Growth performance of male fattening Bali cattle farmers pattern through complete feed supplement containing silage of banana stems with different level

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Abstract. This study aims to determine the effect of providing complete feed containing silage of banana stems with different levels of daily weight gain, chest circumference, shoulder height and length of fattening Bali cattle farmers pattern. In this study 12 male Bali cattle belongs to farmers were used in the age range of 1 - 1.5 years with a body weight of 111-136 kg, an average of 120.79 kg and coefficient variation of 10.72%. The research method used was the experimental method using a Completely Randomized Design (CRD) with 3 treatments and 4 replications. The treatment in this study is: T0; local feed by farmers in timores + 1 kg complete feed without banana stem silage, T1; local feed by farmers in timores + 1 kg complete feed containing 10% silage of banana stems, T2; local feed by farmers in timores + 1 kg complete feed contains 20% silage of banana stems. Data obtained were analyzed using Analysis of variance (ANOVA). The results of the study show that the weight gain (kg / head/day) T0; 0.40 ± 0.10, T1; 0.58 ± 0.04, T2; 0.46 ± 0.09, Increase in Chest Circumference (cm/head/day) T0; 0.11 ± 0.01, T1; 0.14 ± 0.04, T2; 0.12 ± 0.02, Shoulder Height Increase (cm/head/day) T0; 0.09 ± 0.01, T1; 0.12 ± 0.01, T2; 0.11 ± 0.02, Increase in Body Length (cm/head/day) T0; 0.10 ± 0.01, T1; 0.13 ± 0.02, T2; 0.11 ± 0.05. The results of statistical analysis showed that the treatment had no significant effect of P> 0.05 on daily weight gain, chest level, body length and height of fattening male Bali cattle farmers pattern. The conclusion of this study is the provision of complete feed containing silage of banana stems with different levels giving the same effect between treatments on daily weight gain and linear size of fattening male Bali cattle farmers pattern.

1. Introduction

The obstacle to increasing beef cattle production in East Nusa Tenggara (ENT), especially Timor island, is that feeding by farmers is still below the dry material needs of beef cattle, only around 3-4 kg BK / head / day, dry beef cattle need to achieve optimal growth ranged from 6 to 7 kg / head / day [1]. While other constraints experienced by local cattle breeders according to [2] include the slow growth rate of bali cattle that have not reached their genetic potential, this is influenced by the low quality of feed nutrients, especially during the dry season, which causes low productivity beef cattle, especially fattening cattle, another problem faced is the fattening system that still relies on traditional cultivation systems, as well as the untapped use of local feed resources due to the lack of knowledge of farmers in the field of feed processing technology, as a result, the balance of protein and energy has not reached an optimal level of 1: 4.2, whereas the balance of protein and energy which is optimal for the growth

of beef cattle is 1: 5.1. This fact shows that there is a need for the application of local feed processing such as banana stems that have not been used optimally as a commodity that has more value because of the low crude protein content of 4.81% and the coarse fiber content of 32.56%, but availability is sufficiently available in dry land areas such as ENT. Making silage is one of the breakthroughs that can be done because the processing procedure is easy to do so that it can be adopted by farmers [3]. To optimize the potential for silage of banana stems, it is necessary to combine it with other feed ingredients in the form of complete feed aimed at increasing feed usability, supplementing feed elements so as to increase the consumption and microbial fermentation process in the rumen in digesting low-quality feed [4]. With increased consumption, ration digestibility and rumen fermentation, it can have an impact on livestock growth, especially cumulative growth which will also have an impact on relative growth. So that this study aims to determine the effect of giving complete feed containing silage of banana stems with different levels of daily weight gain, chest circumference, shoulder height and length of fattening bali cattle.

2. Material and Methods

2.1. Material

The livestock used in this study were twelve male Bali cattle going in the age range of 1 - 1.5 years with body weight 111-136 kg, an average of 120.79 kg and a coefficient of variation of 10.72%. The feed material used in this study was basal feed in the form of lamtoro leaves and complete feed. The composition of the constituent feed ingredients and the nutritional content of the research ration for each treatment can be seen in Tables 1 and 2. The enclosure used is 12 individual plots, measuring 1.5x2m. The equipment used consists of a container to hold sample feed and faeces, digital scales with an *excellent* trademark with a capacity of 1000 kg with 0.5 kg sensitivity to weigh livestock, digital scales of *morizon scale* with a capacity of 10 kg with a sensitivity of 10 g to weigh feed and measuring tape brands of rondo and measuring sticks for measuring the linear body of livestock.

2.2. Methods

The research method used was the experimental method using a Completely Randomized Design (CRD) with 3 treatments and 4 replications. The treatment in this study is:

T_0 ; local feed by farmers in timores *(Leucaena leucocephala, Acasia Leochoploa, Ficus Sp.)* + 1 kg complete feed without banana stem silage.
T_1 ; local feed by farmers in timores + 1 kg complete feed containing 10% silage of banana stems.
T_2 ; local feed by farmers in timores + 1 kg complete feed contains 20% silage of banana stems.

Tabel 1. Percentage Ingredients of Complate Feed (CF) in DM basis.

Ingredients	T_0	T_1	T_2
Rice-brand (%)	55	50	45
Grinding corn (%)	20	15	10
Fish meal (%)	5	5	5
Gliricidiasepium leaves meal (%)	10	10	10
Moringa oleifera leaves meal (%)	5	5	5
Silage of banana stems (%)	-	10	20
Urea (%)	2,5	2,5	2,5
Salt (%)	2,0	2,0	2,0
Starbio (%)	0,5	0,5	0,5
Total	100	100	100

Tabel 2. Nutrients content of experimental ration in % of dry matter

Ration ingredients		OM	CP	EEP	CF	CHO	NNFE	Energy	
	%DM	(%DM)	(%DM)	(%DM)	(%DM)	(%DM)	(%DM)	MJ/kg DM	Kkal/kg DM
Leucaena leucocephala	29,62	82,77	21,23	3,66	16,88	57,88	41,00	16,41	3906,52
Acasia Leochoploa	87,40	82,94	15,40	3,46	26,74	64,08	37,34	16,00	3809,23
Ficus Sp.	84,10	75,56	12,55	3,40	22,17	59,61	37,44	14,51	3455,77
CF. T_0	76,99	79,76	21,22	3,84	22,58	54,70	32,12	15,92	3789,58
CF. T_1	73,90	80,33	20,27	3,70	16,80	56,36	39,56	15,93	3791,76
CF. T_2	78,36	80,36	18,71	3,70	18,44	57,95	39,51	15,82	3767,23

Note: AnalysisResults of the Feed Chemistry Laboratory – Faculty of Animal Husbandry, Nusa Cendana University (Undana) Kupang.
DM = Dry Matter, OM = Organic Matter, CP = Crude Protein, C-Fat = Crude Fat, CF = Crude Fibre, CHO= carbohydrate, NEE= Non Extract Ether.

The variables measured in this study are based on formulas according to instructions[5]

a. Daily weight gain.

Place the two iron bar scales (bar) in a transverse position on the floor of the clamp enclosure, attach the scales on the scales above the two scales. The weighing rod cable is connected to the monitor and make sure the numbers monitored show zero before starting weighing. To find out that the scale tool can function properly, the weight standard is weighed first. Before the weighing of cattle begins, the weight standard is first weighed again to determine whether the weight is fixed. The position of the cattle when weighed is that cattle are above the scales, try to raise the cattle in an upright position and do not lean on the wall of the clamp. The numbers listed on the monitor screen are recorded after the numbers shown are constant (unchanging) and are calculated as follows:

$$\text{Daily weight gain} = W^2\text{-}W^1/t$$

Note: W^1 = Initial body weight (Kg)
W^2 = Final body weight (Kg)
t = Length of fattening time (days)

b. Linear body zise

The measurement of chest circumference is done by circling the chest behind the elbow joint, perpendicular to the median plane of the body using the meter. Measurements of body length are measured from the upright lateral lateral tuberculosis from the humeral os (front of the shoulder joint) to the ischii tuber (the back edge of the sitting bone) using an extech laser. Measurement of body height is measured from the highest point of the shoulder to the floor on the front foot using a measuring stick. Daily increments are calculated using the following formula:

Daily increase in chest circumference $= ICC^2 - IBL^1 / t$
Daily body length increment $= FBL2 - IBL1 / t$
Daily shoulder height increase $= FSH^2 - ISH^1 / t$

Note: IBL = Initial body length (cm)
FBL = Final body length (cm)
ICC = initial chest circumference (cm)
FCC = Final chest circumference (cm)
ISH = initial shoulder height (cm)
FSH = Final shoulder height (cm)

Research procedure:

1) Livestock randomization

Before the research was carried out, cattle were weighed first to find out the initial body weight, then the animals were numbered. After the cattle are numbered, the cattle are put into each cage which has been prepared and then randomized to treatment using lottery / lottery.

2) Procedure for making silage

The banana stem is chopped into a small size of 2-3 cm, weighed in its fresh weight, then swayed until the remaining moisture content is 70%. The chopped ingredients were weighed, then mixed with rice bran 5% from the forage weight as a preservative, probiotics starbio 3% from the forage weight as the inoculum media according to Siregar's instructions (1994), palm sugar 3% as a fermentation medium. After being mixed evenly then put into a silo in the form of a palastik drum with a capacity of 100 kg silage while pressed until it is solid until the condition becomes anaerobic, then closed using plastic and tied tightly, then stored at room temperature for 21 days. After 21 days the silage was harvested and aerated and then weighed fresh and heavy weight after drying and grinding into flour to be prepared as a complete feed preparation material.

3) The process of making complete feed

Preparation of feed ingredients in the form of rice bran, milled corn, fermented corn cob flour, gamal leaf flour, Moringa leaf flour, fish meal, starbio, urea and salt. After the ingredients are prepared, the feed ingredients are mixed homogeneously starting from the least feed ingredients to the most amount, with the aim of homogeneous mixing and accelerating the mixing process.

4) Consumption data collection procedures

Sampling of consumption data is carried out before feed is given to livestock. The feed is weighed first and the remaining feed is weighed the next day before feeding and the sample is taken (approximately 10%) every day and dried in an oven at 60 0C for 7 consecutive days. At the end of the study, feed samples were given and the remaining feed was composited proportionally per head, then finely ground for analysis of nutrient content.

Data Analysis

The data obtained were tabulated and calculated then analyzed using variance analysis (ANOVA) to determine the effect of treatment [6].

3. Results and Discussion

Fattening business is very much determined by the growth of livestock where the high yield of a livestock is a reflection of the success of fattening efforts, because the high growth rate can shorten the maintenance time so that it can increase farmers' income. The high rate of weight gain in livestock will be followed by the development of exterior body tissues that are interconnected with each other such as chest circumference, body length and shoulder height. The following is the average effect of treatment on daily weight gain, daily chest circumference, daily body length and daily shoulder height presented in Table 3.

Table 3. Effect of treatment on daily weight gain and linear size of fattening male Bali cattle

Parameter	Treatment			P-Value
	$T_0 \pm SD$	$T_1 \pm SD$	$T_2 \pm SD$	
Daily weight gain (kg/h/d)	0,40±0,10	0,58±0,04	0,46±0,09	0,09^{ns}
Daily increase in chest circumference (cm/h/d)	0,11±0,01	0,14±0,04	0,12±0,02	0,41^{ns}
Daily body length increment (cm/h/d)	0,09±0,01	0,12±0,01	0,11±0,02	0,14^{ns}
Daily shoulder height increase (cm/h/d)	0,10±0,01	0,13±0,02	0,11±0,05	0,65^{ns}

Note : ^{Ns} Not significantly

Table 3, it can be seen that the highest weight gain is in treatment T_1 followed by animals that get treatment T_2 and the lowest weight gain is obtained in livestock that get treatment T_0, this result is in line with the increase in other body parts such as, circumference chest, body length and shoulder height. This is due to differences in the composition of animal nutrition, although not too significant, but it greatly influences the amount of nutrients that are digested, especially protein and energy, which is then absorbed by the small intestine which is absorbed into all body tissues and converted to flesh muscle and fatty so that it gives a difference in added body weight, chest circumference, body length and shoulder height. [7] that protein and carbohydrate are important nutrient components of feed for livestock growth. The high rate of growth of cattle is directly proportional to the content of crude protein and carbohydrates as the main energy source in the ration which is a component in body fat and muscle formation. However, the linear growth in this study is in line with the opinion of [8] that the linear size of the body is closely related to weight gain, the higher the growth of livestock, the higher the component of estimation of body weight.

In T_2 treatment, there was an increase in growth rate compared to controls (Table 3). This is because the addition of 20% of banana stem silage in the concentrate can reduce the crude fiber content of the ration as a result of substitution of fiber source constituents by banana stem silage, thus affecting the nutrient digestibility of the treatment ration, with increasing digestibility increasing feed consumption, especially dry ingredients ration to meet the livestock's energy needs. According to [9] that low quality of feed can reduce consumption and digestibility of rations. Added [10] the performance of cattle is strongly influenced by the amount and quality of feed consumed, the level of feed consumption is closely related to growth, the more rations consumed, especially dry ingredients, the higher the weight gain produced because there will be more food substances consumed, used for growth and production. added [11] that one of the factors that influence animal body weight gain is consumption and quality of feed. This is closely related to the nutrient content in the feed and the digestibility level of the feed.

The growth rate at treatment T_0 which is lower compared to other treatments with the addition of silage of banana stems in complete feed, it is thought to be due to the high energy needs of livestock but not sufficient as a result of low dry matter content and organic ingredients which have an impact on the low consumption dry matter and organic ingredients, it indirectly affects the amount of feed energy consumed by livestock even though the protein content is high so livestock often use energy reserves in the body in the form of body fat to meet their energy needs for production which then results in the depletion of fatty components in the body and affect the increase in chest circumference and body length and shoulder height. According to [12] that in the effort of livestock to meet their energy needs, the dry material which is most easily oxidized to produce energy, livestock will increase consumption of dry matter in meeting their energy needs for basic living. Furthermore it was stated that if the basic life needs were not met from the feed, then this need would be met from tissue degradation, so that it would affect the linear size of the body. added [13], that chest circumference was influenced by muscle growth and fat. Furthermore, it was stated that in the period of growth of livestock, it requires a balanced content of food substances in rations, especially protein and carbohydrates because it will be used for the growth of body tissues.

The results of the variance analysis showed that the treatment had no significant effect ($P > 0.05$) on weight gain, chest circumference, body length and daily shoulder height of fattening Bali cattle. This is because the nutritional content of each treatment is not much different, especially the crude protein ration between treatments, namely T_0 21.22%, T_1 20.27%, T_2 18.71%, so it does not affect the amount of protein consumption and nutrient digestibility absorbed to produce weight gain and increase body tissue. This is in line with the results obtained by [11] that protein concentrations between 17-20% do not affect cattle chest circumference. But [14] states that feed with sufficient protein content can function to improve tissue, new tissue growth, and energy metabolism. The growth of livestock depends on the level of nutrients available added [15] that the nutritional content of proteins, carbohydrates, fats, vitamins, minerals and water in the feed given was almost the same which had no effect on the chest circumference, including other body components. The same condition causes the

growth of cattle to be relatively the same. Then [16] stated that increasing the length and height of Bali cattle at the age of 10-12 months had entered the slow growth phase. Even though the consumption of feed was sufficient to ful fill basic needs and produce. Added [15] that the growth pattern in cattle is generally sigmoid pattern, ie growth from the beginning of the cow is born then the acceleration phase of growth until it reaches the inflection point or until it reaches puberty, then the animal reaches the adult body. In this phase the growth slowdown begins until growth is relatively constant.

4. Conclusion

The conclusion of this study is the provision of complete feed containing silage of banana stems with different levels giving the same effect between treatments on daily weight gain and linear size of fattening male Bali cattle.

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