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A Review On Morphological Differences Between Epigeic Earthworm *Eisenia Fetida* (Savigny 1828) And Endogeic *Eutyphoeus Gammiei* (Bedderd 1888) And Its Applications

Dr. Neeta Lal, Dolly Kumari, Dr Rohit Shrivastava, Dr Soni Kumara Tiwari
PG DEPARTMENT OF ZOOLOGY, RANCHI UNIVERSITY, RANCHI, JHARKHAND, INDIA.

Abstract

Epigeic earthworm *Eisenia fetida* belonging to the family lumbricidae, is red, purple and brown in colour and endogeic earthworm *Eutyphoeus gammiei* belonging to the family octochaetidae have unique cytoplasm that is pink in colour. *Eisenia fetida* is a surface – born, fertilizer maker and can tolerate wide range of temperature and active in all seasons and thus is an Eury species. Endogeic species burrow within the top layer of soil and rarely come to the Surface and prefers to live literally within the soil. This article introduces *Eisenia fetida* and *Eutyphoeus gammiei* and its applications in various fields such as in fish farming organic matter decompositions and minerals recycling, as-well-as treating in wounds, Chorionic boils, piles and sore throat etc. The burrowing and feeding activity of earthworms have numerous beneficial effects on soil, as they increase the soil fertility and porosity. Their casts have higher nitrogen, phosphorus, potassium and calcium exchange capacity. The enzyme present inside the gut of the earthworm maintain pH of the soil. Earthworms increase water filtration ratio as they burrow vertically as well as horizontally, which is very important point of quick water filtration. The morphological features of *E. fetida* and *E.gammiei* showed variations in the skin colouration, their occurrence in the soil, segmentation, clitellum location, spermathecal opening, gizzard hardness, differences in position of nepridia and genital pores.

Keywords: Epigeic, Endogeic, segmentation, decomposition, clitellum.

Earthworm (Annelida, Clitellata, Oligocheata) are familiar to almost everyone. In India they are most popular forms of live bait for fishing. They are also important components of diet of many birds and mammals^[1]. They play an important role in organic matter decompositions and mineral recycling^[2]. In ancient times, earthworms were used to cure various human disease such as in treating wounds, chorionic boils, piles, sore throat and hernia when used externally and chorionic cough, diptheria and jaundice etc. When taken internally^[3,4,5]. They have been used successfully to improve health condition either in dried or paste form. The body of the worms produce a unique mucus secretion with antiseptic properties, which allow them to be used as drug in the prevention of various disease^[6,7,8]. Earthworms are also known to prey upon soil nematods in agrosystem^[9]. Epigeic earthworm are litter feeder found in soil surface, they are small in size range from 1-7cm in length, bright red or reddish brown in colour and have short life cycle, however reproduction of epigeic shows similarities with endogeic and anecic species ^[10,11]. *Eisenia fetida*, *Eudrilus eugeniae* and *perionyx excavatus* these are some epigeic species suitable for vermicomposting as well as speed up the rate of decomposition and mineralisation^[12,13]. *E.fetida* have wider tolerance of temperature then other epigeic earthworm as well as endogeic^[14]. Endogeic earthworms live deeper in the soil profile and feed mainly on soil, they have lower reproductive rates and long life cycle than epigeic and more resistance to unfavorable conditions such as drought and lack of food^[15]. On the basis of feeding behaviour epigeic species have a greater potential as waste decomposers then endogeic due to their humus consumption and surface dwelling nature^[16].

- Morphological comparison between Epegeic (*Eisenia fetida*) and Endogeic earthworm (*Eutyphoeus gammiei*)

S.No	Character	<i>Eisenia Fetida</i>	<i>Eutyphoeus Gammiei</i>
1.	Shape and size	Cylindrical body length 35-130mm and 3-5mm diameter	Cylindrical body length 182-405mm and 5-10mm in diameter
2.	Colouration	Red and brown in colour	Light brown or pink in colour
3.	Segmentation	80 th -120 th segment	195 th -228 th segment
4.	Clitellum	24,25 or 26,32	Clitellum ½ 13 th -17 th
5.	First dorsal pore	4/5 th or 5/6 th segment	First 11/12 th or sometime 10/11 th
6.	Spermatheca two pair	9/10 th and 10/11 th	12/13 th and 13/14 th
7.	Gizzard	17 th segment	19 th segment
8.	Female genital pore	14 th segment	14 th segment
9.	Male genital pore (one pair)	Middle of BC on 16 th -17 th segment	two on 17 th segments
10.	Penial setae	18 th segment	Tip spoon shapeds 18 th to 24 th
11.	Seminal vesicles	Two pairs in 9/10 th and 10/11 th	12 th extending posterior to 16 th



Fig.A. Laboratory culture of the epigeic earthworm *Eisenia fetida*(the red worm)

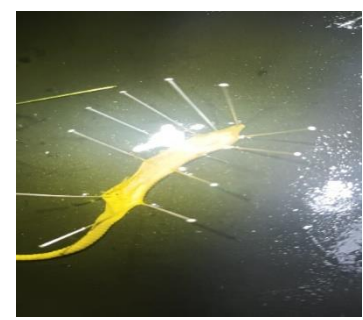
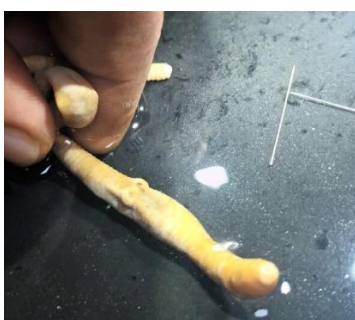


Fig.B. *Eutyphoeus* species showing internal structures (ZSI)

CONCLUSION

With regard to the review of the studies and research this can be concluded that earthworm *Eisenia fetida* and *Eutyphoeus gammiei* play an important role in environment. This soil born organisms give more uniform composition of the soil by creating tunnels and enhances soil structure. The colour of the body is mainly due to haemoglobin in the blood, some colour is due to the presence of yellow coelomic fluid. They have great contribution towards human health and nutrition. Also the use of this organism is in feeding aquaculture and poultry. *Eisenia fetida* and *Eutyphoeus gammiei* are phylogenetically and biologically different species. They have different morphology such as number of segments, location of clitellum, spermathecal opening male and female genital pores etc. Endogeic earthworms species have thick cuticle and hard gizzard with high digging capacity light in colour and less resistance to the sun light while Epigeic have thin cuticle, dark in colour and having high power of reproduction and can tolerate wide range of temperature. These differences may be responsible for the difference in the activities too.

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