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Follicular development of sows at weaning in relation to estimated breeding value for within-litter variation in piglet birth weight

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Short title: Follicular development and birth weight variation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | EBV | | PAR | | RMSE | P-values1 | |
| Parameter | High | Low | 3 | 4 + 5 |  | EBV | PAR |
| Right ovary |  |  |  |  |  |  |  |
| Av. follicle size (mm) | 5.11 | 5.00 | 5.22 | 4.89 | 0.74 | 0.70 | 0.24 |
| Av. follicle size 1-5 (mm)2 | 6.21 | 6.04 | 6.34 | 5.92 | 0.78 | 0.59 | 0.18 |
| Av. follicle size 6-10 (mm)2 | 4.93 | 4.84 | 5.06 | 4.72 | 0.79 | 0.77 | 0.29 |
| Av. follicle size 11-15 (mm)2 | 4.17 | 4.10 | 4.28 | 4.00 | 0.78 | 0.81 | 0.37 |
| Variation (SD) in follicle size (mm) | 1.01 | 0.93 | 1.03 | 0.92 | 0.27 | 0.41 | 0.30 |
| Av. follicle size of 10 largest healthy follicles (mm) | 5.18 | 5.06 | 5.27 | 4.97 | 0.83 | 0.73 | 0.39 |
| Healthy follicles (%) | 64.8 | 66.0 | 67.8 | 66.6 | 17.9 | 0.73 | 0.87 |
| Left ovary |  |  |  |  |  |  |  |
| Healthy COCs (%) | 71.6 | 73.2 | 76.8 | 67.9 | 21 | 0.85 | 0.32 |
| Follicular fluid (µl) | 375 | 367 | 421 | 321 | 149 | 0.89 | 0.10 |

Supplemental Table S1 *Effects of estimated breeding value classes for within-litter variation in piglet birth weight (estimated breeding value (EBV); High vs. Low) and parity classes (PAR; 3 vs. 4+5) on follicular parameters of the 15 largest follicles of the left and right ovary and average follicle size of the 10 largest healthy follicles in sows. All values are presented as LS means.*

COCs = cumulus-oocyte complexes.

1Interactions between EBV and parity were never significant.  
2Average follicle size of the largest follicles (follicles 1-5), medium-sized follicles (follicles 6-10) and smallest follicles (follicles 11-15) of the 15 largest follicles.

Supplemental Table S2 *Effects of average sow follicle size classes (FS; Small <5.0 mm (N=15) vs. Large>5.1 mm (N=14)) and parity classes (PAR; 3 (N=14) vs. 4+5 (N=15)) on follicular parameters of the 15 largest follicles of the left and right ovary. All values are presented as LS means.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | FS | | PAR | | RMSE | P-values1 | |
| Parameter | Small | Large | 3 | 4 + 5 |  | FS | PAR |
| Right ovary |  |  |  |  |  |  |  |
| Average follicle size (mm) | 4.43 | 5.62 | 5.07 | 4.98 | 0.41 | <0.001 | 0.59 |
| Average follicle size 1-5 (mm)2 | 5.49 | 6.70 | 6.19 | 6.01 | 0.48 | <0.001 | 0.34 |
| Average follicle size 6-10 (mm)2 | 4.22 | 5.50 | 4.89 | 4.84 | 0.44 | <0.001 | 0.77 |
| Average follicle size 11-15 (mm)2 | 3.56 | 4.67 | 4.13 | 4.10 | 0.54 | <0.001 | 0.88 |
| Variation (SD) in follicle size (mm) | 0.94 | 1.00 | 1.03 | 0.91 | 0.27 | 0.56 | 0.24 |
| Av. follicle size of 10 largest healthy follicles (mm) | 4.36 | 5.71 | 5.02 | 5.05 | 0.48 | <0.001 | 0.87 |
| Healthy follicles (%) | 61.3 | 72.5 | 66.5 | 67.3 | 16.9 | 0.10 | 0.90 |
| Left ovary |  |  |  |  |  |  |  |
| Healthy COCs (%) | 75.7 | 69.6 | 77.7 | 67.6 | 21 | 0.47 | 0.24 |
| Follicular fluid (µl) | 334 | 405 | 412 | 327 | 145 | 0.21 | 0.14 |

COCs = cumulus-oocyte complexes.

1Interactions between FS and PAR were never significant. 2Average follicle size of the largest follicles (follicles 1-5), medium-sized follicles (follicles 6-10) and smallest follicles (follicles 11-15) of the 15 largest follicles.

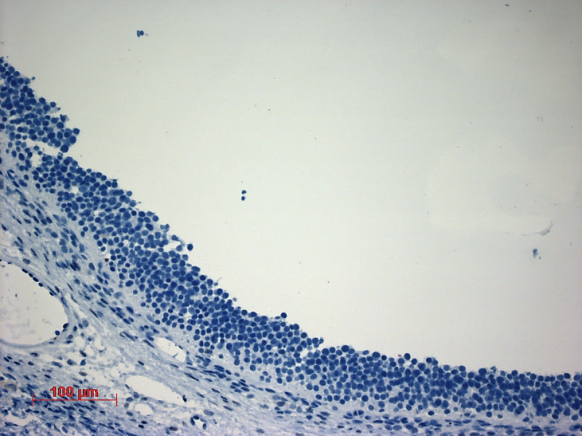
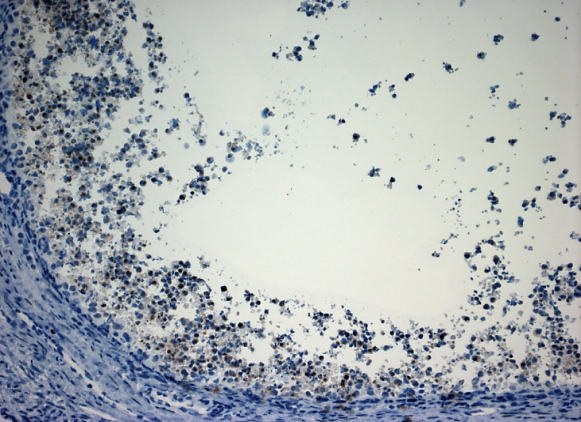
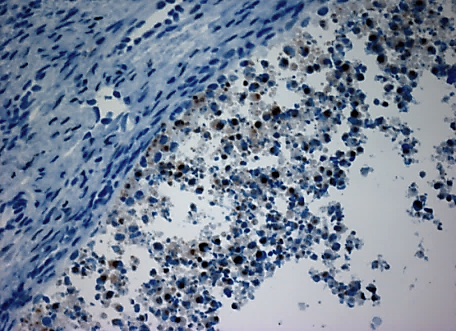
|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | VARFS | | PAR | | RMSE | P-values1 | |
| Parameter | Small | Large | 3 | 4 + 5 |  | VARFS | PAR |
| Right ovary |  |  |  |  |  |  |  |
| Average follicle size (mm) | 5.02 | 5.07 | 5.23 | 4.87 | 0.74 | 0.86 | 0.21 |
| Average follicle size 1-5 (mm)2 | 5.84 | 6.38 | 6.28 | 5.94 | 0.73 | 0.07 | 0.23 |
| Average follicle size 6-10 (mm)2 | 4.87 | 4.91 | 5.07 | 4.71 | 0.79 | 0.91 | 0.25 |
| Average follicle size 11-15 (mm)2 | 4.36 | 3.93 | 4.34 | 3.95 | 0.75 | 0.15 | 0.17 |
| Variation (SD) in follicle size (mm) | 0.74 | 1.18 | 0.98 | 0.95 | 0.15 | <0.001 | 0.60 |
| Av. follicle size of 10 largest healthy follicles (mm) | 5.18 | 5.06 | 5.29 | 4.95 | 0.8 | 0.70 | 0.30 |
| Healthy follicles (%) | 72.5 | 62.2 | 69.6 | 65.2 | 17.1 | 0.13 | 0.51 |
| Left ovary |  |  |  |  |  |  |  |
| Healthy COCs (%) | 67.1 | 76.7 | 74.7 | 69.2 | 21 | 0.26 | 0.51 |
| Follicular fluid (µl) | 336 | 404 | 412 | 327 | 145 | 0.23 | 0.14 |

Supplemental Table S3 *Effects of average sow variation (SD) in follicle size classes (VARFS; Small <0.09 mm (N=14) vs. Large>0.09 mm (N=15)) and parity classes (PAR; 3 (N=14) vs. 4+5 (N=15)) on follicular parameters of the 15 largest follicles of the left and right ovary. All values are presented as LS means.*

COCs = cumulus-oocyte complexes.

1Interactions between VARFS and PAR were never significant. 2Average follicle size of the largest follicles (follicles 1-5), medium-sized follicles (follicles 6-10) and smallest follicles (follicles 11-15) of the 15 largest follicles.

**A**

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**B**

Supplemental Figure S1 *Immunostaining for cleaved-caspase 3 as a marker of cells in apoptosis and used to determine percentage healthy follicles in sows. Representative staining of A healthy and B unhealthy follicles under 20x magnification (insert 40 x magnification) using light microscopy (Axioskop 2, Carl Zeiss Microscopy, Thornwood, NY, US) and imaged using imaging software (Axiovision 4.8, Carl Ziess Microscopy).*

**A**



Supplemental Figure S2 *Regression equation (β) for the relation between backfat thickness at parturition (mm) and backfat loss during lactation (mm). No interactions with parity class (PAR) have been found.*

**A**