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Genetic Variation of Local Ettawah Crossbreed Goats in Two Different Breedings

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Abstract
Goat breeding systems in Indonesia have two models with farmer-owned bucks or government selected bucks in the form of frozen semen. An interesting problem was how the genetic variation of the different goat populations. The purpose of this study was to determine the profile of genetic variation through DNA fragments that appear in gel electrophoresis. Blood samples from each group collected through field studies, followed by analysis of DNA with RAPD. The Primers used in this analysis contained various series primer OPP (OPP series not more 10 and OPP series more 10), and the amplification primers were a recommendation. Each fragment appears from the results of amplification were given a score of 1 and a score of 0 for no fragment appear. Data were analyzed by unpaired t-test using SPSS software V.23. The results showed that the fragments varied from 200 bp to 3000 bp. The DNA fragments used primer OPP which series numbers not more than 10 which significant differences ($P < 0.05$) between two different the goat breeding. There was no difference ($P > 0.05$) the number of fragments that emerged from the RAPD with OPP which the serial number less than 10 and a combined OPP. The conclusion of this study was the genetic variation of PE population with farmer-owned buck breeding was higher than the government selected buck breeding under RAPD analysis used OPP primer series not more than 10.

Keywords: *Local Ettawah Goat, RAPD, OPP*

1. INTRODUCTION

Local Ettawah crossbreed Goats which a popular name in Indonesia as one of the PE goats as local goat Indonesia has the advantage of high adaptability to local conditions that could be developed as meat and dairy goats. Based on the buck that had been used, there were two kinds of breeding models with owned farmer buck breeding and selected government buck breeding. Mudawamah *et al*. (2014) showed that the genetic similarity with software numerical taxonomy and multivariate analysis system (NTSYS) between Local Ettawah crossbreed goats with different populations was 48% with a low category.

The purpose of this study was to analyze the difference of genetic variation in two populations which different breeding models through DNA fragments was amplified by RAPD analysis. RAPD analysis on goats or sheep had been used to analyze the genetic diversity within and between populations (Oliveira *et al*., 2005 and Waheed *et al*., 2015). Therefore, to study the differences in genetic variation between the two populations of goats, it was necessary to analyze the DNA with RAPD. This genetic variation information as a

basis for determining the breeding program in the two populations in order to improve the genetic quality of livestock.

2. METHODS.

This research method was a laboratory experiment. The procedure of this research involved taking a blood sample of 3-5 ml each Local Ettawah Crossbreed goat, DNA extraction included the isolation of white blood cells and isolation of DNA from white blood cells, RAPD Amplification, visualization of DNA fragments by electrophoresis.

Sampling was used purposive which a precision of 20% of the population. The samples were 21 goats for the population of selected government buck breeding and 19 goats for the population of owned farmer buck breeding. RAPD blood samples were taken 3-5 ml per Local Ettawah crossbreed goats. Amplification used a thermal cycler. RAPD products included in a 1.5% agarose. Just a different fragment and obviously given a score to estimate a range of variables. The presence and absence of the fragment were given a score of "1" and "0" (Kumar *et al*., 2008 and El-tarras *et al*., 2015). Primers used a kind of OPA (Table 1), and only primers produced different fragments were used.

Table 1. Primer sequences and annealing temperature on RAPD analysis

OPA Primer Series*		Sequences	Annealing temperature (^oC)
not more than 10	OPA 4	AATCGGGCTG	36
	OPA 6	GGTCCCTGAC	36
	OPA 7	GAAACGGGTG	36
	OPA 8	GTGACGTAGG	36
	OPA 9	GGGTAACGCC	36
	OPA 10	GTGATCGCAG	36
more than 10	OPA 15	TTCCGAACCC	36
	OPA 16	AGCCAGCGAA	36
	OPA 17	GACCGCTTGT	36
	OPA 19	CAAACGTCGG	36

*Mudawamah *et al*. (2014)

Differences of genetic variation between the two populations of goats were analyzed by unpaired t-test using SPSS software version 23 seen from the number of DNA fragments that could be amplified by RAPD.

3. RESULTS AND DISCUSSION.

Difference of Genetic Variation of Local Ettawah Crossbreed Goat

Data from RAPD analysis with primer OPA various series between two different populations could be seen in Table 1.

Table 2. The mean of the amount of DNA fragments of RAPD analysis with various OPA Primer Series

No	OPA Primer Series	Amount of Fragments	
		Breeding with Farmer Bucks	Breeding with Government Bucks
1	not more than 10	$25.38^{a} \pm 0.72$	$33.37^{b} \pm 0.48$
2	more than 10	11.29 ± 2.99	11.74 ± 3.45
3	Combined	36.67 ± 3.67	45.11 ± 0.79

Different notations on the same line meant significantly different (P <0.05)

Table 1 showed that the number of DNA fragments based on the RAPD analysis with primer OPA series > 10 and a combination of both primary OPA series showed no significant differences (P> 0.05) between the two populations. It meant that the genetic variation by RAPD fragments with primary OPA series > 10 and a combination of primer OPA series was the same.

Conversely, RAPD fragments of the population from farmer buck breeding with primary series OPA $\leq$ 10 significantly different (P <0.05) than the population of government buck breeding. The fragments of the goat population by goverment buck breeding was 31.48% higher than the goat population of farmer buck breeding. The results of this study were consistent with the another research found genetic similarity of the population of farmer buck based on RAPD analysis and software NTSYS was higher 3% than the population of government buck breeding (Mudawamah *et al*, 2014). It meant that genetic variation in the population of government buck breeding higher than the population of the farmer buck breeding.

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4. CONCLUSIONS

1. The genetic variation of RAPD analysis with primer OPA series $\leq$ 10 was 31.48 % significantly higher in the population of the government buck breeding than the population of farmer buck breeding.
2. RAPD analysis of genetic variation with primer OPA series more than 10 or combined with both primer OPA series of the different breeding populations was not significantly different.

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