of artificial insemination (AI) with dose containing low-sperm numbers have been used to optimize use of elite bulls. The objectives of the present study were to evaluate the effects of the semen dilution to low-sperm number/dose on sperm motility and integrity of sperm plasma membrane in the cryopreservation process, using 2 commercial extenders (Triladyl®, Bioxcell®) and LDL extender prepared in our laboratory, 97 % purity. 15 ejaculates were collected from 5 fertile crossbred bulls (Bos taurus x Bos indicus). After collection, semen volume and concentration were assessed. Sperm motility was evaluated by computer-assisted semen analysis (Hamilton Thorne Biosciences), morphological sperm characteristics were evaluated by differential interference microscopy and the integrity of plasma membranes was determined using the hypo-osmotic swelling test (HOST). The semen was subsequently divided into 3 aliquots and diluted with the 3 extenders. 15 ejaculates from 5 bulls were diluted to 120, 60 and 20 x 106 sperm /mL. The different semen dilutions were packaged in 0.25 mL straws and frozen. Two straws of semen from each treatment were thawed, and the semen parameters were evaluated. The sperm motility post thawing at 120, 60 and 20x106 sperm/mL dilutions with the different extenders respectively were: LDL 53.06 ± 4.6 %, 41.72 ± 4.6 %, and 29,33 ± 7.3 %, Bioxcell 45.79 ± 7.8 %, 33.33 ± 12.2 %, and 18.19±+ 6.2 %, and Triladyl 46.39 ± 4.5 %, 32.59 ± 6.26 %, and 17,13 ± 5.7 %. With respect sperm plasma membrane integrity the respective values for each dilution with the 3 extenders were: LDL 52,59+/-2.08%, 41,40+/-7.31% and 30,35+/-6,29%, Bioxcell 46,12+/-3.45%, 34,12+/3,45% and 18,98 ± 4,86% and finally Triladyl 46,87 + 3,28 %, 35,06 + 5,52 % and 24,26 + 4,45 %. The statistical analysis (ANOVA) revealed that LDL extender was more effective in preserving sperm motility and integrity of sperm plasma membrane than Bioxcell® and Triladyl® ($p<0.05$), increasing the number of straws for AI and the use of elite bulls.

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Evaluation of factors affecting pregnancy rate in bovine embryo recipients after estrous synchronization for fixed-time embryo transfer

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The aims of this study were to evaluate the efficacy of a hormone protocol for fixed time embryo transfer, and to investigate factors usually associated with the achievement of high pregnancy rates in bovine recipients. Crossbred non-lactating cows, and heifers (n=259) were treated with the following protocol: 2mg of estradiol benzoate (EB) plus an intravaginal progesterone device (CIDR; day 0); 400 IU of eCG (day 5); PGF2α and CIDR withdrawal (day 8); and 1mg of EB (day 9). Ultrasonographic examinations of the ovaries and venous blood sample collections for the determination of plasma progesterone [P4] concentrations by RIA were performed on day 17. Recipients selected based on the presence of one or more corpora lutea received a single, fresh, quality #1 or #2 (IETS) embryo, recovered after superovulation (MOET; n=94) or in vitro culture (IVP; n=88), on day 17 and were examined for pregnancy 23 days later using ultrasonography. Differences among means of plasma progesterone; CL area; pixel value; pixel heterogeneity; embryo source and pregnancy diagnosis were evaluated using student's t-test. Low (0.8 to 1.99 ng/mL), medium (2.0 to 5.99 ng/mL) and high (>6.0 ng/mL) categories of plasma [P4] in pregnant and non-pregnant animals were compared using chi-square analysis. No CL was identified on the ovaries of 58 (22.3%) animals. At least one CL was found on the ovaries of 77.6% (201 of 259) of the recipients; but because the quantity of embryos was limited only 182 received embryos. Pregnancy rates were 56.4 and 30.2% for MOET and IVP derived embryos, respectively. Plasma [P4] was greater in MOET recipients that were later diagnosed as pregnant than in non-pregnant animals (5.88±0.77 vs. 3.98±0.48 ng/mL, respectively; $P<0.05$), but there was no difference between pregnant and non-pregnant IVP recipients (P4 = 3.97±0.57 vs 3.52±0.23 ng/mL, respectively; $P>0.05$). Pregnancy rates also did not differ among animals showing low, medium or high plasma [P4] ($P>0.1$). Plasma [P4] was correlated with CL area ($r= 0.60$; $P<0.0001$), however, CL area did not correlate with pregnancy status. There was no difference in the mean pixel value (71.8±11.4 vs 71.1±11.5; $P>0.10$), nor pixel heterogeneity (14.8 vs. 14.5; $P>0.1$) amongst pregnant and non-pregnant MOET or IVP recipients. In conclusion, corpus luteum area and echotexture was not a useful predictor of pregnancy status in recipients. Plasma [P¬4] relationship with pregnancy rate was evident for recipients inovulated with MOET but not for IVF embryos, in which embryo quality seems to be a more critical variable.

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Effects of breed and feed system on milk production, body condition score and reproductive performance

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Introduction Intense genetic selection for milk production within the Holstein-Friesian breed has resulted in marked improvements in milk production, but has predisposed animals to decreased reproductive performance. The correlated response in feed intake to selection for milk yield is approximately half, resulting in a greater degree of body tissue mobilization in early lactation, the duration and magnitude of which can impact health and fertility. The aim of this study was to investigate differences in milk production, reproductive performance and BCS between alternative breeds and crossbreds.

Materials and methods The dataset consisted of 749 records from 309 cows across 5 years: 79 Holstein-Friesian (HF), 54 Montbeliarde (MB), 24 Normande (NM), 57 Norwegian Red (NRF), 57 MB×HF (MBX) and 38 NM×HF (NMX). Breeds were randomized to either a low concentrate (LC~500kg/cow) or high concentrate feed system (HC~1090kg/cow). Milk yield (kg/day) was recorded daily. Body condition score (BCS) was recorded every 3 to 4 weeks. Reproductive parameters included 24 day submission rate (SR24), pregnancy rate to first service (PREG1), overall pregnancy rate (FINALPR) and calving to conception interval (CCI). Milk yield, BCS and CCI were analyzed using PROC MIXED, while SR24, PREG1 and FINALPR were analyzed using PROC GENMOD (SAS, 2006). The model included the effects of breed, feed system, parity, year and calving day of year. A pre-experimental covariate was created for milk yield and BCS to adjust for differences that may have existed in pre-experimental performance. Interactions between breed and feed system were not significant.

Results Breed and feed system influenced milk yield and BCS ($P<0.001$). The MB (5604kg) and NM (5464kg) had lower milk yield ($P<0.05$) compared to all other breeds. The HF had lower BCS (2.77 BCS; $P<0.001$) compared to all breeds. Cows on HC diet produced higher milk yield and had higher BCS. Compared to HF, NRF (OR=1.57) and MBX (OR=3.11) had increased likelihood of SR24 ($P<0.05$). The MB had a later CCI (95.3 days) compared to all breeds ($P<0.05$) with the exception of HF (89.9 days). The NRF (OR=1.57) and NMX (OR=1.62) tended to have higher PREG1 compared to HF. The MB (OR=1.99), NRF (OR=2.48), MBX (OR=2.40) and NMX (OR=2.37) had higher likelihoods of FINALPR ($P<0.05$) compared to HF. Feed system did not influence reproductive performance.

Conclusion Differences observed between the breeds may reflect differences in the breeding goals between the breeds, namely the inclusion or otherwise of traits aimed at maintaining or improving cow health and fertility.