

TAXONOMY OF MARINE NEMATODES OCCURRING  
ALONG PACIFIC NORTHWEST COASTS

by

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# TAXONOMY OF MARINE NEMATODES OCCURRING ALONG PACIFIC NORTHWEST COASTS

## INTRODUCTION

Little information has been published regarding North American marine nematodes. This deficiency stands in distinct contrast to the extensive publications of a limited number of investigators who have contributed substantially to the knowledge of nematodes from foreign shores. The extensive coastal waters of Oregon had never undergone research of the marine nematode fauna until the current study was undertaken, although limited, but valuable, studies have been conducted on the adjoining Washington and California coasts.

The first appreciable efforts in marine nematology were conducted in Europe during the mid-eighteenth century. Prominent among workers of this period were C. J. Eberth, H. C. Bastian, and O. Butschli, who published major contributions in the years 1863 (23), 1865 (3), and 1874 (6) respectively. N. A. Cobb and J. G. de Man were contemporary nematologists who published prior to and well into the twentieth century. In the course of their lifetimes they published on the marine nematodes from such diverse areas as Australia (12, 13, 39), Arabia (11), and Arctic and Antarctic (14, 15, 18, 38), as well as European and, in the case of N. A. Cobb, North American waters.

Marine nematodes of Danish waters, and forms from expeditions to such diverse areas as New Zealand, Greenland, Auckland and Campbell Islands were described in publications by H. Ditlevsen between the years 1911 and 1934. During this same period (1912-1940)

I. N. Filipjev offered a number of valuable contributions, primarily based on studies from Russian waters. Noteworthy among these is a paper concerned with the nematode fauna in the vicinity of Sebastopol (24). The taxonomic portions of the latter have been translated from Russian to German by H. A. Kreis (33).

H. A. Kreis and W. Schneider started publishing on marine nematodes in 1924, and continued to do so until 1937 and 1943 respectively. Kreis's outstanding contribution lies in his monographical study of the Oncholaiminae (34), which is still the major single source of information on this group. Freilebende und pflanzenparasitische Nematoden, published by W. Schneider (42) as part 36 of Die Tierwelt Deutschlands series is a valuable aide to systematic marine studies. J. Schuurmans Stekhoven, Jr., who published during this same general period, was a notable Dutch worker.

Current European nematologists of note should include C. A. Allgen, S. Gerlach, and W. Wieser. Allgen has published well over one hundred taxonomic papers, most of which are of limited value because of inadequate descriptions and illustrations. Contrasted to this, Gerlach and Wieser have made valuable contributions to the field. The most comprehensive coverage of world literature on marine nematology is found in Wieser's four part monograph series (46, 47, 48, 49) on the marine nematodes of Chile. This series, combined with Wieser's publication of the nematode fauna of Puget Sound beaches (50), the only record of marine nematodes from the Pacific Northwest of the United States, have constituted the major publication aides in conducting this study of the Oregon fauna.



Other workers on marine nematodes in the United States include G. Steiner, B. G. Chitwood, and R. W. Timm. Steiner and Timm published on forms from East Coast waters. Chitwood summarized the limited work done in the United States in his North American Marine Nematodes (8) a work devoted primarily to descriptions of new forms from Texas. More recently he published on the marine nematode families Ironidae, Oncholaimidae, and Enchelidiidae of Northern California (9).

It is the purpose of this study to initiate a survey of the marine nematodes of Oregon. An integral part of the study is the establishment of a permanent collection of specimens, a procedure which has been grossly neglected in most past studies by other investigators. There has been no attempt in this paper to present exhaustive information on collections from any one station, nor to evaluate ecological relationships to any extent. It is hoped that this preliminary taxonomic study will facilitate more comprehensive taxonomic and ecological investigations of the extensive intertidal and off-shore forms which populate the Oregon coast and adjacent coasts of the Pacific Northwest.

## MATERIALS AND METHODS

### Collections Sites

Collections were made from 24 sites along the intertidal areas of the Oregon coast and from five locations in Puget Sound (Figure 1). The latter were the same stations collected by W. Wieser in 1959 (50, p. 3-6). One deep-sea station, a bottom-sample collected on the 1960 Clooney Cruise of the Department of Oceanography, Oregon State University, is represented in the collection (Figure 1).

### Collection Techniques Employed

Marine nematodes are not commonly found as pelagic organisms, but rather are associated with some form of solid or semi-solid substrate. No single method of collection works equally well for all substrates. Nematodes generally are affixed by means of a spinneret, or by coiling around or burrowing through suitable portions of the substrate, and require detachment. For most of the collections represented here detachment was accomplished by mechanical agitation, by scraping the substrate, or by allowing the nematodes to migrate from the substrate into clear water. Other than in the latter case, where the Baermann funnel technique was employed (27, p. 181-182), the nematodes, following separation, were still mixed with various particulate fractions of the substrate. Further separation was accomplished by various combinations of sedimentation, screening and/or migration in the Baermann funnel.

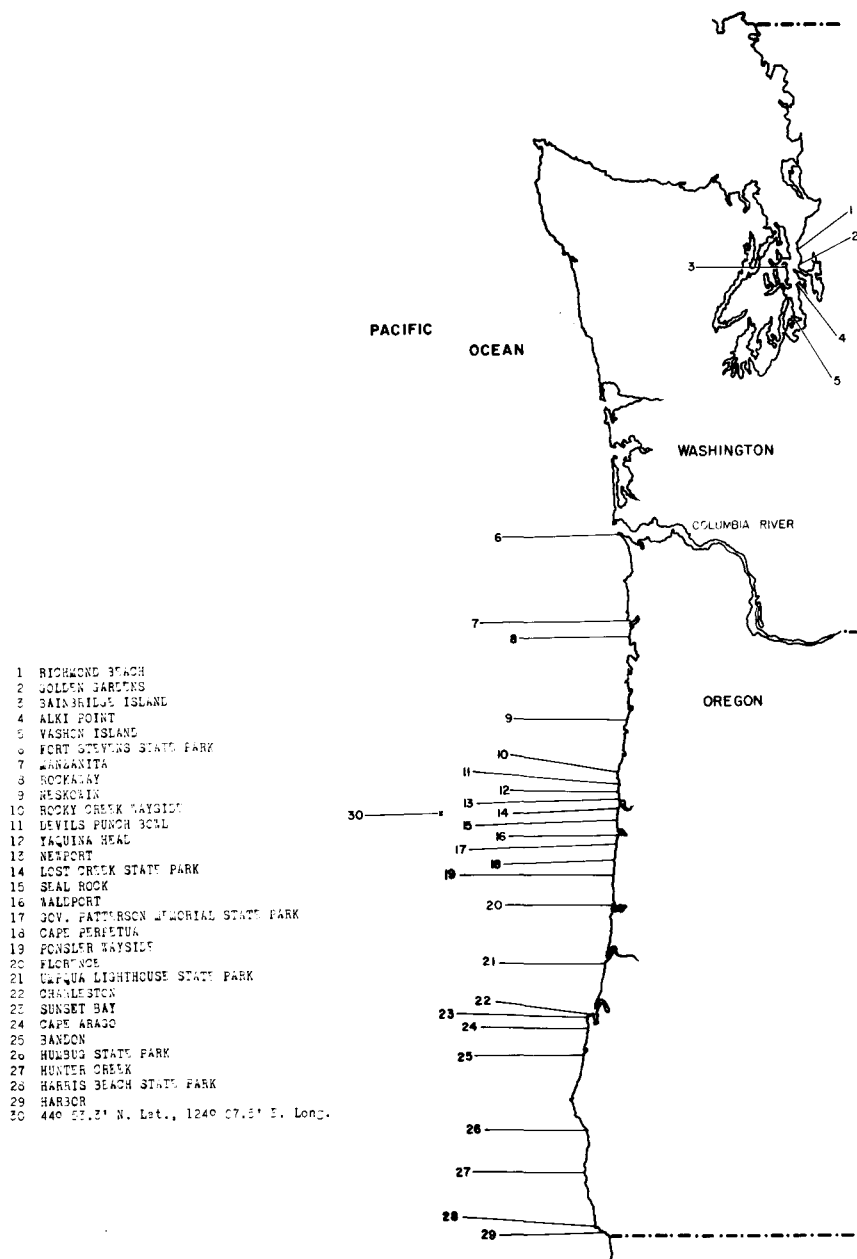


Figure 1. Collection sites represented in Oregon State University Pacific Northwest marine nematode collection.

One of the easiest substrates to collect from proved to be sand subject to considerable wave action. Sandy samples containing nematodes were placed in a large pan containing a volume of water approximately two or three times that of the sample. The sand was then agitated vigorously and allowed to settle briefly so as to deposit the heavier mineral particles, but not long enough to permit settling out of suspended nematodes. The supernatant was poured off into another vessel, and in situations where this material was sufficiently clear the nematodes were concentrated by allowing them to settle to the bottom for a period of ten to fifteen minutes after which the nematode-free supernatant could be decanted. If the wash-water was burdened with excessive debris or colloidal matter the suspension was passed through a series of screens (25, 100, and 200 mesh). The nematodes trapped on the various screens were washed into bottles for retention until further processing. Large particles of floating organic matter (wood chips, algal fragments, etc.) were removed by coarse screening (25 mesh).

Some collections from algae or algal holdfasts could be handled in the manner prescribed above for sand. In other situations, e.g. collecting from the bladder of Nereocystis sp. the nematodes were found migrating through a thin layer of filamentous algae epiphytic to the bladder, and could best be removed and concentrated by scraping the surface of the alga.

Substrates of high clay or organic matter content such as mucks, are the most difficult to process. Generally they could be screened

with a 100 mesh screen; however, the 200 mesh screen rapidly clogged and was therefore of no value. The nematodes were concentrated to whatever degree possible by screening and then the remaining material was processed in Baermann funnels.

When possible, specimens were concentrated at the time of collection or shortly thereafter. Funneling and storage of unfixed specimens generally was conducted at temperatures of 5° to 10° C. In the process of screening fresh material, the nematodes which wrap themselves tightly about the wires of the screen may be lost to the collector. The procedure of relaxing and fixing the sample prior to concentrating the nematodes (unless funneling is to be used) often makes more nematodes available initially, and avoids vital activities of the nematodes which engage them to the screens.

Once concentrated, nematode suspensions were placed in shallow dishes and observed with a dissecting microscope. Desired specimens were removed by means of a bamboo splinter or fine hair and placed in small vessels of seawater.

#### Experimental Collection Techniques

Attempts were made to improve on the foregoing collection techniques by the following methods:

1. Flocculation of colloidal and suspended material in unclear preparations by addition of "Separan" (Dow Chemical Co.). Nematodes became trapped in the floc rendering recovery difficult.

2. Differential sedimentation utilizing a three-quarter inch glass column eight feet in length. The column was closed at the base with a clamp on a rubber tube, then filled with sea water. A mud or sand sample was added through a funnel at the top of the tube. The separation of the different density fractions, including nematodes, could be readily observed by projecting a beam of light through the tube at right-angles to the line of vision. When the desired degree of separation was reached in the column the various fractions were drawn off into separate containers from the base.

A distinct disadvantage lay in the presence of currents developing in the tube in response to the downward passage of sediment. The resultant mixing limited the degree of separation which could be achieved. In addition the technique provided no means of detaching the nematodes from mineral or organic matter fractions.

3. Differential flotation accomplished by bubbling air through a column of water contained in a four-foot, three-quarter inch glass tube. The flow of bubbles to the surface established separation of a sample according to density. The vigorous action of the air passing through water was effective in mechanical separation of nematodes from substrate. Samples were subjected to the action of the separator for periods of 20 to 30 minutes. Positions of the various fractions could be adjusted by creating variations in pressure of the air flow. Fractions were removed by running additional water into the system through a tube at the base and collecting the overflow from the tube. The fraction containing a maximum of nematodes was determined by

experience with the particular substrate in use. The technique shows considerable promise, but needs refinement.

### Preservation and Mounting

Specimens were relaxed in a water-bath by bringing them to a temperature of approximately 48° C. for three to six minutes, depending upon the time required to stop all motion among the specimens. They were then fixed in 4% formalin in sea-water for not less than five hours and generally not in excess of 12 hours, after which they were transferred to 4% glycerine in 35% ethanol. To this latter mixture a small amount of formalin was added to prevent destruction of the collection by fungi. Collections were placed in a dust-free container to permit gradual evaporation under laboratory conditions of humidity for a period of one or two weeks. They were then transferred to a dessicator in which they remained for a period of not less than one week prior to mounting. Whole mounts were prepared in a manner described by W. D. Courtney (21, p. 72-74), using anhydrous glycerin as the mounting medium, and ringing the round coverslip (upper) with Thorne's "zut" (43, p. 98).

Face views were made of all species illustrated after the manner described by E. Buhrer (4, p. 3-6) with modifications, similar to those of R. C. Anderson (2, p. 171-172), elaborated in the following paragraph.

Heads were removed from the nematodes at a point one or one and one-half head-diameters posteriad with a single-edge razor blade while

working at a magnification of 40 diameters with a dissecting microscope. Then the head was placed in molten glycerin jelly on a no. 1 cover-slip which was inverted and placed on a glass slide bearing three glass-rod supports, equal in diameter to the length of the section. The head was brought into the desired position by manipulation of the cover-slip, which was held in final position by three or four drops of Thorne's zut applied around the perimeter.

### Collection Data

The slides and collection data are part of the permanent nematode collection maintained at Oregon State University. Collection data include as minimum information the collector's name, date and place of collection, type of substrate, and method of processing. Collections are numbered in chronological sequence.

### Descriptions

The formula utilized in the descriptions is that of de Man (44, p. 38) where:

L = total body length in millimeters.

a = total body length / maximum body diameter

b = total body length / length of esophagus

c = total body length / length of tail

V = percent length of body anterior to vulva / total body length.

Exponents of "V" are percentages of total body length which subtend



the ovary (...ies), the first exponent indicating the anterior ovary. Measurements were made with the aide of an ocular micrometer and camera lucida. The latter was also used for the initial drawings from which final, inked illustrations were prepared on scratch board.

## TAXONOMIC SECTION

The nematodes described in this section are presented as nearly as possible in taxonomic relationships generally recognized in the publications of both B. G. Chitwood and W. Wieser. Ordinal taxa are included, although not formally recognized (9, p. 347-349), because they are useful in clarifying general relationships according to the most current knowledge. A schematic representation of the relationships involved is presented in Figure 2.

Figure 2. Schematic representation of taxonomic relationships of genera presented in this study.

## Phylum Nemata

## Class Secernentea

## Order Rhabditoidea

## Family Rhabditidae

Genus Rhabditis Dujardin 1845

## Class Adenophorea

## Order Enoploidea

## Family Ironidae

Genus Dolicholaimus de Man 1888

## Family Laurat nematidae

Genus Lauratonema Gerlach 1953

## Family Leptosomatidae

Genus Anticoma Bastian 1865

## Family Phanodermatidae

Genus Phanoderma Bastian 1865

## Family Enoplidae

Genus Enoplus Dujardin 1845

Genus Mesacanthion Filipjev 1925

## Family Oncholaimidae

Genus Pseudanoncholaimus n. g.

Oncholaimium Cobb 1930

## Family Enchelidiidae

Genus Symplocostoma Bastian 1865

## Order Chromadoroidea

## Family Cyatholaimidae

Genus Pomponema Cobb 1917Folialaimus n. g.Paracanthonchus Micoletzky 1924

## Family Selachinematidae

Genus Synonchiella Cobb 1933

## Family Desmodoridae

Genus Desmodora de Man 1889Onyx Cobb 1891Spirina Filipjev 1918Monoposthia de Man 1889

## Family Chaetosomatidae

Genus Notochaetosoma Irwin-Smith 1918

## Family Chromadoridae

Genus Prochromadora Filipjev 1922Chromadorina Filipjev 1918Eudenticullela n. g.Spilophorella Filipjev 1918

## Order Axonolaimoidea

## Family Axonolaimidae

Genus Parascolaimus Wieser 1959

## Family Tripyloididae

Genus Bathylaimus Cobb 1893

## Order Monhysteroidea

## Family Monhysteridae

Genus Rhynconema Cobb 1920Gammarinema Kinne and Gerlach 1953Genus Rhabditis Dujardin 1845 (22, p. 239)

Rhabditidae. The representatives of this genus are cosmopolitan, and have been reported from terrestrial, fresh-water, and marine habitats as well as animal hosts. Females are generally larger than males. Cuticle smooth or annulated. Generally six lips bearing at least one papilla each. Stoma tubular with telorhabdions forming a distinctive glottoid apparatus. Esophagus composed of procorpus, metacarpus, isthmus, and terminal, valvulated bulb. Females usually

didelphic, but in some instances, e.g. R. monhystera Butschli 1873, R. monhysteroides Skwarra 1921 monodelphic (42, p. 185-186); oviparous, ovoviviparous, and viviparous. Males with bursa, supported by ribs.

Genotype: R. terricola Dujardin 1845.

Rhabditis marina Bastian 1865 (3, p. 129)

(Figure 3)

	L (mm)	a	b	c	V (%)	
Female:	1.95	19.4	8.0	18.0	36.0	?
					55.1	
	1.87	17.9	5.8	17.2	43.0	32.8
					52.6	
	1.78	20.8	7.9	15.9	36.4	30.3
					55.0	
	1.68	19.5	7.1	18.0	40.5	28.8
					52.3	
Male:	1.23	21.6	6.4	21.6		
	1.38	21.8	6.7	21.8		

Body diameter at posterior end of esophagus 60 microns. Cuticle annulated. Six prominent lips with one papilla each. Head diameter at base of stoma 22.8 microns. Stoma cylindrical with prominent telorhabdions' surrounded by esophageal tissue at base only. Esophagus with distinct procorpus swollen metacarpus, isthmus and bulb; cardia prominent; nerve-ring encircling isthmus just posterior to metacarpus. Hemizonid, ventral, associated with the nerve-ring. Excretory pore situated immediately posterior to hemizonid. Females

didelphic, ovaries reflexed. Male with prominently ribbed caudal bursa; broad, slightly-curved spicula which tapers distally; thin, crescent-shaped gubernaculum.

Female tail conoid, 3.7 anal diameters long. Male tail conoid, ventrally arcuate.

Plesiotypes: four females and two males collected on 19 October 1960 by D. E. Konicek; specimens on slide OSC OM 82, Oregon State University collection.

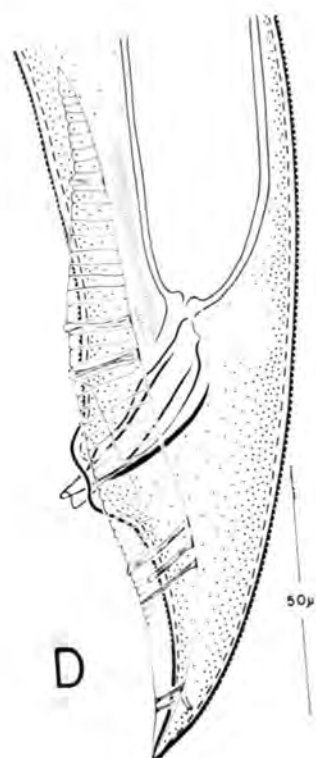
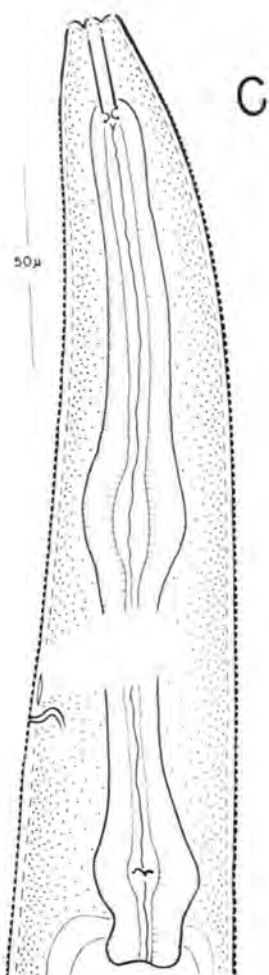
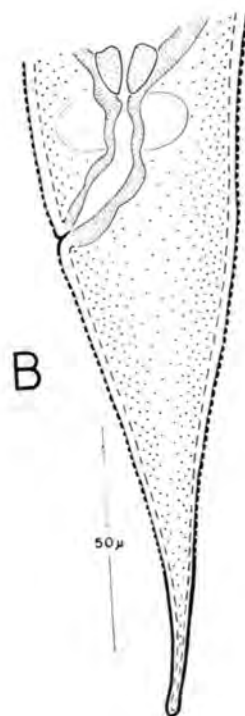
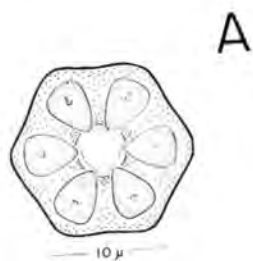
Locality: Harris Beach State Park, Oregon; from inter-tidal algae.

Genus Dolicholaimus de Man 1888 (35, p. 31)

Ironidae. Cuticle smooth, thick. Commonly a minimum of six labial papillae and ten cephalic papillae. Stoma deep, surrounded by prominent buccal musculature; three or four large teeth in anterior region of stoma. Spicula broad; gubernaculum simple and frail or large and conspicuous.

The genus now includes both didelphic and monodelphic females. The latter were separated by Cobb (17, p. 297) and placed in the genus Trissonchulus. This was synonymized with Dolicholaimus by Wieser (46, p. 350-351) due primarily to an omission in species descriptions of the number of ovaries in the female. As the described species become better known, the genus Trissonchulus is likely to be revived.

Figure 3. Rhabditis marina Bastian 1865. A, face view of male.  
B, female tail. C, anterior region of female, lateral view.  
D, male tail.



Wieser in 1953 (46, p. 96) placed Dolicholaimus in the Dorylaimidae, whereas in 1959 (50, p. 23) he placed it in the Ironidae. Chitwood also placed it in the Ironidae (9, p. 350). This positioning is followed here.

Genotype: D. marioni de Man 1888.

Dolicholaimus benepapillosus (Schulz 1935) (49, p. 23)

(Figure 4)

	L (mm)	a	b	c	V (%)
Female:	1.71	32.9	6.2	24.0	12.9 11.0 55.6
	1.95	41.8	5.3	24.6	14.7 11.8 52.3
	1.77	42.8	6.2	24.4	53.5
	1.68	43.7	5.7	22.4	52.7
Male:	2.06	46.1	6.7	27.0	
	2.07	39.3	6.7	30.0	
	2.03	42.1	6.5	25.0	
	1.84	37.8	6.0	23.0	

Body diameter at posterior end of esophagus 38 to 57 microns. Cuticle smooth, 2.4 to 4.7 microns thick, with ten stout, conical, cephalic setae; few small cervical setae; somatic setae not observed. Amphids cup-shaped, 11.7 to 16.5 microns in diameter. Three lips with two papillae each. An additional papilloid structure is located on the ventral lip between the paired papillae; two sub-lateral papillae adjacent to stomal opening. Head diameter 23.7



to 27.4 microns at level of cephalic setae; head set off from cervical region by distinct groove. Stoma cyathiform, several rows of denticles opposing subventral teeth and positioned adjacent to subdorsal teeth. One pair of subventral teeth; one pair of smaller opposing subdorsal teeth, both pair with posteriorly directed apophyses extending 38 microns in length. Peribuccal musculature enlarged; distinct from remainder of esophageal tissues. Posterior half of esophagus enlarged; nerve-ring not observed; cardia round, 12 microns in diameter. Excretory pore not observed. Intestine moderately granular. Females didelphic, ovaries reflexed; vulva slightly protruding. Male with preanal supplement flush with cuticle 350 microns anterior to anus; three ventral, caudal papillae; spicula broad, with median lacuna, 40 microns long; gubernaculum rectangular, with heavily sclerotized distal end.

Tails in both sexes terminating in a spinneret. Female tail conoid, two anal diameters long. Male tail conoid, with slight ventral curve, two anal diameters long.

Plesiotypes: four males and four females collected by H. J. Jensen and D. G. Murphy on 22 July 1958; specimens on slides OSC OM 11, Oregon State University collection.

Locality: Fort Stevens State Park, Oregon; from inter-tidal sand.

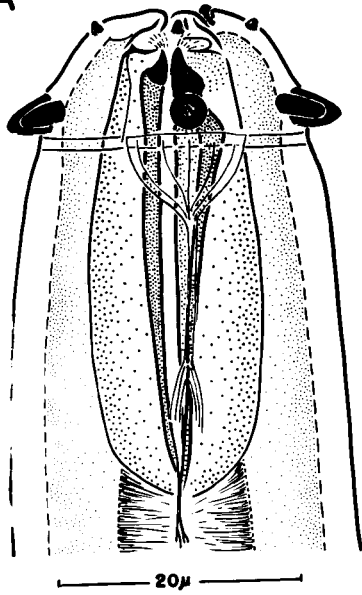
Genus Lauratonema Gerlach 1953 (29, p. 43)

Lauratonematidae. This genus, the only one described at present

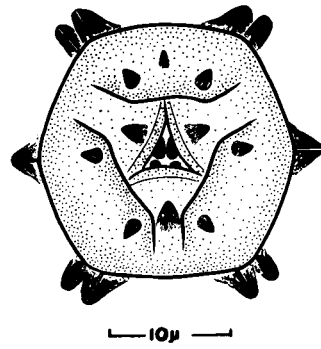
Figure 4. Dolicholaimus benepapillosus (Schulz 1935).

A, anterior region of male, lateral view. B, face view of male. C, male tail. D, female tail.

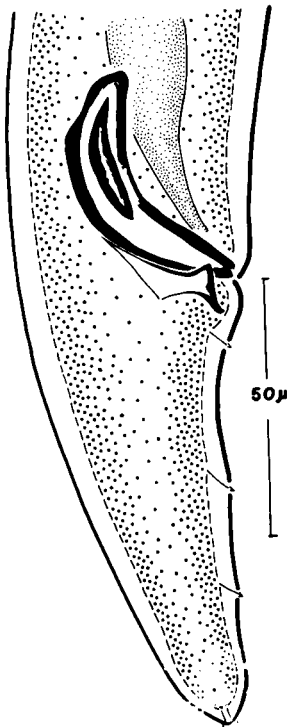
A



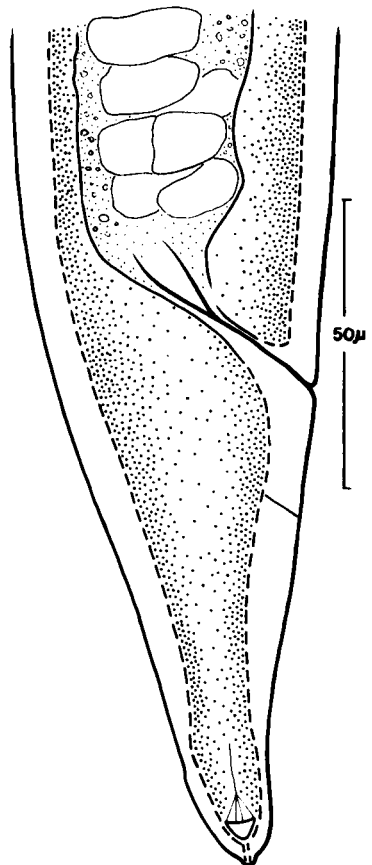
B



C



D



for the family, encompasses a very unique form of nematode in that a cloaca is present in females of most species described. Gerlach (30, p. 86) described L. originale in which females bear a vulva, thus disrupting the homogeneity of the genus. Taxonomic considerations of the species described to date require a knowledge of females because the above factors delineate a natural separation. This cannot be done with L. mentulatum and L. pugiunculus described by Wieser (50, p. 7-8) from Puget Sound, Washington, on the basis of males only. A better understanding of the subgeneric affinities will be obtained as more species are described with both sexes.

The cephalic arrangement of setae is characteristically a single circle of 10, the four submedian setae may be similar to the remaining six, considerably shorter and thinner, or intermediate. Labial papillae may or may not be in evidence. Stoma simple, unarmed. Cuticular striations fine. Amphids weakly sclerotized or obscure; tending to shepard's crook in design. Females monodelphic, with or without vulva. Male genital apparatus simple, gubernaculum may or may not be present.

Genotype: L. reductum Gerlach 1953.

#### Key to species of Lauratonema

1. Gubernaculum present . . . . . (2)
1. Gubernaculum absent . . . . . (3)
2. Gubernaculum well developed; heavily  
sclerotized spicule, weak preanal  
papilla present . . . . . L. spiculifer Gerlach 1959

2. Gubernaculum weakly developed,  
thin . . . . . L. pugiunculus Wieser 1959
3. Buccal cavity cyathiform . . . . . (4)
3. Buccal cavity deep, spacious . . . . L. mentulatum Wieser 1959
4. Head set off by a  
constriction . . . . L. obtusicaudatum Murphy and Jensen 1961
4. Head not set off by a constriction . . . . . (5)
5. Cephalic setae approximately one-half head  
diameter or less . . . . . L. originale Gerlach 1956
5. Cephalic setae longer than one-half head diameter . . . . (6)
6. The four submedian setae one-half length  
of remaining six setae . . . . . L. reductum Gerlach 1953
6. The four submedian setae over one-half length  
of remaining six setae . . . . . (7)
7. Distinct lips bearing small  
papillae . . . . . L. adriaticum Gerlach 1953
7. Labial papillae obscure . . . . . L. hospitum Gerlach 1954

Lauratonema obtusicaudatum Murphy and Jensen 1961 (41)

(Figures 5 and 6)

	L (mm)	a	b	c	
Female:	1.20	50.1	5.0	6.7	ovary = 36.3%
Male:	1.30	53.1	5.0	11.6	
	1.24	56.4	5.1	10.7	
	1.27	54.2	5.1	11.2	
	1.27	55.9	5.1	11.8	

Body with fine, distinct annulation. Few very fine somatic setae. Cephalic region without annulation, set off by a slight constriction. Six conical labial papillae. Lips obscure. Ten cephalic setae 11 mm. and 5.6 mm. long. Amphids indistinct, perhaps shepherd's crook. Stoma funnel shaped, having two weakly sclerotized transverse ridges. Esophagus cylindrical with slight swellings anteriorly and posteriorly. Excretory pore not observed. Monodelphic. Both sexes with cloaca. Males with one preanal and two postanal papilloid structures in which neither nerves nor pores could be observed. Spicula 19 mm. long, acute bend distally, weakly sclerotized. Gubernaculum not observed. Tail cylindrical, possessing several setae. Tails of relaxed male specimens characteristically bent sharply at 90 degree angle. Both sexes with spinneret; sub-terminal caudal setae.

Holotype: male collected 21 August 1958 by D. G. Murphy; specimen on slide OSC OM 5A, Oregon State University collection.

Allotype: female, OSC OM 5B.

Paratypes: three females, OSC OM 5A.

Type-locality: South Slough, Charleston, Oregon; subtidal.

Diagnosis: resembling L. reductum Gerlach 1953 but smaller, differing primarily in the presence of papilloid structures on male caudal region, and possession of a slight cervical constriction.

Genus Anticoma Bastian 1865 (3, p. 141)

Leptosomatidae. Understanding of this genus has evolved since

Figure 5. Lauratonema obtusicaudatum Murphy and Jensen 1961.  
Female.

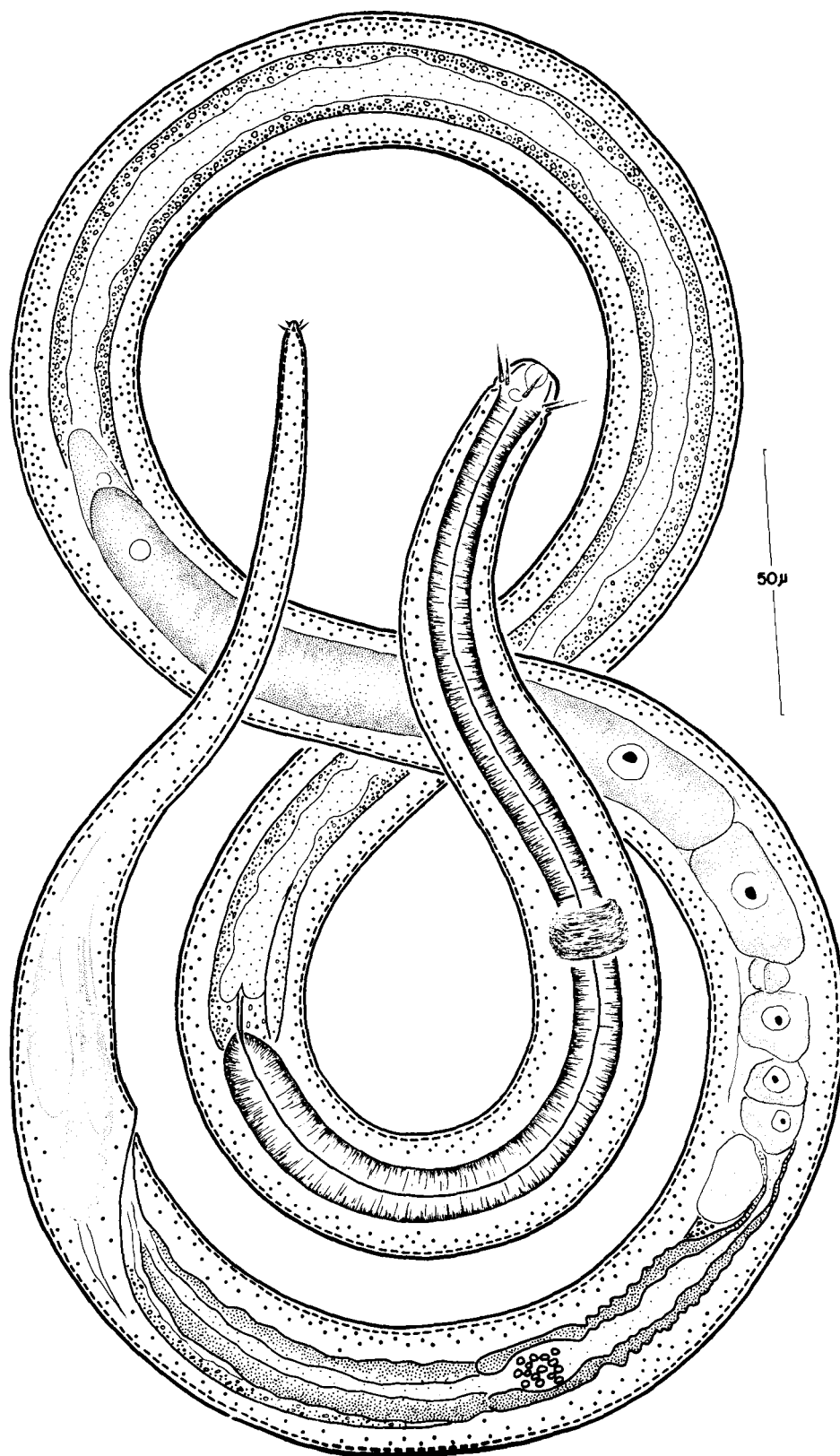
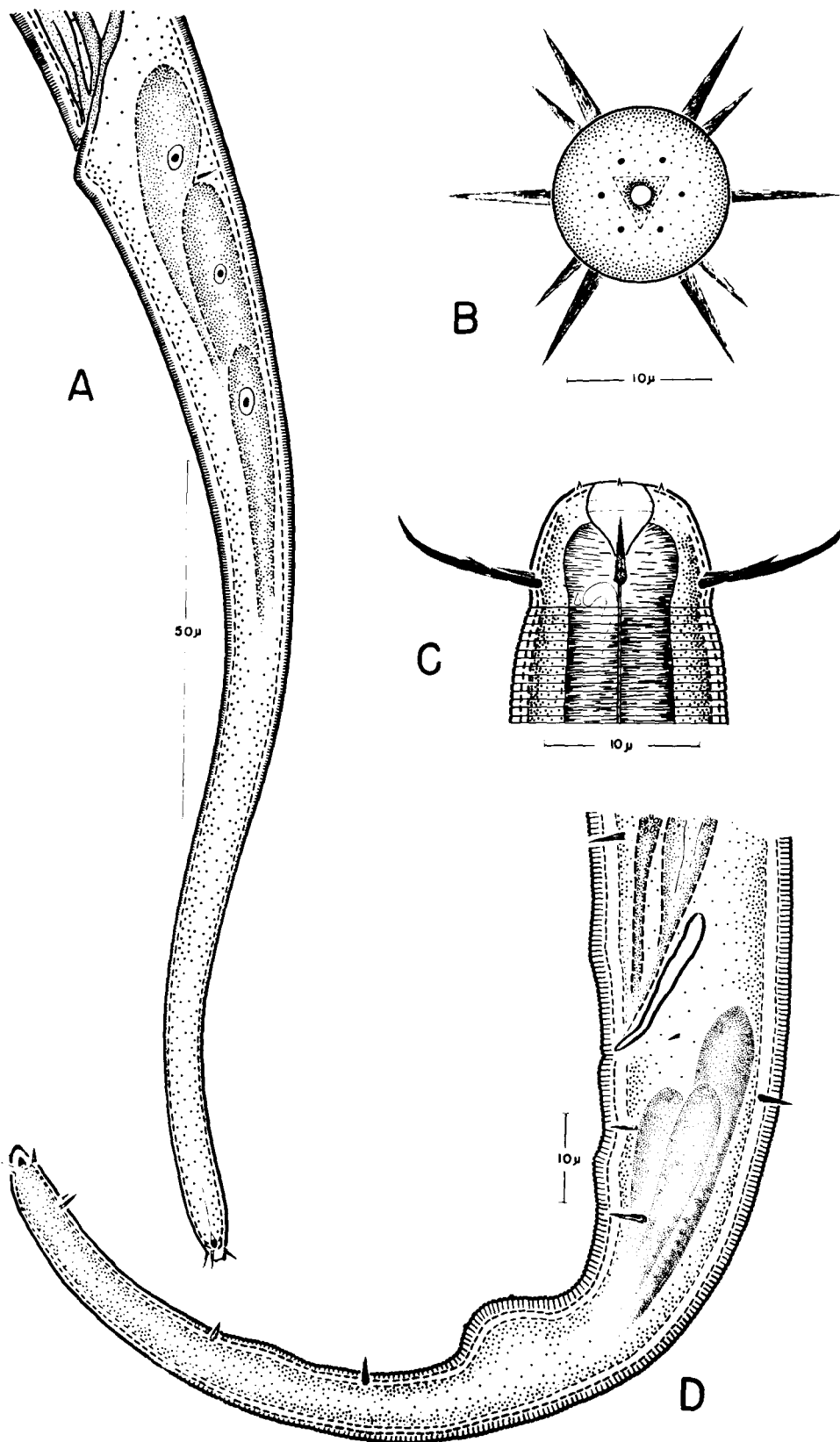




Figure 6. Lauratonema obtusicaudatum Murphy and Jensen 1961.

A, female tail. B, face view of male. C, anterior region of male, lateral view. D, male tail.



the time of description, notably in that males commonly possess a gubernaculum, and that labial papillae are present. Cephalic setae are ten in number, contained in a single circle. Stoma simple, unarmed; generally five pair of cervical setae arranged in distinct, compact, lateral rows; sometimes three to six cervical setae (42, p. 16). Cuticle smooth. Tails generally filiform, although varying considerably even within a species (46, p. 21). Females didelphic. Males with large, single, preanal supplement.

Genotype: Anticoma acuminata (Eberth 1863) Bastian 1865

Anticoma constricta n. sp.

(Figure 7)

	L (mm)	a	b	c	V (%)
Female:	1.59	36.4	4.4	8.2	50.1
Male:	1.79	41.4	5.1	7.0	
	1.79	42.2	4.4	9.4	

Diameter at end of esophagus 40 microns. Cuticle smooth. Ten cephalic setae, one-half head diameter in length. Five pair of cervical setae, the three anterior longer and stouter than the two posterior; somatic setae few, primarily along lateral lines; caudal setae short, scattered. Amphids indistinct because of sublateral positions of specimens. Lips obscure; six distinct labial papillae. Head diameter at level of cephalic setae 12.5 microns. Stoma funnel shaped, walls more heavily sclerotized anteriorly above region of

esophageal tissue; no distinct teeth observed, although six sclerotized ridges are present. Esophagus cylindrical, widening toward base; nerve-ring at 54% of esophagus; cardia arrow-shaped, extending into intestine. Excretory pore 0.7 (females) to 1.35 (males) head diameters from anterior end. Intestine moderately refractive. Females didelphic, ovaries reflexed. Gubernaculum short, apparently tubular. Single large tubular supplement located approximately 1.7 anal diameters anterior to cloaca; males with three pair of stout preanal setae positioned between supplement and anus.

Holotype: male collected 25 February 1960 by D. G. Murphy; specimen on slide OSC OM 55B, Oregon State University collection.

Allotype: female, OSC OM 55B.

Paratype: female, OSC OM 55B.

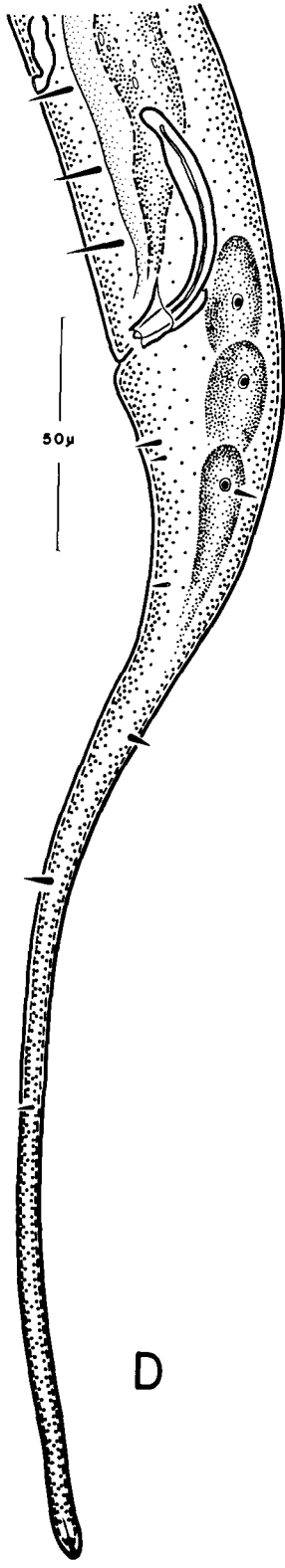
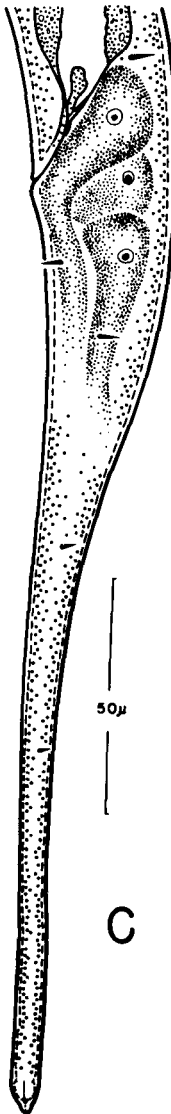
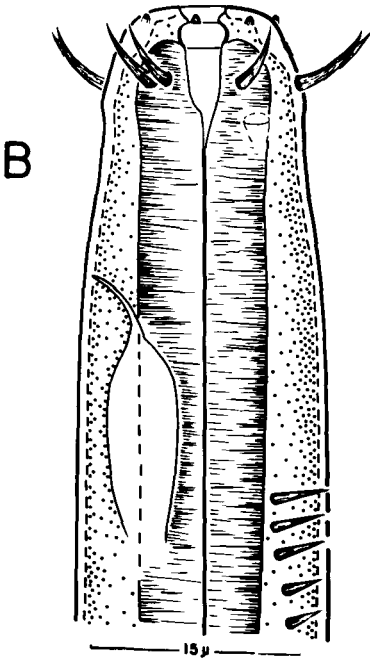
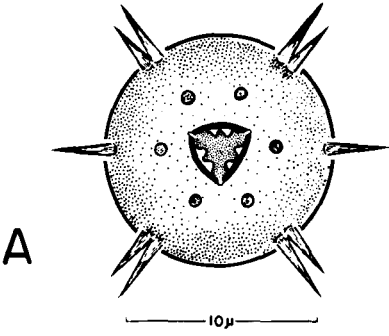
Type-locality: Yaquina Head, Newport, Oregon; associated with hold-fast of Nereocystis sp.

Diagnosis: resembling A. acuminata (Eberth 1863) but differing in the shape of the gubernaculum, position of supplement (anterior to that of A. acuminata), in the head being set off by a constriction, and by the three pair of preanal setae present on males.

Genus Phanoderma Bastian 1865 (3, p. 142)

Phanodermatidae. Relatively large nematodes. Cuticle smooth. Ten cephalic setae. Cephalic capsule prominent. Females didelphic, vulva located midway in body. Males originally described as lacking a gubernaculum; however, this is no longer tenable. Single

Figure 7. Anticoma constricta n. sp. A, face view of male.  
B, anterior region of male, lateral view. C, female tail.  
D, male tail.



supplement; tubular. With or without ocelli.

Genotype: P. tuberculatum (Eberth 1863) Bastian 1865

Phanoderma segmenta n. sp.

(Figure 8)

	L (mm)	a	b	c	V (%)
Female:	3.36	32.3	4.7	22.7	14.1 14.6 60.0
Male:	4.75	44.0	4.3	36.6	

Body diameter at end of esophagus 110 microns. Cuticle smooth, thick. Ten cephalic setae, longest being about one-half head diameter; short cervical, somatic, and caudal setae present. Amphids not observed. Six lips bearing one setose papilla each. Head diameter at level of cephalic setae 26 microns. Characteristic cephalic armor present; portion anterior to cephalic setae being more heavily sclerotized than that of posterior; cephalic armor bearing longitudinal striae. Ocelli present, 50 microns from anterior end. Esophagus long, enlarging over the posterior half; with prominent, repeated muscular swellings; conoid cardia projecting into intestine; nerve-ring at 48% of esophagus. Excretory pore opening 83 microns from anterior end; duct adjacent to pore heavily sclerotized. Females didelphic, ovaries reflexed. Male with long, segmented spicula; tubular gubernaculum; single, tubular, heavily sclerotized supplement located 2.5 anal diameters anterior to anus.

Female tail uniformly convex-conoid, 2.3 anal diameters long.

Male tail conoid, ventrally arcuate. Tail in both sexes terminating with a spinneret.

Holotype: male collected 27 July 1959 by D. G. Murphy; specimen on slide OSC OM 53, Oregon State University collection.

Allotype: female collected 1 July 1959 by D. G. Murphy; specimen on slide OSC OM 54, Oregon State University collection.

Type-locality: Devil's Punch Bowl, Oregon; from inter-tidal rock scrapings.

Remarks: this species belongs to section A. 2. of Wieser's 1953 key (45, p. 49).

Genus Enoplus Dujardin 1845 (21, p. 233)

Enoplidae. Relatively large nematodes. Cuticle smooth or with faint striations in secondary cuticular layers. Ten cephalic setae. Stoma with three bifurcate mandibles; esophagus cylindrical. Amphids pocket-like. Male with tuboid preanal supplement.

Enoplus intermedius n. sp.

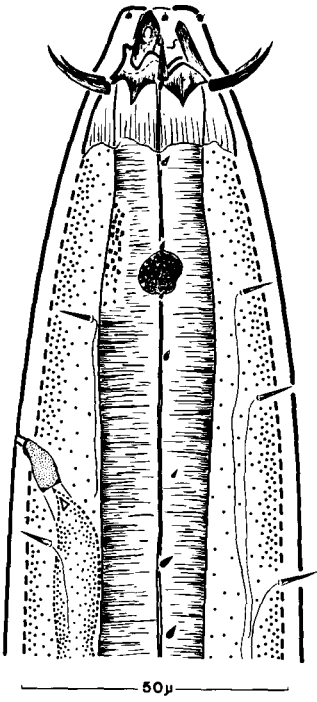
(Figure 9)

	L (mm)	a	b	c	V (%)
Female:	7.99	64.4	8.7	21.7	13.2 1.49 50.4
Male:	7.02	56.6	8.1	24.8	

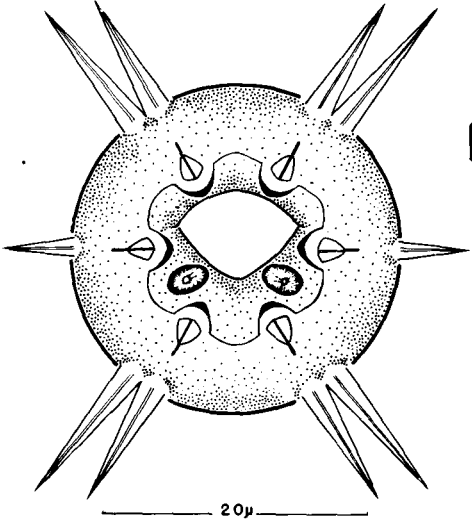
Body diameter at base of esophagus 110 microns. Cuticle smooth; inner cuticular layer with very fine striae. Ten cephalic setae;



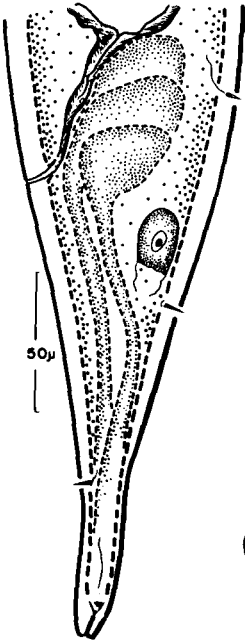
Figure 8. Phanoderma segmenta n. sp. A, anterior region of male, lateral view. B, face view of female. C, female tail. D, male tail.



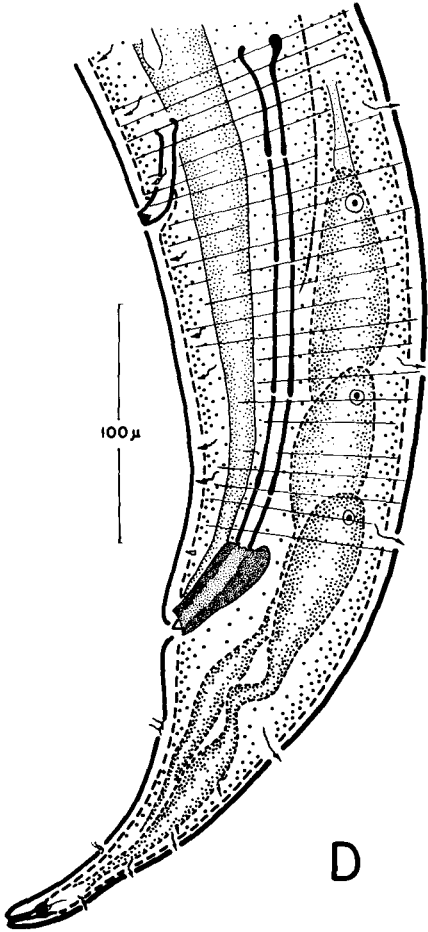
A



B



C



D

short, scattered cervical, somatic, and caudal setae; male with regular arrangement of 15 pairs of setae positioned between supplement and immediate vicinity of cloacal opening. Amphids pocket-like, 5.5 to six microns at greatest width; positioned at a level with the base of the mandibles, anterior to cephalic constriction. Lips more or less foliaceous; six setose labial papillae. Head diameter at level of cephalic setae 77 microns. Stoma with three prominent mandibles; surrounded by ring-like skeletal frame-work. Anterior region of esophagus with pigmented zones. Esophagus cylindrical; cardia prominent, conical, surrounded by intestinal tissue; nerve-ring at 45% of esophagus. Excretory pore 260 microns from anterior end. Intestine densely granular. Females didelphic; ovaries reflexed. Male with arcuate spicula; complex, tubular gubernaculum; heavily sclerotized supplement intermediate between tubular and trumpet-shaped.

Female tail attenuated, 3.6 anal diameters long. Male tail attenuated, curved ventrally, 2.9 anal diameters long. Tails in both sexes bearing subterminal setae; terminating with a spinneret.

Holotype: male collected 14 September 1960 by D. G. Murphy; specimen on slide OSC WM 68.

Allotype: female, OSC WM 68.

Type-locality: north-east end of Bainbridge Island, Puget Sound, Washington; from inter-tidal sand.

Remarks: this species belongs to group B. of Wieser's 1953 key (44, p. 60), and may be distinguished from related species by

the nature of the supplement, the simple, arcuate spicula, and by arrangement of the genital setae.

Genus Mesacanthion Filipjev 1925 (25, p. 143)

Enoplidae. Lips high, labial papillae setose. Cephalic setae articulate at middle or near anterior end of cephalic capsule (an exception being M. arcuatis Wieser 1959). Buccal cavity containing three equal teeth (rarely of slightly differing length), shorter than mandibles. Three arched, claw-like mandibles consisting of two pieces united anteriorly by a bar. Spicula usually short; if long then gubernaculum with caudal apophysis.

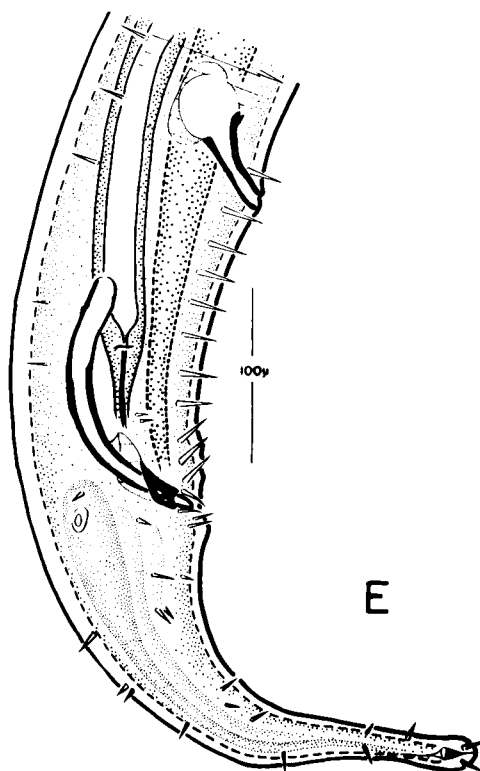
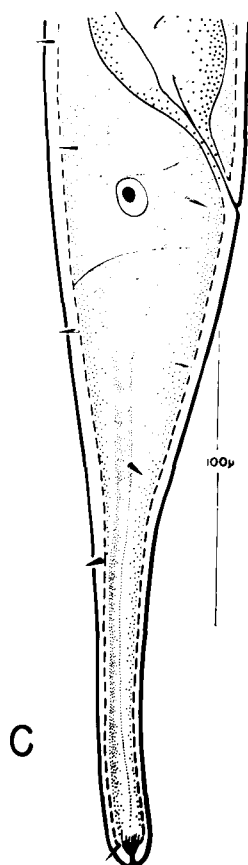
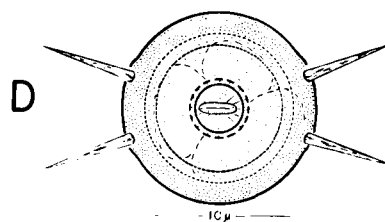
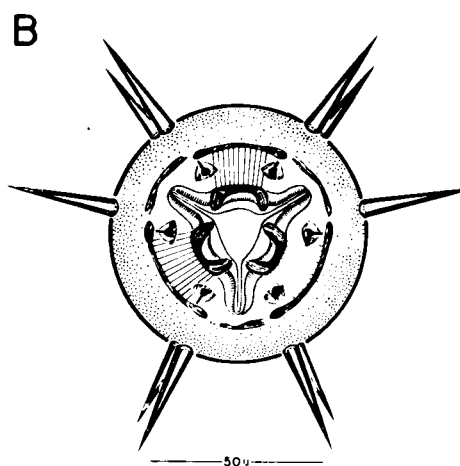
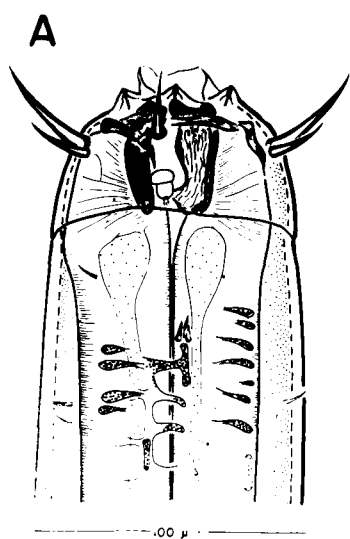
The genus Mesacanthion is closely related to Enoplolaimus de Man 1893, and was originally described as a subgenus thereof. M. arcuatis was considered by Wieser to be intermediate in position between Mesacanthion and Enoplolaimus. For the time being it will be maintained in the former genus, although its position here is questionable.

Mesacanthion arcuatis Wieser 1959 (49, p. 16-17)

(Figure 10)

	L (mm)	a	b	c	V (%)
Female:	3.88	44.8	4.6	18.8	62.7
	3.24	42.4	4.5	16.7	60.4
Male:	2.98	41.8	4.2	15.7	
	2.94	43.7	4.0	15.2	
	2.63	37.0	3.8	14.2	

Figure 9. Enoplus intermedius n. sp. A, anterior region of male, lateral view. B, face view of male. C, female tail. D, male tail, end view. E, male tail.



Wieser described this species on the basis of female specimens only. The male of this species is described here for the first time.

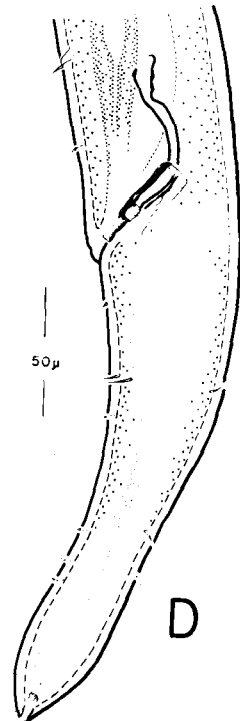
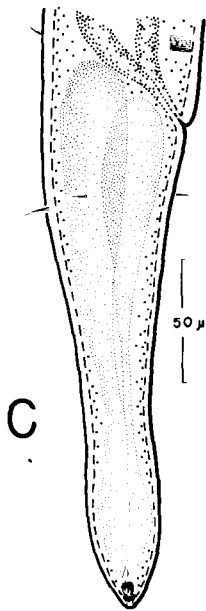
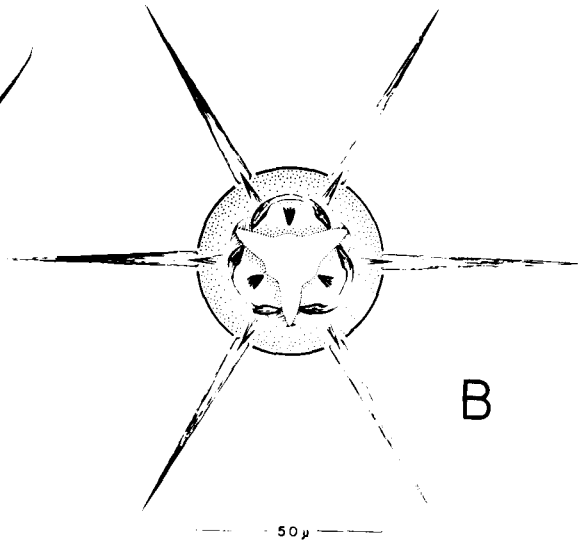
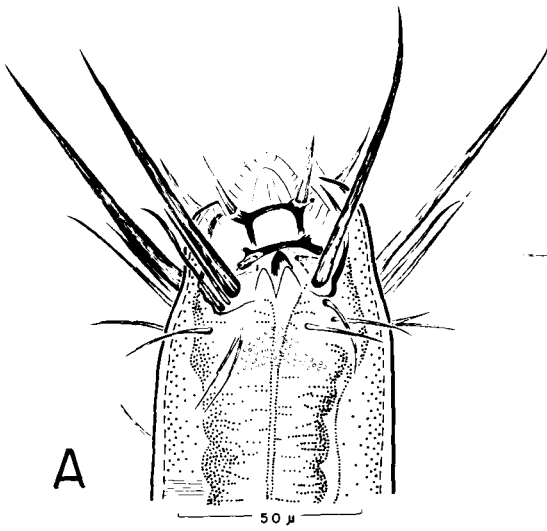
Cuticle with fine annulations below surface layers, (at times difficult to resolve). Cephalic setae in three circles in male; anterior circle largest, 80 microns long, obscuring remaining cephalic setae when observed from face view. Subcephalic setae 31 and 42 microns long. Cephalic setae of female in two circles, 80 and 31 microns long. Numerous fine cervical and somatic setae. Amphids not observed. Lips striated; six setose labial papillae, 23 microns long. Head diameter at level of cephalic setae 53 microns on males, 60 microns on females. Stoma cup-shaped, bearing three prominent mandibles, dorsal tooth and two subventral teeth. Esophagus cylindrical, bearing typical muscular undulations; cardia distinct, conical; nerve-ring three head diameters from anterior end. Ventral attachment zone of nerve-ring (hemizonid?) discernable. Excretory pore not observed. Intestine cellular. Spicula strongly bent; gubernaculum complicated; supplement very obscure, approximately 1.3 anal diameters anterior to anus. Females didelphic; ovaries reflexed. Tails swollen distally, spinneret distinct.

Plesiotypes: two females and three males collected 14 September 1960 by D. G. Murphy; specimens on slide OSC WM 63, Oregon State University collection.

Locality: Golden Gardens, Washington; inter-tidal beach sand.

Figure 10. Mesacanthion arcuatis Wieser 1959. A, anterior region of male, lateral view. B, face view of male. C, female tail. D, male tail.





Genus Pseudadoncholaimus n. g.

Oncholaimidae. Ten cephalic setae. Stoma armed with well developed teeth; stomal walls well sclerotized; differing from other genus of the family in that esophageal tissues enclose the lower half of the stoma. Amphids outwardly appear as two laterally united hexagons. Females didelphic, ovaries reflexed; male with simple gubernaculum and spicula, one small preanal papilla.

Genotype: P. cyathostomus n. g. n. sp.

Pseudadoncholaimus cyathostomus n. g. n. sp.

(Figure 11)

	L (mm)	a	b	c	V (%)
Female:	2.72	45.4	6.1	16.3	16.5 16.7 58.3
Male:	3.30	44.3	6.7	19.7	

Body diameter at end of esophagus 57 microns. Cuticle smooth. Ten cephalic setae in one circle; no cervical or somatic setae observed; caudal setae on male only. Amphids appear as two laterally united hexagons; base of amphid at same level as base of stoma. Stomal aperture large, surrounded by single circle of six papillae. Head diameter at level of cephalic setae 17 microns. Stoma well developed, broad; with three pairs of heavily sclerotized ridges (longitudinal processes of the stomatorhabdions), one ventral, two dorso-lateral; single dorsal tooth, two subventral teeth. Basal one-fourth of esophagus enlarged; cardia prominent, conical,

protruding into intestine; nerve-ring of 50% of esophagus. Excretory pore 27 microns from anterior end. Females didelphic; ovaries reflexed. Male with at least one small preanal papilla, this being 1.1 anal diameters anterior to cloacal opening; spicula arcuate, proximal end set-off by a constriction; gubernaculum small, simple.

Tails of both sexes bluntly conoid, only two caudal glands observed per tail. Female tail 3.5 anal diameters long. Male tail 3.2 anal diameters long. Tail in either sex terminating with a spinneret.

Holotype: male collected 24 June 1959 by Clooney Cruise, Dept. of Oceanography, Oregon State University; specimen on slide OSC OM 45, Oregon State University collection.

Allotype: female, OSC OM 45.

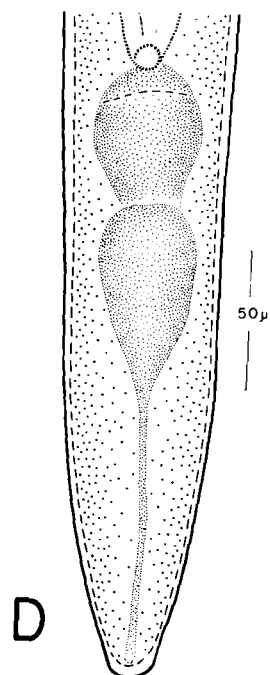
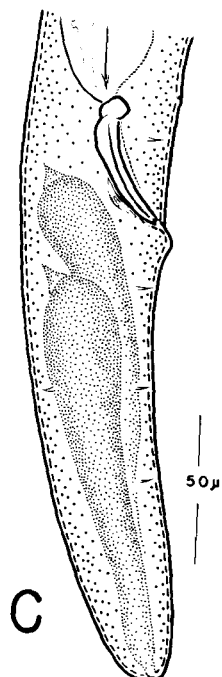
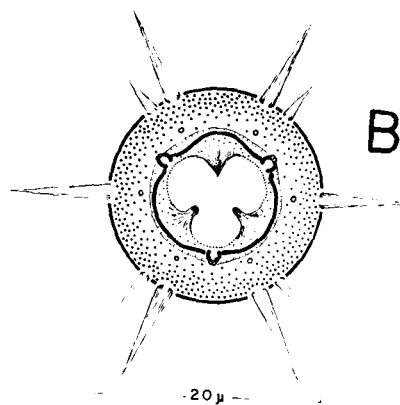
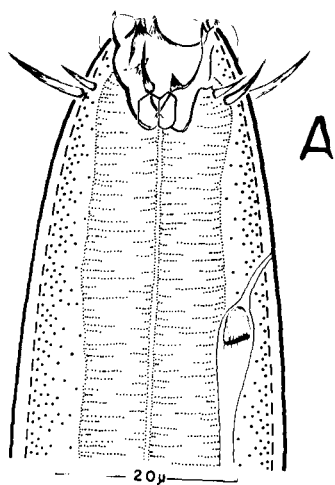
Type-locality: 44 degrees 53.3 minutes N. Latitude, 124 degrees 07.5 minutes E. Longitude (Oregon continental shelf); from sand at a depth of 55 meters.

#### Genus Oncholaimium Cobb 1930 (18, p. 425)

Oncholaimidae (Oncholaiminae). Cobb characterized the genus as "monodelphic Oncholaiminae with demanian system, whose males have a versatile, preanal, ventral appendicule." (19, p. 425) The single, usually large, post-anal papilla of males appears to be an equally valid criteria for the genus. Cephalic setae are in a circle of ten, but apparently need not follow the bilateral symmetry of the nematode (O. cobbi Kreis 1932, O. vesicarium Wieser

Figure 11. Pseudedoncholaimus cyathostomus n. g. n. sp.

A, anterior region of male, lateral view. B, face view of female. C, male tail. D, female tail, dorsal view.



1959, and O. domesticum Chitwood 1960).

B. G. Chitwood (9, p. 362-363) has prepared the most recent discussion of the genus, and has included a key to the species. Only O. vesicarium Wieser 1959 and O. gubernans n. sp. have been reported from the Northwest.

Genotype: O. appendiculatum Cobb 1930.

Oncholaimium gubernans n. sp.

(Figures 12 and 13)

	L (mm)	a	b	c	V (%)
					22.1
Female:	4.09	39.8	6.6	35.6	77.4
	3.71	36.0	6.2	36.0	76.8
	4.37	40.8	7.1	40.8	78.0
	4.52	40.7	7.1	43.9	78.3
Male:	4.28	49.1	7.3	60.0	
	4.73	44.2	8.3	70.1	
	4.46	51.2	7.6	67.2	
	4.29	51.5	7.4	67.5	

Body diameter at end of esophagus 82 microns. Cuticle thick, smooth; no evidence of lateral pattern. Ten cephalic setae, not arranged so as to manifest bilateral symmetry: possibly indicating torsion which rotates the single lateral setae into a sublateral position, and the other four pair correspondingly to sublateral or ventral positions. Short cervical setae present; few somatic

setae in posterior regions; short caudal setae. Amphid cup-shaped, 8.7 microns in width. Lip region flat, bearing six small labial papillae. Head diameter at level of cephalic setae 34 microns. Stoma deep, broad; armed with large lateral tooth and two smaller opposing sublateral teeth. Esophagus cylindrical, with slight enlargement anteriorly; considerable enlargement posteriorly; adjoining to a prominent conical cardia; nerve-ring at 48.5% of esophagus. Excretory pore, ampulla, and plug well sclerotized, positioned 100 microns from anterior end. Male with characteristic preanal supplement located immediately anterior to anus and prominent caudal papilla; spicula slightly arcuate; small, plate-like gubernaculum present. Females prodelphic; ovary out-stretched; demanian system not observed; gravid female with as many as 20 ova in uterus.

Female tail conoid, enlarging at tip; 2.6 anal diameters long. Male tail cylindroid, 3.7 anal diameters long. Tails in both sexes terminating with a spinneret.

Holotype: male collected 14 September 1956 by H. J. Jensen; specimen on slide OSC OM 6, Oregon State University collection.

Allotype: female, OSC OM 6.

Paratypes: three males and three females, OSC OM 6.

Type-locality: Cape Arago, Oregon; associated with tide-pool algae.

Diagnosis: distinguished from Oncholaimium vesicarium Wieser

1959 by possessing a gubernaculum. In all other respects the two species appear identical.

Genus Symplocostoma Bastian 1865 (3, p. 132)

Enchelidiidae (Enchelidiinae). The members of this genus characteristically exhibit sexual dimorphism. In the case of males the buccal cavity is severely reduced at the time of the last moult, although all larval stages bear stomal characteristics similar to the females. The alimentary tract appears functional in the mature males; however, the abrupt change in stomal characteristics would likely necessitate a change in feeding habits, a possibility that would be open to considerable question. The ocelli in S. dissoluta Wieser 1959 become greatly enlarged in the male, indicative perhaps of adaptation for a brief (non-feeding?) period of searching for females. This would be in keeping with the observation that the male genitalia is well developed in the fourth-stage larva (49, p. 32).

The Symplocostoma are generally large nematodes, approaching four to five millimeters in length. The body tapers uniformly at both ends, terminating anteriorly with a head that appears disproportionately small relative to the bulk of the central regions of the animal. Contrary to Bastian's original description a gubernaculum is present, and the head bears setae. The female and all juvenile stoma are cylindrical, sclerotized, including in the armature a large, grooved, subdorsal tooth, i.e. Bastian's "peculiar funnel-shaped body lying along it's...(pharyngeal cavity)...inferior



Figure 12. Oncholaimium guberans n. sp. Female.

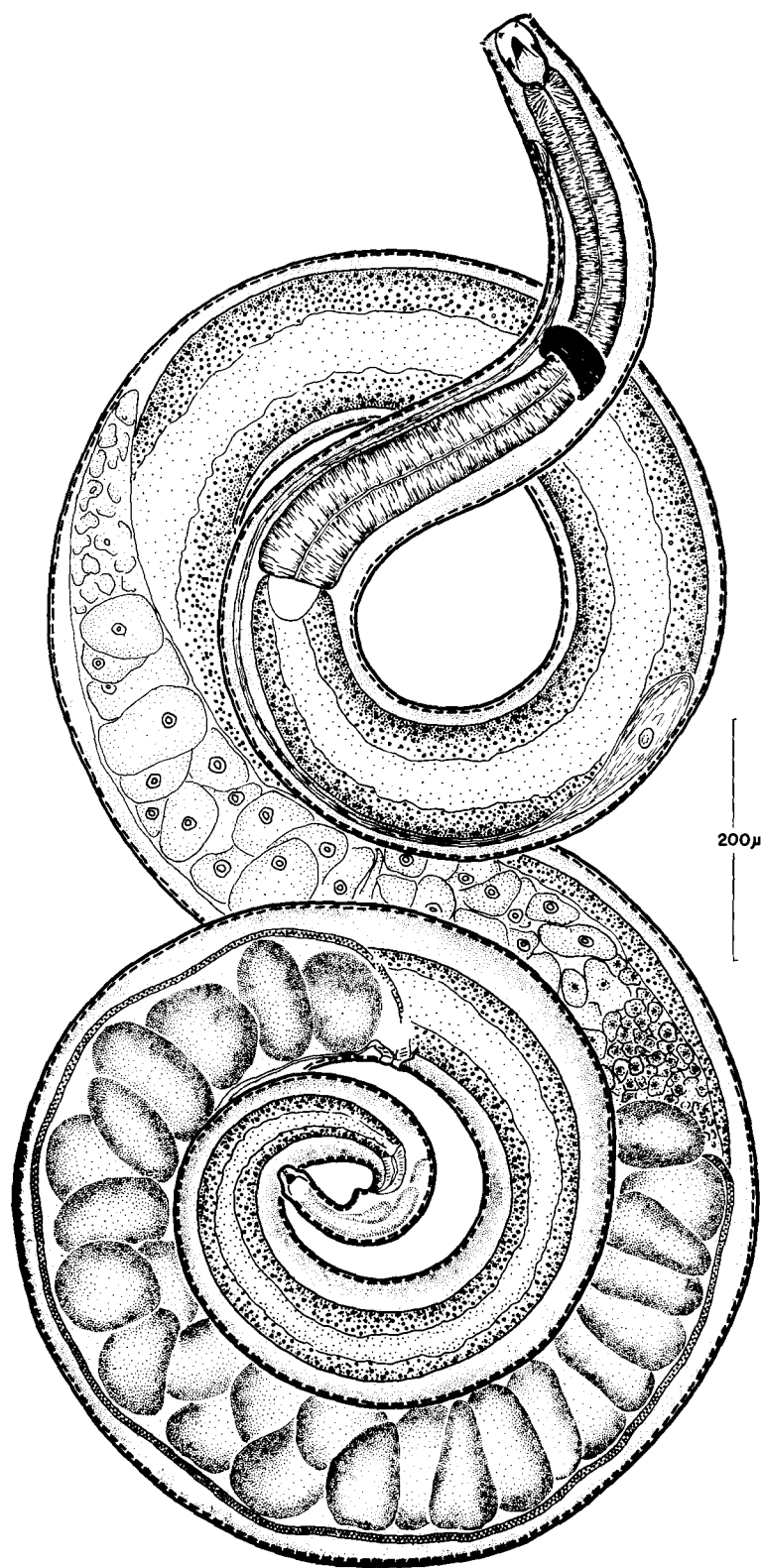
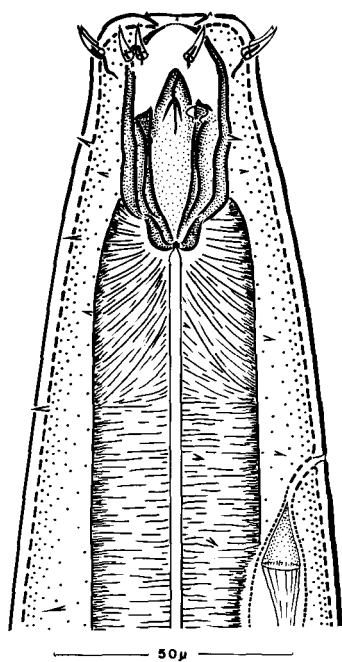
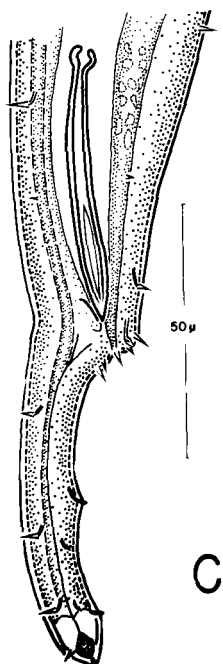
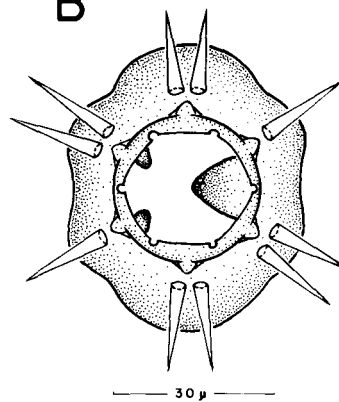


Figure 13. Oncholaimium gubernans n. sp. A, anterior region of male, lateral view. B, face view of male. C, male tail. D, female tail.

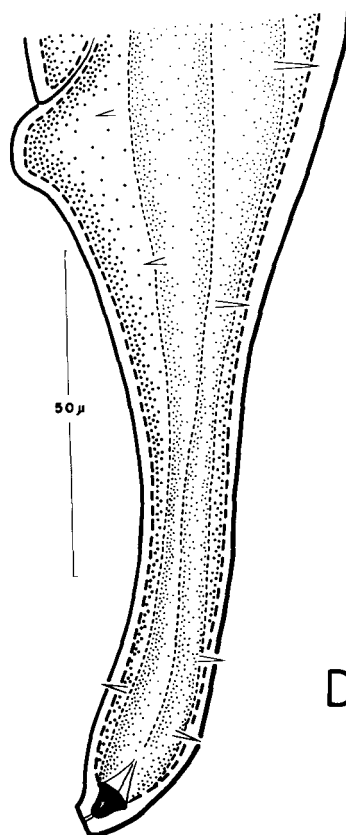
A



B



C



D

aspect." (2, p. 132). The stoma is variously circled by sclerotized rings. Cephalic setae are ten in number, probably all in one circle on adults. Wieser (44, p. 152-170) has presented good coverage of the position of this genus.

Symplocostoma dissoculta Wieser 1959 (49, p. 32)

(Figure 14)

	L (mm)	a	b	c	V (%)	
Female:	3.94	44.5	4.8	19.8	14.7	14.6
					55.7	
	3.41	35.0	4.2	17.0	10.7	12.1
					53.9	

Body diameter at end of esophagus 90 microns. Cuticle smooth, 3.5 microns thick. Ten cephalic setae in one circle, the longer being about 0.5 head diameter in length. Cervical and somatic setae present, scattered. Amphids pocket-like, 5 microns in width. Six poorly differentiated lips bearing a total of six conical papillae. Head diameter at the level of cephalic setae 17 microns. Stoma heavily sclerotized, deep, cup-shaped to cylindrical. Two prominent, longitudinally striped, transverse ridges located in anterior one-half of stomal wall; one less heavily sclerotized ridge located about midway in stoma. Stoma armed with one large, hollow, subventral tooth, and two weaker, smaller teeth, one being dorsal and the other subventral. These latter two teeth are very difficult to discern from other than a face view, and were over-looked by Wieser in his

description of the species. Ocelli located 1.5 head diameter from the anterior end. Esophagus cylindrical, of weak musculature anteriorly posterior half, widening and becoming very muscular; cardia conical, extending a short ways into the intestine; nerve-ring at 40% of the esophagus. Excretory pore 2.5 head diameters from anterior end, excretory duct long, gland controlled by a readily discernable plug. Intestine moderately refractive, cellular nature readily apparent. Females didelphic; ovaries reflexed.

In mature males the stoma is reduced to a cylindrical tube which cannot be distinguished from the lumen of the esophagus; ocelli enlarge considerably. Spicula are narrow, bow-shaped; gubernaculum short; five evenly spaced preanal supplements, each with about four pair of latero-ventral setae.

Tails conical, terminating with a spinneret; female tail 4.2 anal diameters long; male tail curved ventrally, 3.6 anal diameters long.

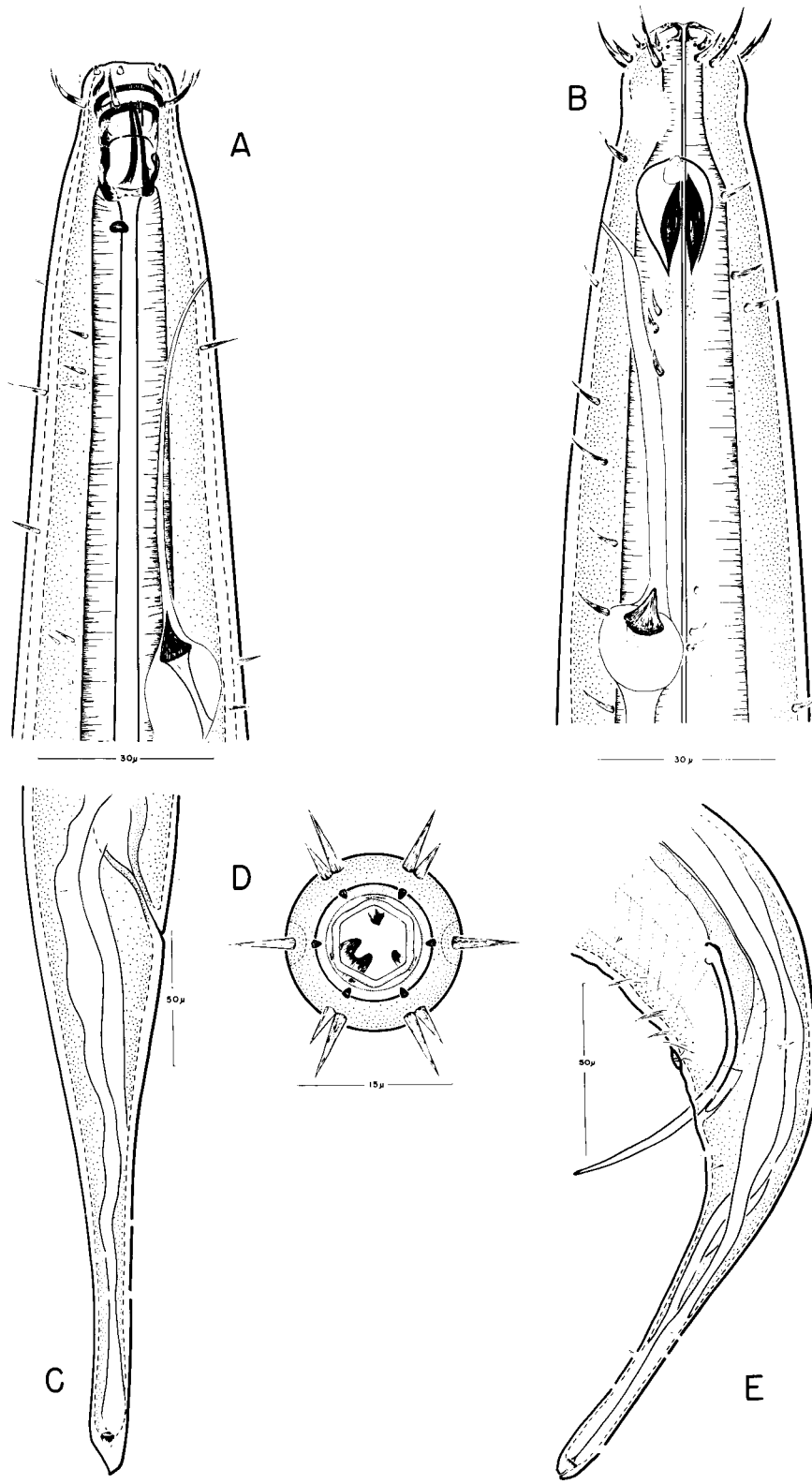
Plesiotypes: two females collected 25 February 1960 by D. G. Murphy; specimens on slide OSC OM 55B, Oregon State University collection.

Locality: Yaquina Head, Newport, Oregon; on Nereocystis sp. holdfast.

Genus Pomponema Cobb 1917 (16, p. 118)

Cyatholaimidae (Cyatholaiminae). Prominent buccal musculature; stoma deep, well developed, with large dorsal tooth and two (or two

Figure 14. Symplocostoma dissoculta Wieser 1959. A, anterior region of female, lateral view. B, anterior region of male, lateral view. C, female tail. D, female face view. E, male tail.





groups) of latero-ventral teeth; with or without rows of denticles. Conspicuous lateral differentiation in form of longitudinal dots, significantly larger than remainder of cuticular dots. Gubernaculum complex; numerous large preanal supplements.

Cobb, in describing this genus, referred to "jointed cephalic organs" (setae) (16, p. 118). This has not been observed as a criterium in later descriptions (25, p. 133; 47, p. 4; 50, p. 34-35), and within present knowledge of the genus may be disregarded as a generic character.

Genotype: P. mirabile Cobb 1917.

Pomponema polydonta n. sp.

(Figure 15)

	L (mm)	a	b	c	V (%)
Female:	1.83	46.6	5.9	13.4	16.6 15.2 63.8
	1.98	47.6	6.0	12.8	60.0
Male:	1.87	58.0	7.4	12.5	
	1.98	63.2	6.3	11.9	
	1.81	56.2	6.1	9.9	
	1.55	43.1	5.4	11.4	

Diameter at end of esophagus 26.5 microns. Cuticle distinctly annulated with coarse punctations. Lateral lines delineated by enlarged cuticular punctation. Labial papillae 12; six setose cephalic papillae. Cephalic setae in one circle of six and four,

being 23 and four microns respectively. Indication of segmentation and articulation of larger setae on some specimens at a point one-third to one-half of the length from the base. Somatic setae not observed; caudal setae present. Head diameter 26.5 microns. Stoma cyathiform; armed with single large dorsal tooth opposed by two or three sets of subventral teeth and two rows of denticles. Esophagus cylindrical, with moderate buccal musculature; post-corpus not set off; cardia not pronounced; nerve-ring at 35% of esophagus. Excretory pore not observed. Females didelphic; ovaries reflexed. Male with heavily sclerotized spicula and complex gubernaculum; 24 uniformly spaced, complex supplements, the first being adjacent to cloacal opening.

Tails elongate-conical, terminating with a spinneret; female tail 5.2 anal diameters long; male tail 6.0 anal diameters long, with two, prominent, subterminal setae.

Holotype: male collected 5 October 1960 by D. G. Murphy; specimen on slide OSC OM 69, Oregon State University collection.

Allotype: female, OSC OM 69.

Paratypes: three males and one female, OSC OM 69.

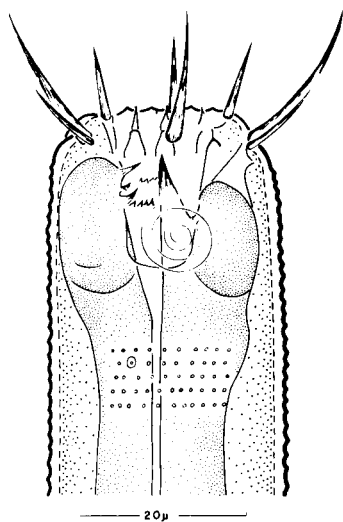
Type-locality: Newport, Oregon; from inter-tidal sand.

Diagnosis: distinguished from existing species by presence of numerous teeth and denticles.

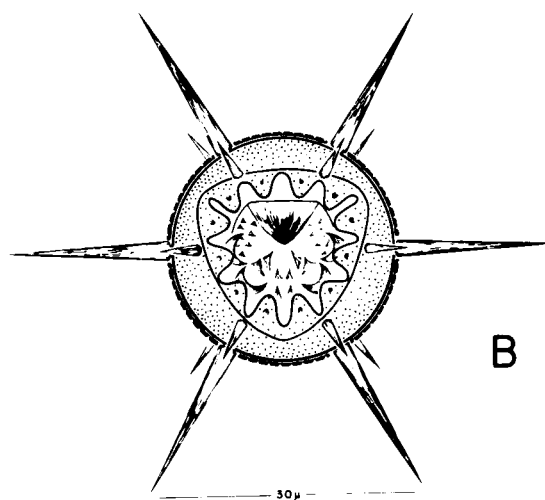
Genus Foliolaimus n. g.

Cyatholaimidae (Cyatholaiminae). Buccal cavity cyathiform,

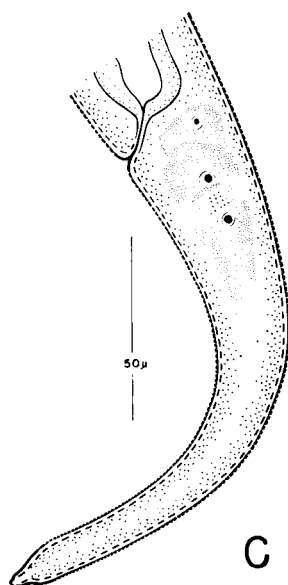
Figure 15. Pomponema polydonta n. sp. A, anterior region  
of male. B, face view of male. C, female tail. D, male tail.



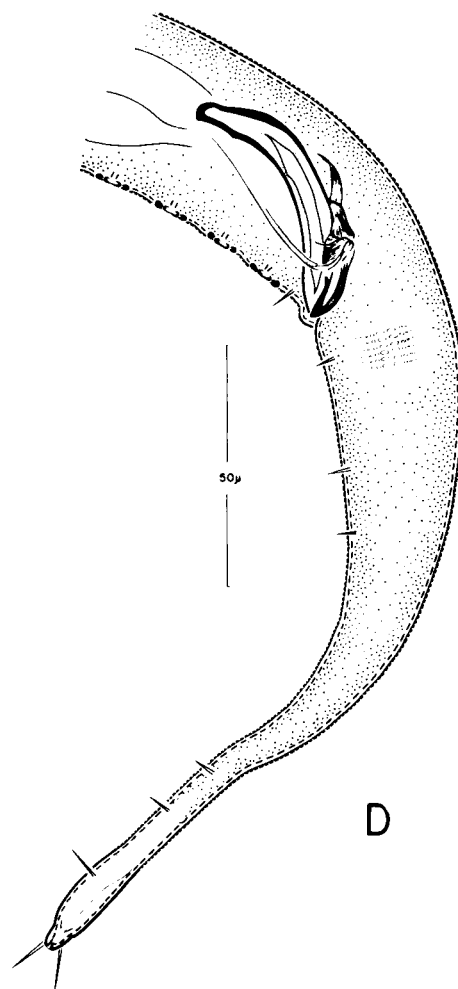
A



B



C



D

with dorsal tooth or dorsal tooth plus subventral teeth. Lips retrose, with foliaceous developments; labial papillae setose. Six (?) or ten cephalic setae. Esophagus without bulbus postcorpus. Cuticular annules resolvable into dots; no longitudinal striae.

This genus is erected to accomodate two closely related species, Foliolaimus dentatus (Wieser 1959) (49, p. 39) n. comb. and Foliolaimus tridentatus n. g. n. sp., distinguished from representatives of the genus Cyatholaimus by unique labial development. Wieser's species is not recognized as the genotype because he failed to establish a type-specimen for his species.

Genotype: F. tridentatus n. g. n. sp.

Foliolaimus tridentatus n. g. n. sp.

(Figure 16)

	L (mm)	a	b	c	V (%)
Female:	1.60	38.9	4.3	10.6	15.2 14.3 54.3
Male:	1.54	50.5	4.6	10.6	

Body diameter at end of esophagus 30 microns. Cuticle finely annulated, evidenced primarily as transverse rows of dots; numerous cuticular pores. Six cephalic setae, one head diameter in length; possibly four additional small setae adjacent to subventral and subdorsal setae; few short cervical setae; numerous short caudal setae on male; no somatic setae observed. Amphids spiral, of five

turns; lowest extremity level with base at buccal musculature. Lips retrorse, with foliaceous growths; six, setose labial papillae directed backward because of lip positioning. Head diameter at level of cephalic setae 25 microns. Stoma cyathiform, armed with a long, protruding dorsal tooth opposed by two smaller latero-ventral teeth. Esophagus long, irregular, with moderate buccal musculature and slight basal enlargement; cardia not distinct; nerve-ring not observed. Excretory pore 130 microns from anterior end. Females didelphic; ovaries reflexed. Male with three postanal papillae; possibly a series of minute preanal papillae; spicula arcuate; gubernaculum long, distal end complex, heavily sclerotized.

Tails conical, terminating with poorly defined spinneret; female tail 4.3 anal diameters long; male tail 3.5 anal diameters long, with a cluster of four subterminal setae.

Holotype: male collected 5 October 1960 by D. G. Murphy; specimen on slide OSC OM 69, Oregon State University collection.

Allotype: female, OSC OM 69.

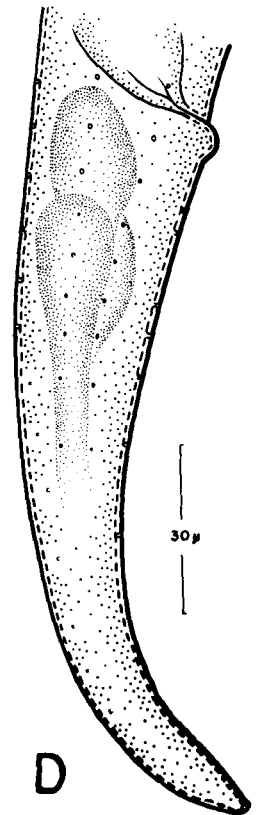
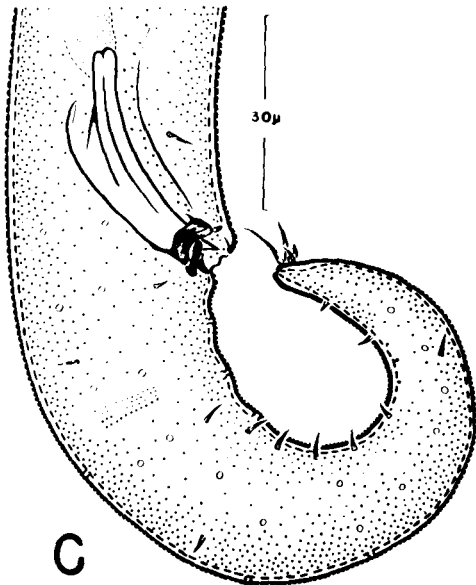
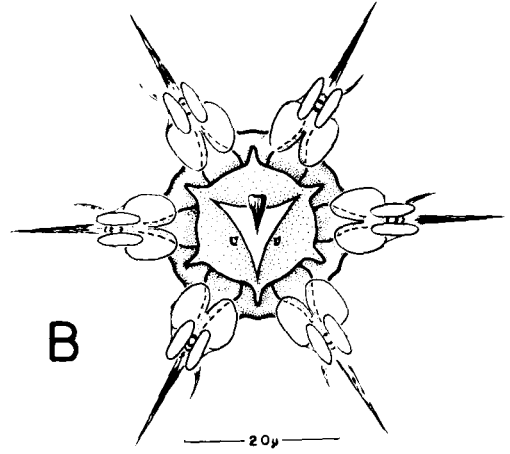
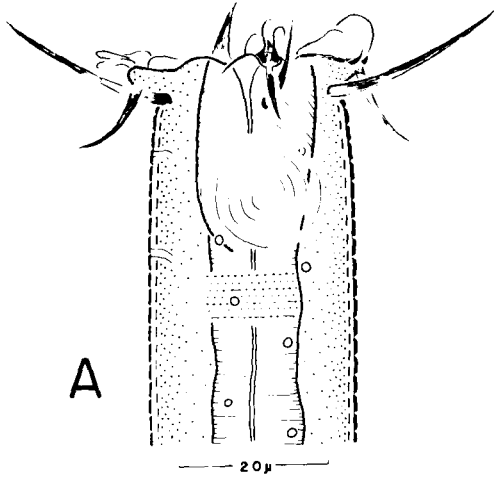
Type-locality: Newport, Oregon; from inter-tidal sand.

Diagnosis: distinguished from F. dentatus (Wieser 1959) by possessing two latero-ventral teeth; amphid describing five rather than four turns.

Genus Paraconthonchus Micoletzky 1924 (39, p. 138)

Cyatholaimidae (Cyatholaiminae). Buccal cavity cyathiform, bearing a dorsal tooth with or without additional opposing teeth.

Figure 16. Foliolaimus tridentatus n. g. n. sp. A, anterior region of male. B, face view of male. C, male tail. D, female tail.





Supplements tubular, the larger of which being of about the same length. Gubernaculum forked proximally. Cuticle annulated, with punctate pattern.

Genotype: P. caecus (Bastian 1865) Micoletzky 1924

Paracanthonchus serratus Wieser 1959 (49, p. 41)

(Figure 17)

	L (mm)	a	b	c	V (%)
Female:	2.67	37.1	8.2	17.1	10.5 13.5 46.5
	2.96	41.1	8.9	17.2	12.7 19.3 44.2
	3.17	43.1	9.5	20.5	13.3 15.0 44.5
	3.50	41.1	9.4	16.5	12.6 17.0 43.6
Male:	2.94	45.0	8.8	19.1	
	2.66	43.0	8.7	16.4	
	2.82	42.9	8.2	14.8	
	2.73	37.2	8.0	18.1	

Body diameter at end of esophagus 58.5 microns. Cuticle annulated, bearing conspicuous punctate pattern, the latter being homogeneous over most of the cuticle. Ten cephalic setae one-half of corresponding head diameter in length, each with two constrictions; numerous, short cervical, somatic, and caudal setae. Amphid spiral, 3.5 turns; 10 to 12 microns at greatest diameter. Lips with prominent labial

rugae surrounded by 12 labial papillae. Head diameter at level of cephalic setae 30 microns. Stoma cyathiform, bearing one large dorsal tooth and four smaller opposing latero-ventral teeth. Esophagus cylindrical, widening slightly at base; cardia distinct, dorso-ventrally flattened, not encompassed by intestine. Excretory pore 3.8 head diameters posteriad. Female didelphic; ovaries reflexed. Males with six tubular preanal supplements, the one nearest the cloaca often obscure; spicula distinct; gubernaculum with broad distal end bearing a serrated edge.

Tails conical, terminating with a spinneret; female tail 3.7 anal diameters long; male tail 2.7 anal diameters long, curved ventrally.

Plesiotypes: four females and four males collected 4 September 1956 by H. J. Jensen; specimens on slide OSC OM 4, Oregon State University collection.

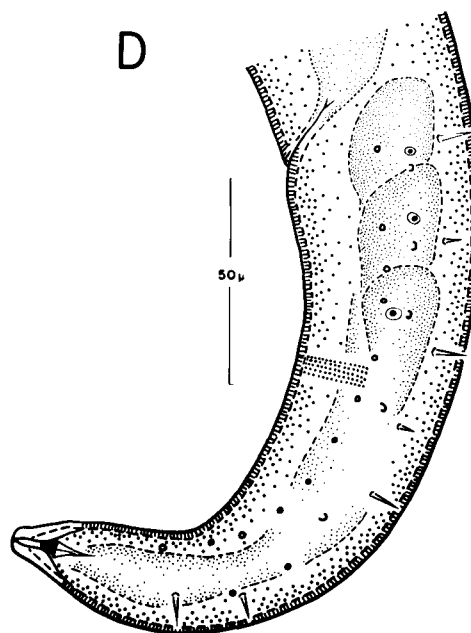
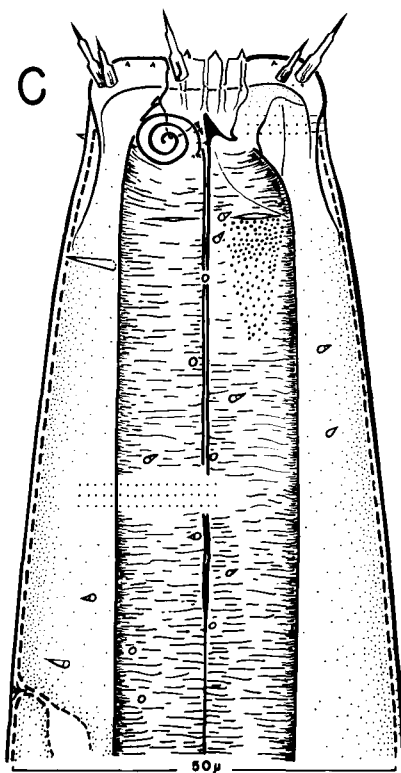
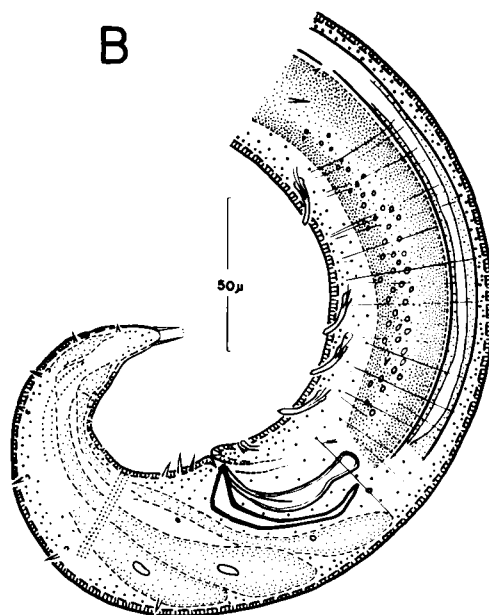
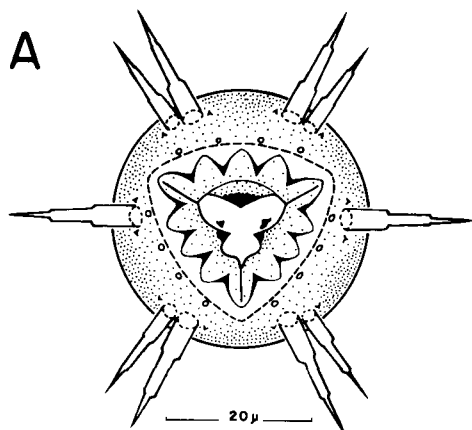
Locality: North Beach, Cape Arago, Oregon; from inter-tidal beach sand.

Genus Synonchiella Cobb 1933 (19, p. 88)

Chromadoridae (Selachineminae). Cuticle striated, resolvable into rows of dots or bars. Esophagus with powerful buccal musculature; stoma with three mandibles each having an even number of hooks. Females didelphic; ovaries reflexed; males with numerous chromadoroid supplements.

N. A. Cobb's description defined the male with small gubernaculum

Figure 17. Paracanthonchus serratus Wieser 1959. A, face view of female. B, male tail. C, anterior region of female. D, female tail.



with apophysis. S. spiculorum n. sp. has a large gubernaculum with no apophysis; in addition this species bears a sclerotized triangular piece which rides in a dorsal notch in the spicule. The description of Cobb's genus is expanded to accommodate these differences rather than erect a separate genus for the new species.

Genotype: S. truncata Cobb 1933.

Synonchiella spiculora n. sp.

(Figure 18)

	L (mm)	a	b	c	V (%)	
Female:	3.54	55.5	8.2	21.9	11.2	11.6
					52.0	
	3.46	54.2	7.5	21.4	12.8	12.5
					56.8	
Male:	3.64	65.8	8.6	19.0		

Body diameter at end of esophagus 53 microns. Cuticle homogeneous, pattern composed of transverse dots; heavy annulation more pronounced at extremities. Ten cephalic setae in one circle, perhaps segmented; longest being one-half corresponding head diameter in length; few cervical setae; female with few short somatic and caudal setae, male with relatively more caudal and genital setae. Amphids a closed spiral of 3.75 turns. Lip region forming a triangular stomal aperture, surrounded by six labial papillae. Head diameter at level of cephalic setae 36 microns. Stoma cyathiform; three bifurcate mandibles with five additional pairs of hooks per mandible. Esophagus cylindrical with powerful buccal musculature; cardia

indistinct; first few cells of intestine lacking refractive granules characteristic of remainder of intestinal cells; nerve-ring not observed. Excretory pore 190 microns from anterior end. Intestinal cells containing numerous highly refractive globules. Females didelphic; ovaries reflexed. Of three males two had 22 supplements, one had 16; supplements protrude considerably in the case of a male with the tail in a tightly curled position; spicula bear dorsal notches in which small, sclerotized, triangular pieces ride, (the function of this unique feature has not been determined); gubernaculum complex, broad, then narrowing toward proximal end, which appears jointed.

Tails conical, terminating with spinneret; female tail 3.6 anal diameters long; male tail 3.5 anal diameters long, with slight ventral curve.

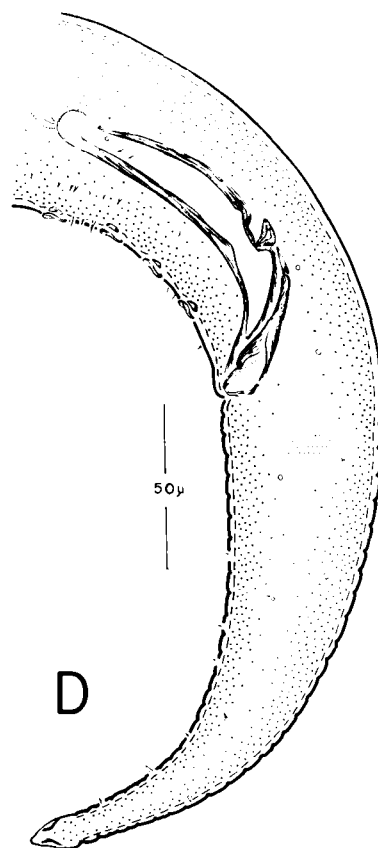
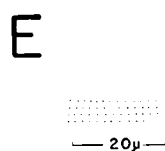
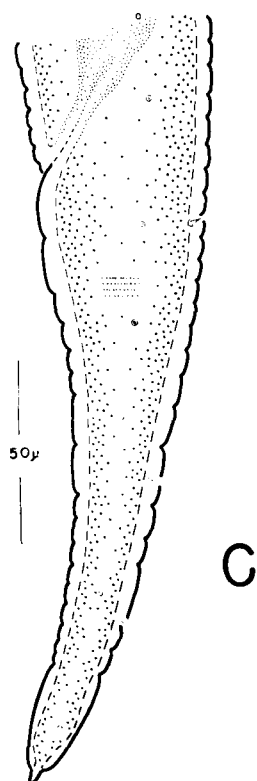
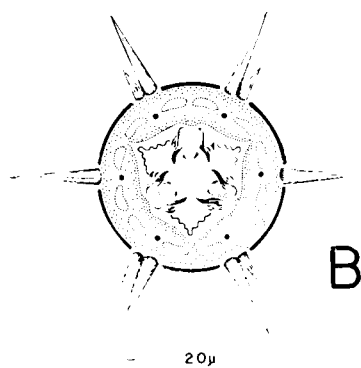
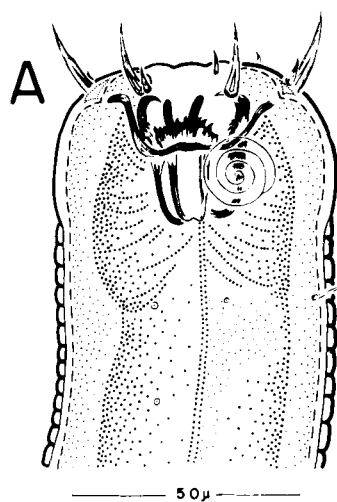
Holotype: male collected 24 June 1959 by Clooney Cruise (Dept. of Oceanography, Oregon State University); specimen on slide OSC OM 45b, Oregon State University collection.

Allotype: female, OSC OM 45b.

Type-locality: 44 degrees 53.3 minutes N. Latitude, 124 degrees 0.75 minutes E. Longitude (Oregon continental shelf); from sand at depth of 55 meters.

Diagnosis: distinguished from other described species by presence of notched spicula.

Figure 18. Synonchiella spiculora n. sp. A, anterior region of female. B, face view of male. C, female tail. D, male tail. E, lateral cuticular ornamentation at level of vulva.





Genus Desmodora de Man 1889 (36, p. 9)

Desmodoridae (Desmodorinae). Amphids spiral; cephalic region protected by a rigid helmet free of annules; cuticle coarsely annulated; esophagus with bulb; ovaries paired, reflexed.

Discussions of this genus are given by C. A. Allgen (1, p. 431), B. G. Chitwood (7, p. 1), and W. Wieser (47, p. 39-48).

Genotype: D. scaldensis de Man 1889.

Desmodora papillostoma n. sp.

(Figure 19)

	L (mm)	a	b	c	V (%)
Female:	1.50	37.2	9.2	18.6	73.6
	1.50	37.4	9.4	20.2	72.6
	1.50	33.5	9.1	22.4	70.7
	1.25	36.3	7.7	17.8	72.2
Male:	1.49	43.6	9.5	19.7	
	1.64	52.4	9.9	20.8	
	1.31	41.0	8.6	15.5	

Body diameter at end of esophagus 30 microns. Cuticle coarsely annulated, annules resolvable into dots. Anterior circle of four cephalic setae, about eight additional cephalic setae; numerous cervical, somatic, and caudal setae, apparently arranged in eight longitudinal rows. Amphids a broad spiral. Lips not distinguishable; six setose labial papillae at anterior region of vestibule.

Head diameter at base of cephalic capsule 27 microns. Cephalic capsule with pigmented (rust-colored) areas. Stoma cyathiform, with one large dorsal and two smaller subventral teeth. Esophagus with moderately bulbous valvulated basal bulb; intestine set-off from basal bulb by cells with fewer refractive inclusions; nerve-ring at 50% of esophagus. Excretory pore not observed. Intestine with numerous highly refractive inclusions. The nature of female genitalia is obscure; vulva markedly pigmented. Male with attenuated spicula; doubly-arcuate gubernaculum.

Tails conical, terminating with a spinneret; female tail 2.6 anal diameters long; male tail 3.3 anal diameters long.

Holotype: male collected 24 June 1959 by Clooney Cruise (Dept. of Oceanography, Oregon State University); specimen on slide OSC OM 45c, Oregon State University collection.

Allotype: female, OSC OM 45c.

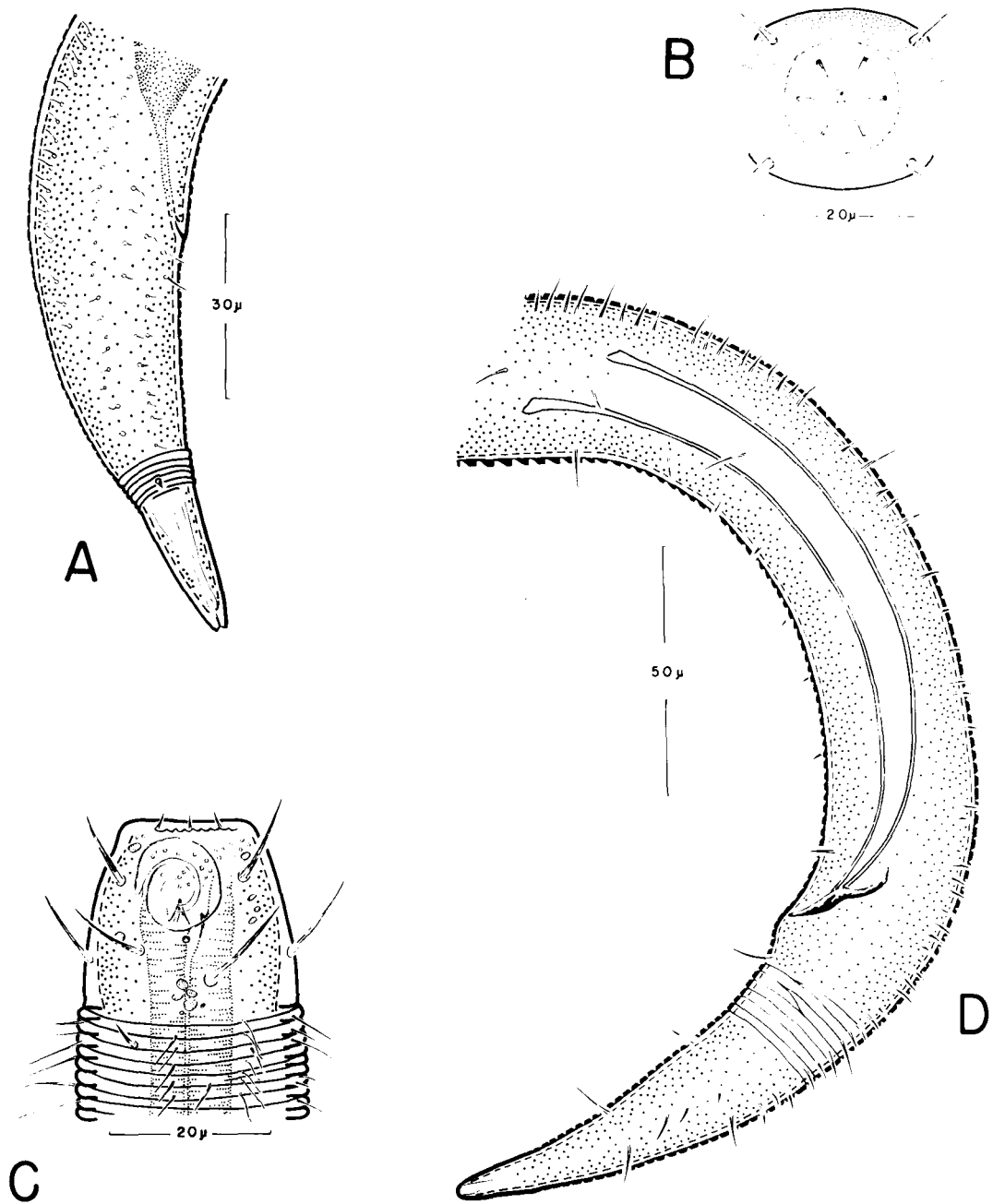
Type-locality: 44 degrees 53.3 minutes N. Latitude, 124 degrees 07.5 minutes E. Longitude (Oregon continental shelf); from sand at a depth of 55 meters.

Diagnosis: distinguished from described species by vestibular location of labial papillae and elongate spicula of male.

Genus Onyx Cobb 1891 (11, p. 146)

Desmodoridae (Richtersiinae). Cobb characterized this genus as having a spear, powerful buccal musculature, cylindrical neck, peculiar head, and powerful esophageal bulb. The term "spear" is

Figure 19. Desmodora papillostoma n. sp. A, female tail.  
B, face view of female. C, anterior region of female.  
D, male tail.



not adequate in this case and for most species described the structure should be regarded as a protrusible dorsal tooth. The current concept of the genus requires broadening in that the species described herein exhibits the dorsal tooth attached, on its dorsal side, to the cup-shaped portion of the buccal cavity. This form is perhaps exhibiting an earlier stage in the development toward the spear-like forms.

Genotype: O. perfectus Cobb 1891.

Onyx pararugata n. sp.

(Figure 20)

	L (mm)	a	b	c	V (%)
Female:	1.03	27.2	5.5	12.5	58
	1.21	28.2	5.6	16.0	56
Male:	1.19	35.1	5.9	15.5	
	1.20	38.1	6.2	12.9	
	1.25	39.6	6.2	14.8	
	1.21	38.1	6.3	15.1	

Body diameter at base of esophagus 34 microns. Cuticle with moderate annulations, these being transverse in somatic and cervical regions, longitudinal in cephalic regions. No lateral differentiation observed. Cephalic setae in two circles; first circle of six, small (setose cephalic papillae?); second circle of four setae, each 17 microns long. Cervical setae prominent near cephalic region; somatic setae few, short. Genital setae present in vulvular region. Amphids

located at juncture of longitudinal and transverse striae, about nine microns in diameter, circular to unispire. Lips bear setose papillae. Head diameter at level of cephalic setae 23 microns. Stoma with powerful dorsal tooth, attached dorsally to the anterior region of the buccal cavity. Esophagus with powerful buccal musculature, cylindrical isthmus, and well developed, valvulated, double bulb; nerve-ring five head diameters from anterior end. Excretory pore not observed. Intestine highly refractive. Female didelphic; ovaries reflexed.

Male with 22 evenly spaced preanal supplements, the first being adjacent to the anus; arcuate spicula with broad proximal end; gubernaculum thin, apparently with thin, paired lateral pieces.

Tails conical, terminating with a spinneret; female tail 2.8 anal diameters long; male tail 2.6 anal diameters long, curved ventrally.

Holotype: male collected 22 July 1958 by D. G. Murphy and H. J. Jensen; specimen on slide OSC OM 13, Oregon State University collection.

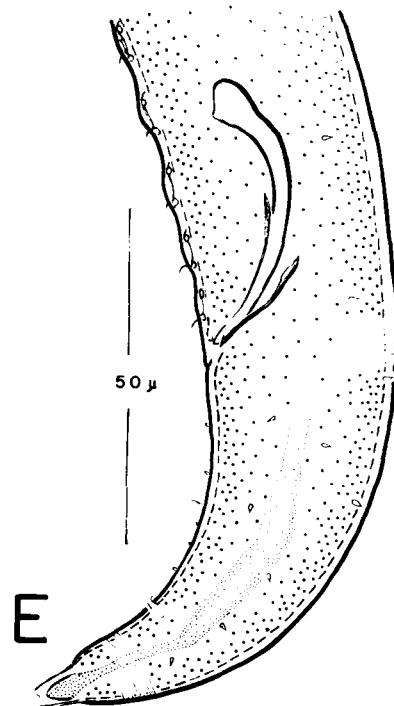
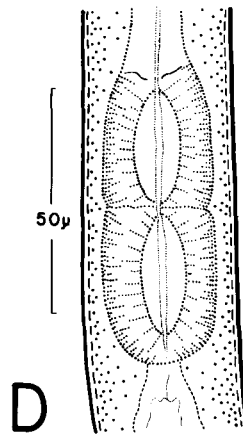
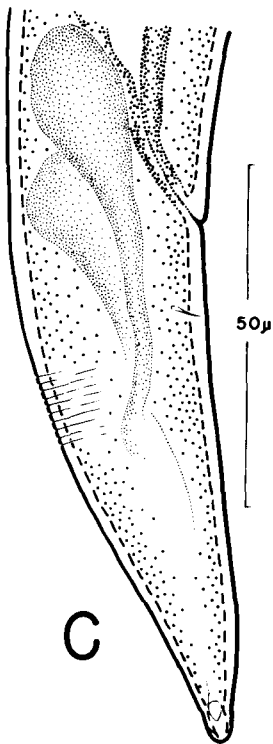
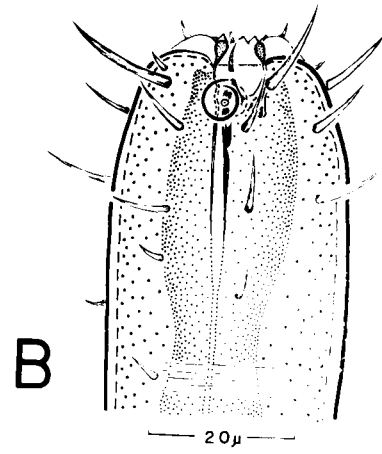
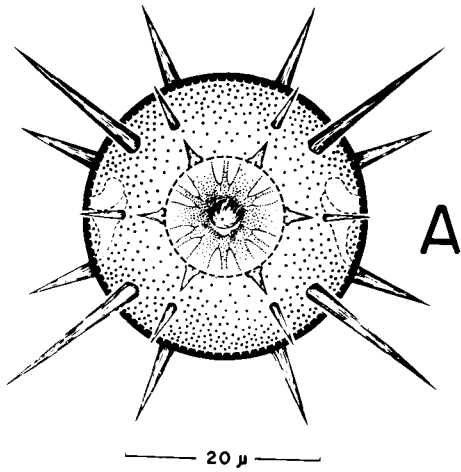
Allotype: female, OSC OM 13.

Paratypes: one female and three males, OSC OM 13.

Type-locality: Rocky Creek Wayside, Oregon.

Diagnosis: generally resembles O. rugata Wieser 1959, but is smaller. The principle distinction lies in the forward attachment of the dorsal portion of the dorsal tooth, whereas in Wieser's species the attachment point is deep in the stoma.

Figure 20. Onyx pararugata n. sp. A, face view of male.  
B, anterior region of male. C, female tail. D, basal bulb  
of male. E, male tail.





Genus Spirina Filipjev 1918 (24, p. 232)

Desmodoridae (Richtersiinae). Medium or small sized nematodes with annulated cuticle. One or two circles of cephalic setae, the anterior ones may be reduced to papillae. Amphids circular or single spiral with external margins forming a circle. Stoma small, or deep and narrow; bearing one or two small teeth. Esophagus cylindrical, terminating in a pronounced bulb. Spicula pronounced, gubernaculum simple.

Genotype: S. parasitifera (Bastian 1865) Filipjev 1918.

Spirina cylindrostoma n. sp.

(Figure 21)

	L (mm)	a	b	c	V (%)	
Female:	2.21	28.6	17.5	19.2	15.9	15.6
					48.1	
	2.18	30.4	16.1	21.4	12.7	11.9
					51.8	
Male:	2.36	32.9	17.2	23.2	17.1	17.3
					50.1	
	2.15	27.8	17.3	24.3	14.1	14.7
					49.9	
Male:	1.94	34.4	16.4	18.3		
	2.30	40.7	16.7	18.0		

Diameter at end of esophagus 51 microns. Cuticle with fine annulations. Four cephalic setae, one-half head diameter in length; cervical and somatic setae arranged in regular, longitudinal rows.

Amphids circular, 5.8 microns in diameter. Lips 12, bearing a total of six small papillae; six pair of very minute cephalic papillae situated posteriad to the labial papillae. Head diameter at level of cephalic setae 14 to 15 microns. Stoma deep and narrow, cylindrical; bearing two small teeth. Esophagus cylindrical, sigmoid, terminating in a distinct, valvulated bulb; cardia not pronounced; nerve-ring positioned at 66% of esophagus. Excretory pore not observed. Females didelphic; ovaries outstretched. Male with two preanal supplements, one-half and one anal diameters from anus; spicula large, thorn-shaped; gubernaculum heavily sclerotized, tapering proximally from a notch located about 50% of total length.

Tails conical, terminating with a spinneret; female tail 2.4 anal diameters long; male tail 2.7 anal diameters long, curved ventrally.

Holotype: male collected 1 April 1960 by D. G. Murphy; specimen on slide OSC OM 57, Oregon State University collection.

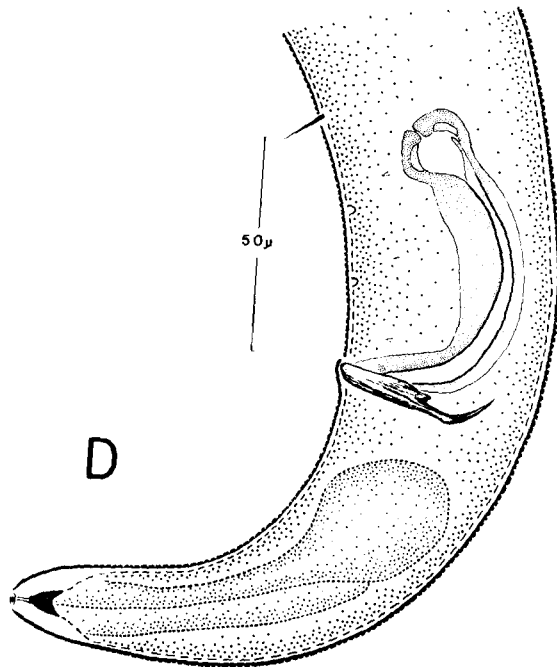
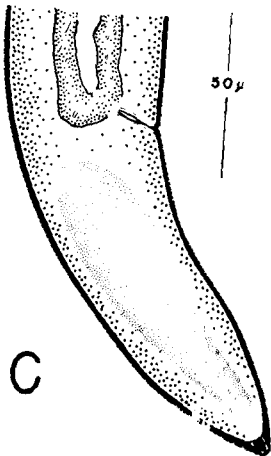
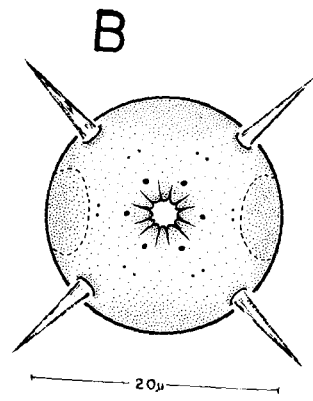
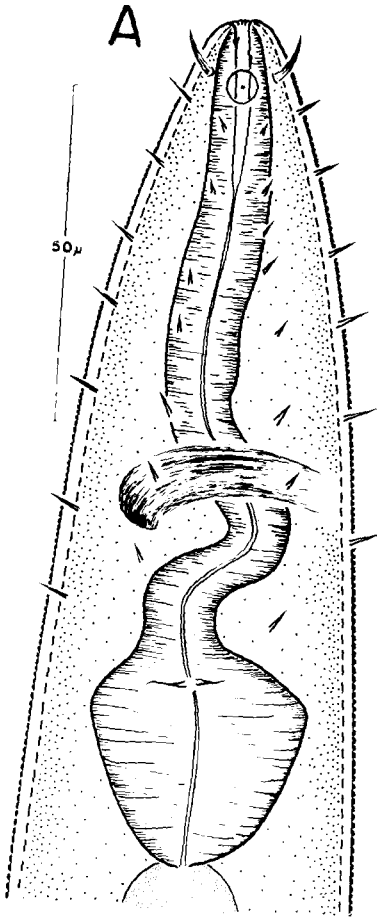
Allotype: female, OSC OM 57.

Paratypes: one male and three females, OSC OM 57.

Type-locality: Yaquina Head, Newport, Oregon; from sand beneath bed of Mytilus californianus Conrad.

Diagnosis: distinguished from S. septentrionalis Wieser 1954 by possessing a smaller amphid, two small supplements, and greater attenuation of the cervical and cephalic regions.

Figure 21. Spirina cylindrostoma n. sp. A, anterior region of female. B, face view of male. C, female tail. D, male tail.



Genus Monoposthia de Man 1889 (36, p. 9)

Desmodoridae (Monoposthiinae). De Man, in subdividing Bastian's genus Spilophora, separated Monoposthia on the basis of lacking a gubernaculum and possessing but one, broad spicule. Wieser (46, p. 53-54) interpreted this to be a situation where the spicula are lacking and the gubernaculum has taken over the function of the spicula. This conclusion appears sound and is accepted here.

Genotype: M. costata (Bastian 1865) de Man 1889.

Monoposthia costata (Bastian 1865) (3, p. 166)

Synonym: Spilophora costata Bastian 1865

(Figure 22)

	L (mm)	a	b	c	V (%)
Female:	1.81	37.9	9.9	16.9	51.5
					88.6
	1.37	28.8	8.0	12.7	48.1
					85.9
Male:	1.45	32.0	8.4	11.0	

Body diameter at end of esophagus 47.6 microns. Cuticular structure heavy, presenting an appearance of plate-like composition due to pronounced striation. Ten longitudinal lines, equally spaced about the animal, run almost the entire length of the body. The juncture of annuli and longitudinal striae are characterized by a "V" marking, the apex pointing posteriorly on the anterior region of the nematode, and anteriorly on the posterior regions. These

cuticular joints appear to provide for flexibility in the armor-like exoskeleton.

Four cephalic setae 11 microns long. Cervical and somatic setae appear to be present in considerable number, but are difficult to distinguish from abundant growths of parasitic Cyanophyta. The amphids are distinct, four microns in diameter, opening in the third and fourth annuli. Six triangular lips bearing distinct papillae. Head diameter at level of cephalic setae 20 microns. Stoma cup-shaped anteriorly, cylindrical in region of buccal musculature. The anterior region of the cup-shaped portion bears one or two transverse sclerotized ridges, posterior to which is located a single, large, dorsal tooth, and two small latero-ventral teeth. Esophagus with cylindrical corpus and large, muscular valvulated bulb; cardia not pronounced, flattened laterally; nerve-ring located at 50% of esophagus. Excretory pore not observed. Females monodelphic; ovary out-stretched. Males without spicula; large claw-shaped gubernaculum apparently serving the function of spicula in copulation. The cloacal opening is bordered anteriorly and posteriorly by cuticular prominences. There is a distinctive ventral, preanal cuticular ridge involving 14 to 15 annuli.

Tails conical, terminating with a spinneret; female tail 4.1 anal diameters long; male tails 3.5 anal diameters long.

Bastian's description and illustrations of this organism are not adequate. Later work, notably de Man (36, p. 9) was well done and has thus adequately established the species in as much as this

can be accomplished without observing type material. It is possible that the Oregon representatives should be described as a new variety in that they are significantly smaller than others reported, including those of Wieser's report from Puget Sound (49, p. 49-50). Consideration of such deliniation will be with-held until further studies of distribution and size are undertaken.

Plesiotypes: one male and two females collected 22 July 1959 by D. G. Murphy; specimens on slide OSC OM 53, Oregon State University collection.

Locality: Devil's Punch Bowl, Oregon; inter-tidal rock scrapings.

Genus Notochaetosoma Irwin-Smith 1918 (31, p. 798)

Quetosomatidae. Cephalic region with distinct helmet; not enlarged. Body epsilonoid. Ambulatory setae in four rows. Males with a gubernaculum.

For the generic taxonomy of this family the reader is referred to a key prepared by E. G. Buisan (5, p. 39).

Genotype: N. tenax Irwin-Smith 1918.

Notochaetosoma costeriata n. sp.

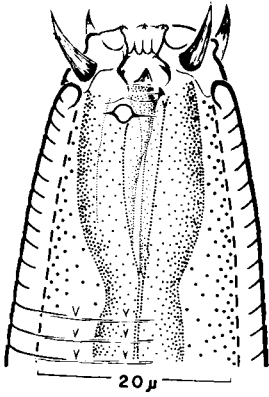
(Figure 23)

	L (mm)	a	b	c
Male:	0.44	12.5	5.5	8.2

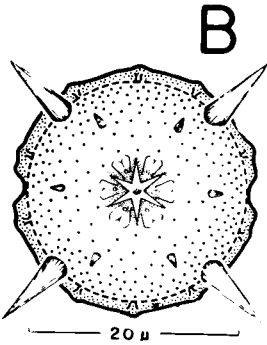
Body shape epsilonoid. Body diameter at end of esophagus

Figure 22. Monoposthia costata (Bastian 1865). A, anterior region of the male. B, face view of the female. C, female tail. D, male tail.

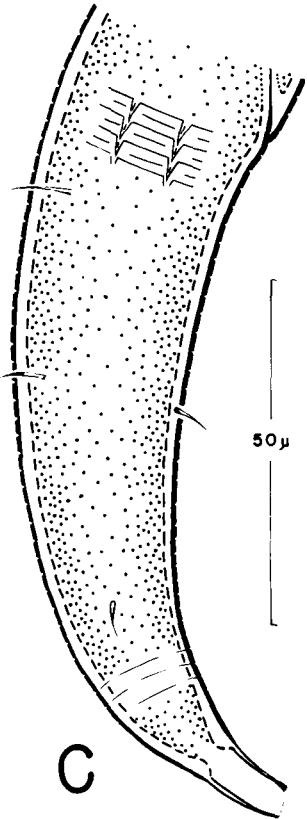




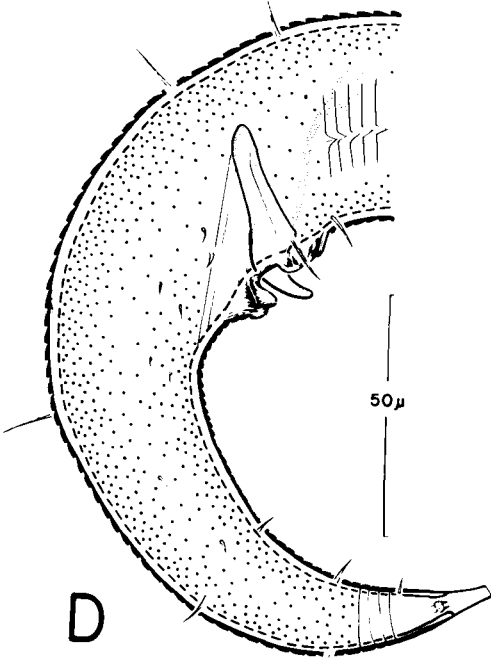
A



B



C



D

30 microns. Cuticle coarsely annulated, annules directed forward on anterior portion of body, backward on posterior portion of body. Eight cephalic setae in two circles of four each; numerous cervical setae; four rows of ambulatory setae. Amphids a closed shepherd's crook, positioned dorso-laterally adjacent to second circle of cephalic setae. Lip region set-off by a step-like reduction in cephalic diameter; with a circle of six small papillae; cephalic helmet well developed. Head diameter at base of cephalic helmet 13.5 microns. Stoma cylindrical, unarmed. Esophagus with well developed, valvulated basal bulb; nerve-ring located at 50% of esophagus; cardia small, dorso-ventrally flattened. Excretory pore not observed. Females didelphic; ovaries reflexed. Male with three triangular, cuticular projections at level of posterior ambulatory setae; large, strongly curved spicula; very small, plate-like gubernaculum.

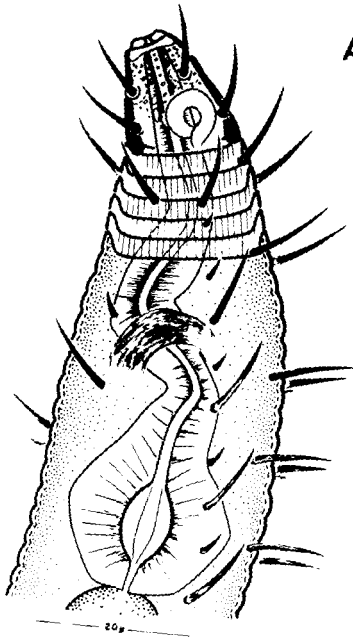
Tails conical, ventrally curved; terminus well sclerotized, with a spinneret; female tail 2.1 anal diameters long; male tail 2.0 anal diameters long.

Holotype: male collected 17 October 1960 by M. Dube; specimen on slide OSC OM 78, Oregon State University collection.

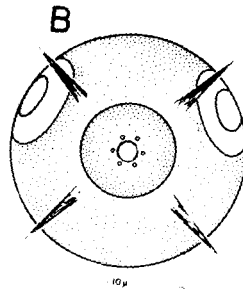
Type-locality: Marine Gardens, north of Devil's Punch Bowl, Oregon; associated with hold fast of Costeria costata (Turner 1819) Saundes 1895.

Diagnosis: distinguished from related species by possessing a small gubernaculum.

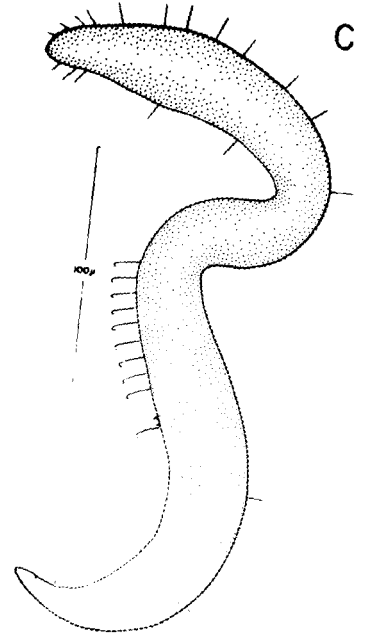
Figure 23. Notochaetosoma costeriata n. sp. A, anterior region of male. B, face view of female. C, lateral silhouette of male. D, male tail. E, female tail.



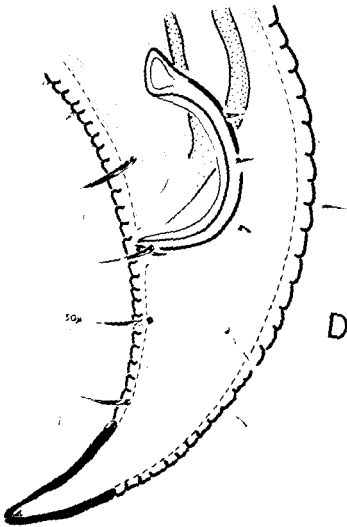
A



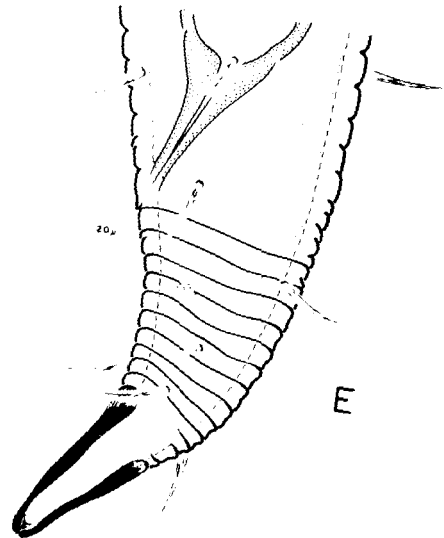
B



C



D



E

Genus Prochromadora Filipjev 1922 (25, p. 137)

Chromadoridae (Chromadorinae). Cuticle annulated, homogeneous; no longitudinal rows. Four cephalic setae. Buccal cavity cyathiform; massive, solid, dorsal tooth. Esophagus terminating in a well developed, large, simple bulb.

Genotype: P. megodonta Filipjev 1922.

Prochromadora trisupplementa n. sp.

(Figure 24)

	L (mm)	a	b	c	V (%)
Female:	0.79	23.4	6.8	7.1	15.3 15.3 46.3
	0.82	23.8	6.4	8.1	14.2 16.2 48.2
Male:	0.57	22.6	5.4	6.3	

Diameter at posterior end of esophagus 25 microns. Cuticle annulated, bearing a scale-like pattern. Four cephalic setae, slightly greater in length than one-half head diameter; cervical and somatic setae present, scattered. Amphids oval, five microns in width; positioned opposite dorsal tooth. Twelve lips bearing a total of six conical papillae. Head diameter at level of cephalic setae 10 to 11 microns. Stoma cyathiform, bearing large dorsal tooth; (tooth may have two apexes, which could conceivably place the species in the Genus Punctodora Filipjev 1930). Esophagus cylindrical, terminating in a distinct bulb; cardia not prominent;

nerve-ring at 60% of esophagus. Excretory pore opens 17 microns from anterior end; excretory gland prominent, with cap-cell. Cellular nature of intestine distinct; approximately four cells in circumference. Females didelphic, ovaries reflexed; spermathecas large. Males with three, large, cup-shaped preanal supplements; details of gubernaculum unclear, may have posterior apophysis; spicula narrow, sharply bent.

Tails conical, with strong ventral curling, terminating with a spinneret; female tail 5.8 anal diameters long; male tail 4.4 anal diameters long.

Holotype: male collected 1 April 1960 by D. G. Murphy; specimen on slide OSC OM 56, Oregon State University collection.

Allotypes: female, OSC OM 56.

Paratype: female, OSC OM 56.

Type-locality: Yaquina Head, Newport, Oregon; from stipe of Egria menziesii (Turner 1808) Areschoug 1876.

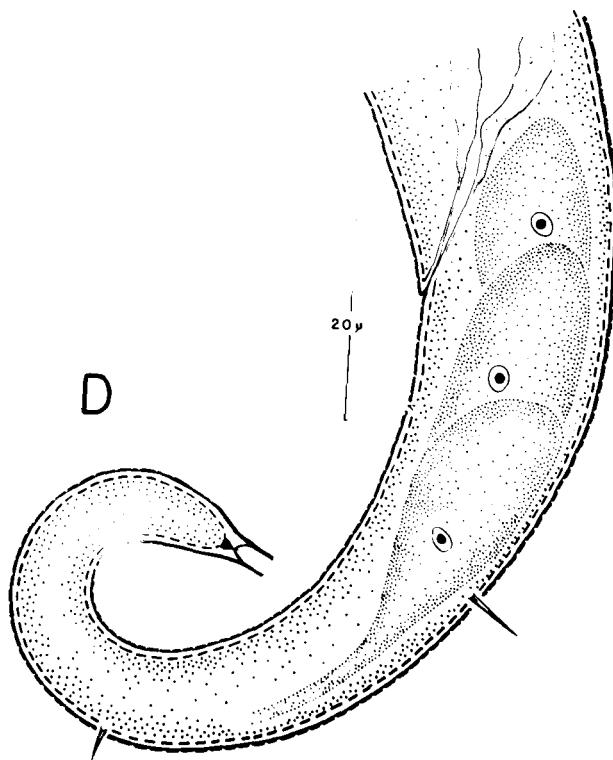
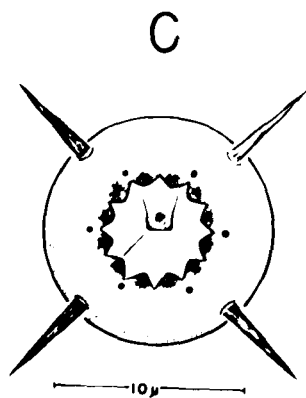
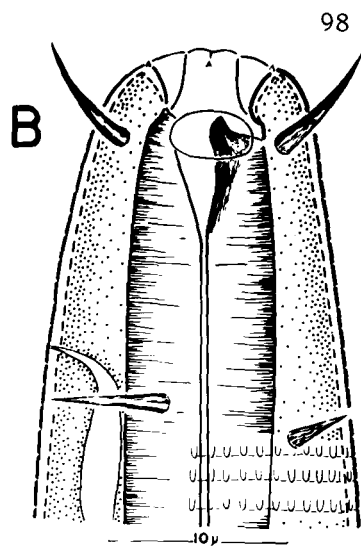
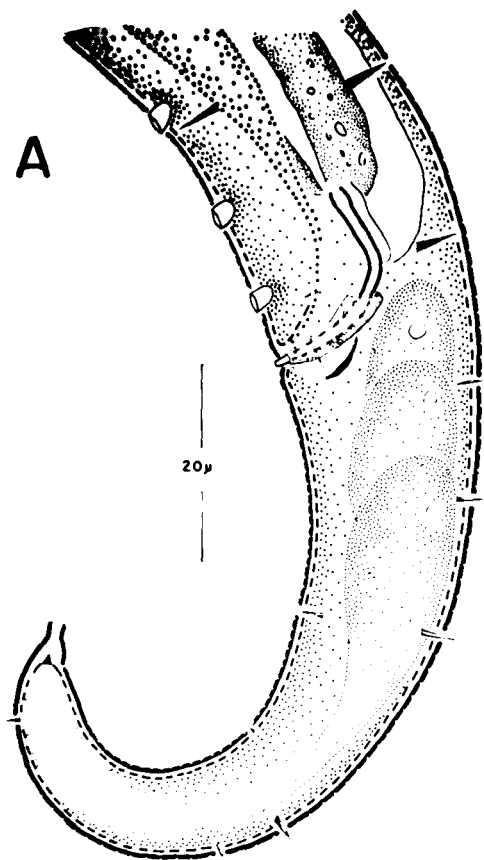
Diagnosis: distinguished from related species by possessing three preanal supplements.

Genus Chromadorina Filipjev 1918 (24, p. 226)

Chromadoridae (Chromadorinae). Generally small nematodes; cuticle annulated; cuticular pattern homogeneous; three solid teeth; amphids oval; four cephalic setae.

Genotype: C. obtusa Filipjev 1918.

Figure 24. Prochromadora trisupplementa n. sp. A, male tail.  
B, anterior region of female. C, face view of male. D, female  
tail.





Chromadorina germanica (Butschli 1874) (5, p. 284)

(Figure 25)

	L (mm)	a	b	c	V (%)	
Female:	0.87	18.6	6.9	6.7	18.4	19.0
					46.7	
	0.86	20.1	6.2	7.0	14.6	12.8
					48.6	
	0.93	23.2	6.9	6.2	19.1	15.0
					48.3	
	0.75	22.3	6.8	6.7	11.5	8.1
					48.8	
Male:	0.96	25.8	7.6	8.9		
	0.92	24.2	7.7	9.5		
	0.92	22.9	7.7	9.5		
	0.64	23.6	5.8	6.4		

Body diameter at posterior end of esophagus 30 microns. Cuticle annulated, with distinct plate-like pattern. Four cephalic setae, one-half corresponding head diameter long; cervical and caudal setae present, no somatic setae observed. Amphids oval, on level with cephalic setae, 29% of corresponding head diameter. Twelve labial rugae present; lips obscure; one circle of 12 labial papillae encircling oral aperture. Head diameter at level of cephalic setae 15 microns. Stoma conical; armed with single dorsal tooth and two opposing sublateral teeth. Ocelli present, anterior edge being 20 microns from anterior end of nematode. Esophagus cylindrical, terminating in prominent basal bulb; cardia not prominent;

nerve-ring positioned at 50% of esophagus. Excretory pore emptying at level of cephalic setae. Females didelphic; ovaries reflexed. Males with 16 to 18 stirrup-shaped preanal supplements; gubernaculum complex, lying close to sharply bent spicula.

Tails curved ventrally, terminating with a spinneret; female tail conical, becoming conoid distally, 6.3 anal diameters long; male tail conical 3.7 anal diameters long.

Plesiotypes: four males and four females collected 14 September 1960 by D. G. Murphy; specimens on slide OSC WM 67, Oregon State University collection.

Locality: Richmond Beach, Puget Sound, Washington; from intertidal sand.

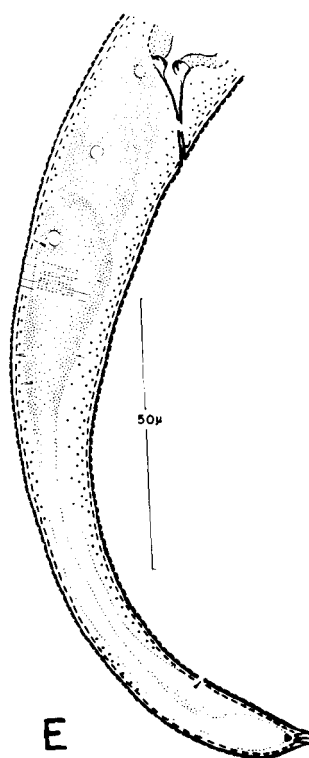
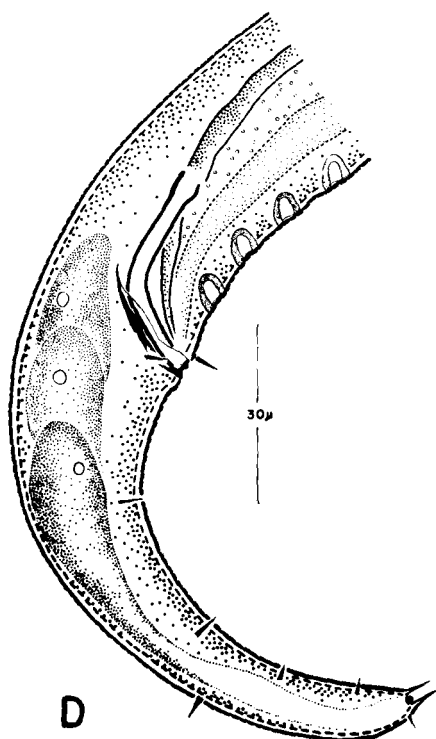
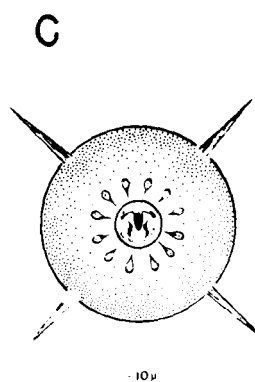
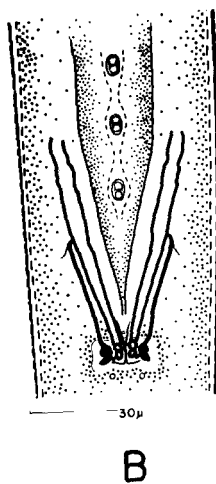
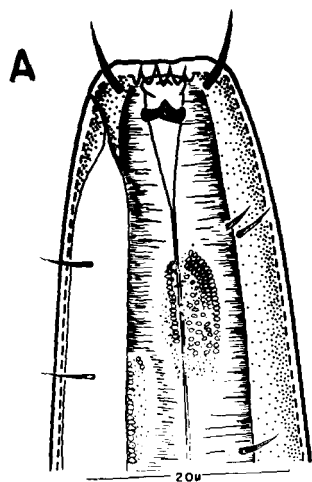
Genus Eudenticullela n. g.

Chromadoridae (Chromadorinae). Amphids slit-like; teeth hollow. Cuticle homogeneous; lateral faces with enlarged dots; two longitudinal striae. Four cephalic setae. Stoma armed with large dorsal tooth, several opposing teeth and denticles. Esophagus with prominent buccal musculature and postcorpus. Supplements chromadoroid.

The genus appears to be closely related to Cobb's Denticullela (20, p. 89) which was established on the basis of a juvenile female specimen obtained from humus. Unfortunately there was no illustration accompanying Cobb's species description. Eudenticullela is distinguished from Denticullela by possessing an additional row of

Figure 25. Chromadorina germanica (Butschli 1874).

A, anterior region of female. B, ventral view of male genital region. C, face view of male. D, male tail. E, female tail.



teeth, pronounced annulation, and sublabial amphids.

Genotype: E. setosa n. g. n. sp.

Eudenticullela setosa n. g. n. sp.

(Figure 26)

	L (mm)	a	b	c	V (%)	
Female:	1.39	24.4	8.3	6.9	18.0	16.8
					46.0	
	1.44	27.8	7.9	6.7	21.7	19.6
					47.7	
	1.40	25.6	8.1	7.4	22.9	21.1
					48.2	
	1.35	25.3	7.7	6.9	23.0	24.2
					47.5	
Male:	1.17	27.4	7.6	7.8		
	1.26	24.2	7.0	7.6		
	1.43	27.6	8.3	8.1		
	1.48	28.5	8.4	8.1		

Body diameter at posterior end of esophagus 34 microns. Cuticle annulated, bearing a punctate pattern; two lateral lines subtending rows of dots which are larger than those of the remainder of the cuticle. Four long cephalic setae, slightly greater than the corresponding head diameter in length; long cervical, somatic and caudal setae. Amphids slit-like, protruding; positioned opposite tip of dorsal tooth. Twelve lips surrounded by a circle of setose cephalic papillae. Head diameter at level of cephalic setae 19 microns. Stoma cyathiform with single powerful dorsal tooth opposed by eight

smaller teeth and eight (or perhaps 10 to 12) denticles; denticles may arise from labial rugae. Esophagus cylindrical with prominent buccal musculature and moderate basal bulb; cardia small, conical; first few cells of intestine lacking granular nature of remainder of intestine; nerve-ring at 55% of esophagus. Excretory pore not observed. Females didelphic; ovaries reflexed. Males with nine, small, evenly spaced, preanal supplements; spicula arcuate; gubernaculum thin, plate-like.

Tails elongate-conical, terminating with a spinneret; female tail 6.3 anal diameters long; male tail 4.6 anal diameters long.

Holotype: male collected 27 July 1959 by D. G. Murphy; specimen on slide OSC OM 53, Oregon State University collection.

Allotype: female, OSC OM 53.

Paratypes: seven females and five males, OSC OM 53.

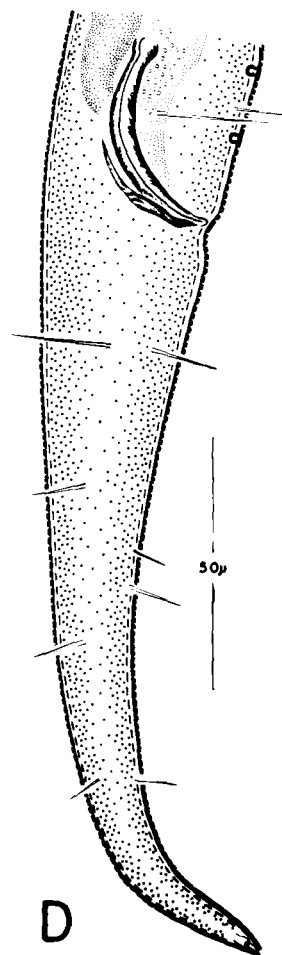
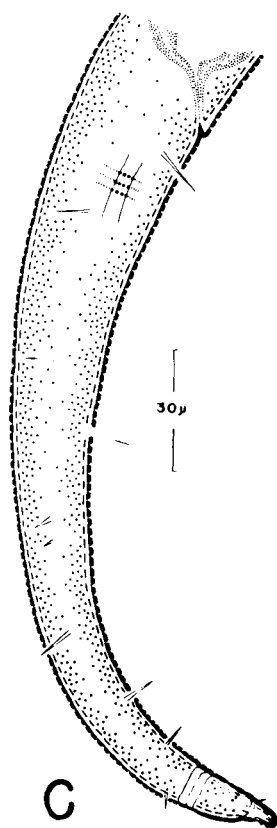
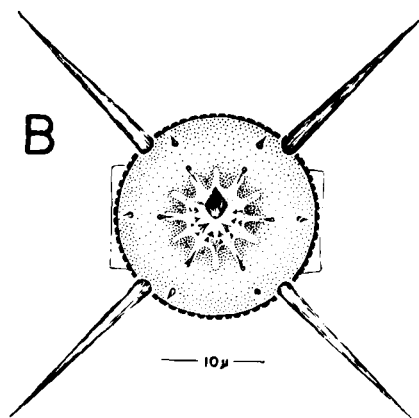
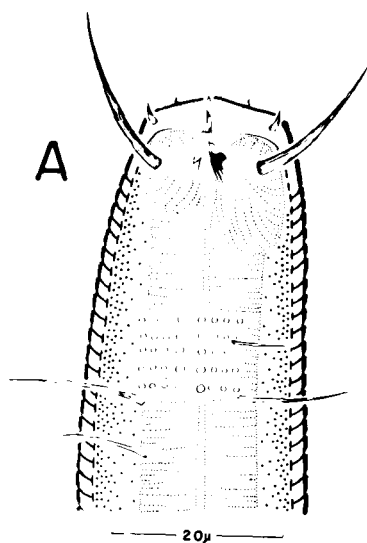
Type-locality: Devil's Punch Bowl, Oregon; from inter-tidal rock-scrapings.

Genus Spillophorella Filipjev 1918 (24, p. 259)

Chromadoridae (Chromadorinae). Cuticle striated, heterogeneous, punctate; two especially well developed lateral rows of punctations. Four cephalic setae. Stoma with large dorsal tooth, with or without additional subventral teeth. Esophagus with large, double, basal bulb. Spinneret long, acute. Females didelphic, ovaries reflexed; males with complicated gubernaculum.

Genotype: S. paradoxa (de Man 1888) Filipjev 1918.

Figure 26. Eudenticullela setosa n. g. n. sp. A, anterior region of male. B, face view of male. C, female tail. D, male tail. E, cuticular pattern at level of vulva.





Spilophorella furcata n. sp.

(Figure 27)

	L (mm)	a	b	c	V (%)
Female:	1.07	23.0	5.8	7.0	46.6
	1.05	22.4	5.8	6.7	19.4 18.1 44.6
Male:	0.89	21.2	5.7	6.7	

Body diameter at posterior end of esophagus 40 microns. Cuticle annulated, lateral differentiation pronounced in the form of two longitudinal rows of enlarged cuticular punctations. Cephalic setae four, 4.5 microns long; cervical and somatic setae short, stout. Amphids obscure. Twelve labial rugae; six distinct papillae. Head diameter at level of cephalic setae 12.2 microns. Stoma conical, somewhat enlarged anteriorly; armed with powerful dorsal tooth. Esophagus with cylindrical corpus terminating with a large, two-valved bulb; nerve-ring located at 50% of esophagus. Excretory pore opposite the dorsal tooth. Females didelphic; ovaries reflexed. Males with heavily sclerotized, broad gubernaculum; spicula arcuate; distal ends bifurcate; preanal supplements may be present (3?).

Tails conical, bearing uniquely arranged spinneret and terminal duct; female tail 5.0 anal diameters long; male tail 4.0 anal diameters long.

Holotype: male collected 27 July 1959 by D. G. Murphy; specimen on slide OSC OM 53, Oregon State University collection.

Allotype: female, OSC OM 53.

Paratype: female, OSC OM 53.

Type-locality: Devil's Punch Bowl, Oregon; inter-tidal rock-scrappings.

Diagnosis: distinguished from S. paradoxa by smaller dimensions and cephalic location of the excretory pore.

Genus Parascolaimus Wieser 1959 (50, p. 66)

Axonolaimidae (Axonolaiminae). Labial papillae claw-like. Buccal cavity deep. Gubernaculum with caudo-dorsal apophysis and paired, tubular distal portion. Amphids a close shepherd's crook, as in Ascolaimus Ditlevsen 1919. Females didelphic.

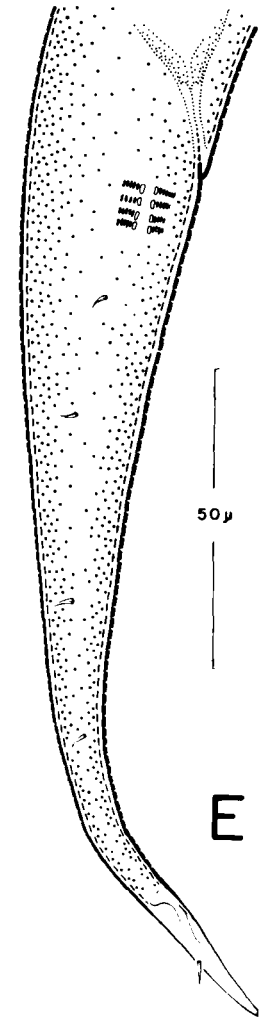
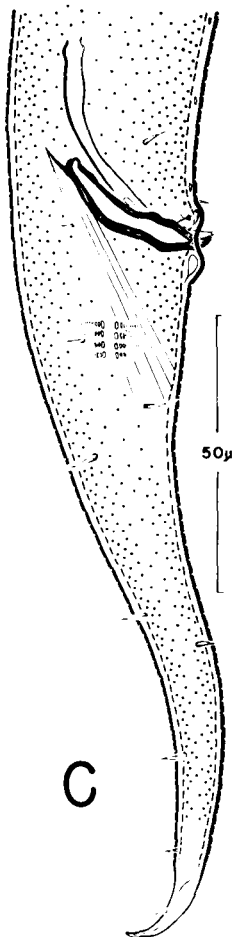
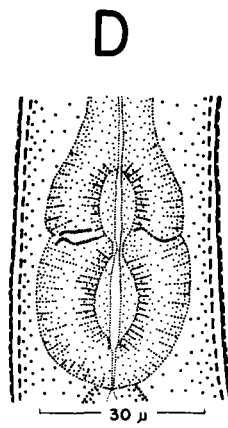
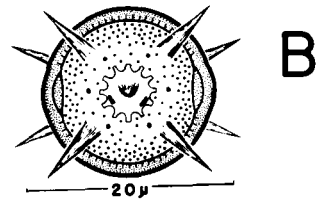
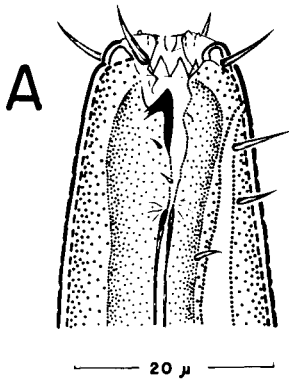
Genotype: P. tau Wieser 1959.

Parascolaimus tau Wieser 1959 (50, p. 66)

(Figure 28)

	L (mm)	a	b	c	V (%)
Female:	1.81	62.2	10.7	26.4	61.8
	1.84	56.7	10.3	26.6	62.5
	1.55	48.0	9.8	23.9	60.6
	2.12	61.5	12.4	27.5	61.3
Male:	1.69	68.1	11.4	18.1	
	1.65	67.7	11.6	18.5	
	1.64	62.0	11.3	18.8	
	1.59	60.1	10.7	17.0	

Figure 27. Spilophorella furcata n. sp. A, anterior region of female. B, face view of female. C, male tail. D, esophageal region of male. E, female tail.



Body diameter at posterior end of esophagus 27 microns. Cuticle annulated. Four cephalic setae, 4.7 times the corresponding head diameter in length; prominent cervical setae; few, short somatic and caudal setae. Amphids a closed shepherd's crook, 55 to 60% of corresponding head diameter; located opposite mid-region of stoma. Six lips bearing one setose (claw-like) papillae each; six cephalic papillae located on outer margins of head. Head diameter at level of cephalic setae 11 microns. Stoma deep, tapering toward base; unarmed. Esophagus cylindrical, broadening at base; cardia conical, surrounded by intestinal tissue; nerve-ring at 53% of esophagus. Excretory pore three head diameters from anterior end. Females didelphic; ovaries reflexed. Males with seven to eight small, tubular, evenly spaced, preanal supplements, (Wieser noted 10 such supplements; however, in Oregon specimens those furthest removed from the cloaca were very obscure and difficult to discern); spicula broad, arcuate; gubernaculum complex, with prominent apophysis.

Tails terminating with a spinneret; female tail conical with a marked reduction in diameter at middle, 2.6 six anal diameters long; male tail conical, 3.6 anal diameters long.

Plesiotypes: collected by H. J. Jensen and D. G. Murphy on 22 July 1958; specimens on slide OSC OM 11, Oregon State University collection.

Locality: Fort Stevens State Park, Oregon; from inter-tidal sand.

Remarks: Oregon specimens are consistently smaller than those

described by Wieser from Puget Sound; however, they agree in sufficient detail to preclude consideration as a new species.

Genus Bathylaimus Cobb 1893 (11, p. 409)

Tripyloididae. Buccal cavity large and deep, two cavitied; posterior cavity considerably smaller than anterior. Lips deeply incised. Buccal armament lacking, or if present, not prominent. Females didelphic; males with large, complex, gubernaculum.

Genotype: B. australis Cobb 1893.

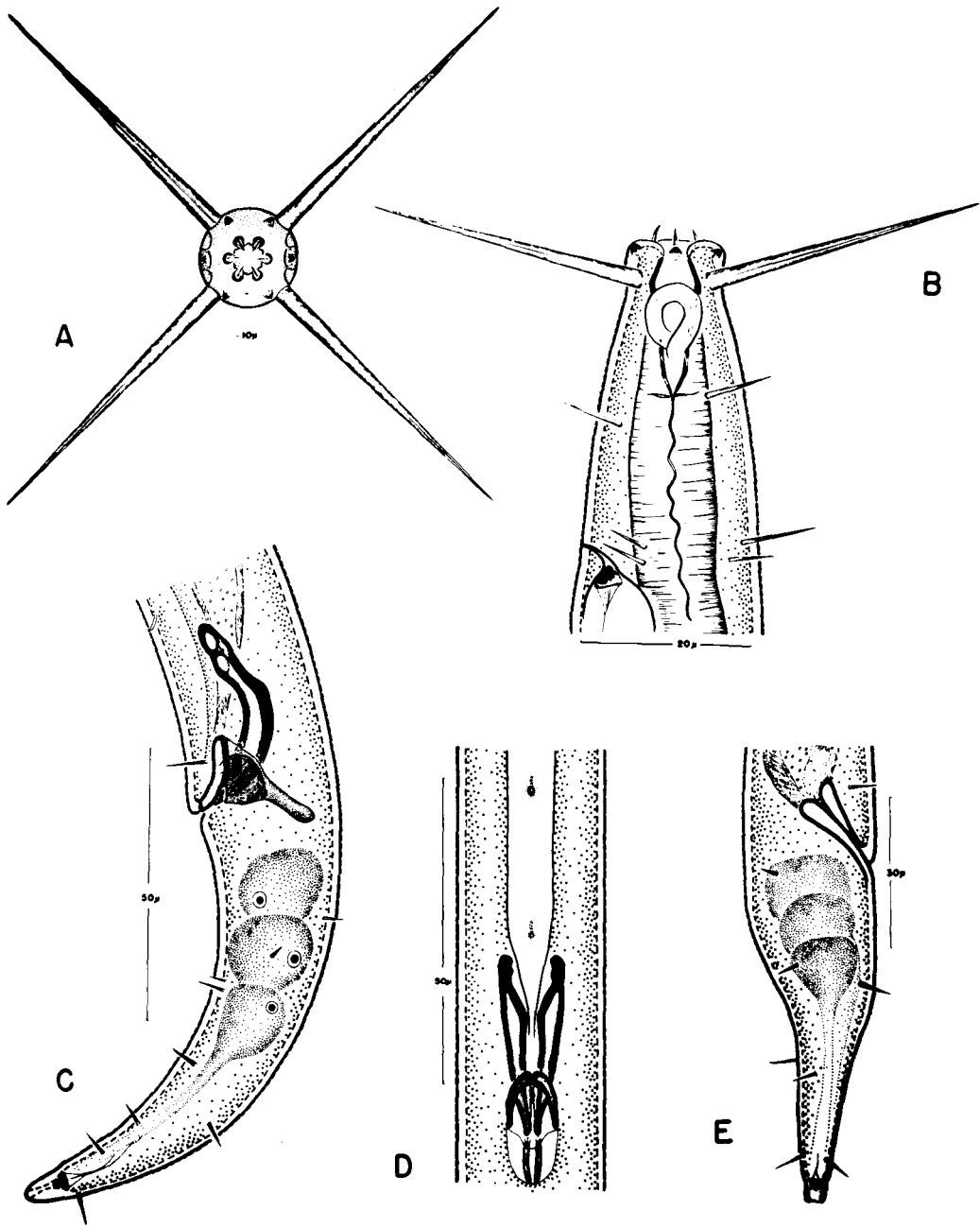
Bathylaimus tarsoides Wieser 1959 (49, p. 74)

(Figure 29)

	L (mm)	a	b	c	V (%)
Female:	1.10	31.8	5.8	21.9	50.7
Male:	1.11	38.1	5.9	19.6	

Body diameter at posterior end of esophagus 26.7 microns. Cuticle annulated. No distinctive lateral pattern observed. The six, large cephalic setae 23 microns long; very stout at base, narrowing markedly at two points, (Wieser noted only one such region per seta), so as to appear jointed or telescoping. Distal portion of setae jointed, perhaps articulating; bi- or trifurcate. Dorso- and ventro-lateral setae fine, appear pointed rather than blunt as in Wieser's description. Cervical or somatic setae few, scattered. Female with numerous caudal setae which may prove to be parasites

Figure 28. Parascolaimus tau Wieser 1959. A, face view of male. B, anterior region of male. C, male tail. D, ventral view of male genital area. E, female tail.





or epiphytes as noted below (Remarks). Male with four preanal setae. Amphids 5.7 microns, forming slightly more than one spiral; located opposite base of stoma. Lips not distinct, having coalesced into three folds. Labial papillae setose; stout, curved, narrowing considerably at distal end. Head diameter at level of cephalic setae 19 microns. Stoma broad and deep, constricted at a region about two-thirds distant from anterior end. Single tooth in posterior region of stoma, the point of origin of which is obscure. Esophagus elongate, cylindrical, enlarging slightly at base to form a valvulated bulb; cardia broad, rounded; nerve-ring located at 50% of esophagus. Excretory pore not observed. Females didelphic; ovaries reflexed. Males with complex gubernaculum bearing lateral apophyses which serve for muscle attachment; large, blade-shaped spicula; one tubular supplement immediately anterior to cloaca (not noted by Wieser).

Tails conical, curved ventrally, terminating with a spinneret; female tail 2.7 anal diameters long; male tail 2.4 anal diameters long.

Plesiotypes: one male and one female collected 22 July 1958 by H. J. Jensen and D. G. Murphy; specimens on slide OSC OM 11, Oregon State University collection.

Locality: Fort Stevens State Park, Oregon; from inter-tidal sand.

Remarks: Oregon specimens of this species are smaller than those described by Wieser from Puget Sound. There are indications of possible bristles on the cephalic setae, which would be a very

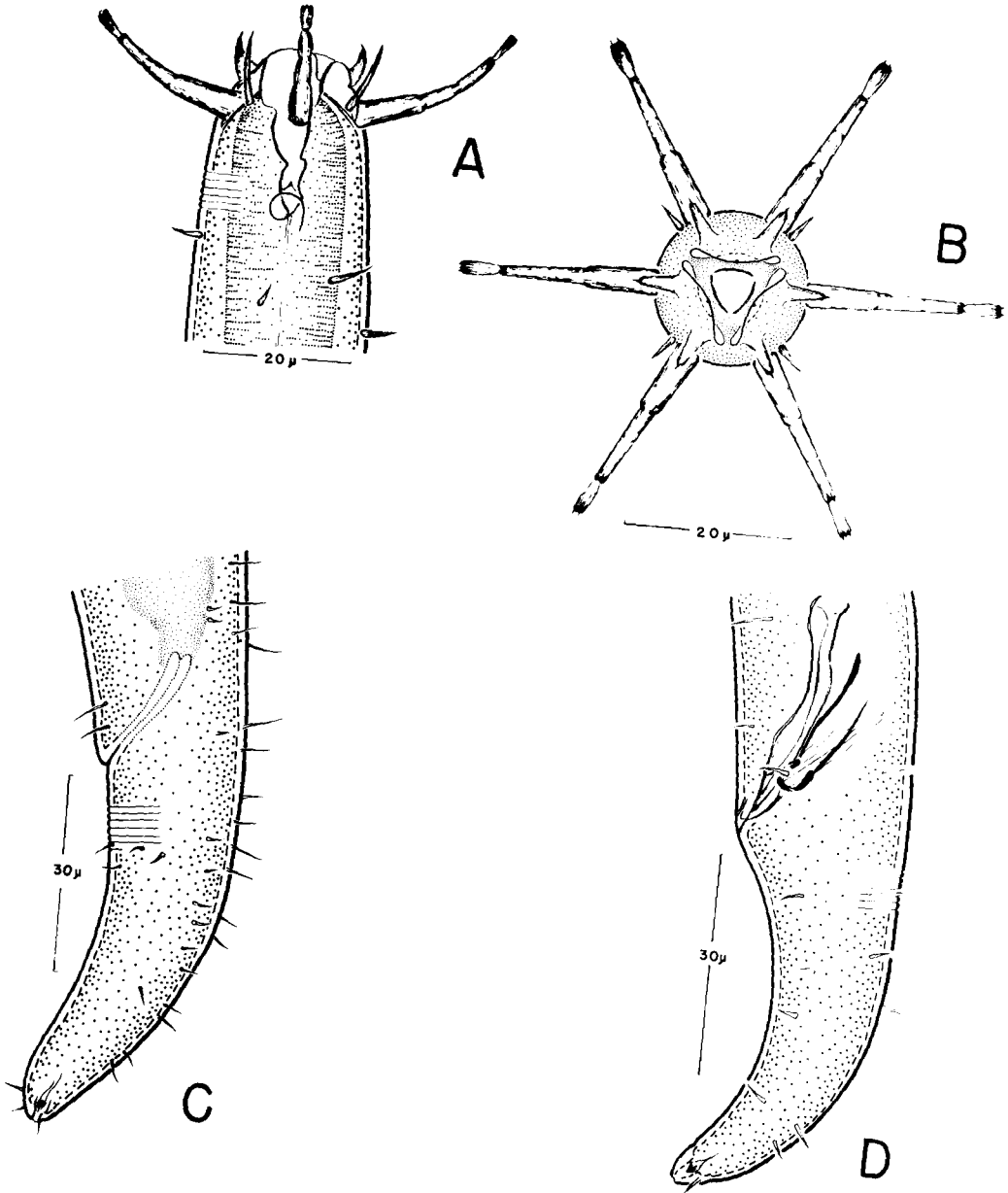
unique feature among the Nemata. Parasitic and epiphytic algae may be suggestive of setae (51, p. 81-87), thus the situation will require further study. Wieser noted the vulva on the two Puget Sound specimens at 40%. The 10% difference noted in Oregon specimens may be significant, but this also requires further comparative studies.

Genus Rhynconema Cobb 1920 (17, p. 260)

Monhysteridae (Monhysterinae). Cobb described the genus Rhynconema from collections made at Salaverry, Peru. He stated, "Rhynconema is composed of a considerable number of species occurring in at least the Atlantic and Pacific Oceans." (17, p. 260). In contrast to this statement there are now only three known species. Cobb's species, R. cinctum, was reported by Wieser from Chile (48, p. 74). Gerlach (28, p. 28) recognized Allgen's description of Leptolaimus lyngei to be identical with Rhynconema material he had collected from the Gulf of Finland and thereby arrived at the new combination R. lyngei (Allgen 1940).

Cobb's and Gerlach's species may well be synonymous, a fact which can not be clarified until type material is established for comparative studies. Cobb's illustration of R. cinctum would separate his species from others by what appears to be enlarged telorhabdions. If this character is valid, then Wieser's description of R. cinctum (48, p. 74) would be more likely related to R. lyngei. R. subsetosum n. sp. is unique to the genus in bearing six

Figure 29. Bathylaimus tarsoides Wieser 1959. A, anterior region of male. B, face view of female. C, female tail. D, male tail.



rather than eight cephalic setae, in all other respects this species is representative.

These are small nematodes with a very long, tubular stoma not to be paralleled elsewhere in the nematode phylum.

Genotype: R. cinctum Cobb 1920.

#### Key to species of Rhynconema

1. Cephalic setae six . . . . . R. subsetosum n. sp.
1. Cephalic setae ten . . . . . (2)
2. Value of "a" (de Man's formula)
  - 23 to 28 . . . . . R. cinctum Cobb 1920
  2. Value of "a" 15 to 17 . . . R. lyngei (Allgen 1940) Gerlach 1953

#### Rhynconema subsetosa n. sp.

(Figure 30)

	L (mm)	a	b	c	V (%)
Female:	0.69	22.7	3.8	8.3	71.2
	0.71	22.4	3.8	7.9	70.1
	0.75	27.9	4.2	8.2	71.8
	0.77	23.8	4.1	8.1	73.0
Males:	0.62	25.5	4.4	8.8	
	0.61	24.9	4.2	8.8	
	0.76	32.8	4.3	7.7	
	0.67	26.7	4.8	8.4	

Diameter at posterior end of esophagus approximately 28 microns. Cephalic region elongate, stoma tubular. Cuticle coarsely annulated, annules pointed forward on anterior portion of body, posteriorly on posterior half. Cephalic setae six, slightly less than one-half head diameter in length; long, narrow somatic and cervical setae arranged at regular intervals. Amphids circular, 4.5 to 5.0 microns in diameter, positioned immediately above base of stoma. Six lips, each bearing one setose papillae. Head diameter at level of cephalic setae five microns; stoma long and cylindrical. Esophagus cylindrical, terminating in a moderate bulb; cardia oval, long axis directed dorso-ventrally; nerve-ring at 35% of esophagus measured from base of stoma. Excretory pore not observed. Intestine highly refractive, lumen containing oval bodies of nine by five microns. Female monodelphic; ovary reflexed. Male with one papilla one anal diameter anterior to anus; sharply bent spicula; plate-like gubernaculum with dorsal apophysis.

Tails conical, curved ventrally, terminating with a spinneret; female tail 4.8 anal diameters long; male tail 3.4 anal diameters long.

Holotype: male collected 8 September 1960 by D. G. Murphy; specimen on slide OSC OM 62, Oregon State University collection.

Allotype: female, OSC OM 62.

Paratypes: three males and three females, OSC OM 62.

Type-locality: Governor Patterson Memorial State Park, Oregon; from sand at mid-tide zone.

Diagnosis: differs from previously described forms in possessing an esophageal bulb, prominent preanal papilla on male, positioning of the amphids anterior to telorhabdions, and in possessing only six setae.

Genus Gammarinema Kinne and Gerlach 1953 (32, p. 193)

The Gammarinema manifest many characteristics of the genus Monhystera Bastian 1865, and most likely is closely related. It shares this position with Diplolaimella Allgen 1929. Wieser (48, p. 64) separates the two by lack of a gubernaculum in the Diplolaimella and presence thereof in the Gammarinema.

The Gammarinema have a smooth cuticle; 10 to 12 cephalic setae. Stoma two cavities in tandem; the distal cavity being the larger of the two; well sclerotized; proximal cavity with tooth-like structures. Amphids circular, well sclerotized.

Genotype: G. gammari Kinne and Gerlach 1953.

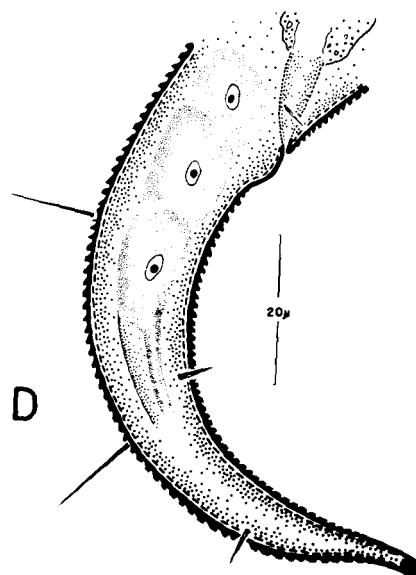
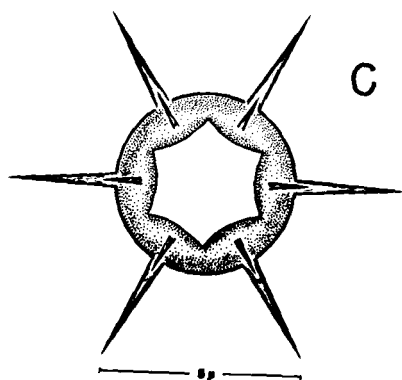
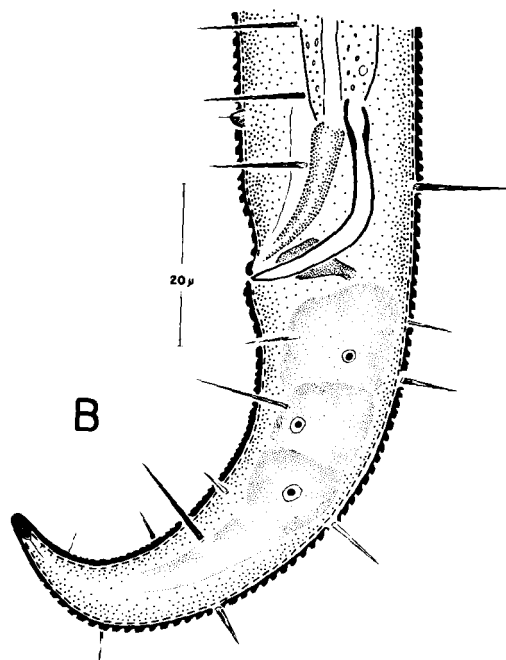
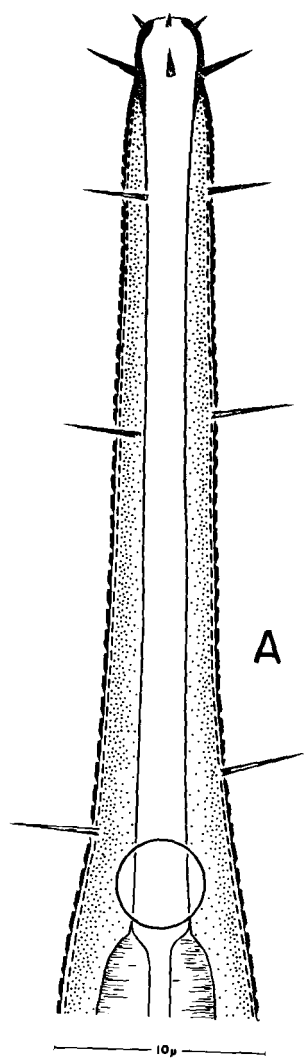
Gammarinema dentata n. sp.

(Figure 31)

	L (mm)	a	b	c	V (%)
Female:	0.66	24.0	6.5	6.8	28.0
					58.5
	0.77	24.4	6.6	6.6	28.4
					56.9
	0.67	22.2	6.2	6.4	28.5
					59.6

Figure 30. Rhynconema subsetosa n. sp. A, anterior region  
of male. B, male tail. C, face view of male. D, female tail.





	L (mm)	a	b	c	V (%)
					28.9
Female:	0.69	21.0	6.5	6.6	58.2
Male:	0.70	27.2	6.9	7.3	

Female curved dorsally, body narrowing immediately behind vulva. Diameter at posterior end of esophagus 24 microns. Cuticle smooth. Twelve cephalic setae; cervical and somatic setae present, scattered. Amphids circular, 2.5 to 3.0 microns in diameter, opposite proximal enlargement of stoma. Six lips bearing six small, conical papillae. Head diameter at level of cephalic setae 10 to 11 microns. Stoma funnel shaped, walls sclerotized; teeth (or some form of glottoid apparatus) are present in the small proximal enlargement of the stoma, although often difficult to discern. Esophagus cylindrical, widening toward the base; cardia small, conical; nerve-ring not observed. Excretory pore at 21% of esophagus. Intestine moderately granular, containing numerous large (24 by 5 microns) diatoms. Females monodelphic; ovary reflexed or doubly reflexed. Male with ventral, preanal protuberance (papilla?) two anal diameters anterior to anus; two caudal papilla; spicula arcuate, blade-shaped; gubernaculum small, simple.

Tails conoid, bulbous at tip, terminating with a spinneret; female tail 5.0 anal diameters long; male tail 4.6 anal diameters long, curved ventrally.

Holotype: male collected by D. G. Murphy 25 February 1960; specimen on slide OSC OM 55a, Oregon State University collection.

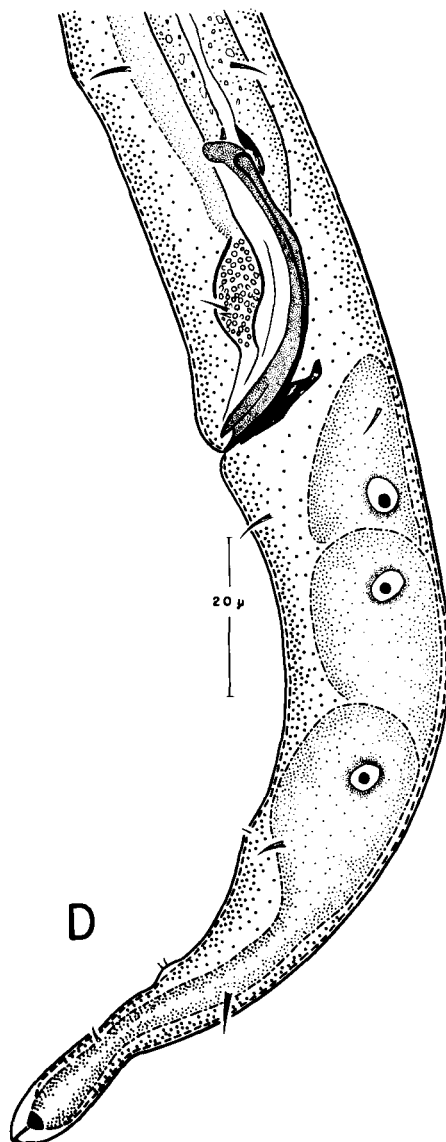
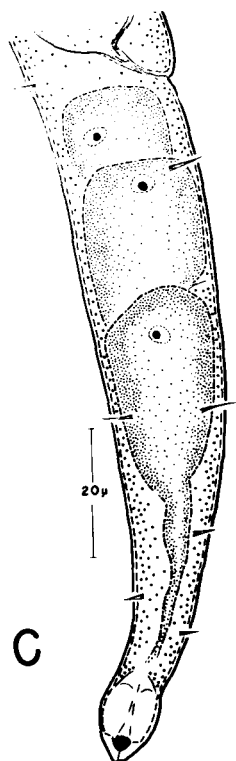
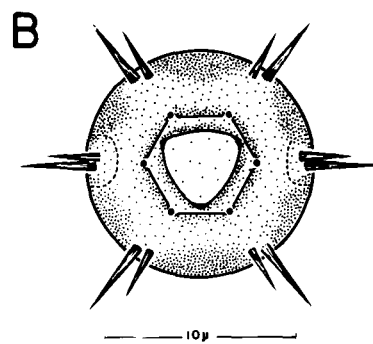
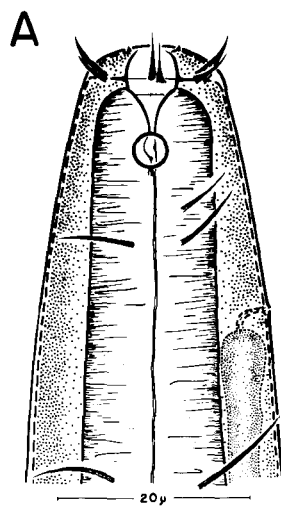
Allotype: female, OSC OM 55a.

Paratypes: three females, OSC OM 55a.

Type-locality: Yaquina Head, Newport, Oregon; epizoic on bladder of Nereocystis spp.

Diagnosis: distinguished from Gammarinema gammeri by possessing 12 rather than 10 cephalic setae.

Figure 31. Gammarinema dentata n. sp. A, anterior region of female. B, face view of male. C, female tail. D, male tail.



## SUMMARY

Species of marine nematodes were described as early as the mid-seventeenth century; since then only a limited number of workers, primarily European, have made contributions. Although marine nematodes are known from Washington and California, this investigation constitutes the first contribution to a comprehensive study of Oregon forms.

Thirty collection sites now are represented in the Oregon State University marine nematode collection. Techniques employed in collecting, preserving, mounting, and describing of the forms reported in this study are presented.

A total of 27 species are described and illustrated. Of these 18 species and three genera are newly described.

An unpredictable number of forms, both coastal and off-shore, offer vast opportunities for further taxonomic and ecological efforts. Such work should be encouraged with the aim of developing a continuing program of research and training in the field of marine nematology.

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