

# Adaptive features of life forms in *Aporrectodea caliginosa*

(Oligochaeta: Lumbricidae)

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**Abstract.** We considered that the morphoecological differences between species of Lumbricidae have adaptive character. For our research, the amplitude and frequency of contractions of the visceral (gizzard) smooth muscles were selected. The contractive activity of the muscles was studied according to the method of isolated preparations. The greatest amplitude of contractions ( $86.71 \pm 3.66$  per mg) was recorded in worms of mineral soils for *Aporrectodea caliginosa caliginosa* in which the frequency of contractions of visceral muscles was  $2.46 \pm 0.58$  contr/min. Apparently, in detritophages the gut muscles push the dense food mass, but their contractions are not more frequent than 2-3 times a minute. The muscles of the surface-living *A. caliginosa trapezoides* showed smaller amplitude,  $49.58 \pm 2.56$  per mg, and frequencies were  $4.89 \pm 0.37$  contr/min. This subspecies ingested decaying vegetative remains, which entered their intestines as loose food mass completely accessible to digestion. Earthworms inhabiting mineral soil layers have greater amplitude of gut muscle contractions than the leaf-litter species, which is probably influenced by differences in their diet. We can conclude that parameters of spontaneous contractive activity of smooth muscles of the *A. caliginosa* digestive tract are related to the subspecies' life characteristics in biocenosis. These parameters are stable characteristics of the forms adapted to consumption of certain types of food resources in natural habitats.

**Key words.** Earthworms, visceral muscles, contractive activity, gut, gizzard, isolated smooth muscles preparations.

## Introduction

Ecological distinctions between species and forms of earthworms can be compared to some obviously adaptive anatomical-morphological and physiological distinctions. There are two main morpho-ecological groups of Lumbricidae: the humus formers feeding coarse particulate organic matter near the ground surface and the humus feeders eating soil humus or the actual soil (PEREL 1977). The features of the digestive systems of different ecological groups of earthworms are connected with their living conditions (SEMENOVA 1966). The intestine or midgut is investigated in more details since the pharynx, oesophagus, and muscular gizzard are morphologically similar in most species of Lumbricidae.

Two different types of the intestine correspond to two groups of earthworms with different characteristics of feeding. The first group (soil-eaters) is characterized by the cylindrical form of the intestine with a powerful typhlosole. The second group (inhabitants of the uppermost soil horizons) is characterized by the bead-form intestine with a small typhlosole.

However, differences in adaptive characters between two groups of Lumbricidae are not exhausted by the anatomical features of the digestive system. Feeding near the surface is