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Research Article

The Effect of Age, Body Height, Weight, Testosterone Hormone Concentration and Semen Quality on the Libido Level of Pesisir Cattle

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Abstract | This research was conducted in two stages to determine the superior criteria characteristics of Pesisir cattle, required for high intensity mating, using 9 cows and 15 bulls. The first stage involves the selection based on age, height, weight, Body Condition Score (BCS), and reproductive diseases. Also, cows were examined for pregnancy and heat, while bulls were evaluated for scrotal boundary, testosterone, and semen quality. Furthermore, the second stage comprise of bulls response assessment to aggressiveness and libido. The results showed a characteristic age range of 18-24 months for cows, and 24-48 months for bulls, with a height of 129.77±1.30cm and 124.33±11.10cm, alongside weight of 256.66±38.28kg and 250.93±87.43kg, respectively. In addition, the BCS were 3-4 and 4-5, correspondingly, and all cows are not pregnant with three heat, three silent heat, and three not experiencing heat. Conversely, the scrotal boundary of bull was 25.30±6.75cm, with testosterone measuring 9.63±5.25ng/ml, alongside good semen quality observed in 11 and bad in 4. The results of the second stage show all bulls to be aggressive towards heat and silent heat, but less aggressive toward non-heat cows. In addition, the libido level was significantly affected by testosterone and age ($P<0.01$), alongside height, weight, and semen quality ($P<0.05$). However, the main contributing factors were determined as testosterone concentration, age, weight, semen quality, and height. In conclusion, the high intensity mating criteria for bulls were ages 36-48 months, height 134±1.73cm, weight 348±31.18kg, scrotal boundary 32±0.87cm, testosterone 12.62±3.77ng/ml and good semen quality.

Keywords | Bulls superior, Mating, Libido, Heat, Aggressive

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INTRODUCTION

Pesisir cows belong to a cattle family separate from other natives or local Indonesian livestock, due to the varied characteristics. There is a significant increase in production with the supply of high quality breeds at the Superior Livestock Breeding and Animal Feed Center (SLBAFC), Padang Mangatas. This is attained through the deployment of management strategies, in an attempt to maximize pasture rotation and other forms of grazing. Furthermore, a natural mating process introduces a superior male with high reproductive potential to fertilize a group of 180 adult cows in 2 months.

Based on the decree of the Minister of Agriculture No. 2908 / Kpts / OT.140 / 6/2011 dated 17 June 2011, the Pesisir cattle demonstrate distinctive characteristic of a brick-red dominant body color varying between yellow,

brown, and black, with blonde lashes. In addition, the back line shows blackish-brown, white legs, black tail hair, small body shape, gumba, wattle, tiny horns, and the ears are turned sideways. The minimum bull selection requirement according to Indonesian National Standard (SNI) 7651.6: 2015 include Pesisir breeds aged 18-24 months of shoulder height 92cm, body length 94cm, chest circumference 111cm, and scrotal boundary 20cm. Specifically, conditions for aged bulls > 24-36 months comprise shoulder height 100cm, body length 108cm, chest circumference 124cm, and scrotal boundary 21cm (BSN, 2015), in addition to an assessment on semen quality, SNI 4869.1: 2017 (BSN, 2017). However, only specimens with the specified features are used.

In addition, there are no criteria for the selection of superior bulls for the purpose of mating in the past, and reproductive failure reaches 20%, because of low copulating ability. Meanwhile, sexual impulse is influenced by the level of libido (Ashwood, 2009), therefore bulls with high drive tend to produce a greater number of viable semenatozoa through repeated ejaculation in a relatively short time (Rehman et al., 2016). Evaluation superior bull for the purpose of mating based on results of the libido effect levels on age, height, weight, testosterone concentration, and semen quality.

The bull age significantly affects semen quality improvement, which reduces after a certain period (Mahmood et al., 2014). Also, the semen quality at certain period gradually decreases after 100 weeks with the tendency to further increase above 300 weeks (Nyuwita, 2015). semenatogenesis and bull fertility depending on the availability of testosterone, and meiosis is not attainable without this hormone (William, 2011). In addition, concentrated quanitities influence libido level to various extent, depeding on the individual species (Mahmood et al., 2013).

However, SNI 7651.6: 2015 only determines the minimum requirements of the breeders without complementing the criteria for high reproductive abilities, and hence does not guarantee successful selection during natural mating. This prompts the need for an investigation to determine the selection criteria for active bulls by analyzing several factors affecting libido levels, including age, height, weight, testosterone concentration and semen quality.

MATERIALS AND METHODS

This research was conducted at Superior Livestock Breeding and Animal Feed Center (SLBAFC), Padang Mangatas, using Pesisir cattle, comprising 9 cows (three heat, three silent heat, three non-heat), and 15 bulls. However, the Pesisir cattle originated from Pesisir Selatan Regency, Sumatera Barat province known to have been developed at SLBAFC, Padang Mangatas. The process was divided into two stages, termed selection of specimen (stage I) and assessment of libido level (stage II).

Stage I, Selection of Cows and Bulls

The cattle were examined to ascertain physical and reproductive status. Therefore, the physical test determines age, height, chest circumference, body weight, body condition score (BCS), and scrotal boundary. The results showed the criteria for estimating BCS with values ranging from 1 – 5, where BCS 1 was observed to be thin, with visible bones, and without fat. Moreover, BCS 2 appeared thin with clear upper bones, and little flesh added at the base of the tail, while BCS 3 represented obvious ribs, slight hip protrusions, and fat formed at the shoulders and chest. BCS 4 showed the bone structure was difficult to recognize, due to the deposit behind and above the shoulder, the base of the tail, and chest. BCS 5 animals were observed without visible bones (Juandhi, et al., 2019). The scrotal size is used to determine age and reproductive ability. Therefore, this factor is recognized as one of the most accurate indicators for male puberty determination. Males with large scrotal boundary exhibit a high tendency to rapidly approach young age (Yelich, 2008).

The screening for the reproductive status for both species showed negative values for Brucellosis, Infectious Bovine Rhinotracheitis (IBR), Bovine Viral Diarrhea (BVD), ParaTuberculosis (ParaTB), Bovine Genital Campylobacteriosis (BGC), Enzootic Bovine Leucosis (EBL), Trichoniosis and Leptospirosis (Bahri and Martindah, 2005). Subsequently, pregnancy and heat tests were conducted by observing the symptoms and follicular development (dominant/not dominant) through rectal palpation of the uterus and ovaries (Waluyo, 2014). According to Pamungkas et al. (2015) follicular development can be analyzed with the use of transrectal ultrasonography. Therefore, the presence of a massive dominant follicle followed by signs of heat, illustrates that it has developed into a de Graaf follicle, however, when it is not followed by signs of heat, it is categorized as a cow in a state of silent heat. In addition, cows without clear signs of heat and no dominant follicle are classified as not in heat. Balumbi et al. (2019), stated that the production of large follicles and high estrogen, indicates that the heat quality is good. One of the common signs of heat is the production of clear mucus.

The examination of Brucellosis was conducted using Rose Bengal Plate test (RBPT) and confirmed by complement fixation test (CFT), while Infectious Bovine Rhinotracheitis (IBR), Enzootic Bovine Leucosis (EBL), Bovine Viral Diarrhae (BVD), and paratuberculosis were analyzed by enzyme-linked immunosorbent assay (ELISA). Scanning

for leptospirosis through the microscopic agglutination test (MAT), while investigating for campylobacteriosis is performed through isolation and identification of bacteria from vaginal swab samples. The detection of trichomoniasis blood parasites is carried out by examining a blood smear.

The dominant follicle in the ovary was determined through rectal palpation as the one with a larger size (Budiyanto, et al., 2015). Measuring follicular diameter with transrectal ultrasonography ranges from 6 - 11 mm. This diameter range is a category of ovulating follicular in Pesisir cattle (Zaituni et al., 2017). Locating the dominant follicle and the presence of heat sign indicates the cows are in estrus. This signal is only observed once during the selection of cows from the grazing field, and is also applied to test libido level. Further observation of heat symptoms includes swollen vulva, thick mucus, restlessness, and heat period (Yousuf et al., 2015).

The bulls were equally evaluated for testosterone concentration as well as semen quality, and several opinions conveyed the hormone range in the blood of various bull types. The average testosterone concentration of Cholistani AI bulls at age 5-11 was 5.81 ± 032ng/ml (Mahmood et al., 2013), while 5.66 ± 1.08ng/ml was recorded for the Karan Fries crossbred (Holstein Friesian × Tharparkar) at age 4-6 (Rajak et al.,2014), and Kuantan at age 2-3, averaged 2.82 ± 1.99ng/ml (Anwar & Jiyanto, 2019). Furthermore, semen quality test showed good standard at normal average pH 6.8 with range from pH of 6.2 - 7.5, characterized by cloudy milk-coloration, or creamy-white, with thick consistency, and specific odor (Toelihere, 1985), with 50% minimum semenatozoa motility (BSN, 2017), concentration 500 (10^6/ml), life percentage >50%, abnormal rate<20% (Zaituni, 2012).

The examination the fresh semen quality was performed macroscopically and microscopically. Macroscopic provision includes: 1) Measuring pH by placing cement on litmus paper. 2) Visually observing the color after holding, as good cement appears beige; 3) Consistency is determined by simply tilting the collection tube and then straightening it back up. The cement drops slowly to indicate high concentration, while a fast release shows the concentration is low. Microscopic examination includes: 1) Individual motility is observed on the motion of the semenatozoa using a microscope with 400x magnification. The motility criteria for semenatozoa are as follows: 0%: immotile semenatozoa are immobile; 50%: semenatozoa move in a circle, less than 50% are progressively and also not wavy; 50-80%: semenatozoa move gradually and produce mass movement; 90%: progressive motion is agile and forms waves; 100%: very progressive and also shows fast waves; 2) Viability and abnormality of semenatozoa, was observed based on differential staining using eosin nigrosin dye. The preparations were achieved under a 400x magnification light microscope. When the preparation is activated, it tends to show white coloration, while dead semenatozoa extends to red due to absorbed eosin color. Furthermore, the number of live and dead semenatozoa is counted from 200 semenatozoa cells. 3) Concentration of semenatozoa are evaluated using haemocytometer pipette and a Neubauer counting chamber. The cement was sucked up to a scale of 0.5 and then mixed with 3% NaCl. Subsequently, the solution was agitated for 2-3 minutes to form a homogenous composition. Then, the sample was observed in a Neubauer counting chamber with a light microscope of 400x magnification. The calculation of semenatozoa concentration in the number of rooms are counted as five boxes with 80 small rooms multiplied by 10 per milliliter (Indriani et al., 2013)

Stage II, Libido Level Assessment

This test commenced by evaluating the aggressive response of bulls to cows, continued by further investigating the factors affecting libido, in an attempt to determine the criteria of superior bulls with high mating intensity.

Aggressive Response Test Bulls to Cows

This was a descriptive evaluation, where the aggressive response of bulls to heat cows, silent heat, and non-heat were examined. Subsequent observations were based on the behavior, starting from the approach or teasers, and insufflating is part of the sexual displays performed by the bulls prior to mating. This is followed by attempts to mount without being accompanied by copulation (Achmad, et al., 2017). The aggressive response assessment initially involved the introduction of 3 selected heat cows into a loose cage (rench). A rench is a loose enclosure surrounded by a fence with an estimated area of 30 x 9 M2, and is also equipped with a floor for feeding and drinking (Affandhy et al., 2007). Next, the bulls were consecutively studied, and the aggressive response towards 3 silent heat cows and 3 non-heat cows was analyzed. Table 1 shows each behavior, assigned a score after a 5 minutes observation period (Walker, 2009).

Table 1: Scoring Response Aggressiveness of Bulls to Cows

Scor	The Response of Bulls to Cows
0	Bull ignores cows
1	Bull approach cows or teasers
2	Bull approach cows or teasers and insufflating
3	Bull approach cows or teasers, insufflating and then followed by trying to mating without being copulation

Low Aggressiveness <1; Moderate Aggressiveness > 1 to <2; High Aggressiveness ≥ 2

Table 2: Data of Physical examination cows and bulls

Physical examination	Pesisir Cattle				
	Cows		Bulls		
	Average ±SD	Standard Value	Average± SD	Standard Value	
Age (month)	18-24	18-24	24-48	24-36	SNI 7651.6:2015
BH (cm)	129.77±1.30	91	124.33±11.10	100	SNI 7651.6:2015
CC (cm)	145.88±8.57	123	142,26±19.07	124	SNI 7651.6:2015
BW (kg)	256.67±38.28	149,1±18,2	250.93 ±87.43	162,2±25,4	SK Mentan No. 2908/Kpts/ OT. 140/6/2011
BCS	3-4		4-5	-	
SB (cm)	-		25,3±6.75	21	SNI 7651.6:2015

BH = Body Height; CC = Chest Circumference; BW = Body Weight; BCS = Body Condition Score; SB = Scrotal Boundary

Factors Test That affects Libido

The assessment involved investigating the effects of age, height, weight, testosterone concentration, and semen quality on libido.

Data Analysis

The generated data were analyzed through cross-tabulation to evaluate the libido level, while Spearman's correlation was employed to ascertain the factors affecting libido. Statistical analysis was conducted with the Statistical Package for Social Science (SPSS) for Windows version 16.

RESULTS AND DISCUSSION

Stage I, Selection of cows and bulls

Physical Examination Results of Cows and Bulls

This examination was performed to determine the effect of age, height, weight, and BCS on the reproduction and heat status of cows.

Table 2 showed higher values, exceeding the minimum standard requirements according to SNI 7651.6: 2015 and Minister of Agriculture Decree No. 2908/Kpts/OT.140/6/2011. This indicates the pasture rotation - grazing system was well maintained and the tendency for high quality selection and bull replacement in certain periods to improve Pesisir cattle performance. This opinion as supported by Brantly (2013), where the management strategies utilized reportedly possessed the potential to maximize livestock growth, resulting from sufficient feeding from tastier and more nutritious forage leaves. The determination of suitable feed is achieved using palatability test, known as the degree of preference for certain foods served to livestock. However, there is a need to substitute the bulls every third calves to avoid inbreeding. The bulls are replaced or abandoned after natural mating until the cows calves three times.

Examination of Reproductive Status Toward Reproductive Disorders

Table 3 shows the screening, performed to ascertain the reproductive disease-free status assumed to influence the heat cycle in cows, and also the libido levels in bulls.

Table 3: Examination Data for Reproductive Disorders

Reproductive Disorders	24 Pesisir Cattle	
	9 Cows	15 Bulls
Brucellosis	(-)	(-)
IBR	(-)	(-)
BVD	(-)	(-)
ParaTB	(-)	(-)
BGC	(-)	(-)
EBL	(-)	(-)
Tricomoniasis	(-)	(-)
Leptospirosis	(-)	(-)

IBR = Infectious Bovine Rhinotracheitis; BVD = Bovine Viral Diarrhae; ParaTB = Para Tuberculosis; BGC = Bovine Genital Campylobacteriosis; EBL = Enzootic Bovine Leucosis; (-) = Negative

Table 3. showed negative values for 9 cows and 15 bulls selected after testing in accordance with the animal health development strategic plan, Directorate of Animal Health, Directorate General Livestock and Animal Health, Ministry of Agriculture. Furthermore, Brucellosis, IBR, BVD, BGC, PataTB, EBL, Trichomoniasis and Leptospirosis are infectious animal diseases forbidden in livestock breeds (Bahri and Martindah, 2005).

Cows Selection

Table 4 shows the cow selection requirements including physical examination, reproductive pregnancy and heat status, among others.

Table 4 shows all non-pregnant cows with heat, based on the dominant follicle/de Graaf growth obtained from six

Table 4: Examination Data of Reproductive Status on Pregnancy and Heat

Cows Number	Reproductive Status				
	Pregnancy Status	Follicular Growth	Follicular Phase	Symptoms of Heat	Heat Status
C1	(-)	DF/dG	F	WSH	H
C2	(-)	DF/dG	F	WSH	H
C3	(-)	DF/dG	F	WSH	H
C4	(-)	DF/dG	F	NSH	SH
C5	(-)	DF/dG	F	NSH	SH
C6	(-)	DF/dG	F	NSH	SH
C7	(-)	NDF	L	NSH	NH
C8	(-)	NDF	L	NSH	NH
C9	(-)	NDF	L	NSH	NH

C1-9 = Cow 1-9; (-) = Non-pregnant; DF/dG = Dominant Follicle/de Graaf; NDF = Non Dominant Follicle; F = Follicular; L = Luteal; WSH = With Symptoms of Heat; NSH = Non Symptoms of Heat; H = Heat, SH = Silent Heat; NH = Non Heat.

Table 5: Data on Reproductive Status Examination to Testosterone Concentration and Semen Quality Compared to SNI Standard Values and Other Bulls

No.	Types of Test	Average ± SD	Standard Values	
1	Testosterone Concentration (µg/ml)	9.63 ±5.25	5.81±032	Bulls Cholistani AI (Mahmood, et al., 2013)
			5.66±1.08	Bulls Karan Fries crossbred (Holstein Friesian×Tharparkar) (Rajak, et al., 2014)
			2,82±1,99	Bulls Kuantan (Anwar and Jiyanto 2019)
2	Characteristics of Fresh Cement			
	a. Macroscopic			
	Color	Milky white-Creamy	Milky white-Creamy	Toelihere, 1984
	pH	6.7±0.25	6,2-7,5	Toelihere, 1985
	Consistency	Dilute-thick	Dilute-thick	Toelihere, 1985
	Smell	Specific	Specific	Toelihere, 1985
	b. Microscopic			
	Motility (%)	55.8±16.10	≥ 50	SNI 4869.1:2017
	Concentration (10^6/ml)	645.73±208.92	≥ 500	Zaituni, 2009
	Life (%)	65.27±14.36	> 50	Zaituni, 2009
	Abnormalities (%)	24.07±5.96	< 20	Zaituni, 2009
3	Semen Quality			
	a. 11 Bulls	Good Quality		
	b. 4 Bulls	Bad Quality		

follicular phases, resulting in three symptoms of heat, non-heat and silent heat, while a total of three were in the luteal phase. According to Waluyo (2014), these symptoms are affected by the production of estrogen hormone by ovaries. Furthermore, there is an increase in estrogen levels at the final phase of maturity of de Graaf follicles. This promotes receptiveness and heat symptoms, including the appearance of swollen and reddish vagina and vulva, several clear and transparent cervix mucus, and vagina flow. Also, heat symptoms are not very obvious in young (newly puberty) or adult cows with several calves.

Bulls Selection

Besides the physical examination, Table 5 shows the two determinant criteria for high intensity superior mating needed to examine the reproductive status. These include testosterone concentration and semen quality.

Table 6: Assessment Data on Response of Bulls to Cows.

Bulls Number	Response Score of Bulls to Cows											
	Heat				Silent Heat				Non Heat			
	CH1	CH2	CH3	x̄	CSH1	CSH2	CSH3	x̄	CNH1	CNH2	CNH3	x̄
B1	3	2	2	2,33	2	2	0	1,33	0	0	0	0,00
B2	2	2	1	1,67	1	1	1	1,00	1	0	0	0,33
B3	1	1	1	1,00	1	0	1	0,67	1	1	0	0,67
B4	3	2	2	2,33	1	0	1	0,67	1	0	0	0,33
B5	2	2	2	2,00	0	1	0	0,33	0	1	0	0,33
B6	2	2	1	1,67	0	1	0	0,33	0	0	0	0,00
B7	2	2	1	1,67	2	1	1	1,33	1	0	0	0,33
B8	2	2	1	1,67	0	1	1	0,67	1	0	0	0,33
B9	2	2	1	1,67	0	0	0	0,00	0	1	0	0,33
B10	2	2	1	1,67	2	1	0	1,00	0	0	0	0,00
B11	2	2	1	1,67	0	0	1	0,33	1	0	0	0,33
B12	0	0	0	0,00	0	0	1	0,33	0	0	0	0,00
B13	1	1	0	0,67	1	0	0	0,33	1	0	0	0,33
B14	0	0	0	0,00	0	0	0	0,00	0	0	0	0,00
B15	1	1	1	1,00	0	1	1	0,67	0	0	0	0,00
x̄	1,67	1,53	1,00	1,40	0,67	0,60	0,53	0,60	0,47	0,20	0,00	0,22

B1-15 = Bull 1-15; CH = Cow Heat; CSH = Cow Silent Heat; CNH = Cow Non Heat; Low Aggressiveness <1, Moderate Aggressiveness ≥1 to <2; High Aggressiveness ≥2; x̄ = Average

Table 5 compares the average value of testosterone concentration in Pesisir bulls with Cholistani AI, crossbred Karan Fries, and Kuantan. The result shows Pesisir as a superior breed, with semen quality of 11 in the good and 4 in bad categories, alongside a minimum of 50% semen motility (SNI 4869.1: 2017).

Testosterone is an androgen in the testes, responsible for supporting semenatogenesis. The main function is to maintain the blood barrier testes, bond Sertoli-semenatids, and release adult semen (William, 2011). Noakes, et al. (2016) reported on the need for testosterone in semen production and subsequent maturity in the epididymis. This hormone has also been implicated in semen quality.

Stage II, Criteria for Superior Bulls with High Mating Intensity

Results of Assessment Bulls Aggressive Response to Cows

Table 6 shows the aggressive response of bulls to heat, silent heat, and non-heat in cows.

Table 6 shows the Cross-tabulation test analysis, and the results indicate aggression conditions of bull libido towards heat and silent heat, but less to non-heat. Furthermore, the response by percentage to heat is 20% high, 60% medium, and 20% low, while to silent heat was 26.7% moderate and 73.7% low, and non-heat was 100% low. Therefore, bulls with lower aggressive response to heat, silent heat and non-heat likely result from the different amounts of pheromone hormone stimulation issued in each heat status. Achmad, et al. (2017) affiliated the desire of bulls to mount cows with the stimuli received from sight, smell, touch, and hearing senses. In addition, there is a higher tendency for aggressiveness, when the cows experience a combination of heat responsible for the emission of fluid and odor pheromones. Baliarti et al. (2019) also corroborates the higher ability for bulls to naturally exhibit different attitudes towards the cycle and behavioral expressions during heat in cows. This is influenced by the chemical compounds or pheromones produced, indicating the entry into heating phase. Therefore, bulls capture specific odor, and is assumed to be stimulated by the appearance of sexual signs behavior.

Table 7: Data Analysis of Factors Affecting Libido Level.

Parameters	Libido
	Correlation Coefficient Significance
Age	0.696 **/SC
BH	0,563 */MC
BW	0,624 */SC
TC	0,813 **/VSC
CQ	0,618 */SC

BH = Body Height; BW = Body Weight; TC = Testosterone Concentration, CQ = Cement Quality; ** = Highly Significant (P<0.01); * = Significant (P<0.05); VLC = Very Low Correlation (0.00-0.19); LC = Low Correlation (0.20-0.39); MC = Moderate Correlation (0.40-0.59); SC = Strong Correlation (0.60-0.79); VSC = Very Strong Correlation (0.80-1.00)

Table 8: Data Assessment of Aggressive Response of bulls in Age Groups to cows

Bulls Age (month)	N	Bulls Height (cm)	Bulls Weight (kg)	Bulls Testosterone Concentration (ng /ml)	Motility Semen (%)			
						Cows Heat	Cows Silent Heat	Cows Non Heat
24	5	113,4±37,8	168±35,21	6,58±5,03	46,40±17,30	0,67	0,33	0,13
30	5	125,2±10,03	245±79,62	8,14±4,40	57,00±17,89	1,67	0,67	0,20
36	2	133,5±17,8	332,5±3,54	13,04±4,34	65,00±7,07	2,00	1,17	0,17
48	3	135±0	344,67±34,43	14,93±3,44	63,33±12,58	1,78	0,56	0,44

N = Number of Samples; Low Aggressiveness <1; Moderate Aggressiveness > 1 to <2; High Aggressiveness ≥ 2

Table 9: Determination Of Criteria For Superior Bull With Mating High Intensity To Cows.

Bulls Number	Age	BH	CC	BW	SQ	TC	SB	Bulls Response to Cows		
								CH	CSH	CNH
B1	36*	132*	160*	330*	G*	*9,97**	31,5*	H*	M	*L*
B2	36	135	163	335	G	16,11	33,0	M	M	L
B3	48	135	158	320	G	16,91	31,5	M	L	L
B4	48*	135*	160*	330*	G*	*16,93**	31,5*	H*	L	*L*
B5	48*	135*	163*	384*	G*	*10,96**	33*	H*	L	*L*
B6	30	130	150	272	G	5,06	27,0	M	L	L
B7	30	134	158	320	G	10,11	30,0	M	M	L
B8	30	133	156	308	G	10,14	28,5	M	L	L
B9	30	117	130	190	G	13,16	21,0	M	L	L
B10	30	112	115	135	B	2,24	15,0	M	M	L
B11	24	120	135	210	B	5,28	25,5	M	L	L
B12	24	114	120	150	B	4,75	18,0	L	L	L
B13	24	119	133	202	G	13,86	22,5	L	L	L
B14	24	112	115	135	B	0,34	15,0	L	L	L
B15	24	102	118	143	G	8,65	16,5	M	L	L

B1-15 = Bull 1-15; BH = Body Height; CC = Chest Circumference; BW = Body Weight; SQ = Cement Quality; TC = Testosterone Concentration; SB = Scrotal Boundary; CH = Cows Heat; CSH = Cows Silent Heat; CNH = Cows Non Heat; H = High; M = Moderate ; L = Low; G = Good; B = Bad; * = Selected Criteria

Test Factors Affecting Libido Level

Table 7 shows the analysis results of factors influencing the libido level. These include age, height, weight, testosterone concentration, and semen quality.

The analysis results showed a very significant effect of age and testosterone concentration at (P<0.01) on libido levels, while the influence of height, weight, and semen quality were at (P<0.05). Furthermore, a strong correlation of (0.80-1.00) exists between testosterone concentration and libido levels, while age, weight, and semen quality was (0.60-0.79). However, height had a moderate correlation at (0.40-0.59).

Table 8 shows the bull libido level towards cows, with respect to age groups of 24, 30, 36, and 48 months.

Table 8 shows the increase in height, weight, testosterone concentration, and semen quality, alongside age from 24 to 48 months. Furthermore, the assessment reveals increased libido at 24 to 36 months and reduction at 48 months due to the decrease in semen motility by 63.33 ± 12.58%. The response towards heat was high aggressiveness at 36, moderate at 30 and 48, and low at 24 months. The outcome towards silent heat was moderate at 36 months while other ages were low, with non-heat prompting overall low aggressiveness. This is almost similar to the opinion of Ahmad et al. (2005), where age showed a significant effect on libido. Adult males aged 3-5, demonstrates the best libido compared to younger males under 3, and their older counterpart over 5 years.

Table 7 and Table 8 indicates several factors influencing libido level, with testosterone concentration as the first and strongest. Chenoweth (1994), Mahmood et al. (2013), and Syarifuddin et al. (2017), affirmed blood hormone concentration and testosterone as an alternative and indirect

assessment procedure for determining libido. Therefore, cattle libido level is affected by testosterone concentration. The second is age. Chenoweth (1994) and Ahmad et al. (2005) posited age impacts libido level and sexual behavior character. An increase in libido is apparent at 16-31 months. Achmad et al. (2017) also asserted the influence on animal libido in is from outside or inside the body. The ability to mount a bull is age based, and older age causes progressively malfunctioning limbs from dislocations/fractures and hind or spine osteoarthritis. Petherick's (2005) confirmed greater libido expression and serving efficiency in older bulls which is likely to signifybetter sexual experience.

The third factor affecting bulls libido level is body weight. Dalimunthe et al. (2017) postulated a higher total amount of PGF2α from bodyweight. Furthermore, the PGF2α concentration is proportionate to androgen hormones including testosterone. The endocrine system development with the animal puberty process impacts libido level.

The fourth factor is semen quality level. William (2011), expressed an impact on semen quality from testosterone concentration. Therefore, good semen quality and adequate hormone testosterone concentration affects libido level.

Height is the fifth factor. Walker et al. (2009) confirmed physical abilities, dominated by the bulls body size, facilitates successful breeding and ability to mate Sumardani et al. (2017) also supported the significant impact of physique higher dimensions on reproductive performance.

Table 9 shows the criteria for superior bulls with high intensity mating and the value of aggressiveness. This is based on the analysis data on response of bulls to cows in Table 6.

Table 9 shows the bulls high aggressiveness response to cows, indicated in codes B1, B4, and B5 cattle. The criteria guidelines selected to determine superior bulls with characteristic high mating intensity includes age, height, chest circumference, weight, scrotal boundary circumference, testosterone concentration, and semen quality.

Table 10 shows the results of criteria to determine superior bulls with high intensity mating to cows.

Table 10 shows higher values for age, height, chest circumference, and scrotal boundary circumference in the criteria for superior bulls with high intensity mating, compared to the minimum standard according to SNI 7651.6: 2015. Furthermore, the quality of semen is of good value according to SNI 4869.1: 2017. There is also an additional requirement of testosterone concentration at 12.62 ± 3.77ng/ml

Table 10: Data of Criteria for Superior bull with mating high intensity to cows

Criteria Bulls Strong With Mating High Intensity to Cows	
Age (month)	36-48
BH (cm)	134±1.73
CC (cm)	161±1.73
BW (kg)	348±31.18
SB (cm)	32±0.87
TC (µg/ml)	12.62±3.77
CQ (G/B)	Good Quality

BH = Body Height; CC = Chest Circumference; BW = Body Weight; SB = Scrotal Boundary; TC = Testosterone Concentration; CQ = Cement Quality; G/B = Good/Bad

CONCLUSION

All bulls are aggressive to heat and silent heat, but less aggressive to non-heat cows. The percentage aggressiveness response towards heat was 20% high, 60% moderate, and 20% low, while, silent heat was 26.7% moderate and 73.7% low, and non-heat was 100% low. The age and testosterone substantially impacted on libido level at ($P<0.01$), while height, weight, semen quality were significant at ($P<0.05$). The libido level strongly correlated with testosterone concentration at (0.80-1.00), while age, weight, and semen quality was significant at (0.60-0.79). However, height showed a moderate relationship at (0.40-0.59).

Progressive age instigates an increase in libido level, and the highest value is observed at 36 months, although a decline was recorded on the 48 month.

The major influencing factors include the hormone testosterone, followed by age, weight, semen quality and height The criteria of Pesisir superior bull with high intensity mating include age 36-48 months, height 134±1.73cm, chest circumference 161±1.73, weight 348±31.18kg, scrotal boundary 32±0.87cm, testosterone concentration 12.62±3.77ng/ml and good semen quality.

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CONFLICT OF INTEREST

The all authors state that there is no conflict of interests.

AUTHORS CONTRIBUTION

IGEB and ZU designed and conducted research. IGEB and EP analyzed data and wrote manuscript. YY criticized and revised the manuscript. IGEB, ZU, EP and YY completed the manuscript.

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