

Measurements of Claw Volume in Buffaloes (*Bubalus bubalus*)

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Buffaloes in Egypt are an important source of tractive power of paddy cultivation, production of milk ,meat and hides. The incidence of foot lameness in buffaloes are less than exotic and native breeds of dairy cattle in Egypt (Khamis et al., 1984). The claws of buffaloes have higher horn quality and lower water contents than Friesian and native cows (El Gohary, 1991). Claw quality is the key to understand claw disorders in cattle (Vermunt and Greenough, 1995).

Claw quality is the product of claw shape and volume (Politiek et al., 1986). There are numerous objective and subjective studies for measuring claw volume in cattle (Huber et al, 1983 ; Smith et al., 1986 a,b ; and Vermunt and Greenough, 1996).

Recently Scott et al (1999) described a simple , valuable and field practical formula for calculating claw volume of bovine claws through three linear measurements of claw dimensions.

A diagram illustrating the aim of a study. At the top, a horizontal navigation bar contains five buttons: 'Introduction' (blue), 'Aim' (red), 'Materials and Methods' (blue), 'Results' (blue), and 'Conclusion' (blue). Below this, a central blue circle with a white border contains the word 'Aim'. A large red arrow with a white outline points from a rounded rectangular box on the left to another rounded rectangular box on the right. The left box contains the text: 'The objective of this study was to determine the claw volume in normal healthy buffaloes.' The right box contains the text: 'Correlate it with the age and body weight in these buffaloes.'

Aim

The objective of this study was to determine the claw volume in normal healthy buffaloes.

Correlate it with the age and body weight in these buffaloes.

Place of the study: Buffalo breeding center at Fac. of Veterinary Medicine, Cairo Univ.

Animals

Number: 35 buffaloes

Age: 3 months-8 years

Body weight: 159-552 kg

Control: Standing position

Examined Claws: 140 claws from thoracic limbs and 140 claws from pelvic limbs

Groups

Group I:

Comprised 15 female buffaloes of 3-18 months old and the average body weight was 159 kg

Group II:

Comprised 20 female buffaloes of 2-8 years old and the average body weight was 552 kg

The three linear measurements (Fig. 1); Coronary Band (CorBand), Abaxial Groove (AbaxGr) and Base (B) were taken by a small flexible metal tape as the method mentioned by Scott et al., (1999) .

The volume of both claws together (lateral and medial) was calculated using the Formula described by Scott et al. (1999):
Claw volume (cm³) = (17.192 x Base) + (7.467 x Abax Gr) + (45.27 x CorBand)-798.5

Fig. 1

A- CorBand
B- Base
C- Abax Gr

Statistical analysis

The significance of mean differences among the three linear measurements in front and hind claws were obtained by applying the multiple Duncan,s (t) test.

The significance of the three linear measurements between two groups was obtained by using paired (t) test. Significance differences were defined as $p < 0.05$

Table(1): The mean values of the three linear measurements and claw volume of the fore and hind limbs of the examined buffaloes

Measurements Limbs	Cor Band (cm) Mean± SE	Base (cm) Mean± SE	Abax Gr (cm) Mean± SE	Claw Volume (cm³)
Right fore limb	19.3 ± 0.36	26.3 ± 0.16	11.5 ± 0.24	595.93 ± 38.1
Lateral claw	9.13	16.62	5.77	
Medial claw	10.16	13.67		
Left fore limb	19.0 ± 0.32	25.6 ± . 55	11.6 ± 0.24	588.21 ± 41.2
Lateral claw	8.79	11.9	5.36	
Medial claw	10.48	14.47	6.4	
Right hind limb	18.7 ± 0.32	25.2 ± 0.66	10.9 ± 0.32	564.79 ± 35.6
Lateral claw	8.96	11.52	5.5	
Medial claw	9.81	13.43	5.29	
Left hind limb	17.8 ± 0.32	24.3 ± 0.5	11.2 ± 0.27	511.46 ± 34.3
Lateral claw	8.52	10.64	4.97	
Medial claw	10.52	14.37	5.85	

Table(2): The mean values of the claw volume and the three linear measurements in the two groups of the examined buffaloes

Measurements	Claw volume _(cm³)		CorBand (cm)		AbaxGr (cm)		Base (cm)	
	Gr I	Gr II	Gr I	Gr II	Gr I	Gr II	Gr I	Gr II
Right fore limb	407.5	759.8	8.2	10.5	5.1	6.29	10.8	14.9
Left fore limb	401	756.2	8.3	10.6	5.1	6.38	10.9	14.5
Right hind limb	391.4	716.4	8.3	10.3	4.9	5.94	10.4	14.3
Left hind limb	371.4	687.2	8.2	10.1	4.8	5.8	10.1	14.1

Gr I: 15 buffaloes of 3-18 months old

Gr II: 20 buffaloes of 2-8 years old

The front claws occupied an average 52% of the total volume , compared to 48% for the hind claws

The mean values of the three linear measurements significantly increased in the medial claws than the lateral claws in the examined buffaloes.

The mean values of the three linear measurements and claw volume in the two groups of buffaloes showed a significant increase as the animals advanced in age and body weight.

This formula appeared simple and practical to determine the claw volume in buffaloes during selection and breeding

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