



ASTHENOZOOSPERMIA IN GEOMAGNETIC ACTIVITY

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INTRODUCTION. Reproductive qualities of farm animals are of great economic and biological importance. Reproductive qualities depend on a complex of biotic and abiotic factors. One of the most important indicators characterizing the reproductive qualities of bulls is the quality of sperm, which depends on numerous parameters. The ejaculate of bulls is characterized by morphological heterogeneity. Pathologies in the structure of each segment or several segments simultaneously may occur under the influence of biotic and abiotic factors, including the environment. The aim of the study was to study the influence of geomagnetic storm on the occurrence of asthenozoospermia in freshly collected bull sperm.

MATERIALS AND METHODS.

Monitoring of geomagnetic activity. Monitoring of geomagnetic activity in the region of the study was carried out according to the Institute of terrestrial magnetism, ionosphere and radio wave propagation. N. V. Pushkova of the Russian Academy of Sciences.

Animals. The object of the study were bulls (n=40) Holstein, Simmental, Jersey, Montbeliard breed. The material of the study was freshly obtained sperm of bulls.

Sperm analysis. Semen concentration and motility was determined by the AndroVision® (Minitüb GmbH, Germany).

Staining. SpermBlue stain was used for morphological analysis.

Microscopy. Fixed samples were visualized using a Nikon Eclipse Ni-U microscope and a Nikon DS-Qi2 camera. Sperm morphology was evaluated using the Argus-CASA software (Russia).

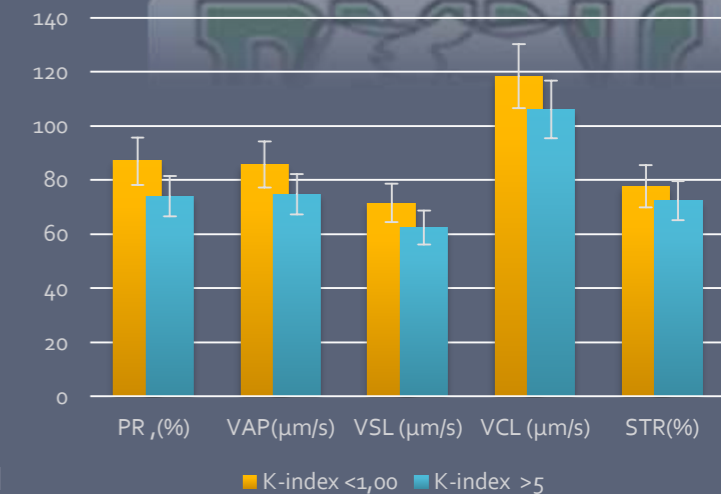


Figure 1. Sperm motility depending on the level of geomagnetic activity

Statistical analysis. For statistical analysis was used SPSS v.23 software. Analysis of variance was performed. The variables between the groups for $K \leq 1.0$ (no geomagnetic disturbance) and $K \geq 5.0$ (geomagnetic storm) were compared with the Scheffe's test.

RESULTS AND DISCUSSION.

A geomagnetic storm with a K-index ≥ 5.0 was recorded four times in the monitoring region during the study period. During the period when the geomagnetic situation was normal ($K = 1.0$), the content of sperm with progressive movement (PR – progressive-mobile) was $87 \pm 2.3\%$, it varied from 82% to 91%. The content of sperm with flagella pathology was $5.74 \pm 0.12\%$. With an increase in geomagnetic activity to K-index ≥ 5.0 , the content of sperm with non – progressive movement (NP-non-progressive-motile) increased to 14.2% and motionless sperm to 27.8% (IM-motionless) (figure 1). The content of motionless sperm at some individuals was 38%. Cells with multiple morphological anomalies accounted for 34% at some bulls (figure 2).

Asthenozoospermia in the period of geomagnetic activity is accompanied by an increase in the number of cells with flagella pathology, including multiple

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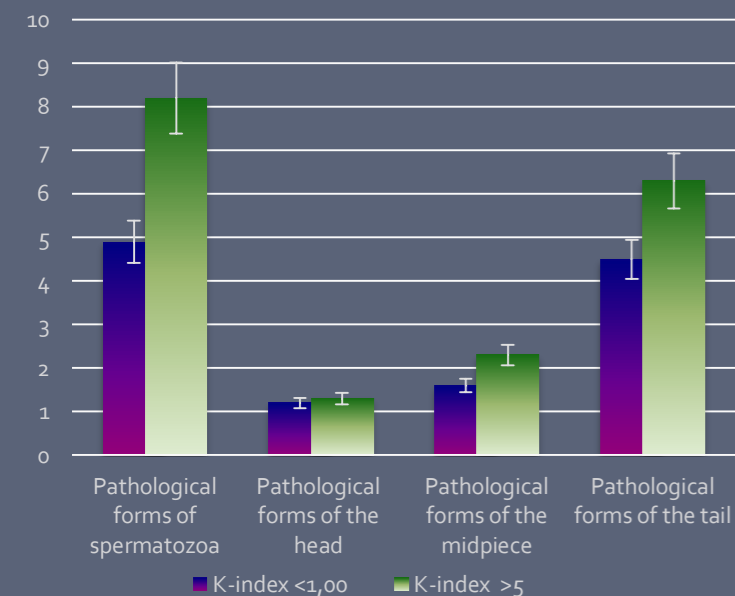


Figure 2. Pathology of individual sperm segments