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JOURNAL ARTICLE

Quantification of bovine sperm separation by a swim-up method. Relationship to sperm motility, integrity of acrosomes, sperm migration in polyacrylamide gel and fertility

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The number of bovine spermatozoa separated in a swim-up procedure was quantified using an electronic cell counter. In an initial test of the swim-up procedure, non-frozen sperm samples with different ratios of live to dead cells were prepared and tested for the number of spermatozoa counted by the swim-up procedure. In ejaculates from six bulls, the number of spermatozoa swimming up was related to the number of live cells present (R2 = 0.97). Next, sperm quality of frozen-thawed semen immediately after thawing was measured at 37 C by swim-up sperm count, sperm motility, spermatozoa with an intact acrosome and migration in polyacrylamide gel and then compared with the fertility of the semen used for artificial insemination. Twenty-nine ejaculates of frozen-thawed semen from 11 bulls were evaluated. Correlations with fertility were highest on an ejaculate basis for motility (r = 0.41, P = 0.05) and for swim-up sperm count (r = 0.35, P = 0.06). On a bull basis, swim-up sperm count had the highest correlation with fertility (r = 0.59, P = 0.06). In a multiple regression model to predict male fertility that included all described measures of semen quality, a R2 value of 0.69 was obtained. This is the first report showing that the ability of spermatozoa to swim out of a more dense medium (whole milk-glycerol extender) into culture media is quantitatively related to in vivo fertility.