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Research Article

STUDY ON THE PHYSIOLOGICAL AND HAEMATOLOGICAL CHANGES DURING THE WORK PERFORMANCE OF CROSSBRED BULLOCKS

BRIJESH SINGH* and S. NANAVATI
Deparment of Livestock Production and Management
College of Veterinary Sciences and Animal Husbandry, Mhow-453 446

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ABSTRACT

The present study was conducted on four crossbred bullocks of 5 to 8 years of age to evaluate physiological and haematological changes during the work performances. Carting and ploughing operations were measured. There was a significant (P< 0.01) increase in all the three physiological parameters after work as compared to their pre-work values. Packed cell volume, haemoglobin and total erythrocyte count decreased significantly (P<0.05) and TLC increased significantly (P< 0.01) after work as compared to their pre-work values.

Key words: Crossbred bullocks, physiological response, haematological response.

With the modernization of agriculture, almost all the large, medium and small farmers use mechanical power in agriculture. However, some small and marginal farmers still depend on a single or a pair of indigenous or crossbred bullocks for field work or transportation. Major research programmes have been under taken in milch animals but draught characteristics of limited breeds have been studied. No systematic studies have been done on physiological and haematological responses during the work performance of these bullocks for sustained working and scheduling of proper work-rest-cycles under different environmental conditions. Such study would help to enhance discriminate use of bullocks for draught power and also help to prevent over use or over loading beyond the capacity. In view of this, the present study was undertaken to compare of physiological and haematological changes after the work performance of crossbreed bullocks.

MATERIALS AND METHODS

The research work was carried out at two different places namely; Veterinary College campus, Mhow and Agricultural fields at Simrol and Datoda villages of Mhow district. Four healthy Holstein Friesian crossbred bullocks were selected for the research work. The whole research work was carried out under the rules and permission of Institutional Animal Ethics Committee. For the carting operation, a bullock cart of modified single animal pneumatic-tyred wheel, iron frame structure, weight 250 kg was used on a level tar road to cover a distance of 10 km. Each of the bullocks was made to pull a total load weight (including cart) of 200% of its body weight. For ploughing operation, a single animal plough was used. Bullocks were made to plough 200 meter level elliptical ploughing track (soil) containing approximately 50% sand and 50% clay continuously for 2 hours in morning from 10 am to 12 am. The research work was conducted in the month of April-May months.

Physiological Parameters: Respiration rate (per min), pulse rate (per min) and body temperature (°F) were recorded according to the standard clinical procedure every day before starting the operation and immediately after the completion of the work.

Haematological Parameters: Blood samples were obtained from each bullock before starting the operation and immediately after the completion of the work. Haematological parameters were estimated as per the procedure described by Jain (1986).

Statistical Analysis: Paired t-test was used for the statistical analysis of the data (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

Physiological Response: A significant (P< 0.01) increase in all the three physiological parameters after work was observed when compared to their pre-work values (Table 1). Respiration rate was found to be affected greatly after draught work followed by pulse rate and rectal temperature. The findings of the present study are comparable with those reported by Yadav and Dhaka (2001) in Hariana bullocks and Behera *et al.* (2008) in Surungi (non-descript

*Corresponding author: dr.brijesh786@gmail.com

Table 1
Physiological and haematological responses of crossbred bullocks

Parameters	Carting			Ploughing		
	Before work	After work	Change	Before work	After work	Change
Respiration rate (per minute)	20.75±0.58	50.75±1.10	30.00**±0.72	20.75±0.47	53.25±0.76	32.50**±0.79
Pulse rate (per minute)	53.00±1.00	74.50±1.10	21.50**±1.54	53.25±0.80	75.00±1.42	21.75**±1.56
Body temperature (ºF)	100.85±0.10	102.47±0.12	1.62**±0.31	100.90±0.08	102.50±0.07	1.60**±0.29
Packed cell volume (%)	31.42±0.51	29.82±0.39	-1.60*±0.42	31.05±0.48	29.27±0.47	-1.77*±0.52
Haemoglobin (g/100 ml)	10.85±0.15	10.22±0.17	- 0.62*±0.21	10.80±0.18	10.17±0.16	- 0.62*±0.31
Total erythrocyte count (million/cu.mm)	5.17±0.10	5.03±0.10	- 0.14*±0.06	5.17±0.14	4.92±0.14	- 0.24*±0.15
Total leukocyte count (thousand/cu.mm)	6.67±0.32	7.29±0.26	0.61**±0.10	6.79±0.38	7.10±0.40	0.31*±0.10

*Significant (P≤0.05), **Significant (P≤0.01)

breed of Orissa) bullocks. Similar findings as that of this study were also reported by Tomar and Joshi (2008) in Kenkatha bullock, Atakare and Siddiqui (2009) in Deoni bullocks and Shelke and Siddiqui (2009) in Red Kandhari bullocks.

Haematological Response: Carting and ploughing operations significantly (P<0.05) decreased PCV, Hb and TEC and increased TLC significantly (P<0.01) (Table 1). Decrease in PCV, Hb and TEC after work has also been reported earlier by Singh *et al.* (1968), Rana *et al. (*1977), Sreekumar and Thomas (1990) in Kangayam and crossbred bullocks and Singh and Upadhyaya (1996, 1997) in cows and buffaloes. Tomar and Joshi (2008) in Kenkatha bullocks also reported the similar findings. However, Yawatikar (2001), Atakare and Siddiqui (2009) and Shelke and Siddiqui (2009) reported an increase in PCV, Hb and TEC in different cattle breeds after work. The decline in PCV, Hb and TEC in this study might be due to haemodilution and destruction of red blood cells due to exercise and work (Upadhyay, 1987).

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