



Research Paper

Comparison Of Reproductive Performance Boerka And Jawarandu Goats (*Capra Hircus*) In Tanah Datar Regency

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ABSTRACT: This study aims to find out a comparison of reproductive performance of Boerka and Jawarandu goats in the Tanah Datar Regency. The method used is a survey. Data analyzed with a T-test using SPSS application version 16.0. Sampling using purposive sampling method, number of samples used by Boerka (n=23 tails) and Jawarandu (n=22 tails). Research changer consists of puberty age, first mating age, first parturition age, long pregnant dan litter size. The results of the study obtained the average puberty age of Boerka goats 5.62 ± 0.40^b months and Jawarandu goat 5.98 ± 0.54^a months give a significant effect ($P < 0.05$), average mating age of first Boerka goats 7.29 ± 0.70^b months and Jawarandu goat 7.88 ± 0.69^a months give a significant effect ($P < 0.05$), average first parturition age Boerka goat 14.79 ± 0.96^b months and Jawarandu goat 15.70 ± 1.22^a months give a significant effect ($P < 0.05$), average long pregnant Boerka goat 149.57 ± 2.25 day and Jawarandu goat 150.05 ± 2.66 day give a not significant effect ($P > 0.05$) and average litter size Boerka goat 1.91 ± 0.67 tail and Jawarandu goat 1.59 ± 0.67 tail give a not significant effect ($P > 0.05$). The average reproductive performance Boerka goat is higher than the Jawarandu goat.

KEYWORDS: Boerka goat, Jawarandu goat, mating, reproduction

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I. INTRODUCTION

Goats have a genetic advantage such as high fertility, prolific, better quality of meat and milk than cows. Indonesia has a very diverse genetic source of goats both imported and local goats with high productivity. The development of goat farms has been constrained by low production, growth rate, and low body weight, kidding interval still above 8 months (not achieved giving birth 3x in 2 years). The goat population in 2019 in West Sumatra was 321.596, still relatively low when compared to the province of South Sumatra 413.923 and North Sumatra 1.064.228 (Direktorat Jendral Peternakan, 2019). Goats have the potential to be a provider of meat needs in the country. Therefore, it is very necessary to increase the productivity of goats in West Sumatra, productivity improvement can be achieved through the improvement of a livestock maintenance and development system that has good reproductive genetics. Good reproduction will affect the birth rate and increase the population.

The Boerka goats are the result of mating Boer males and Kacang females. The Boerka goat is a goat type meat relatively good and potential as a superior goat seed in the future (Ginting dan Mahmilia, 2008). Have a good reproductive performance that is litter size Boerka goats as much as 1.19 tail and long pregnant 149.25 ± 3.82 day (Mahmilia, 2007). The age of first mating of Boerka goats 172 days (5.65 months), first parturition age Boerka goat 366 days (12.03 month) (Mahmilia *et al.*, 2009). Ginting dan Mahmilia (2008) said that the birth weight of Boerka goats on average increased by 42% compared to Kacang goats.

The Jawarandu goat is a mating between Peranakan Ettawa (PE) goats and Kacang goat (Sutama dan Budiarsana, 2010). Puberty in goats age 5-7 months (Hafez, 2000). Jawarandu goats can produce three times in two years with litter size 2-3. Litter size plays an important role in determining the rate of population increase because high litter size will affect the increase in the population (Doloksaribu *et al.*, 2005). This type of goat has been widely developed in Indonesia, in West Sumatra, one of the development places for Boerka and Jawarandu goats is in Tanah Datar Regency. The development of goat livestock is good, due to the environment and adequate availability of feed, but no one has examined how the reproductive performance of Boerka and Jawarandu goats in the Tanah Datar Regency.

There are several problems of goat reproduction at the research site such as females who do not want to mate, females who are infertility, abortus occurred, and *inbreeding*. The growth kid which is not good at the beginning of his life will result in slow growth after adulthood. To get a good goat's performance, it's worth noting various supporting aspects such as genetic traits and maintenance management.

The results of this study are expected to provide information, how is the comparison of the reproductive performance of Boerka and Jawarandu goats. Where there is no information about this goat in West Sumatra, and provide information for goat farmers as well as the government who wish to develop Boerka and Jawarandu goats.

II. MATERIALS AND METHODS

Research Materials: The material used in this study was Boerka goats (23 tails) and Jawarandu (22 tails) clinically healthy in 12 farmers in Tanah Datar Regency, West Sumatra Province.

Research Tools: The tools used in the research are questionnaires for data collection, recording livestock Stationery to record the results of the study, and cameras for documentation.

Method: The method used in this research is a survey. Sampling using the method *purposive sampling* with sample determination based on the criteria determined by the researcher. The data collected includes data between primary and secondary data. The total number of goats used in this study is Boerka (23 tails) and Jawarandu (22 tails) for long pregnant and *litter size*. For puberty age, first mating age, and first parturition age Boerka goats (17 tails) and Jawarandu (14 tails).

Observed Variables: Puberty age, first mating age, first parturition age, long pregnant dan *litter size*.

Data analysis: Research data on puberty age, first mating age, first parturition age, long pregnant, and *litter size* Boerka and Jawarandu goats analyzed with independent T-test SPSS application version 16.0.

III. RESULT AND DISCUSSION

Regency of Tanah Datar

Tanah Datar Regency (Figure 1) is one of the regencies in West Sumatra Province with the capital Batusangkar known as "Luhak Nan Tuo". Geographically, Tanah Datar Regency is in a position to 00° 17 " LS - 00° 39 " LS and 100° 19' BT - 100° 51 BT. This district is the second smallest district for its area in West Sumatra, which is the largest area of 133.600 Ha (1.336 km²). There are limits to his administration is:

- The North is bordered by Agam Regency and 50 Kota
- Southside bordered by Solok Regency
- Westside bordered by Padang Pariaman Regency
- Eastside is bordered by Sawahlunto City and Sijunjung Regency.

Tanah Datar regency is an agricultural area, more than 70% of the population works in the agricultural sector, agriculture, plantations, fisheries, and animal husbandry. In general, the climate in the Tanah Datar regency is moderate with temperatures between 12°C-32°C, with an average rainfall of more than 3,000 mm per year. Most rains fall from September to February. This high rainfall causes sufficient water availability, allowing agricultural and livestock businesses to be widely developed.

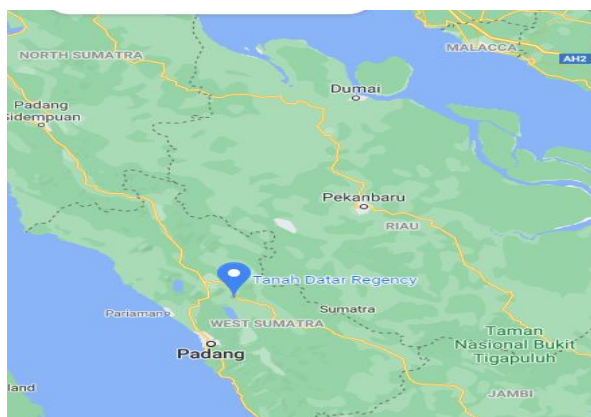


Figure 1. Map of Tanah Datar Regency

Reproduction of goats

The Average puberty age, first mating age, and first parturition age of Boerka and Jawarandu goats in the Tanah Datar Regency can be seen in Table 1.

Table 1. Average puberty age, first mating age, and first parturition age of Boerka and Jawarandu goats

Goats	n	Puberty age (months)	First mating age (months)	First parturition age (months)
Boerka	17	5.62±0.40 ^b	7.29±0.70 ^b	14.79±0.96 ^b
Jawarandu	14	5.98±0.54 ^a	7.88±0.69 ^a	15.70±1.22 ^a

Different superscript letter values in the column give a significant effect (P<0.05)

Puberty (Table 1) is a period in the life of male and female creatures where the reproduction process begins to occur, marked the ability to first produce seed cells. Statistical analysis shows the puberty age of Boerka and Jawarandu goats give a significant effect (P<0.05). The average puberty age of Boerka goats is 5.62±0.40^b months faster when compared to the average puberty age of Jawarandu goats is 5.98±0.54^a months. The difference in puberty age is caused by different types of goats so the resulting reproductive abilities are also different, where the Boerka goat is the marriage between male Boer and female Kacang. While Jawarandu goat is a mating between male PE and female Kacang.

The results of this study are by the Hafez (2000), that the female goat first ovulates or puberty about 5-7 months. Females Boer puberty at 6 months of age and males can be mated at the age of 5-6 months weight 32 kg from the age of 3-4 months (Christopher, 2001). While puberty age goat PE 10.6-12.89 months (Kurniasih *et al.*, 2013). Fastly puberty in Boerka goats was influenced by genetics inherited by Boer goats, that the puberty age of Boer goats obtained from some previous researchers is also lower when compared to PE goat elders from Jawarandu goats

This is one of the causes of puberty of Boerka and Jawarandu goats give a significant effect (P<0.05). Puberty age is defined as the date of the first estrus followed by luteal function, but at this stage, the reproductive organs of livestock have not fully developed. Puberty age can be influenced by the nation, environmental temperature, and adequacy of feed nutrients. The reproductive maturity of livestock is more influenced by the weight of livestock than at the age of (Davendra and Burns, 1994). The Boerka goats at the research site, have a faster growth rate as it enters the puberty phase and caused an earlier estrus from Jawarandu goat.

Age of first mating (Table 1) the age at which goats are first mated. Statistical analysis shows the first mating age of Boerka and Jawarandu goats give a significant effect (P<0.05). The age of the first mating of Boerka goats 7.29±0.70^b months faster when compared to the first mating age of Jawarandu goats 7.88±0.69^a months. The difference in the age of first mating is influenced by genetics and breeders who mating the goat early when the estrus cycle is seen. The results of this study are not much different from Mahmilia *et al.* (2009), who gained the first mating age in Kacang goats 236 days (7.75 months) and the goat Boerka-1 age 172 days (5.65 months). Shorter when compared to the results of the study Kurniasih *et al.* (2013) PE goats that are 10.56±1.55-13.26±3.93 months.

The difference in the age of first mating can be caused by the nation, nutrition, environmental temperature, and maintenance management. The occurrence of variations in the age of the first mating because each female goat has a different productivity ability so that the age of first mating is also different. The rapid age of the first mating was obtained caused by farmers mating their goats when the symptoms of puberty have been seen and the genetic advantages that the elder inherited on his derivative. It is recommended to delay the marriage until several cycles or 3-4 months after the first estrus is seen so that there is no reproductive failure. Delay in the age of the first mating needs to be done, to allow livestock to reach conditions and weight enough to maintain the garden and subsequent reproduction performance, it is recommended at the time of mating of a goat is approaching the adulthood of the body.

First parturition age (Table 1) is the age at which goat first parturition after mating. The results of statistical analysis showed the first parturition age of Boerka and Jawarandu goats gives a significant effect (P<0.05). First parturition age Boerka goat 14.79±0.96^b months faster when compared to first parturition age Jawarandu goat 15.70±1.22^a months. First parturition age positively correlated with first mating age, the sooner the goat are mated and there was gardening then parturition age is also getting faster.

The results obtained are shorter when compared to research by Kurniasih *et al.* (2013) who obtained first parturition age on PE goats 15.44-19.47 months. But longer than Mahmilia *et al.* (2009) obtained the first parturition age in Boerka-1 at the age of 366 days (12.03 months) and Kacang goats at 387 days (12.72 months). Differences in parturition age can be caused by the nation, feed provided, and maintenance management.

Differences in first parturition age Boerka and Jawarandu goats, relating to the age of goat when mated, the sooner the goat are mated and there was a gardening then the faster pula first parturition age. Fast or later time the first parturition depends heavily on the nation, quality of feed provided, and maintenance procedures. Age difference parturition goat, because each doe goat has a different contains time so that the time of giving parturition is also different.

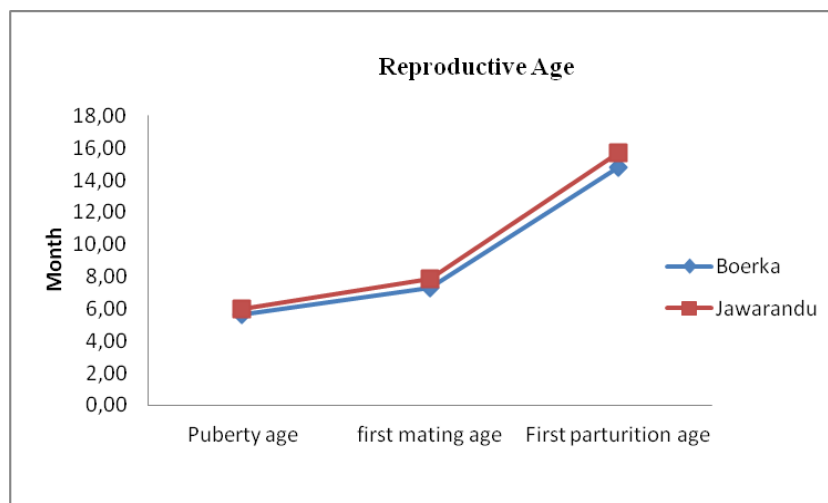


Figure 2: Reproductive

The Average long pregnant and *litter size* Boerka and Jawarandu goats in Tanah Datar Regency can be seen in Table 2.

Table 2. Average Lama long pregnant and *litter size* Boerka and Jawarandu goats

Goats	n	Long pregnant (day)	<i>Liter size</i> (tail)
Boerka	23	149.57±2.25	1.91±0.67
Jawarandu	22	150.05±2.66	1.59±0.67

The results of statistical analysis showed **long pregnant (Table 2)** Boerka and Jawarandu goats give a not significant effect ($P>0.05$). The long pregnant Boerka goat 149.57±2.25 days are not much different when compared to long pregnant Jawarandu goat 150.05±2.66 day. The results of this study are by the Mahmilia (2007) that the average long pregnant Boer goat is 150.40±6.45 day, in Kacang goats mated with Boer studs 149.25±3.82 day and 148.00±1.11 day on Kacang goat mated with Kacang goat. According to Astuti *et al.* (2007) long pregnant PE goat 5-6 months (150-180 days). While Mahmilia *et al.* (2009) obtained long pregnant 146-150 days on Kacang goat and 148-151 days on Boerka-1 goat. However, the long pregnancy of the two goats from the study is still within the normal range.

The long pregnancy is genetically determined although it can be modified by maternal factors, fetus, doe, and environment. The pregnant doe will show no signs of estrus in the next estrus cycle, abdominal enlarge on the right, the body is often swiped into the walls of the cage and relatively quieter. Setiadi *et al.* (2001) stated that with the increasing *litter size*, then long pregnant becomes shorter. According to Toelihere (2003) males in the bladder 1-2 days longer when compared to females. The longer the age and the number of old bunting children will be shorter, this is caused by stem reproductive organs are getting more perfect with increasing lifespan. The long pregnancy varies depending on the species of goat, even between individuals in the same species. During gardening, growth, and development of the uterus are influenced by increased concentrations of the hormones progesterone and estradiol.

Statistical analysis shows ***litter size* (Table 2)** Boerka and Jawarandu goats give a not significant effect ($P>0.05$). Average Boerka goat *litter size* 1.91±0.67 tail is not much different from *litter size* Jawarandu goat 1.59±0.67 tail. The high *litter size* in Boerka goats from Jawarandu goats is caused by Boerka being more prolific and comes from both elders who have high *litter size*. Factors that affect *litter size* are age, nation, and genetic. The results of this study were higher than Mahmilia and Doloksaribu (2010) who obtained LS Boerka-1 is 1.32. The *litter size* on pure Boer goats is 1.74±0.73 tails (Parasmawati *et al.*, 2012). The *litter size* Kacang goat 2.00 tail, PE goat 1.53 tail, Boer-PE goat 1.50 tail, and Boerka goat 1.88 tail (Masrah *et al.*, 2016). Difference *litter size* influenced by weight doe and doe age when first mated, cause weight loss and age doe affect *litter size* and the weight of the kid. High *litter size* can be influenced by genetic factors, parent age factor, doe weight, and nutrition level (Doloksaribu *et al.*, 2005).

The Jawarandu goat is a mating between PE stud goat with female Kacang goat, PE goats usually give birth to an only child, and once a year (Davendra and Burns, 1994). PE goat nation reportedly has lower double twins but high posture. While Boerka is a mating between Boer goat and Kacang goat that has good fertility and reproduction rates. This is what causes *litter size* Boerka to be higher than Jawarandu even statistically give a not significant effect ($P>0.05$). The increase in *litter size* indicates that Boerka goats can ovulate more living ovum and embryos compared to Jawarandu goats. These factors are closely related to the parent's weight,

parent, environmental temperature, and elder genetics (Kaunang *et al.*, 2013). The age of the brood is one of the factors that affect *litter size* because it is related to the readiness of the parent's reproductive organs. *Litter size* tends to increase with the increasing lifespan of the brood, it is thought to be related to hormonal bodies because the more mature the mother will increase the perfect hormonal mechanisms.

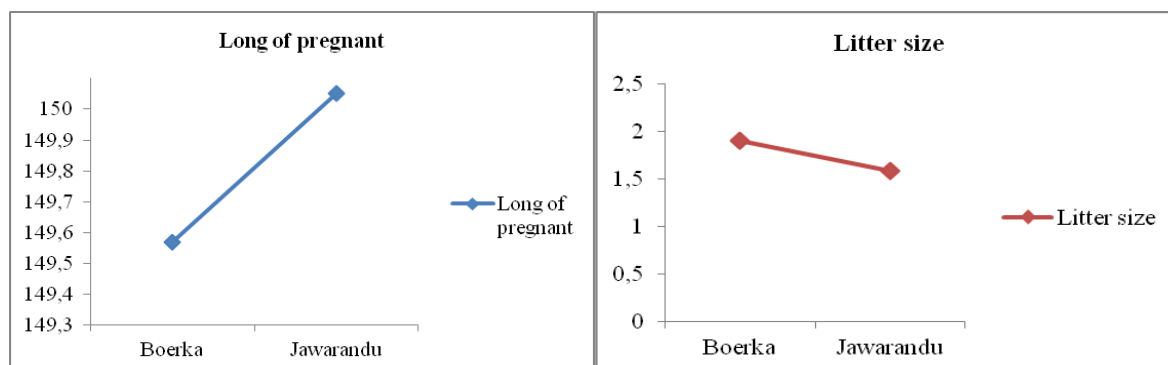


Figure 3: Long of pregnant and *Litter size*

IV. CONCLUSION

The average results of Boerka goat's reproductive performance are higher than Jawarandu goat. For puberty age, the age of first mating and first parturition age Boerka and Jawarandu goats gives a significant effect ($P < 0.05$). While the long pregnant and *litter size* of goats Boerka and Jawarandu give a not significant effect ($P > 0.05$). The reproductive performance of Boerka goat research is better than Jawarandu goat.

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