



**NO EVIDENCE OF EPISTASIS FOR AGE AND WEIGHT AT THE ONSET OF LAY IN THE ROSLIN BROILER X LAYER CROSS**

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Epistasis among quantitative trait loci (QTL) for early growth have been reported in chickens (Carlborg *et al.*, 2004) and reproductive traits are known to exhibit high heterosis. Estimating the extent of epistasis in sexual maturity traits will assist poultry breeders in understanding the role played by non-additive gene action in age and weight at the onset of lay. The data were from an F2 resource population of 944 birds which was made by crossing a broiler sire line with a White Leghorn layer. The onset of egg production (age at first egg, AFE) and bodyweight (WFE) were recorded. DNA from blood samples was genotyped using 106 microsatellite markers covering 25 autosomal linkage groups and Z chromosome of 8 F0 grandparents, 40 F1 and 944 F2. AFE was not normally distributed and was transformed by taking natural logarithms of AFE-94 (LnAFE94). WFE was used as a covariate for LnAFE94 and the natural logarithms of Abdominal Fat as a covariate for WFE. The 2005 consensus linkage map was used in the analysis. A genetic algorithm developed within the GridQTL project with the capability to detect epistatic QTL in outbred populations was used to analyse the data. The algorithm automates one dimensional genome scans to identify single QTL that are used to initiate two dimensional searches for epistatic QTL. The identified QTL mainly act additively (Table) and no statistical evidence of epistasis was observed.

**Table. Additive and dominance effects of QTL for AFE and WFE at first egg**

Chromosome	F-ratio	Position (cM)	Additive effect		Dominance effect		Phenotypic variance %
			Mean	SE	Mean	SE	
AFE94, ln d							
1	10.08**	154	-0.09	0.019	0.02	0.033	2.2
2	15.73**	291	-0.08	0.015	0.06	0.023	3.5
3	7.62**	24	-0.07	0.019	-0.03	0.032	1.6
3	8.47**	139	-0.06	0.017	-0.05	0.024	1.8
4	6.93**	2	-0.07	0.018	0.004	0.027	1.5
4	8.39**	195	-0.07	0.021	-0.06	0.037	1.8
13	7.61**	19	-0.10	0.025	-0.02	0.055	1.6
27	10.23**	0	-0.07	0.016	-0.04	0.023	2.2
28	5.12*	9	0.05	0.019	-0.06	0.031	1.0
WFE, g							
1	11.48**	134	86	18.1	12	27.5	5.1
2	11.81**	324	80	17.8	53	30.8	5.2
4	19.62**	177	201	32.5	-38	86.0	8.7
8	7.75**	23	71	18.4	-3	26.0	3.3
15	4.22*	41	-68	25.8	60	54.4	1.6
27	25.99*	0	122	16.9	-4	-25.8	11.3

P<0.05 and \*\* P<0.01 genome wide significance.

**CARLBORG, R., HOCKING, P.M., BURT, D.W. and HALEY, C.S. (2004).** Simultaneous mapping of epistatic QTL in chickens reveals clusters of QTL pairs with similar genetic effects on growth. *Genetical Research* **83**: 197-209.