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VERMICOMPOSTING AND VERMICULTURE IN DIFFERENT CULTURE MEDIA

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ABSTRACT

The objective of the study was to assess the growth and reproduction of *Eisenia. fetida* (Savigny) on various locally accessible organic manures, such as cow manure, sheep/goat manure, and dry leaves. The study measured the growth and reproduction of *E. fetida (Savigny)* by looking at parameters like body weight gain, the number of eggs produced, and the number of hatchlings that emerged. for almost six months, these worms were raised in this organic manure. In comparison to basic soil, sheep/goat manure, dry leaves, and cow manure, the growth rate of *E. fetida* (Savigny) in cow manure was substantially greater ($P<0.05$). After around the ninth week of inoculation, cow and goat dung demonstrated mortality. When compared to dry leaves, the formation of eggs was substantially higher ($P<0.05$) in cow manure. Simple soil and cow goat dung did not show evidence of cocoon development. Additionally, the number of hatchlings produced in cow manure (118) was much larger ($P<0.05$) than in dry leaves (75hatchlings produced during this experiment). The conclusion is that cow manure works better as a growth and reproductive medium for *E. fetida* (Savigny).

KEYWORDS: E. fetida (Savigny) , hatchlings , mortality, cocoon

1. INTRODUCTION

Earthworms are invertebrates that live in the soil and are very significant to agriculture through ingestion, they affect the structure of the soil, causing organic matter to decompose and be ejected as a surface or subsurface cast (Nijhawan and Kanwar, 1952; Edwards and Lofty, 1977). *Eisenia. fetida* (Savigny) is one of the most promising worms for vermicomposting. Numerous studies have been conducted on its biology and primary environmental needs (Kaplan *et al*., 1980; Hartenstein *et al*., 1981; Reinecke and Venter, 1987; Edwards, 1988). One earthworm that grows quickly is *E. fetida* (Savigny) (Neuhauser *et al*., 1980). reproduces abundantly (Hartenstein *et al*., 1979), has the potential to be used for the management of wastes rich in microbial biomass The process of breaking down organic wastes referred to as vermicomposting (Edwards, 2004). Vermicomposting is a bio-oxidative process that speeds up the decomposition of organic matter and significantly alters its physical and biochemical properties through interactions with detritivorous earthworms and

other fauna in the decomposer community. (Dominguez, 2014, Lim *et al*. 2015, Stiles, 2017) This worm's hardiness allows it to withstand significant temperature and humidity fluctuations This makes it simple to cultivate this species. It has a 70-day duration and an extremely rapid growth rate. The adult worm can gain up to 1500 mg of mass. A mature worm will typically generate one cocoon every three days, and after three to four weeks of incubation, one to three young worms will hatch from each cocoon. Even with its high temperature tolerance, it cannot tolerate intense sunshine or extreme temperatures (Das *et al*.2018) the present piece of is focused on the vermicomposting and growth and reproduction of *E.fedita* (Savigny)

2. MATERIALS AND METHODS

Experiment and observations were made in the vermicomposit unit established at Desh Bhagat University, Punjab, Mandi Gobindgarh
Three organic manures—cow, goat manures and leaves of pipal—were examined for their ability to cultivate *Eisenia fetida* (Savigny). Basic soil was used as the reference. Every material was dried purverized separately. To determine if these organic manures were suitable for cultivating E. fetida, the pH values of the manures were recorded. Two replicates of each medium were taken in eight containers. Each container was filled up to the level so that each medium occupied a depth of 5cm. Water was added to each medium to adjust the moisture content, which varied depending on the medium cow dung had 140% moisture content, leaves had 50%, goat manures had 200% moisture content, and basic soil had 20% moisture content. From stock culture, forty *E.fetida* (Savigny) preclitellate specimens were gathered. After weighing two preclitellate worms to determine their biomass, the worms were divided into eight containers containing various organic medium. To keep earthworms from escaping replicates were covered with paddy straw. of each medium were taken in eight containers

Materials and Methods
Experiment was conducted in Vertebrate Pest Control Laboratory, PMRP/IPEP at National Agricultural Research Center, Islamabad during the period from 30 October 2002 to 14 May 2003, where the stock of E. fetida is being maintained for the past 8 years.

Eisenia fetida development in various organic media were evaluated by tracking weekly changes in biomass, the number of eggs generated, and the number of juvenile that emerged from these eggs. To protect the juvenile from the extremely varied circumstances in these containers, all of the created juvenile were removed from the medium

3. RESULTS

After fifteen weeks of inoculation, cow manure showed high growth. The growth rate in basic soil and dry leaves is depicted .When these findings were compared, it was evident that the worms' weight gain in cow manure was far greater than their weight gain on dry leaves (F1-

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50 = 66.3625, P=0.0000) and basic soil (P=0.0000, F1-50 = 322.913). Compared to simple soil, the growth rate in dry leaves of pipal was substantially higher (F1-50 = 402.88, P=0.0000). Sheep/goat dung was omitted because it continued to display mortality even after the medium was changed, despite having an acidic pH of 5.9 (Table I). It was determined that cow dung could be a great source of food for E. fetida.

PH value of different culture media used in experiment

Organic manures	PH
Simple soil	7.00
Dry leaves	7.1
Cow dung	8.3
Goat /sheep manure	5.9

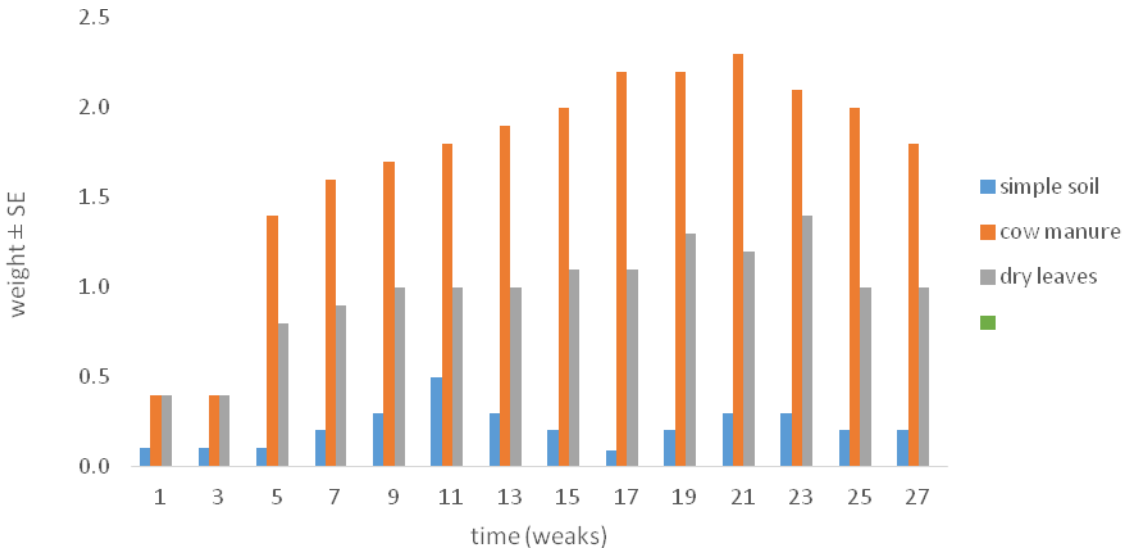

Fig .1 effect of different organic manures on biomass of earthworm Esiena fediata

Worm masses grew to as much as 2 g when incubated separately. Maximum worm masses were 0.02 and 0.2 g/worm, respectively.This result was further supported by the current investigation, as earthworms cultured in pairs reached their maximal biomass of 2.3g in cow manure and 1.4 g in dry leaves. The control group's biomass did not differ significantly. When conditions were unfavorable the size was reduced. This being the case in the culturing of E. fetida at the end of experiment when temperature exceeded the optimal value

Cocoon formation in different media

(Baston 1988) stated that food quality and source might impact on cocoon production.After the third week, egg developed in dry leaves of pipal however, the quantity of eggs produced was lower than that of eggs in cow manure (Fig. 2). Over the course of the entire investigation, 220 eggs were generated in cow dung and 116 eggs were generated in each of

the five replicates of dry leaves. Upon comparing these findings, it was found that cow dung produced substantially more eggs than dry leaves (FI-52 =12.745, P=0.00077). Throughout the trial, no eggs were seen in the sheep/goat or control groups. *E. fetida* growth and population density in cow, horse, or activated sludge were found to be correlated by Neuhauser *et al*. (1980).

hatchling growth and production

Dry leaves of pipal and cow dung were found to be producing juvenile. Over the course of six months in all the replicates, 220 eggs gave birth to a total of 118 hatchlings in cow manure. Out of 116 eggs, 70 juvenile surfaced in the case of dry leaves of pipal the remaining eggs did not hatch during the six-month time frame.

4. CONCLUSION

The present study demonstrated that the worms needed to be fed on a regular basis in order to attain high rates of growth and reproduction Worms need a moist environment to thrive. The bedding material should be kept moist, but not waterlogged. It was also observed that worms thrive in a neutral to slightly acidic environment, typically with a pH range of 6.0 to 7.0. its concluded that monitor the moisture level, food supply, and overall health of the worm population regularly. Harvest compost when it's ready and periodically refresh the bedding material.

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