Selection of Bali Cattle Sires through Body Size Dimensions in BPTHMT Serading Sumbawa

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Abstract
Preservation and improvement of production performance Bali cattle as indigenous livestock needs to be done through targeted breeding programs and standards. One of the efforts to improve Bali cattle breeding program at BPT HMT Serading Sumbawa is to inventory the data size as a measure of body dimensions seeds stud with the right candidate. Dimensions mean are the values that can be measured from the body parts of animals and can be seen on the surface of the cow's body, among others: body height, body length, and chest circumference. Observations obtained in the field (1) The development of Bali cattle population in BPTHMT Serading over the last five years; (2) Distribution of the percentage of livestock deaths; (3) The ratio of male to female animals use; (4) the size of the body of the bulls born in 2013. The size of the body of the male Bali cattle in BPTHMT Serading 1.7-1.9 years of age, still does not meet the minimum requirements of class III standard ISO: lower chest circumference of 22-30%, 15-26% body length shorter and a shoulder height of 10-17% shorter.
Suggested selection of male Bali cattle in BPTHMT Serading that would be candidates for seed based on the dimensions of the body size, should be performed at least 2 years. Besides bulls, candidates provide the seeds of the descendants of a group that has the ideal sex ratio.
Keywords: Cattle Bali, selection, breeding management, vital statistics.

INTRODUCTION
The existence of Bali cow as national animal genetic resources must be maintained and even improved productivity, in order to meet the needs of the meat for the Indonesian people.Some of the benefits include Bali cattle have high fertility rates, durability strong, and can breed in tropical environmental conditions

Bali and Nusa Tenggara is a region that has the potential to the third largest beef cattle in Indonesia (14.18%), with the Bali cattle population of 2.1 million birds (43.75% of the total cattle population of Bali in Indonesia). However managed by the farmers generally still traditional, less attention to aspects of breeding and feeding is good and right, Similarly, in the centers of Bali cattle breeding, such as limited breeding programs and the quality of feed (just grazing in the pasture with a little extra feed concentrate), it leads to low productivity Bali cattle. The results of the data collection beef cattle,   nationally compared to the results   Census of Agriculture in 2013, showed a decrease in population of 16.7 million individuals (14.8 million head of beef cattle among others) to 14.2 million head. Bali cattle is the nation's most beef cattle population (4.8 million head = 32.31%), followed by ex-imported or exotic cattle cross-bred with local cattle outcome as much as 4.4 million animals (30.14%), cattle Ongole 4.3 million head (28.88%), and 1.3 million head of cattle Madura (8.67%)

Maintenance of Bali cattle in most communities in the region of Bali, Nusa Tenggara is still done traditionally without a touch of breeding and feeding technologies. Bali cattle at a breeding center in the BPT-HMT Serading Sumbawa, program selection is still less do programmatically, cattle grazing in the pasture with concentrate feed was given a limited amount, whereas the Bali cattle population in BPT HMT continues to grow. This suggests that the Bali cattle breeding programs likely to be developed and refined, Because of the support of CPM-HMT pretty good pasture management. Bali cattle mating system in the BPT-HMT Serading in order to increase the cattle population of Bali is still receipts system that has not been the true marriage. This is due to the limited number of superior male that does not correspond to the number of females. The impact of these conditions if it lasts for a long time will have an impact as well as the superior male crisis likely will occur inbreeding.

One of the efforts to improve cattle breeding program in the BPT-HMT Bali Serading Sumbawa is to inventory the body dimensions size data as benchmarks candidate seeds stud appropriately. Dimensions in question are the values that can be measured from the body of cattle and can be seen on the surface of the body of the cow among others the size of the head, back height, body length, chest width, chest and chest circumference (Natasasmita and Mudikdj.1979) More Bugiwati (2007) dimension of the body is the factor that is closely related to the appearance and nature of livestock production and can be used to estimate the weight of cattle. The size of the body dimensions of cattle is often used to estimate body weight of cattle as a technical parameter in determining the selection of seedlings cow.

MATERIALS AND METHODS
This research was conducted at the Center for Breeding cattle BPT-HMT Serading Bali Sumbawa NTB. The material used related documents (secondary data) main body dimensions of Bali cattle born in 2009-2013 (Data

last five years). As the comparative data as a standard candidate Bali cattle is the Regulation of the Minister of Agriculture Number: 54 Permentan / OT.140 / 10/2006.

The method used was a case study and direct observation of the material was conducted to obtain data on the primary and secondary performance Bali cattle production and management of his breeding. Location methods and materials were taken intentionally (purposive sampling). The purpose of primary data collection is to cross-check the validity of secondary data that has been measured 5 years (2009-2013). Secondary data were obtained from recording cattle that had been done; which will be evaluated and analyzed genetic potential to determine its feasibility as a prospective parent, appropriate breeding programs.

The data was collected field data calculated mean and standard deviation and coefficient of variation then analyzed descriptively (Warwick et al, 1990) with the following formula:

Average population sample	$\sigma = $ standard deviation	CV = coefficient of variation in percent
$$\frac{\sum_{i=1}^{n} X}{n}$$	$$\sigma = \sqrt{\frac{\sum x_i^2 - (\sum x_i)^2}{n-1}}$$	$$\frac{\sigma \times 100}{\bar{X}}$$

The general requirements SNI Breeding Cattle Bali

1. Originating from nurseries in accordance with guidelines for good breeding beef cattle.
2. Healthy and free from infectious animal diseases are expressed by officers
authorities.
3. Free from any physical disability.
4. Free of reproductive defects, do not have abnormal udder and show no symptoms of infertility.
5. Freedom of defective genitals, has a good libido, quality and quantity of cement is good, and does not have the genealogy of genetically defective.

Qualitative Requirements Bali cattle bull

a) black coat color, knee down white, white rump-shaped half-moon, the tail end of black,
b) horns grow well and the black,
c) wide head shape with a compact and powerful neck.

Bali cattle body size measurements made under the conditions and follow instructions (Gilbert, Bailey, Shannon, (1993)

1. Chest girth (CG) wrapped usually measured with a measuring tape on the chest of the cow right rear foot front or behind the shoulder (scapula), with units cm.
2. The length of the body (BL) was measured from the shoulder (*humerus tuber*) until the base of the tail (*tuber ischii*), with units cm.
3. High shoulder   (HS), measured from the ground where cows are standing upright on all four feet to *os vertebrae thoracic* 6 (or rear *scapula*), with units cm.

Prior to the measurement of the dimensions of the body, cattle must be in the normal position, legs forward and backward should be parallel to each other and the head of livestock should be facing forward and preferably cattle were fasted for 12 hours prior to the measurement, it is intended that the condition of the cattle reach body weight empty (Anonymous, 2006[a]). To maintain the accuracy of measurement and safety officer, cow forcibly inserted into the cage

Quantitative Requirements: Bali cattle male

Age (months)	Parameters	Class I (cm)	Class II (cm)	Class III (cm)
	Chest circumference minimum	176	162	155
24 - < 36	Minimum shoulder height	119	113	107
	The minimum body length	124	117	110
	Minimum chest circumference	189	173	167
>36	Minimum shoulder height	127	121	115
	The minimum body length	132	125	118

Sources : Anonymous (2006[b])

RESULTS AND DISCUSSION
Potential BPTHMT Serading
BPT-HMT Serading Sumbawa NTB is one Implementing technical in cattle breeding under the supervision of the Department of Animal Husbandry and Health Province NTB.

Location Focusing, In particular, Cattle Breeding Cattle Type Bali, Taking Place In Serading Carries Some Considerations Among Others BPTHMT. Serading Occupying Land Covering an area of 42.52 Ha. Topography BPTHMT Serading has flat to hilly land with a height of about 75 meters above sea level. The climatic conditions in the region Serading is average rainfall 1.180 mm / year, the rainy day an average of 77

days/year, wet month in December to in March, air temperature 20-36 ^{0}C and humidity around 76%.   In accordance with the basic tasks BPTHMT Serading in the field of beef cattle that carry out most of the technical task of livestock breeding and forage Feed, then BPTHMT want to create testing, implementation activities of breeding technology.

Population and Performance Bali cattle in BPT HMT Serading
The development of the last populations of Bali cattle in BPTHMT Serading as in Table 1 below.
Table 1. Composition of Bali cattle in BPTHMT Serading, 2014

composition	1 July/1/2014			Juli/31/2014		
	Male	Female	total	male	Female	total
Adult	3	70	73	3	78	81
Young	9	41	50	9	33	42
Calves	52	45	97	59	52	111
Total	64	156	220	71	163	234

From Table 1 above population until the month of July 2014 the number of adult females 78 tails, veal and calf respectively 33 and 52 tails. These data show the birth of the calf 67% of the parent or 22% of the population of a female. From a number of aircraft and the results produced the female calf, good enough to be used as a replacement candidate parent group. But the number of young cattle (aged (1-2) year decreased 36% live 33 rats (64%), if it would be candidates for replacement aircraft is still difficult to predict because it is not supported by data age group parent.

Based on data for 2009-2013 calf mortality rate recorded over the last 5 years 4.1 % i.e 11 head of 269 calves are born tail. Death calf out 2007-2008 seem quite large (11-29%) and death calves less than one month only three tails, more predictable means no death after weaning age. The mortality rate in, the year 2009 decreased to 4-5% by year and in 2013 deaths plummeted (decrease dramatically) stay 1-3%. The number of adult females productive age, a high birth rate, and low mortality is an important indicator in the development of cattle and breeding cattle. In detail, the calf mortality rates each year as shown in Table 2 below:
Table 2. Distribution Amount and percentage of calf mortality (2007-2013)

Year	Number (Head)	Dead (head)	Dead (%)	Die ages< 1 mount (head)
2007 ♀	17	2	11.8	0
2007 ♂	15	3	20.0	0
2008 ♀	22	5	22.7	3
2008 ♂	24	7	29.2	4
2009 ♀	18	1	5.2	1
2009 ♂	27	1	4.1	1
2010 ♀	27	1	3.7	1
2010 ♂	31	1	3.2	1
2011 ♀	24	1	4.2	0
2011 ♂	30	0	0	0
2012 ♀	17	1	5,9	0
2012 ♂	26	1	3,8	1
2013 ♀	42	3	1,4	0
2013 ♂	37	1	3,7	0

Bali cattle production performance in BPTHMT Serading
Birth weight is the weight of the calf   newborn weighted not exceed 24 hours. Customized birth weight collected on the birth weight of males, then for it used a correction factor of 1.07 (USDA, 1981). Bali cow-calf in BPTHMT is born of parent results natural mating with males who owned BPTHMT. Ratio males and Parent in 2009 in the range 1: (13-14); in 2010 amounted to 1 (21-22); in 2011 at 1: 43 and the 1: 79. Use of a stud as bull less precise, because it appeared one year only used one tail of the males, whereas males available stock is ideal for use as the bull. This is not in line with the correct breeding program, in the long run, harm other males because they have to wait for the turn and a chance to give offspring delayed. Besides the ability of males aged drawn ever diminishing, so as to compare or get a superior male and reliable will not be achieved in a short time. Ideally, cows generation interval is reached 3-4 years when the use of a stud still waits 1-2 years, the increasingly long generation interval. The use of such breeding should be conducted in 2009 and 2010.

Birth weight cattle Bali in BPTHMT Serading within the last 5 years 14.928 ± 1.896 kg. Highest birth

weight was obtained in 2011 was 16.19 ± 1.77 kg, but the data was generated from the results of one male to 54 females, so there is no comparison between a male. Low birth weight 13.47 ± 1.86 kg obtained in 2013 as well as resulting from one of the males to 79 females and this does not mean that male offspring are less well because there is no stud comparison. Overall birth weight cattle Bali in BPT Serading lower than BPTU Pulukan Bali cattle in Bali in 2011 which amounted to 17.75 ± 0.96 kg.

Data weighting born in 2009-2013 in BPTHMT Serading as presented in Table 3 below.

Table 3. The number of children and the average weight of calves born in 2009-2013

Years	Bull (tail)	Female (tail)	calves (tail)	Birth weight (kg)	St.dev	CV (%)
2009	3	40	40	14,45	1,57	0,10865
2010	4	65	65	15,51	2,09	0,13475
2011	1	54	54	16,19	1,77	0,10933
2012	1	43	43	15,02	2,19	0,14581
2013	1	79	79	13,47	1,86	0,13808
Total(n)		281	281	74,64	9,48	
Average(5 years)				14,928	1,896	0,12732
Heritability bobot lahir = 0,12						

The number of children produced from natural mating system in paddocks BPTHMT Serading, Bali cattle in early 2013 males aged 1-2 years and the average age of 1.997 ± 0.95, some 95 tail selected based on body size with the selection method of independent culling levels , Bali cattle body size data stud candidates presented in Table 4 below:

Table 4. The body size of Bali cattle stud male candidates were measured (N=95 head)

description	Birth weight (kg)	Ages 1-2 Th	Body Weight kg	Body Length cm	Chest girth cm	shoulder height cm
Total	1471	175,82	9792	7704	9981	8448
Average	15,48	1,997	103,07	81,10	105,06	88,93
St,dev	1,999	0,95	66,15	25,58	31,62	20,33
CV	0,13	0,48	0,64	0,32	0,30	0,23

From Table 4 above Bali cattle males aged 1-2 years and the average age of 1.997 ± 0.95, has the body size is still below standard ISO. To meet the strictest requirements of ISO Class III A, the body size of Bali cattle goats for chest circumference was 30% lower, shoulder height 18 cm lower still (17% less) and shorter body length is still 26 percent.

Similarly to sample the bulls born in the year 2013 and 1.74 ± 0.43 years old, the body size of Bali cattle in BPTHMT Serading high shoulder body size is still 10% lower, chest circumference 22% lower and shorter body length of 15% , Body size data for bulls born in the year 2013 as presented in Table 5.

Table 5. The results of the measurement of Bali cattle male births in 2013

	Age (years)	Body weight (kg)	Body length (cm)	Chest girth (cm)	Shoulder High (cm)
Total	41.77	3272	2607	3368	2693
Average	1.74	116.86	93.11	120.29	96.18
St.dev	0.43	25.86	8.54	8.89	6.71
CV	0.25	0.22	0.09	0.07	0.07

Of the two samples of the birth of the bulls (Table 4 and 5) shows the male body size of Bali cattle in BPTHMT Serading still does not meet the minimum standard Class III standards. This is possible because the age of the bulls still has not reached 2 years, or the female parent rearing less precise or may result from male cattle Bali is the result of improper mating patterns. Warwick et al. (1983) suggest that the interbreeding in the cattle resulted in a decrease of 2.5 to 5.0 kg of body weight every 10% increase in inbreeding. The main problem encountered in the development of Bali cattle is the poor quality of seeds that allegedly result from inbreeding or the management of the maintenance factor. The influence of genetic and crossbreeding are usually detrimental i.e suppression, livestock fertility and birth weight cattle (Sariubang et al., 1998). This is consistent with the statement Mikema (1987) that the effects of inbreeding can increase the proportion of genetic loci that *heterozygote*, along with it will happen "*inbreeding depression*" which result in less resistance, fertility and birth weight cattle.

Conclusions

Of the 123 tail number of samples of Bali cattle in BPTHMT males aged 1.7 to 1.9 years has not entered a minimum standard requirements for the candidates bull. Bali cattle male body size is still 30 per cent below the minimum standard of minimum requirements set seeds SNI.

Suggestion

Selection is based on the dimensions of Bali cattle male body size, when following minimum standards SNI, Bali cattle males should be selected a minimum of 2 years. Besides bulls to be prepared for potential stud, should be provided from the descendants of a group that has the ideal sex ratio and maintained according to standard maintenance, particularly in feeding

Acknowledgements

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