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ANALYSIS

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STUDIES ON THE GROWTH AND COCOON PRODUCTION OF *LAMPITO MAURITII (KING BERG)* CULTURED IN DIFFERENT RICE BRAN MEDIA

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ABSTRACT

The rate of cocoon production of adult earthworm, *Lampito mauritii* kept in 100, 75, 50, 25 and 0 PSR (Per cent substrate ratio) of partly decomposed ricebran waste with soil for 30 days was determined. The worms kept in 50, 75, and 100 PSR media for 30 days showed a gradual increase in their body weight up to 22 days thereafter, a gradual decline until the termination of this study. However, the worms kept in the same media (50, 75 and 100 PSR) after 30 days showed an increased value in their body weight over their respective initial weight. On the contrary, all the worms kept in 0 and 25 PSR media showed a gradual decrease in their body weight until the termination of this study. The worms kept in soil alone for 30 day though showed 100% survival value, only 2 cocoons were laid during the course of study due to less organic matters in the medium. Though the worms kept in other PSR media for 30 days produced relatively more cocoons than the control, the worms in 75 PSR medium produced relatively more cocoons. It could be inferred that the substrate ratio with 75 PSR ricebran medium is considered to be a good medium for the culture of earthworm, *Lampito mauritii.*

Key words: Ricebran, *Lampito mauritii*, Cocoon production.

INTRODUCTION

The Greek Philosopher, Aristotle, named the earthworm as the 'Intestine of Earth'. In India, so far, 509 species, referable to 67 genera and 10 families have been reported (Kale, 1991). Earthworms are omnivorous but they mostly derive nutrition from dead organic matter, which generally does not occur abundantly in soil. Population dynamics, productivity and energy flow in the earthworms cannot be fully understood unless the life cycle of the earthworm is known. Studies on the life cycle of earthworm are also necessary for effective vermiculture. The vermiculture means artificial rearing or cultivation of earthworms and the technology is the scientific process of using them for the betterment of human beings. Vermicompost is the excretory product of earthworm, which is rich in humus and vermitechnology is a promising technique that has shown its potential in certain challenging areas like augmentation of food production, waste recycling, management of soil waste, etc,. The word vermiculture biotechnology implies a modern technique of harnessing the ecosystem for effective utilization of the organic waste with the help of earthworms, which results into generation of useful organic manure. Earthworm decomposes all types of organic wastes such as agricultural wastes like paddy straw, sugarcane trash, vegetable wastes, soya beans harvest waste, development of worms and eventual compost production. Animal products such as pig cattle solids slurries and animal dropping are also converted into reproductive plant growth media by earthworms out as vermicompost. This technique also helps to conserve the bio diversity, which is the need of the hour. Apart from providing self

employment opportunities for the weaker section, it also provides profitable agricultural waste utilization. It will also help in maintaining the environmental/ecological balance.

MATERIALS AND METHODS

COLLECTION OF EARTHWORM

Specimens of adult earthworm, *Lampito mauritii* were collected in the Thiruvidaimaruthur, Village. They were kept in earthen pots with substrate medium containing 50% partly decomposed ricebran and 50% soil and were maintained under the laboratory condition for five days. Care was taken to see that the worms collected from the site, did not experience any pesticide treatment, an adult worms with the size 13.5 to 25.4cm in length and 1.500-2.300gm in weight were used for the present study.

COLLECTION OF SOIL

Dry soil was taken from the Thiruvidaimaruthur village for present study. It was manually powdered using stone and mortar.

COLLECTION OF RICEBRAN

The waste material of ricebran were collected from Thiruvidaimaruthur, Village, Thanjavur District.

PARTIAL DECOMPOSITION OF ORGANIC WASTE

One rectangular brick work cement tank with size 90x35x45cm was constructed and used for the decomposition of ricebran which was free from earthworm invasion. The tanks were filled with ricebran waste and poured with sufficient water. The tanks were closed with polythene sheets in order to avoid water evaporation and a possible release of foul smell during decomposition. Water was poured regularly in the tank after removing the polythene sheets and the tanks were closed again with the same polythene sheets for proper decomposition. Once in three days the decomposing materials were thoroughly mixed using wooden rod so as to ensure uniform decomposition. Ideal semi decomposed ricebran in the form of wet powder can be obtained only often 30 days decomposition. About 120kg of dry semi composed ricebran powder can be obtained during one process. These materials were then manually powdered with particle size less then 1mm as suggested by (Reinecke and Venter 1985) and stored in a polythene bag.

PREPARATION OF SUBSTRATES FOR COCOON PRODUCTION STUDY

Six sets of Five media with percent substrate ratios (PSR), 100,75,50,25, and 0% were prepared using dry soil and powdered ricebran with volume by volume basis and mixed well. 4kgs of substrate in each percent ratio was taken in an earthen pot and sufficient volume of water was added into it to ensure optimum moisture condition as suggested. To assess the rate of cocoon production in the above said media, 12 adult earthworms were introduced into each pot. Six set of control (soil alone) as substrate experiments with 12 adult earthworms in each were also maintained simultaneously along with these media. Regular watering is a must for this culture study to provide optimum moisture condition to the earthworm cocoons produced by earthworms were collected and recorded once in a weak for about a period of one month (09.12.2014 to 07.01.2015) survival of earthworms was also observed in the above said media during the course of study. Rate of cocoon production was calculated at daily as well as monthly basis.

CALCULATION

The rate of cocoon production by earthworm was calculated and comparisons were made between control and experimental data.

RESULTS AND DISCUSSION

COCOON PRODUCTION STUDY

The rate of cocoon production and weight gain / loss of the aniseic earthworm *Lampito mauritii* kept in the 0, 25, 50, 75 and 100 PSR (Percent Substrate Ratio) media prepared from partly decomposed ricebran waste with soil for 30days were given in Table1 and 2 respectively. The worms kept in 50, 75, and 100 PSR media for 30 days showed a gradual increase in their body weight up to 22 days thereafter, a gradual decline until the termination of this study. However, the worms kept in the same media (50, 75 and 100 PSR) after 30 days showed an increased value in their body weight over their respective initial weight. On the contrary, all the worms kept in 0 and 25 PSR media showed a gradual decrease in their body weight until the termination of this study and their respective percent weight loss values were 70.5 and 95.4 (Table 2). The worms kept in soil alone for 30 day though showed 100% survival value, only 2 cocoons were laid during the course of study due to less organic matters in the medium. Though the worms kept in other PSR media for 30 days produced relatively more cocoons than the control, the worms in 75 PSR medium produced relatively more cocoons (10.2 cocoon /day /worm or 0.141 cocoons / month /worm) than the worms kept in other PSR media (7.66 to 9.1cocoon / day / worm or 0.106 to 0.126 cocoon /month /worm) [Table 1]. The rate of the cocoon production observed in the present study irrespective of PSR media used was not in consistence with the results observed by Ramalingam (1997) and Bakthavathsalam and Ramakrishnan (2004) in the same species respectively cultured exclusively under press mud medium and 50 PSR cow dung medium, where they found higher valuesof cocoon production with ± 0.4 and 0.15cocoon / worm / day respectively. Kale *et al*,.(1981) have also observed greater production of cocoons by *Perionyx excavatus* using different organic wastes such as cow dung, sheep dung, horse dung, poultry manure and sludge from bio gas plant. Cocoon production of *Lampito mauritii* is usually high as in other species of *Dravida Willsii* and *Octochaetona surensis* due to their surface dwelling nature and their activity confined to 20 cm depth during winter and 30cm during summer" season (Dash and Senapati, (1980) Evens and Guild (1948) noted the production of 42 – 106 cocoons in one year by surface dwelling. Under laboratory conditions. Evans and Guild (1947) found that *Lumbricus terrestris* produced cocoons at the rate of 3.7 cocoon / worm / month and suggested that *L.terrestris* and endemic earthworm species could be induced to produce cocoons throughout the year. The earthworm culture study made by Subramaniyan (2008) using paddy straw waste showed relatively very low cocoon production value (0.126 cocoon /worm /day) over our present study with the ricebran. The current results proved beyond any doubt that the culture medium containing ricebran was the best one as far as cocoon production and growth of earthworm are concerned.

TABLE – 1

Rate of the cocoon production of epigeic earthworm *Lampito mauritii* kept in different Percent Substrate Ratio (PSR) media of partly decomposed ricebran and vermicompost of the same for one month.

PSR	Total cocoons collected in 6 pots	Total cocoons / pot	Cocoon / day	Cocoon / day / worm
0	21	3.5	0.7	0.009
25	230	38.3	7.66	0.106
50	275	45.8	9.1	0.126
75	307	51.1	10.2	0.141
100	221	36.8	7.3	0.101

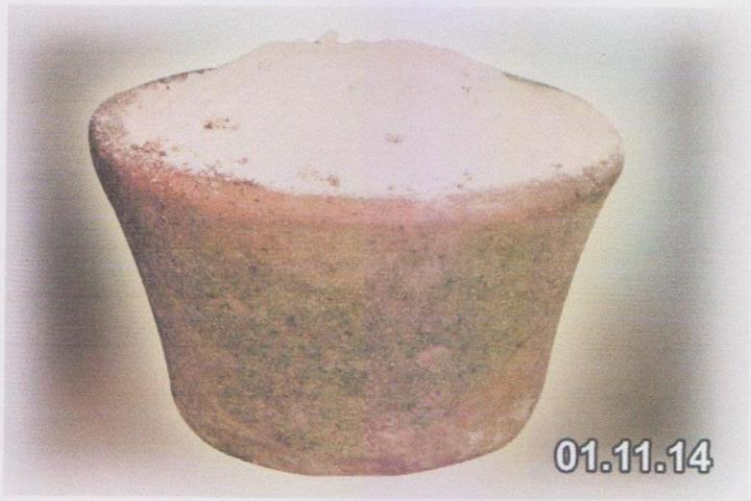
TABLE – 2

Values showing the changes of earthworm weight (gm) during cocoon production of *Lampito mauritii* kept in different percent substrate (PSR) media of partly decomposed ricebran waste and vermicompost of the same for one month.

PSR	0 Day	8th Day	15th Day	22nd Day	30th Day
0	87.2	88.1	83.4	70.5	62.6
25	86.5	96.2	87.0	95.4	90.3
50	87.2	101.3	110.6	120.5	107.2
75	86.6	120.1	132.4	145.6	122.4
100	87.3	113.4	139.6	157.2	139.1

FIG 1. SHOWS THE RICEBRAN, BEFORE AND AFTER COMPOST.

(A) BEFORE COMPOST



(B) AFTER COMPOST

FIG 2. SHOWS THE DIFFERENT RICEBRAN MEDIA USED DURING THIS STUDY.

S – Soil

PD – Partly Decompost

FIG 3. SHOWS THE SAMPLE OF AN EARTHWORM *LAMPITO MAURITII.*

FIG 4. SHOWS THE SAMPLE OF COCOONS OBTAINED DURING THIS STUDY.

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