Journal of Environmental and Occupational Health, 2022
VOL 12, NO. 12, PAGE 01

PERSPECTIVE

Analysis of Reproduction in Earthworms

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ARTICLE HISTORY
Received: 22-Nov-2022, Manuscript No. JENVOH-22-87421; Editor assigned: 24-Nov-2022, PreQC No. JENVOH-22-87421 (PQ); Reviewed: 09-Dec-2022, QC No. JENVOH-22-87421; Revised: 16-Dec-2022, Manuscript No. JENVOH-22-87421 (R); Published: 23-Dec-2022

Description

An earthworm is a member of the phylum Annelida and a terrestrial invertebrate. They feature a tube-within-a-tube body layout, exterior and internal segmentation that corresponds, and typically have setae on every segment. Wherever soil, water, and temperature allow, they can be found. Commonly found in soil, earthworms consume a range of organic materials. Plant material, live protozoa, rotifers, nematodes, bacteria, fungi, and other microbes are all considered to be organic matter. The digestive system of an earthworm spans the entire length of its body.

Reproduction

Earthworms are born small but fully formed, with the exception of their sex structures, which take roughly 60 to 90 days to develop. They take roughly a year to reach their maximum size. According to scientists, most garden types only live one to two years on average, whereas the typical lifespan in the field is predicted to be between four and eight years. The majority of common earthworm species are parthenogenetic, which means that embryonic growth and development take place without fertilisation. Parthenogenesis frequently developed from sexual cousins in lumbricid earthworms. Some Aporrectodea trapezoides lineages developed parthenogenesis 6.4–1.1 million years ago from sexual forebears. In some animals, reproduction is stimulated by mating even when no male genetic material is passed on to the offspring due to pseudogamous parthogenesis.

On the surface, earthworms typically mate at night. Since earthworms have both male and female sexual organs, they are hermaphrodites. Segments 9 to 15 are home to the genitalia. One or two testes are enclosed in sacs in earthworms. The sperm is produced, stored, and released via the male pores by the two or four pairs of seminal vesicles. While sperm is expelled from segment 15, the ovaries and oviducts in segment 13 release eggs via female pores on segment 14. Depending on the species, segments 9 and 10 have one or more pairs of spermathecae, which are internal sacs that collect and hold sperm from the other worm during copulation. With its storage vesicles of its mate, segment 15 of one worm discharges sperm into segments 9 and 10. Some species transmit sperm using external spermatophores.

Two sex pheromones, Attractin and Temptin, were found in all tissue samples of both *Hormogaster samnitica* and *Hormogaster elisae* after sequencing transcriptome DNA libraries from these two species. Earthworms likely need sex pheromones because of their environment, where chemical signals may be essential for luring a mate and facilitating outcrossing. The benefit of outcrossing would be to hide the expression of harmful recessive mutations in offspring.

In earthworms, copulation and reproduction are distinct processes. The mating pair's front ends ventrally overlap, and they trade sperm. The colour of the clitellum changes from bright reddish to pinkish. The clitellum secretes material that eventually creates a ring around the worm long after copulation, when the worms have already separated. The worm then withdraws from the ring while injecting its own eggs and the sperm of another worm into it. Each worm thus assumes the roles of genetic mother for the remainder of their progeny and genetic father for some of them. The ends of the cocoon seal together when the worm emerges from the ring, creating an incubator (cocoon) with a slightly onion-like shape where the developing worms are housed. Fertilization is therefore extrinsic. After that, the cocoon is buried in the ground. 2 to 20 offspring hatch after three weeks, with an average of 4. Direct development means that no larvae are produced.

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