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144 EFFECT OF ANTRAL FOLLICLE COUNT IN BEEF HEIFERS ON *IN VITRO* FERTILIZATION/PRODUCTION

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Abstract

Our objective has been to compare the IVF and *in vitro* production (IVP) of embryos from low and high antral follicle count (AFC) heifers. This is the fourth year of the study with years 1 to 3 reported individually. For this report, we add data for the fourth year and present a combined analysis (years 1 to 4) for the first time. Each year, AFC was determined on ~120 Angus heifers using transrectal ultrasonography. Ten heifers with the lowest AFC and 10 heifers with the highest AFC and all with evidence of oestrous cyclicity were synchronized with two 5-mL injections of $PGF_{2\alpha}$ 11 days apart. Half were harvested on Day 5 to 6 and half on Day 15 to 16 of the oestrous cycle. The IVF procedure was slightly modified each year. For year 4, the IVF procedure included protocols for semi-defined media and was as described (IVP Protocol, P. J. Hansen's Laboratory, University of Florida). Cumulus-oocyte complexes (COC) from follicles less than 8 mm in diameter were cultured in maturation medium (5% CO_2; 38.5°C) for 24 h.

Matured COC were fertilized using thawed frozen semen from a bull that was purified using isolate. Motile spermatozoa were added to COC in fertilization medium at a final concentration of 1×10^6 spermatozoa per mL. About 24 h later, presumptive zygotes were placed in micro drops of development medium under oil, and cultured (5% CO_2; 5% O_2; balance N_2; 38.5°C). On Day 3 and 8 after fertilization, cleavage and blastocyst development rates, respectively, were assessed. Data were analysed using the MIXED procedure of SAS (SAS Institute Inc., Cary, NC, USA) and the model included the effects of year (1 to 4), group (high or low AFC), and their interaction. The year × group interaction was not significant ($P > 0.10$). Low AFC heifers, compared with high AFC heifers, had fewer numbers of COC ($P < 0.0001$; 12.8 ± 1.83 *v.* 31.9 ± 1.86), fewer numbers of COC that cleaved ($P < 0.0001$; 8.0 ± 1.38 *v.* 21.6 ± 1.40), and fewer numbers of COC that developed to the blastocyst stage ($P < 0.0001$; 1.7 ± 0.58 *v.* 5.7 ± 0.58). Year affected the numbers of COC that cleaved ($P < 0.003$) and the numbers of COC that developed to the blastocyst stage ($P < 0.0001$). Year also influenced the percentage of COC that cleaved ($P < 0.0002$) and the percentage of COC that developed to blastocysts ($P < 0.0001$). Group (AFC) did not influence ($P > 0.19$) the percentage of COC that cleaved (61.2 ± 2.83 *v.* 66.4 ± 2.83%, for low *v.* high AFC, respectively). Low AFC heifers had a lower ($P < 0.002$) percentage of COC that developed to blastocysts (10.3 ± 1.52%) than high AFC heifers (17.6 ± 1.52%). These results indicate that high AFC heifers, compared to low AFC heifers, have more COC recovered, more COC cleaved, and more COC developed to the blastocyst stage. The percentage of COC cleaved did not differ between AFC groups; however, the percentage of COC that developed to the blastocyst stage was greater for high than low AFC heifers. This suggests a potential advantage in maternal to embryonic transition for high compared with low AFC heifers.