

()

*

(// / : // / :)

()

(REML)

DFREML

(h_m)

() / () /
) / () / (h_m)

() / (c) (

h_m **c** () /

/ (**am**) / / /

REML

:

()
) ()
) ()
) ()

- y = Xb + Z₁a + e (M1)
- y = Xb + Z₁a + Wc + e (M2)
- y = Xb + Z₁a + Z₂m + e (M3)
- Cov_{am} = 0 (M3)
- y = Xb + Z₁a + Z₂m + e (M4)
- Cov_{am} ≠ 0 (M4)
- y = Xb + Z₁a + Z₂m + Wc + e (M7)
- Cov_{am} = 0 (M7)
- y = Xb + Z₁a + Z₂m + Wc + e (M8)
- Cov_{am} ≠ 0 (M8)

a y
 m c
 Z₁ X e W Z₂ (BW8W)
 () (EW) (EN)
 () (ASM)

Cov_{am} ()

(EN)	(EW)	(BW8W) (ASM)	(DP)
ASM ()	DP ()	EN ()	EW ()
			BW8W ()
/	/	/	/
/ (/)	/ (/)	/ (/)	/ (/)
/	/	/	/
			/
			/

()

/ /

$h_m c^2$ /

()

($P < /$)

($P < /$)

()

/ (/)

/ / /

/ $r_{am} c h_m h_a$ /

()

*

()

-

LogL	r_{am}	h_m^2	c^2	h_a^2	σ_p^2	σ_e^2	σ_{am}	σ_m^2	σ_c^2	σ_a^2
/				/ \pm /	/	/				/
/			/ \pm /	/ \pm /	/	/			/	/
/		/ \pm /		/ \pm /	/	/		/		/
/	/	/ \pm /		/ \pm /	/	/	/	/		/
/		/ \pm /	/ \pm /	/ \pm /	/	/		/	/	/
/	/	/ \pm /	/ \pm /	/ \pm /	/	/	/	/	/	/

σ_{am}

σ_m^2

σ_c^2

σ_a^2 *

c^2

h_a^2

σ_p^2

σ_e^2

LogL

r_{am}

h_m^2

()

-

LogL	r_{am}	h_m^2	c^2	h_a^2	σ_p^2	σ_e^2	σ_{am}	σ_m^2	σ_c^2	σ_a^2
/				/ \pm /	/	/				/
/			/ \pm /	/ \pm /	/	/			/	/
/		/ \pm /		/ \pm /	/	/		/		/
/	/	/ \pm /		/ \pm /	/	/	/	/		/
/		/ \pm /	/ \pm /	/ \pm /	/	/		/	/	/
/	/	/ \pm /	/ \pm /	/ \pm /	/	/	/	/	/	/

...

:

()

-

LogL	r_{am}	h_m^2	c^2	h_a^2	σ_p^2	σ_e^2	σ_{am}	σ_m^2	σ_c^2	σ_a^2
/				/ ± /	/	/				/
/			/ ± /	/ ± /	/	/			/	/
/		/ ± /		/ ± /	/	/		/		/
/	/	/ ± /		/ ± /	/	/	/	/		/
/		/ ± /	/ ± /	/ ± /	/	/		/	/	/
/	/	/ ± /	/ ± /	/ ± /	/	/	/	/	/	/

() ()

(P < /)

r_{am} c h_m h_a

h_m h_a

(/)

(P < /)

(/)

(P < /)

() () () ()

(P < /)

/ / r_{am} c h_m h_a

/ /

()

(/)

(/)

() ()

(r_{am} c h_m h_a)

/ /

/

() :

LogL	r_{am}	h_m^2	c^2	h_a^2	σ_p^2	σ_e^2	σ_{am}	σ_m^2	σ_c^2	σ_a^2
/				/ ± /	/	/				/
/			/ ± /	/ ± /	/	/			/	/
/		/ ± /		/ ± /	/	/		/		/
/	/	/ ± /		/ ± /	/	/	/	/		/
/		/ ± /	/ ± /	/ ± /	/	/		/	/	/
/	/	/ ± /	/ ± /	/ ± /	/	/	/	/	/	/

()

()

()

()

(.)

/ / /

/

$e^2 h_m$

()

- / / /

/)

(

()

/ /

()

/

()

()

()

REFERENCES

4. Akbas, A., Y. Unver, I. Oguz, & O. Aitan. 2002. Estimation of genetic parameters for clutch traits in laying hens. 7th World Congress on Genetics Applied to Livestock Production, August 19–23, Montpellier, France.
5. Chambers, J. R. 1990. Genetic of growth and meat production in chickens. In: Crawford, R. D. (Ed). Poultry Breeding and Genetics. Elsevier, Amsterdam, p.599– 644.
6. Chapuis, H., M. Tixier-boichard, Y. Delabrosse & V. Ducrocq. 1996. Multivariate restricted maximum likelihood estimation of genetic parameters for production traits in three selected turkey strains. *Genetics Selection, Evolution*. 28: 197–215.
7. Crawford, R. D. 1993. Poultry Breeding and Genetics. Elsevier, Amsterdam. 990 pp.
8. Dobson, A. J. 1991. An Introduction to Generalized Linear Models. Chapman and Hall. London, UK. 147pp.

9. Hartmann, C., E. Strandberg, L. Rydhmer & K. Johansson. 2003. Genetic relations of yolk proportion and chick weight with production traits in a White Leghorn line. *British Poultry Science*, 44: 186–191.
10. Koerhuis, A. N. M. & J. C. McKay. 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
11. Koerhuis, A. N. M. & R. Thompson. 1997. Models to estimate maternal effects for juvenile body weight in broiler chickens. *Genetics, Selection Evaluation*, 29: 225–249.
12. Meyer, K. 2000. DFREML version 3.0. Program to estimate variance components by restricted maximum likelihood using derivative-free algorithm. User notes. Animal Genetics and Breeding Unit. University New England, Armidale, NSW, Australia. 84pp.
13. Nelder, J. A. & R. Mead. 1965. A simplex method for function minimization. *Computer Journal*, 7: 147.
14. Prado-Gonzalez, E. A., I. Ramirez-Avila & J. C. Segura-Correa. 2003. Genetic parameters for body weights of Creole chickens from Southeastern Mexico using an animal model. *Livestock Research For Rural Development*, 15 (1).
15. Quadeer, M. A., J. V. Craic, K. E. Kemp & A. D. Dayton. 1977. Selection for egg mass in different social environments. 1. Estimation of some parameter in the foundation stock. *Poultry Science* 59: 1522–1535.
16. Robinson, F. E., J. L. Wilson, M. W. Yu, G. M. Fasenko & R. T. Hardin. 1993. The relationship between body weight and reproduction efficiency in meat-type chickens. *Poultry Science*, 72: 912–922.
17. Willham, R. L. 1980. Problems in estimating maternal effects. *Livestock Production Science*, 7: 405–418.