Productivity of Bali Female Cattle (*Bos sondaicus*) in Bumirestu, Dakaino and Akedaga Villages of East Halmahera Regency

**Abstract**

The current research aimed to determine Bali cattle's productivity in Bumirestu, Akedaga, and Dakaino Villages in East Halmahera Regency. This research was carried out in Bumirestu, Akedaga, and Dakaino Villages, East Halmahera Regency, for three months, from February to April 2018. A presurvey and field survey methods were applied to observe several variables: calf weaning, mothers mating after calving, estrus age after calving, first calving age, and body weight. Livestock productivity could be seen from the reproductive characteristics, the first calving age with 64% in Dakaino Village. Calf weaning with a percentage of 42.5% in Bumirestu Village, estrus age after calving with a percentage of 52% in Dakaino Village, parents were mating after giving birth with a percentage of 60% in Akedaga Village, and body weight by calculating the average of 288.71 ± 17.55 in Dakaino Village. It was revealed that the factors that support the livestock productivity are the first calving age of the cattle was two years old, calf weaning was at 2-4 months old, the estrus age after calving was 30-60 days, and the parents were mated 60 to 90 days after calving.

**Keywords:** Bali cattle, reproductivity, Bumirestu, Dakaino, and Akedaga Villages

A. Introduction

Bali cattle are Indonesian native cattle that could have the ability to grow well even with low nutritional feed and are adaptive to Indonesia's climate. The breeding of Bali cattle in
Indonesia is mostly (90%) handled by smallholder farmers with very limited feed, so the general productivity is low (Baliarti, 1991). Cattle are also an additional source of income and family savings which can be used anytime they need money (Agus & Sudrajat, 2019). The population of Bali cattle reached 3,884 cattle in 2013, then slightly increased to 3,889 cattle in 2014, decreased to 3,453 cattle in 2015, and then increased to 4,105 cattle in 2016. Furthermore, the cattle population increased again in 2017, reaching 13630 cattle (Badan Pusat Statistik, 2017).

The increase in the Bali cattle population is due to its excellent adaptability to tropical environmental conditions. In addition, Bali cattle do not choose their feed to grow well, even in unfavorable environments and conditions. Furthermore, Bali cattle are also suitable for breeding since they can be worked in rice fields (Mansjoer, 2000).

Based on these potential owned by Bali cattle, there are concerns about the decreased Bali cattle productivity in the past years. Hence, problems evaluation is needed on Bali cattle in East Halmahera Regency. The reason is that the reproduction of Bali cattle is strongly affected by two factors of genetics and environment, in which genetics affects by approximately 30%. In contrast, the environment affects approximately 70%. One of the environmental factors is feed. Hence, the ration provided to the cattle, both in quantity and quality, should meet the basic life needs and production to maintain living weight and reproduction (Triyono, 2007).

An evaluation is needed to obtain good seeds in cattle productivity on female cattle. Factors that affect productivity are bodyweight, weight at the age of 1 year, an average gestational age, the interval of mating after giving birth, and interval of calving that affects reproductive efficiency.

This study aimed to investigate the condition of Bali cattle productivity in Bumirestu, Akedaga, and Dakaino Villages in East Halmahera Regency. This research is expected to become a source of information for breeders and related parties about increasing the productivity of Bali cattle in Bumirestu, Akedaga, and Dakaino Villages in East Halmahera Regency.

B. Methodology

1. Sampling

The number of cattle involved in this study was determined by total population sampling of 417 cattle from breeders who have at least one female cattle that have been naturally mated, artificially inseminated (IB), and has calved with a population of 227 breeders in East Halmahera Regency. In this case, Bumirestu Village had 135 breeders, Dakaino Village had 58 breeders, and Akedaga had 34 breeders; 30% were collected as the research samples based on the total cattle population (Sabran, 2015).

2. Data Collection Method

This research applied the post-survey stage and field survey, using questionnaires and direct interviews. The data sources of this research were (1) Primary data which were obtained by direct interviews with breeders using questionnaires, and (2) Secondary data, which were obtained from the animal husbandry department and breeders to determine the location to be used as a respondent.

3. Parameters

The variables involved in the current research were Bali cattle productivity, the age of first calving, calf weaning, estrus age after calving, and mothers mating after calving. Data collected has been evaluated with the calculated percentage of every variable.

C. Result and Discussion

1. The Age of Cattle at First Calving

The age of cattle at first calving is very important to measure Dairy production is characterized by cycles of calving, lactation, including gestation, and a dry period followed by the next calving (Lehmann et al., 2016).

Table 1 describes that in terms of the age of cattle first calving among the three villages, the highest percentage of 35% was in Bumirestu Village, medium percentage of 30% was in Akedaga Village, and the lowest percentage of 5% was in Dakaino Village. Based on these results, it can be summed up that the average age of first calving was at the age of three years old or 18-24 months old. Cattle that can give birth to their first calf at the age of two years will
have a longer lactation period and reproductive period than cattle that give birth to the first calf at the age of 4 years because the reproductive age of cattle is up to 7 years. The success of extended lactation practices is that cows can maintain milk yield per feeding day when the length of the calving interval (CI) is increased (Lehmann et al., 2016).

**Table 1. The Age of Cattle at First Calving**

| Village   | Bumirestu n=40 | Dakaino n=17 | Akedaga n=10 |
|-----------|----------------|--------------|--------------|
| 18-24 months old | 14 (35%) | 1 (5%) | 3 (30%) |
| 24-36 months old | 13 (32.5%) | 3 (17%) | 2 (20%) |
| 30-36 months old | 12 (30%) | 11 (64%) | 4 (40%) |
| >38 months old | 1 (2.5%) | 2 (11%) | 1 (10%) |
| Total       | 40 (100%) | 17 (100%) | 10 (100%) |

Source: Primary Data 2018.

2. **Calf Weaning**

Calf weaning of managing cows for extended lactations rather than lactations of the standard length of 1 year primarily arose from observations of increasing problems with infertility and cows being dried off with high milk yields (Lehmann et al., 2016).

**Table 2. Calf Weaning**

| Villages   | Bumirestu n=40 | Dakaino n=17 | Akedaga n=10 |
|------------|----------------|--------------|--------------|
| 2-4 months old | 17 (42.5%) | 6 (35%) | 4 (40%) |
| 4-6 months old | 15 (37.5%) | 5 (29%) | 4 (40%) |
| 6-8 months old | 8 (20%) | 5 (29%) | 2 (20%) |
| >8 months old | 0 (0%) | 2 (11%) | 0 (0%) |
| Total       | 40 (100%) | 17 (100%) | 10 (100%) |

Source: Primary Data 2018.

Table 2 shows that the highest calf weaning percentage among the three villages was 42.5% in Bumirestu Village, the medium percentage was 40% in Akedaga Village, and the lowest percentage was 35% in Dakaino Village. These results indicate that all the percentages of weaning calves with the highest value of 42.5% are at the age of 2-4 months old. The reason is that the good calf weaning was at the age of 3-6 months old to shorten the post-calving estrus period to 384 days. Early weaning is a strategy to increase calf survival and reduce mortality (Wirdahayati 1994).

3. **Estrus Age after Calving**

The low success rate of mating in dairy cows, both by insemination and natural breeding in Indonesia, should be a big concern. The low level of successful mating is the lack of information and knowledge about the expression of estrus (Akbar et al., 2021).

The table above showed that the estrus age after calving of the three villages obtained the highest percentage of 42.5% in Bumirestu Village, the medium percentage of 40% in Akedaga Village, and the lowest percentage of 35% in Dakaino Village. The results showed that the average estrus age after calving was 60-90 days old, with the highest percentage of 42.5%.

Most cattle have estrus age at 21-28 days old after calving. An average of 70 days revealed that the mother would show estrous symptoms within the second and tenth weeks after birth even though estrus has not returned to normal involution. Uterine involution takes 3-6 weeks after calving. Parent fertility will return to normal at 40-60 days after birth (Kisac et al., 2011).
Table 3. Estrus Age after Calving

| Villages       | Bumirestu n=40 | Dakaino n=17 | Akedaga n=10 |
|---------------|----------------|--------------|--------------|
| Estrus Age after Calving | Number of cattle | Percentage (%) | Number of cattle | Percentage (%) | Number of cattle | Percentage (%) |
| 30-60 days old       | 17             | 42.5         | 6             | 35            | 4              | 40            |
| 60-90 days old       | 18             | 45           | 9             | 52            | 3              | 30            |
| 90-120 days old      | 5              | 12.5         | 2             | 20            | 2              | 20            |
| >120 days old        | 0              | 0            | 0             | 0             | 1              | 10            |
| Total               | 40             | 100          | 17            | 100           | 10             | 100           |

Source: Primary Data 2018.

4. Mothers Mating after Calving

They have calved successfully that young cows must produce a good supply of milk and become pregnant soon after. To achieve this, they must be well fed from calving until the end of mating.

Table 4. Mothers Mating after Calving

| Village         | Bumirestu n=40 | Dakaino n=17 | Akedaga n=10 |
|-----------------|----------------|--------------|--------------|
| Mothers mating after calving | Number of cattle | Percentage (%) | Number of cattle | Percentage (%) | Number of cattle | Percentage (%) |
| 30-60 days old  | 22             | 55           | 8             | 47            | 6              | 60            |
| 60-90 days old  | 18             | 45           | 7             | 41            | 3              | 30            |
| 90-120 days old | 0              | 0            | 2             | 11            | 1              | 10            |
| Total           | 40             | 100          | 17            | 100           | 10             | 100           |

Source: Primary Data 2018.

Table 4 shows that the highest percentage of mothers mating after Akedaga Village of 60% obtained calving among the three villages. The medium percentage of 55% was obtained in Bumirestu Village, and the lowest percentage of 47% was obtained in Dakaino Village. Based on these results, it can be concluded that breeders must know and count the days their cattle must be mated 30-60 days after calving. Female cattle can be bred again after 60-90 days of calving; even though the cattle had begun to reach their estrus age less than six weeks after the calving, the right time to mate the female cattle is when their reproductive organs have returned to normal within two to three months (Kisac et al., 2011).

D. Conclusion

Based on the results and discussion that the factors that support the cattle productivity are the first age of the cattle calving is two years old; the calf weaning is 2-4 months; the estrus age after calving is 30-60 days, and the female cattle are mated 60-90 days after calving.

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