



Pelvimetry in swamp buffalo cows of Nagaland

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Dystocia is reportedly the most common cause of perinatal calf loss (Noakes *et al.* 2001). Pelvic measurement is best method to deal calving problem due to abnormally small or mis-shaped pelvises to reduce dystocia (Deutscher 1995). The internal pelvic area is one of the best predictions of dystocia in heifers (Bellows and Short 1994). Studies on pelvimetry were conducted in cattle (Rice and Wiltbank 1970, Lalrintluanga and Lallianchhunga 2012) and river buffaloes (Oliveira 2001). There is, however, no information on pelvimetry of Indian (Nagaland) swamp buffalo cows. So this study was conducted to know the pelvic area by using external pelvimetry and its influence on the parturition in Indian swamp buffalo cows.

Swamp buffalo cows (22) maintained by private farmers around the NRC on Mithun, Jharnapani, Nagaland, were used in the present study. The study area lies between 25°54'30" North Latitude and 93°44'15" East Longitude and at an altitude range of 250–300 mean sea level. The animals were maintained under semi intensive condition of grazing in forest during day time and tying them in shed during night time. The experimental animals in shed were fed daily with *ad lib.* quantity of locally available forages without providing concentrate. Freshwater was available throughout the day.

According to their age, the experimental cows were equally divided into 4 groups each of 8 cows, viz. group 1: 24 – 36 months (n=8), group 2: 37–54 months (n=8), group 3: 55 – 65 months (n=8) and group 4: 66 months and above (n=8). In all the cows external pelvimetry was taken by measuring external pelvic dimensions (Craig 1930).

- (A) Distance between 2 angles of haunch was measured by taking distance between 2 straight wooden pieces put vertically against each haunch.
- (B) Distance between 2 ischial tuberosity was measured directly using a measuring scale.
- (C) Height from hip joint to level of summit (highest point) of croup was measured. For this, one straight wooden piece was put horizontally across summit of croup and other piece was put horizontally along trochanter and

ischial tuberosity. The vertical distance between above 2 straight wooden pieces was the height from the hip joint to the summit of croup.

Based on above measurements diameters of pelvic outlet, pelvic inlet and pelvic area were calculated. The data were analysed statistically as per Snedecor and Cochran (1989).

The mean $\pm$ SEM of pelvic area and various pelvic measurements in Indian swamp buffalo of different age groups are presented in Table 1.

The distance between the angle of haunch, distance between the two ischial tuberosity and height from the hip joint to the level of the summit (highest point) of the croup were significantly differed ($P<0.05$) in between the age groups, but being highest in group four. Similarly, the transverse, vertical diameter and pelvic area of pelvic inlet and outlet differed significantly ($P<0.05$) between different age groups (Table 1).

Various authors have reported the pelvic measurements for in cattle (Rice and Wiltbank 1970, Lalrintluanga and Lallianchhunga 2012), river buffaloes (Oliveira 2001), but there was no comparable report for Indian (Nagaland) swamp buffaloes. The mean pelvic inlet area was greater than the mean pelvic outlet area in swamp buffalo cow.

In exotic breeds of cows, the pelvic area was reported to be the most important variable influencing calving difficult and can be successfully used to identify abnormally small and/or mis- shaped pelvises (Deutscher 2011). To the best of our knowledge this is the first report about the pelvic dimensions in Indian swamp buffaloes measured by external pelvimetry method in live animal. The mean vertical and transverse pelvic diameter in this study was comparable with report of Lalrintluanga and Lallianchhunga (2012) in indigenous cattle such as Mizoram cattle of India) and lower than the report of Craig (1930) in cattle.

The mean transverse pelvic diameter in this study was lower than reports of Roberts (1971) in cattle, Oliveira *et al.* (2001) in Brazil river buffaloes. The mean $\pm$ SEM and correlation coefficient (r) between the pelvic parameters and/or with age should be ruled out or standardised for mithun

Table 1. Measurement of pelvic parameters in swamp buffalo of Nagaland of different age group

Age group	A	B	C	Transverse pelvic diameter (cm)		Vertical pelvic diameter (cm)		Pelvic area (cm ²)	
				Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
Group 1	30.88	12.41	15.18	13.20	10.82	14.80	11.39	195.61	123.34
24 – 36 months (n=8)	±0.99 ^a	±0.47 ^a	±0.98 ^a	±0.33 ^a	±0.27 ^a	±0.94 ^a	±0.72 ^a	±3.77 ^a	±2.99 ^a
Group 2	32.20	13.20	16.03	13.84	11.35	15.63	12.02	216.65	136.60
37– 54 months(n=8)	±1.14 ^b	±0.81 ^b	±0.86 ^{a b}	±0.74 ^b	±0.67 ^b	±0.85 ^{bc}	±0.74 ^{bc}	±3.95 ^b	±3.13 ^b
Group 3	34.66	14.25	16.52	14.91	12.22	16.11	12.39	240.24	151.47
55 – 65 months (n=8)	±1.20 ^c	±0.81 ^c	±0.82 ^c	±0.78 ^c	±0.70 ^c	±0.81 ^{cd}	±0.71 ^{cd}	±3.33 ^c	±2.64 ^c
Group 4	36.01	15.26	17.18	15.63	12.81	16.78	12.89	262.13	165.26
66 and above months (n=8)	± 0.90 ^d	± 0.90 ^d	± 1.05 ^c	±0.62 ^d	±0.56 ^d	±1.03 ^d	±0.91 ^d	±4.36 ^d	±3.46 ^d
Overall mean	33.44	13.78	16.23	14.40	11.80	15.29	12.17	228.66	144.17
	± 1.52	± 1.11	± 1.06	± 1.03	± 0.93	± 1.04	± 0.91	± 5.40	± 4.29

N, 32. Distance (cm) between angle of haunch (A), ischial tuberosity (B), and between group and hip joint (C). Mean in the same column bearing different superscripts differ significantly (P<0.05).

by detailed study of pelvic girdle, pelvic bone measurement with commercially available pelvimeter assessment.

This study was concluded that the pelvic parameters were higher in 66 month and above age group than other young animals. The parameters were increased as per the age of the animal and the parameters were significantly differed between the age groups. The result of this study will be utilized for selection of swamp buffalo cows for breeding purpose.

SUMMARY

The study was conducted on swamp buffalo cows to study the external pelvimetry. The mean inlet and outlet pelvic area as measured using external pelvimetry were 195.61 ± 3.77 and 123.34 ± 2.99, 216.65 ± 3.95 and 136.60 ± 3.13, 240.24 ± 3.33 and 151.47 ± 2.64, 262.13 ± 4.36 and 165.26 ± 3.46 cm² in group 1: 24–36 months (n=8), group 2: 37–54 months (n=8), group 3: 55–65 months (n=8) and group 4: 66 months and above (n=8); respectively. The overall area of pelvic inlet and outlet was 228.66 ± 5.40 and 144.17 ± 4.29 cm², respectively. It was concluded that the pelvic parameters were higher in 66 month and above age group of animals. The result of this study will be utilized for selection of swamp buffalo cows for breeding purpose.

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