

## Body Growth Measurements of Rural Buffalo Heifers' Between Two and Half to Three Years Age

S. B. Gokhale<sup>1</sup>, R. L. Bhagat<sup>2</sup>, Tejashree Shirsath<sup>3</sup> and Snehal Patil<sup>4</sup>

**ABSTRACT:** Study of 3969 observations generated on body growth measurements of 2421 growing buffalo heifers between 31 to 36 months of age (mean age  $33.30 \pm 0.02$  months) belonging to 2190 farmers spread in 566 villages of 10 regions of Uttar Pradesh state revealed mean body length, height at withers, chest girth and estimated body weight as  $51.58 \pm 6.58$ ,  $51.07 \pm 0.08$ ,  $71.48 \pm 0.10$  inches and  $401.52 \pm 81.54$  kg, respectively. It was noticed that heifers from Faizabad region showed widest chest girth ( $73.61 \pm 0.25$  inches) and were heavier in body weight ( $417.20 \pm 3.18$  kg) and heifers from Lucknow region exhibited longer body length ( $54.57 \pm 0.33$  inches) followed by those from Meerut region ( $52.70 \pm 0.49$  inches) compared to those from other regions studied. The effect of region and sire was highly significant on the traits studied. The age significantly affected chest girth, body weight but did not affected body length and height at wither. Effect of season of birth although showed significant effect on height at wither and body length ( $P < 0.05$ ) the observation needed further confirmation on larger set of data, its effect on chest girth and body weight was not found of much importance. Based on the results obtained, it was concluded that in view of region and sire wise variations in body measures from field level data need to be considered before they are used for monitoring growth of female buffalo calves between 31 to 36 months of age.

**Key words:** Rural buffalo heifers, body growth measures, two and half years to three years

### INTRODUCTION

Importance of buffaloes and its contribution to the milk production of the country does not need specific emphasis as increasing trend of buffalo population observed in recent national census indicates preferential choice of farmers for using buffalo for dairy business. Heifer production although is most expensive part of the dairy farm operation but is important from the point of view of effective herd replacement, it requires more inputs for a longer period of time with no visible returns than any other farm operation. Lower growth rate of calves during their early period of growth either due to under feeding or imbalanced feeding may affect their breeding and consequently the production performance. In view of scanty available reports on growth observations on body measurements of buffalo heifers, an attempt was made to study the body measurements of growing buffalo heifers aging between 31 to 36 months. The present work was

undertaken under World Bank financed and ICAR implemented NAIP-4 project with an objective to arrive at the field norms of body measurements of buffalo heifers at the age mentioned for monitoring growth under rural conditions.

### MATERIAL AND METHODS

The body growth observations on 3969 growing buffalo heifers of 2421 and born out of 12 Murrah sires (Sada, Sahib, Saiman, Sakha, Sahil, Salman, Sanam, Satpal, Shagun, Shrirang, Srinath and Sushil) having age 31 to 36 months and belonging to 2190 farmers spread over 566 villages of 10 regions (Allahabad, Azamgarh, Bareilly, Etawah, Faizabad, Gorakhpur, Kanpur, Lucknow, Meerut and Sultanpur) of Uttar Pradesh state formed the material for present study. All the buffalo animals were hand milked and calves allowed to suckle the mothers by the respective farmers, after weaning they were partly stall fed and were left for grazing

<sup>1</sup>Director Research (suresh.gokhale@vsnl.net), <sup>2</sup>Thematic Program Executive (dr.bhagat@live.com), <sup>3</sup>Data processing Assistant (tejashree.shirsath@gmail.com), <sup>4</sup>Research Officer (sdpatil1986@gmail.com)

BAIF Central Research Station, Uruli Kanchan, Pune, Maharashtra state.

near the villages. Feeding included dry grass and limited available greens during rainy and winter season, supplementation with limited amount of home mixed maintenance ration composed of choker and chunni (depending on the financial capability of the farming family) was found made available especially to milking animals. The body measurements on chest girth (circumference of chest just behind elbows), body length (distance between shoulder points to pin bone) and height at wither (distance between points of withers to ground) were taken during the period from 2008 to 2012 by employing contract recorders. Body weight was estimated as per the procedure given by Rath et. al. (2003). Season was defined as season 1 (March to August) and season 2 (September to February) and three age groups comprising of 2 months each were considered for present study. Standard statistical procedures as per Snedecor and Cochran (1968) were followed for data analysis.

## RESULTS AND DISCUSSIONS

The mean age of growing buffalo heifers under body measurement was observed to be  $33.30 \pm 0.02$  months. Overall mean body length, height at withers, chest girth and estimated body weight were observed to be  $51.58 \pm 6.58$ ,  $51.07 \pm 0.08$ ,  $71.48 \pm 0.10$  inches and  $401.52 \pm 81.54$  kg, respectively (Table-1). These body measures are higher than that of Nili Ravi buffaloes for 1 to 3 years age ( $109.8 \pm 12.2$ ,  $110.6 \pm 10.1$ ,  $139.1 \pm 17.2$  cm &  $192.8 \pm 61.8$  kg; resp.) maintained at Bahadurnagar livestock experimental station in Pakistan (Tariq et. al; 2013) and rural Marathwadi buffalo at 36 months age ( $126.07 \pm 0.29$ ,  $122.93 \pm 0.26$ ,  $171.64 \pm 0.56$  cm &  $345.15 \pm 2.73$  kg; resp.) in Hingoli district of Maharashtra state (Farate et. al; 2012). It was observed that buffalo heifers born in Faizabad region were significantly wider in chest girth ( $73.61 \pm 0.25$  inch) and heavy in body weight ( $401.52 \pm 81.54$  kg); while those born in Lucknow and Meerut regions were longest in body length ( $54.57 \pm 0.33$  inch) and height at withers ( $52.70 \pm 0.49$  inch), respectively. The progenies born in Etawah, Faizabad, Lucknow and Kanpur regions were significantly shorter in body length ( $49.06 \pm 0.33$  inch), height at wither ( $49.67 \pm 0.24$  inch), chest girth ( $68.28 \pm 0.27$  inch) and lighter in body weight ( $384.99 \pm 5.75$  kg), respectively among all the regions under study.

Scrutiny of sire-wise progeny group data revealed that progenies born from Sanam sire were significantly taller in height at wither ( $52.53 \pm 0.44$

inches), wider in chest girth ( $73.96 \pm 0.52$  inch) and heavier in body weight ( $424.84 \pm 6.99$  kg) while those of Sakha sire were longest in body length ( $53.67 \pm 0.33$  inch) compared to progenies born to other sires studied. Progenies born from Shagun sire were significantly shorter in height ( $49.77 \pm 0.43$  inch) and narrow in chest girth ( $68.60 \pm 0.50$  inch) while those of Saiman and Shrirang sire were significantly shorter in body length ( $50.03 \pm 1.22$  inches) and body weight ( $379.69 \pm 4.86$  kg), respectively.

As expected, the chest girth and body weight of heifers increased significantly with the advancement of age but it was noticed that increase in body length and height at withers was at lesser rate. Rana and Bilaspuri (1999) in Murrah and Ahmad et. al. (1984) in Nili Ravi buffalo bulls also recorded that body weight increased progressively with advancement of age. The heifers born in season 1 (March to August) were significantly ( $P < 0.05$ ) longer and taller compared to those born in season 2 (September to February).

In present study, it was noticed that buffalo heifers from Faizabad region born to Sanam sire registered significantly heavier body weight among all the regions and sires under study. Further, the body weight gained at 36 months age was more than 216 kg compared to Nili Ravi buffalo (age 1 to 3 yrs) recorded by Tariq et. al. (2013) at Bahadurnagar livestock experimental station in Pakistan. The much higher difference in body weight might be due to farmers' awareness regarding calf management, resources available in his locality, economic condition of individual farmers and perception of farmers regarding raising his own heifers than to buy replacements along with that of genetic make of animals.

From the study undertaken, it was concluded that body length, height at withers, chest girth and body weight of rural buffalo heifers reported in this investigation is indicative of average growth performance under field feeding and management conditions. Significant variations among regions necessitate arriving standards for these traits on larger numbers for their field use in monitoring the growth of the female calves at field level. Sire variation indicated response of individual genotypes to varying environments and necessity of further examination of quantifying these effects on growth parameters for exploring potential of genetic selection for improvement of these traits using improver sires under field conditions.

## Body Growth Measures in Rural Buffaloes

**Table 1**  
**Region, Sire, Age and Season- wise Body Measurements (inches) and Estimated Body Weight (kg)**

Source	N	Body length	Height at wither	Chest Girth	Body weight
Region(df/ ms)		9/411.1822**	9/478.4181**	9/635.4126**	9/25431.5903**
Allahabad	672	50.66±0.21 <sup>a</sup>	50.88±0.21 <sup>a</sup>	71.98±0.24 <sup>a</sup>	400.69±3.11 <sup>a</sup>
Azamgarh	221	50.67±0.49 <sup>ad</sup>	51.25±0.47 <sup>ade</sup>	71.46±0.43 <sup>afce</sup>	392.27±5.14 <sup>acd</sup>
Bareilly	405	49.63±0.32 <sup>bc</sup>	51.94±0.26 <sup>bdefg</sup>	72.38±0.31 <sup>g</sup>	397.76±4.43 <sup>acd</sup>
Etawah	235	49.06±0.33 <sup>c</sup>	51.19±0.27 <sup>abde</sup>	71.84±0.33 <sup>a</sup>	386.71±4.89 <sup>acd</sup>
Faizabad	655	50.62±0.26 <sup>a</sup>	49.67±0.24 <sup>c</sup>	73.61±0.25 <sup>b</sup>	417.20±3.18 <sup>be</sup>
Gorakhpur	467	51.58±0.25 <sup>ad</sup>	51.64±0.22 <sup>def</sup>	71.90±0.26 <sup>a</sup>	407.22±3.70 <sup>ae</sup>
Kanpur	186	51.78±0.63 <sup>d</sup>	52.02±0.40 <sup>efg</sup>	70.08±0.47 <sup>ce</sup>	384.99±5.75 <sup>cd</sup>
Lucknow	499	54.57±0.33 <sup>e</sup>	51.88±0.20 <sup>fg</sup>	68.28±0.27 <sup>d</sup>	387.57±3.67 <sup>d</sup>
Meerut	48	51.36±0.53 <sup>abcd</sup>	52.70±0.49 <sup>g</sup>	70.45±0.69 <sup>abce</sup>	389.72±10.22 <sup>abcde</sup>
Sultanpur	581	53.82±0.25 <sup>ef</sup>	50.52±0.21 <sup>a</sup>	70.71±0.23 <sup>e</sup>	410.62±3.33 <sup>e</sup>
Sires(df/ ms)		11/108.4427**	11/255.4115**	11/344.8290**	11/33106.6278**
Sada	674	51.74±0.27 <sup>a</sup>	51.18±0.22 <sup>a</sup>	72.20±0.24 <sup>a</sup>	410.66±3.19 <sup>a</sup>
Sahib	314	50.88±0.37 <sup>a</sup>	51.42±0.31 <sup>ac</sup>	71.39±0.33 <sup>bdgh</sup>	395.64±4.67 <sup>bceefghi</sup>
Sahil	130	50.89±0.50 <sup>a</sup>	51.11±0.50 <sup>acf</sup>	73.59±0.54 <sup>ce</sup>	420.64±7.25 <sup>ad</sup>
Saiman	16	50.03±1.22 <sup>a</sup>	50.78±0.93 <sup>abcdef</sup>	70.94±1.40 <sup>abdfgh</sup>	385.75±21.17 <sup>aceefgh</sup>
Sakha	391	53.67±0.33 <sup>ad</sup>	50.68±0.28 <sup>bdef</sup>	69.49±0.29 <sup>dgh</sup>	395.34±4.05 <sup>efgh</sup>
Salman	424	51.09±0.34 <sup>abc</sup>	51.10±0.24 <sup>a</sup>	72.51±0.32 <sup>ag</sup>	408.47±3.98 <sup>ac</sup>
Sanam	143	50.90±0.47 <sup>abce</sup>	52.53±0.44 <sup>c</sup>	73.96±0.52 <sup>e</sup>	424.84±6.99 <sup>d</sup>
Satpal	687	51.74±0.25 <sup>a</sup>	51.08±0.20 <sup>af</sup>	72.51±0.24 <sup>ac</sup>	414.21±3.17 <sup>a</sup>
Shagun	142	53.07±0.54 <sup>a</sup>	49.77±0.43 <sup>de</sup>	68.60±0.50 <sup>fg</sup>	380.06±6.24 <sup>efgh</sup>
Shrirang	213	50.84±0.46 <sup>abc</sup>	50.70±0.34 <sup>ef</sup>	70.12±0.38 <sup>gh</sup>	379.69±4.86 <sup>fgh</sup>
Srinath	384	50.61±0.32 <sup>bc</sup>	50.66±0.29 <sup>f</sup>	71.33±0.30 <sup>ab</sup>	392.68±4.12 <sup>gh</sup>
Sushil	451	51.38±0.27 <sup>c</sup>	51.38±0.23 <sup>af</sup>	69.98±0.26 <sup>h</sup>	383.73±3.55 <sup>h</sup>
Age group (df/ms)		2/65.8662	2/78.5156	2/202.3670**	2/51993.2148**
31 & 32	1416	51.28±0.16	50.73±0.14	71.32±0.16 <sup>a</sup>	396.94±2.01 <sup>a</sup>
33 & 34	1430	51.32±0.17	50.83±0.14	71.32±0.16 <sup>a</sup>	397.73±2.14 <sup>a</sup>
35 & 36	1123	51.86±0.20	51.46±0.16	71.90±0.19 <sup>b</sup>	408.99±2.62 <sup>b</sup>
Seasons (df/ms)		1/183.8682*	1/404.1762**	1/66.7252	1/143.2198
1 (March to Aug.)	2551	51.68±0.13 <sup>a</sup>	50.85±0.10 <sup>a</sup>	71.41±0.12	401.25±1.59
2 (Sept to Feb.)	1418	51.39±0.17 <sup>b</sup>	51.45±0.14 <sup>b</sup>	71.61±0.17	402.02±2.23
Total	3969	51.58±6.58	51.07±0.08	71.48±0.10	401.52±81.54

Averages having same superscripts do not differ significantly from each other \*\* P<0.01, \*P<0.05

### ACKNOWLEDGEMENTS

The financial support provided by ICAR, New Delhi through NAIP-4 component is gratefully acknowledged and thanks also expressed to the workers from field areas in Uttar Pradesh; who supported to undertake the present investigation.

### REFERENCES

- Ahmad Manzoor, Latif M., Ahmad Masood, Qazi M. H., Sahir N. and Arslan M. (1984), Age-related changes in body weight, scrotal size and plasma testosterone levels in buffalo bulls (*Bubalus bubalis*), *Theriogenology*: 22 (6): 651-656.
- Farate N. A., Barbind R. P., Korake R. L. and Bhutkar S. S. (2012), Study of linear body measurement and body weight of Marathwadi buffalo. *Vet. Sci. Res. Journal.*, 3 (1&2): 20-22.
- Rana B. K. and Bilaspuri G. S. (1999), Growth and biometry of testicular traits in immature Murrah buffalo. *Indian Journal of Animal Sciences* 69 (8); 583-584
- Rath R. N., Monhanty A., Pradhan C. R. and Sahoo G. (2003), Appearance and performance of Kalhandi buffaloes in their native tract. *Indian J. Anim. Prod. Mgmt* 19 (1-4), 72-78 (published in Dec.05).
- Snedecor, G. W. and Cochran W. G. (1968), *Statistical Methods* 6th edition. Oxford and IBH publishing Co. New Delhi.
- Tariq Muhammad, Younas Muhammad, Khan Abdul Basit and Schlecht Eva (2013), Body measurements and body condition scoring as basis for estimation of live weight in Nili-Ravi buffaloes. *Pakistan Veterinary Journal.* 33(3): 325-329.

