STUDY ON THE DRAUGHTABILITY OF MALVI BULLOCKS

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ABSTRACT

A study was conducted for evaluation of draughtability of Malvi bullocks. A total of 4 Malvi bullocks, aged between 5 to 8 years were evaluated for draught performance. The Overall Draught Ability (ODA) value of 4 Malvi bullocks ranged from 70.48 to 75.20 with an average of 72.31± 0.88. There was a significant (P< 0.01) increase in all the three physiological parameters as compared to their pre-work values. After the completion of work, PCV, Hb and TEC decreased significantly (P < 0.05) but TLC increased significantly (P< 0.01).

KEY WORDS: Malvi bullocks, Overall Draughtability, Physiological response, Haematological response

INTRODUCTION

India is agriculture based country, however with a few exceptions of big farmers, majority of the farmers possess small land holding and largely depend on animal or manual power for different agricultural operations like ploughing, tilling, threshing and transportation. Information on draughtability of all the major Indian breeds of cattle, buffalo, pack animals and crossbred animals is scanty. Major research programmes have been under taken in milch animals but draught characteristics of limited breeds have been studied. 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 response during different field operations. This will help to enhance discriminate use of bullocks for draught power and also help to prevent over use or over loading beyond the capacity. Hence the present study was undertaken.

MATERIALS AND METHODS

The research work was conducted at the two different places namely; Veterinary college campus, Mhow and Agricultural fields at Simrol and Datoda village of Mhow district. Four healthy Malvi bullocks were selected for the research work. The draught capacity of the bullocks was measured by estimating Overall Draughtability (ODA) as per the method described by Thomas (1996) using modified single animal pneumatic-tyred cart (for carting ability) and single animal plough (for ploughing ability).

ODA = 100 - (A+B/ 2)

$$\text{Where, } A = \frac{\text{Increase in time for final km}}{\text{Time taken for initial km}} \times 100$$

$$B = \frac{\text{Increase in time to cover one lap in closing stage}}{\text{Time taken to cover one lap in initial stage}} \times 100$$

Where: - A - Ability for draught with respect to carting

B - Ability for draught with respect to ploughing

The experiment was conducted during the month of April - May.

For measuring carting ability 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. The time taken to cover initial one kilometer and final one kilometer was noted. For measuring ploughing ability, bullocks were made to plough 200 meter leveled elliptical ploughing track (soil) containing approximately 50% sand and 50% clay continuously for 2 hours. The time taken to complete one lap in initial stage and closing stage was noted.

Malvi bullock during carting operation

The observations on physiological parameters like respiratory rate (no/min), pulse rate (no/min), body temperature (°F) were recorded according to the standard clinical procedure.

In order to study the haematological parameters of bullocks, blood sample were collected from each bullock just before and after carting and ploughing trail. Haematological parameters were estimated as per the procedure described by Jain (1986).

RESULTS AND DISCUSSION

The results of the present study is depicted in the table 1 to 3. In the present investigation, ability for draught with respect to carting of Malvi bullocks was found to be ranging from 19.90 to 29.17% with an average of 26.58 ±1.94% and ability for draught with respect to ploughing ranged from 27.17 to 30.82 % with an average of 28.88 ±0.77%.

Table-1. Overall Draught Ability (ODA) of Malvi bullocks

Bullock no.	Body weight (kg)	Carting			Ability of carting (A)	Ploughing			Ability of ploughing (B)	ODA = [100 – (A +B) /2]
		Time taken for initial km (min.) T1	Time taken for final km (min.) T2	Increase in time (min.) T3	A = (T3 / T1) X 100	Time taken for one lap in initial stage (sec.) T1	Time taken for one lap in closing stage (sec.) T2	Increase in time (sec.) T3	B = (T3 / T1) X 100	
1.	370	17.4	22.30	4.90	28.16	310.20	405.80	95.60	30.82	70.51
2.	358	17.9	23.10	5.20	29.05	322.40	410.00	87.60	27.17	71.86
3.	364	19.1	22.90	3.80	19.90	320.50	415.70	95.20	29.70	75.20
4.	382	16.8	21.70	4.90	29.17	302.10	385.20	83.10	27.51	71.66
Ave.	**3685 ±4.44**	**17.8 ±0.42**	**22.5 ±0.27**	**4.70 ±0.26**	**26.58 ±1.94**	**313.8 ±4.1**	**395.43 ±7.23**	**90.38 ±3.06**	**28.88 ±0.77**	**72.31 ±0.88**

Table-2. Physiological response of Malvi bullocks

Parameters	Carting			Ploughing		
	Before work	After work	Change	Before work	After work	Change
Respiration rate (per minute)	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 minute)	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 temperature (° 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

** (P<0.01)

Table- 3. Haematological responses of Malvi bullocks

Parameters	Carting			Ploughing		
	Before work	After work	Change	Before work	After work	Change
Pack 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
Haemoglobin (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

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

The ODA of Malvi bullocks was found to be ranging from 70.51 to 75.20 with an average of 72.31 ±0.88. The result of draughtability obtained in this study is in close agreement with that of Tomar and Joshi (2008), who reported overall draughtability (ODA) values of 75.63 ± 1.44 in Kenkatha bullocks. However Vinoo et al. (2010) reported a higher value of overall draughtability (83.69 ± 0.75) in Ongole bullocks and Arora et al. (2008) reported a lower ODA value (34.81± 0.52) in Malvi bullocks, which is not in agreement with present findings. The reason of large difference in the finding of Arora et al. (2008) and our results, while the breed is same, is mainly due to the different methods used in both experiments.

PHYSIOLOGICAL CHANGES

In the present study, it was found that immediately after work there was a significant (P< 0.01) increase in all the three physiological parameter as compared to their pre-work values. It is clear that respiration rate was affected greatly after draught work followed by pulse rate and rectal temperature. Similar findings were also reported by, Tomar and Joshi (2008) in Kenkatha bullocks, Atakare and Siddiqui (2009) in Deoni bullocks and Shelke and Siddiqui (2009) in Red Kandhari bullocks, which are in agreement with the findings of the present study.

HAEMATOLOGICAL CHANGES

In the present investigation, PCV, Hb and TEC decreased significantly (P < 0.05) whereas, TLC increased significantly (P< 0.01) as a result of work. 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) in kangayam and crossbred bullocks, Singh and Upadhyaya (1996) in cows and Singh and Upadhyaya (1997) in buffaloes.

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