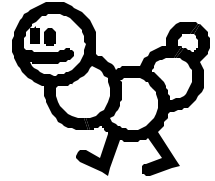


Phylum Annelida – Segmented Worms



15000 – Species

From Latin anellus meaning ring

Earthworms, Leeches, etc – (marine & freshwater species)

Metamerism: division of the body into similar segments to which are arranged linearly on an anterior – posterior axis.

Each segment called a metamere.

Separated into segments by “septa”(internal walls.)

Each septum (singular for septa) is a thin sheet of mesoderm tissue

Home: Live everywhere except polar region frozen soil and dry desert sand.

Cephalization – anterior end concentration of nervous system.

Excretory and Circulatory Systems are well developed.

Digestive tract – long and tubular, has musculature enabling it to function independently of the body wall muscles. Tube within a tube.

Coelomate: Have a true coelom

Protosomes – coelom made from cell masses

Feeding – some filter feeders, some carnivorous

Respiration – gills; moist skin covered in mucus.

Clitellum – band of thickened specialized segments secretes mucus ring, fertilization takes place within this ring of mucus.

Response

- Free living ones
- Nerves
- Brain
- Some with tentacles/chemical receptors, statocysts for gravity and eyes

Movement

Segments allow for greater flexibility and mobility by being able to bend at segmented parts.

- 2 muscle groups function as hydrostatic skeleton.
- Longitudinal – from anterior to posterior contract to make shorten/fatter worm.
- Circular – wrap around each body segment
- Moves by alternating 2 muscle sets and using setae

3 classes

- Class Polychaeta
- Class Oligochaeta
- Class Hirudinea

Class Polychaeta –

- i.e. Clam worm (*Neanthes virens*), Sea Mouse, Sandworms, bloodworms, Bristleworm.
- Segmented lateral projects with setae: bristle like structures used in movement (parapodia)
- Head has tentacles
- Separate sexes
- Most are marine organisms
- Survive at 4500m depths
- Colors: green, red, pink, combinations, iridescent
- Thousands per m²
- Live in cracks and crevices of coral reefs, sand mud, rock piles in and out of H₂O
- Eaten by flatworms, starfish, fish, other marine annelids
- Burrows in sand at tide level comes out at night to feed
- About 200 body segments
- Head well developed
- Mouth: retracted except when feeding
- Has antennae pair
- Only 1 type of Polychaeta move (Errantia)
- Other Polychaeta that don't move
 - They spend their whole lives buried in sediment
 - They are in tubes made from sticky proteins secreted from their mouth and have feathery appendages that extend from the tube and trap food in water.
- Sexual reproduction- only few species mate

Class Hirudinea – i.e. Leaches

- dorsoventrally flattened body
- large posterior sucker
- segmented (inconspicuously) (32 segments)
- lack appendages and setae
- hermaphroditic: reproduction is by cross-fertilization
- fresh and marine water
- most are 20-60 mm in length (largest 50 cm)
- anterior and posterior suckers
 - contain mouth
 - Jaws chitinous teeth for biting
- Can ingest 5 times their weight in blood
- Can go 9 months between feedings
- Respiration through most body surface
 - Some have gills though
- Wastes – removed by nephridia
- Secret fluid to prevent blood from clotting
- ¼ carnivorous
- Eat small invertebrates feed on their blood
- Suck human blood
- Some produce a chemical to anesthetize the wound to keep the host from knowing they are bitten.
- Sometimes used for medicinal purposes
 - Headaches, mental illness, obesity, reduce swelling from surgery, illnesses from too much blood.

Class Oligochaeta – i.e. earthworms (*Lumbricus terrestris*)

- Ancient Greek “Aristotle” called them “the intestines of the Earth”
- Darwin – devoted years and a book to their study
- Aerate soil to 2m depths
- Class name means few setae or appendages
- Streamlined bodies
- Relatives: tubifex worms
 - Red thread like aquatic
 - Sold for fish food
 - About 1 inch long
- Closed circulatory system
- Segmented
- Lack a well developed head
- Have setae on each segment
- Hermaphroditic: but do not self fertilize
- Can live in fresh water /moist soil
- Nocturnal – move primarily at night

Body Structures:

- Clitellum - 1/3 way back from mouth functions in reproduction
- Prostomium – projection over mouth, not considered a segment, on the anterior end
- Anus – posterior end of digestive tract, solid wastes are expelled
- Setae – on ventral surface
- Nephridiopores – small opening on all segments but first three last one connecting with nephridia (primitive kidney)
- Segment 15
 - Large opening “vas deferens” – male structure where sperm is released.
- Segment 14
 - Oviducts – opening eggs are release from
- **Digestion**
 - Pharynx – muscular contractions, move food to esophagus from mouth
 - Esophagus – covered dorsally by three pairs seminal (whitish) vesicles opens to crop.
 - Crop - temp. storage of food, opens to gizzard
 - Gizzard – thick walled highly muscular organ where food is ground up with help of soil taken on by feeding. Opens to intestine.
 - Intestine – food is digested and absorbed. Dorsal wall has infolded typhlosole to surface area for absorption. Leads to anus.
 - Anus – allows for removal of solid waste products from digestion
- **Circulation**
 - “closed” circulatory system – circulates blood through a series of blood vessels.
 - Blood is red from hemoglobin – dissolved in plasma not in cells.
 - Major Circulatory pumps
 - Dorsal vessel – lies on top of the digestive tract allows blood to move toward the head anterior.
 - Ventral vessel – lies below It, allows blood to move toward posterior
 - Non major circulatory pump
 - Dorsal and ventral vessels – are connected by vessels passing around esophagus aortic arches (aka hearts)

- **Reproductive Tract**
 - Trilobed seminal vesicles between segments 9 and 13, connect with vas deferens
 - Testes – within vesicles, produce sperm
 - Ovaries – 1 pair, ventral surface on segment 13
 - Oviducts – 1 pair, in segment 13 opens to genital pore on segment 14
 - Seminal receptacles – In segments 9 and 10
 - Reproduction occurs when:
 - 2 worms come together at clitellum
 - When eggs leave ovaries, clitellum secretes mucus tub on anterior segments to pickup eggs and sperm
 - Mucus tub slips over and off the anterior end of worm to form an egg cocoon.
 - Young hatch from cocoon in a few weeks.
- **Nervous system**
 - Ventral Nerve Cord – runs entire length of worm on interior ventral surface
 - Lateral Nerves – extend around to muscles of body wall.
 - Cerebral Ganglion – brain, 2 swellings formed by ventral nerve cord dividing and passing around pharynx
- **Excretory System**
 - Nephridia – excretory organs (removes wastes urea and ammonia) open into coelomic cavity and act as a kidney – filtration, secretion, and re-absorption.
- **Respiration**
 - Most aquatic – breathe through gills
 - Gill – organ specialized for gas exchange under water.