MARINE NEMATODES OF THE EAST COAST OF NORTH AMERICA. I. FLORIDA

WOLFGANG WIESER[1] AND BRUCE HOPPER[2]

CONTENTS

[1] Zoologisches Institut, Universität Wien, Wien, Austria.

[2] Nematology Section, Entomology Research Institute Research Branch, Canada Department of Agriculture, Ottawa.

ABSTRACT

A beginning is made on a series of papers in which the nematode fauna inhabiting the east coast of North America from Florida to Newfoundland is to be described. The present paper, dealing with 90 species, extends the number of species known from Florida to 118. One new genus, *Paratarvaia* within the Diplopeltidae, and 48 new species, are described, viz.: *Halalaimus meyersi, Bathylaimus arthropappus, Enoploides bisulcus, E. gryphus, Mesacanthoides fibulatus, M. psittacus, Metoncholaimus intermedius, M. simplex, M. scissus, Prooncholaimus hastatus, Viscosia oncholaimelloides, Illium libidinosum, Polygastrophora edax, Pomponema tesselatum, Longicyatholaimus annae, Xyzzors inglisi, Paracanthonchus platypus, Paracyatholaimus pesavis, Spirinia hamata, Chromaspirina inaurita, Metachromadora pulvinata, M. meridiana, Paradesmodora torcutes, Monoposthioides mayri, Paramicrolaimus lunatus, Hypodontolaimus interruptus, Chromadorella trilix, C. vanmeterae, Euchromadora pectinata, E. meadi, Atrochromadora denticulata, Sabatieria paradoxa, S. paracupida, Axonolaimus hexapilus, Odontophora variabilis, Paratarvaia seta, Terschellingia longispiculata, T. monohystera, Paramonhystera canicula, Steineria ampullacea, Theristus calx, T. ostentator, T. floridanus, T. erectus, T. galeatus, T. fistulatus, T. tortus,* and *T. xyaliformis.* The Halanonchinae n. subfam., with *Halanonchus* Cobb, 1920, *Rhabdocoma* Cobb, 1920, and *Cytolaimium* Cobb, 1920, is created within the Tripyloididae. The Halanonchinae, via *Trefusia,* is considered to link the Tripyloididae with the Oxystomatidae.

INTRODUCTION

The nematodes from the coasts of the American continents are poorly known, a fact that is regrettable since this group represents such an important component of the fauna of every marine habitat.

To improve this situation we decided to collect material towards a monograph on the marine nematodes inhabiting the east coast of North America. In order not to overburden this monograph with descriptions of new species and with taxonomic discussions, we shall publish the results of our investigation in a numbers of papers each dealing with a portion of coastline between Florida and Newfoundland. In each paper, descriptions and figures will be given for all the species found except for those in which agreement between our specimens and representations in the literature were considered very good. In addition, a list containing all species reported from the particular region will be included.

In the monograph, the information contained in the special reports will be condensed. Short descriptions and figures will be given of all species, together with keys to most of the genera and families of marine nematodes.

A portion of the material for this undertaking was collected separately by us on excursions to the eastern seaboard during the period 1958–1961, or it was sent to us by various colleagues whose cooperation we shall acknowledge in the relevant sections of this series. The bulk of the material, however, was collected by us between May 7 and June 8, 1963, on a trip in which we covered the area from southern Florida to Maine.

The following remarks should suffice to clarify our approach to the whole project:

Habitats.—At each location we tried to cover the important types of habitat that could be reached by manual sampling. Shallow water dredge or core sampling was carried out in Miami, Florida, Beaufort, North Carolina, Lewes, Delaware, and Woods Hole, Massachusetts. In addition we received shallow or deep water samples from various sources which we shall acknowledge later.

Methods.—In general, nematodes were extracted from the substrate utilizing a combination of the sieving and decanting processes. Live nematodes were relaxed in

an oven maintained at 54°C prior to fixation in 2% formaldehyde. As the number of specimens recovered in most instances was considerable, only a representative fraction of the total was picked out and processed into dehydrated glycerine. The remainder of the material was also preserved and is being kept for reference in the Nematology Section, Entomology Research Institute, at Ottawa.

The dehydration process used was an adaptation of Seinhorst's methyl alcohol method (Seinhorst, 1959). The preserved specimens were placed in a B.P.I. watchglass containing 10% glycerine in methyl alcohol. The watchglass was then placed in an oven maintained at 54°C to hasten the evaporation of the methyl alcohol, a process which took less than 30 minutes. The watchglass containing the specimens was then transferred to a desiccator for 24–48 hours to insure complete dehydration of the glycerine prior to the construction of slides. Nearly all marine nematode species do well when subjected to this dehydration process. Sporadic distortion of varying intensity results with certain members of the Desmodoridae and a few isolated genera of other groups.

Systematics.—When we write the planned monograph we hope to be able to arrange the species and genera of marine nematodes into a more satisfactory classification than has been in use so far. For the special reports, however, we shall adhere to the old Filipjev-Micoletzky system as used by Schuurmans-Stekhoven (1935), with a few improvements suggested by Chitwood, in Chitwood and Chitwood (1950), and Chitwood (1951). We shall proceed only from the family downward, ignoring the position and status of higher systematic categories.

Descriptions.—We feel that too much weight has been attached in the past to the use of formulas in the descriptions of nematode species. Purely relative formulas like those suggested by de Man or by Cobb are of little value. Formulas in which absolute dimensions are used suggest a degree of precision in the construction of nematode species, which is fairly unrealistic. We shall, therefore, in our descriptions give as many absolute measurements as possible of body and organ dimensions but refrain from assembling them into formulas. Instead, we would like to stress the need for giving as precise a representation as possible of the morphology of the animal, especially of the structure of the male genital apparatus.

Various authors (i.e., Wieser, 1955, Chitwood, 1960, Inglis, 1962) have drawn attention to the necessity of the presence of a male specimen of a species as a prerequisite to a valid description of the species. Inglis (1962) goes as far as to state, ". . . I will not, in general, accept identifications based solely on females or larvae and I will insist on treating almost all species based originally on females or larvae alone as *species dubiae*." We are in complete sympathy with this view so far as the "larvae" are concerned. With regard to the female, however, we must support the concept with certain limitations. If such a rule were to be followed with no exceptions, some genera would receive little or no attention, e.g., *Illium* in this paper. Males are scarce or unknown in certain groups, particularly the Plectoidea, and the advancement of our knowledge of these groups could be curtailed if Inglis' suggestion were adhered to without reservation. Therefore, we feel that the action suggested by Inglis might best be limited to those genera in which males are commonly known to occur.

In addition to species descriptions and figures, general discussions and keys will be supplied wherever necessary.

Florida collection.—The Florida coastline is one of the least known with respect to the nematode fauna of all the regions investigated. Only Cobb (1920, 1922), Chitwood (1951, 1956), and Hopper (1961a, 1966) have reported a few species, mainly from Miami and Key West. Our

Table 1. List of Collecting Sites in Florida

Sample No.	Date 1963	
M-1	May 16	Key Biscayne, Bear Cut area; about low water level; seaweeds scraped off mangrove roots. Canadian National Collection of Nematodes No. 4066.
M-2	Id.	Key Biscayne, Bear Cut area; shallow water (about 20 cm at low tide), close to submerged patch of *Thalassia* and *Syringodium*; fine sand and debris. C.N.C. of N. No. 4067.
M-3	Id.	Key Biscayne, Bear Cut area; flat around high-water level, with *Uca*; fine to medium sand, debris. C.N.C. of N. No. 4068.
M-4	May 17	Off Rickenbacker Causeway; very soft mud, stagnant water at low tide. C.N.C. of N. No. 4069.
M-5	Id.	Virginia Key; beach on grounds of Marine Institute; clean sand, mid-tide level. C.N.C. of N. No. 4070.
M-6	May 18	Everglades National Park, Florida Bay near Flamingo; clayish mud with a little sand; below low-tide level. C.N.C. of N. No. 4071.
M-7	Id.	Everglades National Park, Florida Bay near Flamingo; upper part of shore; sandy mud. C.N.C. of N. No. 4072.
M-8	May 20	Biscayne Bay, dredgings in *Thalassia* beds, about four meters deep; sand, shells and mud; several subsamples. C.N.C. of N. No. 4073.
L	May 21	Lauderdale-by-the-Sea; very exposed beach around mid-tide level; clean, coarse sand, shells. C.N.C. of N. No. 4074.
V	Id.	Vero Beach. Sheltered, muddy sand, with *Uca* and mangroves nearby. C.N.C. of N. No. 4075.

collection increases the total of species known to 118.

Most of our collecting was carried out in Biscayne Bay, in the vicinity of the Institute of Marine Science of the University of Miami, Virginia Key, Miami; additional collecting sites were in the Everglades, near Lauderdale-by-the-Sea, and near Vero Beach. A list of the collecting sites is given in Table 1, and a list of all the species found, together with the species reported in the literature, in Table 2.

SYSTEMATIC SECTION[1]

LEPTOSOMATIDAE

ANTICOMA Bastian, 1865

Type species.—*Anticoma eberthi* Bastian, 1865: 141, pl. 11, figs. 143–145.

In this genus it appears possible to distinguish two groups of species characterized by the position of the excretory pore and the length of the terminal excretory duct. The correlation between these two characters is fairly well established, although, due to a few insufficient descriptions, there remains some doubt as to its general applicability. The two groups (A and B) coincide, respectively, with group A and groups B + C in Wieser (1953). Filipjev (1927) had previously arranged the species of this genus in a similar manner.

[1] Abbreviations used in this paper are as follows: a.b.d., anal body diameter; c.b.d., corresponding body diameter; L, length; Vu, vulva; w, width.

Characteristics of Species of Anticoma *Group A*

Excretory pore situated between posterior cervical setae and nerve ring; terminal excretory duct short (never longer than the width of the excretory ampulla).

Key to Species of *Anticoma* Group A

1. Gubernaculum absent ..... *A. dahli* Wieser, 1953
   A. major Mawson, 1956
   Gubernaculum present 2
2. Excretory pore a short distance behind cervical setae 3
   Excretory pore about halfway between cervical setae and nerve ring 4

Excretory pore a short distance in front of nerve ring 6
3. Tail short ..... *A. campbelli* Allgén, 1932
Tail long, filiform *A. filicauda* Mawson, 1956
4. Longer cephalic setae 24–25 μ = about one head diameter long ..... *A. eberthi* Bastian, 1865
Cephalic setae less than 10 μ = one-half to two-thirds of head diameter long 5
5. Cuticularized portion of spicula (excluding velum) more or less parallel ..... *A. lata* Cobb, 1898
Cuticularized portion of spicula strongly dilated near proximal end ..... *A. columba* Wieser, 1953
Syn. *A. australis* Mawson, 1956
6. Supplement opening posterior to proximal end of spicula ..... *A. litoris* Chitwood, 1936
Supplement opening distinctly anterior to proximal end of spicula 7
7. Amphids one-third to one-fourth of cephalic diameter wide ..... *A. trichura* Cobb, 1891
Amphids one-sixth of cephalic diameter wide 8
8. Tail short (4–5 a.b.d.) ..... *A. insulaealbae* Filipjev, 1927
Tail long (8–10 a.b.d.) ..... *A. tenuicaudata* Filipjev, 1946

Others. *A. typica* Cobb, 1891 is related to the above three species but too incompletely known for its position to be determined with certitude.

A. kerguelensis Mawson, 1958b is closely related to *A. lata*, perhaps even identical.

Characteristics of Species of Anticoma *Group B*

Excretory pore situated on a level with or in front of cervical setae; terminal excretory duct long (at least as long as the width of the excretory ampulla).

The species within this group will not be differentiated in this work. However, for the reader's convenience, a list of the recognizable species, including the most recent synonymy, is given:

A. acuminata (Eberth, 1863) (Syn.: *Odontobius acuminatus* Eberth, 1863; *Stenolaimus lepturus* Marion, 1870; *Anticoma limalis* Bastian, 1865 pt.; *A. tyrrhenica* de Man, 1878; *A. calveti* de Rouville, 1903; *A. pontica* Filipjev, 1918; *A. zosterae* Schulz, 1932; *A. similis* Cobb, 1898 [see Gerlach, 1962]; and *A. profunda* Micoletzky, 1930 [see Gerlach, 1962]); *A. pellucida* Bastian, 1865 (Syn. *A. limilis* Bastian, 1865 pt.); *A. subsimilis* Cobb, 1914 (see Mawson, 1958); *A. arctica* Steiner, 1916 (Syn. *A. procera* Micoletzky, 1930 [see Gerlach, 1962]); *A. minor* Filipjev, 1927; *A. murmanica* Filipjev, 1927; *A. extensa* Wieser, 1953; *A. stekhoveni* Wieser, 1953 (Syn. *A. acuminata* of Schuurmans-Stekhoven, 1950, nec Eberth, 1863); *A. wieseri* Mawson, 1958 (Syn. *A. stekhoveni* Mawson, 1956, nec Wieser, 1953).

Anticoma lata Cobb, 1898
Plate I, fig. 1, a–e

Anticoma lata Cobb, 1898: 384, 385.
Anticoma ditlevseni Micoletzky, 1930: 255–258, fig. 2.

L = 2.04–2.06 mm; w = 58 μ; esophagus 390–412 μ; tail 215–220 μ (♀, 6.5 a.b.d., ♂, 5.5 a.b.d.). Cephalic setae 4–4.5 + 3–3.5 μ. Buccal cavity conical. Amphids 3–4 μ wide, 11 μ behind anterior end. Cervical setae 33 μ behind anterior end. Excretory pore 115 μ from anterior end. Spinneret delicate and pointed, directed dorsally (always?). Spicula 61–70 μ, dorsal and ventral contours nearly parallel, velum present. Gubernaculum 21–24 μ. Supplement 56–70 μ in front of anus.

Representation in samples studied.—M-1, Key Biscayne.

Geographical distribution.—Australia (Cobb, 1898), Sunda Islands (Micoletzky, 1930), Maldives (Gerlach, 1962), Red Sea (Gerlach, 1958c).

Remarks.—The spicula are somewhat longer than reported by Micoletzky and by Gerlach (61–70 μ as against 40–47 μ), but our specimens seem to agree in all other points.

Anticoma trichura Cobb, 1898
Plate I, fig. 2, a–d

Anticoma trichura Cobb, 1898: 385, 386.

L = 3.01–3.04 mm; w = 49–52 μ; esophagus 390–445; tail in ♀, 530–565 μ (18 a.b.d.), in ♂, 460–480 μ (14 a.b.d.). Cephalic diameter 18–19 μ. Cephalic setae 15 + 8 μ.

Table 2. List of Free-living Nematodes Reported from the Coasts of Florida (Numbers of Specimens found are given in parentheses)[1]

Leptosomatidae	
Anticoma lata Cobb, 1898	M-1(6)
A. triclura Cobb, 1898	M-2(5)
Oxystomatidae	
Halalaimus cf. *fletcheri* Mawson, 1958	M-2
H. meyersi n. sp.	M-2(3)
H. pachydermatus (Cobb, 1920) Syn. *Tycnodora p.*	Cobb, 1920, Key West
Porocoma striata Cobb, 1920	Cobb, 1920, Biscayne Bay
Litinium aequale Cobb, 1920	Cobb, 1920, Miami
Tripyloididae	
Halanonchus macrurus Cobb, 1920	M-8(2), Cobb, 1920, Biscayne Bay
Cytolaimium exile Cobb, 1920	M-2(1), Cobb, 1920, Biscayne Bay
Bathylaimus australis Cobb, 1893	V(6)
B. arthropappus n. sp.	M-5(9)
Phanodermatidae	
Phanodermopsis longisetae Chitwood, 1936	V
Enoplidae	
Enoploides bisulcus n. sp.	M-2(13)
E. gryphus n. sp.	M-5(6)
Mesacanthoides fibulatus n. sp.	M-3(4)
M. psittacus n. sp.	L(3)
Ironidae	
Trissonchulus occanus Cobb, 1920	Cobb, 1920, Miami
Oncholaimidae	
Anoplostoma heterurum (Cobb, 1914) Syn. *Oncholaimellus h.*	Chitwood, 1951, Ocala
A. viviparum (Bastian, 1865) Syn. *Symplocostoma v.*	Hopper, 1961a, Panama City
Oncholaimus dujardinii de Man, 1878	M-1(24)
Oncholaimium appendiculatum Cobb, 1930	M-1(1), M-2(1)
O. domesticum (Chitwood & Chitwood, 1938)	M-1(2)
Metoncholaimus intermedius n. sp.	M-5(23)
M. simplex n. sp.	M-5
M. scissus n. sp.	M-5
Prooncholaimus hastatus n. sp.	M-8(18)
Viscosia oncholaimelloides n. sp.	M-3(4), M-8(16)
V. papillata Chitwood, 1951	M-7(5), M-8(1), V(6)
V. macramphida Chitwood, 1951	M-2(8), M-8(23)
Enchelidiidae	
Eurystomina minutisculae Chitwood, 1951	M-1(4), M-7(1)
Illium exile Cobb, 1920	M-8(3)
I. libidinosum n. sp.	M-8(1)
Polygastrophora edax n. sp.	M-8(6), V(3)
Calyptronema cobbi Wieser, 1953 Syn. *Catalaimus acuminatus* Cobb, 1920	Cobb, 1920, Biscayne Bay
Cyatholaimidae	
Pomponema tesselatum n. sp.	M-3(1)
Longicyatholaimus annae n. sp.	M-3(13), M-8(1)
Xyzzors inglisi n. sp.	V(5)
Paracanthonchus platypus n. sp.	M-8(5)
P. truncatus (Cobb, 1914) Syn. *Cyatholaimus t.*	Chitwood, 1951, Silver Springs
Paracyatholaimus pesavis n. sp.	M-6(3)
Halichoanolaimus quattuordecimpapillatus Chitwood, 1951	M-2(3), M-6(7), M-8(1)
H. duodecimpapillatus Timm, 1952	V
Neotonchus lutosus Wieser and Hopper, 1966	M-4(2)
Synonchium obtusum Cobb, 1920	Cobb, 1920, Miami

Desmodoridae	
Spirinia parasitifera (Bastian, 1865)	M-4(10), V(55)
S. hamata n. sp.	M-3(14)
Chromaspirina inaurita n. sp.	M-3(4)
Metachromadora pulvinata n. sp.	V(2)
M. onyxoides Chitwood, 1936	M-5(58)
M. meridiana n. sp.	M-2(1), V(103)
Paradesmodora toreutes n. sp.	M-3(7)
Desmodora quadripapillata (Daday, 1899)	
Syn. *Pseudochromadora q.*	M-2(1), M-3(1)
Xennella cephalata Cobb, 1920	Cobb, 1920, Key West
Leptonemella cincta Cobb, 1920	Cobb, 1920, Miami
Monoposthia mirabilis Schulz, 1932	M-2
Monoposthioides mayri n. sp.	M-3(9)
Microlaimidae	
Paramicrolaimus lunatus n. sp.	M-2(8)
Chromadoridae	
Hypodontolaimus interruptus n. sp.	M-1(3), M-3(2), M-5(17)
H. pandispiculatus Hopper, 1961	M-3(25), M-7(2)
Rhips ornata Cobb, 1920	M-5(29), Cobb, 1920, Miami, Key West
Actinonema pachydermata Cobb, 1920	Cobb, 1920, Key West
Chromadora macrolaimoides Steiner, 1915	M-1(30), M-4(9), M-5(1), M-7(1), M-8(3)
Timmia parva (Timm, 1952)	
Syn. *Parachromadora p.*	M-1(12), V(2)
Spilophorella paradoxa (de Man, 1888)	M-1(3), M-2(12), M-3(1), M-6(5), M-7(2), M-8(6)
Prochromadorella mediterranea (Micoletzky, 1922)	M-1(13)
Chromadorella filiformis (Bastian, 1865)	M-1(19)
C. trilix n. sp.	M-2(31)
C. vanmeterae n. sp.	M-2(14)
Euchromadora gaulica Inglis, 1962	M-1(38)
E. pectinata n. sp.	M-8(8)
E. meadi n. sp.	M-2(3), M-8(1)
Atrochromadora denticulata n. sp.	M-1(1), M-2(2)
Comesomatidae	
Mesonchium pellucidum (Cobb, 1920)	
Syn. *Pepsonema p.*	M-8(4)
M. poriferum Cobb, 1920	Cobb, 1920, Key West
Sabatieria paradoxa n. sp.	M-7(2), V
S. paracupida n. sp.	V
Laimella longicauda Cobb, 1920	Cobb, 1920, Biscayne Bay, Key West
Nannolaimus guttatus Cobb, 1920	Cobb, 1920, Biscayne Bay
Axonolaimidae	
Axonolaimus hexapilus n. sp.	M-5(3)
Odontophora variabilis n. sp.	V(11)
Parodontophora brevamphida (Timm, 1952)	V(5)
Aracolaimus punctatus (Cobb, 1920)	
Syn. *Coinonema p.*	Cobb, 1920, Biscayne Bay, Key West
Leptolaimidae	
Alaimella cincta Cobb, 1920	M-2(1), Cobb, 1920, Biscayne Bay
Cynura uniformis Cobb, 1920	Cobb, 1920, Miami
Haliplectus floridanus Cobb in Chitwood, 1956	Chitwood, 1956, Long Key
H. bickneri Chitwood, 1956	Chitwood, 1956, Atwood Grove, Ellenton
Camacolaimidae	
Camacolaimus prytherchi Chitwood, 1933	V(3)
Onchium ocellatum Cobb, 1920	Cobb, 1920, Key West
O. metocellatum Wieser, 1956	
Syn. *Onchulella ocellata* Cobb, 1920	Cobb, 1920, Biscayne Bay
Neurella simplex Cobb, 1920	Cobb, 1920, Key West

Ionema cobbi (Steiner, 1916)	
Syn. *Ionema ocellatum* Cobb, 1920	
Nemella ocellata Cobb, 1920	Cobb, 1920, Biscayne Bay
Diplopeltidae	
Paratarvaia seta n. gen., n. sp.	M-2
Didelta maculatum Cobb, 1920	M-8(1), Cobb, 1920, Key West
Linhomoeidae	
Terschellingia longicaudata de Man, 1907	M-4(1), M-6(13), M-7(89), M-8(1), V(9)
T. longispiculata n. sp.	M-7(24), M-8(1)
T. monohystera n. sp.	V(12)
Anticyathus tenuicaudatus Cobb, 1920	Cobb, 1920, Miami
Halinema spinosum Cobb, 1920	Cobb, 1920, Biscayne Bay
Paralinhomoeus fuscacephalum (Cobb, 1920)	
Syn. *Crystallonema f.*	Cobb, 1920, Miami
P. simile (Cobb, 1920)	
Syn. *Crystallonema s.*	Cobb, 1920, Miami
Linhomoella exilis Cobb, 1920	Cobb, 1920, Biscayne Bay
Monhysteridae	
Paramonhystera cauicula n. sp.	M-1(1), M-3(6)
Steineria ampullacea n. sp.	V(1)
Theristus metaflexensis Gerlach, 1955	M-4(11)
T. calx n. sp.	M-4(3), V(33)
T. polychaetophilus Hopper, 1966	Hopper, 1966, Virginia Key
T. ostentator n. sp.	M-3(58)
T. floridanus n. sp.	M-2(5)
T. erectus n. sp.	M-2(3), M-3(83), M-4(1), V(2)
T. galeatus n. sp.	M-5(3)
T. oxyuroides (Schuurmans-Stekhoven, 1931)	M-2(1), M-4(19), M-5(1), M-8(1)
T. fistulatus n. sp.	M-3(2)
T. tortus n. sp.	M-2(5)
T. xyaliformis n. sp.	M-2(3)
Monhystera parva (Bastian, 1865)	M-1(7), M-7(1)
Scaptrella cincta Cobb, 1917	M-2(2)
Xenolaimus striatus Cobb, 1920	M-2(9), Cobb, 1920, Biscayne Bay
Desmoscolecidae	
Greeffiella dasyura Cobb, 1922	Cobb, 1922, Biscayne Bay

[1] The number of specimens indicated in this table represents only those that were present in the fraction of the total sample examined. In this manner the relative abundance of each species is somewhat suggested. In some cases, where a species was represented by only a few specimens, an effort was made to locate additional material from the preserved remainder of the sample. These additional specimens are not recorded in this table. Species for which the number of specimens is not indicated were not present in the original fraction examined. These were subsequently recovered from the remainder of the sample.

Amphids 5 μ wide = one-third of body diameter. Buccal cavity conical. Cervical setae 35 μ behind anterior end. Excretory pore 170 μ behind anterior end, i.e., 85% of distance anterior end to nerve ring. Spicula 59–63 μ, proximally bent, dorsal and ventral contours nearly parallel, with slight hump near proximal end. Velum present, smooth (not striated as figured by Gerlach, 1962). Gubernaculum about 20 μ. Supplement 55–60 μ in front of anus.

Representation in samples studied.—M-2, Key Biscayne.

Geographical distribution.—Australia (Cobb, 1898), Sunda Islands (Micoletzky, 1930), Maldives (Gerlach, 1962), Antarctic, Subantarctic (Mawson, 1958b, Allgén, 1959).

OXYSTOMATIDAE

HALALAIMUS de Man, 1888

Type species.—*Halalaimus gracilis* de Man, 1888: 3, 4, pl. 1, fig. 1.

A key to the species of this genus, excluding the subgenus *Pachyodora*, was given by Mawson (1958b).

There are three species which are set apart from the rest by the occurrence of a distinct circle of labial setae, i.e., *H. papil-*

lifer Gerlach, 1956, *H. fletcheri* Mawson, 1958, and *H. filicollis* Timm, 1961. In the first species the tail is rounded at the tip, in the latter two the tail is filiform and its tip is bifid. The Miami material contained one species which seems to correspond in all essential features with *H. fletcheri*, although the indistinctness of the amphids and the somewhat sketchy figures of the type leave room for doubt.

The second species in our material is closely related to *H. supercirrhatus* Gerlach, 1955, and *H. longisetosus* Hopper, 1963, but is distinguished by the much more elongated, filiform tail, the spicula which have a ventral hump, and the gubernaculum with its lateral guiding pieces. Examples of *H. longisetosus* have been recovered from the Charleston, South Carolina, samples, and its status will be clarified in the paper dealing with the specimens collected from that area.

Halalaimus (H.) cf. *fletcheri* Mawson, 1958
Plate II, fig. 3, a–c

Halalaimus (H.) cf. *fletcheri* Mawson, 1958: 332, fig. 13, a, b.

L = 2.6–2.37 mm; w = 26–35 μ; tail in ♂, 310 μ (18 a.b.d.), in ♀ 275 μ. Head at level of first cephalic setae about 4 μ wide and 6 μ high. Six labial setae, 2 μ long. Cephalic setae 6 μ long, arranged in two circles (6 + 4) about 4 μ apart. Amphids beginning about 10 μ from anterior end, indistinct, particularly the posterior end which appears to run into lateral alae. Its length in one specimen is probably 17 μ. Anterior portion of neck exceedingly drawn out, narrow for about two-thirds its length. Tail with bifid tip, each prong 10 μ long. Spicula 27 μ long, with velum. Gubernaculum strongly developed.

Representation in samples studied.—M-2, Key Biscayne.

Geographical distribution.—Macquarie Isl., Kerguelen Isl. (Mawson, 1958b).

Halalaimus (H.) meyersi new species
Plate II, fig. 4, a–c

L = 2.26–2.49 mm; w = 17 μ; Vu = 47%; tail in ♂, 540 μ. Head about 4.5 μ wide, 7 μ high. Cephalic setae 20 μ long, arranged in two circles (6 + 4). Cuticle finely striated. Amphids 38–40 μ long, beginning 20–30 μ from anterior end. Excretory pore 50 μ from anterior end, ampulla at base of amphids. Terminal excretory duct 8–10 μ long. Narrowed portion of neck about one-fourth its total length. Spicula 21 μ long, with ventral swelling at the end of its proximal third. Gubernaculum with lateral guiding pieces. Tail very thin, elongated, with narrow tip.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa Collection Number 4067, Type slide No. 60. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

Remarks.—This species is named in honor of Dr. Samuel P. Meyers, our Miami host.

TRIPYLOIDIDAE
HALANONCHINAE new subfamily

Type genus.—*Halanonchus* Cobb, 1920: 266.

Diagnosis.—Tripyloididae, with three large, well-separated lips, six labial papillae, and 10 cephalic setae in two circles, the anterior circle consisting of six jointed, mostly elongated setae; large, unarmed conical or cylindrical buccal cavity without partitions; spiral or tubular amphids; spicula short, bent; gubernaculum plate-shaped, simple, without apophysis; pre- and sometimes postanal supplements present in males.

Discussion.—In Cobb's paper of 1920 one finds the description of three closely related genera, the systematic position of which has been doubtful ever since. These genera are: 1) *Cytolaimium* [with the species *C. exile* Cobb, 1920, and *C. obtusicaudatum* Chitwood, 1936, the latter, according to Gerlach (1962), being a synonym of the former], 2) *Rhabdocoma* [with the

species *R. americana* Cobb, 1920, *R. articulata* Gerlach, 1955, *R. brevicauda* Schuurmans-Stekhoven, 1950, *R. cylindricauda* Schuurmans-Stekhoven, 1950, *R. macrura* Cobb, 1920], and 3) *Halanonchus* (syn. *Latilaimus* Allgén, 1933) [with the species *H. macramphidus* Chitwood, 1936, and *H. macrurus* Cobb, 1920].

All three genera are characterized by a smooth cuticle, an arrangement of cephalic sense organs in three circles of 6 + 6 + 4, the second circle consisting of the longest and distinctly jointed setae, three large, deeply cut lips, a buccal cavity which is either conical or cylindrical, amphids which are either spiral with a single turn and a posterior break (*Cytolaimium*, *Rhabdocoma*), or more tubular or pocket-shaped with a circular opening (*Halanonchus*), simple spicula, plate-shaped, simple gubernacula, and the occurrence in males of many supplements, not only preanally but also postanally and even in the cervical region.

The number (though not the arrangement) of the cephalic setae, the deeply cut lips, the shape of the amphids (although the situation in *Halanonchus* is not quite clear), and the presence of a large buccal cavity suggest relationship with the Tripyloididae, to which family *Halanonchus* and *Rhabdocoma* have been referred by Filipjev (1934). On the other hand, as Schuurmans-Stekhoven (1950) and Gerlach (1955, 1962) have pointed out, both *Rhabdocoma* and *Cytolaimium* have a number of features in common with *Trefusia* de Man, 1893, which has no buccal cavity, pocket-shaped or spiral amphids and no supplements, and which so far has been considered an oxystomatid of somewhat uncertain position. Finally, Chitwood (1936, 1951) placed *Cytolaimium* and *Rhabdocoma* with the Monhysteridae.

We consider that by virtue of the deeply cut lips, the jointed setae, the large buccal cavity (particularly in *Halanonchus*), and the spiral amphids (in *Cytolaimium* and *Rhabdocoma*), the three genera mentioned belong to the family Tripyloididae. However, because of the simplicity of the buccal cavity, the arrangement of the cephalic setae in two circles (instead of one circle), and the different structure of the male genital armature, a distinct subfamily should be created for them, for which we propose the name Halanonchinae new subfamily, with *Halanonchus* Cobb as the type genus.

This new subfamily, via *Trefusia*, links the Tripyloididae with the Oxystomatidae and thus allows a more satisfactory placement of the former family which so far has occupied a rather isolated position either within the order Araeolaimoidea (Schuurmans-Stekhoven, 1935), or the superfamily Chromadoroidea (Chitwood, 1951).

Within the genus *Trefusia* and the subfamily Halanonchinae it seems as if a transition of the amphidial shape from spiral to pocket-shaped or tubular had taken place, thus stressing the intermediary position of this group of genera between the Oxystomatidae and the Tripyloididae. This is demonstrated not only by a comparison of *Halanonchus* with *Cytolaimium* and *Rhabdocoma*, but also by *Trefusia varians* Gerlach, 1955, in which the juveniles have spiral-shaped, and the adults tubular-shaped amphids not too different from the shape which we observed in *H. macrurus* (see below). Further proof of the intermediary position of the new subfamily might be the fact that *Rhabdocoma* is reported to have just one posterior ovary (as is the case in many oxystomatids), whereas *Cytolaimium* has two ovaries (like the Tripyloidinae).

HALANONCHUS Cobb, 1920

Type species.—*Halanonchus macrurus* Cobb, 1920: 266, fig. 51.

Halanonchus Cobb, 1920: 266.
Latilaimus Allgén, 1933: 90.

Halanonchus macrurus Cobb, 1920

Plate III, fig. 5, a–c

Halanonchus macrurus Cobb, 1920: 266, fig. 51.

L = 2.00 mm; w = 40 μ; esophagus = 265 μ. Head diameter (on level of 4 cephalic

setae) 19 μ. Three large, deeply cut lips, on each lip 2 thin labial setae and, shortly behind, 2 larger, two-jointed cephalic setae, measuring 3–3.5 μ. Further behind, there are the four setae of the second cephalic circle, measuring about 5 μ and being non-jointed. There are many yellowish granules which are scattered throughout the epidermis of the body, although a certain arrangement into longitudinal rows can be discerned. The amphids give the impression of sawed-off and slightly bent pieces of tubing with an indistinct, more or less circular orifice; they are 8 μ long and situated 20 μ behind the anterior end. Cobb shows the amphids more pocket-shaped with a distinctly circular orifice. Each lip seems to be supported by a large oval structure which apparently was mistaken for the amphids by Allgén (1933) in his description of *Latilaimus zosterae*. In the cervical region one can distinguish 5–6 ventral bumps which might be papillae. The same organs have been observed in undescribed species of *Rhabdocoma* and *Halanonchus* by Gerlach (1962). Buccal cavity with strong walls, 20–22 μ long. Esophagus weakly dilated posteriorly, no bulb. A small triangular cardia is present. Spicula slender, 32 μ long, gubernaculum either absent or consisting of a thin lamella, lying parallel to the spicula. There are about 12 preanal supplements, the posterior six being more distinct than the more anterior ones. Tail 610 μ long, a.b.d. 28 μ.

Representation in samples studied.—M-8, Biscayne Bay.

Geographical distribution.—Biscayne Bay (Cobb, 1920).

CYTOLAIMIUM Cobb, 1920

Type species.—*Cytolaimium exile* Cobb, 1920: 251, fig. 31.

Cytolaimium exile Cobb, 1920

Plate III, fig. 6, a–d

Cytolaimium exile Cobb, 1920: 251, fig. 31.
Cytolaimium obtusicaudatum Chitwood, 1936: 13, fig. 3, J–L (cf. Gerlach, 1962).

L = 3.2 mm; w = 32 μ; diameter at base of esophagus 30 μ. Esophagus 250 μ long. Head diameter 20–25 μ. Head with six setose labial papillae, six segmented cephalic setae and four subcephalic setae. Cephalic setae in female 20 μ long, in male somewhat longer but distorted so as to render precise measurement impossible. Amphid 8 μ wide and located 20–23 μ from anterior end. Subcephalic setae 10 μ long in male, 5–6 μ in female and located 35 μ from anterior end. Body with several short (3–4 μ) cervical setae beginning 90 μ from anterior end and ceasing at nerve ring and with a few, very thin, somatic setae 10–15 μ in length. Female didelphic, amphidelphic, ovaries reflexed. Male diorchic, testes outstretched. Spicules 37 μ long, their chord 28 μ. Male preanally with 9 pairs of discoid supplements and 2 pairs of fleshy, setose papillae and postanally with 3 pairs of discoid supplements and 5 pairs of fleshy setose papillae. Tail length extremely variable, 15 μ long for one female, 420 μ for the other, and 740 μ for the male.

Representation in samples studied.—M-2, Key Biscayne.

Geographical distribution.—Biscayne Bay (Cobb, 1920), Beaufort, North Carolina (Chitwood, 1936), Maldives (Gerlach, 1962). 1962).

Remarks.—The data for our specimens (1 ♂, 2 ♀) lend support to the view of Gerlach (1962) that *C. obtusicaudatum* Chitwood, 1936, is a synonym of *C. exile* Cobb, 1920. The tail length in our three specimens ranged from 15 μ in one female to 740 μ in the male. In the specimens with shorter tails, the terminus appears abnormal and suggests the phenomenon of wound-healing as discussed for this species by Gerlach. Even in the case of the longest-tailed specimen there is the possibility of a missing portion, as no typical spinneret can be recognized.

The setose papillae associated with the male tail appear to be similar to the papillae seen on the discoid supplements, the only difference being the lack of the disc.

BATHYLAIMUS Cobb, 1893

Type species.—*Bathylaimus australis* Cobb, 1893: 409, 410, fig. 9, I–IV.

Our material contained two species of the genus *Bathylaimus*, one of which appears to be the type species, *B. australis* Cobb, 1893. The other represents an undescribed species closely related to *B. capacosus* Hopper, 1962, from which it can be distinguished by having the shorter of the submedian cephalic setae equal in length to the basal segment of the longer. In *B. capacosus* the shorter of the pair is approximately half as long as the basal segment of the longer.

Bathylaimus australis Cobb, 1893

Plate IV, fig. 7, a–e

Bathylaimus australis Cobb, 1893: 409–410, fig. 9, I–IV.

Bathylaimus assimilis de Man, 1922b: 119, 120, fig. 2–2e. NEW SYNONYMY.

L = ♂, 1.5–2.2 mm, ♀, 1.4 mm; w = 45–53 μ; diameter at base of esophagus 41–44 μ. Esophagus 270–370 μ. Vu = 51%. Tail 98–135 μ (3–3.5 a.b.d.). Head diameter 22–24 μ. Labial setae about 4 μ. Cephalic setae 20 + 9 μ, the longer set comprised of four segments. Cervical region bearing eight rows of somatic setae; those anterior to nerve ring being 5 μ long. Buccal cavity 37–39 μ long, bipartite (29–31 + 8–9 μ); without armature. Amphid 20 μ from anterior end, positioned over posterior half of the anterior portion of buccal cavity; internal amphidial pouch 5 μ wide, its orifice approximately 3 μ. Spicula 48–50 μ long, gubernaculum 50 μ long. Female tail without setae, male tail bearing setae as illustrated (Fig. 7, b, c).

Representation in samples studied.—V, Vero Beach.

Geographical distribution.—Cosmopolitan.

Remarks.—In considering the synonymization of *B. assimilis* de Man with *B. australis* Cobb, the following facts are pertinent. Wieser, 1956, separated the two species on the basis of different values for the lengths of both the buccal cavity and the spicula. According to the information presented by that author, *B. australis* has a buccal cavity of 33 μ and spicula of similar length, while in *B. assimilis* the figures were 50–55 μ and 45 μ, respectively. Further, Wieser states that: "*B. australis* and *B. assimilis* are very closely related and the differences in the length of both spicula and buccal cavity are the only ones I can find." An examination of the original description of *B. australis* shows that Cobb's animal had a buccal cavity of 50 μ and spicula of approximately 40 μ. These figures closely approach those presented by de Man in his original description of *B. assimilis* (buccal cavity 40–43 μ, spicula 37 μ). On this basis we consider *B. assimilis* de Man, 1922b, along with its synonyms, to be a junior synonym of *B. australis* Cobb, 1893.

B. setosicaudatus Timm, 1961, while extremely close to *B. australis*, can be separated by the fact that the spicular cephalization is reduced while that of *B. australis* is prominent. Also the spicula are uniformly bent in *B. setosicaudatus*, while in *B. australis* most of the curvature is limited to the mid region.

Bathylaimus arthropappus new species

Plate IV, fig. 8, a–f

L = 3.1–3.3 mm; w = ♂, 52–55 μ, ♀, 62 μ. Diameter at base of esophagus, ♂, 44–48 μ, ♀, 53 μ. Esophagus ♂, 687–750 μ, ♀, 820 μ, Vu = 56%. Tail ♂, 118–130 μ (3.4–3.7 a.b.d.), ♀, 220 μ (5.4 a.b.d.). Head diameter, 34–37 μ. Labial setae about 20 μ. Cephalic setae 47–52 + 18–19 μ. Both the labial setae and longer cephalic setae are segmented, with the former having three segments and the latter four. Cervical region bearing eight rows of somatic setae which are more or less arranged in circles. First circle, 6 μ long, near base of amphid. Second circle, 17 μ long, half the distance from the anterior end to the nerve ring. Third circle, 8 μ long, just anterior to nerve

ring. Remaining two circles, 8–9 μ long, posterior to nerve ring, the last 70 μ posterior to nerve ring. Buccal cavity 28–35 μ long, without armature. Amphid in ♂, 12–13 μ, in ♀, 8 μ wide, located posterior to buccal cavity, 37–38 μ from anterior end. Spicula 50–57 μ long, proximally cephalated. Gubernaculum 50 μ long. Male tail bearing setae as illustrated (Fig. 8, f); subterminal setae 40–45 μ long. Four gland cells are associated with the spinneret apparatus in both sexes.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4070, Type slide No. 61. Type locality, M-5, Virginia Key.

Representation in samples studied.—M-5, Virginia Key.

Geographical distribution.—The species also occurs at Gulf Shores, Alabama (unpublished observation).

Remarks.—The region of the esophagus directly posterior to the buccal cavity is constructed in such a manner that, if the esophageal musculature were to exert a pull in this region, a cavity might arise which could be mistaken for a second compartment of the buccal cavity. This subject was also brought up in the description of *B. capacosus* Hopper, 1962.

PHANODERMATIDAE

PHANODERMOPSIS Ditlevsen, 1926

Type species.—*Phanodermopsis groenlandica* Ditlevsen, 1926: 13, 14, pl. 7, figs. 1, 2; pl. 8, fig. 5.

Our material contained typical representatives of *P. longisetae* Chitwood, 1936.

The following species have been described since a key to the species of this genus was given by Wieser (1953): *P. conicauda* Filipjev, 1946, and *P. ingrami* Mawson, 1958, belonging to Wieser's group A, and *P. obtusicauda* Filipjev, 1946, belonging to group B. *P. necta* Gerlach, 1957, does not appear to belong to this genus, since it has a well developed supplement and spicula as in *Phanoderma*. *P. suecica* Allgén, 1953, is a *species inquirenda*.

Mawson (1958a) raised the question of the position of this genus since Ditlevsen (1926) did not designate a type species. However, Filipjev (1927) in the appendix to his paper, established synonymy of his genus *Galeonema* with *Phanodermopsis* and designated *P. groenlandica* Ditlevsen as the type species.

Phanodermopsis longisetae Chitwood, 1936
Plate V, fig. 9 a–c

Phanodermopsis longisetae Chitwood, 1936: 209, 210, pl. 26, figs. 16–19.

L = 3.85 mm; w = 80 μ; tail 250 μ. Head diameter 15 μ, capsule weakly developed. Labial papillae distinct, conical. Cephalic setae 15 + 10 μ long. Amphids 6 μ wide = 40% of head diameter, 10 μ behind anterior end. Excretory pore 55 μ behind anterior end. Spicula 360 μ. Gubernaculum 56 μ. Caudal setae arranged in characteristic pattern, the setae being of two types: one fleshy and S-shaped, the other slender and straight or slightly curved.

Representation in samples studied.—V, Vero Beach.

Geographical distribution.—Beaufort, North Carolina (Chitwood, 1936).

ENOPLIDAE

ENOPLOIDES Saveljev, 1912

Type species.—*Enoploides typicus* Saveljev, 1912: 115.

In this genus, classification is possible only on the basis of the male genital armature. Consequently, we have to insist that all species known from juveniles or by females only are to be regarded as *species inquirendae*. This includes, in addition to the doubtful species mentioned by Wieser (1953), the following: *E. labiatus* Bütschli, 1874 [Synonymy of this species with *E. spiculohamatus* Schulz, 1932, cannot be proven in any way and should be abandoned, as advocated by Brunetti, 1950.], *E. tridentatus* Saveljev, 1912, *E. brevis*

Filipjev, 1918, *E. brattstromi*, *E. paralabiatus*, *E. reductus*, and *E. longicaudatus* all Wieser, 1953, *E. oligotricha* Mawson, 1956 (syn. *E. oligochaetus* Mawson, 1956), *E. pterognathus* Mawson, 1956, and *E. kerguelense* Mawson, 1958.

The remaining species can be separated into two groups, one with short spicula, the other with extremely long spicula. The former group comprises only two species, viz., *E. cirrhatus* Filipjev, 1918, and *E. tyrrhenicus* Brunetti, 1949 (cf. Gerlach, 1952), for which most likely a new genus or subgenus should be established.

The group with long spicula is very uniform. Since the gubernaculum represents one of the best distinguishing characters, the shape of this organ in all the species belonging to this group (except *E. typicus*, of which no figures were given) is shown in Text-figure 1. A number of species can be separated immediately by the shape of the gubernaculum, viz., *E. hirsutus* Filipjev, 1918, *E. brunettii* Gerlach, 1952, *E. vectis* Gerlach, 1957 (syn. *E. brunettii* var. *vectis*), and *E. harpax* Wieser, 1959. In the remaining species the gubernaculum is more or less S-shaped, although differences in shape between the species can be found. The species comprising this remaining group can be separated by use of the following key.

Key to Species of *Enoploides* Possessing S-shaped Gubernacula

1. Cephalic setae of equal length ..... *E. cephalophorus* (Ditlevsen, 1919)
   Cephalic setae of unequal length 2
2. Longest cephalic setae about 1.2 head diameters long, shorter setae measuring ½ of longer ones. Gubernaculum with characteristic ventral knob ..... *E. gryphus* n. sp.
   Longest cephalic setae measuring not more than one head diameter, shorter ones about ½ that length. Gubernaculum rather smoothly S-shaped 3
3. Tip of gubernaculum apparently 3-pronged; supplement measuring about half the corresponding body diameter (description and figures not quite clear) ..... *E. spiculohamatus* Schulz, 1932
   Tip of gubernaculum 2-pronged; supplement much shorter 4
4. Distal end of spicula with mobile spine; mandibles 55–60 μ long ..... *E. amphioxi* Filipjev, 1918
   Distal end of spicula without mobile spine; mandibles 45 μ or less 5
5. Spicula smooth, distal end pointed, then dilated; mandibles about 45 μ (extrapolated from Southern's figures and text) ..... *E. labrostriatus* (Southern, 1914)
   Spicula vertically striated, in their distal half with a diagonal break (Fig. 10, c); mandibles 30–35 μ long ..... *E. bisulcus* n. sp.

The type species, *E. typicus* Saveljev, 1912, is poorly known since no figures were given. It seems to differ from all other species by the small dimensions of its organs (cephalic setae only 8 μ long, buccal cavity only 9 μ deep!).

Enoploides bisulcus new species

Plate V, fig. 10, a–d

L = 3.5–4.2 mm; w = 115–120 μ; diameter at base of esophagus 95–105 μ. Esophagus 750–800 μ; nerve ring at 25%. Vu = 52.5%. Eggs 165 × 75 μ, one per uterus. Tail in ♂, 170–200 μ (4 a.b.d.), in ♀, 215–225 μ (3.7–4.5 a.b.d.), in juvenile 4.8 a.b.d. long. Head diameter 50–56 μ. Labial setae 25 μ. Cephalic setae 45–50 + 25–28 μ. Mandibles 30–35 μ long, deeply notched anteriorly, with strong apophyses and muscles that link them to the buccal capsule. Subventral teeth small, nearly parallel to mandibles and thus difficult to observe in lateral view. Their presence can best be ascertained in *en face* view. Dorsal tooth seemingly absent. Peribuccal portion of esophagus strongly developed, muscular. Spicula 420–475 μ, knobbed proximally, vertically striated throughout, with a diagonal break in their distal end that runs from dorsal to ventral, tip pointed. Gubernaculum S-shaped, its proximal end open, ill-defined; distal end forked. Supplement 20 μ long, 120–150 μ preanal. Tail with pair of fleshy, S-shaped spines and a number of setae. Setae in anal area and paired terminal setae, 17 μ long.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Ento-

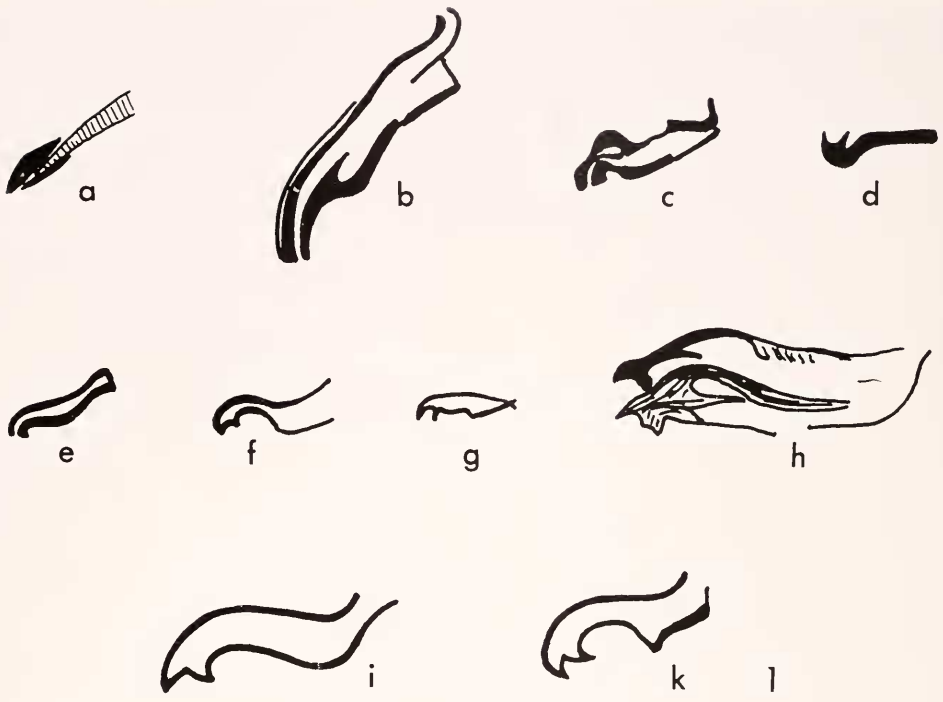

Figure 1. Gubernacula of several species of *Enoploides*. a—*E. hirsutus*; b—*E. brunettii*; c—*E. vectis*; d—*E. harpox*; e—*E. amphioxi*; f—*E. labrostriatus*; g—*E. cephalophorus*; h—*E. spiculohamotus*; i—*E. bisulcus*; k—*E. gryphus*. All gubernacula copied from original descriptions of respective species.

mology Research Institute, Ottawa, Collection Number 4067, Type slide No. 62. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

Enoploides gryphus new species

Plate III, fig. 11c; plate V, fig. 11 a, b

L = 3.0–3.7 mm; w = 85–100 μ; diameter at end of esophagus 70–85 μ. Esophagus 800–900 μ. Tail 190–240 μ; a.b.d. 45–60 μ. Head diameter 45–57 μ. Labial setae 28–32 μ. Cephalic setae 60–80 + 20–27 μ. Mandibles 26–28 μ. Apart from the dimensions, the structure of the buccal armature is the same as in *E. bisulcus*. Spicula 230–260 μ, 6–7 μ wide, knobbed proximally, vertically striated throughout, without break, tip pointed. Gubernaculum hook-shaped, with characteristic ventral knob. Supplement 80–110 μ preanal. Tail with pair of slender postanal spines (not S-shaped as in the foregoing species) and several setae. (Note: All the somatic and caudal setae on this species are shorter and more slender than on *E. bisulcus*.)

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4070, Type slide No. 63. Type locality, M-5, Virginia Key.

Representation in samples studied.—M-5, Virginia Key.

Remarks.—This species resembles the foregoing one in most respects. The main distinguishing features are the longer cephalic setae and the shorter spicular apparatus.

MESACANTHOIDES Wieser, 1953

Type species.—*Mesacanthoides sculptilis* Wieser, 1953: 86, fig. 46, a–d.

Through the addition of two new species this genus is becoming more heterogeneous as far as the male genital apparatus is concerned. However, its most characteristic feature, the shape and texture of the mandibles, suffices to separate it clearly from related genera. Classification is largely based on the genital armature (see Wieser, 1959). Consequently, *M. wieseri* Mawson, 1956, has to be considered a *species inquirenda*, although it appears to be closely related to *M. latignathus*.

Key to Species of *Mesacanthoides*

1. Gubernaculum reduced, no supplement ..... *M. latignathus* (Ditlevsen, 1919)
   Gubernaculum and supplement present 2
2. Supplement small, tubular 3
   Supplement very large, "wrench-like" ..... *M. sculptilis* Wieser, 1953
3. Spicula more than two anal diameters long, tail filiform, with flagellum ..... *M. fibulatus* n. sp.
   Spicula about one anal diameter long, tail plump or elongate, never filiform 4
4. Gubernaculum more or less plate-shaped; head with four circles of cephalic setae ..... *M. caputmedusae* (Ditlevsen, 1919)
   Gubernaculum S-shaped; head with 2–3 circles of cephalic setae 5
5. Implantation of cephalic setae near middle of cephalic capsule; spicula strongly arcuate, tip pointed ..... *M. sinuosus* Wieser, 1959
   Implantation of cephalic setae at posterior edge of cephalic capsule; spicula nearly straight, tip elaborately armed ..... *M. psittacus* n. sp.

Mesacanthoides fibulatus new species

Plate VII, fig. 12 a–c

L = 4.3 mm; w = 75 μ. Esophagus = 675 μ. Tail = 350 μ. Head diameter 33 μ. Labial setae 10 μ. Longest cephalic setae 42 μ, setae of submedian pairs sticking together. One circle of subcephalic setae in male. Cephalic capsule deeply lobed. Cephalic organ present, in front of lateral cephalic seta. Mandibles 18 × 10 μ, solid as in *Enoploides* but with an additional transverse bar near the anterior end; moreover, the sclerotization is not uniform but gives a mottled impression. The tips of the claws are darker than the rest of the mandibles. Teeth well developed, about half as long as the mandibles. Stomodeal ring forming three "brackets" around the mandibles which serve as muscular attachments. Spicula 125–135 μ, about 4 anal diameters, cephalate proximally, with a break just before the distal sixth. Gubernaculum slightly S-shaped, 15 μ long. Supplement small, about 90 μ in front of anus. Tail at first conical, then abruptly attenuated and drawn out into an extremely long and whip-like flagellum, about five times the length of the spicula. In the circumanal region there are scattered setae.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4069, Type slide No. 64. Type locality, M-3, Key Biscayne.

Representation in samples studied.—M-3, Key Biscayne.

Mesacanthoides psittacus new species

Plate VI, fig. 13 a–e

L = 2.32 mm; w = 50 μ; esophagus = 540 μ; tail = 222 μ. Head diameter 35 μ. Lips plump, labial setae stout, 15 μ. Cephalic setae: lateral 62 μ, submedian 56 + 27 μ, implanted near posterior edge of cephalic capsule. The latter with straight edge, 17 μ high. Mandibles 19 × 11 μ, powerful, plump, of typical shape and texture, each claw with an oval apophysis on its "shoulder." Teeth well developed, about half as high as the mandibles. Spicula plump, nearly straight, 50 μ long, their tips broad, each with a three-pronged process on the caudal edge. Gubernaculum S-shaped, about 26 μ long, powerful. Supplement small, 90 μ in front of anus. Tail 5 anal body diameters long, with scattered setae.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collec-

tion Number 4074, Type slide No. 65. Type locality, L, Lauderdale-by-the-Sea.

Representation in samples studied.—L, Lauderdale-by-the-Sea.

ONCHOLAIMIDAE

ONCHOLAIMUS Dujardin, 1845

Type species.—*Oncholaimus attenuatus* Dujardin, 1845: 236.

Keys to the species of *Oncholaimus* can be found in the works of Kreis (1934) and Wieser (1953).

Oncholaimus dujardinii de Man, 1878
Plate VII, fig. 14, a, b

Oncholaimus dujardinii de Man, 1878: 94, pl. 7, fig. 4, a–c.

L = 2.4–2.95 mm; w = 42–45 μ; esophagus 350 μ. Vu = 76%. Tail, in ♀, 67 μ long (2.6 a.b.d.). Head 18–20 μ wide, bearing 10 short, subequal cephalic setae, the longest 4 μ long. Buccal cavity 22–24 × 12 μ armed with 3 strong teeth of which the left subventral is the more prominent. Amphids in male 7–9 μ wide (= 37–45% of c.b.d.). Anterior end of esophagus with a pair of dark pigmented masses (cf. de Man, 1878). Excretory pore 45–50 μ behind anterior end. Renette cell prominent, 90–100 μ long, located approximately 200 μ posterior to base of esophagus. Spicula 27–31 μ long, proximally cephalated. Gubernaculum absent, although a dorsal thickening of the cloacal lining may give the impression of the presence of such a structure. The thickened area appears to be a point of attachment for muscles associated with the spicula. Male tail 40 μ long, ventrally curved; with 12–16 stout, circumcloacal setae. Distal extremity of male tail slightly enlarged and bearing two pairs of short, stout, subventral setae and a pair of slender, subdorsal setae.

Representation in samples studied.—M-1, Key Biscayne.

Geographical distribution.—Cosmopolitan.

Discussion.—While our species appears to be *O. dujardinii* de Man, 1878, there remains some doubt as to the identity of this species. Schuurmans-Stekhoven (1950) and Inglis (1962) reason that the typical *O. dujardinii* is devoid of a gubernaculum, whereas *O. dujardinii* de Man *sensu* Steiner, 1915 (and other authors) possesses such an organ and thus represents a different species. However, we are of the opinion that the dorsal thickening of the cloacal lining described in our specimens has been occasionally misinterpreted as a gubernaculum and we regard the questioned accounts of *O. dujardinii* as representing de Man's species.

ONCHOLAIMIUM Cobb, 1930

Type species.—*Oncholaimium appendiculatum* Cobb, 1930: 227, figs. 2, 3, 6, v, 8, 9.

A discussion of this genus, with a key to species, was given recently by Chitwood (1960). We feel that separation of this genus from *Oncholaimus* should be based mainly on the presence of a Demanian system and not so much on that of the *pre*anal papillae (not *post*anal, as erroneously stressed by Wieser [1953] and subsequent authors), as rudiments of preanal papillae can also be found in representatives of the latter genus as well as in other oncholaimid genera. This would suggest that the two short-spiculed species of *Metoncholaimus* described by Mawson, i.e., *M. brevispiculum* Mawson, 1957, and *M. thysanouraios* Mawson, 1958, actually ought to be referred to *Oncholaimium*. The diagnosis of Cobb (1930) has to be emended so as to include, in this genus, species in which the Demanian organ is provided with exit pores.

Both species found in Florida have been previously reported from the east coast of the United States.

Oncholaimium appendiculatum Cobb, 1930
Plate VIII, fig. 15, a–c

Oncholaimium appendiculatum Cobb, 1930: 227, figs. 2, 3, 6, v, 8, 9.

L = 2.27 mm; w = 44 μ; esophagus = 360 μ; nerve ring 280 μ behind anterior end. Head diameter 26 μ. Labial capsule lobed, conspicuous. Labial papillae conical. Cephalic setae 9 μ, equal. Buccal cavity 30 × 18 μ. Teeth 25 + 15–16 μ, the longest one reaching to about the level of implantation of the cephalic setae. Amphids 11 μ = 40% of c.b.d. wide. Scattered cervical setae. Excretory pore 30 μ in front of nerve ring. Spicula 65 μ (one tail length). No gubernaculum. Anal diameter 25 μ. One large, "prehensile" preanal papilla. Twenty-four to 26 circum- and postanal setae, about 13 μ long. Tail with small ventral papillae at the beginning of the distal third.

Representation in samples studied.—M-1, Key Biscayne.

Geographical distribution.—Woods Hole, Massachusetts, ? Beaufort, North Carolina (Pearse, Humm and Wharton, 1942).

Oncholaimium domesticum Chitwood and Chitwood, 1938

Plate VIII, fig. 16 a–d

Oncholaimium domesticum Chitwood and Chitwood, 1938.

Oncholaimium oxyuris var. *domesticus* Chitwood and Chitwood, 1938: 458, 459, fig. 1, f–h; nec Timm, 1952.

L = 3.3–3.4 mm; w = ♂, 65 μ, ♀, 85 μ; esophagus = 525–550 μ. Tail = 70 μ. Vu = 64%. Head diameter 37 μ. Labial capsule lobed, inconspicuous. Six labial papillae. Cephalic setae subequal, 8 μ. Buccal cavity 37–38 × 25–26 μ. Teeth 25 + 21 μ. Amphids 7–8 μ = 20% wide (both sexes). Excretory pore 70–75 μ behind buccal cavity. Demanian organ well developed, uvette about 400 μ posterior to vulva, 1–2 adanal openings on each side. Spicula 45 μ (one a.b.d.). No gubernaculum. Preanal papilla with two setae. Postanal papillae at the beginning of the distal third of the tail. Circumanal setae present. Tail 60–70 μ, with terminal swelling.

Representation in samples studied.—M-1, Key Biscayne.

Geographical distribution.—New York (Chitwood and Chitwood, 1938), California (Chitwood, 1960).

Remarks.—The characters distinguishing this species from *O. oxyure* (Ditlevsen, 1911) are the short teeth, the well-developed preanal papilla with setae and the stout spicula. The specimens described by Timm (1952) deviate in all these characteristics from *O. domesticum* and seem to be representatives of *O. oxyure*.

METONCHOLAIMUS Filipjev, 1918

Type species.—*Oncholaimus demani* Zur Strassen, 1894: 460, pl. 29, fig. 2.

A key to this genus was given recently by Chitwood (1960). We are of the opinion that, because of the shortness of their spicula, *M. brevispiculum* Mawson, 1957, and *M. thysanouraios* Mawson, 1958, belong to *Oncholaimium*. *M. haplotretos* Mawson, 1958, is considered as doubtful since only females are known.

Our material contained three new species, all of which are characterized by relatively short spicula (< 180 μ as against 250–750 μ in other species) and by the absence of a gubernaculum [which is also lacking in *M. albidus* (Bastian, 1865) but is present in all other species]. Moreover, *M. intermedius* and *M. simplex* are distinguished by short and plump tails, *M. simplex* by the presence of only one Demanian exit pore, *M. scissus* by two ventral papillae on the ♂ tail and by the slit-like openings of the Demanian organ. The relative position of osmosium and uvette serves as a further character distinguishing *M. simplex* and *M. intermedius*.

Metoncholaimus intermedius new species

Plate IX, fig. 17 a, d, e; Plate X, fig. 17 b, c

L = 2.2–2.7 mm; w = 38 μ; esophagus = 350–400 μ; Vu = 66–74%. Head diameter 26 μ. Labial papillae small but distinct. Labial capsule deeply lobed. Cephalic capsule weak. Cephalic setae 8 μ, subequal. Amphids 6 μ in ♀, 8–9 μ = 30–33% of c.b.d. in ♂. Buccal cavity 25–28 × 16–18

μ. Longest tooth 19–20 μ. Ventral gland 150–200 μ behind esophagus; excretory pore 80–90 μ behind anterior end. In some specimens large coelomocytes. Demanian organ well developed, uvette 325 μ behind vulva, osmosium anterior to uvette, two exit pores 70–100 μ preanal. Eggs 90 × 40 μ. Spicula 70–77 μ long, no gubernaculum. Preanal elevation with short, stout seta. Fourteen circumanal setae. One pair of postanal elevations with setae, near beginning of distal third of tail. Anal diameter 25 μ. Tail in ♀, 30 μ, in ♂ 48 μ long. Caudal glands 350, 490, and 560 μ preanal.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4070, Type slide No. 66. Type locality, M-5, Virginia Key.

Representation in samples studied.—M-5, Virginia Key.

Metoncholaimus simplex new species
Plate IX, fig. 18 a; Plate X, fig. 18 b–e

L = 1.95–2.32 mm; w = ♂, 40, ♀, 43–53 μ; esophagus = 330–360 μ; Vu = 63–70%. Head diameter 24–27 μ. Labial papillae small. Labial capsule indistinct. Cephalic capsule relatively (for this family) well developed. Cephalic setae 8–9 μ, subequal. Amphids 9 μ in ♀, 10 μ = 40% of c.b.d. in ♂. Buccal cavity 29–30 × 16–18 μ. Excretory pore 90–100 μ behind anterior end. Demanian organ well developed, uvette 360–430 μ posterior to vulva and 200–280 μ anterior to anus; osmosium *posterior* to uvette; one exit pore, opening on level of anus at dorsal side of body. Moniliform glands of varying grades of distinctness in different specimens. Eggs 107–120 × 40–45 μ. Spicula 120 μ long; no gubernaculum. Twelve to 14 circumanal setae and perhaps two preanal, indistinct pores. Tail conical, 37 μ long in ♂, 40–46 μ in ♀. Anal diameter 26 μ in ♂, 30–32 μ in ♀. In the single male a subterminal dorsal structure was seen on the tail which might represent the opening of two of the three caudal glands. In the female all caudal glands definitely open through the spinneret.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4070, Type slide No. 67. Type locality, M-5, Virginia Key.

Representation in samples studied.—M-5, Virginia Key.

Metoncholaimus scissus new species
Plate IX, fig. 19 a, b; Plate X, fig. 19 c

L = 4.3–4.5 mm; w = ♂, 64, ♀, 72 μ; diameter at base of esophagus ♂, 59, ♀, 69 μ. Esophagus 600–640 μ long. Vu = 65%. Head diameter 36–40 μ. Head with six small labial papillae. The nerves innervating the labial papillae and the points at which they pass through the cuticle are more prominent that the papillae themselves. Cephalic setae 13–15 μ, subequal. Amphid 10–11 μ wide. Buccal cavity 45–48 × 25–27 μ. Longest tooth 35–38 μ, shorter teeth 25–28 μ. Excretory pore 105–125 μ from anterior end. The most conspicuous structures of the Demanian organ are the moniliform glands. These glands are approximately 225 μ long and open to the exterior via 17 μ wide slits (not pores), which are located 157–172 μ preanal. Eggs 115–140 × 55–60 μ, six seen in the uterus of one specimen. Spicules 175–180 μ long. Dorsal wall of cloaca thickened, but not forming a distinct gubernaculum. Tail in ♀, 200–215 μ, in ♂, 220–230 μ long. Male with 5 pairs of circumanal setae, 6–7 pairs of subventral setae and two prominent ventral papillae.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4070, Type slide No. 68. Type locality, M-5, Virginia Key.

Representation in samples studied.—M-5, Virginia Key.

PROONCHOLAIMUS Micoletzky, 1924

Type species.—*Oncholaimus megastoma* Eberth, 1863: 26, pl. 1, figs. 18–20.

This genus is easily recognized by the large bubble-like cells ("Trabekula-Struktur," in German literature) that occur in the pseudocoelomic cavity between the longitudinal chords and the intestine. *P. armiger* Gerlach, 1955, does not possess these cells and is, therefore, of uncertain status. Moreover, since the spicular apparatus turns out to be of prime importance for classification, a number of species known only as females or juveniles have to be considered *species inquirendae*. These are: *P. keiensis*, *P. longisetosus*, and *P. obtusicaudatus*, all Kreis, 1932.

The remaining species form an extremely closely related group and are difficult to separate on the basis of existing information. We agree with Inglis (1962) that the shape of the distal end of the spicula might serve as an important taxonomic character, and use it as such in the differentiation of our species, although we realize that the data in the literature on which some of our conclusions are based probably are insufficient.

List of species of Prooncholaimus (*and their synonyms*)

P. megastoma (Eberth, 1863) [syn. *Oncholaimus megastoma* Eberth, 1863, *Prooncholaimus mediterraneus* Schuurmans-Stekhoven, 1943, nom. nov. for *P. megastoma* Micoletzky, 1924 nec Eberth, *P. megastoma* var. *neapolitanus* Micoletzky, 1924, *P. neapolitanus* (Micoletzky) Kreis, 1934]; *P. eberthi* (Filipjev, 1918) [Syn. *Metoncholaimus eberthi* Filipjev, 1918]; *P. ornatus* Kreis, 1932; *P. aransas* Chitwood, 1951; *P. banyulensis* Inglis, 1962; *P. hastatus* n. sp.

Our new species, *P. hastatus*, is most closely related to *P. banyulensis*, in that the distal extremity of the spicula possesses a distinct barb which is separated from the subterminal swelling of the spicula by a "handle." The two can be separated as follows:

Handle between subterminal swelling of spicula and barb very short; length of spicula 119–135 μ; tail with long terminal setae ..... *P. banyulensis* Inglis, 1962

Handle between subterminal swelling and barb about the same length as the barb itself; length of spicula 90–95 μ; terminal setae very short ..... *P. hastatus* n. sp.

Prooncholaimus hastatus new species

Plate XI, fig. 20 a–e

L = 2.10–2.53 mm; w = 80–100 μ; esophagus: ♂, 310–375 μ, ♀, 425 μ; tail: ♂, 120–150 μ, ♀, 175 μ; Vu = 73%. Head diameter 28 μ. Labial capsule well developed, lobed. Cephalic setae 5 μ, subequal. Amphid in ♂, 10–11 μ = 30% of c.b.d., in juvenile ♀ = 7 μ. Buccal cavity 40 × 21 μ, teeth 31 + 23 μ. Excretory pore on level of cephalic setae in adults. Esophagus with posterior pyriform swelling. Spicula 90–95 μ long, funnel-shaped proximally, distally with subterminal swelling, handle and well-developed barb. Gubernaculum 15 μ long, rather stout. There is an indication of a bursa and there are four pairs of adanal setae. More setae can be found anterior to the anus and subventrally along the tail. Anal body diameter 33 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4073, Type slide No. 69. Type locality, M-8, Biscayne Bay.

Representation in samples studied.—M-8, Biscayne Bay.

VISCOSIA de Man, 1880

Type species.—*Oncholaimus viscosus* Bastian, 1865: 136, pl. 11, figs. 131–133.

There is a group of species in this genus in which the cephalic setae are reduced to papillae or even to barely visible shallow pits in the cuticle. This morphological feature, in addition to the fact that in this genus the spicula offer hardly any distinguishing characters, renders classification particularly difficult. Stress has to be

laid on size of amphids, shape of buccal cavity and teeth, arrangement of male circumanal organs like papillae and bursa, and shape of tail.

Key to Species of *Viscosia* Having Cephalic Papillae

1. Buccal cavity divided by strong cuticular ring into two chambers; one side of buccal cavity weakly cuticularized (resembling the condition in *Oncholaimellus*); ♂ amphids 60% of c.b.d.; pharyngeal valve about three times its own length behind buccal cavity ..... *V. oncholaimelloides* n. sp.
   Buccal cavity not divided by cuticular ring (at most a faint line can be seen); buccal wall well developed all around; amphids not more than 50% of c.b.d. wide; pharyngeal valve not more than its own length behind buccal cavity 2
2. Male with bursa (or circumanal "alar membrane" *sensu* Chitwood, 1960, who was the first to point out the importance of this character) 3
   Male without bursa 4
3. Male amphids ⅓ of c.b.d.; walls of buccal cavity strongly cuticularized; ♂ tail 6 a.b.d. ..... *V. papillata* Chitwood, 1951
   Male amphids 40–45% of c.b.d.; walls of buccal cavity normally developed; ♂ tail 3.4–4.6 a.b.d. ..... *V. papillatoides* Chitwood, 1960
4. Male amphids at most 33% of c.b.d. wide ... 5
   Male amphids 45–50% of c.b.d. wide 7
5. Cephalic papillae distinct; long tooth not quite reaching to anterior end of buccal cavity; ♂ with 3 preanal and 3 postanal, small, setose papillae ..... *V. keiensis* Kreis, 1932
   Cephalic papillae indistinct, long tooth reaching to anterior end of buccal cavity; ♂ with not more than 1 preanal and 1 postanal papilla 6
6. Male amphids 33% of c.b.d.; 1 preanal papilla; spicula open proximally ..... *V. nuda* Kreis, 1932
   Male amphids 25% of c.b.d.; 1 preanal and 1 postanal papilla; spicula knobbed ..... *V. meridionalis* Kreis, 1932
7. Cephalic papillae distinct; longest tooth not quite reaching to anterior end of buccal cavity 8
   Cephalic papillae indistinct to seemingly absent; longest tooth reaching to anterior end of buccal cavity ..... *V. carnleyensis* Kreis, 1932
8. Male tail cylindrical, 5 a.b.d. long ..... *V. nicaraguensis* (Gerlach, 1957)
   Syn. *V. papillata* var. *nicaraguensis* Gerlach, 1957
   Male tail filiform, 8–13 a.b.d. long 9
9. Male with only traces of circumanal papillae ..... *V. glabra* (Bastian, 1865)
   Male with 6 pairs of setose circumanal papillae ..... *V. macramphida* Chitwood, 1951

Remarks.—The relationship of the two latter species is uncertain because no good figures of the male amphids in *V. glabra* have been published. However, the figures of female heads as given by De Coninck (1944) and Schuurmans-Stekhoven (1950) show the amphids to be ⅓ to ⅖ of the c.b.d. in width, or nearly as wide as the stoma, from which it may be concluded that the male amphids should be just as wide as those of *V. macramphida*. The only good difference we could find between the two species in question seems to be the size and arrangement of the genital papillae in the male. We consider this difference to be of specific value for the time being since figures of the male genital region in *V. glabra*, as given by two such excellent observers as de Man (1890) and Micoletzky (1924a), fail to show anything that can be compared with the distinct setose papillae that Chitwood (1951) and we (see below) found in *V. macramphida*.

Doubtful species are: *V. linstowi* (de Man, 1904), *V. pseudoglabra* Kreis, 1932, *V. dubiosa* Kreis, 1932, *V. fatigans* Filipjev, 1946, all of which are known only as juveniles or females, and *V. pellucida* (Cobb, 1898) nec Allgén, 1959, of which no figures were given. The statement in the key by Wieser (1953), copied from Kreis (1934), to the effect that in *V. linstowi* the excretory pore lies only two stomatal lengths from the anterior end, was based on an erroneous translation of de Man's text.

Viscosia oncholaimelloides new species
Plate XI, fig. 21 a–c

L = 1.95 mm; w = 22 μ; esophagus = 300 μ; tail: ♂, 140 μ. Head diameter 12–13 μ. Lips distinct; cephalic papillae distinct. Buccal cavity separated into two chambers

by cuticular ring; anterior portion 5 μ, posterior portion 8–9 μ deep. The large subventral tooth is anchored to the buccal wall from the cuticular ring back to about the middle of the posterior chamber; from there on the buccal wall is weakly developed, resembling the condition in *Oncholaimellus*. The two smaller teeth are normally developed as in other species of *Viscosia* and not reduced as in *Oncholaimellus*. Large subventral tooth 10 μ long. Pharyngeal valve 7–8 μ behind buccal cavity. Scattered papillae in cervical region. Excretory pore just behind nerve ring, 165 μ behind anterior end. Male: spicula dagger-shaped, 17 μ long (1 a.b.d.). There are five pairs of circumanal papillae and one more pair of preanal and postanal papillae, respectively. Scattered papillae on tail.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4073, Type slide No. 70. Type locality, M-8, Biscayne Bay.

Representation in samples studied.—M-8, Biscayne Bay.

Viscosia papillata Chitwood, 1951
Plate XII, fig. 22 a–f

Viscosia papillata Chitwood, 1951: 627, fig. 1, k–n.

L = ♂, 1.18–1.24 mm, ♀, 1.04 mm; w = 39–47 μ; diameter at base of esophagus 39–40 μ. Esophagus 235–250 μ long. Tail 120–125 μ long. Vu = 67%. Head diameter 16 μ. Labial capsule well developed, cephalic papillae distinct. Amphid in male 6 μ, in female 5 μ wide, ⅓ of corresponding body diameter. Buccal cavity 21–22 μ deep, its walls particularly strong. Excretory pore 130–145 μ from anterior end, 15–20 μ behind nerve ring. Excretory cell 30 μ long, 40 μ behind base of esophagus. Spicula 24–25 μ long. Male with circumanal ala containing six pairs of papillae, the posterior pair the most prominent. In addition a pair of preanal setae is present.

Representation in samples studied.—M-7, Everglades National Park; V, Vero Beach.

Geographical distribution.—Copano Bay, Texas (Chitwood, 1951), Chesapeake Bay, Maryland (Timm, 1952).

Viscosia macramphida Chitwood, 1951
Plate XII, fig. 23, a–d

Viscosia macramphida Chitwood, 1951: 627, fig. 1, i–j.

L = 1.5–1.8 mm; w = 40 μ; diameter at base of esophagus 34–39 μ. Esophagus 260–305 μ long. Tail 180–195 μ long. Head diameter 13–16 μ. Labial capsule indistinct, cephalic papillae distinct. Amphid 7 μ wide. Buccal cavity 20–21 μ deep. Excretory pore 30 μ behind nerve ring. Spicula 23–25 μ long. Male with 4–5 pairs of setose papillae associated with circumanal ala as in *V. papillata*.

Representation in samples studied.—M-2, Key Biscayne; M-8, Biscayne Bay.

Geographical distribution.—Aransas Bay, Texas (Chitwood, 1951).

ENCHELIDIIDAE
EURYSTOMININAE
EURYSTOMINA Filipjev, 1918
Type species.—*Eurystoma spectabile* Marion, 1870: 20, 21, pl. E, figs. 1–1b.

This genus has been reviewed by Inglis (1962), who bases his classification almost entirely on the shape of the gubernaculum. While we agree that quite generally in marine nematodes more emphasis should be placed on the structure of the male genital armature, we feel this feature should not dominate to such an extent that other characters are ignored. Thus, Inglis considers *E. americana* Chitwood, 1936, and *E. minutisculae* Chitwood, *sensu* Timm, 1952, to be conspecific because of the similarity in the shape of their gubernacula, although (in Inglis' own words): "Chitwood reports only one row of denticles in the buccal cavity and the absence of ocelli while Timm, in describing his *E. minutisculae*, mentions three rows of denticles and ocelli." Moreover, it could be added, Chit-

wood shows an almost rectangularly bent spiculum, Timm a semicircular one, Chitwood a short terminal excretory duct, Timm a long one, Chitwood a tail provided with setae, Timm a naked one, etc. On the other hand, Inglis considers *E. americana* Chitwood, 1936, *not* to be conspecific with *E. americana* of Chitwood, 1951, because of a slight difference in shape between the two gubernacula in question, although all other characters in the two descriptions seem to agree.

This approach ignores the possibility of small variations in structural features and overrates differences taken from the illustrations of authors of different reliability.

Our material contained one species which is sufficiently close to *E. minutisculae* as described by Chitwood, 1951, and by Timm, 1952, to identify it with this species. The gubernacula of our male specimens are very similar to that figured by Timm, whereas the spicula more closely resemble Chitwood's figure. The heads of the specimens described by Chitwood, by Timm, and by us are so similar that it would seem unwarranted to refer them to different species, although we feel that Chitwood and not Timm was correct in the interpretation of the excretory gland.

Eurystomina minutisculae Chitwood, 1951
Plate XIII, fig. 24, a, b

Eurystomina minutisculae Chitwood, 1951: 629, fig. 3, d–g.

L = 3.1–3.3 mm; w = 45 μ; diameter at base of esophagus 40–45 μ. Esophagus 660–670 μ long. Tail 114–122 μ (3 a.b.d.) long. Head diameter 20 μ. Cephalic setae 9 + 5 μ. Buccal cavity 17–18 μ long, separated into two chambers by three rows of denticles. Amphid aperture transversely oval, displaced dorsally. Excretory pore on level of amphids; terminal excretory duct short. Ocelli 58 μ from anterior end. Gland-like structures (?) present in anterior neck region. Spicula 63–66 μ long, apophysis of gubernaculum 26–31 μ long. Supplements 70–75 μ and 130–155 μ preanal. Three pairs of preanal setae present, one subventral and longer that the two submedian pairs; cuticle in vicinity of anterior pair thickened.

Representation in samples studied.—M-1, Key Biscayne; M-7, Everglades National Park.

Geographical distribution.—Aransas Bay, Texas (Chitwood, 1951), Chesapeake Bay, Maryland (Timm, 1952), ? San Salvador (Gerlach, 1955: *E.* aff. *minutisculae*).

ENCHELIDIINAE

ILLIUM Cobb, 1920

Type species.—*Illium exile* Cobb, 1920: 261, 262, fig. 45.

In 1920 Cobb described a genus, *Illium*, which has never been found again until now. Our material contains two species of which one seems to be Cobb's *I. exile*, while the other is new. So far no males are known in this genus, for which reason we have to deviate from our rule and base the following two descriptions on females only. The shape of the buccal cavity is very much as in *Symplocostoma* or *Polygastrophora* except that there are no teeth. This might also be the reason for the weaker development of the cuticular rings surrounding the buccal cavity. Our two species are easily distinguished by the dimensions of head, amphids, and buccal cavity, as well as by the position of the amphidial "sensilla" with respect to the buccal cavity.

Illium exile Cobb, 1920
Plate XIII, fig. 25 a–d

Illium exile Cobb, 1920: 261, 262, fig. 45

L = 2.02–2.22 mm; w = 23–30 μ; esophagus = 438–492 μ; nerve ring = 240 μ behind anterior end; tail = 110–122 μ; Vu = 60%. Head rounded, with six lips and, perhaps, minute labial papillae. There might be a second circle of cephalic papillae, but all these organs are extremely difficult to see. Buccal cavity consisting of vestibulum and two chambers, separated by two cuticular rings; the two chambers measure 7 μ in length, greatest width is 3 μ. Amphids con-

sisting of opening, about 3 μ wide, pouch, duct and an unusual structure which we call "sensilla." There is no indication of an ocellus as assumed by Cobb. Distance of sensilla from anterior end = 12 μ, c.b.d. = 10 μ. Excretory pore a short distance behind nerve ring. Anal body diameter 17 μ.

Representation in samples studied.—M-8, Biscayne Bay.

Geographical distribution.—Jamaica (Cobb, 1920).

Illium libidinosum new species
Plate XIII, fig. 26, a, b

L = 2.28 mm; w = 70 μ; esophagus = 570 μ; nerve ring = 258 μ behind anterior end; tail = 200 μ; Vu = 60%. Head as in the foregoing species but much larger. Buccal cavity 10 × 5 μ, walls more curved than in the foregoing species. Amphids 5 μ wide, sensilla 15 μ behind anterior end, filled with fragments of a dense material. Excretory pore 25 μ behind nerve ring. Anal body diameter 33 μ.

Holotype specimen.—Female; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4073, Type slide No. 71. Type locality, M-8, Biscayne Bay.

Representation in samples studied.—M-8, Biscayne Bay.

POLYGASTROPHORA de Man, 1922
Type species.—*Polygastrophora attenuata* de Man, 1922a: 131, 132.

In this genus four species each possessing seven esophageal bulbs have been described, to which we shall add a fifth one. Of these five species, *P. tenuicollis* (Allgén, 1951) is best considered a *species inquirenda* as advocated by Chitwood (1960), and not a synonym of *P. heptabulba* as suggested by Wieser (1953). The remaining four species are separated mainly by the arrangement of their cephalic setae, but we are not so sure whether this character will turn out to be as stable as we assume at present.

List and Short Characterization of Valid Polygastrophora *spp. Possessing Seven Esophageal Bulbs*

P. maior Schulz, 1932: Submedian cephalic setae in both sexes very unequal in length (½ and ⅕ of c.b.d., respectively). Excretory pore 130–150 μ from anterior extremity. Spicula length = ⅘ of tail. Gubernaculum conical.

P. heptabulba Timm, 1952: Submedian cephalic setae reduced in ♂, one head diameter long and subequal in ♀. Excretory pore 44 μ behind anterior end. Spicula length = ½ of tail. Gubernaculum absent.

P. septembulba Gerlach, 1954: Submedian cephalic setae subequal (7–6 μ) in ♂, very unequal in ♀ (shorter ones about 2 μ). Excretory pore 41–52 μ from anterior end. Spicula length = ⅖ to ½ of tail. Gubernaculum absent (Gerlach, 1954) or small (Chitwood, 1960).

P. edax n. sp.: Submedian cephalic setae very unequal in length in both sexes (8–7 + 2 μ). Excretory pore 48–50 μ behind anterior end. Spicula length = ½ of tail. Gubernaculum plate-shaped.

Our new species *P. edax* is related to *P. septembulba* from which it can be distinguished by the characters presented in the above list.

Polygastrophora edax new species
Plate XIV, fig. 27, a–c

L = 2.65–2.90 mm; w = 105–110 μ; esophagus = 550–600 μ; tail: ♂, 175 μ, ♀, 165 μ (3.5–4 a.b.d.); Vu = 53%. Head diameter 10 μ. Mouth opening crenate. No labial papillae. Cephalic setae in ♂, 7 + 2 μ, in ♀, 8 + ?, indistinct. Amphids oval, 4.5 μ wide in ♂. Buccal cavity 14 × 7 μ, with two faint cuticular rings at about its middle and one strong basal band that is resolvable into elongated cuticular bodies. Refractory bodies (ocelli?) 18–20 μ behind anterior end. Excretory pore 48–50 μ behind anterior end, ampulla about 72 μ. Male: Spicula 80 μ, knobbed proximally. Gubernaculum faint, plate-shaped. Subventral circumanal setae and along the tail.

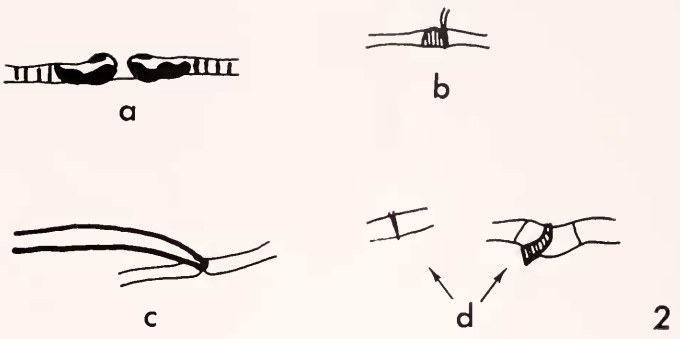

Figure 2. Types of preanal supplements in the Cyatholaimidae. a—*Pomponema* (type A); b—*Longicyatholaimus* (type B); c—*Paracanthonchus* (type C-1); d—*Paracyatholaimus* (type C-2, two forms).

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4075, Type slide No. 72. Type locality, V, Vero Beach.

Representation in samples studied.—V, Vero Beach.

CYATHOLAIMIDAE
CYATHOLAIMINAE

The genera within the subfamily Cyatholaiminae can be divided into two groups based on the presence or absence, in the male, of preanal supplements. In those genera in which the males possess preanal supplements, a further division is possible utilizing the structure and arrangement of these organs. Wieser (1954) presented a key to the genera of this subfamily, a key that still remains useful, but requiring several additions and emendations.

The genera with preanal supplements can be separated into the following three basic types (A, B, C) of which the last is subdivided into forms with "tuboid" supplements (C-1) and forms with "setose" supplements (C-2) (see Text-fig. 2).

Type A) Supplements large, complicated, consisting of several elements; cuticle between supplements lamellated. Genera included: *Pomponema* Cobb (syn. *Endolaimus* Filipjev), *Nummocephalus* Filipjev (syn. *Haustrifera* Wieser), *Craspodema* Gerlach (syn. *Kraspedonema* Gerlach) and *Anaxonchium* Cobb. Tentatively included is *Dispira* Cobb.

Type B) Supplements cup-shaped, large to minute, with narrow ducts leading to the cups. Genera included: *Longicyatholaimus* Micoletzky, *Xyzzors* Inglis, and *Biarmifer* Wieser.

Type C-1) Supplements tubular, large to medium. Genera included: *Paracanthonchus* Micoletzky, *Acanthonchus* Cobb, *Scuratiella* Ditlevsen and *Parascuratiella* Schuurmans-Stekhoven.

Type C-2) Supplements "setose," small. This type can probably be derived from type C-1, the "setose" papillae described by some authors most likely being minute tubuli with very narrow ducts. Genera included: *Paracyatholaimus* Micoletzky (in Text-fig. 2, represented by two forms), and *Paracyatholaimoides* Gerlach.

Those genera that definitely do not possess preanal supplements are: *Cyatholaimus* Bastian, *Xenocyatholaimus* Gerlach, *Metacyatholaimus* Schuurmans-Stekhoven, and *Phyllolaimus* Murphy.

Other genera are considered doubtful.

There are two main difficulties in classifying genera of this subfamily: first, separation of type C-1 from type C-2, since the difference between small tubuli of the *Paracanthonchus*-type and the so-called "setose papillae" of *Paracyatholaimus* may be only slight; second, deciding whether a species is devoid of supplements or pos-

sesses small, cup-shaped papillae of the type B. A case in point is *Longicyatholaimus*, in which species with and species without supplements have been described (see below).

The genus *Choniolaimus*, referred to this subfamily by many authors and included in his key by Wieser (1954), will have to be transferred to the Choanolaiminae since the redescription of the type species, *Ch. papillatus* Ditlevsen, by Gerlach (1964), and the description of *Ch. panicus* Gerlach, 1957, have made it clear that in this genus the buccal cavity is of a shape quite different from other cyatholaimids. Consequently, the species referred to *Choniolaimus* on the strength of their preanal supplements but with a typical cyatholaimid buccal cavity, i.e., *Ch. macrodentatus* Wieser, 1959, and *Ch. wieseri* Inglis, 1963, are to be transferred to *Longicyatholaimus* (see below, p. 265). *Cyatholaimus tautraensis* Allgén, referred to *Choniolaimus* by Wieser (1954) is better placed with *Nummocephalus* (see Gerlach, 1958b).

POMPONEMA Cobb, 1917

Type species.—*Pomponema mirabile* Cobb, 1917: 118, fig. 3.

This genus is characterized by the strong development of the buccal cavity, in which the vestibular ribs seem to function as particularly mobile clasping organs; the dorsal tooth is powerful and opposed either by two strong subventral teeth or by a great number of denticles. Further characteristics are the heterogeneous cuticular ornamentation, the lateral differentiation of the latter, and the peculiar male supplements. Closely related to *Pomponema* is the genus *Nummocephalus* Filipjev (syn. *Haustrifera* Wieser) which has less well developed vestibular ribs and teeth, and in which the cuticular markings are more uniformly dot-like. *Longicyatholaimus lineatus* Gerlach, 1952, which was referred to *Pomponema* by Wieser (1959), is perhaps better placed with *Nummocephalus*.

Key to Species of *Pomponema*

1. Lateral differentiation beginning on level with buccal cavity; in the cervical region the 2 longitudinal rows are half the c.b.d. apart ... *P. multipapillatum* (Filipjev, 1922)
   Lateral differentiation beginning approximately at end of esophagus; 2–4 longitudinal rows which are far less apart than half the c.b.d. ... 2
2. Cephalic setae in two circles, 4 + 6 ... *P. segregatum* Wieser, 1959
   Cephalic setae in one circle ... 3
3. Submedian pairs of cephalic setae very unequal in length. Dorsal tooth opposed by groups or rows of smaller teeth or denticles ... 4
   Submedian pairs of cephalic setae subequal. Dorsal tooth opposed by two subventral teeth ... 5
4. Male amphids 6–6.5 turns, 50% of c.b.d. wide ... *P. stomachor* Wieser, 1954
   Male amphids 4.5 turns, 35% of c.b.d. wide ... *P. polydonta* Murphy, 1963
5. Male amphids 6–6.5 turns, 90% of c.b.d. wide ... *P. mirabile* Cobb, 1917
   Male amphids 4.5 turns, 65% of c.b.d. wide ... *P. tesselatum* n. sp.

Pomponema tesselatum new species

Plate XIV, fig. 28, a–d

L = 1.53 mm; w = 42 μ; esophagus = 360 μ. Head diameter 25 μ. Labial setae 14 μ. Cephalic setae 16 + 13 μ. Buccal cavity spacious, vestibulum protrusible, its ribs giving the appearance of prehensile clasping organs which are linked by joints to the buccal wall; dorsal tooth large, hollow, opposed by two similar though smaller subventral teeth. Amphids 19 μ = 68% of c.b.d. wide, describing 4.5 turns. Cuticular ornamentation complex and heterogeneous; in cervical region each annule at high focus with slit-like markings, at low focus of tesselated appearance; what are seen as dots in lateral view are actually short columns between the outer and the inner layer of the cuticle; these columns become rather thin from the mid-cervical region on, and the dots, consequently, smaller. There are two rows of dots per annule. A lateral differentiation in the form of four longitudinal rows of larger and more widely spaced dots begins at about the end of the esopha-

gus. Many pores are arranged in more or less regular longitudinal rows all along the body. Spicula 45 μ, gubernaculum 36 μ, consisting of two portions, the distal one with lateral projections. There are 15 preanal supplements of characteristic shape. Between the supplements the cuticle gives a lamellated appearance. One preanal seta and many setae on the tail in four longitudinal rows. Tail 132 μ, a.b.d. 36 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4068, Type slide No. 73. Type locality, M-3, Key Biscayne.

Representation in samples studied.—M-3, Key Biscayne.

LONGICYATHOLAIMUS Micoletzky, 1924

Type species.—*Cyatholaimus longicaudatus* de Man, 1878: 111, 112, pl. 10, fig. 16, a–c.

This genus is characterized by the spicular apparatus, which is of a general shape found in some species of *Paracanthonchus* and *Paracyatholaimus*, in combination with the fact that the preanal supplements are never setose or tubular. In the type species, *L. longicaudatus* (de Man), indistinct papillae of type B (see above, p. 263 were apparently seen by de Man (1878) and by Kreis (1928) but not by Schuurmans-Stekhoven (1943). Since then other species have been described in which supplements were not mentioned. It would simplify matters if one were permitted to assume that in all these cases the small cup-shaped supplements were so indistinct as to have been overlooked, but the possibility that there exist species truly devoid of supplements must be considered. In such cases differentiation from other genera without supplements, particularly from *Cyatholaimus*, would have to be based on the shape of the spicular apparatus and, to a lesser extent, on the shape of the tail.

Further characteristics mentioned by Micoletzky are the lateral differentiation of the cuticular ornamentation and the long, filiform tail. However, species with fairly short, though always slender, tails have been described, which in other respects fit the generic diagnosis.

Classification of the species is rendered difficult by the uncertainty as to how the reputed absence of preanal supplements is to be judged. For the present, we shall accept this feature at its face value. This provides for an immediate separation of the species into two groups, Group A containing species described with supplements, and Group B, containing species in which no supplements were reported. The species contained within these groups are as follows:

Longicyatholaimus species group A: *L. longicaudatus* (de Man, 1878); *L. minor* (Cobb, 1898); *L. effilatus* (Schuurmans-Stekhoven, 1946); *L. stekhoveni* Wieser, 1954 (syn. *L. effilatus* Schuurmans-Stekhoven, 1950 nec 1946); *L. quadriseta* Wieser, 1954 nec 1959;[1] ***L. macrodentatus*** (Wieser, 1959) **new combination** (syn. *Choniolaimus macrodentatus*) and ***L. wieseri*** (Inglis, 1963) **new combination** (syn. *Choniolaimus wieseri*).

Longicyatholaimus species group B: *L. trichurus* (Cobb, 1898); *L. zosterae* Allgén, 1933; *L. choanolaimoides* (Schuurmans-Stekhoven, 1942); *L. continus* Filipjev, 1946; *L. dubius* Filipjev, 1946; *L. trichocauda* Gerlach, 1955, and *L. dayi* Inglis, 1963.

Species of doubtful status are: *L. heterurus* (Cobb, 1898); *L. tenuicaudatus* (Saveljev, 1912) and *L. filicaudatus* Schuurmans-Stekhoven, 1950.

As the species we found belongs to group A, a key to the species of this group is provided.

[1] Note: The species described as *L. quadriseta* Wieser by Wieser, 1959, is equipped with setose and not cup-shaped supplements. Since there are other differences from the type (smaller amphids, shape of gubernaculum) we consider *L. quadriseta* Wieser *sensu* Wieser, 1959, to be a different species and refer it to *Paracyatholaimus* under the name ***Paracyatholaimus pugettensis*** **new name** and **new combination.**

KEY TO SPECIES OF *LONGICYATHOLAIMUS* GROUP A

1. Lateral differentiation of cuticle in 4 longitudinal rows ..... *L. minor* (Cobb, 1898)
   Lateral differentiation of cuticle irregular .. 2
2. Posterior portion of tail filiform, much longer than conical portion ..... *L. longicaudatus* (de Man, 1878)
   Posterior portion of tail cylindrical, not longer than conical portion 3
3. Gubernaculum distally truncate or notched; 3 preanal supplements ..... *L. effilatus* (Schuurmans-Stekhoven, 1946) and *L. stekhoveni* Wieser, 1954
   Gubernaculum distally with well developed teeth or processes; 6–7 preanal supplements 4
4. Male amphids about 60% of c.b.d. wide; gubernaculum distally with three digitiform processes of rather unequal shape ..... *L. wieseri* (Inglis, 1963) n. comb.
   Male amphids 30–40% of c.b.d. wide; gubernaculum distally with 3–4 equal-shaped teeth 5
5. Cephalic setae digitiform, 8–10 + 5–6 μ long. Preanal supplements 5 + 2, the 5 anterior ones regularly spaced; gubernaculum with 3 distal teeth ..... *L. macrodentatus* (Wieser, 1959) n. comb.
   Cephalic setae conical, slender, subequal, 12 + 13 μ long; preanal supplements 4 + 2, the first one almost three times as far from the 2nd as the latter from the 3rd; gubernaculum with 4 distal teeth ..... *L. annae n. sp.*

Longicyatholaimus annae new species
Plate XV, fig. 29, a–c

L = 1.96 mm; w = 70 μ; esophagus = 300 μ. Head diameter 33 μ. Labial papillae setose, stout, 4.5 μ long. Cephalic setae 13 + 9 μ. Buccal cavity deep, with one large dorsal tooth, two small subventral teeth and cuticular ridges. Amphids in ♂ 13 μ = 31% of c.b.d. wide, 4.5 turns. A group of dorsolateral cervical setae a short distance behind amphids. Cuticle with annules and homogeneous rows of dots; no lateral differentiation except on tail; there is one row of dots per annule in the anterior cervical region, but two rows can be found on the remainder of the body. Many pores arranged in more or less longitudinal rows. Spicula 70 μ, somewhat S-shaped, with velum in distal half, knobbed proximally. Gubernaculum 64 μ, stout, distally with 4 equal-sized teeth. There are 6 small but distinct cup-shaped preanal supplements, the anteriormost one at a distance of 210–230 μ preanally; the distance between the first and the second papillae is about as great as that between the latter and the anus. The two posteriormost papillae are more closely spaced than all the others. Tail 420 μ, a.b.d. 60 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4068, Type slide No. 74. Type locality, M-3, Key Biscayne.

Representation in samples studied.—M-3, Key Biscayne.

Remarks.—This species is named after Mrs. Ann Hopper, friendly hostess to wandering nematologists.

XYZZORS Inglis, 1963
Type species.—*Xyzzors fitzgeraldae* Inglis, 1963: 544–546, figs. 25–29.

According to Inglis (1963) *Xyzzors* is characterized by irregular lateral differentiation of the cuticle, cup-shaped preanal papillae, large and well-developed buccal armature and some structural peculiarities of the spicular apparatus. However, none of these characters separates *Xyzzors* unequivocally from *Longicyatholaimus*. The cuticle and the supplements are of the same type as found in the latter genus, the gubernaculum is somewhat larger than in most species of *Longicyatholaimus* but, e.g., *L. dubius* Filipjev, 1946, has a gubernaculum of exactly the same shape. Moreover, the figures given by Inglis do not justify his statement that "the spicules are much more elaborate than is usual in species of the Cyatholaimidae." The two features which could perhaps serve as characters distinguishing *Xyzzors* from *Longicyatholaimus* are the nearly conical tail and the buccal armature which indeed seems to be somewhat more elaborate than observed in the latter genus.

In our new species the spicular apparatus

is simpler than in *X. fitzgeraldae* Inglis, and the proximal ends of the spicula are not doubled. There are 3 cup-like supplements followed posteriorly by two indistinct ducts, whereas Inglis reports 6 cup-like supplements. The amphids describe 4 turns in our species as against 6.75 in *X. fitzgeraldae*.

Xyzzors inglisi new species
Plate XV, fig. 30, a–c

L = 1.25 mm; w = 54 μ; esophagus = 240 μ. Head diameter 28 μ. Labial papillae stout. Cephalic setae 12 + 10 μ. Buccal cavity deep, with one large dorsal tooth, 2 pairs of subventral teeth and one conspicuous ridge that surrounds the ventral half of the buccal cavity. Amphids 16 μ = 48% of c.b.d. wide, 4 turns. Cuticle as in the foregoing species. Spicula 52 μ, with velum; proximally the inner edges are more strongly cuticularized, distally the outer edges. Gubernaculum 38 μ, distally expanded and dentate. There are 3 preanal supplements that consist of a cup-shaped portion (protruded in Fig. 30, b, c) and a duct leading to the latter. The distances are: 25 μ from anus to posterior papilla, 45 μ from this to the next one, 30 μ to the anteriormost one. Between the last papilla and the anus, two minute, indistinct ducts can be discerned. Tail conical, 108 μ, a.b.d. 44 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4075, Type slide No. 75. Type locality, V, Vero Beach.

Representation in samples studied.—V, Vero Beach.

PARACANTHONCHUS Micoletzky, 1924

Type species.—*Cyatholaimus caecus* Bastian *sensu* de Man, 1889b: 204–207, pl. 7, fig. 10, a–g.

The species of this genus were grouped by Wieser (1954) who used the shape of the gubernaculum as the main distinguishing feature. The shapes of gubernacula representing species belonging to groups A, B, and C, respectively, in Wieser's key, are shown in Text-figure 3. There are, however, species which do not fit readily into these three categories, for example, those that have a large gubernaculum subterminally dilated and tapering towards a pointed or spoon-shaped distal tip. This type of gubernaculum represents a transition between groups A or B and C, and is also shown in Text-figure 3. Species with such a gubernaculum are mainly *P. ruens* Wieser, 1954, and the new species to be described below, but *P. angulatus* (Schuurmans-Stekhoven, 1950), *P. batidus* Gerlach, 1957, and *P. mutatus* Wieser, 1959, come rather close.

P. platypus n. sp. is separated from its closest relative, *P. ruens* Wieser, 1954, mainly by the number, size, and arrangement of the preanal tubuli, and by the size of the spicular apparatus.

Paracanthonchus platypus new species
Plate XVI, fig. 31, a–c

L = 1.18–132 mm; w = 44–48 μ; esophagus 190 μ; tail: ♂, 135 μ, ♀, 105 μ; Vu = 48%. Head diameter 21–23 μ. Labial papillae conical. Cephalic setae 4 + 5 μ. A short cephalic capsule present. Buccal cavity with well-developed vestibular ribs and with medium-sized triangular tooth. Amphids in ♂, 11 μ = 40% of c.b.d., in ♀, 9 μ = 32% of c.b.d. wide. Excretory pore 27–32 μ behind anterior end. Ocelli 47–50 μ behind anterior end, with fibrils running from the pigment spot forward and backward, a bit reminiscent of the structures described for *Acanthonchus rostratus* by Murphy (1963), but a proper lens was not seen. Cuticular ornamentation homogeneous. Spicula 36 μ, gubernaculum 35 μ, spoon-shaped, with subterminal dilation and tapering towards the tip; there is a lateral projection. Preanally there are 4 tubuli, 22–23 μ long, one large spine (Fig. 31, c), and two subventral rows of slender setae. On the tail there are short setae and a characteristic ventral pair of long setae. Anal body diameter 43 μ.

Holotype specimen.—Male; Canadian Na-

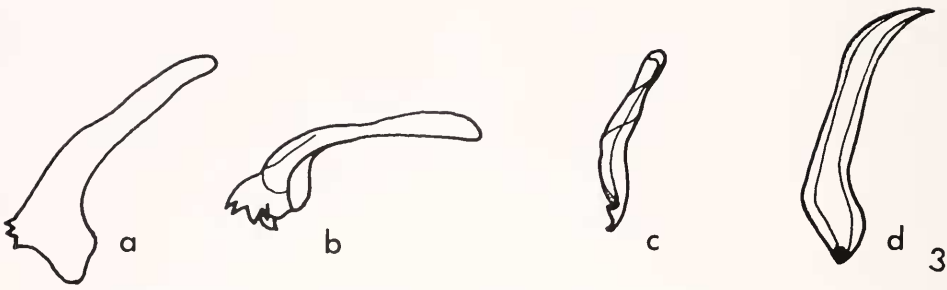

Figure 3. Types af gubernacula in *Paracanthonchus*. a—*P. strandensis* (after Schulz, 1932); b—*P. caecus* (after Timm, 1952); c—*P. cochlearis* (after Gerlach, 1957); d—*P. platypus* n. sp.

tional Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4073, Type slide No. 76. Type locality, M-8, Biscayne Bay.

Representation in samples studied.—M-8, Biscayne Bay.

PARACYATHOLAIMUS Micoletzky, 1921

Type species.—*Cyatholaimus dubiosus* Bütschli, 1874: 284, pl. 7, fig. 31, a, b.

This genus is characterized by the simple gubernaculum which is supposed to hardly expand distally, and in the diagnosis by Micoletzky (1924b) was described as being "ohne Dornen," and by the male supplements which Micoletzky called "Borstenpapillen." These supplements probably are not true setae but represent ducts of the *Paracanthonchus*-type with the lumina so narrow as to give the impression of setae.

Gerlach (1955) described a species, *P. paucipapillatus*, in which the gubernaculum expands distally to form a plate covered with rasp-like denticles. The supplements consist of strongly protruding conical papillae with cuticularized, narrow ducts. The first character links Gerlach's species to *Paracanthonchus*, the second character sets it apart from all other species of *Paracanthonchus* and *Paracyatholaimus* with the exception, perhaps, of *P. digitatus* Gerlach, 1957, in which similar supplements have been described and the gubernaculum is also rather strongly dentate. Our material contained representatives of what at first we held to be *P. paucipapillatus*. However, on closer examination we noted the following differences: 1) distal end of gubernaculum with distinct teeth, numbering from 4–8, rather than with a rasp-like field of denticles, 2) ducts of supplements more elaborate, and 3) buccal cavity with one large dorsal tooth and three small subventral teeth, whereas Gerlach speaks only of one dorsal tooth.

We consider these differences important enough to establish a new species, *P. pesavis* n. sp., named after the appearance of the distal end of the gubernaculum which resembles a spread bird's foot. This species and the two described by Gerlach mentioned above form a rather distinct group within the two genera *Paracanthonchus* and *Paracyatholaimus*.

Paracyatholaimus pesavis new species

Plate XVI, fig. 32, a–e

L = 1.08–1.17 mm; w = 35–44 μ; esophagus = 195–200 μ. Head diameter 18–20 μ. Labial papillae distinct. Cephalic setae 7–8 + 5–6 μ. Short cephalic capsule. Buccal cavity with one large pointed dorsal tooth and three small subventral teeth. Amphids 11 μ = 44% of c.b.d. wide, approximately 5 turns. Cuticular ornamentation with slight lateral differentiation in cervical and anal region. Spicula 29–31 μ, with velum. Gubernaculum 22–23 μ, expanding distally to a plate which in one specimen carried 8, in another 4 small

teeth (Pl. XVI, fig. 32, c, d). There are two large conical papillae at a distance of 25–28 and 50–53 μ, respectively, from the anus. The papillae are penetrated by cuticularized ducts which show some distal elaborations; their openings are posteriorly directed. There is a very faint third papilla (10–13 μ in front of the anus) which might actually consist of two closely spaced minute tubuli as found in other species of *Paracyatholaimus*. Tail 80–100 μ long, narrowing abruptly in distal third; a.b.d. 35–40 μ. Spinneret 6–7 μ long.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4071, Type slide No. 77. Type locality, M-6, Everglades National Park.

Representation in samples studied.—M-6, Everglades National Park; V, Vero Beach.

Remarks.—The closely related species, *P. paucipapillatus*, was originally described from the Pacific coast of San Salvador, and later from the Congo estuary, and from Brazil (Gerlach, 1957a, b, c). The possibility that the Atlantic specimens are actually representatives of our new species is intriguing but remains to be proven.

HALICHOANOLAIMUS de Man, 1888

Type species.—*Spiliphera robusta* Bastian, 1865: 166, pl. 13, figs. 226, 227.

Our material contained two closely allied species which appear to represent *H. quattuordecimpapillatus* Chitwood, 1951, and *H. duodecimpapillatus* Timm, 1952. As neither author specifically stated the tail length for their respective species, it was necessary to make use of the de Man *c* value in identifying the two populations. The two species can be separated on the basis of the tail length as well as the shape of the spicules and gubernaculum. As the heads of both species are very similar, only one has been figured, *H. duodecimpapillatus*.

Halichoanolaimus quattuordecimpapillatus Chitwood 1951

Plate XVII, fig. 33, a–c

Halichoanolaimus quattuordecimpapillatus Chitwood, 1951: 639, fig. 7 c.

L = ♂, 1.7–2.0, ♀, 2.0–2.4 mm; w = ♂, 60–65, ♀, 70–90 μ; diameter at base of esophagus, ♂, 55–70, ♀, 70–83 μ. Vu = 43–45%. Esophagus in ♂, 270–300 μ, in ♀, 310–340 μ long. Excretory pore in ♂, 150–155 μ, in ♀, 162–180 μ from anterior end. Head 35–40 μ wide, with an internal circle of 6 labial papillae and an external circle of 10 cephalic papillae of which the laterodorsal and lateroventral pairs are setose. Amphid 15 μ wide, 16–19 μ from anterior end, spiral with 3.75–4 turns. Buccal cavity typical, containing 3 posterior apophyses, the anterior margins of which bear comb-like ribs and a medial, retrorse tooth. Spicules 88–90 μ long, weakly cephalated proximally and narrowing gradually distally. Gubernaculum paired, 40–45 μ long, with characteristic proximal cephalization (bottle-cap-opener). Male with 11–14 papilloid supplements. Tail initially truncate-conoid, then filiform, in ♂, 265–300 μ long, in ♀, 315–370 μ long. Spinneret 10–12 μ long. The male has a postanal ventral depression just prior to the filiform portion of the tail. The de Man *c* value for both sexes is 5.8–6.6.

Representation in samples studied.—M-2, Key Biscayne, Everglades National Park.

Geographical distribution.—Aransas Bay, Texas (Chitwood, 1951), Congo estuary, West Africa (Gerlach, 1957b), Cananeia, Brazil (Gerlach, 1957c).

Remarks.—An entire specimen of *Spilophorella paradoxa* was found within the gut of one female.

Halichoanolaimus duodecimpapillatus Timm, 1952

Plate XVII, fig. 34, a–d

Halichoanolaimus duodecimpapillatus Timm, 1952: 26–28, pl. 5, fig. 44.

L = ♂, 1.9–2.2, ♀, 2.1–2.5 mm; w = ♂,

68–72, ♀, 80–97 μ; diameter at base of esophagus, ♂, 62 μ, ♀, 65–87 μ. Vu = 40–47%. Esophagus in ♂, 250–280 μ, in ♀, 270–310 μ. Excretory pore 130–147 μ from anterior end. Head, cephalic sense organs and buccal cavity as described above for *H. quattuordecimpapillatus*. Spicules 90–100 μ long, proximal cephalization, broad and flat. Distally the spicules narrow more abruptly than in the foregoing species. Gubernaculum about 50 μ long, of characteristic shape. Male with 11–13 papilliod supplements. Tail elongate-conoid, then filiform, in ♂, 180–190 μ long, in ♀, 165–230 μ long. Spinneret 9–10 μ long. The de Man *c* value for the ♂ is 10.1–11.3 and for the ♀, 9.1–14.3.

Representation in samples studied.—V, Vero Beach.

Geographical distribution.—Chesapeake Bay, Maryland (Timm, 1952).

NEOTONCHINAE

NEOTONCHUS Cobb, 1933

Type species. *Neotonchus punctatus* Cobb, 1933: 87.

Comesa Gerlach, 1956: 94.

Neotonchus lutosus Wieser and Hopper, 1966

Plate XXVI, fig. 56, a–d

L = 0.87–1.02 mm; w = 42 μ; esophagus = 120 μ. Head diameter 20 μ. One circle of six minute labial papillae, one circle of six short cephalic setae, 3 μ long, and four submedian setae of about equal length. Scattered short cervical setae. Amphids 10 μ = 50% of c.b.d. wide, 4–4.2 turns. Cuticle with homogeneous punctation, the lateral dots somewhat larger and more widely spaced than the submedian ones. Buccal cavity 14 μ long, with one large hollow dorsal tooth and two small subventral teeth. Esophageal bulb pyriform, 30 × 25 μ, with two weak interruptions. Excretory pore 40 μ from anterior end. Spicula of shape typical for genus, bent at beginning of distal third, 29 μ long. Gubernaculum plate-shaped, dilated distally. One stiff preanal seta and 20 large, complicated supplements. Tail 75 μ long, a.b.d. 28 μ.

Representation in samples studied.—M-4, Rickenbacker Causeway.

Geographical distribution.—Restricted to above locality.

DESMODORIDAE

The Desmodoridae was first subdivided by Chitwood (1936). The original groupings, however, do not appear to be entirely satisfactory, especially with regard to their generic composition and systematic position. Uncertainties regarding the shape of amphids in the Stilbonematinae present further difficulties. A key position within the family is assumed by *Spirinia* (syn. *Spirina*) which not only links the Metachromadorinae with the Desmodorinae—perhaps via *Chromaspirina* (see Gerlach, 1963)—but also shows close affinities to the Microlaimidae and the Linhomoeidae (Wieser, 1954; Timm, 1962). The discussion of many genera belonging to the Desmodoridae by Gerlach (1951b, 1963b) has been a valuable aid in the classification of the family. The characters of each subfamily are briefly outlined below:

Brief Characterization of Subfamilies of Desmodoridae

A) Metachromadorinae (Chitwood, 1936): Cuticle always finely striated (striation sometimes so indistinct as to impart a smooth appearance to the cuticle); head not sharply set off from striation, nonrigid; striation always surrounding amphids; cuticle not tiled; esophageal bulb always present, either round or elongated; buccal cavity typically with well-developed armature, except in *Spirinia* where there are only minute teeth. (For further classification, see below.)

B) Richtersiinae Cobb, 1933: Cuticle striated, with many longitudinal rows of spines or hooks; head non-rigid; buccal cavity small or wide, unarmed; esophagus

cylindrical, without bulb. With the genera: *Richtersia* Steiner, 1916 (syn. *Richtersiella* Kreis, 1929), and *Pteronium* Cobb, 1933.

C) Desmodorinae Micoletzky, 1924: Cuticle heavily annulated; head rigid, sharply set off from annulation; amphids not surrounded by annulation (exceptions are *Paradesmodora* and *Metadesmodora* in which the heavy annulation serves as distinguishing characters from the Metachromadorinae); amphids loop-shaped or spiral; cuticle not tiled (except, occasionally, on the head); esophageal bulb round or elongated; buccal cavity always armed with distinct teeth. (For further classification, see below.)

D) Stilbonematinae Chitwood, 1936: Cuticle striated or annulated, not tiled or longitudinally broken; buccal cavity shallow-conical or absent, unarmed or with minute teeth; head always well defined, amphids wholly outside striation, spiral-shaped, but apparently sometimes sunk into the cuticle so that only the slit-like opening is visible; esophageal bulb round to pyriform. With the genera: *Eubostrichus* Greeff, 1869 (syn. *Catanema* Cobb, 1920, ?*Laxus* Cobb, 1893), *Laxonema* Cobb, 1920, *Leptonemella* Cobb, 1920, *Stilbonema* Cobb, 1920, *Robbea* Gerlach, 1956, and *Squanema* Gerlach, 1963.

E) Ceramonematinae Cobb, 1933[1]: Cuticle heavily annulated, tiled or longitudinally broken by spined alae; head well set off from annulation; buccal cavity minute or absent, unarmed; amphids obscurely spiral to shepherd's crook; esophagus. With the genera: *Ceramonema* Cobb, 1920, *Xenella* Cobb, 1920, *Dasynemella* Cobb, 1933 (syn. *Dasynema* Cobb, 1920), *Pristionema* Cobb, 1933, *Pselionema* Cobb, 1933, *Dasynemoides* Chitwood, 1936, *Metadasynemella* de Coninck, 1942, and *Pterygonema* Gerlach, 1954.

F) Monoposthiinae Filipjev, 1934: Cuticle coarsely annulated, broken longitudinally by alae; head well set off from annulation, rigid; amphids circular, surrounded by annulation; buccal cavity well armed; esophageal bulb barrel-shaped. With the genera: *Monoposthia* de Man, 1889, *Nudora* Cobb, 1920, *Rhinema*, Cobb, 1920, and *Monoposthioides* Hopper, 1963.

[1] This subfamily may not belong to the Desmodoridae. Gerlach (1957) considers it related to the Axonolaimidae and the Halaphanolaimidae.

Key to Genera of Metachromadorinae
(Based on classification of Gerlach, 1951)

1. Male supplements heavily cuticularized, large and tubular 2
   Male supplements indistinct or conical or consisting of narrow ducts, not large and tubular; only in *M. vivipara* and *M. quadribulba* are the supplements heavily cuticularized but not tubular 4
2. Supplements strongly S-shaped, heavily cuticularized 3
   Supplements faintly S-shaped, cuticularization light ..... *Onyx* Cobb, 1891
3. Cephalic and subcephalic setae present ..... *Sigmophora* Cobb, 1933
   Cephalic setae only present ..... *Polysigma* Cobb, 1920
4. Teeth absent or minute ..... *Spirinia* Gerlach, 1963
   Teeth well developed 5
5. Esophageal bulb weakly developed, round to pyriform; cuticular lining faint ..... *Chromaspirina* Filipjev, 1918
   Esophageal bulb well developed, usually elongate, sometimes "barrel-shaped," rarely clavate and indistinctly set off from esophagus; cuticular lining usually distinct ..... *Metachromadora* Filipjev, 1918

Pseudometachromadora Timm, 1952, is a genus of doubtful position. The esophagus is barely enlarged posteriorly, the cuticular striation is all but absent, the amphids are situated near the lips and the buccal cavity is cylindrical and strongly armed.

SPIRINIA Gerlach, 1963

Type species.—*Spira parasitifera* Bastian, 1865: 159, 160, pl. 13, figs. 201–203.

Spira Bastian, 1865, nec Brown, 1844, and *Spirina* Filipjev, 1918, nec Kayser, 1889.

Our material contained two species, one of which undoubtedly is *S. parasitifera* (Bastian, 1865). A redescription of this cosmopolitan species with discussion of its synonymy was recently given by Gerlach (1963b). Our second species is closely re-

lated to *S. striaticaudata* (Timm, 1962) from which it can be distinguished by the hook-shaped proximal end of the spicula and the presence of small but distinct teeth in the conical buccal cavity. These two species are separated from all other members of the genus by the flagellate tail which in both sexes is much more distinctly and coarsely striated than the rest of the body. This is such a conspicuous and characteristic feature that we feel justified in establishing a new subgenus on it.

Spirinia (*S.*) *parasitifera* (Gerlach, 1963) Plate XVII, fig. 35, a–e

Spirinia (*S.*) *parasitifera* (Bastian, 1865) Gerlach, 1963b: 67.

Spira parasitifera Bastian, 1865: 159–160, pl. 13, figs. 201–203; *Spirina parasitifera* auct.; *Spilophora oxycephala* Bütschli, 1874; *Spirina uidrosicusis* Allgén, 1933; *S. zosterae* Filipjev, 1918; and *S. rouvillei* Schuurmans-Stekhoven, 1950.

L = 1.57 mm; w = 55 μ; esophagus = 140 μ; nerve ring 77 μ from anterior end; tail = 140–155 μ. Head diameter 22 μ; cephalic setae 5 μ, on level of amphids. Cervical setae beginning at short distance behind amphids, rather scattered. Amphids 6 μ wide. Buccal cavity small, with 3 minute teeth. Esophageal bulb 40 × 36 μ. Spicula 50 μ, knobbed proximally, with velum, tail conical, a.b.d. 24–28 μ.

Representation in samples studied.—M-4, Rickenbacker Causeway, V, Vero Beach.

Geographical distribution.—Baltic, North Sea, North Atlantic, Black Sea, Mediterranean, Barents Sea, Indian Ocean (Maldives).

Spirinia (*Perspiria*) new subgenus

Type species.—*Spirinia* (*Perspiria*) *hamata* new species.

Differential diagnosis.—*Perspiria* n. subg. is distinguished from *Spirinia sensu stricto* by the more prominently striated and flagellate tail. In *Spirinia sensu stricto* the tail is conoid and the striations are fine—no coarser than those on the remainder of the body.

In addition to the new species described below, *Spirinia striaticaudata* (Timm, 1962) (syn. *Spirina striaticaudata*) is also included in the new subgenus.

KEY TO SPECIES OF *SPIRINIA* (*PERSPIRIA*)

1. Stoma without teeth; proximal end of spicula knobbed, rounded ..... *S.* (*P.*) *striaticaudata* (Timm, 1962)
   Stoma with minute teeth; proximal end of spicula hook-shaped ..... *S.* (*P.*) *hamata* new species

Spirinia (*Perspiria*) *hamata* new species Plate XVIII, fig. 36, a–c

L = 2.04 mm; esophagus = 160 μ. Head diameter 16–21 μ. Cephalic setae 4–5 μ. Very few short, scattered cervical setae. Amphids 5–6 μ. Buccal cavity small, with three minute teeth. Esophageal bulb 45 × 36 μ. Excretory pore between bulb and nerve ring. Cuticular striation distinct but weak. Spicula 37–43 μ, gubernaculum 16 μ. Tail 230–340 μ, from beginning of second fifth on coarsely striated, tip unstriated. Anal body diameter 32–43 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4068, Type slide No. 78. Type locality, M-3, Key Biscayne.

Representation in samples studied.—M-3, Key Biscayne.

CHROMASPIRINA Filipjev, 1918

Type species.—*Chromaspirina pontica* Filipjev, 1918: 229, 230–234, pl. 7, fig. 45, a–c.

Mesodorus Cobb, 1920: 325.

As previously suggested by Gerlach (1963b), this genus probably links the Metachromadorinae with the Desmodorinae. We do not agree, however, with Gerlach that the intermediate position of this genus is sufficient justification for merging the two subfamilies together. The position of *Chromaspirina* becomes less problematical if some of Gerlach's new combinations are returned to their former status. Thus

we cannot accept the transfer of *Desmodora inflexa* Wieser, 1954, and *D. dimorpha* Hopper, 1961, to *Chromaspirina*. Both species are characterized by heavy annulation and a rigid head with the amphids situated outside the annulation (although in the latter species, admittedly, the position of the amphids with respect to the cuticular annulation is a bit doubtful) and thus most likely represent true members of *Desmodora*. The same would seem to apply to *D. rabosa* Gerlach, 1956, which was also tranferred to *Chromaspirina* by Gerlach. However, this species is known only from one female and thus remains doubtful.

Other doubtful species are *C. paucispira* Schuurmans-Stekhoven, 1950 (♀ only) and *C. robusta* Wieser, 1954 (juv. only). Two more species are known only as females, i.e., *C. crinita* Gerlach, 1952, and *C. pellita* Gerlach, 1954, but in their cases the pilosity of either head (*crinita*) or body (*pellita*) is probably sufficient to recognize them as good species. The following are regarded as good species of *Chromaspirina*: *C. cylindricollis* (Cobb, 1920) (syn. *Mesodorus cylindricollis*), *C. indica* Gerlach, 1963, *C. madagascariensis* Gerlach, 1953, *C. parapontica* Luc and De Coninck, 1959, *C. pontica* Filipjev, 1918, and *C. thieryi* De Coninck, 1943.

The conspecificity of *C. pontica* Filipjev *sensu* Gerlach, 1951, with Filipjev's species is questionable, as, in Gerlach's specimens, the cephalic setae are 9–11 μ long (as against 5 μ), the amphids are relatively larger, and the gubernaculum is shorter and of a somewhat different shape.

From the above mentioned species, *C. inaurita* n. sp., is separated by the indistinct cephalic papillae, the large and oval amphids which are about as long as the head is wide, the shape of the gubernaculum, and the presence of ventral papillae on the tail.

Chromaspirina inaurita new species
Plate XVIII, fig. 36, a–c

L = 1.18–1.35 mm; w = 29–35 μ; esophagus = 105–115 μ; tail: ♂, 90–95 μ, ♀, 90 μ; Vu = 49%. Eggs 30–33 × 60–70 μ. Head diameter 14 μ. Six minute cephalic papillae. Four cephalic setae, 5 μ long. In ♂ two (dorsal and ventral) subcephalic setae, in both sexes scattered short cervical setae. Amphids in ♂, 12–14 + 10–12 μ, loop-shaped, inner circle more heavily cuticularized, 6 × 5.5 μ, more narrowly coiled. Cuticular annulation distinct. Buccal cavity with three small teeth (these teeth are smaller than in most other species of *Chromaspirina* and stress the proximity of the genus to *Spirinia*). Esophageal bulb pyriform, 25 × 20 μ. Spicula 27–28 μ, with faint velum, hooked proximal end. Gubernaculum sickle-shaped, 15 μ. The preanal ventral cuticle is crenate over a long distance. Immediately in front of the anus there is a stout spine. On the tail there are four ventral supplements each accompanied by a pair of setae. Subventrally and subdorsally more setae can be seen. A.b.d. 23 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4068, Type slide No. 79. Type locality, M-3, Key Biscayne.

Representation in samples studied.—M-3, Key Biscayne.

METACHROMADORA Filipjev, 1918

Type species.—*Metachromadora macroutera* Filipjev, 1918: 218, 219–225, pl. 6, fig. 42a; pl. 7, fig. 42, b–h.

Key to Species of *Metachromadora*

1. Male supplements conical, each consisting of three (1 central, 2 lateral) cuticularized pieces ..... subgenus *Chromadoropsis* Filipjev, 1918 2
   Male supplements indistinct or narrow ducts the openings of which are differentiated into button-shaped or conical bodies 3
2. Esophageal bulb, 2-sectioned ..... *M. vivipara* (de Man, 1907) (syn. *Chromadora vivipara* de Man, 1907)
   Esophageal bulb, 4-sectioned ..... *M. quadribulba* Gerlach, 1956
3. Somatic setae arranged in 10 dense longitudinal rows ..... subgenus *Metonyx*

Chitwood, 1936 ..... *M. horrida* Chitwood, 1936

Somatic setae not arranged in 10 dense longitudinal rows 4

4. Head with pronounced longitudinal striation ..... subgenus *Metachromadora* Filipjev, 1918[1] 5

Head without pronounced longitudinal striation 6

5. Length 2.4–2.6 mm; male with 26–48 preanal supplements ..... *M. macroutera* Filipjev, 1918

Length 1.0–1.4 mm; male with 12–14 preanal supplement ..... *M. chandleri* (Chitwood, 1951) (syn. *Ichthyodesmodora chandleri* Chitwood, 1951, and *Metachromadora parasitifera* Timm, 1952)

6. Posterior portion of esophagus clavate; bulb not well set off, partitions absent or indistinct; cuticle smooth to indistinctly striated. (Subgenus doubtful, perhaps a new one to be established) 7

Posterior portion of esophagus bulbular; bulb well set off, partitions distinct; striations of cuticle distinct 9

7. Male without preanal supplements ..... *M. spiralis* Gerlach, 1955

Male with distinct preanal supplements 8

8. Male with 3 knob-like preanal supplements ..... *M. clavata* Gerlach, 1957

Male with 19–21 conoid preanal supplements ..... *M. serrata* Gerlach, 1963

9. Posterior cephalic setae absent or stout and short; amphids (at least in male) on thick cuticularized plates; cuticle with lateral wings ..... subgenus *Metachromadoroides* Timm, 1961 10

Posterior cephalic setae slender; amphids not on thick cuticularized plates 13

10. Esophageal bulb, 2-sectioned ..... *M. remanei* Gerlach, 1951

Esophageal bulb, 3-sectioned 11

11. Male without preanal supplements and without ventral caudal "bumps" or "warts" ..... *M. vulgaris* Timm, 1961

Male with 17–23 preanal supplements and with 2 ventral caudal "bumps" or "warts" 12

12. Cephalic setae present ..... *M. pulvinata* new species

Cephalic setae absent ..... *M. complexa* Timm, 1961

13. Lateral wings present ..... subgenus *Neonyx* Cobb, 1933 14

Lateral wings absent ..... subgenus *Bradylaimus* Schuurmans-Stekhoven, 1931 18

14. Circles of cephalic setae in typical arrangement (6 + 6 + 4) 15

Circles of cephalic setae in atypical arrangement, 6 + 6 + 8, through fusion with subcephalic setae (Cobb mentions this condition in rather vague fashion for *M. cancellata*) 17

15. Esophageal bulb, barrel-shaped; preanal supplements, 8; body shape, obese, de Man *a* value = ♂, 16–24, ♀, 9.5–11.5 ..... *M. obesa* Chitwood, 1936

Esophageal bulb, elongate; preanal supplements, 12; body shape more slender, de Man *a* value = ♂, 33–44; ♀, 34 16

16. Subcephalic and cervical setae shorter than the longest cephalic setae ..... *M. pseudocampycoma* Hopper, 1961

Subcephalic and cervical setae longer than the longest cephalic setae ..... *M. campycoma* (Cobb, 1933) (doubtful species) (syn. *Neonyx campycoma* Cobb, 1933)

17. Buccal cavity with denticles ..... *M. cancellata* (Cobb, 1933) (syn. *Neonyx cancellata* Cobb, 1933)

Buccal cavity without denticles ..... *M. meridiana* new species

18. Esophageal bulb, 3-sectioned 19

Esophageal bulb, 2-sectioned 21

19. Buccal cavity with denticles; head with several circles of long subcephalic and cervical setae posterior to cephalic setae ..... *M. setosa* Hopper, 1961

Buccal cavity without denticles; head with only a single circle of long subcephalic setae posterior to cephalic setae 20

20. Male with 9–10 preanal supplements ..... *M. onyxoides* Chitwood, 1936

Male without supplements ..... *M. asupplementa* (Crites, 1961)[2] (syn. *Neonyx asupplementa* Crites, 1961)

21. Esophageal bulb elongate, length more than twice width 22

Esophageal bulb ovate, length less than twice width 23

22. Amphid 7.5 μ wide, less than one-third c.b.d. ..... *M. gerlachi* new name (syn. *M. onyxoides sensu* Gerlach, 1955, nec Chitwood, 1936)

Amphid 15 μ wide, more than two-thirds c.b.d. ..... *M. spectans* Gerlach, 1957

23. Amphid 12 μ wide, more than one-half c.b.d. ..... *M. pneumatica* Gerlach, 1954

Amphid 7–8 μ wide, about one-fourth c.b.d. ..... *M. succica* (Allgén, 1929) (syn. *Oistolaimus succicus* Allgén, 1929)

[1] *M. cystoseirae* Filipjev, 1918, also belongs to this subgenus. However, it appears to have been described on the basis of a single female, and, as such, its systematic position is doubtful.

[2] Possibly a synonym of *M. onyxoides*.

Metachromadora (Metachromadoroides) pulvinata new species

Plate XIX, fig. 38, a–c

L = 1.72 (juv. ♀ = 1.11) mm; w = 95 (juv. ♀ = 65) μ; esophagus = 315 (juv. ♀ = 220) μ; tail: juv. ♀ = 80 μ; Vu 64%. Head diameter on level of amphids 40 μ. Lips cushion-like, demarcated from head by distinct groove. Labial papillae conical. Cephalic setae stout, 8 μ long in male. Short cervical setae. Somatic setae up to 18 μ in posterior part of body. Amphids in ♂, 22 × 18 μ, on cuticularized plates, ring-shaped, in ♀, 8 × 6 μ, loop-shaped. Cuticular striation distinct, reaching to base of lips. Lateral differentiation not very pronounced, beginning around end of esophagus, ending at some distance in front of anus. Buccal cavity strongly cuticularized, in ♂, 50 μ long, with large dorsal tooth, 2 small subventral teeth and an additional tooth at the bottom of the buccal cavity; vestibulum with ribs. Esophageal bulb tripartite, with heavy cuticular lining, about 105 × 62 μ. Spicula 55 μ long, 15 μ broad. Gubernaculum 27 μ. Preanally the ventral cuticle is extended and forms a striated membrane which is traversed by about 23 narrow ducts, each duct ending in a button-shaped body. Extended cuticle reaching 540 μ preanal. Immediately in front of anus one strong spine. Tail 110 μ = 2 a.b.d. long, in ♂ with two ventral, conical, cuticularized warts. Many long spines in longitudinal rows.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4075, Type slide No. 80. Type locality, V, Vero Beach.

Representation in samples studied.—V, Vero Beach.

Remarks.—The only other species in this subgenus with postanal ventral warts is *M. complexa* Timm, 1961, which, however, is devoid of cephalic setae.

Metachromadora (Bradylaimus) onyxoides Chitwood, 1936

Metachromadora (Bradylaimus) onyxoides Chitwood, 1936: 5, fig. 1, v–x.

Our specimens appear to be typical representatives of *M. onyxoides* as described by Chitwood (1936) and Hopper (1961a). The amphids in our male measured 7–8 μ.

Representation in samples studied.—M-5, Virginia Key.

Geographical distribution.—Beaufort, North Carolina (Chitwood, 1936), Gulf Shores, Alabama (Hopper, 1961a) and ? Pernambuco, Brazil (Gerlach, 1956).

Remarks.—Gerlach's (1955) identification of specimens from San Salvador as *M. onyxoides* is doubtful. In the table below some dimensions of our own specimens are compared with those of the animals described by Hopper (1961a) and by Gerlach (1955). It follows that Gerlach's specimens belong to a different species for which the name *M. gerlachi* new name is proposed.

	Present material (μ)	Hopper, 1961	Gerlach, 1955 (μ)
Length of first cephalic setae	2.5–3	"short"	6–7
Length of second cephalic setae	10	11 μ	15–17
Length of spicula	50	60 μ	27
Length of gubernaculum	35	40 μ	15
Esophageal bulb, length of partitions	25+25+25	20+25+25 μ	29+35

Metachromadora (Bradylaimus) gerlachi new name

Metachromadora onyxoides Chitwood *sensu* Gerlach, 1955.

Metachromadora (*Bradylaimus*) *gerlachi* new name is related to *M. onyxoides* Chitwood, 1936, from which it is distinguished by having a two-sectioned esophageal bulb, the bulb in *M. onyxoides* being three-sectioned.

Metachromadora (*Neonyx*) *meridiana* new species

Plate XIX, fig. 39, a–d

L = 0.95–1.05 mm; w = ♂, 47, ♀, 55–62 μ; esophagus 175–185 μ. Lips prominent. There are three distinct circles of cephalic sense organs: in front two circles, each composed of 6 conical, setose papillae, followed by one circle of 8 slender setae, each measuring 6–7 μ. It is assumed that this circle consists of the typical 4 cephalic plus 4 subcephalic setae. Close to the amphids there are two more subcephalic setae on each side of the body, measuring 8 μ. Cervical setae in the anterior region up to 10 μ, in posterior region up to 15 μ long. Amphids spiral, 7 μ = 30% of c.b.d. wide. Cuticular striation reaching to anterior end of amphids; lateral alae starting around middle of cervical region. Buccal cavity with rather thin walls, very strong dorsal tooth and small subventral projections. Esophageal bulb tripartite, with heavy cuticular lining, 60–70 × 28–32 μ in ♂, 80 × 35 μ in ♀. Eggs 70–75 × 40–50 μ. Spicules arcuate, 58 μ long, gubernaculum 29 μ long. Male with 9–10 thin preanal supplements, traversing the raised ventral cuticle. Tail 80–95 μ long. Female a.b.d. = 28 μ, male = 35 μ. Caudal setae on male tail arranged as illustrated in Plate XIX, figure 39c.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4075, Type slide No. 81. Type locality, V, Vero Beach.

Representation in samples studied.—V, Vero Beach.

Remarks.—At first we thought we had found *M. obesa*. However, Chitwood's original description is rather poor and all other authors who subsequently described this species (Timm, 1952; Hopper, 1961b; Crites, 1961) mention the typical arrangement of 6 short and 4 long cephalic setae, whereas in our specimens there is definitely a circle of 8 long cephalic setae.

DESMODORINAE

Key to Genera of Desmodorinae

1. Esophageal bulb elongate, tripartite 2
   Esophageal bulb round to pyriform 3
2. Head with large plates in posterior portion (head "jointed" or tiled) ..... *Acanthopharyngoides* Chitwood, 1936[1]
   Head simple, without plates ..... *Acanthopharynx* Marion, 1870
   syn. *Xanthodora* Cobb, 1920
3. Amphids half or completely surrounded by annulation 4
   Amphids not surrounded by annulation ..... *Desmodora* de Man, 1889
   (see discussion by Gerlach, 1963b)
4. Amphids half surrounded by annulation, not situated on cuticularized plates ..... *Paradesmodora* Schuurmans-Stekhoven, 1950
   Amphids completely surrounded by annulation, situated on cuticularized plates ..... *Metadesmodora* Schuurmans-Stekhoven, 1942

PARADESMODORA Schuurmans-Stekhoven, 1950

Type species.—*Paradesmodora cephalata* Schuurmans-Stekhoven, 1950: 117, fig. 67, a–e.

This genus contains the following species: *P. campbelli* (Allgén, 1932) Gerlach, 1963 (syn. *Spirina campbelli*), *P. immersa* Wieser, 1954, *P. punctata* Gerlach, 1963, and *P. toreutes* n. sp. The type species, *P. cephalata* Schuurmans-Stekhoven, 1950, is known from a juvenile female only and is considered a *species inquirenda*.

Our new species can be distinguished from all other species of the genus by the shape and arrangement of male supplements, the hook-shaped spicula and the cuticular differentiations of the head.

Paradesmodora toreutes new species

Plate XX, fig. 40, a–f

L = 1.62 mm; w = 21 μ; esophagus = 114

[1] In this genus the cuticular annulation is not quite as pronounced as in other genera of this subfamily.

μ; head diameter 14 μ. Lips distinct, papillae minute. Cephalic setae 6 μ. Cuticle in posterior portion of (adult) head very much enlarged and forming plates which surround the anterior portions of the amphids. Amphids 6 μ = 40% of c.b.d. wide, one circular loop. There are a few short cervical setae. Cuticular annulation coarse. Esophageal bulb pyriform, 22 × 15 μ. Spicula semicircular, 20 μ, proximal end hooked. There are 10 preanal supplements each consisting of a ventral bump and a thickening of the cuticle. The row of supplements extends 220 μ preanally. Between two supplements there are 13–18 cuticular annules. Tail 95 μ long, a.b.d. 20 μ. Juvenile tail 7 a.b.d. long.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4068, Type slide No. 82. Type locality, M-3, Key Biscayne.

Representation in samples studied.—M-3, Key Biscayne.

DESMODORA de Man, 1889

Type species.—*Spilophora communis* Bütschli, 1874: 282, 283, pl. 5, fig. 27, a, b; pl. 7, fig. 27, c, d.

Gerlach (1963) has recently reviewed this genus, relegating several known genera to subgeneric rank (i.e., *Pseudochromadora*, *Xenodesmodora*, *Croconema*, *Bolbonema*, *Desmodorella* and *Zalonema*). Excellent discussions, with keys, for both the subgenera and the species within each subgenus are presented in Gerlach's paper.

Gerlach's (1963b, p. 84) discussion of *Xenodesmodora* makes synonymization of *Bla* Inglis, 1963, with the former subgenus inevitable. The type species, *Bla nini* Inglis, 1963, therefore, is transferred to the genus *Desmodora* and becomes ***Desmodora* (*Xenodesmodora*) *nini*** (Inglis, 1963) **new combination.**

The genus *Desmodora* was represented in our material, in samples M-2 and M-3 from Key Biscayne, by a single, well-known species, *Desmodora* (*Pseudochromadora*) *quadripapillata* (Daday, 1899) Gerlach, 1963 (synonyms *Pseudochromadora quadripapillata* Daday, 1899, *Micromicron cephalata* Cobb, 1920, and *M. luticola* Timm, 1952).

Pertinent measurements from a male specimen are as follows: L = 0.74 mm. Head diameter 14 μ. Amphids 6 μ. Spicula 28 μ.

Representation in samples studied.—M-2, Key Biscayne, M-3, Key Biscayne.

Geographical distribution.—New Guinea (Daday, 1899), Costa Rica (Cobb, 1920), Chesapeake Bay, Maryland (Timm, 1952), and Cananeia, Brazil (Gerlach, 1957).

MONOPOSTHIINAE

MONOPOSTHIA de Man, 1889

Type species.—*Spiliphora costata* Bastian, 1865: 166, 167, pl. 13, figs. 228, 229.

We prefer not to follow Gerlach (1963) in his synonymization of *Monoposthia* and *Nudora*. Thus in *Monoposthia* only species are retained in which the spicula are absent and the single gubernaculum is not conspicuously enlarged proximally. Within the genus there is a group of species characterized by the enlarged second annule. A key to this group reads as follows:

Key to Species of *Monoposthia*

1. Both first and second annule enlarged; amphids between the two annules ..... *M. thorakista* Schulz, 1935
   Only second annule enlarged; amphids on this annule 2
2. Cuticle with 12 longitudinal rows of V-shaped markings ..... *M. duodecimalata* Chitwood, 1936
   Cuticle with 6 longitudinal rows of V-shaped markings 3
3. Cephalic setae measuring less than ½ of head diameter; amphids ⅓ of c.b.d. wide ..... *M. mielcki* Steiner, 1916
   Cephalic setae approximately one head diameter long; amphids about ⅙ of c.b.d. wide ..... *M. mirabilis* Schulz, 1932
   syn. *M. longiseta* Allgén, 1935

Our material is representative of *M. mirabilis* Schulz, 1932, agreeing in all essential points with the excellent redescription given of this species by Luc and De

Coninck (1959). *M. ornata* Timm, 1952, described on the basis of one juvenile, is either a synonym of *M. mirabilis* or else a *species inquirenda*.

Monoposthia mirabilis Schulz, 1932
Plate XX, fig. 41, a, b

Monoposthia mirabilis Schulz, 1932: 380–382, fig. 26, a–g

Male.—L = 1.6 mm; w = 57 μ. Diameter at base of esophagus, 54 μ. Esophagus 210 μ long. Head diameter 19 μ, bearing six labial papillae and four, 19 μ long, cephalic setae. Cuticle with 6 longitudinal rows of V-like markings. Reversal of V's at mid-body. Body bearing 4 rows of somatic setae which carry on to the tail. Buccal cavity armed with dorsal tooth and opposed by a number of denticles. Gonad single, outstretched. Gubernaculum 38 μ long. Tail 110 μ long, a.b.d. 39 μ. A prominent double pair of fleshy papillae are positioned preanally, surrounded by a cuticularized ridge.

Representation in samples studied.—M-2, Key Biscayne.

Geographical distribution.—European Atlantic coasts, Mediterranean Sea (Gerlach, 1952).

MONOPOSTHIOIDES Hopper, 1963
Type species.—*Monoposthioides anonoposthia* Hopper, 1963: 850–852, figs. 11–18.

This genus is differentiated from *Monoposthia* by the shape of the gubernaculum ("spiculum" in the interpretation of other authors), the long spine attached to the latter, the presence of two testes and the absence of V-like markings in the anterior portion of the body.

Our specimens agree with this diagnosis except for the absence of the gubernacular spine. No trace of it could be detected in the four males examined. Further differences from the type, *M. anonoposthia*, are: the cephalic setae measure only about one head diameter as against 1.5, and in the gubernaculum it is the *dorsal* rather than the *ventral* arm of the proximal extension which is the longer. We thus consider our specimens to represent a new species which we call *M. mayri* n. sp. in honor of Dr. Ernst Mayr of the Museum of Comparative Zoology, Harvard University.

Monoposthioides mayri new species
Plate XX, fig. 42, a, b

L = ♂, 1.72, ♀, 1.4–1.5 mm; w = 40 μ; esophagus = 185 μ; Vu = 90–92%. Head diameter 16 μ. Lips distinct, with 6 setose papillae. Cephalic setae 17 μ. Cuticle with broad rings in the anterior cervical region whence they gradually become narrower. The second annule is even more enlarged than the adjacent ones and measures 7 μ in width. There are at least 12, probably 14, longitudinal rows of V-like markings which start about 50 μ from the anterior end. The reversal of the V's takes place in the male at 140 μ behind the posterior end of the esophageal bulb, in the female at 240–250 μ (in *M. anonoposthia* the V-shaped markings are reversed in the male at a point opposite the anterior margin of the bulb and in the female at a point approximately one and one-half tail lengths anterior to the anus). Buccal cavity cylindrical, measuring 22 μ from tip of tooth to base, with one large dorsal tooth and small subventral projections. Amphids more or less pocket-shaped and sunk into the cuticle, somewhat irregular in outline. Esophageal bulb 47 × 25 μ. Single gubernaculum 42 μ long, axe-like, proximal end 23 μ wide, gliding in an anal sheath as reported for *M. anonoposthia*. Tail: ♂, 140 μ, ♀, 100–105 μ long; a.b.d. = 30 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4067, Type slide No. 83. Type locality, M-3, Key Biscayne.

Representation in samples studied.—M-3, Key Biscayne.

MICROLAIMIDAE

PARAMICROLAIMUS Wieser, 1954

Type species.—*Paramicrolaimus primus* Wieser, 1954: 64, fig. 135, a–c.

In this genus the first circle of (6) cephalic sense organs is not papilloid but consists of slender setae which, in the three species so far described, are more than half as long as the (4) cephalic setae of the second circle. In our new species, the setae of the first circle are considerably shorter than those of the second. Thus the arrangement of cephalic organs is very much like that of several species of *Microlaimus*. However, further distinguishing features of *Paramicrolaimus* are the transversely oval amphids and the distinct preanal papillae in the male. The following species are known: *P. primus* Wieser, 1954 (♀ only!), *P. papillatus* (Gerlach, 1954) (syn. *Microlaimus papillatus*), *P. spirulifer* Wieser, 1959, and *P. lunatus* n. sp. In addition to the shorter cephalic setae, *P. lunatus* is characterized by the semicircular spicula.

Paramicrolaimus lunatus new species

Plate XXI, fig. 43, a–c

L = 1.2–1.3 mm; w = 29–33 μ. Head diameter 11–13 μ. Labial papillae distinct. First circle of cephalic setae short, at best 3 μ long. Second circle of cephalic setae, 7 μ long in ♂, 11 μ long in ♀. Amphids transversely oval, 10 μ wide (⅔ c.b.d.) in ♂, 8 μ wide (⅖ c.b.d.) in ♀; located 10–13 μ behind anterior end. Cuticular striation distinct, extending anteriorly only to base of cephalic setae. Buccal cavity wide, conical, with one large dorsal tooth, 2 subventral teeth and projections at the base. Esophagus 145–155 μ long, terminated by esophageal bulb 28 × 22 μ. The musculature of the esophageal bulb is indistinctly divided into two parts by a weak transverse break. Spicula 45 μ, regularly bent. Gubernaculum simple, 19 μ long. The male bears 5 prominent preanal supplements which appear to be tubular in structure. The cuticle in the area of each supplement is somewhat swollen. The 3rd and 4th preanal supplements are always closer together than are any of the remaining ones. Tail conical, 85–90 μ long, bearing 6 pairs of subventral setae; a.b.d. = 25–27 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4066, Type slide No. 84. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

CHROMADORIDAE

CHROMADORINAE

The genera in this subfamily are arranged as in Wieser (1954); that is, the primary division is into genera with hollow or with solid teeth. Within each of these two groups further separation is based on the structure of the cuticle (homogeneous or heterogeneous and with or without lateral differentiation).

HYPODONTOLAIMUS de Man, 1888

Type species.—*Spiliphera inaequalis* Bastian, 1865: 166, pl. 13, figs. 223–225.

Group A in Wieser's key (1954) contains species with very long somatic setae and up to now is represented by six species. Since classification of these species leans heavily on features of the spicular apparatus, *H. heymonsi* (Steiner, 1922), known from 1 ♀ only, is considered a *species inquirenda*. A key to the species reads as follows:

Key to Species of *Hypodontolaimus* (Group A of Wieser, 1954)

1. Cephalic setae twice the head diameter. Pharyngeal bulb not very powerful, dorsal tooth weakly S-shaped, not pushed into ventral buccal wall. Indistinct preanal papillae present . *H. setosus* (Bütschli, 1874)
   Cephalic setae measuring about 1 head diameter. Pharyngeal bulb powerful, dorsal tooth strongly S-shaped, pushed into ventral buccal wall. No preanal papillae 2
2. Distal portion of tail with *ventral* curvature. First circle of (6) cephalic sense organs

papilloid. Esophageal bulb indistinctly set off from esophagus ..... *H. colesi* Inglis, 1962

Distal portion of tail with *dorsal* curvature. First circle of (6) cephalic sense organs setose. Esophageal bulb well set off 3

3. Gubernaculum with hook-shaped apophysis ..... *H. steineri* Wieser, 1954

Gubernaculum without apophysis 4

4. Gubernaculum well developed, spoon-shaped, half the length of the spicula ..... *H. schuurmansstekhoveni* Gerlach, 1951

Gubernaculum reduced to a short plate with thin lamella between the 2 spicula. Free portion of gubernaculum much shorter than half the length of the spicula 5

5. Gubernacular lamella with dorsal extension. Spicula evenly curved, of nearly equal width throughout. Tail without break ..... *H. solivagus* Hopper, 1963

Gubernacular lamella minute, without extension. Spicula tapering unevenly and of characteristic shape (see Fig. 44, d). Tail with distinct break in cuticle ..... *H. interruptus* n. sp.

Group B of Wieser's key, comprising species without elongated somatic setae, includes a few species characterized by the possession of a double bulb. This group, which has been referred to as a distinct subgenus, *Ptycholaimellus* Cobb, 1920, by Gerlach (1955), is represented by the following 4 species:

H. carinatus (Cobb, 1920), distinguished by long cephalic setae but imperfectly known. The specimens described under this name by Timm (1952) almost certainly do not belong to *H. carinatus* but more likely to one of the following two species:

H. ponticus Filipjev, 1922. (For synonyms and description see Gerlach, 1951a.)

H. pandispiculatus Hopper, 1961. On the basis of our own material we can confirm Hopper's conclusion that this species is separated from *H. ponticus* by the shape of spicula and gubernaculum and by the shorter cephalic setae.

H. macrodentatus Timm, 1961, characterized by knob-like swellings at the base of the dorsal tooth, and by the shape of the spicula.

Hypodontolaimus (*H.*) *interruptus* new species

Plate XXI, fig. 44, a–d

L = 0.58–0.59 mm; w = 23–25 μ; esophagus = 95–100 μ. Head diameter 15 μ. Lips large. Cephalic setae: first circle of six = 2.5 μ, second circle of four = 15 μ. Cervical and somatic setae up to 35 μ long. The somatic setae are arranged in two sublateral rows on each side of the body. The same holds for the cervical setae but some submedian setae can also be seen. Cuticle annulated, with dots between the annules; lateral differentiation consisting of two longitudinal rows of larger dots and faint wings. Distance of longitudinal rows = 4 μ in mid-body, 5 μ in cervical region. Buccal cavity with powerful dorsal tooth. Pharyngeal bulb well developed. Esophageal bulb 20 × 16 μ. Amphids elliptical. Spicula 21 μ long, tapering unevenly, tip obliquely truncate. Gubernaculum reduced to a small plate with minute lamella between the spicula. Tail 85–87 μ long, with break in cuticle shortly before the middle; a.b.d. 22 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4070, Type slide No. 85. Type locality, M-5, Virginia Key.

Representation in samples studied.—M-5, Virginia Key.

Hypodontolaimus (*Ptycholaimellus*) *pandispiculatus* Hopper, 1961

Plate XXI, fig. 45, d, e; Plate XXII, fig. 45, a–c, f

Hypodontolaimus (*Ptycholaimellus*) *pandispiculatus* Hopper, 1961: 360, 361, figs. 1–4.

L = 1.14 mm; w = 28–30 μ; esophagus = 180 μ. Head diameter 15 μ. Cephalic setae (only second circle of four seen) 5–6 μ. Lips distinct. Cervical and somatic setae short, in two sublateral rows. Cuticular ornamentation typical; longitudinal rows of dots 5 μ apart in mid-body, 4 μ on level of esophageal bulb. Buccal cavity with medium-sized dorsal tooth and subventral

projections. Pharyngeal bulb not very large. Esophageal bulb 40 × 28 μ, barrel-shaped, double, the anterior portion smaller than the posterior one. Excretory pore 22 μ behind anterior end. Spicula 35 μ long, with velum. *Two* gubernacula, 12 μ long, proximally expanded. Tail 110 μ long, a.b.d. 35 μ.

Representation in samples studied.—M-3, Key Biscayne.

Geographical distribution.—Gulf Shores, Alabama (Hopper, 1961).

Remarks.—Our specimens differ from the type in the more posterior position of the excretory pore, but there is agreement on all other essential points.

RHIPS Cobb, 1920

Type species.—*Rhips ornata* Cobb, 1920: 339, 340, fig. 118, a–c.

This genus comprises two species, *R. ornata* Cobb, 1920, and *R. longicauda* Timm, 1961, the latter being characterized by the elongated tail. We found Cobb's species in our material and shall give a figure of the head end, the spicular apparatus being well described in Cobb's original publication.

Rhips ornata Cobb, 1920

Plate XXII, fig. 46, a, b

Rhips ornata Cobb, 1920: 339, 340, fig. 118, a–c

L = 1.46 mm. Head diameter 12 μ. Lips distinct, with 6 setose labial papillae. Cephalic setae 5 + 3 μ, in two circles. Amphids 10 μ wide. Head with six triangular plates that probably serve as supports. Cuticular annules resolvable into basketwork-like structures in the cervical region, into elongated, more or less hexagonal structures in remainder of body. V-shaped lateral differentiations in posterior portion of body. A few cervical setae, measuring up to 15 μ. Buccal cavity with large dorsal tooth and two small subventral teeth. Spicula 43 + 28 μ long. Gubernaculum (lateral pieces) 19 μ. Tail 130 μ long, a.b.d. 23.

Representation in samples studied.—M-5, Virginia Key.

Geographical distribution.—Ocean Beach, Florida (Cobb, 1920), Brazil (Gerlach, 1957), and ? Campbell Islands (Allgén, 1932).

CHROMADORA Bastian, 1865

Type species.—*Chromadora nudicapitata* Bastian, 1865: 168, pl. 13, figs. 230–232.

This genus was discussed by Wieser (1954, 1955). We found what is probably *C. macrolaimoides* Steiner, 1915, as in our specimens the distal end of the gubernaculum seems to be more strongly expanded than that figured by Steiner or Chitwood (1951). However, this portion is weakly cuticularized and difficult to see. The species is characterized by the large esophageal bulb, the two small and rather faint preanal papillae, the weak curvature of the spicula and the long spinneret.

Chromadora macrolaimoides Steiner, 1915

Plate XXII, fig. 47

Chromadora macrolaimoides Steiner, 1915: 234–237, figs. 23–27; Wieser, 1955 (nec Steiner, 1922; Allgén, 1927).

Chromadorella macrolaimoides,—Filipjev, 1918; Chitwood, 1951.

Spicula 21 μ long, weakly curved, with velum. Gubernaculum 15 μ long, strongly expanded distally, edge slightly serrated. There are two preanal supplements, rather faint and of the usual cup-like shape but surrounded by an additional cuticular differentiation. The distance of the posterior supplement from the anus is 20 μ. Spinneret 6 μ long.

Representation in samples studied.—M-1, Key Biscayne, M-4, Rickenbacker Causeway.

Geographical distribution.—Sumatra (Steiner, 1915), Texas, Gulf Coast (Chitwood, 1951), and Japan (Wieser, 1955).

TIMMIA Hopper, 1961

Type species.—*Parachromadora parva* Timm, 1952: 24, 25, figs. 38, 39.

Parachromadora Timm, 1952, nec Micoletzky, 1914, nec Schulz, 1939.

This genus is distinguished from *Chro-*

madorina Filipjev, 1918, solely by the occurrence of a tubular supplement in addition to the usual preanal papillae in the male. Our material, from Vero Beach, contained representatives of the type species, *Timmia parva* (Timm, 1952) Hopper, 1961. In addition to the present locality, the species is known from Chesapeake Bay, Maryland (Timm, 1952), and Gulf Shores, Alabama (Hopper, 1961).

SPILOPHORELLA Filipjev, 1918

Type species.—*Spilophora paradoxa* de Man, 1888: 45–47, pl. 4, fig. 19.

We seem to have typical representatives of the cosmopolitan species, *Spilophorella paradoxa*, in our material.

Spilophorella paradoxa (de Man, 1888) Filipjev, 1918

Spilophora paradoxa de Man, 1888: 45–47, pl. 4, fig. 19.
Spilophorella paradoxa (de Man, 1888) Filipjev, 1918: 259.

L = 0.73–0.80 mm; w = 31 μ; esophagus = 145 μ; Vu = 44%. Head diameter 11 μ. Cephalic setae 5 μ. Esophageal bulb double, typical. Spicula 36–43 μ; gubernaculum 30–36 μ. Tail 120–130 μ long, spinneret 20–22 μ.

Representation in samples studied.—M-2, Key Biscayne, M-6, Everglades National Park.

Geographical distribution.—Cosmopolitan.

PROCHROMADORELLA Micoletzky, 1924

Type species.—*Chromadora neopolitana* de Man, 1878: 113, 114, pl. 9, fig. 17, a–c.

Prochromadorella mediterranea (Micoletzky, 1922)

Plate XXII, fig. 48, a–c; Plate XXIII, fig. 48, d, e

Chromadora mediterranea Micoletzky, 1922b; *Chromadorella pontica* Filipjev, 1922; and ? *Hypodontolaimus arabicus* Cobb, 1891.

L = 0.5–0.67 mm; w = 17–21 μ; esophagus = 100–105 μ; Vu = 46%. Head diameter 10–11 μ. Lips and labial papillae distinct. Cephalic setae in two circles, 6 short ones (about 1–1.5 μ), 4 longer ones (5 μ). A few cervical setae up to 10 μ, amongst which one characteristic circle of four sublateral pairs, two on each side, at about 20 μ from the anterior end. Cuticle typical, with at first dots, then elongated hexagonal bodies and rods between annules. Amphids faint though large, oval. Excretory pore on level of cephalic setae. Buccal cavity with three solid, subequal teeth. Esophagus enlarged posteriorly. Spicula semicircular, chord 18 μ long. Gubernaculum 10 μ, distally slightly expanded, with two or three teeth. Two faint preanal supplements 15 and 27 μ from anus, respectively. Tail in ♂, 75–100 μ (= 6–6.7 a.b.d.), in ♀, 110 μ (9 a.b.d.).

Representation in samples studied.—M-1, Key Biscayne.

Geographical distribution.—Mediterranean Sea, Black Sea, Red Sea (Gerlach, 1958), Bay of Bengal (Timm, 1961).

Remarks.—Our specimens are in perfect agreement with the type and with material from the Mediterranean.

CHROMADORELLA Filipjev, 1918

Type species.—*Chromadora filiformis* Bastian, 1865: 169, pl. 13, figs. 242–244.

Since our material contained three species, two of which are new, we shall provide a new key to the genus (see also Wieser, 1954).

Key to Species of *Chromadorella*

1. Cuticular ornamentation always consisting of dots and rod-like markings 2
   Cuticular ornamentation in anterior cervical region consisting of solid bands with crenate contour, or of fused hexagonal bodies 5
2. Four longitudinal rows of dots on each side of body ..... *C. circumflexa* Wieser, 1954
   Two longitudinal rows of dots on each side of body 3
3. Lateral differentiation beginning with cuticular annulation, there measuring ⅕ to ⅙ of e.b.d. .....

C. parapoecilosoma (Micoletzky, 1922)[1]
Lateral differentiation beginning a short distance behind cuticular annulation, there measuring not more than 1/10 of c.b.d. 4
4. Longitudinal rows 1/10 to 1/12 of c.b.d. apart; membrane present
C. membranata Micoletzky, 1924
Longitudinal rows 1/6 to 1/8 of c.b.d. apart; membrane absent
C. filiformis (Bastian, 1865)
5. Twelve preanal supplements 6
Five to 6 preanal supplements 7
6. Lateral differentiation irregular
C. edmondsoni Wieser, 1959
Lateral differentiation two longitudinal rows, widely spaced in anterior cervical region
C. galeata Wieser, 1959
7. Esophageal bulb distinctly set off, barrel-shaped, short. Spicula nearly semicircularly curved ..... *C. parabolica* Wieser, 1954
Esophageal bulb not so well set off, more elongated. Spicula rectangularly bent 8
8. Three longitudinal rows, in anterior cervical region 1/10 of c.b.d. apart ..... *C. trilix* n. sp.
Two longitudinal rows, in anterior cervical region 1/4 of c.b.d. apart *C. vanmeterae* n. sp.

We consider *C. mytilicola* Filipjev, 1918, as doubtful since only females are known.

Chromadorella filiformis (Bastian, 1865) Plate XXIII, fig. 49, a, b; Plate XXIV, fig. 49, c, d

Chromadora filiformis Bastian, 1865; *Dichromadora tenuicauda* Schuurmans-Stekhoven, 1950; *Chromadorella filiformoides* Chitwood, 1951.

L = 0.77 mm; w = 26 μ; esophagus = 115 μ. Head diameter 14–15 μ. Lips distinct. Six short cephalic setae and 4 long ones, measuring 10–11 μ. Ocelli and pairs of cervical setae 20 μ behind anterior end (ocelli sometimes indistinct). Cuticle annulated, with transverse rows of dots between annules which become elongated in the posterior cervical region. Lateral differentiation through larger dots which arrange themselves into distinct longitudinal rows at about the level of the ocelli. Between esophageal bulb and anus the longitudinal rows are from 3.5–4.5 μ apart, that is, 1/6 to 1/8 of c.b.d. Buccal cavity with three solid, subequal teeth. Esophageal bulb elongated, 30–34 × 15–16 μ. Excretory pore on level of nerve ring, 60 μ behind anterior end. Spicula 5 μ wide, strongly curved; true length = 30 μ, chord = 22 μ. Gubernaculum 19 μ long, consisting of a piece between the two spicula and a caudal plate which distally ends in a three-pronged projection. There are 5 large preanal supplements. Tail 110 μ long, a.b.d. 25 μ.

Representation in samples studied.—M-1, Key Biscayne.

Geographical distribution.—Atlantic, Mediterranean, Black Sea, Red Sea, Sumatra, Japan, Sargasso Sea, Texas.

Remarks.—As has been noted in other species, the appearance of the ocelli in different specimens is variable, probably due to the action of the preserving fluid. Consequently, Chitwood's species, *C. filiformoides*, cannot be maintained.

A further fact that should be mentioned is that in our specimens the longitudinal rows of dots seem to be more widely spaced than indicated by de Man (1890) in his excellent description of European representatives of this species. Comparative data on this point would be desirable.

Chromadorella trilix new species Plate XXIII, fig. 50, a–c; Plate XXIV, fig. 50, d, e

L = 0.95 mm; w = 28–30 μ; esophagus = 135 μ. Head diameter 13 μ. Lips distinct. Labial papillae and first circle of cephalic setae not seen. Four cephalic setae 5–6 μ long. Cuticular ornamentation consisting of solid bands with crenate contour in anterior cervical region which further posterior become resolved into rod-like markings. Lateral differentiation beginning with annulation, at first consisting of round markings, 1.5 μ apart, then of two rows of larger dots. About 30 μ behind the anterior end, one of the two longitudinal rows of dots moves into the middle of the lateral fields and is replaced sublaterally by a new row of dots.

[1] This species is not well known. There are doubts concerning the cuticular ornamentation since Micoletzky (1922) and Schuurmans-Stekhoven (1943) mention only dots and rod-like markings, whereas Wieser (1951) figures solid bands with crenate contour.

The result is a lateral differentiation consisting of three longitudinal rows which run to approximately the level of the anus where the middle row drops out. In midbody the outer rows are 3.5–4 μ apart. Buccal cavity with three solid, subequal teeth. Esophagus elongated, with three fairly distinct interruptions. Spicula 26 μ long. Gubernaculum expanded distally. Five large supplements, extending to 90 μ preanal. Tail 91 μ, a.b.d. 22 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4067, Type slide No. 86. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

Chromadorella vanmeterae new species
Plate XXIII, fig. 51, a–c; Plate XXIV, fig. 51, d, e

L = 1.25 mm; w = 35 μ; esophagus = 160 μ. Head diameter 20 μ. Head slightly swollen. Lips and labial papillae distinct. First circle of cephalic setae not seen, second circle of four setae, 5–6 μ. Cervical setae about 35 μ, behind anterior end, somatic setae along lateral fields. Cuticular ornamentation consisting of solid bands with crenate contour in anterior cervical region, resolving into elongated markings further posterior. Lateral differentiation by larger dots, forming two longitudinal rows, 4–6 μ apart. Buccal cavity typical. Esophageal bulb elongated, with distinct plasmatic interruptions. Spicula 31 μ long. Gubernaculum simple. Six preanal supplements, extending to 113 μ preanal. Tail 150 μ, a.b.d. 23 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4067, Type slide No. 87. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

Remarks.—This species is dedicated to Miss Nancy Van Meter who guided us safely to the muds of Florida Bay, Everglades National Park.

EUCHROMADORA de Man, 1886
Type species.—*Chromadora vulgaris* Bastian, 1865: 167, 168, pl. 13, figs. 233–235.

This genus is rather difficult because it seems to contain a great number of species distinguishable by subtle characters of the cuticle and the spicular apparatus. Most descriptions, however, are too vague to permit comparison on a sufficiently detailed level. We agree with Inglis (1962) that the highly developed cuticle possesses a number of features that could be used for taxonomic purposes. Probably the most suitable is the structure of the annules underlying the variously shaped blocks, rods, and "basketwork"-types of differentiations. These annules have, along the lateral line of the body, anterior or posterior projections which may be straight, notched, fenestrated, or even entirely separated from the annules, thus forming small cuticular pieces between the latter. All these differentiations may be specific but more comparative studies are required.

A grouping of the genus seems to be possible along the lines indicated by Wieser (1954). Thus, there is a group of species in which the dorsal tooth is relatively small, poorly cuticularized, forward pointing and not embedded in pharyngeal tissue. This group contains the following species: *E. amokurae* (Ditlevsen, 1921), (syn. *Spilophora amokurae* Ditlevsen, 1921); *E. arctica* Filipjev, 1946; *E. luederitzi* Steiner, 1918 (somewhat doubtful); and *E. mediterranea* Allgén, 1942. All other species referred to this group by Wieser (1954, group B) are insufficiently described and are considered *species inquirendae.*

In the second group, the dorsal tooth is large and heavily cuticularized, its base embedded in pharyngeal tissue. Two of the included species are characterized by a well-developed, oval bulb, distinctly set off from the esophagus, viz.: *E. loricata*

(Steiner, 1916) (synonyms: *Spilophora loricata* Steiner, 1916, *E. archaica* Steiner and Höppli, 1926), and *E. tyrrhenica* Brunetti, 1951.

The remaining species are difficult to separate. They are listed below, together with a short characterization of their distinguishing features, but the original descriptions should be consulted in each case.

E. vulgaris (Bastian, 1865)

Chromadora vulgaris Bastian, 1865; *E. tridentata* Allgén, 1929.

Spicula asymmetrical.

E. striata (Eberth, 1863)

Odontobius striatus Eberth, 1863, non *E. striata* of Chitwood, 1951 (= *E. gaulica*).

Spicula 70–90 μ, stout, central portion enlarged; lateral pieces of gubernaculum about 50% of spicula.

E. gaulica Inglis, 1962

E. striata of Chitwood, 1951, non Eberth, 1863; *E. chitwoodi* Coles, 1965.

Spicula 42–53 μ, proximal portion slender, proximal and "crinkled," distal portion enlarged; gubernaculum 50–66% of spicula.

E. parafricana Gerlach, 1958

Spicula 25–27 μ, stout; gubernaculum of even thickness, boomerang-shaped. Cephalic setae shorter than in above species.

E. pectinata n. sp. (See below, p. 286.)

Closely related to foregoing species. Spicula just as stout but more heavily cuticularized, 37–40 μ; gubernaculum sharply bent, with acute tip. Comb-like ridges in buccal cavity. Cephalic setae even shorter. Cuticular annules transversely split.

E. permutabilis Wieser, 1954

Spicula 104–133 μ. Tail plump (4 a.b.d. in ♀). Gubernaculum sharply curved distally.

E. tokiokai Wieser, 1955

Spicula 41–50 μ, slender throughout. Gubernaculum 66% of spicula, slightly curved distally.

E. meadi n. sp. (See below, p. 286.)

First circle of 6 cephalic setae elongated, second circle—at least in adults—absent. The absence of the second circle of cephalic setae distinguishes *E. meadi* from the remaining species of this group.

In addition to these species there are two more with unusually shaped spicular apparatus which might not belong to the genus at all, viz., *E. inflatispiculum* Schuurmans-Stekhoven, 1943, and *E. kryptospiculum* Allgén, 1951.

All the other species described are here considered as doubtful, or have been transferred to other genera by Wieser (1954).

Euchromadora gaulica Inglis, 1962
Plate XXIV, fig. 52, a; Plate XXV, fig. 52, b–d

Euchromadora gaulica Inglis, 1962: 260.
E. striata of Chitwood, 1951, non Eberth, 1863.
E. chitwoodi Coles, 1965 (NEW SYNONYMY).

L = 1.11–1.57 mm; w = 40–52 μ; esophagus = 245 μ; Vu = 50%. Head diameter 19 μ. First circle of six cephalic setae short, second circle of four, 7–9 μ. Cuticular ornamentation consisting, in front, of three transverse rows of dots, followed by the usual annules covered with hexagonal bodies which themselves are interconnected by a meshwork of lines. Further posterior, these bodies are more elongated and form a sort of grid that links the annules. The latter are solid and possess lateral projections ("lateral plates" of Inglis, 1962) which are directed anteriorly in the anterior half of the body, posteriorly in the posterior half. Each projection fits into a notch of the following annule, thus forming a series of joints. This condition has already been described by Steiner (1918). Occasionally the lateral projections are separated from the annules and then can be seen as cuticu-

lar pieces between the latter. Traces of pigment spots occur in the anterior cervical region. Buccal cavity with large dorsal tooth and several subventral and ventral denticles which form a comb-like ridge. Pharyngeal bulb well developed, esophageal bulb not set off, indistinct. Spicula 42–47 μ long, proximal end giving a "crinkled" impression, distal two-thirds dilated. Lateral plates of gubernaculum 25–28 μ long, proximal end straight or round depending on focus, distal end acute, with two minute subterminal denticles; dorsal plate 26–33 μ long, with lateral projections. Tail 135–150 μ long, a.b.d. 30 μ in ♂.

Representation in samples studied.—M-1, Key Biscayne.

Geographical distribution.—Texas, Gulf Coast (Chitwood, 1951), Mediterranean Sea (Inglis, 1962), coast of England (Coles, 1965).

Euchromadora pectinata new species
Plate XXIV, fig. 53, a; Plate XXV, fig. 53, b–d

L = 1.65–1.97 mm; w = 40–50 μ; esophagus = 258–290 μ; Vu = 48%. Head diameter 19 μ. Labial papillae indistinct. Cephalic setae: first circle of six, papillose; second circle of four, 3.5–4 μ. Cuticular ornamentation beginning, a short distance behind the cephalic setae, with two fused annules on which faint longitudinal striation can be seen, followed by single annules which, however, from about the middle of the cervical region to the middle of the tail, are transversely split. Consequently each annule consists—at least in the lateral portion of the body—of two parts of which the posterior one is the larger. This posterior part possesses the same lateral projections as described for the foregoing species, only less pronounced. Moreover, there are transverse "lacunae" on the annules of the mid-body. The differentiation superimposed upon the annules consists of the usual hexagonal blocks in the anterior cervical region, rod-like markings in the remainder of the body. These markings are thinner than in the foregoing species. The cuticle shows ventral or subventral differentiations in the vulvar region, in the anal region, and in males at a distance of 120 μ preanal and 70 μ postanal, respectively. Buccal cavity with medium-sized tooth, not as strongly cuticularized as in other species of this group, and a series of comb-like structures. Esophagus dilated, no true bulb. Spicula 6–7 μ wide, strongly cuticularized, without velum, 37–40 μ long. Lateral plates of gubernaculum 20–22 μ long, sharply bent distally and with acute tip. Tail in ♂, 160–180 μ long, a.b.d. 35 μ, in ♀, 200 μ long, a.b.d. 27 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4073, Type slide No. 88. Type locality, M-8, Biscayne Bay.

Representation in samples studied.—M-8, Biscayne Bay.

Euchromadora meadi new species
Plate XXIV, fig. 54, a, b; Plate XXV, fig. 54, c–f

L = 1.50 mm; w = 40 μ; esophagus = 200 μ. Head diameter 19 μ. Lips and labial papillae distinct. First circle of cephalic setae 2 μ, no second circle in adults. In juveniles four short setae could be seen immediately behind the first circle of six setae. Amphids fairly distinct, 12–13 μ wide. Cuticular ornamentation beginning with large annule, longitudinally striated, followed by narrower annules which are all solid and show no secondary development except the lateral projections described in the species above. Hexagonal blocks very thin even in anterior cervical region. Buccal cavity with large dorsal tooth and at least two subventral projections, no comb-like ridges. No distinct esophageal bulb. Spicula 45–47 μ long, slender, with velum. Lateral plates of gubernaculum 22–24 μ long, hammer-shaped; dorsal plate 18 μ long, with characteristic proximal projection. In the anal area the cuticular annules are weakly

cuticularized subventrally to form a sort of "window." Tail 135 μ long, a.b.d. 35 μ, in juveniles 5–6 a.b.d. long.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4067, Type slide No. 89. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

ATROCHROMADORA Wieser, 1959

Type species.—*Spilophora parva* de Man, 1893: 89–91, pl. 5, fig. 5.

We found what appeared at first to be *A. parva* (de Man, 1893), but closer study revealed the following differences:

	parva	*denticulata*
Spacing of longitudinal rows (mid-body)	3.5 μ	6 μ
Length of spicula	17–18 μ	34 μ
Distal end of gubernaculum	straight	denticulated
Length of spinneret	12 μ = $\frac{1}{7}$ tail	7–8 μ = $\frac{1}{15}$ tail

Atrochromadora denticulata new species

Plate XXVI, fig. 55, a–f

L = 0.79–0.80 mm; w = 31–32 μ; esophagus = 96–109 μ; Vu = 46%. Head diameter 11 μ. Lips distinct, labial papillae and first circle of cephalic sense organs not seen. Cephalic setae 5–6 μ. Cervical setae as in *A. parva*. Amphids distinctly spiral, but small. Cuticular ornamentation beginning with transverse rows of dots, followed by annules. In the lateral region of the body a few dots or rod-like markings can be seen between the annules, particularly two longitudinal rows of larger dots, the spacing of which is 5–6 μ between cervical region and anus. Buccal cavity with three solid, subequal teeth. Esophageal bulb round. Excretory pore 37 μ in front of end of esophagus, ventral gland reaching to 48 μ behind the esophagus. Spicula nearly semicircular, 3 μ wide, 34 μ long. Gubernaculum 23 μ long, strongly dilated distally, with denticulated end plate. Tail 124–128 μ long, a.b.d. 28 μ in ♂, 20 μ in ♀. Spinneret 7–8 μ. In ♂ there is a slight ventral swelling, 45 μ postanally.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4067, Type slide No. 90. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

COMESOMATIDAE

MESONCHIUM Cobb, 1920

Type species.—*Mesonchium poriferum* Cobb, 1920: 294, 295, fig. 76.

Pepsonema Cobb, 1920: 295.

The following five species are known: *M. poriferum* Cobb, 1920; *M. pellucidum* (Cobb, 1920) syn. *Pepsonema pellucidum*; *M. nini* Inglis, 1961; *M. punctatum* Timm, 1961; *M. janetae* Inglis, 1963. They can be separated mainly by the shape of their spicula and by the pattern of their lateral cuticular differentiations. Moreover, *M. janetae* has shorter cephalic setae, and *M. nini* amphids with more turns than the rest of the species.

Our species agree with the description of *M. pellucidum* by Cobb (1920) except that in the posterior portion of the body we observed four longitudinal rows of dots, whereas Cobb states that near the tail "there are sometimes six or possibly eight rows." We cannot agree with Timm's (1961) synonymization of *M. pellucidum* with *M. poriferum* since in the two species the longitudinal rows are differently arranged, and in *M. pellucidum* the spicula are retrorsely barbed (a fact already mentioned by Cobb), whereas in *M. poriferum* they are acute distally. The description of *M. punctatum* Timm is confusing. In the text the presence of the usual number of four cephalic setae is mentioned, whereas the figure shows the head equipped with what seems to be eight or ten setae. In the text the amphids are said to describe 2.5 turns; in the figure they definitely have three turns. Even without these confusing

discrepancies it would be difficult to give unequivocal reasons why *M. punctatum* and *M. poriferum* should be distinct species.

Mesonchium pellucidum (Cobb, 1920) Plate XXVII, fig. 57, a–d

Pepsonema pellucidum Cobb, 1920: 295, 296, fig. 77.

L = 1.77–2.00 mm; w = 73–75 μ; esophagus = 250 μ; Vu = 47%. Head diameter 15 μ. Cephalic setae 12 μ. Amphids 10 μ, 2.5 turns. Buccal cavity cylindrical, 23 μ long, with three teeth. (The heads of our male specimens agree in every respect with Cobb's figures.) Cuticular differentiation: In both sexes there are four longitudinal rows of coarser dots, running from behind the amphids to behind the end of the esophagus. From there on the two outer rows gradually disappear and the whole lateral field is raised to form a lateral wing. In mid-body there are only two longitudinal rows of coarser dots. In the posterior portion of the body the wings are flattened again and the two outer rows of dots reappear. The spaces between the coarser dots are resolvable with difficulty into transverse rows of minute and closely spaced dots which are continuations of the usual transverse rows of dots into the lateral fields. Esophagus with a barrel-shaped posterior bulb and a small cardia. Ventral gland opposite end of esophagus, excretory pore behind nerve ring. Spicula 110 μ long, proximally cephalate, distally retrorsely barbed. Gubernaculum heavy, with 30 μ long apophysis. There are about 16 indistinct tubular supplements. Tail 200 μ long, a.b.d. 45–50 μ.

Representation in samples studied.—M-8, Biscayne Bay.

Geographical distribution.—Kingson, Jamaica (Cobb, 1920).

SABATIERIA de Rouville, 1903

Type species.—*Sabatieria cettensis* de Rouville, 1903: 11.

Two closely related, but distinct, species of *Sabatieria* were found in the sample from Vero Beach. Following the key given by Wieser, 1954, they belong to the group encompassing S. *cupida* Bresslau and Schuurmans-Stekhoven *in* Schuurmans-Stekhoven, 1935, S. *heterura* (Cobb, 1898), S. *rugosa* Schuurmans-Stekhoven, 1950, S. *similis* (Allgén, 1933), and S. *tenuicaudata* (Bastian, 1865).

The two new species, S. *paradoxa* and S. *paracupida*, can be separated from the above-mentioned related species by use of the following key.

Key to Group Based on Male Characteristics

1. Supplements 28–32 ..... S. *tenuicaudata* (Bastian, 1865) (doubtful species)
   Supplements 15–22 2
2. Cephalic setae more than ⅔ of head diameter in length 3
   Cephalic setae less than ⅔ of head diameter in length 4
3. Spicules 46–50 μ long, 1.2 anal body diameters ..... S. *cupida* Bresslau and Schuurmans-Stekhoven *in* Schuurmans-Stekhoven, 1935
   Spicules 63–68 μ long, 1.7–1.8 anal body diameters ..... S. *paracupida* n. sp.
4. Spicules 1.6 or more anal body diameters in length 5
   Spicules 1.3 or less anal body diameters in length 6
5. Spicules 85 μ long, without proximal cephalation ..... S. *heterura* (Cobb, 1898)
   Spicules 60–62 μ long, proximally distinctly cephalated ..... S. *paradoxa* n. sp.
6. Amphid with 2.5 turns ..... S. *rugosa* Schuurmans-Stekhoven, 1950
   Amphid with 2 turns ..... S. *similis* (Allgén, 1933)

Sabatieria paradoxa new species Plate XXVII, fig. 58, a–d

L = 1.46–1.66 mm; w = 42–44 μ. Diameter at base of esophagus 38–39 μ. Esophagus 135–140 μ. Tail 140–142 μ (4.0–4.1 a.b.d.). Head diameter 13 μ. Labial and cephalic papillae distinct. Cephalic setae 5–6 μ long, 38–46% of head diameter. Cervical setae, short, widely dispersed, somatic setae shorter and more widely spaced. Amphids spiral, with 2.25 turns; 7 μ wide (54% of head diameter). Lateral differen-

tiation prominent, the transverse rows of punctations overlying the lateral chords being coarser and more widely spaced than on the remainder of the body. Spicules 60–62 μ long (1.7–1.8 a.b.d.), proximally cephalated, distally quite narrowed. Gubernaculum with lateral guiding pieces. Apophyses of gubernaculum 25–27 μ long. Preanal supplements minute, 17–19 in number. Caudal setae present, arranged as illustrated (Pl. XXVII, fig. 58, b).

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4075, Type slide No. 92. Type locality, V, Vero Beach.

Representation in samples studied.—M-7, Everglades National Park, V, Vero Beach.

Sabatieria paracupida new species
Plate XXVIII, fig. 59, a–c

L = 1.7–1.85 mm; w = 47–52 μ. Diameter at base of esophagus 44 μ. Esophagus 180–184 μ. Tail 148–150 μ (4 a.b.d.). Head diameter 13–14 μ. Labial and cephalic papillae distinct. Cephalic setae 10 μ long, 71–77% of head diameter. Cervical and somatic setae similar to preceding species. Amphids spiral, with 2.25 turns; 9 μ wide (64–70% of head diameter). Lateral differentiation as in preceding species. Spicules 63–68 μ long (1.7–1.8 a.b.d.), lacking proximal cephalation. Gubernaculum with lateral guiding pieces. Apophyses of gubernaculum 20 μ long. Preanal supplements minute, 19–22 in number. Caudal setae present, arranged as illustrated (Pl. XXVIII, fig. 59, c).

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4075, Type slide No. 93. Type locality, V, Vero Beach.

Representation in samples studied.—V, Vero Beach.

AXONOLAIMIDAE

AXONOLAIMUS de Man, 1889

Type species.—*Anoplostoma spinosum* Bütschli, 1874 *sensu* de Man, 1888: 19–21, pl. 2, fig. 11.

Axonolaimus hexapilus new species
Plate XXVIII, fig. 60, a–e

L = ♂, 1.8, ♀, 1.9 mm; w = ♂, 28, ♀, 35 μ; diameter at base of esophagus 28, 31 μ. Esophagus 172, 137 μ. Vu = 54%. Tail 128, 138 μ (4.3–4.6 a.b.d.). Head diameter 13, 14 μ. Head with six labial papillae and four cephalic setae (21–24 μ long). An additional 21–24 μ long seta is located about 5 μ behind each amphid. Amphid 12–13.5 μ long by 6–7 μ wide, slightly to distinctly open loop-shaped, 8 μ from anterior end. Buccal cavity 14–16 μ deep, of which the posterior conoid portion makes up about 10 μ. Anterior part of buccal cavity with six weak odontia. Esophagus clavate, 10 μ wide at base of buccal cavity, 12 μ at the nerve ring, expanding in the posterior ¼ to 20 μ at the base. Excretory pore slightly behind middle of conoid portion of the buccal cavity. Excretory pore ampulla 40 μ from head end, at level of "break" in esophageal musculature. Renette cell large, posterior to base of esophagus. Pseudocoelomocyte immediately behind renette cell. Cuticle finely striated. Somatic setae about 5 μ long.

Female didelphic, amphidelphic, ovaries outstretched; with two eggs observed in the posterior uterus (eggs 75–110 μ by 30 μ). Male diorchic, testes opposed, outstretched. Spicules 39 μ long. Gubernaculum short, with 12 μ long apophyses. Supplementary organs glandular, with minute exit pores. Male and female tail obtusely conoid. Caudal setae arranged as illustrated (Pl. XXVIII, fig. 60, c), those near terminus longer than the remainder. Spinneret three-lobed, the associated glands located in the tail.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collec-

tion Number 4070, Type slide No. 94. Type locality, M-5, Virginia Key.

Representation in samples studied.—M-5, Virginia Key.

Remarks.—*A. hexapilus* n. sp. can be distinguished from all other *Axonolaimus* species by the presence of a long lateral seta associated near the base of each amphid. In possessing this character, along with the tri-lobed spinneret, this animal has some relationship to the monodelphic genus *Synodontium* Cobb, 1920.

ODONTOPHORA Bütschli, 1874

Type species.—*Odontophora marina* Bütschli, 1874: 285, pl. 3, fig. 13.

Odontophora variabilis new species

Plate XXVIII, fig. 61, a, b; Plate XXIX, fig. 61, c–e

L = 1.3–2.2; w = 36–50 μ; Vu = 53–56%. Diameter at base of esophagus 29–33 μ. Esophagus 112–135 μ long. Head diameter 11–15 μ. Head with cephalic papillae, 4 cephalic setae and 3 circles of subcephalic setae. Cephalic setae 14–17 μ long in ♂, 11–14 μ in ♀. First circle of subcephalic setae (paramphidial) 11–13 μ, second circle, 8–9 μ, third 4–5 μ long. The subcephalic setae all occur within the range of the buccal cavity. Cervical setae located 15–25 μ posterior to base of buccal cavity, the first circle the longest, 7–8 μ, the next two following closely and being progressively shorter. Amphid 8–10 μ long. Buccal cavity 23–25 μ long, the posterior conoid portion being 17 μ long. Buccal cavity with 6 odontia, the odontia with prominent apophyses to which are attached longitudinally directed muscles, an arrangement that undoubtedly serves to evert the odontia. Excretory pore at base of odontia. Eggs 100–110 μ long by 45 μ wide, two per uterus. Spicula sickle-shaped, 47–49 μ long, the chord being 32–33 μ. Gubernaculum with 12–13 μ long apophysis. Preanal supplements not observed. Tail length variable, 70–117 μ long. Male tail with numerous caudal setae and with terminal setae 17–18 μ long. Female tail with fewer caudal setae and devoid of terminal setae.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4075, Type slide No. 95. Type locality, V, Vero Beach.

Representation in samples studied.—V, Vero Beach.

Remarks.—The specific name *variabilis* serves to indicate the variation found within the specimens recovered from the single sample taken from the Vero Beach area. Body dimensions, such as total length, maximum width and tail length, are quite variable. Morphological structures, however, i.e., spicula, buccal cavity, amphid, distribution and size of cephalic and subcephalic setae, were conspicuously in close agreement. In particular, the shapes of the spicula were nearly identical despite the fact that the tails in the three male specimens observed measured 70 μ, 85 μ, and 117 μ in length.

O. variabilis, in possessing, in addition to the cephalic setae, three circles of subcephalic setae which could be interpreted as being arranged in four submedian rows, is related to *O. angustilaimoides* Chitwood, 1951, and perhaps may be that species. However, no mention is made of the presence of cervical setae in *O. angustilaimoides*, these being a prominent feature in *O. variabilis*. In addition, the size of the eggs and the number of eggs per uterus differs. Moreover, since no males have been described of *O. angustilaimoides*, this species is of doubtful status.

PARODONTOPHORA Timm, 1963

Type species.—*Pseudolella paragranulifera* Timm, 1952: 45, pl. 9, fig. 78.

Parodontophora brevamphida (Timm, 1952) Timm, 1963

Pseudolella brevamphida Timm, 1952: 44, 45, pl. 9, figs. 76, 77.

Parodontophora pacifica (Allgén) *sensu* Timm, 1963: 35, 36, fig. 1, g, h (NEW SYNONYMY).

L = 1.1–1.4 mm; w = 36–48 μ; Vu = 47–50%. Body bearing four rows of somatic setae, two on either side of each lateral chord. Anteriorly the somatic setae are about 4 μ long in the region of the nerve ring. At the vulva their length is reduced to less than 2 μ. Except for the anteriormost 14 μ, the cuticle is finely striated. One dorsal and two ventral setae are located in the region of the amphid. Amphid short shepherd's crook, with the ventral arm longer than the dorsal. Dorsal arm about 10 μ long, ventral arm 14–17 μ long. Amphid located on a level with and distinctly shorter than the 19 μ long posterior cylindrical portion of the stoma. Head rounded, with six lips, six labial papillae, and four 7–8 μ long, cephalic setae (75% of corresponding body diameter). There are no subcephalic setae. Anterior part of stoma with six prominent odontia, posteriorly cylindrical, 25–28 μ deep. Esophageal diameter increasing posteriorly; without basal bulb. Approximately 15 μ posterior to the base of the buccal cavity the tuboid esophageal marginal rays commence. Nerve ring encircling esophagus at approximately 65% of its length. Excretory pore not detected, the ampulla, however, located at the base of buccal cavity. Renette cell 65 μ long (40% of esophageal length), located posterior to base of esophagus. A prominent pseudocoelomocyte occurs immediately posterior to the renette cell.

Female didelphic, amphidelphic, ovaries outstretched. Eggs not observed. Male diorchic, testes opposed, outstretched. Spicules arcuate, 31–36 μ long (according to angle of view). Gubernaculum 8–10 μ long, arcuate. Male and female tail elongate-conoid, 135–155 μ long, the terminal ⅓ nearly cylindrical. Subterminal setae present on some specimens. Male with a short preanal seta and two subventral rows of 7–8 setae. Spinneret present, the gland cells located in the anterior portion of the tail.

Representation in samples studied.—V, Vero Beach.

Geographical distribution.—Chesapeake Bay, Maryland (Timm, 1952), Bay of Bengal (Timm, 1961), Arabian Sea at Karachi (Timm, 1962), Maldives (Gerlach, 1962).

Remarks.—At the present time considerable confusion exists in the taxa that have been identified as *P. pacifica* (Allgén, 1947) (syn. *Odontophora p.* Allgén). Gerlach (1962) considers a variety of species as synonyms of Allgén's species. In his list of synonyms, Gerlach lumps species in which the amphids are 18 μ long together with species in which the amphids are 80–150 μ long. This action seems a bit premature and is considered doubtful. Timm (1963) in creating the genus *Parodontophora* for species of *Odontophora* with parallel stomatal walls, intimates that *P. pacifica* might best be considered as a *species inquirenda*, validating *P. quadristicha* (Schuurmans-Stekhoven, 1950). We agree with Timm's statement and herein consider *P. pacifica* (Allgén, 1947) as a *species inquirenda*. However, in supporting such a move we do not feel that all subsequent *P. pacifica* descriptions refer to *P. quadristicha* and feel that *P. brevamphida* can be suitably differentiated from Schuurmans-Stekhoven's species.

For the present the following differences can be used to separate the two species under consideration:

P. quadristicha [syn. *O. pacifica* Allgén of Wieser, 1956] has amphids 24–32 μ long, a buccal cavity 40 μ long, and a renette cell 90–100 μ long (app. 50–55% of the esophageal length).

P. brevamphida [syn. *Pseudolella pacifica* (Allgén, 1947) of Timm, 1961, *Odontophora pacifica* Allgén of Gerlach, 1962, and *Parodontophora pacifica* (Allgén, 1947) of Timm, 1963] has amphids 12–18 μ long, a buccal cavity 25–31 μ long, and a renette cell 32–65 μ long (app. 30–40% of the esophageal length).

LEPTOLAIMIDAE

ALAIMELLA Cobb, 1920

Type species.—*Alaimella truncata* Cobb, 1920: 234, fig. 7b.

Alaimella cincta Cobb, 1920

Plate XXIX, fig. 63, a–c

Alaimella cincta Cobb, 1920: 233–234, fig. 7a.

Male.—L = 1.3 mm; w = 16 μ; diameter at base of esophagus 13 μ. Esophagus 250 μ long, with conoid cardia. Head 7 μ wide, bearing six papillae and four 12–13 μ long cephalic setae. Amphid 7 μ wide, with central raised "fleck." Cuticle coarsely annulated, the annules bearing prominent longitudinal markings. Spicules 27 μ long (chord 22 μ), proximally cephalated. Gubernaculum 9 μ long. Tail 100 μ long (7 a.b.d.), with at least one caudal seta.

Representation in samples studied.—M-2, Key Biscayne.

Geographical distribution.—Biscayne Bay, Florida (Cobb, 1920), Aransas Bay, Texas (Chitwood, 1951).

Remarks.—The central raised portion of the amphid in our specimens, while illustrated by Chitwood for his example, was not originally depicted by Cobb. This feature is somewhat suggestive of *A. truncata* Cobb, 1920. However, regarding the cuticle of *A. truncata*, Cobb states, "Secondary markings of the cuticle faint, if any." The Miami specimens, by manifesting prominent longitudinal markings, cannot be regarded as representative of *A. truncata* in view of this strong statement questioning the presence of such markings. Thus, even though the amphid on our specimens has a central fleck, we feel the remainder of the characters support our view.

CAMACOLAIMIDAE

CAMACOLAIMUS de Man, 1889

Type species.—*Camacolaimus tardus* de Man, 1889a: 8.

Camacolaimus prytherchi Chitwood, 1935

Plate XXIX, fig. 64, a–c

Camacolaimus prytherchi Chitwood, 1935: 49, 50, fig. 7, a–e.

L = ♂, 1.8, ♀, 1.9; w = ♂, 33, ♀, 39; diameter at base of esophagus 30–32 μ; esophagus 240–250 μ long. Vu = 54%. Tail 90–105 μ (3.1–3.4 a.b.d.). Head 13–14 μ wide, bearing six labial papillae and four, 8–10 μ long, cephalic setae. Somatic setae, short and thick, staggered in region overlying lateral chords, widespaced. Cuticle finely striated. Lateral surfaces with slight "bulges" anteriorly, progressively getting higher posteriorly until finally lateral alae are formed at a point approximately midway from vulva to anus, fading away quickly on the tail. Dorsal tooth and its base, 15 μ long. Esophagus divided into three distinct regions—corpus, isthmus, and swollen terminal region. Nerve ring encircling isthmus immediately behind the corpus. Terminal region gradually enlarged. Cardia 8 μ long and 12 μ wide. Spicules 53 μ long. Male tail with caudal alae and a pair of postanal setae.

Representation in samples studied.—V, Vero Beach.

Geographical distribution.—North Carolina (Chitwood, 1933); Chile (Wieser, 1956); Maldives (Gerlach, 1962).

Remarks.—An examination of the type specimen of *C. prytherchi* discloses the presence of both the caudal alae and the postanal setae. We wish to thank Mr. Curtis Sabrosky for making the specimens available for study.

DIPLOPELTIDAE

Some genera of this family have recently been transferred to the family Linhomoeidae by Gerlach (1963a). We postpone judgment on these changes until the material for our monograph is complete and shall adhere, in this paper, to the old classification.

PARATARVAIA new genus

Type species.—*Paratarvaia seta* n. sp.

Definition.—Diplopeltidae (or Linhomoeidae?). Head with 6 labial papillae and 10 cephalic setae in two circles, 6 + 4.

Amphid, double spiral, situated on punctated plaque. Esophagus cylindroid with small basal bulb, without valves. Cardia small. Female didelphic, amphidelphic. Male without supplements. Spicules arcuate, gubernaculum with medial piece, lateral guiding pieces and posteriorly directed apophyses.

Remarks.—Paratarvaia possesses characters that show affinity with both the Diplopeltidae (spiral amphid, amphid on plaque) and the Linhomoeidae (reduced buccal cavity and spicular apparatus as in *Terschellingia*, number of cephalic sensory organs). However, as we are going to postpone our judgment of the recent proposals by Gerlach (1963), we provisionally assign *Paratarvaia* to the Diplopeltidae. Within the Diplopeltidae *Paratarvaia* is related to both *Tarvaia* Allgén, 1934, and *Disconema* Filipjev, 1918. It is distinguished from *Tarvaia* by possessing 10 cephalic setae, as opposed to four. From *Disconema*, which lacks a plaque, *Paratarvaia* is separated by possessing a punctated plaque as well as by having the 10 cephalic setae separated into two circles of 6 and 4.

Paratarvaia seta new species
Plate XXX, fig. 65, a–c

L = 1.3–1.4 mm; w = 23–24 μ; width at base of esophagus 20–21 μ. Head 13 μ wide, bearing an internal circle of six setose labial papillae and a divided external circle of 10 (6 + 4) setae, 16 + 18 μ in length. Amphid a double spiral, 21–23 μ long and 16–17 μ wide, situated on a punctated plaque 25–27 μ long and 17 μ wide. In dorsal–ventral view the plaques are seen to be separated by a distance of 2–3 μ. Cuticle coarsely annulated, the annules about 1.5 μ wide just posterior to the amphids, about 2.0 μ at mid-body and about 1 μ wide on the tail. Body with fine somatic setae which extend onto the tail. Buccal cavity extremely reduced, with minute lips protruding from the head contour. Esophagus 165–170 μ long, cylindroid to a small, non-valvular, terminal bulb. Cardia present, flattened, not prominent. Excretory pore not observed. Vu = 54%, female with two opposed ovaries. Number of testes in male not determined. Spicules arcuate, 40 μ long (chord 25 μ). Gubernaculum complicated, bearing a medial piece between the spicules and two sigmoid lateral guiding pieces. Apophyses to gubernaculum 10 μ long. Male without supplements. Tail 150–180 μ long, the anterior ⅔ conoid, the remainder cylindroid to the slightly swollen terminus. Terminus with spinneret and two 8 μ long, terminal setae.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4067, Type slide No. 96. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

DIDELTA Cobb, 1920
Type species.—*Didelta maculatum* Cobb, 1920: 252, 253, fig. 33.

We found in our material one juvenile specimen which in every respect resembles Cobb's *Didelta maculatum*. Since Cobb's figure of the head is very good we supply only a figure of the tail of our single specimen.

Didelta maculatum Cobb, 1920
Plate XXX, fig. 66

Didelta maculatum Cobb, 1920: 252, 253, fig. 33.

Head diameter 23 μ. Cephalic setae 15 + 3 μ. Amphids (with plaque) 25 × 17 μ. Esophagus enlarged posteriorly, short cardia (25 μ long, 30 μ wide) present. Tail 410 μ, a.b.d. 37 μ. No spinneret or caudal glands.

Representation in samples studied.—M-8, Biscayne Bay.

Geographical distribution.—Off Key West, Florida (Cobb, 1920).

LINHOMOEIDAE

TERSCHELLINGIA de Man, 1888
Type species.—*Terschellingia communis* de Man, 1888: 12, pl. I, fig. 7.

The material from Florida contained

three species of *Terschellingia*. Excellent examples of *T. longicaudata* were found both in Biscayne Bay and in Florida Bay, with a variant found at Vero Beach. The distribution of the cervical setae in the specimens from the former habitats is exactly as depicted by de Man in his original figures of the species. The variant from Vero Beach has a slightly different arrangement of the cervical setae, viz., a reduction in number and a more posterior location of the first circle (compare Pl. XXX, figs. 67a, b, and 68a, b). These differences are stable within Florida habitats. Subsequent collections from South Carolina contain specimens, not only with the above two divergent patterns of cervical setae, but with intermediary distributions as well.

A second species, *T. monohystera* n. sp. is unique in that only the anterior ovary appears to be well developed, the posterior gonad being quite rudimentary. The third species, *T. longispiculata* n. sp., can be distinguished by the arrangement of the cephalic and cervical setae and also by the long spicules, which are about 2.5 anal body diameters in length.

Terschellingia longicaudata de Man, 1907
Plate XXX, figs. 67, a–c, 68, a, b; Plate XXXI, figs. 67, d, 68, c–e.

Terschellingia longicaudata de Man, 1907: 230.

L = 1.1–1.3 mm; w = 29–32 μ; diameter at base of esophagus 27–29 μ. Esophagus 90-125 μ; nerve ring at 50%. Head with four cephalic setae, 4–5 μ long. Cervical setae 4–5 μ long and arranged in distinctive patterns. The Biscayne Bay and Florida Bay specimens have two paramphidial pairs, two postamphidial pairs and a somewhat broken circle of eight situated about midway between the amphid and the nerve ring (Pl. XXX, fig. 67a). The Vero Beach specimens have a circle of four postamphidial, two sublateral and a dorsal–ventral pair (Pl. XXX, fig. 68a, b). Amphids circular, 7–8 μ wide. Terminal esophageal bulb 25 μ long and nearly of equal width. Cardia elongate, 14 μ long, 5 μ wide. Excretory pore located at a level slightly anterior to the anterior end of the esophageal bulb. Spicules 38–46 μ long (about 1.4–1.8 a.b.d), proximally cephalated. Apophyses of gubernaculum 10–12 μ long. Tail 325–365 μ long (about 14 a.b.d.).

Representation in samples studied.—M-4, Rickenbacker Causeway; M-6, M-7, Everglades National Park; M-8, Biscayne Bay; V, Vero Beach.

Geographical distribution.—Cosmopolitan.

Terschellingia monohystera new species
Plate XXXI, fig. 69, a–f

L = 0.97–1.06 mm; w = 33–35 μ; Vu = 44%. Diameter at base of esophagus 31 μ. Esophagus 83–93 μ. Head diameter 13 μ. Head with four cephalic setae, 4 μ long. Four somatic setae occur in the cervical region. The anteriormost lies 8–12 μ behind the base of the amphid and is placed ventral to the lateral surface of the body. The three others are staggered dorsal and ventral in respect to the lateral surface. Amphid circular, 5 μ wide, 3–5 μ from anterior end; corresponding body diameter 14–15 μ. Female with only the anterior ovary developed and producing eggs (195 μ long), posterior branch rudimentary (70 μ long). Spicules 40 μ long (about 1.3 a.b.d.), without proximal cephalization. Apophyses of gubernaculum about 13 μ long. Tail 220–225 μ long (7.5–10 a.b.d.), of which the posterior half is filiform. Caudal setae arranged as illustrated (Pl. XXXI, fig. 69e).

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4075, Type slide No. 99. Type locality, V, Vero Beach.

Representation in samples studied.—V, Vero Beach.

Terschellingia longispiculata new species
Plate XXXI, fig. 70, c, d; Plate XXXII, fig. 70, a, b

L = 2.2–2.3 mm; w = 63–65 μ; Vu = about

40%. Diameter at base of esophagus 55–57 μ. Esophagus with six cephalic papillae and four cephalic setae, 4–5 μ long. Two circles of prominent cervical setae present, four setae in each circle and all setae 4 μ long. The first circle occurs at the level of the posterior edge of the amphids. In addition to the prominent cervical setae, setae of lesser stature also occur in the anterior neck region. While these could be arranged in transverse circles of eight (sometimes incomplete), they could also be said to be arranged in eight longitudinal rows in which the prominent cervical setae might represent the anteriormost seta of each row. Amphid circular, 10 μ wide, 11–14 μ from anterior end; corresponding body diameter 33–36 μ. Terminal esophageal bulb 50 μ long and 42 μ wide. Spicules 122 μ long (about 2.5 a.b.d.); proximally cephalated. Apophyses of gubernaculum 25–30 μ long. Tail 435 μ long (about 10 a.b.d.). Caudal setae arranged as illustrated (Pl. XXXI, fig. 70, c).

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4072, Type slide No. 98. Type locality, M-7, Everglades National Park.

Representation in samples studied.—M-7, Everglades National Park, and M-8, Biscayne Bay.

MONHYSTERIDAE
MONHYSTERINAE
PARAMONHYSTERA Steiner, 1916

Type species.—Monohystera (Paramonohystera) *megacephala* Steiner, 1916: 639–641, pl. 32, fig. 37, a–f.

A key to the subgenera and species of *Paramonhystera* is provided by Wieser (1956). Following this author, the subgenus *Paramonhystera sensu stricto* contains the following species: *P. megacephala* Steiner, 1916, *P. micramphis* Schuurmans-Stekhoven, 1950, *P. biformis* Wieser, 1956, and *P. proteus* Wieser, 1956. Of these, *P. micramphis* is known from females and juveniles only and is considered a *species inquirenda*. Our new species, *P. canicula* n. sp., is distinguished from the remaining species by the long cephalic setae, the round amphids and the characteristic shape of the gubernaculum.

Paramonhystera canicula new species
Plate XXXII, fig. 71, a–d

L = 1.60 mm; w = 42 μ; esophagus = 250 μ. Head diameter 25 μ. Lips large, rounded, each with two labial setae 5 μ long. Cephalic setae 23 + 18 μ. Amphids with very faint contour, convex, in ♂, 14 μ = 52% of c.b.d. wide. Cervical and somatic setae in irregular longitudinal rows, the former 10–12 μ long. One short, asymmetrical (dorsolateral) seta between amphid and cephalic setae on each side of body. Cuticular annulation coarse. Spicula 135 μ long, knobbed proximally. Gubernaculum rather complicated, consisting of a proximal portion, cylindrical and 20 μ long, and a distal portion, 18 μ long, dilated, with ventrolateral projections, a deep notch and a serrated distal edge. Tail 175 μ long, a.b.d. 35 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4068. Type slide No. 100. Type locality, M-3, Key Biscayne.

Representation in samples studied.—M-3, Key Biscayne.

STEINERIA Micoletzky, 1922

Type species.—*Monohystera polychaeta* Steiner, 1915: 224–226, figs. 1–3 (new subsequent designation).

Monhystera setosissima Cobb, 1893, transferred to *Steineria* and regarded as the type species by Schuurmans-Stekhoven and De Coninck (1933: 10), is herein rejected as the type species of the genus *Steineria* on the grounds that it was not one of the included species brought to the subgenus *Steineria* when first established by Micoletzky (1922a: 168). This action is in accord with Article 69a (ii) of the International Code of Zoological Nomenclature adopted

by the XV International Congress of Zoology, London, July, 1958.

In this genus, two species with punctate cuticle have been known so far, i.e., *S. punctata* Gerlach, 1955, and *S. gerlachi* Wieser, 1959. From our Florida material a third species can be added that is rather closely related to *S. punctata* but can be separated on the following counts: subcephalic setae in eight groups of 5 and 4 (instead of 6 and 3), cephalic setae relatively longer, gubernaculum of different shape.

Steineria ampullacea new species

Plate XXXII, fig. 72, c; Plate XXXIII, fig. 72, a, b

L = 1.44 mm; w = 68 μ; esophagus = 210 μ. Head diameter 24 μ. Lips round, with small labial papillae. Cephalic setae jointed, 15 + 12 μ. Subcephalic setae in eight groups, the sublateral ones with 5 setae, measuring 20 + 27 + 30 + 40 + 62 μ, the submedian ones with 4 setae. Many cervical and somatic setae in eight longitudinal rows. Cuticle annulated, the annules resolvable into dots. Amphids 10 μ in ♂, 16 μ behind anterior end. Vestibulum of buccal cavity vertically striated which might be a characteristic separating this genus from *Theristus*, in which the supporting structures of the vestibulum give the impression of a more oblique striation. Excretory pore just posterior to nerve ring, the whole gland very short, its posterior end 30 μ anterior to the end of the esophagus. Spicula 55 μ long, gubernaculum with curved apophysis, 23 μ long. Tail 175 μ long, a.b.d. 55 μ, terminal setae 35 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4075, Type slide No. 101. Type locality, V, Vero Beach.

Representation in samples studied.—V, Vero Beach.

THERISTUS Bastian, 1865

Type species.—*Theristus acer* Bastian, 1865: 156, 157, pl. 13, figs. 187, 188.

Keys to the subgenera and their species are provided by Wieser, 1956. Species described subsequent to this work are considered in a more recent paper (Wieser, 1959).

Subgenus *Penzancia* de Man, 1889

Type species.—*Theristus velox* Bastian, 1865: 157, pl. 13, figs. 189–191.

The species of this subgenus may be separated into three groups according to the presence or absence of a gubernaculum and to the shape of the gubernaculum, as follows:

A) Gubernaculum with distal hook or triangular plate of characteristic shape (see Text-fig. 4):
T. bipunctatus (G. Schneider, 1906) (syn. *Monhystera bipunctata*); *T. flevensis* Schuurmans-Stekhoven, 1935 (syn. *Monhystera velox* Bütschli, 1874, de Man, 1922 nec Bastian [see Gerlach, 1951c]); *T. ambronensis* Schulz, 1935 (see Gerlach, 1951); *T. parambronensis* Timm, 1952; *T. macroflevensis* Gerlach, 1953; *T. metaflevensis* Gerlach, 1955; *T. borosi* Andrássy, 1958; and *T. calx* n. sp.

B) Gubernaculum conical or blunt:
T. inermis Gerlach, 1952; *T. parvulus* Timm, 1952 (doubtful species); *T. biarcospiculum* Timm, 1952; *T. tersus* Gerlach, 1954; *T. acribus* Gerlach, 1954; *T. megalaimoides* Wieser, 1956; and *T. stranus* Gerlach, 1957.

C) Gubernaculum absent:
T. megalaima Stewart, 1914 (doubtful species); *T. aculeatus* Schulz, 1935; *T. heteroscanicus* Wieser, 1955; and *T. hamatus* Gerlach, 1956.

All the other species listed by Wieser (1956) are here considered doubtful.

Group A, which was represented by two species in our material, is very homogeneous. The shape of the spicular apparatus (see

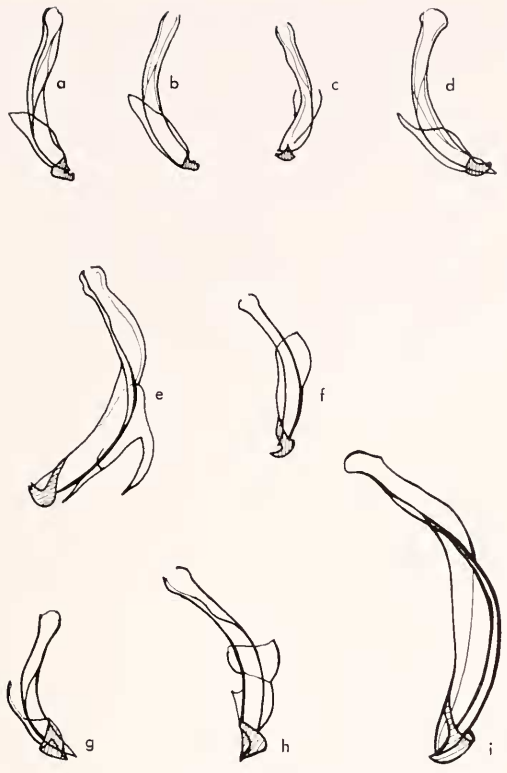

Figure 4. Spicular apparatus of species of *Theristus flevensis* group. a—*T. ambronensis* (after Gerlach, 1951); b—*T. flevensis* (after Gerlach, 1951); c—*T. bipunctatus* (after Skwarra, 1924); d—*T. macraflevensis* (after Gerlach, 1953); e—*T. borasi* (after Andrássy, 1958); f—*T. parambranensis* (after Timm, 1952); g—*T. metaflevensis* (after Gerlach, 1955); h—same species, present material; i—*T. calx* (present material).

Text-fig. 4) immediately separates *T. borosi* and *T. calx* from all other species. As for the remaining species, it could be argued that *T. flevensis*, *T. ambronensis*, and *T. bipunctatus* represent three subspecies of *T. flevensis*, characterized by the position of the vulva (65–72%), the more posterior position of the amphids, and the slight subterminal protuberance at the inner edge of the gubernacular hook (shown by Gerlach in 1951, but not in 1957). On the other hand, *T. metaflevensis* and *T. parambronensis* have the vulva at 83–87% and the gubernaculum ends distally either in a triangular plate or a smooth hook. However, the latter species is insufficiently described and the figure of the spicular apparatus is obviously rather stylized. *T. macroflevensis* is said to be characterized mainly by the long somatic setae. In other respects it links the *flevensis*-group with *metaflevensis* and *parambronensis*.

We have identified our second species with *T. metaflevensis* although we saw the gubernaculum to be slightly different from that described by Gerlach and found only *one* lateral seta instead of *three*. It is impossible at this time to judge the systematic value of these differences.

Theristus (*Penzancia*) *metaflevensis* Gerlach, 1955
Plate XXXIII, fig. 73

Theristus (*Penzancia*) *metaflevensis* Gerlach, 1955: 291–293, fig. 25, a–d

L = ♀, 1.36, ♂, 1.8 mm; w = 34–40 μ; esophagus = 230–275 μ; Vu = 83%. Head diameter ♀, 19, ♂, 26 μ. Cephalic setae 9 μ in female, 14 + 12 μ in male, only the usual ten setae seen, that is, no additional lateral setae. Amphids in male 7 μ wide, 19 μ behind anterior end, in female 6 μ and 13 μ, respectively. Spicula 53 μ long, typical. Gubernaculum rather large, distally with triangular plate in which a hook-shaped contour can be discerned. Tail in ♀, 170 μ, in ♂, 240 μ long; a.b.d. in the latter 42 μ.

Representation in samples studied.—M-4, Rickenbacker Causeway.

Geographical distribution.—San Salvador, Brazil (Gerlach, 1955).

Theristus (*Penzancia*) *calx* new species
Plate XXXIII, fig. 74, a, b

L = 3.25 mm; w = 70 μ; esophagus = 350 μ. Head diameter 31 μ. Six setose labial papillae, 10 cephalic setae, 16 + 13 μ. Amphids 7 μ = 20% of c.b.d. wide, 23 μ behind anterior end. No cervical setae. Spicula 118 μ long, of characteristic shape; the diagonal list that can be observed in all species of this group is here developed into

a lateral plate connecting proximal and distal end of the spiculum. The gubernaculum is reduced except for the triangular plate that also in this species is very prominent. Tail 300 μ long; a.b.d. 60 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4069, Type slide No. 102. Type locality, M-4, Rickenbacker Causeway.

Representation in samples studied.—M-4, Rickenbacker Causeway.

Subgenus *Daptonema* Cobb, 1920

Type species.—*Daptonema fissendens* Cobb, 1920: 281, 282, fig. 66a.

In this subgenus there is a group of species distinguished by a characteristically shaped gubernaculum which gradually enlarges in its distal half, has a subterminal constriction and ends in a prominent hook (see Pl. XXXIV, fig. 75, e). Previously this group consisted of the following closely related species: *T. buetschlii* Bresslau and Schuurmans-Stekhoven, 1940; *T. buetschlioides* Chitwood, 1951, and *T. parabuetschlii* Timm, 1961. To this group we add a fourth species, *T. ostentator* n. sp., which is separated from the other three by the much larger male amphids, the shorter spicula, the longer cephalic setae and some other minor characters.

Theristus (*Daptonema*) *ostentator* new species

Plate XXXIII, fig. 75, a, b; Plate XXXIV, fig. 75, c–e

L = 1.76–1.77 mm; w = 30–32 μ; esophagus = 300–310 μ; Vu = 63%. Head diameter 20–23 μ. Lips large, with strongly developed framework (labial capsule). Labial setae 3 μ. Cephalic setae 20 + 15–16 μ, with additional lateral setae (1–3). Cervical setae short. Amphids, in male, 15 μ = 66% of e.b.d. wide, in female, 8 μ and 30%, respectively. Cuticular annulation coarse. Buccal cavity spacious, with cuticularized walls. Spicula 38–42 μ long, cephalate proximally. Gubernaculum 17–18 μ long, plate-shaped in its distal half, with subterminal constriction and terminal hook; there are also lateral projections. Tail in male, 130–155 μ long, a.b.d. 25–26 μ; in female, 175 μ long, a.b.d. 26 μ. Terminal setae, ♂, 20 μ long.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4068, Type slide No. 103. Type locality, M-3, Key Biscayne.

Representation in samples studied.—M-3, Key Biscayne.

Subgenus *Trichotheristus* Wieser, 1956

Type species.—*Steineria mirabilis* Schuurmans-Stekhoven and De Coninck, 1933: 10, 11, pl. 4, fig. 5; pl. 5, figs. 1–3.

Mesotheristus Wieser, 1956: 80, 91, NEW SYNONYMY.

We consider it inadvisable to base subgeneric division entirely on differences in the length of somatic setae and we therefore merge the two subgenera mentioned above. The important feature of this subgenus is the occurrence of long somatic setae. These setae may be confined to the anterior region of the body but they should *not* be confused with the single circle of eight groups of elongated cervical setae about on level with the amphids, characteristic of the subgenus *Pseudosteineria*.

Further classification of the subgenus may be based on the shape of the gubernaculum, the length and arrangement of the somatic setae, etc., as set out in the following key.

Key to Species of Subgenus *Trichotheristus*

1. Gubernaculum without apophysis 2
   Gubernaculum with apophysis 3
2. Length of spicula 12.5 μ. Setae all over body ... *T. longisctosus* Schuurmans-Stekhoven and De Coninck, 1933
   Length of spicula 64 μ. Setae in anterior half of cervical region only ..... *T. circumscriptus* Wieser, 1959
3. Apophysis large, set at an angle to the distal

shaft of the gubernaculum, pointing dorsocaudally 4
Apophysis small, in direct continuation of distal shaft, pointing dorsally 8
4. Somatic setae, at least in cervical region, measuring 2 c.b.d. or more 5
Somatic setae not surpassing one c.b.d. in length 7
5. Spicula strongly cephalate proximally, distally with large lateral hook. Longest setae in mid-cervical region ..... *T. sanctimarteni* Timm, 1957
Spicula not cephalate, without lateral hook; longest setae in anterior cervical region .. 6
6. Distal half of spicula S-shaped. Additional circle of six subcephalic setae in ♂ ..... *T. floridanus* n. sp.
Distal half of spicula more or less straight. No subcephalic setae ..... *T. mirabilis* (Schuurmans-Stekhoven and De Coninck, 1933)
7. Cephalic setae 23–26 μ long, male amphids 13 μ wide, apophysis of gubernaculum rod-shaped ..... *T. laxus* Wieser, 1956
Cephalic setae 13–16 μ, amphids 5–8 μ, apophysis of gubernaculum plate-shaped .. *T. setosus* (Bütschli, 1874); *T. hirtus* Gerlach, 1951 (for differences see Gerlach, 1951)
8. Somatic setae, at least in cervical region, measuring 1.5 c.b.d. or more 9
Somatic setae not surpassing one c.b.d. in length ..... *T. erectus* n. sp.
9. Amphids distinctly spiral. Cephalic capsule well developed. One circle of four subcephalic setae in male .... *T. galeatus* n. sp.
Amphids circular. No cephalic capsule. No subcephalic setae 10
10. Lateral cephalic seta in ♂ elongated. Amphids 0.5 head diameters behind anterior end ..... *T. heterus* Gerlach, 1957
Lateral cephalic seta not particularly elongated. Amphids 1.5 head diameters behind anterior end ..... *T. setifer* Gerlach, 1952

Theristus (*Trichotheristus*) *floridanus* new species

Plate XXXIV, fig. 76, a–d

L = 1.50–1.57 mm; w = 50–60 μ; esophagus = 325–350 μ; Vu = 65%. Head diameter 20–23 μ. Lips round, labial papillae setose, short. Head with 12 cephalic setae, 20 + 16 μ long; in ♂ there is an additional circle of 6 subcephalic setae. Long and short somatic setae, the longest ones measuring 60–70 μ which is nearly 3 c.b.d. in the cervical region, about 1.2 c.b.d. in mid-body. Amphids in ♂, 7 μ, in ♀, 6 μ wide, 18–23 μ behind anterior end. Spicula 37 μ long, distal half S-shaped. Gubernaculum complicated, with plate-shaped apophysis, 10 μ long. Tail in ♂ 225 μ long = 5 a.b.d., in ♀ 250 μ long = 5.5 a.b.d. Terminal setae 60 μ long.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4067, Type slide No. 104. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

Theristus (*Trichotheristus*) *erectus* new species

Plate XXXIV, fig. 77, b; Plate XXXV, fig. 77, a, c, d

L = 1.3 mm; w = 55 μ; esophagus = 275 μ. Head diameter 16–24 μ. Lips round, labial papillae setose, short. Cephalic setae 10–17 + 8–15 μ long. Short and long somatic setae, the longest ones measuring 34 μ which is about one body diameter in the cervical region. There are four characteristic pairs of sublateral setae behind the amphids. Amphids in ♂ 6–7 μ = about 23% of c.b.d. in width, 16–22 μ behind anterior end. Cuticle with lateral alae (incisures?) which occur, for the most part, as two parallel refractive lines 7–8 μ apart (about 1/7–1/8 c.b.d.). In the posterior neck and preanal regions, there frequently occurs a third refractive line between those normally present. Faint cuticular striations can be traced over the lateral alae. Spicula 35–38 μ long, proximal end cephalate, distal half slightly S-shaped, distal end with a lateral tooth. Gubernaculum 23 μ, with small, plate-shaped dorsal apophysis. Tail 200–210 μ long, a.b.d. 40 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4067, Type slide No. 105. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne, M-3, Key Biscayne, and M-4, Rickenbacker Causeway.

Remarks.—The closest relative of this species is *T. setosus* from which it can be separated by the small and dorsally directed apophysis of the gubernaculum.

Theristus (*Trichotheristus*) *galeatus* new species

Plate XXXV, fig. 78, a–c

L = 1.02 mm; w = 32 μ; esophagus = 205 μ. Head diameter 15 μ. Labial papillae setose, short. Cephalic setae jointed, 10 in number, 15 + 12 μ long. Male with 4 subcephalic setae. Short and long somatic setae, the longest ones measuring 65 μ which is about three times the c.b.d. in the cervical region. Cuticular annulation coarse, one annule 1.4 μ wide. The head seems to be strengthened by a cephalic capsule which consists of two portions, an anterior and a posterior one. Amphids spiral, 6 × 7 μ, 32–36 μ behind anterior end. Spicula 36 μ long, cephalate proximally, distally with a lateral tooth. Gubernaculum with dorsal apophysis and a distal three-pronged piece. In the postanal region there are indications of 'breaks' in the cuticular annulation. These breaks, however, seem to be rather irregular and are differently arranged in different specimens. Tail 170 μ long, a.b.d. 36 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4070, Type slide No. 106. Type locality, M-5, Virginia Key.

Representation in samples studied.—M-5, Virginia Key.

Subgenus *Cylindrotheristus* Wieser, 1956

Type species.—*Monohystera normandica* de Man, 1890: 169–171, pl. 3, figs. 1–1d.

This subgenus presents the greatest problems of classification, and, due to the insufficiency of many descriptions, no satisfactory treatment is possible at the present time. We follow Wieser (1956, 1959) and, on the basis of the shape of the gubernaculum, distinguish three groups of species, viz., A) gubernaculum without apophysis, B) with small dorsal apophysis, C) with distinct caudal apophysis. No new species have been described since Wieser's paper of 1959, but probably more of the species included in the grouping by Wieser have to be considered as *species inquirendae*, e.g., *T. longicaudatus* Filipjev, 1922, and *T. naviculivorus* Cobb, 1930.

Group A, species without gubernacular apophysis, contains a number of species in which the spicula in their distal fifth or sixth show a very characteristic outward bend. This additional curvature of the spicula appears to give, as it were, more room to the development of the distal portion of the gubernaculum which in these species shows some complex features that are difficult to analyze. The situation is illustrated by figures 79, c, and 80, c, d on Plate XXXVI in this paper. To this subgroup belong with certainty *T. kornoeensis* (Allgén, 1929) *sensu* Wieser, 1959, *T. oxyuroides* (Schuurmans-Stekhoven, 1931) and *T. fistulatus* n. sp., but it cannot be excluded that some more species described in the literature show the same differentiation of the spicular apparatus. *T. trecuspidatus* Wieser, 1959, displays the same characteristic but, by possessing a small dorsal apophysis of the gubernaculum, has been assigned to the next group.

Group B of this subgenus, comprising species with small dorsal gubernacular apophysis, is represented in our material by two well characterized new species, *T. tortus* n. sp., and *T. xyaliformis* n. sp.

Theristus (*Cylindrotheristus*) *oxyuroides* (Schuurmans-Stekhoven, 1931)

Plate XXXVI, fig. 79, a–c

Monhystera oxyuroides Schuurmans-Stekhoven, 1931: 655, 656, fig. 8, a–c.

L = 0.9 mm; w = 43 μ; esophagus = 140 μ. Head diameter 14 μ. Lips round, with

short setose papillae. Twelve subequal cephalic setae, 9 μ long. Rows of short cervical and somatic setae. Amphids 7 μ wide, 12 μ behind anterior end. Spicula 28 μ long, sharply bent in middle and with an additional outward curvature in its distal sixth. Gubernaculum sleeve-like, without apophysis, distal half with curved pieces. Tail 160 μ long, a.b.d. 29 μ.

Representation in samples studied.—M-4, Rickenbacker Causeway.

Geographical distribution.—Baltic, North Sea, Zuiderzee; Chesapeake Bay, Maryland (Timm, 1952).

Remarks.—Our material contained what we consider to be fairly typical representatives of *T. oxyuroides* (Schuurmans-Stekhoven, 1931). The characteristic distal curvature of the spicula is apparent in Schuurmans-Stekhoven's original description, but both Gerlach (1951c) and Timm (1952), as far as one can infer from their figures, seem to hold that it is the gubernaculum and not the spicula that is curved distally. *T. kornoecensis* (Allgén, 1929) and *T. fistulatus* n. sp. can be separated from *T. oxyuroides* by the more backward position of the amphids and by differences in the finer structure of the spicular apparatus.

Theristus (*Cylindrotheristus*) *fistulatus* new species

Plate XXXVI, fig. 80, a–d

L = 0.86–1.04 mm; w = 30–36 μ; esophagus = 144–180 μ. Head diameter 15 μ. Lips round, bearing short setose papillae. Ten to 12 cephalic setae 13 + 11 μ long. Scattered cervical and somatic setae. Amphids 8–9 μ = 40–45 per cent of c.b.d. wide, 15–18 μ behind anterior end. Spicula 25–27 μ long, cephalate proximally, outwardly curved in its distal sixth. Gubernaculum sleeve-like, without apophysis, distally with curved, tubular piece. Tail 210–228 μ long, a.b.d. 23–26 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4068, Type slide No. 107. Type locality, M-3, Key Biscayne.

Representation in samples studied.—M-3, Key Biscayne.

Remarks.—*T. fistulatus* is characterized by the tubular element in the distal portion of the gubernaculum, whereas *T. kornoecensis* is equipped with two lateral projections at the distal tip of the gubernaculum.

Theristus (*Cylindrotheristus*) *tortus* new species

Plate XXXVI, fig. 81, a–d

L = 0.74–0.76 mm; w = 25–30 μ; esophagus = 168–192 μ. Head diameter 10–12 μ. Lips round, bearing short setose papillae. Ten to 12 cephalic setae, 10–12 + 7–9 μ long. No cervical or somatic setae. Amphids in ♀, 8 μ = 47% of c.b.d. wide, 24 μ behind anterior end, in ♂, 10 μ = 60% of c.b.d. wide, 23 μ behind anterior end. Thirteen to 15 cuticular annules between anterior end and amphids. Spicula slender, of even thickness, 27 μ long, cephalate proximally. Gubernaculum 15–16 μ long, with short dorsal apophysis, oblique grooves in distal half and two conspicuous, laterally pointing projections at its distal end. Tail in ♀, 175 μ, in ♂, 132–156 μ long, a.b.d. 20 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4067, Type slide No. 108. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

Remarks.—*T. tortus* n. sp. is distinguishable from all other species of this group by the large and posteriorly situated amphids, and by the shape of the gubernaculum. Its closest relative is *T. resimus* Wieser, 1959, which has a similar gubernaculum, although without the oblique grooves that occupy the anterior part of the gubernaculum in *T. tortus*.

Theristus (*Cylindrotheristus*) *xyaliformis* new species

Plate XXXVI, fig. 82, a–d

L = 0.63–0.73 mm; w = 21–22 μ; esophagus = 125–150 μ. Head round, diameter 6 μ. Labial papillae indistinct. Ten cephalic setae, subequal, 5 μ long. No cervical and somatic setae. Amphids 5 μ = 50% of c.b.d. wide, 20–22 μ behind anterior end, about 30 cuticular annules between anterior end and amphids. Buccal cavity unusually deep by enlargement of the "buccal ring." Spicula 19–20 μ long, cephalate proximally. Gubernaculum distally with small lateral projection, proximally with hook-shaped dorsally pointing apophysis. Tail 127–145 μ long, a.b.d. 16–19 μ.

Holotype specimen.—Male; Canadian National Collection of Nematodes, Entomology Research Institute, Ottawa, Collection Number 4067, Type slide No. 109. Type locality, M-2, Key Biscayne.

Representation in samples studied.—M-2, Key Biscayne.

Remarks.—In *T. xyaliformis* n. sp. the buccal cavity differs from that of all other species of *Theristus* by its elongation. The elongation has come about by the widening of the "buccal ring" which is in fact the prostome (in the sense of Osche, 1952), i.e., that part of the buccal cavity that lies between the base of the lips and the anterior end of the esophagus. Since the same type of elongation is a characteristic feature of the subfamily Xyalinae, *T. xyaliformis* can be considered to link this subfamily with the Monhysterinae. Moreover, *T. xyaliformis* is characterized by the far posteriorly situated amphids and by the hook-shaped apophysis of the gubernaculum.

MONHYSTERA Bastian, 1865

Type species.—*Monhystera stagnalis* Bastian, 1865: 97, pl. 9, figs. 9–11.

The proper status of our species is impossible to determine. It is undoubtedly closely related to *M. parva* (Bastian) but the differences of opinion concerning this species cannot be resolved at present. De Man (1888) figures the spicula of *M. parva* without any teeth or projections but subsequent authors all show the spicula in their proximal third or fourth to be equipped with a ventral projection (actually the point of attachment of the muscular "velum"). De Coninck and Schuurmans-Stekhoven (1933) claim that de Man overlooked this projection and consider *M. heteroparva* Micoletzky, 1924, to be a synonym. Timm (1952) rejected this claim and revived *M. heteroparva* as a valid species, to be separated from *M. parva* by the possession of this ventral tooth. Andrássy (1958) figured the spicular apparatus of *M. parva* not only with the proximal projection but also with a distal "nose" and hook. Our species closely agrees with Andrássy's description and figure and we tend to think that indeed many authors overlooked, or misinterpreted, either the proximal or the distal projection, or both, and that *M. parva* is a cosmopolitan species which needs to be restudied in its type habitat. We observed faint preanal supplements but again have our doubts whether this can be considered a real difference from previous descriptions.

Monhystera parva (Bastian, 1865)

Plate XXXVII, fig. 83, a–d

Tachyhodites parvus Bastian, 1865: 156, pl. 13, figs. 185, 186; *Monhystera parva* var. *meridiana* Micoletzky, 1922; *M. heteroparva* Micoletzky, 1924; *M. kossuensis* Paramonon, 1929; *M. antarctica* Cobb, 1914.

L = 0.58–0.72 mm; w = 18–22 μ; esophagus = 102–115 μ; Vu = 65%. Head diameter 8–10 μ. No labial papillae seen. Ten cephalic setae, 4 + 3 μ long. Amphids in ♂, 3.5 μ = 36% of c.b.d. wide, 10 μ behind anterior end. Two pairs of submedian cervical setae, 25 μ behind anterior end, excretory pore 37 μ, nerve ring 63 μ behind anterior end. Spicula 26–27 μ long, with proximal "handle" and projection on which the velum attaches, distally with a triangu-

lar cuticularized piece which forms a sort of recurved hook. Gubernacular apophysis 13 μ. About 15 indistinct preanal and two postanal supplements. In some specimens these supplements are hardly visible and appear only as darker and lighter portions of the cuticle. Tail 95–100 μ long, a.b.d. 16–18 μ.

Representation in samples studied.—M-1, Key Biscayne.

Geographical distribution.—Cosmopolitan.

XYALINAE

SCAPTRELLA Cobb, 1917

Type species.—*Scaptrella cincta* Cobb, 1917: 119, fig. 4.

Scaptrella cincta Cobb, 1917

Plate XXXVII, fig. 84, a–c

Scaptrella cincta Cobb, 1917: 119, fig. 4.

L = 1.7 mm; w = 41 μ; diameter at base of esophagus 33 μ. Esophagus 220 μ. Tail 360 μ. Head diameter 20 μ. Labial setae 6–7 μ long. Cephalic setae 12 (6 + 6), the lateral pairs 30 + 18 μ, the submedian 50 + 30 μ long. Amphid circular, with internal spiral, ♂, 10 μ, ♀, 8 μ wide. Buccal cavity cylindrical, 30 μ deep. Anteriorly armed with 6 jointed odontia. In addition, a blunt, weakly-sclerotized, dorsally-positioned onchium is present. Cuticle coarsely striated, about 3 μ wide in neck region and about 2 μ in mid-body. Somatic setae numerous, very fine, averaging 17 μ long on most of the body length. Tail with numerous caudal setae and a pair of 20 μ long terminal setae. Spicula 34 μ long, proximally cephalated. Gubernaculum with bidentated lateral guiding pieces.

Representation in samples studied.—M-2, Key Biscayne.

Geographical distribution.—Atlantic Coast from Massachusetts to North Carolina (according to Chitwood, 1951), Pernambuco, Brazil (Gerlach, 1956).

Remarks.—*Scaptrella cincta* is separated from *S. brevicaudata* Gerlach, 1952, by the longer and more filiform tail and by the longer cephalic setae.

XENOLAIMUS Cobb, 1920

Type species.—*Xenolaimus striatus* Cobb, 1920: 250, 251, fig. 30.

Xenolaimus striatus Cobb, 1920

Plate XXXVII, fig. 85, a–d

Xenolaimus striatus Cobb, 1920: 250, 251, fig. 30.

L = 1.06 mm; w = 33 μ; esophagus = 300 μ. Head diameter 16–17 μ. Lips 7 μ high, flap-like. Labial setae 5.5 μ long. Ten cephalic setae, the longer ones measuring 19 μ; the two setae of each submedian pair stick together. Buccal cavity wide and deep, with two weakly cuticularized teeth or cuticular folds projecting from the base of the mouth to the base of the lips. Amphids in an enlarged portion of the fifth cuticular annule. This enlargement about 6 μ. First cuticular annule wider than the following ones. The head, in the words of Cobb (1920: 250), "is protrusile and appears as if surrounded by a balustrade composed of the anterior annules of the cervical cuticle." Cuticular annulation coarse, with an unspecified number (12?) of longitudinal rows of V-shaped structures. Spicula asymmetrical, 28–30 + 32–34 μ long. Apophyses of gubernacula also asymmetrical, 17 + 21 μ long. Tail conical, 145 μ long, a.b.d. 27 μ.

Representation in samples studied.—M-2, Key Biscayne.

Geographical distribution.—Biscayne Bay, Florida (Cobb, 1920).

Remarks.—The present record represents the first time this species has been found since Cobb's original description. An unidentified example of *Xenolaimus* was recorded in a list of nematodes from the Gulf Coast of Florida by King, 1962 (*Xenolaimus* sp.).

ACKNOWLEDGMENTS

The collecting trip during the period from May 7 to June 8, 1963, was made

possible through NSF grant GB 498 to one of us (W.W.). In this connection, we wish to thank Professor Ernst Mayr and Dr. Giles Mead of the Museum of Comparative Zoology of Harvard University for their support and encouragement. Particular thanks are due to Mr. R. H. Mulvey, Chief, Nematology Section, Entomology Research Institute, Canada Department of Agriculture, Ottawa, in whose Section the slides of our collections were mounted and who supported our project in many other ways. We wish to thank Mr. Curtis W. Sabrosky, U.S.D.A., Washington, for making available for study several type specimens from the United States National Museum. We are grateful to Dr. S. P. Meyers, of the Institute of Marine Science, University of Miami, Miami, Florida, who arranged for our stay at the Institute and, in addition, provided valuable assistance. Miss Nancy Van Meter served as an efficient guide to collecting sites in the Everglades National Park.

Many more people were very helpful to us during our trip and we shall acknowledge their hospitality and cooperation as we proceed with publication of our reports.

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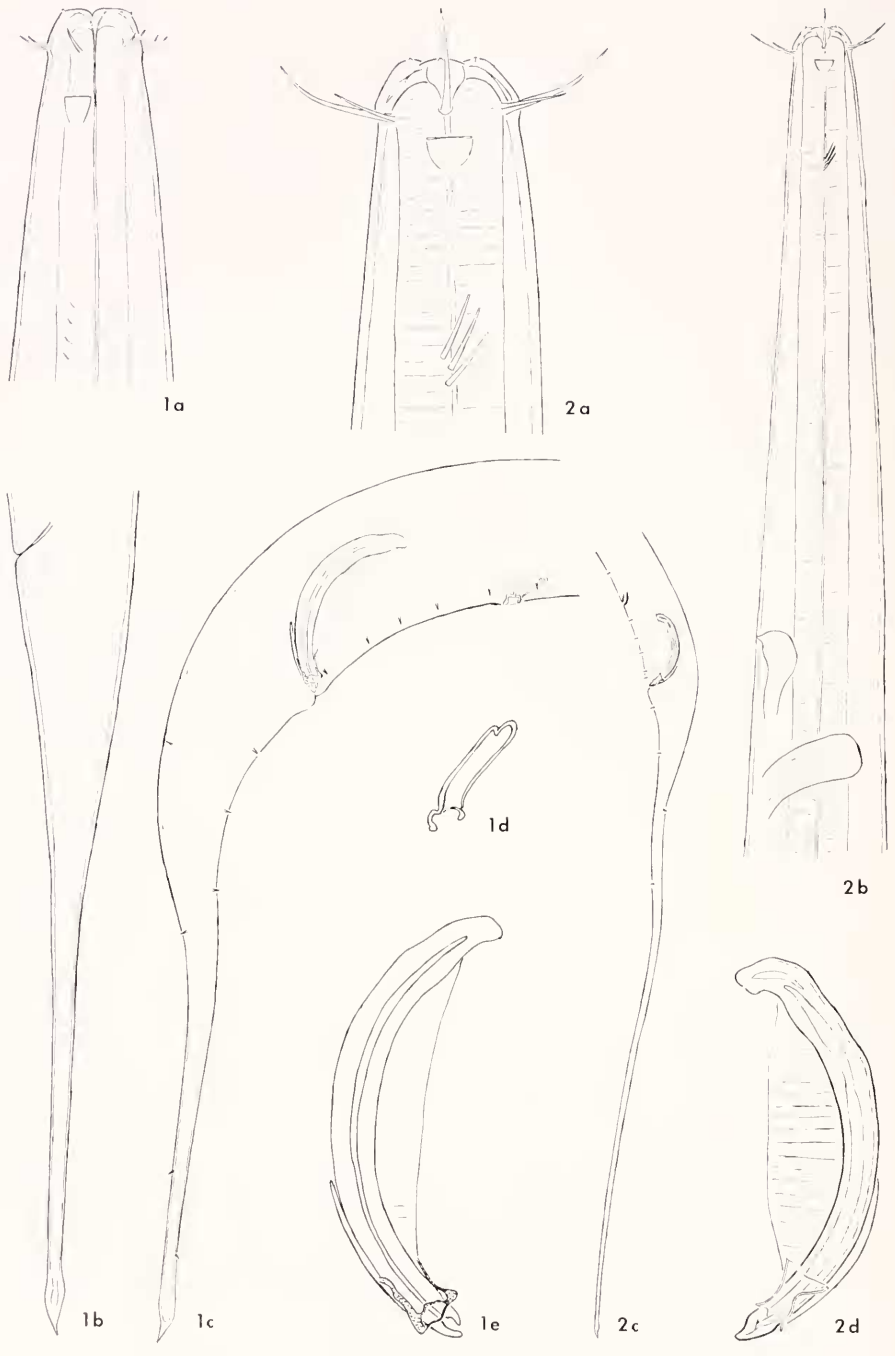


Plate I

Anticoma lata Fig. 1, a–e: a—anteriar end af male; b—posteriar end af female; c—posteriar end af male; d—supplement; e—spicular apparatus. *Anticoma trichura* Fig. 2, a–d: a—anteriar end af male; b—anteriar neck regian af male; c—posteriar end af male; d—spicular apparatus.

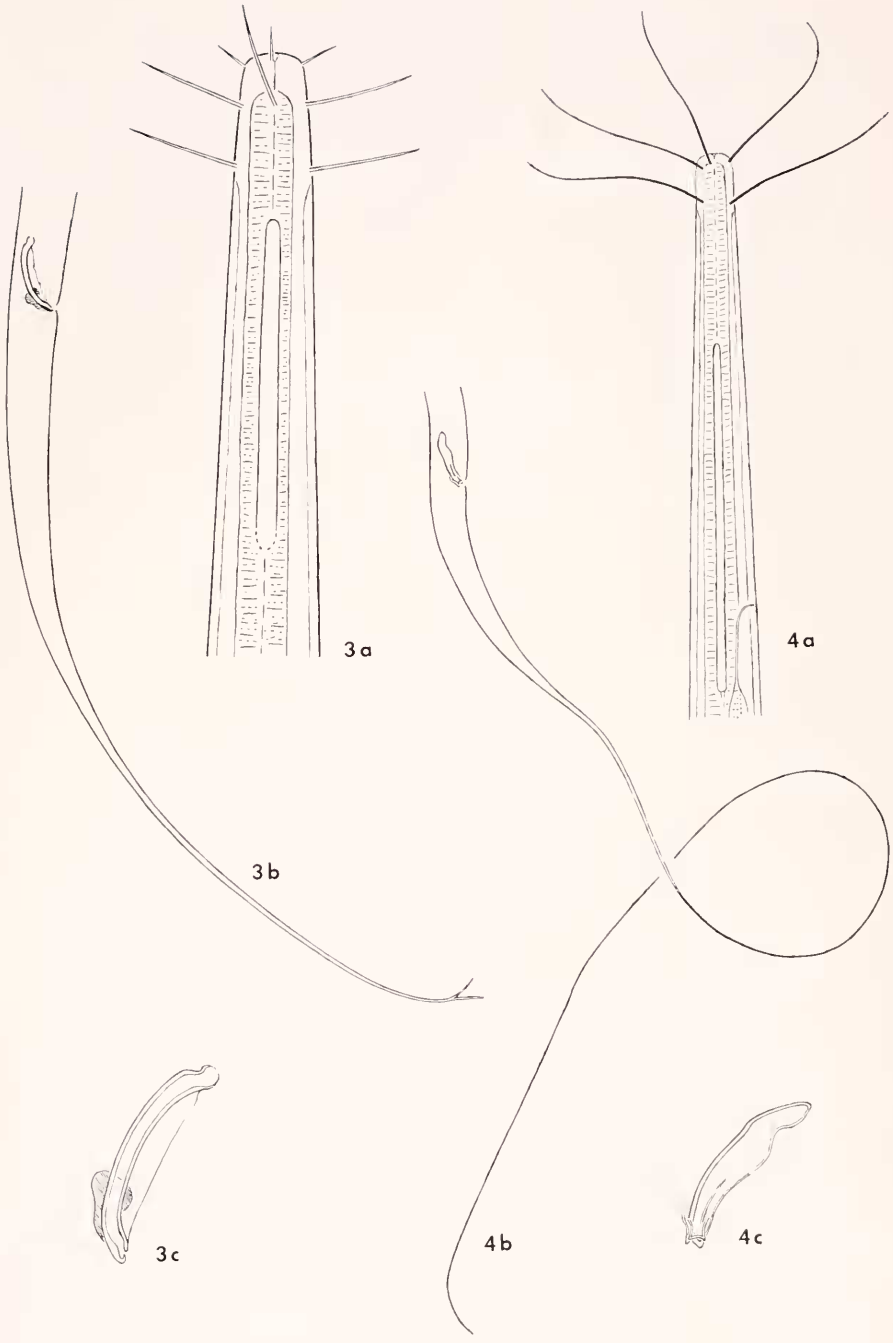


Plate II

Halalaimus cf. *fletcheri* Fig. 3, a–c: a—anterior end of male; b—posterior end of male; c—spicular apparatus. *Halalaimus meyersi* Fig. 4, a–c: a—anterior end of male; b—posterior end of male; c—spicular apparatus.

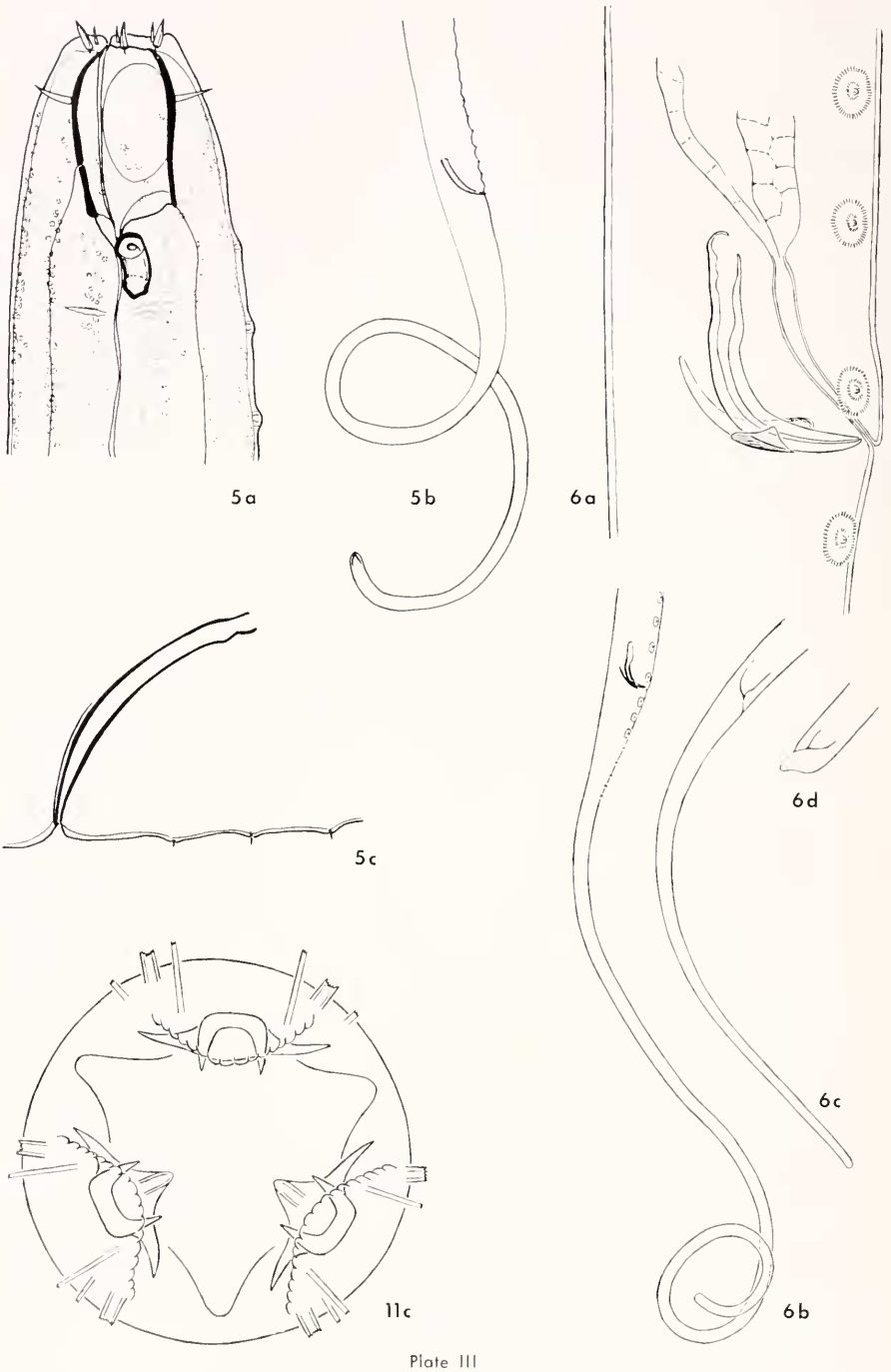


Plate III

Halanonchus macrurus Fig. 5, a–c: a—anterior end of male; b—posterior end of male; c—spicular apparatus. *Cytolaimium exile* Fig. 6, a–d: a—spiculor apparatus; b–d—posterior ends of three different specimens. *Enoploides gryphus* Fig. 11, c: en face view.

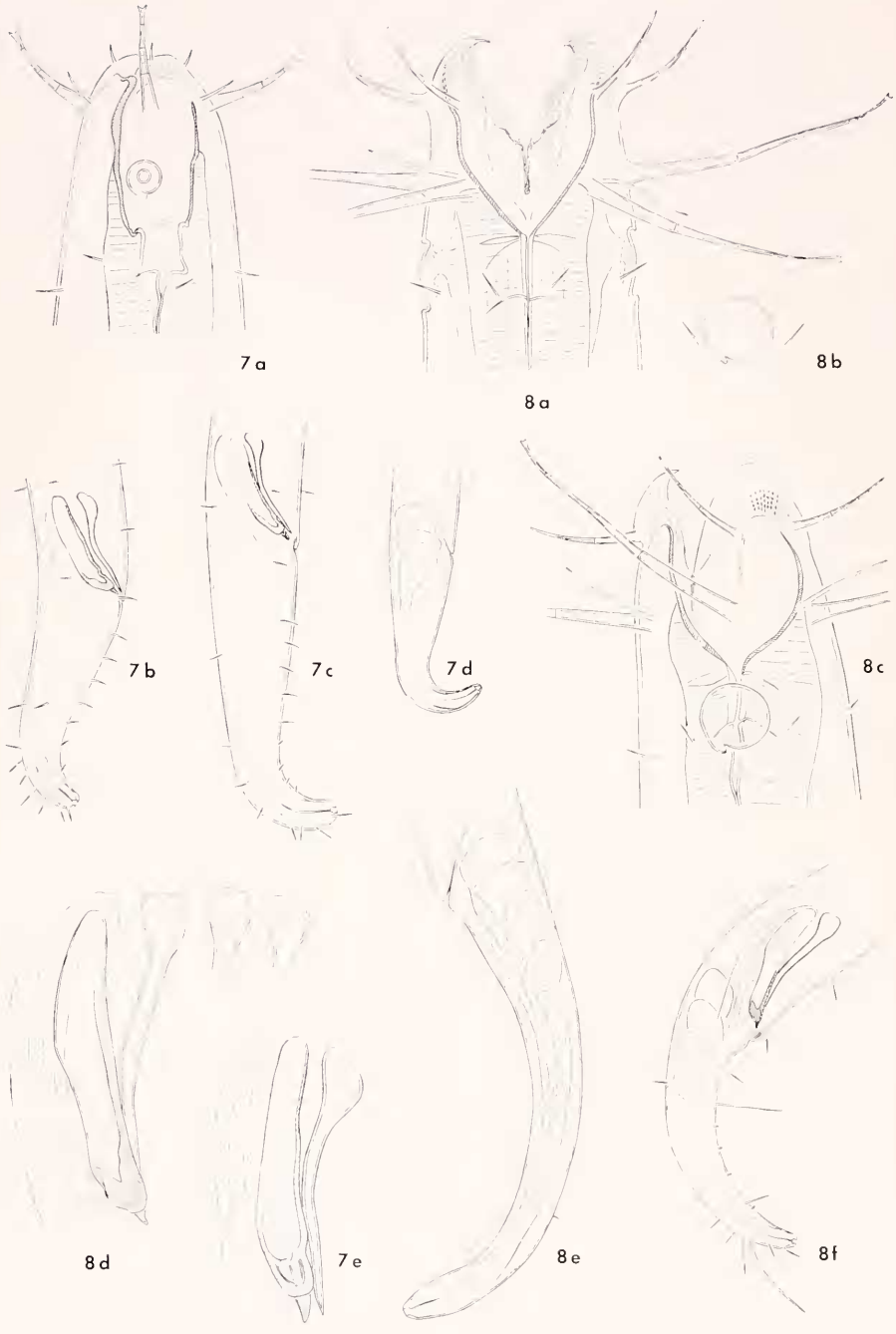


Plate IV

Bathylaimus australis Fig. 7, a–e: a—anterior end of male; b—posterior end of male; c—posterior end of another male; d—posterior end of female; e—spicular apparatus. *Bathylaimus arthrapappus* Fig. 8, a–f: a—anterior end of male, dorsoventral view; b—amphid of male; c—anterior end of male, lateral view; d—spicular apparatus and proximal spicular cephalization from two other specimens; e—posterior end of female; f—posterior end of male.

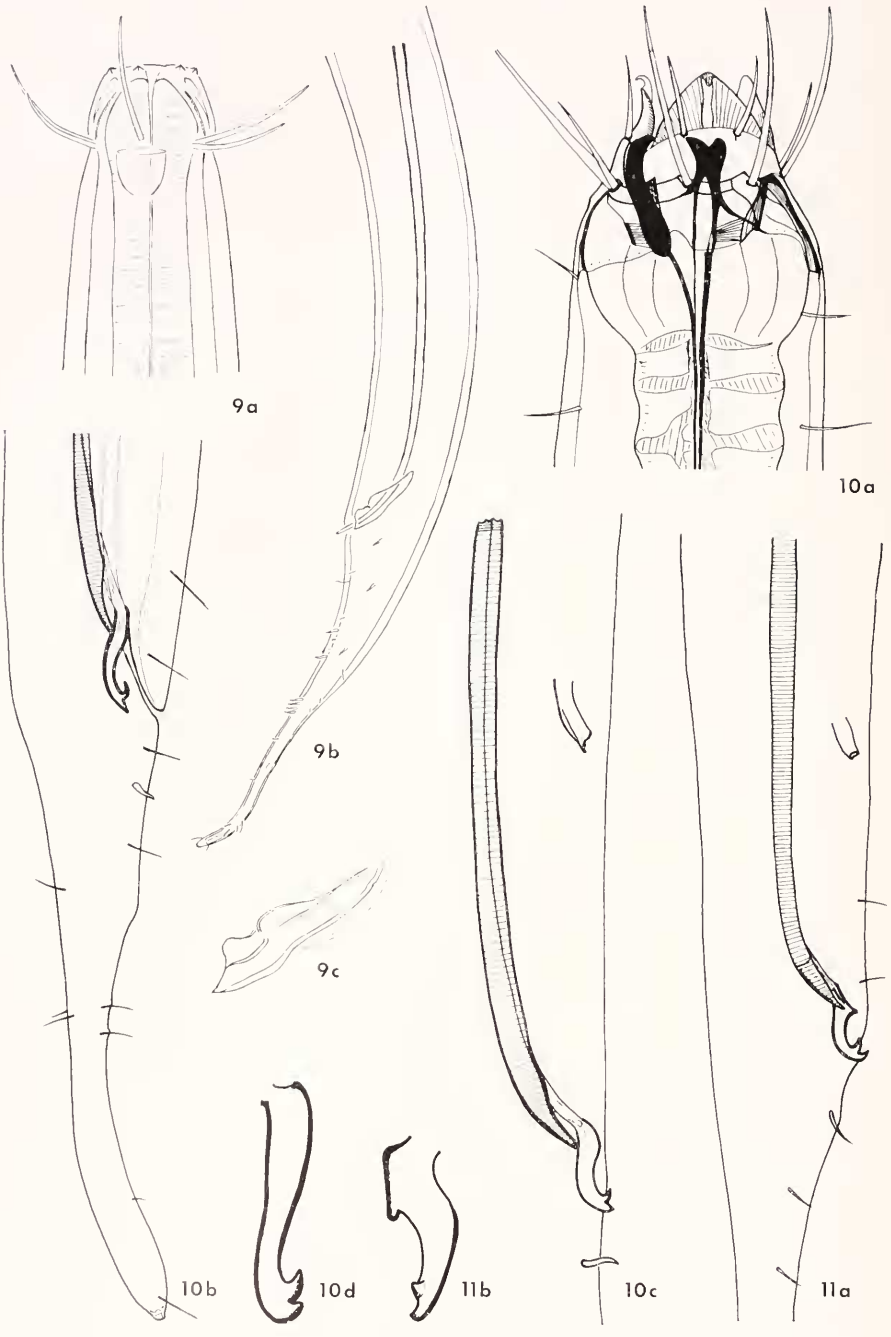


Plate V

Phanodermopsis longisetae Fig. 9, a–c: a—anterior end of male; b—posterior end of male; c—spicular apparatus. *Enoploides bisulcus* Fig. 10, a–d: a—anterior end of male; b—posterior end of male; c—spicular apparatus and supplement of another male; d—gubernaculum of third male in lateroventral view. *Enoploides gryphus* Fig. 11, a, b: a—spicular apparatus; b—gubernaculum in lateroventral view.

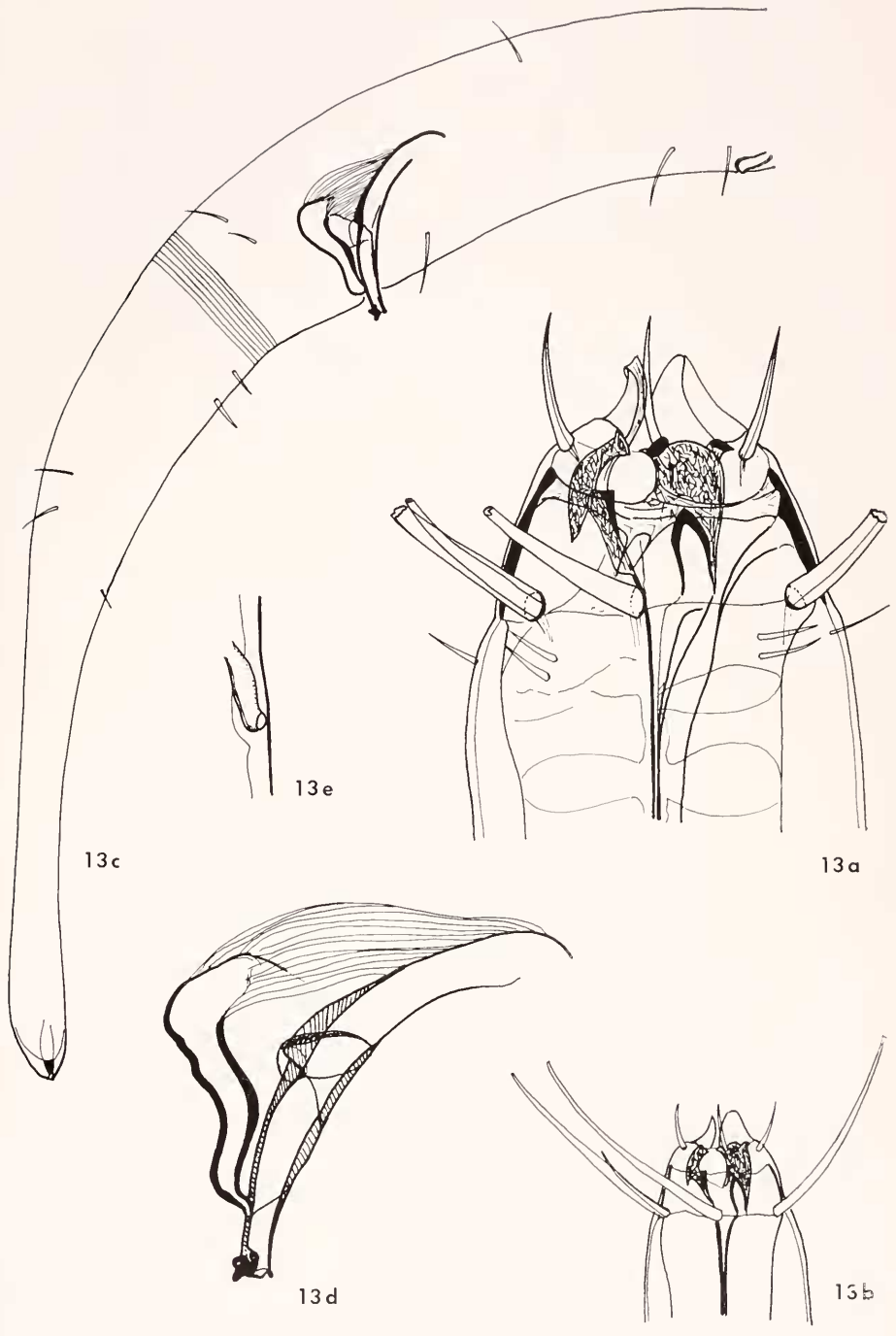
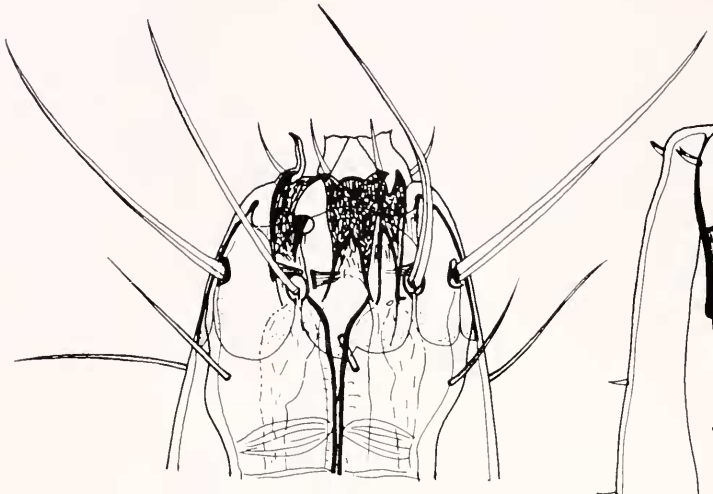
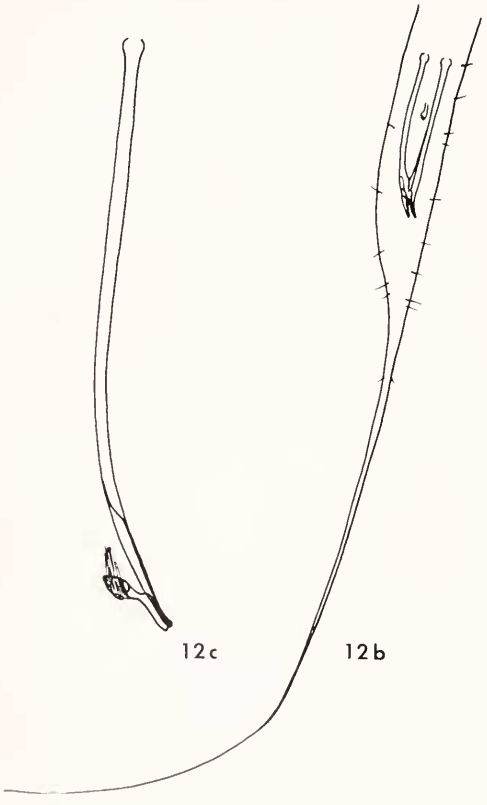


Plate VI

Mesacanthaides psittacus Fig. 13, a–e: a—anterior end of male (cephalic setae cut off); b—anterior end of same male; c—posterior end of male; d—spicular apparatus; e—supplement.





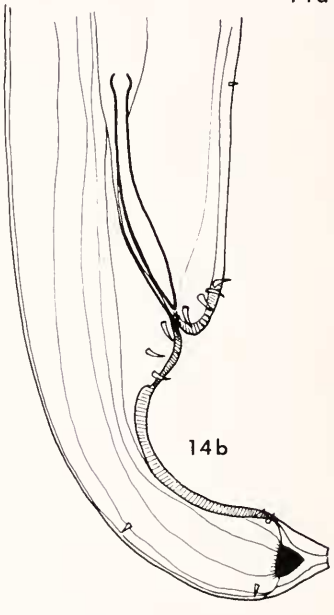
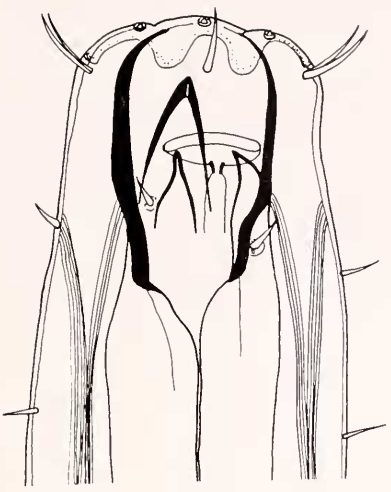
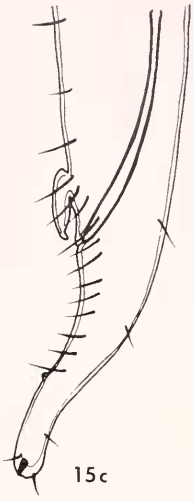


Plate VII

Mesacanthoides fibulatus Fig. 12, a–c: a—anteriar end of male; b—posterior end of male; c—spicular apparatus. *Oncholaimus dujardinii* Fig. 14, a, b: a—anterior end of male; b—pasterior end af male.

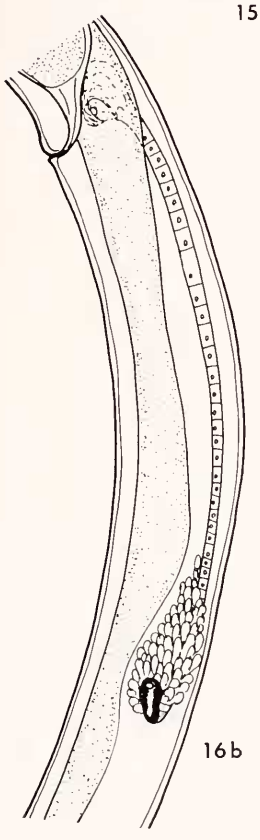


15a

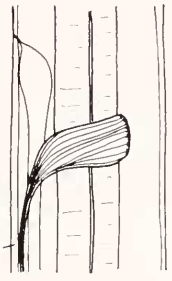


15c

16a



16b



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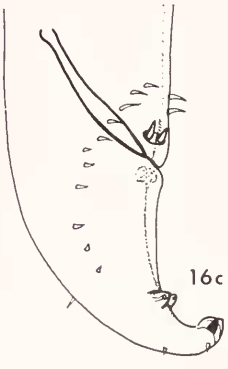

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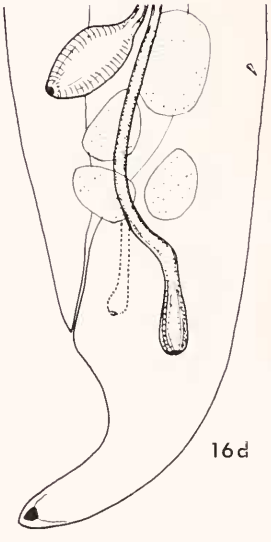

16d

Plate VIII

Oncholaimium appendiculatum Fig. 15, a–c: a—anterior end of male; b—region of nerve ring; c—posterior end of male. *Oncholaimium domesticum* Fig. 16, a–d: a—anterior end of male; b—demanian organ, region of uvette; c—posterior end of male, lateroventral view to show poiredness of pre- and postanal papillae; d—posterior end of female.

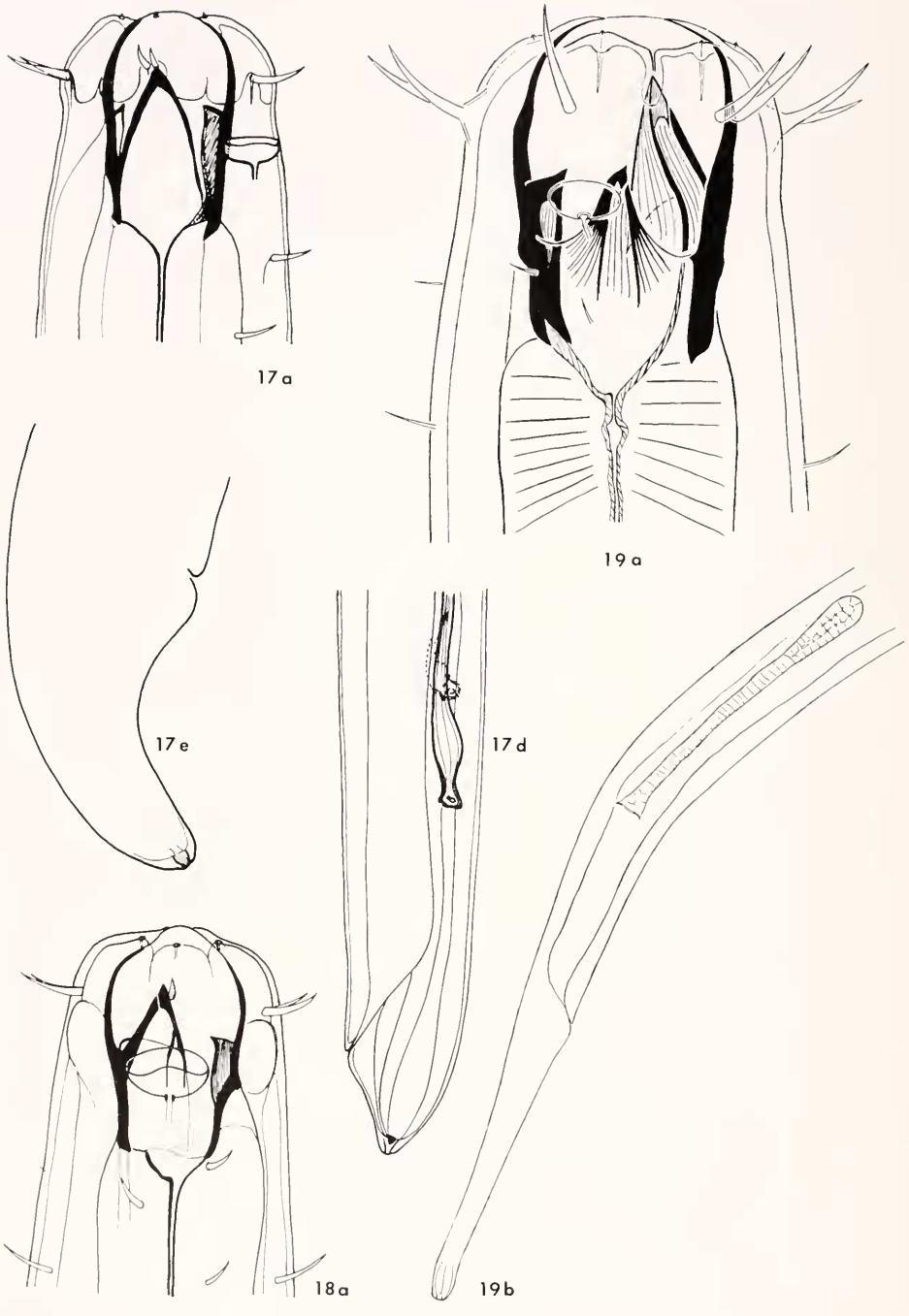

Plate IX

Metoncholaimus intermedius Fig. 17, a, d, e: a—anterior end of male; d—posterior end of female; e—tail of juvenile female. *Metoncholaimus simplex* Fig. 18, a—anterior end of male. *Metoncholaimus scissus* Fig. 19, a, b: a—anterior end of male; b—posterior end of female.

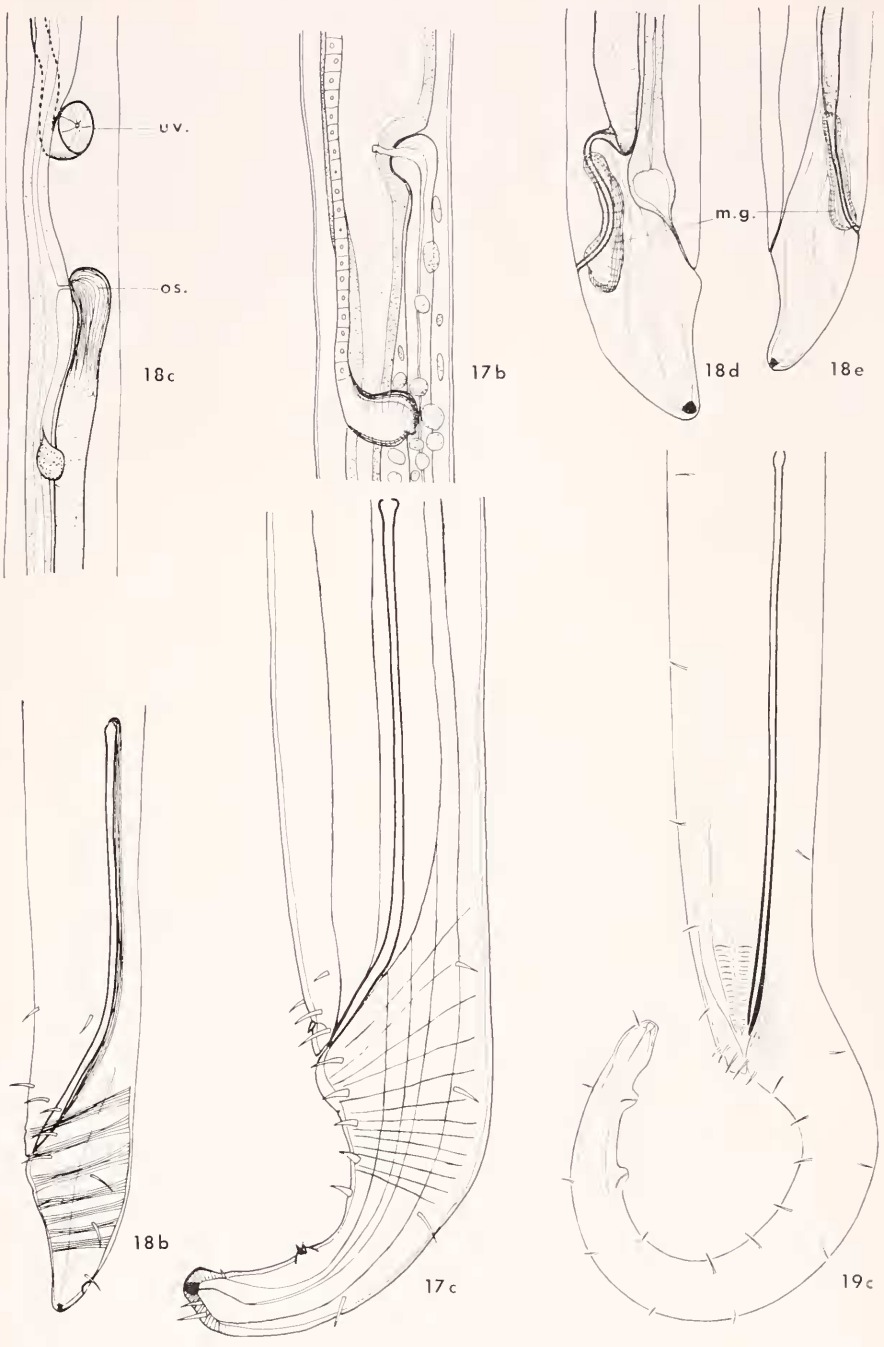

Plate X

Metancholaimus intermedius Fig. 17, b, c: b—demanian organ, region of uvette and opening of enterine efferent into intestine; c—posterior end of male. *Metanchalaimus simplex* Fig. 18, b–e: b—posterior end of male; c—part of demanian organ (*uv.*, uvette; *os.*, osmasium); d, e—posterior ends of two females (*m.g.*, maniliform glands). *Metanchalaimus scissus* Fig. 19, c—posterior end of male.

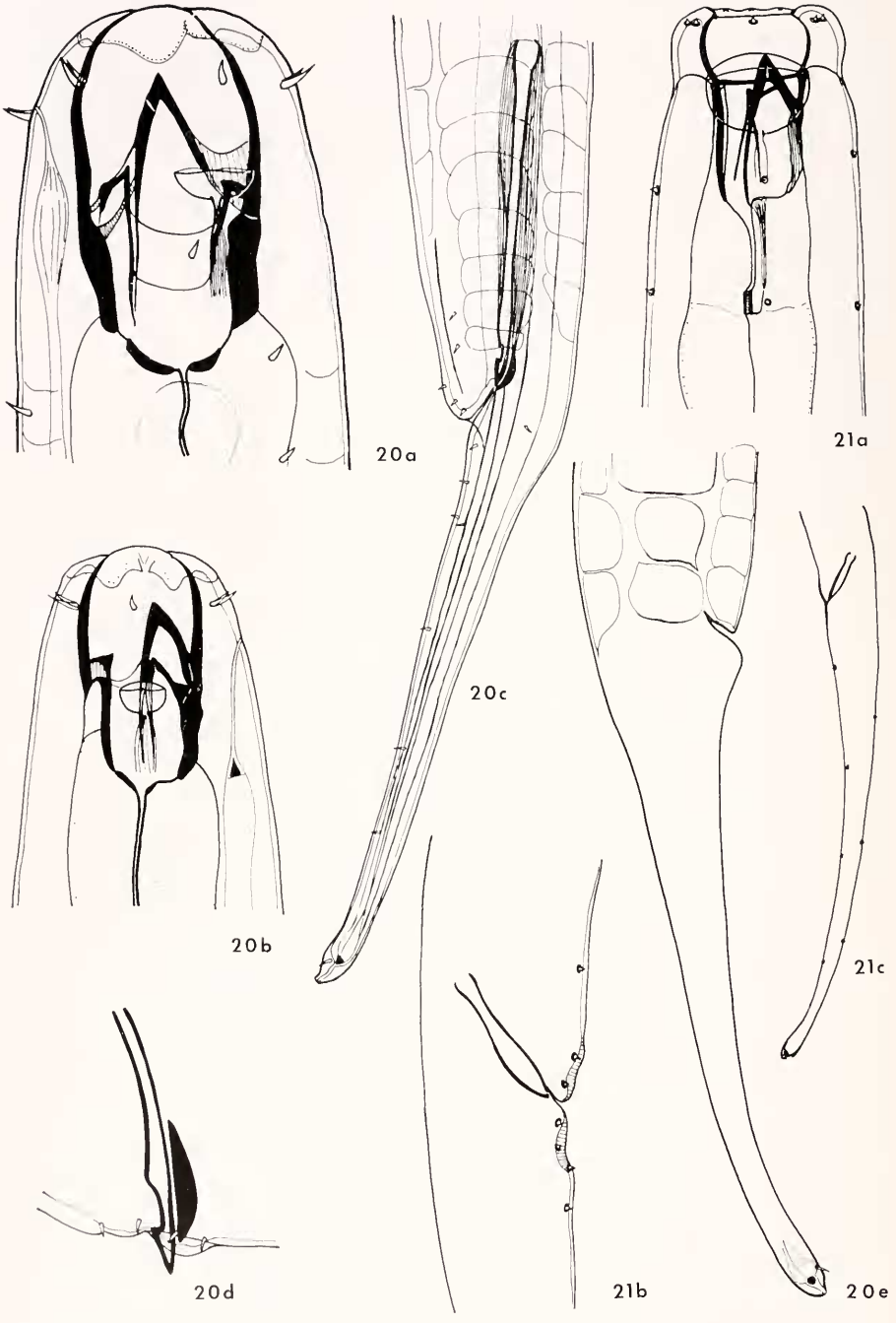

Plate XI

Prooncholaimus hastatus Fig. 20, a–e: a—anterior end of male; b—anterior end of young female; c—posterior end of male; d—distol portion of spiculum; e—posterior end of female. *Viscosia ancholaimelloides* Fig. 21, a–c: a—anterior end of male; b—anal region of mole; c—posterior end of mole.

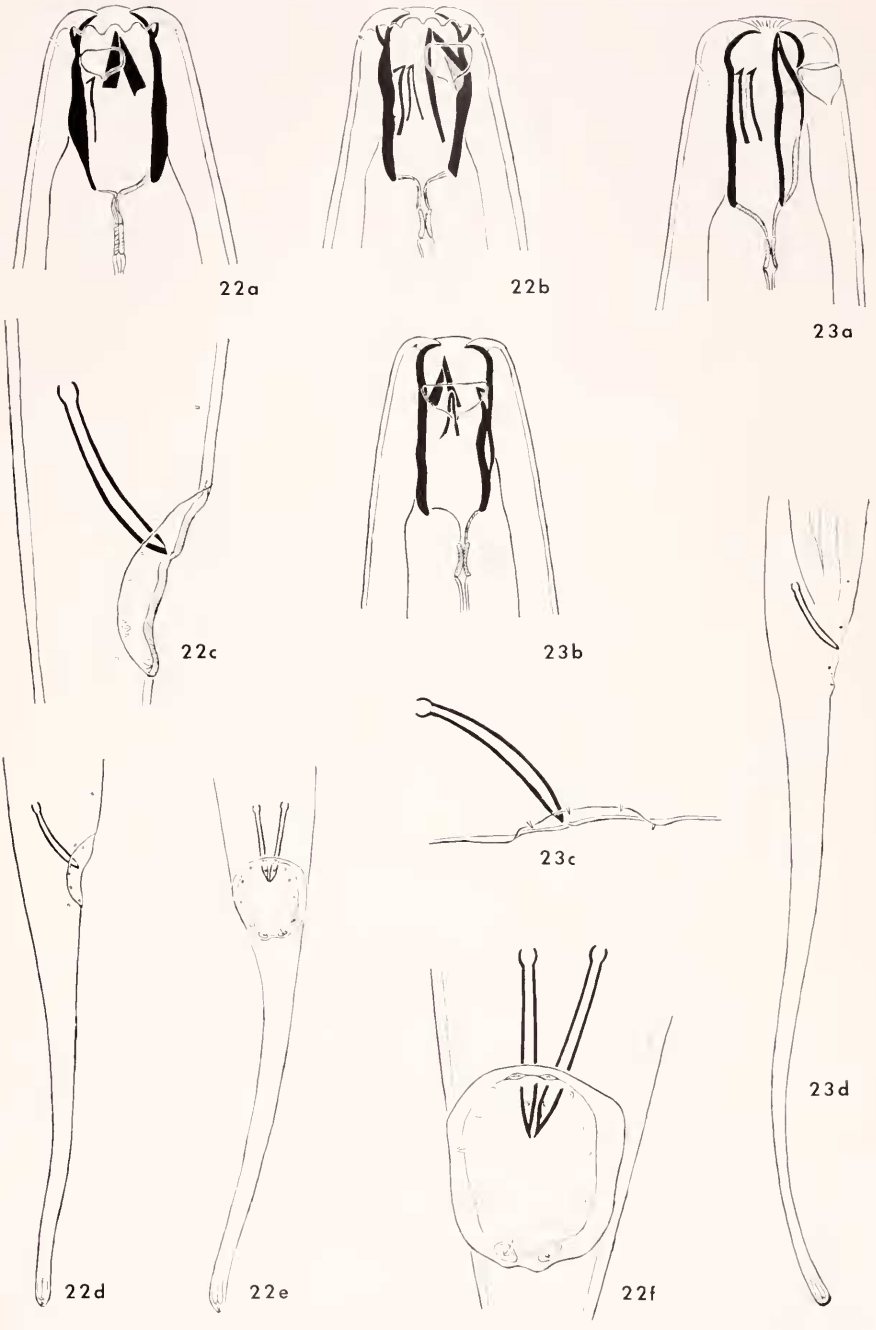

Plate XII

Viscosia popillata Fig. 22, a–f: a—anterior end of female; b—anterior end of male; c—spicular region, lateral view; d—posterior end of male; e—posterior end of male, ventral view; f—spicular region, ventral view. *Viscosia macramphida* Fig. 23, a–d: a, b—anterior ends of two males; c—spicular region; d—posterior end of male.

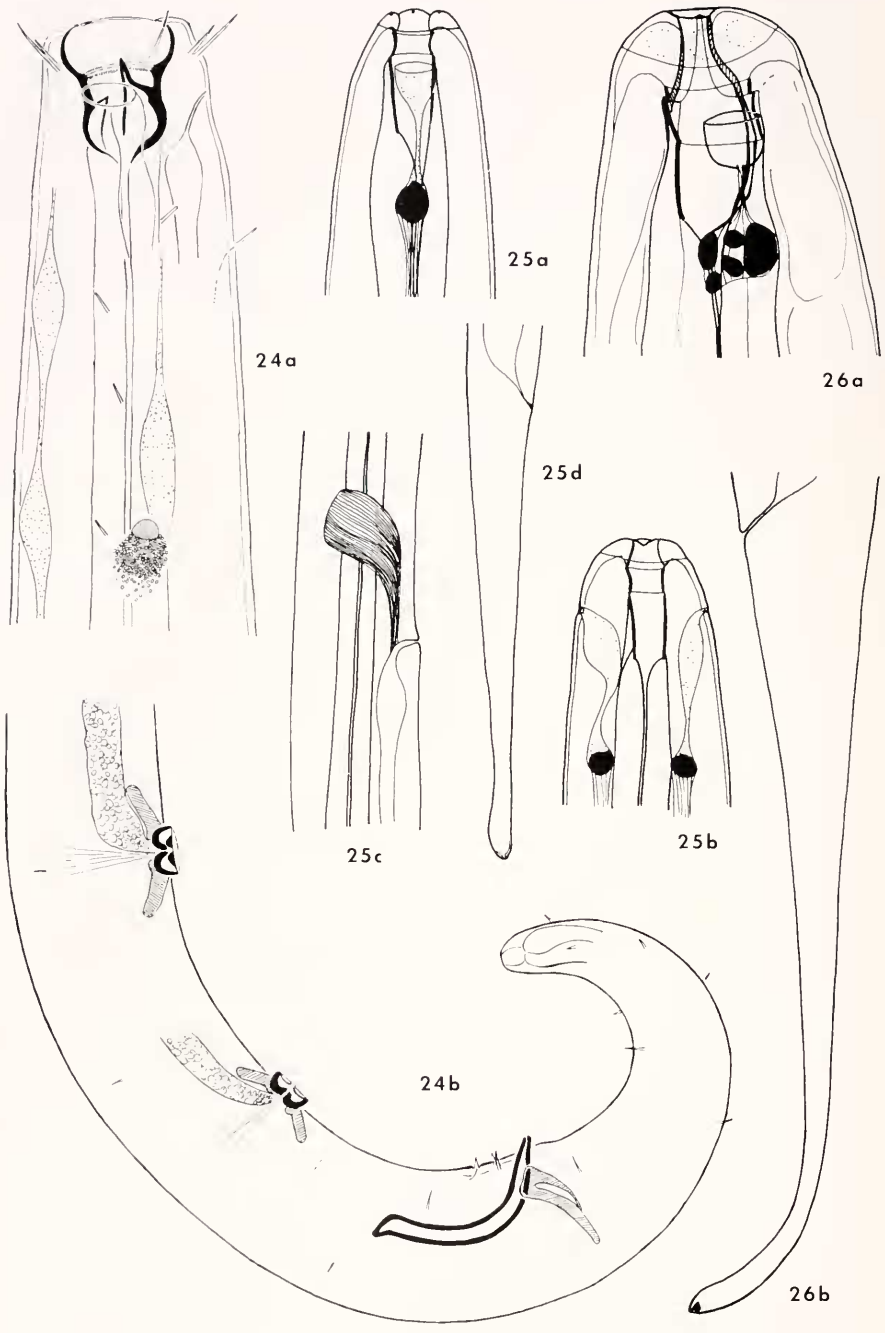

Plate XIII

Eurystamina minutisculae Fig. 24, a, b: a—anterior end of male; b—posterior end of male. *Illium exile* Fig. 25, a–d: a—anterior end of female, loteral view; b—anterior end of another female, darsal view; c—regian of nerve ring; d—posterior end of female. *Illium libidinosum* Fig. 26, a, b: a—anteriar end of female; b—posterior end of female.

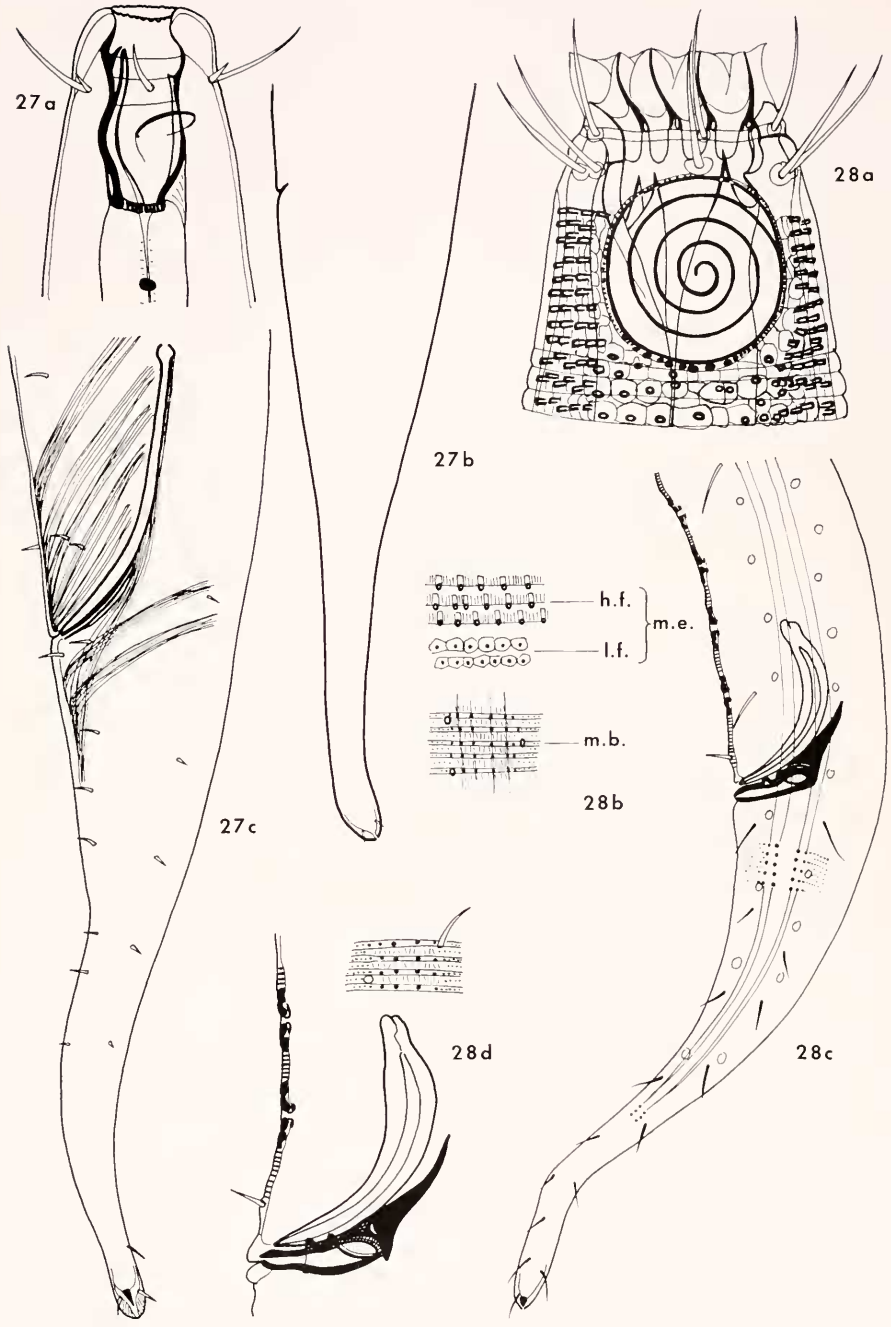

Plate XIV

Polygastrophora edax Fig. 27, a–c: a—anterior end of mole; b—posterior end of female; c—posterior end of male. *Pomponema tesselatum* Fig. 28, a–d: a—onterior end of male; b—cuticular differentiation in lateral region (*h.f.*, high focus; *l.f.*, low focus; *m.e.*, mid-esophogus; *m.b.*, mid-body); c—posterior end of mole; d—anal region of male.

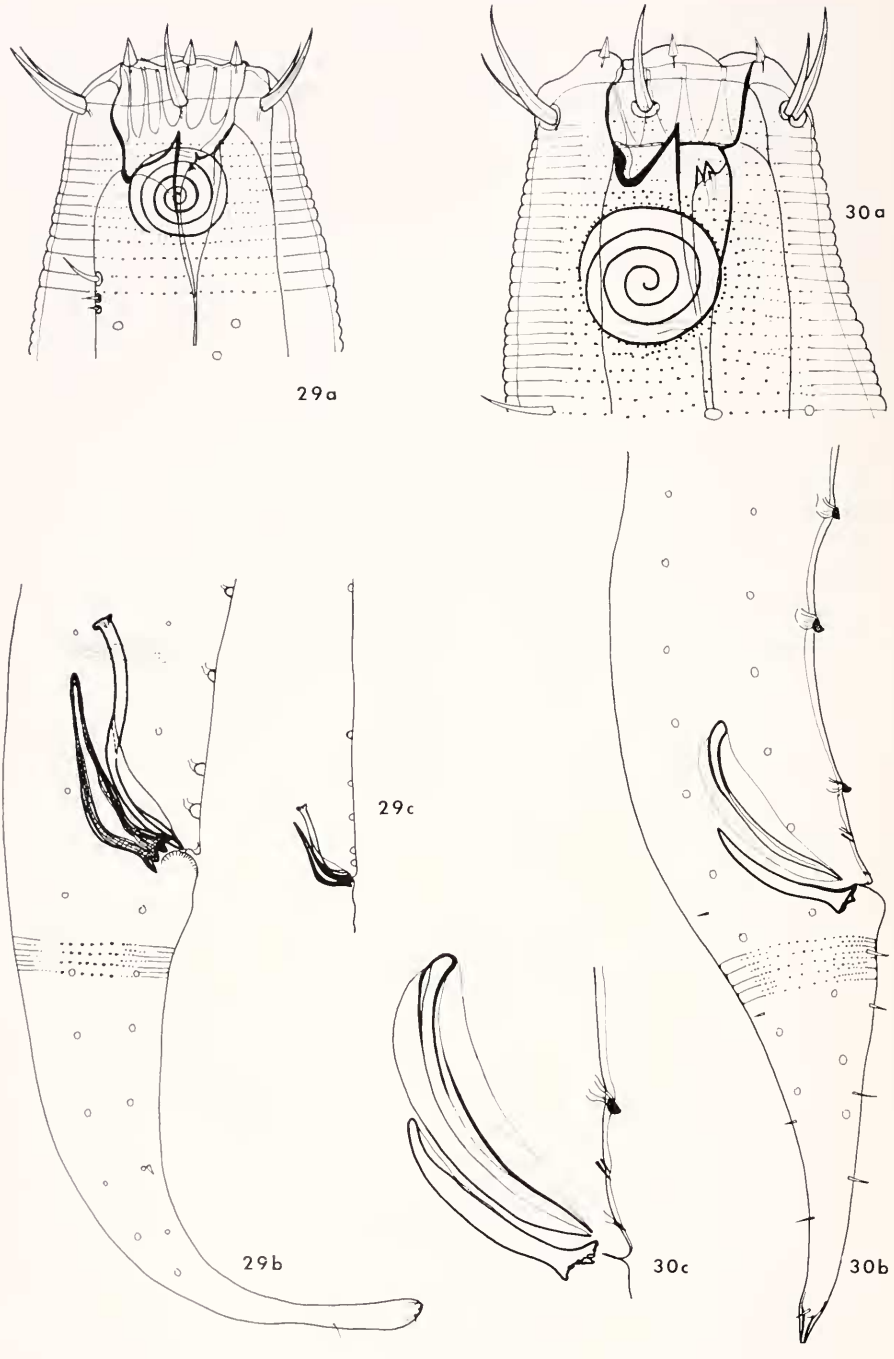

Plate XV

Longicyatholaimus annae Fig. 29, a–c: a—anteriar end af male; b—pasteriar end af male; c—spicular apparatus and row af supplements. *Xyzzors inglisi* Fig. 30, a–c: a—anterior end af male; b—pasteriar end of male; c—spicular apparatus.

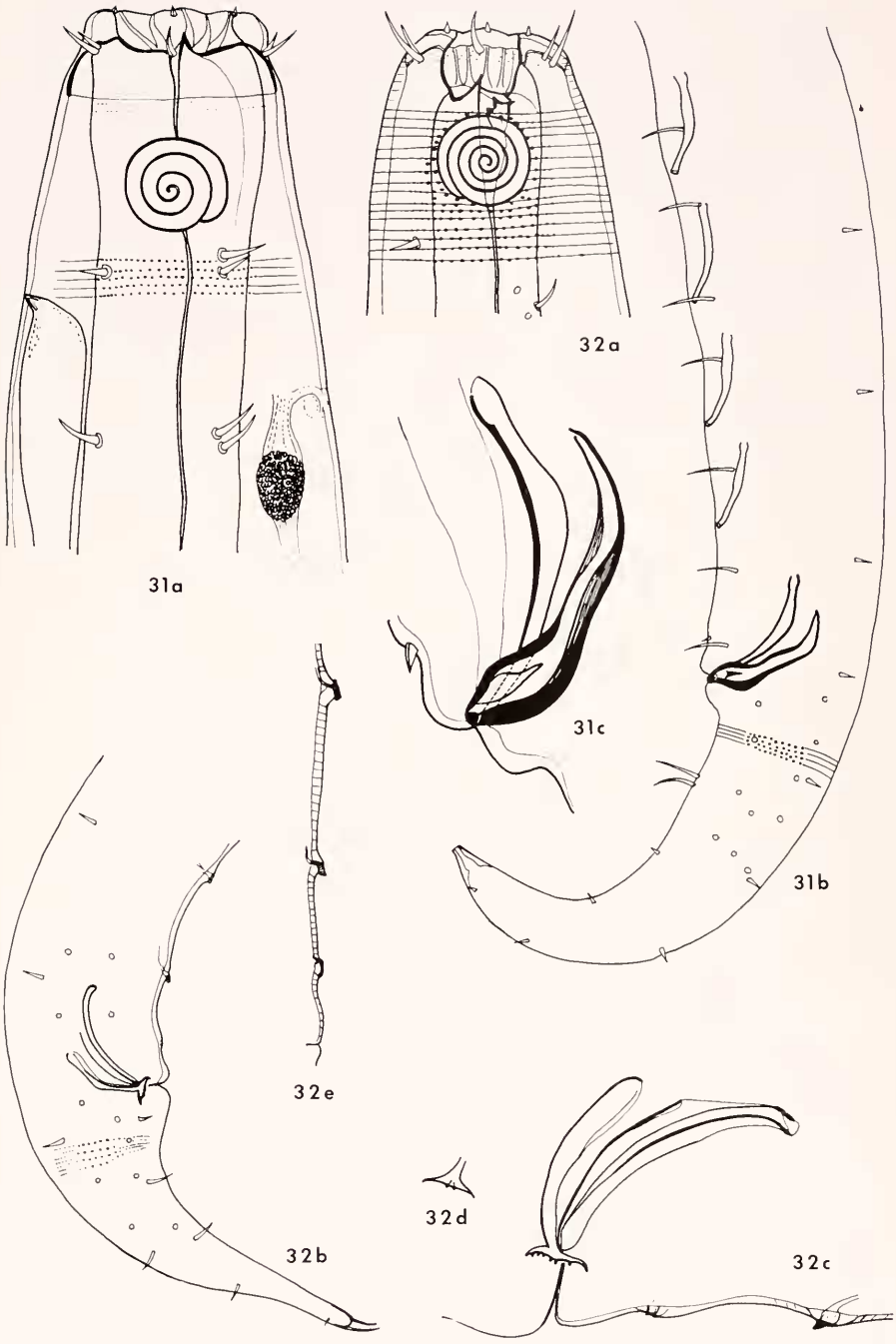

Plate XVI

Paracanthanchus platypus Fig. 31, a–c: a—anteriar end af male; b—posteriar end af female; c—spicular apparatus. *Paracyathalaimus pesavis* Fig. 32, a–e: a—anteriar end af male; b—posteriar end of male; c—spicular apparatus; d—distal end of gubernaculum of onother male; e—row of supplements.

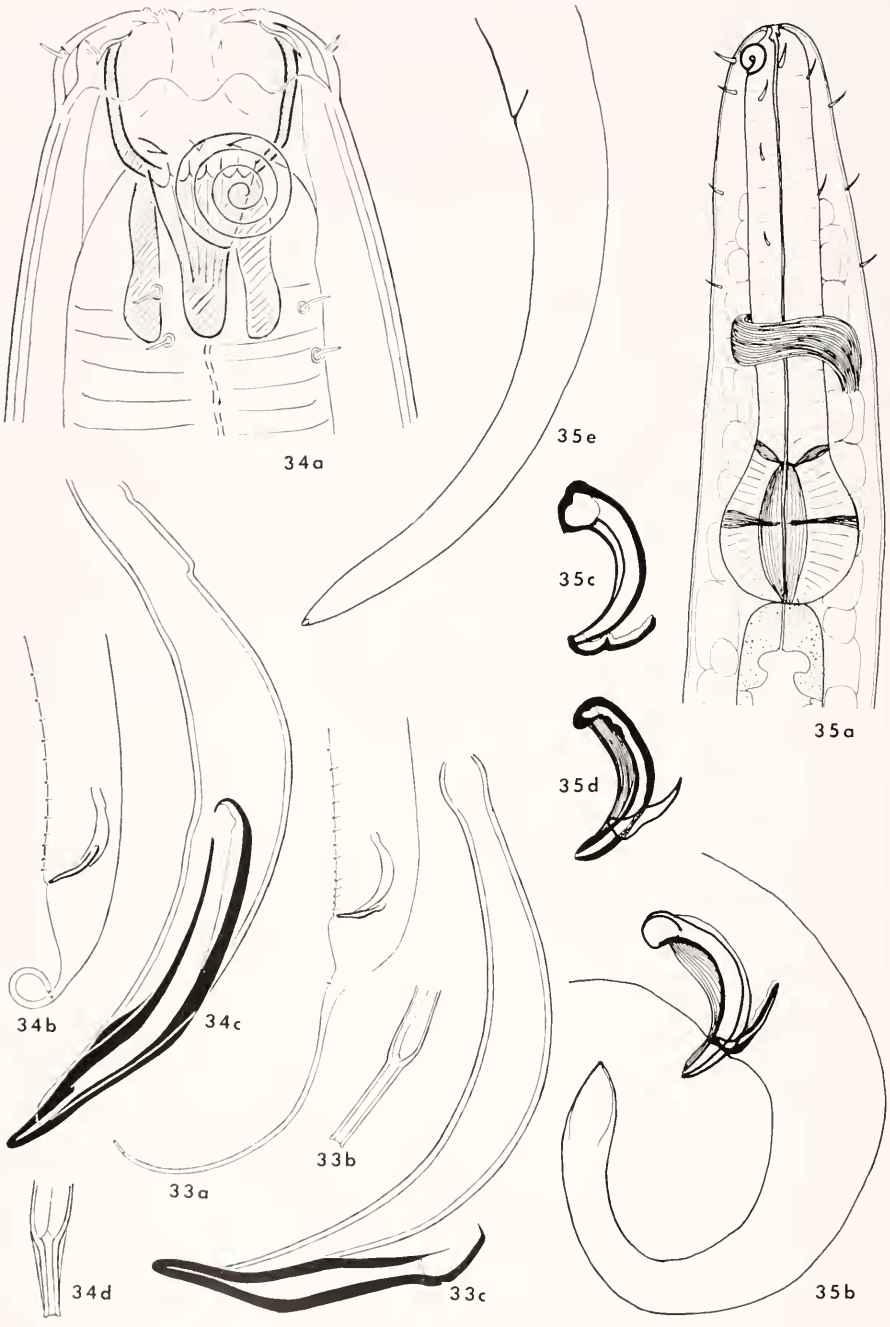

Plate XVII

Halichoanolaimus quattuordecimpapillatus Fig. 33, a–c: a—posterior end of male; b—spinneret; c—spicular apparatus. *Halichoanolaimus duodecimpapillatus* Fig. 34, a–d: a—anterior end of male; b—posterior end of male; c—spicular apparatus; d—spinneret. *Spirinia parasitifera* Fig. 35, a–e: a—anterior region of male; b—posterior end of male; c, d—spicular apparatus of two more males; e—posterior end of female.

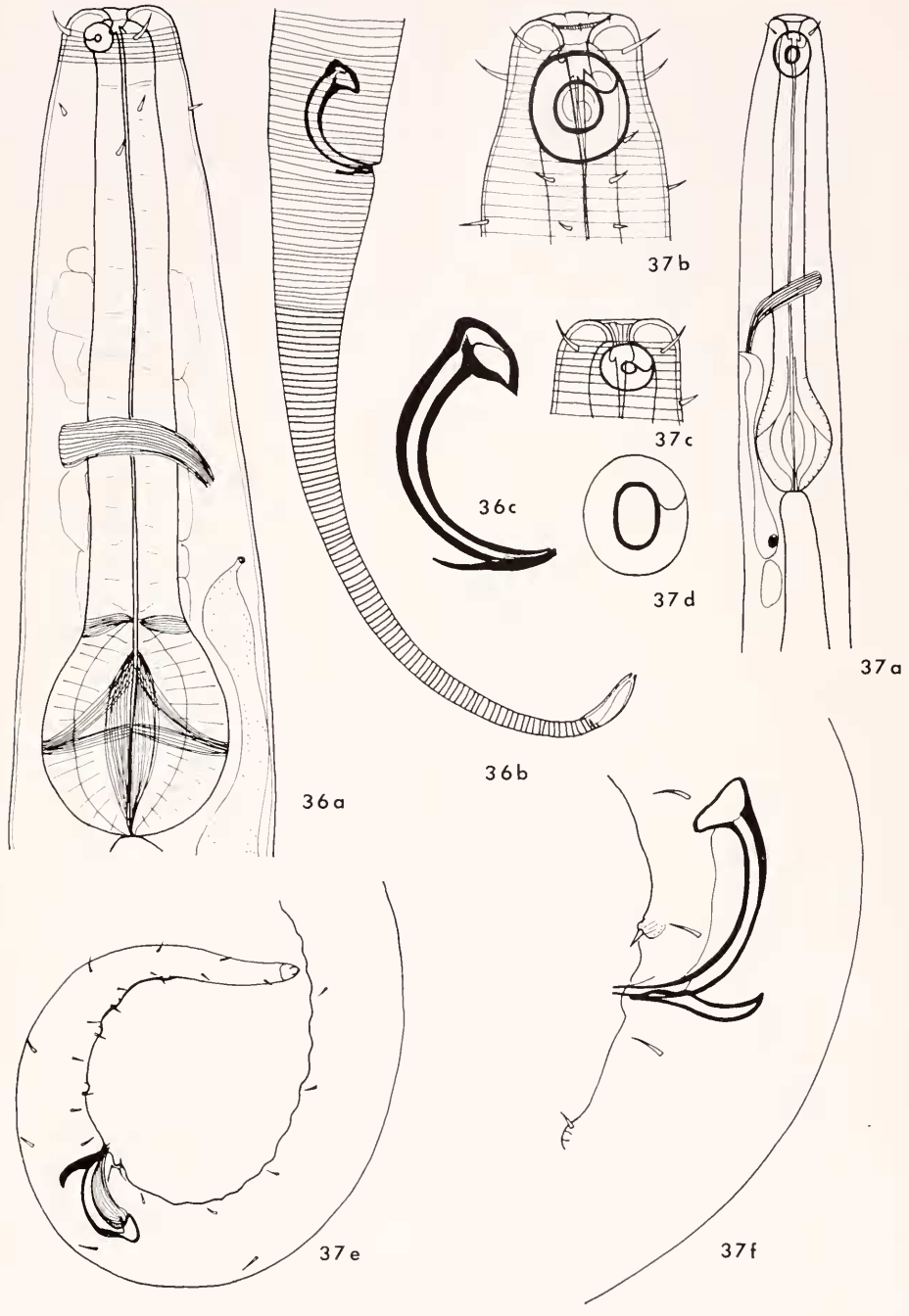

Plate XVIII

Spirinia hamata Fig. 36, a–c: a—anterior region of male; b—posterior end of male; c—spicular apparatus. *Chromaspirina inaurita* Fig. 37, a–f: a—anterior region of male; b—anterior end of male; c—anterior end of female; d—amphid of another male; e—posterior end of male; f—anal region.

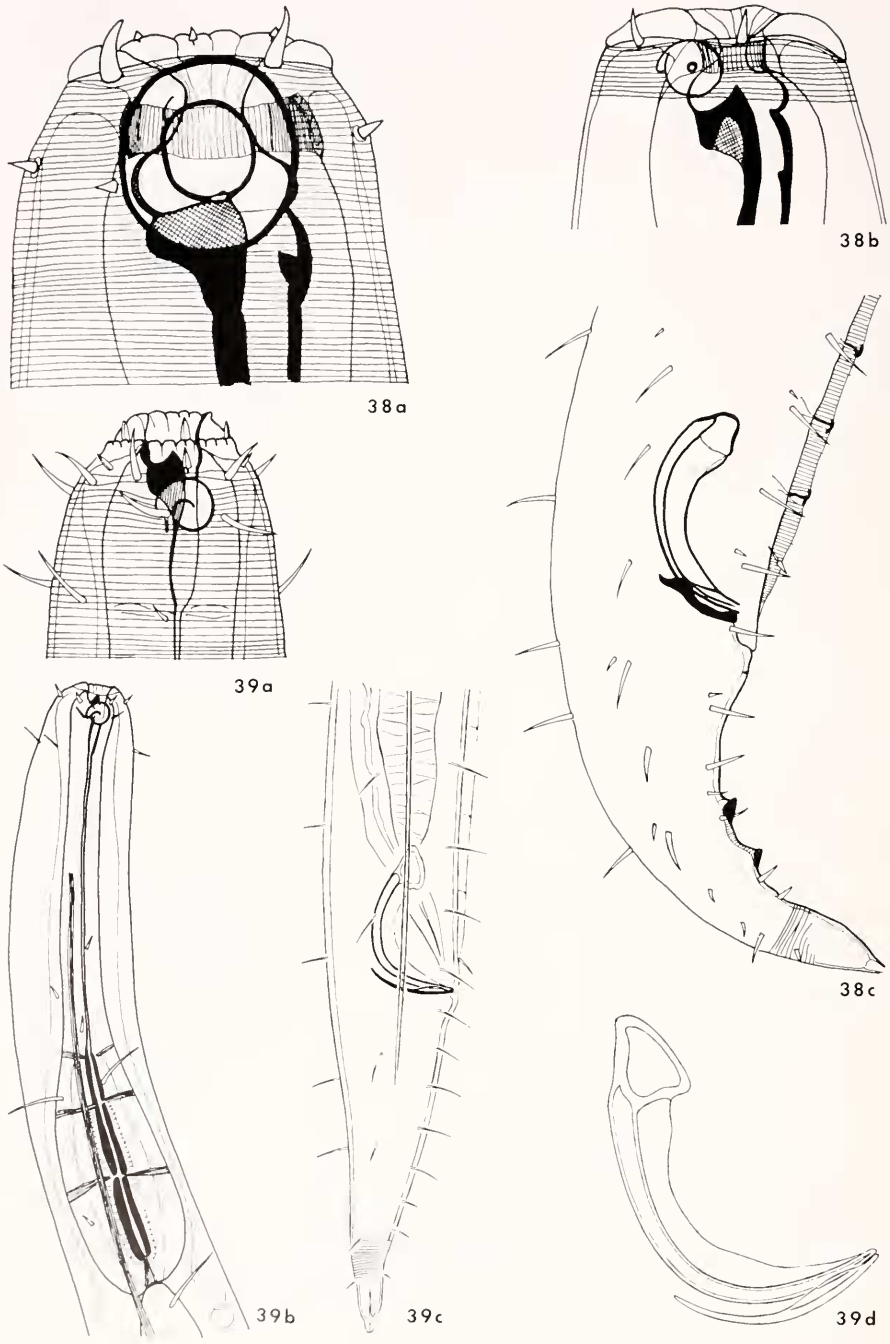

Plate XIX

Metachromadora pulvinata Fig. 38, a–c: a—anterior end of male; b—anterior end of juvenile; c—posterior end of male. *Metachromadara meridiana* Fig. 39, a–d: a—anterior end of male; b—anterior region of male; c—posterior end of male; d—spicular apparatus.

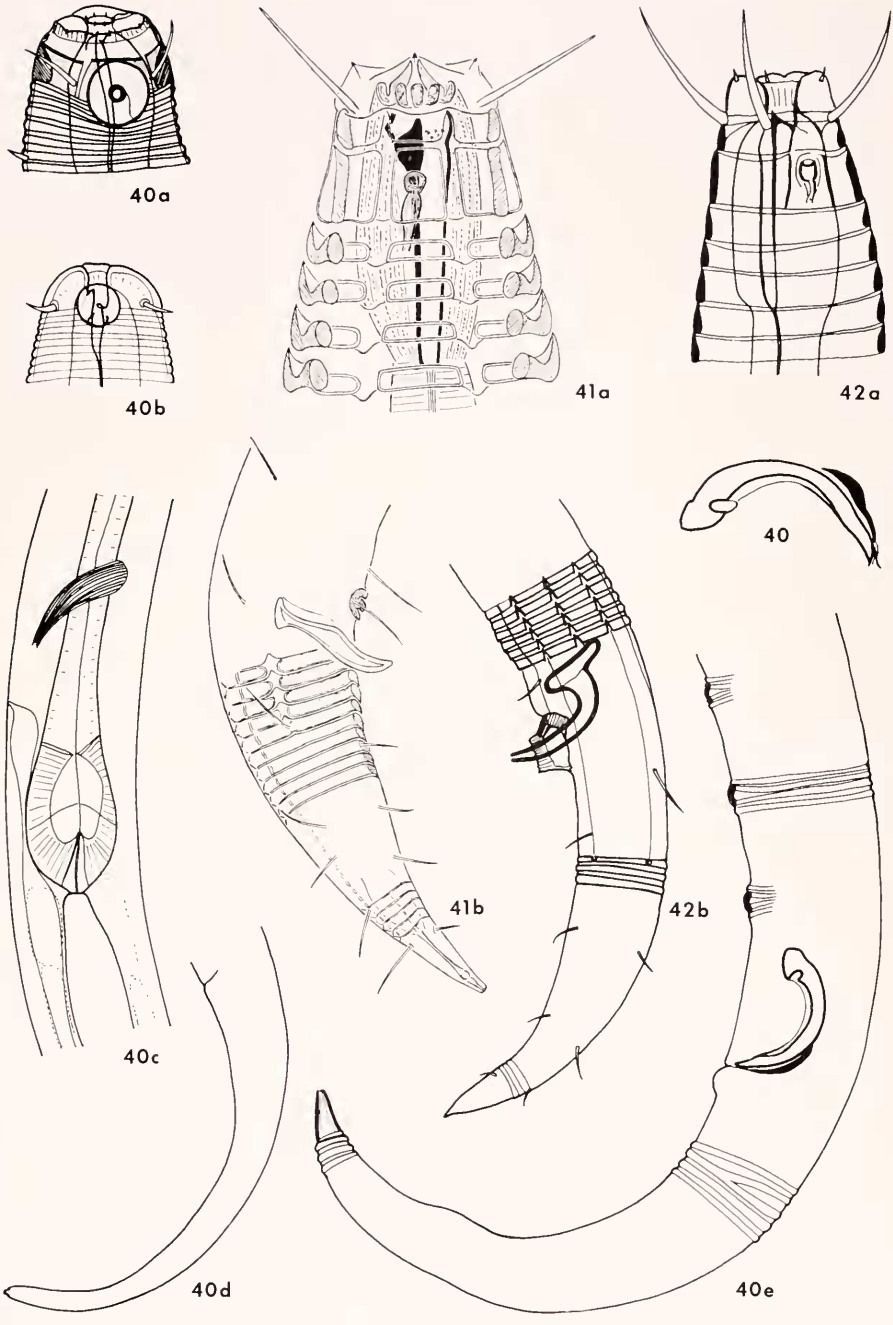

Plate XX

Paradesmodora toreutes Fig. 40, a–f: a—onterior end of male; b—anterior end of juvenile; c—region of esophogeal bulb; d—tail of juvenile; e—posterior end of male; f—spicular apparatus. *Monoposthia mirabilis* Fig. 41, a, b: a—anterior end of male; b—posterior end of male. *Monoposthioides mayri* Fig. 42, a, b: a—onterior end of male; b—posterior end of male.

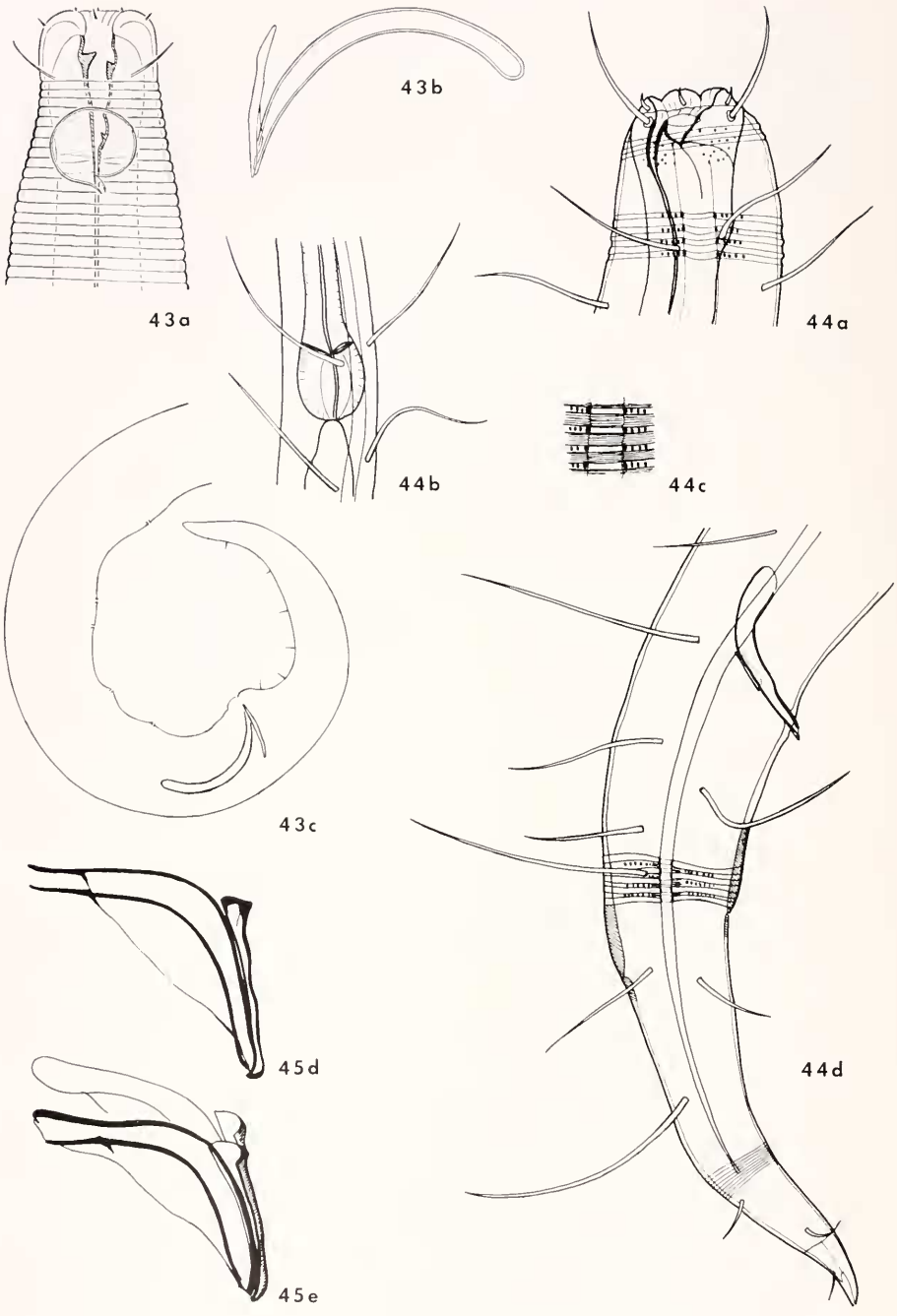

Plate XXI

Paramicrolaimus lunatus Fig. 43, a–c: a—anterior end of male; b—spicular apparatus; c—posterior end of male. *Hypadantalaimus interruptus* Fig. 44, a–d: a—anterior end of male; b—region of esophageal bulb; c—lateral differentiation of cuticle in mid-body; d—posterior end of male. *Hypodontolaimus pandispiculotus* Fig. 45, d, e: spicular apparatus of two males.

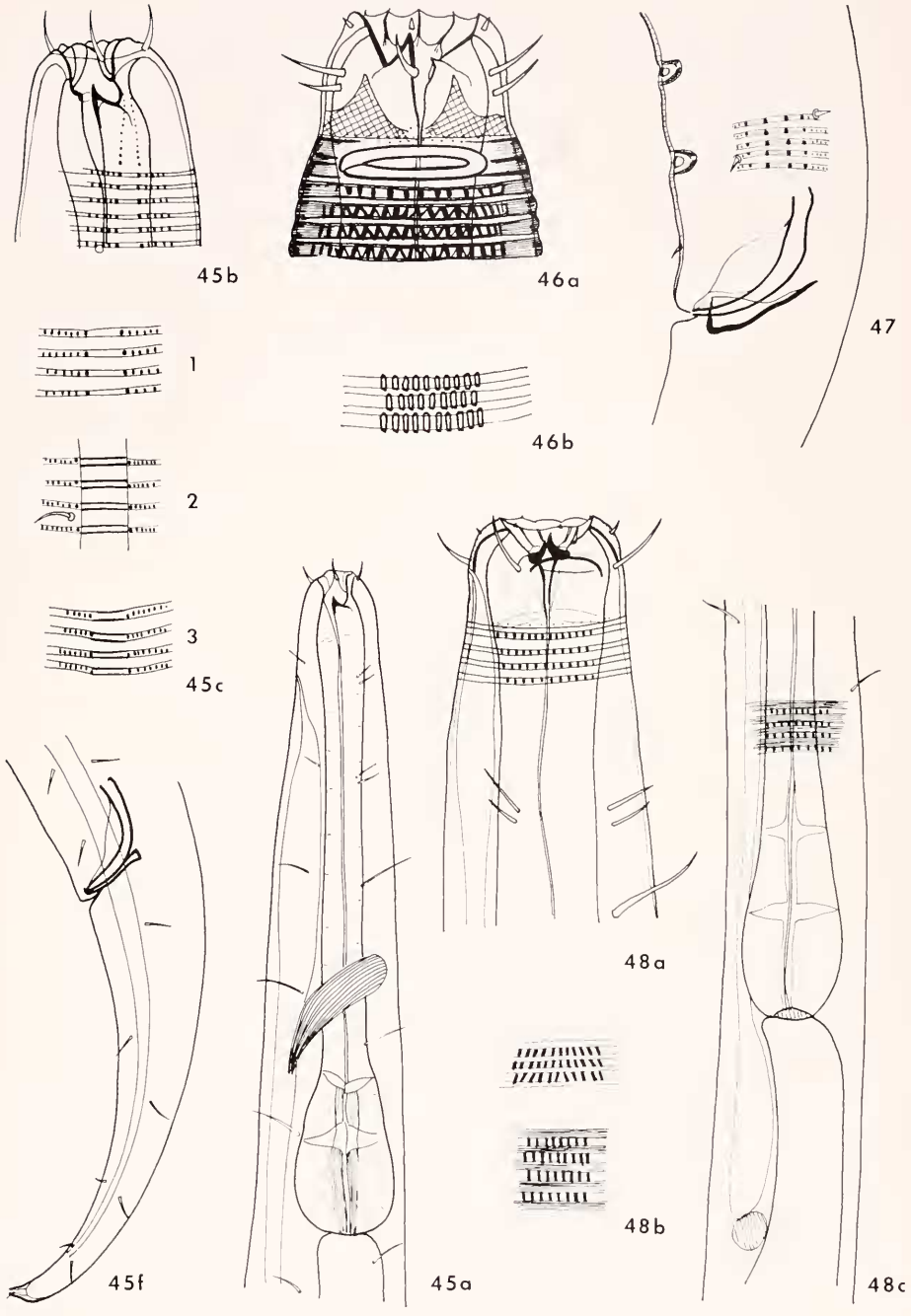

Plate XXII

Hypodontolaimus pondispiculatus Fig. 45, a–c, f: a—anterior end of male; b—anterior region of male; c—lateral differentiation of cuticle, 1: bulbar region, 2: mid-body, 3: anal region; f—posterior end of male. *Rhips ornata* Fig. 46, a, b: a—anterior end of male; b—cuticular differentiation in mid-esophagus region. *Chromadora macrolaimoides* Fig. 47: anal region of male. *Prochromadorella mediterranea* Fig. 48, a–c: a—anterior end of male; b—cuticular differentiation: mid-esophagus (above) and mid-body; c—region of esophageal bulb.

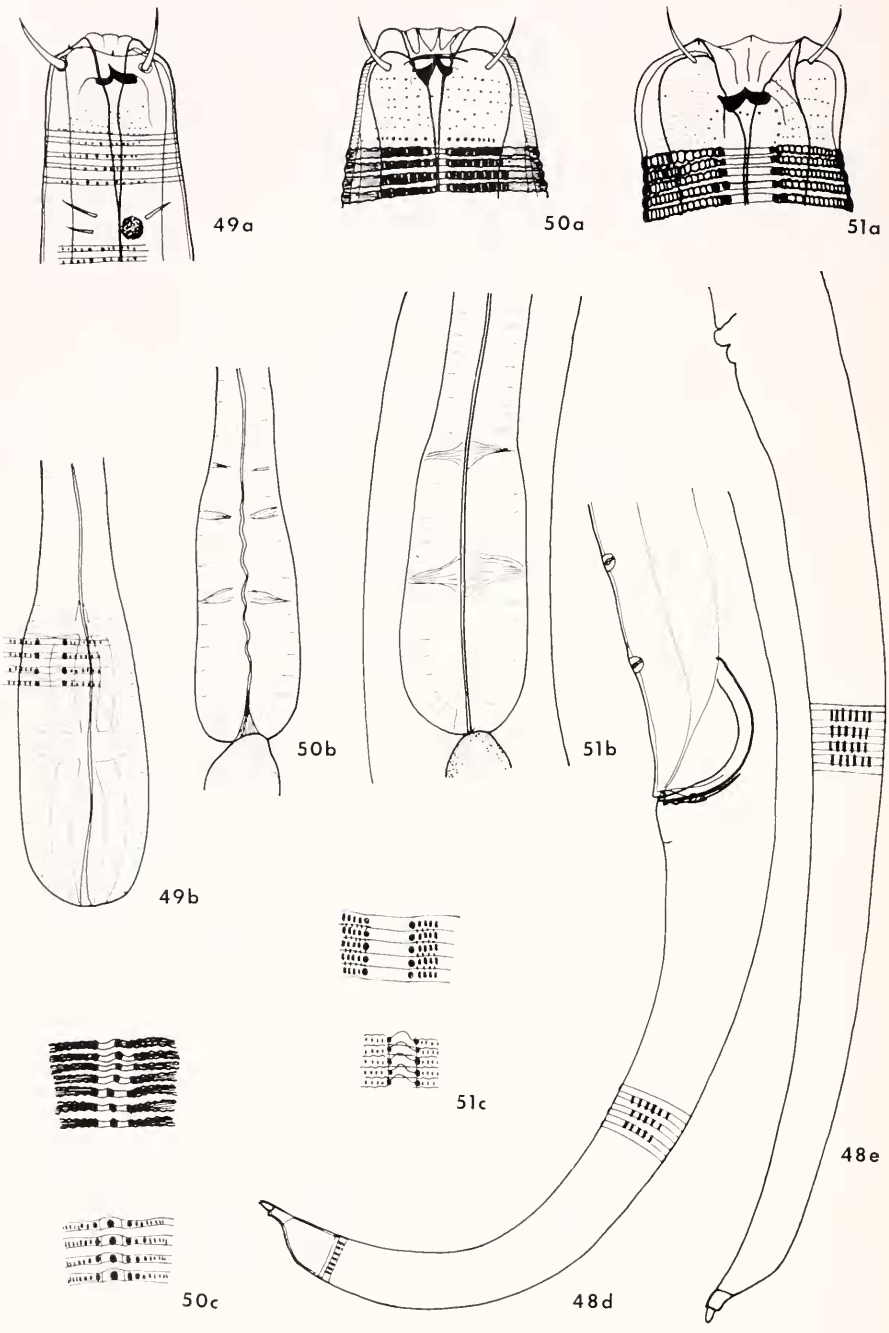

Plate XXIII

Prochromadorella mediterranea Fig. 48, d, e: d—posterior end of male; e—posterior end of female. *Chromadorella filiformis* Fig. 49, a, b: a—anterior end of male; b—esophageal bulb. *Chromadorella trilix* Fig. 50, a–c: a—anterior end of male; b—esophageal bulb; c—cuticular differentiation: onterior cervical region (above) and mid-esophagus. *Chromadorella vanmeterae* Fig. 51, a–c: a—anterior end of male; b—esophageal bulb; c—cuticular differentiation: posterior cervical region (above) and mid-body.

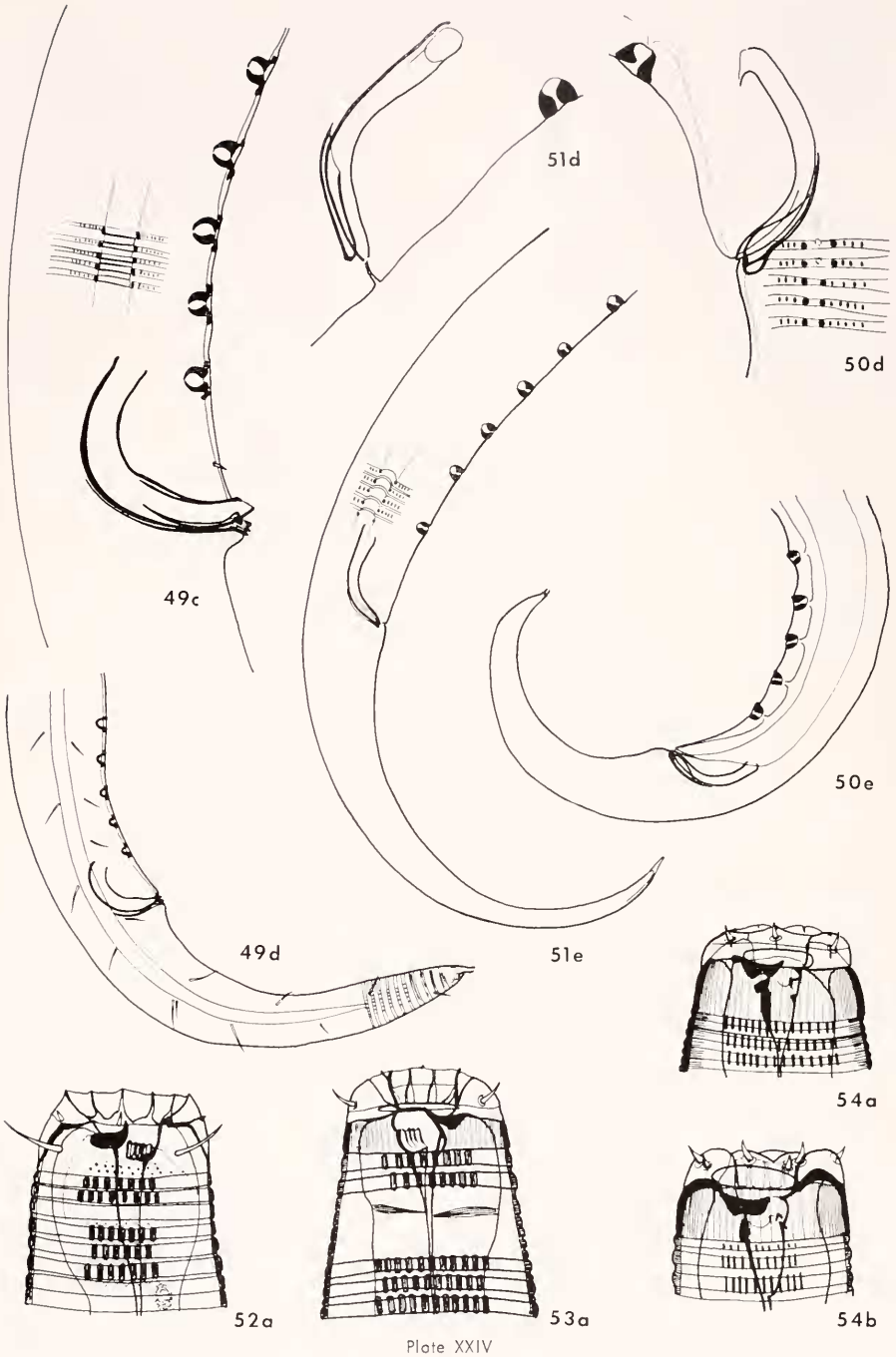

Plate XXIV

Chromadorella lilifarmis Fig. 49, c, d: c—anal region of male; d—posterior end of male. *Chramadorella trilex* Fig. 50, d, e: d—spicular apparatus; e—posterior end of male. *Chromadorella vanmeterae* Fig. 51, d, e: d—spicular apparatus; e—posterior end of male. *Euchramadora gaulica* Fig. 52, a—anterior end of male. *Euchromadora pectinata* Fig. 53, a—anterior end of male. *Euchromadora meadi* Fig. 54, a, b: a—anterior end of male; b—anterior end of juvenile.

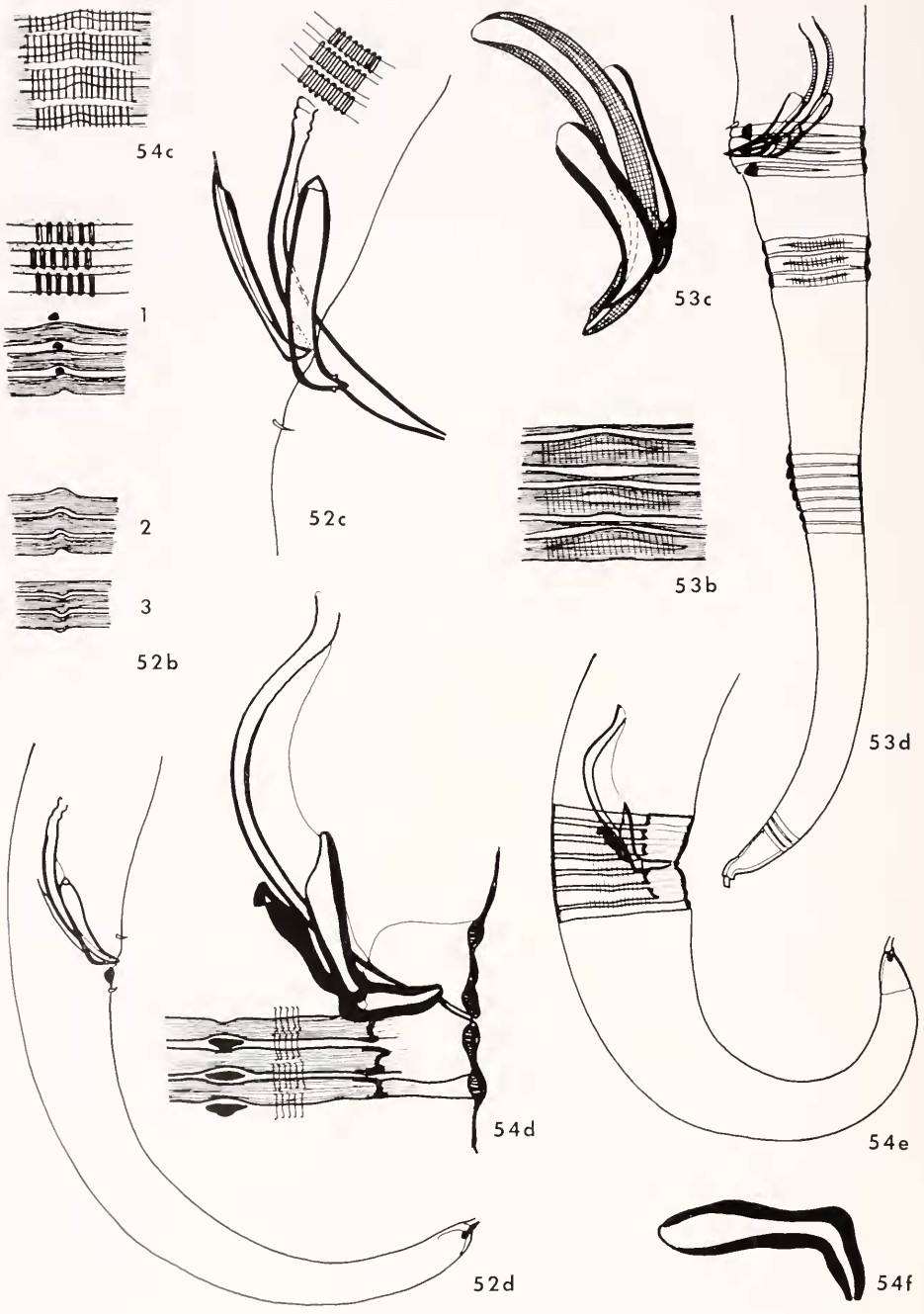

Plate XXV

Euchromadora gaulica Fig. 52, b–d: b—cuticular differentiation, 1: end of esophagus, high focus (above) and low focus, 2: mid-body, low focus, 3: anal region, low focus; c—spicular apparatus; d—posterior end of male. *Euchromadora pectinata* Fig. 53, b–d: b—cuticular differentiation, mid-body; c—spicular apparatus; d—posterior end of male. *Euchromadora meadi* Fig. 54, c–f: c—cuticular differentiation, end of esophagus; d—anal region of male; e—posterior end of male; f—gubernaculum of another male.

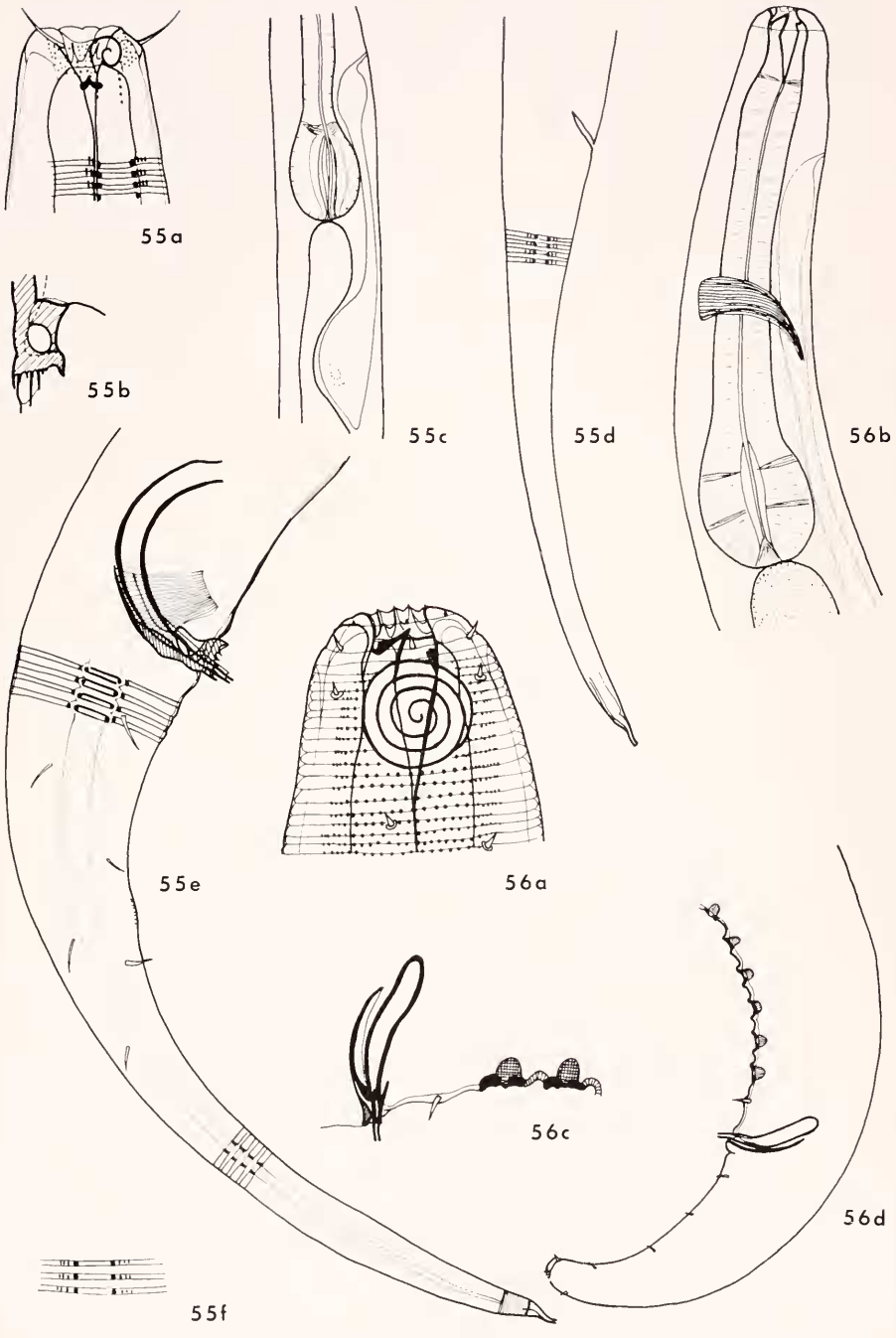

Plate XXVI

Atrochromadora denticulata Fig. 55, a–f: a—anterior end of male; b—distal end of spicular apparatus; c—region of esophageal bulb; d—tail of female; e—posterior end of male; f—cuticular differentiation, end of esophagus. *Neotonchus lutosus* Fig. 56, a–d: a—anterior end of male; b—anterior region of male; c—spicular apparatus; d—posterior end of male.

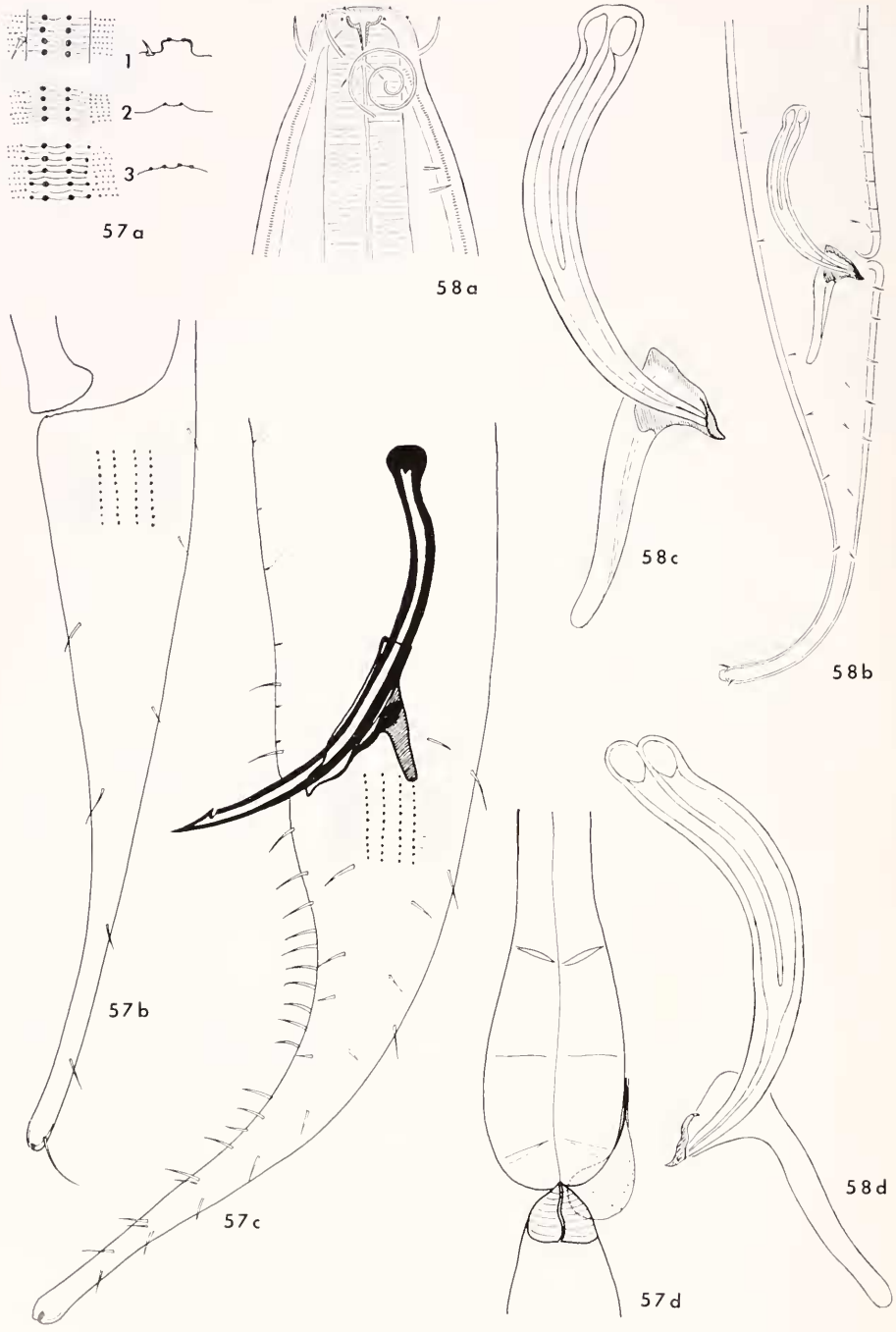

Plate XXVII

Mesanchium pellucidum Fig. 57, a–d: a—lateral differentiation of cuticle in lateral view and in cross section, 1: mid-body, 2: anal region of male, 3: anal region of female; b—tail of female; c—posterior end of male; d—esophageal bulb. *Sabatieria paradoxa* Fig. 58, a–d: a—anterior end of male; b—posterior end of male; c, d—spicular apparatus of two different males.

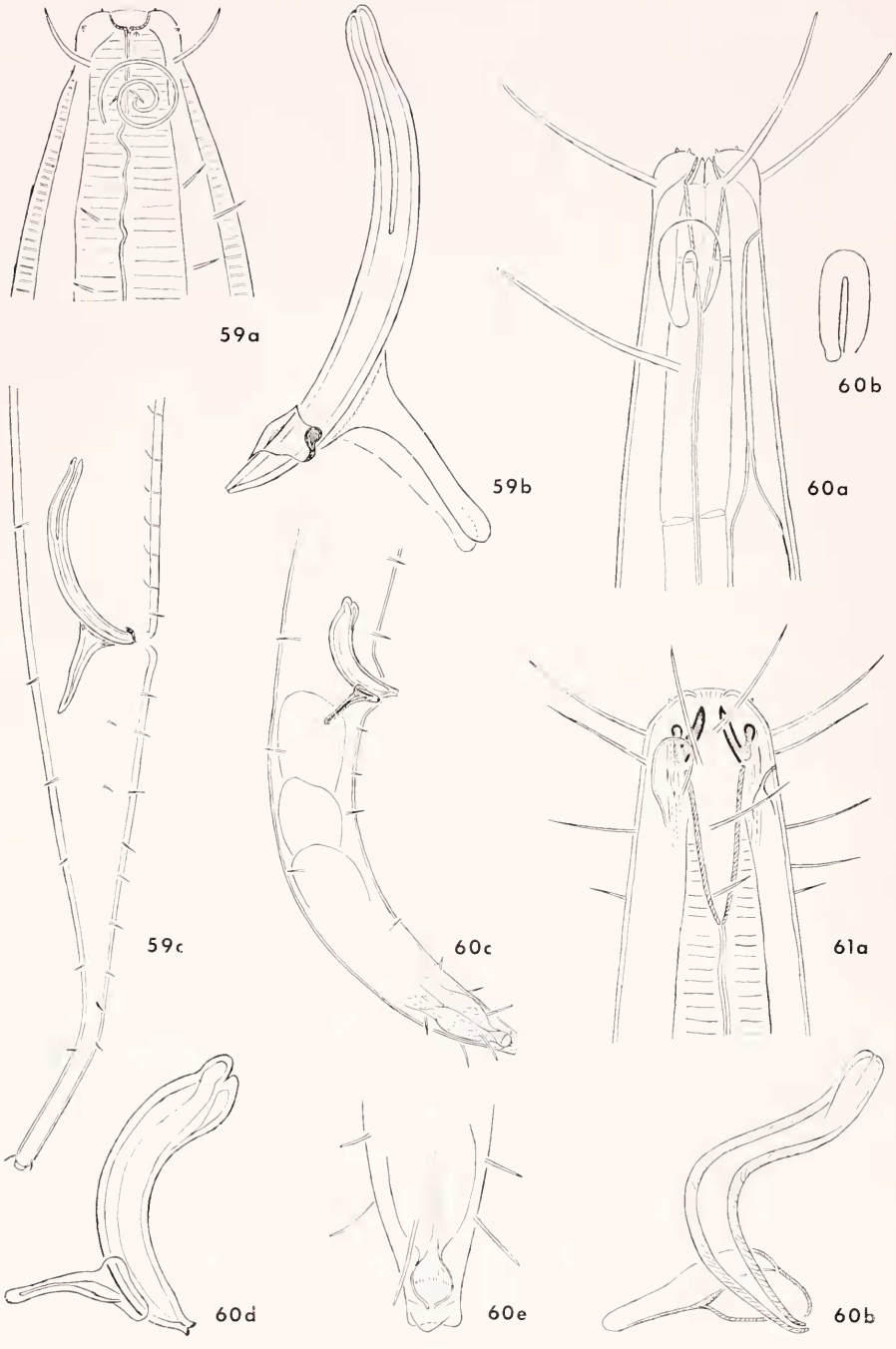

Plate XXVIII

Sabatieria paracupida Fig. 59, a–c: a—anterior end of male; b—spiculor apparatus; c—posterior end of male. *Axonolaimus hexapilus* Fig. 60, a–e: a—anterior end of male; b—amphid of female; c—posterior end of male; d—spiculor apparatus; e—tail terminus. *Odontophora variabilis* Fig. 61, a, b: a—anterior end of male; b—spiculor apparatus (lower right, mislabeled 60b).

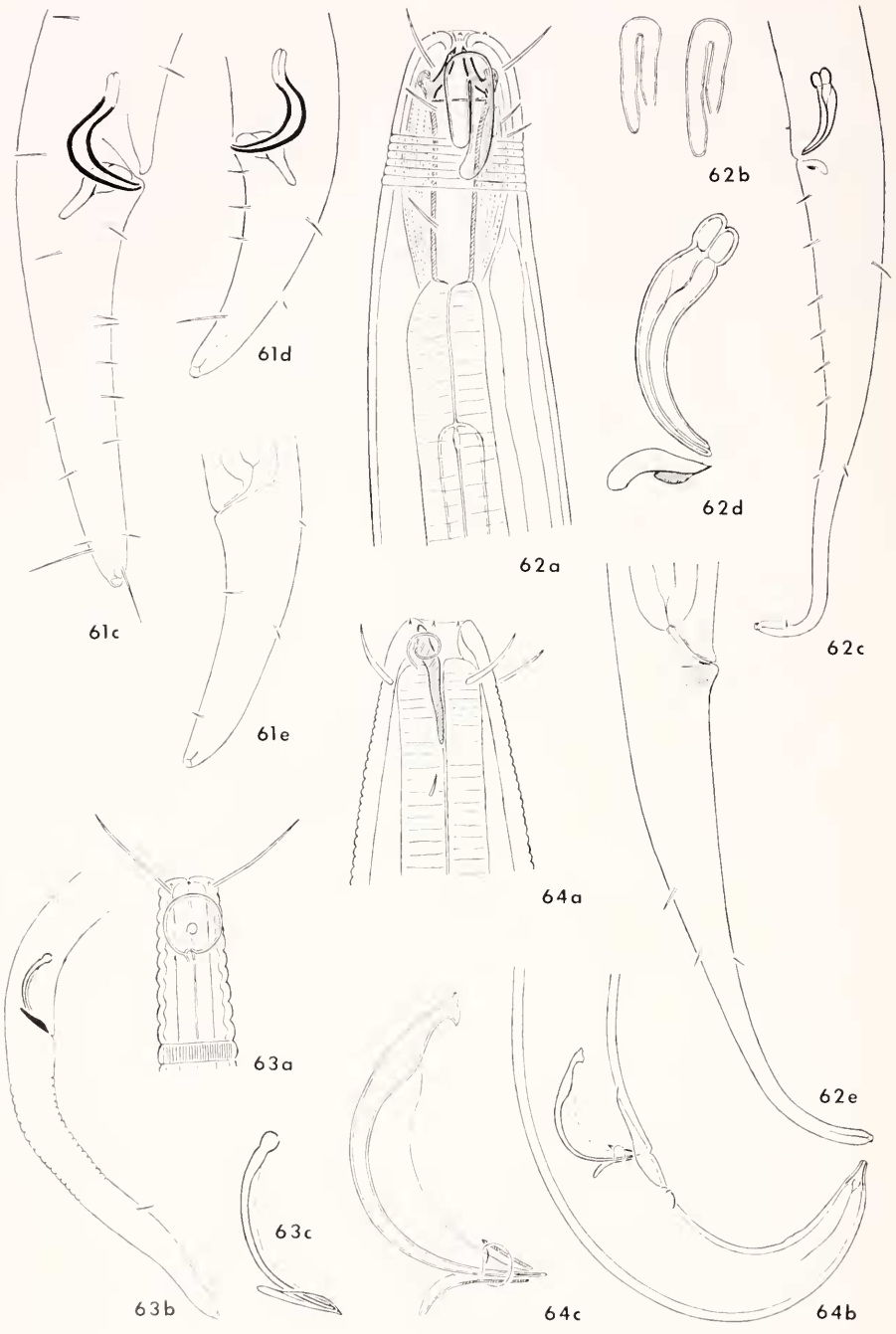

Plate XXIX

Odontophora variabilis Fig. 61, c–e: c, d—posterior ends of two males; e—posterior end of female. *Paradontophora brevamphida* Fig. 62, a–e: a—anterior end of male; b—amphids of two other specimens; c—posterior end of male; d—spicular apparatus; e—posterior end of female. *Alaimella cincta* Fig. 63, a–c: a—anterior end of male; b—posterior end of male; c—spicular apparatus. *Camacolaimus prytherchi* Fig. 64, a–c: a—anterior end of male; b—posterior end of male; c—spicular apparatus.

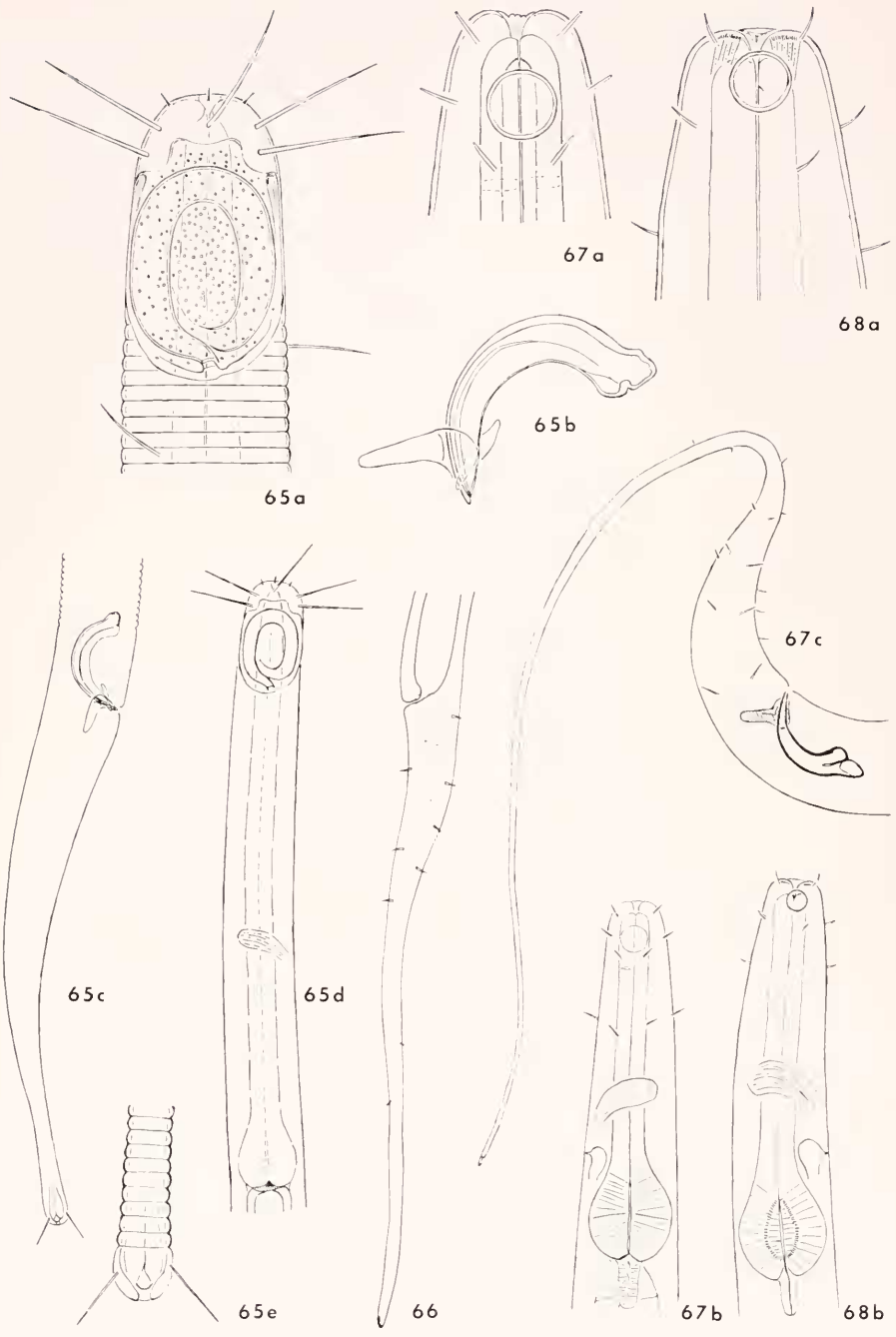

Plate XXX

Paratarvaia seta Fig. 65, a–e: a—anterior end of male; b—spicular apparatus; c—posterior end of male; d—anteriar regian af male; e—tail terminus. *Didelta maculatum* Fig. 66—posteriar end af juvenile. *Terschellingia longicaudata* (Biscayne Bay-Florida Bay) Fig. 67, a–c: a—anterior end af male; b—anterior regian of male; c—posterior end of male; (Vera Beach) Fig. 68, a, b: a—anteriar end af male; b—anteriar regian af male.

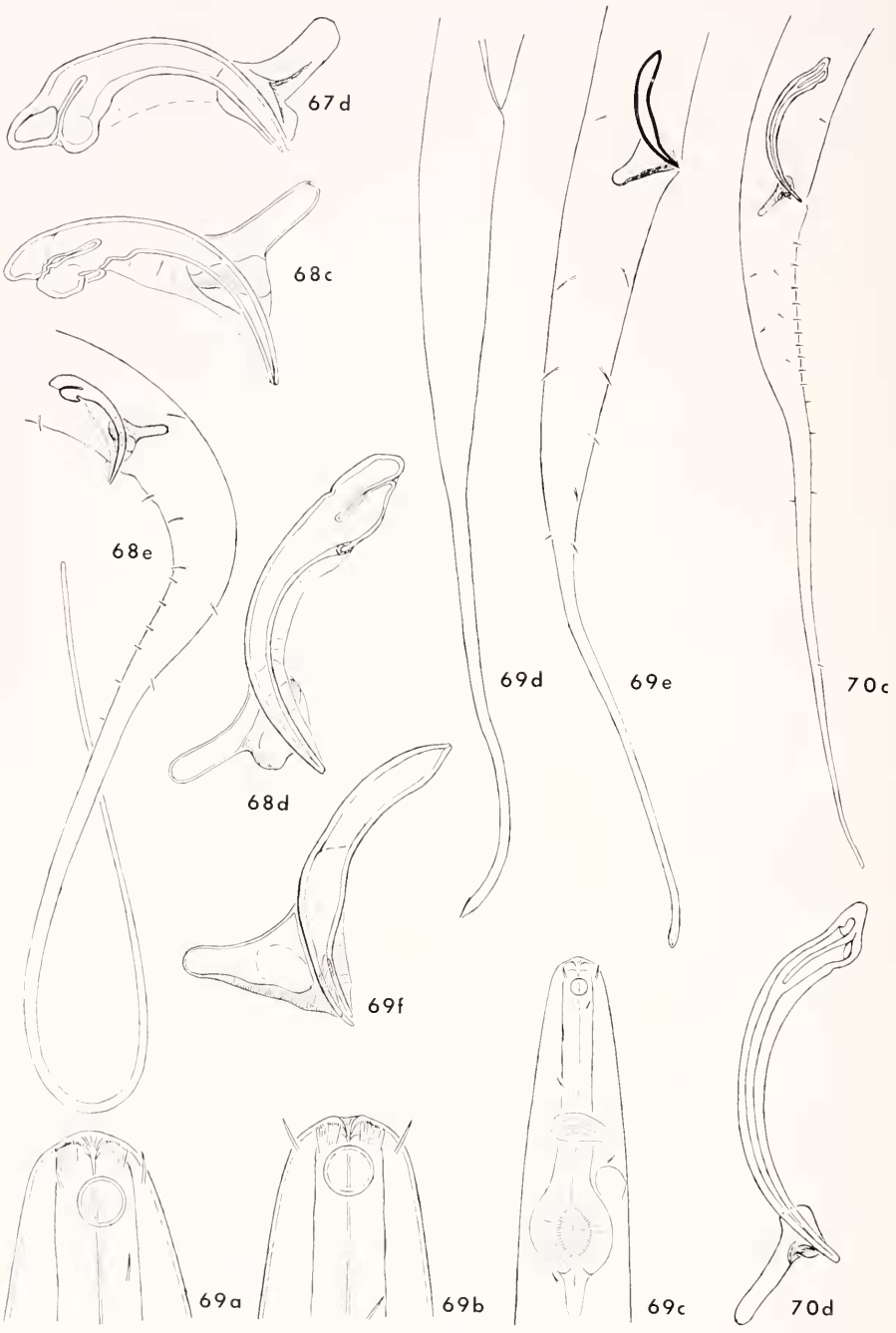

Plate XXXI

Terschellingia longicaudata (Biscayne Bay-Florida Bay) Fig. 67, d—spicular apparatus; (Vera Beach) Fig. 68, c–e: c, d—spicular apparatus of two males; e—posterior end of male. *Terschellingia monohystera* Fig. 69, a–f: a—anterior end of female; b—anterior end of male; c—anterior region of female; d—female tail; e—posterior end of male; f—spicular apparatus. *Terschellingia longispiculata* Fig. 70, c, d: posterior end of male; d—spicular apparatus.

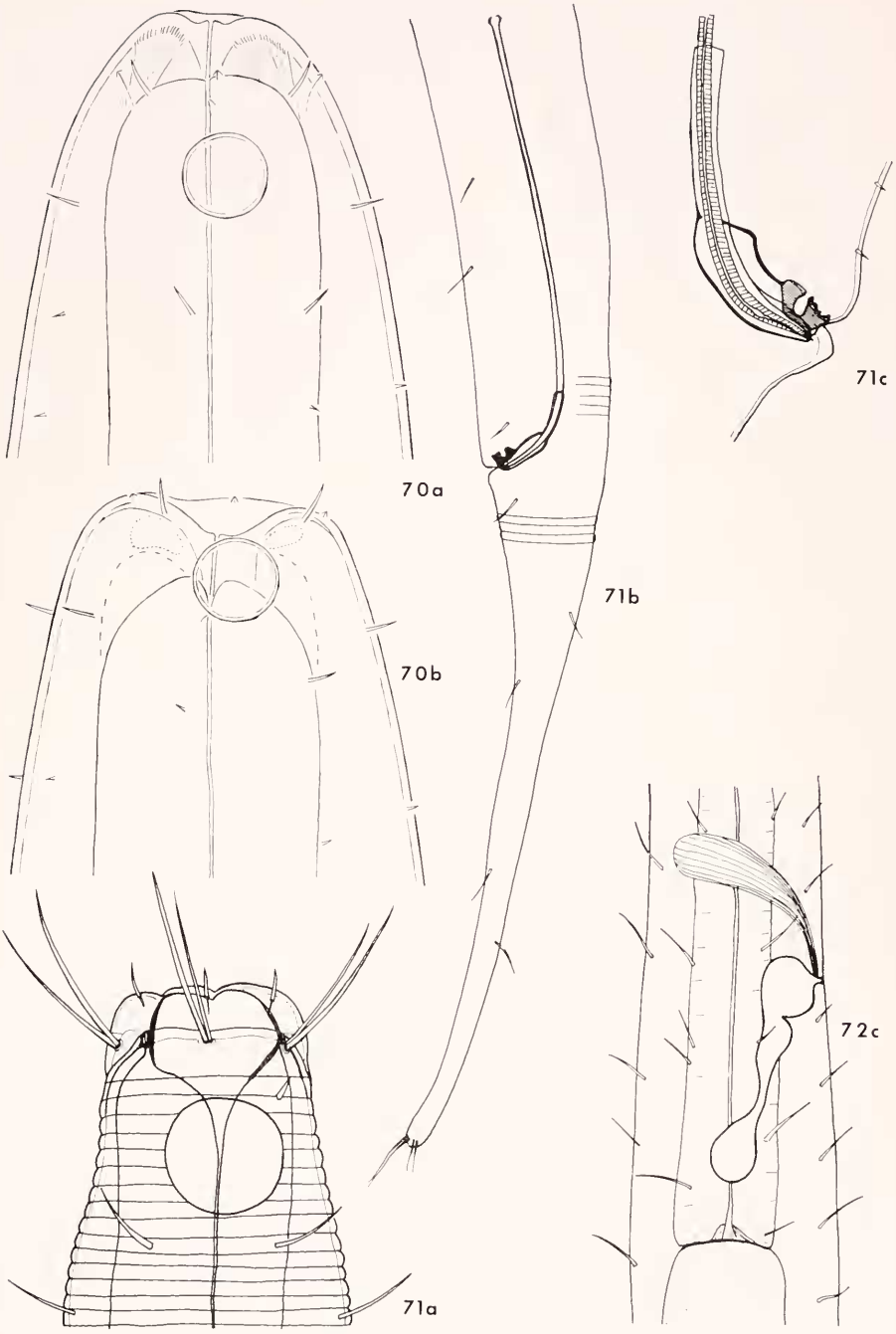

Plate XXXII

Terschellingia langispiculata Fig. 70, a, b: a—anterior end of female; b—anterior end of male. *Paramonhystera canicula* Fig. 71, a–c: a—anterior end of male; b—posterior end of male; c—distal portion of spicular apparatus. *Steineria ampullacea* Fig. 72, c—posterior esophageal region.

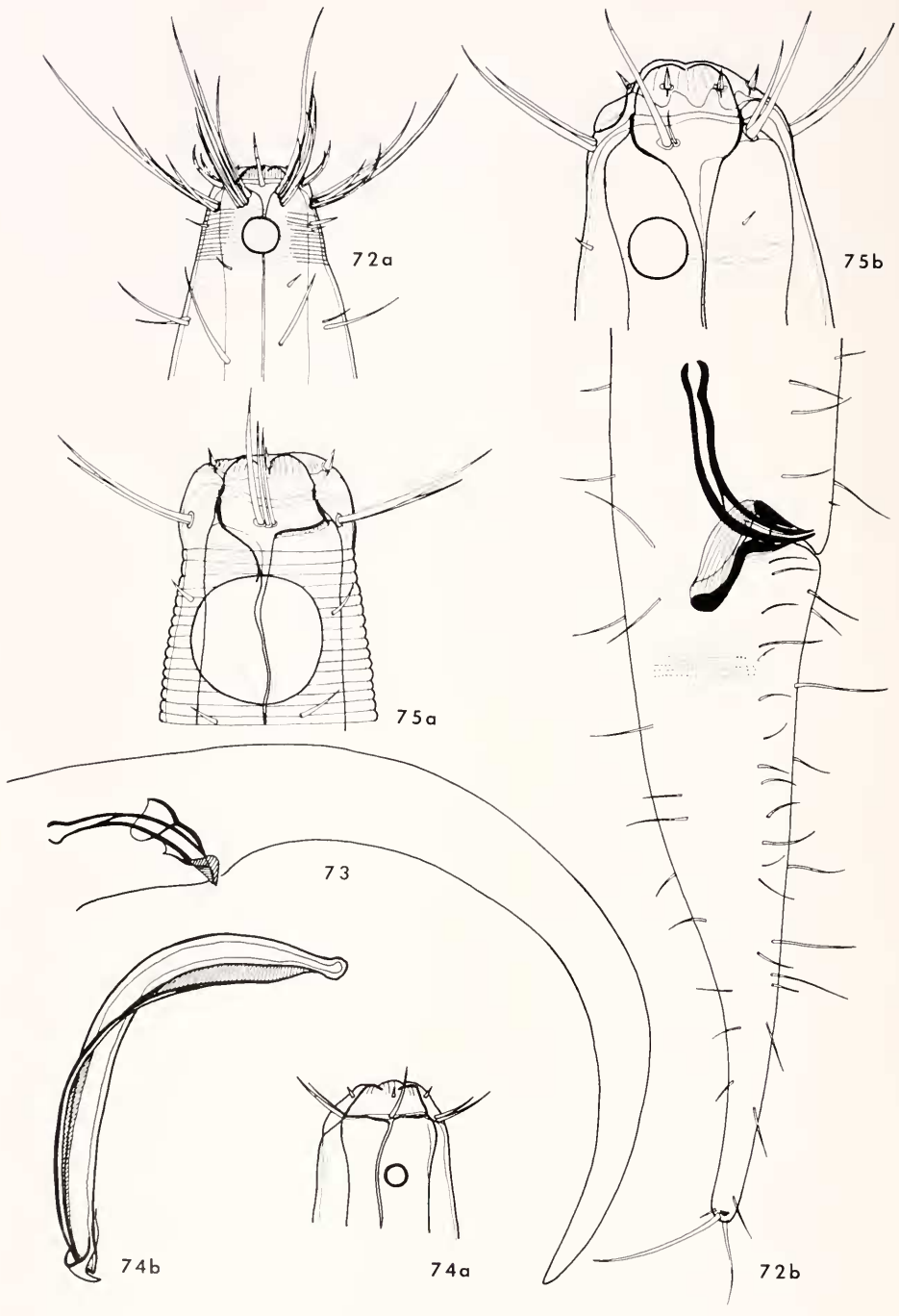

Plate XXXIII

Steineria ampullacea Fig. 72, a, b: a—anterior end of male; b—posterior end of male. *Theristus metaflevensis* Fig. 73—posterior end of male. *Theristus calx* Fig. 74, a, b: a—anterior end of male; b—spicular apparatus. *Theristus ostentator* Fig. 75, a, b: a—anterior end of male; b—anterior end of female.

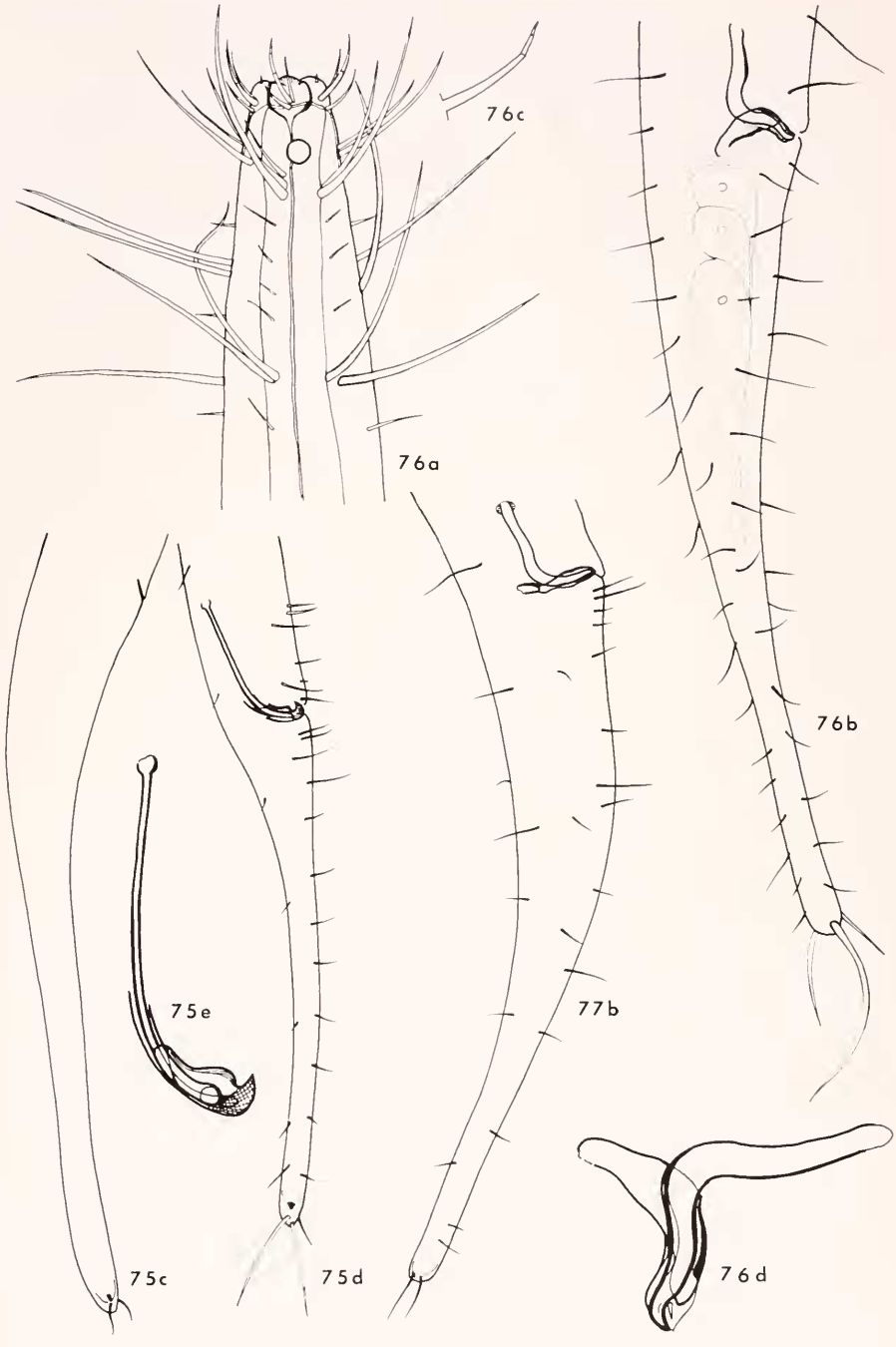

Plate XXXIV

Theristus astentatar Fig. 75, c–e: c—tail of female; d—posterior end af male; e—spicular apparatus. *Theristus floridanus* Fig. 76, a–d: a—anterior end of male; b—posterior end of male; c—cephalic seta; d—spicular apparatus. *Theristus erectus* Fig. 77, b—posterior end of male.

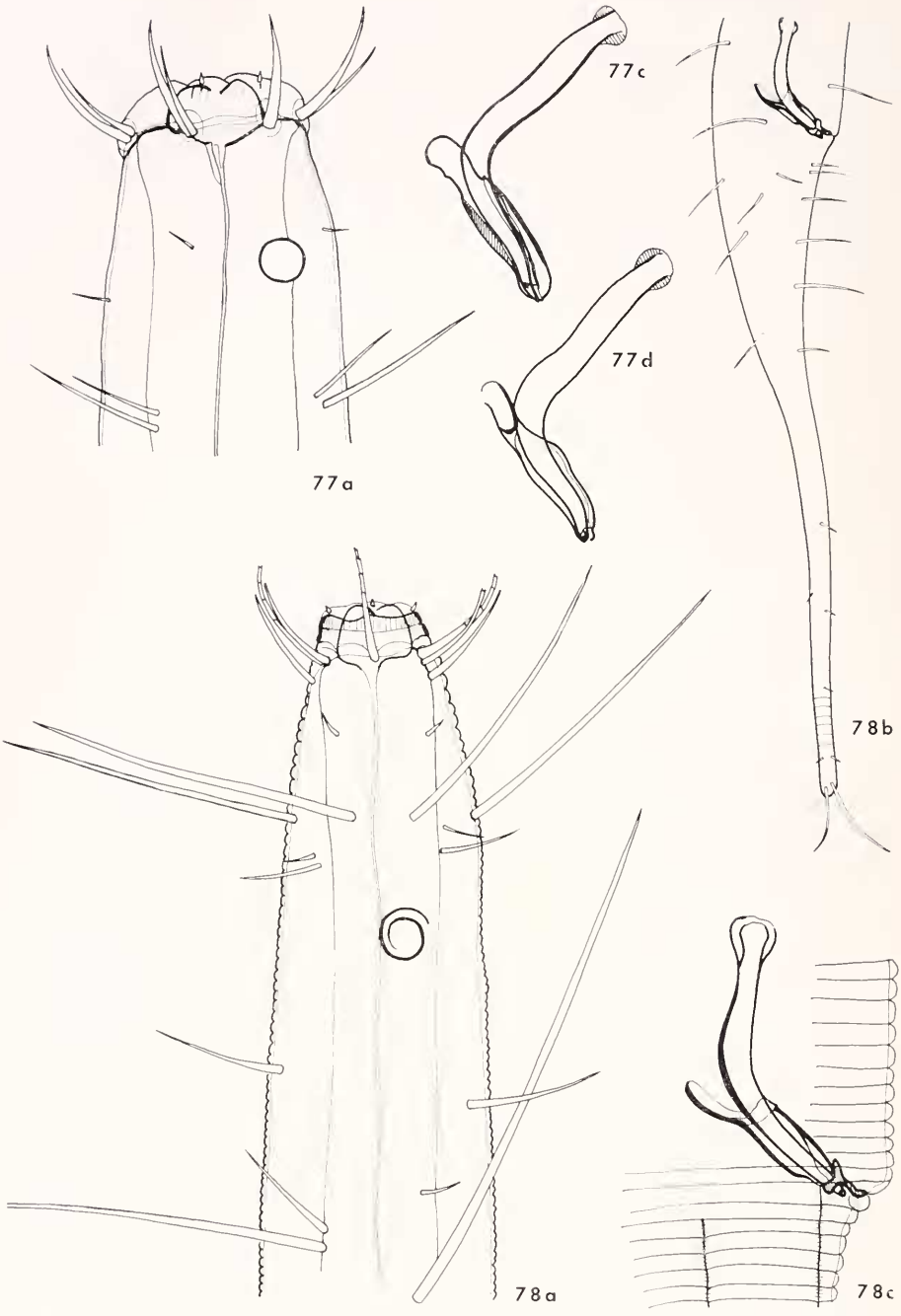

Plate XXXV

Theristus erectus Fig. 77, a, c, d: a—anteriar end af male; c, d—spicular apparatus af twa specimens. *Theristus galeatus* Fig. 78, a–c: a—anteriar end af male; b—pasteriar end af male; c—anal regian af male.

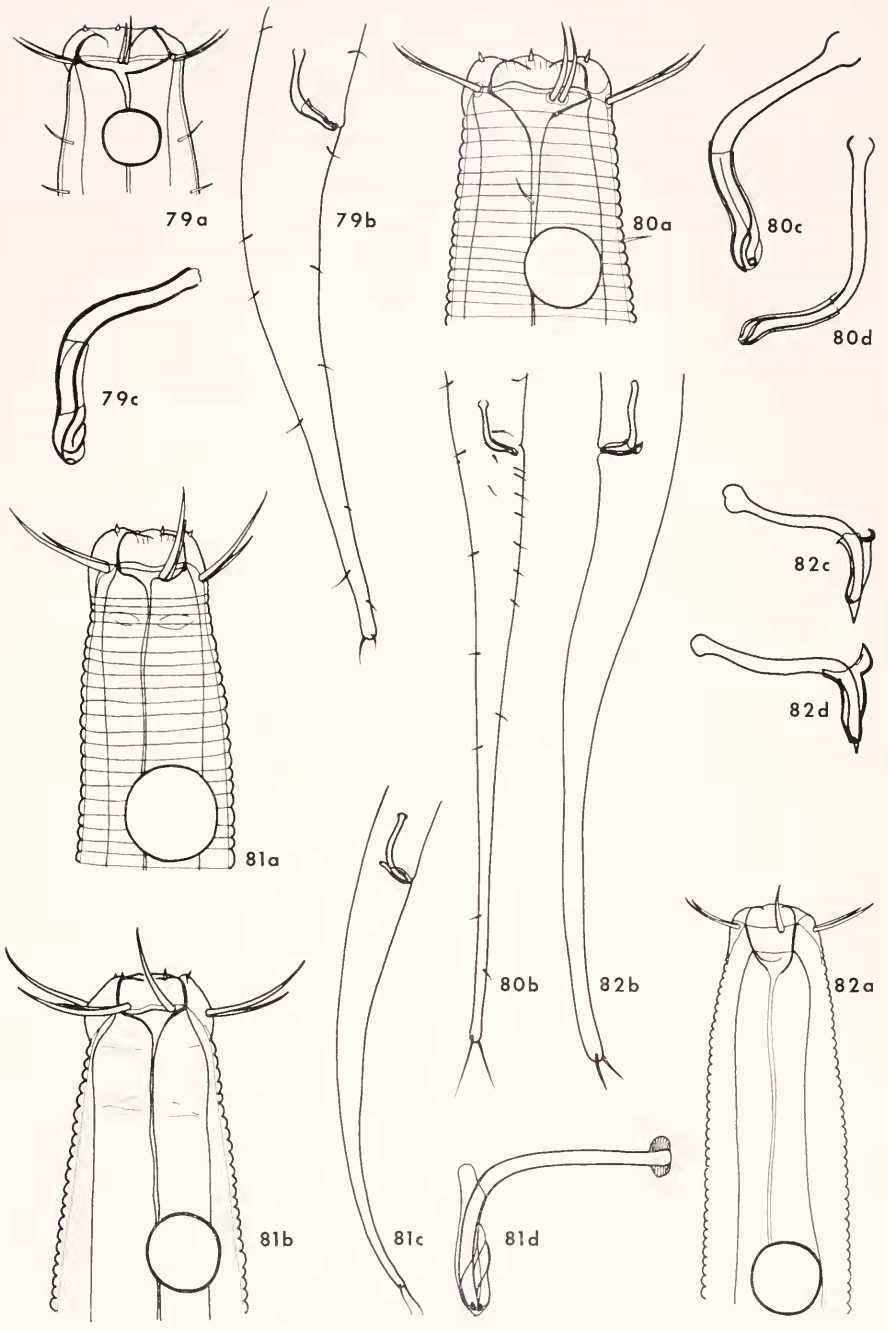

Plate XXXVI

Theristus oxyuraides Fig. 79, a–c: a—anterior end of male; b—posterior end of male; c—spicular apparatus. *Theristus fistulatus* Fig. 80, a–d: a—anterior end of male; b—posterior end of male; c, d—spicular apparatus of two specimens. *Theristus tortus* Fig. 81, a–d: a—anterior end of male; b—anterior end of female; c—posterior end of male; d—spicular apparatus. *Theristus xyaliformis* Fig. 82, a–d: a—anterior end of male; b—posterior end of male; c, d—spicular apparatus of two specimens.

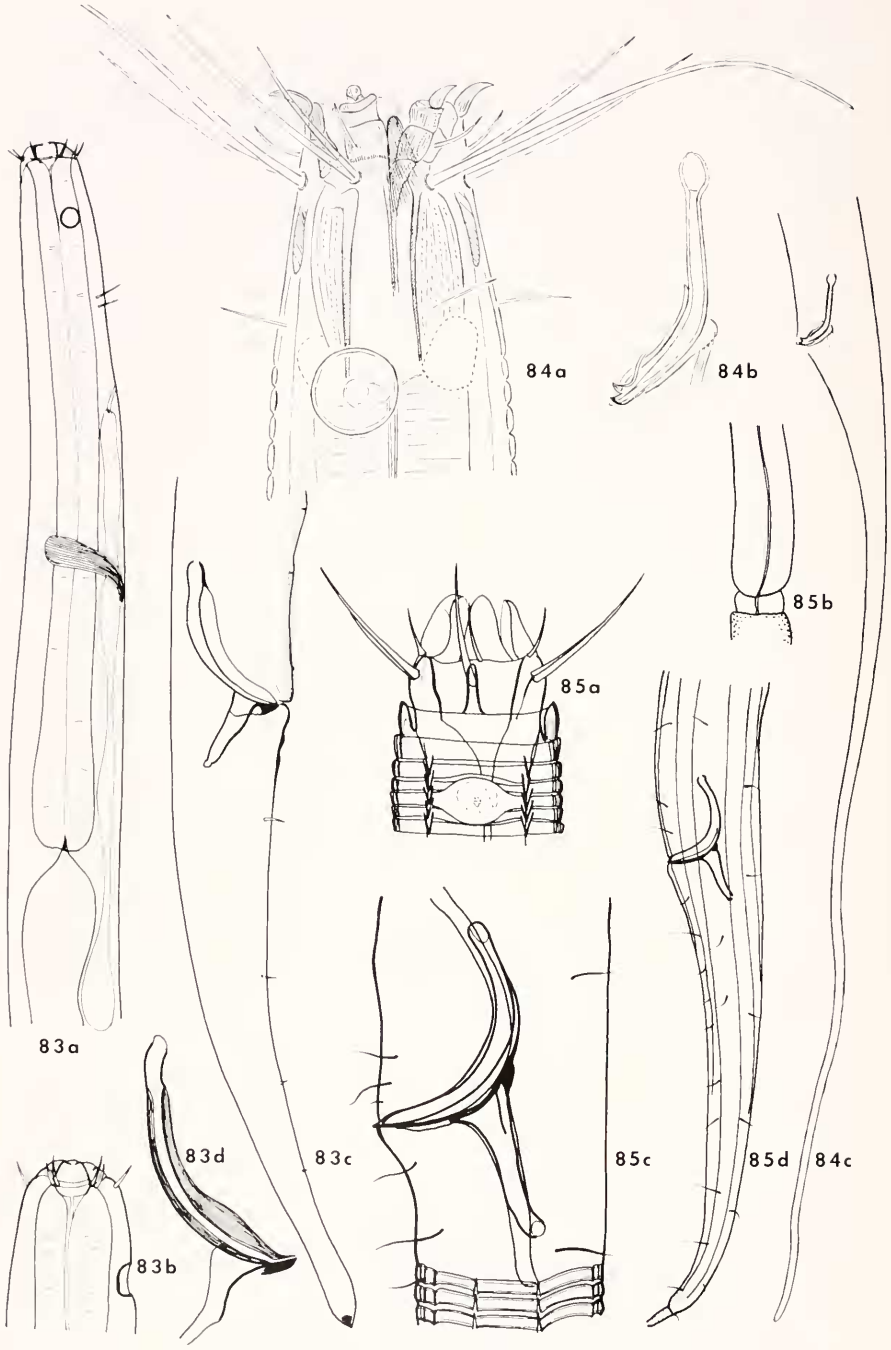

Plate XXXVII

Monhystera parva Fig. 83, a–d: a—esophageal region of male; b—anterior end of male; c—posterior end of male; d—spicular apparatus. *Scaptrella cincta* Fig. 84, a–c: a—anterior end of male; b—spicular apparatus; c—posterior end of male. *Xenalaimus striatus* Fig. 85, a–d: a—anterior end of male; b—posterior esophageal region; c—anal region of male; d—posterior end of male.