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paper text:

Breeding Value of Saburai Goats The Estimation of Breeding Value of Saburai Goats at Weaning Weight

3**in Gisting Atas Village, Gisting District, Tanggamus Regency**, Lampung Province **Kusuma Adhianto***, Chairul Rahman **Arif**

, Dian Kurniawati, dan Ahmad Dakhlan Departement of Animal Science, Faculty of Agriculture, University of Lampung, Jl. Prof.Dr. Soemantri Brojonegoro No.1 Gedong Meneng Bandar Lampung 35145 *For correspondence:

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The Estimation of Breeding Value

15**of Saburai Goats at Weaning** Weight **in**

3**Gisting Atas Village, Gisting District, Tanggamus Regency, Lampung Province**

ABSTRACT Background and Objective: One of the goats developed in Lampung Province is the Saburai goat.

6**Selection is an** action **to select** livestock **with** good **genetic quality**

.

6**This study aims to determine the** genetic potential **of** male and female **Saburai goats**

that have good genetic quality at weaning based on their BV and to determine which individuals are eligible to be retained in the population.

14**Materials and Methods: This research was conducted** in **March**

—May 2021 at Gisting Atas Village, Gisting District, Tanggamus

10**Regency. This study uses a survey method** using **primary and secondary data. Primary data** was **obtained**

from interview questionnaires and weighing the weaning weight of goats. Secondary data was obtained from weaning weight data in the recording. The observed variables were birth weight, weaning weight, weaning age, age of the mother at partus, type of birth, and sex. Results:

1**The results of this study** showed that **the average weaning** weights of male **and female Saburai goats were 16**.46±1.1 **kg and**

16.40±0.98 kg, heritability value was 0.37±0.24 and BV of weaning weights of male were 16.45±0.40 kg and female Saburai goats 16.39±0.37 kg, respectively. Conclusion: There were 5 males with the highest breeding value

3**in Gisting Atas Village, Gisting District, Tanggamus Regency**

, namely BG8 (17.20 kg); LS9 (17.16 kg); LS8 (17.16 kg); LJ3 (17.09 kg); and BG (17.06 kg). Meanwhile, there were 5 females with the highest breeding value, namely BG5 (17.03 kg); BG6 (16.93 kg); SU4 (16.86 kg); SU5 (16.86 kg); and MR3 (16.84 kg). Keywords: Estimation, Weaning weight, Heritability, Breeding Value, Saburai Goat, Tanggamus, Lampung. INTRODUCTION The need for meat as a source of animal protein will increase along with the high awareness, population growth, and increasing purchasing power of the people. One of the livestock that can be used for meat as a solution to increase the need for animal protein is goats. According to BPS, the goat population in Indonesia in 2019 was 18,975,955 heads. Lampung Province as the province with the largest goat population in Sumatra or 1,453,529 heads, accounts for 7.6% of the goat population in Indonesia. The number of goat populations in Lampung Province has continued to increase in recent years. According to BPS data, the goat population in Lampung in 2015-2019 was 1,297,872, 1,326,103, 1,360,734, 1,430, respectively. 416, and 1,453,529 individuals (Central Bureau of Statistics, 2019). One of the goats developed in Lampung Province is the

1**Saburai goat. The Saburai goat is a** broiler **goat** resulting **from** a **grading up** cross **between** a **male Boer goat** and a **female Etawa** Peranakan (**PE) goat**

with a blood composition of 75% Boer goat and 25% PE

1**goat. Saburai goat is a goat designated as a local genetic resource in Lampung Province based on the Decree of the Minister of Agriculture of the Republic of Indonesia Number 359/Kpts/PK.040/6/2015**

(

1**Sulastri and Sukur, 2015; Adhianto et al., 2015**

). Efforts that can be made for the success of the Saburai goat farming business is to provide superior seeds. One way to produce superior seeds is by selection.

6**Selection is an** action **to select** livestock **with** good **genetic quality**

. Selection is usually carried out on livestock traits that can be measured, one of which is weaning weight. One selection system that uses weaning weights is the breeding value (BV). BV estimation in goats when they reach weaning age can be a reference for breeders to determine which individuals are selected to be maintained in the population. Gisting District, Tanggamus Regency, is one of the Saburai goat development areas in Lampung Province. One of the villages that is the development of the Saburai goat is Gisting Atas Village. In that village the recording of the Saburai goat is quite good. Based on this, it is necessary to conduct research to determine the estimation BV of weaning weight Saburai goats

3**in Gisting Atas Village, Gisting District, Tanggamus Regency**

.

2**MATERIALS AND METHODS Materials** The **materials** used in **this study** were recordings **of** 100 **Saburai**

goats consisting of 50 recordings of male Saburai goats and 50 recordings of female Saburai goats at weaning age. The equipment used were stationery, scales for goat kids at weaning, and a camera for documentation. Research

1**Methods This study used a survey method using primary and secondary data. Research was** taken **by purposive sampling by observing Saburai**

goats that reached weaning

1**age at the study site. Primary data was obtained by weighing**

goats that had reached weaning age that had not been recorded in the recording

1**and conducting** direct **interviews with farmers. Secondary data was obtained from the results of measurements and weighing carried out by farmers on goats that were observed and** recorded on a **recording**

. Variables observed Variables observed in this study included the age of doe at the time of partus, birth weight, weaning weight, weaning age, type of birth, and sex. Data Analysis Weaning weight data obtained from recording and weighing directly was corrected for the age of the parent (FKUI), type of birth (FKTL), and sex (FKJK)

9**with the formula according to Hardjosubroto's (1994)** recommendation **as follows**

: $BS - BI\ BSS = (BI + x\ 90)\ xEISI\ x\ EISI\ x\ EIII\ Weaning\ age$ Description:

2**BST = corrected weaning weight BL = birth weight BS = weaning weight**

2**FKJK = sex correction factor FKTL** = birth **type correction factor FKUI** = parent **age correction factor** The heritability **of**

weaning weights was estimated using stepbrother method using the formula as recommended by Hardjosubroto (1994) as follows: Description: h 2 = Heritability $\sigma w2$ = Variation in males $\sigma s2$ = Variation between males $h2 = 4\ \sigma s2\ \sigma w2 + \sigma s2$ Standard error (SE) heritability value is calculated by the formula: $SE(h2) = 4\ \sqrt{}\ 2(1 - s)2\ (1 + (k - 1)s)2\ k(k - 1)(s - 1)$ Description: SE = standard deviation/standard error t = correlation in class k = number of offspring per male s = total number of individuals Heritability value of weaning weight obtained is used to calculate the breeding value (BV), According to Hardjosubroto (1994) to calculate BV the following formula is used: $NP = h2\ (P - P) + P$ Description: NP = Breeding Value h 2 = Heritability P = Individual weaning weight P = Average population weaning weight RESULTS AND DISCUSSION Overview of Research Locations Gisting Atas village is one of the villages in Gisting Subdistrict, Tanggamus Regency, where many people keep goats. One of the goats kept by the community in Gisting Atas Village is the Saburai goat. According to the Central Statistics Agency (2018), the goat population in Gisting District in 2018 reached 15,595 heads. Gisting Atas Village has an area of 4.64 km2 and is included in the administrative area of Gisting District which has an area of 32.53 km2. Gisting District is located 12 km from Kota Agung which is the capital of Tanggamus Regency and 75 km from Bandar Lampung City which is the capital of Lampung Province. The boundaries of the Gisting sub-district are as follows:

8**in the** north **it is bordered by** Sumberejo sub-district, **in the** east **it is bordered by** Gunung Alip **sub-district, in the west it is bordered by**

the East Kota Agung sub-district. The average altitude of Gisting sub-district is ±700 m above sea level with air temperature around 18-28 °C. The average humidity in Gisting District is 61-98%. These conditions support the growth of abundant forage both grasses and legumes. So this area is suitable as a place for the

development of Saburai goats. Most of the residents in Gisting Atas Village work as farmers and ranchers. According to research data, from the results of interviews conducted with members of the Makmur II and Mutiara Tani livestock groups in Gisting Atas Village, it shows that the main profession of members as breeders is 63.16%. Meanwhile, members who work as farmers and raise livestock as a side business are 36.84%. The last education of the members of the livestock group studied was grouped by education level of elementary, junior high, and high school or equivalent, the results were 15.79%, 36.84%, and 47.37%, respectively. The age of the breeders in the study area were grouped into categories of age

> 12**30-40 years, 41-50 years, and** more than **51 years**, from **the**

results of the grouping the results were 21.05%, 42.10%, and 36.84 %. Farmers in Gisting Atas provide feed 3 times a day, at

> 13**06.00 AM, 11.00 AM, and** 04.**00 PM**

. The feed used is in the form of forage consisting of odot grass, legumes such as calliandra; gamal; and lamtoro, as well as agricultural waste such as sweet potato waste; carrot waste; and so forth. From the results of the study, the Saburai goat cage at the study site used a stage cage with wooden floors. All cages at the study site had individual cages with a head to head form of cage. The roofs of the cages in the Makmur II and Mutiara Tani groups in this study were in the form of monitors (63.16%) and gables (36.84%). Saburai Goat Weaning weight is a performance that is often used as a selection criterion for goats. Weaning weights need to be corrected first so that there are no other influencing factors, so they can be used as selection criteria.

> 1**Weaning weight can be used as a criterion**

in estimating livestock performance and can be used as a selection criterion to predict post-weaning calf growth. Weaning weight is influenced by sex, age of mother, type of birth, and age of weaning (Hardjosubroto, 1994). Based on the data (Table 1), it is known that the average corrected weaning weight for male Saburai goats is 16.46 ± 1.1 kg, which is greater than the average corrected weaning weight for female Saburai goats, which is 16.40 ± 0.98 kg. The average male weaning weight is greater than the female weaning average weight because gender has an influence on weaning weight. According to Devendra and Burns (1994), male bulls are almost always heavier than female calves in the same breed of goat. Weaning weight has a strong correlation with birth weight, according to Sulastri et al. (2002) Cempe who have a high birth weight are likely to have a high weaning weight as well. Hardjosubroto (1994) stated that birth weight is influenced by differences in hormones that affect fetal growth in the mother's womb. According to Alfiansyah (2011) the androgen hormones contained in the male goat fetal hormonal system work and produce growth processes in all body tissues. This is different from the female fetus. Androgen hormones found in female goat fetuses limit the growth of tube bones in the prenatal phase. This causes the birth weight of males to be higher than that of females and then also to the weight when they reach weaning age. The

> 11**results of this study** are **relatively the same as those of**

Adhianto et al. (2017) which shows the weaning weight of male Saburai goats in Gisting is 16.22±3.77 kg and Adhianto et al. (2016) which shows the

> 1**weaning weight of female Saburai goats in** Gisting is **16**.1±3.4 **kg**

. However, this result is lower than the statement from the Lampung Province Disnakkeswan (2015) which states that the weaning weights of male and female Saburai goats are 19.67±6.88 kg and 18.56±1.46 kg, respectively. This difference is thought to be due to the influence of environmental factors, especially the feed received by the broodstock at the study site. Saburai goats at the study site were only fed forage. According to Sutama (2003)

> 1**weaning weight is influenced by the** condition **of the mother, the** number **of** children, and **the**

condition of the children born. Weaning weight is a trait that is influenced by the genetic component of the parent (maternal genetic effect), namely the influence of genes that affect environmental conditions in the parent which ultimately affects individual performance (Bourdon, 1997). Heritability Value Saburai Goats at weaning Knowledge of the magnitude of heritability is important in the development of selection and mating plans to improve livestock quality. This knowledge provides a basis for estimating the magnitude of progress in different breeding programs (Dakhlan and Sulastri, 2002). The value of heritability in the field of livestock breeding has an important role because the value of heritability provides information on the magnitude of the value of a trait passed on by parents to their offspring (Hardjosubroto, 1994). The heritability

> 2**value of** the **weaning weight of Saburai** goats in **this study** was **0**

.37. This shows that the heritability value of Saburai goat's weaning weight which was analyzed using the step-brother method was

> 1**included in the high category**. This is **in** line with **the** opinion **of**

Hardjosubroto (1994) which

> 1**states that the** heritability **value** is **said to be** low **if the value is**

less than 0.10, moderate if the value is between 0.10- 0.30, and high if it is more than 0.30-1.00. Gunawan and Noor (2006) argue that heritability

> 7**categorized as moderate to high can provide** an indication **that the selection** made **will be more effective and efficient in improving genetic quality improvement**. Based on **the** estimation results, the **selection**

of prospective parents or determination of suitable goats to be maintained as elders in the population can be done through individual selection. The heritability of weaning weight for Saburai goat 0.37 means that the difference or diversity in weaning weight for Saburai goat, 37% is caused by genetic factors, while the rest is caused by environmental factors. The heritability

> 2**value of** the **weaning weight of** the **Saburai goat** in **this study**

was greater than the heritability value of the Boerawa goat in the study of Pirdania et al. (2014) which is 0.072 ± 0.006, greater than the research of Beyleto et al. (2010) which is 0.30±0.17, and lower than research by Nugraha (2007) which is 0.41±0.102. The difference in the heritability of weaning weight in this study with previous studies is thought to be caused by differences in the number of observations, time, and environment. In addition, the selection of elders made by breeders affects the subsequent individual performance. According to Hardjosubroto (1994) the heritability value of a trait will vary between populations. These variations can be caused by differences in genetic factors (genetic diversity), environmental differences (environmental diversity), methods and the number of data samples used. In addition, it is also influenced by the selection generation time. The heritability estimation of Saburai goat weight in this study had a low standard error of 0.24. Standard error is said to be low if its value is smaller than the estimated heritability. This result is presumably because in the study the data obtained were corrected in advance for the age of the parent, type of birth, and sex. According to Warwick et al. (1990) the high heritability standard error was due to the absence of data adjustment, sampling errors, the number of individuals in each family group being too varied. The heritability standard is declared low if the value is smaller than the heritability value obtained. Heritability which has a low standard error indicates that the heritability value is quite reliable. This reliable estimate of heritability when used in calculating livestock breeding formulas has results that are not much different from real conditions in the field (Legates and Warwick, 1990). Breeding Value Breeding value (BV) is an assessment of the genetic quality of livestock for a particular trait given relatively on the basis of its position in the population (Hardjosubroto, 1994). The breeding

2**value of** the **weaning weight of** the **Saburai goat** in **this study**

is presented in Table 2.

1**Based on the results of** the **study, the average**

value of the breeding

5**weight of** the **male and female Saburai goats** was 16.45±**0**.45 **kg**

and 16.39±0.37, respectively. kg. This result is thought to be caused by the

1**average weaning weight of Saburai goats in** this study, which **was 16**.46 ± 1.1 **kg** for males **and**

16.40 ± 0.98 kg for females, and the heritability value was 0.37 ± 0, 24. According to Hardjosubroto (1994) the magnitude of the breeding value is determined by heritability and the magnitude of the performance or trait measured by the breeding value.

5**The results of this study** are lower than **those** of Pirdania **et al**

. (2014) which shows the average breeding value of Boerawa goats is 25.706±0.205 kg. This difference is thought to be due to differences in the genetic potential of each observed individual, weaning weight, and heritability value of weaning weight from each research result. The results of the breeding value of 100 heads (50 males and 50 females) of Saburai goats were evaluated, it was obtained that the estimated weaning weight breeding value was above the group average of 50% (25 heads) in male and 52% (26

heads) in female. Saburai goats that have a breeding value above the average need to be maintained, because the higher the breeding value of an animal, the more superior the animal will be and can repeat its superior performance.

> 1**According to Dakhlan and Sulastri (2002**) individuals with **high** breeding values will **show**

a high ability to pass on their genetic potential to their offspring and repeat their production. Based on the research results, if it is determined that 10 percent of the male and female Saburai goat population has the highest breeding value, it will produce the 5 best individuals. The results of the selection of 10 percent of the population

> 5**are presented in Table** 3. The **results of this study** indicate **that**

the male Saburai goat with livestock code LS9 has the highest breeding value of 17.20 kg and female Saburai goat with livestock code BG5 has the highest BV value of 17.03 kg. Sulastri et al. (2019) stated that an excessively high number

> 4**of adult male goats** only adds to **the** cost **of**

maintenance

> 4**but does not increase the population like female goats** which **support** population **increase through** the **birth**

of offspring. Population of adult female goats in

> 4**livestock business is an important factor related to reproductive performance and prediction of** population growth **rate in a**

certain area. Based on this breeding value, it is expected that the cempe with the highest breeding value deserves to be maintained for further development as replacement stock because it has an above-average breeding value. This is done so that the Saburai goats at the research site continue to experience increased performance. CONCLUSION Conclusion

> 1**Based on the results of research and discussion, it can be concluded that** heritability value of **weaning weight of Saburai** goat **in**

Gisting Atas Village is 0.70 (high category). The estimated average

> 2**value of** the **weaning weight of** male **Saburai** goats **in Gisting**

Atas Village is 16.45±0.75 kg. If the selection is made as much as 10 percent of the population, the male Saburai goats have the highest breeding values, namely BG8, LS9, LS8, LJ3, and BG7. Meanwhile, the

estimated breeding value for the weaning weight of female Saburai goats in Gisting Atas Village is 16.40±0.69 kg. If the selection is done by as much as 10 percent of the population, female Saburai goats have the highest breeding values, namely BG5, BG6, SU4, SU5, and MR3. REFERENCES Adhianto, K., M.D. Iqbal Hamdani dan Sulastri. 2015. Model Kurva Pertumbuhan Pra Sapih Kambing Saburai di Kabupaten Tanggamus. Jurnal Sains Peternakan Indonesia. 10: 2: 95-100. DOI: 10.31186/jspi.id.10.2.95-100 Adhianto, K., MDI Hamdani, Sulastri, I. Listiana. 2016. Production performance of male Saburai goats in two seed source areas in Tanggamus Regency. Journal of Animal Science Vol.14 (2): 22—29. Adhianto, K., Sulastri, MDI Hamdani, D. Novriani, and L. Yuliani. 2017. The performance of female Saburai goats in the seed source area of Tanggamus Regency, Lampung Province. Journal of Animal Sciences Vol.20 (1): 9-16. Alfiansyah, M. 2011. Kinds and types of bones based on their shape.

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