Haryana Vet. (June, 2014) **53 (1)**, 72-73

Research Article

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

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Received: 20.03.2014; Accepted: 29.05.2014

ABSTRACT

The present study was conducted to evaluate physiological and haematological changes during the work performance of Malvi bullocks for which a total of four Malvi bullocks aged between 5 to 8 years were selected. Carting and ploughing operation was done for the exercise/work. There was a significant (P< 0.01) increase in all the three physiological parameters (respiration rate, pulse rate and body temperature) as compared to their pre-work values. The haematological performance indicated a significant decrease in PCV, Hb and TEC while a significant increase in TLC after the completion of work.

Key words: Malvi bullocks, physiological response, haematological response

With the modernization of agriculture, the use of mechanical power in agriculture has increased. However, small and marginal farmers mainly depend on a single or a pair of bullocks. Physiological norms for continuous working of animals without undue fatigue are not available. Owing to the importance of bullocks as draught animals it is necessary to know their working efficiency, physiological and haematological responses during different field operations. This will help to enhance discriminate use of bullocks for draught power and also to prevent over use or over loading beyond the capacity. The present study was therefore, undertaken to evaluate physiological and haematological changes during the work performance of Malvi bullocks.

MATERIALS AND METHODS

The research work was carried out on two different places namely; Veterinary college campus, Mhow and Agricultural fields at Simrol and Datoda villages of Mhow district in April and May months. Four healthy Malvi bullocks 5 to 8 years of age were selected. The research work was carried out under the rules and permission of Institutional Animal Ethics Committee.

For carting operation, a bullock cart of modified single animal pneumatic-tyred wheel, iron frame structure, weight 250 kg was used. Each of the bullocks was made to pull a total load weight (including cart) of 200% of its body weight over a distance of 10 km on a level tar road. For ploughing operation, a single animal plough was used. For measuring ploughing ability, bullocks were made to plough 200 meter level elliptical ploughing track (soil) containing approx. 50% sand and 50% clay continuously for 2 hours.

Physiological Parameters: The observations on physiological parameters like respiration rate (no./min), pulse rate (no./min), 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 drawn from each of the four bullocks. The blood sample (5 ml) was collected 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 data (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

Physiological Response: Immediately after work there was a significant (P< 0.01) increase in all the three physiological parameter as compared to their pre-work values (Table 1). Respiration rate was found to be affected to a greater extent after draught work followed by pulse rate and rectal temperature. The increase in all three physiological responses after completion of work observed in present study are comparable with the findings of Yadav and Dhaka (2001) in Hariana bullocks

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Table 1
Physiological and haematological responses of Malvi bullocks

Parameters	Carting			Ploughing		
	Before work	After work	Change	Before work	After work	Change
Respiration rate (per min.)	20.75±0.56	50.00±0.96	29.25**±0.68	21.00±0.43	52.25±0.63	31.75**±0.65
Pulse rate (per min.)	51.00±1.0	72.75±1.13	21.75**±1.54	51.00±1.05	73.75±1.47	22.75**±1.58
Body temp. (^{0}F)	101.07±0.12	102.67±0.13	1.60**±0.10	101.15±0.07	102.80±0.09	1.72**±0.10
Packed cell volume (%)	32.40±0.55	30.80±0.44	-1.60*±0.44	32.27±0.51	30.52±0.49	- 1.75*±0.50
Hb (g/100 ml)	10.77±0.15	10.2±0.19	- 0.57*±0.24	10.72±0.19	10.07±0.18	- 0.65*±0.28
Total erythrocyte count (million/cu.mm)	5.75±0.15	5.34±0.08	- 0.16*±0.05	5.66±0.10	5.40±0.08	- 0.23*±0.10
Total leukocyte count (thousand/cu.mm)	6.82±0.29	7.35±0.28	0.53**±0.11	6.82±0.30	7.27±0.32	0.44*±0.10

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

and Behera *et al.* (2008) in Surungi (non-descript breed of Orissa) bullocks. Similar findings were also reported by Tomar and Joshi (2008) in Kenkatha bullock, Atakare and Siddiqui (2009) in Deoni bullocks, Shelke and Siddiqui (2009) in Red Kandhari bullocks and Singh and Nanavati (2013) in crossbred bullocks.

Haematological Response: In the present investigation, packed cell volume (PCV), total erythrocyte count (TEC) and total leukocyte count (TLC) decreased significantly (P≤0.05) whereas, TLC increased significantly (P≤0.01) as a result of work (Table 1). Decrease in PCV, Hb and TEC after work has also been reported by Singh *et al.* (1968), Rana *et al. (*1977), Sreekumar and Thomas (1990) and Singh and Nanavati (2013) in Kangayam and/ or crossbred bullocks and Singh and Upadhyay (1996, 1997) in cows and buffaloes. Similar findings were also observed by Kataktalware *et al.* (2008) in yak and Tomar and Joshi (2008) in Kenkatha bullocks. In contrast, Yawtikar (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 might have been contributed on account of haemodilution and destruction of red blood cells due to exercise and work (Upadhyay, 1987).

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