

Course: Rhizosphere Fauna (selective course)

Level one – Program Biotechnology

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Introduction to soil macrofauna (3)

By

Prof. Dr. Gad Hamada Hassan Rady

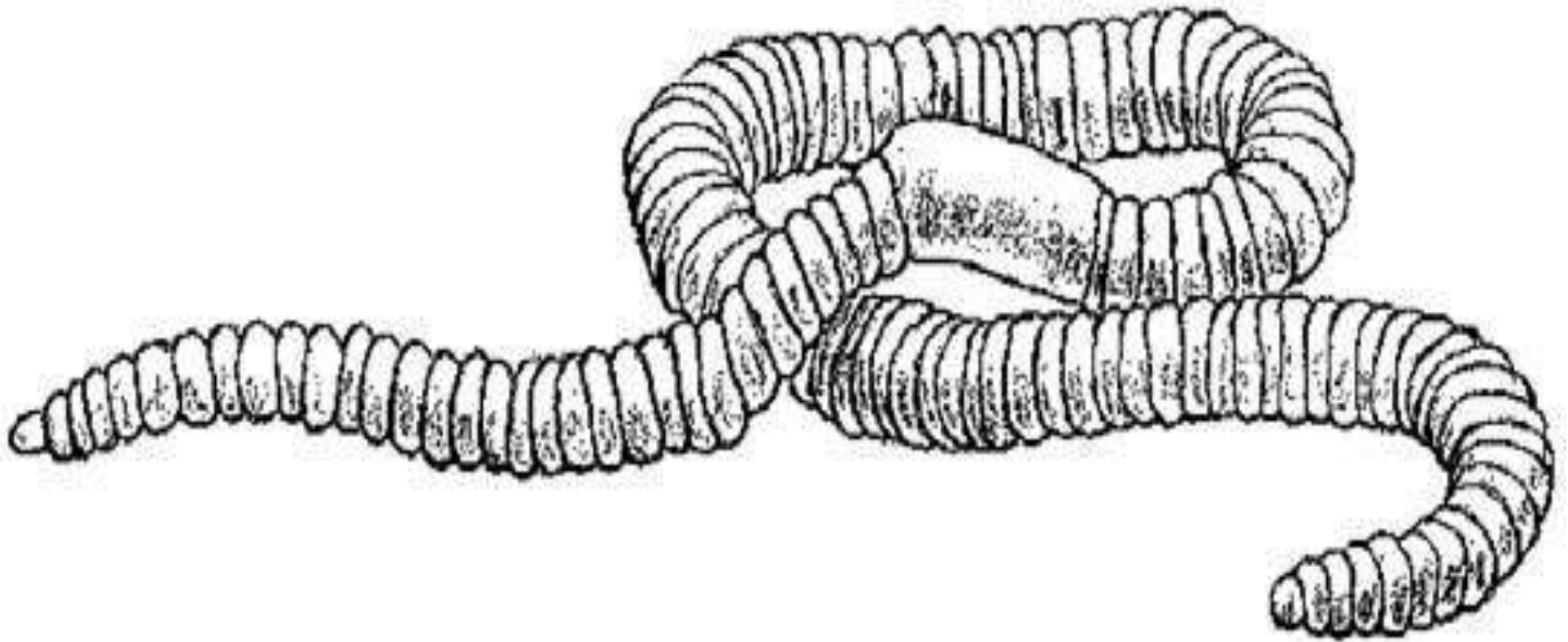
Plant Protection Department

Earthworms

Earthworms are terrestrial worms that burrow into and help to aerate soil. They often surface when the ground is cool or wet.

Earthworms are invertebrates that may be present in very high densities. They are found in litter and soil in all except the coldest regions of the world. They feed on decaying litter and plant residues in soil. Earthworms are extremely important ecosystem engineers, and play a vital role in soil fertility. They are solitary and they are sampled most effectively by hand-sorting soil samples.

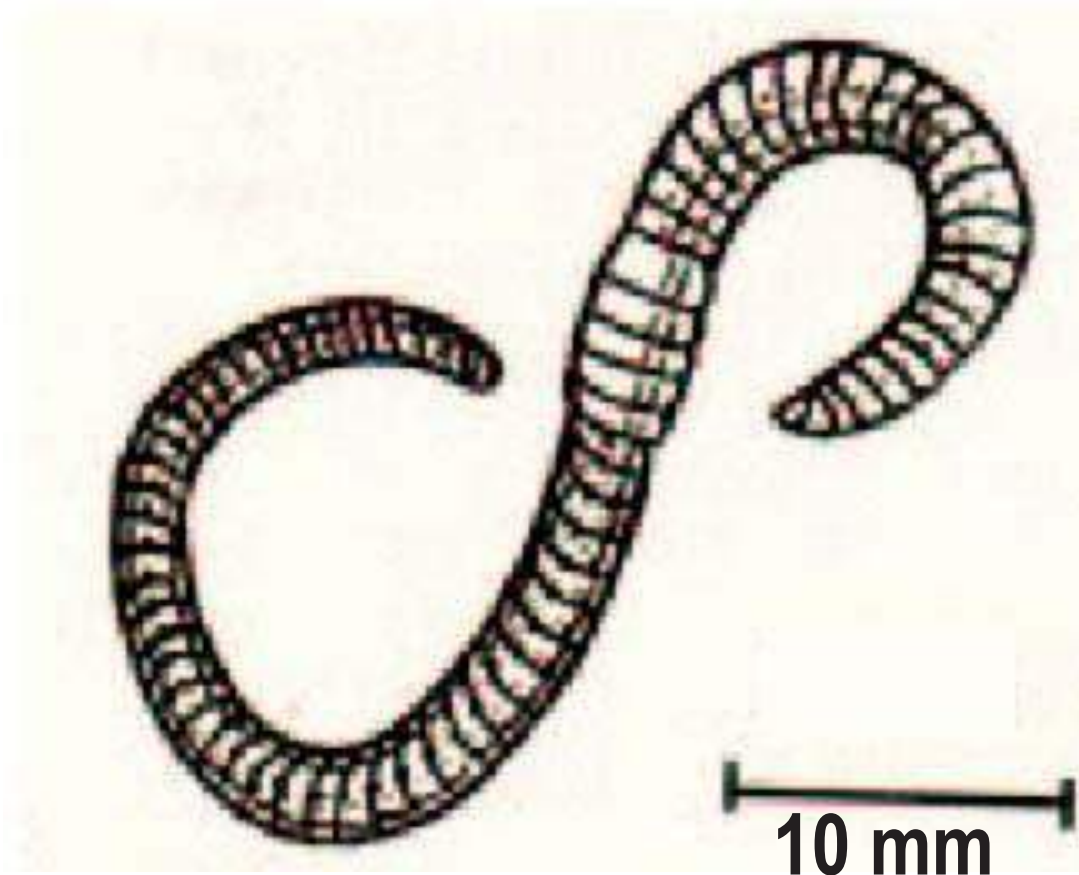
FIGURE 5
General view of an earthworm



Earthworms have developed a range of adaptive strategies to live in soil. They can be divided into functional groups according to their feeding habits. They are classed into three main ecological types: **epigeic, anecic and endogeic**

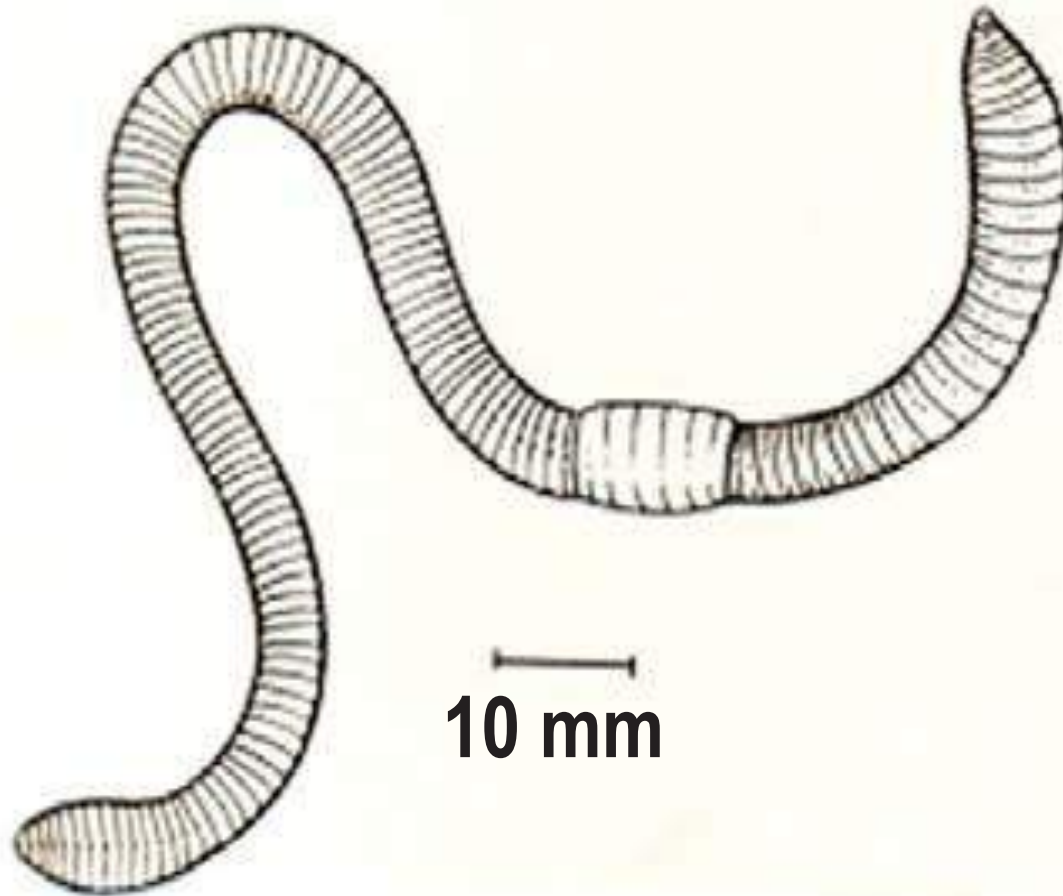
Epigeic earthworms (Figure 6) live within the litter layers, a changing environment, where they are subject to occasional drought, extreme temperatures and high predator densities. They are generally small (less than 15 cm long on average when adult), homogeneously pigmented (green, blue or reddish) and have rapid movements.

FIGURE 6
Epigeic earthworm



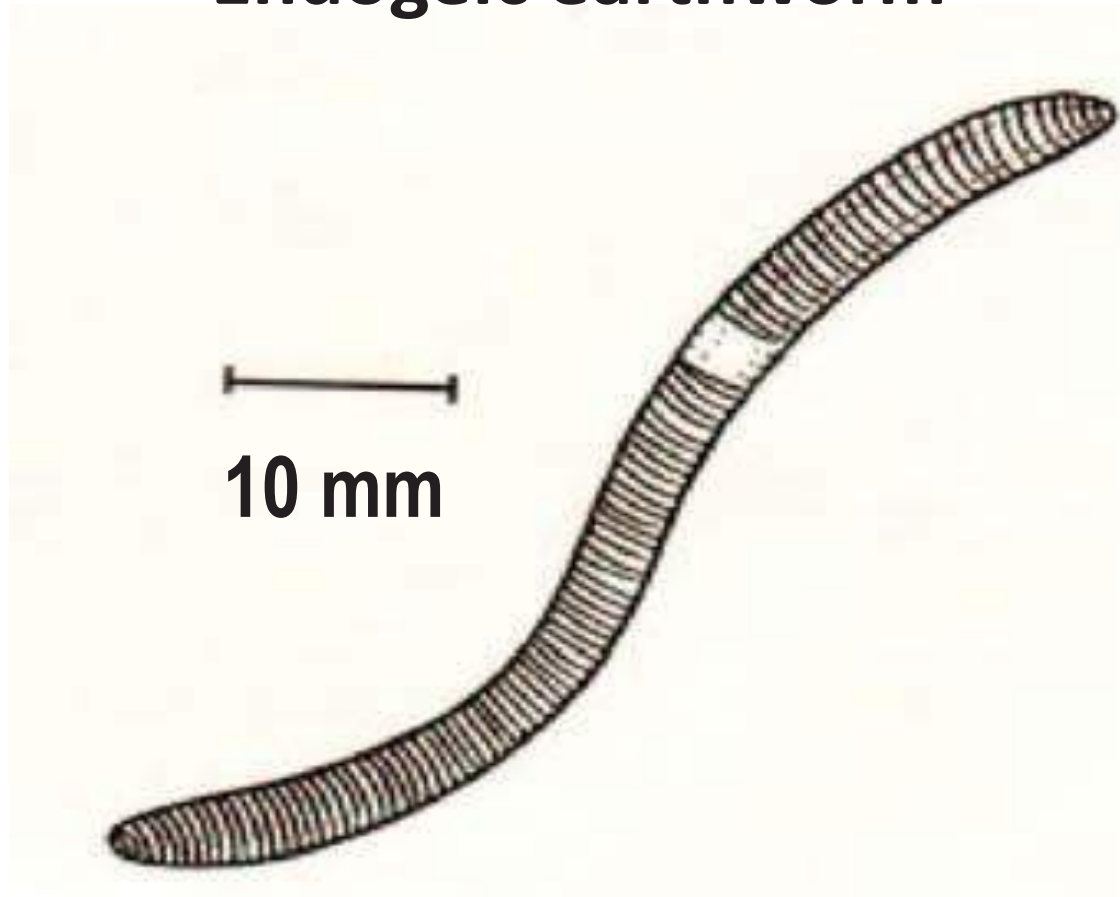
Anecic earthworms (Figure 7) feed on surface litter that they mix with soil. They spend most of their time in the soil. Anecic earthworms are large (more than 15 cm long when adult). They are pigmented dark green, blue, brown or reddish and the pigmentation is concentrated in the antero-dorsal part of the body. They dig subvertical galleries in the soil. The tail may be flat and enlarged in most common species.

FIGURE 7
Anecic earthworm



The unpigmented earthworms (no pigment in skin, same colour on the dorsal and ventral parts, pink or slightly brown owing to the soil ingested) that live and feed in the soil are called **endogeic earthworms** (Figure 8)

FIGURE 8
Endogeic earthworm

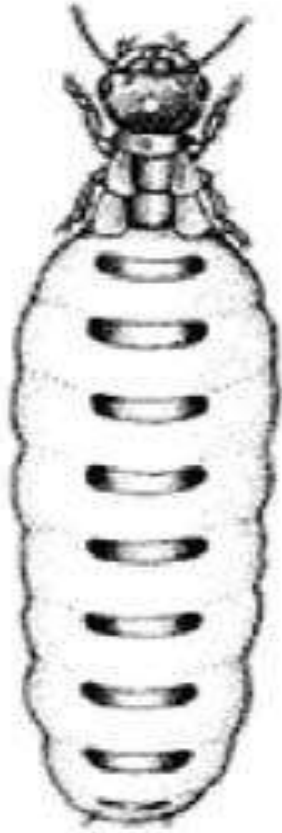


Termites

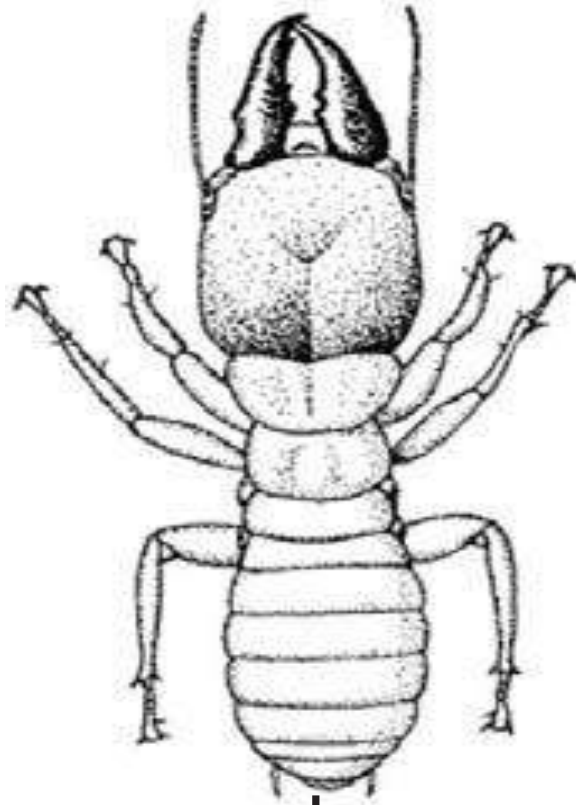
Termites are social insects. This means that they are organized, forming colonies where various castes (different individuals with different roles in the colony) with a set of morphological and physiological specializations coexist. The main castes are: the queen (the termite that forms the colony), the workers and the soldiers (Figure 9). They are abundant and considered a serious pest in dryland areas of Africa

FIGURE 9
Main castes of termite colonies:

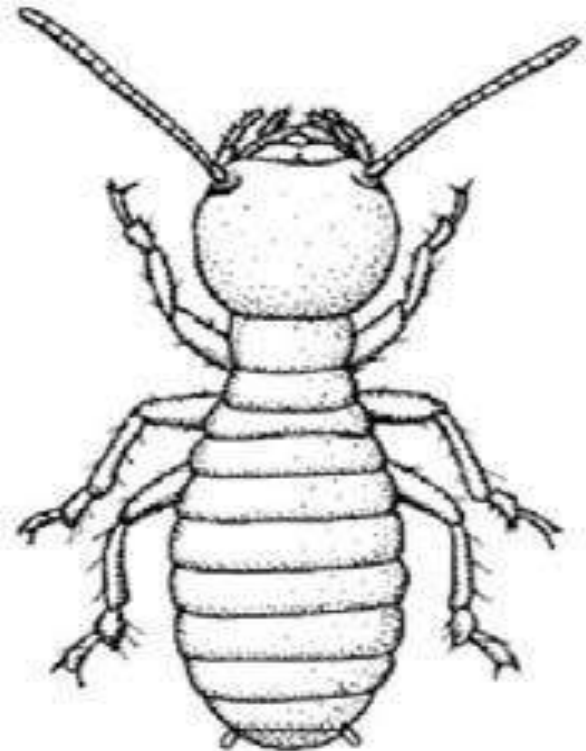
a) queen; b) soldier; c) worker



a



b



c

In general, termites may be separated into five broad groups according to the type of food they ingest

- **Grass harvesters: these termites harvest the dead leaves of grasses, which may be stored in their nests**
- **Surface litter feeders: termites that forage for leaf litter, live or dry standing grass stems and small woody items, usually cutting the material before consumption or portage to the nest system.**

- **Wood feeders: termites feeding on wood and excavating galleries in larger items of woody litter, which may become colony centres.**
- **Soil-wood feeders: termites feeding in highly decayed wood which has become friable and soil-like, or predominantly within soil under logs or soil plastered on the surface of rotting logs or mixed with rotting leaves.**

- **Soil feeders (humivores): termites distributed in the soil profile, the organic litter layer and/or epigeal mounds, feeding deliberately on mineral soil, apparently with some degree of selection of silt and clay fractions.**

Termites are important ecosystem engineers, and may have a similar role to earthworms in promoting soil fertility in tropical systems. They influence:

- **soil porosity and texture through tunnelling, soil ingestion and transport and gallery construction.**

nutrient cycling through the transport, shredding and digestion of organic matter.