

## Impact of Climate Change on Some Physiological Parameters of Cyclic Female Egyptian Buffalo

**Authors :** Nabil Abu-Heikal, Ismail Abo-Ghanema, Basma Hamed Merghani

**Abstract :** The aim of this investigation is to study the effect of seasonal variations in Egypt on hematological parameters, reproductive and metabolic hormones of Egyptian buffalo-cows. This study lasted one year extending from December 2009 to November 2010 and was conducted on sixty buffalo-cows. Group of 5 buffalo-cows at estrus phase were selected monthly. Then, after blood sampling through tail vein puncture in the 2nd day after natural service, they were divided in two samples: one with anticoagulant for hematological analysis and the other without anticoagulant for serum separation. Results of this investigation revealed that the highest atmospheric temperature was in hot summer  $32.61 \pm 1.12^{\circ}\text{C}$  versus  $26.18 \pm 1.67^{\circ}\text{C}$  in spring and  $19.92 \pm 0.70^{\circ}\text{C}$  in winter season, while the highest relative humidity % was in winter season  $43.50 \pm 1.60\%$  versus  $32.50 \pm 2.29\%$  in summer season. The rise in temperature-humidity index from  $63.73 \pm 1.29$  in winter to  $78.53 \pm 1.58$  in summer indicates severe heat stress which is associated with significant reduction in total red blood cell count ( $3.20 \pm 0.15 \times 10^6$ ), hemoglobin concentration ( $8.83 \pm 0.43$  g/dl), packed cell volume ( $30.73 \pm 0.12\%$ ), lymphocytes % ( $40.66 \pm 2.33\%$ ), serum progesterone hormone concentration ( $0.56 \pm 0.03$  ng/ml), estradiol17-B concentration ( $16.8 \pm 0.64$  ng/ml), triiodothyronin (T3) concentration ( $2.33 \pm 0.33$  ng/ml) and thyroxin hormone (T4) concentration ( $21.66 \pm 1.66$  ng/ml), while hot summer resulted in significant increase in mean cell volume ( $96.55 \pm 2.25$  fl), mean cell hemoglobin ( $30.81 \pm 1.33$  pg), total white blood cell count ( $10.63 \pm 0.97 \times 10^3$ ), neutrophils % ( $49.66 \pm 2.33\%$ ), serum prolactin hormone (PRL) concentration ( $23.45 \pm 1.72$  ng/ml) and cortisol hormone concentration ( $4.47 \pm 0.33$  ng/ml) compared to winter season. There was no significant seasonal variation in mean cell hemoglobin concentration (MCHC). It was concluded that in Egypt there was a seasonal variation in atmospheric temperature, relative humidity, temperature humidity index (THI) and the rise in THI above the upper critical level (72 units), which, for lactating buffalo-cows in Egypt is the major constraint on buffalo-cows' hematological parameters and hormonal secretion that affects animal reproduction. Hence, we should improve climatic conditions inside the dairy farm to eliminate or reduce summer infertility.

**Keywords :** buffalo, climate change, Egypt, physiological parameters

**Conference Title :** ICADS 2014 : International Conference on Animal and Dairy Sciences

**Conference Location :** Berlin, Germany

**Conference Dates :** May 22-23, 2014