**Genetic parameters of sow feed efficiency during lactation and its underlying traits in a Duroc Population**

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**Supplementary material S1**

In order to obtain the weight of dead piglets during lactation, mortality rate (**MR**)and piglet average daily gain (**PADG1**) from birth to mid-lactation and, piglet average daily gain (**PADG2**) from mid-lactation to weaning were computed, using information from animals with no missing values for litter size and weight at any time, as:

$MR=\frac{(LS\_{s}- LS\_{i} )}{LS\_{s}}$, $PADG1=\frac{PIW\_{i}-PIW\_{s}}{date\_{i}-date\_{s}}$, and $PADG2=\frac{PIW\_{w}-PIW\_{i}}{date\_{w}-date\_{i}}$ in which $date\_{s}$, $date\_{i}$ and $date\_{w}$ are the dates at start-lactation, mid-lactation and weaning, respectively. Then, those values were used to impute missing values of litter size (**LSi**) as $LS\_{i}=LS\_{s}-LS\_{s}×MR$ and of piglet individual weight (**PIWi**) as $PIW\_{i}=PIW\_{s}+mean\left(PADG1\right)×(date\_{i}- date\_{s}) $ assuming that mortality rate and growth was the same in all batches.

Estimated weight of dead piglets between start of lactation and mid-lactation (**DPW1**) was computed as$ DPW1= \left(LS\_{s}-LS\_{i}\right)×(PIW\_{s}+\left(PADG×0.8\right)×(date\_{i}-date\_{s})$, and weight of dead piglets between mid-lactation and weaning (**DPW2**) as$ DPW2= \left(LS\_{w}-LS\_{i}\right)×(PIW\_{i}+\left(PADG2×0.8\right)×(date\_{w}-date\_{i})$. In both cases, it was assumed that growth of a piglet that finally died was 80% growth of alive piglets. Finally, daily litter weight gain during lactation was computed as $dLWG=\frac{LW\_{Total}-LW\_{S}}{ND}$ in which LWTotal is the total litter weight at the end of lactation which included the weight of piglets that died before weaning to better account for sow energy output; it was calculated as $LW\_{Total}=LW\_{W}+DPW1+DPW2$ and ND is the number of days between end and start of lactation.

At weaning, sow body weight (**SWw**) and backfat thickness (**BFTw**) were also recorded in the same way as before. Sow weight at farrowing (**SWf**) was estimated as in Bersgma et al., (2009) (deduced from Noblet et al., 1985):

$$SW\_{f}\left(kg\right)=SW\_{E}\left(kg\right)-LW\_{S}(kg)×\frac{TFW\_{E}+PW\_{E}+IUFW\_{E}}{TFW\_{S}}$$

Where, TFWE is the total foetus weight, PWE is the placenta weight and IUFWE is intra-uterine fluid weight, all of them at 109 ± 6 days of pregnancy (i.e time at entrance to farrowing house, when sow weight was recorded), and TFWs is the total foetus weight at start of lactation. They were estimated as follows;

$$TFW(kg)=\frac{e^{(8.72962-\left(4.07466×e^{\left(-0.03318×\left(dpregn-45\right)\right)}\right)+0.000154×ENgest×dpregn+0.06774×Nf)}}{1000}$$

$$PW(kg)=\frac{e^{(7.02746-0.95164×e^{\left(-0.06879×\left(dpregn-45\right)\right)}+0.000085×ENgest×dpregn+0.09335×Nf)}}{1000}$$

$$IUFW(kg)=\frac{e^{(-0.2636+0.18805×dpregn-0.001189×dpregn^{2}+0.13194×Nf)}}{1000}$$

Where, dpregn is the number of days of pregnancy, ENgest is the net energy of total feed intake during gestation (MJ ME/d) and Nf is the number of foetuses estimated here as total number of piglets born (**TB**).

Daily balance (gain/loss) of SW and BF were computed as following:

Daily sow weight balance (kg): $dSWB=\frac{SW\_{w}-SW\_{f}}{ND}$

Daily backfat balance (kg): $dBFB=\frac{BF\_{w}-BF\_{f}}{ND}$

In which, ND was the number of days between both recordings.

Backfat thickness at farrowing was considered to be the same as BFTE, assuming that there is no significant change of backfat content during that week.

Sow weight at weaning (**SWW**) was computed as Bergsma et al. (2009; based on Kim et al., 1999-2000):

$$SW\_{W}\left(kg\right)= SW\_{W} recorded\left(kg\right)-\left(\frac{\left(NFG-LS\_{W}\right)×73+\left(LS\_{W}×146.15+2.17×ADG\right)×\left(\frac{1-DM\_{w}}{100}\right)-NFG×431.5×\left(\frac{1-DM\_{f}}{100}\right)}{1000}\right)$$

Where, NFG is the number of functional glands at parturition (NFG = LSs +1 (with a maximum of 15)), ADG is the average daily gain of the litter and DM is the percentage of dry tissue (w at weaning and f at farrowing). Components of SWw were, in turn, calculated as:

$$NFG=LS\_{S}+1 (with a maximum of 15)$$

$DM\left(\%\right)=31.805-0.6027×DL+0.011×DL^{2}$ where, DL is the day of lactation.

Sow metabolic weight: $SMW=\left(\frac{SW\_{f}+SW\_{W}}{2}\right)^{0.75}$ (Noblet et al., 1990)

Litter metabolic weight (kg): $LMW=\left(\frac{LW\_{E}+LW\_{W}}{2}\right)^{0.75}$