

## **Lecture 05 - Anatomy: Oesophageal glands**

Three uninucleated oesophageal glands. One gland on dorsal and other two ventro lateral or sub ventral in position. These glands connect with the lumen of the oesophagus by means of ducts, often by means of a terminal swelling or ampulla.

The oesophageal glands have an important role in hatching host penetration and also establishment of host parasitic relationship.

### **Rectal glands**

Are responsible for the copious production of gelatinous mucopolysaccharide matrix in which eggs are deposited as a mass. It protects the eggs from adverse environmental conditions.

### **Function of digestive system**

Digestive juices secreted from dorsal oesophageal glands are injected into the host plant cell by means of the stylet. During feeding a distinct zone develops around the feeding site in the host cell. There are two feeding phases. 1. Injection phase or salivation phase and 2. Ingestion phase.

### **Injection phase or Salivation phase**

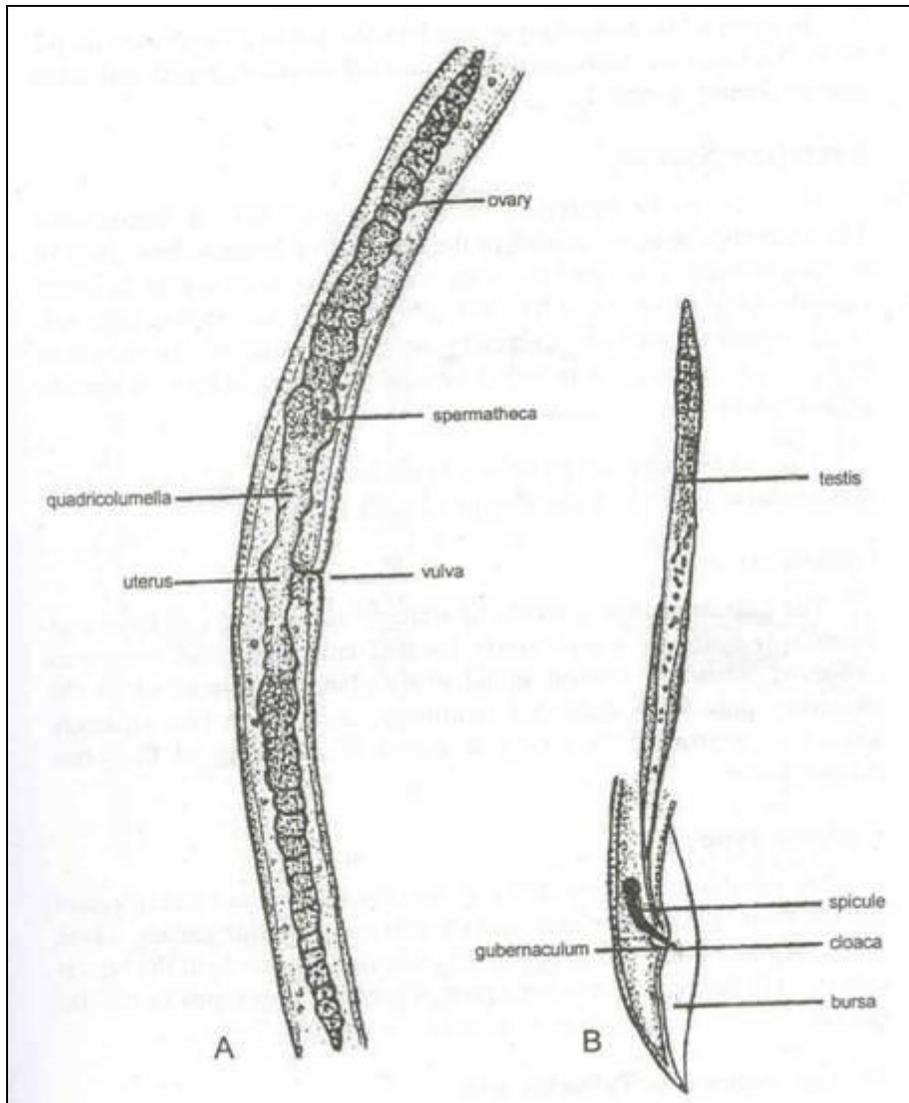
During this phase, the flow of salivary juices into the host cell occurs due to contraction of lateral muscle of the median bulb.

### **Ingestion phase**

During this phase rhythmic contraction of the posterior part of the oesophagus associated with the median bulb occurs.

### **Reproductive System**

The nematodes are generally dioecious. Majority of plant parasitic nematodes do not exhibit any differences as far as body shape. Both sexes are vermiform. However, sexual dimorphism is observed in some genera viz., *Meloidogyne*, *Heterodera*, *Globodera*, *Rotylenchulus*, *Tylenchulus* and *Nacobbus*. The females of these genera become enlarged and assume different shapes after attaining maturity.



**Female**

**Male**

### **Female Reproductive System**

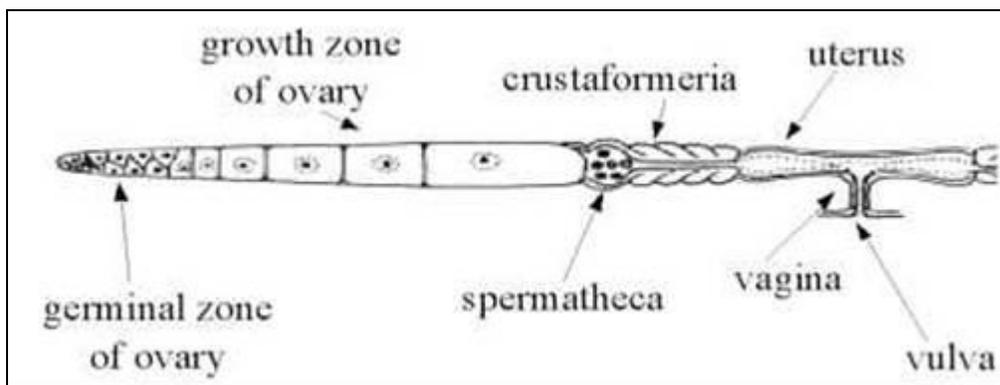
Present in nematodes having single ovary as observed in the genera *Pratylenchus* and *Ditylenchus*. The uterus opens outside to a ventrally located vulval opening through a tube known as vagina, which is a cuticularised structure. In plant parasitic nematodes the number of ovary may be one or two. When there is one ovary that condition is known as monodelphic and when the number is two, the condition is called as didelphic.

In monodelphic condition, the ovary is always, anteriorly directed, i.e Prodelphic. In case of didelphic ovaries, if both the ovaries are anteriorly directed and vulva is terminal in position then the condition is known as didelphic prodelphic as found in the case of *Meloidogyne*,

*Heterodera* and *Globodera*. In some nematodes, two ovaries are opposite to one another, such that one is anteriorly directed and the condition, as found in the case of *Tylenchorhynchus*, *Hoplolaimus* and *Helicotylenchus* etc.

The vulval opening is a transverse slit and not covered with any flap, but in *Agelenchus* and *Coslenchus* vulva is covered with a membranous flap known as vulval flap. The vaginal tube in *Hoplolaimus* and *Cosaglenchus* are provided with a cuticular sclerotised structure encircling the tube known as epiptygma. Ovary in most of the plant parasitic nematodes is always straight and does not curve back. Such ovaries are called as outstretched ovaries as in the case of *Tylenchorhynchus*, *Radopholus* and *Hirschmanniella* etc. In Dorylaimid nematodes, the tip of the ovary is curved back. It is known as reflexed ovary. If the ovary is single and posteriorly directed, then it is known as monodelphic ophistodelphic condition and such conditions are rarely seen. (eg. *Xiphinema* spp.)

Further, an ovary is called hologenic if it produces oocytes throughout its length and telogenic if producing oocytes only at its distal end.

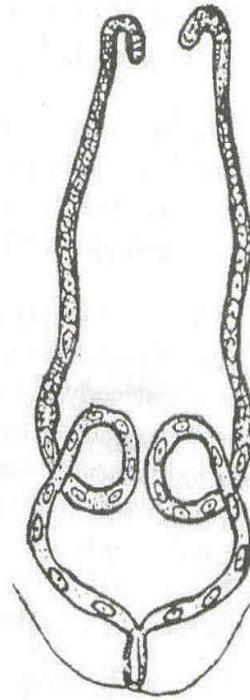




**Monodelphic  
prodeplhic**



**Didelphic  
amphidelphic**



**Didelphic  
prodeplhic ovaries**