

Earth worms culture

Earth worm as live food



Importance as fish food

- Earthworms are excellent food for cultured fish species
- Earthworms have been used alone and in combination with other foods, such as commercial feeds, in diets of fish species
- Also used as live bait to the fishes in anglings

Earth worms

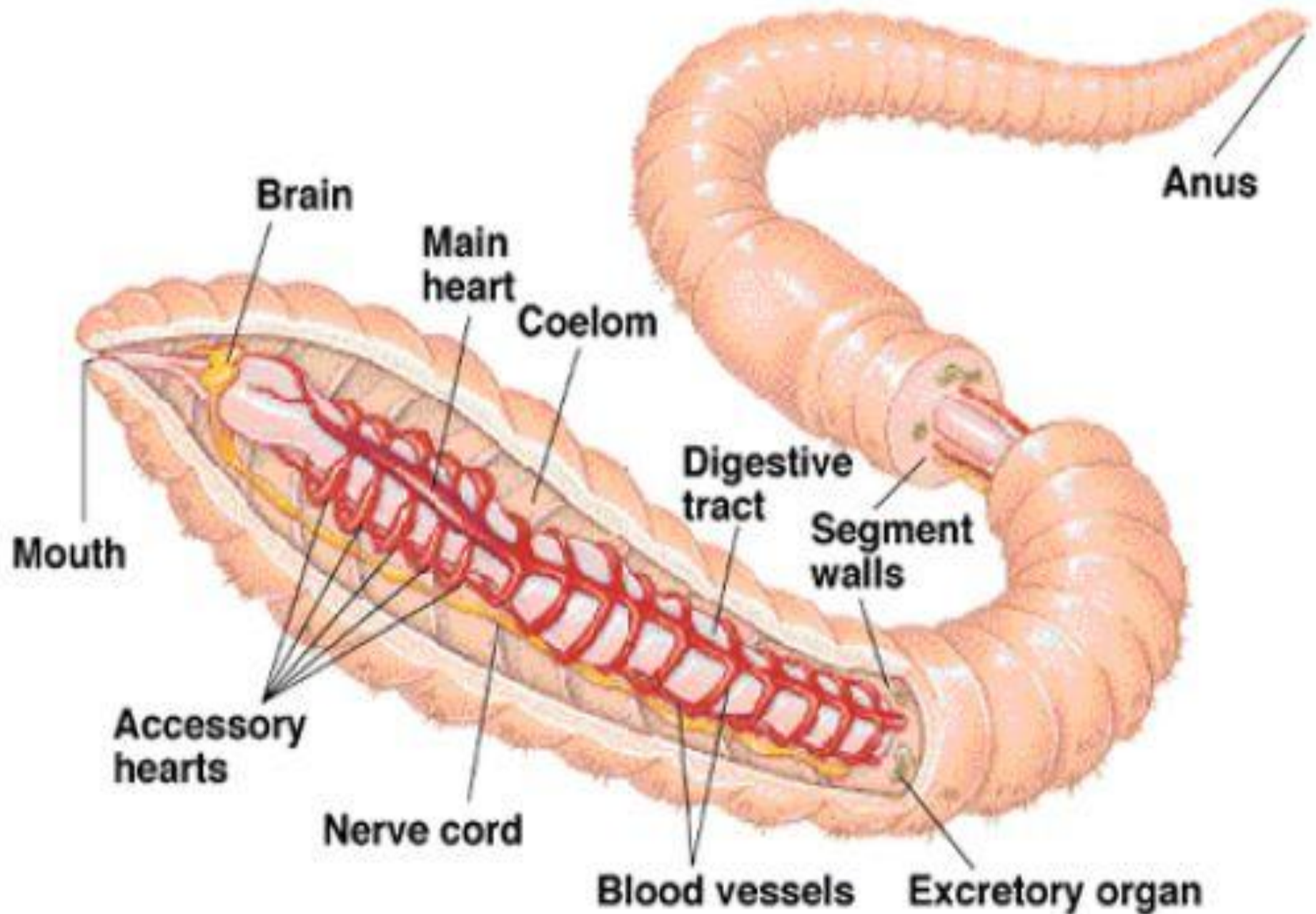
- Earthworms are invertebrates
- There are 3600 types of earthworms in the world, mainly divided into two types
- Burrowing and Non-burrowing
- Important burrowing species: *Pertima elongata* and *Pertima asiatica*- they live in the soil
- Important non- burrowing species: *Eisenia fetida* and *Eudrilus eugeniae*- live in upper layer of soil surface

Systematic position

- Phylum:Annelida
Class:Clitellata
Order:Haplotaxida
- Family:**Lumbricina**
(about 17 families)

Appearance

- The borrowing types are pale, 20-30 cm long and live for 15 years, eat 90% soil and 10% organic matter soil, come to soil surface only at night, photonegative, makes hole into the soil upto the depth of 3.5m and produce 5.6 kg casts by ingesting soils.
- The non-borrowing types are red or purple and 10-15 cm long and life span is only 28 months, eat 10 % soil and 90% organic waste materials



Anatomy

- The basic [body plan](#) of an earthworm is a tube, the digestive system, within a tube, the muscular slimy, moist outer body.
- The body is annular, formed of segments that are most specialized in the anterior.
- Earthworms have a simple circulatory system. They have two main blood vessels that extend through the length of their body: a [ventral](#) blood vessel which leads the blood to the [posterior](#) end, and a dorsal blood vessel which leads to the anterior end.

Contd.

- ◎ The dorsal vessel is contractile and pumps blood forward, where it is pumped into the ventral vessel by a series of "hearts" (aortic arches) which vary in number in the different taxa.
- ◎ A typical lumbricid will have 5 hearts. The blood is distributed from the ventral vessel into capillaries on the body wall and other organs and into a vascular sinus in the gut wall, where gases and nutrients are exchanged.
- ◎ Most earthworms are decomposers feeding on undecayed leaf and other plant matter, others are more geophagous (feeding on soil).

Reproduction

- ⦿ Earthworms are [hermaphrodites](#)
- ⦿ They typically have two pairs of [testes](#), surrounded by 2 pairs of testes sacs.
- ⦿ There are 2 or 4 pairs of [seminal vesicles](#) which produce, store and release the sperm via the male pores, and ovaries
- ⦿ Ovipores in segment 13 that release eggs via female pores on segment 14.
- ⦿ However, most also have one or more pairs of [spermathecae](#) (on female, a receptacle in which sperm is stored after mating)(depending on the species) that are internal sacs which receive and store sperm from the other worm in copulation.
- ⦿ Some species use external [spermatophores](#) for transfer instead.
- ⦿ Several common earthworm species are mostly [parthenogenetic](#), that is, with asexual reproduction resulting in clones

Earthworm cocoons



Regeneration

- Earthworms have the ability to regenerate lost segments, but this ability varies between species and depends on the extent of the damage.
- *Eisenia fetida* with head regeneration, in an anterior direction, possible at each intersegmental level back to and including 23/24, while tails were regenerated at any levels behind 20/21

Culture method

- ◎ It can be cultured using box made from wood cement bricks or plastic.
- ◎ Care should be taken that there are no holes in the box and they must be placed in a cool place with plenty of shade.
- ◎ Box dimension should be 1mX1mX0.3m depth. Prepare a layer of saw dust, sand and top soil each of 3cm depth.
- ◎ **Spread 15-20 cm layer of organic materials on the polythene sheet**
- ◎ Add about 6 l water to keep them moist.
- ◎ Add cattle dung: poultry: veg waste: cereal waste in the ratio 10:1:1:1. One kilogram worms feed on 5-10kg feed.
- ◎ Inoculate 100 small worms per box @25 kg wet weight.
- ◎ **Cover the cistern with a gunny bag**

Maintenance



Remove worms waste daily and maintain water content of less than or equal to 50%. Maintain a temperature of 20-30°C and keep control over ants and other worms.

- Sprinkle water every three days to maintain adequate moisture and body temperature of the earth worms

● **Harvesting**

Arrange soil with worms in conical heap for 24 hours. This causes the worm to settle at the bottom therefore collect them and store them in closed vessel with moisture.

- Worms will shed all the waste in the gut in 2-3 days. Wash and use them fresh or live or as worm meal (drying at 60°C. First harvest can be done after 3 months and in 6 months 2 more harvest can be done.
- As continuation add more manure, change the soil and retain young ones.

- **Production**

100 worms of 25g in 3 months become 2kg (wet weight) which gives 500 gm worm meal.

- In span of 6 months 2 more harvests can be done.

Care

- ▣ Cultures should be kept thoroughly moist at all times for best results.
- ▣ In watering, a gentle sprinkler stream should be used so that the surface of the culture
- ▣ Use a layer of gunny sack material on top of the culture material in each box
- ▣ The gunny sacking conserves moisture and prevents drying out; and also acts as a water spreader, insuring even spread of the water and preventing disturbance of the culture material by force of the water.
- ▣ Harvesting is done as per requirement and continued the culture with new stock of compost and eggs