrical cirrophore, style missing on all segments. Ventral cirri with smooth to papillate, tapering style.

Parapodia biramous; notopodia with elongate acicular lobe; neuropodia with elongate prechaetal acicular lobe with digitiform supra-acicular process; neuropodial postchaetal lobe shorter than prechaetal lobe, rounded; tips of noto- and neuroacicula penetrating epidermis (Figure 8E). Notochaetae stouter than neurochaetae; notochaetae with distinct rows of spines and short, bare, blunt tip (Figure 8F, G); neurochaetae falcate, with rows of spines distally; tip of neurochaetae bidentate with secondary tooth, some lower neurochaetae unidentate (Figure 8H, I).

Nephridial papillae distinct from segment 6.

#### Measurements

Lectotype of *Lagisca crosetensis* (BMNH 1885.12.1.68), cs in two fragments, figured herein (Figure 8): L 18.5 mm, W 6.5 mm for 36 segments; largest syntype of *Evarne kerguelensis* (BMNH 1921.5.1.490), cs: L 14, W 4 mm for 36 segments; holotype of *Harmothoe spinosa fullo* (BMNH 1902.1.8.86), af with few last segments missing: L 32 mm, W 10 mm for 33 segments; holotype of *H. spinosa fullo lagiscoides* (BMNH 1902.1.8.97), cs: L 46 mm, W 11 mm for 40 segments; paratype of *H. gruzovi* (ZISP 5), cs: L 24 mm, W 7 mm for 39 segments.

#### Remarks

Willey (1902) established the subspecies *Harmothoe crosetensis acuminata* for specimens collected by the “Southern Cross” Expedition which he considered to be closely related to *Lagisca crosetensis* McIntosh, 1885, collected during the “Challenger” Expedition. For the latter Willey created the subspecies *Harmothoe crosetensis laciniata*. The comparison of our material from the Weddell Sea with the types of *Harmothoe crosetensis* (McIntosh, 1885) and *H. crosetensis acuminata* Willey, 1902 revealed that the differences between *H. crosetensis* and Willey’s subspecies are strong enough to raise the latter to species level, thus we establish the name *Harmothoe acuminata* Willey, 1902 herein (see below). Furthermore, the subspecies name *laciniata* is not to be used for *H. crosetensis* (McIntosh, 1885) subsequently.

*Harmothoe crosetensis* differs significantly from *H. acuminata* due to its elytral and chaetal characters. Elytra of *H. crosetensis* are densely covered by microtubercles, being conical in the anterior part, becoming gradually larger towards the posterior margin, with blunt or slightly multifid tips (“laciniate”, cf. Willey 1902; Figure 8B–D). In contrast elytra of *H.*

*acuminata* differ clearly in size and shape of the tubercles, conical microtubercles with pointed or blunt tip being present near the anterior margin and the thorn- to spine-shaped macrotubercles with sharp pointed tip on the central and posterior part of the elytra (Figure 9B–D). Regarding the chaetae, *H. crosetensis* is characterized by notochaetae with short, bare, blunt tip and numerous bidentate neurochaetae with distinct, slender secondary tooth (Figure 8F–I), while in *H. acuminata* tips of notochaetae have a comparatively long bare part and neurochaetae are mostly unidentate, with only some middle neurochaetae being bidentate with minute secondary tooth (Figure 9F–J).

In his paper of 1916 Bergström supposed that *Evarne kerguelensis* McIntosh, 1885 and *Harmothoe spinosa fullo lagiscoides* Willey, 1902 might be synonyms of *Harmothoe crosetensis*. Having checked the type material listed above we confirm this view and add to this synonymy also *H. spinosa fullo* Willey, 1902 and *H. gruzovi* Averincev, 1972.

The fact that *H. crosetensis fullo lagiscoides* is herein synonymized with *H. crosetensis* allows us now to raise *H. lagiscoides serrata* Day, 1963 definitely to species level. The latter subspecies had been studied by Barnich and Fiege (2000) in a partial revision of the Mediterranean *Harmothoe* species, but since the authors had not started to investigate the Antarctic species of *Harmothoe* at that time, the decision to raise this subspecies to species rank had to be postponed. *Harmothoe serrata* Day, 1963 mainly differs from *H. crosetensis* in its elytra with a row of slender, thorn-shaped macrotubercles with pointed tip near the posterior margin, and the thorn-shaped, pointed microtubercles on the elytral surface. In *H. crosetensis* distinct macrotubercles are not present; microtubercles are conical, elongate with blunt tip in anterior half, becoming gradually larger towards posterior margin, with blunt to slightly multifid tip.

#### *Distribution*

Subantarctic region: Crozet Islands (type locality) and Kerguelen Islands; Antarctic region: Graham Land (Bergström 1916), Davis Sea, and Cape Adare.

#### ***Harmothoe acuminata* Willey, 1902**

(Figure 9A–J; Table III)

*Harmothoe crosetensis acuminata* Willey 1902, p 266, Plate 43 Figures 3, 9–11.

*Harmothoe crosetensis*: Bergström 1916, p 284, Plate 2 Figure 4; Monro 1939, p 96 (part);

Knox and Cameron 1988, p 31, Figures 60, 61. [not *H. crosetensis* (McIntosh, 1885)]

*Harmothoe crosetensis* type B: Uschakov 1962, p 159. [not *H. crosetensis* (McIntosh, 1885)]

*Harmothoe crosetensis* type A: Averincev 1972, p 119, Table 1. [not *H. crosetensis* (McIntosh, 1885)]

#### *Type material*

*Harmothoe crosetensis acuminata*: BMNH 1902.1.8.93–4, lectotype (cs in two fragments; designated, described, and figured herein) and BMNH 2005.2455, paralectotype (cs, strongly bent), “Southern Cross” Expedition, Cape Adare, 9 January 1900, 26 fathoms.

*Lagisca crosetensis*: BMNH 1885.12.1.68, lectotype (cs in two fragments) and BMNH 2005.2454, paralectotype (af), “Challenger” Expedition, St. 147, 46°16'S, 48°27'E, near the Crozet Islands, 30 December 1873, 1600 fathoms, diatom ooze (see description of *Harmothoe crosetensis* above).

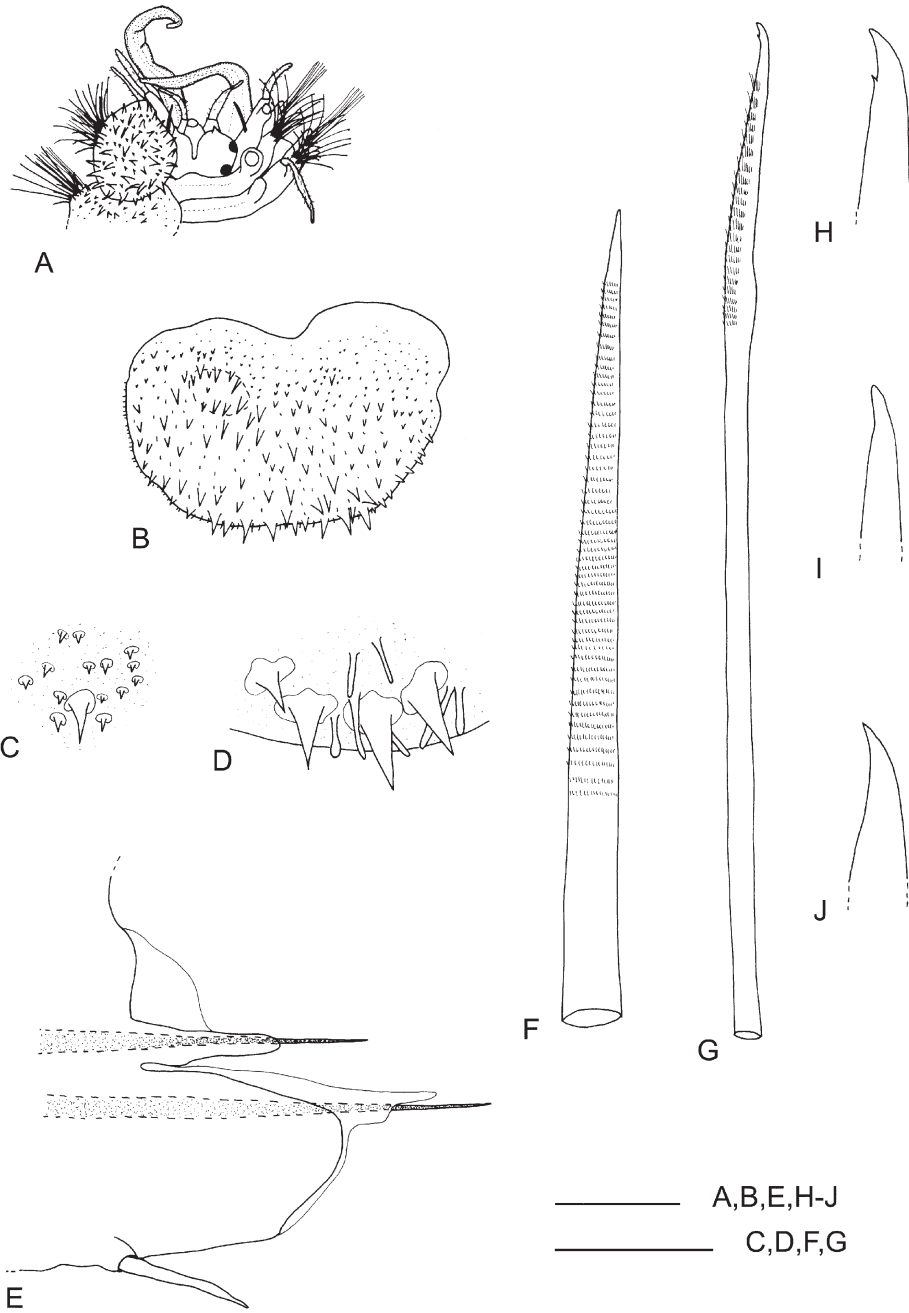


Figure 9. *Harmothoe acuminata* (lectotype, BMNH 1902.1.8.93–4). (A) Anterior end; styles of median antenna and right dorsal tentacular cirrus missing, tips of styles of remaining tentacular cirri broken; (B) left elytron of segment 5; (C) detail from area near anterior margin of same; (D) detail of posterior margin of same; (E) right elytrigerous parapodium from mid-body region, posterior view; (F) long notochaeta; (G) middle neurochaeta; (H) tip of same; (I) tip of upper neurochaeta; (J) tip of lower neurochaeta. Scale bars: 2 mm (A); 1 mm (B); 250  $\mu$ m (C, D, F, G); 500  $\mu$ m (E); 50  $\mu$ m (H–J).

*Additional material.* One spm. (cs), ANT XIII/3, 39/018, AGT; one spm. (cs in two fragments), ANT XIII/3, 39/025, AGT; one spm., SMF 15164 (af), ANT XIII/3, 39/025, AGT; one spm. (af with separate elytra), ANT XIII/3, 39/025, AGT.

### *Diagnosis*

Elytral margin with digitiform papillae; near anterior elytral margin surface with conical, pointed, or blunt microtubercles, central and posterior part of elytron with numerous, pointed, thorn- to spine-shaped macro-tubercles getting larger towards posterior margin.

### *Description (based on lectotype of Harmothoe crosetensis acuminata)*

Body with 34 segments. At anterior end (Figure 9A), prostomium bilobed, with cephalic peaks; ceratophore of median antenna in anterior notch, style of median antenna missing; lateral antennae inserted ventrally with papillate, tapering styles; anterior pair of eyes situated dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; palps papillate, tapering.

Tentaculophores inserted laterally to prostomium, each with a single notochaeta and a dorsal and ventral tentacular cirrus with styles of cirri regenerating or broken (style of right dorsal tentacular cirrus missing). Second segment with first pair of elytra, biramous parapodia, and long buccal cirri.

Fifteen pairs of elytra, covering dorsum, on segments 2, 4, 5, 7, then on every second segment to 23, 26, 29, 32; last two segments cirriferous; outer lateral margin, posterior margin, and posterior half of elytra with digitiform papillae; near anterior elytral margin surface with conical, pointed, or blunt microtubercles, central and posterior part of elytron with numerous, pointed, thorn- to spine-shaped macro-tubercles getting larger towards posterior margin (Figure 9B–D). Cirriferous segments with distinct dorsal tubercles; dorsal cirri with cylindrical cirrophore and style papillate, abruptly tapering subdistally. Ventral cirri with smooth, tapering style.

Parapodia biramous; notopodia with elongate acicular lobe; neuropodia with elongate prechaetal acicular lobe with digitiform supra-acicular process; neuropodial postchaetal lobe shorter than prechaetal lobe, rounded; tips of noto- and neuroacicula penetrating epidermis (Figure 9E). Notochaetae stouter than neurochaetae; notochaetae with distinct rows of spines and long bare, blunt to pointed tip (Figure 9F); neurochaetae falcate, with rows of spines distally; upper and lower neurochaetae unidentate, tip of middle neurochaetae bidentate with minute secondary tooth (often abraded) (Figure 9G–J).

Nephridial papillae distinct from segment 6.

### *Measurements*

Lectotype of *Harmothoe crosetensis acuminata* (BMNH 1902.1.8.93–4), cs in two fragments, some middle segments cut off (Figure 9): L 21 mm, W 6.5 mm for 34 segments; paralectotype (BMNH 2005.2455), cs, strongly bent: L 30 mm, W 10 mm for 37 segments; additional specimen (SMF 15164), af: L 18 mm, W 6 mm for 22 segments.

### *Remarks*

Since the differences between *H. crosetensis* and *H. acuminata* have been extensively discussed above, we focus here only on the characters separating *H. acuminata* from *H.*

*serrata* Day, 1963 (see also above). Both species share papillate elytral margins and surface and pointed, thorn- or spine-shaped elytral macrotubercles. But in *H. serrata* thorn-shaped macrotubercles are only present near the posterior elytral margin, while in *H. acuminata* macrotubercles are thorn- to spine-shaped, covering the central and posterior part of the elytron and becoming larger towards the posterior margin.

Among the Antarctic species described herein, the two species belonging to the new genus *Antarctinoe* (see below), i.e. *A. ferox* (Baird, 1865) and *A. spicoides* (Hartmann-Schröder, 1986), are also characterized by thorn-shaped, pointed macrotubercles. However, in these two species the characteristic papillae occurring at the elytral margin and the surface of both *H. acuminata* and *H. serrata* are missing. Furthermore, species belonging to *Antarctinoe* gen. nov. differ from *Harmothoe* in the characteristic length and orientation of the notochaetae (for more details, see below) and the exclusive presence of unidentate neurochaetae.

### Distribution

Antarctic region: South Georgia and Graham region (Bergström 1916), Weddell Sea, and Cape Adare, Ross Sea (type locality).

### *Antarctinoe* gen. nov.

*Type species. Harmothoe (Eunoe) spica spicoides* Hartmann-Schröder, 1986.

### Diagnosis

Body dorsoventrally flattened, short, with fewer than 50 segments; dorsum covered only partly by elytra, except first two to three pairs. Fifteen pairs of elytra on segments 2, 4, 5, 7, on alternate segments to 23, 26, 29, and 32. Dorsal cirri with cylindrical cirrophore and long style on segments lacking elytra; pair of nodular dorsal tubercles on cirriferous segments. Ventral cirri short (except on second segment), consisting of cirrophore and style on all segments.

Prostomium bilobed, with distinct cephalic peaks and three antennae; ceratophore of median antenna in anterior notch, lateral antennae with ceratophores inserted ventrally to median antenna; a pair of palps present; two pairs of eyes, anterior pair situated dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; pharynx with nine pairs of border papillae and two pairs of hooked jaws. Facial tubercle present.

First or tentacular segment with a pair of tentaculophores inserted laterally to prostomium, each bearing a dorsal and a ventral tentacular cirrus and a single notochaeta. Second or buccal segment with first pair of elytra, biramous parapodia, long ventral cirri, and a nuchal lobe.

Parapodia biramous, both rami with elongate acicular lobe; noto- and neuropodia of about same size; neuropodia with digitiform supra-acicular process; tips of noto- and neuroacicula penetrating epidermis. Bases of neuropodia ventrally without tubercles between ventral cirrus and body wall. Notochaetae of several kinds (depending on the species); all known species with very long, stout notochaetae, some projecting laterally, the majority projecting dorsally to meet mid-dorsally; longest stout notochaetae distinctly longer than longest neurochaetae (up to about twice the length).

Neurochaetae falcate with unidentate tip.

Nephridial papillae distinct from segment 6 to the end of the body. Pygidium with one pair of anal cirri.



*Remarks*

In our material from the Weddell Sea, we found specimens belonging to two species having very long, stout notochaetae projecting dorsally to meet mid-dorsally, unidentate neurochaetae, and the same ornamentation of the elytra, but differing in the number of notochaetal types and the shape of the notochaetal tips. In the literature specimens showing only short and very long stout notochaetae with more or less blunt tips, were referred to *Hermadion* or *Harmothoe ferox*, to *Eunoe spica*, or to *Harmothoe crosetensis* among others. Specimens with up to four kinds of notochaetae (i.e. short notochaetae with pointed tip; very long stout notochaetae with pin-like tip; fine, slender notochaetae with pointed to pin-like tip; and capillary notochaetae with pointed tip; with the presence of the latter two types occurring only in large specimens) were described as *Harmothoe (Eunoe) spica spicoides* or *H. crosetensis* (for extensive synonymy see below).

We establish herein the new genus *Antarctinoe* gen. nov. for the two species *A. ferox* (Baird, 1865) and *A. spicoides* (Hartmann-Schröder, 1986), described below, and characterized mainly by the presence of 15 pairs of elytra, fewer than 50 segments, prostomium with cephalic peaks, neuropodia with a supra-acicular process, very long stout notochaetae mostly orientated dorsally to meet mid-dorsally, and unidentate neurochaetae.

*Antarctinoe* gen. nov. is easily separated from *Harmothoe* Kinberg, 1856 due to the exclusive presence of unidentate neurochaetae, never being distinctly bidentate as in *Harmothoe*. Furthermore, the very long stout notochaetae orientated to protect the dorsum are a unique character of *Antarctinoe* enabling the further distinction between this genus and *Harmothoe*, and also from *Eunoe* Malmgren, 1865. To our knowledge, in the latter two genera the longest stout notochaetae are never distinctly longer than the longest neurochaetae (usually shorter or of about same length) and mostly orientated laterally (see Barnich and Fiege 2000, 2003, 2004).

The differentiation between *Antarctinoe* and *Hermadion* Kinberg, 1856 is rather easily demonstrated. Our investigations of a syntype of *Hermadion magalhaensi* Kinberg, 1856 (SMNH-532), i.e. the type species of the genus, showed that *Hermadion* is characterized by rounded anterior prostomial edges without cephalic peaks and acicular neuropodial lobes without supra-acicular process, while *Antarctinoe* shows a prostomium with cephalic peaks and neuropodia with a distinct supra-acicular process distally at the acicular lobe. Furthermore, the characteristic size and orientation of the notochaetae as described above for *Antarctinoe* are not found in *Hermadion*.

*Etymology*

The name refers to the geographical area (*Antarcti-*) and to the closely related genus *Eunoe* (*-noe*); gender feminine.

***Antarctinoe spicoides* (Hartmann-Schröder, 1986) comb. nov.**

(Figures 10A–G, 11A–E)

*Harmothoe (Eunoe) spica spicoides* Hartmann-Schröder 1986, p 73, Figures 1–4; Hartmann-Schröder and Rosenfeldt 1990, p 92. [new synonymy]

*Eunoe spica spicoides*: Stiller 1996, p 33, Plate 14.

*Hermadion rouchi*: Benham 1921, p 46, Figures 43–47. [not *Hermadion rouchi* Gravier, 1911].

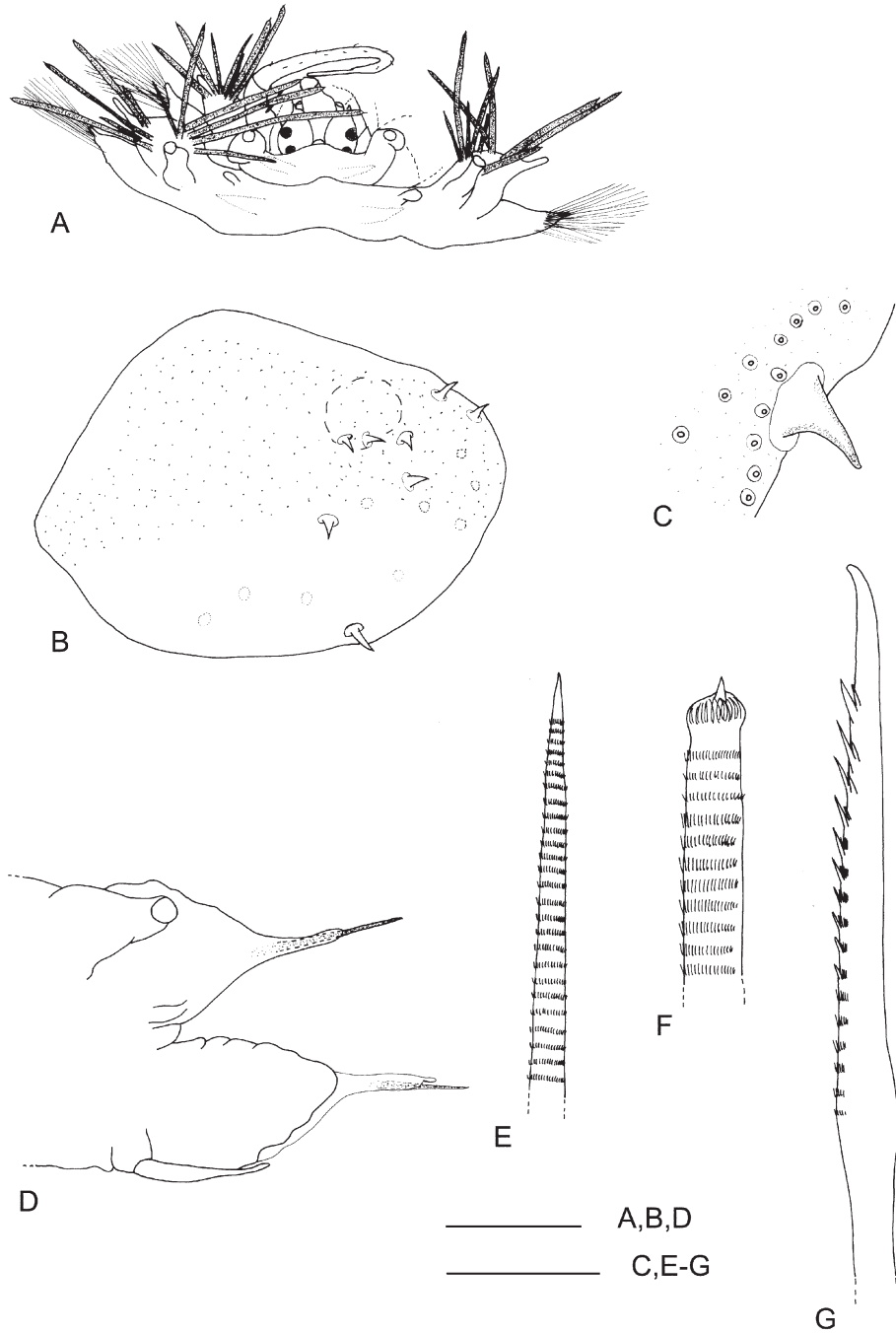


Figure 10. *Antarctinoe spicoides* (holotype, ZMH P-18608). (A) Anterior end; palps and styles of antennae and cirri missing, except for left dorsal tentacular one; right tentaculophore and right second parapodium cut off; (B) right elytron from unknown segment; (C) detail of outer lateral margin of same; (D) right cirriferous parapodium from mid-body region, posterior view; (E) distal half of short, stout notochaeta; (F) tip of long, stout notochaeta; (G) distal part of middle neurochaeta. Scale bars: 2 mm (A); 1 mm (B, D); 250  $\mu$ m (C, E-G).

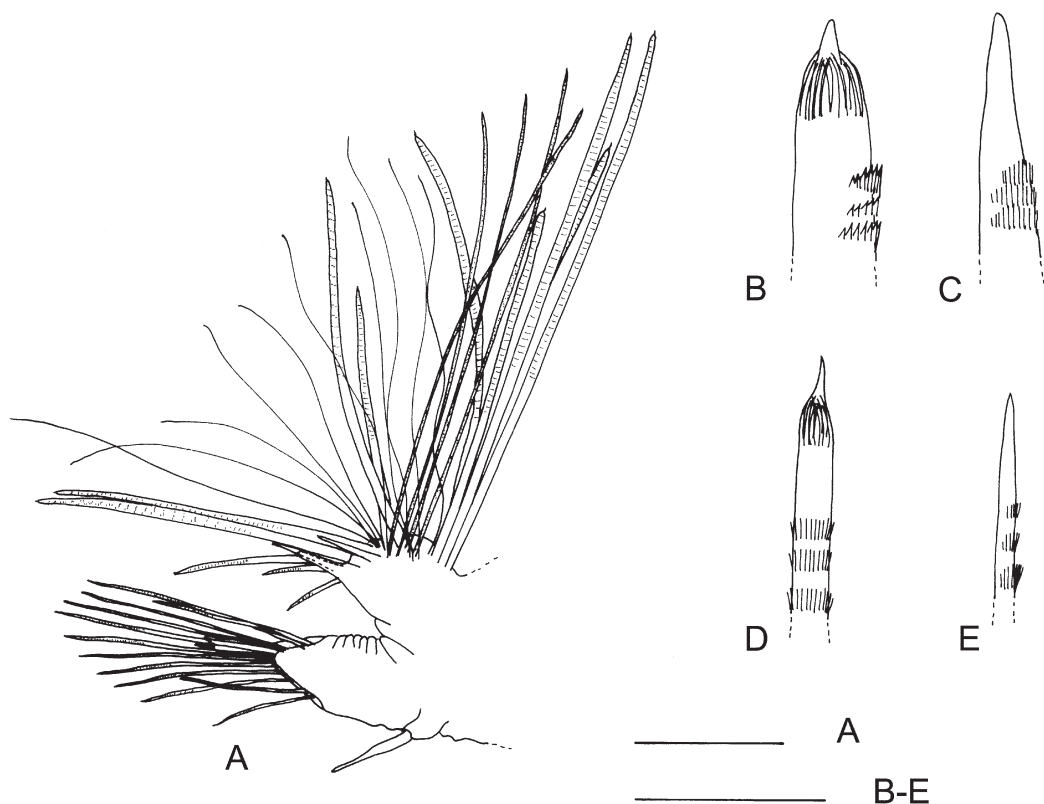


Figure 11. *Antarctinoe spicoides* (SMF 15165). (A) Left cirriferous parapodium of segment 18, posterior view; (B) tip of long, stout notochaeta; (C) tip of short, stout notochaeta; (D) tip of fine, slender notochaeta; (E) tip of capillary notochaeta. Scale bars: 2 mm (A); 100  $\mu$ m (B-E).

*Harmothoe crosetensis*: Ehlers 1913, p 442, Plate 27 Figures 1–4; Monro 1939, p 96 (part). [not *Harmothoe crosetensis* (McIntosh, 1885)]

*Harmothoe crozetensis* [sic]: Augener 1932b, p 17, Figure 1. [not *H. crosetensis* (McIntosh, 1885)]

*Harmothoe crosetensis* type C: Uschakov 1962, p 159, Plate 3 Figures A–G. [not *H. crosetensis* (McIntosh, 1885)]

*Harmothoe crosetensis* type B and C: Averincev 1972, p 119, Table 1. [not *H. crosetensis* (McIntosh, 1885)]

*Harmothoe crosetensis*: Hartman 1964, p 28, Plate 7 Figure 5 (part). [not *H. crosetensis* (McIntosh, 1885)]

#### Type material

*Harmothoe (Eunoe) spica spicoides*: ZMH P-18608, holotype, South Shetland Islands Expedition, “Meteor” 56, St. 195, 61°26.7'S, 52°06.3'W, 18 January 1981, 650 m,

*Additional material*. Ten spms (9 cs, 1 af), ANT XIII/3, 39/006, AGT; one spm., SMF 15165 (cs), ANT XIII/3, 39/006, AGT; three spms (2 cs, 1af), ANT XIII/3, 39/009, AGT;

one spm. (af), ANT XIII/3, 39/012, GSN; one spm. (cs), ANT XIII/3, 39/013, GSN; three spms (cs), ANT XIII/3 1996, 39/015, GSN; two spms (cs), ANT XIII/3, 39/017, GSN; 19 spms (9 cs, 10 af), ANT XIII/3, 39/029, GKG; 17 spms (13 cs, 4 af), ANT XV/3, 48/049; one spm. (cs), ANT XV/3, 48/277.

### *Diagnosis*

Elytral margin smooth; elytral surface with conical microtubercles with blunt to pointed tip; thorn-shaped macrotubercles scattered in posterior half of elytron. Long, stout notochaetae projecting dorsally to meet mid-dorsally with rows of spines distally and pin-like tip; large specimens with additional fine, slender notochaetae with pointed to pin-like tip, and capillary notochaetae with pointed tip. Neurochaetae falcate, unidentate.

### *Description*

The description is based on the holotype of *Harmothoe (Eunoe) spica spicoides*, but notochaetal characters are complemented by an additional specimen from the Weddell Sea (SMF 15165); see “Remarks” section below.

Body with 42 segments. At anterior end (Figure 10A), prostomium bilobed, with cephalic peaks; ceratophore of median antenna in anterior notch, style missing; lateral antennae inserted ventrally, styles missing; anterior pair of eyes situated dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; palps missing.

Tentaculophores inserted laterally to prostomium, each with a single notochaeta and a dorsal and ventral tentacular cirrus with styles papillate, slightly inflated subdistally, then abruptly tapering (styles missing, except for left dorsal tentacular one). Second segment with first pair of elytra, biramous parapodia, and long buccal cirri.

Fifteen pairs of elytra, covering dorsum, on segments 2, 4, 5, 7, then on every second segment to 23, 26, 29, 32; last 10 segments cirriferous; elytral margin smooth; elytral surface with conical microtubercles with blunt to pointed tip; thorn-shaped macrotubercles scattered in posterior half of elytron, mainly near outer lateral and posterior margin (Figure 10B, C). Cirriferous segments with distinct, dorsal tubercles; dorsal cirri with cylindrical cirrophore and style smooth to slightly papillate, slightly inflated subdistally, then abruptly tapering. Ventral cirri with slightly papillate, tapering style.

Parapodia biramous; notopodia of about same size as neuropodia with elongate acicular lobe; neuropodia with elongate prechaetal acicular lobe with digitiform supra-acicular process; neuropodial postchaetal lobe shorter than prechaetal lobe, rounded; tips of noto- and neuroacicula penetrating epidermis (Figures 10D, 11A).

Notochaetae of several kinds depending on the size of the specimen; small to medium-sized specimens with short, stout notochaetae with rows of spines and more or less pointed tip and long, stout notochaetae projecting dorsally to meet mid-dorsally with rows of spines distally and pin-like tip (Figures 10E, F, 11B, C); large specimens additionally with fine, slender notochaetae with rows of spines distally and pointed to pin-like tip, and capillary notochaetae with rows of spines distally and pointed tip (Figure 11A–E). Neurochaetae falcate with unidentate tip (Figure 10G).

Nephridial papillae distinct from segment 6.

*Measurements*

Holotype of *Harmothoe (Eunoe) spica spicoides* (ZMH P-18608), cs, figured herein (Figure 10): L 33 mm, W 8 mm for 42 segments (medium-sized); additional large specimen figured (SMF 15165), cs (Figure 11): L 49 mm, W 10 mm for 43 segments. Smallest specimen found: L 15 mm, W 4 mm for 30 segments (last few segments missing); largest specimen found: L 50 mm, W 14 mm for 40 segments.

*Remarks*

Ehlers (1913) described as *Harmothoe crosetensis* specimens with the characteristic notochaetae and unidentate neurochaetae of *Antarctinoe spicoides*. He supposed that the orientation and length of the notochaetae and the occurrence of additional slender or capillary notochaetae could be features of an epitokous stage. But since we found these characters also in small, immature specimens, they cannot be epitokous; neither are they sex-related, since we found both males and females with these characters. Ehlers (1913) also noted the resemblance of his specimens with *Hermadion ferox* (Baird, 1865), referred herein to *Antarctinoe ferox*. But, according to him specimens of *H. ferox* have elytra which do not cover the dorsum, which is true for large specimens only, as we could confirm by our observations. As demonstrated below, *A. spicoides* can be clearly separated from *A. ferox* by the presence of pin-like tips in the long, stout notochaetae and the occurrence of additional slender and capillary notochaetae in larger specimens.

Influenced by Ehlers, Monro (1939) described an atokous form of *Harmothoe crosetensis* (referred herein to *H. acuminata* Willey, 1902) and an epitokous form, which we recognize as *A. spicoides*. The differences observed by Monro are not related to the reproductive stage of the specimens, but in this case two genera and species have been confused: (1) *Harmothoe acuminata* characterized by at least some bidentate neurochaetae, relatively short notochaetae orientated mostly laterally, and elytra with papillate margin and surface and numerous thorn- to spine-shaped macrotubercles; and (2) *Antarctinoe spicoides* with unidentate neurochaetae, long, stout notochaetae projecting dorsally to meet mid-dorsally with pin-like tip (large specimens with additional slender and capillary notochaetae), and elytra without papillae at margin and surface and thorn-shaped macrotubercles scattered only in posterior half of elytron.

According to our observations the occurrence of additional slender and capillary notochaetae is size-related. The holotype of *Harmothoe (Eunoe) spica spicoides* is a medium-sized specimen with a width of 8 mm having no additional notochaetal types. But we found also specimens of about the same size with few capillary and slender notochaetae; all larger specimens showed numerous additional notochaetae.

Among the larger specimens we found males and females as well, thus, the occurrence of different kinds of notochaetae is not due to sexual dimorphism. Sex determination proved to be rather difficult since the specimens were not in a sexually reproductive stage, the dissection of the gonads revealing mostly immature sperm or eggs.

*Distribution*

Widely distributed in the Antarctic region: South Shetland Islands (type locality), Elephant Island (Hartmann-Schröder and Rosenfeldt 1990), Weddell Sea (cf. also Stiller 1996), Bouvet and Bridgman Island (Augener 1932b); King George Land (Ehlers 1913; Monro 1939), Commonwealth Bay (Benham 1921).

*Antarctinoe ferox* (Baird, 1865) comb. nov.

(Figures 12A–K, 13B)

*Hermadion ferox* Baird 1865, p 197; Monro 1929, p 163; Monro 1930, p 40, Figure 6; Knox and Cameron 1998, p 33, Figures 65–68.*Harmothoe ferox*: Uschakov 1962, p 160; Averincev 1972, p 122, Table 1.*Hermadion rouchi* Gravier 1911a, p 312; Gravier 1911b, p 82, Plate 3 Figures 33–34, Plate 4 Figures 45–51, Plate 7 Figure 74.*Eunoe hubrechtii*: Day 1967, p 62, Figure 1.7.q–v (part). [not *Evarne hubrechtii* McIntosh, 1900]*Harmothoe crosetensis* type D: Averincev 1972, p 119, Table 1. [not *H. crosetensis* (McIntosh, 1885)]*Harmothoe crosetensis*: Stiller 1996, p 35, Plate 16 (part). [not *H. crosetensis* (McIntosh, 1885)]*Eunoe spica* Hartman 1978, p 134, Figure 6a–e; Stiller 1996, p 33, Plate 13. [new synonymy]*Type material**Hermadion ferox*: BMNH 1971.242, ?holotype (or syntype, not clearly stated in Baird 1865; cs, in bad shape), Antarctic Expedition, 74.5°S, 175.5°E, Ross Sea, 300 fathoms.*Eunoe spica*: USNM 46582, holotype (checked by K. Fauchald, USNM, personal communication), International Weddell Sea Oceanographic Expedition, USCGS “Glacier”, St. 69-1, 74°28.1'S, 30°31.7'W, 24 February 1969, 513 m, anchor dredge.*Additional material*. Three spms (2 cs, 1 af), ANT XIII/3, 39/001, GSN; one spm. (cs), ANT XIII/3, 39/005, EBS; six spms (2 cs, 4 af), ANT XIII/3, 39/006, AGT; nine spms (4 cs, 5 af), ANT XIII/3, 39/011, GSN; 19 spms (11 cs, 8 af), ANT XIII/3, 39/012, GSN, one spm., SMF 15166 (cs), ANT XIII/3, 39/012, GSN; four spms (cs), ANT XIII/3, 39/012, GSN; one spm. (af), ANT XIII/3, 39/013, GSN; 18 spms (11 cs, 7 af), ANT XIII/3, 39/029, BPN; one spm. (cs), ANT XV/3, 48/197, AGT.*Diagnosis*

Elytral margin smooth; elytral surface with conical microtubercles with blunt to pointed tip; thorn-shaped macrotubercles scattered in posterior half of elytron. Long, stout notochaetae projecting dorsally to meet mid-dorsally with blunt tip and shaft usually smooth. Large specimens without additional slender and capillary notochaetae. Neurochaetae falcate, unidentate.

*Description*Since the holotype of *Hermadion ferox* is in bad shape, the description is based on an additional specimen from the Weddell Sea (SMF 15166).

Body with 38 segments. At anterior end (Figure 12A), prostomium bilobed, with cephalic peaks; ceratophore of median antenna in anterior notch, style of median antenna smooth, distal part broken; lateral antennae inserted ventrally, styles missing; anterior pair of eyes situated dorsolaterally on widest part of prostomium, posterior pair dorsally near hind margin of prostomium; palps slightly papillate, tapering.

Tentaculophores inserted laterally to prostomium, each with a single notochaeta and a dorsal and ventral tentacular cirrus with styles missing. Second segment with first pair of elytra, biramous parapodia, and long buccal cirri.

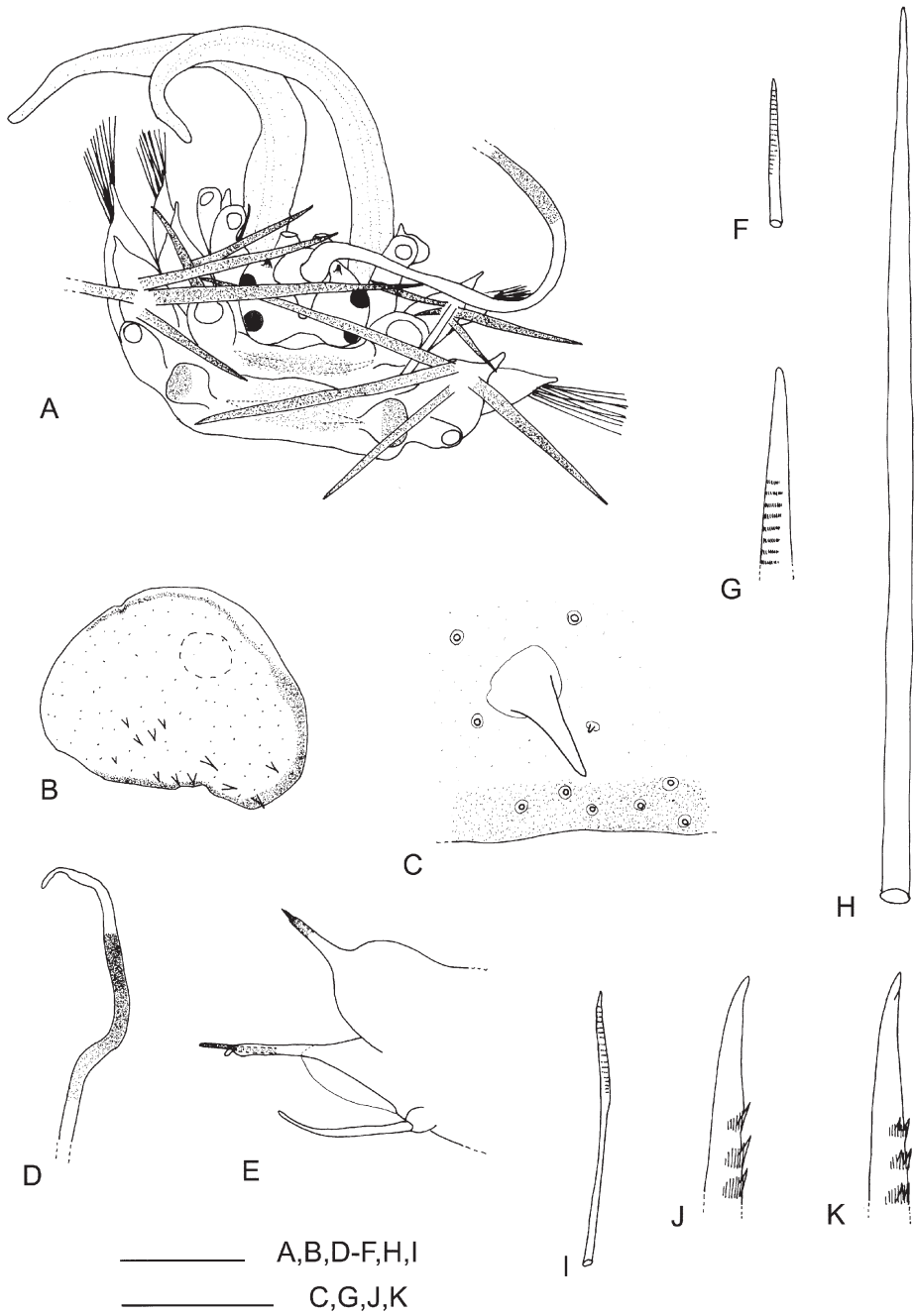


Figure 12. *Antarcticoloe ferox* (SMF 15166). (A) Anterior end; styles of antennae and cirri missing, except for median antenna, but here tip broken; (B) right elytron from unknown segment in mid-body region; (C) detail of posterior margin of same; (D) distal half of dorsal cirrus from mid-body region; (E) right elytragerous parapodium of segment 15, anterior view; (F) short, stout notochaeta; (G) tip of same; (H) long, stout notochaeta; (I) middle neurochaeta; (J) tip of same; (K) tip of middle neurochaeta with subdistal slit. Scale bars: 2 mm (A, B, D-F, H, I); 250  $\mu$ m (C, G, J, K).

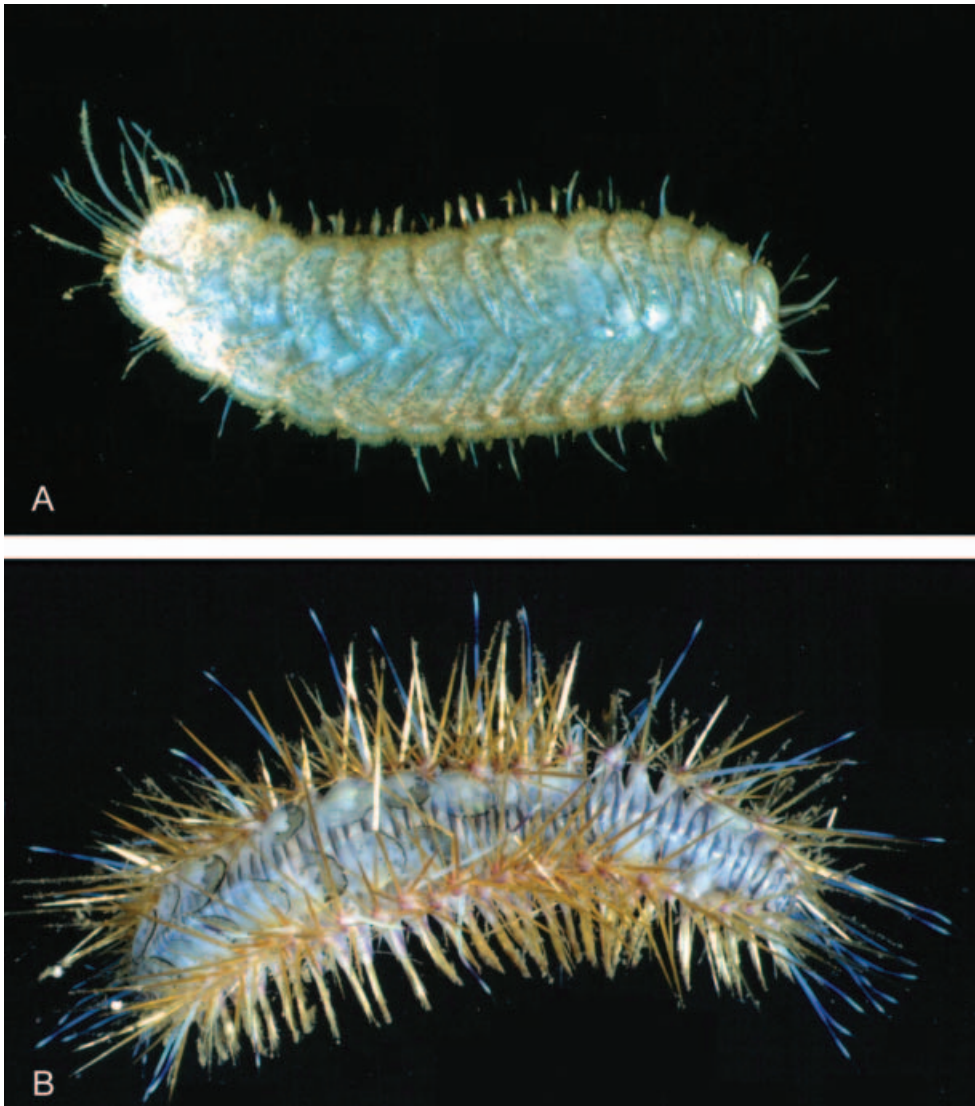


Figure 13. (A) Living specimen of *Harmothoe fuliginosa*; (B) living specimen of *Antarcticoe ferox*. Photographs: Martin Rauschert (AWI, Berlin).

Fifteen pairs of elytra, covering dorsum (in large specimens dorsum in mid-body region uncovered), on segments 2, 4, 5, 7, then on every second segment to 23, 26, 29, 32; last six segments cirriferous; elytral margin smooth; elytral surface with conical microtubercles with blunt to pointed tip; thorn-shaped macrotubercles scattered in posterior half of elytron, mainly near outer lateral and posterior margin (Figure 12B, C). Cirriferous segments with distinct, globular dorsal tubercles; dorsal cirri with cylindrical cirrophore and smooth style, slightly inflated subdistally, then abruptly tapering (Figure 12D). Ventral cirri with smooth, tapering style.

Parapodia biramous; notopodia of about same size as neuropodia with elongate acicular lobe; neuropodia with elongate prechaetal acicular lobe with digitiform supra-acicular



process; neuropodial postchaetal lobe shorter than prechaetal lobe, rounded; tips of noto- and neuroacicula penetrating epidermis (Figure 12E).

Notochaetae of two kinds independent of size of individual: short, stout notochaetae with rows of spines and more or less pointed tip, and long, stout notochaetae projecting dorsally to meet mid-dorsally with blunt tip and shaft usually smooth (in smaller specimens few rows of spines present distally) (Figure 12F–H).

Neurochaetae falcate with unidentate tip; one or two neurochaetae with subdistal slit suggesting presence of secondary tooth (but never distinctly bidentate as in *Harmothoe*) (Figure 12I–K).

Nephridial papillae distinct from segment 6.

### Measurements

Additional specimen (SMF 15166), cs, figured herein (Figure 12): L 44 mm, W 11 mm for 38 segments. Largest additional specimen found L 50 mm, W 15 mm for 42 segments; smallest found L 17 mm, W 5 mm for 39 segments.

### Remarks

Although the type specimen of *Hermadion ferox* Baird, 1865 is in bad shape with no remaining elytra, the notochaetal characters together with the description given in Baird (1865) leave no doubt regarding its authenticity. Unfortunately Baird does not clearly state if his description is based on a single specimen, i.e. the holotype, or on syntypes.

The type material of *Hermadion rouchi* Gravier, 1911 is not available in the MNHN in Paris and thus probably lost (cf. F. Pleijel, personal communication). But the description and figures by Gravier (1911b) are sufficient to synonymize this species with *Antarctinoe ferox*. This was also recognized by Monro (1929) who was the first to synonymize *Hermadion rouchi* with *Hermadion ferox*, and by Uschakov (1962) who considered the species to belong to the genus *Harmothoe*.

According to Monro (1930), *Hermadion ferox* is difficult to differentiate from *Harmothoe crosetensis sensu* Bergström (1916) which is considered herein to be synonymous with *Harmothoe acuminata* Willey, 1902 (see above). But Willey's description and figures of his subspecies *Harmothoe crosetensis acuminata* are rather confusing. Our investigations of the respective type material showed that *Harmothoe acuminata* is easily distinguished from *Antarctinoe ferox*, the former having some middle neurochaetae with distinctly bidentate tip, short and long notochaetae orientated mostly laterally, and elytra with papillate margin and numerous elongate, pointed, spine-shaped macrotubercles, while *A. ferox* differs in its unidentate neurochaetae, very long and stout notochaetae orientated mostly mid-dorsally, and elytra with smooth margin and smaller, curved, thorn-shaped macrotubercles.

Besides the similar elytral ornamentation, *Antarctinoe spicoides* and *A. ferox* share the same type of short notochaetae and the same characteristic orientation of the very long, stout notochaetae pointing mostly mid-dorsally. But *A. spicoides* can be clearly separated from *A. ferox* by the presence of pin-like tips in the long, stout notochaetae and larger specimens showing additional slender and capillary notochaetae, while *A. ferox* is characterized by only a single kind of long, stout notochaetae with blunt tip and usually smooth shaft.

Within the specimens from station ANT XIII/3, 39/012 we observed two different morphs independent of the size of the individuals. Some specimens show pigmented

transverse bands on the dorsum and at the elytral margin (in ethanol) together with very long, stout notochaetae extending to the elythrohores or dorsal tubercles of the opposite side (the holotype and the figured specimen belonging also to this morph). Other specimens from the same station are more or less unpigmented (in ethanol) and have long stout notochaetae extending only to about the mid-dorsum. Since the specimens were not sexually reproductive (i.e. dissection of gonads showed no clear distinction between immature sperm or eggs) we do not know if the occurrence of the two morphs is due to sexual dimorphism.

### Distribution

Antarctic region: Marguerite Bay (Gravier 1911a, 1911b), Weddell Sea (cf. also Hartman 1978; Stiller 1996), and Ross Sea (type locality).

### Identification key to the species covered herein

1. Neurochaetae unidentate; stout notochaetae very long, mostly orientated dorsally to meet mid-dorsally; longest notochaetae distinctly longer than longest neurochaetae: *Antarctinoe* gen. nov. . . . . 2
- Neurochaetae bidentate or bi- and unidentate; long, stout notochaetae mostly orientated laterally; longest notochaetae never distinctly longer than longest neurochaetae: *Harmothoe* . . . . . 3
2. Long, stout notochaetae with rows of spines distally and pin-like tip; large specimens with additional fine, slender notochaetae with pointed to pin-like tip, and capillary notochaetae with pointed tip . . . *Antarctinoe spicoides* (Figures 10, 11)
- Long, stout notochaetae with blunt tip and shaft usually smooth; large specimens without additional slender and capillary notochaetae . . . *Antarctinoe ferox* (Figure 12)
3. Inner posterior margin of elytra with mound . . . . . 4
- Inner posterior margin of elytra without mound . . . . . 5
4. Elytral mound with very long, filiform papillae, distinctly longer than those at adjacent margin; few conical to cylindrical macrotubercles occurring near posterior elytral margin . . . . . *Harmothoe fullo* (Figure 4)
- Elytral mound with short papillae, of same size as those at adjacent margin; spherical macrotubercles present at the centre of elytron and near posterior margin . . . . . *H. antarctica* (Figure 5)
5. Elytra without distinct macrotubercles . . . . . 6
- Elytra with macrotubercles . . . . . 7
6. Anterior part of elytra covered with conical microtubercles of about same size (number of microtubercles and surface covered variable); outer lateral and posterior elytral margin with few, scattered papillae . . . . . *Harmothoe magellanica* (Figures 6, 7)
- Elytral surface densely covered by conical microtubercles with blunt tip in anterior half, becoming gradually larger towards posterior margin, with tips blunt to slightly multifid; outer lateral and posterior elytral margin with numerous papillae . . . . . *Harmothoe crosetensis* (Figure 8)
7. Elytral macrotubercles thorn- to spine-shaped . . . *Harmothoe acuminata* (Figure 9)
- Elytral macrotubercles not thorn- or spine-shaped . . . . . 8

8. Outer elytral margin with dense fringe of long, filiform papillae; posterior half of elytra with numerous, globular to conical macrotubercles . . . *Harmothoe fuliginosa* (Figure 3)  
 – Outer elytral margin with scattered, short papillae; elytral macrotubercles otherwise 9
9. Elytral macrotubercles pyriform to globose with or without distal papilla, occurring near outer and posterior margin . . . *Harmothoe exanthema* (Figure 2)  
 – Elytral macrotubercles conical; occurring mainly near posterior margin . . .  
 . . . . . *Harmothoe spinosa* (Figure 1)

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