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Haemoglobin Polymorphism in Chuckar (*Alectoris chuckar*) and Pheasant (*Phasianus colchicus*)

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Abstract: In this study, Haemoglobin (Hb) polymorphisms were investigated in the Chuckar and pheasant raised in the farm of Agricultural Faculty of Selcuk University. There were used 65 chuckars and 41 pheasants. Selection studies have not been executed at the investigated population since the beginning of flock. This study was carried out to determine haemoglobin loci status of chuckars and pheasants which was not investigated before. Two haemoglobin allels were determined both for chuckars and pheasants. The Hb A gene frequences were found to be 0.73 and 0.76 for chuckar and pheasant respectively. It was seen that the chuckars and pheasants were in Hardy-Weinberg equilibrium.

Key words: Chuckar, pheasant, haemoglobin, polymorphism, cellulose asetate

INTRODUCTION

In the recent years, many polymorphic loci have determined by using DNA markers for evaluation of the genetic composition of the populations[1]. Polymorphic-biochemical systems had been used to determination of the genetic composition of population until 1990's. After these dates, directly determination possibilities individual's genotypic structure have been obtained by developing new techniques related to determine genetic variations on DNA levels. At the present day these variations have been widely used for some subjects such as definition of genetic variation in livestock, estimation of the genetic relationships between different breed and eco-types and pedigree determination[2]. Genetic markers may provide useful information at different levels: population structure, levels of gene of gene flow, phylogenetic relationships, pattern of historical biogeography and the analyses of parentage and relatedness[3]. In the past, it had been concluded that the origins and migration ways of the populations could be determined by using polymorphic characters in blood. On the other hand, polymorphic characters has been investigated intensively whether they can be used as indirect selection criteria for animal improvement, by making use of the relationships between polymorphic characters and some production traits. These researches have become dense on blood antigens, serum proteins and relationships between genes and some production traits[4].

At the present day, information about genetic structures of the populations have been obtained by widely using DNA markers. But these techniques have not been used at the Turkey yet. Majority of the polymorphic studies on livestock subjected on biochemical polymorphism[5-7]. For these reasons cellulose acetate technique was used in this study.

In poultry species, it is known that haemoglobine types come true heredity with otozomal co-dominant allels. The B allel moves faster than A allel towards anode and determination of haemoglobin types have been done as to fast of this act.

The aim of this study was to investigated whether the haemoglobin types of chuckar and pheasent populations were in Hardy-Weinberg equilibrium.

MATERIALS AND METHODS

The Blood were collected from 65 chuckars and 41 pheasants, reared in the Research Farm of Agriculture Faculty, University of Selcuk in Konya province.

Electrophoresis were used for determination of haemoglobin types. In current study, It was made use of laboratory equipments like cellulose acetate paper, test tube and also hydroksi methyl amino methane (tris), amonium oxalate, boric aside as chemicals.

Blood samples were taken from vena axillaris. After samples had been taken with 5 cc injector amount 0.5-1.0 cm^3 blood, they set in 0.5 $\mu L\ 5^{-1}$ mL steriled heparine tube. Twenty times pure water spilled out on sample tubes.

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Thus, eriytrocytes were broken into pieces in pure water and haemoglobins set free in solution.

Haemoglobine types were determined by using Electrophoresis acetate cellulose[8]. After buffer solution and cellulose acetates were located in electrophoresis tank, hemolized blood samples, which were prepared, were applied on the cellulose acetate with automatic pipette amount one sample per 0.5 cm. The beginning of cathode was gotten as a application point. Haemoglobin molecules are moved to anode at pH 8.6, because of their negative electron charge.

12 g hydroxymethyl aminomethane (tris), 1.56 g EDTA (ethylenediaminetetraacedicacide) and 0.92 g boric acide were added to 1000 mL pure water and got it dissolved. The pH for prepared solutions was 8.6.

Pancau'S protein paint was used as paint solution. It was made of 5% acetic acid solutions in two part utensils so that extra paint could isolated from cellulose acetate after process. Samples at the first utensil were exposed to 5 min and second utensil were exposed to 2 min in composition to be present 5% acetic acide within, so It was supplied to appear of haemoglobin bants on cellulose acetate. 350 mL buffer solution was added to anode and katode of tank and 100 mL buffer solution within another utensil was added for wet cellulose acetate.

Whether the populations were Hardy-Weinberg equilibrium was determinated by using khi-square test[9].

DISCUSSION

At the result of electrophoresis analysis, three haemoglobin types were determinated by two co-dominant allele (Hb A and Hb B) in chuckars and pheasants. These are A, AB and B types. Heterozygot (AB) haemoglobin types are given below for quails, chuckars and pheasants (Fig. 1). Formerly obtained results for quail heterozygot haemoglobin type was given to compare with chuckar and pheasant[10].

The observed and expected rates of Hb genotypes of chuckar and pheasant were given in Table 1.

The frequency of Hb A and Hb B in chuckars and pheasants were determined as 0.73 and 0.27, 0.76 and 0.24 respectively. The results of this study were similar to results of Kimura[11-14] of interested in haemoglobin types and gen frequency for quail.

Table 1: Haemoglobin types distrubition in chuckar and pheasant

		Haemoglobin genotypes				
		HbAA	HbAB	HbBB	Total	χ^2
Chuckar	Observed	36	23	6	65	0.661 ns
	expected	34.71	25.58	4.71	65	
Pheasant	Observed	24	14	3	41	
	expected	23.44	15.12	2.44	41	5.337 ns

ns: non significant

Fig. 1: Heterozygot (AB) haemoglobin types of some poultry species

The differences between observed and expected frequencies of haemoglobin types were not statistically significant for the chuckars and pheasants. Therefore, it was concluded that chuckars and pheasants were in Hardy-Weinberg equilibrium. This equilibrium may have been due to any selection study has not executed.

Chance, migration, mutation or selection can change to expected gene frequencies. So, It can be said that haemoglobin gene frequencies of the chuckar and pheasant flock are not affected from one of these factors. In this study, which haemoglobin type could be suggested is not certain for these flocks in respect of their production traits.

The relationships between haemoglobin types and production traits of chuckars and pheasants must be investigated on large flocks in the future studies. This study is only set an example for later studies.

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