

CONVENTIONAL LABORATORY TEST AND FLOW CYTOMETRY IN THE PROGNOSTIC TESTING OF BULL SEMEN FERTILITY

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Abstract. We aimed to determine the relationships between the results of routine AI laboratory tests and flow cytometric analysis (FCM) of the quality of frozen-thawed (FT) bovine spermatozoa. The results were compared to the field fertility data. Forty five ejaculates from fifteen (14 to 86 Mo age) Estonian Holstein (EHF) dairy bulls were examined for motility (subjectively by light microscope and objectively using a computer assisted motility analyzer (CMA)), hypo-osmotic swelling tests (HOS-1, HOS-2, HOS-3), membrane lipid architecture status (Merocyanine 540 staining) and mitochondrial membrane potential (Mitotracker Deep Reed 633 staining). Stained spermatozoa were assessed by FCM. Significant positive correlations were observed between subjectively assessed motility variables (SubMot), general motile (GMot) and progressively motile (PMot) spermatozoa and sperm with stable membrane (LSM) ($P<0.001$). Strong positive correlations with non-return rates (NRR) were obtained for HOS-2, HOS-3, SubMot, PMot, GMot and curve line velocity (VCL) ($P<0.01$). The best predictive model PNRR (predictive non-return rates), according to the results of routine laboratory tests and FCM analysis, included seven parameters ($R^2=0.91$). The strongest positive correlation was found between PNRR and NRR on bull level ($r=0.96$; $P<0.001$) compared to that of batch level. Combinations of common AI laboratory tests (motility analysis, HOS) and FCM assays can be used for the prediction of the FT bull semen fertility.

Keywords: bull semen quality, flow cytometry, fertility prediction.