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THREE NEW SPECIES OF ORIBATID MITES (ACARINA, ORIBATIDA: HAPLOCHTHONIIDAE) FROM THE ANTARCTIC CONTINENT

ТРИ НОВЫХ ВИДА ПАНЦИРНЫХ КЛЕЩЕЙ (ACARINA, ORIBATIDA: HAPLOCHTHONIIDAE) С АНТАРКТИЧЕСКОГО КОНТИНЕНТА

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Ключевые слова: панцирные клещи, орибатиды, мхи, Антарктика

ABSTRACT

Three new species, *Haplochthonius antarcticus, H. maitri* and *H. longisetosus,* collected from mosses and soil in the Antarctic Continent are described and illustrated. The family Haplochthoniidae is recorded for the first time from Antarctica.

РЕЗЮМЕ

Три новых вида *Haplochthonius antarcticus, H. maitri* и *H. longisetosus*, собранные во мхах и в почве на Антарктическом континенте, описаны и проиллюстрированы. Семейство Haplochthoiniidae впервые зарегистрировано в Антарктике.

INTRODUCTION

Oribatid mites inhabiting soil and mosses are known from the Antarctic continent through expeditions in the mainland Antarctica, the offshore and sub-antarctic islands and the Southern Ocean itself. All available data on the Antarctic mites have been collated by Pugh [1993], which listed 104 species of oribatid mites.

The specimens described in the present work were collected by the third author from the mainland Antarctica during XVII Indian Scientific Expedition to Schirmacher Oasis in the Antarctic Continent during December 1997 to April 1998.

The Schirmacher Oasis is situated between shelf and land ice having an ice free area with lakes, lagoons, ponds, water streams in the dome-shaped hills of Queen Maud land of the east Antarctica. The Oasis is about 16 km long and 0.5 to 3.5 km wide covering an area of about 36 sq. km of solid rocks of the Precambrian origin. The elevation of this Oasis ranges from 0 to 228 m. with an average of about 100 m lying between 70° 34′ S and 70° 77′ S latitude and 11° 22′ E and 11° 55′ E longitude and 90 km south of Princess Astrid coast of the East Antarctica, where the Indian Station "Maitri" is located. The average annual temperature of the station and its surroundings recorded equals 10.5° C for the period from 1961 to 1980.

The moss and soil samples were collected from different sites of the Schirmacher Oasis by using metal shovel and kept in polyethylene bags. The bags containing samples were tightly closed with rubber bands and stored in a fridge in the ship to avoid evaporation. The samples were extracted with the Tullgren funnel extraction apparatus immediately after reaching the Acarology laboratory, Zoological Survey of India, Calcutta. While studying the collected mite samples the authors came across several specimens of oribatid mites and identified these as new species *viz. Haplochthonius antarcticus, H. maitri* and *H. longisetosus* belonging to the family Haplochthoniidae. It is also interesting to note that the family is reported for the first time from the Antarctic Continent.

The types of new taxa are deposited in the National Zoological Collection (NZC), Zoological Survey of India, Calcutta.

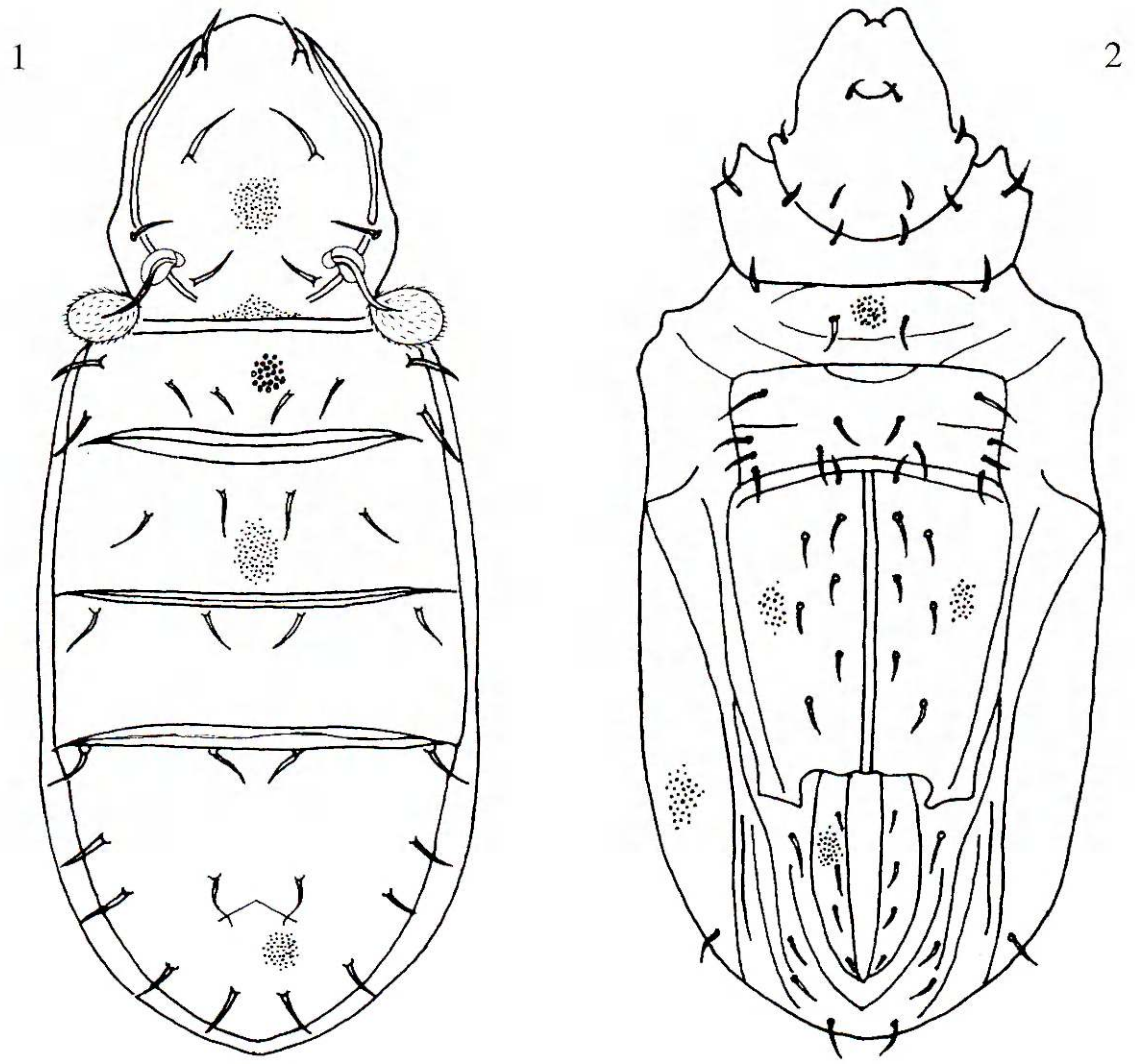
All measurements are given in micrometers.

Haplochthonius antarcticus Sanyal, Basak *et* Barman, sp. n.

Figs. 1–2.

Color of the body and legs pale-greyish. Body length 329, width 133.

Prodorsum (Fig. 1). Prodorsum rounded, covered with secretions. Rostrum broad and round, rostral setae short (16.45), placed on short apophyses, nearly half of their mutual distance, strong, pointed, directed inward, tips with considerable gap. Lamellar setae situated far posteriad, short (19), slightly longer than half of their mutual dis-



Figs. 1–2. *Haplochthonius antarcticus* **sp. n.,** adult female: 1 — dorsum; 2 — venter.

tance, slightly broad at the base and pointed distally, directed upward and inward, reaches nearly half the distance between rostral and lamellar setae. Interlamellar setae placed below the bothridium, similar to lamellar setae in appearance, but slightly shorter (15), directed inward. Exopseudostigmatic setae inserted lateral to bothridium, short (14), thin, directed inward. A continuous chitinous ridge originating from the side of each apophysis of rostral setae runs down parallel to the lateral margin of prodorsum and extends up to the base of interlamellar setae. Bothridium cup-shaped. Sensillus (42) with short, thin stalk and big round head set with numerous short bristles.

Notogaster (Fig. 1). Notogaster sub-cylindrical, punctate, covered with secretions, consisting of minute granules. Notogaster divided into 4 parts by 3 transversal lines which are thick in the middle and narrow down on either side, reaching the lateral margin but not touching the latter. Notogastral setae: 15 pairs, segment I with 8 setae, 2 pairs in the middle of notogaster placed in between dorsosejugal suture and first transversal line, 2 pairs on either side near lateral margin, placed one below the other; segment II with 4 setae: one pair in the middle of notogaster placed nearer to first transversal line and other pair on either side placed in the middle of first and second transversal lines; 4 setae on segment III, two in the middle of notogaster and two near lateral line, all setae placed very close to second transversal line; segment IV with 7 pairs of setae: one pair placed in the middle of notogaster touching third transversal line, extend downward and curved inward, one pair placed far below the transversal line and almost in the middle of notogaster, extends downward and curved inward, 10 setae originate along the dorsolateral margin, directed outward. Considerable gaps exist between the setal tips and bases of two consecutive segments. An inverted "v'-shaped fine line in between

setae h_1. Notogastral setae short (14.10–21.15), setae slightly broad near base with fine distal end, all setae covered with secretions.

Ventral Region (Fig. 2). Epimeres III and IV fused, epimeral setal formula 3–2–2–4, epimeral plate broad. Genital plate (94.00) with 7 pairs of setae. Genital setae minute, fine, smooth. Anogenital plate (70.50) with 4 pairs of anal and 4 pairs of adanal setae. Anal setae short. Adanal setae longer than anal setae, fine, smooth, all of almost equal length.

Legs. Legs I to IV, each with one, well-developed claw.

Type material . Holotype adult female, ex moss mixed with soil, Lake 26, about 5 km east of Maitri, Antarctic Continent, 25.01.1998, coll. R. P. Barman. Paratype: 1 adult female, ex moss mixed with soil, Epsilon lake, about 10 km west of Maitri, Antarctic Continent, 7.01.1998, coll. R. P. Barman.

DIFFERENTIAL DIAGNOSIS

The new species, *H. antarcticus,* from the Antarctica clearly differs from all the other known species of the genus *Haplochthonius* mainly in the round shape of sensillus, length of prodorsal and notogastral setae and corresponding gaps in between the tip of upper notogastral setae and base of the setae placed immediately below which is large in the new species in comparison to the gaps in all other species under the genus (Table 1).

Haplochthonius maitri Sanyal, Basak et Barman, sp. n.

Figs. 3–4.

Color of the body and legs pale-greyish. Body length 320.00, width 157.45.

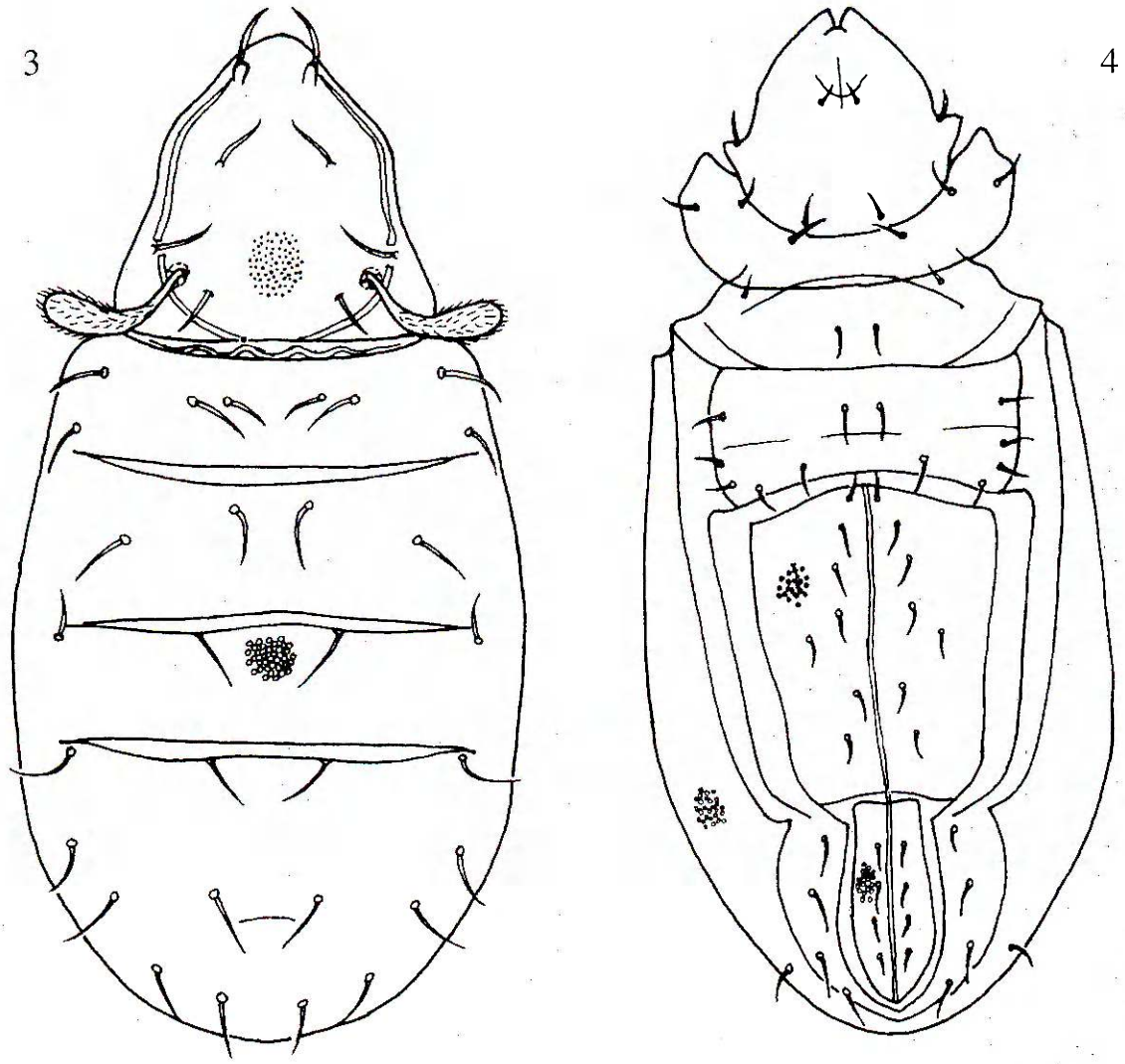
Prodorsum (Fig. 3). Prodorsum rounded, covered with secretions. Rostrum broad and round, rostral setae long (22.33), on small apophyses, placed apart and slightly shorter than their mutual distance, strong, almost of equal thickness, directed forward and curved inward and tend to meet medially but considerable gap exists. Lamellar setae situated far posteriad, long (21.15), slightly longer than half of their mutual distance, slightly broad at the base and distal end fine, directed upward and inward, shightly longer than half of the mutual distance between rostral and lamellar setae. A prominent continuous chitinous ridge extends between the base of apopohyses of rostral seate and exopseudostigmatic setae on each side of the prodorsum. Two chitinous ridges originating from bothridium on both sides extend downward and touch dorsosejugal suture medially. Interlamellar setae situated below bothridium and terminate a little above the dorsosejugal suture, short (18.80), fine, directed downward and curved outward. Exopseudostigmatic setae inserted lateral to the bothridium, short, thin, directed inward. Sensillus long (54.05), flat, club-shaped, being broadest at the distal end and set with numerous short bristles. Undulating chitinous ridge on dorsosejugal suture.

Notogasrter (Fig. 3). Notogaster sub-cylindrical, having the appearance of closely packed foveolae and covered with secretion. Notogaster divided by 3 transversal lines into 4 parts; the lines thick in the middle and narrow down on either side reaching the lateral margins, but not touching the latter. 15 pairs of notogastral setae; segment I with 8 setae: 2 pairs in the middle of notogaster, inner pair shorter than the other pair, placed in almost middle between dorsosejugal suture and first transversal line, 2 on either side of the lateral margin, one near dorsosejugal suture extends outward beyond the lateral margin and other near first transversal line extends downward into the second segment; 4 setae on segment II : one pair in the middle, placed above near first transversal line, other pair on either side placed almost middle in between two transversal lines; segment III with 4 setae: all placed on second transversal line, outer pair extend upward into the second segment, inner pair extend downward and reaches up to the middle of segment three; segment IV with 7 pairs of setae: one pair placed in the middle of notogaster on the third transversal line extend downward and curved inward, one pair placed far below the transversal line and almost in the middle of notogaster, extends downward and curved inward, 10 setae originate along the dorsolateral margin. Considerable gaps exist between setal tips and bases of two consecutive segments. Notogastral setae stout, moderately long (16.45 to 25.85), more or less straight, setae along the dorsolateral margin curved outward, setal base broad and distal end fine, all covered with secretion.

Ventral region (Fig. 4). Epimeres III and IV fused, epimeral setal formula 3–2–2–4, epimeral plate broad. Genital plate (99) with 7 pairs of setae. Genital setae very short, fine, smooth. Anogenital plate (70.5) with 4 pairs of anal and 4 pairs of adanal setae. Anal setae short, fine. Adanal setae longer than anal setae, fine and almost of equal length.

Legs. All legs monodactylous.

Type material. Holotype adult female, ex moss mixed with soil, Lake 27 (Russian Lake), about 6 km east of Maitri, Antarctic Continent,



Figs. 3–4. *Haplochthonius maitri* **sp. n.**, adult female: 3 — dorsum; 4 — venter.

27.01.1998, coll. R. P. Barman. Paratypes: 1 adult female, same data as holotype; 1 adult female, ex moss mixed with soil, Epsilon lake, about 10 km west of Maitri, Antarctic Continent, 7.01.1998, coll. R. P. Barman; adult female, ex moss mixed with soil, Lake 55, about 12 km west of Maitri, Antarctic Continent, 8.01.1998, coll. R.P. Barman.

DIFFERENTIAL DIAGNOSIS

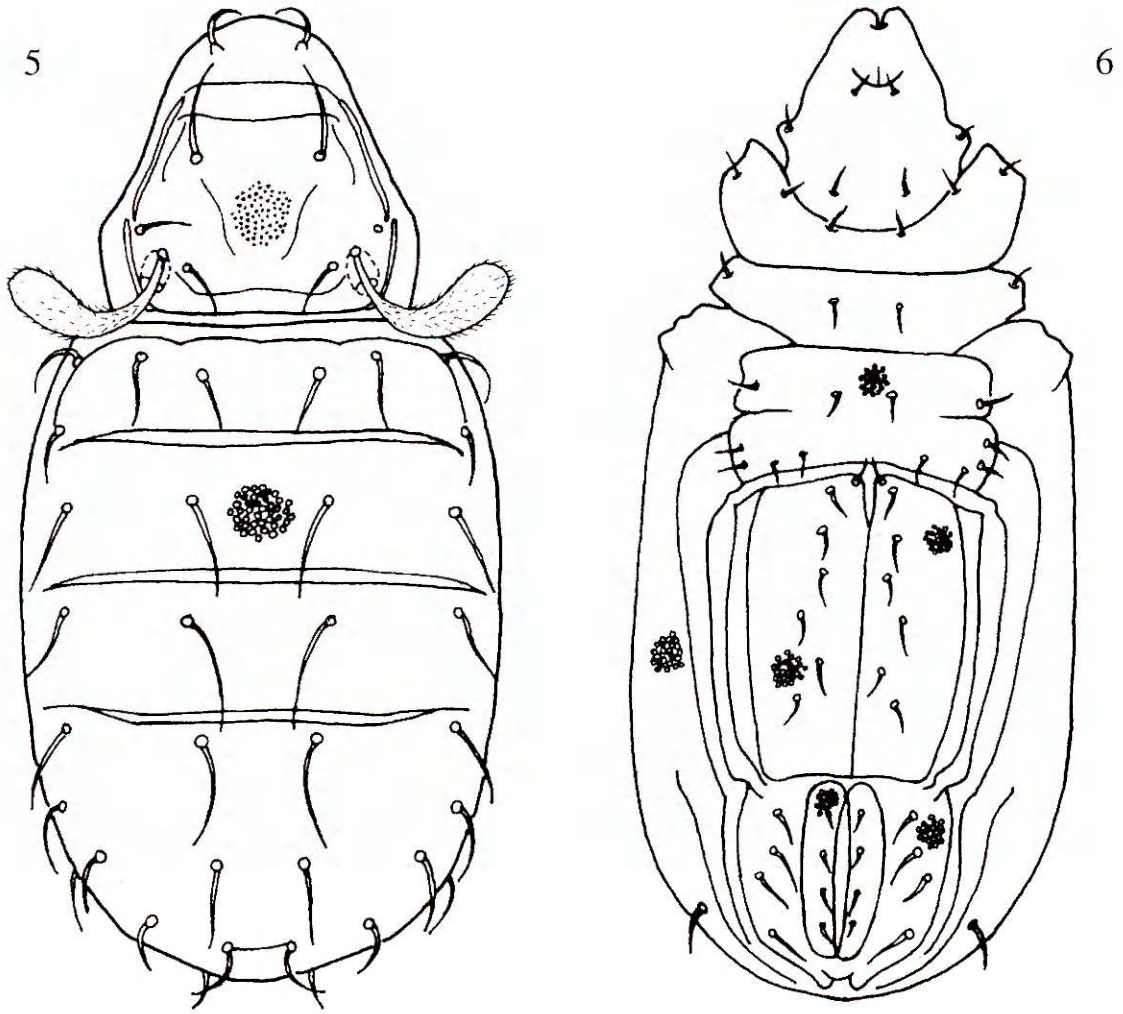
The new species from Antarctica agrees with *H. clavatus* described by Hammer [1958] from Argentina in having club-shaped sensillus. However the new species can be separated from the Hammer's species by the presence of chitinous wavy line on dorsosejugal suture, length of notogastral setae and closely packed foveolae on notogaster. The Antarctic species also shows similarities with *H. simplex* described by Willmann [1930] in length of lamellar, interlamellar and notogastral setae, gap between lamellar setal tip and insertion point of rostral setae, but differs markedly from the latter species in the shape of sensillus, chitinous wavy line on dorsosejugal suture and longer gaps in between tips of upper notogastral setae and base of the lower setae. The new species also shows similarity with *H. antarcticus* n. sp. but differs in the presence of wavy line on dorsosejugal suture, larger notogastral setae and packed foveolae on notogaster (Table 1).

Haplochthonius longisetosus Sanyal, Basak et Barman, sp . n.

Figs. 5–6.

Body and legs pale-greyish in color. Body length 282, width 131.

Prodorsum (Fig. 5). Prodorsum rounded, covered with secretions. Rostrum broad and round, rostral setae on small apophyses, short (16.45), fine, directed outward and curved inward, touching the rostrum, distinctly shorter than their mutual



Figs. 5–6. *Haplochthonius longisetosus* **sp.n.,** adult female: 5 — dorsum; 6 — venter.

distance, covered with secretions. Lamellar setae situated far posteriad, long (28.20), distinctly shorter than their mutual distance, slightly broad at the base, distal end fine, directed forward and almost reaching the base of the apophyses of rostral setae. A little in front of the lamellar setae a transverse line which continues backwards laterally to the lamellar setae. A little further anteriad a distinct sharp line present. Interlamellar setae situated below bothridium and a little above dorsosejugal suture, shorter (15) than lamellar setae, fine, directed downward and curved inward, touching dorsosejugal suture. A chitinous ridge originating a little in front of lamellar setae runs downward parallel to the lateral margin of prodorsum on each side and extends with a small gap near exopseudostigmatic setae upto the dorsosejugal suture. Exopseudostigmatic setae placed lateral to bothridium, short, thin, directed inward. Sensillus long (47), flat, club-shaped, directed outward, being broadest at distal end and having numerous short bristles.

Notogaster (Fig. 5). Notogaster sub-cylindrical, giving the appearance of closely packed foveolae and covered with secretion. Notogaster divided by 3 transversal lines into 4 parts; the lines thick in the middle and narrow down on either side, reaching the lateral margins but not touching the latter. Fifteen pairs of notogastral setae; segment I with 8 setae: 2 pairs placed almost in the middle of notogaster and a little below the dorsosejugal suture and touching the first transversal line, 2 on either side on lateral margin, one situated near dorsosejugal suture extending outward beyond the lateral margin and curved inward and the other being placed near the first transversal line, extending downward to the second segment; 4 setae on segment II: one pair in the middle placed in between two transversal lines, extending downward little beyond the second transversal line, other pair placed on either side near lateral margin with tips touching the second transversal line, all setae long and almost touching the base of the setae of the next

Table 1. Diagnostic morphological features of species of the genus *Haplochthonius*
Таблица 1. Диагностические признаки видов рода *Haplochthonius*

Species	Body length	Rostral setae	Rostral apophyses	Length of prodorsal setae	Sensillus	Body cover	Notogastral setal length & shape	Setae *h1* / *h2*	Genital setae
Haplochthonius simplex Willmann, 1930	270–281	Very fine, smooth, as long as their mutual distance	Very small	Short, very thin, apices of *ro* touching each other, tip of *la* far apart from the base of *ro*, apices not crossing each other	Elliptical	Minutely granulated	Thin, setiform, all setal end far above the respective suture below	*h1* placed far apart,same as distance between *h1–h2*	Short
H. clavatus Hammer, 1958	–	Strong, equally thick throughout, as long as their mutual distance	Prominent, connected by a line	Long, tips crossing each other, tip of *la* nearly touching the base of *ro*	Slightly dilated, broadest near the tip	Minutely granulated	Thick, moderately long, *c* series surpass the suture and *d* series touching the suture below	*h1* placed far apart, distance between *h1* almost same as between *h1– h2*	Very minute
H. variabilis Wallwork, 1972	247–275	Thin, simple, as long as their mutual distance	Very small	Moderately long, simple	Elliptical	Minutely granulated	Thin, setiform, *c, d* and *e* series surpass the suture below to a great extent	Distance between *h1–h1* smaller than distance between *h1–h2*	Right plate with 5 setae
H. sanctaeluciae Bernini, 1973	255–270	Widening, smooth	Prominent, connected by a line	Long, robust, apices crossing each other, tip of *la* touching base of *ro*	Clavate	Minutely granulated	Widening or knife blade-like, *c* and *d* series nearly touching the suture below	*h1* nearer to each other than distance between *h1–h2*, *h2* near *ps3*	Very minute
H. intermedius Chakrabarti et al., 1977	241–247	Bilaterally barbed, nearly as long as their mutual distance	Not discernible	Moderately long, except *ro* all simple, smooth	Narrow, club-shaped	Minutely granulated	Simple, *c, d* and *e* series extend slightly beyond the suture below	*h1* far apart, *h1–h1* almost same as *h1–h2*	Proximal setae slightly longer, others minute
H. antarcticus sp.n.	323–332	Nearly half of their mutual distance, thin	Very prominent	Short, fine, tip of *ro* not touching each other, tip of *la* not touching the base of *ro*	Short, thin stalk, with big round head	Minutely granulated	Thin, setiform, all setae ends far above the suture below	*h1* far apart, *h1–h1* almost same as *h1–h2*, an inverted 'V'-shaped line between *h1*	Short, simple
H. maitri sp.n.	310–322	Long, slightly shorter than their mutual distance, pointed	Very prominent	Short, fine, tip of *la* not touching the base of *ro*	Long, flat, club-shaped	Foveolated	Thin, setiform, *c, d* and *e* series end far above the suture below	*h1* far apart, *h1–h1* little, smaller than *h1–h2*	Short, simple
H. longisetosus sp.n.	275–284	Short, fine, shorter than their mutual distance	Small	Strong, *la* long nearly touching the base of *ro*	Long, flat, club-shaped	Foveolated	Thick, strong, *c, d,* and *e* series extend slightly beyond the suture below	*h1* far apart, *h1–h1* little smaller than *h1–h2*	Short, simple

segment; segment III with 4 setae: 2 middle setae placed near to second transversal line, extending downward little beyond the third transversal line and almost touching the bases of setae of the next segment, 2 setae near lateral margin placed near to second transversal line with tips not reaching the transversal line below; segment IV having 2 pairs of setae in the middle of notogaster of which upper pair longer than the lower one and placed near upper transversal line, the setae touches the base of the setae placed below, 10 setae originate along the dorsal margin. Notogastral setae long (1880 to 37.00), middle setae longer, setal base broad, distal end fine, setae along the dorsal margin directed outward and curved inward, all setae covered with secretions.

Ventral Region (Fig. 6). Epimeres III and IV fused, epimeral setal formula 3–2–2–4, epimeral plates broad. Genital plate (94) with 7 pairs of setae. Genital setae very short, fine, smooth. Anogenital plate (59) with 4 pairs of anal and 4 pairs of adanal setae. Anal setae short, fine. Adanal setae longer than anal setae, fine and all of almost equal length.

Legs. All legs monodactylous.

Type material: Holotype adult female, ex moss mixed with soil, Lake 26, about 5 km east of Maitri, Antarctic Continent, 25.01.1998, coll. R.P. Barman. Paratype: 1 adult female, same data as holotype.

DIFFERENTIAL DIAGNOSIS

The species from Antarctica shows some resemblance with *H . clavatus* Hammer, 1958 in general body shape, nature of prodorsal and notogastral setae and sensillus. However the present Antarctic species clearly differs from Argentinian species in having closely packed foveolae on notogaster, shorter and thin rostral setae; downwardly extended interlamellar setae; comparatively broader head of sensillus, longer notogastral setae (19 to 37), tip of which extending below the transversal lines and almost touching the base of the setae placed below (Table 1).

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