



RESEARCH ARTICLE.....

# Study on physiological changes of Malvi bullocks during carting bullock drawn sprayer

S.P.S. SOMVANSHI, R. GUPTA, H.P. SINGH AND VENKATA SATISH KUCHI

**ABSTRACT.....** The present study was undertaken to evaluate physiological changes of Malvi bullocks during carting bullock drawn sprayer in soybean. Four healthy Malvi breed bullocks owing 6 to 8 years of age were selected for carting operation research work under Front Line Demonstration (FLD) during 2012-13-2013-14, at village Surkheda of Mandasaur (M.P.) 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.

**KEY WORDS.....** Malvi breed, Physiological response, Bullock drawn sprayer, Physical behavioural

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## INTRODUCTION.....

The majority of the Indian farmers continue to use draught animals in agriculture. Draught animals play a dominant role in our rural economy. With the modernization of agriculture, the use of mechanical power in agriculture has increased but draught animal power (DAP) continues to be used on Indian farms due to small holdings and hill agriculture. More than 55 per cent of the total cultivated area is still being managed by using draught animals as against about 20 per cent by tractors. Animal draught power was the first supplement to human energy inputs in agriculture. The draught power of an animal depends on the species, breed, sex, size, body weight, nutrition and health, environment, training for work and terrain conditions. Cattle and buffalo are the species predominantly used in agriculture operations to

pull agricultural implements and devices. 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 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.

## RESEARCH METHODS.....

Four healthy Malvi breed bullocks owing 6 to 8 years of age were selected for carting operation research work. 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 per cent of its body weight for 1 hour in soybean field during pesticide spraying.

### Physiological parameters:

The observations on physiological parameters like respiration rate (no./min), pulse rate (no./min), body temperature ( $^{\circ}$ F) were recorded according to the standard clinical procedure every day before starting the operation and immediately after the completion of the work and physical behavioral symptoms were noted before and after work and the fatigue score was developed (Upadhaya and Madan, 1985). The total score consisted of 40 points; animals which attained a value of 20 or more were declared fatigued. Statistical analysis was done by using the Paired t-test for the statistical analysis of data (Snedecor and Cochran, 1994).

### RESEARCH FINDINGS AND ANALYSIS.....

The results obtained from the present investigation as well as relevant discussion have been summarized under the following heads :

#### Physiological response:

Immediately after work there was a significant ( $P < 0.05$ ) 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 is comparable with the findings of Singh and Upadhyay (1996) in cattle, Yadav and Dhaka (2001) and Upadhyay and Madan (1987) in Haryana bullocks 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 Singh and Nanavati (2013) in crossbred bullocks and Singh *et al.* (2014) and Singh and Singh (2009) in Malvi bullocks. The bullocks are stressed due to environment and scores upto almost 16 points and therefore, animal fatigue due to environment stress is more important. The data related to physical response of bullocks and fatigue score is presented in Table 2. The bullock drawn traction sprayer was tested under the work-rest schedule of one hour work and half an hour rest. The results revealed that the fatigue score of 6 and 5 for left and right bullocks, respectively were observed during first hour of operation and progressively increased to 14 and 17, respectively at fourth hour of spraying operation. The bullock's response was within the physiological limits. Similar results were reported by Veerangouda *et al.* (2010) in Khillari breed.

**Table 1: Physiological parameters of malvi bullocks with bullock drawn sprayer**

Parameters	Before	After	Change
Respiration rate (per min)	21.5 $\pm$ 1.31	51.2 $\pm$ 1.74	29.7 $\pm$ 1.62*
Pulse rate (per min)	50.50 $\pm$ 2.36	71.35 $\pm$ 1.18	20.85 $\pm$ 2.05*
Body temp. ( $^{\circ}$ F)	101.74 $\pm$ 0.24	102.87 $\pm$ 0.26	1.27 $\pm$ 0.57*

\*indicate significance of value at  $P < 0.05$

**Table 2 : Physical behavioural symptoms of malvi bullocks with bullock drawn sprayer**

Parameters	LB	RB	LB	RB	LB	RB	LB	RB
Frothing	(0)	(0)	(2)	(2)	(3)	(3)	(2)	(3)
Leg un-coordination	(1)	(0)	(1)	(1)	(2)	(2)	(3)	(3)
Excitement	(0)	(0)	(0)	(0)	(1)	(2)	(2)	(2)
Inhibition of progressive movement	(1)	(1)	(2)	(2)	(1)	(1)	(1)	(1)
Tongue protrusion	(0)	(0)	(2)	(1)	(1)	(0)	(1)	(2)
Total fatigue Score	(6)	(5)	(11)	(10)	(12)	(13)	(14)	(17)

LB= Left bullock

RB= Right bullock

Breed of bullocks: Malvi

Ambient temperature: 30 $^{\circ}$ C

Operating pressure: 5 kg/cm<sup>2</sup>

Relative humidity: 55%

Average draft: 100 kg

Sunshine condition: Cool and cloudy

Work-rest-schedule : 1 hr W - ½ hr R - 1 hr W - ½ hr R - 1 hr W - ½ hr R - 1 hr W (4 working hours)

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