Additional file 1

Table S1 Estimates of genetic parameters from the univariate classical animal model and corresponding SE of FCS

Line	Region	σ_A	σ_{cage}^2	σ_P^2
W1	Neck	0.134±0.017	0.099±0.006	0.307±0.007
	Back	0.117±0.015	0.035 ±0.003	0.186±0.004
	Rump	0.059±0.014	0.105 ±0.005	0.243±0.006
	Belly	0.180±0.021	0.099±0.007	0.414±0.009
	Total	0.348±0.043	0.805 ±0.044	2.031±0.048
WB	Neck	0.307±0.029	0.471 ±0.023	0.956±0.025
	Back	0.221±0.030	0.435±0.022	0.933±0.023
	Rump	0.238±0.030	0.680±0.031	1.184±0.032
	Belly	0.229±0.031	0.235±0.016	0.831±0.019
	Total	0.949±0.091	5.260±0.241	9.479±0.257

Estimates are shown for FCS in each body region and for total FCS in two lines (W1, WB); σ_A is the genetic standard deviation; σ_c^2 is the cage variance; σ_P^2 is the phenotypic variance: $\sigma_P^2 = \sigma_A^2 + \sigma_c^2 + \sigma_e^2$. FCS is feather condition score, for each body region FCS ranges from 1 through 5, and total FCS ranges from 4 through 20.

Table S2 Estimates of genetic parameters from the univariate direct-indirect effects model and corresponding SE of FCS

Line	Region	σ_{A_D}	σ_{A_S}	σ_{TBV}	σ^2_{cage}	σ^2_P	r_A
W1	Neck	0.135	0.061	0.244	0.087	0.306	0.16
		±0.019	±0.013	±0.049	±0.007	±0.007	±0.23
	Back	0.118	0.055	0.218	0.026	0.185	0.16
		±0.015	±0.010	±0.036	±0.004	±0.004	±0.21
	Rump	0.045	0.051	0.154	0.100	0.243	-0.12
		±0.019	±0.013	±0.052	±0.006	±0.006	±0.51
	Belly	0.181	0.048	0.243	0.092	0.414	0.11
		±0.021	±0.016	±0.052	±0.009	±0.009	±0.28
	Total	0.335	0.197	0.713	0.701	2.022	0.12
		±0.047	±0.033	±0.129	±0.053	±0.049	±0.21
WB	Neck	0.270	0.193	0.595	0.403	0.954	-0.17
		±0.031	±0.026	±0.097	±0.029	±0.026	±0.18
	Back	0.157	0.204	0.572	0.367	0.936	-0.38
		±0.032	±0.025	±0.092	±0.027	±0.025	±0.24
	Rump	0.185	0.240	0.735	0.559	1.185	-0.05
		±0.035	±0.030	±0.110	±0.040	±0.034	±0.22
	Belly	0.241	0.109	0.459	0.197	0.832	0.29
		±0.033	±0.022	±0.084	±0.021	±0.019	±0.22
	Total	0.718	0.775	2.254	4.170	9.475	-0.25
		±0.096	±0.084	±0.309	±0.318	±0.276	±0.18

Estimates are shown for FCS in each body region and for total FCS in two lines (W1, WB); σ_{A_D} and σ_{A_S} are estimates of the standard deviation of the direct breeding value and the standard deviation of the indirect breeding value. σ_{TBV} is the standard deviation of the total breeding value: $\sigma^2_{TBV} = \sigma^2_{A_D} + 2(n-1)\sigma_{A_{DS}} + (n-1)^2\sigma^2_{A_S}$. σ^2_c is the cage variance. σ^2_P is the phenotypic variance: $\sigma^2_P = \sigma^2_{A_D} + (n-1)\sigma^2_{A_S} + \sigma^2_c + \sigma^2_e$. r_A is the genetic correlation between the direct breeding value and the indirect breeding value. FCS is feather condition score, for each body region FCS ranges from 1 through 5, and total FCS ranges from 4 through 20.

Table S3 Estimates of genetic correlations between the four body regions from the direct-indirect effects model.

Line	Region	Region			
		Neck	Back	Rump	Belly
W1	Neck		0.84±0.13	NC[1]	>0.99
	Back	0.75±0.11		0.92±0.14	0.75±0.30
	Rump	NC[1]	0.87±0.20		>0.99
	Belly	0.09±0.18	-0.02±0.18	0.48±0.28	
WB	Neck		NC[1]	0.97±0.03	0.92±0.09
	Back	NC[1]		0.98±0.03	0.85±0.11
	Rump	0.65±0.14	0.74±0.13		0.74±0.13
	Belly	0.47±0.15	0.46±0.20	0.25±0.21	

Estimates are shown for FCS in each body region in two lines (W1, WB); the estimates below the diagonal refer to the direct genetic correlations (r_{12_D}); the estimates above the diagonal refer to the indirect genetic correlations (r_{12_S}); [1]NC = not converged

Table S4 Means with corresponding SD of the four persons who recorded the FCS

Person	n	W1				WB			
		Neck	Back	Rump	Belly	Neck	Back	Rump	Belly
1	2988	1.30	1.30	1.19	1.36	2.28	1.60	2.17	1.72
		±0.59	±0.41	±0.52	±0.70	±1.18	±1.04	±1.25	±1.01
2	2870	1.22	1.12	1.23	1.32	1.99	1.70	2.26	1.57
		±0.47	±0.40	±0.57	±0.75	±1.01	±1.10	±1.19	±0.99
3	2970	1.48	1.16	1.13	1.36	2.65	1.68	2.13	1.65
		±0.68	±0.46	±0.46	±0.67	±1.21	±1.11	±1.30	±0.96
4	3364	1.46	1.22	1.16	1.17	2.32	1.63	2.11	1.49
		±0.57	±0.48	±0.48	±0.50	±1.11	±0.96	±1.26	±0.82

Estimates with corresponding SD are shown for each body region in two lines (W1, WB); FCS is feather condition score, for each body region FCS ranges from 1 through 5, and total FCS ranges from 4 through 20.