

Effect of Seasons on the Sex Ratio and Calving Frequency of Cattle Under Farm Condition

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Abstract: Calving records with sex ratio of births were studied in summer, monsoon and winter of local, crossbred and purebred cows. The higher percentage of birth found during summer (39.07%) followed by winter (32.79%) and monsoon (28.14%) and female and male ratio were 48.25:51.75; 44.66:55.34 and 40.83:59.17, respectively in summer, monsoon and winter in local cows; whereas in crossbred cows, birth percentage is highest in summer (36.96%) followed by winter (35.98%) and monsoon (27.06%) and no significant difference were found on sex ratio of births of crossbred cows. The highest percentage of birth of purebred at Holstein-Friesian and Sahival cows are noted in winter (40.93%) followed by monsoon (30.48%) and summer (28.59%) and no significant difference were found on sex ratio of births of purebred cows in different seasons.

Key words: Calving percentage, season, sex ratio

Introduction

The shortage of feed is the major cause of the low production performance of livestock. The seasonal patterns of food supply affect fertility patterns in cattle, then seasons of calving is important since this should not coincide with the main planting seasons of crops. Generally, a farmer desires to have more females born in his herd so as to build up and increase his cattle wealth. Bangladesh has different seasons in a year out of which summer, monsoon and winter are the most distinct in respect of temperature and relative humidity. The climate is an important factor for the conception of cattle. High temperature and high degree of humidity will result in less visible signs of estrous and reduced conception rate. Season of service among other factors such as genotype, age, parity and management system is associated with number of service required per conception. Researchers have proved that climate has the direct bearing on the productive and reproductive performance of the animals.

The reasonability of birth and breeding seems to be strongly influenced by and correlated with the climatic conditions. In Bangladesh little comprehensive work has been done regarding the fertility of cattle and the effect of age, parity, sex ratio, season of service and service per conception. So in this study, attempts have been made on the seasonal variation that affect the calving percentage and sex-ratio of local, crossbred and purebred cows reared and maintained in Central Cattle Breeding Station, Savar, Dhaka. Findings of such studies may provide some clue to the farmers to adjust breeding plan of animals. Bhattacharyya *et al.* (1956), Ferrara (1960), Tomer and Mittal (1960) and Goswami and Nair (1968) have worked on the environmental factors and influence the sex ratio in cattle and buffaloes.

Materials and Methods

The data recorded of cows reared at Central Cattle Breeding Station (CCBS), Savar, Dhaka, were used for this study in 1999 and to determine the significant effect of season between the observed and expected female: male ratio. The included data covered a period from 1992 to 1998. A total record of 1772 normal birth calving was recorded, out of which 366 records are from local cows, 717 from crossbred cows and 689 purebred cows. Feeding and management system of the farm during the observed period was almost uniform and seasons taken as summer (march-June), monsoon (July-October) and winter (November-February) for the experiment. Then the collected data were analyzed statistically by chi-square test for testing independence in a contingency table according to Steel and Torrie (1980).

The test criterion was given by the equation: $\lambda^2 =$ The sum of

$(\text{observed} - \text{expected})^2 / \text{expected}$; with (row^{-1}) (column^{-1}) degree of freedom.

Results and Discussion

Table 1 represents the sex ratio between male and female in relation to season in local cows of CCBS. A total of 366 calving records were studied, out of which 143 were in summer, 103 in monsoon and 120 in winter. It is noticed that the highest percentage of total birth was found in summer (39.07), followed by winter (32.79) and monsoon (28.14). The male and female ratio during summer, monsoon and winter were 51.75:48.25; 55.34:44.66 and 59.17:40.83, respectively. Statistical analysis showed that there was no significant ($\lambda^2 = 1.45$, $p > 0.05$) effect of season on the sex ratio. The results of this study are not in agreement with the results found by Abhi *et al.* (1978); Kulkarni, (1980), Hussain and Kumar (1984) and Ali *et al.* (1999).

Table 1: Sex ratio between male and female in relation to season in local calves of CCBS

Calving season	No. of birth	Percentage of total birth	Sex ratio in percentage	
			Male	Female
Summer	143	39.07	51.75(74)	48.25(69)
Monsoon	103	28.14	55.34(57)	44.66(46)
Winter	120	32.79	59.17(71)	40.83(49)
Total	366		55.19(202)	44.81(164)

$\lambda^2 = 1.45$, $P > 0.05$. Figures within parentheses indicate number of calving

Table 2: Sex ratio between male and female in relation to season in crossbred calves of CCBS

Calving season	Total birth	Percentage of total birth	Sex ratio in percentage	
			Male	Female
Summer	265	36.96	50.19(133)	49.81(132)
Monsoon	194	27.06	52.06(101)	47.94(93)
Winter	258	35.98	44.19(114)	55.81(144)
Total	717		48.54(348)	51.46(369)

$\lambda^2 = 3.21$, $P > 0.05$. Figures within parentheses indicate number of calving

Table 2 shows the sex ratio between the male and female in relation to season in crossbred cows of CCBS. Birth records of 717 calves were studied out of which 265, 194 and 258 were noticed during summer, monsoon and winter, respectively. The highest percentage of birth was obtained during summer followed by winter and monsoon in descending order which were 36.96,

Rahman *et al.*: Calving percentage, season, sex ratio

Table 3: Sex ratio between male and female in relation to season in purebred calves of CCBS

Calving season	Total birth	Percentage of total birth	Sex ratio in percentage	
			Male	Female
Summer	197	28.59	47.72(94)	52.28(103)
Monsoon	210	30.48	45.24(95)	54.76(115)
Winter	282	40.93	50.71(143)	49.29(139)
Total	689		48.19(332)	51.81(357)

$\chi^2 = 1.47, P > 0.05$. Figures within parentheses indicate number of calving

35.98 and 27.06, respectively. But Ali *et al.* (1999) observed that the highest percentage of birth was obtained during winter followed by summer and monsoon in descending order which were 40.53, 30.14 and 29.33, respectively (Table 3). Among the crossbred cows, the births of male and female ratio did not differ significantly ($\chi^2 = 3.21, p > 0.05$) indicating that there was no significant effect of season on the sex ratio from the expected ratio of 50:50; which agrees with the findings of Tomar *et al.* (1960); Abhi *et al.* (1978); Kulkarni (1980) and Ali *et al.* (1999). The highest female calves born during winter (55.81%) followed by summer (49.81%) and monsoon (47.94%), while the birth of male calves were highest during monsoon (52.06%) followed by summer (50.19%) and winter (44.19%).

The sex ratio in respect of season in case of purebred Holstein-Friesian and Sahiwal calves born in CCBS in Table 3 as below.

The total number of observations were 689 out of which 197 in summer, 210 in monsoon and 282 during winter. The total birth percentage was highest during winter (40.93) followed by monsoon (30.48) and summer (28.59). The effect of season on the sex ratio were not significant ($\chi^2 = 1.47, p > 0.05$). Ali *et al.* (1999) observed that the total birth percentage was highest during winter (68.11) followed by summer (20.29) and monsoon (11.60).

The percentage of female birth was highest during monsoon (54.76) followed by summer (52.28) and winter (49.29) and the percentage of male birth was highest in winter (50.71) followed by

summer (47.72) and monsoon (45.24). Ali *et al.* (1999) reported the percentage of female birth was highest during summer (50.00) followed by winter (44.68) and monsoon (37.00) and the percentage of male birth was highest in monsoon (62.50) followed by winter (55.32) and summer (50.00).

However, from the study it indicates that overall percentages of calving was better during winter and summer followed by monsoon and seasonal effect on sex-ratio of calves did not deviated to far from the expected 50:50 ratio.

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