PERFORMANCE AND COEFFICIENT OF VARIATION IN PRODUCTION CHARACTERISTICS OF ETTAWAH CROSSED GOATS AS THE BASIS FOR SELECTION IN THE PROVINCE OF BALI, INDONESIA

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ABSTRACT

The selection program is an effective effort to improve the genetic quality of livestock, if the population of the selected livestock has a trait with high phenotypic diversity. The amount of phenotypic diversity of the population is measured by calculating the coefficient of variation (CV). A population is said to be diverse if the CV value is >15%. This study aims to examine the performance and coefficient of variation of Etawah Crossed (EC) goat production traits in Bali Province, Indonesia. The study was conducted for 5 months on livestock groups in Tabanan and Jembrana Regency, Bali Province by measuring the performance of production characteristics (shoulder height, body length, chest circumference, ear length, and body weight) of female EC goats. Furthermore, the measurement results were grouped by tooth (I0; I1; and I2). Data analysis was carried out descriptively to obtain the average characteristics of EC goat production and calculate the CV value. The results showed that the performance of female EC goats in the age group I0; I1; and I2 is higher than the Indonesian National Standard (SNI 7352.1:2015), regarding EC goats. The CV values for the production characteristics of female EC goats in the I0 age group were more diverse than those in the I1 and I2 age groups. It can be concluded that to obtain superior breeds of Ettawah Crossed goats according to SNI 7352.1:2015 concerning EC goats, the selection can be made starting at the age group I0.

KEYWORDS: Superior breeds, coefficient of variation, selection, Etawah crossed.

INTRODUCTION

The selection program is a breeding action that can be carried out in the hope of increasing the genetic quality of livestock. The selection program will be effective if the population of livestock to be selected has a trait with high phenotypic diversity. This diversity will determine the next selection process. The amount of phenotypic diversity of the population can be measured by calculating the coefficient of variation (CV) and the population is said to be diverse if the CV value is >15%.[1,2] Henceforth, livestock with production characteristics above the population average can be selected as potential broodstock. The number of livestock selected as prospective broodstock depends on how many livestock will be needed as prospective breeders or replacement livestock (replacement).

The Bali Provincial Government has designated Tabanan and Jembrana regencies as livestock breeding areas for goats, considering that the goat population in both regencies is quite large. Based on data from the[3], the population of EC goats in Bali Province is 34,396 heads.

The population of EC goats in Tabanan is 2,215 heads, while in Jembrana Regency it is 4,791 heads. Based on this, the research was conducted in these two districts by measuring the performance and coefficient of variation of production traits (shoulder height, body length, chest circumference, ear length, and body weight) of female EC goats in several livestock groups in the region. Furthermore, the measurement results are compared with the quantitative requirements of EC goats according to the Indonesian National Standard (SNI) 7352.1:2015, regarding EC goats to obtain superior broodstock candidates.

MATERIALS AND METHODS

The study was conducted for five[5] months on livestock herds in Tabanan and Jembrana regencies, Bali Province, Indonesia. Using 166 female Etawah crossed goats with teeth I_0; I_1; and I_2. The tools used in this study were fixation cages, scales, and measuring tapes.

The study was conducted by direct measurement of the characteristics of livestock production (shoulder height,

body length, chest circumference, ear length and body weight) of female EC goats, then grouped based on teeth growing (tooth-0, tooth-1, and tooth-2 or I_0; I_1; and I_2). The independent variables used in this study were: teeth growing (tooth-0; tooth-1; and tooth-2). The dependent variable is the nature of production (shoulder height, body length, chest circumference, ear length, and body weight) of female EC goats. While the control variable is livestock rearing management (the feed given is assumed to be the same). Then calculated the average and coefficient of variation of production characteristics in each age group.

Analysis of the coefficient of variation (CV) of production traits (shoulder height, body length, chest circumference, ear length and body weight) female EC goats, was carried out descriptively using the formula $CV = Sd/X \times 100\%$[3], where CV = coefficient of variation; Sd = standard deviation of the population mean; and X = population mean.

RESULTS AND DISCUSSION
The average performance of production characteristics (shoulder height, body length, chest circumference, ear length and body weight) and coefficient of variation of female EC goats are presented in Table 1.

Table 1: Average performance of production characteristics and coefficient of variation of female EC goats in different age groups.

Production Characteristics	Age groups								
	I_0			I_1			I_2		
	n	X	CV	n	X	CV	n	X	CV
Shoulder height (cm)	37	56.03±11.67	20.83	56	70.48±6.76	9.59	73	72.26±6,14	8,5
Body length (cm)		52.05±10.09	19.38		70.45±10.29	14.60		73.60±8,08	10,98
Chest circumference (cm)		53.22±13.30	24.98		74.48±7.60	10.21		76.37±7,12	9,32
Ear length (cm)		24.59±3.85	15.64		27.59±3.88	14.08		27.71±3,49	12,59
Body weight (kg)		21.29±6.49	30.47		34.48±9.50	27.55		38.30±10,11	26,39

Note:
n = Number (heads); X = Average; ± = standard deviation; CV = Coefficient of variation.

The average shoulder height of female EC goats based on age groups (I_0; I_1; and I_2) obtained in this study were 56.03±11.67 cm; 70.48±6.76 cm; and 72.26±6.14 cm, respectively. The average shoulder height obtained in this study, in the age group I_0 was 0.05% higher than the minimum quantitative requirement for female EC goat breeds in accordance with SNI for EC goat breeds. Meanwhile, in groups I_1 and I_2, it was 8% and 5% higher than the SNI for EC goat breeds.

The average body length obtained in this study were: 52.05±10.09 cm; 70.45±10.29 cm; and 73.60±8.08 cm, respectively. The average body length obtained in this study in the age group I_0 was 2.06% higher than the SNI standard for EC goat breeds. On the other hand, in I_1 and I_2 it was 14% and 13% higher than the SNI for EC goat breeds. The mean chest circumference in EC goats I_0; I_1; and I_2 were: 53.22±13.30cm; 74.48±7.60cm; 76.37±7.12cm, respectively. The mean chest circumference at I_0; I_1; and I_2 were: 2.35%; 13% and 17% higher than the standard set for EC goat breeds.

The mean length of the ears were: 24.59±3.85 cm; 27.59±3.88 cm; and 27.71±3.49 cm, respectively. When compared with SNI for EC goat breeds, the results obtained are: 12%; 6%; and 7% higher. The results showed the average body weight in the age group I_0; I_1; and I_2 were: 21.29±6.49 cm; 34.48±9.50 cm; and 38.30±10.11 cm, respectively. The results obtained were: 12.05%; 32% and 13% higher than the SNI for EC goat breeds.

The results showed that the performance of production characteristics (shoulder height, body length, chest circumference, ear length, and body weight) female EC goats in all age groups (I_0; I_1; and I_2) was higher than the quantitative requirements for female EC goat breeds. This result is in accordance with what is stated in the SNI for EC goat breeds. Based on SNI 7352.1:2015, regarding EC goat breeds, the quantitative requirements for female EC goat breeds for age group I_0 (<12 months) for shoulder height, body length, chest circumference, ear length, and body weight were 56 cm; 51 cm; 52 cm; 22 cm; and 19 kg. Meanwhile, the age group I_1 (>12-18 months) were: 65 cm; 62 cm; 66cm; 26 cm; and 26 kg and in the age group I_2 (>18-24 months) were: 69 cm; 65 cm; 72 cm; 26 cm; and 34 kg.

The coefficient of variation (CV) of shoulder height in the group of EC goats aged: I_0; I_1; and I_2 were: 20.83%; 9.59%; and 8.5%%, respectively. In terms of body length production, the CV is: 19.38%; 14.6%; and 10.98%. While the CV on the nature of the production of chest circumference are: 24.98%; 10.21%; and 9.32%. CV on the nature of ear length production are: 15.64%; 14.08%; and 12.59%, while the CV on the nature of body weight production are: 30.47%; 27.55%; and 26.39%.

Based on the results of the study, it can be reported that the CV of production characteristics (shoulder height, body length, chest circumference, ear length, and body weight) of female EC goats in the I_0 age group is diverse, because it has a CV value above 15%. On the other hand, the I_1 and I_2 age groups were homogeneous, because the

CV value was less than 15%. This is in accordance with the statement of[4] which states that the population is said to be diverse if the coefficient of diversity is above 15%. On the other hand, it can be said to be homogeneous if the coefficient of phenotypic diversity is below 15%.

The shoulder height performance obtained in this study was higher than the results reported by.[5,6] Furthermore, for the performance of chest circumference, the results obtained were higher than the results reported by.[6] As for body weight performance,[5] got lower results than the results of this study.

Based on this, it can be reported that EC goats in the age group I_0; I_1; and I_2 are suitable as seeds, because they are in accordance with SNI 7352.1:2015, regarding EC goat seeds. This female EC goat, when mated with a superior male, is expected to be able to improve the genetic quality of the goat population in the Bali Province.

The high diversity value in the production characteristics of female goats in the I_0 age group, indicates that the selection process will be effective in the I_0 age group. The higher the diversity, the faster the selection response. If the population is heterogeneous, within-breed selection will be effective. However, if the population is uniform (homogeneous), it is necessary to introduce new livestock from other areas (outside the nucleus). This is in accordance with the opinion of[3,8] which states that if the phenotypic diversity is high, then within-breed selection will be effective and efficient. On the other hand, if the phenotypic diversity is low, it is necessary to consider bringing in livestock from outside the population, so that the phenotypic diversity of the population increases.

The coefficient of variance of PE camp body weight production characteristics, both in groups I_0; I_1; and I_2 was very high. This is due to the variation in feeding by farmers. In addition to genetics, the environment, especially feed, plays a very important role in increasing the body weight of livestock. In this study, the goats used were livestock in several livestock groups with intensive maintenance, where feeding depends on the breeder.

CONCLUSION

Based on the results of this study, it can be concluded that the performance of the production characteristics of female EC goats in the age groups: I_0; I_1; and I_2 is higher than SNI 7352.1:2015, regarding EC goats. The coefficient of variation in the production characteristics of female EC goats in the I_0 age group was varied.

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