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Measurement of reproductive performance of Etawa-crossed goats managed in JK community

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Abstract

This study aimed to determine the reproductive performance of Etawa-crossed goats managed in JK Community. The research was conducted using descriptive method with direct measurement of 56 samples of Etawa-crossed goats. Observation variables are first mating age, litter size, kidding interval, and post partum estrus. The results showed that reproductive performance with the age of Etawa-crossed goat is 2 to 4 years. The first age of mating is average of 9.25 ± 0.84 months, litter size 2.02 ± 0.51 kids, kidding interval 8.79 ± 0.85 months, and post partum estrus with an average of 3.41 ± 0.49 months. The reproductive performance of Etawa-crossed goats managed in JK Community has been good.

Keywords: Etawa-crossed goats, kidding interval, litter size, post partum estrus, reproductive performance

1. Introduction

Goat farming is a commodity that has enormous potential to be developed. Currently in Polewali Mandar Regency, goat farming is used as a leading commodity which is supported by the availability of land and the community's habit of keeping livestock for generations. One of the types developed is the Etawa-crossed goat with the advantage of its high adaptability to various environmental conditions and high reproductive potential^[1].

The suitability of a female animal in a livestock business can be seen from its reproductive performance. Measurement of reproductive performance is based on age at first mating, litter size, kidding interval, and post partum estrus^[2, 3]. Knowledge about reproductive performance can help in measuring the growth rate of the goat population, so that the development of the goat farming business will be maximized^[4].

JK Community is one of the goat farming businesses in West Sulawesi, especially in Polewali Mandar, Tandassura Village, Limboro District. The types of goats developed at JK Community are Etawa-crossed and Boer. One of the basic components in farming management is recording. Recording needs to be done so that livestock development can be monitored with certainty and measurability^[5]. This recording system will produce long-term benefits through controlling input and output in an effort to produce better livestock^[6]. Knowledge regarding the performance of Etawa-crossed female goats in the JK Community is important to evaluate maintenance management so that livestock productivity can continue to be improved. It is necessary to conduct a study regarding the reproductive performance of Etawa-crossed female goats that managed in the JK Community.

Materials and Methods

Research variable

This study is a type of quantitative descriptive research, with the number of samples observed being 56 Etawa-crossed female goats. The research variables observed in this study included age at first mating, litter size, kidding interval, and post partum estrus.

Data Collection

The data collection technique in this research used the observation method, through direct observations of the objects studied, as well as direct interviews with breeders.

Data analysis

The data obtained to observe the reproductive performance of Etawa-crossed female goats managed at JK Community were tabulated and then analyzed descriptively using the average values and standard deviations of all observed variables.

Results and Discussion

A. Characteristics of Etawa-crossed Goat Female in JK Community

The reproductive performance of female goats can be seen from their ability to produce children. The suitability of a female animal in a livestock business can be seen from its reproductive potential [2]. The measurement of reproductive potential is based on the ability to give birth as seen in table 1.

Table 1: Characteristics of Etawa-crossed Female Goats in JK Community

Age of goats (Year)	Number of goats	Percentage (%)	Body weight (kg)	Parity (times)
>2	28	50.00	33.35 ± 6.41	2.00 ± 0.00
>3	24	42.86	36.12 ± 9.07	2.67 ± 0.47
>4	4	7.14	38.19 ± 2.41	3.00 ± 0.00
Total	56	100		
Average			34.88 ± 7.72	

Based on the Table 1, the Etawa-crossed goat in the JK Community have an age of between 2 - 4 years from a total sample of 56 with an average body weight of 34.88 ± 7.72 kg and parity 2.36 ± 0.47 times. The largest number of the Etawa-crossed female in the JK Community were aged >2 with 28 goats (50.00%) that have average body weight of 33.35 ± 6.41 kg and parity was 2.00 ± 0.00 times. Age >3 years amounted to 24 individuals (42.86%) with an average weight of 36.12 ± 9.07 kg and parity 2.67 ± 0.47 times. Meanwhile, for those aged >4 years, there were 4 goats (7.14%) with an average body weight of 38.19 ± 2.41 kg and parity was 3.00 ± 0.00 times. Each livestock generally has different body weight measurements which are characterized by differences in age and maintenance management carried out by the breeders.

Livestock development in JK Community is carried out using an intensive maintenance system. An intensive system is maintenance carried out in cages with the aim of making it easier to control and feeding. The cage system in the JK Community is in colonies or groups female and male goats to facilitate the mating process. After the female goats have finished mating, they are separated from the group and moved to individual cages until the goats give birth.

The results showed that the average body weight is smaller than the research results by Rasminati [7] that an average of 40 kg at 3-4 years of age. The difference in body weight of the Etawa-crossed goats based on different ages is due to growth factors and maintenance management of each breeder. Increasing goat age will be followed by an increase in body weight. This is supported by Septian *et al.* [8] who stated that body weight and body size are increasing because livestock are in their growth period, the process of increasing body weight, muscle and body size as the age of the livestock increases.

Parity is the stage at which a female gives birth to a kid. Parity needs to be a concern because it is related to productivity traits and also helps in the genetic selection process of livestock [9]. The productivity of an animal can be assessed based on the age, body weight, parity and litter size [10]. According to Pan *et al.* [11] that parity has a high

correlation with the parent's age, body weight and litter size. There is a tendency that increasing parental parity will be followed by an increase in litter size. In addition, the litter size tends to increase as the mother's age increases from 2-6 years.

B. Reproductive Performance of Etawa-crossed Female Goats in JK Community

Reproductive performance are aspects related to livestock reproduction. Reproductive performance can include age at first mating, litter size, kidding interval [12] and post partum estrus. Knowledge about livestock reproductive performance is very important for planning the process of improving of a farm which includes mating and rearing management [13]. The reproductive performance of female goats in research conducted at JK Community can be seen in Table 2.

Table 2: Reproductive performance of Etawa-crossed female goats in JK Community

Age of goats (Year)	Age of first mating (month)	Litter size (Kids)	Kidding interval (month)	Post partum estrus (month)
(>2)	9.25 ± 0.74	1.79 ± 0.41	8.57 ± 0.56	3.36 ± 0.48
(>3)	9.17 ± 0.90	2.21 ± 0.50	8.88 ± 0.97	3.42 ± 0.49
(>4)	9.75 ± 0.83	2.50 ± 0.50	9.75 ± 0.83	3.75 ± 0.43
Average	9.25 ± 0.84	2.02 ± 0.51	8.79 ± 0.85	3.41 ± 0.49

Age of First Mating

Age at first mating is the age at which female are first mated. The aim of knowing the age at first mating is to maintain livestock productivity, so that by the time they are mated the livestock will be approaching maturity [3]. Differences in the age at first mating are usually due to differences in livestock growth rates which can be seen from livestock rearing methods and the farmer's experience.

Based on the results of research regarding the age at which goats are first mated in the JK Community, it showed an average of 9.25 ± 0.84 months. The age at first mating of the Etawa-crossed goats in the JK Community is in the normal category. Based on interviews conducted, goats are first mated at the age of 9-12 months. This is in accordance with Zein and Rahmatullah [3] where goats should be mated at the age of 10-12 months when the goat has reached body maturity. The results of this study are similar with the research of Jermias *et al.* [13], at the age of 9.19 ± 1.37 months, while the research results of Sarina *et al.* [14], with an average of 11.17 months. In general, goats in Indonesia have a first mating age of around 8-12 months [15]. The livestock mating process is different due to differences in breeder maintenance management in each region.

Litter Size

Litter size is the number of offspring per birth to see the fertility level of the female. The litter size of a mother goat is influenced by several factors including the mother's age, body weight, environmental temperature, etc. Litter size in Etawa-crossed female goat in JK Community has an average of 2.02 ± 0.51 kids. The body performance of Etawa-crossed female goat who give birth to twins appears to be greater than that single [16]. Twins will require a larger abdominal and uterine space.

The results of this research are in line with Kurniasih *et al.* [17] who stated that Etawa-crossed goat in Cimalaka District aged 3-4 years had multiple births with an average of 2.13 ± 0.5 kids. This is also in accordance with Budisatria and Udo [18]

that Etawa-crossed goats kept in Bantul Regency showed a litter size of 1.7 when the female was >2 years old. Furthermore, according to Haldar *et al.* [10] that the litter size is influenced by the age of the animal, body weight, and body posture of the mother.

Kidding Interval

Kidding interval is determined by the length of pregnancy and the time of estrus after giving birth. Kidding interval or calving interval is the time interval calculated from calving to next calving. The shorter of the calving interval, the higher the mother's productivity. Calving interval is the most important character for assessing productivity and is the best index for evaluating reproductive efficiency. Based on the results of this study, the kidding interval for Etawa-crossed goats showed an average of 8.79 ± 0.85 months. The results are higher than Masrah *et al.* [19] that 7.16 months, while Utomo [20] in his research stated that the kidding interval for Etawa-crossed goats kept in coastal vs. mountainous areas was 9.3 months and 9.5 months.

The average kidding interval in this study is in the high category. Various of kidding intervals are related to uterine activity returning to normal size after giving birth. The slower the uterine involution, the slower the ovaries will return to activity so that in the end the female animal will be delayed in entering the next heat cycle. This is in accordance with the opinion of Kurniasih *et al.* [17] who stated that the kidding interval for goats varies due to sexual activity after giving birth and the farmer's level of knowledge.

Post Partum Estrus

Post partum estrus is used to determine estrus in female after giving birth. Post partum estrus is an important factor that influences reproductive efficiency in goats. The shorter the first heat interval after giving birth, the shorter the calving interval will be, and vice versa. The first heat that appears after giving birth is called post partum estrus. The results of research related to post partum estrus show that female goats aged 2 – 4 years have an average post partum estrus of 3.41 ± 0.49 months. The results of this research are still within normal and standard figures. According to Murdjito *et al.* [21] that post partum estrus in Etawa-crossed goats of 3 to 5 months is still within the normal range. Furthermore, Utomo [20] stated that post partum estrus of Etawa-crossed goats is 3-5 months after giving birth, where this is relative depending on the condition of the feed provided and the influence of the breeder's level of knowledge in livestock management.

The results of interviews conducted with breeders in the JK Community showed that the adequacy of nutrients needed by livestock continues to be considered because feed can influence the process of development and maturation of oocytes. Nutrient aspects consisting of energy, protein, minerals and vitamins can affect reproduction and nutrient deficiencies are related to the reproductive performance of livestock. Post partum estrus is influenced by the female care after giving birth, especially in relation to adequate feed and nutritional perfection.

Conclusion

The reproductive performance of Etawa-crossed female goats managed at JK Community is quite good, with an average age at first mating of 9.25 ± 0.84 months, litter size of 2.02 ± 0.51 kids, kidding interval of 8.79 ± 0.85 months, and post partum estrus 3.41 ± 0.49 month.

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