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Effect of Adding Various Food Media on the Level of Growth of Earthworms

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ABSTRACT
A laboratory study on earthworms terrestris Lumbricus was conducted during the period from November 9 to December 6, 2017, using 36 adult worms of equal weight and age were divided into six groups, the control group was not added to the soil food, and the rest of the groups were added to the soil Food media (oats, cowpea, Roltlsh, Sera Goldy, Tetra). It was observed in this study that the treatment media was significantly superior to all treatments in weight and height, It is the only treatment that has not been reported in a group of worms. While the control group recorded the death of earthworms after the third reading. The results of the study showed the appearance of small worms in the soil on the fourth reading when using the nutritional medium as cowpea and the fifth reading of the oat medium.

Keywords: Earthworms, Industrial Media, Oats.

INTRODUCTION

Earthworms are invertebrates that inhabit the soil, Classified from Annelida phylum, Category Oligochaeta, Genus terrestris Lumbricus he is a natural food for fish and birds in most regions of the world (Hassan, 2011). Although it is an intermediate host of some parasites that infect poultry such as tapeworm and threadworm, and a natural means to ventilate the soil and deliver moisture to it through the tunnels formed in the soil as a result of the movement of the worm (Murad, 1981). Studies have confirmed the importance of the type of food media and temperature for the growth and reproduction of earthworms (Levin and Areed, 2005). Its activity and activities are highly influenced by the biological, chemical and physical soil properties (Blair et al., 1995; Edwards and Bohlen, 1996; Lee, 1985). Studies have indicated that the growth of earthworms and the utilization of food energy after the stage of maturity is towards the formation of sexual organs and reproduction rather than tissue building. There are several ways to measure the growth rates of earthworms through increased biomass and reproduction during the specified time periods (Daniel et al., 1996).

Study confirmed the effect of the growth of earthworm species by environmental factors such as temperature and water content of the soil (Daugbjerg, 1988). The difference in location (field, laboratory), time period (season), soil characteristics (soil texture, and organic matter content), availability of nutrients, fluctuations in temperature, and moisture content in the soil have a major impact on the growth of earthworms(Kurek,2003; Hendrix et al.,1992). Studies indicated that the number of earthworms is more in agricultural ecosystems containing organic materials compared to environmental systems to which organic or inorganic fertilizers are added.

However, there were no studies regarding the long-term effects of adding them to the growth and reproduction of earthworms (Whalen and Parmelee, 1988; Francis, 1995). Earthworms are used medically as a treatment for some human diseases such as viral hepatitis, high hair growth rate and high rate of milk generation (Dales and Klac, 2001). Since laboratory studies on the growth rates of earthworms are relatively few, and due to their natural availability, they can be produced in the laboratory and determine the optimal nutritional medium for their growth and reproduction to provide food for fish farming or for medical use and at the lowest cost. In this sense, I have identified the subject of the current study.

MATERIALS AND METHODS

Worms collection: Earthworms were collected 36 worms, It is one of the common and well-

known species in the home garden in the association / gray area after drilling half a meter deep, Manual sorting after extracting from the soil and distinguishing them by shape, size and length and by the presence of the Clitellum saddle area in adult worms, then put it on the filter paper for its weight. The worms were divided into 5 groups, each group of 6 worms of similar length after washing and cleaning them several times in a good way to get rid of the suspended soil and clays.

Measuring the weight and length of adult worms

Worms' groups are weighed with a sensitive scale DT-580 MINI Electronic, The group weights ranged between (8-13) g, each group was transported to plastic containers. Weights were recorded every 72 hours and for ten consecutive readings. The individual length of each worm in the group was measured by a ruler after fixation from both sides 22 cm.

Soil preparation process: Soil was taken from the same home garden from which the soil was taken with a volume of 4 kg and free of compost and sterilized in an Oven electric oven at a temperature of 80 C for a period of 24 hours, Then it was divided into plastic containers after weighing 570 grams of soil for each container. Various nutritional media (natural and artificial) were added at a rate of 5% of the soil weight for (oats, cowpea, Roltlsh, Sera Goldy, Tetra).

Prepare the food media: The vegetable portion of the cowpea was collected, dried and then ground in a universal mill, Use QUAKER oatmeal, The three industrial food media are Roltlsh (Sera Goldy, Tetra).It was weighed by a Chinese-origin DT-580 MINI Electronic sensor scale and added to the soil distributed in plastic containers.

Table 1: The chemical composition of the food media used in the experiment

chemical composition	Food medium
Protein 11%, Carbohydrates 60%, Fat 8%, Fiber 9%,	Oats
24%protein, 48% carbohydrates, 1.5% fat, C and B vitamins and minerals.	cowpea
Protein 56%, Crude Fat 13%, Minerals 4%	Roltlsh
Starch of maize, wheat flour, wheat clotine, blue algae 10%, wheat grains, brewer's yeast, fish oil (49% of which is omega), flea, maltose sugar (0.4%), nettles, herbs, alfalfa clover, parsley, snails, hashish Water, pepper, spinach, carrots, garlic	Sera Goldy
Protein 38%, Fat and Crude Oils 9%, Crude Fibers 2%, Moisture 7%, Vitamin A, D, Manganese 81 mg / kg, Zinc 48 mg / kg, Iron 32 mg / kg, Cobalt 0.6 mg	Tetra

RESULTS AND DISCUSSION

The average weight of worms: Table 2 indicates the height in the weight of worms treated from the second reading and the reading was (10, 12, 14) g and the readings were fixed 14 g until the tenth reading, In group two, weights increased (oats, Sera Goldy, Tetra), As for the third reading, Table 2 shows a decrease in the weight of worms in the oat group and the survival of earthworms in the nutritional media (Sera Goldy, Roltlsh, Tetra).

The reason may be attributed to the fact that the media consisting of food for ornamental fish contains a high percentage of protein, which negatively affected the growth of earthworms, while the table showed an increase in the average weight of the cowpea group (12 g). The results of Table 2 showed an increase in the weight of worms for the two oat groups and cowpea gain in the fourth and fifth reading after reading 4 worms from the oat group and 3 worms from the cowpea group in the fifth reading and this is consistent with (Marian and Pandian, 1984; Hassan, 2011). It was noted from the results of the current study the emergence of small worms immediately after hatching eggs from inside the cocoon that was placed by adults in the soil on

the fourth reading of cowpea and the fifth reading of oats. This is evidence that earthworms after puberty use the energy of food toward reproduction and egg formation and is consistent with the results of the study (Daniel et al., 1996), and that natural media are the best results for improving the productive and reproductive performance of earthworms.

The reason for the loss of the groups added to it is due to the industrial and natural food media (oats, cowpea gain) due to the high concentrations of active organic substances in a manner that affects the performance of earthworms and their natural functions, or it may be due to temperature changes, and this is consistent with what he observed (Hassan, 2011).

Where I took in the study five readings instead of ten readings due to the death of worms, which attributed the reason to the incompatibility of the nutritional medium jett powder with the temperature 20 ° C, The current study did not register a reproductive state except with a group of oats and cowpea, with small worms remaining for the second month in the same medium as food.

Table 2: Effect of dietary media on the weight of earthworms (LSD 5% = 2.66)

temperature	Average weight (g) for groups						Today
	Tetra	Sera Goldy	Roltlsh	Cowpea	Oats	the control	
°25-22	10	11	10	11	13	10	2017-11-9
°24-22	11	11	9	11	14	12	2017-11-12
°23-22	11	11	9	12	13	14	2017-11-15
°22	11	11	9	‡10	16	14	2017-11-18
°20	12	11	12	8	16	14	2017-11-21
°20	12	11	12	8	16	*	2017-11-24
°19	12	13	12	12	17	*	2017-11-27
°19	14	13	13	13	17	*	2017-11-30
°18	14	13	13	*	*	*	2017-12-3
°18	14	14	13	*	*	*	2017-12-6

Small worms appear *Group worms perishing ‡

THE LENGTH OF EARTHWORMS

Table 3 indicates a significant increase compared to the control treatment by 0.3 until the fourth reading, and then some reading remained stable without any noticeable change until the tenth reading, And two groups of oats and cowpea by 0.1 by the third reading, where the most increase in length was by treating oats and cowpea, It may be due to this superiority that they are rich in protein and mineral elements (Hassan, 2011) and are characterized by being rich in vitamin B, which helps to increase growth (Kurek, 2003).

It can be deduced from the above experience that the best food media was oatmeal and cowpea gain in the first place and then the rest of the industrial media comes with a temperature of 18-18 o o It is useful media that can be added to improve the growth of worms in the soil and has provided protection for worms from low temperatures due to their content of Proteins and high energy nutrients.

Table 3: Effect of food media on earthworms

temperature	Average height (cm) for groups						Today
	Tetra	Sera Goldy	Roltlsh	Cowpea	Oats	the contro	
°25-22	22	22	22	22	22	22	2017-11-9
°24-22	22	22	22	22	22.1	22.1	2017-11-12
°23-22	23	23	22	22.1	22.1	22.2	2017-11-15
°22	23	23	23	22	22.1	22.3	2017-11-18
°20	23	23	23	21	22	22.3	2017-11-21
°20	23	23	23	20	22	22.3	2017-11-24
°19	23	23	23	22	24	22.3	2017-11-27
°19	24	23	23	22	24	22.3	2017-11-30

°18	24	23	23	24	25	22.3	2017-12-3
°18	*	23	23	*	*	22.3	2017-12-6

Group worms perishing*

REFERENCES

1. Bohlen PJ, Parmelee RW, McCartney DA and Edwards CA. Earthworm effects on carbon and nitrogen dynamics of surface litter in corn agroecosystems. Ecological Applications, 1997; 7(4): 1341-1349.
2. Dales PP and Klac Y. Earth worms in medicine Amer. J. Nursing, 2001; 7(2):72-127.
3. Daniel O, Kohli L and Bieri M. Weight gain and weight loss of the earthworm Lumbricus terrestris L. at different temperatures and body weights Soil Biology and Biochemistry, 1996; 28: 1235-1240
4.
5. Daugbjerg P. Temperature and moisture preferences of three earthworm species (Oligochaeta, Lumbricidae). Pedobiologia (Jena), 1988; 32(1-2): 57-64.
6. Edwards CA, Bohlen PJ, Linden DR and Subler S. Earthworms in agroecosystems. Earthworm ecology and biogeography in North America, 1995: 185-213.
7. Francis GS and Knight TL. Long-term effects of conventional and no-tillage on selected soil properties and crop yields in Canterbury, New Zealand. Soil and Tillage Research, 1993; 26(3): 193-210.
8. Hassan and Majeed S. The effect of different food media and temperatures on the growth of the earthworm, Journal of Pure and Applied Sciences, 2011; 2(19): 617-622.
9. Zhang, N.The role of endogenous aryl hydrocarbon receptor signaling in cardiovascular physiology(2011) Journal of Cardiovascular Disease Research, 2 (2), pp. 91-95. DOI: 10.4103/0975-3583.83033
10. Kurek A. Annual changes in coelomocytes of four earth worm species. Pedobiologia, 2003; 47(55): 205- 212.
11. Kurek A. Annual changes in coelomocytes of four earth worm species .Pedobiologia, 2000; 47(55): 205-212
12. Lee KE. Earthworms: their ecology and relationship with soils and land use. Academic Press, Sydney, 1985.
13. Levin LA and Creed EL. Effect of temperature and food availability on reproductive responses of Streblospio benedicti (Polychaeta: Spionidae) with planktotrophic or lecithotrophic development. Marine Biology, 1986; 92(1): 103-113.
14. Lietz DM. Potential for aquatic oligochaetes as live food in commercial aguaculture. Hydrobiology, 2001; 155: 309-310.
15. Marian MP and Pandian TJ. Culture and harvesting techniques for Tubifex tubifex. Aquaculture, 1984; 42(3-4): 303-315.
16. Murad, Murad B. Invertebrates, 3rd ed. 1981; 243-256.
17. Paolett A. Cohort culture of Tubitex tubifex form. Hydrobiology, 2002; 180:143-150
18. Blair JM, Parmelee RW and Lavelle P. Influences of earthworms on biogeochemistry. Earthworm ecology and biogeography in North America, 1995; 127-158
19. Whalen JK, Parmelee RW and Edwards CA. (1998). Population dynamics of earthworm communities in corn agroecosystems receiving organic or inorganic fertilizer amendments. Biology and Fertility of Soils, 27(4), 400-407.