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NEMATODI D'ACQUA DOLCE

Manuale di identificazione al genere e metodi di raccolta

Aldo Zullini

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Foto di copertina e retrocopertina: rappresentazione artistica in vetro di un nematode. Photos and sculpture by Luke Jerram (https://www.lukejerram.com)

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NEMATODI D'ACQUA DOLCE
Manuale di identificazione al genere e metodi di raccolta

Aldo Zullini

SOMMARIO

CURIOSITÀ

La maggior parte (80%) degli animali continentali (suolo e acque dolci) è costituita da nematodi, dato che il loro numero, sul nostro pianeta, supera i 10^{20}. Tale numero, tradotto in secondi, corrisponde a mille volte l'età dell'Universo. Nel complesso essi pesano 0,3 miliardi di tonnellate[1].

Gruppo di nematodi, con uova embrionate.

I nematodi (phylum Nematoda) presentano una grande varietà di forme e dimensioni[2], ma quelli continentali a vita libera (non parassiti) sono immediatamente riconoscibili, al microscopio, per il loro aspetto filiforme e per il loro incessante movimento sinusoidale.

L'evoluzione dei nematodi è iniziata nell'ambiente marino, successivamente alcune famiglie colonizzarono acque salmastre e le acque dolci. In seguito è stato colonizzato anche il suolo. Alcuni generi si sono spinti a sfruttare l'ambiente saprobio (materiale organico in decomposizione e feci). Da quest'ultimo ambiente si sono poi evoluti i nematodi parassiti degli animali, uomo compreso.

Non esiste un carattere distintivo tra i nematodi del suolo e quelli acquatici. In generale si può dire che questi ultimi, rispetto alle specie del suolo, sono mediamente più lunghi e sottili, sono spesso dotati di lunghe sete sensitive cefaliche, presentano chemiocettori (anfidi) più grandi e talvolta ocelli. Inoltre hanno spesso code più lunghe e un sistema colloso per aderire al substrato (ghiandole caudali e spinneret). Le numerose specie semiacquatiche presentano caratteristiche intermedie[3].

Caenorhabditis elegans è probabilmente l'animale più studiato e meglio conosciuto al mondo, essendo diventato un modello per studi di biologia, specialmente da quando, nel 2002, S. Brenner, R. Horvitz e J. Sulston vinsero il premio Nobel per i risultati ottenuti studiando questo nematode. Digitando *C. elegans* su un motore di ricerca si ottengono circa 20 milioni di risultati, più di qualsiasi altro nome latino di animale.

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1) van den Hoogen J. *et al.* (2019): Soil nematode abundance and functional group composition at a global scale. *NATURE* https://www.nature.com/articles/s41586-019-1418-6
2) Zullini A. (2012): What is a nematode? *Zootaxa* 3363: 63-64.
3) Zullini A. & Semprucci F. (2020): Morphological differences between free-living soil and freshwater nematodes in relation to their environments. *Nematology* 22: 125-132.

PRESENTAZIONE DELL'EDITORE

Il manuale originale *Identification manual for freshwater nematode genera* – che qui proponiamo in una versione arricchita e aggiornata – nasce come dispensa illustrata distribuita dal prof. Zullini, dell'Università di Milano-Bicocca, agli studenti di un corso di specializzazione all'Università di Gent (Belgio).

Fino ad oggi il manuale ha fatto parte della così detta *letteratura grigia*, cioè di quell'insieme di testi diffusi dagli stessi autori senza fini di lucro e non pubblicati attraverso i normali canali del commercio librario.

Ma la letteratura grigia, come noto, riveste un ruolo importante nel mondo scientifico perché consente la circolazione di informazioni difficilmente accolte dai canali più tradizionali.

Attraverso l'operazione editoriale di riunire alcuni dattiloscritti sui nematodi in un numero speciale di Biologia Ambientale, il Centro Italiano Studi di Biologia Ambientale consente a questo prezioso materiale di entrare a far parte della letteratura scientifica.

La qualità e l'utilità dei contenuti appaiono immediatamente evidenti alla prima lettura e siamo certi che saranno di grande interesse per molti dei nostri Soci.

Per questo motivo, siamo grati al prof. Aldo Zullini per aver concesso al Centro Italiano Studi di Biologia Ambientale la riproduzione del materiale e per averci pienamente supportato nell'attività editoriale.

Daniela Lucchini
Presidente CISBA

PRESENTAZIONE DELL'AUTORE

Quando, nel lontano 1967, da giovane ricercatore cominciai a lavorare sull'ecologia e biologia delle acque dolci, rimasi affascinato dalla bellezza e trasparenza di certi organismi microscopici e, in particolare, dai nematodi. All'epoca la conoscenza dei nematodi acquatici era modesta e gli articoli che ne trattavano erano scritti in varie lingue e reperibili solo girando varie biblioteche europee e scrivendo a vari Istituti per ottenere certe fotocopie (non c'era Internet).

Fu così che girai per l'Europa fermandomi presso nematologi affermati per imparare l'arte e fare il pieno di pubblicazioni scientifiche. Per i nematodi d'acqua dolce non c'erano testi generali che aiutassero a identificare tale microfauna né, tantomeno, che ne descrivessero il ruolo ecologico. Poi le cose andarono migliorando, ma ancor oggi è difficile, per un principiante, orientarsi in questo studio.

Tale situazione mi ha costretto, dovendo insegnare la materia per un corso di specializzazione, a scrivere una guida per il riconoscimento dei generi dei nematodi d'acqua dolce per i miei studenti. Cioè il manuale che io stesso avrei voluto avere quando muovevo i primi passi in questo campo.

Rifuggendo dalle impegnative chiavi dicotomiche, mi sono soprattutto affidato alle immagini (disegni e anche foto) scelte tra quelle dei migliori autori della materia. Ogni disegno è un'interpretazione, ecco perché, di regola, una figura sola non basta: due o più disegni (= punti di vista) restituiscono molto meglio le sfuggenti strutture microscopiche in oggetto.

Quando il prof. Ghetti e la Dr. Lucchini hanno gentilmente proposto la pubblicazione del mio Manuale, mi sono impegnato a riscriverlo per migliorarlo, arricchirlo e aggiornarlo. Ho avuto la fortuna di avere costantemente accanto (adesso c'è Internet) la valida ed efficiente assistenza dei redattori di *Biologia Ambientale* che per alcuni mesi hanno contribuito in modo sostanziale alla struttura e alla veste grafica dell'opera. Lavorando di squadra, con contatti quasi quotidiani. Ad essi vanno i miei più vivi ringraziamenti.

Aldo Zullini

I NEMATODI

Habitat

I Nematodi d'acqua dolce vivono sul fondo dei laghi, degli stagni, dei fiumi e dei ruscelli ma si possono trovare anche nelle acque sotterranee, nelle grotte e nelle sorgenti.

Sono animali strettamente bentonici; possono tuttavia essere strappati dal loro habitat e quindi trovarsi temporaneamente sospesi nell'acqua corrente dei fiumi.

I Nematodi d'acqua dolce abbondano negli strati superficiali dei sedimenti ricchi di materia organica: in tal caso possono essere presenti con molte migliaia di esemplari per metro quadrato (per lo più, da diecimila a un milione) ma, di regola, rappresentati da poche decine di specie.

Nei fondi ciottolosi, sabbiosi o argillosi dei fiumi puliti e ben ossigenati i nematodi non sono molto numerosi (anche meno di un migliaio di individui per metro quadrato) ma solitamente comprendono parecchie specie.

Nelle limpidissime acque delle grotte, delle sorgenti o dei ruscelli di montagna i nematodi sono poco numerosi.

Nei laghi abbondano soprattutto a bassa profondità, presso le rive; vivono anche nelle acque più profonde purché vi sia sempre un certo tenore di ossigeno.

Le specie di Nematodi conosciute nel mondo sono oltre 25.000, di cui circa metà parassite di piante o di animali, ma si pensa che le specie esistenti siano almeno dieci volte più numerose. Le specie rinvenute nelle acque dolci sono poco meno di 2000.

Anatomia

I Nematodi, o vermi filamentosi, hanno un aspetto generalmente molto allungato, vermiforme, più o meno filamentoso (Fig. 1).

Le specie di acqua dolce hanno lunghezze che vanno generalmente da 0,25 mm a circa 8 mm.

Il corpo, non segmentato, è ricoperto da una cuticola non cellulare, trasparente, spesso munita di un certo numero di sete sensoriali. La cuticola è secreta da un sottile epiderma immediatamente sottostante.

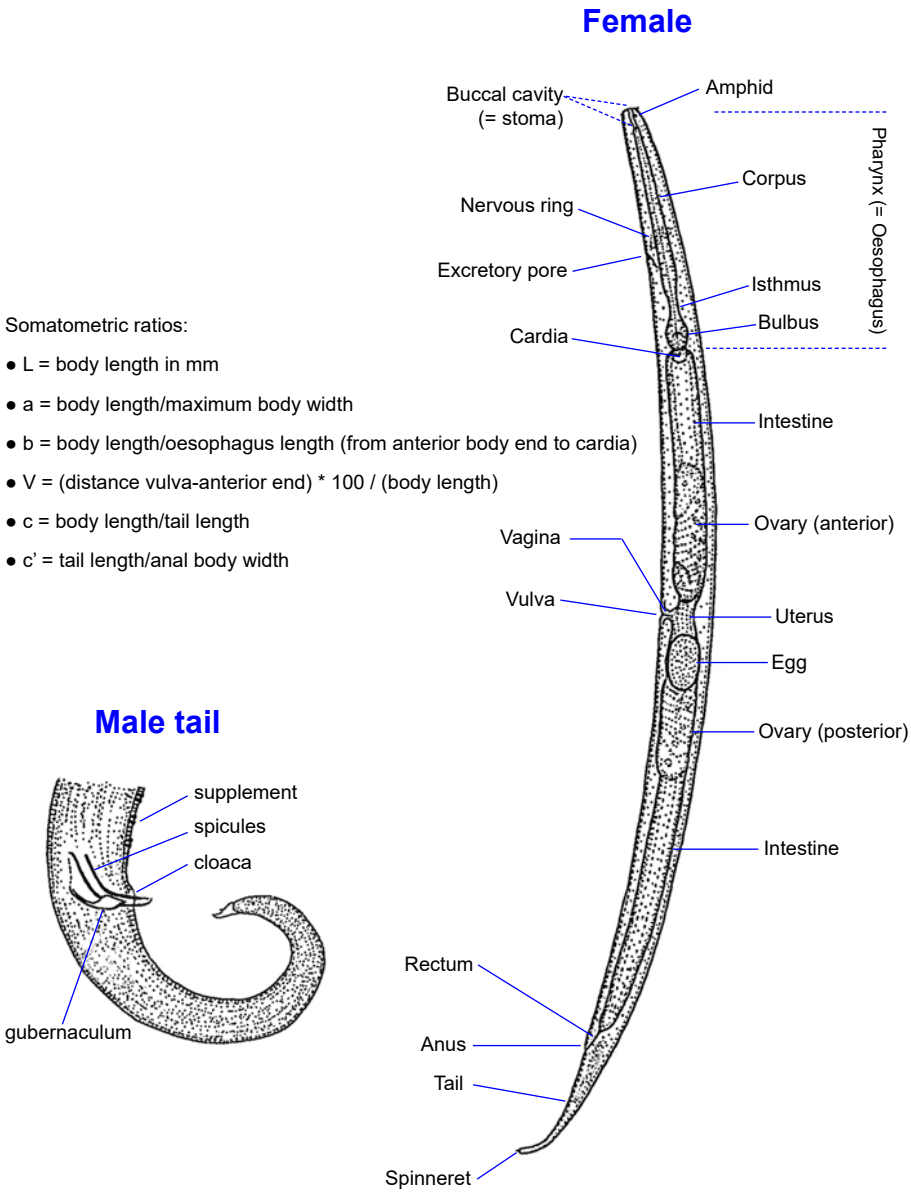
Sotto l'epiderma vi è un unico strato di lunghe cellule muscolari longitudinali.

Tra queste ultime e il tubo intestinale vi è un'ampia cavità pseudocelomatica riempita da un liquido sotto pressione (che funziona da scheletro idrostatico).

Il tubo digerente, rettilineo, si apre all'estremità anteriore con la bocca e termina in un punto più o meno vicino all'estremità posteriore.

Mancano gli apparati circolatorio e respiratorio.

Anatomy of a nematode



Somatometric ratios:

- L = body length in mm
- a = body length/maximum body width
- b = body length/oesophagus length (from anterior body end to cardia)
- V = (distance vulva-anterior end) * 100 / (body length)
- c = body length/tail length
- c' = tail length/anal body width

Fig. 1. Anatomia di un nematode.

I sessi sono di regola separati; i maschi, che in molte specie sono rari o sconosciuti, posseggono nella cloaca delle caratteristiche spicole copulatrici. L'apertura genitale femminile si apre, separatamente dall'ano, solitamente a metà corpo.

La riproduzione è ovipara, talora ovovivipara. Lo sviluppo si effettua in seguito al compimento di quattro mute.

I nematodi liberi, e in particolare quelli di acqua dolce, non hanno il corpo pigmentato e sono più o meno trasparenti. Sovente è visibile – per almeno due terzi della loro lunghezza – la striscia scura dell'intestino, che appare bruna o verde a seconda del materiale ingerito; la parte anteriore del corpo, occupata dall'esofago, appare invece chiara e trasparente.

L'identificazione dei nematodi si basa principalmente sulla struttura della cuticola (e suoi derivati) e sulla struttura dell'apparato digerente (soprattutto bocca ed esofago).

La **cuticola** dei Nematodi è resistente, flessibile e talora notevolmente spessa; è formata essenzialmente da proteine simili al collagene. Può presentarsi marcata da strie trasversali simili ad un'anellatura superficiale più o meno evidente o addirittura con appendici embricate o a forma di scaglie; in alcuni casi presenta due o più lunghi rilievi e solchi longitudinali – detti **campi laterali** (*lateral fields*) – situati sui due fianchi.

Intorno all'apertura boccale vi sono differenziazioni cuticolari chiamate **labbra**: solitamente sono sei e sono sormontate da altrettante piccole **papille labiali** interne circondate, a loro volta, da un cerchio di sei papille labiali, spesso setiformi, esterne.

Dietro alle labbra vi possono essere quattro **sete cefaliche**, talvolta molto lunghe.

Lungo tutto il corpo vi sono talora otto file di papille o **sete somatiche**.

Presso l'estremità anteriore del corpo ci sono anche due piccole aperture scavate nella cuticola: si tratta dello sbocco di recettori chimici chiamati **anfidi** (Fig. 2).

L'apertura degli anfidi è solitamente ben visibile quando ha forma circolare, ellittica, parzialmente spiralata o spiralata; altre volte è puntiforme e quasi invisibile, altre volte ancora ha la forma di una tasca incavata. Gli anfidi devono il nome al fatto di apparire, in certe specie, come due dischetti (anfidischi) ai due lati del corpo.

La cavità boccale, detta **stoma** (Fig. 3 e 4), si apre all'estremità anteriore; è più o meno ampia e spesso fornita di strutture solide, dall'aspetto compatto e rifrangente.

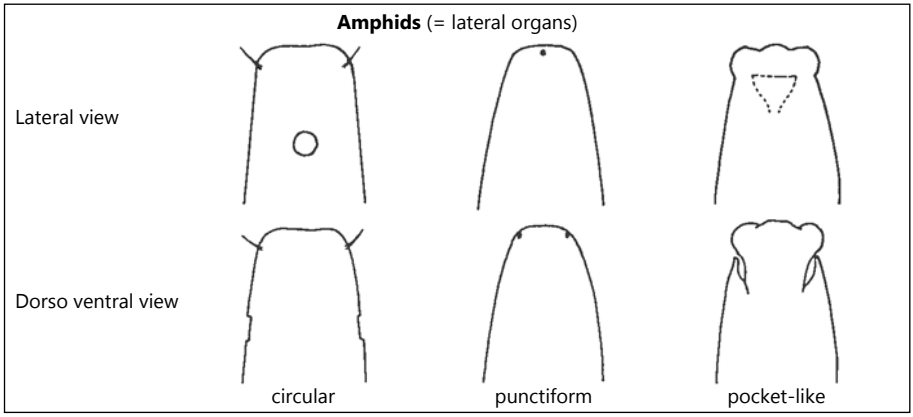


Fig. 2. Tipi di anfidi (organi laterali) in vista laterale (sopra) e dorso-ventrale (sotto).

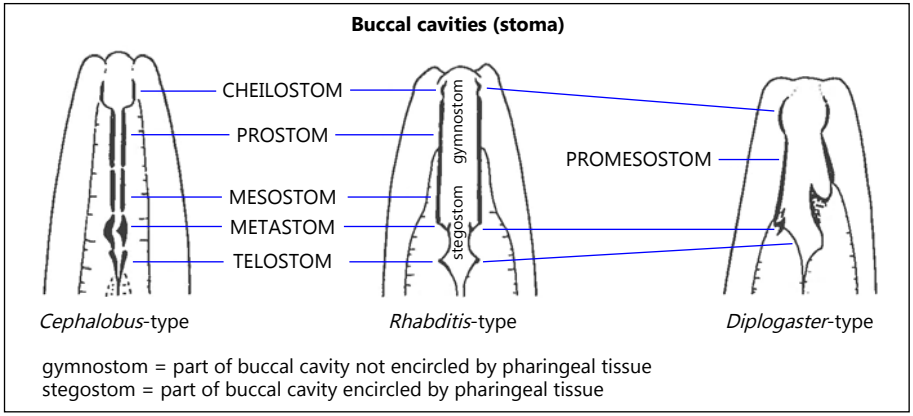


Fig. 3. Alcuni tipi di cavità boccale.

Nelle specie che si nutrono di batteri la bocca è un tubo privo (o quasi) di dentelli mentre in quelle che si cibano di alghe o di piccoli animali è presente una robusta capsula boccale ben munita di denti e dentelli (Fig. 5).

Alcuni generi, soprattutto se le specie sono succhiatrici di linfe vegetali, sono dotati di uno stiletto cavo protrusibile derivato da trasformazioni successive dei pezzi boccali (Tylencomorfi). Di tutt'altra origine e struttura è invece l'**odontostilo**, lo stiletto boccale dell'ordine Dorylaimida. Si tratta (eccetto che per i Nygolaimidae) di un tubicino in posizione assiale, più o meno sottile, con apertura anteriore obliqua a mo' di ago di siringa. Serve per perforare e aspirare materiale vegetale o animale, ragion per cui molti Dorylaimida sono generalmente (e genericamente) considerati "onnivori".

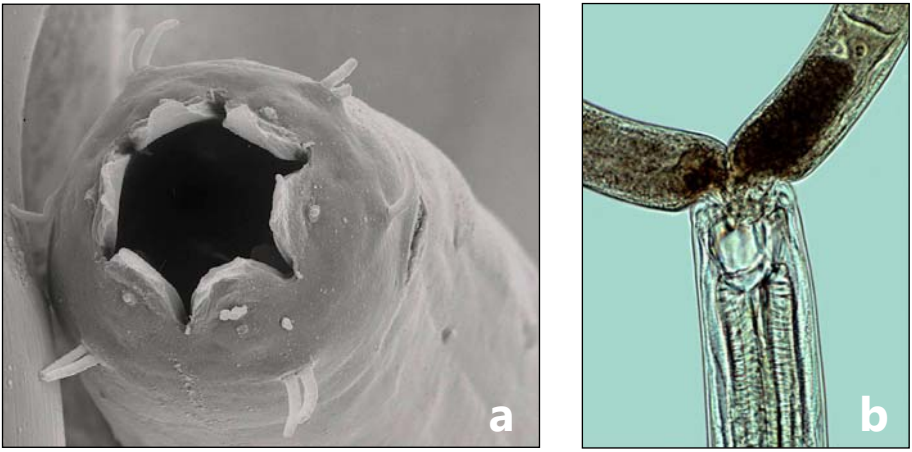


Fig. 4. A sinistra: estremità anteriore di un nematode con la bocca aperta (immagine al microscopio elettronico). Si notino le tipiche sei labbra. A destra, un nematode che preda un altro nematode.

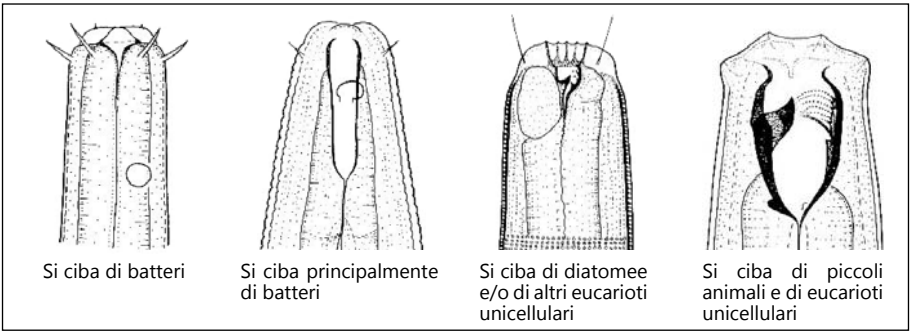


Fig. 5. Tipi di alimentazione.

Gli stadi giovanili, oltre all'odontostilo funzionale, ne presentano un altro, in posizione arretrata, pronto per quando, con la muta, verrà eliminata la vecchia cuticola e il vecchio odontostilo.

La forma complessiva dell'esofago è della massima importanza nella classificazione dei Nematodi.

L'**esofago** – che dal punto di vista funzionale è un faringe – è un potente organo muscolare: si tratta di un cilindro più o meno modificato, lungo di solito da un terzo a un sesto del corpo dell'animale (Fig. 6A).

Per **bulbo esofageo** si intende una regione particolarmente ingrossata dell'esofago: esso può trovarsi in posizione mediana o posteriore; talvolta esso è preceduto da un tratto sottile (isthmus) che lo separa dalla parte principale dell'esofago (corpus).

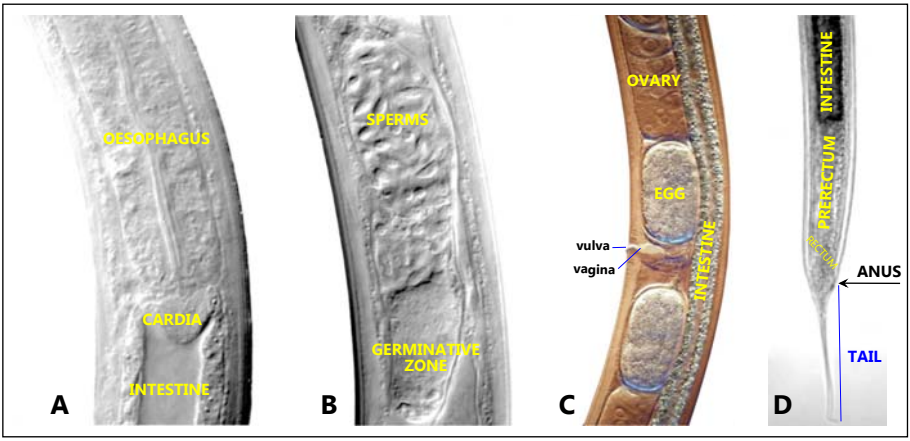


Fig. 6. **A:** regione tra esofago e intestino; **B:** ovario di femmina fecondata; **C:** regione vulvare; **D:** porzione terminale di femmina di nematode.

Tra esofago e intestino è presente una valvola, detta **cardia**.

L'intestino è un lungo tubo a parete sottile, fatto di un solo strato di cellule; termina in un retto molto appiattito dorso-ventralmente.

Nella muscolatura somatica dello pseudoceloma possono essere presenti **corpi cristalloidi**.

Quasi tutte le cellule muscolari dei nematodi sono disposte longitudinalmente, sotto l'epiderma, a formare il cosiddetto sacco muscolo-cutaneo.

Alla disposizione longitudinale della muscolatura corrisponde una struttura nervosa consistente in cordoni che percorrono longitudinalmente il corpo dell'animale.

Il centro del sistema nervoso è costituito da un anello di gangli che circonda l'esofago. Da questo anello periesofageo – non sempre facile da vedere – partono i nervi motori verso la regione posteriore del corpo nonché i nervi sensoriali verso le papille, le sete cefaliche e gli anfidi.

Altri organi di senso sono gli **ocelli** (o macchie oculari) posti uno a destra e uno a sinistra a fianco dell'esofago e a una certa distanza dall'estremità anteriore. Sono presenti solo in pochi generi.

Nella femmina adulta è ben riconoscibile l'**apertura vulvare** situata lungo la linea ventrale mediana, solitamente a metà corpo (Fig. 6C). La sua posizione viene indicata con *V %*, che corrisponde alla percentuale della distanza tra estremità anteriore e vulva rispetto all'intera lunghezza corporea.

Il maschio adulto è immediatamente riconoscibile per la presenza dell'apparato copulatore e, eventualmente, di organi precloacali. L'**apparato copulatore** è costituito da una o due **spicole**, dalla forma generalmente arcuata, più o meno lunghe o tozze; esse, a loro volta, possono poggiare sopra un altro pezzo sclerificato detto **gubernaculum**.

L'individuazione della vulva e l'adesione del maschio alla femmina è resa possibile dagli organi precloacali o **supplementi**: possono essere grandi e sporgenti, oppure piccoli disposti in file (molto lunghe o di poche unità).

Nell'ordine Rhabditida l'apparato sensitivo e adesivo del maschio di molte specie è formato da un'espansione trasparente della cuticola detta **borsa copulatrice** percorsa da canalicoli precloacali e postcloacali: il loro numero e la loro posizione sono importanti ai fini della classificazione.

I maschi non possiedono un ano bensì una **cloaca**, ossia uno sbocco comune sia ai prodotti genitali sia ai prodotti fecali: dalla cloaca protrudono, nel corso dell'accoppiamento, le spicole. Gli spermatozoi, sferoidali o allungati, sono privi di flagello e spesso ben visibili nel maschio o nell'utero delle femmine fecondate (Fig. 6B).

La parte del corpo che segue l'ano (o la cloaca) è la **coda**, la cui forma è molto importante per il riconoscimento (Fig. 6D). In molte specie essa porta alla sua estremità un piccolo sbocco (semplice o a tubetto sporgente) detto **spinneret** dal quale può fuoriuscire un materiale vischioso utile per attaccare l'animale al substrato.

ORGANIZZAZIONE DEL MANUALE

La chiave di identificazione dei generi è basata sull'esofago (pag. 24).

La **scheda relativa al singolo genere** (Fig. 7) contiene le seguenti informazioni:

- icona del tipo di esofago
- ordine e famiglia di appartenenza del genere
- distribuzione geografica
- alcuni rapporti somatometrici tipici del genere
- caratteristiche anatomiche tipiche del genere
- habitat
- alimentazione
- indice di maturità c-p (Bongers 1990). L'indice colloca il genere su una scala che varia da 1 (per nematodi colonizzatori) a 5 (per nematodi stabili).

Significato dell'indice c-p (*colonizers-persisters*)

c-p 1

Nematodi (*colonizers*) a riproduzione rapida (pochi giorni) e a vita breve, sempre molto attivi nei movimenti e nell'alimentazione. Quando si esaurisce il cibo, sopravvivono come stadi dormienti (*dauer larvae*) che possono essere trasportati e diffusi (foresi) principalmente da insetti. Colonizzano substrati, spesso temporanei, ricchi di batteri (materiale organico in decomposizione, sterco) producendo tantissimi individui. Producono uova piccole e numerose: sono tipici *r-strateghi* cioè specie opportuniste. Tollerano bene gli stress da inquinamento.

c-p 2

Simili ai precedenti, ma non formano stadi duraturi (*dauer larvae*) e sono attivi anche se il cibo (batteri) è scarso. Tollerano un certo grado di inquinamento.

c-p 3

Nematodi con caratteristiche intermedie tra c-2 e c-p 4. Hanno tempi riproduttivi e di vita più lunghi (settimane) e, a seconda dei generi, si nutrono di batteri, funghi, eucarioti unicellulari o piccoli animali. Non tollerano bene l'inquinamento.

SCHEDA DESCRITTIVA DEL GENERE

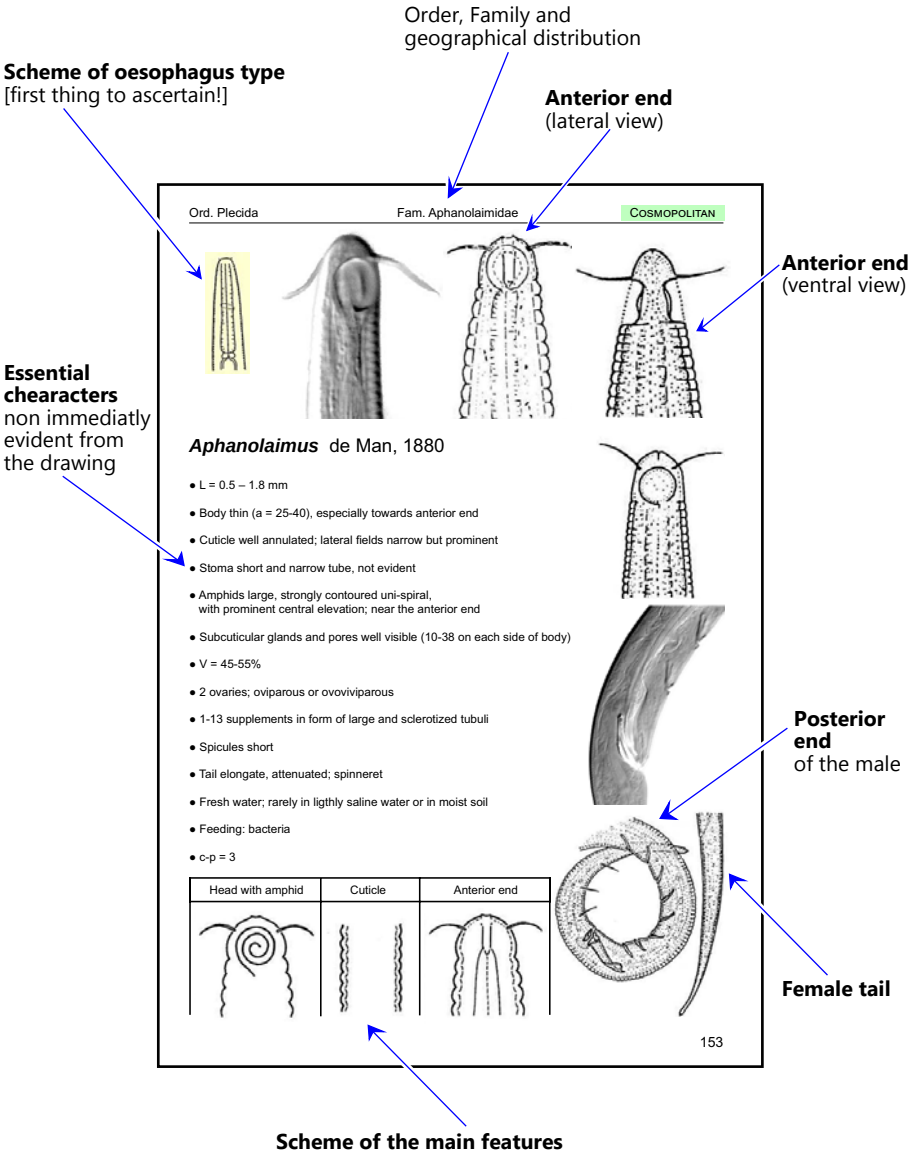


Fig. 7. Contenuti delle schede descrittive dei generi di nematodi.

c-p 4

Nematodi di varie dimensioni con tempi di generazione e di vita lunghi (settimane, mesi). Si nutrono di batteri, di eucarioti unicellulari o di piccoli animali. Tranne le specie carnivore, sono piuttosto lenti nei movimenti. La cuticola è alquanto permeabile e perciò sono sensibili ai fattori inquinanti.

c-p 5

Nematodi (*persisters*) di grande dimensione e a vita lunga (anche molti mesi), poco mobili e a basso metabolismo. Producono poche uova ma grandi: sono tipici *K-strateghi*. Sono onnivori o predatori di piccoli animali. Sono molto sensibili agli stress e all'inquinamento. Sono tipici di ambienti stabili, non inquinati ed ecologicamente maturi.

Il significato della **distribuzione geografica** è il seguente:

COSMOPOLITA: il genere è presente in Europa e in qualche altro continente
EUROPA: il genere è stato (finora) trovato solamente in Europa
TROPICI: un genere che vive nella fascia tropicale (con alcune specie in un certo continente e altre specie in un altro continente)
ARTICO: genere presente nei pressi, o al di là, del circolo polare in Eurasia e/o in Alaska
BAIKAL: genere endemico di questo lago

Per facilitarne l'immediata individuazione, a colpo d'occhio, la distribuzione cosmopolita è evidenziata in verde, quella europea in turchese e le altre in rosa.

Occorre sottolineare, però, che generi conosciuti altrove potrebbero essere presenti anche in Europa benché non ancora segnalati.

METODI DI RACCOLTA E PREPARAZIONE

I Nematodi d'acqua dolce sono quasi sempre invisibili ad occhio nudo a causa della loro relativa trasparenza e della loro sottigliezza.

Per raccoglierli occorre innanzitutto separarli dal loro substrato e concentrarli.

Si prelevano dal fondo del corpo d'acqua alcuni litri di sedimento (ghiaia, sabbia e/o argilla), si versano in un secchio capiente cui si aggiunge altra acqua; si mescola energicamente per staccare i nematodi dalle particelle di substrato, mentre il periphyton che riveste i ciottoli va "lavato" a mano onde staccarne i nematodi eventualmente presenti.

Si lascia sedimentare il materiale più grossolano e si filtra il sopranatante (per eliminare l'argilla ma non i nematodi) con un setaccio a maglie di circa un ventesimo di millimetro fino a quando il filtro inizia a intasarsi.

Con l'aiuto di una spruzzetta si raccoglie il detrito rimasto sul setaccio e lo si versa in una ciotola.

Si riempie nuovamente d'acqua il secchio e si ripete l'operazione.

Terminata questa prima fase, prima di eliminare l'acqua, la si lascia decantare a lungo nella ciotola, nella quale sedimenteranno i detriti con i nematodi.

I detriti, che ospitano i nematodi, andranno trattati in laboratorio.

Estrazione con Ludox

Per estrarre i nematodi dai sedimenti d'acqua dolce è particolarmente indicata l'estrazione con Ludox.

Disponendo di una soluzione di silice colloidale Ludox (il cui peso specifico va ridotto a 1,14) è sufficiente raccogliere campioni anche piccoli (meno di 100 ml di sedimento) dai quali si otterranno nematodi con un minimo di detrito e di sporco.

In laboratorio si procede come segue:

1. Mettere in ogni tubo Falcon (da 50 ml) un campione di sedimento (< 20 ml) da trattare.
2. Pesare i tubi Falcon (col tappo) in modo da equilibrarli a due a due mediante aggiunta di acqua.
3. Centrifugare a 2000 giri, per pochi secondi, i tubi così preparati.
4. Eliminare l'eccesso d'acqua [su filtro (Ø 10 cm) da 35 µm, per recuperare eventuali nematodi].
5. Aggiungere del Ludox, al culotto nel tubo, fino a raggiungere i 45 ml.
6. Pesare nuovamente le provette Falcon a coppie, uguagliando i pesi col

Ludox.

7. Mescolare, tappare e agitare bene per omogeneizzare il sedimento col Ludox.
8. Centrifugare per 6 minuti a 2000 giri/minuto (così i nematodi – avendo una densità di circa 1,08 – si portano a galla).
9. Versare il Ludox (con i nematodi) sullo stesso filtro del punto 4.
10. Sciacquare con acqua (spruzzetta) il filtro da 35 µm, raccogliendo i nematodi in un recipientino nella quantità minima di acqua possibile.
11. Eventualmente colorare con pochissimo Rosa Bengala i pochi ml così ottenuti.
12. Osservare (o estrarre) al binoculare i nematodi (ancora vivi) servendosi di una Petri piccola.
13. Finita l'osservazione, aggiungere una piccola quantità di formalina calda (scaldata a bagnomaria in una spruzzetta a circa 70-90°C) a scopo fissativo e conservante. L'alta temperatura blocca istantaneamente l'attività enzimatica e quindi il deterioramento di certe strutture prima che fissaggio sia completato.

I nematodi dovranno rimanere in una soluzione di formalina al 2%.

Estrazione diretta

Se l'estrazione col Ludox sembra troppo complessa o non ha dato un buon risultato (nematodi accompagnati da molto sporco o da detrito), si deve procedere con l'estrazione diretta (manuale) degli esemplari allo scopo di isolarli dal detrito (sabbia, limo, frammenti vegetali). Infatti il ben noto imbuto di Baermann, molto pratico per estrarre i nematodi dal suolo, solitamente dà risultati scarsi o nulli per i nematodi acquatici.

Il materiale con i nematodi viene posto in una Petri dal fondo rigato. Gli esemplari, che sono sempre in agitazione continua, vengono cercati tra il detrito e pazientemente raccolti uno per uno mediante uno spillo entomologico molto sottile (n° 00 oppure 000), un'arista di graminacea o un sopracciglio dell'occhio, debitamente immanicati. Ciò richiede molta abilità ed esercizio, ma con un allenamento di pochi giorni si possono raccogliere, con questa tecnica, anche cinque o sei esemplari al minuto.

I nematodi possono essere osservati direttamente su vetrino portaoggetti in una goccia d'acqua ricoperta dal vetrino coprioggetti, come preparato temporaneo. Per immobilizzarli basta riscaldare il vetrino su una fiamma per pochi secondi. In tal caso l'osservazione al microscopio (da farsi ad almeno 400 ingrandimenti) va completata prima del prosciugamento del preparato.

Per una visione migliore degli esemplari e per osservazioni più dettagliate

(da farsi anche a 1000 ingrandimenti con obiettivo ad olio di immersione) vanno fatti preparati permanenti che richiedono l'immersione degli animali in glicerina.

L'immersione diretta in questo liquido (che esercita una grande pressione osmotica) ha l'effetto di distorcere brutalmente gli esemplari rendendoli irriconoscibili.

Pertanto si deve procedere nel modo seguente:

1. Trasferire i nematodi in acqua estratti da un campione in una piccola Petri (33-54 mm di diametro), oppure in una salierina o vetrino di orologio.
2. Attendere ca. 10 minuti affinché gli esemplari sedimentino.
3. Decantare lentamente il contenuto della Petri in modo da eliminare quanta più acqua possibile.
4. Uccidere e fissare i nematodi. Per far ciò riscaldare a bagnomaria una soluzione di formalina e versarla, quasi bollente, nella Petri contenente i nematodi da uccidere (calcolare la diluizione in modo che gli esemplari finiscano per trovarsi in formalina al 4%). L'uccisione a caldo evita che certe strutture anatomiche si alterino durante la procedura.
5. Se si vuole un risultato ottimale, lasciare che la formalina indurisca la cuticola e i tessuti ponendo la Petri (coperta) a 70°C per almeno 4 ore[*].
6. Osservare la Petri allo stereomicroscopio e togliere con una pipetta Pasteur quasi tutto il liquido.
7. Se non si hanno particolari esigenze di qualità, si riempie la Petri con glicerina al 2% in acqua, passando poi direttamente al punto 9; altrimenti si riempie con glicerina al 2% in alcool etilico e si prosegue come descritto al punto 8.
8. Eventualmente togliere di nuovo tutto il liquido e sostituirlo con altro alcool etilico contenente il 2% di glicerina. In questo modo l'acqua viene eliminata e l'alcool etilico potrà imbibire meglio i nematodi con la glicerina contenuta.
9. Riporre la Petri in termostato a 30-40°C e lasciarvela per almeno 3 giorni.
10. Durante questo tempo l'alcool (o l'acqua) evapora lasciando i nematodi in una soluzione di glicerina via via più concentrata. La gradualità del processo evita la distorsione degli esemplari che, dopo 3 giorni, si trovano in glicerina quasi pura. In tale condizione si conservano intatti per anni.
11. Si toglie la Petri dal termostato: i nematodi si trovano sul fondo imprigionati

* A questo punto, poiché l'osservazione microscopica va fatta sugli esemplari imbibiti di glicerina e in essa immersi, occorre sostituire con glicerina la soluzione acquosa di formalina penetrata nei nematodi. La sostituzione va effettuata molto gradualmente, a partire da una soluzione di glicerina al solo 2% (concentrazione che non deforma gli esemplari) in alcool (che favorisce la penetrazione della glicerina nei tessuti interni), e rimuovendo poi per evaporazione la formalina, l'acqua e l'alcool. Il risulato viene raggiunto con i passaggi 6-10.

in un sottile film di glicerina. Pertanto occorre aggiungere altra glicerina in modo da riempirne il fondo con ca. 1-2 mm di spessore.

12. A questo punto, osservando con un microscopio binoculare stereoscopico a 15-30 ingrandimenti, è possibile estrarre gli esemplari mediante un sottile spillo entomologico immanicato.
13. Trasferire gli esemplari entro una goccia di glicerina posta su un vetrino portaoggetti.

Montaggio dei vetrini

Per la preparazione dei vetrini permanenti occorre seguire una precisa procedura.

Con lo spillo immanicato si raccolgono i nematodi per disporli in una goccia di glicerina pulita posta su un vetrino. Il vetrino è stato preventivamente preparato apponendovi una cornice di paraffina. Per far ciò si riscalda sopra una piastra un tubetto di rame (o di ottone) immanicato, lungo 2-3 cm e col diametro (esterno) uguale al diametro di un vetrino coprioggetto (o al suo lato, se il coprioggetto è quadrato) e lo si posa per qualche secondo sopra un blocco di paraffina. Subito dopo si "timbra" un vetrino portaoggetto in modo da lasciarvi una cornice rotonda di paraffina. Tale cornice non deve essere troppo esigua (perché poi lascerebbe fuoriuscire la glicerina) né troppo ricca di paraffina (perché ciò terrebbe il vetrino coprioggetto troppo sollevato, con problemi di messa fuoco nel momento in cui verrà usato l'obiettivo a immersione).

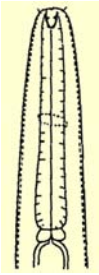
Al centro della cornice va collocata una piccolissima goccia di glicerina pulita che dev'essere appena sufficiente per collocarvi da 1 a 20 nematodi. Si badi a disporre gli esemplari parallelamente tra loro, in modo che non si accavallino.

Infine si copre delicatamente la cornice (con la goccia degli esemplari nel mezzo) con un vetrino coprioggetto e si posa il tutto su di una piastra riscaldante. Il vetrino va tolto non appena la cornice di paraffina comincia a fondere (la glicerina non deve bollire): in questo modo si forma un bordo di paraffina largo alcuni millimetri racchiudente nel mezzo la glicerina con i nematodi. Dopo alcuni secondi la paraffina risolidifica cementando il coprioggetto al portaoggetto ed il vetrino permanente è pronto per l'osservazione al microscopio. Onde evitare di rovinare esemplari forse preziosi, il principiante dovrà prima esercitarsi adoperando piccoli segmenti di capelli umani al posto dei nematodi.

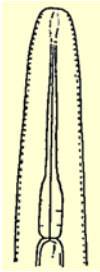
Per una buona osservazione al microscopio dei dettagli anatomici di questi animali, si raccomanda di usare una luce moderata, assolutamente *non* abbagliante, e ben contrastata (stringendo il diaframma del microscopio).

Indice dei generi

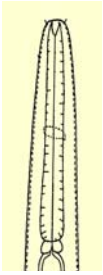
Oesophageal types



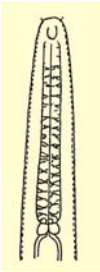
oesophagus cylindrical, stoma & tooth/teeth large, cephalic setae
pag. 25



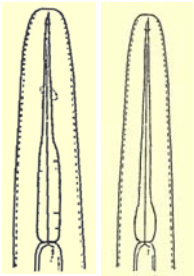
oesophagus poste-riorly expanded, stoma very narrow or tubular, amphids pocket-like (circular) pag. 37



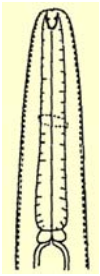
oesophagus cylindrical, stoma & teeth visible, amphids not circular
pag. 51



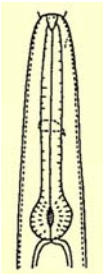
oesophagus cylindrical, areolate, stoma & teeth well visible, amphids not circular, tail filiform
pag. 65



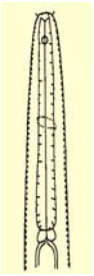
oesophagus poste-riorly expanded, stoma with odontostyle, no cephalic setae
pag. 71



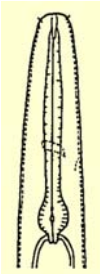
oesophagus cylindrical, stoma & tooth/teeth large, no cephalic setae
pag. 127



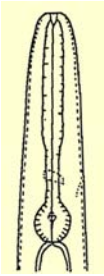
oesophagus with large basal bulb
pag. 147



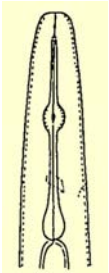
oesophagus cylindroid, stoma small or almost tubular, amphids ≈ circular
pag. 163



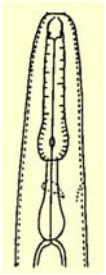
oesophagus with basal bulb
pag. 183



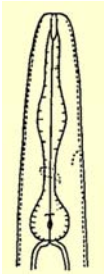
oesophagus with cylindrical corpus and basal bulb, males without bursa
pag. 199



oesophagus with median bulb, stoma with spear with basal knobs
pag. 207

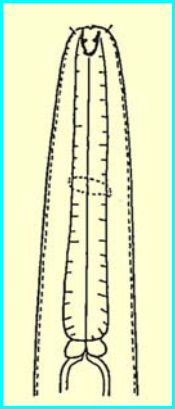


anterior oesophagus strong, muscular, posterior oesophagus weak, glandular
pag. 213

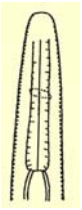


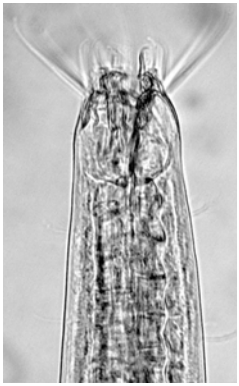
oesophagus with swollen corpus and basal bulb, males often with bursa. pag. 227

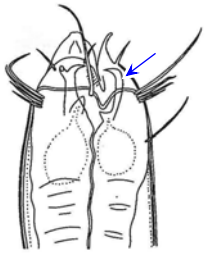
Oesophagus type

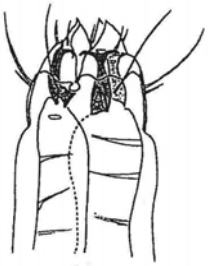


oesophagus cylindrical,
stoma & tooth/teeth large,
with cephalic setae



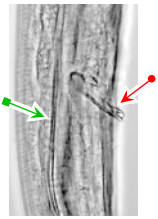


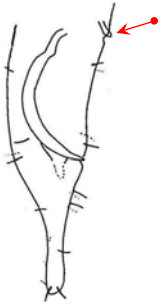


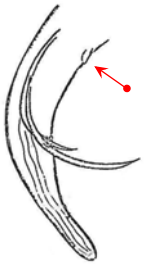


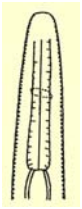
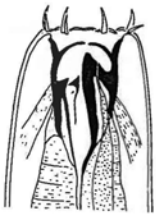
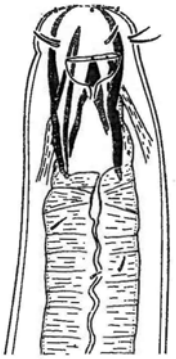
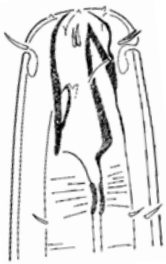
Enoploides Ssaweljev, 1912

- L = 1.1 – 2.6 mm
- Cephalic setae very long
- Stoma: 3 big solid mandibles with claw-like tip; 3 teeth shorter than mandibles
- Ovaries 2
- V = 49-60%
- 1 male supplement
- Spicules long
- Tail conoid with rounded terminus; c' = 1.8 – 3.0; spinneret
- Marine, few fresh water species
- Feeding: small animals, unicellular eukaryotes (?)
- c-p = 5



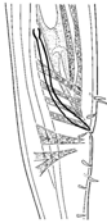


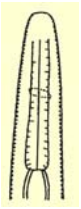


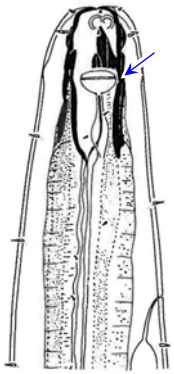





Viscosia de Man, 1890

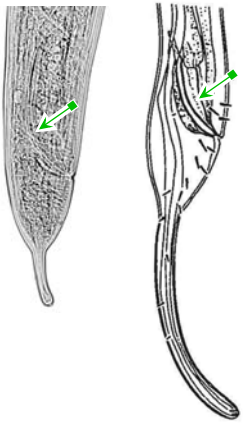
- L usually 1.5 – 5 mm
- Body slender
- Cuticle often viscose, whith adhering particles
- Stoma with 3 large hollow teeth: the right subventral tooth is the largest
- Oesophagus short (b >5.0)
- 2 ovaries
- Males supplements papilliform
- Males without bursa
- Spicules not too long; no gubernaculum
- Tail rather regularly conical
- Sea; brackish water; rare in fresh water
- c-p = 3



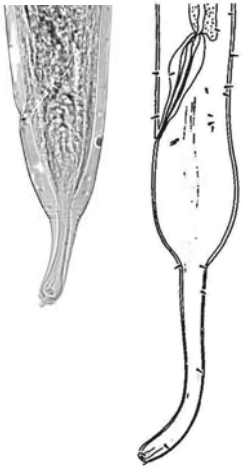


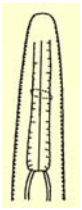


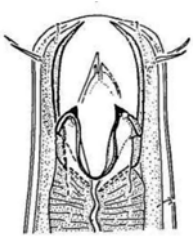
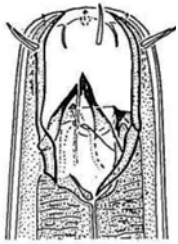
Adoncholaimus Filipjev, 1918



- L = 1 – 3 mm
- Body slender
- Amphids aperture elliptical
- Stoma: right subventral tooth largest, both left subventral tooth and dorsal tooth smaller
- V about half body; vulva transverse
- 2 ovaries
- Males with several pairs of setiform supplements
- Tail conical-elongated, or cupula-shaped with thinner terminal part
- Spicules long; gubernaculum small or absent
- Sea, brackish water, rare in freshwater
- Feeding: small animals?
- c-p = 4

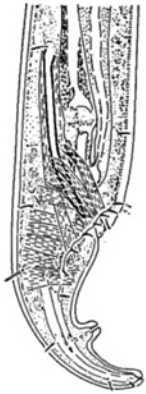


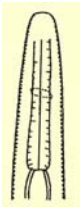


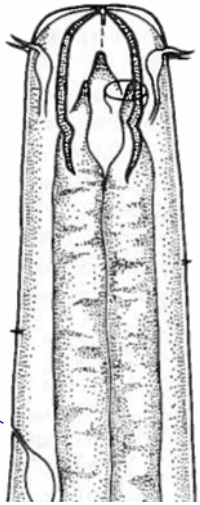




Oncholaimus Dujardin, 1845

- L = 2.3 – 4.0 mm
- Body slender
- Stoma with 3 large hollow teeth: the left subventral tooth is the largest
- Oesophagus short (b >5.0)
- 1 anterior ovary
- Spicules not too long; no gubernaculum
- Tail short (c' = 1.2-3.5); spinneret
- Sea, brackish water, fresh water
- Feeding: small animals, unicellular eukaryotes (?)
- c-p = 4

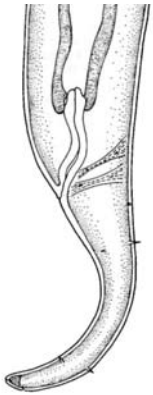



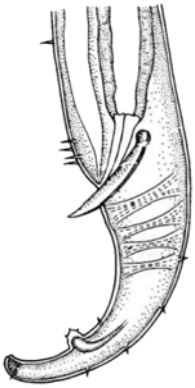



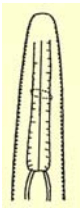
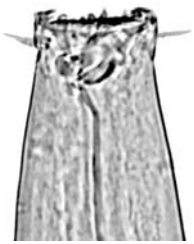
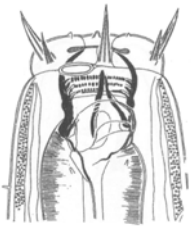
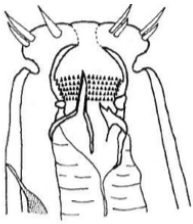


Pseudoncholaimus Kreis, 1932

- L = 3 – 8 mm
- Body very slender (usually a >40)
- Cuticle smooth
- Stoma: subventral left tooth the largest, dorsal and subventral right tooth smaller and equal
- V >50%
- 1 anterior ovary
- Male spicules dagger-shaped; no gubernaculum
- Sea, brackish lakes
- Feeding: small animals, unicellular eukaryotes (?)
- c-p = 2 or 3

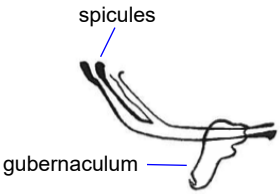


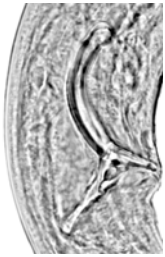


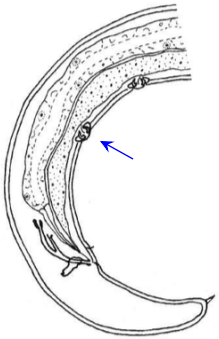
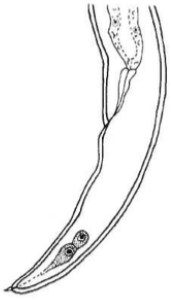





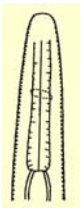
Eurystomina Filipjev, 1921

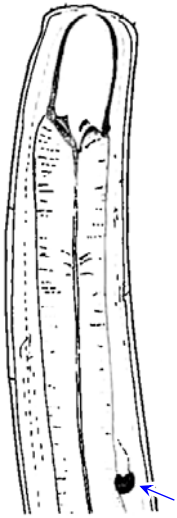
- L usually > 3 mm
- Body very slender (a > 50)
- Amphids spiral
- Ocelli present in some species
- Stoma: large dorsal tooth + 2 small subventral teeth (right the largest); several rows of denticles
- Oesophagus without bulb
- V > 50%
- Male supplements few, cup-shaped
- Brackish water, saline sandy soil
- Feeding: small animals?
- c-p = 4

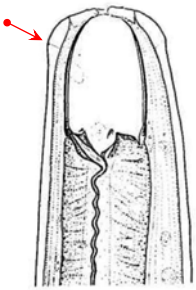


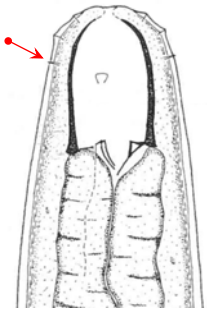




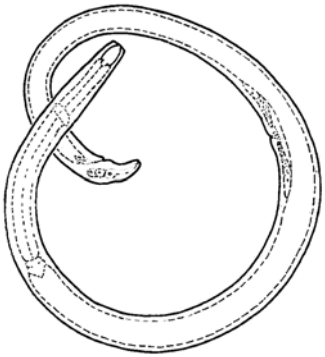


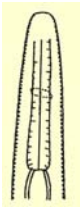


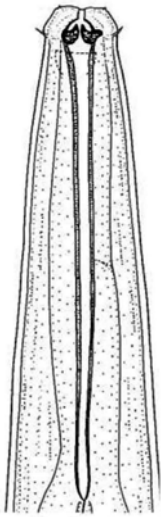


Thalassogenus Andrássy, 1973

- L = 1.5 – 3.2 mm
- Cephalic setae very short
- Stoma wide, barrel-shaped, with 3 identical teeth in its base
- Oesophagus cylindrical, strongly muscular
- Eye spot (ocellus) ventral, near the nerve ring at about 4.5-5.5 head diameters from anterior end
- 2 ovaries
- Tail bluntly conoid; c' = 0.9 – 4.3; spinneret
- Soil, moss, fresh water
- Feeding: diatoms, nematodes, rotifers, oligochaets
- c-p = 4-5 (?)

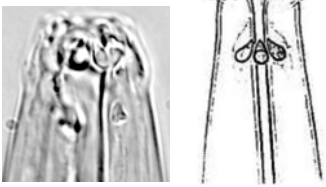




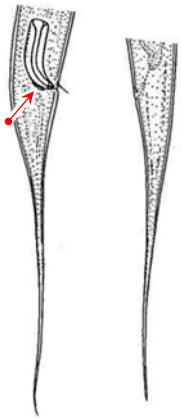


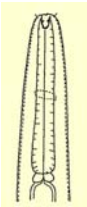
Ironus Bastian, 1865

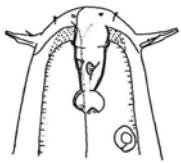
- L = 1.4 – 4.2 mm
- Body long and thin (a = 35-80); typically straight
- Cuticle smooth; 3 lips
- Amphids pocket-like, immediately posterior to lip region
- Stoma very long (60-150 µm); 3 movable claw-like teeth nearly equal in size
- Oesophagus cylindrical gradually swollen posteriorly
- 2 ovaries (rarely only 1 posterior ovary)
- Males rare
- Spicules strong arcuate, gubernaculum small
- Tails conical-elongated to filiform, rarely short and rounded
- Typical freshwater genus, rare in brackish water and moist soil
- Feeding: small animals (e.g. oligochetes), unicellular eukaryotes (e.g. diatoms and other algae)
- c-p = 4



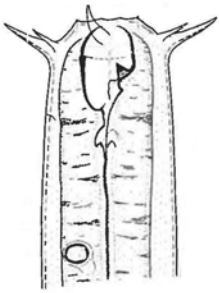
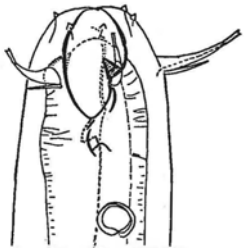
Juveniles with spare teeth



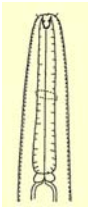


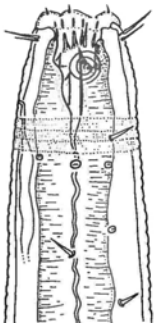



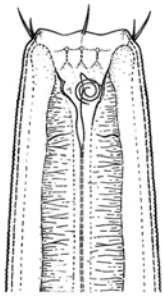
Tripyloides de Man, 1886

- L = 0.8 – 2.7 mm
- Amphids round, cryptospiral
- 2 ovaries
- Male supplements absent
- Tail with spinneret
- Sea; brackish water; salty soil; rare in fresh water
- Feeding: unicellular eukaryotes (?), small animals (?)
- c-p = 2

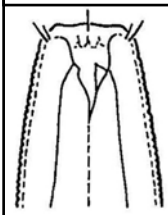
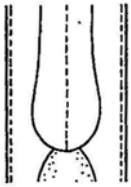



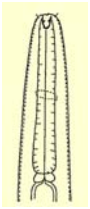
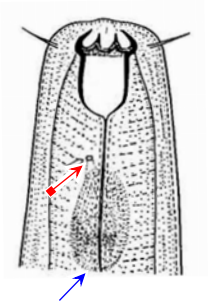
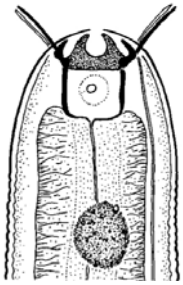
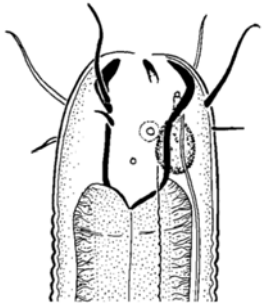




Paracyatholaimus Micoletzky, 1922

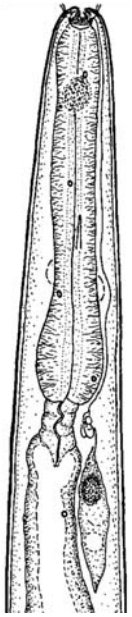
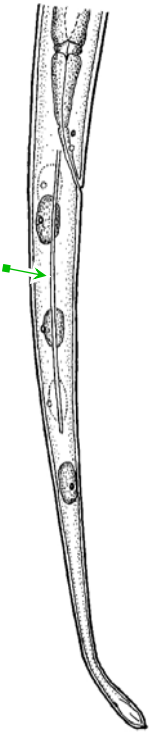
- L = 0.8 – 1.6 mm
- Cuticle finely annulated and punctuated
- Amphids multi-spiral
- Stoma not longer than wide; one distinct dorsal tooth, often smaller subventral teeth
- 2 ovaries
- 4-8 small male supplements, cuticularized and setose; gubernaculum distally rounded
- Tail conical or with a more or less slender cylindrical terminal portion; c' = 3 - 6; spinneret long
- Sea, brackish water, fresh water; also in dune sand
- Feeding: unicellular eukaryotes (?)
- c-p = 3

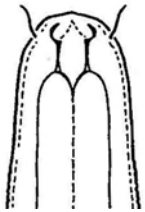
Anterior end	Amphid	Oesophagus base
		

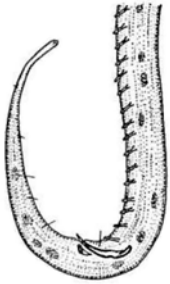





Anonchus Cobb, 1913

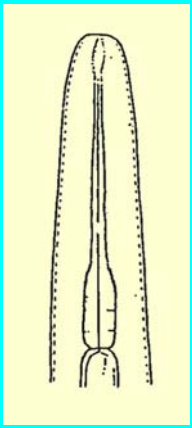
- L = 0.8-1.5
- Cuticle slightly annulated; lateral fields present
- Many evident, large, subcuticular coloured glands with cuticular pores on each body side
- Amphids rounded, unispiral
- Oesophagus short (b = 5-8), cylindrical, muscularized
- V = 42-50%
- 1 or 2 ovaries
- 1-72 tubular supplements; some species with also numerous alveolar supplements
- Tail elongated conoid; spinneret functional
- Fresh water, brackish water, sea
- c-p = 3

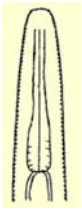
Anterior end	Amphid
	

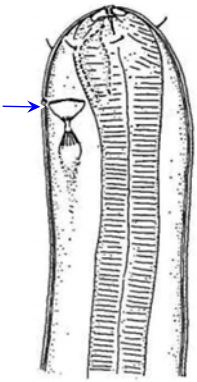


Oesophagus type



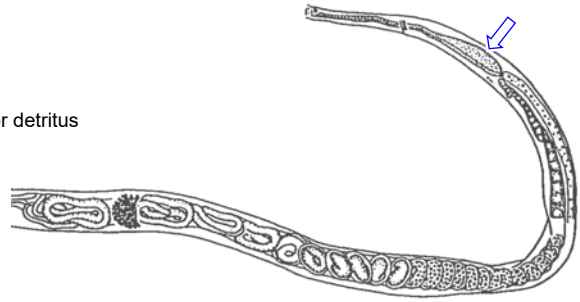
oesophagus posteriorly expanded,
stoma very narrow or tubular,
amphids pocket-like (circular)

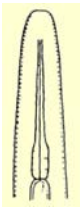


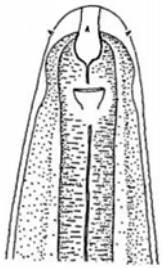


Andrassya Brzeski, 1960

- L = 4.0 – 6.3 mm
- Body very slender (a = 40 – 80)
- Cuticle pratically smooth
- Short cephalic setae
- Amphids pocket-like
- Stoma completely reduced, encircled by oesophageal musculature; no teeth
- Oesophagus short (b = 8-11), posteriorly enlarged
- V about 50% or less
- 2 ovaries; ovoviviparous
- Tails very long but not filiform
- Freshwater on aquatic plants or detritus
- Feeding: bacteria
- c-p ?



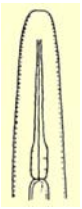


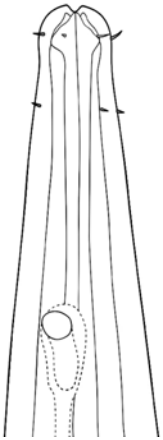


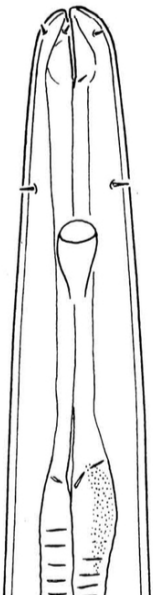
Malakhovia Tchesunov & Gagarin, 1999

- L about 1 mm
- Body slender (a = 30 - 40)
- Cuticle very finely cross-striated
- Short cephalic setae
- Amphids behind stoma, pocket-like
- Stoma small but well distinct, partially encircled by oesophageal musculature; no teeth
- Oesophagus rather short (b about 6), cylindrical, posteriorly enlarged
- V about 50%
- 2 ovaries; ovoviviparous
- Tail very long
- Freshwater on aquatic plants or detritus
- Feeding: bacteria (?)
- c-p ?

Some authors consider *Malakhovia* a synonym of *Andrassya*.

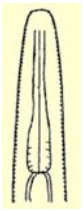


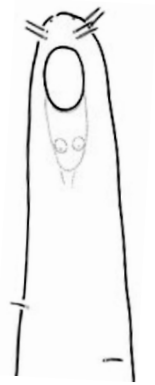


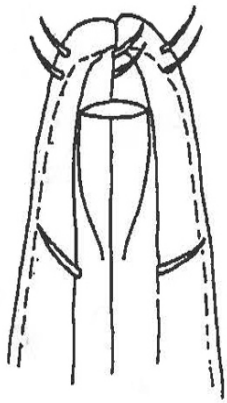


Oxystomina Filipjev, 1921

- L = 1 – 3 mm
- Body very slender (a = 60-110)
- Buccal cavity absent
- Amphids pocket-like with oval aperture
- V <50%
- Tail clavate
- Sea, brackish water, salt marshes, mangroves, hot springs
- Feeding: bacteria
- c-p = 4

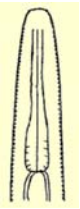


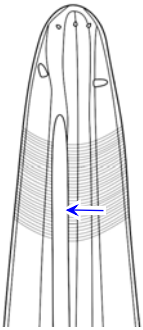


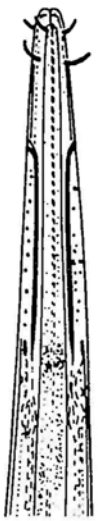


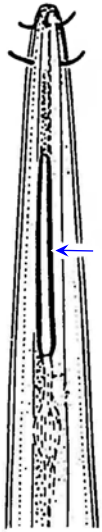
Thalassoalaimus de Man, 1893

- L = 0.7 – 2 mm
- Cuticle smooth
- Amphids pocket-like with oval aperture
- Stoma very narrow
- *Oxystomina*-like oesophagus
- Ovaries 1-2
- Spicules cephalated; gubernaculum
- Sea, river mouths, continental groundwater
- Feeding: bacteria
- c-p = 4



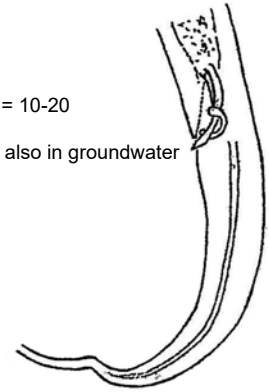


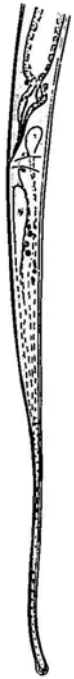


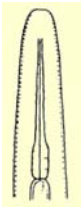


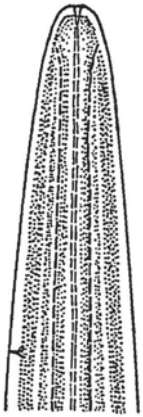
Halalaimus de Man, 1888

- L = 0.7 – 1.5 mm
- Body strongly tapering at either end
- Amphids longitudinal, very long and narrow
- Buccal cavity absent
- *Oxystomina*-like oesophagus
- V about 50%
- 2 ovaries
- Tail conical-cylindrical, tip blunt or bifurcate; c' = 10-20
- Marine, some brackish and freshwater species; also in groundwater
- Feeding: bacteria (?)
- c-p = 4



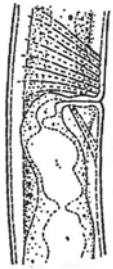


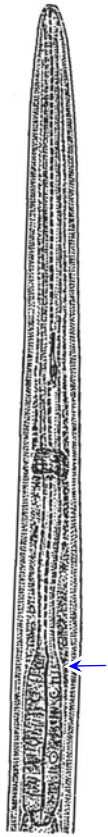


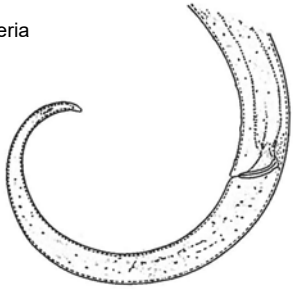


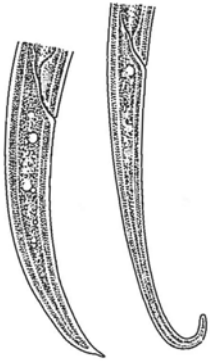
Alaimus de Man, 1880

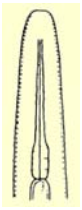
- L = 0.4 – 4 mm
- Cuticle thin and smooth
- Head rounded or conical
- Stoma almost not visible
- Oesophagus widened at about 80% of its length
- V usually <50%; vulva closed; vagina narrow
- 1 posterior ovary
- Male supplements 3-9 (to 16), non contiguous
- Spicules short and straight, no gubernaculum
- Tails elongated-conoid, rarely very short (c' = 2-25)
- Soil, moss, rarely in fresh water
- Feeding: bacteria
- c-p = 4

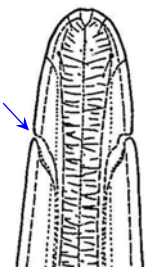


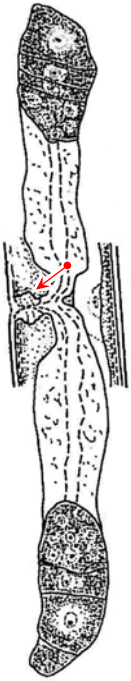






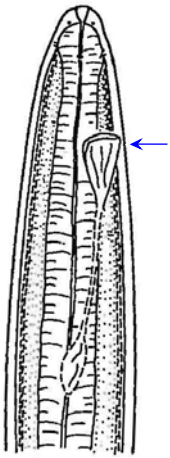


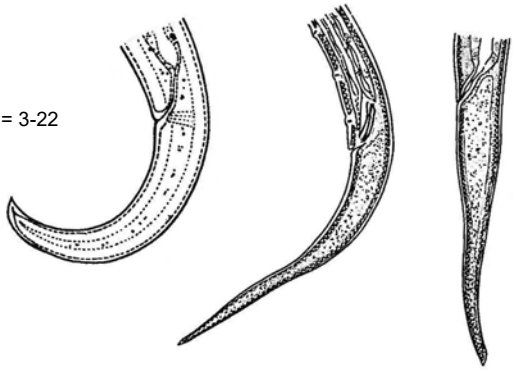


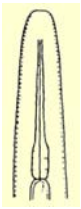


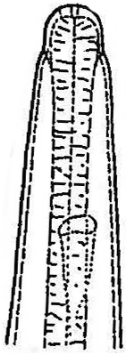
Amphidelus Thorne, 1939

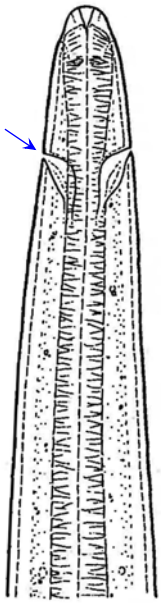
- L = 0.9 – 4.2 mm
- Body slender (a = 35-90)
- Cuticle smooth
- Stoma small
- Amphids well discernible, pocket-shaped with sclerotized margins, at 1-4 cephalic diameters from anterior end
- Oesophagus gradually widened in its posterior part
- Vulva open; vagina swollen
- 2 ovaries (rarely 1)
- Males rare
- Male supplements 2-5 non contiguous
- Spicules short, straight; no gubernaculum
- Tail conoid, elongated-conoid to filiform; c' = 3-22
- Fresh water, soil, moss
- Feeding: bacteria
- c-p = 4



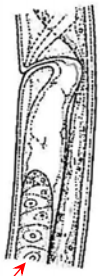




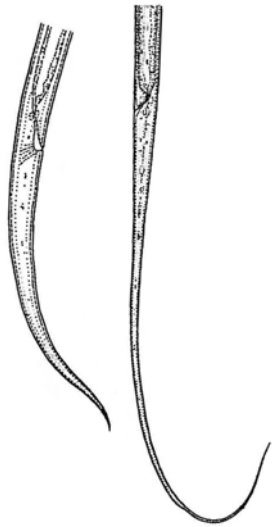


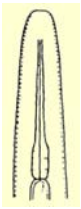


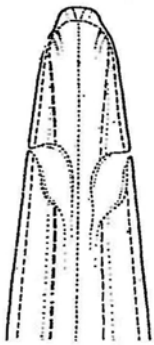
Paramphidelus Andrássy, 1977

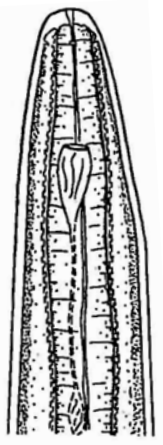


- L = 0.5 – 3.3 mm
- Body very slender (a = 42-125)
- Cuticle smooth
- Stoma small
- Amphids well discernible, pocket-shaped with crescent-shaped sclerotized aperture, at 2-6 cephalic diameters from anterior end
- Oesophagus gradually expanding in its posterior part
- 1 posterior ovary
- Vulva closed; vagina thin
- Males rare
- Male supplements 2-5, non contiguous
- Spicules short, straight; no gubernaculum
- Tail elongated to very long (c' = 6-36)
- Soil, litter, rarely in brackish and fresh water
- Feeding: bacteria
- c-p = 4



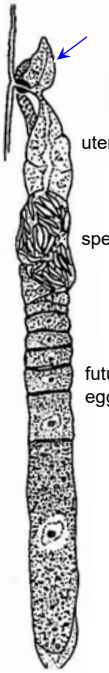


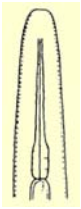


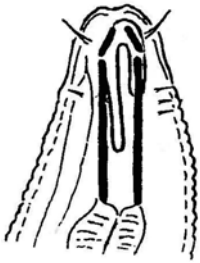


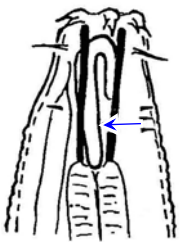
Scleramphidelus Clausi & Vinciguerra, 1995

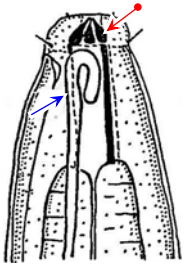
- L = 1 – 1.5 mm
- Body slender (a = 44-64)
- Stoma small
- Amphids well discernible, at 2-5 cephalic diameters from anterior end, openings with sclerotized margins
- Oesophagus rather short (b = 4-6), expanding at 85-90% of its length
- 1 posterior ovary and a prevulval sac
- Vulva sclerotized, vagina thin
- Male supplements 4-5 non contiguous
- Spicules short, massive; no gubernaculum
- Tail filiform; c' = 15-20
- Lakes, river mud, wet soil
- Feeding: bacteria
- c-p = 4



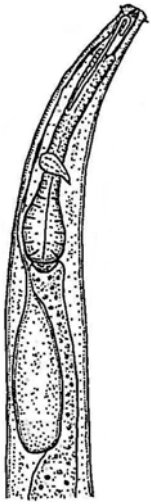




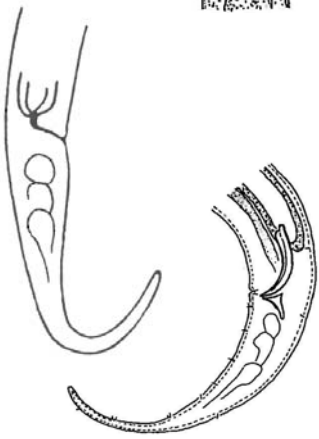


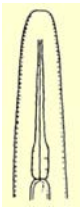


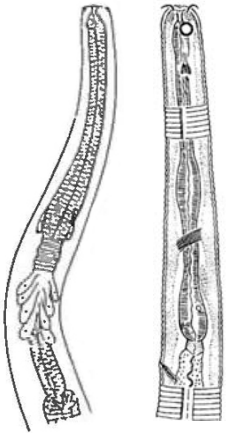
Parodontophora Timm, 1963

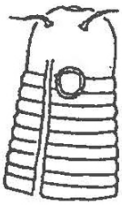


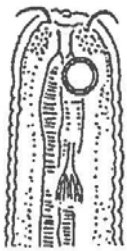
- L = 0.7-1.2 mm
- Amphids very large, open-looped
- Anterior stoma with 6 bifurcated teeth (often protruding from the mouth)
- V = 44-54%; vulva transverse
- 2 ovaries
- Sperms rounded or irregular, 6-11 µm in diameter
- Spicules arched with cephalated anterior end; gubernaculum with apophysis
- Tail elongated-conical; spinneret
- Sea; brackish water; very rare in fresh water
- Feeding: bacteria (?)
- c-p ?

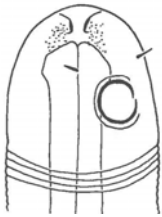


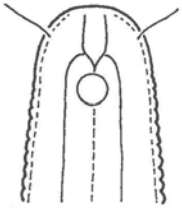


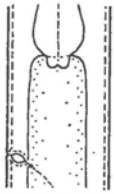






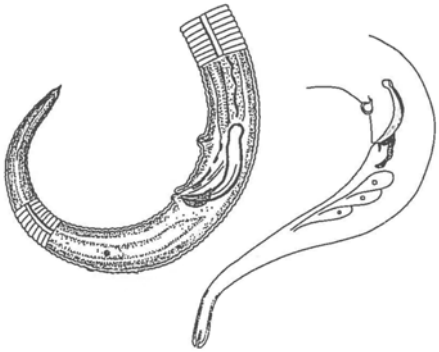


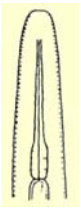


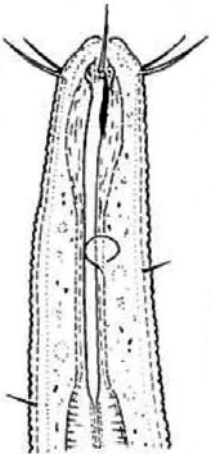


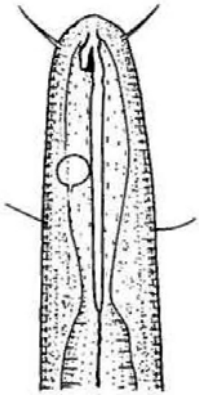
Domorganus Goodey, 1947

- L = 0.5 – 2.3 mm
- Oesophagus with 2 swellings
- Ovaries 2
- Excretory pore well visible behind cardia
- Male: 1 precloacal supplement
- Caudal glands and spinneret
- Soil; possibly parasitic in oligochaets; fresh water; some species in sea
- c-p = 3

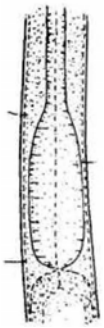




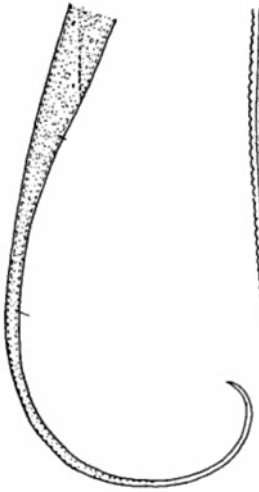


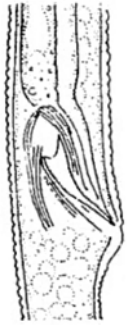


Odontolaimus de Man, 1880

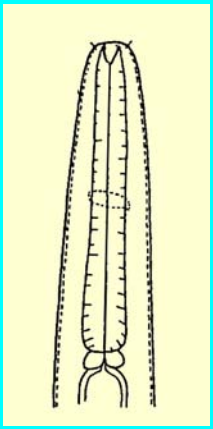


- L = 0.5 – 0.9 mm
- Cuticle finely annulated
- Amphids circular, anterior rim at 1.3-2.3 head widts from anterior end
- Stoma encircled by its own musculature; dorsal tooth sharp, protrusible
- Oesophagus enlarged in its posterior third
- V = 30-60%
- Males without supplements
- 2 ovaries
- Tail long, occasionally filiform
- Soil, moss, fresh water
- Feeding: bacteria or unicellular eukaryotes (?)
- c-p = 3

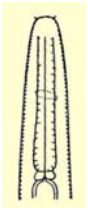


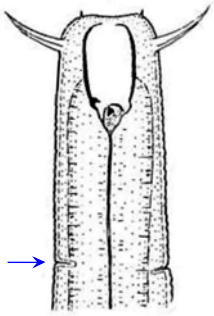


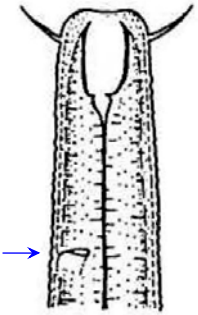
Oesophagus type

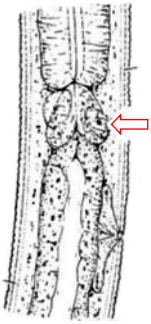


oesophagus cylindrical,
stoma & teeth visible,
amphids not circular



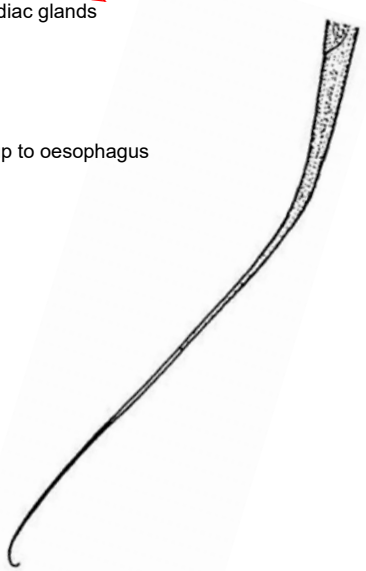


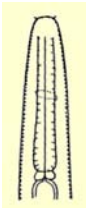


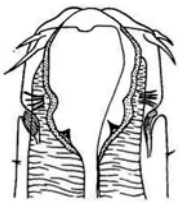


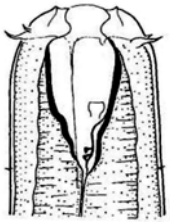
Prismatolaimus de Man, 1880

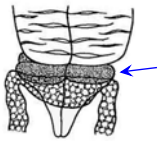
- L = 0.4 – 1.9 mm
- Cuticle finely annulated
- Amphids: transverse oval slit-like; aperture at 2-3 head diameters behind anterior end
- Stoma prismatic with minute teeth at its bottom
- Oesophagus cylindrical; cardia large, spheroid; 3 large cardiac glands
- 1 (anterior) or 2 ovaries; egg very large (one at a time)
- Males rare
- Supplements 11-46, small, in posterior body or extending up to oesophagus
- Spicules simple, gubernaculum thin
- Tail filiform in both sexes, usually ending with a small hook
- Soil, moss, fresh water
- Feeding: bacteria (?)
- c-p = 3





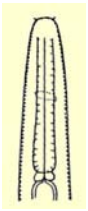




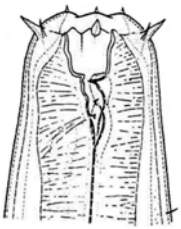


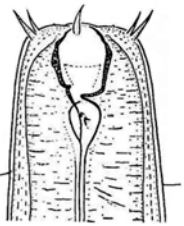
Paratrilobus Micoletzky, 1922

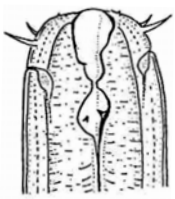
- L = 2 - 5 mm
- Stoma almost entirely encircled by oesophageal musculature; teeth near each other
- 3 large cardiac glands
- 2 ovaries
- Male supplements 6
- Spicules about 1 anal body width
- Tail tip with spinneret
- Fresh water, brackish water
- Feeding: unicellular eukaryotes, small animals
- c-p = 3



(specimen with full mouth)

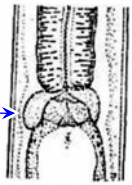


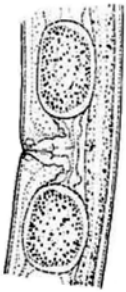


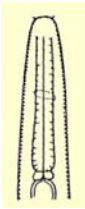


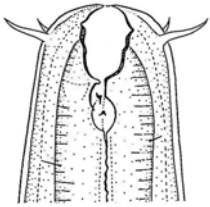
Tobrilus Andrássy, 1959

- L = 1.0 – 4.5 mm
- Cephalic setae length usually 1/3 of head width
- Stoma almost entirely encircled by oesophageal musculature; teeth near each other (0-6 µm apart)
- 3 large cardiac glands
- Vaginal musculature weak or not too strong
- 2 ovaries
- Male supplements 6 (rarely 4-13), small, almost regularly spaced
- Spicules short (1.8 – 2.5 % of body length)
- Tail tip with spinneret small or absent
- Fresh water (rarely in brackish water or in wet soil)
- Feeding: unicellular eukaryotes, small animals
- c-p = 3



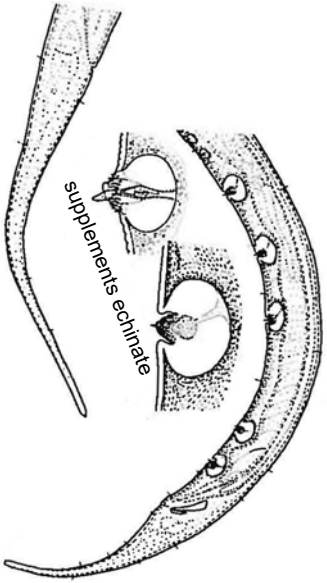


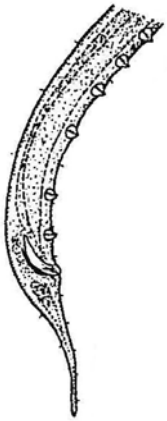


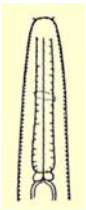


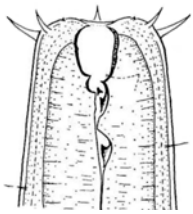
Eutobrilus Tsalolikhin, 1981

- L = 1.5 – 4.7 mm
- Cephalic setae long (usually 40-60% of head width)
- Stoma almost entirely encircled by oesophageal musculature; teeth 2-8 µm apart
- 3 large cardiac glands
- 2 ovaries
- Vaginal musculature normal (not too strong)
- Male supplements 5-10 (usually 6), echinate and protrusible, rather regularly spaced; first and last ones smaller
- Spicules short (usually 2.0-2.5% of body length)
- Tail tip with spinneret
- Fresh water (rarely in brackish water)
- Feeding: unicellular eukaryotes, small animals
- c-p = 3

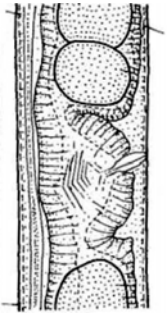




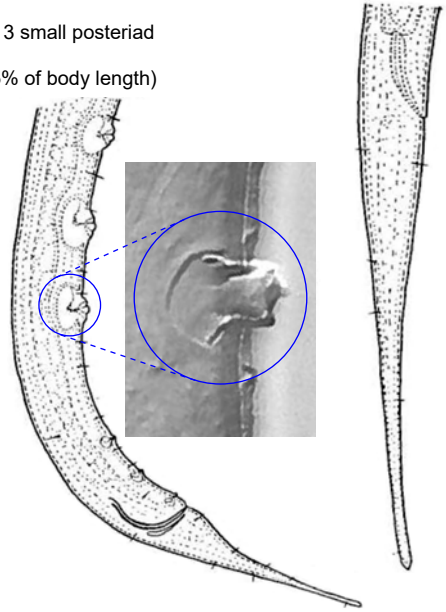


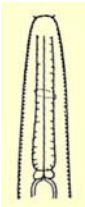


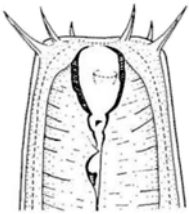
Neotobrilus Tsalolikhin, 1981



- L = 1.2 – 4.3 mm
- Cephalic setae short or long, 20-60% the head width
- Stoma almost entirely encircled by oesophageal musculature; teeth 7–20 µm apart
- 3 large cardiac glands
- Vaginal musculature very strong, bulb-like, often layered
- 2 ovaries
- Male supplements protruding: 3 large anteriad + 3 small posteriad
- Spicules long (>1 anal body width) and thin; (3-5% of body length)
- Tail tip with spinneret
- Fresh water (rarely in wet soil or in moss)
- Feeding: unicellular eukaryotes, small animals
- c-p = 3

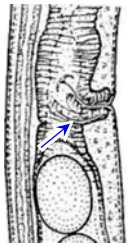


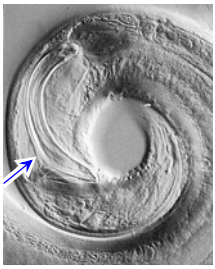


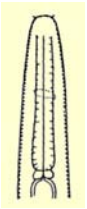


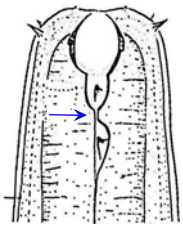
Semitobrilus Tsalolikhin, 1981

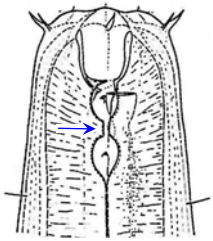
- L = 1.2 – 3.0 mm
- Cephalic setae long (30-60% of head width)
- Stoma almost entirely encircled by oesophageal musculature; teeth 6-12 µm apart
- 3 large cardiac glands
- Vagina very muscular, usually anteriorly directed
- 2 ovaries
- Male supplements 6-10, small, not protruding, irregularly spaced
- Vas deferens often convoluted
- Spicules crescent-shaped, robust, longer than anal body width (3.3-5.0% of body length)
- Tail tip with spinneret
- Fresh water, groundwater (rarely in brackish water)
- Feeding: unicellular eukaryotes, small animals
- c-p = 3



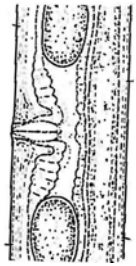




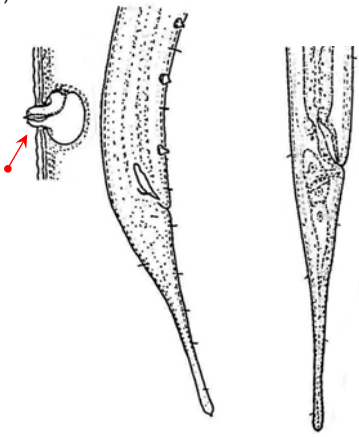


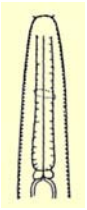
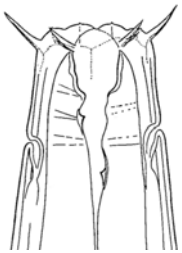
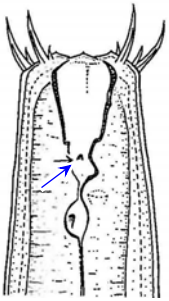
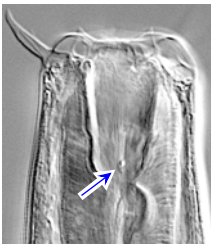


Brevitobrilus Tsalolikhin, 1981

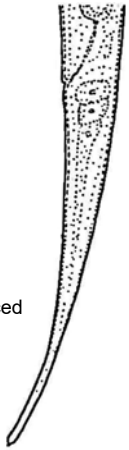


- L = 0.9 – 2.4 mm
- Cephalic setae short (usually 18-28% of head width)
- Stoma almost entirely encircled by oesophageal musculature; anterior stomatal cavity distinctly separated from anterior buccal pocket; the 2 pokets are separate by a narrow duct; teeth 8-12 µm apart
- 3 large cardiac glands
- Vaginal musculature normal (not too strong)
- 2 ovaries
- Male supplements 6, slightly protruding with a neck; posterior supplement usually smaller
- Spicules about 1 anal body with (2.0-2.8% of body length)
- Tail tip with spinneret
- Fresh water (also in brackish water or in wet soil)
- Feeding: unicellular eukaryotes, small animals
- c-p = 3



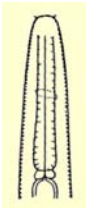





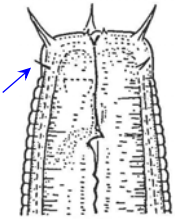
Epitobrilus Tsalolikhin, 1981

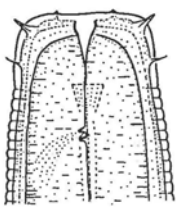


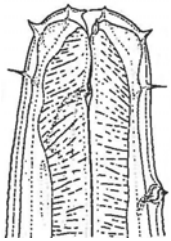
- L = 1.3 – 3.0 mm
- Cephalic setae long (usually 40-50% of head width)
- Stoma almost entirely encircled by oesophageal musculature; anterior stomatal cavity and anterior buccal pocket almost jointed in a funnel-shaped structure (therefore anterior tooth is in, or near, the anterior stoma cavity); teeth 8-20 µm apart
- 3 large cardiac glands
- 2 ovaries
- Male supplements 5-7 (rarely more), usually small and not protruding, irregularly spaced
- Spicules >1 anal body with, stout (3.3-5.0% of body length)
- Tail tip with spinneret
- Fresh water (rarely in brackish water or in wet soil)
- Feeding: unicellular eukaryotes, small animals
- c-p = 3

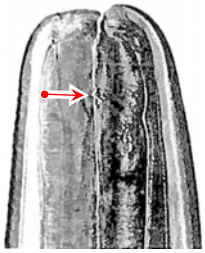
Andrássy (2007) synonymized:
Setsalia with ***Eutobrilus***
Raritobrilus and *Brevitobrilus* with ***Epitobrilus***
Baicalobrus and *Mesotobrilus* with ***Paratrilobus***





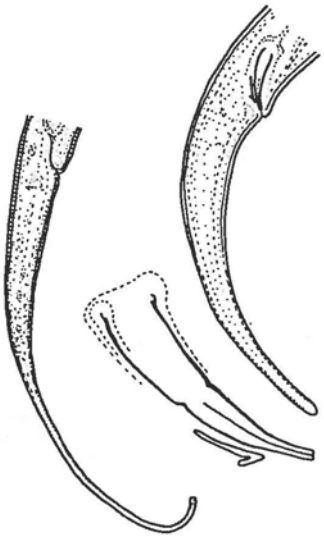


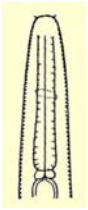
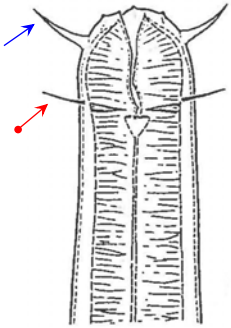
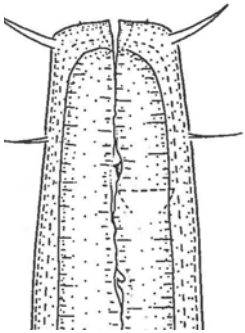




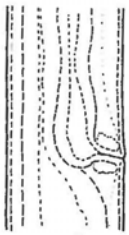
Tripyla Bastian, 1865

- L = 0.4 – 3.4 mm
- Cuticle annulated, thick
- Cephalic setae: 6 anterior (labial), and 4 posterior (cephalic)
- Stoma narrow, encircled by oesophageal musculature; dorsal tooth posterior to the 2 (difficult to see) subventral denticles
- 3 large cardiac glands
- 2 ovaries
- Male supplements numerous, reaching the oesophageal region
- Spicules wide, horn-shaped
- Tail length variable; tip with spinneret
- Soil, moss, fresh water
- Feeding: small animals
- c-p = 3

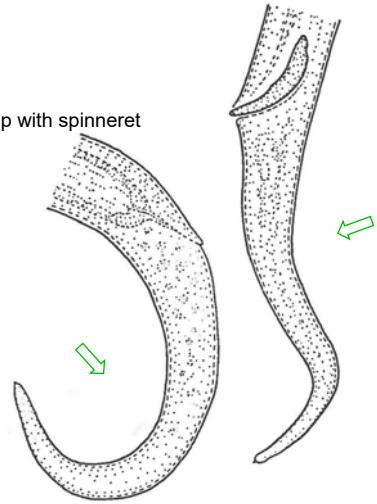


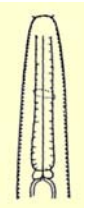




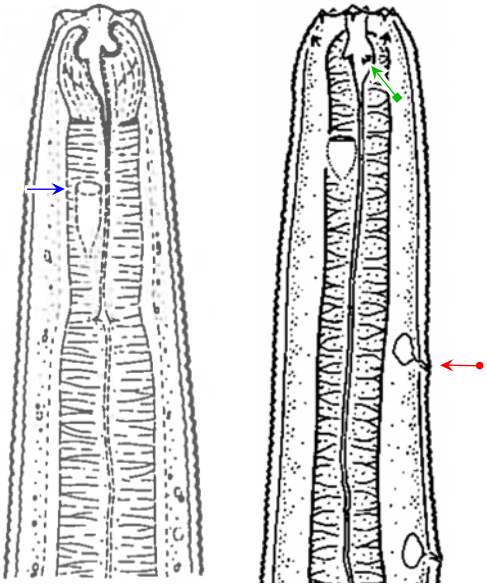

Trischistoma Cobb, 1913



- L = 0.6 – 2.2 mm
- Body slender (a = 40 – 80)
- Cuticle smooth, thin
- Long cephalic setae: 6 anterior (labial), and 4 posterior (cephalic)
- Stoma encircled by oesophageal musculature; denticles minute
- 3 cardiac glands
- V = 73-83%
- 1 anterior ovary
- Male supplements 0-3
- Sperms fusiform, unusually large
- Tail dorsally bent, more or less S-shaped; c' = 3 – 7; tip with spinneret
- Soil, moss, fresh water
- Feeding: small animals
- c-p = 3

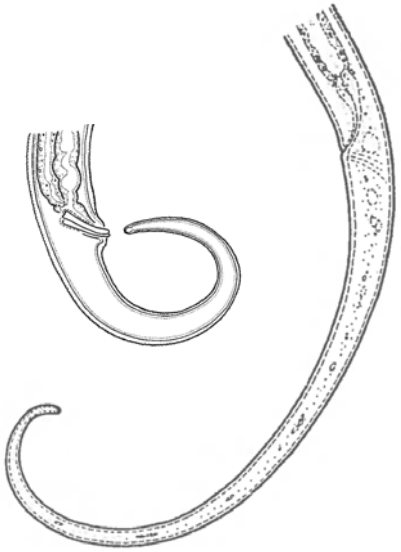


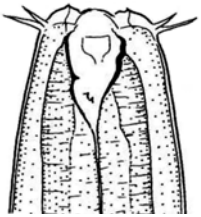




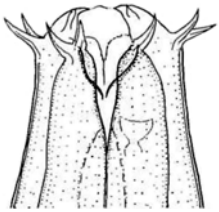
Tobrilia Andrássy, 1967

- L < 1 mm
- Cephalic setae absent
- Amphids pocket-like with oval aperture
- Stoma: dorsal tooth pointed, larger than 2 posterior subventral teeth
- Oesophagus cylindrical
- V <50%
- Ovaries 2
- Male supplements extending to oesophageal region
- Spicules short
- Tail long (c' = 7-15)
- Semiaquatic, soil
- Feeding: probably bacteria, unicellular eukaryotes
- c-p = 3

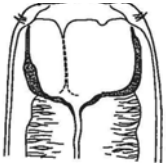




Mesotobrilus
Tsalolikhin, 1981

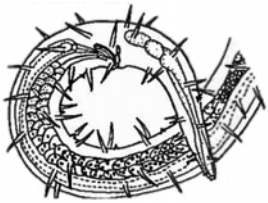


Quasibrilus
Tsalolikhin, 1976

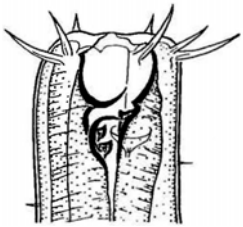


Kurikania
Tsalolikhin, 1976

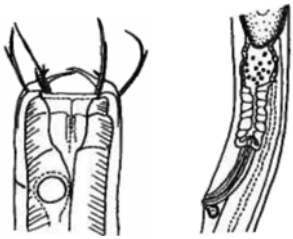
Lamuania
Tsalolikhin, 1976



Asperotobrilus
Shoshin, 1991

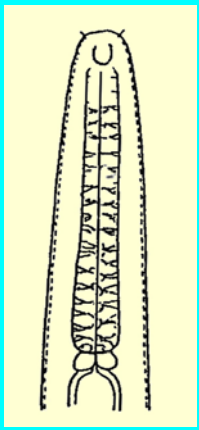


Setsalia
Shoshina, 2003

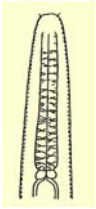


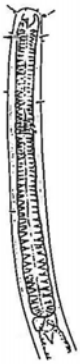
Sacrimarinema
Shoshin, 2001

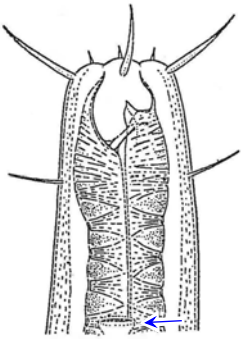
Oesophagus type



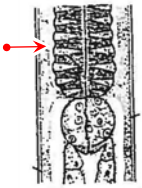
oesophagus cylindrical, areolate,
stoma & teeth well visible,
amphids not circular, tail filiform



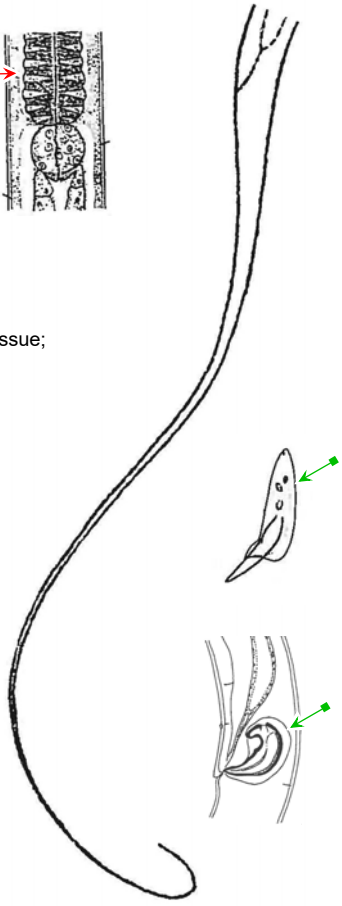


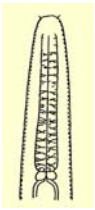


Onchulus Cobb, 1920

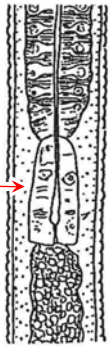


- L = 0.5 – 4.3 mm
- Cuticle practically smooth
- Amphids pocket-like, 2-3 labial widths from anterior end
- Cephalic setae very long
- Stoma with large dorsal tooth
- Oesophagus areolated: muscular bands mingled with glandular tissue; cardia large, spheroid
- V = 39-50%
- 2 ovaries
- Males rare
- Male supplements small, spaced
- Spicules short and linear or strongly curved; more or less enveloped by a sheath
- Tail in both sexes filiform; c' = 10 - 25
- Soil, moss, rotting wood, fresh water, groundwater
- Feeding: small animals, unicellular eukaryotes
- c-p = 3

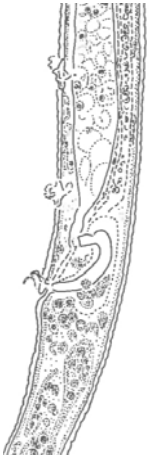


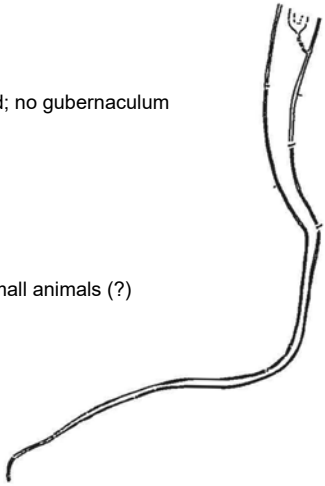


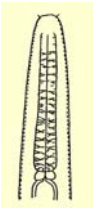
Caprionchulus Swart & Heyns, 1993

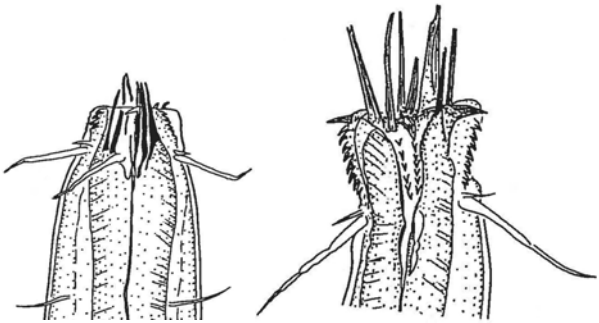


- L = 1.5 – 1.9 mm
- Body very slender (a = 60-80)
- Cuticle annulated
- Amphids slit-like
- Cephalic setae very long
- Stoma with dorsal tooth in the anterior part
- Oesophagus areolated: muscular bands mingled with glandular tissue
- Cardia elongated
- 2 ovaries
- Male supplements numerous, papilloid; no gubernaculum
- Spicules strongly curved, cephalated
- Tail filiform
- Fresh water
- Feeding: unicellular eukaryotes (?), small animals (?)
- c-p = 3



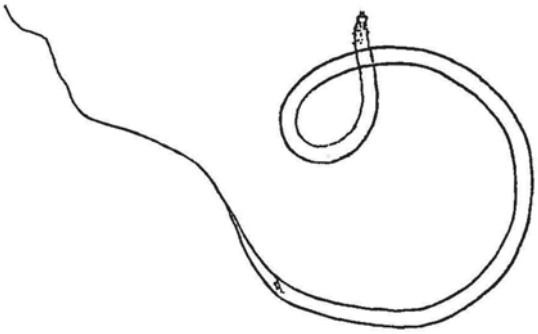


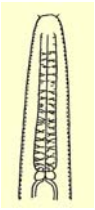


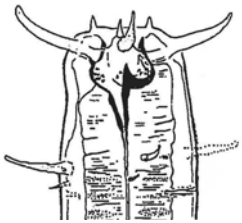


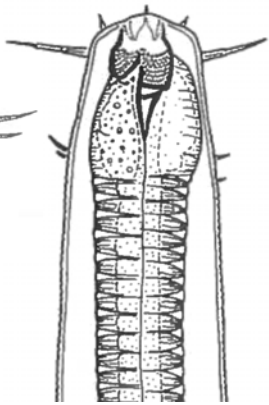
Kinonchulus Riemann, 1972

- L about 3.2-3.6 mm
- Body very slender (a = 80-110)
- Stoma with a long acute dorsal tooth and 12 long pricks; protrusible
- Oesophagus: muscular bands mingled with glandular tissue; cardia oval
- V = 40-45%
- 2 ovaries
- Male supplements 5
- Tail long filiform
- Fresh/brackish water (psammon)
- Feeding: unicellular eukaryotes (?), small animals (?)
- c-p = 3 (?)



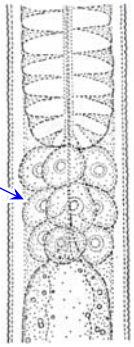


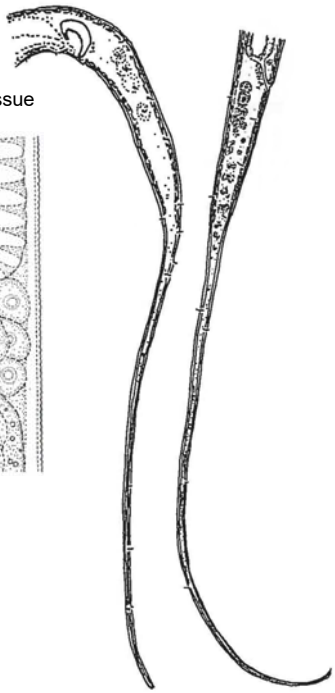


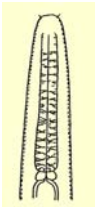


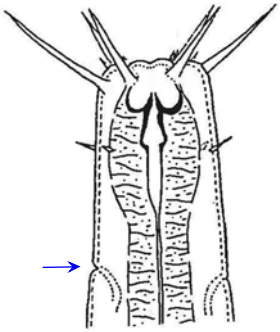
Limonchulus Andrássy, 1963

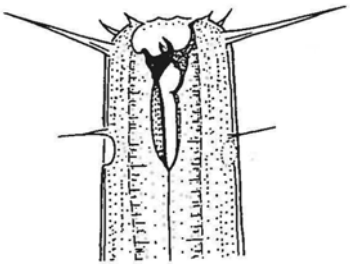
- L = 0.9 – 2.3 mm
- Stoma with robust dorsal tooth and subventral scattered denticles
- Oesophagus: muscular bands mingled with glandular tissue
- Cardia multicellular
- V about 50%
- 2 ovaries
- Male supplements papilloid
- Sperms very elongated or sickle-shaped
- Spicules strongly curved, no gubernaculum
- Tail elongated-filiform
- Fresh water; moss
- Feeding: unicellular eukaryotes (?), small animals (?)
- c-p = 3

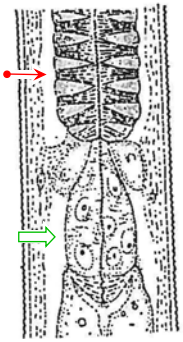






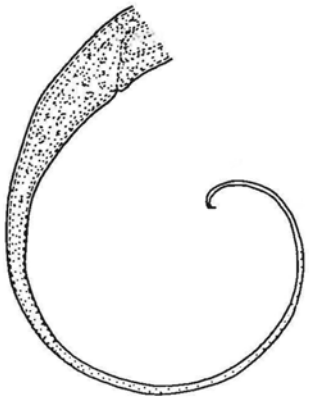




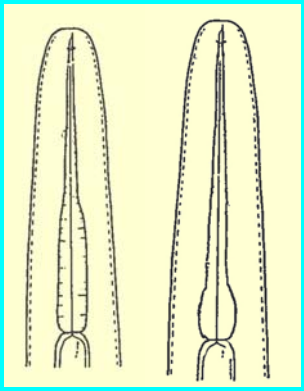


Stenonchulus Schneider, 1940

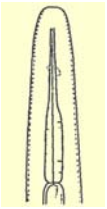
- L = 1.1 – 1.8 mm
- Body slender (a = 50-70)
- Cuticle finely annulated; cephalic setae very long
- Amphids elliptical, narrow, well behind stoma
- Stoma with 3 claw-like teeth of equal size
- Oesophagus areolated: muscular bands mingled with glandular tissue
- Cardia elongated, pear-shaped
- 2 ovaries
- V = 38-48%
- Males unknown
- Tail long, finely pointed; c' = 10 – 18
- Humid soil, fresh water, groundwater, psammon
- Feeding: unicellular eukaryotes (?), small animals (?)
- c-p = 3

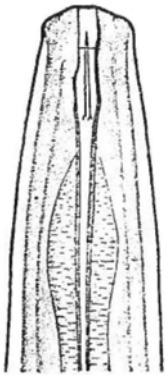


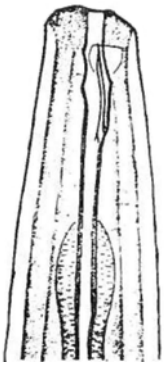
Oesophagus type



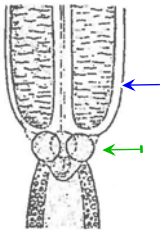
oesophagus posteriorly expanded,
stoma with odontostyle,
no cephalic setae



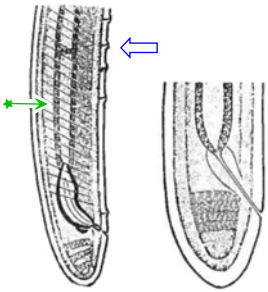


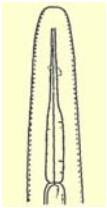


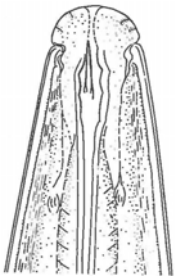
Aquatides Heyns, 1968

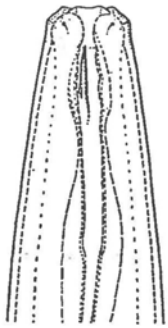


- L = 1 – 4 mm
- Head truncate to rounded
- Cuticle practically smooth
- Stoma with mural linear tooth
- Oesophageal sheath present; cardial glands spheroid
- Vulva transverse
- 2 ovaries
- Male supplements 4-7
- Spicules massive; gubernaculum
- Prerectum 1-4 times the anal body width long
- Tail short, bluntly conoid to hemispherical in both sexes
- Soil; sometimes in fresh water
- Feeding: small animals
- c-p = 5



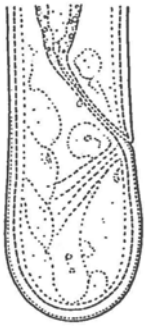


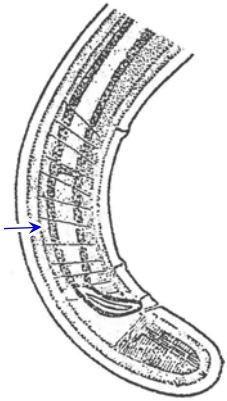


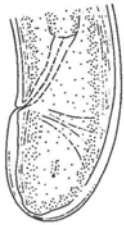


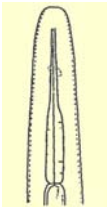
Clavicaudoides Heyns, 1968

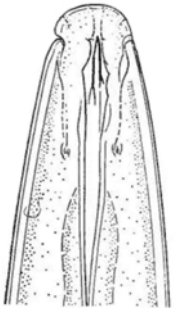
- L = 0.9-2.2 mm
- Cuticle practically smooth
- Stoma with mural tooth (deltoid to linear) shorter than labial width
- Thin sheath around basal part of oesophagus
- Vulva transverse
- 2 ovaries
- Males rare
- Male supplements: few and small
- Spicules small; no gubernaculum
- Prerectum 2-4 anal body widths long
- Tail similar in sexes, hemispheroid to clavate, usually longer than anal body width
- Soil, rare in fresh water
- Feeding: small animals
- c-p = 5





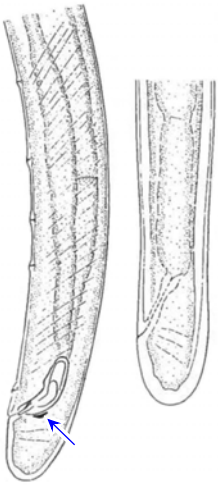


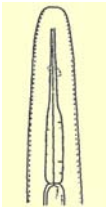


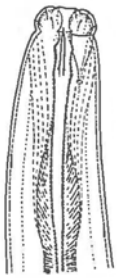


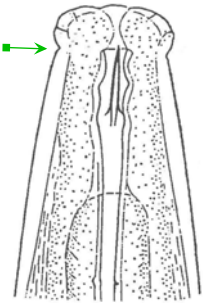
Laevides Heyns, 1968

- L = 1.2 – 7.3 mm
- Body posture straight
- Cuticle practically smooth
- Stoma with mural tooth (dorylaimoid), relatively short and thick
- Thin sheath around basal part of oesophagus
- Vulva transverse
- 2 ovaries
- Prerectum 2-4 anal body widths long
- Male supplements 4-8, well developed
- Spicules large; gubernaculum
- Tail similar in sexes, short conoid to hemispheroid, to slightly clavate
- Soil, fresh water
- Feeding: small animals
- c-p = 5

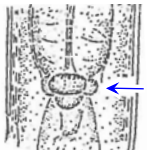




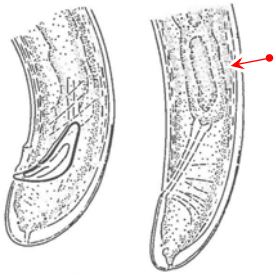


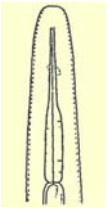
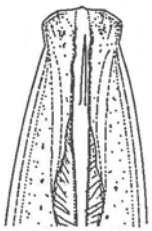
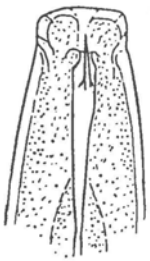
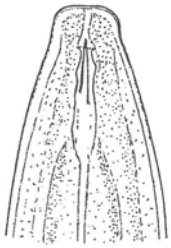


Nygolaimus Cobb, 1913

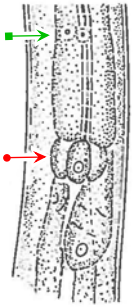


- L = 1 – 4 mm
- Lip region offset by constriction
- Cuticle practically smooth
- Stoma with mural tooth usually shorter than lip region width
- Oesophagus widened at half, or less, its total length; posterior part surrounded by a delicate sheath
- 3 large cardial rounded glands
- Vulva transverse
- 2 ovaries
- Male supplements small or absent
- Spicules curved, no gubernaculum
- Prerectum short
- Tail similar in sexes, short, rounded or conoid
- Soil, fresh water
- Feeding: small animals
- c-p = 5



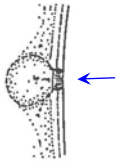





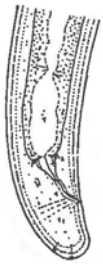
Paravulvus Heyns, 1968

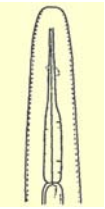


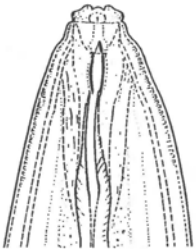
L > W

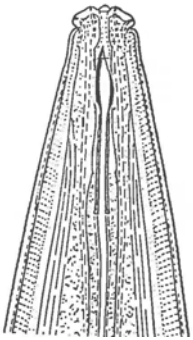
- L = 0.9 – 2.2 mm
- Cuticle practically smooth
- Stoma with mural tooth deltoid
- Oesophageal gland nuclei large and well visible
- 3 large cardial ovoid glands
- Vulva longitudinal; often near vulva some papilla- or pore-like organs (paravulvae)
- 2 ovaries
- Male supplements 5-14, well developed
- Spicules massive; gubernaculum slender
- Tail similar in sexes, short, rounded to elongated-conoid
- Soil, fresh water
- Feeding: small animals
- c-p = 5



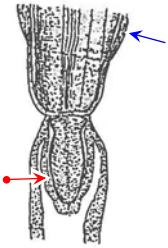


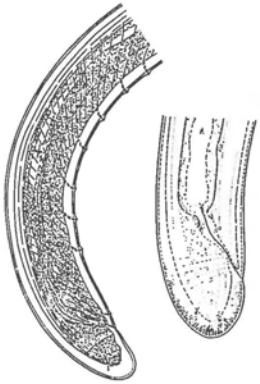


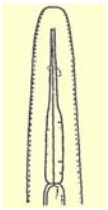


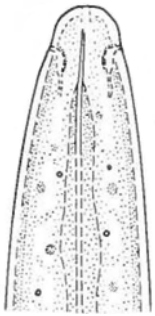
Axonchium Cobb, 1920

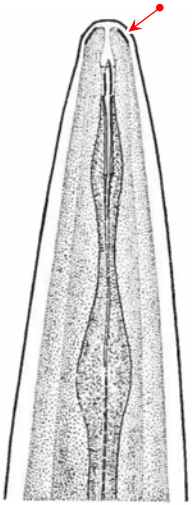


- L = 1-4 mm
- Body almost straight after fixation
- Cuticle smooth
- Lip region offset
- Odontostyle short, fusiform or cylindroid
- Oesophagus long; anterior slender part separated by constriction from posterior widened part; this latter is longer and surroundet by a transparent sheath
- Cardia long, muscular
- Vagina well developed
- 1 posterior ovary, often an anterior uterine sac
- Male supplements 2-30, spaced
- Spicules well developed with lateral guiding pieces
- Tail in both sexes rounded to conoid
- Soil, fresh water, groundwater
- Feeding: plant, omnivorous (?)
- c-p = 5



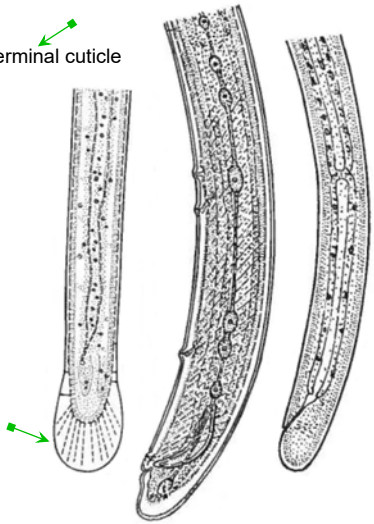


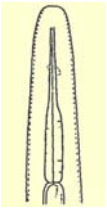


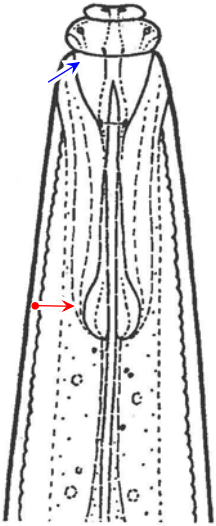


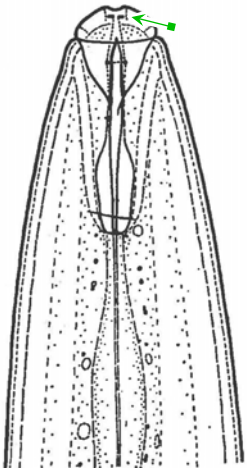
Belondira Thorne, 1939

- L = 0.7 – 2.4 mm
- Cuticle smooth
- Head rounded, with sclerotizations
- Odontostyle <1 head width
- Oesophagus: anterior part with an elongated ellipsoidal swelling; posterior part encircled by a spirally striated sheath
- 1 posterior ovary; anterior uterus vestigial
- Male supplements 1 or 2 widely spaced
- Tail short rounded to cylindroid; often clavate with thick terminal cuticle
- Soil; rarely in fresh water
- Feeding: omnivorous? plant feeder?
- c-p = 5

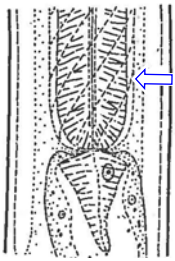




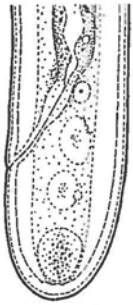


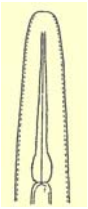


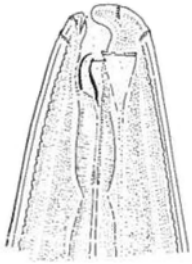
Dorylaimellus Cobb, 1913

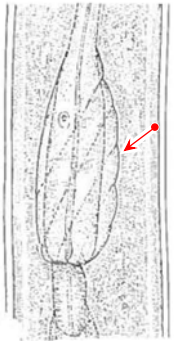


- L = 0.4 – 1.8 mm
- Body ventrally curved upon fixation
- Cuticle practically smooth
- Head truncated, set off, sometimes a labial disc
- Amphids pocket-like, with slit-like aperture almost encircling the head
- Stoma: 4 tiny refractive pieces around entrance
- Odontostyle small and thin; guiding ring single; odontophore with broad flanges
- Posterior oesophagus encircled by a spiral sheath
- V = 40-60%; vulva longitudinal
- 2 ovaries or, rarely, 1 posterior
- Male supplements 4-5, separate or in pairs, spaced
- Tails similar in sexes; from short round to filiform
- Soil; rarely in fresh water
- Feeding: omnivorous? plant feeder?
- c-p = 5



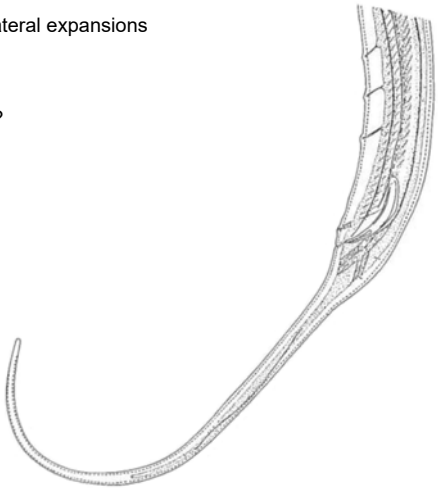


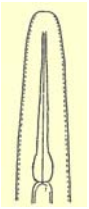


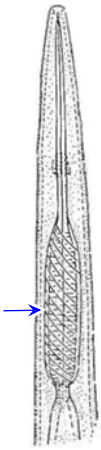


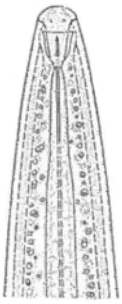
Falcihasta Clark, 1964

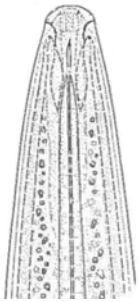
- L = 1.1 – 1.8 mm
- Head continuous with body, asymmetrical
- Odontostyle falcate
- Oesophageal bulb short, pyriform, encircled by dextrally spiral sheath
- Vulva transverse
- 2 ovaries (rarely only 1 posterior ovary)
- Male supplements 1-3
- Tails similar in sexes, filiform, with or wihout lateral expansions
- Soil; swampy soil
- Feeding: omnivorous? plant or hyphal feeder?
- c-p = 5

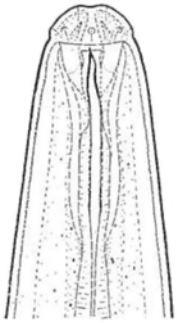


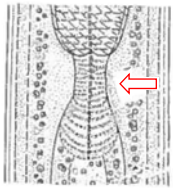






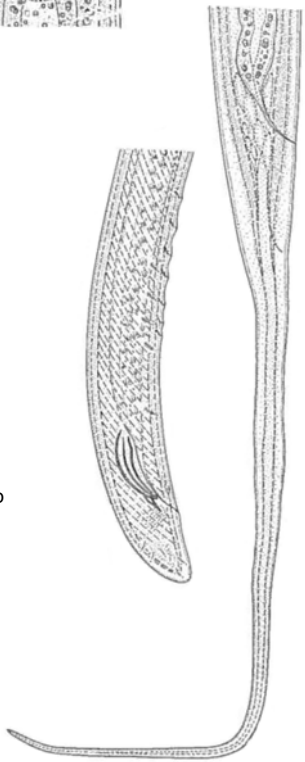


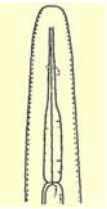


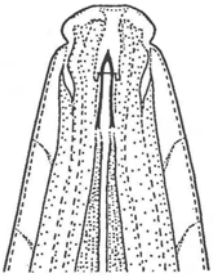


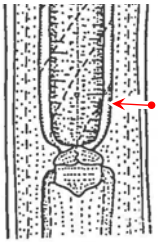
Lindseyus Ferris & Ferris, 1973

- L = 3 – 6 mm
- Body very slender (a = 67 - 86)
- Head continuous with body
- Faint basket-like structures in lip region
- Odontostyle short, thin, slightly asymmetrical; no guiding ring
- Oesophageal bulb 1/3 of oesophageal length, encircled by sinistrally spiral sheath
- Cardia long
- 2 ovaries
- Male supplements 7-10
- Female tail long, filiform; male tail short, conoid with rounded tip
- Swampy soil, rice felds, rarely in fresh water
- Feeding: omnivorous? plant or hyphal feeder?
- c-p = 5



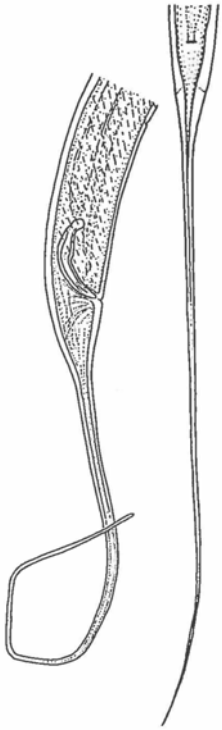


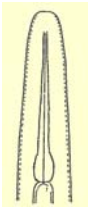


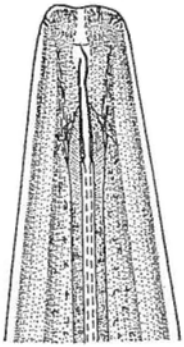


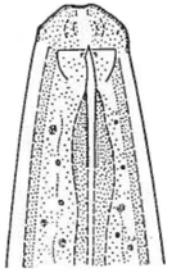
Oxydirus Thorne, 1939

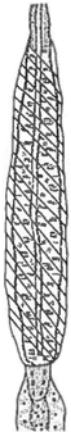
- L = 1 – 4 mm
- Cuticle practically smooth
- Lip region continuous with body, appearing asymmetrical in lateral view
- Odontostyle short, guiding ring single
- Posterior widened half of oesophagus enclosed in a transparent sheath (dextrally spiral)
- Vulva transverse
- 1 (posterior) or 2 ovaries
- Male supplements 5-15 mostly contiguous, rarely spaced
- Prerectum 5-7 anal body widths long
- Tails similar in sexes, long, filiform
- Moist soil, fresh water
- Feeding: plant, omnivorous (?)
- c-p = 5





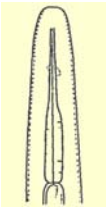


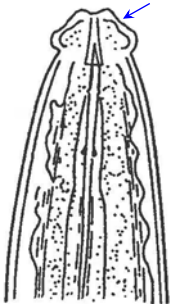
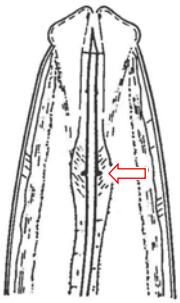




Paraoxydirus Jairajpuri & Ahmad, 1979

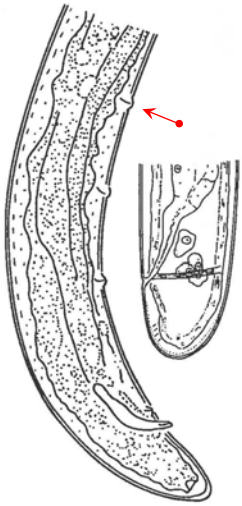
- L = 3.6 – 6.0 mm
- Body slender
- Odontostyle short, asymmetrical
- Oesophageal bulb 1/3 of oesophageal length, encircled by thick sinistrally spiral sheath
- 2 ovaries
- Vulva transverse or pore-like; vagina large
- Male supplements 11-15, contiguous, well anterior to cloaca
- Tails in both sexes long filiform
- Rice fields, swampy soil
- Feeding: omnivorous? plant or hyphal feeder?
- c-p = 5

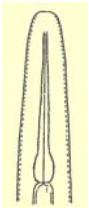


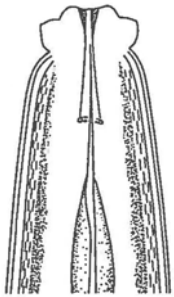
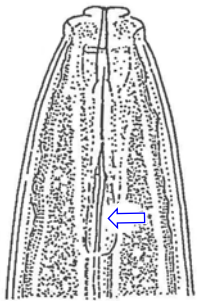




Tylencholaimus de Man, 1876

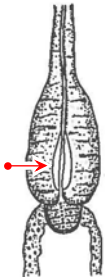
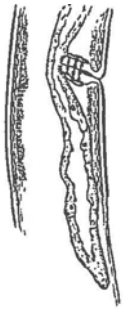
- L = 0.3-1.0 mm (rarely till 1.5 mm or more)
- Subcuticle loose, irregular
- Lip region cap-like, offset by constriction or depression
- Amphids pocket-like, with slit aperture half as wide as corresponding body
- Odontostyle thin, 4-8 µm; less (or as) long as labial width
- Odontophore 1.0-1.5 times as long as the odontostyle; with basal knobs
- Anterior part of oesophagus very slender, widened behind its middle
- V = 50-70%; vulva transverse
- 2 ovaries or only 1 ovary (anterior or posterior)
- Male supplements 2-6, spaced (rarely till 10 and contiguous)
- Tail hemispheroid to elongated-conoid, similar in both sexes; no spinneret
- Soil; rare in fresh water
- Feeding: fungal hyphae
- c-p = 4



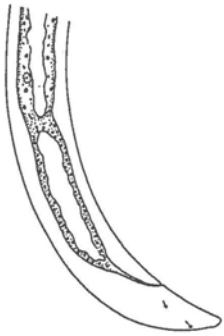


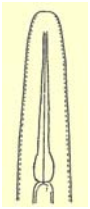



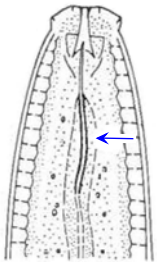
Basirotyleptus Jairajpuri, 1964

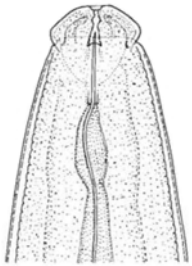



- L = 0.3 – 1.2 mm
- Body cylindroid
- Cuticle and sub-cuticle striated
- Lip region offset, cap-like
- Stoma a long truncate cone, sclerotized
- Odontostyle solid, needle-like; odontophore simple, not flanged
- Oesophageal bulb pyriform with inner cuticularized lumen
- Vulva transverse
- 1 ovary (anterior or posterior) or 2
- Male supplements 0-4
- Tail in both sexes short, rounded to conoid
- Moist soil, rice fields, freshwater, springs
- Feeding: hyphae
- c-p = 4



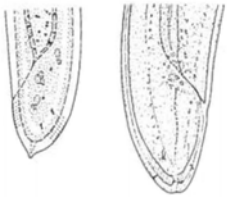



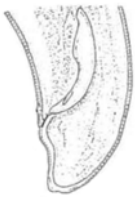


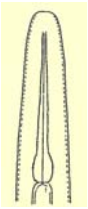


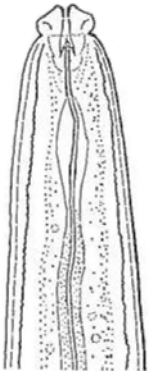
Funaria van der Linde, 1938

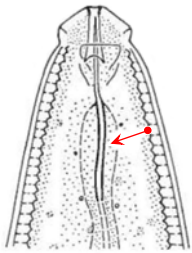
- L = 1 – 2.2 mm
- Body cylindroid
- Cuticle with fine transverse striations; subcuticle coarsely striated
- Lip region offset, cap-like
- Stoma curicularized
- Odontostyle very slender (sometimes arcuate) with narrow lumen; odontophore cuticularized, usually arcuate, not flanged
- Oesophagus widened at 80% of its length in a cylindroid (rarely pyriform) bulb; cardia large
- Vulva longitudinal
- 2 ovaries
- Male supplements 4-10, well spaced
- Prerectum very long
- Tail similar in sexes, short, rounded to conoid, with acute tip
- Soil, river banks, rare in freshwater
- Feeding: hyphae
- c-p = 4



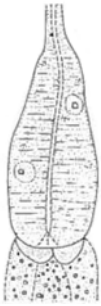




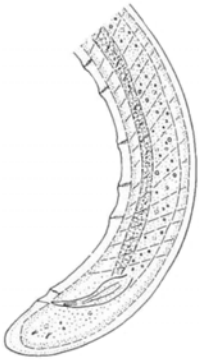


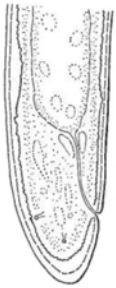


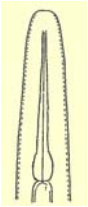
Leptonchus Cobb, 1920

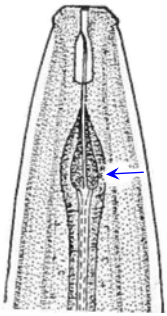


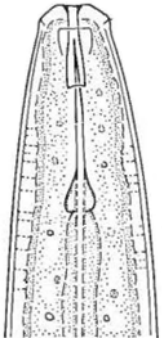
- L = 0.7 – 1.5 mm
- Body cylindroid
- Cuticle with fine transverse striations; subcuticle coarsely striated
- Lip region offset, cap-like
- Stoma curicularized
- Odontostyle very slender with narrow lumen; odontophore cuticularized, usually arcuate, not flanged
- Oesophagus widened at 80% of its length in a pyriform bulb; cardia small
- Vulva transverse
- 2 ovaries
- Male supplements 5-7, spaced
- Prerectum very long
- Tails in both sexes short, rounded to bluntly conoid
- Soil, rare in freshwater
- Feeding: hyphae
- c-p = 4





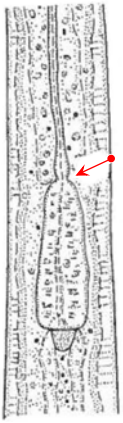


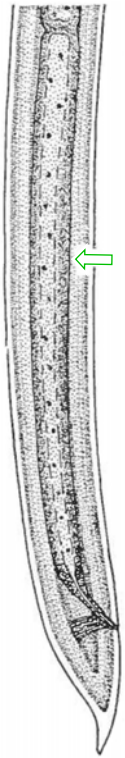


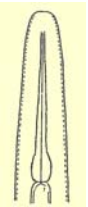


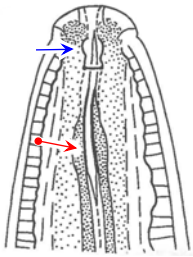
Proleptonchoides Ferris, Goseco & Kumar, 1979

- L = 0.7 – 1.5 mm
- Body cylindroid
- Cuticle with fine transverse striations; subcuticle coarsely striated
- Stoma curicularized, bottle-shaped
- Odontostyle very slender, straight or bent at tip; odontophore flanged
- Oesophagus widened at 75% of its length in a pyriform bulb set off by constriction; cardia small
- Vulva longitudinal
- 1 anterior ovary
- Male unknown
- Prerectum very long
- Tail conical digitate or spicate
- Soil, rice fields, swampy soil
- Feeding: hyphae
- c-p = 4

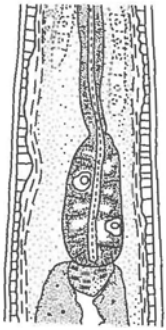




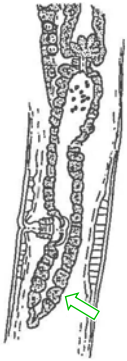


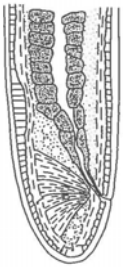


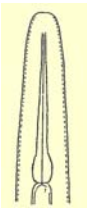
Proleptonchus Lordello, 1955

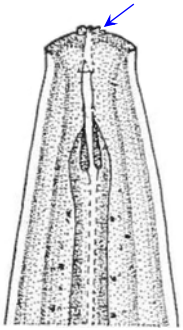


- L = 0.8 – 1.9 mm
- Cuticle with many radial refractive elements
- Subcuticle striated
- Stoma flask-shaped, cuticularized
- Odontostyle very slender; odontophore cuticularized, arcuate
- Oesophagus widened (with a constriction) at 75-80% of its length, in a pyriform shape
- 1 anterior ovary; postvulval sac
- V = 40-60%
- Male supplements 1-6, widely spaced
- Tails short, rounded to bluntly conoid
- Soil; rarely in fresh water
- Feeding: omnivorous?
- c-p = 4



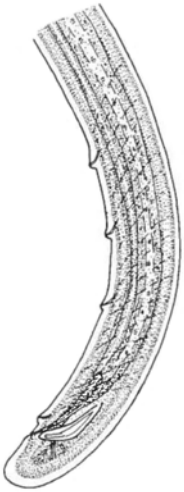


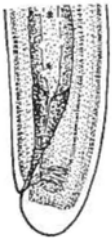


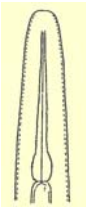


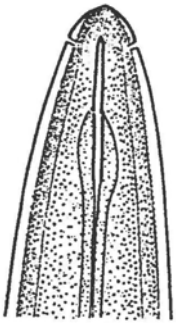
Tyleptus Thorne, 1939

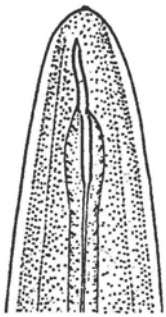
- L = 0.5 – 1.5 mm
- Body cylindroid
- Lip region with distinct inner liplets
- Stoma a short truncate cone, slightly sclerotized
- Odontostyle short and comparatively thick; odontophore simple or flanged
- Oesophageal bulb pyriform with inner cuticularized lumen
- Vulva transverse
- 1 posterior ovary
- Male supplements 1-3
- Tails short, rounded or conoid
- Soil, rice fields, river banks, rare in freshwater
- Feeding: hyphae
- c-p = 4





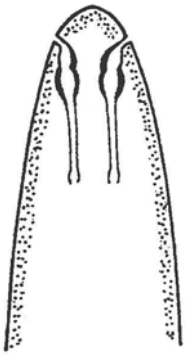


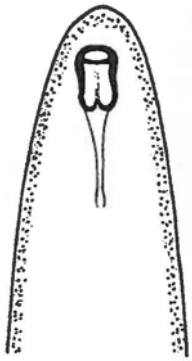


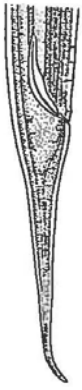


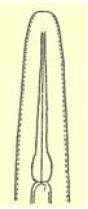
Athernema Ahmad & Jairajpuri,1978

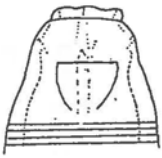
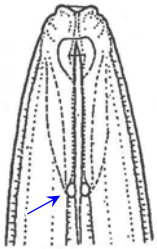
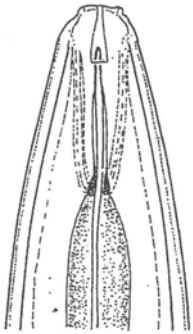
- L = 1.5 – 1.8 mm
- Cuticle almost smooth
- Head not offset
- Amphids sclerotized and bilobed
- Odontostyle arcuate, asymmetrical
- Oesophagus widened (without constriction) at 80% of its length
- Vulva transverse
- 1 posterior ovary
- Male supplements: few and very faint
- Tail elongated in both sexes
- Semi-aquatic
- Feeding: omnivorous?
- c-p = 4



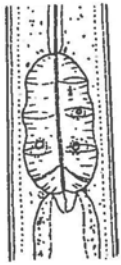




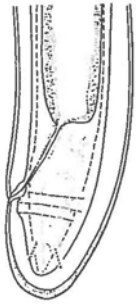


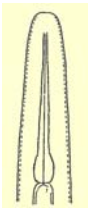




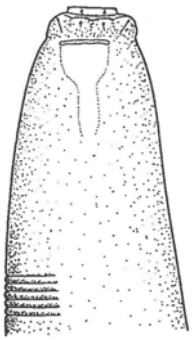
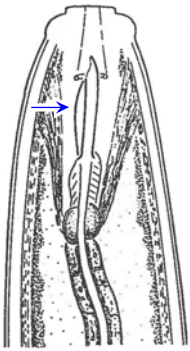
Doryllium Cobb, 1920

- L = 0.5-1.1 mm
- Cuticle almost smooth
- Head continuous with body or with labial disc
- Odontostyle short, odontophore with basal knobs or flanges
- Oesophageal bulb offset by constriction
- 1 posterior ovary; often an anterior uterine sac
- Male supplement: 1 (and 1 adanal pair)
- Tail similar in sexes, short and rounded
- Soil, rare in fresh water
- Feeding: hyphal feeder?
- c-p = 4

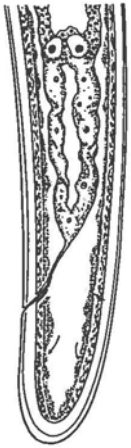


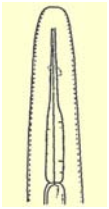


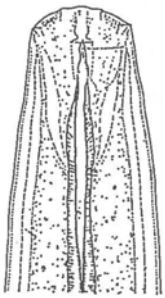



Tylencholaimellus Cobb in M.V. Cobb, 1915

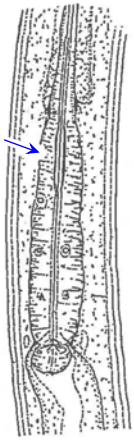
- L = 0.3 – 1.5 mm
- Cuticle practically smooth
- Head offset, often with labial disc
- Odontostyle short with dorsal accessory structure; odontophore shorter, with basal knobs
- Oesophageal bulb offset by constriction
- 1 posterior ovary; often anterior uterine sac
- Male supplements 1-2, well anterior from spicular region
- Tail in both sexes rounded or conoid with rounded tip
- Soil, rarely in fresh water
- Feeding: hyphal feeder
- c-p = 4



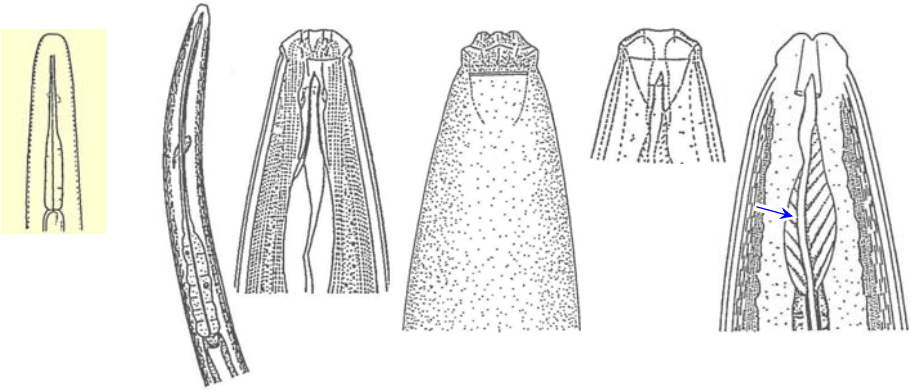




Calolaimus Timm, 1964

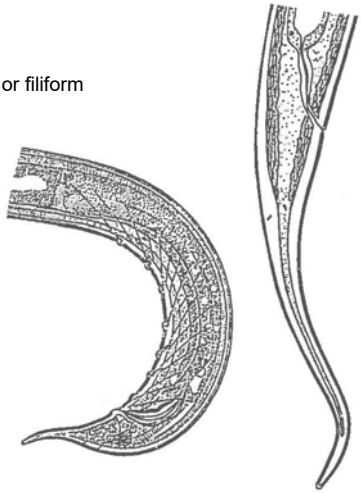


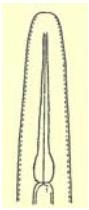
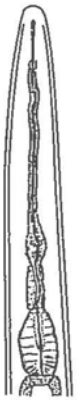
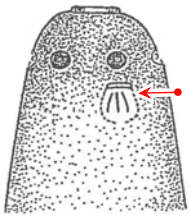
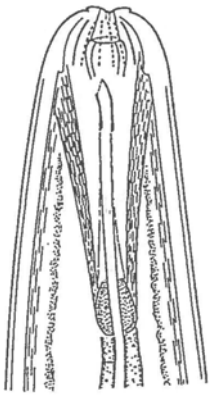
- L = 2.5 – 6.8 mm
- Cuticle practically smooth
- Odontostyle shorter than labial width, irregularly shaped; odontophore straight, sclerotized; guiding ring sclerotised, belt-like
- Posterior third of oesophagus enlarged (bulboid); lumen with thick lining
- 2 ovaries
- Male supplements 8-20, spaced
- Tail similar in sexes, elongated conoid to filiform
- Soil, rice fields, fresh water, roots of aquatic plants
- Feeding: plant, omnivorous (?)
- c-p = 4



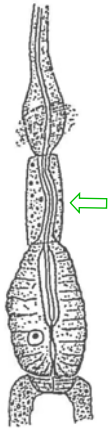
Dorylaimoides Thorne & Swanger, 1936

- L = 0.7 - 2 mm
- Cuticle practically smooth
- Odontostyle short, asymmetrical, ventral shorter than dorsal; odontophore not straight
- Oesophagus widened at 65-75% of its length
- Vulva transverse
- 1 posterior ovary or 2 ovaries
- Male supplements 1-12, spaced
- Tail similar in sexes, from short and rounded to elongated or filiform
- Soil; rarely in fresh water
- Feeding: omnivorous?
- c-p = 4

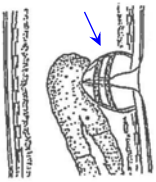
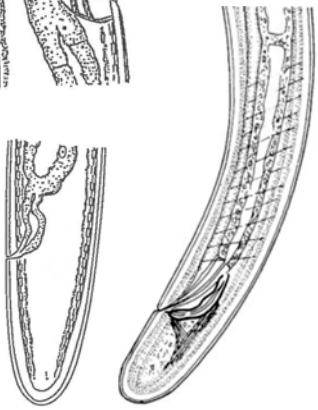


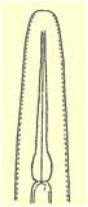





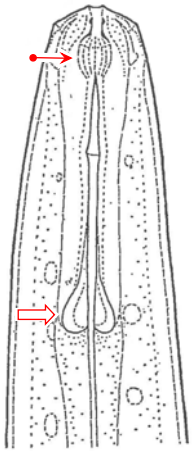
Adenolaimus Andrássy, 1973



- L = 0.4 – 1.3 mm
- Cuticle practically smooth
- Head rounded
- Amphids basket-like
- Stoma with rib-like structures
- Odontostyle <1 head with, but with distinct lumen; odontophore longer and flanged
- Oesophagus: slender anterior part + glandular section + bulb
- 1 posterior ovary
- Vagina wide with distinct walls
- Male supplements 0-2
- Spicules slender; gubernaculum
- Tail short, tapering to rounded tip
- Soil, fresh water, wet moss
- Feeding: omnivorous?
- c-p = 4

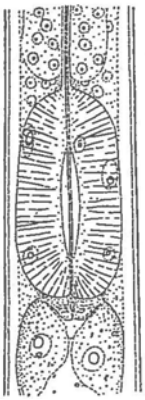



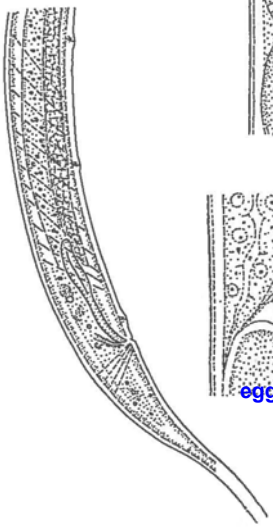


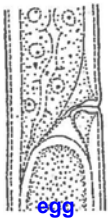


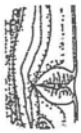
Aulolaimoides Micoletzky, 1915

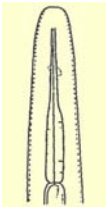
- L = 0.6 – 1.9 mm
- Cuticle practically smooth
- Head not offset
- Amphids with rib-like elements
- Stoma with basket-like structure; odontostyle narrow with small aperture; odontophore long, flanged
- Oesophagus: slender anterior part + glandular section + bulb
- Vagina swollen
- 1 posterior ovary
- Male supplements 1-2
- Spicules slender, gubernaculum small
- Tail similar in sexes, long, filiform
- Moist soil, moss, fresh water
- Feeding: omnivorous?
- c-p = 3

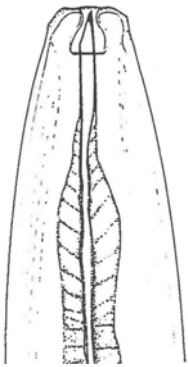






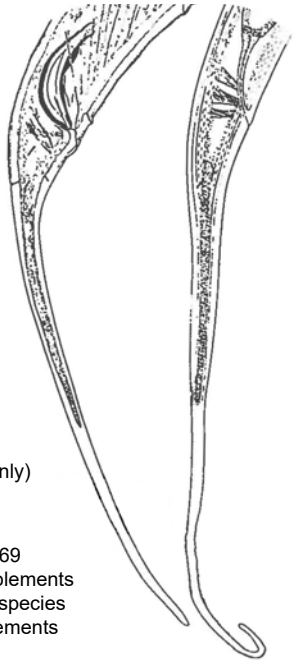






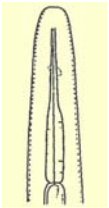
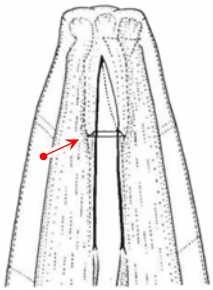
Prodorylaimus Andrássy, 1959

- L = 1 – 5 mm
- Body slender (a = 30-90)
- Cuticle practically smooth, thin to very thick
- Lip region slightly offset
- Odontostyle massive, 11-70 µm, longer than labial width; aperture 1/3 – 1/4 of its length; guiding ring double but thin, at about 1 head diameter from anterior body end
- Oesophagus widened near middle
- V = 32-53%
- 2 ovaries
- Male supplements 6-31, contiguous; sperms fusiform
- Female prerectum 4-12 times anal body width; male prerectum beginning before the supplements
- Tail in both sexes very short to long filiform; c' = 2 – 25
- Fresh water, moss, moist soil
- Feeding: omnivorous
- c-p = 4



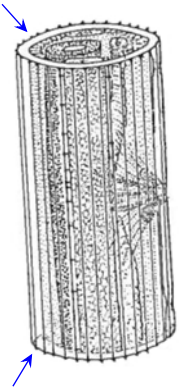
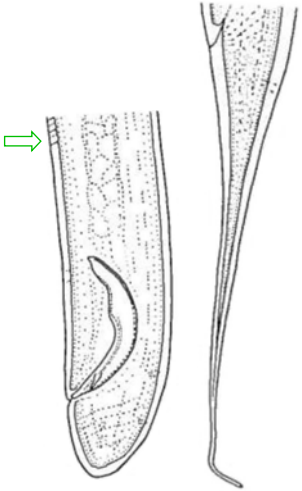
(*Prodorylaimus* can be distinguished from *Laimydorus* by the males only)

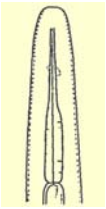
Following Andrássy (2009), genus *Prodorylaimium* Andrássy,1969 (species with L=1.1-2.5 mm; female prerectum short; male supplements 6-10 well separated) should be separated from *Prodorylaimus* (species with L=1-5 mm; female prerectum moderately long; male supplements 13-31 contiguous).

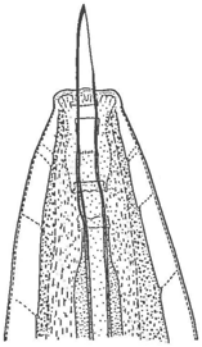



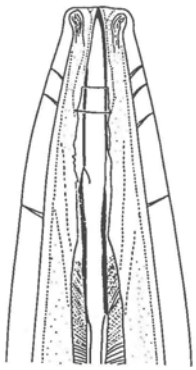
Dorylaimus Dujardin, 1845

- L = 2 - 9 mm (mostly 3 - 5 mm)
- Cuticle thick with 28-60 longitudinal ridges (warning: do not mistake the well visible longitudinal body musculature for the superficial and faint cuticular ridges!)
- Labial region slightly offset
- Odontostyle strong, usually 35-63 µm; aperture <0.5 its length; guiding ring double, at 1.0-1.5 head diameters from anterior body end
- Oesophagus muscular, widened near middle
- V = 34–51%; vulva longitudinal or transverse
- 2 ovaries
- Male supplements 22-62, contiguous; the posterior one at 1-2 spicular lengths from spicules
- Sperms elongated-oval or fusiform
- Male prerectum beginning well anteriorly to supplements
- Female tail elongated to filiform; male tail short and rounded
- Fresh water, moss, moist soil
- Feeding: omnivorous
- c-p = 4

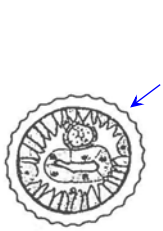


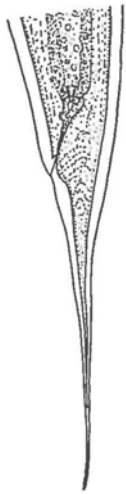


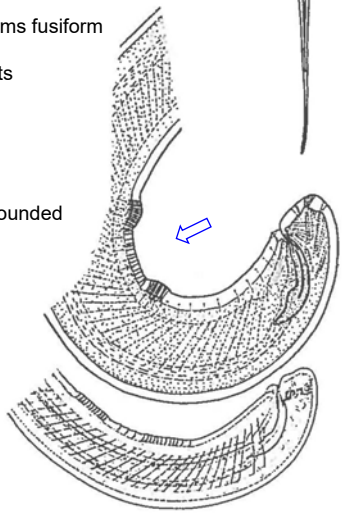


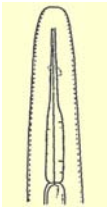
Ischiodorylaimus Andrássy, 1969

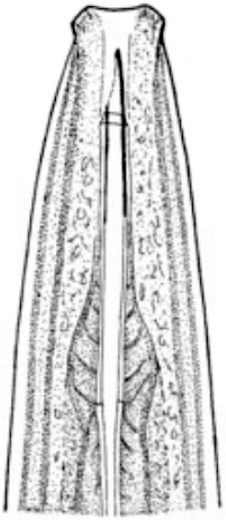
- L = 2.5 – 8.5 mm
- Body slender; a = 30-50
- Cuticle very thick with 28-56 longitudinal ridges
- Odontostyle 46-106 µm, 2-3 times as long as labial width; aperture 30-40% of its length; guiding ring double, at >1 head diameter fron anterior end
- Oesophagus generally expanded before its middle
- V = 27-45%; vulva longitudinal, sclerotized, with some advulval papillae
- 2 ovaries
- Male supplements small, in 2 dense groups or fascicles; sperms fusiform
- Male prerectum beginning far before the range of supplements
- Spicules large and slender
- Female prerectum 3-10 times as anal body width
- Female tail elongated-conoid; c' = 2.5-8; male tail short and rounded
- Fresh water; wet soil
- Feeding: omnivorous
- c-p = 4

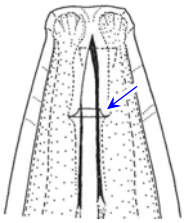






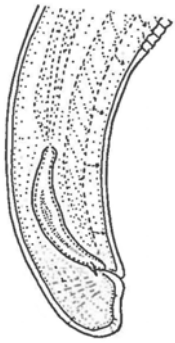




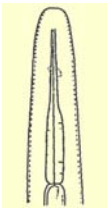


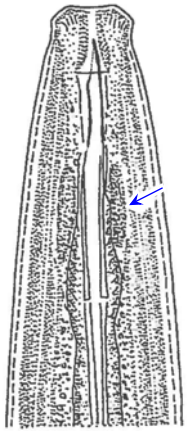
Laimydorus Siddiqi, 1969

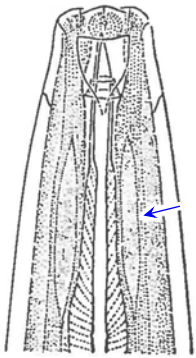
- L rarely <2 mm, generally 2-6 mm
- Body slender (a = 30-90)
- Cuticle smooth, thin to very thick
- Odontostyle massive, 11-70 µm, longer than labial width; aperture about 1/3 of its length; guiding ring usually double, at about 1 head diameter from anterior body end
- Oesophagus widened at or behind its middle
- V = 32-53%
- 2 ovaries
- Male supplements (15-) 20 to 47, contiguous; sperms fusiform
- Female prerectum 4-12 times long as anal body width; male prerectum beginning far before the supplements
- Female tail elongated to filiform; c' = 5 – 25; male tail short conical to rounded
- Fresh water, moss, moist soil
- Feeding: omnivorous
- c-p = 4



(*Laimydorus* can be distinguished from *Prodorylaimus* by the males only)

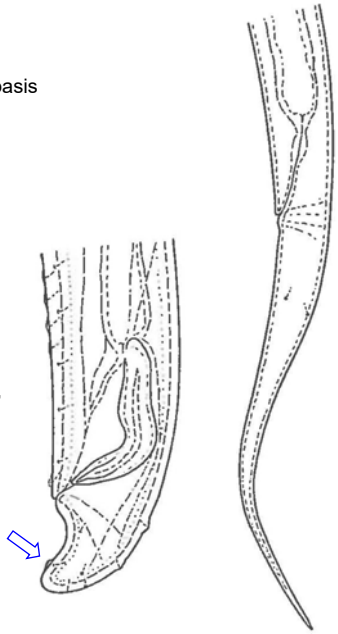


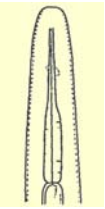


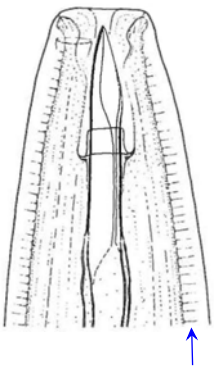


Crocodorylaimus Andrássy, 1988

- L = 1.4 – 3.5 mm
- Body slender (a = 42-75)
- Cuticle practically smooth
- Odontostyle 15-20 µm, 1.3-2.3 times as long as labial width; aperture about 1/3 of its length; guiding ring thin
- 4 spindle-shaped yellowish (or gray) bodies near odontostyle basis
- V = 40-52%
- 2 ovaries
- Male supplements 12-32, contiguous; sperms fusiform; prerectum beginning far before the range of supplements
- Spicules massive
- Female prerectum 3-6 times long as anal body width
- Female tail attenuated c' = 3-10; male tail short, finger-shaped, ventrally bent with a subterminal blister
- Fresh water; thermal water; humid soil
- Feeding: omnivorous
- c-p = 4

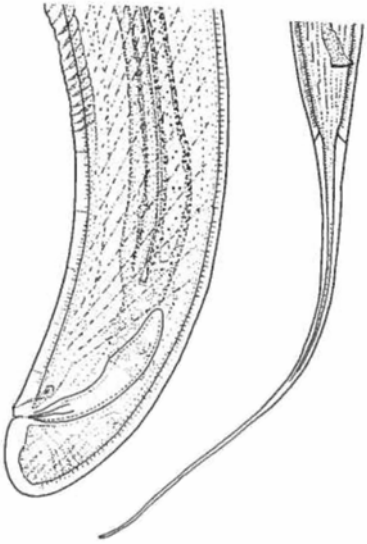




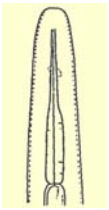


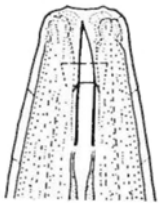
Idiodorylaimus Andrássy, 1969

- L = 2 – 7 mm
- Inner cuticle with distinct annulation
- Lip region continuous
- Odontostyle massive, 29-62 µm; aperture about 1/3 its length
- V = 39-49%; vulva longitudinal
- 2 ovaries
- Male supplements 19-37
- Male prerectum beginning before the supplements
- Female tail elongated-conoid to filiform; c' = 4 – 10; male tail short conical to rounded
- Fresh water, moss, moist soil
- Feeding: omnivorous
- c-p = 4



(*Idiodorylaimus* can be distinguished from *Laimydorus* by the cuticular striations)

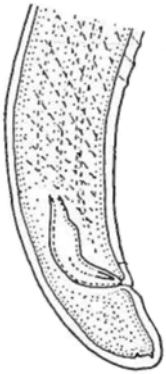


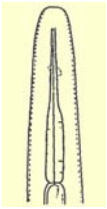


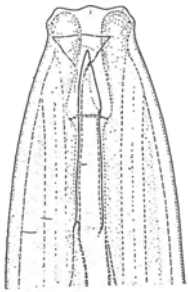

Mesodorylaimus Andrássy, 1959

- L = 0.8 – 2.3 mm
- Body normal or slender, a = 22 - 48
- Cuticle thin, smooth or finely annulated
- Odontostyle 7-25 µm, 1-1.5 times as long as labial width; rather narrow; aperture 1/3 of its length; guiding ring single
- Oesophagus widened at middle or posterior to it
- V = 37-60%
- 2 ovaries
- Male supplements 4-26 (often 7-13), usually spaced
- Sperms fusiform
- Female prerectum 4-12 times as anal body width; in male it begins within the range of supplements
- Female tail elongated to filiform (c' = 1-20); male tail short and rounded
- Soil, moss, fresh water
- Feeding: omnivorous
- c-p = 4

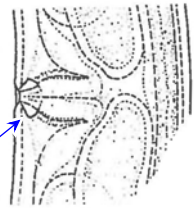


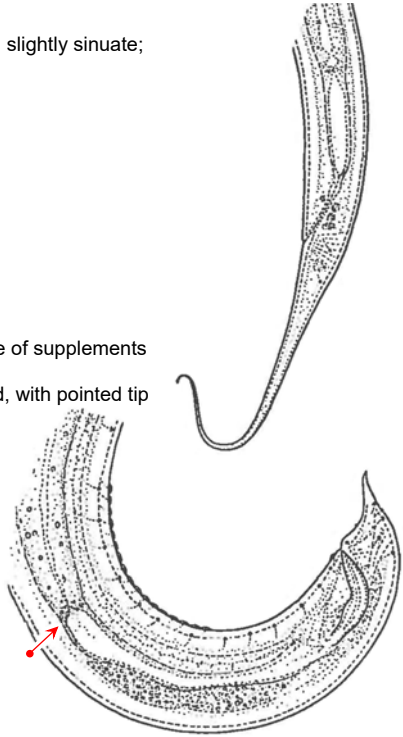


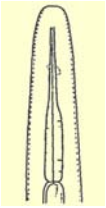


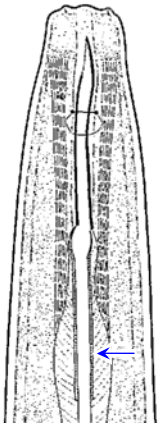
Afrodorylaimus Andrássy, 1973

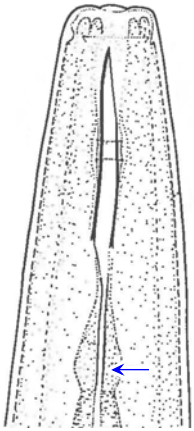


- L = 1 – 5 mm
- Body slender (a = 25-60)
- Cuticle practically smooth
- Odontostyle strong, about twice as long as head width, slightly sinuate; guiding ring thin
- Cardia elongated
- V about 50%; vulva longitudinal, lips sclerotized
- 2 ovaries
- Male supplements 8-20, mostly separate
- Sperms small, rounded
- Prerectum short; in male prerectum begins in the range of supplements
- Female tail long, filiform; male tail short, conoid, curved, with pointed tip
- Fresh water, moss, wet soil
- Feeding: omnivorous
- c-p = 4



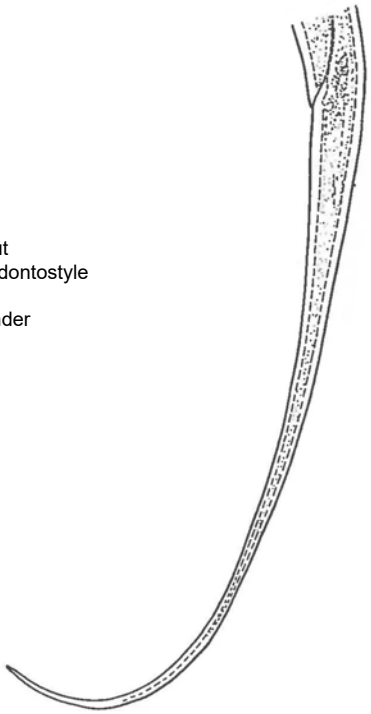


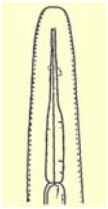


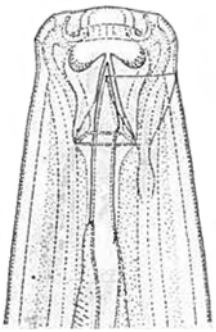


Drepanodorylaimus Jairajpuri, 1966

- L = 0.9 – 2.3 mm
- Body rather slender
- Cuticle smooth and thin
- Lip region truncate, continuous with body
- Amphids pocket-like, large, the aperture corresponds to 65-75% body width
- Odontostyle 2-2.5 times as long as head width, slightly but clearly sinuate; odontophore as long as, or shorter than odontostyle
- Oesophagus enlarged behind its middle; cardia long, slender
- V about 50%; vulva sunken in body contour
- 2 ovaries; uteri short
- Prerectum short
- Female tail long, filiform
- Soil, moss, fresh water
- Feeding: omnivorous
- c-p = 4

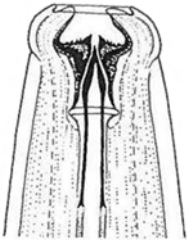


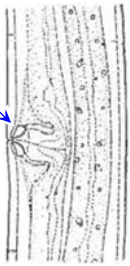


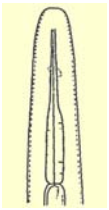


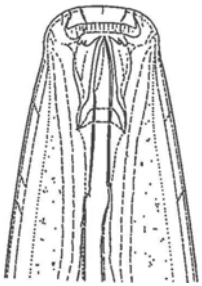
Paractinolaimus Meyl, 1957

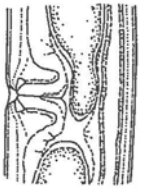
- Usually L = 1.4 – 5 mm
- Cuticle moderately thick, practically smooth; no longitudinal ridges
- Stoma: corrugated anterior ring, vestibular walls with tiny denticles; 4 large onchia around odontostyle
- Oesophagus with widened posterior half (cylindrus)
- Vulva with sclerotized lips
- 2 ovaries
- Male supplements numerous
- Female tail elongated; male tail short, rounded
- Fresh water, moist soil
- Feeding: small animals
- c-p = 5





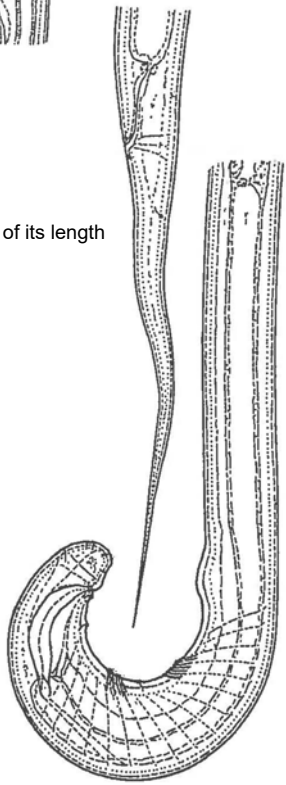


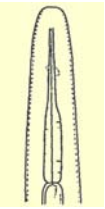


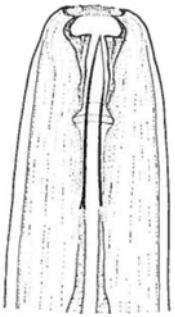


Neoactinolaimus Thorne, 1967

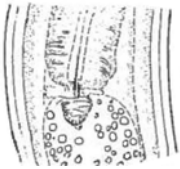
- L = 1.3 – 6.0 mm
- Body slender
- Cuticle smooth, no longitudinal striae
- Stoma: corrugated anterior ring; vestibule without denticles; 4 large onchia, each with 1-2 additional teeth; odontostyle massive
- Oesophagus: widened posterior part (cylindrus) occupies nearly half of its length
- Vulval lips sclerotized
- 2 ovaries
- Male supplements located in 2 fascicles
- Female tail elongated to filiform; male tail short, rounded
- Fresh water, thermal water, moist soil
- Feeding: small animals
- c-p = 5



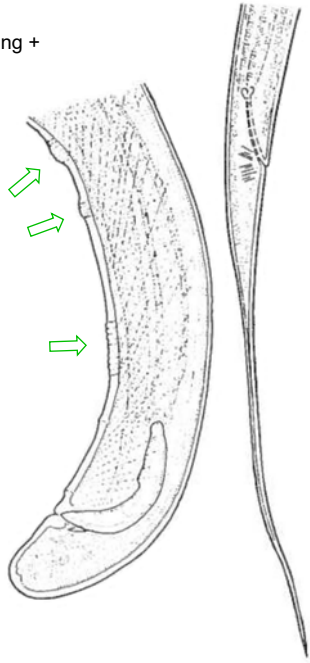


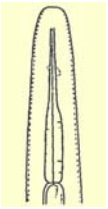


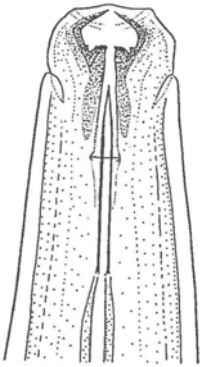
Parastomachoglossa Coomans & Loof, 1986

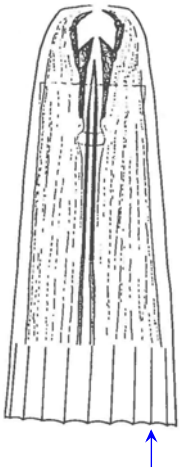


- L = 2.4 – 4.4 mm
- Body slender (a = 35-65)
- Cuticle with prominent longitudinal ridges
- Stoma: anterior end with a cuticular ring; vestibule without denticles; odontostyle 20-35 µm, robust; around it are 4 solid onchia; between them are 1-4 narrow denticles
- Oesophagus in 3 portions: anterior hyaline tube + median widening + posterior muscular
- 2 ovaries; vulva longitudinal
- Vagina muscular, lightly sclerotized
- Males supplements in 2 or 3 fascicles
- Tail elongated to filiform in females, in males short and rounded
- Wet soil, wet moss, fresh water
- Feeding: small animals, omnivorous
- c-p = 5



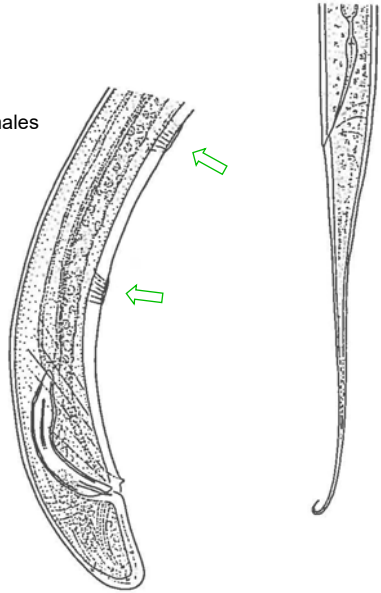


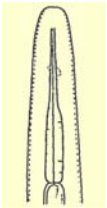


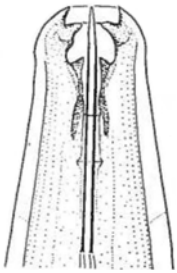


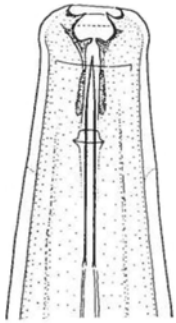
Actinca Andrássy, 1964

- L = 1.5 – 3 mm
- Body slender (a = 35-70)
- Cuticle with conspicuous longitudinal ridges
- Stoma: anteriorly a weak cuticular ring, vestibule without denticles, 4 onchia
- V = 45-50%; vulva longitudinal, slightly sclerotized
- 2 ovaries
- Males supplements in 2 fascicles
- Tail elongated in females (c' = 5-13), short and round in males
- Soil, moss, fresh water
- Feeding: small animals, omnivorous
- c-p = 5



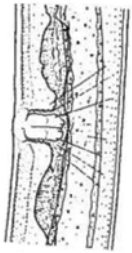


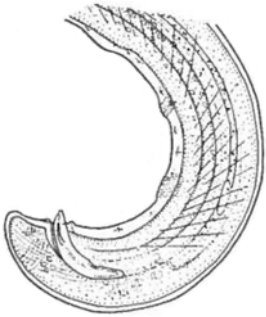


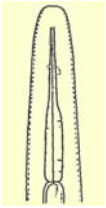


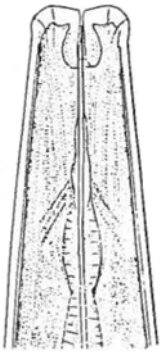
Brasilaimus Lordello & Zamith, 1957

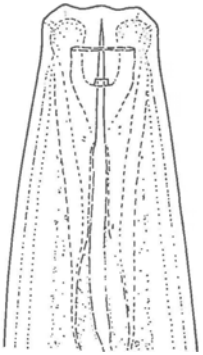
- L = 1.5 – 2 mm
- Body slender (a = 25-45)
- Cuticle thick or very thick (3-9 µm), with conspicuous longitudinal ridges
- Stoma: anteriorly with a cuticular ring, vestibule without denticles, 4 onchia
- V = 40-45; vulva longitudinal, lips not scletotized
- 2 ovaries
- Males supplements in 2 fascicles
- Tail elongated in females (c' = 4-14); short and round in males
- Soil, moss, fresh water
- Feeding: small animals, omnivorous
- c-p = 5



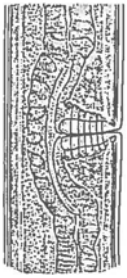




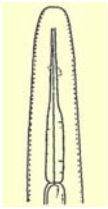


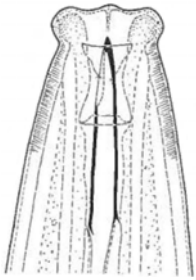


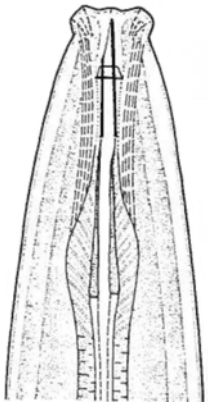
Chrysonema Thorne, 1929



- L = 1 – 3 mm
- Body very slender (a = 40-90)
- Cuticle practically smooth
- Head continuous with body, with thickened cuticle
- Odontoslyle thin, aperture small (one fourth or less of odontostyle length); guiding ring thin
- V = 34-49%; vulva transverse, not sclerotized
- 2 ovaries
- Male supplements 6-9, spaced
- Spicules moderately curved, no gubernaculum
- Tail in both sexes elongated conoid, c' = 4-8
- Soil, fresh water, roots of aquatic plants
- Feeding: plant, omnivorous (?)
- c-p = 5

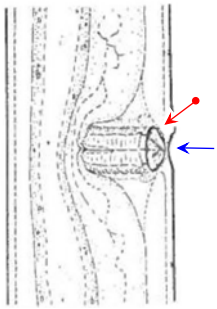


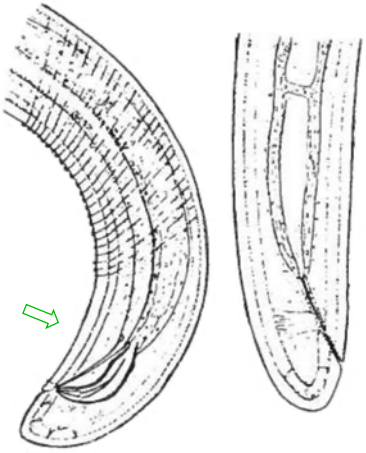


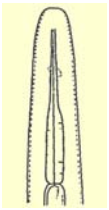


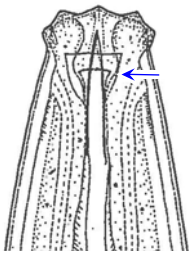
Labronema Thorne, 1939

- L = 1 – 6 mm
- Cuticle fairly thick, often finely annulated
- Head mostly well offset
- Odontostyle 11 - 60 µm, thick; aperture 30-50% of its length; guiding ring double
- Anterior part of oesophagus stronger than usual
- V = 46-63%; vulva longitudinal, sclerotized
- 2 ovaries
- Male supplements 14-36, contiguous
- No supplements in the spicular region
- Sperms oval
- Tails short, conoid-rounded or hemispheroid in both sexes
- Soil, sometimes in fresh water
- Feeding: small animals, omnivorous
- c-p = 4



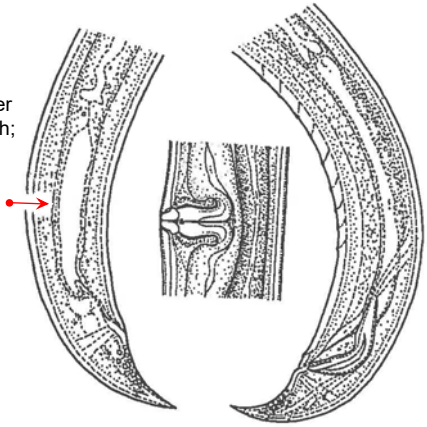






Eudorylaimus Andrássy, 1959

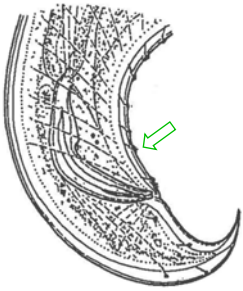
- L = 0.8 – 3.5 mm
- Cuticle practically smooth
- Head usually offset, lips angular
- Odontostyle 11 - 28 µm, as long or somewhat longer than cephalic diameter; aperture 0.3-0.5 of its length; guiding ring simple
- Oesophagus widened near middle
- V = 40-64%
- 2 ovaries; vulva mostly transverse, well sclerotized
- Male supplements 3-22, spaced; the posterior one placed at some distance from spicules
- Sperms fusiform
- Prerectum 1-5 anal body widths long
- Tail conoid, pointed, straight or slightly ventrally curved; c' = 1 - 3; similar in sexes
- Soil, sometimes in fresh water
- Feeding: small animals, omnivorous
- c-p = 4

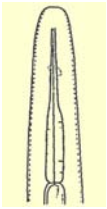


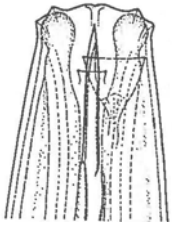
Allodorylaimus Andrássy, 1986

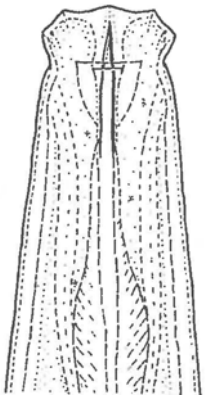
differs from *Eudorylaimus* in the following:

- L = 0.9 – 3.3 mm
- Male supplements 5-20, spaced
- Posterior most supplements placed in the spicular region
- Tail short, conoid or convex-conoid, straight or ventrally arcuate
- Essentially in terrestrial biotopes, sandy soil, moss



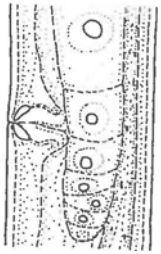


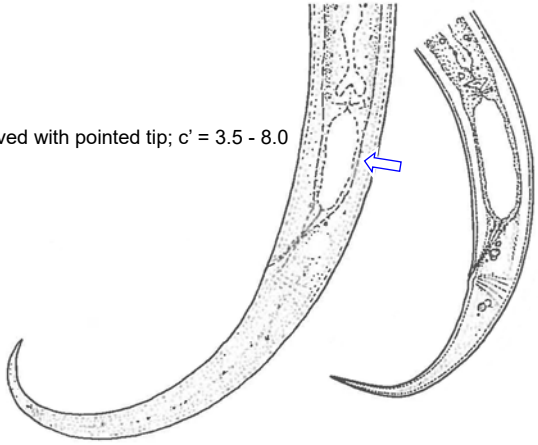


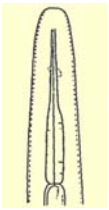


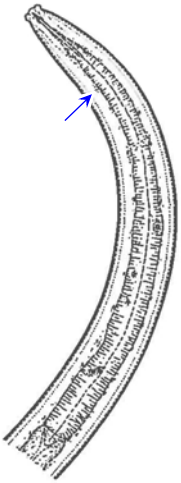
Epidorylaimus Andrássy, 1959

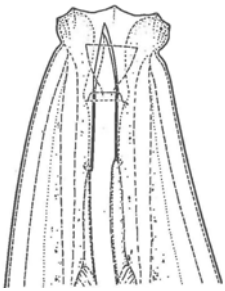
- L = 0.6 – 2.3 mm
- Cuticle practically smooth
- Head offset
- Odontostyle 9-30 µm, as long or a bit longer than labial diameter; guiding ring simple
- Oesophagus widened near its middle
- Vulva cuticularized
- 2 ovaries
- Males rare
- Male supplements 4-13
- Prerectum 1-3 anal body widths long
- Tail conoid, relatively long, ventrally curved with pointed tip; c' = 3.5 - 8.0
- Soil; not common in fresh water
- Feeding: omnivorous
- c-p = 4



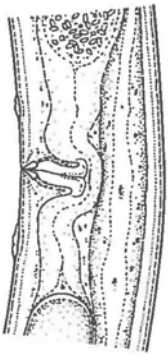




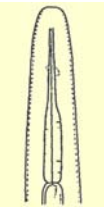


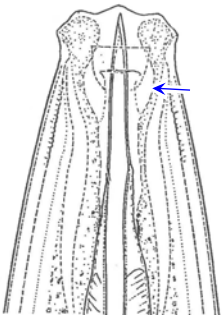


Crassogula Andrássy, 1991



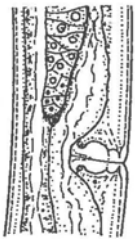
- L = 2.5 – 3.5 mm
- Cuticle smooth
- Head well offset
- Odontostyle 35-40 µm
- Oesophagus unusually thick also in its anterior half
- Vulva transverse, sclerotized
- 2 ovaries
- Sperms small, elongated
- Male supplements about 30, minute, contiguous
- Tails short, rounded
- Fresh water
- Feeding: omnivorous?
- c-p = 4

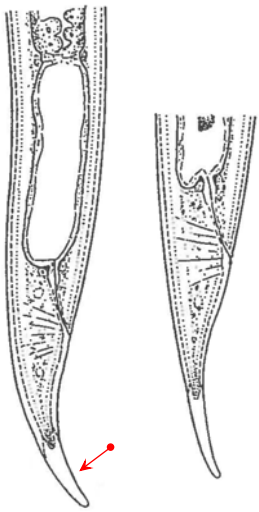


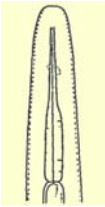


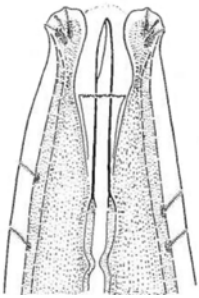
Boreolaimus Andrássy, 1998

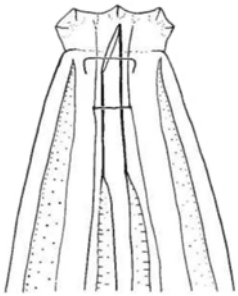
- L = 1.5 – 2.5 mm
- Cuticle practically smooth
- Head offset by depression
- Odontostyle 22 - 28 µm (1.2-1.5 times head width); guiding ring a long tube; stoma lining around odontostyle very spacious
- Oesophagus expanding before or near middle
- V = 40-60%; vulva transverse
- 2 ovaries
- Prerectum 1.5-4.5 times body width
- Tail conoid, straight to ventrally arcuate; distal part “empty”; tip rounded; c’ = 2-5
- Groundwater, psammon
- Feeding: omnivorous
- c-p = 4





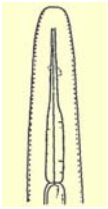


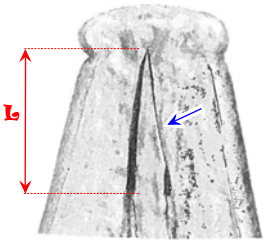


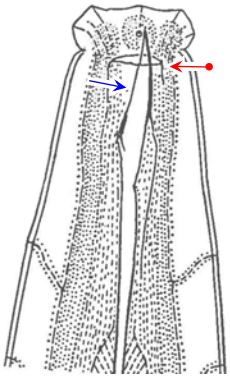


Arctidorylaimus Mulvey & Anderson, 1979

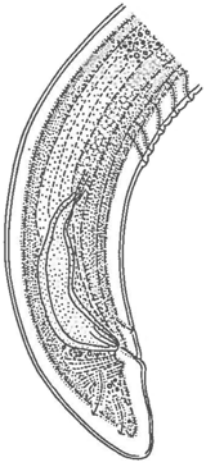
- L = 1.5–6.5 mm
- Cuticle with longitudinal ridges, or smooth
- Head offset
- Odontostyle 33 - 53 µm (about 1.5 times head width); guiding ring double
- Oesophagus widened before its middle
- V = 40-60%
- 2 ovaries
- Male supplements 7-18, regularly spaced
- Tails conoid, rounded, arcuate
- Fresh water
- Feeding: omnivorous
- c-p = 4



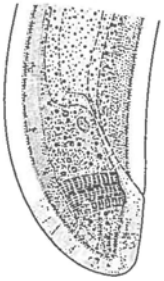


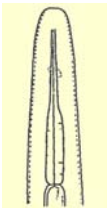


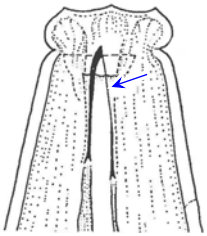
Aporcelaimus Thorne & Swanger, 1936

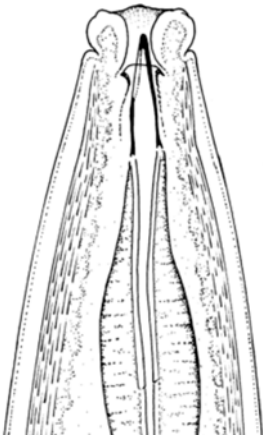


- L = 3 – 10 mm
- Head width only 20-25% of the body width at cardia level
- Cuticle thick with fine criss-cross lines (see tail)
- Labial region clearly offset by constriction
- Odontostyle 17-42 µm, nearly as long as lip diameter; aperture 65-80% of its length (L); guiding sheath thin, plicate
- Oesophagus gradually widened before its middle
- 2 ovaries
- Vulva transverse, vagina very strongly developed, often cuticularized
- Male supplements 7-30, usually spaced
- Spicules strongly swollen or slender
- c' = <1; tails rounded or conoid-rounded, sometimes subdigitate; similar in sexes
- Soil, fresh water
- Feeding: small animals, omnivorous
- c-p = 5



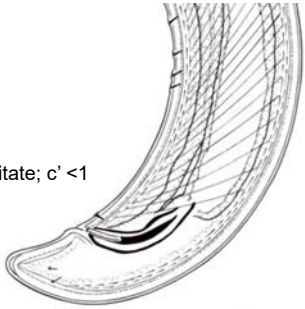


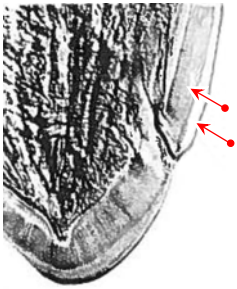


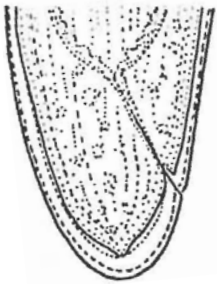


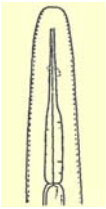
Aporcelaimellus Heyns, 1965

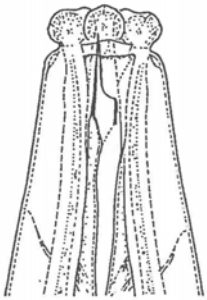
- L = 0.8 – 3.4 mm
- Body usually plump
- Cuticle thick, 2 layers of different refraction: outer transparent, inner compact (see tail)
- Labial region clearly offset by deep constriction
- Cervical region: between cuticle and somatic muscles, a “hollow” zone (lacuna)
- Odontostyle short and thick, aperture 50% of its length; guiding sheath thin
- 2 ovaries
- Vulva transverse or pore-like, inner labia sclerotized
- Males rare
- Supplements 5-21 (to 34), spaced
- Tail rounded or conoid-rounded in both sexes, occasionally subdigitate; c’ <1
- Soil, moss, fresh water
- Feeding: small animals, omnivorous
- c-p = 5



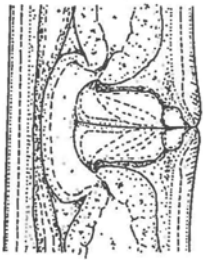




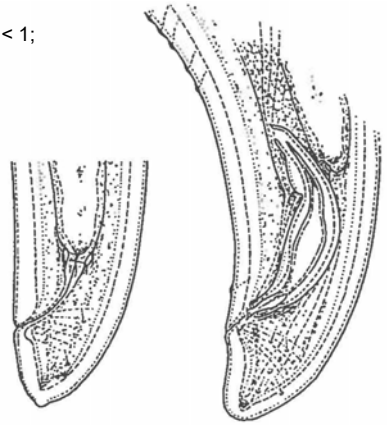


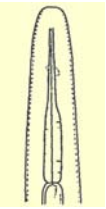


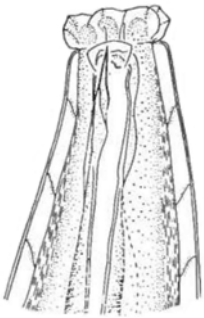
Epacrolaimus Andrássy, 2000



- L = 7 – 9.3 mm
- Cuticle thick with fine criss-cross lines (see tail)
- Lip region clearly offset by deep constriction
- Odontostyle aperture large, arched, forming a thin blade
- Oesophagus gradually widening far before the middle
- 2 ovaries
- Vulva transverse with wrinkled cuticle
- Male supplements 11-16, mostly separate
- Spicules very strong
- Tail conoid-rounded or subdigitate, similar in sexes; c' < 1;
- Soil, fresh water, brackish water
- Feeding: small animals, omnivorous
- c-p = 5

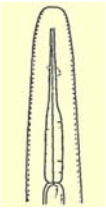
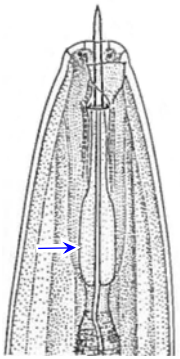


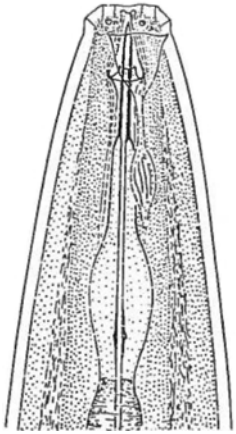




Sectonema Thorne, 1930

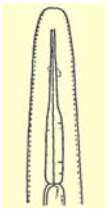
- L = 4 - 10 mm
- Cuticle with fine transverse striae and cris-cross lines
- Head well offset
- Amphids pocket-like, usually with median support
- Stoma: mural tooth on ventral wall with diverging basal projections
- Disc between oesophagus and intestine
- Vulva transverse, sclerotized
- 2 ovaries
- Male supplements 6-8, irregular
- Spicules strong, often swollen
- Tail similar in sexes, short conoid to hemispheroid
- Soil; sometimes in groundwater and springs
- Feeding: small animals, omnivorous
- c-p = 5

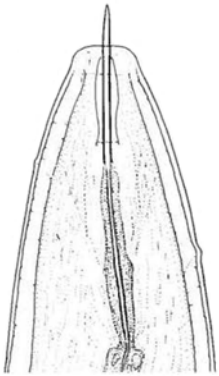



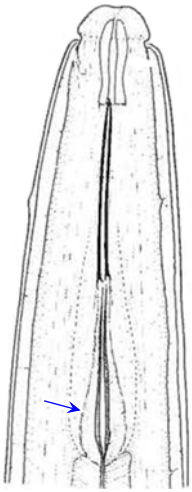


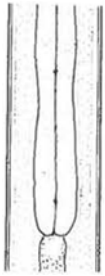
Enchodelus Thorne, 1939

- L = 0.6 – 2.8 mm
- Cuticle smooth, rarely striated
- Head slightly or distinctly offset
- Odontostyle very thin, 8-70 µm, 1-2 labial diameters; aperture small; guiding ring double; odontophore often with basal flanges
- Oesophagus widens behind its middle
- Posterior intestine often coloured (green)
- 2 ovaries
- Prerectum 1-5 anal body widths long
- Males rare
- Male supplements 4-16, spaced
- Tail similar in sexes, short, rounded to elongated
- Soil; rare in fresh water
- Feeding: omnivorous or unicellular eukaryotes feeder (?)
- c-p = 4



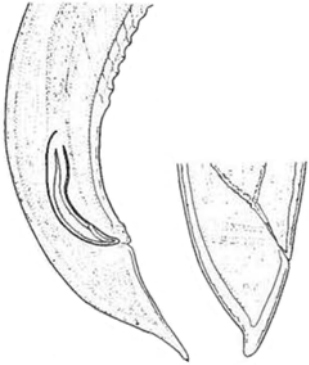


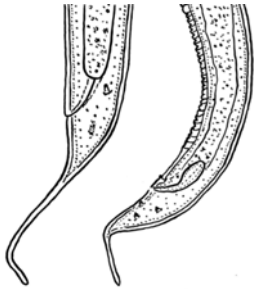


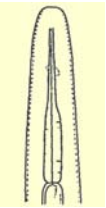


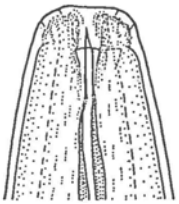
Lanzavecchia Zullini, 1988

- L = 2-8 mm
- Body slender or very slender (a = 40-100)
- Cuticle smooth
- Odontostyle 20-60 µm, 1.6-2.5 times as long as head width; aperture 10-15% of its length
- Odontophore about as long as odontosyle
- Oesophagus widened at 50-60% of its length
- V = 40-50
- 2 ovaries
- Vulva longitudinal, not sclerotized
- Male supplements 20-30; sperms fusiform
- Tail in both sexes anteriorly conical, posteriorly thinner; c' = 1-3
- Fresh- and brackish water: lake and mangroves environments
- Feeding: small animals (?), omnivorous
- c-p = 4

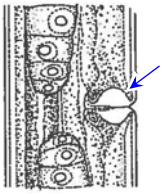




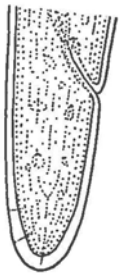


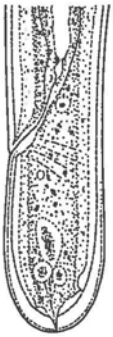


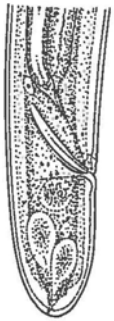
Thornia Meyl, 1954

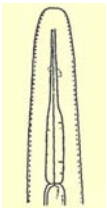


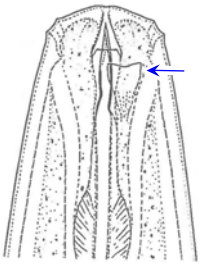
- L = 0.5 – 2.0 mm
- Cuticle smooth, thin
- Body cylindrical; head continuous with adjacent body
- Odontostyle thin, 5-15 µm, posteriorly somewhat irregular; guiding ring thin
- Oesophagus widened at or behind its middle; posteriorly surrounded by a thin sheath
- 2 ovaries
- V = 42-59%; vulval lips not sclerotized, vagina strongly swollen
- No male supplements
- Spicules short and straight, gubernaculum thin
- Tail short-cylindroid, broadly rounded, similar in sexes; c' <3
- Fresh water, brackish water, psammon, moss, moist soil
- Feeding: omnivorous (?)
- c-p = 4



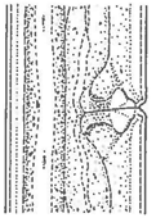




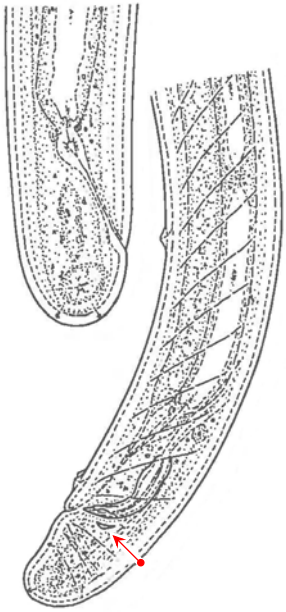




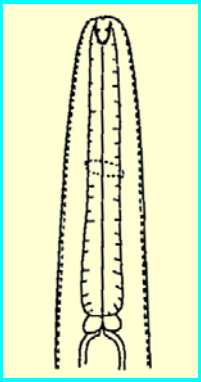
Nygolaimoides Meyl, 1960



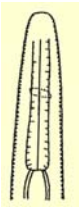
- L = 0.7 – 1.9 mm
- Cuticle smooth
- Head continuous with body
- Amphids pocket-like, small
- Odontostyle weak, posteriorly somewhat irregular
- Oesophagus widened at 55-65% of its length
- Vulva transverse, not sclerotized
- 2 ovaries
- 1 male supplement
- Sperms spindle-shaped
- Spicules with internal sclerotization, gubernaculum and lateral pieces present
- c' = 0.5 – 1.0
- Tail in both sexes broadly rounded
- Some species in dung, decaying matter or soil; other in fresh water
- Feeding: small animals (?)
- c-p = 5 (?)

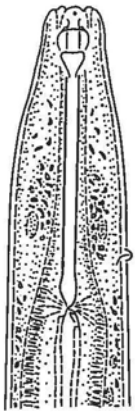


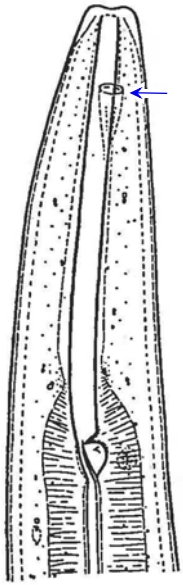
Oesophagus type



oesophagus cylindrical,
stoma & tooth/teeth large,
no cephalic setae

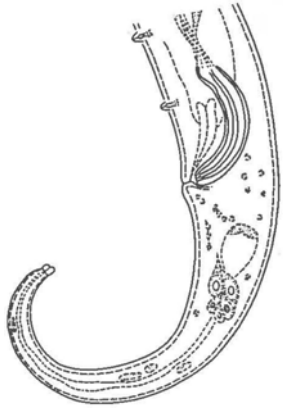


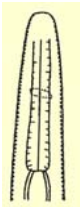


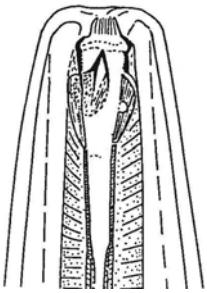


Cryptonchus Cobb, 1913

- L = 0.8 – 3.0 mm
- Cuticle smooth
- Amphids pocket-like
- Stoma a long cylinder with a small denticle on its left ventrosublateral base
- Oesophagus cylindrical; cardia bulboid, multinucleated
- V = 50% or slightly more
- 1 anterior ovary
- Male supplements present
- Spicules arcuate, no gubernaculum
- Tail conical-elongated to filiform
- Fresh water, moist soil
- Feeding: bacteria
- c-p = 4

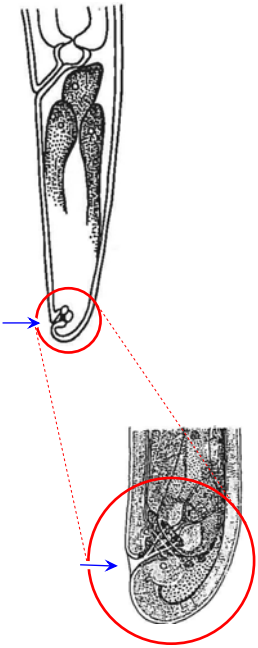


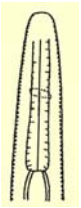


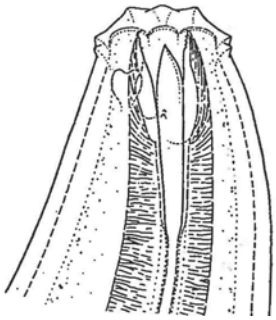



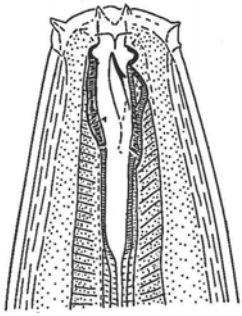
Mononchulus Cobb, 1918

- L = 0.7 – 1.3 mm
- Cuticle nearly smooth
- Amphids pocket-like
- 1 anterior ovary
  (sometimes also a rudimental posterior ovary)
- Tail tip rounded; c' > 2
- Spinneret subterminal, ventral
- Soil, fresh water
- Feeding: bacteria (?)
- c-p = 4



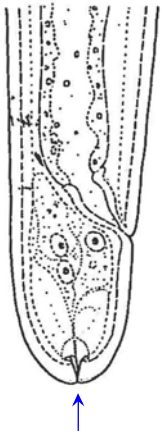





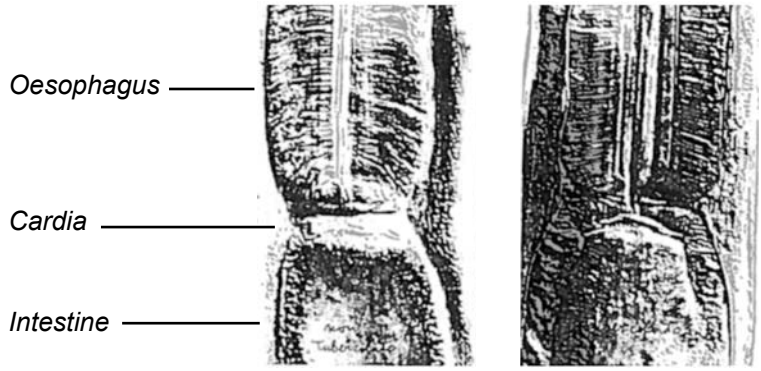


Oionchus Cobb, 1913

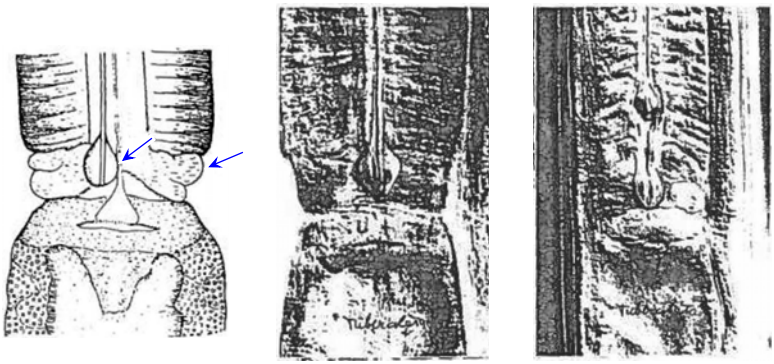
- L = 0.9 – 1.2 mm
- Cuticle nearly smooth
- Amphids pocket-like, near the anterior end
- 1 anterior ovary
  (sometimes also a rudimental posterior ovary)
- Tail rounded; c' about 1
- Spinneret terminal
- Soil, fresh water
- Feeding: bacteria (?)
- c-p = 4

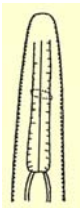


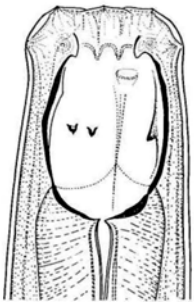
Oesophagus not tuberculate

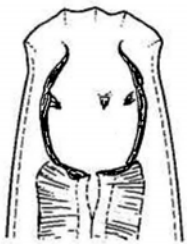


Oesophagus tuberculate



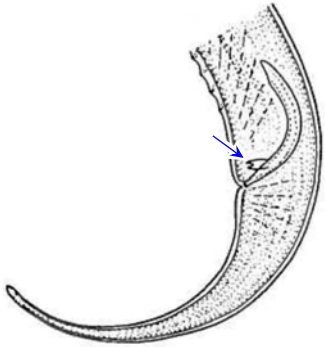


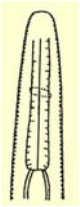


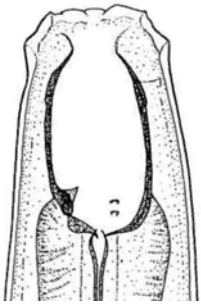


Anatonchus Cobb, 1916

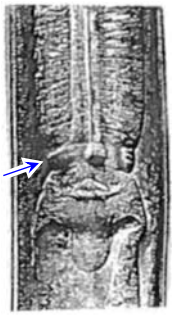
- L = 1.5 – 4.5 mm
- Cuticle smooth
- Stoma oblong or nealry spherical; dorsal tooth and the 2 subventral teeth retrorse, of the same shape and location in anterior, middle or posterior stoma
- Posterior end of oesophagus tuberculate
- V = 58-71%
- 2 ovaries
- Male supplements 10-20
- Spicules arcuate with lateral pieces
- Tail similar in sexes: short conoid to long filiform (c' = 2 - 14); spinneret usually present
- Soil, fresh water, groundwater
- Feeding: small animals
- c-p = 4



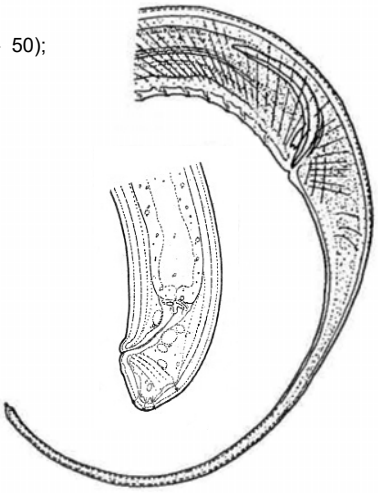


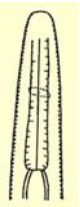


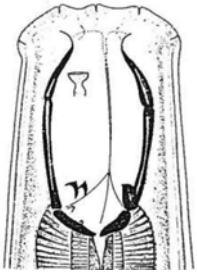
Iotonchus Cobb, 1916

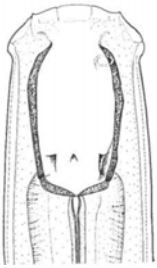


- L = 0.8 – 6.4 mm
- Cuticle smooth
- Stoma roomy 20-90 µm long; dorsal tooth at base of buccal cavity, small to moderately strong; no other teeth or denticles
- Posterior end of oesophagus tuberculate
- V = 50-80%
- 2 ovaries or 1 anterior ovary
- Male supplements 6-22
- Spicules arcuate with bifurcate lateral pieces
- Tail similar in sexes: from very short to very long (c' = 0.7 - 50); spinneret present, rarely absent
- Soil, fresh water
- Feeding: small animals
- c-p = 4



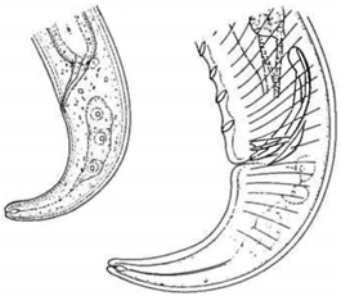


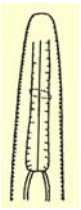
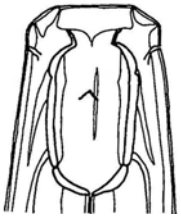
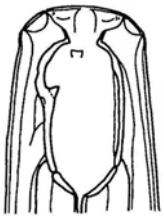
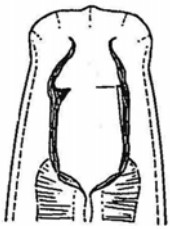




Miconchus Andrássy, 1958

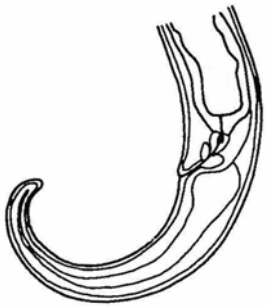
- L = 1 – 7 mm
- Cuticle smooth
- Stoma with 3 teeth, equal in shape, at base or in posterior half of stoma, pointed forwards; no other denticles or ridges
- Posterior end of oesophagus tuberculate
- V = 49-79%
- 2 ovaries (rarely 1 anterior ovary)
- Male supplements 9-24
- Spicules arcuate, with lateral pieces
- Tail similar in sexes: from short to very long (c' = 2 - 25); spinneret present or absent
- Soil, rarely fresh water
- Feeding: small animals
- c-p = 4



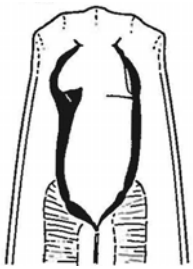





Jensenonchus Jairajpuri & Khan, 1982

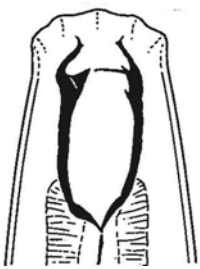
- L = 0.5 – 2.3 mm
- Cuticle smooth
- Stoma: dorsal tooth in anterior half of buccal cavity, each subventral wall with a short transverse rib at dorsal tooth level; no other teeth or denticles
- Posterior end of oesophagus tuberculate
- V = 60-80%
- 2 ovaries or 1 anterior ovary
- Male supplements 9-15
- Spicules arcuate
- Tail very short and rounded or conoid; c' = 2-5; no spinneret
- Soil, rarely fresh water
- Feeding: small animals
- c-p = 4



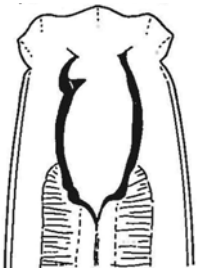
Genera of **Mononchidae** (soil and/or freshwater)



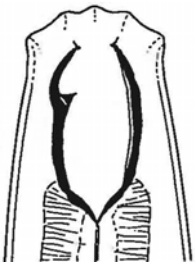
Mononchus



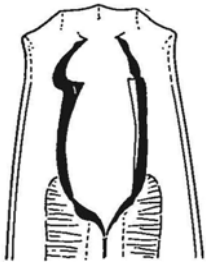
Paramononchus



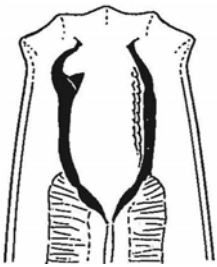
Nigronchus



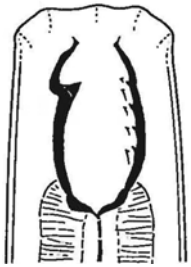
Coomansus



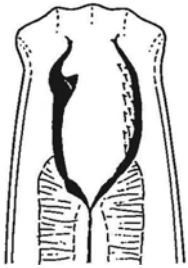
Clarkus



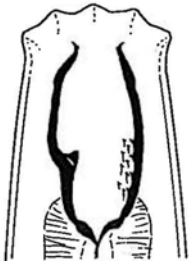
Prionchulus



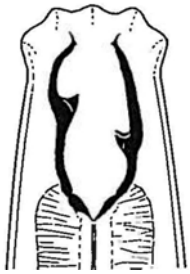
Actus



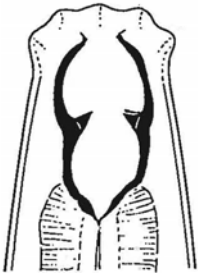
Sporonchulus



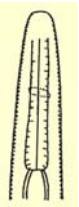
Judonchulus

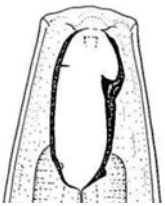


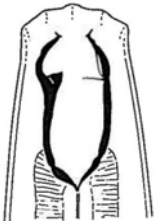
Cobbonchus

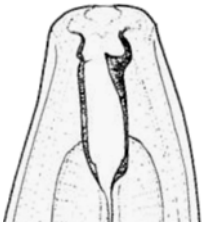


Comiconchus





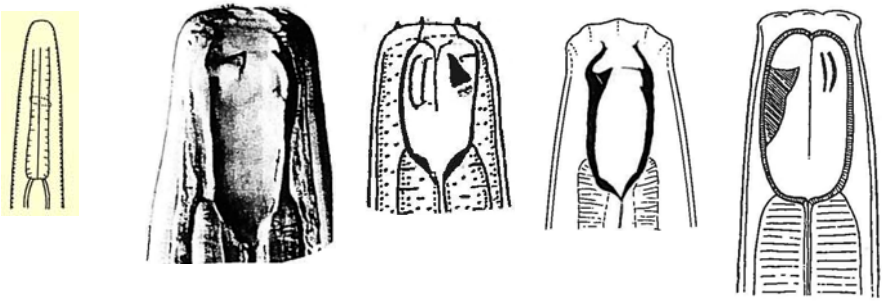




Juvenile stoma moulting

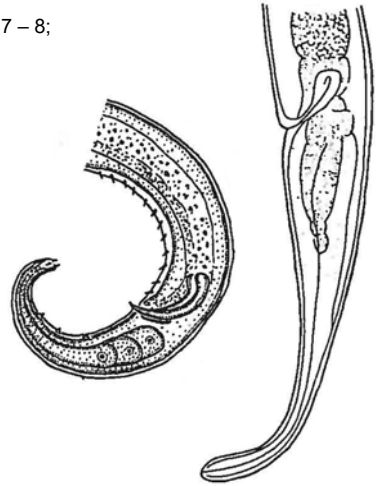
Mononchus Bastian, 1865

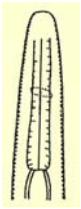
- L = 1- 6 mm
- Cuticle smooth
- In the anterior third of stoma one massive dorsal tooth
- Posterior end of oesophagus not tuberculate
- 2 ovaries
- V = 46-62%
- Males rare
- Male supplements 10-47
- Tail similar in sexes, elongated; c' = 5 – 8 (rarely c' < 4); tail tip with spinneret
- Fresh water, rarely in humid soil
- Feeding: small animals
- c-p = 4

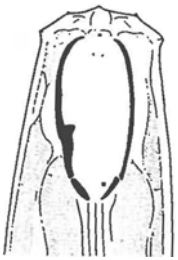


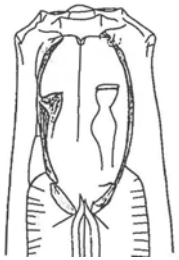
Paramononchus Mulvey, 1978

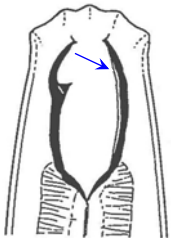
- L = 2.5 – 4 mm
- Cuticle smooth
- In the anterior third of stoma one massive dorsal tooth; in opposite position: one pair of short longitudinal ridges
- Posterior end of oesophagus not tuberculate
- V = 50-56%
- 2 ovaries (rarely 1 posterior ovary)
- Male supplements 12
- Spicules arcuate, gubernaculum
- Female tail conical-elongated, posteriorly cylindrical; c' = 7 – 8; tail tip with spinneret
- Fresh water, mineral springs
- Feeding: small animals
- c-p = 4





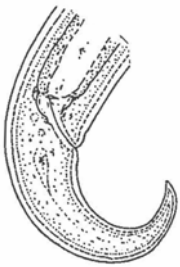


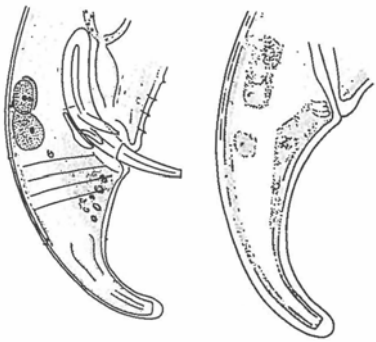


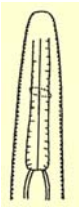


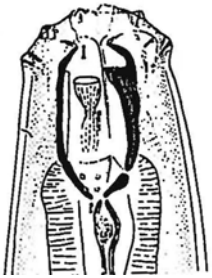
Coomansus Jairajpuri & Khan, 1977

- L = 0.7 – 5.8 mm
- Stoma oblong; dorsal tooth in anterior or posterior half of stoma; on ventral wall (opposite the dorsal tooth) a pair of faint longitudinal ridges ending not abruptly at the dorsal tooth level
- Posterior third of oesophagus with ventral pearl-shaped structures
- Posterior end of oesophagus not tuberculate
- V = 45-75%
- 2 ovaries
- Male supplemets 8-28
- Spicules short with accessory pieces
- Tail similar in sexes, conoid-arcuate; c' = 2 – 6; no spinneret
- Soil, moss, rarely in fresh water
- Feeding: small animals
- c-p = 4



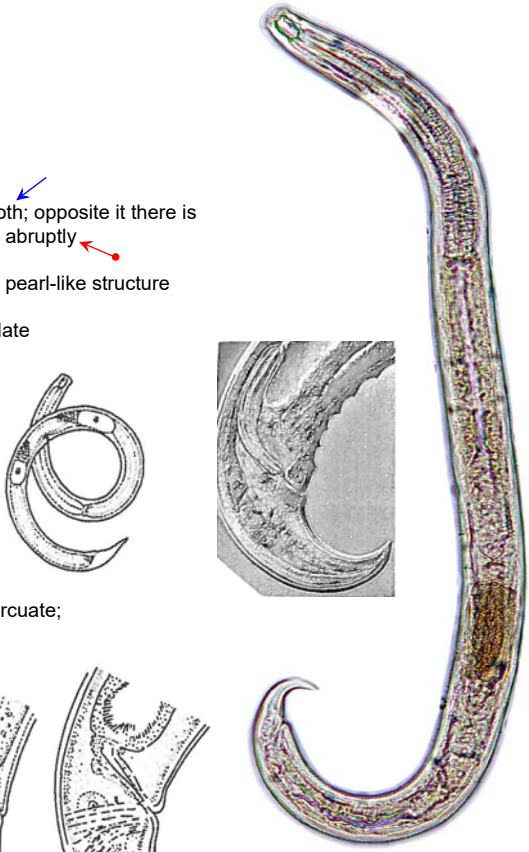


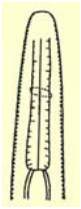


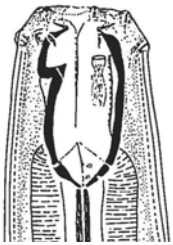


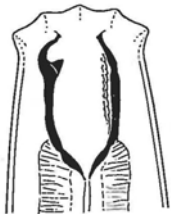
Clarkus Jairajpuri, 1970

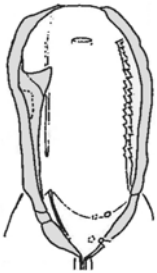
- L = 0.7 – 2.8 mm
- Cuticle smooth
- Stoma oblong with one anterior dorsal tooth; opposite it there is a faint longitudinal ridge anteriorly ending abruptly
- Posterior ventral wall of oesophagus with pearl-like structure
- Posterior end of oesophagus not tuberculate
- V = 45-69%
- 2 ovaries
- Males rare
- Male supplements 10-20
- Spicules rather short
- Tail similar in both sexes, short, conoid, arcuate; c' = 1.5 – 6; no spinneret
- Soil, moss, rarely in fresh water
- Feeding: small animals
- c-p = 4

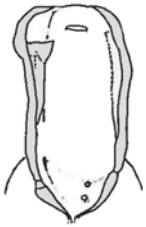






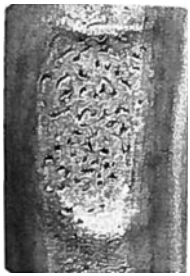




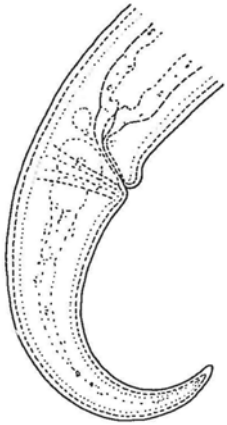


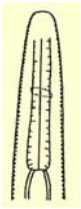
Prionchulus Cobb, 1916

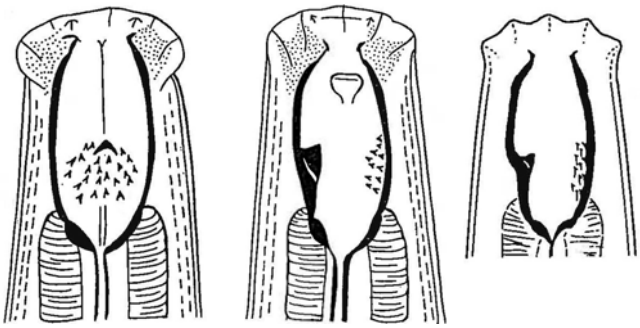
- L = 1 – 5 mm
- Cuticle smooth
- Stoma: opposite the anterior large dorsal tooth there are 2 subventral long longitudinal ridges armed with several denticles
- Posterior end of oesophagus not tuberculate
- V = 54-69%
- 2 ovaries
- Males rare
- Male supplements 13-30
- Spicules stout, arcuate with bifid lateral pieces
- Tail short, arcuate-conoid; c' = 2 - 5; no spinneret
- Soil, moss, fresh water, rarely in brackish water
- Feeding: small animals
- c-p = 4



Echinulate eggshell of *P. punctatus*

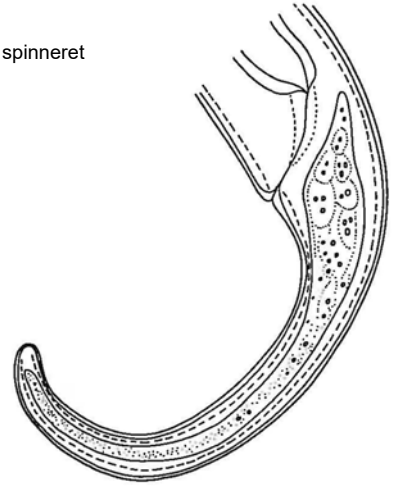


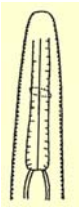


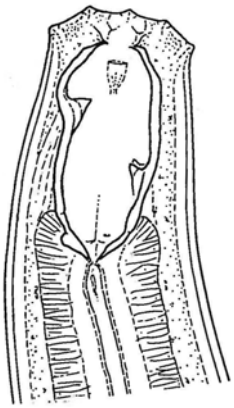


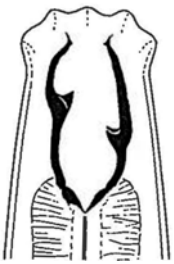
Judonchulus Andrássy, 1958

- L = 1.4 – 5.1 mm
- Body slender or very slender (a = 32 – 95)
- Cuticle smooth
- Stoma: dorsal tooth midway or in lower buccal cavity, opposed by small, scattered denticles in posterior stoma
- Posterior end of oesophagus not tuberculate
- V = 63-65%
- 2 ovaries
- Tail elongated, nearly cylindrical; c' = 4 - 7; tail tip with spinneret
- Fresh water, rarely in humid soil
- Feeding: small animals
- c-p = 4



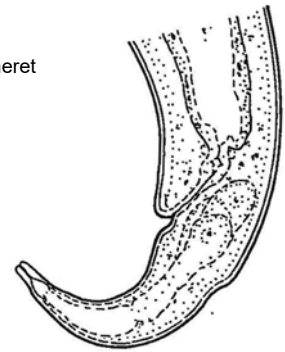


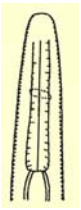


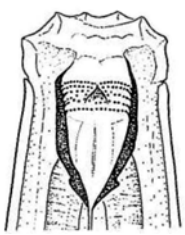


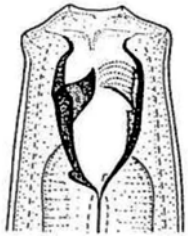
Cobbonchus Andrássy, 1958

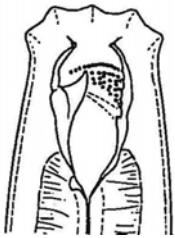
- L = 0.8 – 3.9 mm
- Cuticle smooth
- Stoma: dorsal tooth in anterior, 2 subventral teeth in posterior half of buccal cavity
- Posterior end of oesophagus not tuberculate
- V = 58-80%
- 2 ovaries or 1 anterior ovary
- Male supplements 6-18
- Tail short, conoid to digitate or blunt; c' = 0.5 – 2.3; tail tip with spinneret
- Fresh water, moss, humid soil, litter
- Feeding: small animals
- c-p = 4

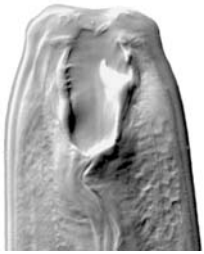






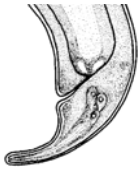


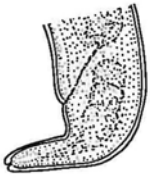


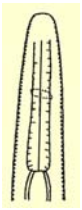
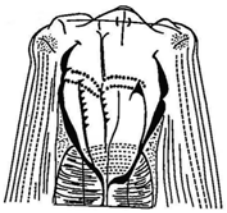
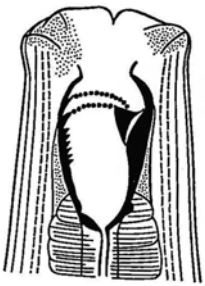
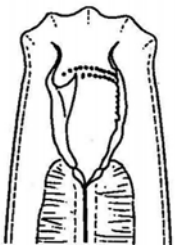


Mylonchulus Cobb, 1916

- L = 0.5 – 2.9 mm
- Cuticle smooth
- Stoma: goblet- or funnel-shaped; dorsal tooth, very large and claw-like, in anterior half of buccal cavity; opposite (ventrally) there are 4-7 transverse rows of pearl-shaped denticles, forming a rasp-like field
- Posterior end of oesophagus not tuberculate
- 2 ovaries or 1 anterior ovary
- V = 52-72%
- Male supplements 6-16
- Spicules rather short
- Tail similar in sexes, from obtusely rounded to elongated; c' < 4; spinneret terminal or subterminal
- Soil, fresh water
- Feeding: small animals
- c-p = 4

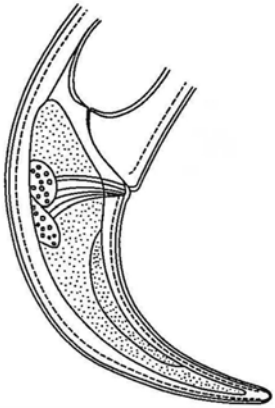


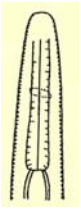


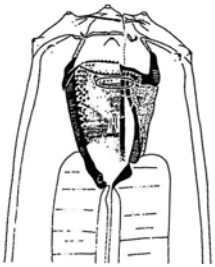





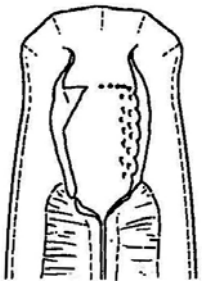
Polyonchulus Mulvey & Jensen, 1967

- L = 0.9 – 1.1 mm
- Cuticle smooth
- Stoma oblong, anterior dorsal tooth and, opposite, subventral denticles in 2-7 rows and 2 long longitudinal serrate ridges *Prionchulus*-like
- Posterior end of oesophagus not tuberculate
- V = 66-70%
- 1 anterior ovary or 2 ovaries
- Spicules arcuate
- Tail short, conoid or subdigitate; c' = 1 – 2.5; spinneret present or reduced
- Soil, fresh water
- Feeding: small animals
- c-p = 4



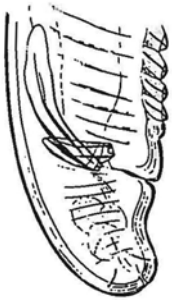


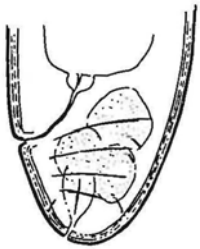




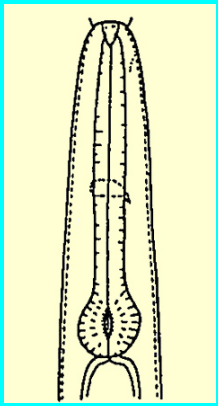
Granonchulus Andrássy, 1958

- L = 1 – 2.2 mm
- Cuticle smooth
- Stoma: dorsal tooth in anterior third of buccal cavity; at its level one transverse row of denticles along the buccal subventral walls; several scattered denticles in posterior ventral stoma
- Posterior end of oesophagus not tuberculate
- V = 54-65%
- 2 ovaries
- Male supplements 15-21
- Tail short, hemispheroid or conoid; c' = 1.0 – 2.5; tail tip with spinneret
- Soil, fresh water, groundwater
- Feeding: small animals
- c-p = 4

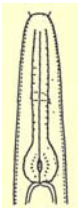


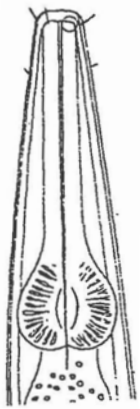


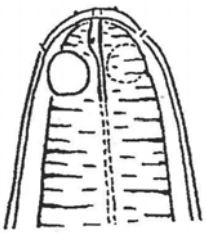
Oesophagus type



oesophagus with large basal bulb

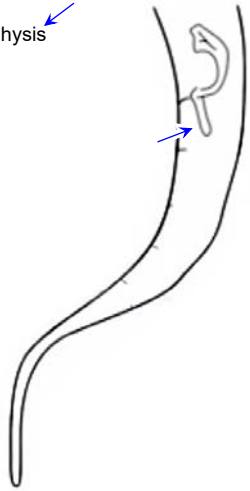


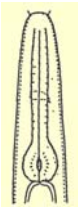
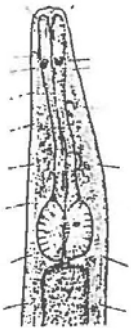
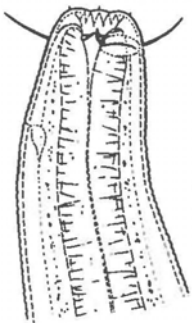
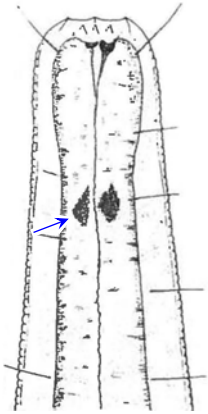




Terschellingia de Man, 1888

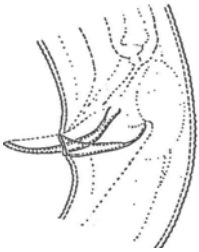
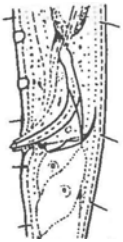
- L = 1.0 – 3.5 mm
- Cuticle practically smooth
- Amphids circular, < 1 body width from anterior end
- Stoma small and narrow
- Oesophagus short; strong terminal bulb
- V about 50%
- 2 ovaries
- Spicules short, robust, curved; gubernaculum with well developed apophysis
- Tail conical-cylindrical; tip rounded, no terminal setae
- Sea; rare in fresh water
- Feeding: bacteria, substrate
- c-p = 2

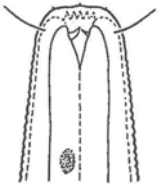
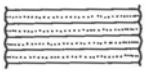


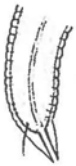





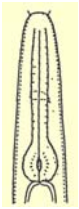
Chromadorina Filipjev, 1918

- L = 0.5 – 1.0 mm
- Cuticle finely punctuated; lateral fields punctuated like other cuticular regions
- Amphids anterior, transverse-oval or slit-like
- Ocelli (one or two)
- Oesophageal bulb strong
- 2 ovaries
- Males nearly as frequent as females
- Zero or usually 11-16 knob-like male supplements
- Spicules more or less arcuate
- Tail elongated-conoid; c' = 4 - 9; spinneret developed
- Sea, fresh water
- Feeding: bacteria, unicellular eukaryotes (?)
- c-p = 3

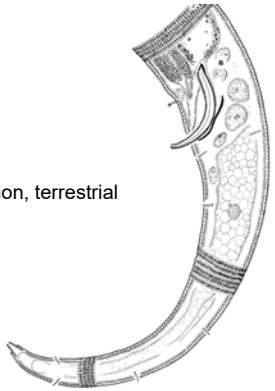
Anterior end	Amphid	Cuticle structure
		

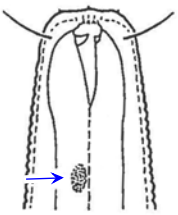
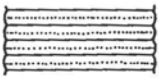



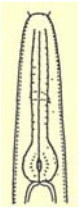


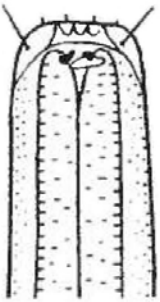

Prochromadora Filipjev, 1922

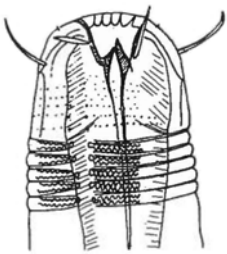
- L = 0.6 – 2.5 mm
- Cuticle finely and uniformly punctuated; lateral fields punctuated like other cuticular regions
- Amphids usually indistinct
- Ocelli
- Oesophageal bulb strong, globular
- 2 ovaries
- (0)-20 male knob-like supplements
- Tail conoid; c' = 3 - 6; spinneret
- Sea, brackish water, saline lakes, fresh water, groundwater, psammon, terrestrial
- Feeding: bacteria, unicellular eukaryotes (?)
- c-p = 3



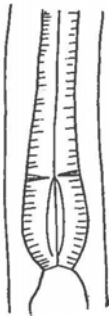
Anterior end	Amphid	Cuticle structure
		



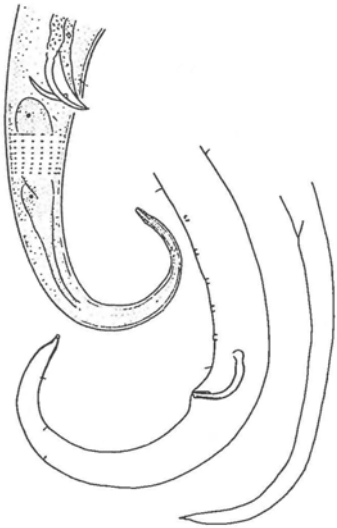


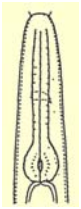


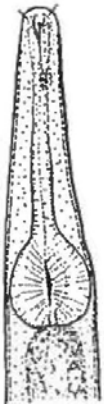
Prochromadorella Micoletzky, 1924

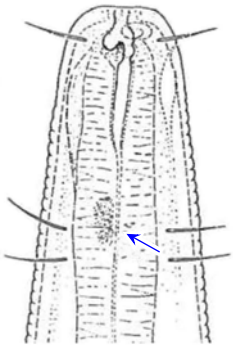


- L = 0.4 – 1.7 mm
- Cuticular ornamentation hetereogeneous
- Amphids anterior, obscure, transverse oval-slit
- Stoma with 3 solid teeth
- Some species with ocelli
- 2 ovaries
- Male supplements cup-shaped; present or absent
- Spinneret long (3-6 µm)
- Sea; brackish water
- Feeding: unicellular eukaryotes
- c-p = 2



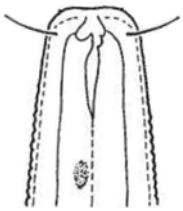
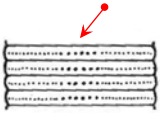


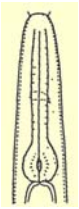


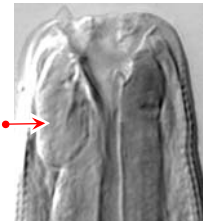


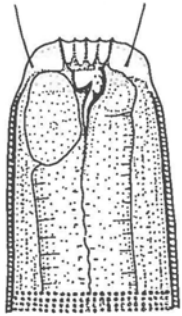
Punctodora Filipjev, 1930

- L = 0.6 –1.0 mm
- Cuticle finely punctuated; lateral fields with stronger punctuations
- Amphids spiral
- Ocelli
- Oesophageal bulbus very strong, almost spherical
- 2 ovaries
- 1-18 knob-like male supplements
- Spicules arcuate
- Tail conoid; c' = 3 - 6; spinneret
- Sea, brackish water, salt lakes, fresh water
- Feeding: bacteria, unicellular eukaryotes (?)
- c-p = 3

Anterior end	Amphid	Cuticle structure
		

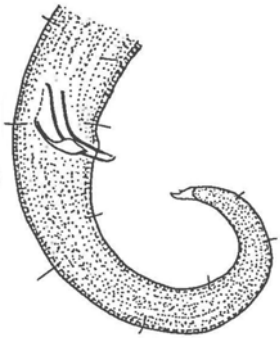


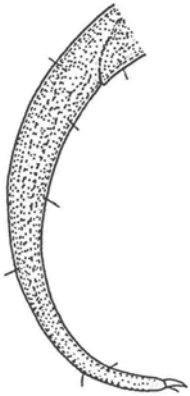


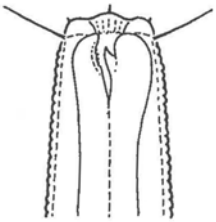
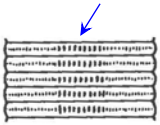


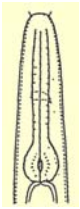
Chromadorita Filipjev, 1922

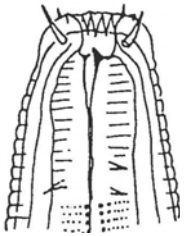
- L = 0.7 – 1.4 mm
- Cuticle annulated and punctuated; lateral fields distinctly puctuated
- Amphids immediately behind lips, slit-like
- Anterior oesophageal end dorsally enlarged
- Oesophageal bulbus weak
- 2 ovaries
- About 8 male knob-like supplements
- Tail conoid; c' = 4 - 9; spinneret triangular
- Sea, fresh water
- Feeding: unicellular eukaryotes
- c-p = 3





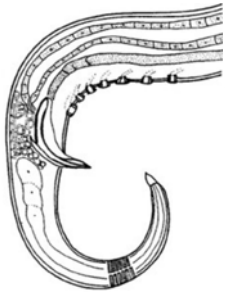
Anterior end	Cuticle structure	Spicular region
		

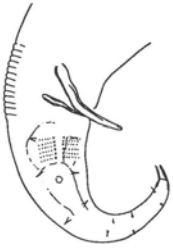


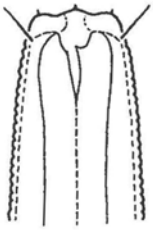


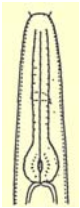
Dichromadora Kreis, 1929

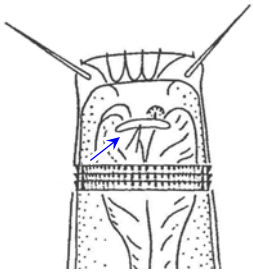
- L = 0.6 – 1.0 mm
- Cuticle annulated and punctuated; lateral fields bordered by distinct punctuation
- Stoma with 1 S-shaped hollow dorsal tooth, or with 3 teeth (1 dorsal larger, 2 subventral smaller)
- Amphids transverse slit-like to bean-like
- Oesophagus with a distinct bulbus
- 2 ovaries
- Male supplements present or absent
- c' = 3 - 5; spinneret
- Sea, and in more or less brackish/fresh water
- Feeding: bacteria, unicellular eukaryotes (?)
- c-p = 3

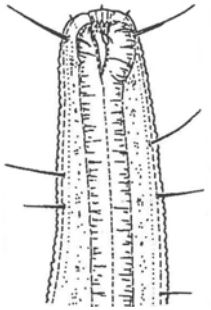




Anterior end	Cuticle structure	Spicular region
		

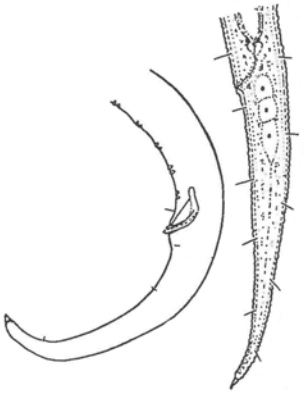


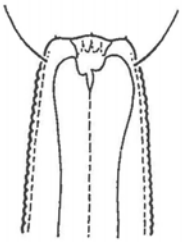
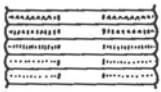


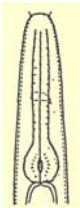


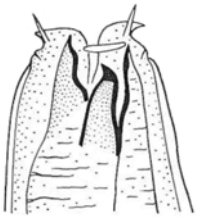
Neochromadora Micoletzky, 1924

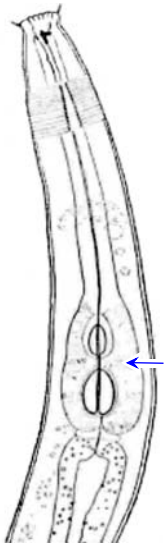
- L = 0.8 – 1.0 mm
- Cuticle finely annulated and punctuated; lateral fields bordered by distinct puntuations
- Amphids a transverse slit, on anterior body end
- Oesophagus bulbus weak
- 2 ovaries
- About 7 male knob-like supplements
- Tail conoid; c' = 4 - 7; spinneret
- Sea, brackish water, fresh water
- Feeding: bacteria, unicellular eukaryotes (?)
- c-p = 3



Anterior end	Cuticle structure	Spicular region
		

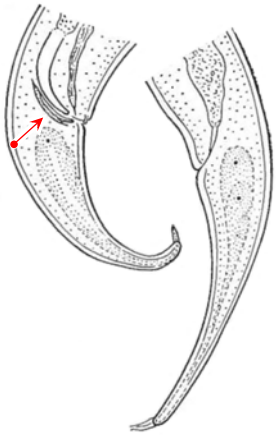


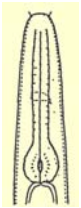


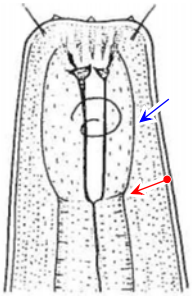


Spilophorella Filipjev, 1917

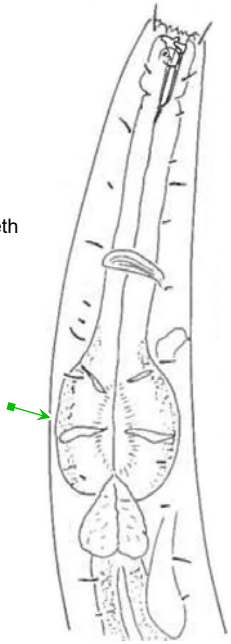
- L = 0.7 – 1.6 mm
- Cuticular ornamentation hetereogeneous
- Amphids anterior, transverse slits
- Stoma a deep cavity with a long hollow dorsal tooth
- Oesophagus with an elongated double bulbus
- 2 ovaries
- Male supplements absent
- Spicules curved, gubernaculum long
- Tail conical-elongated; spinneret often very long (6-12 µm)
- Sea; brackish water
- Feeding: eukaryote (?)
- c-p = 2





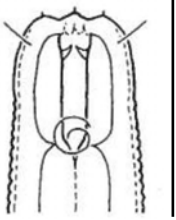


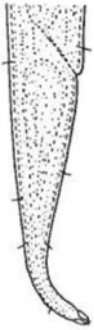
Ethmolaimus de Man, 1880

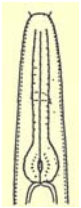


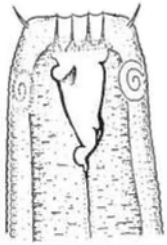
- L = 0.5 – 1.2 mm
- Cuticle finely annulated and punctuated
- Amphids at stoma level, large, circular or slightly spiral
- Stoma tubular, anteriorly with a dorsal tooth and two smaller subventral teeth
- Anterior oesophagus offset, bulb-like;
  terminal bulbus moderately developed to strong
- 2 ovaries
- 6-24 knob-like male supplements
- Spicules slender, arcuate; gubernaculum thin
- Tail conoid; c' = 4 - 7; spinneret sclerotized
- Fresh water, brackish water, soil
- Feeding: bacteria, unicellular eukaryotes (?)
- c-p = 3

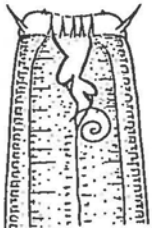
Anterior end



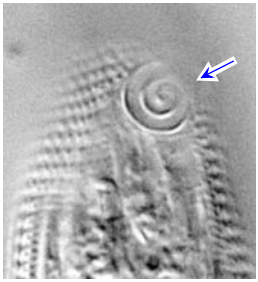




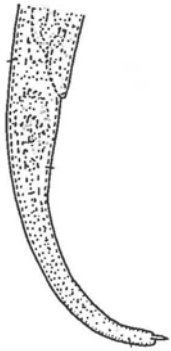


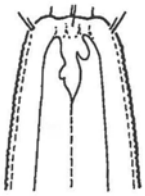
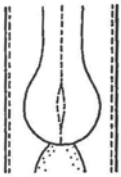


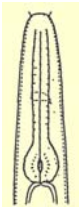
Achromadora Cobb, 1913

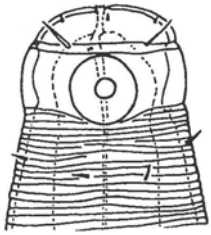


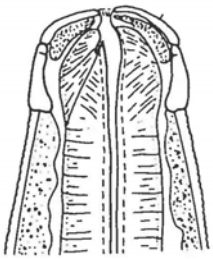
- L = 0.4 – 1.3 mm
- Cuticle finely punctuated in transversal rows
- Amphids large, multi-spiral, opposite stoma or behind that
- Oesophageal bulbus moderately developed
- 2 ovaries
- Males very rare; 0 - 9 flat supplements
- Spicules short and straight
- Rectum occasionally very long
- Tail elongated conoid; c' = 3 - 7; spinneret long and sclerotized
- Soil, fresh water
- Feeding: unicellular eukaryotes
- c-p = 3



Anterior end	Amphid	Oesophagus base
		

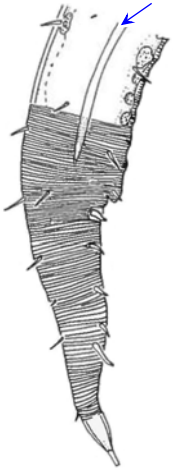


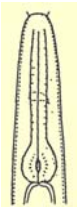


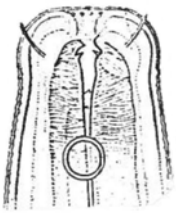
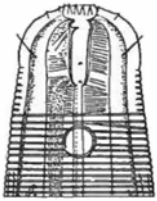
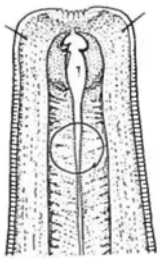


Pseudochromadora Daday, 1899

- L = 0.8 – 3 mm
- Cuticle heavily annulated with distinct lateral fields; strong somatic setae
- Cephalic capsule without annules, wider than long
- Amphids unispiral on head capsule
- Stoma without denticles
- Oesophagus very short (b = 7.5 – 13), cylindrical, enlarged into a bulb
- Terminal tail portion smooth (no punctuation)
- Sea, rarely in fresh water
- Feeding: bacteria, unicellular eukaryotes
- c-p = 3

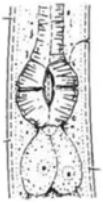
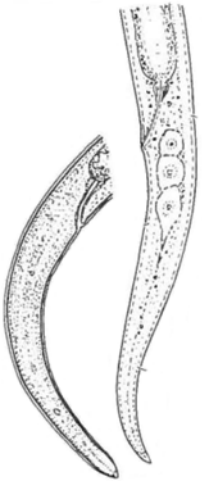


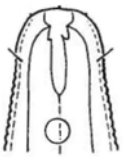
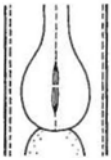
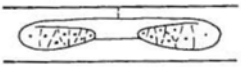


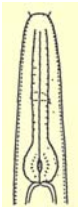
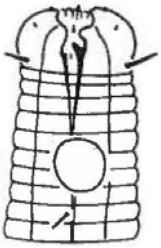
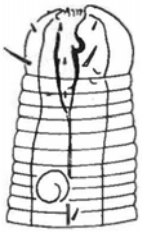
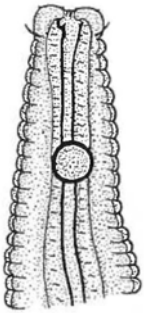
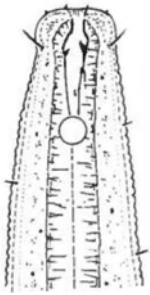





Prodesmodora Micoletzky, 1923

- L = 0.3 – 0.9 mm
- Cuticle annulated
- Amphids circular or slightly oval, large, behind the stoma
- Oesophagus cylindrical, ending with a bulbus transversely divided into two halves
- 2 ovaries
- No male supplements
- Spicules and gubernaculum simple
- Tail conoid with spinneret; c' = 4 – 7
- Fresh water, soil
- Feeding: bacteria
- c-p = 3

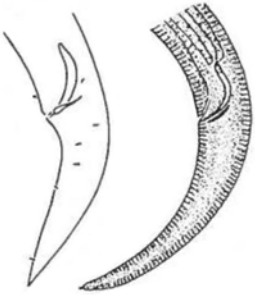



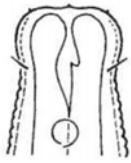
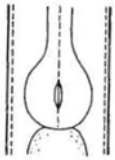
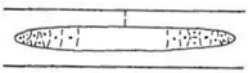
Anterior end	Oesophagus base	♀ Gonads
		

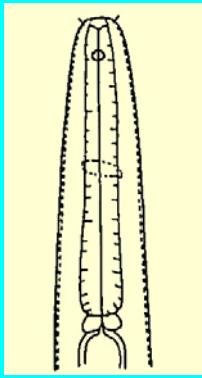
Microlaimus de Man, 1880

- L = 0.3 – 0.8 mm
- Cuticle annulated
- Amphids large, circular or uni-spiral, behind the stoma
- Oesophagus tubular and ending in a strong bulbus
- 2 ovaries
- Male supplements small, pore-like
- Spicules short, gubernaculum thin
- No male supplements
- Tail conoid; c' = 3 - 6; spinneret sclerotized
- Sea, brackish water, fresh water, hot springs
- Feeding: bacteria
- c-p = 2

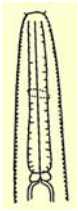


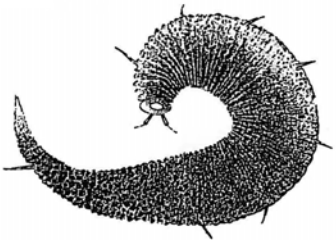

Anterior end	Oesophagus base	♀ Gonads
		

Oesophagus type



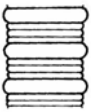
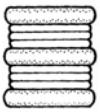
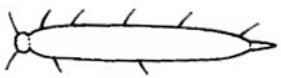
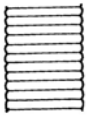
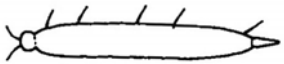
oesophagus cylindroid,
stoma small or almost tubular
amphids ≈ circular

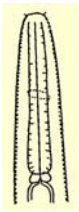


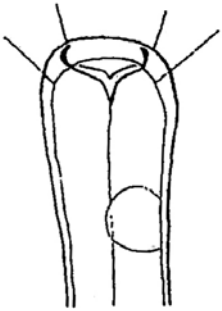


Desmoscolex Claparède, 1863

- L = 0.15 – 0.30 mm
- Cuticular rings massive
- Many body setae
- Oesophagus (not easy to see) short, cylindrical
- Spicules thin; small gubernaculum
- Sea; coastal salty pools; rare in fresh water: springs, deep lakes, rivers; wet soil
- Feeding: bacteria
- c-p = 4

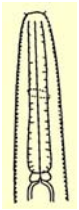
Cuticolar rings	Structure of the cuticolar rings	Somatic setae
		
		

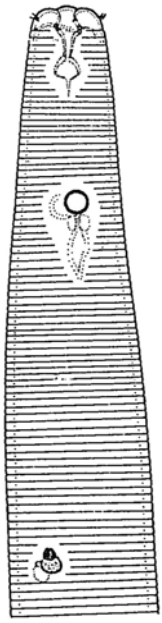


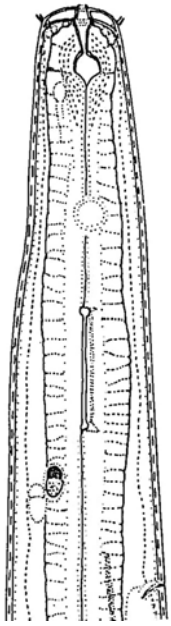


Anguimonhystera Andrássy, 1981

- L = 1.4 – 2.4 mm
- Body very slender (a = 43 – 100)
- Cephalic setae long
- Amphids >1 head width from anterior end
- Stoma funnel-shaped, no denticles
- No ocelli
- V = 60-80%
- 1 anterior ovary
- Spicules short; gubernaculum slipper-shaped
- Tail long, without terminal setae
- Groundwater
- Feeding: bacteria, substrate
- c-p = 2

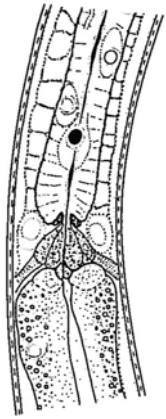


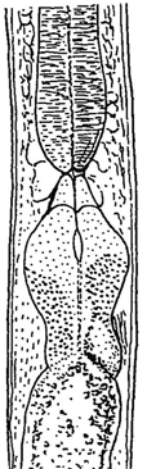


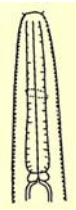


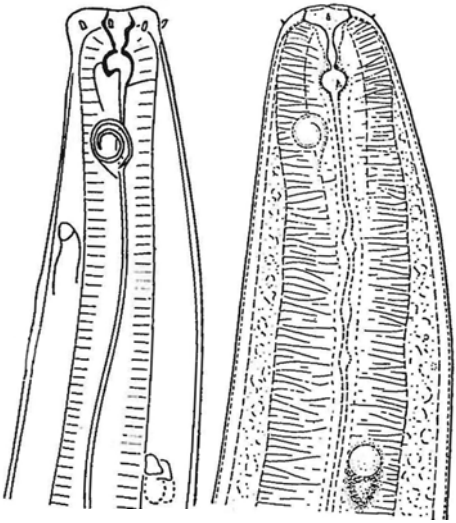
Diplolaimella Allgén, 1929

- L = 0.4 – 1.3 mm
- Body slender (a = 40-60)
- Amphid circular, at 1.5-3.0 cephalic diameters from anterior end
- Some species with ocelli
- V about 50%
- 1 anterior ovary
- Male supplements often present
- Spicules arcuated, short (< 2 cloacal body widths); gubernaculum well developed
- Tail long or very long (c' = 5-20); spinneret
- Sea; brackish water
- Feeding: bacteria, selective deposit feeder
- c-p = 1



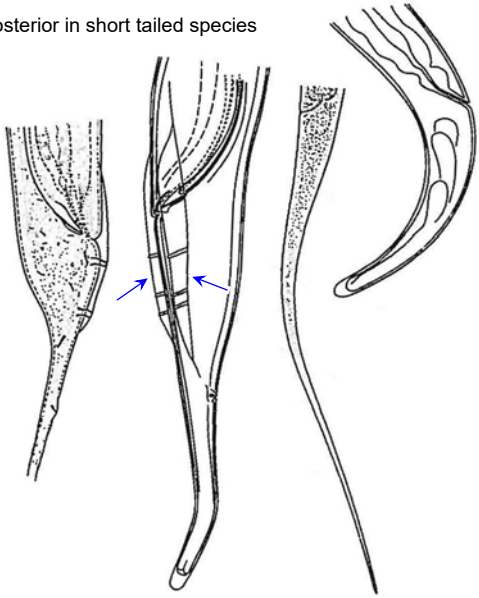


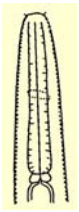


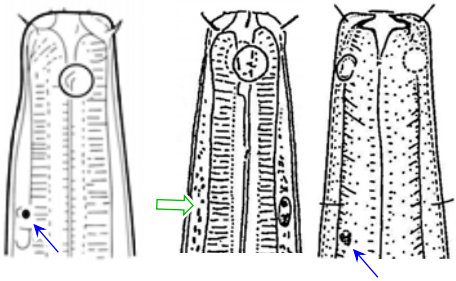


Diplolaimelloides Meyl, 1954

- L = 0.4 – 1.5 mm
- Amphid uni-spiral, practically circular, 1-2 cephalic diameters from anterior end
- Anterior stoma with 1 tooth
- Some species with ocelli
- 1 anterior ovary
- V about 50% in long tailed species; V more posterior in short tailed species
- Male with thin adanal bursa
- Spicules slender, long (up to 4.5 cloacal body widths); gubernaculum small
- Tail similar in sexes; short to long; c' = 3-14
- Caudal glands and long spinneret
- Sea; brackish water; brackish soil; rarely freshwater
- Feeding: microbivorous
- c-p = 2 (?)

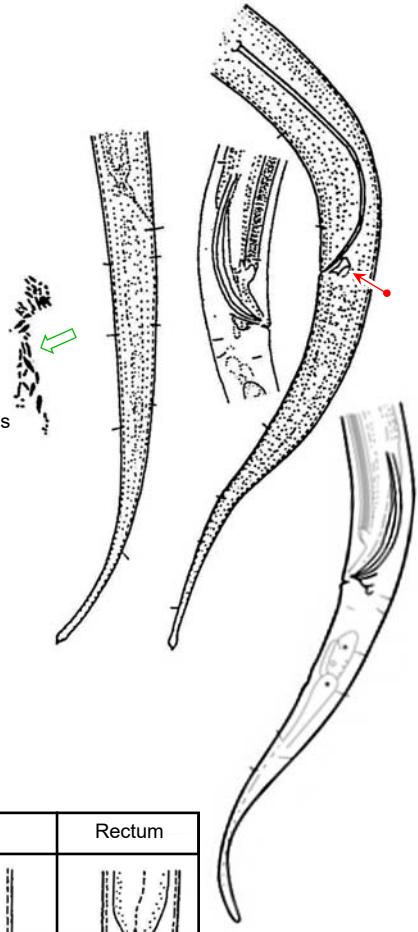


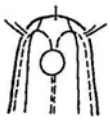
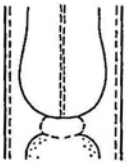
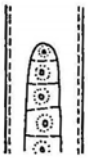
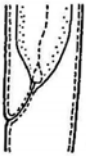


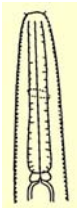


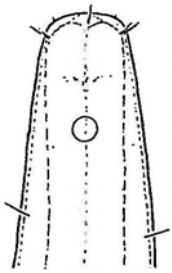
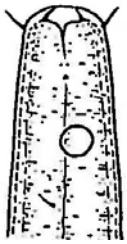
Monhystera Bastian, 1865

- L = 0.7 – 1.5 mm
- Cuticle smooth
- Cephalic setae much shorter than labial diameter
- Amphids circular, large, anterior rim <1 labial width from anterior end
- Usually with ocelli (sometimes faded after fixation)
- Crystalloids present
- Oesophagus practically cylindrical
- V = 55-75%
- 1 anterior straight long ovary; oviparous or ovoviparous
- Female tail shorter than vulva-anus distance
- Males relatively frequent
- Spinneret short
- Spicules long (2.5 to 7 anal body diameters) and thin; gubernaculum short
- Fresh water, brackish water
- Feeding: bacteria, substrate
- c-p = 2



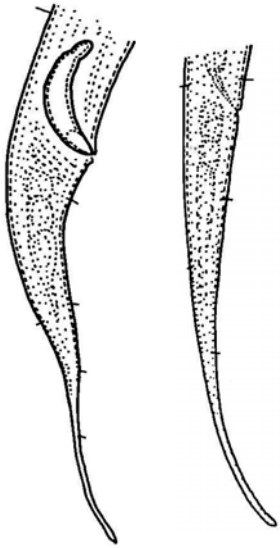
Anterior end	Oesophagus base	Ovary	Rectum
			

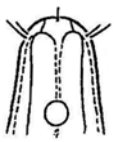
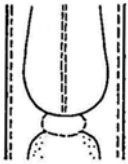
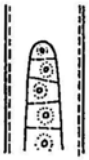
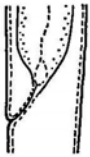


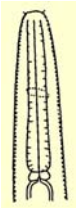




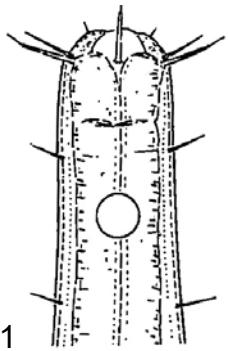
Eumonhystera Andrássy, 1981

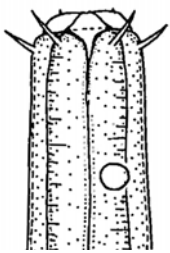
- L = 0.3 – 1.0 mm
- Cuticle smooth
- Cephalic setae shorter than ½ labial width
- Amphids circular, rather small, >1 labial width from anterior end
- No crystalloids; ocelli usually absent
- Oesophagus practically cylindrical
- V = 50-68%
- 1 anterior straight ovary; uterus with max. 2 eggs
- Oviparous, usually parthenogenetic
- Tail usually longer than vulva-anus distance
- Males very rare
- Spicules shorter than 2 cloacal body widths; gubernaculum small
- Spinneret moderately long
- Fresh water, brackish water
- Feeding: bacteria, substrate
- c-p = 2



Anterior end	Oesophagus base	Ovary	Rectum
			

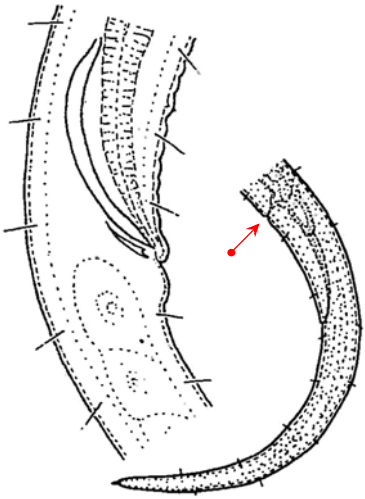


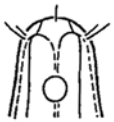
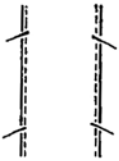
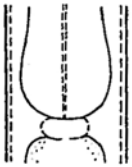
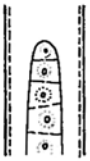
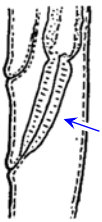


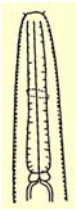


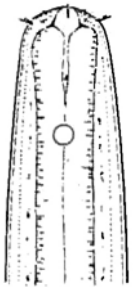
Geomonhystera Andrássy, 1981

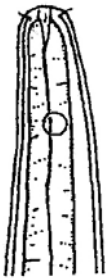
- L = 0.5 – 1.3 mm
- Cuticle smooth, subcuticle slightly annulated
- No crystalloids, no ocelli
- Longer cephalic setae articulate, ½ to ¾ labial width long
- Amphids circular, large, anterior rim 1-2 head diameters from anterior end
- 1 anterior straight ovary
- V = 75-85%; gonad never reaches oesophagus
- Vulva near the anus (vulva-anus distance < tail length)
- Spicules slender, 1.5-2.0 times body width
- Rectum long (>1 anal body diameter long), muscular
- Tail conoid to elongate conoid; spinneret short
- Sea, moist soil, moss, freshwater
- Feeding: bacteria, substrate
- c-p = 2

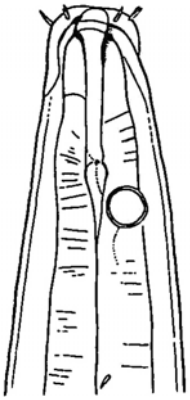


Anterior end	Cuticle with setae	Oesophagus base	Ovary	Vulva and anus
				



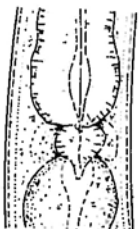


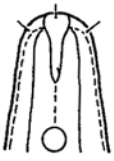
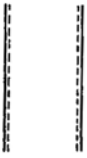
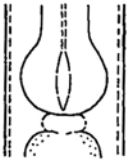
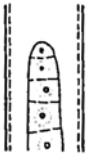
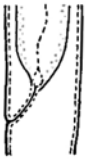


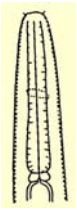


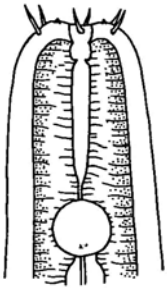
Monhystrella Cobb, 1918

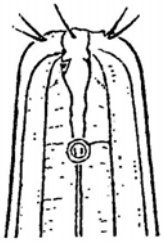
- L = 0.3 – 0.7 mm
- Cephalic setae < 1/3 labial width
- Amphids circular, at 2-4 head diameters from anterior end
- Crystalloids and ocelli rarely present
- Oesophagus posteriorly somewhat swollen
- V = 40-53%
- 1 anterior straight and short ovary; uterus with a single egg
- Males very rare
- Tail filiform with very long spinneret
- Fresh water, brackish water, humid soil
- Feeding: bacteria, substrate
- c-p = 2



Anterior end	Cuticle	Oesophagus base	Ovary	Rectum
				

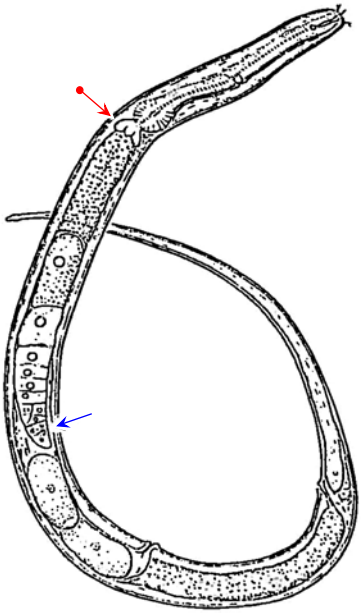


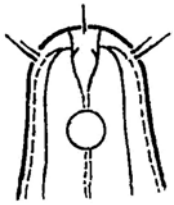
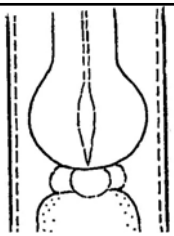
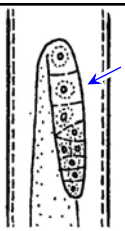
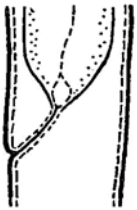


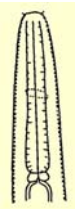


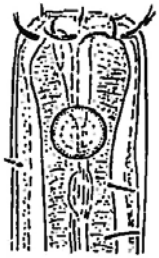
Sinanema Andrássy, 1960

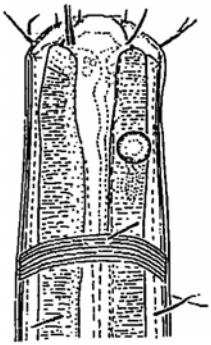
- L = 0.4 – 0.7 mm
- Cuticle smooth
- Amphids rounded, small or large
- Stoma with 3 small anterior teeth
- Oesophageal base swollen, and 3 cardial cells
- V = 50-65 %
- 1 long anterior ovary, bent at its extremity
- Males unknown
- Tail longer than vulva-anus distance
- Spinneret short
- Thermal water; fresh water
- Feeding: bacteria, substrate
- c-p = 2



Anterior end	Oesophagus base	Ovary	Rectum
			

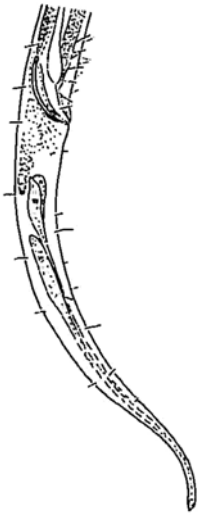


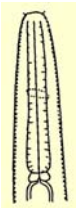


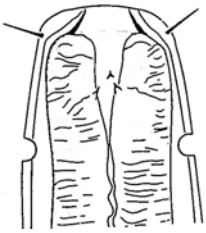


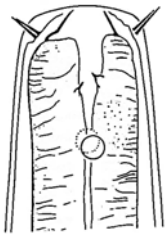
Thalassomonhystera Jacobs, 1987

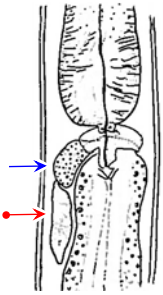
- L = 0.4 – 1.5 mm
- Stoma funnel-shaped
- Ocelli sometimes present
- Oesophagus with slightly swollen base
- 1 anterior ovary; uterus with max. 2 eggs
- Spicules 1.2 – 2.2 anal body widths;
  gubernaculum either small, robust with apophysis or tube-like without apophysis
- Tail elongated-conoid, cylindrical terminal part often dorsally bent;
  female tail < vulva-anus distance
- Sea; fresh water
- Feeding: bacteria, substrate
- c-p = 2





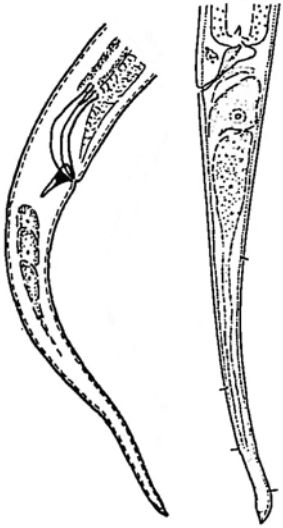


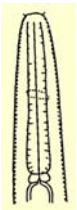


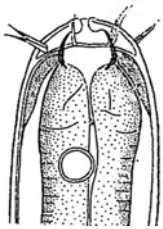


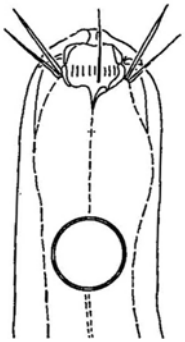
Tridentula Eyualem & Coomans, 1995

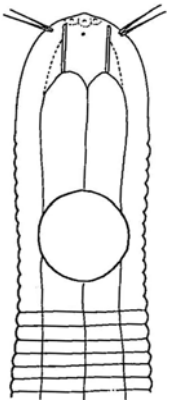
- L = 0.4 – 1.1 mm
- Cuticle smooth or finely annulated
- Amphids small, at 0.8-1.6 head diameter from anterior end
- Perioral platelets
- Stoma with 3 small denticles (the dorsal one slightly anterior)
- Cardia with associated granular cell
- Near cardia, a ventral gland cell body
- No crystalloids
- 1 anterior outstretched ovary
- V = 56-70%
- Tail: c' = 4 – 15
- Spinneret usually directed towards the ventral side
- Fresh water
- Feeding: bacteria, substrate, unicellular eukaryotes (?)
- c-p = 2





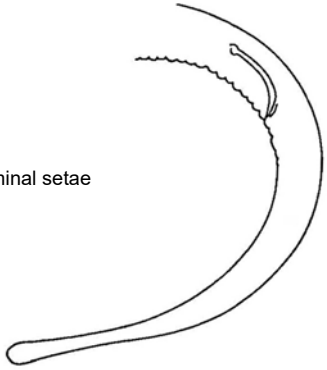


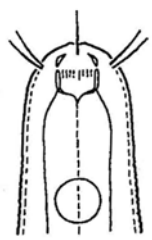
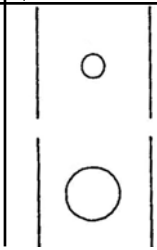


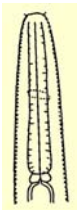


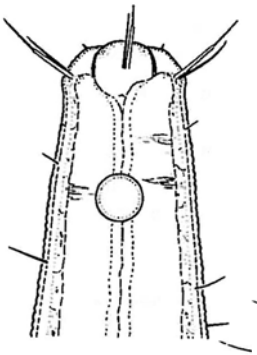
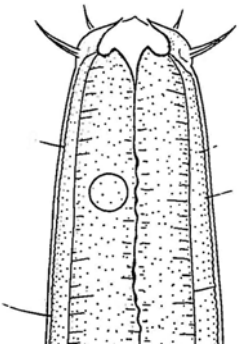
Hofmaenneria Schneider, 1940

- L = 0.4 – 2.0 mm
- Cuticle slightly annulated
- Stoma wide, sclerotized; posterior portion surrounded by oesophageal tissue
- Amphids circular, posterior to stoma, at 0.8-2 cephalic widths from anterior end; larger in males than in females
- V = 59-67%
- 1 anterior ovary
- Spicules slender; gubernaculum small
- Tail conico-cylindrical with terminal pore, no spinneret, no terminal setae
- Fresh water, brackish water
- c-p = 3



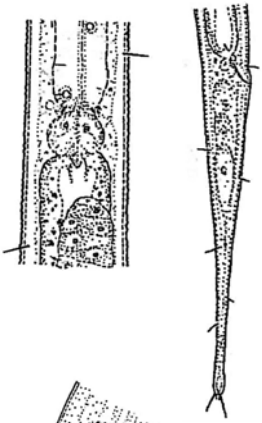
Anterior end	Amphid ♀ (up) ♂(down)
	

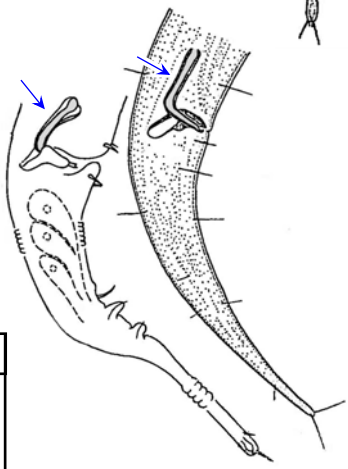


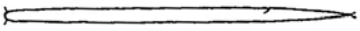
Daptonema Cobb, 1920

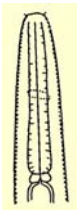
- L = 0.8 – 1.6 mm (in freshwater species)
- Cuticle slightly annulated; lateral fields
- Amphids circular of varying size and position
- Stoma conical, weakly sclerotized
- Cardia small, surrounded by intestine
- V = 65–71%
- 1 anterior ovary
- Spicules usually 1.5-2 times the anal body diameter, L-shaped
- Tail conical-cylindrical with 2 (rarely 3-4) terminal setae
- Sea, brackish water, fresh water
- Feeding: bacteria, substrate, unicellular eukaryotes
- c-p = 2

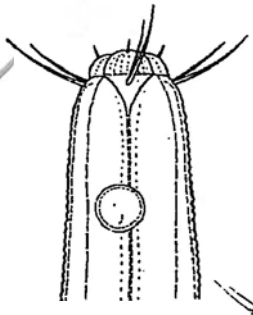


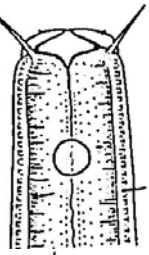


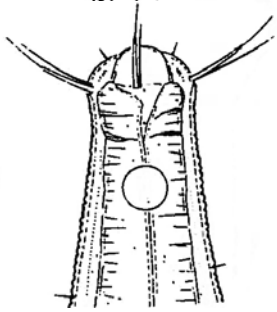
According to Andrássy (2005), the freshwater species of Xyalidae with rectangular (L-shaped) spicules must be placed in *Mesotheristus* or in *Mongolotheristus*; the species with arcuate spicules must be placed in *Cylindrotheristus*, *Daptonema*, or *Sacrimarinema*.

Location of the vulva	Tail tip
	



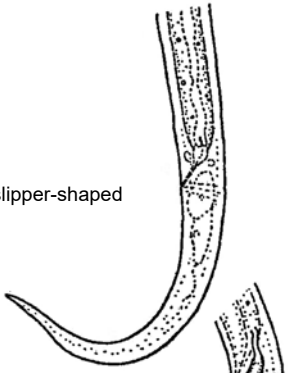


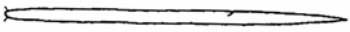
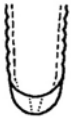


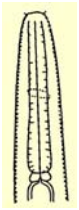
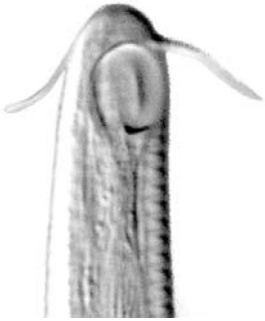
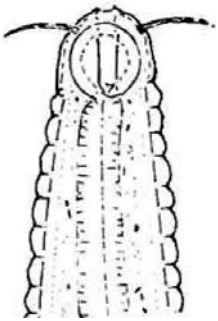
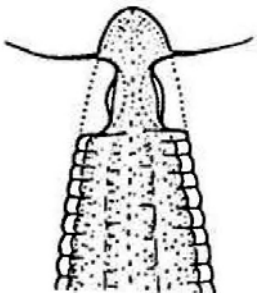


Theristus Bastian, 1965

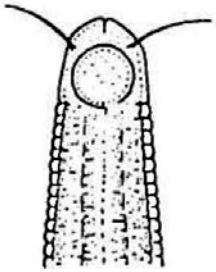
- L = 0.6 – 1.7 mm (in freshwater species)
- Cuticle slightly annulated
- Some species with ocelli
- Stoma conical
- Vulva at 2/3 of the body length
- 1 anterior ovary
- Spicules 1 anal body diameter long or much longer; gubernaculum slipper-shaped
- Tail conical, ventrally curved; no terminal setae
- Sea, brackish water, fresh water, groundwater, moist soil
- Feeding: bacteria, substrate, unicellular eukaryotes
- c-p = 2



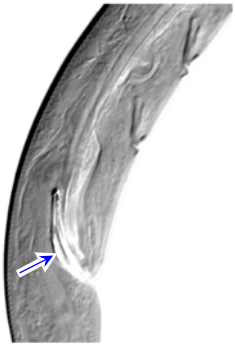
Location of the vulva	Tail tip
	

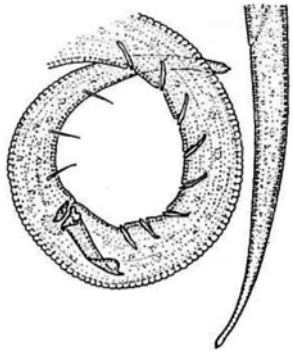





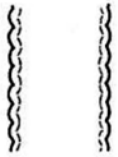
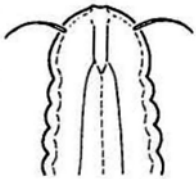
Aphanolaimus de Man, 1880

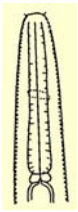


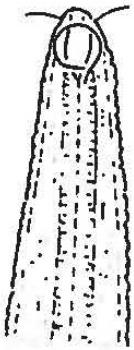
- L = 0.5 – 1.8 mm
- Body thin (a = 25-40), especially towards anterior end
- Cuticle well annulated; lateral fields narrow but prominent
- Stoma short and narrow tube, not evident
- Amphids large, strongly contoured, uni- or multispiral, with prominent central elevation; near the anterior end
- Subcuticular glands and pores well visible (10-38 on each side of body)
- V = 45-55%
- 2 ovaries; oviparous or ovoviviparous
- 1-13 supplements in form of large and sclerotized tubuli
- Spicules short
- Tail elongate, attenuated; spinneret
- Fresh water; rarely in ligthly saline water or in moist soil
- Feeding: bacteria
- c-p = 3

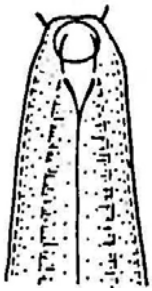




Head with amphid	Cuticle	Anterior end
		

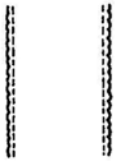
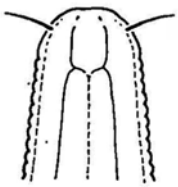


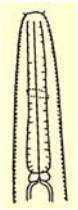


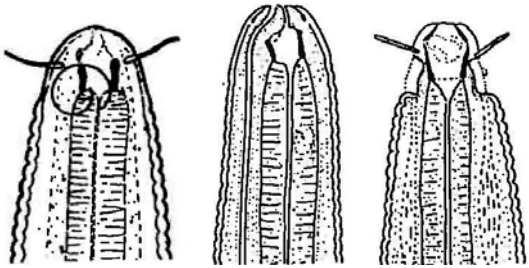


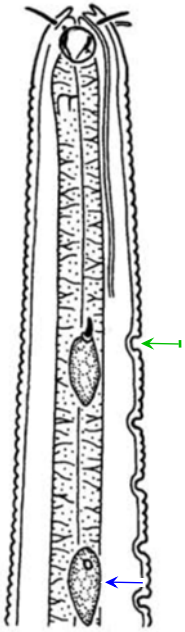
Paraphanolaimus Micoletzky, 1923

- L = 0.7-1.5 mm
- Body thin (a = 25-40), especially towards the anterior end
- Cuticle finely annulated; lateral fields prominent
- Amphids large, circular or open-circular, no prominent central elevation; near the anterior end
- Subcuticular glands and distinct lateral pores (10-26 on each side of body)
- Stoma visible
- 2 ovaries; oviparous or ovoviviparous
- Spicules long or short
- 8-20 tubular supplements
- Tail elongate with more or less swollen tip; spinneret
- Fresh water, brackish water, sea, moist soil
- Feeding: bacteria
- c-p = 3

Head with amphid	Cuticle	Anterior end
		

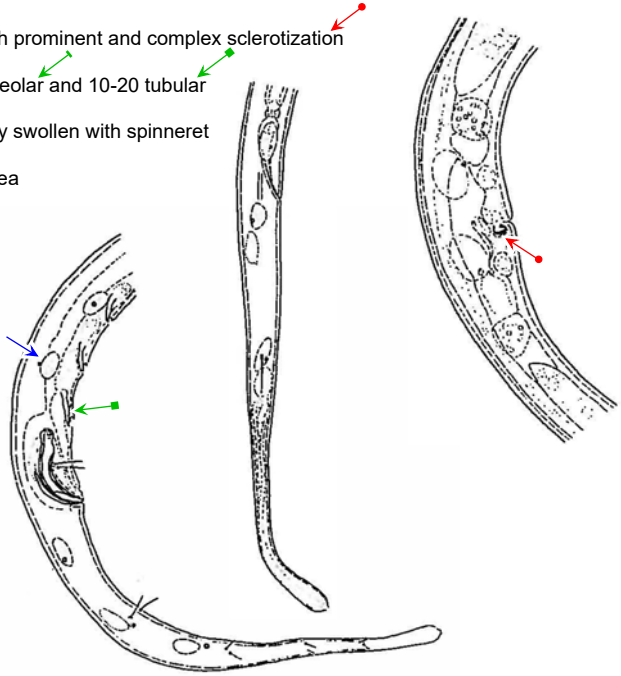


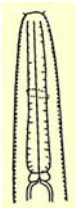


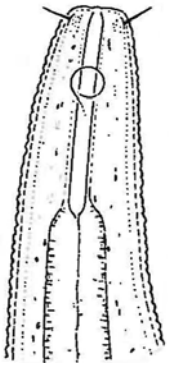


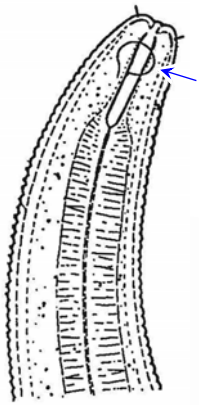
Aphanonchus Coomans & Raski, 1991

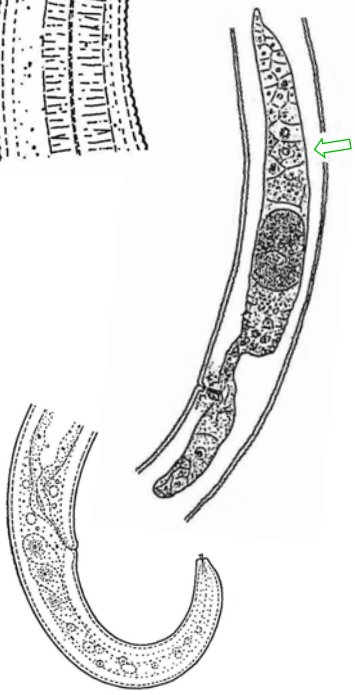
- L = 1–2 mm
- Cuticle finely annulated
- Amphids ventrally uni-spiral; near the anterior end
- Lateral epidermal glands well developed
- Oesophagus cylindrical, weakly muscularized
- 2 ovaries
- V about 50%; vagina often with prominent and complex sclerotization
- Male supplements: 20-108 alveolar and 10-20 tubular
- Tail elongate conoid, tip slightly swollen with spinneret
- Fresh water, brackish water, sea
- Feeding: bacteria
- c-p = 3





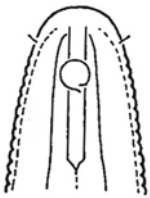
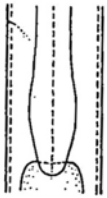


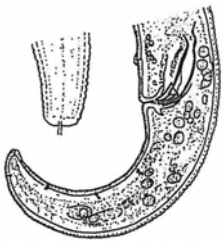


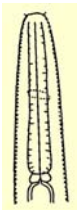


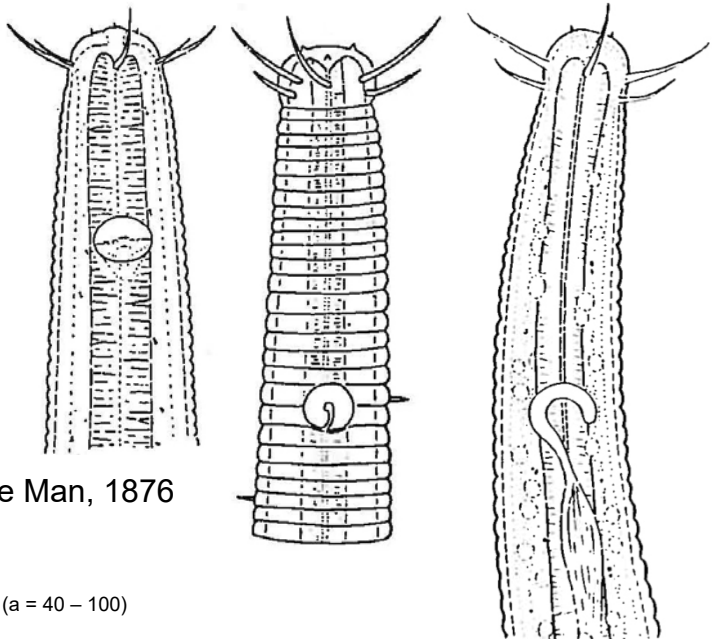
Cylindrolaimus de Man, 1880

- L = 0.4 – 1.4 mm
- Cuticle sligthly annulated
- Amphids circular or spiroid
- Stoma a cylinder 2-6 head widths long; no teeth
- Oesophagus cylindroid, widening slightly at its base
- V = 50-65%
- 2 ovaries (rarely 1), the anterior one more developed
- Males extremely rare
- Tail rather plump with rounded terminus; spinneret short
- Soil, fresh water
- Feeding: bacteria
- c-p = 3

Anterior end	Location of the excretory pore
	

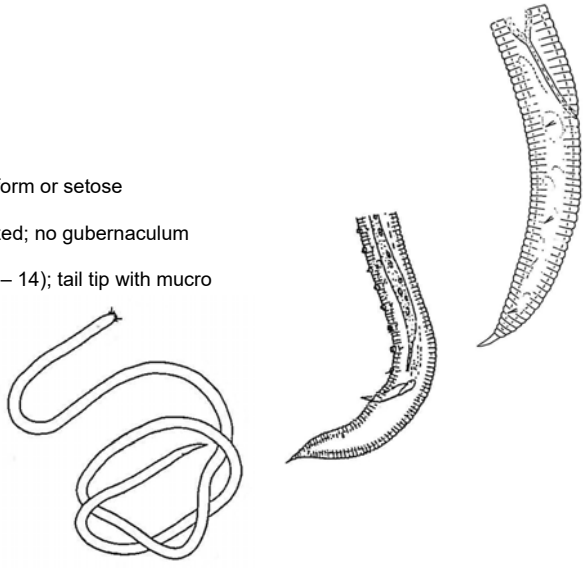




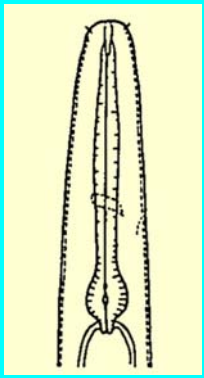


Bastiania de Man, 1876

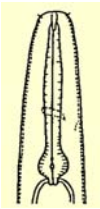
- L = 0.5 – 1.8 mm
- Body very slender (a = 40 – 100)
- Cuticle distinctly annulated
- Amphids, oval or spiroid (?-shaped), at 3-7 cephalic diameters from anterior end
- Stoma practically absent
- Oesophagus cylindroid
- 2 ovaries
- V = 56-68%
- Male supplements 7-90, papilliform or setose
- Spicules short, weakly sclerotized; no gubernaculum
- Tail conoid or elongated (c' = 3 – 14); tail tip with mucro
- Soil, sometimes in fresh water
- Feeding: bacteria
- c-p = 3

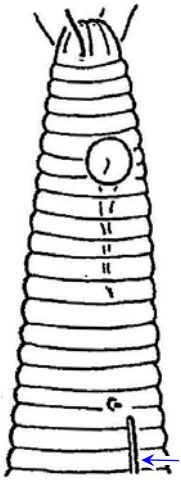


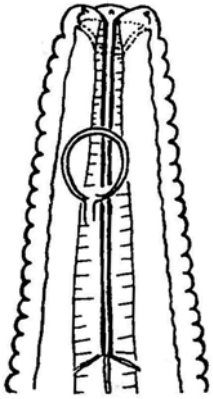
Oesophagus type

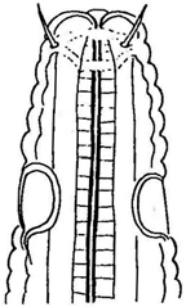


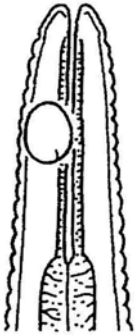
oesophagus with basal bulb





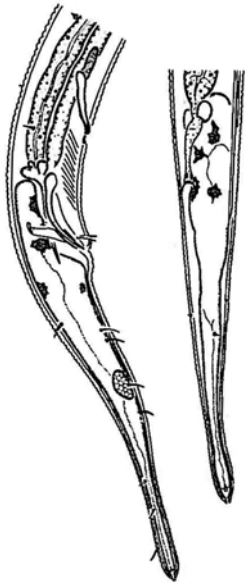


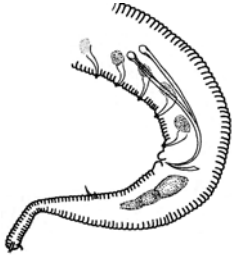


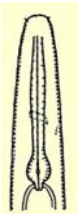


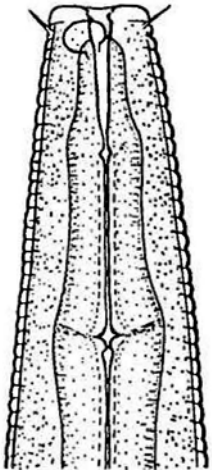
Leptolaimus de Man, 1876

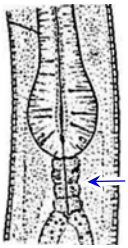
- L = 0.3 – 0.9 mm
- Cuticle annulated, lateral fields
- Amphids unispiral
- Stoma tubular, without denticles
- Oesophageal bulb without valve
- V about 50%; vagina straight
- 2 ovaries
- Male alveolar supplements 0-40, or tubular supplements 0-112
- Spicules arcuate; gubernaculum rectangular or plate-like
- Tail conoid, elongate or subcylindrical; spinneret weakly cuticularized or absent
- Marine or brackish water, rare in brackish soil or in fresh water
- Feeding: bacteria
- c-p = 3





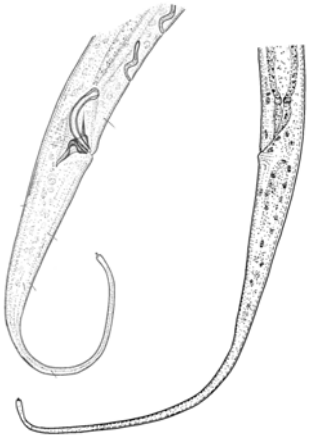


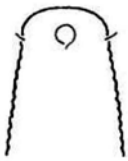
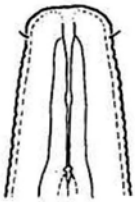
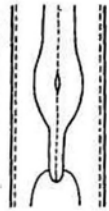
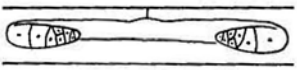


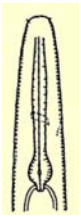


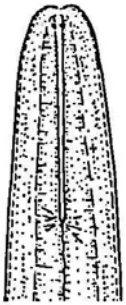
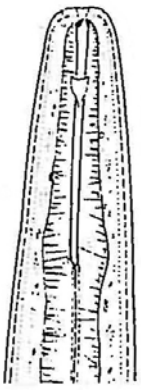
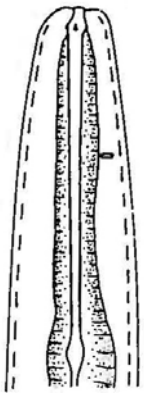
Paraplectonema Strand, 1934

- L = 0.8 – 1.3 mm
- Cuticle annulated
- Amphids oval or uni-spiral; anterior rim <1 labial width from anterior end
- Oesophagus with terminal bulb
- Bulb with a long posterior extension (cardia)
- V = 38-50 %
- 2 ovaries
- Male with 9-13 sigmoid tubular supplements
- Spicules arcuate; gubernaculum with caudal apophysis
- Tail conoid, elongate or subcylindrical, with 3 glands; spinneret short, functional
- Fresh water
- Feeding: bacteria
- c-p = 3



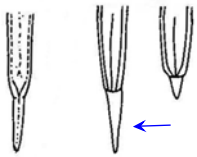
Head with amphid	Anterior end	Oesophagus bulb	♀ Genital organ
			

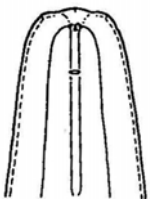
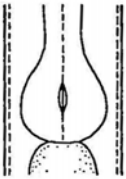
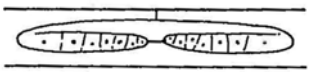


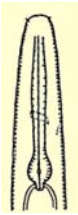




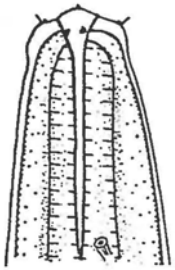
Rhabdolaimus de Man, 1880

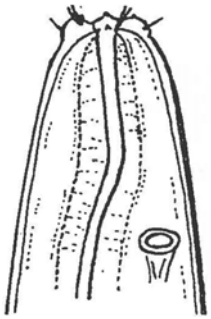
- L = 0.3 – 0.6 mm
- Cuticle practically smooth
- No cephalic setae
- Amphids very small, slit-like, difficult to see; at 1 head diameter from anterior end
- Stoma a long and very narrow tube with 3 anterior tiny denticles
- Oesophagus muscular; terminal bulb with simple valve
- V = 38-56%
- 2 ovaries
- Males very rare
- Male spicules short and simple; no supplements
- Tail elongate to filiform; spinneret long
- Fresh water, brackish water, soil
- Feeding: bacteria
- c-p = 3

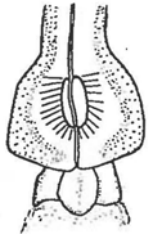
Head with amphid	Oesophagus bulb	♀ Gonads
		



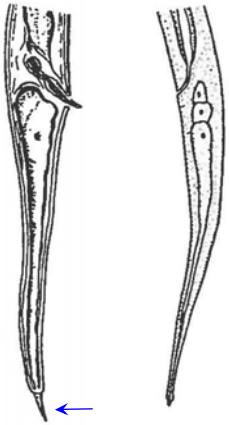


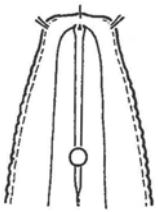
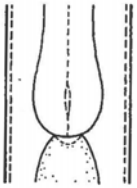


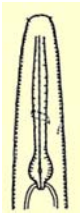
Rogerus Hoeppli & Chu, 1934

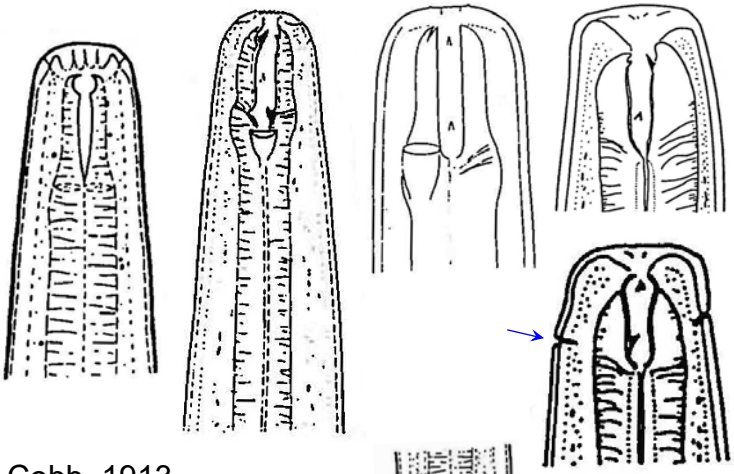


- L = 0.3 – 0.6 mm
- Amphids oval
- Stoma very long, sclerotized; 3 small teeth in anterior mouth opening
- Oesophagus cylindrical but ending in a bulb
- V <50%
- 2 ovaries
- Spicules slightly curved
- Tail conical elongate; spinneret long
- Thermal springs; saline water
- Feeding: bacteria (?)
- c-p ?



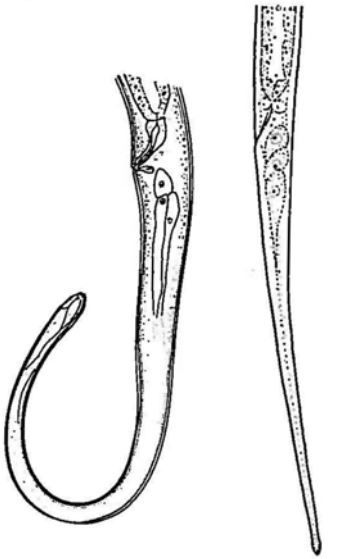
Head with amphid	Oesophagus bulb
	

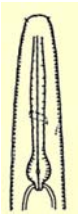


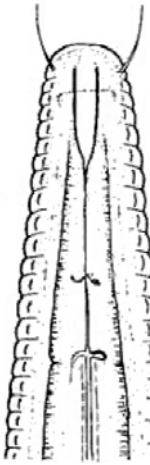


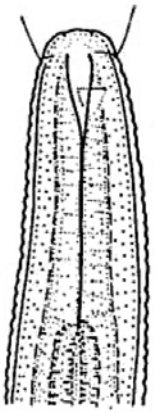
Udonchus Cobb, 1913

- L = 0.4 – 0.7 mm
- Cuticle practically smooth
- Body cavity packed with minute biocrystals
- Amphids pocket-shaped
- Stoma tubular, with anterior dorsal tooth and posterior subventral teeth
- Oesophagus cylindrical ending in a developed bulb
- 1 ovary, anterior
- Tail elongate, gradually tapering; c' = 5-20; spinneret
- Fresh water, thermal springs
- Feeding: bacteria
- c-p = 3

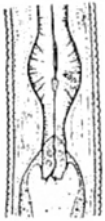




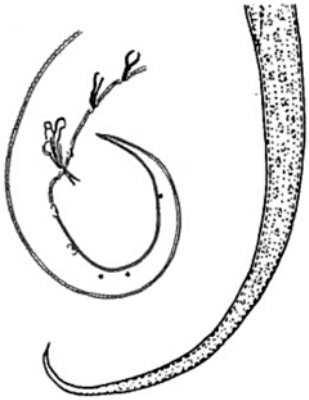


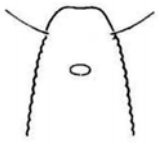
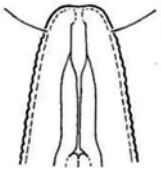
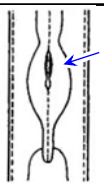
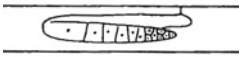


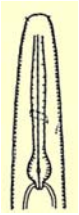
Chronogaster Cobb, 1913

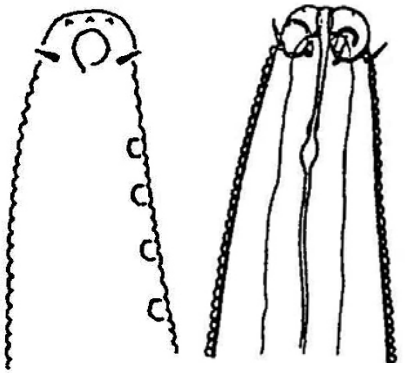


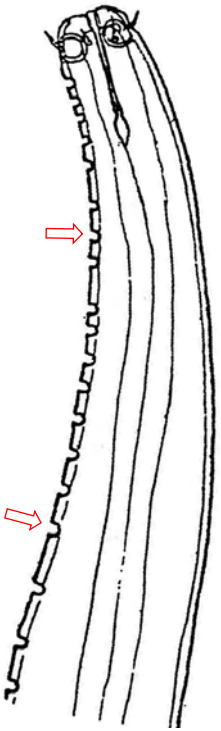
- L = 0.4 – 1.8 mm
- Body slender to very slender (a = 30-100)
- Cuticle annulated; large subepidermal glands
- Cephalic setae as long as labial width or longer
- Amphids oval or slit-like, levelling with stoma
- Stoma tuboid or funnel-shaped, no teeth
- Oesophageal bulbus with elongated valve and a long posterior prolongation
- V = 44-56%
- 1 anterior ovary
- Males very rare
- 5-19 sclerotized tubular male supplements
- Tail elongate-conoid to filiform (c' = 7-24); no spinneret but often terminal mucro with spines
- Soil, fresh water
- Feeding: bacteria
- c-p = 3



Head with amphid	Anterior end	Oesophagus bulb	♀ Genital organ
			

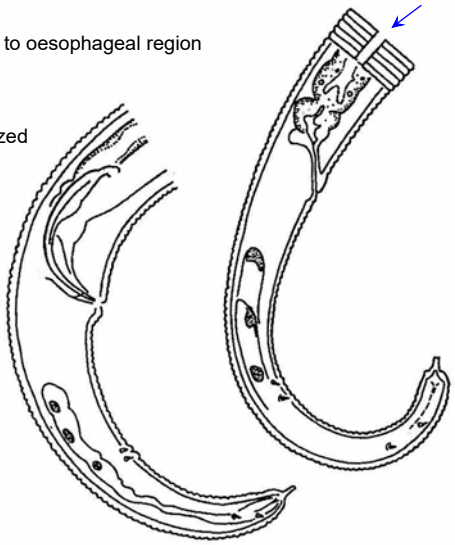


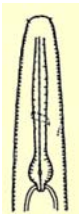
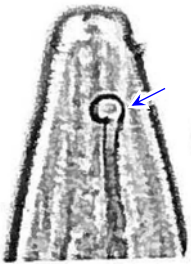
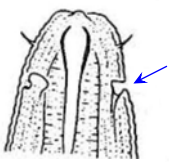
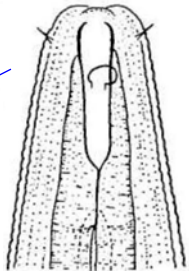




Deontolaimus de Man, 1880

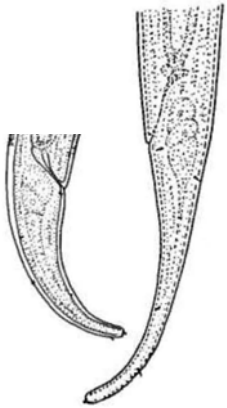
- L = 0.7 – 1.2 mm
- Cuticle finely annulated; lateral fields
- Amphids unispiral, near the anterior body end
- Stoma narrow with a single tooth pointing forward
- Oesophagus cylindrical gradually widening posteriorly
- V about 50%; vagina straight
- 2 ovaries
- Male supplements 22-35, alveolar, extending up to oesophageal region
- Spicules arcuate; gubernaculum plate-like
- Tail elongate-conoid; spinneret weakly cuticularized
- Sea, brackish soil; rarely in brackish water
- Feeding: bacteria
- c-p = 3

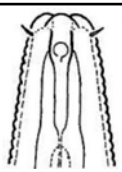


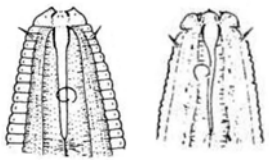

Plectus Bastian, 1865

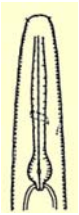
- L = 0.3 – 2.0 mm
- Cuticle annulated with lateral fields
- Amphids uni-spiral, at level of mouth cavity
- Stoma funnel-shaped
- Oesophagus well subdivided into corpus, isthmus and bulbus; bulbus with posterior process
- V = 41-63%
- 2 ovaries; usually parthenogenetic
- Males very rare
- 0-6 tubular male supplements
- Spicules arcuate, left and right spicule different; gubernaculum
- Tail conoid, elongate-conoid or subcylindrical; c' = 2.5 – 14; spinneret functional
- Soil, moss, fresh water
- Feeding: bacteria
- c-p = 2

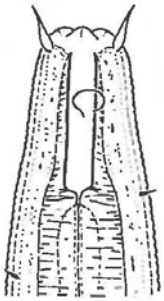


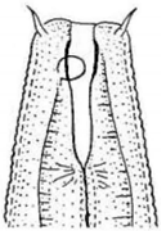
Anterior end	Stoma region
	

According to Andrássy (2005), the species (of *Plectus*) with a sharply offset head, globular lips, prostome shorter than wide, and cuticle strongly annulated, must be placed in *Chiloplectus* Andrássy, 1984.

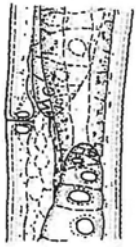




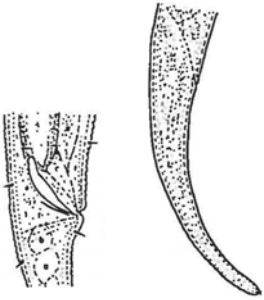


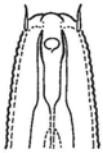


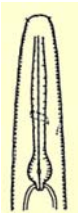
Plectus (subg. *Ceratoplectus*) Andrássy, 1984

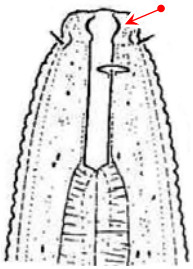


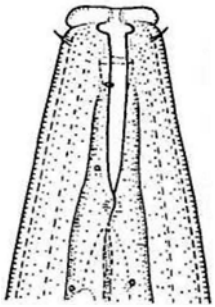
- L = 0.3 – 0.9 mm (one species 1.8-1.9 mm)
- Head not set off
- Cephalic setae strong and long, directed forward
- Amphids uni-spiral, at level of mouth cavity
- Stoma (mouth cavity) rather broad, with almost parallel walls
- V about 50%
- 2 ovaries
- Males rare
- No male supplements; spicules symmetrical
- Tail conoid, almost straight; c' = 3 – 7; spinneret
- Soil, moss, rarely in fresh water
- Feeding: bacteria
- c-p = 2



Anterior end	Stoma region
	

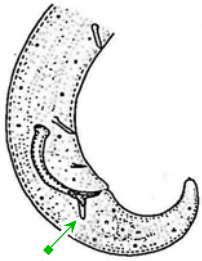


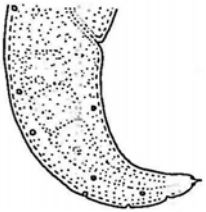


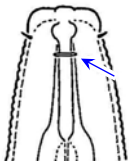
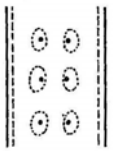


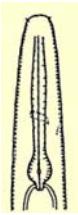
Anaplectus De Coninck & Sch. Stekhoven, 1933

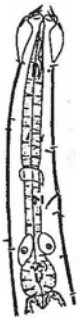
- L = 0.7 – 2.0 mm
- Cuticle annulated with distinct lateral fields
- Subcuticular glands and pores very numerous along the body
- Amphids narrow elliptical, transverse, on anterior half of stoma
- Anterior part of stoma short and globular, posterior part tubular
- Oesophagus ending in a bulb with a long posterior process
- V = 46-57%
- 2 ovaries
- Males common
- 2-5 tubular male supplements
- Spicules arcuate with anterior swollen end; gubernaculum with caudal apophysis
- Tail conoid, curved; spinneret short or reduced
- Soil, fresh water
- Feeding: bacteria
- c-p = 2

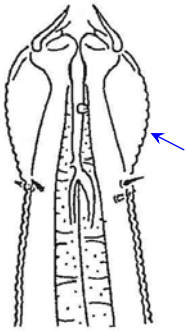




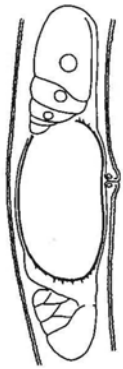
Lips and cephalic setae	Anterior end	Subcuticular glands
		



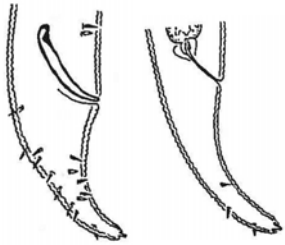


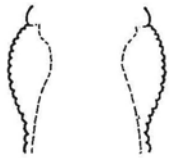
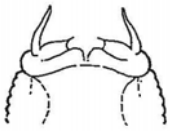


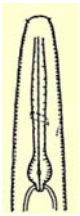
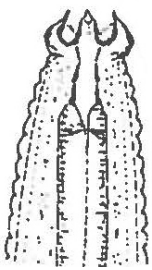
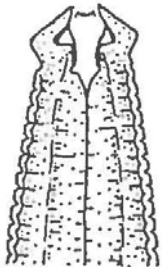
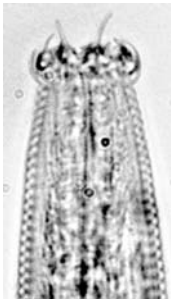
Tylocephalus Crossman, 1933



- L = 0.3 – 0.6 mm
- Cuticle finely annulated
- Cervical expansions bulbiform, annulated
- 4 cornua (= modified setae)
- Amphids circular, at half of stoma length
- V = 42-58%
- 2 ovaries
- Males very rare; no supplements
- Spicules anteriorly hooked; no gubernaculum
- Tail short, conoid, with glands and spinneret
- Moss, soil, litter, rare in fresh water (aquatic plants; bromeliads)
- Feeding: bacteria
- c-p = 2

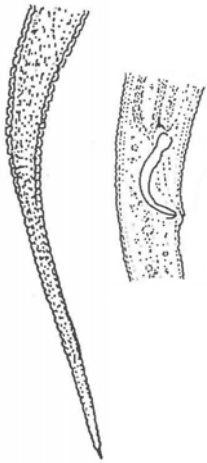


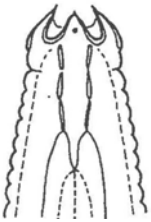
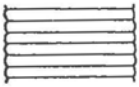
Neck swelling	Lip region
	

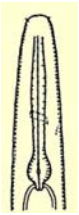





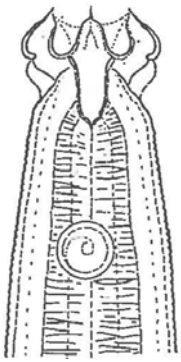
Teratocephalus de Man, 1876

- L = 0.3 – 0.9 mm
- Cuticle strongly annulated, not punctuated; lateral fields narrow with well demarcated wavy contours
- Head well offset, with incisures and lobes
- Amphids small, near stoma
- Oesophagus cylindrical, slender, with strong bulbus
- V = 40-65%
- Anterior ovary developed; short post-vulval sac
- Males rare
- Spicules sickle-shaped, anteriorly cephalated; no gubernaculum
- Tail long-conoid; c' = 5 – 30; tail tip pointed, no spinneret
- Soil, moss, fresh water
- Feeding: bacteria
- c-p = 3

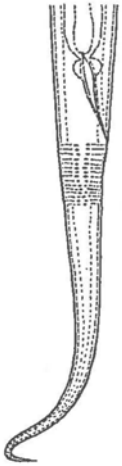


Stoma region	Cuticle
	

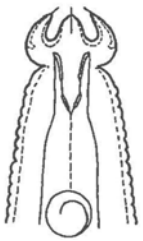


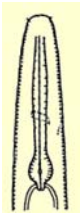


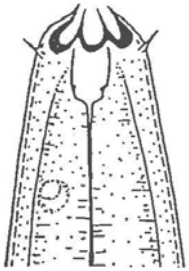
Metateratocephalus Eroshenko, 1973

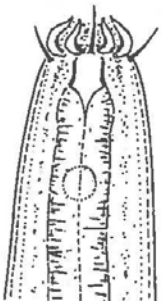


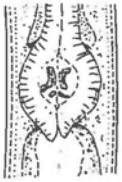
- L = 0.3 – 0.5 mm
- Cuticle finely punctuated
- Head clearly offset
- Amphids large, crypto-spiral, behind the stoma
- Stoma cup-shaped, short, no teeth
- Oesophagus with strong terminal bulb with valvular apparatus
- V = 50-60 %
- 2 ovaries
- Males very rare
- Tail conoid, dorsally curved; tip pointed; c' = 4 – 8
- Moss, soil, fresh water
- Feeding: bacteria
- c-p = 3

Anterior region	Tail
	



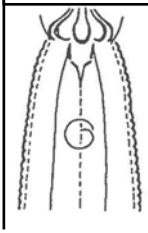




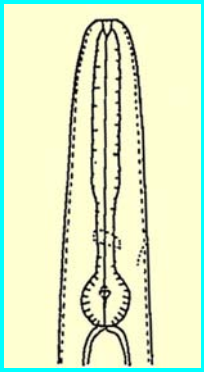


Euteratocephalus Andrássy, 1958

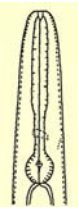
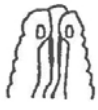
- L = 0.6 – 1.0 mm
- Cuticle slightly annulated, punctuated on/near the lateral filds
- Head not clearly offset, with 4 setae
- Amphids large, uni-spiral, two head diameters from anterior end
- Oesophagus a slender tube with strong terminal bulbus containing valvular elements
- V = 45-55%
- 2 short ovaries
- Males very rare; one tubular supplement
- Spicules hardly curved; gubernaculum thin
- Tail elongate-conoid; c' = 5-10
- Tail more or less ventrally curved; tail tip rather acute, no spinneret
- Fresh water
- Feeding: bacteria
- c-p = 3

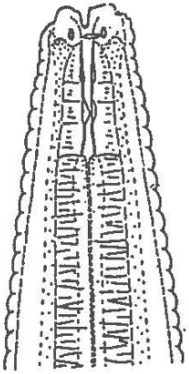
Anterior region	Tail
	

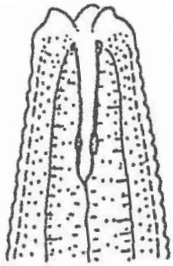
Oesophagus type



oesophagus with cylindrical corpus and basal bulb,
males without bursa

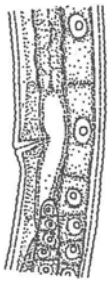
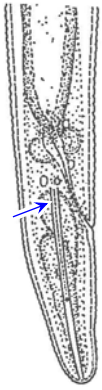
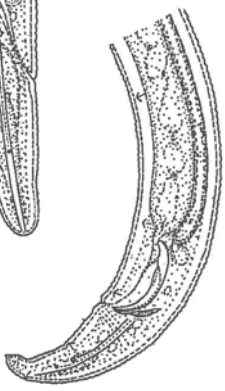
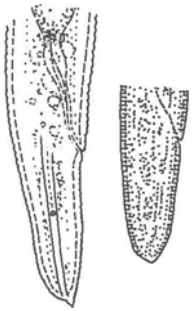



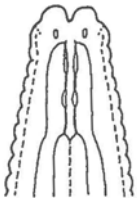



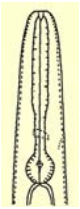



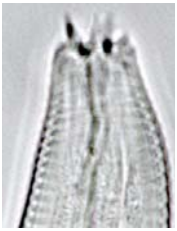
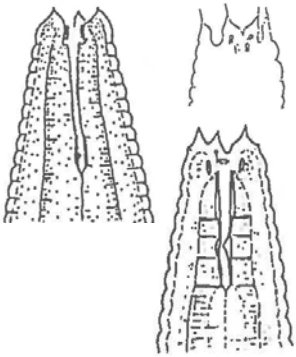

Cephalobus Bastian, 1865

- L = 0.3 – 1.0 mm
- Cuticle annulated; lateral fields with 3-5 incisures, in female, extends to the tail tip
- 3 low asymmetric probolae (inner lips)
- Oesophagus corpus cylindrical
- 1 female genital organ anteriorly directed, but reflexed posteriorly beyond vulva, in a double flexure
- Males fairly frequent
- Tail usually short (c' = 1.5-2.5), in female rounded, in male pointed
- Soil, moss, decaying matter, fresh water
- Feeding: bacteria
- c-p = 2

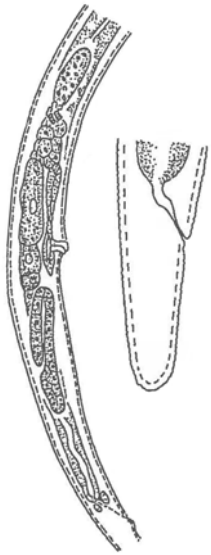





Anterior end	Tail tip
	

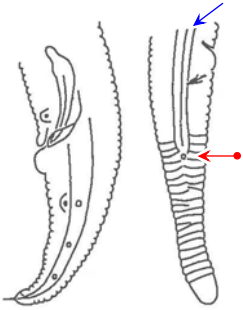
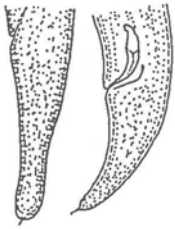


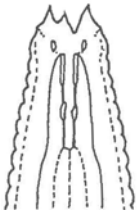



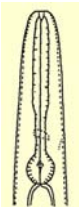
Eucephalobus Steiner, 1936

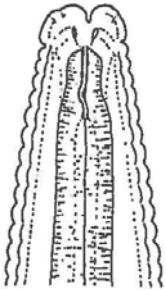


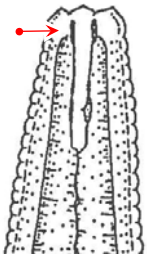
- L = 0.4 – 0.9 mm
- Cuticle annulated; lateral fields with 3 incisures, extending to phasmid or to tail tip
- 6 pointed probolae (inner lips)
- Oesophagus cylindrical
- V about 60-70%
- 1 female genital organ anteriorly directed, but reflexed posteriorly beyond vulva in a double flexure
- Male supplements, pre- and postcloacal, paired
- Female tail conoid, pointed or rounded (c' = 1.7 – 5.5); male tail with mucro
- Soil, decaying matter, fresh water
- Feeding: bacteria
- c-p = 2

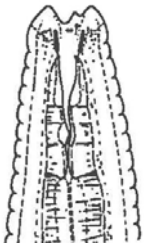



Anterior end	Male tail tip
	



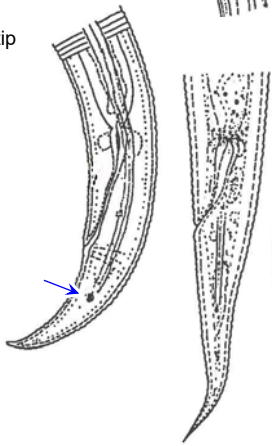


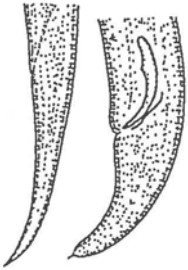


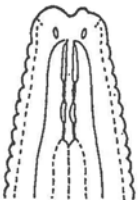


Pseudacrobeles Steiner, 1938

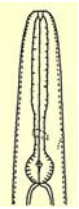
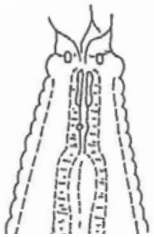
- L = 0.3 – 1.0 mm
- Cuticle annulated; lateral field, in female, extends only to the phasmid
- Cephalic probolae absent to short-setiform
- Cheilostome wide, with bar- or granule-shaped rhabdions
- 1 female genital organ anteriorly directed, but reflexed posteriorly in a double flexure
- Postvulval uterine branch usually developed, never surpassing ovary tip
- Female tail sharp or blunt, conical: c' = 2.5 – 10; male tail with or wihout mucro
- No spinneret; tail tip pointed
- Soil, moss, decaying matter, fresh water
- Feeding: bacteria
- c-p = 2

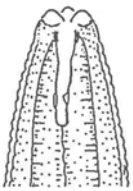
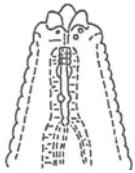




Anterior end	Tail tip
	

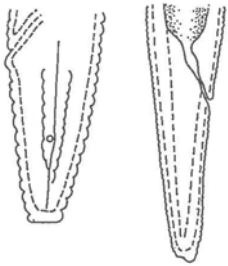
Heterocephalobus Brzeski, 1960 was considered *genus inquirendum* by De Ley, Boström (1993) and most of its species were placed in *Pseudacrobeles*. The same Authors also suggested that *Pseudacrobeles* and *Eucephalobus* could be included, in the future, into *Cephalobus*.

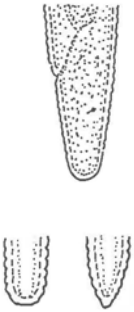



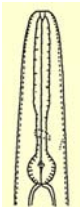
Acrobeloides Cobb, 1924

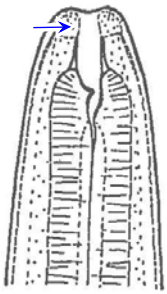
- L = 0.3 – 1.2 mm
- Cuticle annulated; lateral fields with 2-5 incisures often extending to the tail tip
- 3 rounded or pointed probolae (inner lips) [whose form also depends on food availability]
- Oesophagus corpus somewhat swollen, fusiform
- V about 60-70%
- 1 female genital organ anteriorly directed, but reflexed posteriorly in a double flexure
- Males almost absent
- Tail short and plump, broadly rounded or conoid; in female c' = 1-5
- Soil, decaying matter, fresh water
- Feeding: bacteria
- c-p = 2

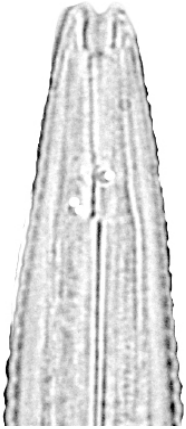


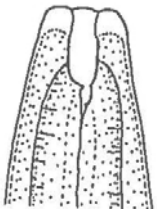


Anterior end	Tail tip
	



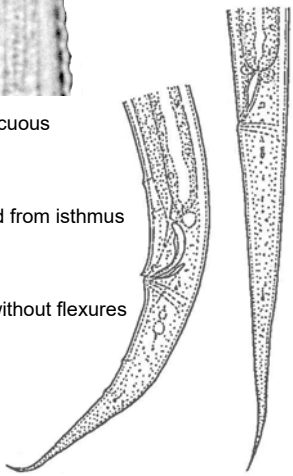


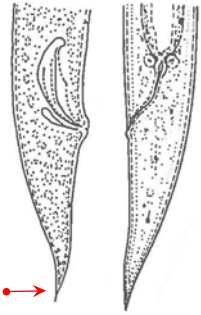


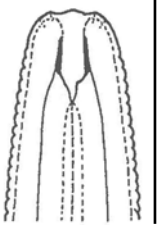
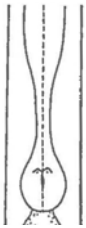


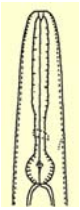
Panagrolaimus Fuchs, 1930

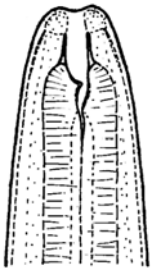
- L = 0.3 – 1.9 mm
- Cuticle very finely annulated or almost smooth; lateral fields conspicuous
- Stoma: anterior part (cheilostom) not cuticularized
- Oesophagean corpus posteriorly somewhat swollen, well separated from isthmus
- Vulval lips protruding; body on ventral side narrowed behind vulva
- 1 female genital organ anteriorly directed, but reflexed posteriorly without flexures
- Post-vulval sac
- c' = 2-8
- Tail conical, sharpened posteriorly and with pointed tip
- No spinneret
- Soil, decaying matter, fresh water
- Feeding: bacteria
- c-p = 1

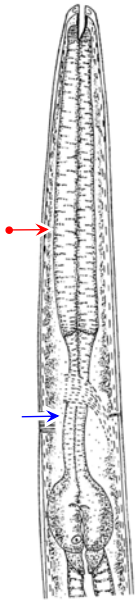




Anterior end	Oesophagus end
	

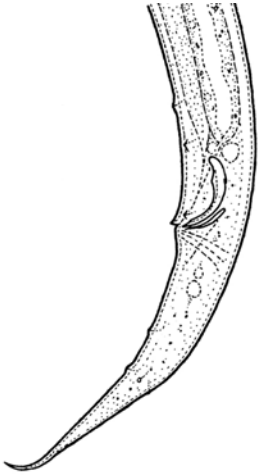


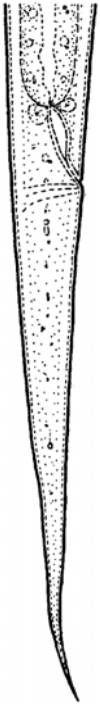


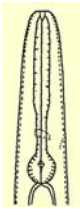


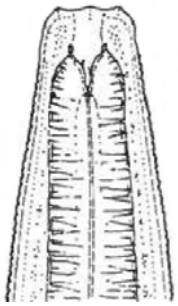
Propanagrolaimus Andrássy, 2005

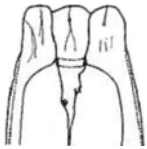
- L = 0.9 – 1.9 mm
- Body slender (up to a = 70)
- Cuticle very finely annulated, practically smooth; lateral fields inconspicuous, with 2 incisures
- Stoma: anterior part (cheilostom) not, or only slightly, cuticularized
- Oesophagus short (b = 5-7); isthmus half as long as corpus, or longer
- V = 40-80%; vulval lips not protruding
- 1 female genital organ anteriorly directed, but reflexed posteriorly without flexures
- Oviparous or ovoviviparous
- Males rare, reproduction by proterandry
- Tail elongate-conoid, pointed or finely rounded tip; c' = 5-12
- Fresh water; mostly on roots of water plants
- Feeding: bacteria
- c-p = 1

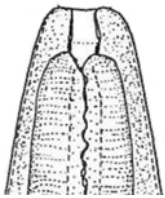






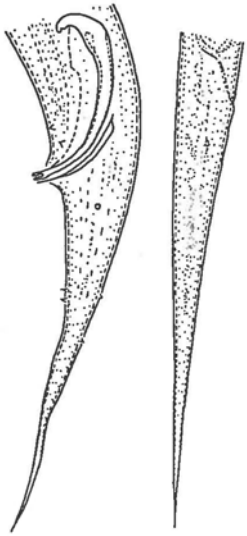


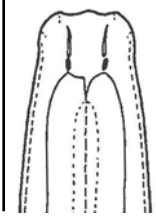
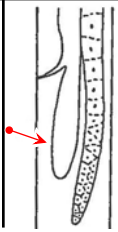




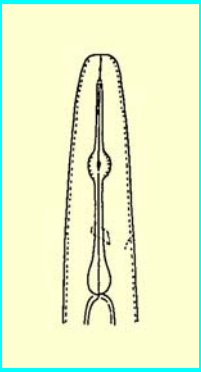
Panagrellus Thorne, 1938

- L = 0.6 – 3.0 mm
- Cuticle practically smooth
- Anterior part of stoma only weakly cuticularized
- Oesophageal corpus long (55-65% of oesophageal length) and massive
- 1 female genital organ anteriorly directed, but reflexed posteriorly
- Post-uterine sac longer than body width
- Oviparous or ovoviviparous
- Male genital papillae: 7 pairs
- Spicules anteriorly hook-shaped, posterior end bifurcate
- Tail elongate-conical, sharply tipped; c' = 3-7
- Decaying matter in soil and fresh water
- Feeding: bacteria
- c-p = 1

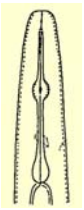


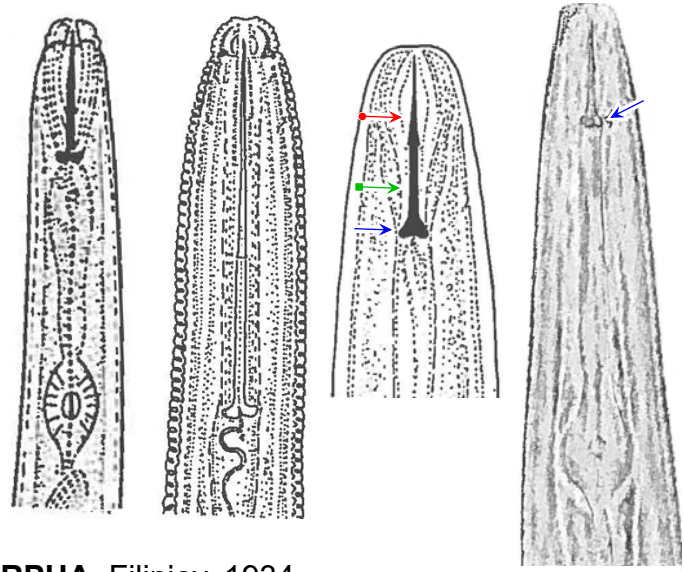
Anterior end	♀ Gonads	Spiculum
		

Oesophagus type



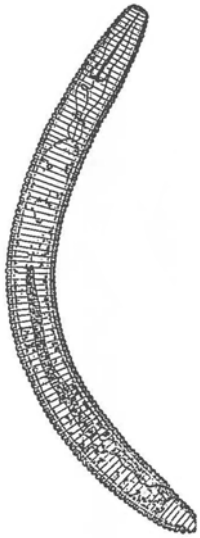
oesophagus with median bulb,
stoma with spear with
basal knobs

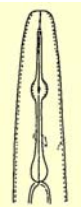


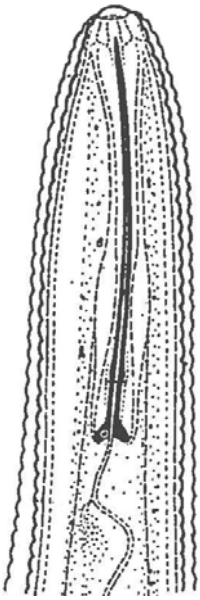


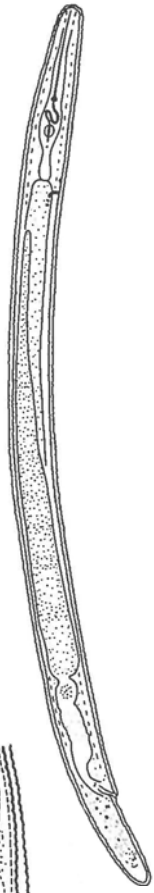
TYLENCHOMORPHA Filipjev, 1934

- Cuticle annulated (sometimes very faintly annulated)
- Stoma with a stylet usually with visible basal knobs
- Stylet (5 - 180 µm long) consisting of conus, shaft, 3 basal knobs
- Stylet lumen very narrow (<1 µm), usually not visible
- Most are plant parasites, some are moss or fungal feeders
- Living in (or on) plant tissue; in soil especially during their free-living phase
- Very few species can be considered really freshwater
- Most Tylenchomorpha found in fresh water are accidental (rain dragged)



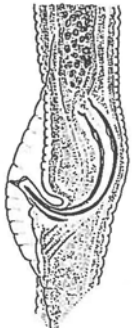


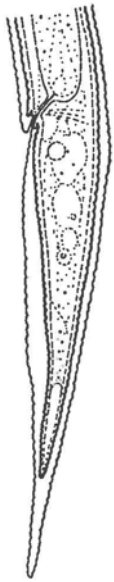


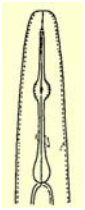


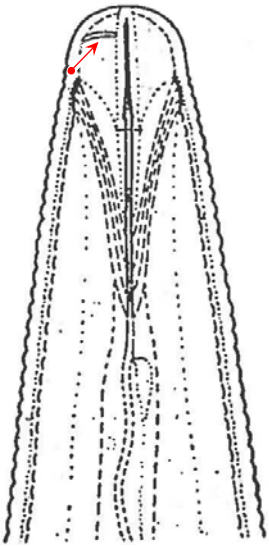
Hemicycliophora de Man, 1921

- L = 0.6-1.8 mm
- Body narrowed behind vulva
- Body sheath as a second cuticle (appearing double); cuticle well annulated
- V about 80-90%; vulval lips divergent
- Males without buccal stylet
- Spicules thin, semicircular
- Tail: in female conoid or cylindroid; in male long-conoid to filiform
- Soil, roots; some species also in brackish or fresh water
- Feeding: females usually ectoparasites on roots
- c-p = 3



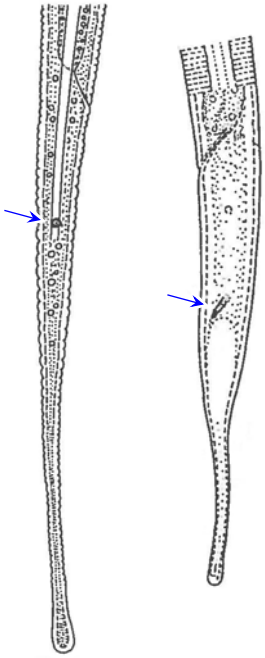


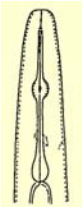


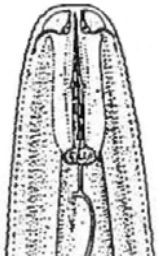


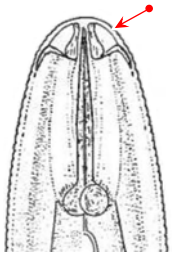
Psilenchus de Man, 1921

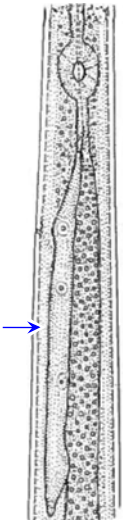
- L = 0.7 – 1.7 mm
- Amphids slit-like, well discernible, on lateral lips
- Buccal stylet: needle-like, base not knobbed
- Oesophagus: both bulbs well expressed
- V = 45-53%
- 2 ovaries
- Male bursa adanal
- Phasmids distinct, on anterior to middle tail
- Tail similar in sexes, elongate, straight; tip often clavate
- Soil, humid soil, rare in freshwater
- Feeding: root hair and epidermal cells
- c-p = 2





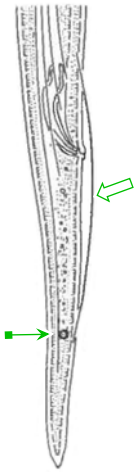


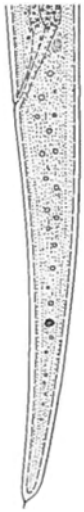




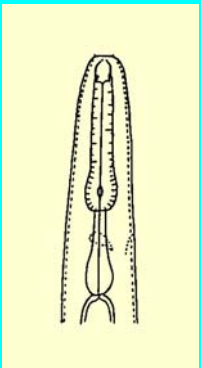
Hirschmanniella Luc & Goodey, 1964

- L = 0.9 – 4.2 mm
- Body very slender (usually a = 50-70) and straight when relaxed
- Cuticle finely annulated; lateral field with 4 incisures
- Labial region with strong framework
- Buccal stylet strong, knobs rounded
- Oesophageal glands elongated, ventral to intestine
- 2 ovaries
- Male bursa elongate but not encircling tail tip
- Tails similar in sexes, elongate conoid, with pointed or mucronate terminus
- Phasmids on posterior third of tail
- Feeding: endoparasitic in roots of aquatic plants (*Phragmites* etc.), rarer in wet soil
- c-p = 3

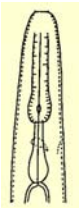


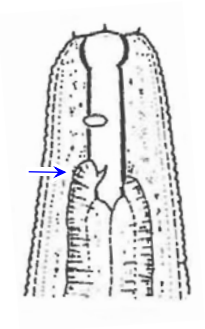


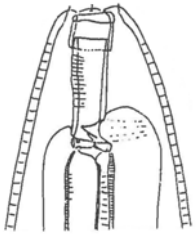
Oesophagus type

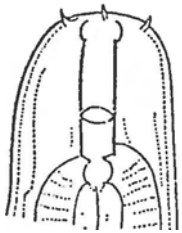


anterior oesophagus strong, muscular,
posterior oesophagus weak, glandular

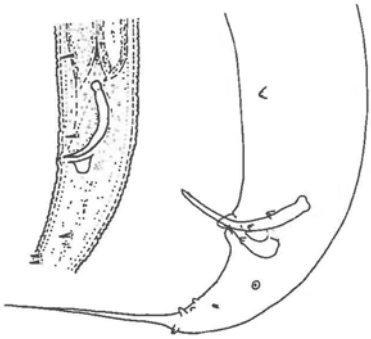






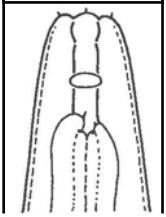


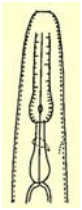
Diplogasteroides de Man, 1912

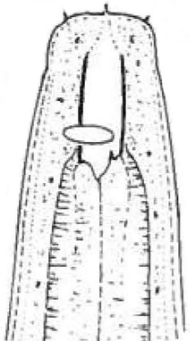


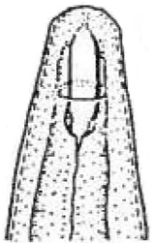
- L = 0.4 – 1.5 mm
- Cuticle smooth or finely annulated
- Amphids oval, at level of stoma or posterior to it
- Stoma tubular; metastom asymmetric
- Oesophagus rather short (b = 5-7), medial bulb spherical
- V = 42-55%
- 1 anterior ovary, postvulval sac; or 2 ovaries
- Spicules arcuate, gubernaculum strong
- Tail in both sexes filiform (c' = 6 – 20)
- Soil, fresh water
- Feeding: bacteria
- c-p = 1

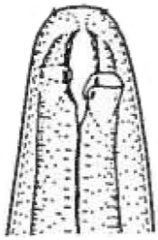
Anterior end



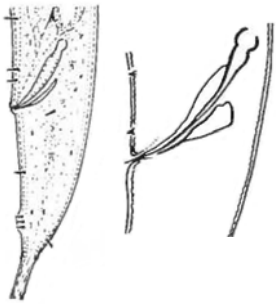




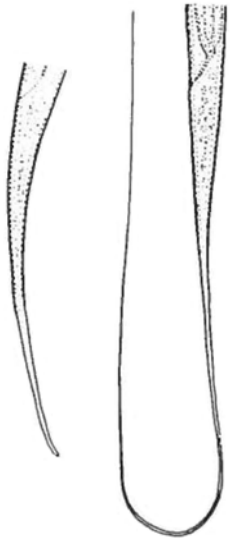


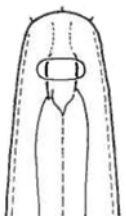
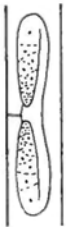


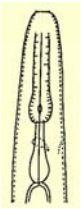
Goffartia Hirschmann, 1952

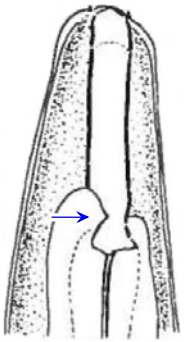


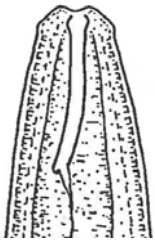
- L = 0.6 – 1.3 mm
- Amphids rather large, oval, at posterior half of stoma
- Stoma tubular, fairly roomy; metastom with 1 small tooth
- Oesophageal medial bulb weak or very weak
- V = 30-48%
- 2 ovaries
- Spicules hardly bent
- Tails in both sexes long, filiform (c' = 15 – 25)
- Fresh water, moist soil
- Feeding: bacteria
- c-p = 1



Anterior end	♀ gonads
	

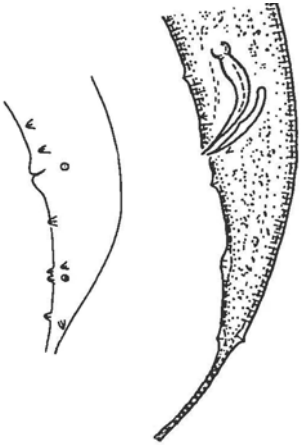


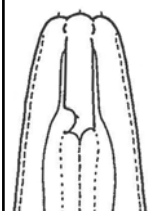
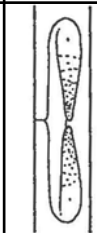


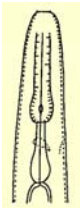


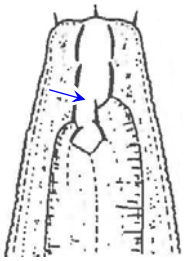
Rhabditidoides Rahm, 1928

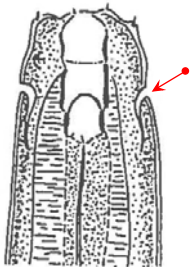
- L = 0.6 – 2.3 mm
- Cuticle smooth or with longitudinal striae
- Stoma weakly sclerotized, 5-6 times longer than wide; metastom asymmetric: dorsal bulge with 3 tiny bristle-teeth
- V = 31-68%
- 2 ovaries
- Male bursa very reduced and narrow; sex papillae hair-like
- Spicules sickle-like
- Tail in both sexes long, filiform; female c' = 10 – 30; male c' = 3 - 9
- Soil, compost, dung, rotten wood, polluted water
- Feeding: bacteria
- c-p = 1

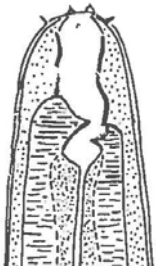


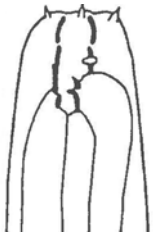
Anterior end	♀ gonads	Bursa
		





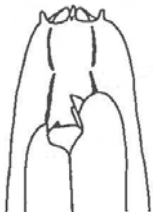


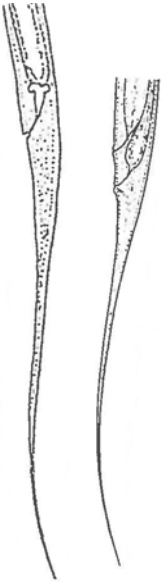


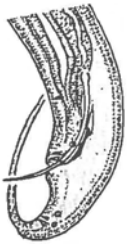


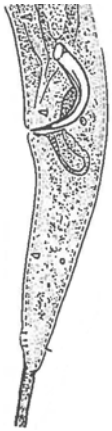
Acrostichus Rahm, 1928

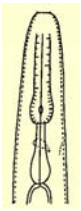
- L = 0.5 – 1.9 mm
- Cuticle longitudinally striated and finely annulated
- Amphids elliptical, large in males, at mid stoma level or posterior to that
- Stoma 2-3 times as long as wide
- Cheilostom unstriated, stoma strongly anisomorphic
- Metastom with 1 comma-like dorsal tooth + 2 small subventral teeth
- Muscular oesophagus (including stoma) is 60% of oesophagus length
- V = 50% or more, vulva circular
- 1 anterior strongly reflexed ovary; mostly 1 post-vulval sac
- Spicules separate; 9 papillae (3-4 precloacal + 5-6 postcloacal); a very small bursa occasionally present
- Tails long (female c'>10; male c'>5)
- Rotting wood and leaves, dung, soil, putrefying mushroom, moss, fresh water
- Feeding: bacteria, unicellular eukaryotes
- c-p = 1

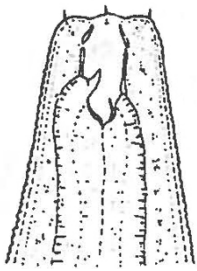


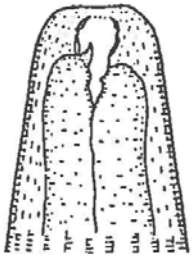




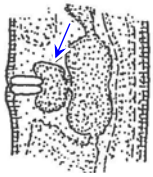




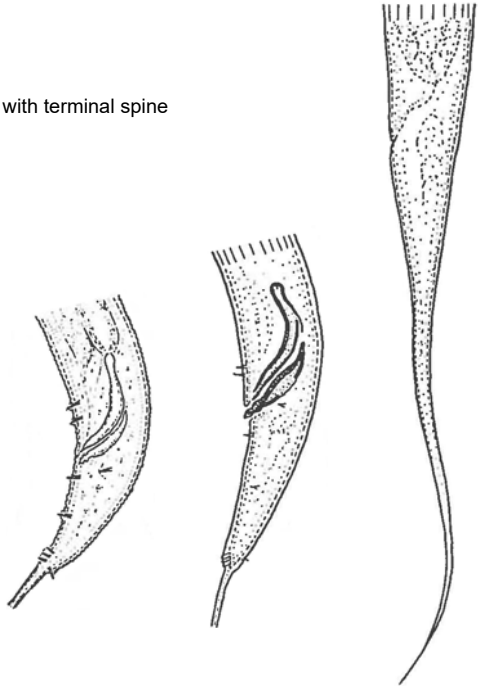


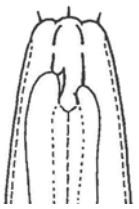
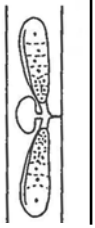


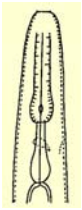
Diplogasteritus Paramonov, 1952

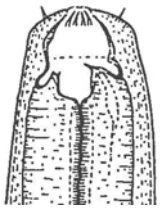
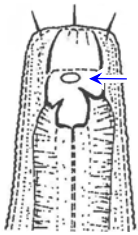


- L = 0.5 – 1.5 mm
- Cuticle longitudinally striated
- Amphids at mid stoma or posterior to that
- Stoma 1.5-2 times as long as wide; 1 thorn-like dorsal tooth and small subventral teeth
- V < 50%
- 2 ovaries; uterus with a pouch at vaginal level
- 8-10 pairs of genital papillae
- Spicules separate; gubernaculum large, often with terminal spine
- Tail in both sexes long, filiform
- Dung, compost, polluted fresh water
- Feeding: bacteria, unicellular eukaryotes
- c-p = 1



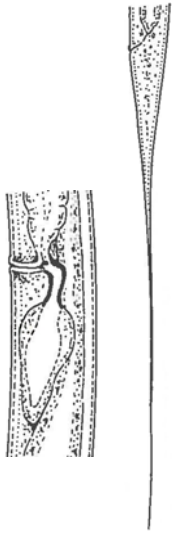
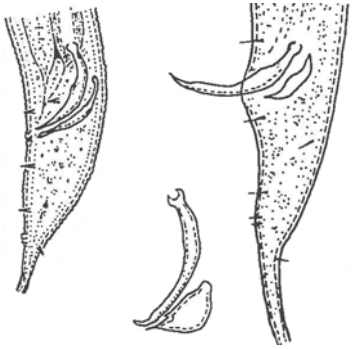
Anterior end	♀ gonads
	

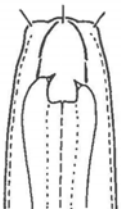


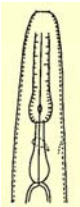



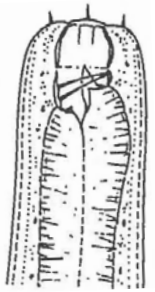
Butlerius Goodey, 1929

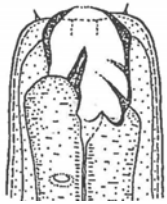
- L = 0.8 – 2 mm
- Cuticle finely annulated and mostly also longitudinally striated
- Labial papillae long, setiform
- Amphids oval, at stoma level
- Metastom with large dorsal tooth and 2 smaller subventral teeth
- V = 39-54%
- 2 ovaries
- Spicules slender, gubernaculum strong
- Tail of both sexes filiform; c' = 8 - 15
- Soil, decaying matter, fresh water
- Feeding: bacteria, small animals (especially nematodes)
- c-p = 1

Anterior end	♀ gonads
	

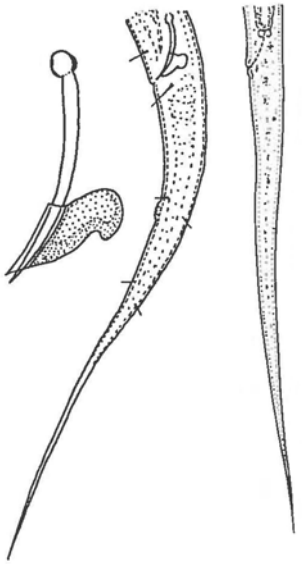


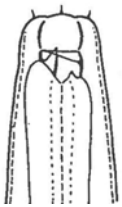


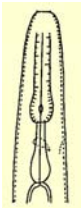


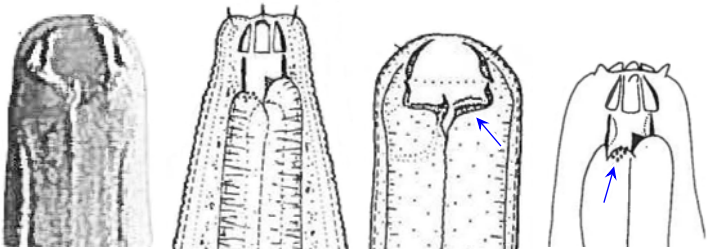
Diplogaster Schultze in Carus, 1857

- L = 1.3 – 2.5 mm
- Cuticle smooth
- Stoma spacious, about as long as labial width;
  cheilostom with fine longitudinal striae;
  metastom strongly anisomorphic;
  dorsal tooth strong, triangular, subventral teeth small
- V = 48-57%
- 2 ovaries; ovoviviparous
- Male genital papillae long, setiform
- Tail in both sexes long; c' = 12 – 15
- Fresh water, also in somewhat polluted water
- Feeding: bacteria, small animals, unicellular eukaryote
- c-p = 1

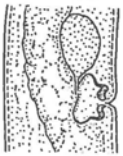


Anterior end	♀ gonads
	



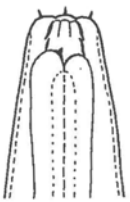


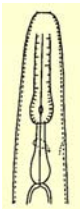
Paroigolaimella Paramonov, 1952

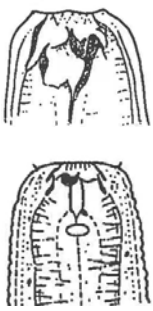


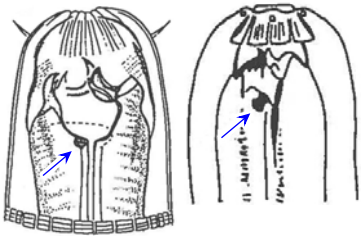
- L = 0.5 – 1.4 mm
- Cuticle practically smooth
- Stoma short and wide, cheilostom divided into plates; metastom with a small triangular tooth and two subventral bulges rasp-like
- V = 37-53%
- 2 ovaries
- Male bursa reduced, difficult to see
- Spicules often well sclerotized and complex in structure
- Tail in both sexes long to filiform; c' = 8 - 12
- Fresh water, soil, compost, dung
- Feeding: bacteria
- c-p = 1

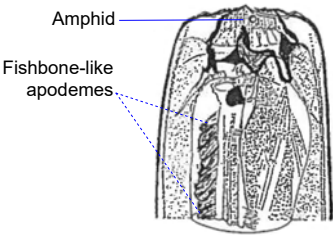
Anterior end





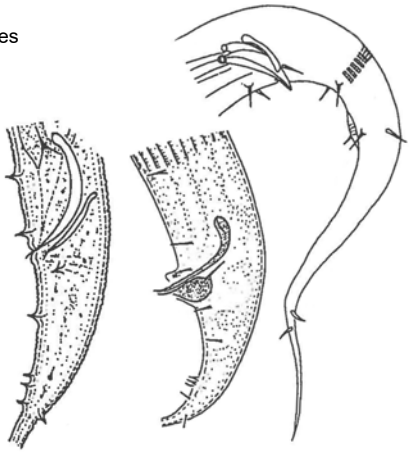


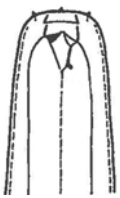


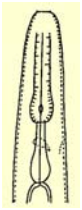


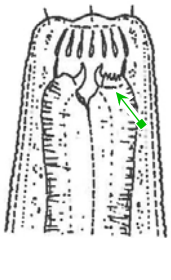
Koerneria Meyl, 1961

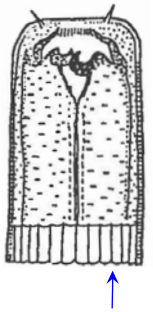
- L = 0.3 – 1.8 mm
- Cuticle practically smooth
- Stoma: anterior (cheilostom) with longitudinal striae; metastom: 2 robust teeth + 1 small denticle; posterior part of stoma (telostom) ventrally knobbed. Each sex often showing two distinct stomatal morphs (narrow vs. wide)
- V = 35-61%
- 2 ovaries (rarely only 1 anterior)
- Female c' = 4-25 with acute or filiform tip; male tail shorter
- Bursa reduced or absent; spicules separated
- Soil, rotten wood, rarely fresh water
- Feeding: bacteria, small animals, unicellular eukaryotes
- c-p = 1

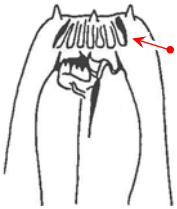


Anterior end	Tail
	



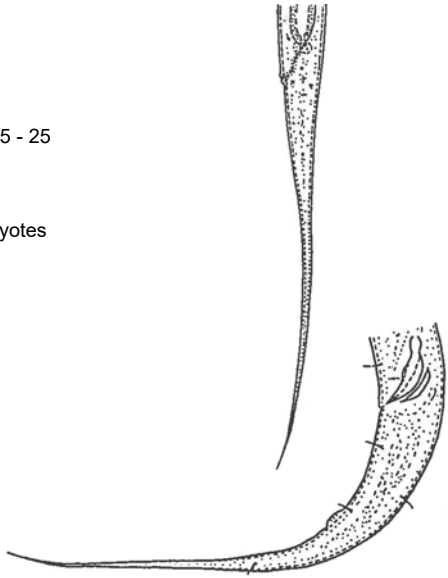


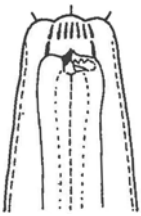


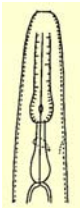


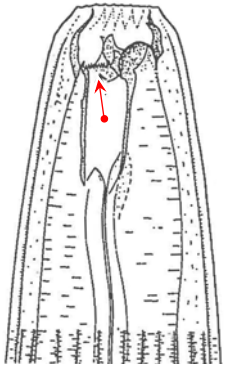
Fictor Paramonov, 1952

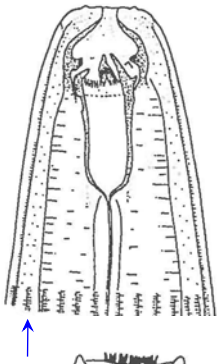
- L = 0.5 – 2.4 mm
- Cuticle longitudinally striated, but also with fine transverse striae
- Amphids small on lateral lips, or large at stoma level
- Stoma fairly roomy; cheilostom with narrow plates; metastom with 1 dorsal claw-like tooth, 1 subventral tooth and 1 subventral serrated (comb) plate
- V = 30-58%
- 2 ovaries
- Tail in both sexes elongate-conical to filiform; c' = 5 - 25
- Fresh water, soil, moss, litter, dung
- Feeding: bacteria, small animals, unicellular eukaryotes
- c-p = 1 (but *Fictor fictor* in clean water)

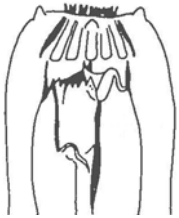


Anterior end	Tail
	



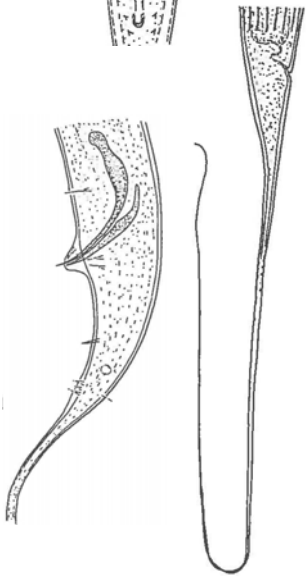


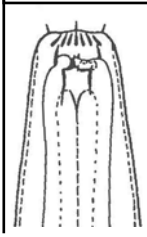
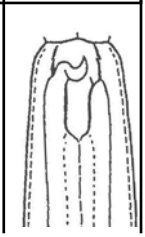


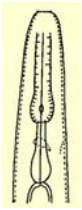
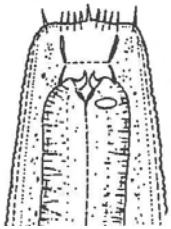
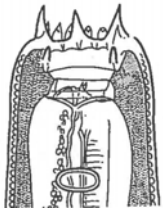
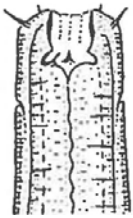
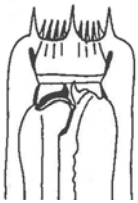


Mononchoides Rahm, 1928

- L = 0.6 – 3.4 mm
- Cuticle longitudinally striated, but also with fine transverse striae
- Amphids small on lateral lips, or large at stoma level
- Stoma: cheilostom divided into thin plates; metastom: 2 robust teeth + 1 or 2 comb plates; posterior part of stoma (telostom) large
- 2 ovaries
- V = 25-65%
- Spicules slender, gubernaculum
- Tail of both sexes long to filiform; c' = 6 - 30
- Fresh water, salt water, soil, litter, decaying material
- Feeding: bacteria, small animals
- c-p = 1

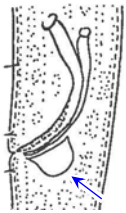


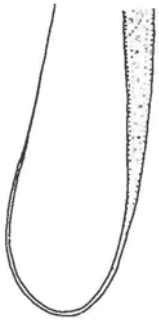
Anterior end	Tail	Anterior end
		

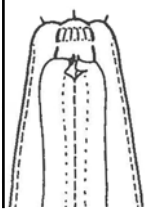






Oigolaimella Paramonov, 1952

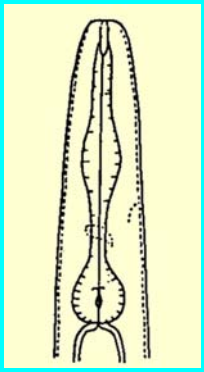
- L = 0.6 – 1.5 mm
- Cuticle with very fine transverse and longitudinal striations (or punctuations)
- Labial papillae setiform
- Amphids oval, at stoma level or behind it
- Stoma: gymnostom a short wide ring divided into plates; stegostom with 2 teeth
- Vulva at 50% or less
- 2 ovaries
- Male without bursa
- Spicules curved; gubernaculum small or keeled
- Tail in both sexes filiform, hair-like; about 1/3 of body length; c' = 20 - 25
- Rotten wood, litter, compost, polluted fresh water
- Feeding: bacteria
- c-p = 1



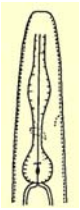


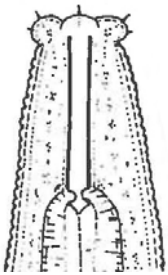
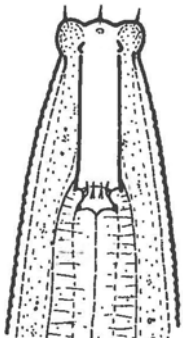
Anterior end	Tail
	

Oesophagus type

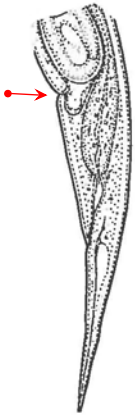


oesophagus with swollen corpus and basal bulb,
males often with bursa

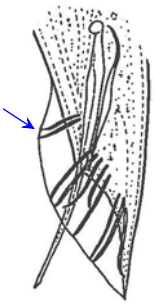
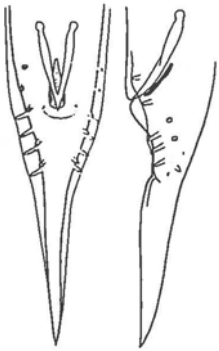


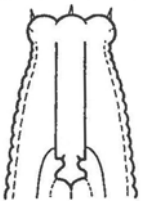



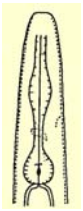
Mesorhabditis Osche, 1952

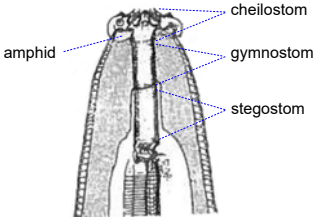


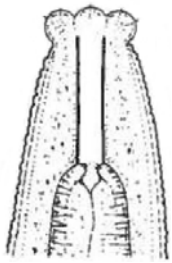
- L = 0.3 – 1.0 mm
- Cuticle finely annulated and often finely punctuated
- Head offset ; 6 lips with setiform papillae
- Stoma 2 (or 3) times long as the head width; not encircled by musculature
- Oesophageal bulb with double haustrulum
- V = 66-92%
- 1 anterior ovary; no posterior uterine sac
- Male bursa narrow with 6-7 pairs papillae; spicules 20-27 µm;
  or *male bursa wide with 9-10 pairs papillae; spicules 30-76 µm*
- Female tail conical, male tail short; c' = 1-10
- Soil, decaying matter, fresh water
- Feeding: bacteria
- c-p = 1

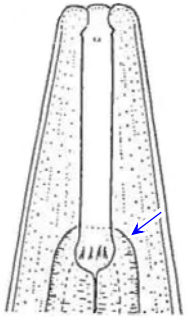



Anterior end	Tail	Spicules	Wide bursa	Narrow bursa
				



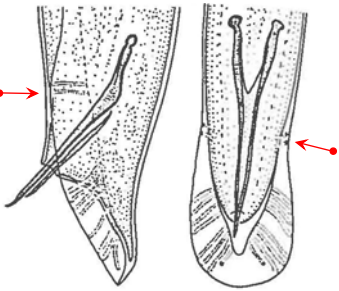


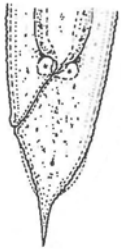


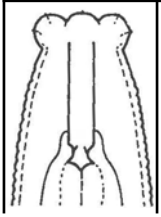


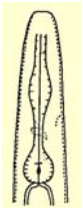
Pelodera Schneider, 1866

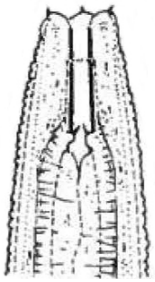
- L = 0.6 – 3.6 mm (usually 1-2 mm)
- Cuticle mostly annulated
- Labial region offset
- Stoma long and narrow: encircled by thin musculature or almost not encircled; metastom with 3 setose teeth on each swelling
- V = 49-60%
- 2 ovaries; ovoviviparous or oviparous
- Male bursa peloderan, anteriorly open, with 10 pairs papillae (2 pairs precloacal)
- Spicules long (30-100 µm), posteriorly fused by more than 50%
- Female tail short, cupola-shaped or conical-elongate; male tail short; c' = 0.6 - 4
- Soil, decaying matter, fresh water, snails gut, fur of mammals
- Feeding: bacteria
- c-p = 1

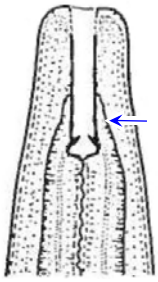




Anterior end	Tail	Spicules	Bursa
			

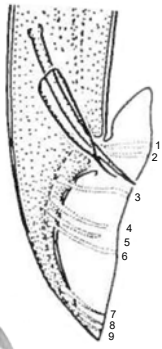


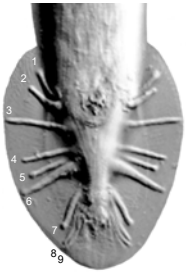


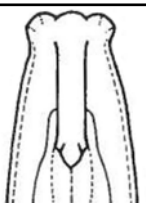


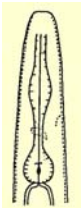
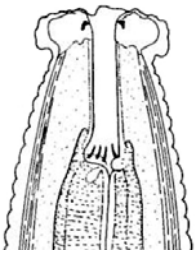
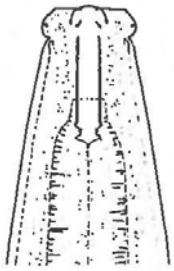
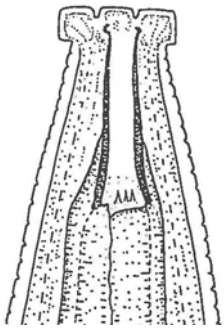
Caenorhabditis Osche, 1952

- L = 0.6 – 1.9 mm
- Cuticle practically smooth
- Stoma tubular: much less than one half encircled by musculature
- Oesophageal median bulb relatively strong; basal bulbus with double haustrulum
- V = 45-56%
- 2 ovaries
- Male bursa peloderan, nearly closed; with 9 pairs papillae, 2 of them precloacal (2 / 4+3)
- Spicules separate, 27-52 µm (rarely up to 95 µm)
- Female tail conical or elongate-conical, male tail short; c' = 1.5 - 8
- Soil, decaying matter, snails gut, fresh water
- Feeding: bacteria
- c-p = 1



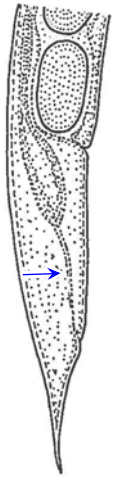
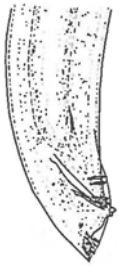
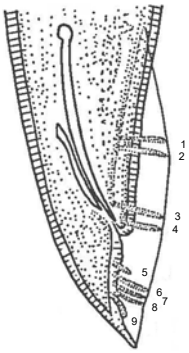


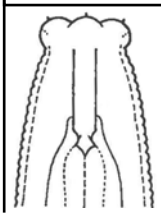
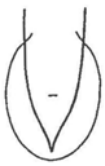
Anterior end	Tail	Spicules	Bursa
			

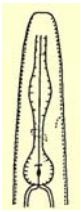





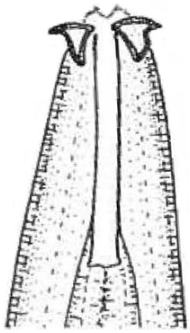
Cruznema Artigas, 1927

- L = 0.6 – 2.2 mm
- Cuticle annulated
- 6 separated lips with fine setose papillae; labial region offset
- Stoma well developed; 3 conspicuous teeth on each metarhabdion; stoma encircled by musculature at its base only
- V = 80-90%
- 1 anterior ovary; no posterior uterine sac
- Rectum much longer than anal body width
- Female tail conical, male tail short; c' = 1.5 - 4; tip tail pointed
- Male bursa peloderan, anteriorly open, with 9 pairs papillae: 2 pairs precloacal (2 / 2+5)
- Spicules free (= separate)
- Soil, decaying matter, peat-bogs, fresh water
- Feeding: bacteria
- c-p = 1

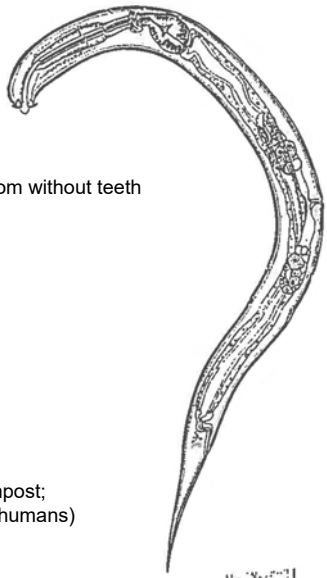




Anterior end	Tail	Spicules	Bursa
			

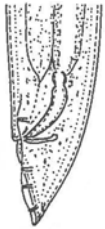


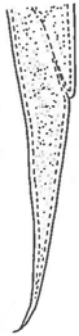


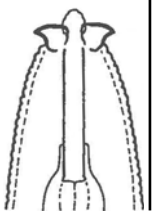
Diploscapter Cobb, 1913

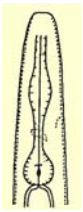


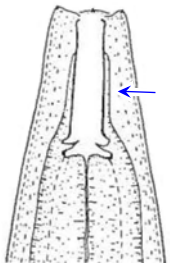
- L = 0.3 – 0.5 mm (rarely up to 1.1 mm)
- Cuticle annulated or almost smooth
- Dorsal and ventral lips transformed into sclerotized hooks
- Stoma tubular encircled by musculature at its base only; metastom without teeth
- V = 48-85%
- 2 ovaries
- Males very rare
- Bursa: open peloderan with narrow velum;
  6-9 pairs papillae (first 2-3 are precloacal)
- Female tail elongate, male tail short; c' = 1.5 - 10
- Soil, decaying matter, polluted fresh water, sewage, faeces, compost;
  facultative intestinal parasite of insect and vertebrates (rarely in humans)
- Feeding: bacteria
- c-p = 1

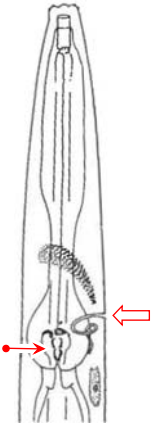




Anterior end	Bursa
	

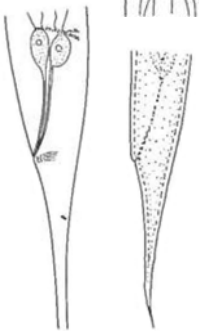


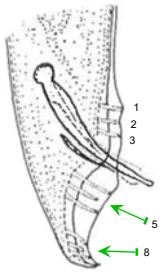


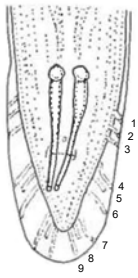


Oscheius Andrássy, 1976

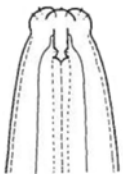
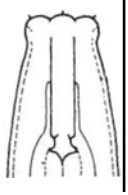
- L = 0.3 – 3 mm
- Stoma encircled by musculature > 50%
- Oesophageal bulb with duplex haustrulum
- Cervical duct conspicuous, looped, cuticularized
- V = 45-56%
- 2 ovaries
- Rectum long (>1.5 times anal body diameter)
- Male bursa pseudopeloderan with 9 pairs papillae (3 are pre-cloacal); papillae 5 and 8 terminating on dorsal side of the velum
- Female tail conical; c' = 3 – 5
- Soil, rotting wood, moors, fresh water; juveniles are insect parasites
- Feeding: bacteria
- c-p = 1

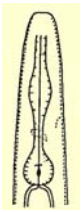


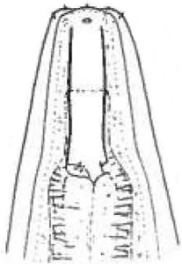


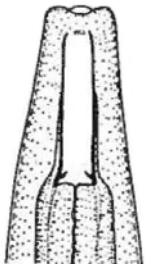


According to Andrássy (2005), the freshwater species [of *Oscheius*] with peloderan (not leptoderan) bursa and spicules with distal simple (not hooked) tips, must be placed in *Dolichorhabditis* Andrássy, 1983.

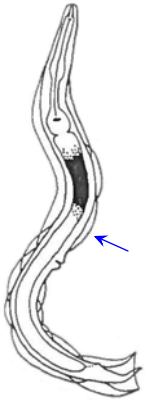
Anterior region	Anterior end	Tail	Spicules	B. peloderan	B. leptoderan
					



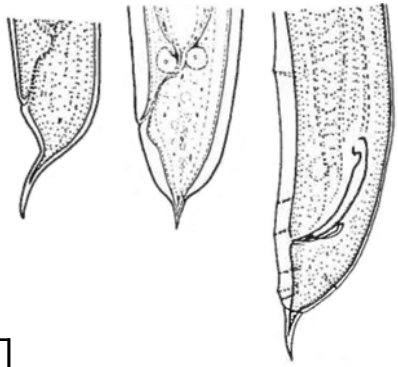


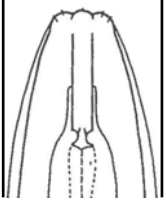
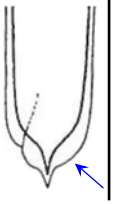
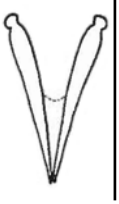


Cuticularia Van der Linde, 1938

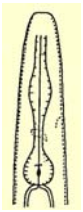


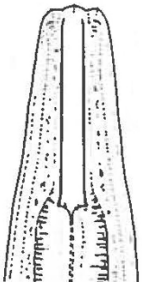
- L = 0.4 – 1.3 mm
- Body plump (a = 14-25)
- Cuticle very loose, often detached from body
- V = 52-61%
- 2 ovaries
- Male bursa almost not visible, leptoderan, with 7-9 pairs papillae (2-3 precloacal, the anteriormost far before spicules)
- Spicules separate
- Female tail short, cupola-shaped
- Soil, compost, sewer, very polluted fresh water
- Feeding: bacteria
- c-p = 1

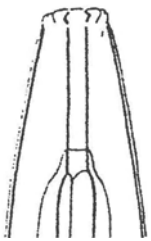


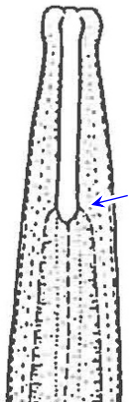
Anterior end	Tail lateral	Tail frontal	Spicules
			

Species of this genus are subsumed, by some authors, into *Poikilolaimus* Fuchs, 1930.



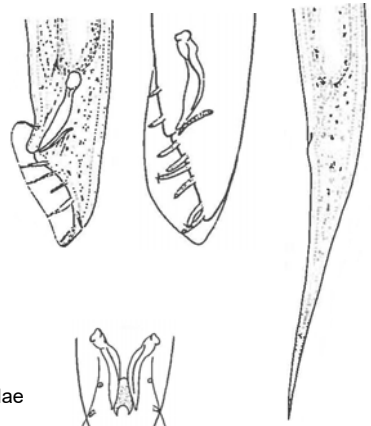


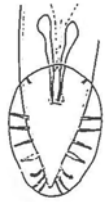


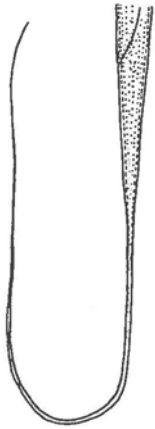


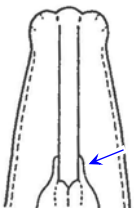
Protorhabditis Osche, 1952

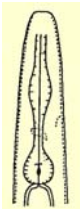
- L = 0.3 – 1.0 mm
- Cuticle very finely annulated
- Stoma narrow, 2-4 times long as the head width; not encircled by musculature;
- Cheilostom sclerotized
- Oesophageal basal bulb with doubled haustrulum
- V about 50%
- 2 ovaries
- Spicules separate
- Male bursa peloderan, anteriorly open, with 7-9 pairs papillae
- Female tail conical; male tail shorter; c' = 1.5 - 14
- Soil, decaying matter, fresh water
- Feeding: bacteria
- c-p = 1

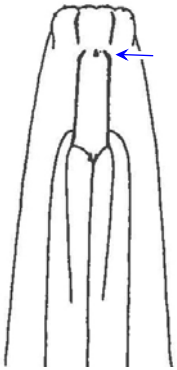






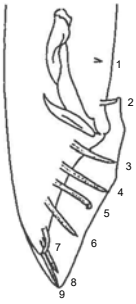
Anterior end	Tail	Spicules
		

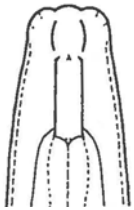
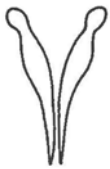


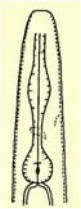


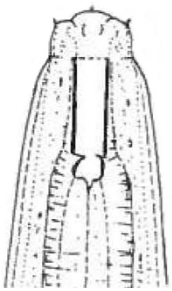
Prodontorhabditis Timm, 1961

- L = 0.3 – 1 mm
- Lips not distinct
- Stoma with cuticularized cheilostom; 3 denticles in anterior buccal tube; stoma not encircled by musculature
- 2 ovaries (dorsally flexed)
- V about 50%
- Male bursa peloderan; 9 pairs papillae (1+1 / 7); papillae 5° and 7° open dorsally on the velum
- Female tail filiform (c' = 6 – 20);
- Soil, fresh water
- Feeding: bacteria
- c-p = 1

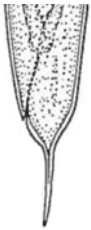


Anterior end	Tail	Spicules
		

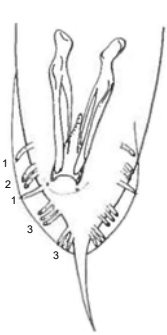


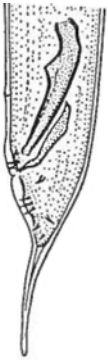


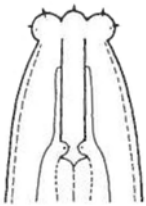
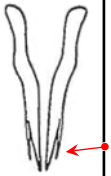
Curviditis Dougherty, 1953

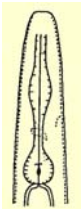


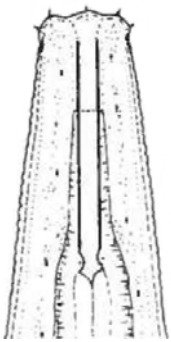
- L = 0.8 – 2.0 mm
- Stoma: most encircled by thin musculature
- V = 53-64%
- 2 ovaries
- Male bursa narrow, with 10 pairs papillae (3 precloacal)
- Spicules separate, each with a long dorsal spine
- Female tail cupola-shaped with short tip; c' = 1.5 – 3.0
- Soil, rotting wood, fresh water
- Feeding: bacteria
- c-p = 1

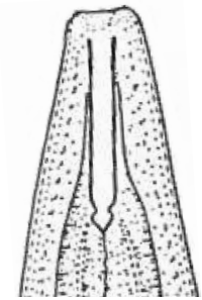




Anterior end	Tail	Bursa	Spicules
			

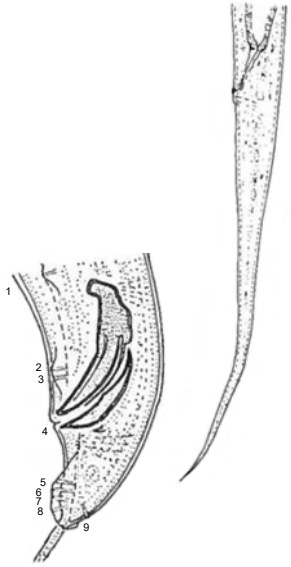


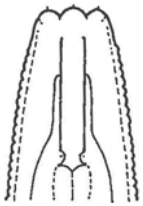




Rhabditella Cobb, 1929

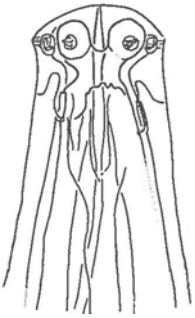
- L = 0.5 – 2.9 mm
- Buccal tube long: more than a half encircled by musculature
- V = 38-50%
- 2 ovaries; their reflexed tips reach the vulva level
- Male bursa reduced, leptoderan, with 9-10 pairs papillae, 3 pairs of them precloacal (1+2 / 1+x),
- papillae 1, 4, 9 placed laterally
- Spicules separate, 30-50 µm; with long dorsal spines
- Tail long, often filiform (c' = 6 – 18)
- Soil, decaying matter, dung, polluted fresh water
- Feeding: bacteria
- c-p = 1

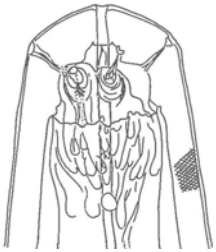


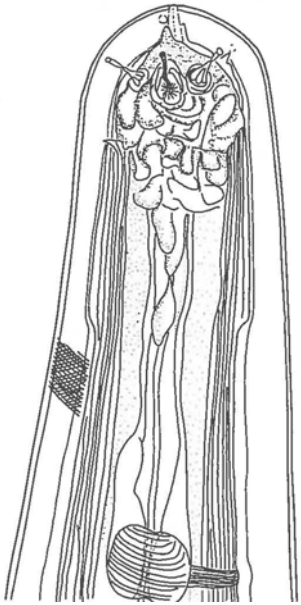
Anterior end	Tail	Bursa	Spicules
			

Other oesophagus type

MERMITHIDAE

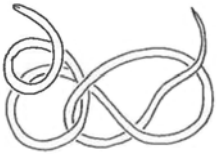


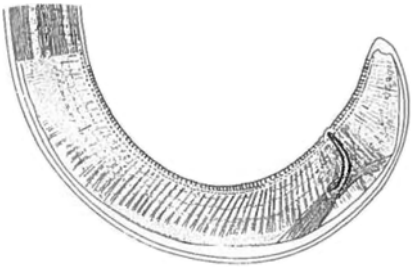




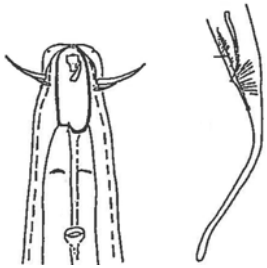
MERMITHIDAE Braun, 1883

- L = 5 – 50 cm (usually 1-10 cm)
- Cuticle smooth or with criss-cross fiber
- Stoma not functional
- Oesophagus a slender tube closed in its posterior part
- Intestine modified to a cellular or syncytial sac
- Vagina muscular
- Spicules short to very long
- No functional anus
- Life stage parasitic in terrestrial or freshwater arthropods
- Soil (also deep soil), on wet grass, fresh water
- Feeding: juveniles parasite, then no more food ingestion

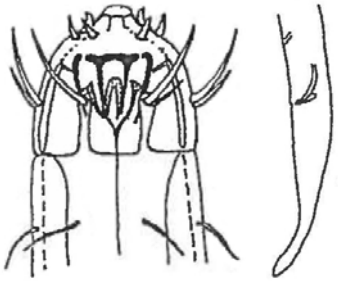




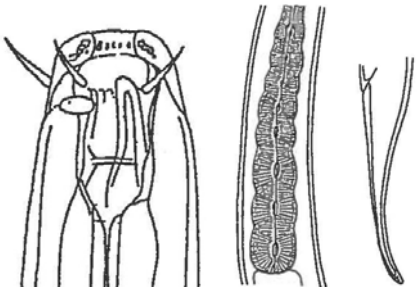
Marine and brackish water genera rarely found in continental waters



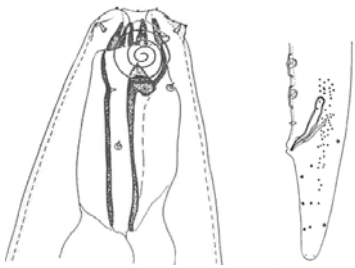
Anoplostoma Bűtschli, 1874
Ord. Enoplida
Fam. Anoplostomatidae



Mesacanthion Filipjev, 1927
Ord. Enoplida
Fam. Thoracostomopsidae

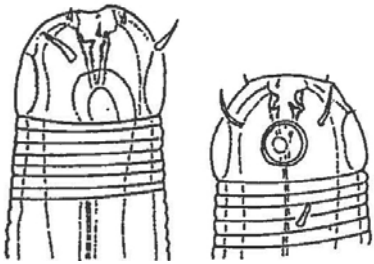


Polygastrophora de Man, 1922
Ord. Enoplida
Fam. Enchelidiidae

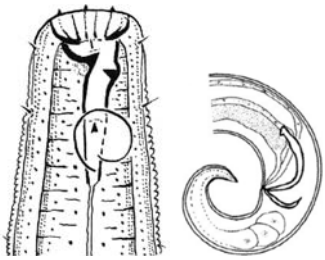


Gomphionema Wieser & Hopper, 1966
Ord. Chromadorida
Fam. Ethmolaimidae

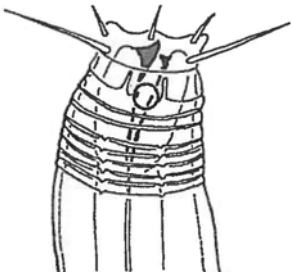
Desmodorella Cobb, 1933
Ord. Desmodorida
Fam. Desmodoridae



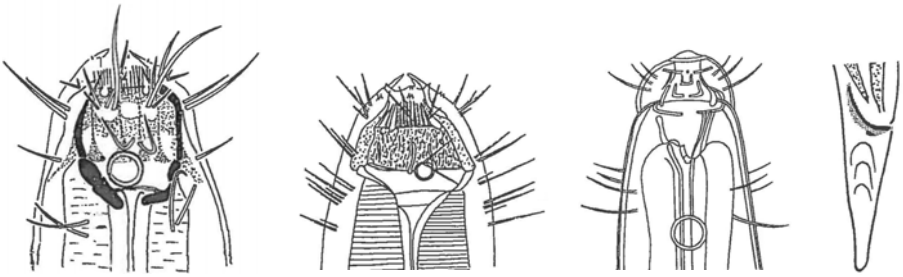
Sibayinema Swart & Heyns, 1991
Ord. Desmodorida
Fam. Desmodoridae



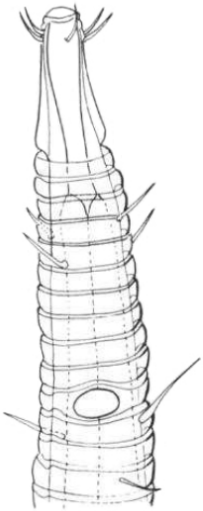
Bolbolaimus Cobb, 1920
Ord. Desmodorida
Fam. Microlaimidae



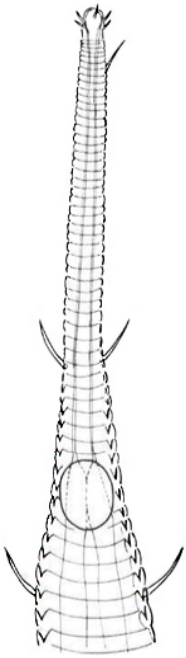
Nudora Cobb, 1920
Ord. Desmodorida
Fam. Monoposthiidae



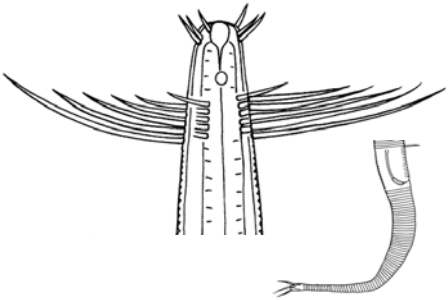
Sphaerolaimus Bastian, 1965
Ord. Monhysterida
Fam. Sphaerolaimidae



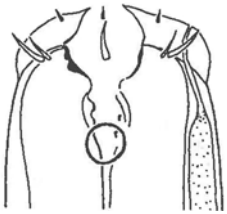
Prorhynchonema Gourbault, 1982
Ord. Monhysterida
Fam. Xyalidae



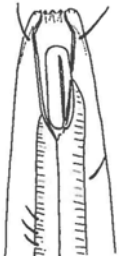
Rhynchonema Cobb, 1920
Ord. Monhysterida
Fam. Xyalidae



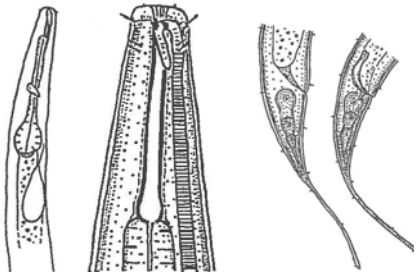
Pseudosteineria Wieser, 1956
Ord. Monhysterida
Fam. Xyalidae



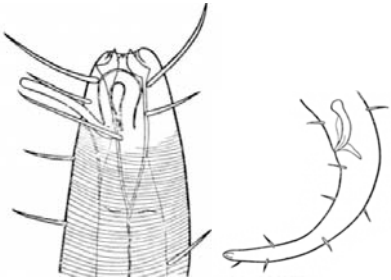
Gammarinema Kinne & Gerlach, 1953
Ord. Monhysterida
Fam. Monhysteridae



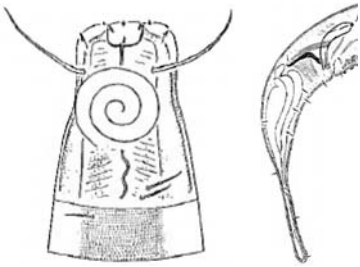
Axonolaimus de Man, 1889
Ord. Araeolaimida
Fam. Axonolaimidae



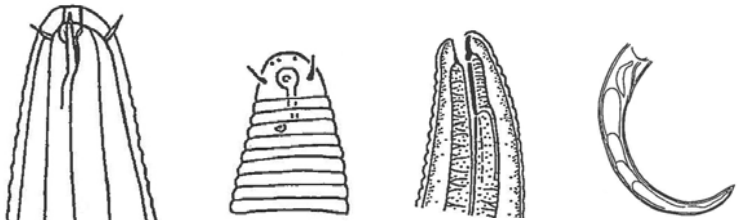
Pseudolella Cobb, 1920
Ord. Araeolaimida
Fam. Axonolaimidae



Odontophoroides
Boucher & Helléouët, 1977
Ord. Araeolaimida
Fam. Axonolaimidae



Sabatieria Rouville, 1903
Ord. Araeolaimida
Fam. Comesomatidae



Camacolaimus de Man, 1889
Ord. Plectida
Fam. Camacolaimidae

GLOSSARIO ETIMOLOGICO

a- = without
acantho = thorn
acro = high, pointed
actino = radial in form
afro = African
allo = different
amphi = both, paired
amphid = double [disk]
ana = up, new
angui = eel
Andrássy I. = nematologist
annulus = ring
aphano = not evident
aporce = without quiver [in stoma]
aqua = water
Ather H. Siddiqi = biologist
aulos = tube
ax = axis, axial
Basir M.A. = biologist
Bastian H.C. = nematologist
belos = arrow
boreo = northern
brevi = short
bucca = mouth
bursa = bag, purse
Butler E.J. = nematologist
caeno = new, recent, surprising
calo = beautiful
Capri(vi) = locality in Namibia
cauda = tail
cephalo = head
cerato = horn [cephalic setae]
chilo/cheilo = lip, pincers
chist/kist = box
chroma = colour, pigment
chronos = (hand of) clock
chryso = gold
Clark W.C. = nematologist
clavi = club
Cobb N.A. = nematologist
Coomans A. = nematologist
croco = yellow
cruz (from: Santa Cruz, Brazil)
crypto = hidden
curvi = curved, bent
cuticula = [for loose] cuticle
cyatho = calyx, goblet
delus = evident, visible
dera = skin
desmo = bond, fastening
diplo = double
dirus = fearful
Do. Morgan = biologist
dolicho = long
dora = skin
dory = spear, weapon
-ellus/-ella = [diminutive]
drepan = scythe
emi = half
encho = spear, lance
epacro = sharpened
epi = up, higher
ethmo = sieve
eu = proper, good
eury = wide
falci = sickle
fictor = molder, sculptor
Funaria = genus of moss
Gammarus = genus of crustacean
gaster = gut [oesophagus]
genus = (pure) race
geo = earth, soil
glossa = tongue
gran = grain
Goffart H. = nematologist
gymno = naked
hal = salt, salty
hasta = pole, spear
hemi = half
hemicycliophora = semicircular [spicules]
hetero = different
Hirschmann H. = nematologist
hyster = uterus, womb
idio = proper
iron/eiron = dissembler [dead-like]
Jensen H.J. = nematologist
ioto = (similar to) letter iota
kino = movement [of anterior end]
Koerner H. = nematologist
Kurikani = ancient Siberian people
kyklos = circle (see spicular form)
labro = lip
laimus = mouth, throat
Lamu = ancient name of Baikal

Lanzavecchia G. = biologist
Lindsey A.A. = ecologist
lepto = thin
lobus = lobe
Malakhov V.V =nematologist
macro = large
meso = middle, intermediate
meta = beyond [different]
micro = very small
mic(u) = a Hungarian pet name
mon/mono = one, single
mylos = molar tooth
nema = thread
nematode/nematoides = tread-like
neo = new
nothus = mongrel
nyg = pricking
odonto = tooth
-oides = similar to
oigo = open
onchulus = small tooth
onchus = hook, tooth
oplo = armed
Osche G. = nematologist
oxy = acute, sharp
panagro = net
para = near, similar
pelo = mud
phano = evident
phoro = bearer
plect = twisted [excretory canal]
poikilo = variegated
poly = many, plural
porce = quiver [odontostyle ring]
pri = a saw
prismato = prismatic
pro = anterior
pro/proto = ancient, primitive
pseudo = false, fake
psil = stripped [for knobless spear]
punctum = point, spot
pyl = entrance, orifice
quasi =almost, nearly
rhabdo = rod, stick
Roger Greene = biologist
sacrimari = holy sea [Baikal]
scapter = hoe
schisto = split
scler = hard, solid
scolex = worm
semi = half, quasi
setsal = *Se*myon *Tsal*olikhin (nematologist)
sina = China
spilo = curved shape
stego = covered
steno = thin, narrow
stichos = line [tooth]
stoma = mouth
sub = under
telo = terminal
terato = monstre, marvellous
Terschelling = Duch island
thalasso = sea
theristus = reaper [for spicular shape]
thonus = anagram of nothus
Thorne G. = nematologist
tobrilus = anagram of trilobus
trident = with 3 teeth
trilobus = 3 lobes [cardiac glands]
tris = three
tyl = hump, knob [of the spear]
-ulus/-ula = [diminutive]
udos = hydos = water
viscos = sticky [the cuticle]

BIBLIOGRAFIA

Per l'**identificazione dei nematodi**, almeno a livello di genere, sono consigliati i seguenti testi.

ANDRÁSSY I. (1984): *Klasse Nematoda*. G. Fischer, Stuttgart. 509 pp.
Chiavi dicotomiche, fino alla specie, dei nematodi (del suolo e d'acqua dolce), appartenenti agli ordini Monhysterida, Desmoscolecida, Araeolaimida, Chromadorida e Rhabditida. Disegni schematici per ciascun genere.

ANDRÁSSY I. (2005): *Free-living nematodes of Hungary. Vol. I.* Hungarian Natural History Museum, Budapest. 518 pp.
Tratta i seguenti ordini: Monhysterida, Desmoscolecida, Araeolaimida, Chromadorida, Rhabditida. Opera utilissima perché, anche se non riporta tutte le specie europee, descrive le più comuni. Non descrive i generi non reperiti in Ungheria.

ANDRÁSSY I. (2007): *Free-living nematodes of Hungary. Vol. II.* Hungarian Natural History Museum, Budapest. 496 pp.

Tratta i seguenti ordini: Aphelenchida, Tylenchida, Enoplida, Trefusiida. Opera utilissima perché, anche se non riporta tutte le specie europee, descrive le più comuni. Inoltre descrive tutti i generi europei.

ANDRÁSSY I. (2009): *Free-living nematodes of Hungary. Vol. III.* Hungarian Natural History Museum, Budapest. 608 pp.
Tratta la sottoclasse Dorylaimia. Opera utilissima perché, anche se non riporta tutte le specie europee, descrive le più comuni. Inoltre descrive tutti i generi europei.

BONGERS T. (1988): *De Nematoden van Nederland*. Stichting Uitgeverij Koninklije Nederlandse Natuurhistorische Vereniging, nr.46, Utrecht, pp.408.
È il testo migliore per l'identificazione dei nematodi del suolo e d'acqua dolce. È scritto in olandese, ma tutte le specie sono illustrate con misure, disegni molto schematici e a volte anche con foto. Comprende pressoché tutte le specie trovate in Olanda e perciò circa l'80-90% delle specie europee e praticamente tutte le famiglie e i generi trovati in Europa fino ad allora.

GOODEY J.B. (1963): *Soil and freshwater nematodes*. Methuen & Co., London. 544 pp.
Rassegna (illustrata) dei generi fino ad allora conosciuti.

LOOF P. (1999): *Nematoda, Adenophorea (Dorylaimida)*. Spektrum G. Fisher, Heidelberg, 264 pp.
Serve per il riconoscimento dei generi e delle specie dei Dorylaimida d'acqua dolce centro-europei, molti dei quali presenti anche nel suolo.

TARJAN A.C. *et al.*: *Interactive diagnostic key to plant parasitic, freeliving and predacious nematodes*. http://nematode.unl.edu/key/nemakey.htm
Chiave dicotomica illustrata interattiva reperibile gratuitamente in Internet.

ZULLINI A. (1982): *Nematodi (Nematoda), Guide per il riconoscimento delle specie animali delle acque interne italiane*, CNR AQ/1/190 n.17, 117 pp.
Testo per l'identificazione delle specie dei più comuni nematodi d'acqua dolce italiani (alcuni dei quali vivono anche nel suolo).

Per lo studio della **morfologia e dell'ecologia dei nematodi d'acqua dolce** si consigliano i seguenti testi:

BONGERS T. & BONGERS M. (1998): Functional diversity of nematodes. *Applied Soil Ecology*, **10**: 239-251.

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TRAUNSPURGER W. (ed.) (2021): Ecology of freshwater nematodes, CABI Publ., Wallingford, UK, 384 pp.

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Hellawell J.M., 1986. *Biological indicators of freshwater pollution and environmental management*. Elsevier Applied Science Publishers, London and New York, 546 pp.

Pulliam H.R., 1996. Sources and sinks: empirical evidence and population consequences. In: Rhodes O.E., Chesser R.K., Smith M.H. (eds.), *Population dynamics in ecological space and time*. The University of Chicago Press, Chicago: 45-69.

Corbetta F., Pirone G., (1986-1987) 1988. I fiumi d'Abruzzo: aspetti della vegetazione. In: Atti Conv. Scient. *"I corsi d'acqua minori dell'Italia appenninica. Aspetti ecologici e gestionali"*, Aulla (MS), 22-24 giugno 1987. Boll. Mus. St. Nat. Lunigiana 6-7: 95-98.

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Manuale di identificazione al genere e metodi di raccolta