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Profile of beef cow Calf Afkir at the Bali cattle Center Sobangan, Mengwi-Bali

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Abstract
Culling cows is a management practice that should be routinely employed to remove cows that fail to wean a calf on an annual basis or develop physical issues that inhibit performance, and to meet the resource availability of the beef cattle enterprise. Culling cows from the cow herd creates vacancies to be filled to ensure the long-term herd size and revenue potential of the operation. This study was conducted to determine the performance of female Bali cattle rejected at the UPT. Bali Cattle Center Sobangan Mengwi-Badung, Bali. The samples observed were 170 Bali beef cow calves that would be culled. The parameters observed were age, body weight, shoulder height, body length, and chest circumference. Apart from that, observations of abnormalities or body defects that can be observed from the outside were carried out, as well as additional information from recordings held by the UPT. The results of this research showed that the profile of the cows rejected at the Bali Sobangan Mengwi Bali Cattle Center was an average age of 13.25 ± 1.4 years, body weight 292.69 ± 48.3 kg, chest circumference 167.41 ± 12.0 cm, body length 125.77 ± 5.3 cm, and body height 115.75 ± 6.2 cm. This research concluded that even though the female cows that were rejected are old (13.25 ± 1.4 years old), the condition of these cows still has the potential to be sold as beef cattle.

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Introduction

In Indonesia, cows are the main source of animal protein which is important in daily life. Consumption has increased from year to year, in line with the economic growth of the Indonesian population which has a major influence on national beef demand. However, the high level of public demand for beef is not in line with the rate of increase in production, so domestic meat is unable to meet this need (Darwan, 2013) [4]. To meet the national demand for beef, the Government is still importing beef and cattle (Directorate General of Animal Husbandry and Animal Health, 2022). To reduce and prevent dependence on imported livestock products, especially beef, efforts to increase population and improve local cattle productivity, as well as increase beef production need to continue.

Bali, as an area with minimal natural resources (mining), is blessed with very productive germplasm, namely the Bali Cow. Bali cattle are one of the original breeds of cattle in Indonesia which are the result of direct domestication from wild bulls (Martojo, 2003) [12]. This cow is known by the public to have very good adaptability so it is suitable for development in various regions in Indonesia. Apart from that, Bali cattle have high fertility so they can give birth every year, and have high carcass production (Guntoro, 2002) [5]. Currently, Bali cattle are not only developed on the island of Bali but have become a prime source of meat in other areas such as Java, Sulawesi, and Nusa Tenggara, but national meat production is still unable to meet the increasing demand that is occurring (Baihaqi et al, 2020) [3].

UPT. The Bali Cattle Center Sobangan Mengwi-Badung, Bali was established to preserve and help increase the Bali cattle population by producing calves that are then distributed to livestock groups in the community.

This UPT belongs to the Badung Regency Regional Government which was established to help provide calves for the community. Since 2012, hundreds of calves have been donated to livestock groups. In 2020, the total number of cow calves reared was 288. By providing sufficient feed, especially given additional feed in the form of concentrate, it is hoped that the cow calves that are kept will give birth every year. Abidin (2008) stated that the reproductive ability of Bali cattle is the best among local cattle in Indonesia because Bali cattle can give birth every year. After the productive period is over, the cows can be used as beef cattle (Harmini et.al. 2011) [9].

The cattle population in Bali over the last five years has shown a low percentage increase in population (BPS, 2022) [1]; from 546,370 in 2016 to 594,379 in 2021. Livestock productivity in a region is influenced by the composition of livestock based on age, sex, birth, death, and length of time in breeding (Hardjosubroto, 1994) [8]. The length of time a mother cow is kept in breeding depends very much on the productivity of the animal. Mother cows are generally kept until the age of seven years after calving 4-5 times (Harmini et.al. 2011) [9]. The decline in productivity is caused by various factors, including the cow is too old so that the cow is unable to produce another calf or the calf being born with a disability and small body size. Decreased fertility after mating is caused by several factors such as the very old, abnormalities or disorders of the reproductive organs such as being unable to produce eggs (ovulation) which causes infertility, the female suffering from disease, or experiencing physical disabilities due to accidents. Livestock that experience this condition certainly cannot be maintained so the livestock must be rejected or culled. This must be done to make a business more efficient so that losses do not occur in the livestock business. In the livestock business, keeping livestock that is unable to produce maximum results will have fatal consequences in planning business costs. In developed countries, the main reasons for livestock breeders to cull their livestock are age, pregnancy status, economics (drought, population reduction, and market conditions), and poor productivity. Factors that can be used to predict the productivity of livestock are body dimensions, including body weight, body length, body height, and chest circumference (Kadarsih, 2003) [11]. Several researchers reported the average weight and body dimensions of 2-year-old male Bali cattle, namely 209.35 ± 24.04 kg, shoulder height 111.9 ± 4.28 - 116.93 ± 20.05 cm, body length 112.8 ± 2 .57 cm and body circumference 142.4 ± 7.73 - 144.75 ± 13.91 cm (Syaiful et al. 2020, Rajab. 2021). Meanwhile, Zaki et al. 2021 found a body weight of 279.56 ± 50.23 kg, shoulder height of 113.07 ± 7.29 cm, body length of 113.78 ± 7.97 cm, and chest circumference of 145.13 ± 11.63 cm in bulls aged over 2 years. Meanwhile, in adult female cattle over 2 years old, respectively, 230.64 ± 48.60 kg, 112.70 ± 7.10 cm, 116.83 ± 6.53 cm and 149.44 ± 8.42 cm. This research aims to see the profile of female Bali cattle that were rejected at the UPT. Bali Sobangan Cattle Center Mengwi-Badung, Bali.

Methodology

The samples used in this research were female cattle that were rejected at the UPT. Sobangan Mengwi-Badung Bali Cattle Center, Bali with 170 cows. This research was conducted using observation or survey methods. The data collected is primary. The variables observed were body measurements including body length, body height, chest circumference, and body weight, the measurements of which were according to Awaluddin and Panjaitan (2010), namely:

1. Body length, measured by extending a measuring stick from the elbow (Humerus) to the lump on the sieve bone (Tuber ischii) (cm).
2. Body height, is the distance from a flat surface to the highest part of the shoulder through the scapula perpendicularly, while the measuring tool used is a measuring stick (cm).
3. Chest Circumference, measurements are taken with a measuring tape (cm) around the chest cavity behind the hump and the shoulder joint (Os scapula).

Apart from the body size mentioned above, observations were also made on qualitative appearances such as color abnormalities, body defects, wounds, and also reproductive appearance which was known from the records of each individual.

Data Analysis: research data were analyzed descriptively, by calculating mean values and standard deviations.

Results and Discussions

UPT. Bali Sobangan Mengwi-Badung Cattle Center, Bali is an institution owned by the Regional Government of Badung Regency which aims to increase the cattle population and also to preserve Bali cattle on the island of Bali (Non-profit Oriented). This center started its activities in 2008 by procuring 240 cows using the 2008 to 2010 Regional Revenue and Expenditure Budget. Additional 48 cows were obtained from cows purchased in 2008 as much as 23, and 25 from purchases in 2009 so the total number of cows kept is 288 cows. Following the aim of establishing this center, calves or prospective mothers born after weaning are given to livestock groups in Badung Regency. Until 2023, as many as 645 calves from the procured cows have been donated to the farming community, in addition to being used as replacements for 42 of them.

Until now, there has never been a purchase of replacement for cows who died due to accidents, uterine prolapse, or diseases. The replacement was obtained from calves born in this population. The dead cows are replaced by potential cows born at the center. Mating was carried out by artificial insemination using Bali cattle frozen semen from the Baturiti Regional Artificial Insemination Center, Bali. The feed given is fresh forage amounting to 10% of the average body weight of the cow and an additional 2 kg of concentrate.

Appearance considerations for culling

Considering that the Sobangan Center is owned by the Government, purchasing heifers, selling rejected cows, or donating the prospective cattle (heifers and male) must go through procedures which of course take time. Culling cows is a management practice that should be routinely employed to remove cows that fail to wean a calf on an annual basis or develop physical issues that inhibit performance, and to meet the resource availability of the beef cattle enterprise. Culling cows from the cow herd creates vacancies to be filled to ensure the long-term herd size and revenue potential of the operation. In the case of culling the rejected cow, it must be

carried out with several considerations that must obtain approval from the competent government officials at this time. The considerations used in this center are presented in table 1 below.

Table 1: Appearance of cull cows at UPT. Bali Cattle Center Sobangan Mengwi- Badung, Bali

No.	Deskripsi	Percentage (%)
1.	Color Deviation/abnormalities	16
2	Unable give birth/Reproductive problems	25
3	Physical Issues	59

Through the Decree of the Animal Husbandry Law No. 6 of 1968, the Government decided that the island of Bali is a source of pure Bali cattle breeds, and as such, other breeds of cattle are not permitted to be introduced to the island of Bali, to preserve the purity of Bali cattle. These cattle are a derivative of a Banteng that has been domesticated for many years and has very unique and distinctive characteristics.

The appearance of bali cattle is easily distinguished from other local cattle breeds reared in Indonesia. Their color is also unique, both females and males from their birth up to their prior sexual maturity are in brick (terracotta) color. In contrast, the females remain in brick color although they reach their sexual maturity, the sexual maturity males on the other hand turn to be black. When young males are castrated, their color remains in brick, however, when the sexual maturity males are castrated their black coat color turns to brick again (Oka, 1995) [13]. In addition to these characteristics, bali cattle also have other distinctive characteristics, namely the black line that extends like an eel from the back of the neck to the base of the tail. Their legs, starting from the top ruffled to the knees are white, having a white mirror on the rump and the tip of the tail is black. However, the bali cattle breeding and development that occurred in Bali Province in many cases delivered calves with color deviations. Some of their color deviations namely albino (the whole body coat is white color), injin (the whole body coat is black color), the whole body coat is gading color, the whole body coat is bang color, poleng (the whole body coat is white and gading), mores (the whole body coat has white spots), panjut (the tip of the tail is white color where supposed to be black color), and cundang (white triangle shape on the forehead) (Hardjosubroto, 1994) [8] (figure 1.). Putra and Suranjaya (2019) [14] found the proportion of deviant colorations in Bali cattle reared in Bali Province such as albino was 26.3%, mores was 21%, injin was 31.5% and 0.05% of mixed poleng, panjut, gading, and bang. Cattle with this color disorder when sold will have a much lower price than the price of a cattle with a brick color. In addition, if cows with this color disorder are allowed to grow, it is feared that it will interfere with the color uniformity of the bali cattle themselves.

Fig 1: Normal Bali Cattle and Bali Cattle with some color deviations (personal collections)

So that cows born with color deviations will automatically not be selected as potential breeding stock. However, not all of these abnormalities will be observable when the cow is young, such as mores, this abnormality usually appears after the cow has given birth several times so this character can only be culled after the cow gives birth when the abnormality can be observed. This will not be a problem, as long as the recording is carried out strictly so that where the offspring of defective cows were given away, it can be traced, which is then followed by culling that cow which can be sold as beef cows to avoid the development of cows that carry this defective trait.

It can be seen that 3 (three) appearances were used as considerations for rejecting cows at Sentra Sobangan (Table 1.). The first, as explained in the previous paragraph, was character abnormalities, where in this center the most frequently found were mores (the appearance of white spots all over the body) with a percentage of 16% of those culled. Unfortunately, this character can be observed after the cow has given birth several times and the calves born from those cows have been given away to the community. So, it will be difficult to reduce that abnormality. The culling consideration of government property is not as easy as private or individual property, because there must be a procedure that is followed. Of all the cows that were culled, the main consideration at this center was age, considering that all (170) cows that were culled have an average age of 13 years (Table 2).

The age of cull cows is an important consideration. Cow age at culling reflects the overall cow longevity within the herd and the opportunity to recoup development costs. Cows culled at a young age have not produced enough calves to recover development costs or reached peak calf weaning weight to evaluate genetic quality. Cows culled at a young age reflect a potentially poor match of cow genetics to the production environment, primarily because the nutritional resources do not meet cow nutrient requirements. Cows in

this age range are certainly culled for reproductive reasons, but may also have physical issues that are beginning to limit production. Aged cows may be culled for all reasons, including reproduction and physical issues.

Then the second consideration is any cow that does not get pregnant or wean a calf. Since the primary productive objective of any cow in the herd is to produce a live calf annually. In cases in this center, was due to age and this amounted to 25% of the total cull. Then the factors that were also used as consideration were body defects (physical issues) such as crooked legs, broken horns, and finally a body full of wounds that were difficult to heal at 59%. The physical issues referred to here include that the parent being culled has bent legs because some of the cages (which were built at the earliest) have feeders that are too low so that over time the front legs of the parent become bent to support the weight of the parent's body. Other culling decisions are made based on additional undesirable cow characteristics or financial and environmental reasons.

Morphometric appearance of culled cattle at the Sobangan Center

The average age of the mother cows that were rejected at the Sobangan Cattle Center during this period was 13.25 ± 1.4 years (Table 2). This confirms that the fertility of Bali cattle is known to be very high (Halimah *et.al*. 2022) [6]. Of the total discarded, it was found that some were still pregnant, but their body condition did not allow them to be kept. Separate research needs to be carried out to find out how long Bali cows can be kept to provide economic benefits. Although it was sporadically known that there were breeders in the community who kept their cows until they were 15 (fifteen) years old because they could still provide calves.

Table 2: Quantitative Performance of cull cows at UPT. Bali Cattle Center Sobangan Mengwi-Badung, Bali

No.	Performance	Average
1	Age (Year)	
2	Body Weight (Kg)	
3	Body Length (cm)	
4	Chest Circumference (cm)	
5	Body Height (cm)	

These rejected cows can still be used as beef cattle (Harmini et. al. 2011) [9] and can be priced quite high by looking at their production performance such as body weight, chest circumference, body length, and body height (Kadarsih, 2003) [11]. Table 1 showed that the average body weight of cows that were rejected was 292.69 ± 48.3 kg with a fairly large standard deviation, meaning that the weight of female cows that were rejected ranged from 244.39 kg – 340.99 kg. Likewise, the average chest circumference was 167.41 ± 12.0 cm, body length was 125.77 ± 5.3 cm and shoulder height was 115.75 ± 6.2 cm. The body weight of the cows at Sentra was still relatively good, still in the range of Bali cattle kept in livestock communities, and at BPTU Denpasar aged 5 years, namely 264 kg and 300 kg (Maya Purwanti and Harry, 2006), this means that if they were sold as beef livestock you can still get a good price, this may be due to the additional concentrate feed provided at the Sobangan Center. Likewise, chest circumference, body length, and body height obtained from the breeder community and BPTU-Denpasar were 160.8 cm and 174.2 cm respectively; 118.5 cm and 120 cm; and 113.6 cm and 114.4 cm. By looking at this comparison, it can be said that even though the age difference was very large, ± 8 years (13 years and 5 years), the rejected Bali cattle at the Sobangan Center were still suitable for use as beef cattle.

Conclusion

The profile of the cows that were rejected by the Bali Sobangan Cattle Center, Mengwi-Bali was an average age of 13.25 ± 1.4 years, body weight 292.69 ± 48.3 kg, chest circumference 167.41 ± 12.0 cm, body length 125.77 ± 5.3 cm, and gumba height 115.75 ± 6.2 cm. The condition of these cows still has the potential to be sold as beef cattle.

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