Effect of Feces of Kaur Beef Fed Palm Frond, Setaria and Sakura Block as Media on Growth of Earthworm (*Pheretima sp*)

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ABSTRACT

The present study was conducted to evaluate the effect of Kaur feces as media on growth and biomass production of earthworm.This study used a completely randomized design (CRD) with 4 treatments and 5 replications. Each treatment gorup used the media to grow earthworms derived from 50% husk and 50% Kaur cattle feces fed different level of palm frond. Each replication contained 10 *Pheretima sp* aged of 2-3 days. Total earthworm used was 200 individuals. The treatment groups were as follows. P0 = 50% rice husks + 50% of Kaur feces (100% natural grass + sakura Block); P1= 50% rice husks + 50% Kaur feces (75% natural grass + 25% palm frond + Sakura Block); P2 = 50% rice husk + 50% Kaur feces (50% natural grass + 50% palm frond + sakura block); P3 = 50% rice husk + 50% Kaur feces (25% natural grass + 75% palm frond + Sakura Block)The results of analysis of variance showed that the treatments had no effect on the parent body weight gain per unit of the experiment (P> 0.05). The results of analysis of variance showed that treatmet of media had significantly affected (P <0.05) the production of biomass of Pheretima sp. In conculsion, feces of Kaur cattle fed 50% setaria + 50% palm frondv+ sakura block was the best media for maintaining *Pheretima sp.* as indicated by the highest biomass production.

Key words: earthworm, *Pheretima sp.*, growth, biomass production

INTRODUCTION

Feces from beef cattle still contained organic and anorganic compounds which could be used as nutrition in animals. Kaur beef cattle is local cattle which were maintaied for a long times and had natural selection in tropical environment and traditional maintenance. Kaur cattle was maintained in the field without housing and fed natural grass. This cattle was maintained by local residents. Because of this cattle was maintained in the field, their feces become a problem such as causing pollution. In addition, production of these cattles maintained in palm oil plantation were low as a result of lowing in forage production (Batubara, 2003). On the other hand, the production of palm frond was abundance and could be used as feed of Kaur cattles to substitute forages (Diwyanto *et al*., 2003; Subagyono, 2004; Azmi dan Gunawan, 2005; Sulaiman et al., 2013). Pelepah sawit contained 23% dry matter, 3,38% crude protein, 36,6% crude fiber and 5,51% ash (Anonimous, 2015). A high in crude fiber on palm frond would cause lower digestion if it was not accompanied by feed supplement rich in carbohidrate and protein (Leng and Kanjanakruthipong, 1995). Sakura block was feed supplemnet rich in nutrition such as protein, energy and mineral needed by livestock. Sakura block as feed supplement could improve performance of goat (jarmuji *et al*., 2006) and Bali cattle (Jarmuji *et al*., 2013).

Although earthworm had many beneficial effect on human being, earthowrm was not maintained intensively by Indonesian as compared with other countries (Budiarti dan Palungkun, 1992). Earthworm had main properties as composer which converted feces to organic compost (Brata, 2003). The ability of earthworm in composing organic matter was 3 –5 times faster than microbes and other composer with better organic compost quality. *Pheretima sp* was local earthworm of Southeast including Indonesia (Sihombing, 2001). Physical characteristics of earthworm included klitelium lies on the segment 14-16, dorsal and ventral pigmentation maroon, slender body size, adult body length reaches 11 cm and diameter 2 mm, the amount of pigment 122-153 (Edwar and Lofty, 1977). Living habitat most suitable for the growth of earthworms is organic matter from leaf litter, dung, decaying animal after the fermentation process (Budiarti and Palungkun, 1992). According Ruslim, et al. (2013), the characters of morphology and growth of earthworms were influenced by genotype and feed media. Furthermore Sunandi (2010) stated that the differences in media for the worms maintaining could affect the nutrient content of vermin compost.

MATERIALS AND METHODS

Procurement of *Pheretima sp.*

Procurement of *Pheretima sp*. was performed by maintaining the adult of *Pheretima sp*. to produce child worm. Then child worm aged 2-3 days taken as many as 200 individuals for research material.

Media Preparation

Media for earthworms growing used was Kaur cattle feces, rice husks and $CaCO_3$. The ratio of these media was Kaur cattle feces was 50% and 50% rice husks. Cattle feces was dreid and cleaned to remove inorganic objects such as plastic and metal. Furthermore stirred media were stirred and given CaCO3 for 0.2% of the media, and given water untill the water content of media reach 60% and then fermented in a plastic bag for 21 days to remove the gases that are not desired. The calculation of the media was based on adult body weight of earthworms (a gram), period of maintenance (b-day), and the need to feed earthworms counted twice weight. From these results can be calculated needs of media (Y) using the formula: Y (gram) = a gram x bx 2 (Brata. 2003).

Research Preparation and Earthworm Maintenance

Each bucket which has been filled with media was included 10 heads of earthworms Pheretima sp age of 2-3 days. Earthworm planting was done by making a hole amid media with a depth of 5 cm, then plant the worm and the hole closed. To avoid the release of earthworms from the container maintenance, then the maintenance area was covered with gauze. Furthermore, each bucket was coded. Watering is done once in three days and the reversal of the media done once a week (Brata, 2003).

Research Design

This study used a completely randomized design (CRD) with 4 treatments and 5 replications. Each treatment gorup used the media to grow worms derived from 50% husk and 50% Kaur cattle feces fed different level of palm frond. Each replication contained 10 *Pheretima sp* aged of 2-3 days. Total earthworm used was 200 individuals. The treatment groups were as follows.

P0 = 50% rice husks + 50% of Kaur feces (100% natural grass + sakura Block)

P1= 50% rice husks + 50% Kaur feces (75% natural grass + 25% palm frond + Sakura Block)

P2 = 50% rice husk + 50% Kaur feces (50% natural grass + 50% palm frond + sakura block)

P3 = 50% rice husk + 50% Kaur feces (25% natural grass + 75% palm frond + Sakura Block)

Variable measured were body weight of earthworm induk and biomass production. Biomass production was calculated using the following equation: Biomass production= body weight of parent worms + body weight of child worms.

RESULTS AND DISCUSSION

Effect of Treatment on Body Weight Gain of Parent Worm

The average weight gain per unit parent worms (10 animals Pheretima) each treatment are presented in Table 1. The results of analysis of variance showed that the treatments had no effect on the parent body weight gain per unit of the experiment (P> 0.05).

Table 1. Average body weight gain of eartworm (gram/unit)

Treatment	Replication					Average
	1	2	3	4	5	
P0	1.44	1.18	1.47	1.39	1.42	1.38 ns
P1	1.88	1.4	1.65	1.47	1.88	1.66 ns
P2	1.18	1.35	1.37	1.5	1.23	1.33 ns
P3	1.81	1.56	1.54	1.48	1.6	1.60 ns
Average	1.58	1.37	1.51	1.46	1.54	1.49

The average parent body weight gain in the study was 1.54 g / units. This average was lower than the parent body weight gain *Pheretima sp* treated with media feed mixture of cattle feces and rice straw, namely 2.19 g / unit (Sunadi, 2010). This difference is due to a mixture of straw as feed media *Pheretima* had better organic material than rice husk, and therefore it could be used as feed worms

more effective. According Apriyani et al. (2009), Pheretima sp has a high preference and a high rate of growth in the medium straw, namely 10.8 individu / day as compared with sawdust and garden soil, namely 4.6 individuals / day and 1.9 individuals / day, respectively. However, those values were lower than medium banana compost which reached 32.8 individuals / day. Budiarti and Palungkun (1992), stated that earthworms feed was organic material derived from leaf litter, animal manure, and dead animals or plant after the fermentation process. Catalan (1981) stated that earthworm growth rate was highly dependent on the type and amount of feed consumed.

Effect of Treatment on Biomass Production

The average biomass production during the study was 3.22 grams/unit (Table 2). The results of analysis of variance showed that Treatment of media had significantly affected (P <0.05) the production of biomass of Pheretima sp. Biomass production is the total of the parent body weight and weight of child worm in the experimental unit.

Table 2. Averge of biomass production of earthworm (gram/nit)

Treatmen	Replication					Average
	1	2	3	4	5	
P0	2.67	2.33	2.14	3.13	3.96	2.84[a]
P1	2.81	2.2	2.69	2.76	3.27	2.75 [a]
P2	3.10	5.59	4.02	4.09	3.97	4.15[b]
P3	2.36	2.66	2.93	2.92	2.30	2.63[a]
Average	2.74	3.45	3.20	2.93	3.38	3.22

Giving a mixture of 50% rice husks and 50% feces of cattle originating from the feed (50% Setaria + 50% fronds of palm + sakura blocks) on P2 results in the production of biomass Pheretima sp highest in the amount, namely 415 g/unit as compared to P0, P1 and P3 which had biomass production of 3.33 g /unit, 2.75 g / unit and 2.63 g unit, respectively.

Feces from Kaur cattle fed 50% Setaria + 50% palm frond supplemented sakura block was the best media for earthworm as indicated by the best organic matter content and aeration for oxygen exchange as compared with other treatment groups. The content of nitrogen in the feces on dry weight basis used in P0, P1, P2 and P3 was 1.19%, 1.19%, 1.30% and 1.16%, respectively (Anonymous, 2015).

According to Edward and Lofty (1977) earthworms which consume feed with high protein would have a higher weight gain and faster reproduction. Aeration is also one of the factors that affect the rate of growth and reproduction. Good aeration will create an optimal circulation of oxygen that is needed for the life of earthworms (Haukka, 1987; Budiarti and Palungkun, 1992; Sihombing 2001). According Maryanto et al. (2007) the addition of 40-60% of palm oil empty bunch could increase biomass production of earthworms that were kept for 60 days.

CONCLUSION

Feces of Kaur cattle fed 50% setaria + 50% palm frondv+ sakura block was the best media for maintaining *Pheretima sp* as indicated by the highest biomass production.

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