Use of Shaeffer's Formula for the Prediction of Body Weight of Slaughtering Cattle

Hamayun Khan, [1]Sir Zamin, M. Misri Rind, Rahmatullah Rind and [1]M. Riaz
Department of Anatomy and Histology, Faculty of Animal Husbandry and Veterinary Sciences
Sindh Agriculture University Tando Jam, [1]Department of Livestock Management,
N. W. F. P Agricultural University Pehsawar, Pakistan

Abstract: In order to use Shaeffer's formula for the predication of body weight of slaughtering cattle, one hundred and four cattle, 52 of each male and female was used. Linear body measurements such as length from the point of shoulder to the point of pin bone and hearth girth (around the thoracic cavity just behind the elbow joint were taken with measuring tape just before the slaughter of the animals at the slaughter house of Hyderabad city. According to the formula $W = G^2 \times L / 300$. Where, "W" is the live body weight of animal in pounds, "G" is the Heart Girth (in inches) and "L" is the length from the point of shoulder to the point of pin bone (in inches). Finally the body weight was converted from pound to Kg. The mean body weight for Male cattle at the age of 2, 3, 4 and 5 years was 200.95kg (2.66, 298kg) (0.71, 300kg) (12.77, 454.04kg) (11.64 respectively. The mean body weight of Female cattle at the age of 2, 3, 4 and 5 years was 217.09kg (9.48, 266.25kg) (6.62, 313.71kg) (4.91 and 340.05kg (8.72 respectively. The present investigation showed a significant increase in the mean body weight of male and female cattle as the age of the animals advanced. The correlation of body weight with spleen size was also made which shows the increase trend in spleen size as the body weight increase.

Introduction

The relationship between body weight and linear body measurement can be of great use in determining the extent of variation in body weight caused by biometry of the animal and thus helpful in formulation a suitable selection criteria on the basis of body conformation of animals. The use of body measurement for estimation of animal body weight have been reported by many authors (Medevdv and Efimov, I. A., 1988 and Pandey *et al.*, 1986) but unfortunately no such type of study has been carried out in this country for the estimation of body weight of slaughtering cattle. Therefore the present study has been design to predict the relationship between the body measurement and body weight of the slaughtering cattle. The present study will provide guideline for the scientist involved in various researches in animal sciences. Furthermore, the finding of this research will also be helpful for all those who are involved in meat industry.

Materials and Methods

One hundred and four cattle, 52 each male and female of nondescript breed of various ages were selected for this study. All the animals were free of the diseases and healthy. Linear body measurements such as length from the point of shoulder to the point of pin bone and hearth girth (around the thoracic cavity just behind the elbow joint) were taken with measuring tape just before the slaughter of the animals at the slaughter house of Hyderabad city. Shaeffer's formula as described by Sastry *et al.*, (1983) was used to calculate the body weight of the animal.
According to the formula, $W = G^2 \times L / 300$
Where "W" is the live body weight of animal in pounds, "G" is the heart girth (in inches) and "L" is the length from the point of shoulder to the point of pin bone (in inches). Finally the body weight was converted from pound to Kg. The data was analyzed per M. Stat-C microcomputer programme. The measurements were computed for analyzing the data such as range, mean, Standard Error. Correlation of body weight of animals with spleen size in male and female cattle was also made. Age of the animal was determined by the formula as presented by Bone (1979).

Results and Discussion

The experimental animals were classified into four groups according to their age. The approximate age was calculated through the eruption of their teeth. Group A, comprised the animal with one pair of permanent incisor teeth;

Table 1: The age of different groups of male and female cattle on the basis of incisor teeth

Groups	Eruption of permanent teeth (incisors)	Approximate age in years
A	2 permanent incisors	2
B	4 permanent incisors	3
C	6 permanent incisors	4
D	8 permanent incisors	5

Table 2: The body weight of male cattle as calculated by applying Shaeffers formula

Body weight (kg)	At 2 year n=24	At 3 year n=02	At 4 year n=02	At 5 year n=24
Mean±S.E	200.95±2.66	298.0±0.71	330.0±12.77	454.04±11.64
Range	125.0-298.0	297.0-299.0	312.0-348.0	326.0-606.0

Table 3: The body weight of female cattle as calculated by applying Shaeffers formula

Body weight (kg)	At 2 year n=22	At 3 year n=04	At 4 year n=04	At 5 year n=19
Mean±S.E	217.09±9.48	266.25±6.63	313.71±4.92	340.05±8.72
Range	146.0-299.0	245.0-281.0	300.0-340.0	302.0-431.0

Table 4: Correlation analysis between body weight male cattle and spleen size

Variable	"r" values	Remarks
Age of animal and body weight of animal	0.931	**
Body weight of animal and length of spleen	0.838	**
Body weight of animal and width of spleen	0.714	**
Body weight of animal and thickness of spleen	0.580	**
Bodyweight of animal and weight of spleen	0.773	**

r = Correlation Coefficient   ** = Highly Significant at 5% level

Table 5: Correlation analysis between body weight female cattle and spleen size

Variable	"r" values	Remarks
Age of animal and body weight of animal	0.861	**
Body weight of animal and length of spleen	0.690	**
Body weight of animal and width of spleen	0.247	**
Body weight of animal and thickness of spleen	0.496	**
Bodyweight of animal and weight of spleen	0.731	**

r = Correlation Coefficient   ** = Highly significant at 5% level   NS = Non significant

the approximate age was two year. Group B included the animals with two pair of permanent incisor teeth; the approximate age was three year. Group C comprised the animal with three pair of incisor teeth; the estimated age was recorded as four year. And Group D selected the the animals with four permanent incisor teeth, the animals were considered to be five year of age.

The mean body weight of male and female cattle in presented in Table 1 and 2. The mean body weight for male cattle at the age of 2, 3, 4 and 5 years was 200.95kg ±2.66, 298kg ± 0.71, 330kg ±12.77, 454.04kg ±11.64 respectively. The mean body weight of Female cattle at the age of 2, 3, 4 and 5 years was 217.09kg ±9.48, 266.25kg ±6.62, 313.71kg ± 4.91 and 340.05kg ± 8.72 respectively. A significant increase in the body weight was observed with increase in age in male and female cattle during the present investigation. Previously the spleen of these

animal was used for biometric study, therefore the correlation between body weight of these animal and spleen size was made indicating that there is positive correlation between the body weight of animal and spleen size. It means that as the body weight of animal increase size of spleen also increase proportionately to play its normal physiologic role.

In scientific literature such kind of study is limited. However, the mean body weight of cattle of both sexes in the present study, fall in close agreement with that of the Khan and Issani (1994) Bhutto _et al._ (1993) and Joshi (1982). Khan and Issani (1994) described body weight for various breed of cattle. They calculated body weight of the adult Red Sindhi. Tharparker, Dhani etc Average body weight for Male Red Sindhi, Tharparker and Dhanni were 425-525kg, -400-500kg and 350-450kg respectively while for Female of these breed were 300-350kg, 300-380kg and 270-330kg respectively. Bhutto _et al._

(1993) reported the average weight of male and female of Red Sindhi, Tharparket and Dhanni were 552kg, 318kg, 504kg, 285kg respectively. Joshi (1982) described the weight of the adult male of Dhanni at the age of one year, two year and mature are 181kg, 153.6kg and 476.28kg respectively and that for female of the same breed at one year, two year, and mature are 158.76kg, 385.56kg and 408.24kg respectively. Therefore the findings regarding body weight of cattle of both sexes in present study fall in close agreement with those reported by the above workers.

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