SEASONAL INFLUENCE ON OESTRUS INCIDENCE AND CONCEPTION RATE IN BUFFALOES

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Seasonal influence on oestrus incidence and conception rate in the buffaloes of the Commonwealth Livestock Farm, Rakh Ghulaman, Mianwali District was studied. The maximum number of services occurred during the fall season (51.0 per cent), while the minimum occurred during spring (11.6 per cent). The conception rate was the poorest during spring and summer and was the highest during winter and fall. The maximum calving occurred during summer (40.7 per cent.), while minimum calvings were recorded during winter (11.5 per cent.). The mean gestation length was 305.34 days with standard deviation of 5.17. Male calves were carried on an average 0.30 day longer than female calves. The longest gestation was recorded in buffaloes calving during spring and summer.

INTRODUCTION

Buffaloes have been reported to be seasonal breeders. The physiological phenomenon of oestrus is more pronounced in October, November and December. The conception rate is also markedly affected by a seasonal fluctuations. The seasonal factors which affect the physiology of reproduction are light, temperature and humidity. Pakistan has sub-tropical climatic conditions and the year is divided into different seasons. The seasonal fluctuations sometimes approach the extremes. Studies of seasonal influence on conception rate and breeding efficiency in buffaloes under our climatic conditions are limited. The buffalo is an important dairy animal in this country. To obtain the maximum returns from this animal, regularity in breeding and high conception rate is of paramount importance. Studies on the present status and on the various factors affecting breeding efficiency in buffalo stock in the country is necessary in this regard.

REVIEW OF LITERATURE

Hafez (1955) noticed buffalo remaining completely an oestrus during the hot weather (April-July) and returning to sexual activity with onset of autumn (August). Manzoor *et al.* (1964) concluded that there was an increased frequency of oestrus during October, November and December in

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buffaloes. Chein *et al.* (1965) studied 232 oestrus cycles of 110 buffaloes from March to December, 1963 and observed that oestrus occurred most commonly in September to December, and seasonal trend was significant. Yadava and Kushwaha (1965) analysed data of 537 fertile services occurring in 1954-1961. They found that about 82 per cent of services occurred in September to January and the highest monthly incidence was observed in November (26.3 per cent). Rice *et al.* (1957) stated that in semitropical areas of southern U.S.A., the fertility of cattle is reduced during hot weather and there are significantly fewer conceptions in July and August. Badreldin (1952) stated that in a herd of 772 female buffaloes with which the bulls remained throughout the year, conception rate was maximal in October, November and December and minimal in July, August, and September. Environmental conditions for this trait were most favourable in October and November. Basirov (1964) collected data over a number of years from farms in Azerbaijan, where conception rate varied considerably during the year and was considerably affected by environmental conditions. Goswami and Nair (1964) observed that there was a marked effect of the climatological factors on conception and calving of buffaloes. Their study revealed that cool (low) air temperature with low relative humidity was inducive to conception of buffaloes (for good quality semen of buffalo bulls also). They also observed lowered hypothyroid activity in buffaloes during the period with high air temperature associated with high relative humidity.

Rao and Murari (1956) studied the seasonal distribution of calving on buffaloes involving a total of 523 observations and it was found that 77.6 per cent of all calving occurred during June to December. Kohli and Malik (1960) analysed the data of 321 buffaloes calvings in the herd at the Government Farm, Hissar and found that the peak (72.6 per cent) calving period was from July to November and the fewer (19.3 per cent) calving occurred from December to May. Majeed *et al.* (1966) observed high calving frequency in buffaloes from July to October. Anantakrishnan *et al.* (1952) studied various factors influencing the gestation period and birth weight in *Murrah* buffaloes. The average gestation period for farm bred buffaloes was 305.3 days and for purchased buffaloes 302.4 days. Basirov (1964) indicated that in buffaloes the average gestation period was 310-315 days. Ghanem *et al.* (1955) analysed the calving records of Egyptian buffaloes from 1935 to 1951 at the Bahteen Farm of the Egyptian Agricultural Society. The average length of gestation of 424 calves carried to normal term was 316.4 $\pm$ 7.86 days. The average length of gestation of calves born in the winter (December, January and February) was 318.5 days, whereas 314.5 days for calves born in autumn (September, October and November). Female calves were carried on an

average 1.5 days longer than male calves. Ishaq (1954) observed that average gestation period in buffaloes was 307.67 days. Male calves were carried 0.37 days longer than female calves and the difference was non-significant statistically.

MATERIALS AND METHODS

Fifteen years' data pertaining to the incidence of oestrus, conception, calving were obtained from the Commonwealth Livestock Farm, Rakh Ghulaman, Mianwali District. A total number of 2,163 observations of service resulting in calving and 1,958 known gestation periods were made from the records. The service records were utilized to find the incidence of oestrus. It was assumed that the trend of the incidence of oestrus was similar to that of frequency of services and service frequency was used as a measure of oestrus incidences. A herd of about 250 buffaloes and 4 buffalo bulls was maintained at the farm. Breeding of the herd was practised through natural service. The meteorological data were taken from Meteorological Observatory, Mianwali. The gestation period was calculated by estimating the days between date of service and date of calving for 1958 records. Sex-wise and season-wise gestation period were also estimated. "t" test was applied to know statistical differences in the average gestation length of the two groups of buffaloes which produced male and female calves. The information on services, conception rate, repeated services, calvings and gestation length were arranged into different seasons of the year. The year was divided into winter (December, January and February), spring (March, April, and May), summer (June, July and August) and fall (September, October, and November). The data pertaining to seasonal incidences of oestrus (services) and calving were subjected to analysis of variance to know the differences among the seasons. A total of 408 services were rendered during the year 1958 and 1963 which resulted in 309 conceptions. Percentage of conception in each month was calculated on the basis of total services rendered and the number of buffaloes conceived. The data on monthly conception rate were then seasonally arranged and were subjected to analysis of variance to ascertain if there was any significant difference among the seasons.

RESULTS AND DISCUSSION

The seasonwise percentage of frequency of services of buffaloes are presented in Table 1. The maximum number of services occurred during the fall season (51.0 per cent) followed by winter (22.2 per cent), summer (15.2 per cent) and spring (11.6 per cent). The differences in the service frequency among different season of the year were found to be highly significant ($P<0.01$).

The highest monthly frequency of services were availed in October (20.9 per cent). The results revealed that though the buffaloes naturally come into heat throughout the year round, yet the fall season is the most usual period in a year for the occu rence of oestrus in them. The results are in conformity with those of Manzoor *et al.* (1964) and Chein *et al.* (1965) who reported an increased frequency of oestrus during October, November and December. The results showed that the sexual activity did not cease completely during hot weather (April-July) as indicated by Hafez (1955), but buffaloes came into heat throughout the year although there was a marked decrease in the onset of oestrus during this weather. The findings of study do not agree with those of Yadava and Kushwaha (1965) that 82 per cent of services occurred in September to January and the highest monthly incidence was observed in November (26.3 per cent). According to the results of present study, 68.2 per cent of services occurred during this period and the highest monthly incidences were availed in October (20.9 per cent). The trend in the increase of service frequency is similar to the above report.

TABLE 1.—*Seasonal Percentage of Service and Calving Frequency.*

Season	Service percentage	Calving percentage
Winter (December, January, and February)	22.2	11.5
Spring (March, April, and May)	11.6	14.1
Summer (June, July, and August)	15.2	40.7
Fall (September, October, and December)	51.0	33.7

The season-wise calving percentage in buffaloes (Table 1) showed that maximum calvings occurred during summer (40.7 per cent), followed by fall (33.7 per cent), spring (14.1 per cent), while in winter minimum calving occurred (11.5 per cent). The differences in the calving frequency among different seasons of the year were found to be highly significant ($P < 0.01$) The results indicated that most of the calvings occurred during summer and fall and there was a low calving frequency during winter and spring. The results are in conformity with those of Rao and Murari (1956), who reported that 77.6 per cent of the total calvings occurred during June to December. Kohli and Malik (1960) also showed that 72.6 per cent calving occurred from

July to November but fewer from December to June. Similar results were reported by Majeed *et al.* (1966).

The highest fertility occurred during winter (82.5 per cent) followed by fall (77.3 per cent), summer (68.3 per cent) and lowest during spring (60.5 per cent). The season-wise conception rate indicates that the fertility level was reduced by increasing ambient temperature during spring and summer. Basirov (1964) and Rice *et al.* (1957) concluded that season of the year markedly influence the fertility in cattle. They observed that the fertility level was reduced during summer months when there was high ambient temperature. The data on average maximum and minimum temperature and relative humidity of the area indicate that the temperature starts increasing gradually in the month of March, reaches its peak in June and then starts declining gradually during the months of July and onward. The relative humidity percentage showed fluctuation with the change in the season. The findings are also in conformity with those of Badreldin (1952), who reported maximum conception rate in October, November and December. But it is reduced during summer months. Similar results were reported by Goswami and Nair (1964).

The mean gestation length was 305.34 days with standard deviation of 5.17. The results are in conformity with those of Anantakrishnan *et al.* (1952) but do not corroborate with those of Ghanem *et al.* (1955) and Basirov (1964). It is evident from their findings that Russian and Egyptian buffaloes have longer gestation period than the buffaloes raised in this country. The mean gestation length in the case of male calves was 305.67 days, whereas in female it was 305.37 days, with standard deviation of 7.78 and 7.50 respectively. The differences of 0.30 day between the two sexes was statistically non-significant. The results are in agreement with those of Ishaq (1954), but quite contradictory to those of Ghanem *et al.* (1955) who observed that females calve were carried 1.5 days longer than male calves. The gestation period was longest in the case of calves born during spring (306.91 days), followed by winter (306.45 days), fall (305.24 days) and summer (305.22 days) with standard deviation of 7.578, 9.201, 8.007 and 7.017 respectively. The findings of this study do not fully agree with those of Ghanem *et al.* (1955) who showed that buffaloes calving during winter had slightly longer gestation period. The results of the present study revealed that buffaloes calving during spring and winter had slightly longer gestation period than the other seasons of the year.

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