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## Doe Productivity Index of Saburai Goats at Sumberejo and Gisting Districts, Tanggamus Regency

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### ABSTRACT

Saburai goat is a local genetic resource of Lampung Province. Sumberejo and Gisting district are Saburai goat development area. To increase the productivity of Saburai goats in both districts, selection on doe was done based on doe productivity index (DPI). The study was conducted from July 1<sup>st</sup>, 2017 to October 30<sup>th</sup>, 2017 to estimate the productivity of Saburai goats based on DPI. Materials of this research were a recording of mating, birth, and weaning weight of 50 of Saburai goat kids, kept in Sumberejo and Gisting district. The Does were in second parity and had weaned the goat kids. Variables observed were litter size (LS), kidding interval (KI), weaning weight (WW) and DPI. The Result indicated that in Sumberejo LS, KI, WW and DPI were 1.74±0.44 heads, 22.00±0.95 months, 21.48±4.04 kg, and 57.52±8.15 kg, respectively. While in Gisting LS, KI, WW, and DPI were 1.44±0.50 heads, 7.86±0.35 months, 15.18±4.32 kg, and 21.02±4.86 kg, respectively. It could be concluded that Saburai doe in Sumberejo district could be selected for breeding stock.

Key words: Doe productivity index, Kidding interval, Litter size, Saburai doe, Weaning weight

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### Introduction

Saburai Goat is a local genetic resource of Lampung Province based on Decree of the Minister of Agriculture of the Republic of Indonesia No. 359/Kpts/PK.040/6/2015. Currently, the goats are developed in Tanggamus Regency with development centers in Sumberejo and Gisting districts (Adhianto *et al.*, 2015; Sulastri *et al.*, 2016). The growth performance reflects good meat type. Birth weight 3.72 ± 0.89 kg, weaning weight 19.67 ± 1.89 kg, the weight of one year age 42.27 ± 2.29 kg (Sulastri and Adhianto, 2016).

The problem lies in the slow development of goat population because of the high mutations out of Saburai goats (Sulastri and Sukur, 2015; Sulastri *et al.*, 2016). Its rapid growth and exterior performance that reflects superior meat type is an allure for goat farmers.

The high mutation out resulted in the difficulty of Tanggamus become a source Saburai goat breed. The percentage of Saburai goat population is still very low, ie 13.96% of all goat breeds in Tanggamus (Sulastri and Sukur, 2015). Based on the research of Sulastri *et al.* (2016), the percentage of Saburai Goat breed has reached 81% (2,269 heads) calculated based on goat population in Sumberejo and Gisting districts which are Saburai goat development area. That means the action is needed to increase the

population as well as the genetic quality of the goat.

Efforts that can be taken, among others, do the selection on the nature of twins. Goats of selection stated to have superior genetic quality are then selected as a breeder for further development in the population. Selection is done to improve economically valuable performance. The economically valuable performance of the Saburai Goat as a meat type is body weight (Adhianto *et al.*, 2017). The Saburai goat is prolific in the research area, giving one to four heads per birth (litter size/LS 1 - 4 heads). This is the inheritance of Boer and PE Goat. The goat also have the chance to give birth to four kids per birth even though the percentage is very low. Mellado *et al.* (2011) reported that 5 Anglo-Nubian goats gave birth with LS 4 heads. High birth types can be maintained by giving feed which has nutritional content according to the doe and fetal needs.

Mellado *et al.* (2006) stated that increasing of litter size is interesting to goat farmer because prolific is an economical characteristic. Until now, there is very little information about the relationship between body conformation with some properties of reproduction in goats. The properties of the linear type, as well as physical strength, slop from the rump angel, show a close association with LS in dairy goats.

Efforts to increase the productivity of Saburai goats in both districts are done through selection on the doe based on the value of productivity index (DPI). The DPI value is determined by weaning weights, LS, and KI. The aim of this research was to know the value of Saburai goat livestock in Sumberejo and Gisting district.

## Materials and Methods

The research was conducted by survey method. Research material in the form of recording of birth, weaning, and weaning weights of Saburai Goat. Sampling method using purposive sampling with doe restriction which has a recording at first and second parity, a number of 50 heads of Saburai doe in Sumberejo district and 50 heads of Saburai doe in Gisting district, Regency of Tanggamus. The research method was done by looking and observing the recording data that has been collected. The observed variables include LS, KI, and weaning weight of goat kid, each at first and second parity. The data obtained was used to estimate the DPI value of each doe with the formula according to Hardjosubroto's (1994) as follows:

$$DPI = \left(\frac{12}{KI}\right)(LS)(WW)$$

Description: DPI = doe productivity index (kg), KI = kidding interval (month), LS = litter size (head), WW = weaning weight (kg).

## Result and Discussion

### Kidding interval

The results showed that the average KI of Saburai goat in Sumberejo district was  $8.22 \pm 0.95$  months and in Gisting was  $7.86 \pm 0.35$  months (Table 1). The length of KI that was not much different caused by the length of lactation that was almost the same that was about 3 months in Sumberejo and 2 months in Gisting.

Saburai goat farmers in both districts weaned goat kids in a short time to increase goat production which could obtain many kids within one year. Rapid weaning was meant to doe estrus soon again so that it can be mated soon. This was achieved by providing a quality feed that was to provide leguminous and leaves in an unlimited quantity (*adlibitum*) to meet the nutritional needs of female goats. This condition was in accordance

with the statement of Tjiptosumirat (2010) that feeding of livestock after birth with nutritional content in accordance with the need would accelerate the process of restoration of the livestock reproduction system so that the interval between birth until pregnant again and KI became shorter.

The strategy of allocating nutrients to goats to shorten the KI was also done in local Mexico goats. The average local Mexican goat KI was  $195.00 \pm 8.0$  days or about 6.5 months, the goats were kept in dry tropical regions (Gaytan *et al.*, 2016). Martínez-Rojero *et al.* (2014) reported that the goats observed were extensively maintained and 62% of them received feed supplementation. Means the effort is to limit the nutrients in the feed to shorten lactation in one parity and allocate nutrients for future births.

KI of Saburai goat in Sumberejo district (8.22 months) and Gisting (7.86 months) was shorter than previous research of Saburai goat that was  $9.06 \pm 0.83$  months (Sulastrri and Adhianto, 2016), the result of crossing between male Boer goat with female PE (Boerawa) was  $9.70 \pm 0.85$  months (Sulastrri and Qisthon, 2007), 11.75 months in Boerawa goats receiving traditional feed and 10.45 months of rational feeding (Dakhlan *et al.*, 2009).

The low KI at this study sites was caused by low S/C because most of the female goats were mated naturally. The male goat was immediately placed near the female Saburai goat that had weaned the kid so that the female goats were estrus soon. In addition, short duration of lactation at this study area was also shortened KI. This is in accordance with the opinion of Dakhlan *et al.* (2009) that long duration of lactation resulted in delayed estrus symptoms after birth. Lactation duration of Boerawa goat in Gisting district was 3-4 months so that slow the occurrence of estrus again after the doe birth.

### Litter size (LS)

The results showed that the average LS of Saburai goat in Sumberejo district was  $(1.74 \pm 0.44)$  head) and in Gisting district was  $(1.44 \pm 0.50)$  heads) as in Table 2.

Female Saburai goats observed in Sumberejo more that gave birth to twins, both in the first and second parity. This was due to the selection of prospective doe with twin criteria two. The female goats selected as elders in Sumberejo district were selected as the result

Table 1. Kidding Interval of Saburai Goats in Sumberejo dan Gisting district

Variable	Sumberejo district	Gisting district
Age at first calving (month)	15.58±1.51	15.38±1.43
Age at second calving (month)	23.80±1.36	23.24±1.45
KI (month)	8.22±0.95	7.86±0.35

Table 2. Litter size of Saburai Goats in Sumberejo dan Gisting district

Variable	Sumberejo district	Gisting district
Litter size at first parity (head)	1.76±0.43	1.48±0.50
Litter size at second parity (head)	1.74±0.31	1.40±0.49
Average	1.74±0.44	1.44±0.50

of the birth of twins. The twin properties were inherited in the female doe though not entirely giving birth to twins.

The female goats in Gisting district showed low LS because most goat kids was born in a single birth type. Female Saburai goats in Gisting districts selected as elders were not selected based on the type of twin births so most of the goat kid was born in a single-born type state. According to Hardjosubroto (1994), the type of twinning is a property inherited by the elders to the descendant.

According to Yang *et al.* (2011), LS of female Boer goats in the first parity was  $1.48 \pm 0.05$  heads, second parity  $1.79 \pm 0.04$  heads, third parity  $1.95 \pm 0.05$  heads, the fourth parity  $2.01 \pm 0.06$  heads, fifth parity  $1.75 \pm 0.03$  heads. According to Sulastris and Adhianto (2016), the average LS of Saburai goat 1.84 heads.

Pregnant goats with more fetus required more dry feed ingredients with higher nutritional content. The energy stored in the doe body was depleted to meet the needs of the doe itself as well as for the fetus its contained (Cleal *et al.*, 2007; Liesegang *et al.*, 2007). The doe required more nutrition during the last 2.5 months of her pregnancy as energy depletion in the doe body (Shinagawa *et al.*, 2005). The rapid increase of nutritional requirements was the result of fetal and placental development while the rumen capacity decreases with the increasing number of fetuses (Kiani *et al.*, 2008).

Goats kept in hot environments were less proliferative than tempered (Mellado and Meza-Herrera, 2002). The low number of multiple births four indicated that rare goats were ovulating more than three eggs (Luther *et al.*, 2007).

### **Weaning weight**

The results showed that corrected weaning weight (CWW) of Saburai goat in Sumberejo district at the first parity was  $(22.13 \pm 4.39)$  kg and second parity  $(20.84 \pm 3.68)$  kg, while CWW in Gisting district at first parity was  $(16.29 \pm 4.99)$  kg and in the second parity  $(14.67 \pm 4.33)$  kg (Table 3).

The high value of average CWW of Saburai goats in Sumberejo district was the result of interaction between genetic with the environment. The genetic quality of Saburai goat in Sumberejo district showed an increase. Increased genetic quality could be seen from the high weaning weight. The selection was done on a prospective female and male doe that had weaning weight above the average of prospective elders in the location. The female goats and young males goat that had weaning weight below the average weaning weight of young goat were immediately removed or fattened as meat type goats. The selection was supported by recording of the weaning weights that was done by Saburai goat farmers in Sumberejo district. The selection was an effort to select prospective male or female elders based on genetic quality estimated based

on their performance for further breeding in a population (Sulastris *et al.*, 2002).

Environmental factors that support weaning weight of Saburai goat in Sumberejo district were a cage, feed, and health. The goats in the location every day got the feed of a mixture of leguminous, foliage, and fresh grass that has been withered first in sufficient quantities of goat needs. Drinking water was available throughout the day. The cage is always clean every day.

Saburai goat farmers in Gisting district also provided the same environment with Saburai goat farmers in Sumberejo district. Selection of prospective female elder has not been done based on the recording of weaning weights of prospective female doe. This was due to the development of Saburai goat just started in 2016, while Sumberejo district was the pioneer of Saburai goat development which had been performing livestock breeding procedures starting in 2006. Selection of the prospective doe and Saburai male doe in Gisting district was done based on qualitative performance which included head and body color, head and body shape, horn shape, and ear shape. The selection had not been able to increase the weaning weight of offspring generations.

The weaning weight of Saburai goat kid in Sumberejo district was quite high because the duration of goat kid weaning was about 3 months or 90 days ( $96.9 \pm 10.95$  days in the first parity and  $94.8 \pm 15.03$  days in the second parity) so that the goat kid got the doe milk in sufficient quantities. Length of weaning that more than 3 months in Sumberejo district was meant to have the weaned goat kid with strong conditions and could consume more forages than weaning at less than 3 months. The average weaning weight of Saburai goat kid in Sumberejo district was not different much with the results of Sulastris (2014) who did research in the same location that was  $19.67 \pm 1.54$  kg.

The average age weaning of Saburai goat kid in Gisting district was more than 2 months or 60 days ( $76.20 \pm 25.70$  in the first parity and  $65.70 \pm 17.80$  days in the second parity). The weaning weight of Saburai goat kid in the district was also quite low ( $16.29 \pm 4.99$  kg in the first parity and  $14.67 \pm 4.33$  kg in the second parity). According to Sulastris *et al.* (2002), weaning weight was an indicator of the doe ability to produce milk for goat kid and doe ability in treating its kids.

The average weaning weight of Saburai goat kid was high in Sumberejo district expected to be able to pass on its superiority in offspring. This was in line with the opinion of Sulastris *et al.* (2002) who stated that goat kid with high weaning weight was expected to produce offspring with high weaning weight if the doe also had high weaning weight.

### **Doe productivity index**

The results showed that the average DPI of Saburai doe in Sumberejo district was  $57.52 \pm 9.04$  kg and Gisting district was  $21.02 \pm 8.66$  kg (Table 4).

Table 3. Corrected weaning weight of Saburai goats in Sumberejo dan Gisting district

Variable	District			
	Sumberejo		Gisting	
	Parity 1	Parity 2	Parity 1	Parity 2
Age of doe at birth (month)	15.58±1.36	22.94±1.69	15.38±1.43	23.24±1.45
Age of goat kid at weaning (day)	96.9±10.95	94.8±15.03	76.20±25.70	65.70±17.80
Birth weight (kg)	3.32±0.43	3.10±0.40	3.21±0.55	3.13±0.50
Weaning weight (kg)	22.13±4.39	20.84±3.68	16.29±4.99	14.67±4.33
Single birth type	15	12	27	30
Twin birth type	35	38	23	20
Amount of male goat kid (head)	21	23	20	31
Amount of female goat kid (head)	64	65	53	38

Table 4. DPI value of Saburai goats in Sumberejo dan Gisting district

Variable	District	
	Sumberejo	Gisting
Litter size (head)	1.74±0.44	1.44±0.50
Kidding interval (month)	8.22±0.95	7.86±0.35
Weaning weight (kg)	21.49±4.04	15.48±4.66
DPI (kg)	57.52± 9.04	21.02±8.66

more forages than weaning at less than 3 months. The average weaning weight of Saburai goat kid in Sumberejo district was not different much with the results of Sulastrri (2014) who did research in the same location that was 19.67±1.54 kg.

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#### Doe productivity index

The results showed that the average DPI of Saburai doe in Sumberejo district was 57.52±9.04 kg and Gisting district was 21.02±8.66 kg (Table 4).

The average DPI of 57.52±21.15 kg indicated that within a year, the doe was able to produce goat kid with a total weaning weight of 57.52 kg in Sumberejo and 21.02 kg in Gisting. Based on the DPI value it was known that the productivity of female Saburai goats in Sumberejo was better than in Gisting. This was due to the average weaning weight and also LS of goat in Sumberejo higher than goats in Gisting.

The productivity of the doe could be seen through total birth weight, total weaning weight, litter size and goat kid survival until weaning (Sumediana *et al.*, 2000). The doe productivity could be calculated from the total live weight of goat kid during pre-weaning with the assumption

that the growth of goat kid during pre-weaning depended heavily on the production of doe milk and total weaning weight. The parameter was quite objective because it described the ability of the doe in raising goat kid (Setiadi *et al.*, 2001). Inounu *et al.* (2002) stated that the number of birth-kids increased from the first parity to the fourth parity and then decreases at the parity of five.

#### Conclusion

Based on the results and discussion obtained Saburai doe in Sumberejo district has DPI 57.52±8.15 kg higher than Gisting district (DPI 21.02±4.86 kg) could be further cultivated as elders in the region itself as well as other regions.

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