Further Contribution on Correlation Coefficients among Gene Markers of Some Blood Proteins in Fertile Purebred Arabian Mares

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Abstract: The present study aimed to investigate the correlation coefficients among gene markers that affect the fertility status in purebred Arabian mares. Study was carried out on 64 Arabian mares kept at AL-Zahraa stud, AinShams, Cairo, Egypt. Results revealed significant, (P<0.05), high significant, (P<0.01) and very high significant, (P<0.001) correlation. Very high significant were found among the following gene markers: Al with AP, Al with AP, Tf with (ptf, F and Gc), Tf with (ptf, F and Gc), ptf with both (F and Gc), F with Gc, AP with Gc and AP with Gc.

Key words: Correlation coefficient - Gene marker - Arabian mares

INTRODUCTION

During the last decade individual genes with great effects on reproduction of Arabian horse have been identified and studied, these genes increase our understanding of the control of reproduction and also reproductive rates [1-3].

The genetic characteristics of the horse are classified into quantitative characters, controlled by multiple minor genes and qualitative characters controlled by single major genes [4]. One of the most important goal of reproduction in equine is to detect the origin of provenance of species parentage, especially purebred ones and the most effective polymorphic, which can reach this goal are Pr and Tf loci [5]. Correlations between reproductive parameters and genetic markers have been previously reported [2,3, 6-10].

The current work is a further investigations on correlations among gene markers of some blood proteins in fertile purebred Arabian mares.

MATERIALS AND METHODS

Experimental Animals: The present study was carried out on 64 purebred Arabian mares including 14 fertile non-pregnant during estrus -15 non pregnant during diestrus -13 early pregnant -12 mid pregnant and 10 late pregnant.

RESULTS

Results of the present study is shown in Table 1. this table reveals very highly significant correlations (P>0.001) among studied alleles as follows:

- Pr with Pat, Pr with Pat, Al with Ap and Pal
- Al with Ap and Pal
- Tf with Ptf, Fα and Ge
- Tf with Ptf, Ge and Fα
- Ptf with Fα, Ap and Ge
- Ptf with Fα, Ap and Ge
- Fα with Ge and Es
- Fα with Ge and Es
- Ap with Ge
- Ap with Ge

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**DISCUSSION**

The main goal of the current study was to investigate the possible correlations among the different gene markers known to affect fertility status in pure bred Arabian mares in Egypt. Ahmed *et al.* [3] studied seven blood protein loci and reported that the most predominant gene markers related to fertile mare were $\text{Al}^1$, $\text{Ptf}^1$, $\text{F}\alpha^2$, $\text{Es}^3$, and $\text{Gc}^3$. The previous results indicated that $\text{Tf}^2$ was positively correlated with the fertility index, while $\text{Pal}^2$ was dominant in mares having high progesterone level. These findings explain the genetic control of fertility in Arabian mares and this fact was confirmed by different researches [6,12-14]. Alexander and Ivrine [15] reported that mares with inactive ovaries have been characterized by high frequency of $\text{Pr}^2$ and $\text{F}\alpha^2$, and they suggested that the cause may be attributed to the polygenic effect. The results of the present study recorded three levels of correlations among seven genetic loci (about 14 genetic alleles) first level significant correlation (P<0.05) and unirversal significant (P<0.01) and 2nd level very highly significant correlations(P<0.001). The very highly significant correlations among different gene markers give evidence that not only one gene affect one trait, but may be different genes affect one trait “polygenic effect” and the condition may be due to closely connection of these genes on the same chromosome [16,17] or may be attributed to the association between genetic constitution and physiological function asin case of $\text{Pr}$ as the only function of $\text{Pr}$ is thyroxin binding and transport [18] or due to protein coding loci [19]. In this respect, Shalaby *et al.* [17] reported that the relationship between blood proteins and steroid hormones is based on their great effect by plasma concentration of binding protein receptors. Ovarian steroid hormone stimulate RNA and protein synthesis indicating that those hormones act at gene level through a receptor mediated mechanism. It was concluded that it could be concluded that the fertility status in Arabian mares is controlled by different genetic markers , and the correlations between these genetic markers need more and more researches to find out the final map of genetic control of fertility in Arabian mares.

**REFERENCES**


