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## Body Measurements and Body Condition Scoring as Parameters for Estimation of Live-Weight in Nilli Ravi Buffalo

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### Abstract

The implementation of management recommendations for Nilli Ravi buffalo in (semi-)commercial dairy production systems in Pakistan is often hampered by difficulties to determine the animals' body weight (BW). Managerial decisions are therefore based on rough and inaccurate BW estimates. A workable and accurate means of predicting BW of this breed by using body measurements and body condition scoring (BCS) was therefore explored.

211 Nilli Ravi buffaloes of the Livestock Experiment Station, Bahadurnagar, Okra, Pakistan, were divided into age groups 1–3 years (G1), 3–8 years (G2) and >8 years (G3). Animals were weighed on a mechanical scale (0–1000 kg, accuracy 1.0 kg), and their heart girth (HG), body length (BL) and shoulder height (SH) was measured. In addition BCS was performed (1–5 point scale with 0.5 point intervals) as suggested by Abeygunawardana and colleagues in 2000. The recorded data was subjected to simple and multiple linear regression analysis.

Buffaloes' BW ranged from 100–750 kg, the overall mean values of BW, HG, BL, SH and BCS were  $359 \pm 160.9$  kg,  $170 \pm 30.1$  cm,  $130 \pm 19.2$  cm,  $125 \pm 14.5$  cm and  $3.8 \pm 0.77$ . With correlation coefficients ( $r$ ) of 0.97 (HG), 0.94 (BL), 0.93 (SH) and 0.43 (BCS), the relationship between the individual independent variables with BW was significant ( $p < 0.01$ ) in all cases. The multiple linear regression between BW and HG, BL and BCS was highly significant ( $p < 0.001$ ) for each of the three groups (G1:  $r^2 = 0.95$ , G2:  $r^2 = 0.86$ , G3:  $r^2 = 0.83$ ). The equation for the most productive group G2 was:  $BW \text{ (kg)} = -1142.48 + 3.85HG \text{ (cm)} + 2.56 BL \text{ (cm)} - 46.87 \text{ bcs1} - 27.89 \text{ bcs2}$ , whereby bcs1 is a dummy (yes/no, i.e. 1/0) for a BCS between >2.5 - <4 and bcs2 is a dummy for a BCS between 4–5. Similar equations were developed for the other two groups.

Buffalo farmers who lack mechanical or electronic scales to regularly determine their animals' BW can thus combine two simple morphometric body measurements (HG, BL) with BCS in order to adjust specific management decisions (feeding, health treatment, breeding) to their individual animals.

**Keywords:** Body weight, multiple regression analysis, water buffalo