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Study of Blood Polymorphism of Kerinci Duck

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Abstract: Knowing genetic potential of duck would give a better understanding on proper rearing management for efficient production. There is still lacking information of genetic data base of Kerinci ducks, one of indigenous productive-layer type ducks in Indonesia. A study was conducted in Jambi Province, Indonesia and aimed at elucidating blood protein profile and evaluating genetic diversity of Kerinci ducks. The results showed three kinds of blood protein, namely transferin, post-transferin 1 and post-transferin 2. Albumin was not detected in the blood. Polymorphism was only detected in transferin locus. Gene frequency in the locus of post-transferin 1 and post-transferin 2 was recognized as A gene. Both genes A and B were seen in the locus of transferin with A being dominant. Data indicated highly genetic similarity of Kerinci Ducks which potentially gives similar phenotypic potential among them.

Key words: Polymorphism, kerinci duck

INTRODUCTION

It is necessary to preserve local livestock including ducks in an area they have adapted to because there animals usually survive the environment, feed availability and local desease infection (Maeda *et al*., 1980). The important thing of preserving genetic recources (i.e., duck) is to maintain the purity of genetic potential of the animals for the benefit of animal product and human life. Cross breeding which could posibly accur due to duck transportation or mixed rearing, would increase genetic variation in breed. This likely happening in Indonesia as control on inbreeding of the diversed local livestock in lacking. Therefore, a thorough attention is needed on the on the existing genetic resources to reduce or prevent the increasing genetic erosion of local livestock. The action may be done through stocktaking, documentation or data collection and conservation. Kerinci duck is one of the original duck in Indonesia which is highly prolific. This breed was named after the name of the area Kerinci, just the same with other local ducks such as Bali ducks, Tegal ducks, Alabio ducks and Mojosari ducks. Blood polymorphism is one of quick technique to study genetic variation within a flock (Thohari *et al*., 1991; Yellita, 1998). The genetic information abouts ducks in Indonesia, especially Kerinci duks, has not been gathered until now. Therefore, the current study was to review the genetic information in order to support the conservation program on local livestock's genetic resources.

MATERIALS AND METHODS

Animals and blood samples: Blood sample used in the present study was taken from 15 Kerinci ducks that were raised extensively in the Districk of Kerinci.

Three ml of blood sample of Kerinci Duck was taken through wing vein of Kerinci ducks. Then, blood sample was placed in test tube with 0.15 ml heparin as anticoagulant and kept in the ice box. Furthermore, the blood plasma was separated through a centrifuge by using of RCF (relative centrifugal force) with 2200 g for ten minute. Then, blood plasma sample was put in bottle sample and kept in freezer with -20 C for further analysis.

Blood plasma was analyzed by PAGE-TLE (*Polyacrilamide Gel Electrophoresis-Thin Layer Electrophoresis*) according to Ogita and Markert (1979). The identification of elektroforesis bands were Transferin (Tf) and Albumin (Al).

Data analysis: Gen Frequencies were analyzed according to Warwick *et al*. (1990):

$$F_{an} = \frac{\sum locus_{an}}{\sum locusA_1 + \sum locusA_2 \sum locusA_n}$$

In which F_{an} = Gen Frequency A at locus n.

RESULTS AND DISCUSSION

General overview of kerinci area: The district of Kerinci is one of the regions of the Province of Jambi, Indonesia. The area is approximately 7.86% of the Province area, located Bukit Barisan mountain and is about 500-1000 meters above sea level. The climate is categories C type (Schmidt-Forguson) with the temperature of ranging from 23 to 30.6°C and humidity 0f 82%. The soil types are mainly podsolic andosol, alluvial and litosol (Bureau of Statistical Center, 2004). A central production area for duck breeder was founded in Air Hangat Sub District for

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the development of duck husbandry. Almost 50% of Kerinci duck breed populations are located in this area and the rest is in a non-central production area (Livestock Services Office, 2002). The objectives of central production area are to enhance the production and increase the population of Kerinci duck breed.

Kerinci duck: The origin of Kerinci duck is not clearly identified. This kind of duck is categorized as mountain ducks and they are mainly raised for eggs. Currently, based on limited information, Kerinci duck is assumed to be a good egg layer. Kerinci ducks that are raised in Jamby City which has higher temperature than Kerinci district, produce the first egg at 140 days of age. This is faster than Tegal Duck (175 days), Alabio duck (185 days) and Bali duck (185 days) (Pramudiyati and Sarworini, 2001). Kerinci ducks stand with the position of 50 up to 60 degrees from the ground and the average body weight of adults is 1400 g for male and 1860 g for female (Adrizal *et al*., 2004). However, with intensive treatment, a male adult duck could weigh 1600 g (Manin, 2003). The dominant feather color is brown spots for female and a combination with white for female. Both female and male used to have greenish black color at the top of their wings (Juwanda, 2006; Adrizal *et al*., 2004).

Polymorphism genetic analysis: The blood protein polymorphism analisys with acrylamide gel electrophoresis technique on Kerinci ducks blood samples resulted in three proteins: Transpherin (Tf), Post transpherin-1 (Ptf-1) and Post transpherin-2 (Ptf-2). The ribbon pattern of electrophoresis result was Fig. 1 out by zymogram as shown in Fig. 2.

Transpherin locus (Tf): The result of acrilamyde gel electrophoresis analysis on blood plasma of Kerinci ducks which are raised in Kerinci district showed tranpherin locus ribbon with different amount and mobility. In other words. There were variations of phenotype ribbons AA, AB and BB. This result is similar with the research on Talang Benih ducks in Bengkulu (Azmi *et al*., 2006). However, this is different from the result found by Yellita (1998) on local ducks in West Sumatera. In the case of local chicken as concluded by Strail (1968), the transpherin locus was controlled by three autosomal codominant alleles, Tf^A, Tf^B and Tf^C.

Post transpherin-1 locus (Ptf-1): All result of acrilamyde gel electrophoresis analysis on blood plasma of Kerinci ducks show s Ptf-1 locus ribbons with the same amount and mobility. There was no variation of phenotype ribbon in this locus. All result showed the same phenotype which was AA genotype as shown in Fig. 2. This result differs from the result reported by Yellita (1998) that local ducks in West Sumatera had AA, AB and BB genotype. It

Fig. 1: Kerinci dukcs; male and female

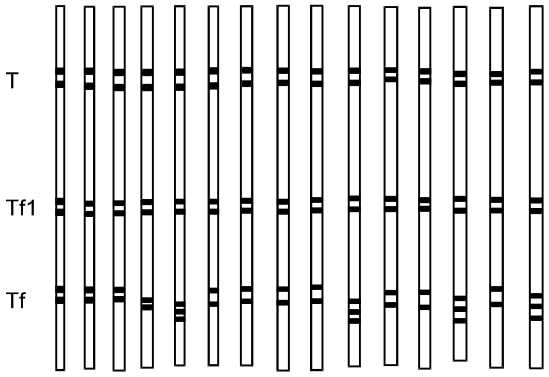

Fig. 2: Zymogram Elektroforesis Post-Transferin-2 (Tf-2), Post

also differs with the result confirmed by Azmi *et al*. (2006) from the research on Talang Benih ducks in Bengkulu which showed BB and CC.

Post transferin-2 locus (Ptf-2): All result of electrophoresis analysis on blood plasma of Kerinci ducks showed Ptf-2 locus ribbons with the same amount and the same phenotype which was AA. Thus, there was no variation of phenotype ribbon in this locus either. The same result was found on Talang Benih ducks which was germplasm of the local ducks in Bengkulu, although with different genotype BB (Azmi *et al*., 2006). Compared to the research performed by Yellita (1988), this result is different as the local ducks in West Sumatera was found to have AA and BB.

Genotype frequency-transpherin locus (Tf): The genotype frequency on each locus is shown in Table 1.The result of electrophoresis analysis explained the ribbon pattern variations on transpherin locus. In other words, this locus was polymorphic, although there was a tendency to be A allele (0.8). The result differs from the result the result reported Yellita (1988) which demonstrated that local ducks in West Sumatera had

Table 1: The Variation of Genotype and Gene Frequency on Transpherin Locus (Tf), Post Transpherin-1 Locus (Ptf-1), Post Transpherin-2 (Ptf-2) and Albumin

		Genotype						Frequency	
Locus	n	AA	BB	CC	AB	AC	BC	A	B
Transpherin (Tf)	15	10	1	-	4	-	-	0.8	0.2
Post Transpherin1(Ptf-1)	15	15	-	-	-	-	-	1.0	0.0
Post Transpherin2(Ptf-2)	15	15	-	-	-	-	-	1.0	0.0
Albumin (Alb)	15	*	*	*	*	*	*	*	*

*not clearly detected

homozygote genotype on transpherin gene pair AA. In contrast, Azmi *et al*. (2006) found that there was a polymorphic blood protein in the transpherin locus of Talang Benih ducks in Bengkulu.

Genotype frequency-post transpherin-1 Locus (Ptf-1): The acrilamyde gel electrophoresis analysis showed no differences between ribbons patterns (all result showed two ribbons). It indicated that there was no variation in Ptf-1 locus and that there was the same gene locus. This ducks, therefore have homozygote genotype on AA transpherin gene pair, or in other words it is called monomorphic (Harris, 1994). According to Yellita (1998), there was a polymorphic pattern in the Ptf-1 locus of Kamangducks and Pitalah ducks in West Sumater. The same fact were also found in Talang Benih ducks in Bengkulu (Azmi *et al*., 2006).

Genotype frequency-post transpherin-2 locus (Ptf-2): As in Ptf-1, the acrilamyde gel electrophoresis analysis also showed no differences between ribbon patterns formed in Ptf-2 locus which according to Harris (1994) was called monomorphic. This result is identical with the conclusion of Azmi *et al*. (2006), that there was no variation in post Ptf-2 of Talang Benih Bengkulu ducks, The case of local ducks in West Sumatera, Yellita (1998) reported differences on the ribbon patterns in Ptf-2 locus.

Albumin locus (Alb): Albumin locus is not clearly identfied in all the result of blood sample analysis. It's difficult to explain the cause whereas other studies in local ducks (Kamang ducks, Solok ducks, Talang Benih ducks) using the same methode indicated the presence of blood albumin.

Conclusions: Three types of blood protein Kerinci ducks were detected transpherin, post transpherin-1 and post transpherin-2 but the albumin was not clearly detected. The polymorphism of Kerinci ducks blood protein was found intranspherin locus.

The genotype found in post transpherin-1 and post transpherin-2 locus was gene A. Gene A, B, AB was found in transpherin locus, however, gene A was more predominant.

The genetic similarity of Kerinci ducks was very high, meaning the genetic performances of Kerinci ducks were almost identical.

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