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Correlation of Pregnancy Duration, Litter Size, Birth Weight and Sex Ratio of Saburai Goat In Sumberejo Subdistrict, Tanggamus Regency, Indonesia

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Abstract | The current aims to determine the correlation value of the pregnancy duration, litter size, birth weight, and sex ratio of Saburai Goat in Sumberejo Subdistrict, Tanggamus Regency by observing 50 pregnant doe delivered 72 head. This research was conducted in 2018. The survey was conducted using primary and secondary data collected by either direct observation in the field or from the records of Sumberejo subdistrict. The variables observed included pregnancy duration, litter size, birth weight, and sex ratio. The results revealed a pregnancy duration 145.93 ± 6.22 days, birth weight 3.54 ± 0.60 kg; litter size 1.64 ± 0.56 head, and sex ratio of goat kid 40.27% male and 59.73% female of Saburai Goat in Sumberejo Subdistrict, Tanggamus Regency. The pregnancy duration of saburai goat has correlation with litter size 0.766 (strong relationship), birth weight 0.398 (weak relationship) and sex 0.202 (weak relationship). The conclusions from this study indicate that the pregnancy duration of Saburai goat significantly affected litter size, birth weight, and sex.

Keywords | Saburai Goat, Pregnancy Duration, Litter Size, Birth Weight, Sex Ratio

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INTRODUCTION

Saburai goats serve to provide a profitable meat and milk products. They carry many advantages including: easy to maintain, high reproductive abilities, high growth rates, and high adaptability against various macro climatic conditions (Sulastri et al., 2018).

Targeting Saburai goats for meat production purposes is of low chances, because of low productivity and low representation from total goats population in Tanggamus, as well as other breeds have a higher population representation (Sulastri and Adhianto, 2016). Another factor contributed low Saburai goat population is shortage in managemental factors including feeding issues. Improved feeding during pregnancy and lactation is expected to improve litter size and quality (Adhianto et al., 2017).

The low Saburai goat population is influenced by uncontrolled good maintenance management such as feed management, cages, and breeding. To increase goat productivity care must be given to breeding programs, improvement of reproductive efficiency, improvement of maintenance and attention to the body weight at the time of mating, pregnancy duration, litter size, birth weight, and correlation of these characteristics.

Pregnancy duration influenced by genetic, maternal, fetal, and environmental factors (Jainudeen and Hafez, 2000). The weight of doe has the possibility of having twinning higher than the lower (Johnston, 1983). Goats with a high birth weight have better daily body weight and weaning weight than goat with low birth weight.

The problem in breeding saburai goat is the limited information on basic data for the production and reproduction of goats as a basis for increasing productivity and until now research on pregnancy duration that can affect the birth weight of livestock, litter size and *sex ratio* in Saburai goats has never been done. Based on this, a correlation between pregnancy duration, litter size, birth weight and sex ratio Saburai goat was conducted in Sumberejo District, Tanggamus Regency.

MATERIALS AND METHODS

Material

Study material consisted of Saburai goats who were pregnant and gave birth in January – February 2018 as many as 72 in the Sumberejo District in breeder group. The tools used in this study arebrand digital scales with a *Portable* capacity of 45 kg with accuracy of 0.01 kg, stationery, and cameras.

Methods

Research carried out by using survey method and sample determination was done by purposive sampling. The material was observed in the form of Saburai doe who was pregnant and gave birth to Saburai temple in January-February 2018. The changes observed consisted of pregnancy duration, litter size, birth weight, and sex ratio.

Data Analysis Data

Pregnancy duration, litter size, birth weight, and sex ratio of goats were analysis with correlation analysis using SPSS.16.0 (Santoso, 2002)

RESULTS AND DISCUSSION

Correlation of Pregnancy Duration with Birth Weight

The average birth weight of Saburai goat in this study was 3.54 ± 0.60 kg (Table 1). The average birth weight is higher than those reported by Sulastri et al. (2014) as 3.02 ± 0.66 kg. The difference is due to breed or genetic influences in this case is the male factor used.

The results of the analysis showed that the pregnancy duration correlation had a significant effect (P <0.05) on the birth weight of the goat kid born (Saburai) which was equal to r = 0.398 (Table 2). This means that the longer of pregnancy duration, the higher the birth weight of the goat kid. (Prasojo et al., 2008) also found a strong relationship between pregnancy duration and birth weight, r = 0.248. Hunter (1995) added that the average birth weight depends on the age of the fetus.

Factors that are thought to influence pregnancy duration and birth weight are feed nutrition, environment, fetus, the number of vegetables contained, the sex of the fetus. Saburai goat breeders in Sumberejo sub-district provide sufficient forage feed, routine fermentation, and concentrates such as tofu dregs, so that nutrition can be fulfilled during pregnancy. This is in line with Priyanto (1994) who reported that good quality and quantity of feed at the end of pregnancy will result in a higher birth weight of goat kid and greater body weight of the doe will give higher birth weight of goat kid.

Another factor that affects birth weight is parity of doe. Parity of doe in Sumberejo sub-district is more than one. According to Farid and Fahmy (1996) parity has a significant effect on birth weight. Parity is related to age of doe. The higher parity means the more complete the anatomical and physiological functions of the reproductive organs. The maximum anatomical and physiological functions of the reproductive organs will further support the growth of the fetus.

The Correlation Of Pregnancy Duration with Litter Size

Litter size has an important role in determining the rate of increase in goat population, because higher number of delivered goat kids will influence the population increasing pattern (Doloksaribu et al., 2005). The current results were in line with those reported by Adhianto et al. (2011) who revealed a litter size of Saburai goat about 1.6 ± 0.6 tails. Factors that can affect litter size are parent age, parent body weight, male influence, season, and nutrient level. Mahmilia and Elieser (2008) add that the number of kid depends on the number of ovulated cells, the number of eggs that can be fertilized and embryonal mortality rate.

The results showed that correlation of pregnancy duration had a significant effect (P <0.05) on litter size (Table 2). This means that the age of pregnancy will be shorter with the increase in the number of kid in birth. The magnitude of the relationship is 0.766 (strong relationship according Sugiyono, 2014). The same situation was also reported by Mahmilia and Elieser (2008) that the increasing number of litter size, pregnancy duration is getting faster. It is suspected that the number of more than one fetus in the uterus causes the development of the uterus to be faster, besides that the hormones needed for the birth process are more numerous than the single birth.

The Correlation Pregnancy Duration with Sex

Gender is determined at conception (Berry and Cromie, 2007). In mammals, the sex of goat's kid depends on the maintenance of the ovum that carries the X chromosome by the sperm carrying X or Y chromosomes. If the zygote consists of pairs of X and Y chromosomes it will develop into male individuals, whereas the zygote consisting of the

X chromosome pair female individuals. The probability of the combination of XY (male male) and XX combination (individual female) is equal or 50%: 50%. In fact, there is often a shift in the value of the balance both at the time of conception and its development (Reed, 1985).

Based on the results of the study (Table 1), it was shown that thesex ratioof Saburai goats was 40.27% (male) and 59.73% (female) from the number of births as many as 72, with 29 male less than female goat kid (43 heads). The results are different from Ettawa crossbreed goat at 83.37% (male) and 16.67% (female) (Sariadi et al., 2014). This difference is thought to be due to the influence of goat, season, level of selection carried out by breeders, age and parity of female and male parents used (Demural et al., 2007); Vaginal pH (Cole and Cupps, 1997); feed and parent nutrition (Rosenfeld and Roberts, 2004; Green et al., 2008) and time of artificial insemination (Rorie, 1999).

The results of the study showed that correlation of pregnancy duration had a significant effect (P <0.05) on the sex, with the results of the correlation analysis were 0.202 (weak relationship according Sugiyono, 2014) which means that the gestational age is longer then the female born tends to be male, and vice versa (Table 2). This is supported by the statement Prasojo et al. (2008) that gestational age in male Balinese cows shows a significant difference in gestational age in Balinese females, ie kid who are sexually challenged tend to have a longer gestational age. Other factors that affect the length of pregnancy with sex are the age of the parent, the season, genetic traits and geographical location.

Table 1: Average pregnancy duration, birth weight, *litter size,* and *sex ratio*

Parameters	Mean± SD
Pregnancy duration (days)	145.93 ± 6.22
Birth weight (kg)	3.54 ± 0.60
Litter size (tail)	1.64 ± 0.56
Sex ratio (%)	
male Female	40.27 59.73

Table 2: Correlation coefficient between pregnancy duration with birth weight, *litter size,* and sex

Parameter	Correlation value
Birth weight	0.398
Litter size	0.766
Sex	0.202

CONCLUSIONS AND RECOMMENDATIONS

Based on the research that has been done, it can be concluded that pregnancy duration has a correlation with litter size, birth weight, and sex ratio of Saburai goats in Sumberejo District, Tanggamus Regency.

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CONFLICT OF INTEREST

All authors declare there is no conflcit of interest.

AUTHORS CONTRIBUTION

K Adhianto, designed the study, data analysis and wrote the manuscript draft, RA Lestari, performed sample collection and data analysis, S Siswanto, supervised the experiment and revised the manuscript and S Sulastri, supervised the experiment and revised the manuscript. All the authors have read and approved the final manuscript

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