

Embryonic and fetal development in a commercial dam-line genotype

S.C. Town¹, J.L. Patterson, C.Z. Pereira¹ and G.R. Foxcroft¹

¹ Swine Reproduction-Development Program, Swine Research & Technology Centre, AFNS, University of Alberta, Edmonton, AB T6G 2P5; **Email:** george.foxcroft@ualberta.ca

High ovulation rates in commercial dam-line sows may result in crowding of embryos *in utero* in the immediate post-implantation period and negatively affect placental and embryonic development. This may have major consequences for prenatal development and postnatal growth performance, analogous to Intra-Uterine Growth Restriction (IUGR) previously reported in the pig. A collaboration with Swine Graphics Enterprises Inc (Webster City, IA) provided the opportunity to collect extensive data on ovulation rate, the pattern of prenatal loss, and placental and fetal development from commercial dam-line sows. These data were used to 1) examine the relationship between ovulation rate and the pattern of prenatal loss and 2), to extend previous studies to determine associations between the pattern of prenatal loss and placental and fetal development. Groups of Large White x Landrace females (n = 447) were slaughtered between d20-30, 50-55 or 85-90 of gestation, with approximately equal numbers of animals representing Gilts and Parity 1 (G/P1), Parity 2-3 (P2/3), and Parity 4+ (P4+). Ovulation rate and embryo number were recorded for all animals. Except for the G/P1 animals, embryonic and placental weight was recorded for four conceptuses per sow on d20-30; on d85-90 two conceptuses per sow were dissected to determine placental and fetal development.

A parity effect was observed on ovulation rate, number of surviving conceptuses (which was higher ($P < 0.05$) in the P2/3 sows than in other parity groups), and on placental weight and fetal brain:liver weight ratio (a measure of IUGR).

Parameter	N	G/P1	P2/3	P4+
Ovulation rate	421	20.18 ± 0.49 ^a	23.59 ± 0.43 ^b	24.71 ± 0.38 ^b
Placental weight (g) at d20-30	89	N/A	7.55 ± 0.43 ^a	3.42 ± 0.40 ^b
Placental weight (g) at d85-90	169	235.7 ± 7.3 ^a	209.5 ± 8.5 ^b	235.4 ± 7.1 ^a
Brain:liver weight ratio at d85-90	170	1.00 ± 0.03 ^a	0.85 ± 0.04 ^b	0.92 ± 0.03 ^{ab}

Implications: Brain sparing effects seen in smaller fetuses in later gestation and in higher parity sows indicate that the uterine environment affects fetal development. This has obvious implications for postnatal growth and is an important economic concern for the swine industry.