

## GENERAL CHARACTERISTICS OF ASCHELMINTHES

Spl. Focus On  
Nematode

### (a) External features:

- (1) In spite of the very wide distribution and the large number of environmental situations in which nematodes are found, they show remarkably little morphological change or adaptation to their varied forms of existence. The most conspicuous variation among the nematodes is in size. Whereas some species of free-living nematodes do not exceed 1 mm in length, some of the parasitic species such as the guinea worm (*Dracunculus medinensis*) and *Diioctophyma renale* measure several metres in length.
- (2) Nematodes exhibit to a greater or lesser extent in the various groups the phenomenon of 'eutely', i.e. a constancy in the number of cells in the various tissues. This occurs especially in **nervous tissue**, but in some species it occurs with other tissues through all stages of development.
- (3) Modification of the **external cuticle** is manifested by the presence of lateral flanges (alae) [The alae is a protruding ridge that forms longitudinally on many nematodes. In the *Caenorhabditis elegans* nematode they are present in the L1, dauer (an alternative long living larvae stage where the nematode is dormant) and adult stages. The alae are most pronounced during the dauer larval stage and not present in the L2, and L3 *C. elegans* stages. The term 'alae' is the plural of *ala* (wing), describing either one of the pair of ridges that forms on a nematode or an individual crease found on an individual ridge. The term 'ala' is rarely used in describing the alae and scientific journals use the term 'alae' both singularly and in the plural] which may occur throughout the whole length of the body, only in the cervical region, or in the caudal region of the male where, in some forms, there is a tri-lobed expansion which serves a copulatory function.
- (4) The surface cuticle may bear punctate markings, bosses, ridges or other modifications, and specialised cuticular structures may occur, such as spines and bristles).

### (b) Digestive System

- 1) Differences in feeding habits offer the mouth region much scope for variation. Nematodes parasitic in plants may have a **stylet** where by they pierce cells, whereas nematodes parasitic in animals may have teeth, cutting plates, rasps or denticles whereby they may tear the tissues.
- 2) Behind the mouth there may be a **buccal capsule** with teeth in its base the buccal region may be strengthened by spiral or *basket-like thickenings*. Forms living within animal tissues probably feed mainly on fluids, the mouth region of such forms being reduced to a minute pore leading directly into the pharynx.
- 3) At the head of a plant-parasitic nematode is a hollow mouth spear (like a hypodermic needle) called a stylet. The nematode uses this **stylet** to puncture plant cells, to withdraw food and also to secrete protein and metabolites that aid the nematode in parasitizing the plant.
- 4) Free-living **saprophagic** forms also have a fine tube through which they suck organic fluids, whereas predatory free-living nematodes have well-developed teeth for capturing small prey.
- 5) The general structure of the pharynx of nematodes resembles that of *A. suum* in relation to the lumen, musculature and glands. On the other hand, the pharynx varies considerably in shape and in the relative proportion of glandular to muscular tissue, probably as manifestations of various forms of diet.
- 6) Many plant nematodes have a characteristic *egg-shaped swelling* at about the centre of the pharynx.
- 7) Among nematodes parasitic in animals, the pharynx is useful in differentiating the major groups. Some have a strong muscular bulb at the posterior end of the pharynx, others have a posterior non-muscular glandular 'ventriculus' which may be elongated into an appendix, or a pharynx which is divided into a short, anterior muscular portion and a wider posterior glandular portion.
- 8) The intestine is not subject to much variation, except that at the anterior end some may have a **caecal outgrowth**, and the surface may be thrown into folds. A *valve between the oesophagus and intestine* may be present in some forms. A muscle network has been described around the intestine of some nematodes and the number of cells comprising the intestine varies considerably.

### (c) Sense Organs and Other Superficial Structures

- 1) The arrangement and number of the sensory organs on the anterior end in most nematodes is basically similar to that of *Ascaris suum*.