

Vital Statistics Performants of Bali Cattle on Wet Peatland and Dry Peatland in Central Kalimantan

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Abstract— The purpose of this study is to evaluate Bali cattle breeds as potential livestock on peatlands. Wet peatland is an area that has abundant natural grass potential that grows around swamps and river banks, even above the river streams, while dry peat land utilizes forage that is planted as animal feed. Types of developed cattle in peatlands are generally Balinese cattle. Regional samples were used as many as 4 districts taken by purposive sampling based on the largest population of Bali cattle in peatlands with the used number as 314 samples. The results showed that the performance of Bali cattle which included vital statistics of brood stock body length, shoulder height and chest circumference that were maintained on wet peatlands was higher than dry peatlands that showed significant. Increasing livestock age will affect the increase in livestock's growth performance. Different maintenance between wet and dry peatlands in general for livestock breeding in the two locations already has good productivity.

Keywords— Bali cattle, vital statistics, wet peatlands, dry peatlands.

I. INTRODUCTION

The development of beef cattle on peatlands has been carried out by the people of Central Kalimantan. This location is ideal for developing beef cattle because it has the potential for abundant natural grass that grows around swamps and river banks even on the river streams. The type of developed cattle on peatlands are generally Bali cattle which are known to have a high adaptation to poor environmental maintenance conditions. Bali Cattle (*Bos sondaicus*) is a local Indonesian beef cattle that spread in various regions, which on peatlands. Bali cattle have advantages and good productivity in various environments. According to Dhany *et al.*, (2015) that 70% of livestock productivity especially growth and production that influenced by environmental factors, while 30% is influenced by genetic factors. Maintaining Bali cattle on peatlands in Central Kalimantan Province was said to be based on peatland maintenance.

Bali cattle that raised on peatlands are expected to become productive development sites. Beef fattening business which one is Bali cattle is a potential business in the context of fulfilling national beef self-sufficiency and is expected to reduce dependence on beef and beef imports (Sahala *et al.*, 2016). The achievement of a commercial effort needs considerable capital, from this condition it is necessary to glance at the potential of each region in Indonesia where one of Bali's beef cattle development areas is on peatlands.

Maintenance of Bali cattle which in peatland environmental conditions will affect the characteristics of Bali

cattle in increasing performance as indicated by an increase in body weight, body length, shoulder height, and chest circumference. Dhany *et al.*, (2015), stated several important body measurements such as gumba height, chest circumference and body length are criteria for assessing cattle. The body size can play a role in estimating livestock practically in the field so that the level of productivity of the livestock concerned can be known easily. The performance of Bali cattle is an illustration which states that the livestock are experiencing growth or development accordingly due to the impact of maintenance management and environmental factors. Vital performance statistics on body size of Bali cattle need to be assessed to maximize livestock productivity on different peatlands.

II. MATERIALS AND METHODS

This study used a survey method by taking measurement data directly. Statistical vital measurements of livestock include body length measured from the distance between the side end of the shoulder bone (*Tuberculum humerus lateral*) to the tip of the sitting bone (*Tuberculum ischiadium*), measured using a measuring stick (units in cm). Shoulder height is measured using a measuring stick, from the highest part of the shoulder to the back (*scapula*), perpendicular to the ground. Chest circumference is measured around the chest cavity behind the shoulder bone joint (*Os scapula*) using a brand measuring tape (*Rondo*).

A. Research Sites

The study was conducted in four districts namely Pandih Batu Subdistrict, Maluku Subdistrict, Jabiren Raya Subdistrict, and Sebangau Subdistrict, on a farm owned by the people of Pulusang Regency, Central Kalimantan Province, Indonesia. The research location was determined by purposive sampling, that is, the research was carried out on peatland which has the largest population. In September - November 2019.

B. Materi

There were 314 samples of Balinese cattle with female sex consisting of age groups > 2-2.5 years with 75 heads, > 3-3.5 years with 118 heads and > 4-4.5 years with 121 heads. Respondents' breeders have a minimum of five years experience criteria of raising Balinese cattle as respondents.

C. Data Analysis

Data analysis uses the T-test (*Independent T-test*) with SPSS version 22 to get a comparison of two different peatland locations and calculate the average value and standard deviation.

III. RESULT AND DISCUSSION

Shoulder Height

The results of observations of the shoulder height of Bali cattle in two different conditions in Pulang Pisau Regency are shown in Table 1.

TABLE 1. Average height of Balinese cattle's shoulder (cm)

Brood stock's age	Wet Peatland		Dry Peatland	
	Jabiren Raya	Sebangau	Maliku	Pandih Batu
>2-2,5	103,83±4,42 ^b	106,29±4,74 ^b	98,90±5,29 ^a	102,79±4,53 ^a
>3-3,5	107,00±4,01 ^a	112,47±2,57 ^b	103,60±6,34 ^a	105,46±4,78 ^b
>4-4,5	107,15±3,40 ^b	110,53±4,14 ^b	106,92±4,12 ^a	106,05±3,02 ^a

Note: ^{a, b} Superscripts in different columns show significant differences (P <0.05).

The results of data analysis showed that there were significant differences (P<0.05) on the shoulder height of Bali cattle between wet and dry peatlands. This condition shows the shoulder height in maintenance on wet peatland is higher than dry peatland. Forages that given on wet peatlands is natural forage that grows and develops on wet peatland while forages on dry peatland that given was planted. From the side of the amount of feed that is more on wet peatland compared to feed on dry peatland.

In wet peatland at age > 2-2.5 shoulder height 103.83 ± 4.42 and 106.29 ± 4.74 while in dry peatland 98.90 ± 5.29 cm and 102.79 ± 4.53 cm. This measure is higher the results of research by Kocu *et.al.*, (2017) stated that the average height of the shoulder of Balinese cattle aged > 2-2.5 years on pasture land and oil palm is 108.58 ± 37.6-110.34 ± 5.30 cm. According to the Indonesian National Standard (2017), it is explained in SNI 2017 that young female Bali cattle breeders are aged 18-24 months, body length at class I category = 107 cm, class II = 104 cm and class III = 100 cm, at age > 24- 36 months body length category at class I = 110 cm, class II = 106 cm and class III = 104 cm. On peatlands the length of the body of Bali cattle is categorized as II and III. Age > 3-3.5 years on wet peatland 107.00 ± 4.01 cm and 112.47 ± 2.57 cm while on dry peatland 103.60 ± 6.34 cm and 105.46 ± 4.78 cm and at age > 4-4.5 shoulder height in wet peatland 107.15 ± 3.40 cm and 110.53 ± 4.14 cm while in dry peatland 106.92 ± 4.12 cm and 106.05 ± 3.02 cm. The results obtained that on wet peatlands are higher than on dry peatlands. This difference is influenced by different environmental factors and place of maintenance. Hikmawaty *et al.*, (2014) stated that differences in body size between one animal and another may be caused by differences in genetic potential, origin location, breeding and mating systems applied in the area.

Body Length

The observations result of Bali cattle body length in two different conditions in Pulang Pisau Regency are shown in Table 2.

TABLE 2. Average length of Bali cattle's body (cm)

Brood stock's	Wet Peatland		Dry Peatland	
	Jabiren Raya	Sebangau	Maliku	Pandih Batu
>2-2,5	103,29±5,70 ^a	104,65±4,55 ^b	99,95±5,35 ^a	102,93±7,01 ^b
>3-3,5	105,86±4,89 ^a	110,43±3,85 ^b	104,02±4,83 ^a	105,79±2,96 ^b
>4-4,5	108,19±3,48 ^b	107,97±4,96 ^b	107,21±4,56 ^b	105,91±4,96 ^b

Note: ^{a, b} Superscripts in different columns show significant differences (P <0.05).

Table 2 showed that the comparison of body lengths of Bali cattle shows that there are significant differences (P <0.05). Bali cattle body length at different ages shows the average value on wet peatland > 2-2.5 years old at 103.29 ± 5.70 cm and 104.65 ± 4.55 cm while on dry peatland 99, 95 ± 5.35 cm and 102.93 ± 7.01 cm. The results of this study on peatlands are higher than those of Trimeldus *et.al.*, (2009), stating that an average body length of 96.50 ± 4.73 cm Bali cattle are kept in TTU District. The result of the length measurements of Bali cattle on peatland fall into categories II and III of the Indonesian National Standard (2017), explained in SNI 2017 that young female Bali cattle breeds aged 18-24 months category class I = 112 cm, class II = 105 cm and class III = 101 cm. Body length at age > 3-3.5 years on wet peatland 105.86 ± 4.89 cm and 110.43 ± 3.85 cm while on dry peatland 104.02 ± 4.83 cm and 105.79 ± 2.96 cm. At age > 4-4.5 years body length on wet peatland 108.19 ± 3.48 cm and 107.97 ± 4.96 cm higher than the results of the study of Pikana *et.al.*, (2018) stated that body length of Bali cattle in the Slaughterhouse (RPH) Kefamenanu City at an average of 96.32 cm. The results of the observations concluded that the older of the livestock, the body size of the livestock also increases. Tillman *et.al.*, (1998), stated that growth usually starts slowly and takes place more quickly, then gradually decreases and stops after reaching an adult body.

Chest Circumference

The observations result of Bali cattle chest circumference in two different conditions in Pulang Pisau Regency are shown in Table 3.

TABLE 3. Average Circumference of Bali cattle's Chest (cm)

Brood stock's	Wet Peatland		Dry Peatland	
	Jabiren Raya	Sebangau	Maliku	Pandih Batu
>2-2,5	142,38±5,43 ^a	143,35±10,41 ^a	136,55 ±5,73 ^a	140,71±8,60 ^b
>3-3,5	146,91±7,46 ^a	143,83± 7,09 ^b	145,38±7,30 ^a	143,46±6,61 ^b
>4-4,5	142,74±7,56 ^a	143,68±5,43 ^b	141,45±5,81 ^a	143,55±5,22 ^b

Note: ^{a, b} Superscripts in different columns show significant differences (P <0.05).

The results of the analysis in Table 3 shows that there is a significant difference (P <0.05) on the chest circumference of the Balinese cattle between wet and dry peatlands. The size of the Balinese cattle chest circumference shows that the cattle's performance increases also the chest circumference. According to Nugraha *et.al.*, (2015) livestock age affects the condition of vital statistical measures and body weight. Livestock that raised on peatlands which differ between wet and dry peatlands also affect the vital statistical difference in the size of Balinese cattle's chest circumference. Barahum *et.al.*, (2017) stated that the performance of a livestock is the result of the influence of genetic factors and the cumulative

influence of environmental factors. According to Amiano *et.al.*, (2018) stated that the different peatlands greatly affect livestock performance, especially from environmental factors, female Bali cattle that are kept at the peatlands location point to a large environmental heat threat so that it will affect the physiological processes of the livestock body maintained

On wet peatland at age > 2-2.5 chest circumference 142.38 ± 5.43 cm and 143.35 ± 10.41 cm compared to dry peatland 136.55 ± 5.73 cm and $140.71 \pm 8, 60$ cm. The results of this study indicate that the standard of Bali cattle breed seen from the circumference of the chest has met the Indonesian National Standard (2017), explained in SNI 2017 that young female Bali cattle breeds aged 18-24 months have size of the chest circumference category class I = 139 cm, class II = 130 cm and class III = 124 cm. The results of this study also showed that peatlands were higher compared to studies in Bengkulu Kadarsih province, (2003) which stated that the average chest circumference of female Bali cattle was 130.00 ± 4.29 cm. The factors that influence this difference are the different maintenance environments. At the age > 3-3.5 on wet peatland 146.91 ± 7.46 cm and 143.83 ± 7.09 cm while on dry peatland 145.38 ± 7.30 cm and 143.46 ± 6.61 cm and at the age > 4-4.5 chest circumference on wet peatland 142.74 ± 7.56 cm and 143.68 ± 5.43 cm while on dry peatland 141.45 ± 5.81 cm and 143.55 ± 5.22 cm. Vital statistics of Balinese cattle through the circumference of the chest shows that the increasing age of the cattle is also increased the circumference of the breasts. Chest circumference in Bali cattle is influenced by sex, age of the animal, living conditions such as different feeds (Chamdi, 2010). Takandjandji, (2015) stated that body size develops with age and was influenced by management factors, especially food and health.

IV. CONCLUSION

Vital performance statistic of Bali cattle include body length, shoulder height, and chest circumference that are maintained in wet peatland are higher than in the dry peatland. The increasing age of livestock influences the increase of livestock growth performance. The different maintenances between wet and dry peatlands in general for breeding livestock at the two locations already have good productivity.

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