Growth performance of Bali Cattle with Lamtoro Taramba (Leucaena leucocephala) feed in Kupang Regency, Nusa Tenggara Timur

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Abstract: This research aimed to develop a Bali cattle farming system in Nusa Tenggara Timur (NTT) with Lamtoro Taramba feed's main base. The research was conducted in the Raknamo farmer group, Kupang Regency, Nusa Tenggara Timur. The livestock used in this study were 8 (eight) Bali cattle, age 12-15 months, with an average initial body weight of 134.38 – 146.63 kg. The observation activity was to collect data on Bali cattle's body weight, which were given the main feed of Lamtoro Taramba for three months and always feed available in cattle-shed, then calculated the daily body weight gain. The research results showed that Bali cattle's average body weight from the first month of observation is 134.38 kg, the second month is 140.69 kg, the third month is 146.63 kg. The results of the research showed for the daily bodyweight gain from the first to second month (ADG 1) was 0.18 kg/day, the third month increased (ADG 2) by 0.19 kg/day; the statistical data was significant (P < 0.05). So, the daily body weight gain of Bali cattle increases with Lamtoro Taramba main feed.

1. Introduction
The cattle population in Nusa Tenggara Timur Province in 2016 was 984,508 heads; in 2017, it increased by 1,007,608 heads, and in 2018 it increased to 1,027,256 heads [1]. There is an increase in cattle population from the aspect population, while from the aspect of genetic quality, it has decreased. This decrease is due to the low productivity of cattle and environmental factors, the high slaughter of productive females, and young cattle's high mortality [2].

Raising Bali cattle is generally maintained extensively in Nusa Tenggara Timur. The cattle are raised by grazing and not given additional feeds with such a maintenance system usually could slow down livestock productivity because pasture conditions in certain seasons did not support Bali cattle's nutritional needs for growth and development. In terms of feeding patterns, livestock farmers have also not considered Bali cattle's growth phase in preparing and providing feed to their livestock. Likewise, the feed nutritional content given to livestock has not received the primary attention of livestock farmers. The conditions for livestock growth vary widely even though they have received adequate feed [3].

In normal conditions, Bali cattle will grow rapidly until they reach the maturity of about two years, whereas if they are more than two years old, they can use medium to low-quality feed to maintain their body condition while weaning Bali cattle have to get quality feed, because the nutrients it gets are not only used to maintain the condition of the body but are also used for the growth process. During this initial phase of growth, most of the nutrients consumed by livestock will be used to support optimal
skeletal growth. If the livestock's body frame could grow optimally, the cattle's body weight after reaching maturity will be optimal as well [4].

Lamtoro Taramba (*Leucaena leucocephala*) is a high-quality fodder that has long been valued in Nusa Tenggara Timur Province, Indonesia. Year-round feed production with proper management of regular pruning at intervals of 3 to 4 months for each harvest. Lamtoro is three, hard and dry resistant, contains high protein, and is commonly used as a feed ingredient for ruminants in tropical regions [5]. [6] reports on composition proximate Leucaena leaf meal is 88.2% dry matter, 21.8% crude protein, 15.1% crude fiber, 3.1% ash, 8.6% extract ether, and 50.7% BETN. Lamtoro important as a source of feed ingredients because it is rich in protein, essential amino acids, minerals, carotenoids, and vitamins [7].

Based on the above problems, one of the animal feeds that could thrive in NTT and is always green in dry seasons and has a high nutritional value is Lamtoro Taramba. Lamtoro Taramba will be tested on Bali cattle weaning off with a semi-intensive maintenance system; namely, the livestock will be released in pasture-based on Lamtoro Taramba with a combination of other forage feeds such as grass. This study aims to determine the growth of Bali cattle grazing on Lamtoro Taramba pasture-based in the Kupang district.

2. Materials and methods

2.1 Location and time

The research was conducted for three months in Raknamo village, East Kupang sub-district, Kupang regency, NTT.

2.2 Research materials

The livestock used in this study were 8 (eight) Bali cattle, age 12-15 months. The main feed used in this research was Lamtoro Taramba, then additional feed was mixed with the forage that has been cutting into pieces such as grass, legumes, and corn leaves planted around the cage environment.

2.3 Research methods

The observation activity was to collect data on Bali cattle's body weight, which were given the main feed of Lamtoro Taramba for three months and always feed available in the cattle shed, then calculated the daily body weight gain. The daily weight gain was determined according to the following formula:

\[
\text{ADG (g/day)} = \frac{\text{IBW} - \text{FBW}}{\text{days}}
\]

where ADG is daily weight gain (g/day), IBW is initial body weight (g), FBW is the final body weight (g).

3. Results and discussion

Bali cattle's performance condition at the observation location in the Raknamo farmer group, Kupang district, showed that the average live weight is presented in Table 1. The Average Daily Gain (kg) of Bali cattle in the study location from the first month of observation is 134.38 kg, the second month 140.69 kg, the third month to 146.63 kg. Bali cattle weight gain from the first month to the second month by 6.31 kg, and the second month to the third month by 5.94 kg. The average Daily Gain (ADG) of Bali cattle in the first to second month (ADG 1) was 0.18 kg/day, the third month increased (ADG 2) by 0.19 kg/day.

The average daily gain data for Bali cattle belonging to the Raknamo farmer group increased from ADG 1 to ADG 2; the statistical data was significant (P < 0.05). According to [8], in general, it was noticed that the intensive feeding of *Leucaena* leaf gave higher bodyweight gain than that of free grazing animal even during the wet season where the main forage available was from the native grassland. The grazing animals, especially during the dry season, experienced body weight loss, while the gain in the wet season was only between 1-5 kg monthly. This indicated an urgent need to improve
forage availability by establishing more drought-resistant fodder plants such as *Leucaena leucocephala*, particularly from the psyllid tolerance cultivar i.e., Tarramba [9].

**Table 1.** The average daily gain of Bali Cattle with Lamtoro Taramba feed-in Raknamo Farmer Group, Kupang Regency, NTT.

| No | Cattle       | Observation time (days) | Average daily gain (ADG) |
|----|--------------|-------------------------|--------------------------|
|    |              | Month 1 (kg)            | Month 2 (kg)             | Month 3 (kg) | ADG 1 (kg) | ADG 2 (kg) |
| 1  | Bali Cattle 1| 124.5                   | 131                      | 136          | 0.19       | 0.16       |
| 2  | Bali Cattle 2| 170                     | 174.5                    | 181          | 0.13       | 0.2        |
| 3  | Bali Cattle 3| 148                     | 152                      | 154          | 0.11       | 0.06       |
| 4  | Bali Cattle 4| 141                     | 152                      | 156.5        | 0.31       | 0.14       |
| 5  | Bali Cattle 5| 130                     | 141.5                    | 152          | 0.33       | 0.33       |
| 6  | Bali Cattle 6| 113                     | 120.5                    | 127.5        | 0.21       | 0.22       |
| 7  | Bali Cattle 7| 112                     | 114                      | 117.5        | 0.06       | 0.11       |
| 8  | Bali Cattle 8| 136.5                   | 140                      | 148.5        | 0.1        | 0.27       |

| Mean Deviation | ADG 1 (kg) | 0.18 | ADG 2 (kg) | 0.19 |
|----------------|------------|------|------------|------|
| Standard Min.  | 0.099      | 0.06 | Max.       | 0.33 | 0.33 |

According to [10], the average Bali cattle bodyweight at the study increased which given feed is available in the pasture field. It consists of rice straw mixed with forages such as Lamtoro, king grass, legumes, and corn showed that from the first month of observation were 134.38 kg, the second month 159.30 kg, the third month up to 159.99 kg, and the fourth month 162.14 kg. Besides Lamtoro Taramba, Bali cattle were fed with straw, corn straw waste, and grass in providing the feed. According to [11], rice straw and additional feed in rice bran and fiber bio plus can provide PPBH 0.39-0.55 kg/head/day in Bali cattle. Meanwhile, the use of fermented rice straw coupled with natural grass or other forage and the addition of biochar can provide ADG of around 0.6 kg per day and ADG of around 0.64-0.70 kg/head per day. Some of the factors that influence ADG are the quality of the feed given, the environment, sex, and livestock density.

Growth path study obtained that feeding 100% *Leucaena leucocephala* leaf only treatment gave the lowest of one-year average daily weight gain (0.25 kg/head/day), compared to that of *Leucaena leucocephala* + grass treatment (0.28 kg/head/day), while *Leucaena* + grass + fresh cassava tuber treatment almost doubled (0.47 kg/head/day) [12]. Like the Lamtoro Taramba planting system, the tree legume applied is a tunnel model, a monoculture model, and a living fence. Lamtoro is not planted together with food plants mixed or using close spacing in the dryland farming system. It will provide heavy shade for food crops grown together, for example, corn, and reduce the production of food crops due to competition between Lamtoro plants and food plants. The plant tunnel model could also be done by slashing and burning, which is often done during research and assessment by farmers to use the distance between the alley-forming plants (fence rows) with a large distance (4-6 m between rows plants). It is not even slashing with the surface on Lamtoro plants but only trimmed as necessary for use as animal feed or green manure [13].

The potential of biomass Lamtoro in community forests is 67.23 plus minus 25.35 tonnes/ha. Also, Lamtoro, also beneficial in terms of socio-economic subsistence communities, is as cattle eat forage by 12.1 kg/day and as fuelwood by 0.04 sm/day with subsistence value consecutive IDR 2.000.00 / kg and IDR 60,000.00/sm [14]. The *Leucaena leucocephala* has a great potency to be further developed in
Nusa Tenggara Timur to boost cattle production in the region dominated by dry land and climate be impossible to achieve from other means of developing other cattle forages for cattle feeding.

4. Conclusion
Bali cattle’s average bodyweight from the first-month observation was 134.38 kg, the second month was 140.69 kg, and the third month was 146.63 kg. The research results showed for the daily bodyweight gain from the first to second month (ADG 1) was 0.18 kg/day, the third month increased (ADG 2) was 0.19 kg/day. The statistical data was significant (P < 0.05). So, Bali cattle’s daily body weight gain could increase with Lamtoro Taramba as the main feed.

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