

EFFECT OF SEASON ON QUALITY AND QUANTITY OF SEMEN IN CROSSBRED BULLS UNDER CONDITIONS OF PAKISTAN

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The data were recorded during 1980-85 on crossbred bulls maintained at the Semen Production Unit, Qadirabad, district Sahiwal. From 2374 ejaculates it was found that volume per ejaculate was 6.65, 6.52, 5.94, 5.51 and 5.95 ml during winter, spring, summer dry, summer wet and autumn seasons, respectively (A, B, C, D and E) with an overall average of 5.98 ml per ejaculate. The motility percentage was 49.60, 46.25, 46.92, 40.39 and 44.35 while sperm concentration was 647.81, 714.51, 700.97, 508.31 and 597.28 million per ml during A, B, C, D and E seasons respectively. It was concluded that season had no significant effect on volume, motility percentage and sperm concentration in crossbred bulls.

INTRODUCTION

The overall production potential of livestock in Pakistan has always been low when compared with the livestock of developed countries. This low productivity is mainly due to low genetic potential and poor environmental conditions. As far as inherited potential is concerned both parents contribute equally with the exception of genes on the sex chromosomes. A female in a year can contribute 50% of her genetic potential to one offspring at the most but a male can contribute his hereditary potential to thousands of offspring in a year, through the modern technique of A.I., hence known as half of the herd.

There is an acute shortage of desirable sires in the country. Selective breeding is one of the remedy, which is only possible through the extensive use of artificial insemination. This technique is a key to expl-

oit the best available genetic material in the shortest possible time for the improvement of genetic potential of our livestock.

The use of modern technique of frozen dry semen has led to the maximum utilization of excellent breeding sires not only during their life but even after their death. Preparation of maximum doses of diluted semen during the life of the sire depends upon the volume of semen produced per ejaculate, motility percentage and sperm concentration. Since there is a lot of environmental variation during different seasons of the year, expected to affect both productive and reproductive traits of our animals, therefore, this project was planned to determine the effect of different seasons on volume, motility percentage and sperm concentration per ml of semen in crossbred sires under local environmental conditions.

MATERIALS AND METHODS

The data pertaining to crossbred bulls maintained at the Semen Production Unit, Qadirabad, district Sahiwal were collected during 1980-85.

Semen collection and processing:

Semen was collected with the help of an artificial vagina from healthy and vigorous bulls obtaining four ejaculates twice a week with an interval of ten to thirty minutes. After collection semen was immediately deposited in the semen processing laboratory where the following data were recorded: volume of semen, mass motility, motility percentage, sperm concentration and dilution rate.

The sperm concentration and dilution rate were estimated with the help of electronic photometer. The diluted semen was preserved in 1/2 ml doses in frozen form in liquid nitrogen at a temperature of -190°C . The recorded data were arranged into the following five seasons:

- A Winter (Dec.-Feb.)
- B Spring (March-April)
- C Summer (dry) (May-July)
- D Summer (wet) (Aug.-Sep.)
- E Autumn (Oct.-Nov.)

The data arranged according to various seasons were subjected to a standard technique of statistical analysis for significance (Steel and Torrie, 1981).

RESULTS AND DISCUSSION

The overall average values for different semen characteristics from 2374 ejaculates during 1980-85 have been summerized in Table 1.

Volume: The average volume of semen per ejaculate produced by the crossbred bulls was 5.98 ml. When the data were arranged according to different seasons, it was observed that the volume was maximum i.e. 6.65 ml during season A (Dec.-Feb.) and minimum (5.51 ml) during season D (Aug.-Sept.). The seasonally arranged data on being subjected to analysis of variance revealed a non-significant difference among different seasons of the year (Table 2).

These results regarding volume and non-significant effect of season are in agreement with the findings of Sangaev (1975) who studied 127-177 ejaculates from Kalmyk bulls and reported that the volume averaged 4.68 ml. Afiefy *et al.* (1984) found that ejaculate volume in buffalo and Friesian bulls did not differ

Table 1. Semen characteristics of crossbred bulls

Season	Total ejaculates	Average volume (ml)	Mass. motility	Motility percentage	Sperm conc. (millions/ml)
A	636	6.65	1.61	49.60	647.81
B	437	6.52	1.56	46.25	714.51
C	560	5.94	1.50	46.92	700.97
D	347	5.51	1.34	40.39	508.31
E	394	5.95	1.34	44.35	597.28

Table 2. Effect of season on volume of semen per ejaculate

Source of variation	D.F	S.S	M.S	F.ratio
Season	4	345.63	86.41	0.348 ^{N.S}
Error	2369	588362.84	248.36	
Total	2373	588708.47		

N.S = Non-significant.

significantly among seasons and between species. Similarly, Usmani *et al.* (1985) collected data over 11 years period on 53 Sahiwal bulls and found that ejaculate volume averaged 4.8 ml. They further observed that season had no significant effect on any semen trait studied.

Motility percentage: The average mass motility was estimated to be 1.61, 1.56, 1.50, 1.34, 1.34 and the motility was 49.60, 46.25, 46.92, 40.39 and 44.35% during A, B, C, D and E seasons respectively. The results of analysis of variance revealed non-significant differences in motility percentage during different seasons (Table 3). Similar results were also reported by Gauthier and Varo (1985).

Sperm concentration: The average sperm concentration was 647.81,

714.51, 700.97, 508.31 and 597.28 million per ml during A, B, C, D and E seasons respectively. The analysis revealed that season had a non-significant effect on sperm concentration in crossbred bulls.

Usmani *et al.* (1985) found that sperm concentration in Sahiwal bulls was ($\times 10^6$) 880.2 ± 538.2 . They also reported that season had a non-significant effect on sperm concentration. Gauthier and Varo (1985) also reported similar findings. However, the difference in sperm concentration between the two studies could be attributed to breed and environmental variation especially the feeding and managerial practices.

It was concluded from the results that season had no significant effect on volume, motility percentage and sperm concentration of

Table 3. Effect of season on motility percentage

Source of variation	D.F	S.S	M.S	F.ratio
Season	4	3402.05	850.51	3.51 ^{N.S}
Error	380	92169.03	242.55	
Total	384	95571.05		

N.S = Non-significant.

semen in crossbred (Holstein X Sahiwal) bulls. Non-significant effects of season on semen characteristics indicate that if the bulls are provided proper environmental conditions to avoid seasonal stress and suitable interval between ejaculates then the season will not affect the said semen characteristics.

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