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839 **Supplementary file**

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841 Appendix: Estimation of random regression parameters from parameters from Gompertz  
842 growth curve

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844 The weekly genetic covariance matrix ( $\mathbf{G}$ ) from birth through 130 weeks of age was obtained  
845 by generating random numbers based on the genetic parameters of the Gompertz growth  
846 curve.

847

848 The weekly genetic covariance matrix ( $\mathbf{G}$ ) was transformed as follows;

$$849 \mathbf{G} = \boldsymbol{\varphi} \mathbf{H} \boldsymbol{\varphi}'$$

850 ,where  $\mathbf{H}$  =the genetic covariance matrix of Legendre polynomial coefficients,

$$851 \boldsymbol{\varphi} = \begin{bmatrix} \varphi_0(t_0) & \varphi_1(t_0) & \varphi_2(t_0) & \dots & \varphi_k(t_0) \\ \varphi_0(t_1) & \varphi_1(t_1) & \varphi_2(t_1) & \dots & \varphi_k(t_1) \\ \dots & \dots & \dots & \dots & \dots \\ \varphi_0(t_{130}) & \varphi_1(t_{130}) & \varphi_2(t_{130}) & \dots & \varphi_k(t_{130}) \end{bmatrix},$$

852  $\boldsymbol{\varphi}$  is a  $131 \times (k + 1)$  matrix,  $t_i$  is the age standardized for the  $i^{\text{th}}$  specific time in fattening  
853 process and  $\varphi_j(t_i)$  is the  $j^{\text{th}}$  order of Legendre polynomial ( $j = 0, \dots, k$ ) evaluated at age  $t_i$   
854 standardized,

855  $\boldsymbol{\varphi}$  is defined by Legendre polynomial functions and does not depend on the values in the  
856 matrix  $\mathbf{G}$ . Therefore, it is possible to estimate  $\mathbf{H}$  as follows;

$$857 \mathbf{H} = \boldsymbol{\varphi}^{-1} \mathbf{G} (\boldsymbol{\varphi}^{-1})'$$