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SUPPLEMENTAL DATA

2 **Supplement Table 1.** Variance components of direct additive genetic effect, maternal genetic effect and permanent environmental hen effects for body weight at
 3 day 1 (BW1D), 4 (BW4), 8 (BW8), 12 (BW12), 16 (BW16), 20 (BW20) and 24 (BW24) weeks of age, and body weight at first egg (BWFE) of LHKK chickens
 4 using in different models.

Trait	Model ¹	Variance components				Genetic parameters			Log L
		σ^2_a	σ^2_m	σ^2_{pe}	σ^2_p	h^2_a	h^2_m	h^2_{pe}	
BW1D (g)	A	5.98±0.23	-	-	10.26±0.17	0.58±0.02	-	-	-17878.51
	B	1.21±0.23	8.35±0.41	-	13.77±0.41	0.09±0.02	0.61±0.01	-	-16533.65
	C	1.40±0.24	-	5.75±0.28	11.27±0.29	0.12±0.02	-	0.51±0.02	-16540.11
	D	1.20±0.23	2.96±0.51	3.13±0.38	11.51±0.33	0.10±0.02	0.26±0.04	0.27±0.03	-16495.77
BW4 (g)	A	474.82±32.81	-	-	1177.43±20.92	0.40±0.02	-	-	-44206.29
	B	247.89±33.38	160.55±17.91	-	1176.82±21.89	0.21±0.03	0.14±0.01	-	-44120.98
	C	249.17±32.27	-	127.29±13.11	1138.20±19.92	0.22±0.03	-	0.11±0.01	-44112.20
	D	232.65±32.32	47.98±19.11	91.40±17.03	1141.78±20.34	0.20±0.03	0.04±0.02	0.08±0.02	-44107.08
BW8 (g)	A	3814.22±243.74	-	-	8027.36±151.74	0.48±0.02	-	-	-52729.33
	B	2679.65±266.64	767.97±109.43	-	7995.64±157.31	0.34±0.03	0.10±0.01	-	-52681.30
	C	2780.03±261.40	-	585.86±78.27	7837.23±150.61	0.36±0.03	-	0.08±0.01	-52678.94
	D	2645.90±264.98	301.01±130.00	379.14±104.73	7860.71±153.07	0.34±0.03	0.04±0.02	0.05±0.01	-52675.10
BW12 (kg)	A	0.01±0.00	-	-	0.02±0.00	0.49±0.03	-	-	-52472.54
	B	0.01±0.00	0.00±0.00	-	0.02±0.00	0.38±0.03	0.08±0.01	-	-52437.31

	C	0.01±0.00	-	0.00±0.00	0.02±0.00	0.38±0.03	-	0.07±0.01	-52433.93
	D	0.01±0.00	0.00±0.00	0.00±0.00	0.02±0.00	0.37±0.03	0.03±0.02	0.05±0.01	-52430.75
BW16 (kg)	A	0.02±0.00	-	-	0.04±0.00	0.41±0.03	-	-	10311.28
	B	0.01±0.00	0.00±0.00	-	0.04±0.00	0.31±0.03	0.08±0.01	-	10341.79
	C	0.01±0.00	-	0.00±0.00	0.04±0.00	0.31±0.03	-	0.07±0.01	10341.94
	D	0.01±0.00	0.00±0.00	0.00±0.00	0.04±0.00	0.30±0.03	0.04±0.02	0.04±0.01	10345.32
BW20 (kg)	A	0.03±0.00	-	-	0.06±0.00	0.42±0.03	-	-	6988.87
	B	0.02±0.00	0.01±0.00	-	0.06±0.00	0.31±0.03	0.08±0.02	-	7010.73
	C	0.02±0.00	-	0.00±0.00	0.06±0.00	0.30±0.03	-	0.07±0.01	7014.48
	D	0.02±0.00	0.00±0.00	0.00±0.00	0.06±0.00	0.30±0.03	0.02±0.02	0.06±0.02	7015.38
BW24 (kg)	A	0.04±0.00	-	-	0.10±0.00	0.46±0.03	-	-	4462.07
	B	0.03±0.00	0.01±0.00	-	0.09±0.00	0.30±0.04	0.10±0.02	-	4479.15
	C	0.03±0.00	-	0.01±0.00	0.09±0.00	0.31±0.04	-	0.08±0.02	4477.75
	D	0.03±0.00	0.01±0.00	0.00±0.00	0.09±0.00	0.29±0.04	0.06±0.03	0.04±0.02	4480.07
BWFE (kg)	A	0.03±0.00	-	-	0.05±0.00	0.47±0.06	-	-	-8117.52
	B	0.02±0.00	0.00±0.00	-	0.05±0.00	0.39±0.08	0.05±0.04	-	-8116.66
	C	0.02±0.00	-	0.00±0.00	0.05±0.00	0.44±0.07	-	0.03±0.03	-8117.15
	D	0.02±0.00	0.00±0.00	0.00±0.00	0.05±0.00	0.39±0.08	0.05±0.06	0.00±0.05	-8116.67

5 ¹Estimates from the best model were bolded.

6 **Supplement Table 2.** Variance components of direct additive genetic effect, maternal genetic effect and permanent environmental hen effects for age at first egg
 7 (AFE) , egg weight at first egg (EWFE) and total number of egg from onset of lay to 17 weeks of lay (EN) of LHKK chickens using in different models.

Trait	Model ¹	Variance components				Genetic parameters			Log L
		σ_d^2	σ_m^2	σ_{pe}^2	σ_p^2	h_d^2	h_m^2	h_{pe}^2	
AFE (day)	A	58.74±14.11	-	-	247.97±10.21	0.24±0.05	-	-	-4390.07
	B	36.91±16.58	14.18±8.84	-	247.13±10.12	0.15±0.07	0.06±0.04	-	-4388.61
	C	40.49±14.74	-	13.95±7.58	246.37±10.04	0.16±0.06	-	0.06±0.03	-4387.63
	D	40.18±17.13	0.36±11.34	13.74±10.34	246.36±10.04	0.16±0.07	0.00±0.05	0.06±0.04	-4387.63
EWFE (g)	A	3.03±0.91	-	-	19.40±0.77	0.16±0.05	-	-	-2697.57
	B	2.49±1.16	0.38±0.59	-	19.39±0.77	0.13±0.06	0.02±0.03	-	-2697.34
	C	3.03±1.04	-	0.00±0.50	19.40±0.77	0.16±0.05	-	0.00±0.03	-2697.57
	D	2.49±1.16	0.39±0.83	0.00±0.76	19.39±0.77	0.13±0.06	0.02±0.04	0.00±0.04	-2698.00
EN (egg) ²	A	24.50±17.52	-	-	161.65±12.01	0.15±0.11	-	-	-1151.49

8 ¹ Estimates from the best model were bolded.

9 ² Model with direct additive genetic effect only fitted

