

()

*

(// : // :)

DFREML

()

)

()

(

(

)

(P<0.05)

(P<0.05)

(Wilson, 1991; Crawford, 1993)

(Hartmann

et al., 2003b; Prado-Gonzalez et al., 2003)

(Meyer, 2000) DFREML

$$y = Xb + Z_1a + Z_2m + Wc + e \quad \sigma_{am} \neq 0 \quad ($$

(Hartmann et al.,

2003a)

$$\begin{pmatrix} y \\ a \\ b \\ m \\ c \\ e \end{pmatrix} = \begin{pmatrix} X & Z_1 & Z_2 & W \\ & & & \end{pmatrix} \begin{pmatrix} b \\ a \\ m \\ c \\ e \end{pmatrix} + \begin{pmatrix} e \\ & & & & \end{pmatrix}$$

(Hartmann et al., 2002)

σ_{am}

Simplex

(Log L)

(McNoughton & Gous, 1999)

(Pappas et al., 2005)

VLDL

/	/	/
/	/	/
/	/	/

()
()

...
 / / / /
 / / / /
 (/)
 (/)
 / /

(Koerhuis & Mckay, 1996; Zhang et al., 2005)

/ / / /
 / / / /
 (Zhang et al., 2005)

±				
/	/	/	/ ± /	()
/	/	/	/ ± /	()
/	/	/	/ ± /	()
/	/	/	/ ± /	()
/	/	/	/ ± /	()
/	/	/	/ ± /	()
/	/	/	/ ± /	()

(
 Force Gauge

$$y_{ij} = \mu + G_i + e_{ij} \quad (1)$$

$$y_{ij} = \mu + G_i + \beta(EW_{ij} - \overline{EW}) + e_{ij} \quad (2)$$

$$e_{ij} = \beta \overline{EW} - EW_{ij} + G_i + \mu + y_{ij}$$

/ / / /
 / /
 (Wang et al., 2000; Farzin et al., 2007)

(2000) Minitab

	/	/	()	
	.(P<0.05)			
(/)			±	
(/)	/	/	/	/ ± /
	/	/	/	/ ± /
	/	/	/	/ ± /
	/	/	/	/ ± /
	/	/	/	/ ± /

()

.(Joseph et al., 1999) /

/

.(p<0.05) /

.(P<0.05)

(/)

(/)

()

/ (/)

.(Joseph et al., 1999)

	/	^c ± /	/	^b ± /	/	^a ± /	[]	()
	/	± /	/	± /	/	± /	[]	()
/	/	± /	/	± /	/	± /	[]	
	/	± /	/	± /	/	± /	[]	()
/	/	± /	/	± /	/	± /	[]	
	/	^b ± /	/	^b ± /	/	^a ± /	[]	()
/	/	± /	/	± /	/	± /	[]	
	/	^b ± /	/	^{ab} ± /	/	^a ± /	[]	()
/	/	± /	/	± /	/	± /	[]	
	/	^b ± /	/	^{ab} ± /	/	^a ± /	[]	()
/	/	± /	/	± /	/	± /	[]	
	/	^c ± /	/	^b ± /	/	^a ± /	[]	()
/	/	± /	/	± /	/	± /	[]	
	/	^b ± /	/	^{ab} ± /	/	^a ± /	[]	()
/	/	± /	/	± /	/	± /	[]	

...

:

) (p<0.01) (/)
 /
 ((p<0.05) (/ /)

(Pappas et al., 2005)

(Farzin et al.,

2007)

(Hartmann et al.,

/ / /

.2003b)

(autocorrelation)

(Hartmann et al., 2003b)

/ ± /	/ ± /	/ ± /
/ ± /	/ ± /	/ ± /
/ ± /	/ ± /	/ ± /
/ ± /	/ ± /	/ ± /
/ ± /	/ ± /	/ ± /
/ ± /	/ ± /	/ ± /

() (p<0.05) /
 ()
 / /)
 /) ()
 (/

(Cherian & Sim, 1997)

REFERENCES

1. Cherian, G. & Sim, J. S. (1997). Egg yolk polyunsaturated fatty acids and vitamin E content alters the tocopherol status of hatched chicks. *Poultry Science*, 76, 1753-759.
2. Crawford, R. D. (1993). *Poultry Breeding and Genetics*. Amsterdam, Elsevier. 990 pp.
3. Farzin, N., Vaez Torshizi, R. & Emam Jome Kashan, N. (2007). Estimates of genetic parameters for egg weight, yolk weight and yolk composition in a commercial broiler line. *Modern Genetics Journal*, 2, 25-30 (In Farsi).
4. Hartmann, C., Strandberg, E. & Rydhmer, L. (2002). Genetic relations between reproduction, chick weight and maternal egg composition in a White Leghorn line. *Acta Agriculture Scandinavica, Section A-Animal Sciences*, 52, 91-101.
5. Hartmann, C., Strandberg, E., Rydhmer, L. & Johansson, K. (2003a). Genetic relations of yolk proportion and chick weight with production traits in a White Leghorn line. *British Poultry Science*, 44(2), 186-191.
6. Hartmann, C., Johansson, K., Strandberg, E. & Rydhmer, L. (2003b). Genetic correlations between the maternal genetic effect on chick weight and the direct genetic effects on egg composition traits in a White Leghorn line. *Poultry Science*, 82, 1-8.
7. Joseph, N. S., Robinson, N. A., Renema, R. A. & Robinson, F. E. (1999). Shell quality and color variation in broiler breeder eggs. *Journal of Applied Poultry Research*, 8, 70-74.
8. Koerhuis, A. N. M. & McKay, J. C. (1996). Restricted maximum likelihood estimation of genetic parameters on egg production traits in relation to juvenile body weight in broiler chicken. *Livestock Production Science*, 46, 117-127.
9. McNoughton, L. & Gous, R. M. (1999). The effect of egg size on pre and post natal growth of broiler breeder. *World's Poultry Science Journal*, 15(8), 34-38.
10. Meyer, K. (2000). *DFREML*. User's notes. Animal Genetic and Breeding Unit. NSW, Australia, 84 pp.
11. Minitab. (2000). *Minitab Software Statistical Package*. Release 13.1. Minitab Inc, USA.
12. Pappas, A.C., Acamovic, T., Sparks, N. H. C., Surai, P. F. & McDevitt, M. R. (2005). Effects of supplementing broiler breeder diets with organic selenium and polyunsaturated fatty acids in egg quality during storage. *Poultry Science*, 84, 865-874.
13. Prado-González, E.A., Ramírez-Avila, L. & Segura-Correa, J.C. (2003). Genetic parameters for body weights of Creole chickens from southeastern Mexico using an animal model. *Livestock Research for Rural Development*, 15 (1).
14. Wang, R., Sunwoo, G. & Sim, J. S. (2000). Fatty acid determination in chicken egg yolk: A composition of different methods. *Poultry Science*, 99,75-82.
15. Wilson, H. R. (1991). Interrelationships of egg size, chick size, post hatching growth and hatchability. *World's Poultry Science Journal*, 47, 5-20.
16. Zhang, L. C., Ning, H. Z., Xu, G. Y., Hou, Z. C. & Yang, N. (2005). Heritabilities and genetic and phenotypic correlations of egg quality traits in brown-egg dwarf layers. *Poultry Science*, 84, 1209-1213.