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Studies on the Free-Living Marine Nematodes from Hokkaido, IV[1)]

By

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(With 13 Text-figures)

Since my study of phytal animals in the *Sargassum* region was started out at Oshoro Bay, Hokkaido, in 1973, many taxonomic and ecological results were obtained and some of which were reported: general account of whole phytal animals (Kito, 1975) and phenology of harpacticoid copepods (Kito, 1977a). In the course of the study a special interest in free-living marine nematodes among phytal animals was taken and I presented a dissertation on taxonomy and ecology of phytal marine nematodes.

The present paper deals with thirteen species, of which seven are new to science and six are new to Japan, among the nematode species reported in taxonomic part of the dissertation: each one new species belonging to the genus *Onchium* (Family Leptolaimidae), *Pseudaraeolaimus* (Family Axonolaimidae), *Graphonema*, *Dichromadora* and *Neochromadora* (Family Chromadoridae) and two new species of the genus *Paracanthonchus* (Family Cyatholaimidae), and each one known species of the genus *Rhabditis* (Family Rhabditidae), *Theristus* (Subgenus *Theristus*; Family Monhysteridae), *Monoposthia* (Family Monoposthiidae) and two known species of the genus *Monhystera* (Family Monhysteridae). Among the other phytal nematodes untreated in this paper, some species have already reported in the previous papers (Kito, 1976, 1977b, 1978) and the others will be treated elsewhere.

All the specimens were collected from among *Sargassum confusum* Agardh in Oshoro Bay on the Japan Sea coast of Hokkaido, northern Japan (see Kito, 1975) and the type series are deposited in the Museum of the Zoological Institute, Faculty of Science, Hokkaido University.

Before going further, I would like to express my sincere gratitude to Professor Mayumi Yamada, Hokkaido University, for his kind guidance and reading the manuscript.

1) This paper is based upon a part of the dissertation presented to the Faculty of Science, Hokkaido University, Sapporo (1980).

Abbreviations

L=body length; mbd=maximum body diameter; eso=esophageal length; t=tail length; v=distance of vulva from anterior extremity; hd=head diameter at the level of cephalic setae; bd=body diameter at the base of esophagus; vd=body diameter at the level of vulva; ad=anal (cloacal) body diameter; cs=length of long cephalic seta, or longer+shorter; oc(ps)=distance of ocelli (pigment spots) from anterior; nr=distance of nerve ring from anterior; ep=distance of excretory pore from anterior; vg=distance of posterior end of ventral gland from anterior; spic=spicule length, measured along the meddian line and the length of chord in parentheses; gub=gubernaculum length, measured along the meddian line, or lateral piece (chord)+dorsal piece. All measurements are in micra.

Family **Rhabditidae**

Rhabditis marina Bastian, 1865

(Fig. 1)

Measurements

Males (2): L=886; 985, mbd=35; 43, eso=171; 173, t=36; 37, hd=8; 9, bd=29; 34, ad=19; 23, nr=127; 112, ep= –; 150, spic=32; 37, gub=20; 19.

Females (2): L=979; 1270, mbd (=vd) =43; 57, eso=184; 195, t=68; 55, v =514; 668, hd=9; 10, bd=33; 47, ad=19; 26, nr=119; 132, ep=147; 154.

Male (♂-2). Cuticle apparently smooth but with fine transverse striations; lateral fields present from posterior part of buccal cavity to anal region, about one-seventh of corresponding body diameter at middle of body; number of incisures indistinct (6?). Head (Fig. 1–2)[1] with six minute labial papillae and two circles of short cephalic setae (6+4), less than 1 μm long. Amphids obscure, small, ovate and opening at level of outer cephalic setae. Buccal cavity typical, 17 μm deep (22 μm in ♂-1) from anterior extremity to base of telostome. Esophagus (Fig. 1–1) with a distinct middle bulb at 54% of esophageal length from anterior and a posterior basal bulb; nerve ring located between both bubls. Excretory pore opening just anterior to the posterior bulb of esophagus, gland indistinct. Testis single and reflexed at 139 μm behind esophageal end. Spicules (Fig. 1–3) equal, identical and double in structure; outer structure proximally cephalate and the following part well swollen, inner one almost equal in diameter and slightly arcuate. Gubernaculum parallel to spicules, about half of spicule length. Tail short, sharply tapering off to a point, furnished with broad caudal alae at both sides, each of which is supported by nine narrow caudal papillae or rays, arranged in groups of 1, 2, 3, 3 (right ala of ♂-1 supported by eight papillae, arranged in 1, 2, 2, 3); the posteriormost three closely set papillae shorter than the other anterior ones.

1) In the present paper, figures are represented in lateral view if not stated otherwise.

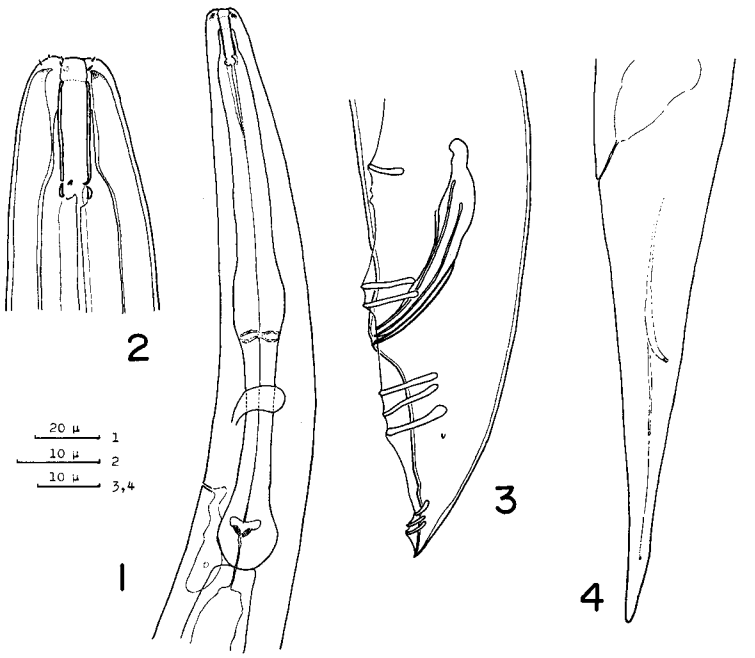

Fig. 1. *Rhabditis marina* Bastian, 1865. Male (♂-2). 1. anterior end; 2. head; 3. posterior end; Female (♀-1). 4. tail.

Female (♀-1). Vulva located slightly posterior to middle of body. Ovaries paird, opposed; the anterior reflexed at 243 μm and the posterior at 257 μm (434 and 418 μm in ♀-2) before and behind vulva. Four eggs present in uteri, 41–45 ×25–26 μm in size (including ♀-2). Tail (Fig. 1–4) longer than of the male, gradually tapering off.

Remarks. The morphology of *Rhabditis marina* has been redescribed in detail and its synonymy after the original record by Bastian (1865) was well discussed by Inglis and Coles (1961), therefore, I mainly referred to that work for identifying the Japanese specimens. Although the one male ♂-1 was equipped with different number of caudal papillae between the right and left caudal alae, the right set of caudal papillae arranged in 1, 2, 2, 3 are considered to abnormally lack a middle papilla of the anterior third group corresponding to the left set of papillae arranged in 1, 2, 3, 3.

Material studied. Two males and two females (23-VIII-1973).

Family **Leptolaimidae**

***Onchium minutum* n. sp.**

(Fig. 2)

Measurements

Males (Holotype and 1 paratype): L=558; 677, mbd=15; 13, eso=228; –, t=69; 68, hd=6; 6, bd=13; –, ad=13; 11, cs=2.5; 2.3, nr=76; 64, vg= –; –, spic=23(15); 23(16), gub=3; 3.

Females (Allotype and 2 paratypes): L=875; 749; 911, mbd=20; 20; 19, eso =325; 268; 332, t=86; 75; 79, v=547; 468; 547, hd=7; 6; 6, bd=19; 17; 19, vd= 20; 16; 18, ad=14; 15; 13, cs=2.2; 2.7; 2.5, nr=90; 81; 92, vg=475; 377; 463.

Male (Holotype). Body cylindrical with almost equal width. Cuticle thin, apparently smooth but actually with very fine transverse striations. No body setae

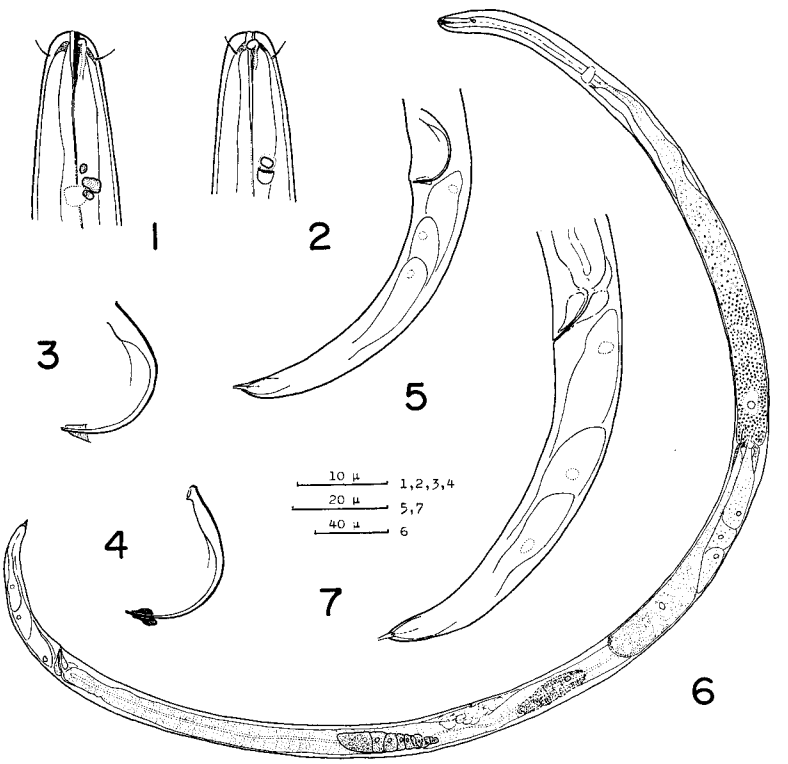

Fig. 2. *Onchium minutum* n. sp. Male (Holotype; 2, 4, paratype). 1–2. head; 3–4. spicules and gubernaculum; 5. tail; Female (Allotype). 6. entire body; 7, tail.

present except for cephalic ones. Head (Fig. 2–1, 2) blunted, equipped with four cephalic setae; labial papillae and anterior circle of cephalic setae not seen. Buccal cavity narrow; a stylet-like tooth dorsally present, dark-coloured, about 6 μm long; in a paratype male dorsal tooth indistinct but cuticular wall somewhat expanded. Amphids small, oval or unispiral in shape, located laterally between cephalic setae; following duct distinctly observed. Visual organ comprising pigment spots and refractive element, located at 16 μm long from anterior extremity (less than 3.0 head diameters long from anterior both in the male and female). Esophagus slender to level of nerve ring but the remaining part not clearly seen for the presence of well developed granular glands (see Fig. 2–6); nerve ring present at 33% of esophageal length from anterior. Excretory pore not seen, excretory ampulla just posterior to nerve ring; ventral gland obscure. Spicules (Fig. 2–3, 4) arcuate, weakly cuticularized; proximal end cephalate, with faint ventral apophysis, distal two-thirds conspicuously slender at equal diameter. Gubernaculum small, triangular in lateral view; well cuticularized in the paratype. Tail (Fig. 2–5) cylindro-conoid, gradually tapering and terminating in distinct spinneret; three caudal glands present in tandem.

Female (Allotype). Internal structure of body (Fig. 2–6) rather distinctly observable than in the male. Excretory gland remarkably large, located posterior to some small nongranular glands, 70 μm long by almost corresponding body diameter. Ovaries paired, opposed and reflexed at 67 and 78 μm (7.6–10.0 and 6.3–9.2% of body length including paratypes) before and behind vulva. No egg present. Vulva located far posterior to middle of body, 62.5% of body length from anterior extremity. Tail (Fig. 2–7) almost as in the male.

Remarks. All of the seven known species belonging to the genus *Onchium* Cobb, 1920 (see Gerlach and Riemann, 1973) are originally described on the basis of one sex, female. Among them the males of only two species are reported, which are *O. conicaudatum* (Allgen, 1935) by Wieser (1951) and *O. ocellatum* Cobb, 1920 by Gerlach (1962) and Allgen (1935, no description and figure). The present species, therefore, can not be discussed about the relationship with the other congeneric species, based upon the male.

The present new species is distinguishable from other members of *Onchium* in the small body size (558–677 μm long in the male and 749–911 in the female), the long esophagus (De Man's ratio **b**=2.5–2.8) and the vulva located rather posteriorly (De Man's ratio **V**=60.0–62.5%). The shape of the spicules and gubernaculum in the male of this new species, especially the paratype male, is similar to that of *O. ocellatum* reported from Maldive Islands by Gerlach (1962), though the male of the latter species differs from the present males in the large size of the body (1610 μm long) and probably the short esophagus (not measured in his male but **b**=5.6 in his female).

Material studied. Two males and three females: Holotype ♂ (7–IX–1974),

allotype ♀ (14–XII–1973), and paratypes; ♂-1 and ♀-1 (23–VIII–9173) and ♀-2 (22–II–1974).

Family **Axonolaimidae**

***Pseudaraeolaimus ocellatus* n. sp.**

(Fig. 3)

Measurements

Males (Holotype and 1 paratype): L=893; 933, mbd=14; 15, eso=137; 133, t=71; 70, hd=4; 5, bd=13; 14, ad=14; 13, cs=4; 3, oc=30; 30, nr=85; 83, vg=272; 297, spic=19 (14); 18 (12), gub=7; 5.

Female (Allotype): L=765, mbd=17, eso=128, t=56, v=442, hd=4, bd=13, vd=16, ad=10, cs=4, oc=32, nr=80, vg=253.

Male (Holotype). Body slender, almost equal diameter. Cuticle smooth and feeble. Somatic setae sparsely distributed in esophageal region but indistinct on the remaining body. Head (Fig. 3–1) blunted, with four cephalic setae; labial papillae not seen. Buccal cavity narrow, shallow and faintly observed.

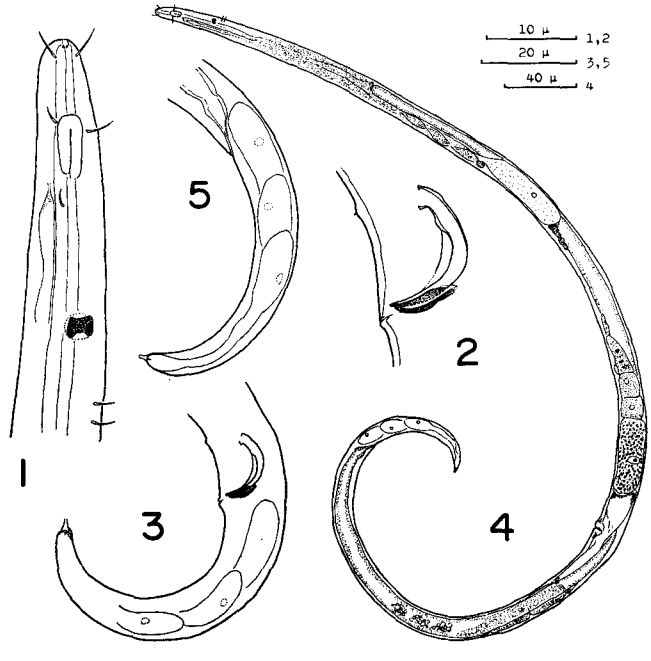

Fig. 3. *Pseudaraeolaimus ocellatus* n. sp. Male (Holotype). 1. head; 2. cloacal region; 3. posterior end; Female (Allotype). 4. entire body; 5. tail.

Amphids folded sausage-shaped, located at 8 μm from anterior extremity, 7×3 μm in size, 41–44% of corresponding body diameter (including a paratype). Ocelli distinct, 8 μm wide. Cirvical setae characteristically arranged; two setae (3.0 μm long) at both sides of amphids, one seta subventrally just posterior to amphid and two subdorsally posterior to level of ocelli. Anterior half of esophagus very slender, distinctly observed but posterior half indistinct for the presence of many glandular cells around esophagus, ventrally several esophageal glands (5 or 6 ?) following in tandem. Excretory pore invisible, ampulla just posterior to level of amphids, ventral gland conspicuously large, 55×8 μm in size (67×12 in the paratype). Testes paired, the posterior reflexed. Spicules (Fig. 3–2) arcuate, proximal end distinctively cephalate. Gubernaculum parallel to spicules, supporting them from dorsal side. Preanal seta faintly observed on ventral swelling, located at 13 μm before anus. Tail (Fig. 3–3) gradually tapering, with three caudal glands.

Female (Allotype). Body (Fig. 3–4) similar to the male in most detail. Amphids about 5×3 μm in size, at 8 μm from anterior extremity. Excretory ampulla at 18 μm from anterior, ventral gland 51×11 μm in size. Vulva located far posterior to middle of body, about 58% of body length from anterior. Ovaries paired, opposed and outstretched; the end of the anterior and posterior ovaries located at 143 and 103 μm before and behind vulva, respectively. Tail (Fig. 3–5) similar to that of the male.

Remarks. The present species is the second member of the genus *Pseudaraeolaimus* Chitwood, 1951, which is characterized by the esophagus posteriorly broken down with glands in tandem (see Chitwood, 1951). This species differs from the type species, *P. perplexus* Chitwood, 1951 collected from Texas, USA in the following characters; the ocelli distinctly observed, the cervical setae posterior to the amphids and ocelli, the large ventral gland, and the vulva opening more posteriorly (against 48% of the body length from the anterior extremity in *P. perplexus*).

Material studied. Two males and one female: Holotype ♂ (26–VIII–1974), allotype ♀ and paratype ♂ (23–VIII–1973).

Family **Monhysteridae**

Monhystera disjuncta Bastian, 1865

(Fig. 4)

Measurements

Males (4): L=532; 660; 707; 773, mbd=19; 20; 23; 21, eso=83; 103; 107; 120, t=63; 78; 80; 83, hd=5; 6; 6; 6, bd=15; 18; 19; 17, ad=16; 18; 19; 20, cs=–; 1; –; 1, nr=44; 57; 63; 72, ep=19; 21; 21; 25, vg=152; 194; 204; 217, spic=28(23); 32(27); 32(25); 30(25), gub=5; 6; 6; 6.

Females (4): L=594; 620; 630; 706, mbd=21; 20; 24; 21, eso=98; 96; 103; 97, t=81; 81; 78; 89, v=484; 514; 522; 581, hd=6; 7; 7; 7, bd=17; 17; 17; 20, vd=17; 17; 16; 19, ad=13; 14; 13; 16, cs=–; 1; 1; 1, nr=55; 52; 57; 56, ep=21; 21; 23; 23, vg=181; 192; 190; 215.

Male (♂-3). Cuticle smooth, rather faint, without striations or punctations. Somatic setae not seen. Mouth opening (Fig. 4–2) surrounded by six obscure lips but the presence or absence of labial papillae indistinct. Cephalic setae also indistinct in number for their short length and faintness. Buccal cavity anteriorly conoid with slightly sclerotized walls, posteriorly cylindrical to somewhat dilated part. Amphids circular, located at almost two head diameters from anterior extremity, 3.0 μm (2.3–3.1 in other males) in diameter, 29% of corresponding body diameter. A pair of short cervical setae occurring side by side behind amphids, at 21 μm from anterior. Ocelli not seen. Esophagus (Fig. 4–1) slender, cylindrical, without a definite bulb; progaster remarkable. Nerve ring at approximately 60% of esophageal length from anterior. Excretory system rather difficult to observe; excretory pore opening posterior to level of amphids, 3.0 to 4.1 head diameters

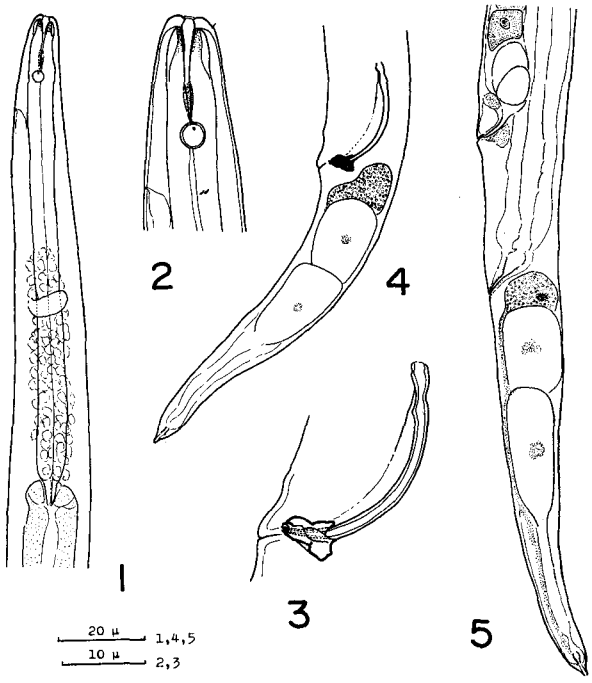

Fig. 4. *Monhystera disjuncta* Bastian, 1865. Male (♂-3). 1. anterior end; 2. head; 3. spicules and gubernaculum; 4. tail; Female (♀-4). 5. posterior end.

long (including other males) from anterior; ventral gland cell quite large, 53×21 μm in size, more than three-fourths of corresponding body diameter. Testis single, outstretched, extending almost to posterior end of ventral gland. Spicules (Fig. 4–3) apparently slender, arcuate with slight proximal cephalation and inconspicuous ventral alae. Gubernaculum complicated, triangular in outline; distal and dorsal portion heavily sclerotized; surrounding one-fifth of spicule. Ventral cuticular elevation weakly present at 7 μm before anus; any other supplements not observed. Tail (Fig. 4–4) cylindro-conoid, slightly bending, with three caudal glands; the anteriormost one conspicuous. Spinneret tube not bent, proximally a characteristic funnel-shaped structure present.

Female (♀–4). Amphids relatively smaller than those of the male, 24% (21–26 in other females) of corresponding body diameter. Ovary single and outstretched; anterior end of ovary located at 63 μm from posterior end of ventral gland. Vulva (Fig. 4–5) located at 36 μm before anus (32–48 μm in other females). Fgg 33×14 μm in size (♀–2). Tail gradually narrowing, rather bending dorsally.

Remarks. Monhystera disjuncta is known by the possession of various variations on the shape of the gubernaculum; parallel to spicules (Osche, 1955) and with dorsal apophysis variously developed (e.g., Bastian, 1865; De Coninck and S. Stekhoven, 1933; Otto, 1936; Bresslau and S. Stekhoven, 1940; Gerlach, 1953; Chitwood and Murphy, 1964; Hopper, 1969; De Man, 1888 as *M. ambigua*). The present Japanese specimens are equipped with the triangular gubernaculum in outline as the original description and figures (Bastian, 1865), and its dorsal apophysis is well sclerotized, rather like those of the specimens from Chile (Gerlach, 1953) and Svalbard (Gerlach, 1965), but not so developed rearward.

Material studied. Four males and four females (4–X–1973).

Monhystera refringens Bresslau et Schuurmans Stekhoven in Schuurmans Stekhoven, 1935

(Fig. 5)

Measurements

Males (5): L=604, 613; 632; 658; 665, mbd=24; 25; 24; 27; 25, eso=91; 100; 99; 100; 96, t=100; 101; 110 109; 106, hd=11; 11; 11; 10; 10, bd=21; 21; 20; 22; 20, ad=23; 24; 24; 23; 22, cs=4; 3; 4; 3; 4, oc=–; 13; –; –; 12, nr =58; 64; 62; 61; 59, ep=17; 17; 26; 18; 16, vg=143; 154; 143; 155; 152, spic=35(31); 41(36); 41(38); 42(37); 41(35), gub=16; 17; 16; 17; 16.

Females (5): L=645; 684; 697; 764; 776, mbd=30; 31; 31; 36; 34, eso=111; 105; 105; 112; 111, t=107; 112; 117; 123; 123, v=374; 393; 390; 432; 450, hd=12; 11; 12; 11; 11, bd=23; 25; 24; 25; 26, vd=27; 29; 29; 33; 33, ad=22; 22; 24; 23; 24, cs=4; 3; 4; 3; 4, oc=12; –; –; –; –, nr=69; 62; 63; –; –, ep=16; 19; 22; 18; 17, vg=167; 157; 164; 178; 178.

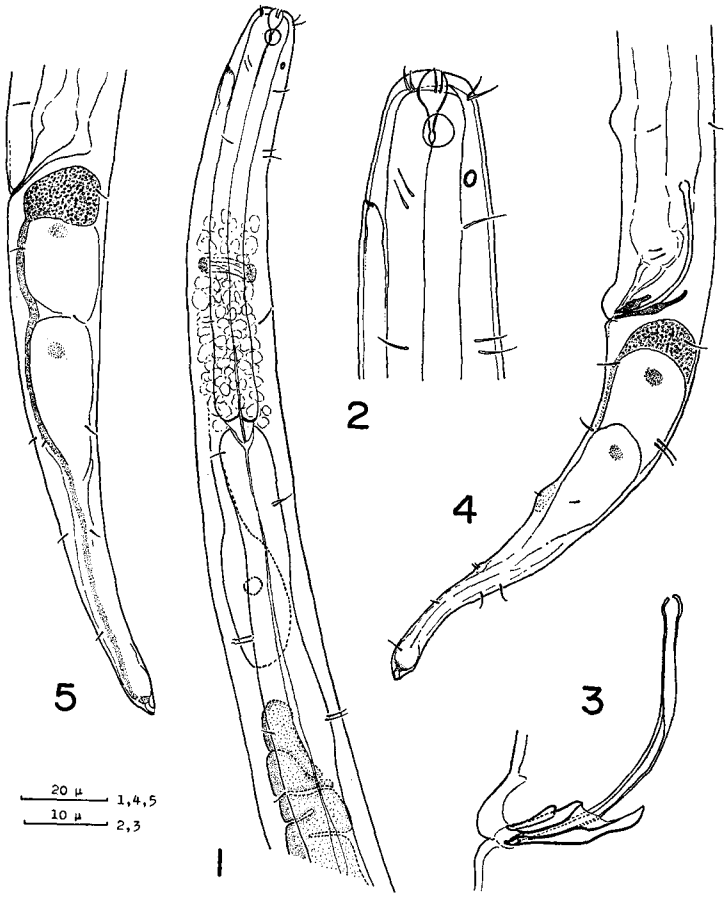

Fig. 5. *Monhystera refringens* Bresslau et Schuurmans Stekhoven in Schuurmans Stekhoven, 1935. Male (♂-5). 1. anterior end; 2. head; 3. spicules and gubernaculum; 4. posterior end; Female (♀-4). 5. tail.

Male (♂-5). Body showing specific shape in formalin fixative; gradually bending to dorsal side from anterior extremity to anal region, the following two-thirds of tail to ventral side to the contrary and the posterior portion of tail to dorsal side again. Cuticle faint, smooth without striations or punctations. Somatic setae sublaterally arranged, less than 5 μm long, some of which are paired. Head (Fig. 5-2) blunt with 12 short cephalic setae, about 0.4 head diameters long. Amphids circular, located at 5 μm from anterior, 3.9 μm wide, 33% of corresponding body diameter. Small rounded ocelli remarkable dorso-laterally behind amphids, about 2 μm wide. Esophagus (Fig. 5-1) cylindrical with almost equal diameter, bulb not set off before progaster; nerve ring indistinctly

observed. Excretory pore distinct at 0.2 esophageal length from anterior; ventral gland 31×14 μm in size, about 60% of corresponding body diameter. Cervical setae characteristically distributed; a pair of setae ventro-laterally and a seta dorso-laterally at level of excretory pore, a seta ventro-laterally and a pair dorso-laterally at twice distance of the first group of setae from anterior extremity. Testis single, extending near to posterior end of ventral gland; proximally reflexed, putting back and winding. Spicules (Fig. 5–3) slender, arcuate with slight proximal cephalation. Gubernaculum complicated, dorsal piece with inconspicuous apophysis, ventral piece short, rugged with cuticularized warts. A ventral swelling (Fig. 5–4) present at 45 μm before anus; indistinct in some specimens. Tail characteristically bending, subdivided into two parts by postanal ventral swelling; the anterior half cylindro-conoid, then narrowing to cylindroid posterior half. The postanal ventral swelling equipped with a seta, and a cuticular small elevation occurring on middle of posterior half of tail, with two pairs of setae. Spinnert short and conical; tube bending, opening somewhat dorsally. The anteriormost caudal gland very conspicuous.

Female (♀–4). Body arucate to dorsal side in formalin fixative. Amphids located at 8 μm from anterior extremity, 3.1 μm wide, 22% of corresponding body diameter. Ocelli invisible. Ovaries single, of which anterior end is located at 33 μm from posterior end of ventral gland; proximally reflexed and putting back towards anus. Vulva opening after middle of body, at 56.0–58.0% of body length in all females. One egg present in uterus, 32–37×18–22 μm in size (including other females). Tail (Fig. 5–5) gradually narrowing, without any postanal modifications.

Remarks. Bresslau and Schuurmans Stekhoven (in Schuurmans stekhoven, 1935; Bresslau and Schuurmans Stekhoven, 1940) described and illustrated that *Monhystera refringens* possessed the ventral gland with "blindem zurückgeschlagenem Endschenekl" (see 1935, p. 140, fig. 312c and 1940, p. 62–63, fig. 70A) but the subsequent author did not refer to the presence or absence of this structure (Wieser, 1959; 1951 as *M. refringens britanica*; 1956 as *M. britanica*). The careful observation based upon the present Japanese specimens shows evidently that such winding structure is not an accessory of the ventral gland but the anterior part of the testis or ovary extending nearly to the level of the posterior end of the ventral gland. Almost other characteristics are sufficiently identical with the original description based upon the European specimens.

Material studied. Five males and five females: 3♂♂ and 3♀♀ (23–VIII–1973), 2♂♂ and 2♀♀ (7–IX–1973).

Paramonohystera* (*Leptogastrella*) *pellucida (Cobb, 1920)

(Fig. 6)

Measurements

Males (2): L=1457; 1564, mbd=61; 68, eso=280; 306, t=164; 185, hd=19; 22, bd=54; 54, ad=38; 41, cs=6+3; 8+5, nr=124; 129, spic=62(50); 64 (58), gub=29; 28.

Females (2): L=1583; 2254, mbd=75; 111, eso=340; 445, t=196; 221, v=1059; 1600, hd=26; 31, bd=58; 81, vd=67; 92, ad=39; 46, cs=11+7; 10+7, nr=152; 182.

Male (♂-2). Cuticle finely annulate, numerous somatic setae distributed whole on the body. Mouth opening (Fig. 6-2) surrounded by six well developed lips, each bearing one labial papilla (seta ?). Cephalic setae arranged in six groups, each comprising one longer and one or two shorter setae. A short seta sublaterally

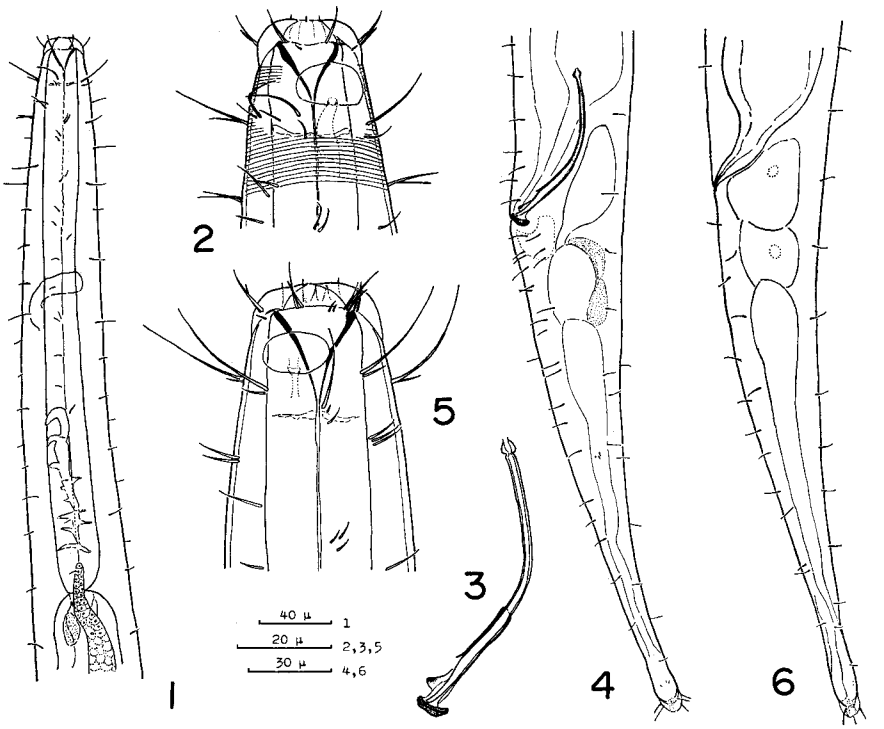

Fig. 6. *Paramonohystera* (*Leptogastrella*) *pellucida* (Cobb, 1920). Male (♂-2). 1. anterior end; 2. head; 3. spicules and gubernaculum; 4. tail; Female (♀-1). 5. head; 6. tail.

just posterior to level of cephalic setae. Amphids elliptical, with posterior duct, 14 μm wide and 58% of corresponding body diameter (bad condition in ♂-1). Cervical setae arranged in eight longitudinal rows to level of nerve ring; the anteriormost circle of setae conspicuously longer than the remaining ones, 17 μm long (24 in ♂-1) at maximum. Buccal cavity spacious funnel-shaped, cuticular walls well developed and with no modifications. Esophagus (Fig. 6-1) cylindrical, posterior third of which is somewhat differentiated but without bulb; nerve ring just anterior to middle of esophagus. Excretory system invisible. Testis single, extending over posterior end of esophagus; a group of glandular cells not seen (which was observed in the specimens from Chille by Wieser, 1956). Spicules (Fig. 6-3) slender, faint and arcuate, proximally cephalate and distally narrowing. Proximal half of gubernaculum distinctly tubular, distal end complicated, expanded laterally and with ventral projection inside. Short setae densely distributed in anal region. Tail (Fig. 6-4) conoid, 4.5 (4.3 in ♂-1) anal body diameters long; spinneret faint, five or six setae present.

Female (♀-1). Cephalic setae (Fig. 6-5) arranged in six groups in the same way as in the male, a certain group consisting of one longer seta and four shorter setae. One or two short setae sublaterally just posterior to level of cephalic setae. Amphids faintly observed, 14 μm wide and 48% of corresponding body diameter (19 μm and 49% in ♀-2). Longest cervical seta 26 (31 in ♀-2) μm long. Ovary single and outstretched, extending almost to posterior end of esophagus. Vulva at about 67% (71 in ♀-2) of body length from anterior. One egg in uterus, 68×38 μm in size. Tail (Fig. 6-6) similar to that of the male, 5.0 (4.8 in ♀-2) anal body diameters long.

Remarks. In the subgenus *Leptogastrella* Cobb, 1920, it is very difficult to distinguish species since most of the taxonomically important characters are variable and their ranges of variations are overlapped according to the accumulation of information on each species from various areas. The present Japanese specimens resemble *P. elliptica* Filipjev, 1918, *P. paranormandica* (Micoletzky, 1922), and *P. pellucida* (Cobb, 1920) in the characters of the number and arrangement of the cephalic setae, the shape of the spicules and gubernaculum and so on; the shape of the spicules and gubernaculum of *P. paranormandica* described and figured by Micoletzky (1922) is slightly different from that of the other two species: cf. Filipjev (1918), Schuurmans Stekhoven (1935, 1950), Gerlach (1951), Wieser (1959)-*P. elliptica*; Micoletzky (1922, 1924), Schurrmans Stekhoven (1943, 1950), Wieser (1955)-*P. paranormandica*; Cobb (1920), Wieser (1956), Timm (1963)-*P. pellucida*. However, they are considered to be representatives of the third species mainly in the proportion of the amphids; about 50% of corresponding body diameter, against more than 60% in the first two species. Although one female was reported as *P. paranormandica* aff. from Shirahama, Japan by Wieser (1955), more specimens from that locality should be reexamined to make clear its taxonomic position.

Material studied. Two males and two females: ♂-1 (7-IX-1973), ♂-2 (23-VIII-1973), ♀-1 and 2 (19-VI-1974).

Theristus* (*Theristus*) *acer Bastian, 1865

(Fig. 7)

Measurements

Males (4): L=1195; 1367; 1376; 1730, mbd=26; 32; 28; 33, eso=194; 206; 222; 236, t=158; 141; 157; 183, hd=15; 13; 14; 14, bd=24; 27; 25; 28, ad=24; 28; 27; 27, cs=8; 8; 8; 9, nr=95; 100; 116; 117, spic=25(19); 24(20); 28(22); 27 (22), gub=15; 15; 15; 15.

Females (3): L=1449; 1610; 1807, mbd=44; 41; 43, eso=230; 221; 263, t=192; 196; 221, v=940; 1076; 1170, hd=16; 17; 14, bd=29; 31; 33, vd=40; 41; 41, ad=23; 25; 26, cs=10; 10; 10, nr=116; 110; 132.

Male (♂-4). Cuticle weakly annulate, about 1 μm wide at anterior end, 2 μm at middle part of body. One or a pair of somatic setae sublaterally arranged, 7 μm long at maximum. Head (Fig. 7-2) with six labial setose papillae and 14 cephalic setae (2+3+2 in each side). Amphids circular, 7 μm wide, 42% of corresponding body diameter (41-45% in other males); anterior margin located at 13 μm from anterior extremity. Visual mechanism not seen. Four closely set cervical setae pronouncedly arranged ventro-laterally behind amphids, less than 8 μm long. Buccal cavity well developed, without any modifications. Esophagus (Fig. 7-1) muscular, cylindrical with 11 μm long cardia; nerve ring rather obvious. Excretory pore probably opening near esophageal end but not exactly observed. Testes paired; anterior one extending to level slightly behind esophageal end. Spicules (Fig. 7-3) L-shaped; longitudinal 0.6 part gently winding, without proximal cephalation, transverse part pronouncedly undulating and distal end tapering with no ridges. Gubernaculum well cuticularized, with short, broad apophysis, 6 μm wide. Four inconspicuous preanal supplements (cuticular swellings?) present, of which the posteriormost is equipped with one minute seta; distance between adjacent two, and the posteriormost and anus, 64 (30-36 in other males), 45 (22-30), 19(9-11) and 10(9-10) μm long, respectively. Tail (Fig. 7-4) cylindro-conoid, gradually tapering; terminal end of tail blunt.

Female (♀-2). Amphids smaller than of the male, 6 μm wide, 32% of corresponding body diameter (30-32 in other females); anterior margin located at 17 μm from anterior extremity. Ovary single, outstretched, extending to level of posterior end of esophagus. Vulva (Fig. 7-5) located at 67% of body length from anterior. Two eggs present in uterus, 29-32×23-24 μm in size. Tail similar to that of the male.

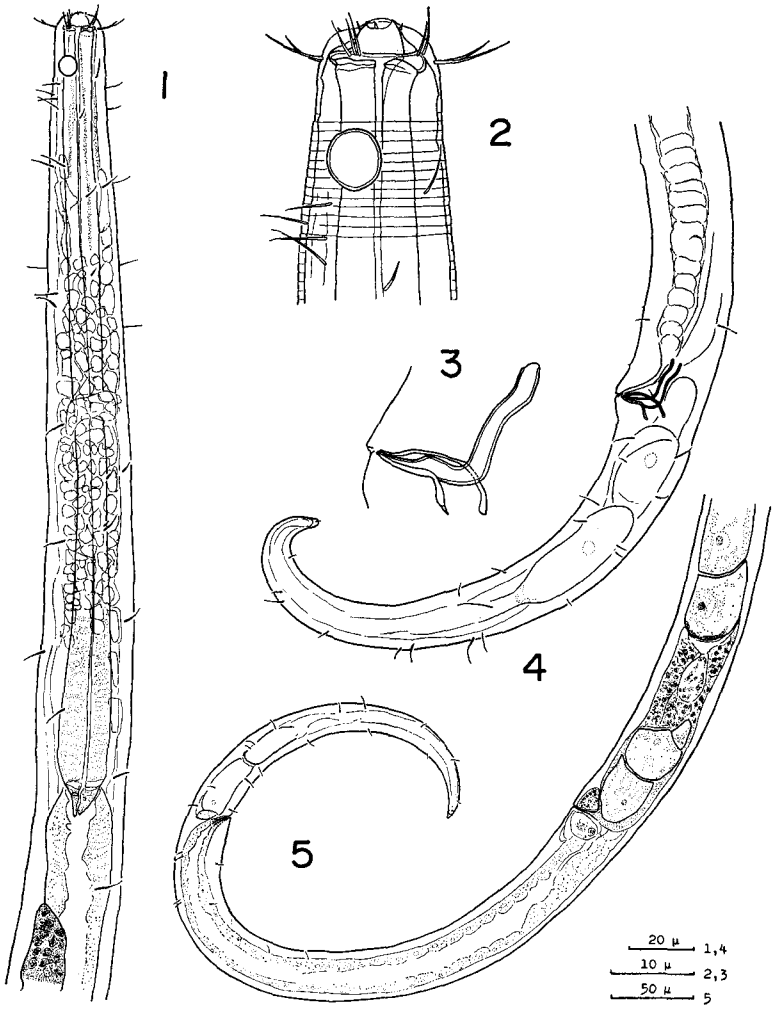

Fig. 7. *Theristus* (*Theristus*) *acer* Bastian, 1865. Male (♂-4). 1. anterior end; 2. head; 3. spicules and gubernaculum; 4. posterior end; Female (♀-2). 5. posterior end.

Remarks. The present specimens well agree with *Theristus* (*T.*) *acer* Bastian, 1865 in the structure of the spicules and gubernaculum. The presence of the preanal supplements is not referred in many previous works including the original description (Bastian, 1865), but in the redescriptions by Gerlach (1965; from Spitsbergen, at least two supplements) and Lorenzen (1969; from North Sea, one short seta and six supplements), and the present observation from Japan. These

supplements are small and weakly cuticularized, therefore they may have been overlooked for such inconspicuousness.

Material studied. Four males and three females (24–IV–1974).

Family **Monoposthiidae**

Monoposthia costata (Bastian, 1865)

(Fig. 8)

Measurements

Males (3): L=1585; 1631; 1970, mbd=58; 49; 57, eso=219; 211; 217, t=153; 145; 167, hd=23; 23; 23, bd=52; 49; 57, ad=45; 42; 46, cs=11; 13; –, nr=116; 112; –, gub=42; 39; 43.

Females (3): L=1509; 1625; 1677, mbd=58; 55; 60, eso=204; 213; 206, t=115; 117; 123, v=1293; 1419; 1457, hd =23; 22; 23, bd=52; 53; 53, vd=47; 48; 50, ad=35; 35; 36, cs=11; 8; 13, nr=–; 120; 109.

Male (♂–2). Cuticle thick, remarkably annulate, about 3 μm apart, probably with 18 longitudinal rows of V-shaped structures; a lateral row running just behind amphid to anterior tail region (Fig. 8–1, 4); V-shaped cuticular condition reversed at 69% of body length from anterior extremity (34 and 33% in ♂–1 and 2). Short somatic setae subdorsally and subventrally. Head (Fig. 8–2) truncated, with six labial papillae, six cephalic papillae and four stout cephalic setae. Amphids rounded in outline, 3.2 μm wide, located between the third and fourth annule. Buccal cavity well cuticularized, with a large dorsal tooth, a small subventral tooth (?) and two transverse folds; some tiny cuticular ridges may be present. Anterior one-fifth of esophagus swelling around buccal cavity, esophageal bulb ovate, large with two constrictions, 65×36 μm in size. Nerve ring obscurely seen. Excretory pore invisible; ventral gland faint and small, just posterior to esophageal end. Testes paired and opposed. Spicules (Fig. 8–3) invisible (probably fused with gubernaculum); in other specimens very weak cuticular structures like distal end of spicules are observed distally along ventral side of gubernaculum. Gubernaculum heavily sclerotized; middle portion thickening, distal one arcuate and tapering. Anal opening surrounded by an elevated smooth cuticle. Three or four cuticular warts arranged just before anus, ventral part of cuticle conspicuously swelling between 84 to 130 μm before anus (Fig. 8–4). Annulations on lateral side of anus irregularly disappearing. Tail conical, gradually tapering and terminating in smooth tip end, 20 μm long; spinneret well cuticularized.

Female (♀–1). Similar to the male in general. A lateral row of V-shaped structure running down just from posterior margin of amphids to about level of

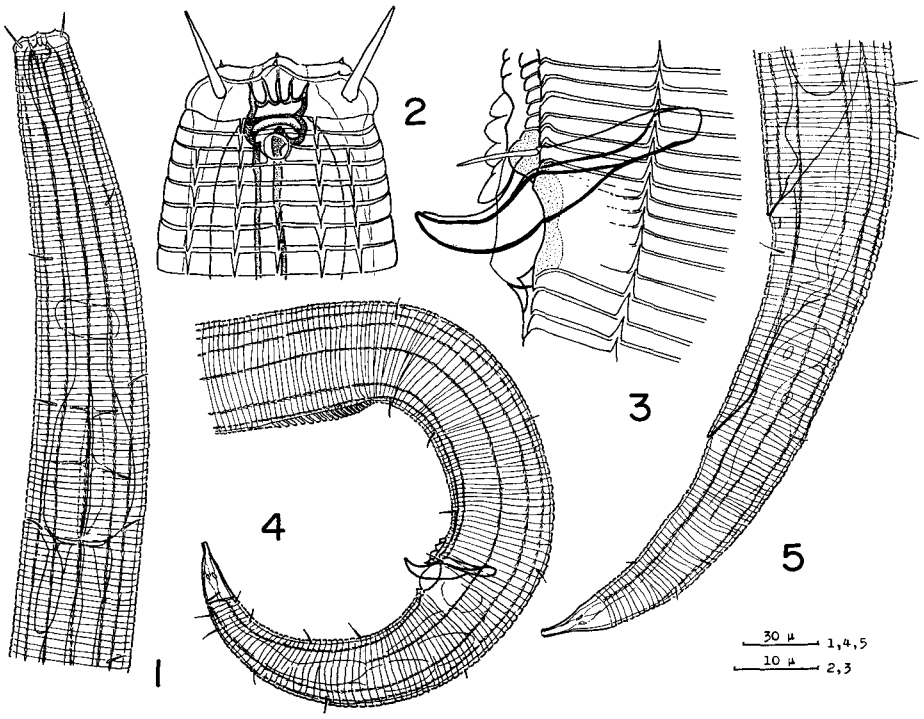

Fig. 8. *Monoposthia costata* (Bastian, 1865). Male (♂-2). 1. anterior end; 2. head; 3. cloacal region; 4. posterior end; Female (♀-1). 5. posterior end.

vulva; cuticular condition reversed at 34% of body length from anterior extremity. Amphids rather larger than those of the male, 4.7 μm wide. Ovary single and reflexed at 421 μm from anterior; proximal end of ovary at 881 μm from anterior. Vulva (Fig. 8-5) located at 86% of body length from anterior. Embryos of a later stage present in uterus, 110×29 μm in size.

Remarks. The present specimens resemble those reported as *Monoposthia chinensis* from the Yellow Sea coast of China (Steiner, 1921b) on the structure of the genital apparatus in the male, although they differ from the latter lacking the four ephalic setae by having them. I agree with the opinion of Gerlach (1963) that the absence of the cephalic setae in *M. chinensis* is artifiical and that species is synonymous with *M. costata*.

In adjacent region of Japan, *M. costata* has been recorded at Shikotan Island in the Kurile Islands (Belgurov, 1978) besides China mentioned above.

Material studied. Three males and three females: 3♂♂ and 1♀ (22-II-1974), 2♀♀ (7-IX-1973).

Family **Chromadoridae**

***Graphonema metuliferum* n. sp.**

(Fig. 9)

Measurements

Males (Holotype and 3 paratypes): L=1372; 967; 987; 1056, mbd=42; 30; 31; 34, eso=194; 167; 178; 198, t=157; 133; 152; 154, hd=16; 13; 14; 17, bd=28; 26; 27; 29, ad=28; 27; 26; 28, cs=4+2; 3+2; –; –, nr=88; 78; 80; 94, vg=286; 236; 252; 278, spic=51 (41); 40 (34); 46 (39); 47(41), gub=22(21)+22; 19(17)+20; 22(20)+22; 19(18)+23.

Females (Allotype and 4 paratypes): L=1379; 1195; 1230; 1287; 1415, mbd (=vd)=43; 35; 41; 58; 52, eso=200; 201; 186; 194; 203, t=183; 180; 161; 180; 203, v=643; 575; 588; 611; 659, hd=17; 16; 16; 16; 16, bd=29; 31; 26; 36; 31, ad=21; 25; 20; 27; 25, cs=4+2; 3+2; 4+–; 3+–; 4+2, nr=85; 97; 82; 90; 99, vg=283; 287; 278; 266; 291.

Male (Holotype). Body and cuticle typically *Euchromadora*-like; no lateral differentiation. Small punctations apparently arranged in transverse rows at anterior end around buccal cavity, some of which are irregularly distributed, the following body markedly striated with large oval to hexagonal blocks, which shape gradually becoming elongated to rod-like form further posteriorly; lateral plate indistinct. Short setae sublaterally arranged but not so distinct, about 3 μm long. Head (Fig. 9–2) with six labial papillae and two circles of short cephalic setae (6+4). Amphids narrow, crescentic and located laterally at about the same level as cephalic setae. Buccal cavity (Fig. 9–3) equipped with a prominent dorsal tooth (hollow ?, but appearing to be heavily cuticularized, see Warwick and Coles, 1975, p. 404), and two small subventral teeth; cuticular ridges or flanges on lateral and ventral wall distinctly observed, but rows of denticles absent; two tooth-like structures anteriorly on lateral wall. Esophagus (Fig. 9–1) slender, cylindrical and without definite bulb; nerve ring slightly anterior to middle of esophagus. Excretory pore indistinct; ventral gland slender, just posterior to esophageal end. Testis single and outstretched. Spicules (Fig. 9–4, 5, 6) weakly cuticularized, arcuate, gradually narrowing and probably without alae; proximal end rounded in sublateral view and obliqued in lateral view. Gubernaculum well cuticularized; lateral pieces of gubernaculum stout and L-shaped in lateral view, distal end equipped with two tiny lateral denticles or ridges; dorsal piece straight and proximally thin. Two short setae (2–3 μm long) distinctly observed before anus in paratype ♂-2 and 3, the anterior seta located 9 μm before and the posterior just before anus. Tail (Fig. 9–7) slender and gradually tapering, 5.6 (4.9–5.8 in paratypes) anal body diameters long; posterior end of tail not annulate.

Female (Allotype). Ovaries paired, equal, opposed and reflexed at 235 and 273 μm (13.1–18.2 and 11.1—19.8% of body length, including paratypes) before and

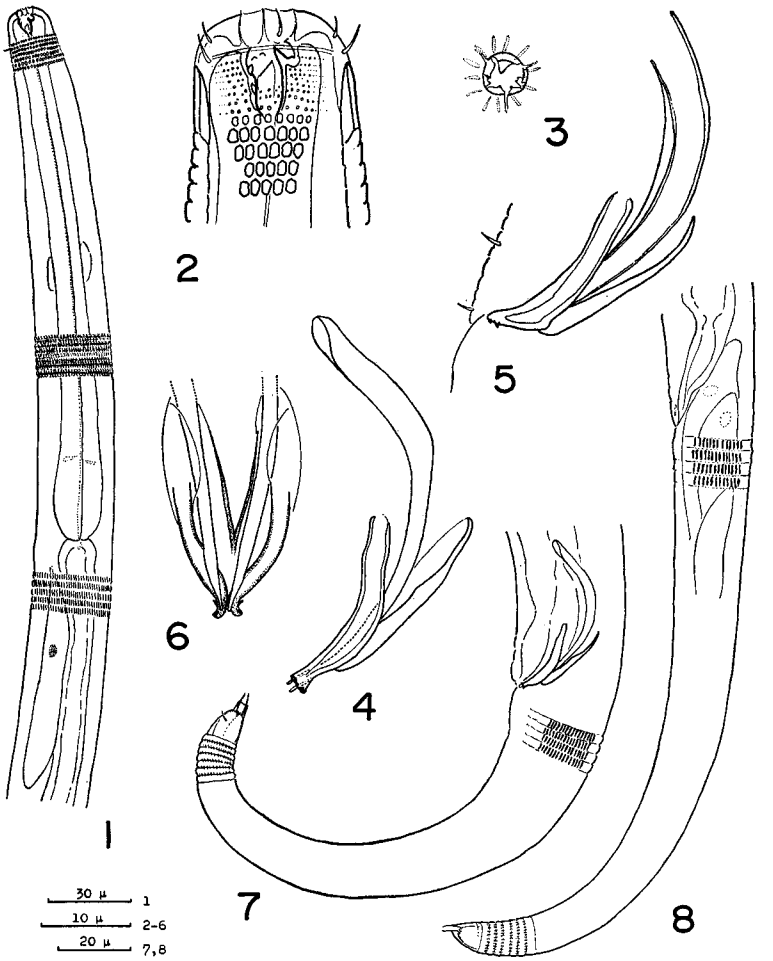

Fig. 9. *Graphonema metuliferum* n. sp. Male (Holotype; 3, 5, 6, paratypes). 1. anterior end; 2. head; 3. buccal armatures, *en face* view; 4–6. spicules and gubernaculum, lateral, lateral and ventral view; 7. tail; Female (Allotype). 8. tail.

behind vulva. Vulva slightly anterior to middle of body. Nine eggs are present, 26–44×23–39 μm in size (including paratypes). Tail (Fig. 9–8) longer than of the male, 8.7 (6.7–8.1 in paratypes) anal body diameters long.

Remarks. The present new species is characterized in the size and shape of the copulatory apparatus, especially the lateral pieces of the gubernaculum, in the male. The spicules are weakly cuticularized and without a distinctly set-off knob, 40–51

(34–41 in chord) μm long. The lateral pieces of the gubernaculum are very pronounced, L-shaped in lateral view and equipped with two tiny denticles or ridges on the distal end, 19–22 μm long. *Graphonema metuliferum* n. sp. belongs to the group 4, including *G. parafricana* (Gerlach, 1958), *G. scampae* (Coles, 1965) and *G. northumbriae* Warwick and Coles, 1975, in the key to species by Warwick and Coles (1975), but it differs from them by the spicule length (chord) and the shape of the lateral pieces of gubernaculum with two denticles or ridges (in this character of the gubernaculum the present species is distinguishable from all other *Graphonema*-species).

Material studied. Five males and five females: Holotype ♂ and allotype ♀ (19–VI–1974), paratypes; 2♀♀ (23–VIII–1973), 1♂ (7–IX–1973), 2♂♂ and 2♀♀ (14–XII–1973), 1♂ (28–III–1974).

Dichromadora amphidiscoides n. sp.

(Fig. 10)

Measurements

Males (Holotype and 1 paratype): L=612; 551, mbd=20; 20, eso=82; 77, t=117; 103, hd=7; 7, bd=18; 15, ad=16; 13, cs=–; 4, nr=47; 45, vg=124; 120, spic=26(19); 18(15), gub=12(11); 11(10).

Females (Allotype and 3 paratypes): L=453; 398; 439; 547, mbd=19; 17; 24; 23, eso=67; 65; 67; 76, t=94; 88; 94; 107, v=198; 183; 194; 253, hd=5; 6; 6; 7, bd=13; 14; 17; 18, vd=19; 17; 24; 23, ad=11; 11; 13; 14, cs=3; 2; 3; –, vg=106; 103; 103; 116.

Male (Holotype). Cuticle (Fig. 10–1) homogeneously annulate with transverse rows of cuticular markings, and lateral differentiation present; anterior one or two transverse rows consisting of small punctations, following transverse rows of punctations to level of about 0.5 esophageal length conspicuous and appearing to be fused, on the following body such punctations fine and indistinct dorsally and ventrally; two longitudinal rows of marked punctations laterally differentiated just posterior to amphids to tail end, distance between these two lateral punctations about 2 μm in cervical region, 4 μm at level of esophageal end, 3 μm at middle of body and anal region. Cervical and somatic setae arranged in four sublateral longitudinal rows but generally indistinct, 5 μm long at maximum. Head end not in excellent condition; four cephalic setae sublaterally observed in paratype (Fig. 10–2). Buccal cavity ornamented with a hollow dorsal tooth and two small subventral teeth. Amphids distinctly circular in outline but their internal structure indistinct, about 2 μm wide, 0.24 corresponding body diameter (0.3 in paratype). Esophagus slightly swelling around buccal cavity, with a definite basal bulb, 16× 11 μm in size; nerve ring obscurely observed. Excretory pore not seen. Spicules (Fig. 10–3) arcuate, conspicuously cephalate at proximal end, without alae.

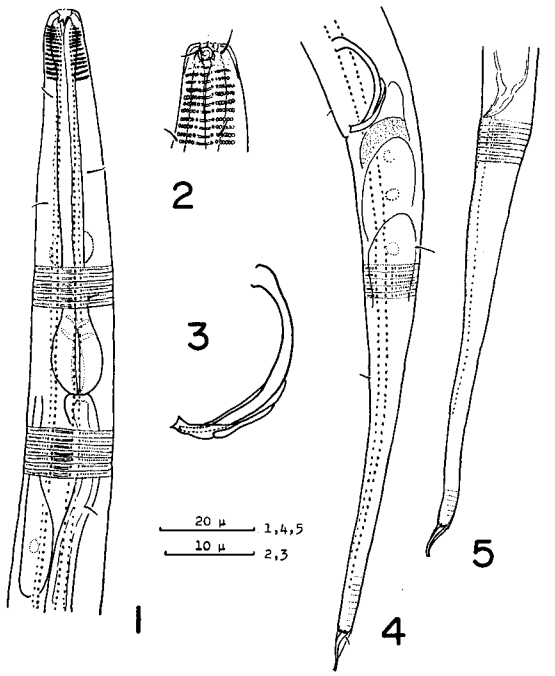

Fig. 10. *Dichromadora amphidiscoides* n. sp. Male (Holotype; 2, paratype). 1. anterior end; 2. head; 3. spicules and gubernaculum; 4. tail; Female (Allotype). 5. tail.

Gubernaculum characteristically dilated at distal part and its dilated end with projecting corners. Preanal supplements absent. Tail (Fig. 10–4) rather long, slender and uniformly narrowing, 7.3 (7.9 in paratype) anal body diameters long; spinneret long and S-shaped, 8 μm long.

Female (Allotype). Head distinctly observed. Amphids slightly smaller than of the male, 1.7 μm wide, 0.19–0.33 corresponding body diameter (including paratypes). Excretory pore indistinct, opening at 50 μm from anterior extremity in paratype ♀–3. Ovaries paired, opposed and reflexed at 43 and 51 μm (9.4–11.4 and 7.5–12.4% of body length, including paratypes) before and behind vulva. Vulva rather anterior to middle of body. One egg present, 35×16 μm in size. Tail (Fig. 10–5) similar to the male, 8.5 (7.2–8.0 in paratypes) anal body diameters long. Spinneret 8 μm long.

Remarks. *Dichromadora amphidiscoides* n. sp. rather resembles *D. apapillata* Timm, 1961 in the shape of the spicules and gubernaculum, especially lateral pieces of the gubernaculum, among the species without preanal supplements. The present species is characterized by the circular-shaped amphids and the long, slender tail

(7.3–7.9 anal body diameters long in the male and 7.2–8.5 in the female), while the latter species is by the slit-shaped amphids and the short tail (4.1 in the male and 5.7 in the female; Timm, 1961). Such the circular-shaped amphids are only reported in one species, *D. silandica* Kreis, 1963 (Kreis, 1963) among the previously known *Dichromadora*-species which generally have slit- or oval-shaped amphids.

Material studied. Two males and four females: Holotype ♂ (23–VIII–1973), allotype ♀ (26–VII–1974), and paratypes; 1♂ (7–IX–1973), 1♀ (23–VIII–1973), 2♀♀ (7–VII–1974).

***Neochromadora oshoroana* n. sp.**

(Fig. 11)

Measurements

Males (Holotype and 1 paratype): L=812; 937, mbd=30; 39, eso=127; 121, t=118; 118, hd=12; 12, bd=23; 23, ad=23; 25, cs= –; 8, nr=71; 77, vg=208; 214, spic=37(28); 38(29), gub=22(20); 22(20).

Females (Allotype and 1 paratype): L=868; 767, mbd (=vd)=37; 37, eso=124; 114, t=121; 112, v=412; 353, hd=13; 14, bd=24; 24, ad=20; 19, cs=11; 7, nr=75; 66, vg=195; 183.

Female (Allotype). Cuticle highly complicated and heterogeneously differentiated; anterior three (?) transverse rows of cuticular markings small, in the following anterior part such rows consisting of large angular to hexagonal blocks, appearing to be fused at dorsal and ventral sides; interval between lateral two markings distinctly wide; cuticular markings, except for lateral two, gradually becoming rod-like in form backwards from the middle of esophageal region. Lateral wings conspicuous near level of nerve ring to middle of tail, in lateral view they are observable triangularly to quadrangularly (Fig. 11–3, 4). Cervical and somatic setae sublaterally arranged, 8 μm long at maximum. Head (Fig. 11–2) blunted with two circles of cephalic setae (6+4), labial papillae indistinct. Crescent-like amphids large and distinct, located at the same level as cephalic setae. Buccal cavity shallow, ornamented with one hollow medium-sized dorsal tooth, two subventral teeth and several minute denticles or ridges on lateral walls. Esophagus (Fig. 11–1) with a definite bulb, less than 0.2 esophageal length. Excretory pore invisible; ventral gland followed by a small cell. Ovaries paired, opposed and reflexed at 162 and 160 μm (15.0–18.7 and 14.6–18.4% of body length, including paratype) before and behind vulva. Vulva located anterior to middle of body. One egg present in anterior uterus 47×30 μm in size. Tail (Fig. 11–5) gradually tapering; spinneret stout and short, 5 μm long.

Male (Holotype). General features similar to those of the female but

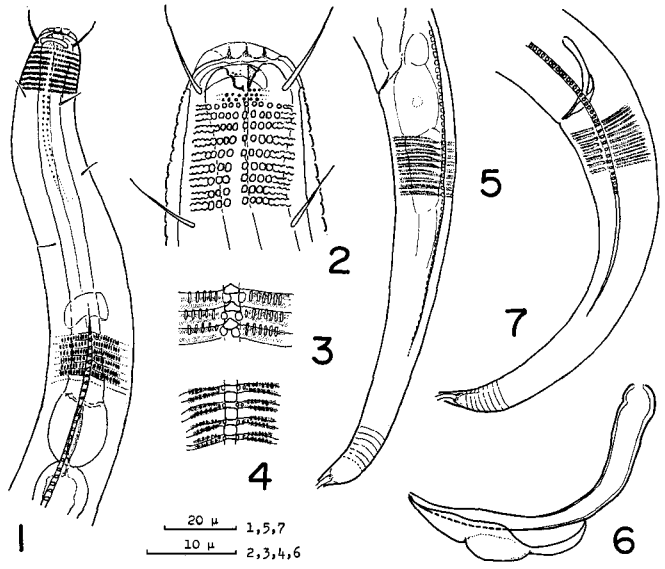

Fig. 11. *Neochromadora oshoroana* n. sp. Female (Allotype). 1. anterior end; 2. head; 3–4. lateral membrane, near posterior end of esophagus and vulva; 5. tail; Male (Holotype). 6. spicules and gubernaculum; 7. tail.

structure of cuticle not so distinct as in the female. Spicules (Fig. 11–6) arcuate, slender, proximal end slightly cephalate and distal end tapering. Gubernaculum dilated, conspicuously expanded to dorso-lateral side in about middle part. No preanal supplements. Tail (Fig. 11–7) slender; spinneret 6 μm long.

Remarks. There are four known species in which the preanal supplements have not been recognized in the male as in the present species, i.e., *Neochromadora brevisetosa* Wieser, 1954, *N. calathifera* Wieser, 1954, *N. trichophora* (Steiner, 1921) and *N. nitida* Timm, 1961. The first two species have the shorter cephalic setae (2–3 μm long) and the esophagus without a definite bulb (see Wieser, 1954a–*N. calathifera*; Wieser, 1954b – *N. brevisetosa*), while the last two are characterized by the large dorsal tooth (see Steiner, 1921a, Gerlach, 1951, Riemann, 1966 – *N. trichophora*; Timm, 1961 – *N. nitida*), moreover, *N. trichophora* is equipped with the long cephalic setae (14 μm long). The gubernaculum of the first three species are simple-shaped but *N. nitida* has the gubernaculum surrounding the tip of the spicules. The present species differs from the above four species in having the following characters; the cephalic setae 7–11 μm long, the esophagus with a definite bulb, the medium-sized dorsal tooth and the gubernaculum dilated and expanded in the middle part.

Material studied. Two males and two females: Holotype ♂ (23–VIII–1973), allotype ♀ (23–IV–1974), and paratypes; 1♂ and 1♀ (19–VI–1974).

Family **Cyatholaimidae**

***Paracanthonchus kamui* n. sp.**

(Fig. 12)

Measurements

Males (Holotype and 2 paratypes): L=1728; 1658; 1726, mbd=68; 60; 60, eso=323; 330; 329, t=137; 144; 140, hd=25; 26; 26, bd=63; 60; 60, ad=49; 50; 48, cs=13+9; 13+10; 13+9, nr=132; 129; 141; ep=71; 82; 75, vg=342; 352; 346, spic=60(53); 53(47); 55(50), gub=55; 45; 53.

Females (Allotype and 1 paratype): L=1761; 1816, mbd=71; 72, eso=335; 336, t=137; 135, v=853; 851, hd=24; 26, bd=60; 63, vd=71; 72, ad=49; 50, cs =11+8; 13+10, nr=132; 131, ep=80; 68, vg=353; 353.

Male (Holotype). Cuticle marked with transverse rows of fairly distinct punctations, rather irregularly arranged at lateral sides, especially in posterior part of body; rows 1.5 μm apart from each other at anterior part of body, 1.1 μm at middle of body and 2.1 μm near anus; other rows situated between such two rows except laterally after about level of excretory pore. Two types of pores distributed; small rounded pores ("type-a" of Warwick, 1971) arranged probably in 12 longitudinal rows but being irregular anteriorly and posteriorly; larger pores bounded anteriorly and posteriorly by a small rounded punctation ("type-b" of Warwick, op. cit.), longitudinally arranged in a mid-lateral row at each side, especially remarkable between excretory pore and nerve ring, near esophageal end, at middle part of body, and anal region. Short setae up to 7 μm long, sublaterally distributed. Head (Fig. 12–1) equipped with six labial setae, less than 3 μm long, and ten stout cephalic setae, six of which are longer and four stouter. Amphids 4.25 turns, 10 μm wide; 4.2–4.25 turns, 35–42% of corresponding body diameter in all specimens. Buccal cavity (Fig. 12–2) bearing a large hollow dorsal tooth and two small teeth or ridges on each ventro-lateral expanded wall. Esophagus gradually broadening, without a bulb. Excretory pore opening in the middle between anterior extremity and nerve ring; small ventral gland (Fig. 12–3) obscurely present near esophageal end, 29×14 μm in size. Testes paired and opposed. Spicules (Fig. 12–4) slender and arcuate; proximally swollen and rapidly narrowing from middle part to distal end. Gubernaculum heavily cuticularized and complicated; distal one-third broadening with a rib-like structure, distal end laterally expanded, bearing series of tiny processes. Six preanal supplements (Fig. 12–5) present; anterior three 13 μm long and the following three 12, 8, and 6 μm long; distance between adjacent two supplements, and the posteriormost and anus, 30, 31, 24, 10 and 11 μm; distance between the anteriormost and anus relatively constant, 2.6–2.9 anal body diameters long in all males. Tail short and conoid; spinneret tube 8 μm long.

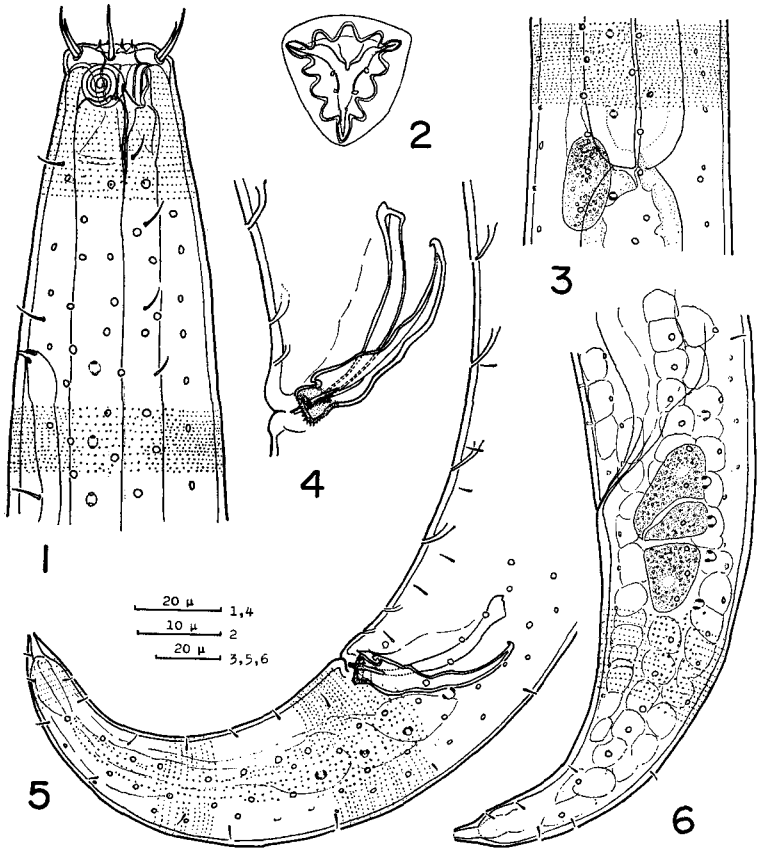

Fig. 12. *Paracanthonchus kamui* n. sp. Male (Holotype). 1. head; 2. buccal armatures, *en face* view; 3. posterior region of esophagus; 4. spicules and gubernaculum; 5. posterior end; Female (Allotype). 6. tail.

Female (Allotype). Ovaries paired, opposed and reflexed at 165 μm (8.9–9.4 and 9.2–9.4% of body length, including paratype) before and behind bulva. Vulva located before middle of body. Egg 64×36 μm in size in paratype. Tail (Fig. 12–6) short and conoid.

Remarks. The present species belongs to the group B of the rearrangement by Wieser (1954a), based upon the shape of the gubernaculum. This species resembles *Paracanthonchus austrospectabilis* Wieser, 1954 (Wieser, 1954a) and *P. sonadiae* Timm, 1961 (Timm, 1961) in such the characters as the distally dentated gubernaculum, the features of the buccal armatures and the amphids, and the number of the preanal supplements (4+2). *P. kamui* n. sp., however, differs from

them by the detailed structure of the gubernaculum; the characteristic lateral expansion of distal end bearing tiny denticles.

Material studied. Three males and two females (23–VIII–1973).

***Paracanthonchus perspicuus* n. sp.**

(Fig. 13)

Measurements

Males (Holotype and 1 paratype): L=1269; 1287, mbd=46; 52, eso=169; 167, t=120; 122, hd=19; 19, bd=41; 45, ad=34; 36, cs=5+3; --+3, nr=88; 82, ep=37; 40, vg =217; 246, spic=31(28); 31(27), gub=24; 22.

Male (Holotype). Cuticle marked with transverse rows of fairly fine punctations, these rows less than 1 μm apart from each other; no remarkable lateral differentiation, but punctations somewhat irregularly arranged at lateral sides. Small rounded pores ("type-a" of Warwick, 1971) arranged in 12 longitudinal

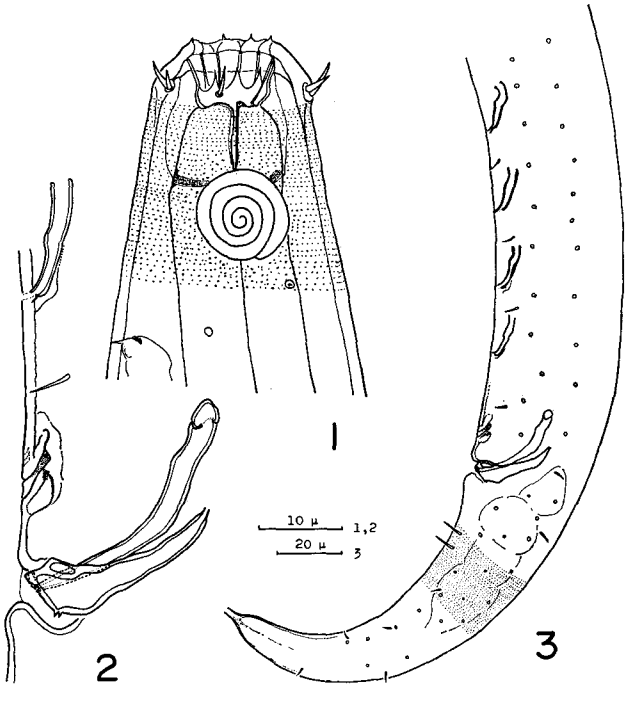

Fig. 13. *Paracanthonchus perspicuus* n. sp. Male (Holotype). 1. head; 2. cloacal region; 3. posterior end.

rows, another type of small pores observable, only a few at lateral sides of anterior body and anal region, their structure indistinct but probably the same as those of the foregoing species (type-b). Short somatic setae sublaterally distributed. Head (Fig. 13-1) with six labial papillae and ten short cephalic setae (6+4). Amphids large, 11 μm wide and 46% of corresponding body diameter, 4.25 turnes. Buccal cavity 8 μm deep, equipped with a small dorsal tooth; ventro-lateral walls expanded but without any modifications. Esophagus cylindrical, with no bulb. Excretory pore distinct at about two times as long as head diameter from anterior extremity; ventral gland slender. Testes paired and opposed. Spicules (Fig. 13-2) proximally cephalate, ventral swelling slightly noticeable at a quarter of length from proximal end, distal half gradually tapering. Distal part of gubernaculum broadening, bearing some tiny processes and two distinctive large ones on distal edge. Five preanal supplements arranged (Fig. 13-3); anterior four supplements tubular, 13–16 μm long and distance between adjacent two and, the fourth and anus, 25, 23, 20, 23, 37 μm; the posteriormost just before anus, indistinct in detailed structure, probably a duct opening, surrounded by well developed cuticular wall. Two long setae present postanally, 7 μm long. Tail conoid, gradually tapering; spinneret straight, 6 μm long.

Female. Not found.

Remarks. The present species is similar to *Paracanthonchus stekhoveni* Wieser, 1954 among the group A (see Wieser, 1954a) in the shape of the spicules and gubernaculum, the arrangement of the preanal supplements (4 or 5+1), the shape of the amphids (cf. Schuurmans Stekhoven, 1950 as *P. micoletzkyi*). *P. perspicuus* n. sp. is, however, discernible from *P. stekhoveni* by the following features; the possession of a dorsal tooth, rather simple dentation of the distal end of the gubernaculum and the characteristic structure of the posteriormost preanal supplement (in this respect *P. perspicuus* differs from all the previously described species of *Paracanthonchus*). This posteriormost preanal supplement has to be examined with special attention because this can be seen as two different tubular supplements in a lower magnification.

Material studied. Two males (23-VIII-1973).

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