Eco. Env. & Cons. 28 (September Suppl. Issue) : 2022; pp. (S66-S71)
Copyright@ EM International
ISSN 0971–765X

DOI No.: http://doi.org/10.53550/EEC.2022.v28i05s.012

Production performance of fattening Bali cattle using farmer pattern in Oelatsala Village, Taebenu Sub-district of Kupang District, East Nusa Tenggara

Upik Syamsiar Rosnah[1], E.D. Sulistijo[1], Y.U.L. Sobang[1], G. Maranatha[1] and M. Yunus[1]

[1]Faculty of Animal Husbandry, Marine and Fisheries, Universitas Nusa Cendana, Kupang, Indonesia

(Received 24 February, 2022; Accepted 3 April, 2022)

ABSTRACT

The Bali cattle fattening business in Kupang district is faced with the fact that the development and productivity of cattle in general is still low, one of which is because of the feed factor. Farmers have various ways to obtain forage to fulfill their fattening animal feed. This study aims to know the production performance of fattening Bali cattle using farmer pattern. The method used in this study is survey using observation and laboratory analysis. Animal sampling technique is random sampling so that 36 cattle (20% out of total fattening cattle) spread in five hamlets. The data obtained are analyzed by calculating the mean and standard deviation. The variables observed consisted of daily weight gain, daily linear body size, feed consumption, digestibility, feed conversion and percentage of botanical ration composition. The results showed that average of daily weight gain was 0.28 ± 0.259 kg/h/d; average of linear body size increased (body length was 0.06 ± 0.037cm /h/d; chest circumference was 0.07 ± 0.0563 cm/h/d, and shoulder height was 0.04 ± 0.0291 cm/h/d; Consumption of DM/BW was 2.5%, consumption of DM was 3.78 kg, consumption of OM was 3.22kg; digestibility of DM was 58.97%; digestibility of OM was 61.53%; conversion of feed (13.5) and feed efficiency was 7.4%; with botanical composition feed of fattening Bali cattle (based on fresh matter) were leucaena (*Leucaena leucocephala*) 85.2%, sesbania (*Sesbania grandiflora*) 5.49%, banyan (*Ficus sp*) 2.92%, banana stems (*Musa paradisiacal*) 2.52%, acacia (*Acacia leucophloea*) 1.33%, cassava stem (*Manihot utilisima*) 1.17%, kname / babui *(Brousonetia papyritera*) 0.52%, timo (*Timonius timun*) 0.38%, hibiscus (*Hibiscus rosasinensis*) 0.37%, and busi (*Melochia umbellata)* 0.28%;. Based on the results of this study, it can be concluded that 1) the use of local feed is quite varied according to the availability at the farmers level; 2) the production performance of fattening Bali cattle at the farmer level was still low (0.28 ± 0.259kg /h/d) compared to the potential of Bali cattle optimum growth at 0.5-0.6kg /h/d.

Key words : *Production Performance, Bali cattle, Fattening, Local feed, Farmer pattern*

Introduction

Bali cattle have greatly contributed to the increasing income of farmers in Kupang district in particular and East Nusa Tenggara in general, as well as supporting the achievement of national meat stock programmed by the government. East Nusa Tenggara as one of the main centers of beef cattle production, therefore local government is required to keep increasing the production and population of cattle to fulfill the central government's economic program.

Kupang district is one of regions for fattening cattle production in East Nusa Tenggara. The pattern of fattening cattle business is practiced by farm-

ers known as Amarasi model (local name is paron system). Fernandez, *et al.* (2003), explains that the "paron" system is done by tying cattle under the tree fed by *Leucaena leucocephala* forage as fresh feed. The feeding system is more intensive, especially for bull cattle that will be transported as beef cattle.

The challenge faced in the fattening Bali cattle business in Kupang district is confronted with the fact that the development of cattle generally slow which also indicates slow productivity with a long fattening process period up to 2 years. This is due to the longer dry season for 8 months with uneven rainy day distribution, and often burning land habit so that there is not much vegetation except plants with deep roots, many plants dry out and eventually die, while grasses as the main feed are in dry conditions with low nutritional value and crude protein content around 3.99% (Rosnah, 2014).

Farmers have various ways to obtain forages in fulfilling the feed for their fattening cattle. There are those who depend on the existence of forage from nature, some plant forage, and others take from potential land. Such conditions indicate that farmers actually have realized that sustainable availability of animal feed is necessary. The variation of how to get feed will also vary in the botanical composition and the amount of the feed which ultimately affects the quality of feed consumed; and the cattle production. Furthermore, the purpose of this study is to know the production performance of fattening Bali cattle using farmer pattern

Materials and Methods

Time and the study area

This research was conducted for 3 months (August to October 2020) in Oeletsala Village, Taebenu Subdistrict, Kupang District, East Nusa Tenggara Province, Indonesia

Study method

The material used in this study was fattening Bali cattle at the level of farmers at the age of 1.5 to 2.5 years. The method used is a survey with observation and laboratory analysis. The cattle sampling method was carried out by random sampling so that 36 cattle (20% out of the total fattening cattle) were scattered in five hamlets. The parameters observed consisted of daily weight gain, daily body linear size, feed consumption, digestibility, feed conversion, and percentage of ration botanical composition. The data obtained were analyzed by calculating the mean and standard deviation.

The parameters observed in this study are: (1) Feed botanical composition is to describe the proportion of a type of forage feed in the ration given to fattening cattle. (2) Daily weight gain, is obtained from the difference between the final body weight and initial body weight divided by the length of observation with units of kg/h/d. (3) Daily body linear size includes: a) an Increase in daily body length, which is obtained from the difference between the final body length and the initial body length divided by the length of time, with units of cm/c/d. Body length is obtained from the measurement results on the front leg lump to the sitting bone lump (*os ischium*) using a measuring stick. b) Increase of daily chest circumference, it is obtained from the difference between the final chest circumference and the initial chest circumference divided by the duration of treatment, in units of cm/c/d. Chest circumference is obtained from the circle measurement on the chest right behind the elbow of the front leg using a measuring tape. c) The increase in shoulder height, which is obtained from the difference between the final shoulder height and the initial shoulder height divided by the length of time, with units of cm/e/h. Shoulder height is obtained from the measurement result perpendicular from the floor to the highest point of the shoulder using a measuring stick. (4) Consumption of Dry Matter (DM) = amount feed given x % DM Feed – leftover feed x % DM of leftover feed. (5) Dry Matter Digestibility

$$(\%) = \frac{\text{DM consumed(g)} - \text{DM faeces(g)}}{\text{DM consumed(g)}} \text{x} 100\% . \quad (6)$$

Feed conversion = consumption of dry matter divided by weight gain. The data obtained in this study is quantitative and reported qualitatively.

Results

The study was conducted in the dry season using fattening cattle by traditional way or farmer pattern. The fattening Bali cattle used was in healthy condition, where the cattle were tied to wood bars or large trees with soil floors as much as 65% and which are fed in cement-floor cages at 35%. In this study, 10 types of forage were found at the farmer level. It is found that the feed botanical composition varies; and is dominated by local feed as a source of protein that comes from around the farmers' farm (Table 1).

Forage provided by farmers to fattening cattle is dominated by leucaena (*Leucaena leucocephala)* given in fresh form with the proportion of 85.02% followed by sesbania (*Sesbania grandiflora)* 5.49%, banyan (*Ficus sp*) 2.92 % and other plants with a much lower portion. The crude protein content of forage given ranges from 6.31-27.28% DM. To fulfill the needs of livestock, the farmers use plants around them, especially in the dry season, for example Kname/babui (*Brousonetia papyritera),* Timo (*Timonius timun*) and busi (*Melochia umbellata*). The use of forages which were grouped in the leaves of local plants as alternative components of fattening beef ration was still limited. There was a tendency to cut whatever type of feed found and carried to the cage then given to cattle for that day. The next day, it can change again; this pattern has an impact on the type of feed and the amount of feeding.

Further results related to the production performance of fattening Bali cattle includes daily weight gain (DWG); increase of body length, chest circumference and shoulder height; consumption of dry matter; dry matter digestibility; feed conversion and feed efficiency were displayed at Table 2.

This study showed that fattening cattle using farmer pattern have an increase in the size of the linear body. The linear size of the body was a size of body part that increases which relating each other linearly. However, these study found that the daily body weight gain (DWG) of fattening Bali cattle was quite low, only 0.28 ± 0.259 kg/head/day with dry matter consumption of 3.78 kg/head/day or 2.5% of body weight. Based on the condition of the feed, the dry matter digestibility value was 58.97% with conversion and feed efficiency values of 13.5 and 7.4%, respectively (Table 2).

Discussion

Table 2. Linear Body Size Increase and Daily Weight Gain of Fattening Bali Cattle using Farmer Pattern

Parameter	Average
Increase of body length (cm/h/d)	0.06±0.037
Increase of chest circumference (cm/h/d)	0.07±0.056
Weight Gain (kg/h/d)	0.28±0.259
Consumption, DM/BW (%)	2.5
Consumption of DM (kg/h/d)	3.78
DM Digestibility (%)	58.97
Feed conversion	13.5
Feed Efficiency (%)	7.4

This study found that at the farmer level there were 10 types of forage given to fattening cattle. The types of forage referred to were generally obtained from locations around the farmer's household and can act as a source of protein (Table 1). According to Sulistijo and Rosnah (2014), the varied composition of feed given to livestock depends on the type of feed available around the farmer during the production process. The more varied of existed types of feed in a location compared to other locations indicate the independence level of farmers to provide feed forage. Table 1 also showed that the forage was given in fresh form and was dominated by leucaena by 85.02%. According to Rosnah (2014) forage feeding at the community level of farmers was still in fresh form and was not used in dry form or in concentrate feed formulations. Jelantik (2017) stated that *Leucaena leucocephala* is a feed plant with tremendous potential in solving feed problems in dry

Table 1. Botanical Composition and Forage Feed Nutrient Content of Fattening Bali Cattle using Farmer Pattern

Animal Feed Forage	Botanical Feed Composition (%, based on Fresh matter)	Dry Matter (DM)	CP (% DM)*
Leucaena *(Leuchaena leucocephala)*	85,02	32.23	25,28
Sesbania *(Sesbania grandiflora)*	5,49	17,71	27,84
Banyan *(Ficus sp)*	2,92	18,04	12,08
Banana Stem *(Musa paradisiacal)*	2,52	9,53	6,31
Acacia *(Acacia leucophloea)*	1,33	40,55	15,07
Stem of Cassava *(Manihot utilisima)*	1,17	33,39	10,97
Kname/Babui *(Brousonetia papyritera)*	0,52	10,36	8,46
Timo *(Timonius timun)*	0,38	31,7	11,81
Hibiscus *(Hibiscus rosasinensis)*	0,37	26,35	20,13
Busi *(Melochia umbellata)*	0,28	41,60	18,52

Note * = Result Analysis is done at Animal Feed Chemistry Laboratory of Animal Husbandry Faculty, Undana-Kupang, 2017

land areas. With deep roots, this plant is able to produce high quality forages in areas with low rainfall intensity. *Leucaena leucocephala* can live long as a source of animal feed. Since 1970s, farmers in Kupang district (particularly Amarasi area) have used *Leucaena leucocephala* as the main feed for fattening cattle. Several other species with a lower proportion (Table 1) are local forages that can be found around the farmer's house. This condition showed the amount of the position and role of local forage was still just as supporting feed. This is due to the nature of growth or its characteristics. Therefore, it was found that the level of variation in the types of feed given to fattening cattle indicating the difficulty of feed at the intended location and plant biodiversity were higher compared to other locations. The type of feed given will change throughout the year in response to soil/climate/season conditions which will affect both farming and other alternative types of feed. According to Sulistijo and Rosnah (2014), *Melochia umbellata* forage is mostly eaten by Bali cattle, not only the leaves, but also the stem, the crude protein contains 18.22% CP. The planting effort has been carried out by farmers but it cannot last long, mostly grows naturally like other local plants. Timo plant is a plant like evergreen with rough leaves and sour taste.

In Table 1, it displayed that the crude protein content of forage given ranges from 6.31-27.28% DM. The higher the protein content in the ration, the more bacteria can live in the rumen so that the amount of protein that can be digested increases. This condition can stimulate the development of rumen microbes so that the utilization of crude protein rations consumed more, then causes the increase of digestibility of crude protein rations. At certain limits, the increase of the amount protein consumption has exceeded the optimal limit, so the addition of protein consumption will actually reduce the digested power, and can even reduce the digestibility of other food substances (Thaariq, 2017).

In addition, as presented in Table 2, the average increase of fattening Bali cattle body length was 0.06 ± 0.037 cm/h/d, the increase in chest circumference was 0.07 ± 0.056 cm/e/h and shoulder height was 0.04 ± 0.019 cm/h/d. This is accordance with Kempster et al (1982) who state that body linear changes are a reflection of livestock physical performance related to the adequacy of nutrients, so that the linear changes in the body of livestock in line with growth and maturity. The result of this study were higher than those obtained by Sobang (2008) that the increase of fattening cattle body linear size influenced by concentrated feed with different levels of protein and energy. Those are the increase in body length 0.013 ± 0.012 cm/d, increase in chest circumference 0.015 ± 0.001 cm/d and shoulder height 0.026 ± 0.015 cm/d. This may be due to the differences in the amount and quality of feed and the age of observed cattle; so affecting different rates of bone growth. Jafar (2014), the addition of concentrates containing *Gliricidia sp* leaf flour, vitamin B-complex and vermicide for Bali bull obtained an increase in body length of 0.10 cm, body circumference by 0.12 cm and shoulder height of 0.11 cm. From this comparison, it can be concluded that Bali cattle have potential to grow and to develop higher if supported by quality feed.

In terms of weight gain, the nutritional quality of local feedd is very good which dominated by protein sources (Table 1), with the amount of fresh feed 19.923 ± 6.44 kg fresh matter/head/day. Judging from the amount of fresh matter form feeding has been above the standard of giving 10% of the average body weight (145kg), but the daily weight gain is still low at 0.28 ± 0.259 kg/h/d. It is found that at the farmer level, feeding still has not been separated between edible and non-edible part so that the consumption of dry matter is only 3.78 kg/h/d or 2.5% of body weight. The results of this study is similar as reported by Sobang (2005) that the daily weight gain of fattening Bali cattle at the farmer level ranged from 0.25-0.35kg /h/d. The results of this study are still below the growth potential of Bali cattle of 0.5-0.6 kg/h/d. This is dealt with Hogan (1996) who states that to increase the productivity of cattle, quality feed supplementation is required to fulfill protein and energy balance for optimal growth of beef cattle, namely 1: 5.1. Although, the forage quality in terms of crude protein is quite high, the use of *Leucaena leucocephala* as a basic feed influence weight gain that has not been optimal. In line with Nulik *et al.* (2014) that cattle fed by *Leucaena leucocephala* forage have increase in the body only 2.25 kg/h/d. This may be due to the pattern of animal feed that relies on tree legumes. The tree legumes have not provided balance between protein and energy which is still in an unoptimal ratio (Sobang, 2005 and Jelantik, *et al.*, 2009). On the other hand, Sobang (2003) expalains that the addition of energy source concentrate feed to fattening Bali cattle at the farmer

level obtain weight gain of 0.45-0.5 kg/h/d. This condition is confirmed by Parakasi (1999) that cattle with less nutrient out of their needs cannot show optimal productivity; so, some of the nutritional needs such as dry matter, crude protein and additional energy sources are needed to increase body weight.

Based on the data in Table 2, it can be seen that the average of dry matter consumed by fattening cattle using farmer pattern is 3.78 kg/h/d. The level of dry matter consumption is influenced by feed factors (feed type, feed size, amount of feed, influence of feed mixture, palatability), environmental factors (temperature and humidity). Such level of dry matter consumption in this study is due to the variations of feed type given by farmers which not concerning on the recommended number and quality limits. According to Tillman *et al.,* (1991), the ability to consume feed per cow per day in the form of dry matter is 3% of the body weight. The average of dry matter consumption of the fattening Bali by the breeders pattern is 2.5% of the average body weight. From these data, it is known that the consumption of dry ingredients of fattening cattle during the study is almost sufficient. Based on the value of dry matter consumption and daily body weight gain obtained, the feed conversion value was 13.5 with a feed utilization efficiency of 7.4%, this value is still slightly lower compared to the standard for beef cattle ranging from 7.52% -11.20 % (Siregar, 2001). Some factors that influence the value of efficiency are age, feed quality and weight. The better the quality of feed, the better the efficiency of energy formation and production is.

In Table 2, the value of dry matter digestibility is 58.97%. This digestibility value is concerned high. According to Bakrie *et al.* (1996), the value of dry matter digestibility for cattle in tropical regions ranged from 40% -65%. Furthermore, although the quality of forage of crude protein is quite high, the use of *Leucaena leucocephala* as a basic feed affect unoptimal weight gain. Cattle that fed by *Leucaena leucocephala* forage have weigh gain only 0.25 kg/h/d (Nulik *et al.,* 2014). Some causes include balance of protein and high energy (Sobang, 2005 and Jelantik, *et al.,* 2017). According to Sobang (2003), the addition of energy source concentrate feed to fattening Bali cattle feed obtained weight gain of 0.45-0.5 kg/h/d. According to Parakasi (1999), cattle with less nutrients than needed cannot show optimal productivity, for body weight gain needs dry matter, crude protein and the addition of energy sources.

Conclusion

Based on the results of this study it can be concluded that 1) local feed dominated as a protein source with quite varied utilization according to the availability at the farmer level; 2) The performance of fattening Bali cattle at the farm level is still low with daily weight gain of 0.28 ± 0.259 kg/h/d compared to the optimal growth potential of Bali cattle at 0.5-0.6 kg/h/d.

References

Fernandez, P. Th., Ratnawati, S. and Rubianti, A. 2003. Pengkajian Teknologi Penggemukan Sapi Di Desa Binoni Kabupaten Kupang-NTT. *Dalam Buletin Nutrisi.* 6(3): Maret 2003. ISSN No: 1410-6191. Fapet Undana. Kupang

Hogan, J. 1996. Principles of Supplementary Feeding. In. Ruminant Nutrition and Production in The Tropics and Subtropics. Editor: B. Bakrie, J. Hogan, J.B. Liang, A.M.M. Tereque, and R.C. Upadhyay. Australian Center for International Agricultural Research, Canberra.

Jafar, J. 2014. Pengaruh pemberian konsentrat yang mengandung tepung daun gamal, vitamin B-compleks dan obat cacing terhadap pertambahan ukuran linear tubuh sapi Bali penggemukan pola peternak di desa binaan Undana. Skripsi. Fapet Undana. Kupang

Jelantik, I.G.N. 2009. Kemajuan and Tantangan Pengembangan Iptek Peternakan Lahan Kering. *Dalam Prosiding: Seminar Nasional Peternakan III.14-15 November 2017. I*

Jelantik, I.G.N. 2017. Kemajuan and Tantangan Pengembangan Iptek Peternakan Lahan Kering. Dalam Prosiding: Seminar Nasional Peternakan III.14-15 November 2017. ISBN. 978-602-6906-34-2. Hal.55-66

Kempster, A.J., Curtbertson, A. and Harington, G. 1982. Carcass Evaluation Livestock Breeding, Production, and Marketing.

Parakkasi, A. 1999. *Ilmu Nutrisi dan Makanan Ternak Ruminant*. Universitas Indonesia Press, Jakarta.

Siregar, S. 2001. Ransum Ternak Ruminansia. Penebar Swadaya. Jakarta

Sobang, Y.U.L. 2003. Kinerja Produksi Sapi Bali Penggemukan Yang Diberi Pakan Konsentrat Lokal Di Tingkat Peternak. Laporan Penelitian. Lembaga Penelitian Undana. Kupang.

Sobang, Y. U. L. 2005. Karakteristik Sistim Penggemukan Sapi Pola Gaduhan Menurut Zona Agroklimat dan Dampaknya Terhadap Pendapatan Petani Di

Kabupaten Kupang NTT. *Bulletin Nutrisi.* 8(2). Maret 2002, ISSN: 1410–6191, Hal : 71–76.

Sobang, Y.U.L. 2008. Kinerja Produksi Sapi Bali Penggemukan yang Diberikan Pakan Konsentrat Dengan Imbangan Protein dan Energi Yang Berbeda. Laporan Penelitian. Lembaga Penelitian. Universitas Nusa Cendana, Kupang.

Rosnah, U. Sy. 1998. Pertumbuhan Sapi Bali Yang Digembalakan Pada Ketinggian Tempat Yang Berbeda Di Tim0r Barat. *Bulletin Nutrisi.* V II (1). ISSN: 1410 – 6191, Hal : 22-26.

Rosnah, U. Sy. 2014. IbM Kelompok Peternak Sapi Bali Dalam Penyediaan Pakan Berkelanjutan, Laporan Kegiatan PPM. Lembaga Pengabdian Pada masyarakat Undana, Kupang.

Sulistijo, E.D. 2007. Optimalisasi Pemanfaatan legume Pohon Sebagai Pakan Sapi Pada Ekosistem Lahan Kering Di Timor Barat. *Jurnal Lingkungan Semiringkai PPLH Undana* (ISSN 0852-4874. Vol,4/No.1/2007).

Sulistijo, E.D and U.S. Rosnah, 2014. Penyediaan Pakan Lokal Berdasarkan Zona Agroklimat Di Kabupaten Kupang. *Dalam Prosiding: Peternakan Berkelanjutan Berbasis Lahan Kering*, 1 November 2014. ISBN Fapet Undana, Kupang

Thaariq, S.M.H. 2017. Pengaruh Pakan Hijauan Dan Konsentrat Terhadap Daya Cerna Pada Sapi Aceh Jantan. ejournal.stkipbbm.ac.id/index.php/gm/article/download/223. Hal 78-89.