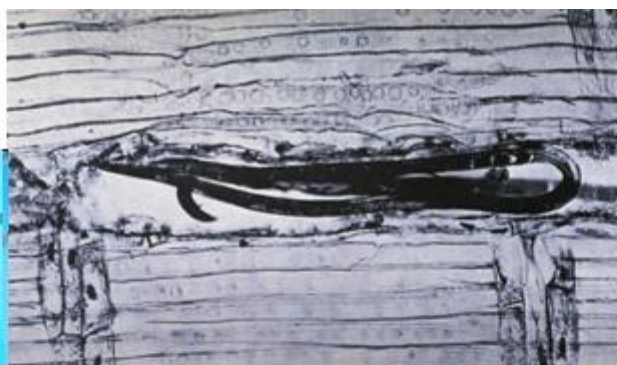


Diagnostic Protocols for Regulated Pests

Pictorial Glossary of Morphological Terms in Nematology



Broken cyst with eggs of  
*G. pallida*.  
Plant Protection Service,  
NL



*B. xylophilus* in an  
axial resin canal of  
*Pinus densiflora*  
Y. Mamiya, Japan



*Meloidogyne enterolobii* on cucumber roots.  
Courtesy: Dr Sebastian Kiewnick, Agroscope Changins-  
Wädenswil Research Station (CH)



Cysts of *Globodera rostochiensis*.  
FERA, York (GB) - British Crown

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OEPP/EPPO  
21 boulevard Richard Lenoir  
F-75011 Paris

## Diagnostic Protocols for Regulated Pests

### Pictorial Glossary of Morphological Terms in Nematology

*Comment: This document lists all the nematological terms used in all the EPPO diagnostic protocols on plant-parasitic nematodes, and should finally have definitions for each term.*

A	
<b>Adanal</b>	Situated in the proximity of the anus.
<b>Ambifenestrate</b>	Form of fenestra in the genus <i>Heterodera</i> where the vulval bridge is slender and the semifenestrae are flattened next to the bridge (Fig. 15 + Fig. 3 in PM 7/89). See Bifenestrate, Circumfenestrate, Semifenestrate.
<b>Amphid</b> (pl. amphids)	Paired lateral chemoreceptors which generally open to the exterior on or near the lip region (Fig. 5).
<b>Amphidelphic</b>	Having two ovaries of similar length, generally one extending anteriorly and the other posteriorly of the vulva (Fig. 6). See Monodelphic, Prodelphic, Didelphic.
<b>Amphidial Aperture</b> (= Amphidial Opening)	The opening leading to the fovea of the amphid (Fig. 3).
<b>Anastomotic</b>	The condition where adjacent body striae are confluent.
<b>Annulate</b>	Comprising or furnished with rings (ringed).
<b>Annulations</b>	Transverse incisions which occur at regular intervals in the cuticle (Fig. 10).
<b>Annule</b> (pl annules)	The interval between the annulations (Fig. 10). See Annulations.
<b>Anterior</b>	In front. Before. The front position as opposed to the posterior.
<b>Anus</b>	The extremity of the rectum. The posterior opening of the alimentary canal (Fig. 13, 14, 19).
<b>Apex</b> (pl. apices) (= condylus).	A dorsal continuation of the Aphelenchoid spicule base. The tip (Fig. 12).
<b>Appendage</b>	An external organ or limb.
<b>Arch</b>	A structure or form usually curved. In perineal patterns of <i>Meloidogyne</i> females the curved formation of cuticular incisures dorsal to the phasmids (Fig. 19).
<b>Arcuate</b>	Curved like a bow. Arched.
<b>Areolation</b>	The extension of the transverse incisures of the body annuli into the lateral field (Fig. 10).
<b>Axial</b>	Belonging to, or around, in the direction of or along an axis.
B	
<b>Basal Bulb</b>	Muscular or glandular enlargement at the posterior of the pharynx (Fig. 2).
<b>Basal Knobs</b>	See Stylet Knobs.
<b>Basin</b>	See Vulval Basin.

<b>Bifenestrate</b>	Form of fenestra in the genus <i>Heterodera</i> where the vulval bridge is stout and divides the fenestra so that the semifenestrae appear to be two nearly separate holes (Fig. 17). See Ambifenestrate, Circumfenestrate, Semifenestrate.
<b>Bifurcate</b>	Divided into two branches. Forked.
<b>Bipartite</b>	Having two distinct parts.
<b>Blunt</b>	Rounded.
<b>Body</b>	The nematode frame with its organs. The important and largest part of an organ, as the body of the spicule.
<b>Bulb</b>	See Basal bulb.
<b>Bulla</b> (pl. bullae)	Lump like projections at the base of the cone of some <i>Heterodera</i> species which are the remains of the vagina and musculature. (Fig. 16).
<b>Bursa</b> (pl. bursae) (= Caudal Alae)	Winglike extensions of the lateral cuticle of the male (Fig. 11).
<b>C</b>	
<b>Canalis</b>	Tube or duct.
<b>Cardia</b>	See Pharyngeal-intestinal valve.
<b>Caudal Alae</b>	See Bursa.
<b>Caudal</b>	Belonging to, or like, a tail. Situated on or near the tail.
<b>Caudal Papillae</b>	Papillae located on the tail.
<b>Central Valve Plates</b>	See Metacorpus Plates.
<b>Cephalated</b>	Possessing a head or head-like structure.
<b>Cephalic Framework</b>	A rigid supporting (sclerotised) structure that provides form to the head and axially acts as a stylet guide (Fig. 1, 4) and serving as attachment of stylet protractor muscles.
<b>Cephalic Papillae</b>	See Labial Papillae.
<b>Cephalic Region</b>	The lip region with the cephalic framework.
<b>Cervical</b>	Pertaining to, belonging to or situated in, on or near the neck.
<b>Cheilostome</b>	Lip cavity that in derived conditions can extend further posteriorly, as in the Longidoridae, where the cheilostome represents the stoma <i>sensu stricto</i> , and extends from the oral aperture to the guiding ring (Fig. 7).
<b>Circumfenestrate</b>	Form of fenestra in the genera <i>Globodera</i> , <i>Cactodera</i> and <i>Punctodera</i> , where the vulva is lost when fenestration occurs by the breakdown of the thin cyst wall around the vulva leaving a circular hatching pore (Fig. 17). See Ambifenestrate, Bifenestrate, Semifenestrate.
<b>Circum-Oesophageal</b>	See Circum-Pharyngeal.
<b>Circum-Pharyngeal</b>	About or surrounding the pharynx.
<b>Cloaca</b>	In the male a common chamber lined with cuticle which receives the products of the intestinal and reproductive tracts and empties to the exterior via the anus (Fig. 11).
<b>Coarse</b>	Rough, unrefined. Not a fine surface or texture.

<b>Compensation sacs</b>	Sacs formed from hydrostatic tissue, within the inner cuticular stomatal lining, used to regulate pressure on stylet protraction.
<b>Concave</b>	Incurved, as the inner surface of a curved surface or line.
<b>Condylus</b>	See Apex
<b>Cone</b>	Shape of a body having a circle for its base and terminating in an apex. The posterior region of a female cyst of the genus <i>Heterodera</i> (Fig. 16).
<b>Conoid</b>	Shape of a cone, e.g. both sides of the tail surface tapering at an equal angle to the tail tip.
<b>Constriction</b>	Often used to describe the junction of the head and the cervical region when delimited by a pronounced groove (Fig. 4) but the term may be used for other morphological features as well.
<b>Continuous</b>	Going on or extending without interruption or break. Unbroken (Fig. 4).
<b>Conus</b>	The hollow, anterior part of the stylet.
<b>Convex</b>	A surface or line curved or rounded as the exterior of a sphere or circular form.
<b>Corpus</b>	See Metacarpus, Procorpus.
<b>Crenate</b>	Having a margin formed of rounded scallops. Furrowed.
<b>Crescent</b>	Sickle shaped, like the new moon with convex and concave edges.
<b>Crescentic Plate</b>	See Metacarpus plates.
<b>Cucullus</b>	Dislike projection at the distal end of the spicula (Fig. 12).
<b>Curved</b>	Curving line or surface. Bend.
<b>Cuticle</b>	The noncellular external covering of the nematode and apparently connective tissue of the hypodermis. The cuticle lines the natural openings of the body e.g. the oral cavity, the anal aperture, the vulva, the vagina, the lumen of the pharynx, the rectum, the cervical pore and the cuticular ampulla of the cervical pore.
<b>Cuticular Ridges</b>	Raised lines on the surface of cysts (Fig. 4 in PM 7/40 (2)).
<b>Cyst</b>	At maturity the female body wall of some nematode genera such as <i>Globodera</i> and <i>Heterodera</i> thickens, becomes resistant to decay and turns brown as the female dies resulting in a protective shelter for the eggs (Fig. 16).
<b>D</b>	
<b>Deirids</b>	Lateral sense organs at the level of the nerve ring.
<b>Delicate</b>	Characteristically slight or thin.
<b>Demarcation</b>	Marked by bounds. Delimited. A separation.
<b>Desiccation</b>	The process of drying up.
<b>Didelphic</b>	Having two gonads (Fig. 8). See Amphidelphic, Monodelphic, Prodelphic.
<b>Digitate</b>	Fingerlike in shape or divided into fingerlike processes.

<b>Dimorphism</b>	Individuals of the same species occur in two distinct forms e.g. vermiform male and swollen female of <i>Globodera</i> , <i>Heterodera</i> or <i>Meloidogyne</i> .
<b>D-Layer</b>	Extra layer of collagen fibrils on the cyst wall cuticle. Arced pattern oriented as helicots (helicoidal layer). Present in <i>Globodera</i> , absent in <i>Heterodera</i> .
<b>Distal</b>	Remote from the point of origin or attachment. See proximal.
<b>Dorsal Gland Orifice (DGO) (= Dorsal Gland Opening or Dorsal Oesophageal Gland Opening, DOGO)</b>	The dorsal pharyngeal gland opening for Tylenchs and Aphelenchida (Fig. 1, 2).
<b>Dorsal</b>	On the back.
<b>Dorsolateral</b>	The position on the nematode body situated 30° laterally from the dorsomedian line and perpendicular to the anteroposterior axis. Subdorsal.
<b>Dorsoventral</b>	An imaginary line extending from the dorsal to ventral side. The dorsoventral axis. The median line.
<b>Double Flexure</b>	Bended two times, like the genital tract of nematodes in some genera (Fig. 8).
<b>E</b>	
<b>Ellipsoidal</b>	Elliptical. Oval.
<b>Elliptical</b>	Shaped like an ellipse. Oval.
<b>Elongate</b>	To lengthen. To extend
<b>Epiptygma (pl. epiptygmata)</b>	Fine cuticular outgrowths along the anterior and/or posterior vulval lips, which can be inwardly curved or outwardly projecting.
<b>Esophagus</b>	See Pharynx.
<b>Excretory Pore</b>	The ventral opening of the secretory-excretory system in the cuticle by which secretions and the waste products are emitted to the exterior (Fig. 1).
<b>Fenestra (pl. fenestrae)</b>	See Vulval Fenestra.
<b>F</b>	
<b>Filiform</b>	Having the shape or thread of a filament.
<b>Flange</b>	A rib, rim or expansion developed for strength, guiding or attachment to another part or organ; e.g. basal flanges of the odontophore in the genus <i>Xiphinema</i> (Fig. 5).
<b>Flex</b>	To bend, curve.
<b>Fovea</b>	Area immediately behind the amphidial aperture; maybe any shape from a slit to a wide oval.
<b>G</b>	
<b>Gland</b>	An organ or group of cells that produces secretions.
<b>Glandularium</b>	Distance between DN and pharyngeal-intestinal junction.
<b>Globose</b>	Being spherical or rounded.

<b>Gonad</b>	Part of the reproductive system that produces eggs or sperms. Gonads in females are ovaries and in males are testes (Fig. 8).
<b>Gonoduct</b>	The tube leading from the gonads to the exterior through which eggs or sperms pass. The gonoduct may consist of an oviduct, one or more sphincters, spermatheca, crustaformeria, uterus and post vulval sac (Fig. 9).
<b>Granek's Ratio</b>	The distance from the anus to the nearest edge of the vulval basin, divided by vulval basin diameter (Fig. 7 in PM 7/40 (2)).
<b>Gubernaculum</b>	In male nematodes a grooved cuticularized structure, sometimes paired, which guides the spiculum and is formed by sclerotization of the dorsal wall of the spicular pouch, sometimes indistinct or absent (Fig. 10).
<b>Guide Ring</b>	The guiding ring of the stylet (Fig. 5).
<b>Guiding Apparatus</b>	The stomatal lining at the stylet cone region; folded tube between guide ring and odontophore; seem to be homologous with guide rings (Fig. 5).
<b>H</b>	
<b>Head</b>	See Lip Region.
<b>Hemispherical</b>	Half of a sphere or globe.
<b>Hemizonid</b>	A nerve commissure of highly refractive nature, generally biconvex in longitudinal section and which extends ventrally from lateral cord to lateral cord (Fig. 1, 5).
<b>Hiatus</b>	A gap, passage or discontinuity.
<b>Hyaline</b>	Clear. Transparent. Without colour. See Hyaline Part.
<b>Hyaline Part</b>	Thick cuticle at tail end (Fig. 13).
<b>Hypodermal chord</b>	Dorsal, ventral or lateral longitudinal thickenings of the hypodermis, generally internal.
<b>I</b>	
<b>Incisures</b>	The longitudinal cuticular clefts which divide the lateral field (Fig. 10). See Lateral Field.
<b>Intestine (=Gut)</b>	A simple tube composed of a single layer of epithelial cells in which digestion of food takes place (Fig. 1, 11).
<b>Isthmus</b>	The segment between the median bulb and basal bulb of the pharynx where the nerve ring is located (Fig. 2).
<b>J</b>	
<b>Juvenile</b>	Any immature nematode. Not to confuse with larva (pl. larvae). The latter undergo metamorphosis during development like insects.
<b>K</b>	
<b>Knobs</b>	See Stylet Knobs.
<b>L</b>	
<b>Labial Disc</b>	The more or less circular form of cuticle about the oral opening and delimited posteriorly by the first transverse striation; sometimes fused with submedial lip sectors (Fig. 3).
<b>Labial Papillae</b>	Papillae located on the lips. Sensilla often end in papillae (Fig. 3). See Papilla



<b>Labial Region</b>	see Lip Region.
<b>Labial Sensilla;</b>	Mechano- and/or chemoreceptors in the lip region.
<b>Larva</b> (pl. larvae)	See Juvenile.
<b>Lateral Field</b>	A form of cuticular ridge above the lateral cords often with longitudinal incisures (Fig. 10).
<b>Lateral Lines</b>	Longitudinal incisures within the lateral field (Fig. 19).
<b>Limbs</b>	Within Aphelenchoides the central part of spicular region, usually curved, dorsal and ventral limb
<b>Lip Region</b>	The cuticular area from the basal ring forward. The lip region can be continuous with the body contour or more or less offset from the rest of the body by a constriction, or be broader than the adjoining body and therefore expanded (Fig. 3).
<b>Lobe</b>	A generally rounded part of projection of a part or organ separated from neighbouring parts by fissures or constrictions.
<b>Longitudinal Striation</b>	In the cuticle grooves, ridges or incisures parallel to the longitudinal axis, but outside the lateral field.
<b>M</b>	
<b>Median</b>	A midway point in position. Situated in the middle position. A plane of division dividing a bilateral organism into right and left halves.
<b>Median Bulb</b>	See Metacarpus.
<b>Metacarpus</b>	The posterior subdivision of the corpus taking an ovate form and being preceded by a cylindrical anterior segment (Fig. 2). See Procorpus.
<b>Metacarpus Plates</b>	A refractive structure situated in the median bulb and probably functions as a valve during feeding (Fig. 1).
<b>Monodelphic</b>	Having one ovary (Fig. 7). See Amphidelphic, Didelphic, Prodelphic.
<b>Monoprodelphic</b>	Having one ovary directed to the head region.
<b>Morphology</b>	The study of form and structure of organisms.
<b>Morphometry</b>	Measurement of shape.
<b>Mucro</b>	A fine pointed structure at the end of the tail (Fig. 15).
<b>Mural tooth</b>	A tooth attached to, or derived from the stomatal wall (Fig. 6).
<b>N</b>	
<b>Neck</b>	That portion of the nematode body from the base of the lips to the base of the pharynx.
<b>Nerve Ring</b>	A belt, broad and flat in slender nematodes but narrow in forms with a large pharynx, containing cell bodies of neurons distributed around it. The nerve ring represents the dorsal and ventral connections between the lateral ganglia (Fig. 1, 2).
<b>Notch</b>	A concave or V-shaped cut or indentation. Observed e.g. at the tail end of some <i>Hirschmanniella</i> species.
<b>O</b>	
<b>Obese</b>	Very fat, corpulent.

<b>Odontophore</b>	Supporting structure of the odontostyle in Longidorids and other Dorylaimids, formed by a modification of the anterior pharyngeal region (Fig. 5).
<b>Odontostyle</b>	Hollow protrusible anterior part of a dorylaimid stylet with a dorsal opening and supported by the odontophore (Fig. 5).
<b>Onchiostyle</b>	The protrusible tooth of nematodes in the family Trichodoridae
<b>Oesophageal Bulb</b>	See Basal Bulb.
<b>Oesophageal Glands</b>	See Pharyngeal Glands.
<b>Oesophageal Intestinal Valve</b>	See Pharyngo-Intestinal Valve.
<b>Oesophagus</b>	See Pharynx.
<b>Oral Aperture</b>	Mouth opening. The entrance into the stoma (Fig. 3).
<b>Orifice</b>	An aperture. Opening of a tube, duct, etc. See Dorsal Gland Orifice.
<b>Outstretched</b>	All segments of the reproductive tube are in a straight line.
<b>Ovejector</b>	Preferred spelling of Ovijector.
<b>Oviduct</b>	A tube which serves for the passage of eggs from the gonads to the uterus (Fig. 9). See Gonoduct.
<b>Ovijector</b>	Part of the female genital system between the end of the uterus and the vulva, modified to aid in the expulsion of the eggs.
<b>Ovoid</b>	Having a shape like an egg.
<b>P</b>	
<b>Papilla</b> (pl. papillae)	Minute elevations of the cuticle. Any small nipplelike projection or part. Often sensilla protrude from the cuticle via a terminal pore on top of a papilla (Fig. 3). See Caudal Papillae and Labial Papillae.
<b>Pars dilatata oviductus</b>	Wider part of the oviduct.
<b>Pars distalis vaginae</b>	Distal part of vagina.
<b>Pars proximalis vaginae</b>	Proximal part of vagina.
<b>Peloderan</b>	Bursa which envelopes the tail.
<b>Perineal Pattern</b>	Configurations on the cuticle surface of the perineum; they are transformations of the body annulations; specific designs are common to each species of <i>Meloidogyne</i> spp. and may facilitate identification (Fig. 19).
<b>Perineum</b>	The superficial region about the anus and vulva (Fig. 19)
<b>Pharyngeal Glands</b> (= Oesophageal Glands)	Elongated glands that release secretions in the pharynx. There are three in the Tylenchida (some hoplolaims have more than three nuclei, some anguinids have less than three nuclei). The Dorylaimida and Triplonchida have three or five (with three in the Longidoridae and Trichodoridae) (Fig. 1).
<b>Pharyngo-Intestinal Valve</b> (= Oesophago-Intestinal Valve, cardia)	A muscular structure at the base of the pharynx that opens into the intestine (Fig. 1).
<b>Pharynx</b> (= Oesophagus, Esophagus)	The muscular tube that leads from the stoma or stylet base to the intestine (Fig. 2).
<b>Pharyngostome</b>	Triradially symmetrical, specialised part of the pharynx. In plant-parasitic nematodes the pharyngostome possess a protrusible stylet



	or dorsal tooth. The protrusion of the onchiostyle in the Trichodoridae occurs upon contraction of the protractor muscles of the pharyngostome (Fig. 7).
<b>Phasmids</b>	The lateral caudal sensory organs connected with the lateral precaudal glands. Paired lateral chemoreceptor sensory organs at the anterior part of the nematode (Fig. 14, 19).
<b>Platelet reinforcements</b>	Plate-like thickenings along the lumen wall within the pharynx of some Dorylaimida.
<b>Pointed</b>	With a sharp terminus.
<b>Posterior</b>	On or toward the hind end of a body or part.
<b>Postmedian</b>	See Median.
<b>Post-Uterine Sac</b>	The postvulvar uterine branch.
<b>Post-Vulval Sac (Pvs)</b>	A rudimentary extension of the posterior uterus which often functions as a spermatheca.
<b>Process</b>	See Projection.
<b>Pre-cloacal supplements</b>	In males, organs of secretion and attachment ventromedian in position, derived of cuticle and functioning during copulation, placed anterior to the cloaca.
<b>Procorpus</b>	The anterior subdivision of the corpus taking a cylindrical form and generally being terminated by an oval or circular posterior segment (Fig. 2). See Metacorporus.
<b>Prodelphic</b>	Having one or two ovaries anterior to the vulva (Fig. 8). See Amphidelphic, Didelphic, Monodelphic.
<b>Projection</b>	A part that stands out. A prominence or prolongation of a surface. An outgrowth or extension.
<b>Prominent</b>	Standing out or projecting beyond a surface or line; conspicuous.
<b>Protrude</b>	To extend or project.
<b>Proximal</b>	Closest to a certain centre that has to be specified.
<b>Punctations</b>	Small pits or depressions on the surface of the cuticle; the shape is usually rounded but may vary (Fig. 19).
<b>R</b>	
<b>Rectum</b>	A narrow tube, flattened in dorsoventral direction and separated from the intestine by a sphincter muscle. It is derived as an invagination of the epidermis and is lined by a cuticularized intima. The hindgut (Fig. 11, 13).
<b>Reproductive System</b>	In females consists of an ovary (= gonad) and a gonoduct. It ends in a vagina and a vulva, and between the ovary and the gonoduct is a constriction, the oviduct. The gonoduct may show additional constrictions, separating e.g. the spermatheca from the uterus; the male reproductive system consists of a genital tube (testis, seminal vesicle, vas deferens) ending in the cloaca.
<b>Rosethorn-Shaped</b>	Shape of spicula as in aphelenchids.
<b>Rostrum (pl. rostra)</b>	A beaklike projection ventrated near the proximal end of the aphelenchid spicule, joining the dorsal and ventral spicular shafts (Fig. 12). A ventral process or projection.
<b>S</b>	

<b>Sagittate</b>	Having the shape of an arrowhead.
<b>Sclerotization</b>	A noncommittal term for hardened, dense, refractive parts of the nematode body.
<b>Semifenestrate</b>	A situation in some species of the genus <i>Heterodera</i> where the vulval bridge divides the fenestra into two parts (Fig. 17). See Ambifenestrate, Bifenestrate, Circumfenestrate.
<b>S-E pore</b>	See excretory pore
<b>Shaft</b>	Often present as the main body of the spicula, usually curved and often bearing a thin flange of cuticle termed the velum (Fig. 12). Also called the calomus. The term is also used for the posterior part of the stylet.
<b>Sinuate</b>	Having a serpentine, undulant or curving form.
<b>Skin</b>	The cuticle.
<b>Slim</b>	Slender. Small in girth in proportion to height or length.
<b>Sperm</b>	The matured and functional sex cell or gamete of the male which unites with the ovum (Fig. 9).
<b>Spermatheca</b>	The enlarged portion of the female reproductive system which functions as a reservoir in receiving and holding sperms from the male (Fig. 9).
<b>Spermatozoon</b> (pl. spermatozoa)	See Sperm.
<b>Spheroid</b>	A body that is almost but not quite a sphere.
<b>Sphincter muscle</b>	A ring-like muscle that contracts, constricts, or closes an orifice.
<b>Spicule</b> (pl. spicules)	Sclerotised structure forming part of the male copulatory system (Fig. 11, 13).
<b>Spine</b>	A firm sharp pointed projection generally of the cortical and matrix layer of the cuticle.
<b>Spiral</b>	Winding or circling about a central axis in a closing or broadening manner.
<b>Star-shaped</b>	Form of a star, e.g. mucro within <i>Aphelenchoides</i> . (Fig. 15 + Fig. Appendix I in PM 7/39).
<b>Stoma</b>	The mouth cavity. That segment of the digestive tract between the oral opening and the triradiate beginning of the pharynx including the oral aperture and the stoma walls.
<b>Stomodeum</b> (= Fore-intestine, Foregut)	The cuticle-lined anterior part of the alimentary tract and associated glands, formed by an invagination of the body wall, and composed of the lips, stoma <i>sensu lato</i> (as composed of the cheilostome and pharyngostome), pharynx and cardia (Fig. 7).
<b>Stout</b>	Fat; sturdy in body.
<b>Stria</b> (pl. striae)	An elongate depression or groove. A minute banding (Fig. 10, 19).
<b>Striation</b>	The arrangement of striae.
<b>Stylet</b>	A rather slender, hollow feeding structure; usually axial in the adult. In Tylenchida the stylet consists of an anterior cone with a posterior shaft and knobs (Fig. 2, 5).
<b>Stylet Knobs</b>	Three swellings at the posterior end of the stylet of Tylenchida.

<b>Subcrystalline Layer</b>	A waxy, translucent substance on the cysts of certain <i>Heterodera</i> spp. persisting only for a short time in the soil.
<b>Subcylindroid</b>	Term used to describe a structure, e.g. the tail, where the sides appear to run parallel for most of their length, and end with a hemispherical or subhemispherical tail tip.
<b>Submedian Cephalic Papillae</b>	See Labial Papillae.
<b>Submedian</b>	The position of the nematode body situated 45° from the dorsomedian or ventromedian line and perpendicular to the anteroposterior axis.
<b>T</b>	
<b>Tactoreceptors</b>	Sensory organs of touch.
<b>Tail Terminus</b>	The tail tip (Fig. 11).
<b>Tail</b>	The posterior portion of the nematode body delimited proximally by the anus and distally by the tail terminus (Fig. 13).
<b>Tandem</b>	A set of two or more things or objects arranged one behind another.
<b>Taper</b>	A gradual reduction in breadth of an elongate body.
<b>Thorn-Shaped</b>	An extended mucronate or pointed process like a rosethorne (e.g. spicule of <i>Aphelenchoides</i> ).
<b>Titilla</b> (pl. titillae)	Small projections on either side of the distal end of the gubernaculum (Fig. 12)
<b>Transverse Striation</b>	Circular grooves in the nematode cuticle whose plane is perpendicular to the longitudinal axis.
<b>Truncate</b>	Having a squared terminus.
<b>Tubercle</b>	A small knoblike protuberance of cuticle.
<b>U</b>	
<b>Underbridge</b>	The anterior bifurcation of the vagina composed of tough, brown material which may extend across the vulval cone and parallel to the vulval bridge (Fig. 16 + Fig. 2 in PM 7/89).
<b>Uterine</b>	Pertaining to or belonging to the uterus.
<b>Uterine Sac</b>	A thin-walled, muscular sac to which the uterus is joined and into which the vagina opens. It may be obscurely separated from the uterus by a slight constriction or merely by a differentiation of tissue.
<b>Uterus</b> (pl. uteri)	A region of the oviduct modified to function as a place of development (sometimes maturation) of the egg (Fig. 9).
<b>V</b>	
<b>Vagina</b>	A canal lined with cuticle connecting the uterus or the ovijector with the vulva (Fig. 9).
<b>Valve Plates</b>	See Metacarpus Plates.
<b>Valve Apparatus</b>	See Metacarpus Plates.
<b>Velum</b>	A delicate cuticular membrane on the ventral side of the spicule (Fig. 12).
<b>Ventral</b>	The abdominal aspect of a nematode.

<b>Ventrolateral</b>	The position on the nematode body situated 30° laterally from the ventromedian line and perpendicular to the anteroposterior axis.
<b>Vermiform</b>	Having a wormlike shape.
<b>Verrucomicrobial Endosymbionts</b>	Bacterial species of the genus <i>Verrucomicrobia</i> that are obligate endosymbionts and residing in the gametes of some species of <i>Xiphinema</i> .
<b>Vestigium</b>	The tip of reserve odontostyle.
<b>Vulva</b>	The transverse slit of the female genital opening situated on the ventral line in most genera (Fig. 8, 19, 20).
<b>Vulval Area</b>	A relatively moderate protuberance at the posterior end of <i>Heterodera</i> cysts (Fig. 16).
<b>Vulval Basin</b>	Slight circular depression at the end of the vulval cone comprising the vulval slit and fenestra (Fig. 4 in PM 7/40 (2) + Fig. 2 in PM 7/89).
<b>Vulval Bridge</b>	In species of <i>Heterodera</i> the vulval slit persists across the fenestra as a bridge creating two semifenestrae (Fig. 2 in PM 7/89).
<b>Vulval Fenestra</b>	In <i>Globodera</i> and <i>Heterodera</i> a thin-walled transparent region at the vulva which may breakdown to form the hatching pore (Fig. 17, 18 + Fig. 2 in PM 7/89).
<b>Vulval Flap</b>	A cuticular, membranous structure around the vulva or on the vulval lip (Fig. 2 in PM 7/4).
<b>Vulval Slit</b>	The external opening of the vulva (Fig. 4 in PM 7/40 (2) + Fig. 2 in PM 7/89).
<b>Z</b>	
<b>Z-Organ</b>	A distinct, highly developed differentiation of the uterus in some species of <i>Xiphinema</i> , except for <i>X. americanum</i> sensu lato. If not so developed or distinct, then is referred to as a pseudo-Z organ (Fig. 20).

## Annex I Abbreviations used for nematode measurements

- a Nematode body length divided by greatest width (usually at mid-body).
- b Nematode body length divided by pharynx length from the lips to pharyngo-intestinal valve.
- b' Nematode body length divided by pharynx length from the lips to end of pharyngeal glands.
- c Nematode body length divided by tail length.
- c' Tail length divided by body width at anus.
- h Length of hyaline part of tail.
- L Length of nematode body.
- o Distance of dorsal gland opening from base of stylet.
- Ost Length of odontostyle
- Oph Length of odontophore
- st Length of stylet
- V Distance from the anterior end to the vulva divided by nematode body length (%)

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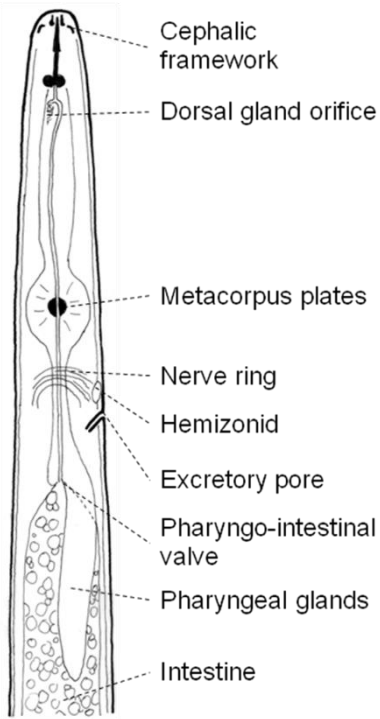


Fig. 1: Anterior end of Tylenchida

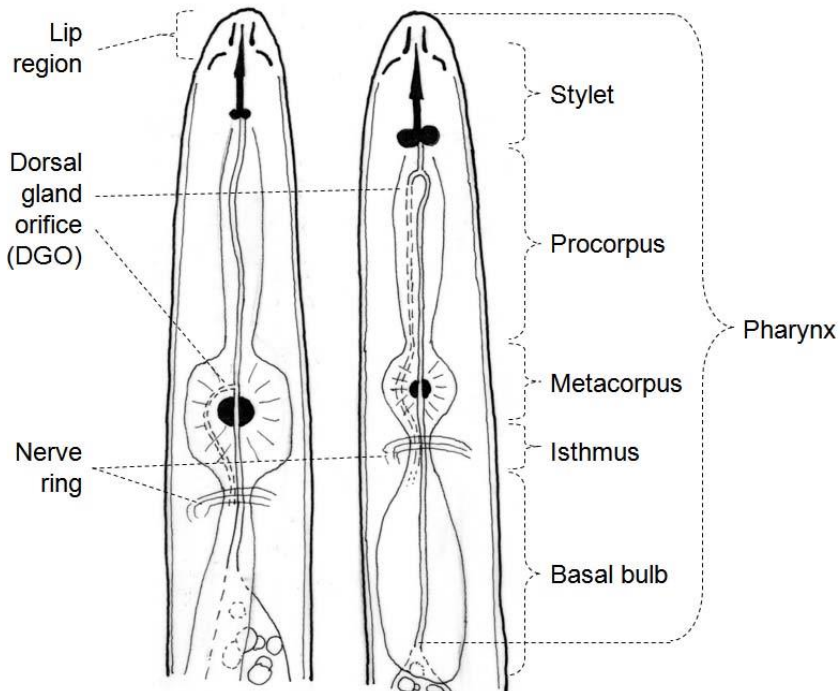


Fig. 2: Anterior end of Aphelenchida and Tylenchida (redrawn after Decker, 1969)



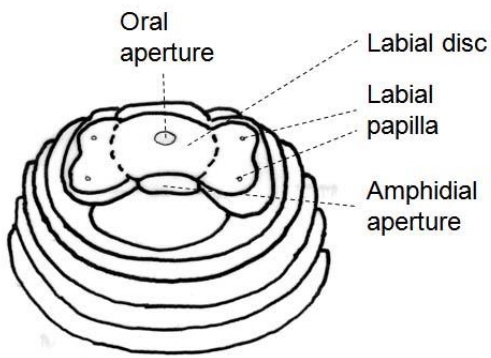


Fig. 3: Lip region

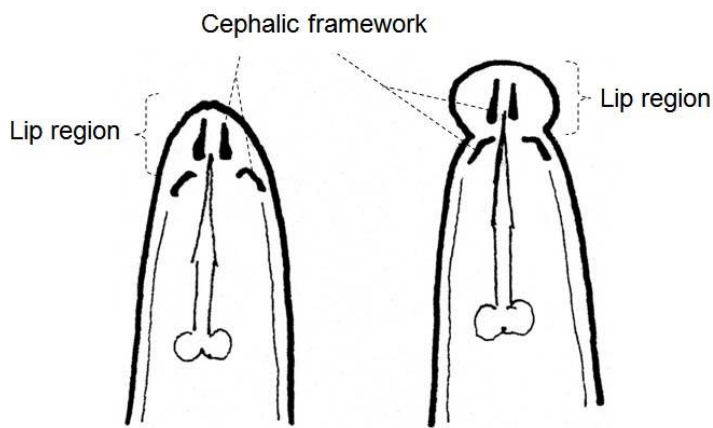


Fig. 4: Lip region continuous (left) and off-set by a constriction (right)

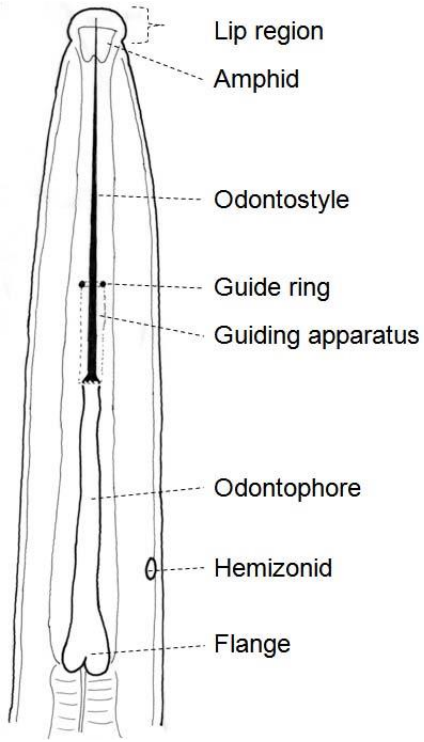


Fig. 5: Anterior end of *Xiphinema*

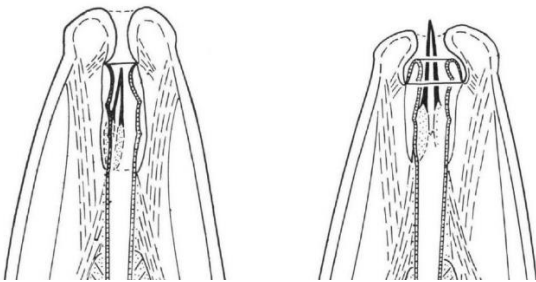


Fig. 6: Mural tooth and eversible stoma of *Nygolaimus* sp. Subdorsal view (left), Lateral view (right) Drawings from Coomans (1963)

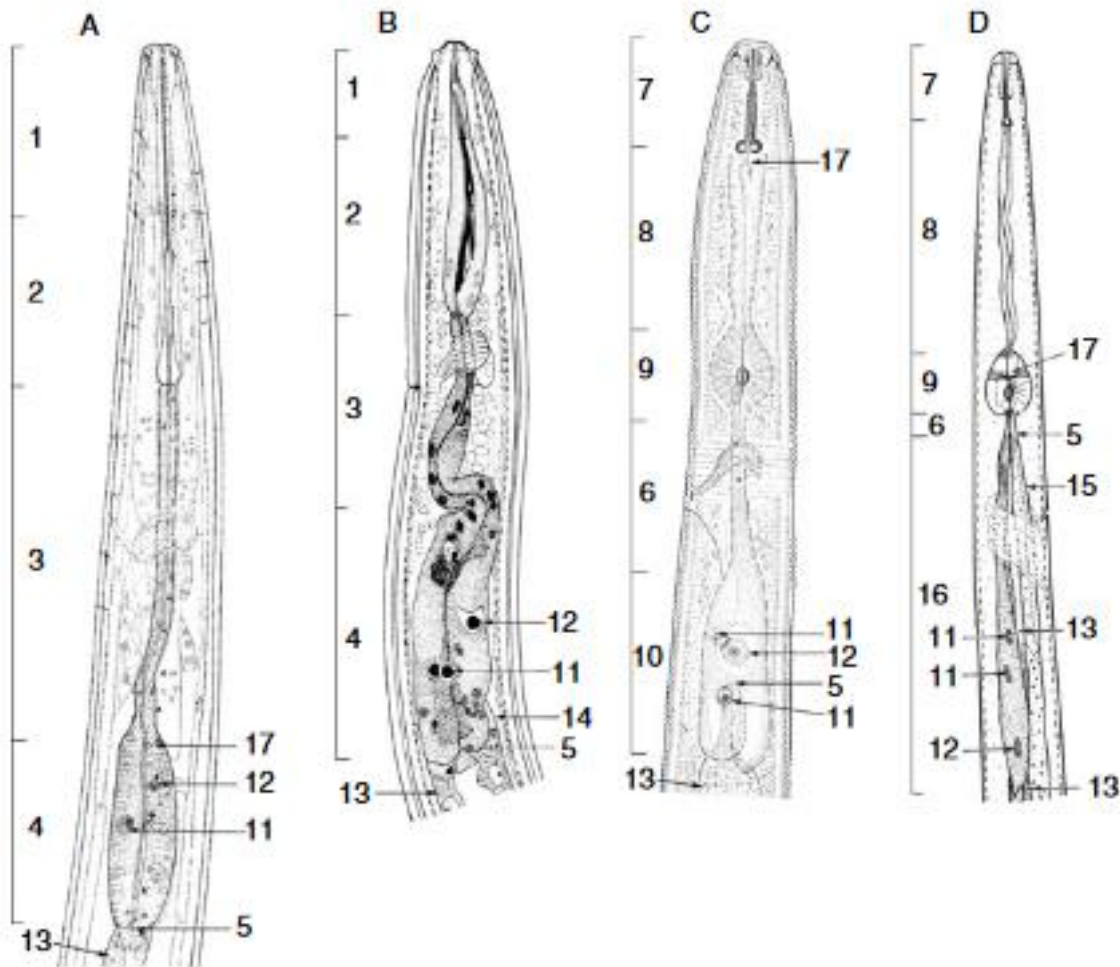


Fig. 7: Digestive system of plant-parasitic nematode taxa. A. *Paraxiphidorus* (Longidoridae). B. *Paratrichodorus* (Trichodoridae). C. *Pratylenchoides* (Pratylenchidae. D. *Aphelenchoides* (Aphelenchoidae). 1. Cheilostome; 2. pharyngostome; 3. narrow anterior region of pharynx; 4. pharyngeal bulb; 5. pharyngeal-intestinal junction; 6. isthmus; 7. stomatostylet; 8. procorpus; 9. metacarpus; 10. post-corpus; 11. ventrosublateral pharyngeal gland nuclei; 12. dorsal pharyngeal gland nucleus; 13. intestine; 14. intestine dorsally overlapping pharynx; 15. pharyngeal-intestinal junction valve cell; 16. pharyngeal gland lobe; 17. dorsal pharyngeal gland orifice. A, from Decreamer et al. (1998); b, from Decreamer and De Waele (1981); c, from Siddiqi (1986), D, from Shepherd et al. (1980).

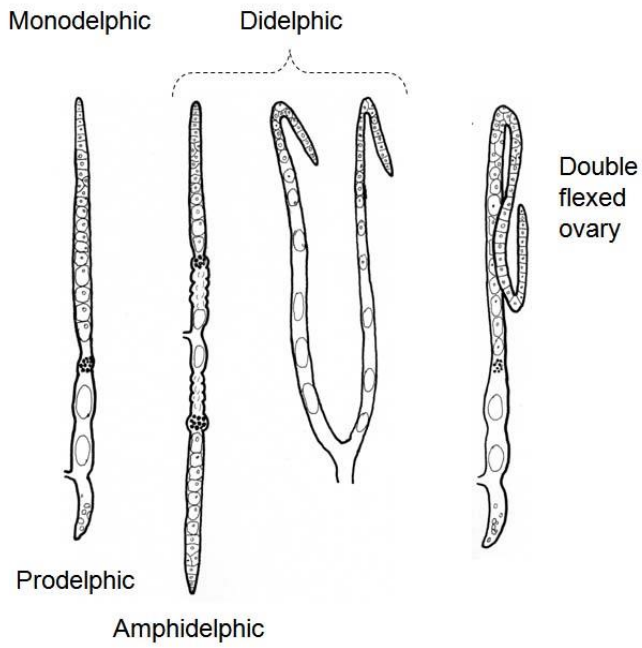


Fig. 8: Female reproductive systems (redrawn after Decker, 1969)

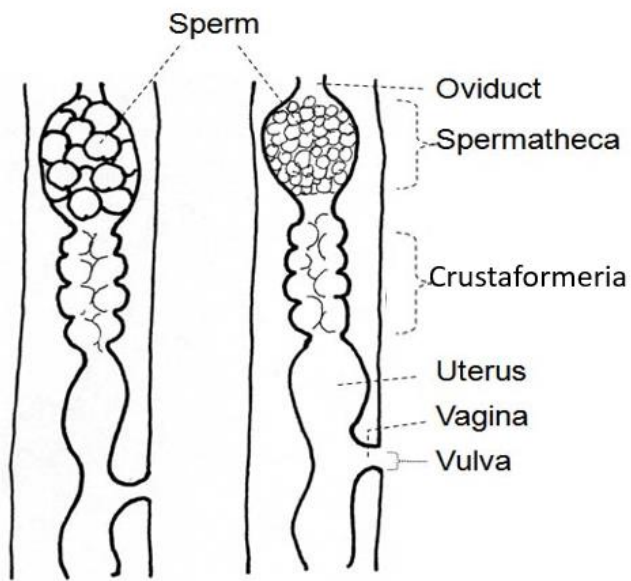


Fig. 9: *Ditylenchus* sp. – sperm „large”; *B. Basiria* sp. – sperm „small” (redrawn after Brzeski, 1998).

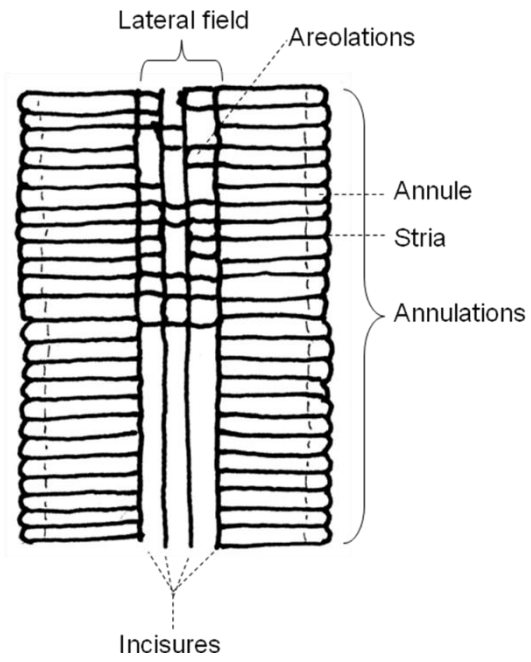


Fig. 10: Nematode cuticle

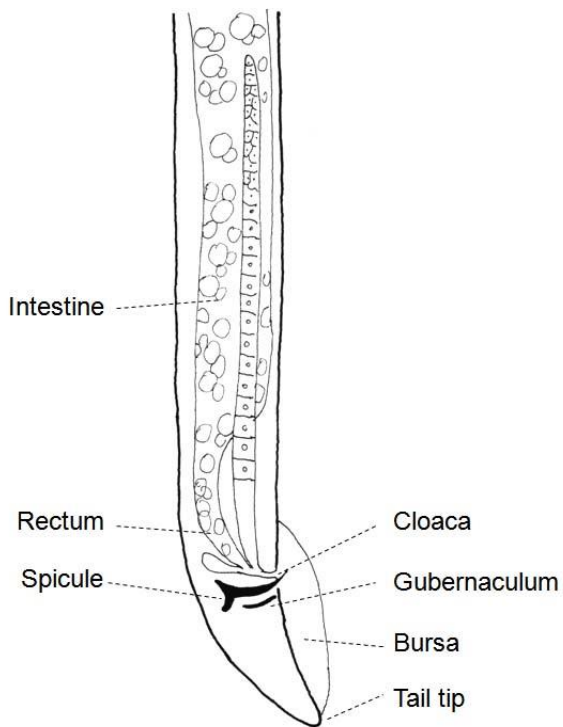


Fig. 11: Posterior region of male (redrawn after Decker, 1969)

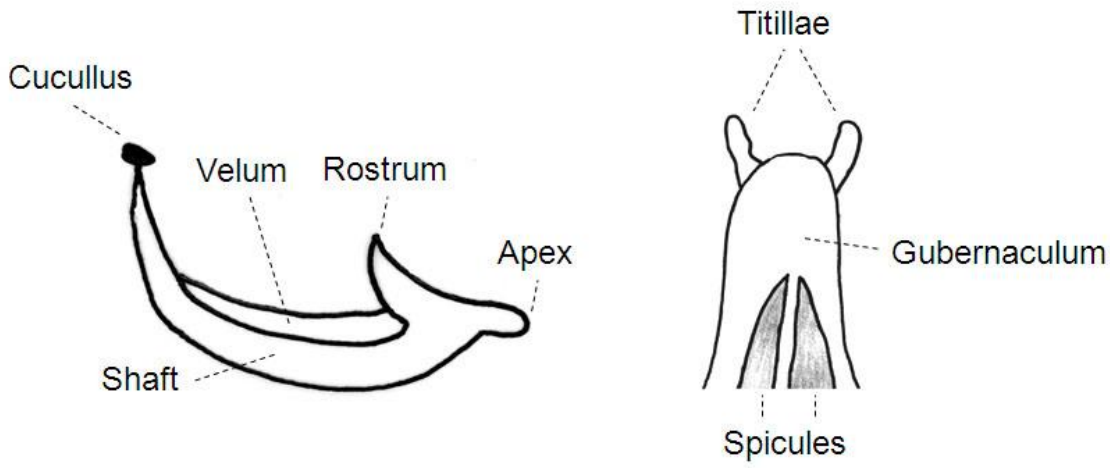


Fig. 12: Left : Male spicule (aphelenchid type) ; Right : Top view of gubernaculum with titillae (e.g. *Radopholus*).

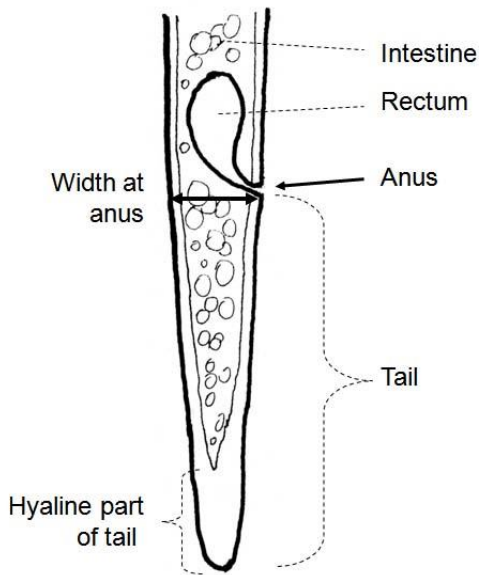


Fig. 13: Tail end of juvenile

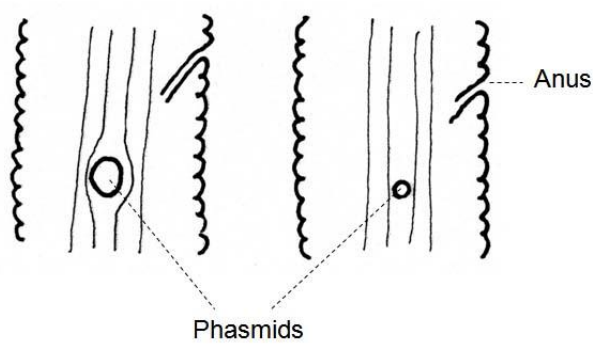


Fig. 14: Phasmids large ("Scutellum") (left) and small (right)



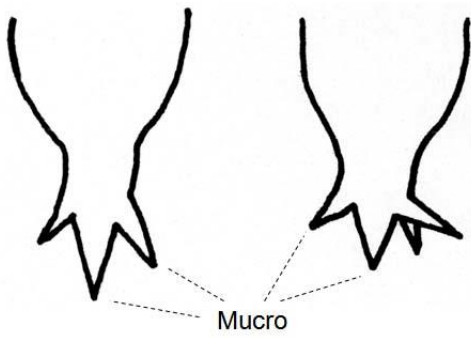


Fig. 15: Tail end of *Aphelenchooides*

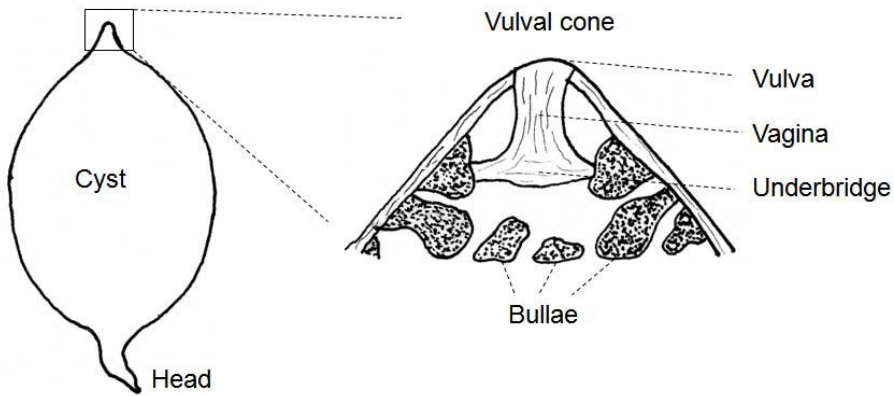


Fig. 16: Vulval cone of *Heterodera* cyst

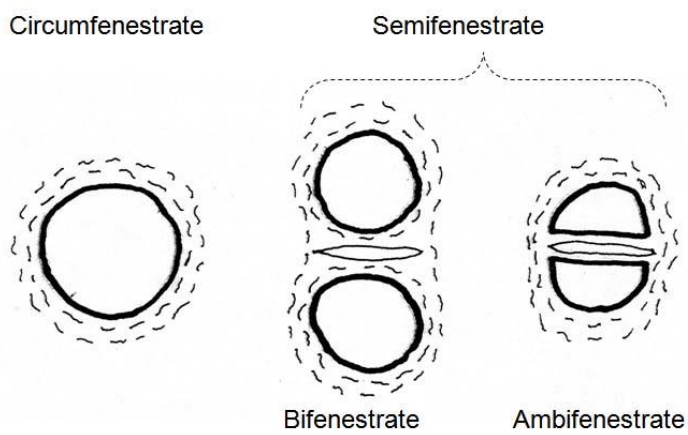


Fig. 17: Vulval fenestra of *Globodera* (left) and *Heterodera* (center, right) cysts

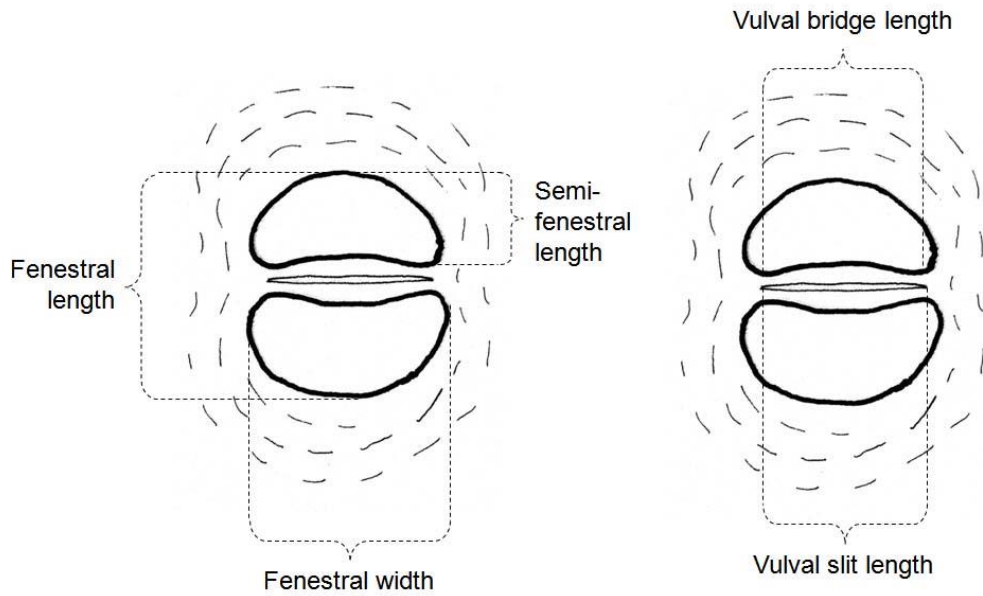


Fig. 18: Measurements of vulval fenestra

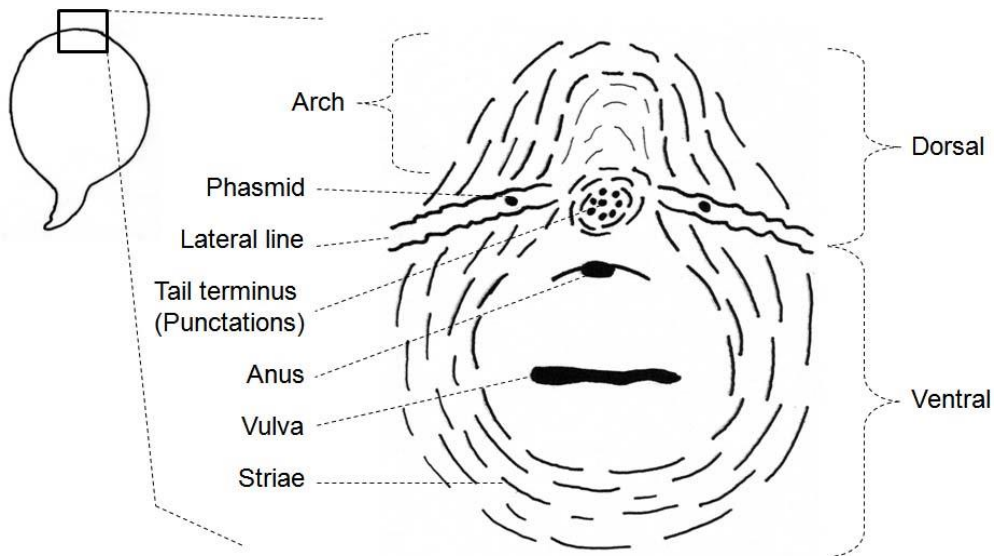


Fig. 19: Perineum of *Meloidogyne*

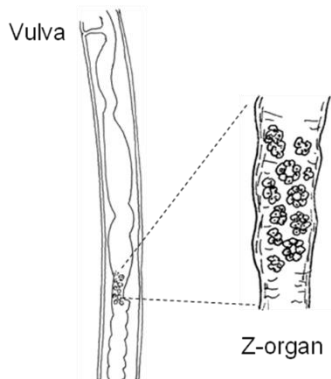


Fig. 20: Z-organ in the uterus of some species of *Xiphinema* except *X. americanum sensu lato*