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Short Communication

Effect of season and period on semen characteristics of two and three breed Gir crosses

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ABSTRACT

The present investigation was undertaken on 4931 ejaculate records pertains to halfbred and triple cross bulls maintaind at Research-cum-Development Project on Cattle, Rahuri. The overall means of semen volume (M1), sperm motility (0-5 scale) and per cent live spermatozoa in IFG (50% Holstein-Friesian + 50% Gir Interse), IFJG (50% Holstein-Friesian + 25% Jersey + 25% Gir Interse), IJFG (50% Jersey + 25% Holstein-Friesian + 25 Gir Interse) and IBFG (50% Brown Swiss + 25% Holstein-Friesian + 25% Gir Interse) were 5.040±0.106, 3.172±0.106, 3.172±0.018 and 76.458±0.250, 4.508±0.039, 3.267±0.016 and 77.344±0.189; 3.887±0.063, 2.639±0.026 and 71.145±0.321 and 5.170±0.071, 3.380±0.023 and 78.489±0.297, respectively. The effect of season on semen volume, sperm motility and per cent live spermatozoa was nonsignificant in all the genetic groups under study However, the influence of period of semen collection on the traits was significant in all the groups.

Key words : Semen characteristics, Gir crosses bulls

The quality and quantity of semen produced by bull depends on various factors viz., breed, age, weight of bull, season and frequency of semen collection and nutritional status of farm. The present study was undertaken to investigate nongenetic factors affecting characteristics of semen in two and three breed Gir crosses bulls.

The data pertains to 493 ejaculate records of 52 breeding bulls (15 IFG, 24 IFJG, 6 IJFG and 7 IBFG) maintaind at Research-cum-Development Project on Cattle, Mahatma Phule Krishi Vidyapeeth, Rahuri for a period of 23 years (1978 to 2000) was utilized for the present study. The least squares means of semen volume (ml), sperm motility (0-5 scale) and per cent live spermatozoa in semen were estimated by considering season and period effects (Harvey, 1966). The difference between two mean values were compared by using Duncans Multiple Range Test (Kramer, 1957). The year was divided into three seasons viz., summer (March-June), rainy (July-October) and winter (November-February) season. The entire period of study was divided into 6 different periods.

The genetic group and effectwise least-squares means of semen volume (M_1), sperm motility (0-5 scale) and live spermatozoa (5%) in IFG, IFJG, IJFG and IBFG genetic groups are presented in Table 1 to 4, respectively. The overall least-squares means of semen volume (M_1) in IFG, IFJG, IJFG and IBFG interbreds were 5.040±0.106±4.508±0.039, 3.887±0.063 and 5.170±0.071 respectively. The effect of season of semen collection on sperm volume was nonsignificant in all IFG, IFJG, IJFG and IBFG genetic groups. Similar results were reported by Saxena and Tripathi (1981) and Jersey x Sahiwal halfbreds The present results revealed that the semen volume was not affected by the season of semen collection in any of the groups. This might be due to proper feeding and management of breeding bulls maintained at the farm.

The influence of period of semen collection on semen volume was significant ($P < 0.01$) in IFG, IFJG, IJFG and IBFG two and three breed crosses. These result were in agreement with Raja and Rao (1992) reported in crossbred bulls of Brown Swiss, Jersey with Ongole breed and pure Ongole bulls.

The perusal of Table 1 indicated that in IFG group semen volume obtained during P5 (7.140±0.157 ml) was significantly higher than noticed in P1 to P4 and P6 groups. The semen volume observed inP2 (5.065±0.266 ml) was significantly higher than in P1, P3, P4 and P6 groups which did not differed significantly from each other. In IFJG triple cross semen volume recorded during various periods (P1 to

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Table 1. Least square means for some semen traits as affected by season and period of semen collection in IFG group

Traits/Effects	N	Semen volume (%)		Sperm motility (0-5 scale)		Live spermatozoa (%)	
		Mean	S.E.	Mean	S.E.	Mean	S.E.
Population mean (u)	1218	5.040	0.106	3.172	0.018	76.458	0.250
Season							
S1	404	5.34	0.277	3.155	0.049	76.448	0.654
S2	422	5.58	0.160	3.210	0.028	76.887	0.377
S3	392	5.027	0.116	3.151	0.029	76.039	0.393
Period							
P1	113	3.995^{a}	0.324	2.560^{a}	0.057	69.463^{a}	0.764
P2	131	5.065^{b}	0.266	3.513^{e}	0.047	76.288^{ab}	0.726
P3	354	3.957^{ab}	0.162	3.158^{c}	0.028	76.749^{ab}	0.384
P4	184	5.060^{ab}	0.224	3.072^{b}	0.039	76.414^{ab}	0.528
P5	375	7.140^{c}	0.157	3.367^{d}	0.027	77.893^{ab}	0.371
P6	61	5.063^{ab}	0.390	3.361^{d}	0.068	81.940^{b}	0.919

Means under each class in the same column with different superscripts differ significantly.

Table 2. Least square means for some semen traits as affected by season and period of semen collection in IFJG group

Traits/Effects	N	Semen volume (%)		Sperm motility (0-5 scale)		Live spermatozoa (%)	
		Mean	S.E.	Mean	S.E.	Mean	S.E.
Population mean (u)	2383	4.508	0.039	3.267	0.016	77.344	0.189
Season							
S1	817	4.580	0.073	3.306	0.030	77.708	0.356
S2	736	4.462	0.056	3.271	0.023	77.017	0.273
S3	830	4.482	0.054	3.224	0.022	77.306	0.261
Period							
P1	290	3.504^{a}	0.089	2.740^{a}	0.036	70.766^{a}	0.430
P2	536	5.912^{d}	0.057	3.342^{b}	0.023	74.590^{b}	0.2770
P3	680	4.015^{c}	0.051	3.300^{c}	0.020	79.100^{bc}	0.2450
P4	501	4.920^{d}	0.059	3.367^{b}	0.024	79.587^{bc}	0.286
P5	51	3.772^{b}	0.186	3.416^{bd}	0.076	78.219^{bc}	0.897
P6	325	5.643^{e}	0.073	3.438^{d}	0.030	81.000^{c}	0.356

Means under each class in the same column with different superscripts differ significantly.

Table 3. Least square means for some semen traits as affected by season and period of semen collection in IJFG group

Traits/Effects	N	Semen volume (%)		Sperm motility (0-5 scale)		Live spermatozoa (%)	
		Mean	S.E.	Mean	S.E.	Mean	S.E.
Population mean (u)	657	3.887	0.063	2.639	0.026	71.145	0.321
Season							
S1	229	3.925	0.116	2.675	0.048	71.206	0.589
S2	181	3.946	0.108	2.651	0.045	70.956	0.548
S3	247	3.790	0.091	2.590	0.038	71.273	0.462
Period							
P1	91	3.874^{a}	0.179	1.529^{a}	0.074	61.950^{a}	0.904
P2	290	5.128^{c}	0.083	3.468^{c}	0.034	75.441^{b}	0.419
P3	276	4.658^{b}	0.084	2.919^{b}	0.035	76.043^{c}	0.427

Means under each class in the same column with different superscripts differ significantly.

P6) differed significantly from each other except between P2-P6, the highest in P6 (5.643±0.074 ml) and lowest in P1 (3.504±0.080 ml) group.

In IJFG group semen volume (MI) noticed during various periods differed significantly from each other. The semen volume was highest during P2 (5.128±0.083) followed

Table 4. Least square means for some semen traits as affected by season and period of semen collection in IBFG group

Traits/Effects	N	Semen volume (%)		Sperm motility (0-5 scale)		Live spermatozoa (%)	
		Mean	S.E.	Mean	S.E.	Mean	S.E.
Population mean (u)	673	5.170	0.071	3.380	0.023	78.489	0.297
Season							
S1	174	5.008	0.133	3.449	0.043	78.883	0.552
S2	251	5.139	0.109	3.350	0.035	78.036	0.454
S3	248	5.364	0.114	3.339	0.037	78.550	0.474
Period							
P1	173	6.295[b]	0.159	3.583[b]	0.051	77.659	0.660
P2	351	4.381[a]	0.092	3.284[a]	0.030	79.043	0.384
P3	149	4.835[a]	0.141	3.272[a]	0.045	78.766	0.586

Means under each class in the same column with different superscripts differ significantly.

by P3 and lowest in P1 (3.874±0.179) group. In IBFG crossbred semen produced during P1 (6.259±0.159 ml) was significantly higher than P2 (4.381±0.092 ml) and P3 (4.935±0.141 ml) groups which were at par with each other.

The influence of season of semen collection on sperm motility was nonsignificant in IFG, IFJG, IJFG and IBFG genetic groups. This indicated that there is no change in sperm motility in semen due to change in season of semen collection. This might be due to proper feeding and management of breeding bulls during different periods.

The variation due to period of semen collection in semen motility was significant ($P < 0.01$) in all the groups under study. Similar results were reported by Terwaki *et al.* (1990) in Holstein Friesian bulls. In IFG halfbreds sperm motility (0-5 scale) in semen observed during P5 (3.367±0.027) and P6 (3.361±0.068) was significantly higher than obtained in rest of the periods (P1 to P4) however, at par with each other. The variation in sperm motility of semen recorded among P1 to P4 groups was significant, highest during P2 followed by P3, P4 and P1 group. In FJG group semen motility (0-5 scale) noticed during P5 (3.416±0.076) and P6 (3.438±0.030) was significantly higher than observed in P1 to P4 groups which differed significantly from each other. The highest sperm motility in semen was obtained in P3 group (3.300±0.020) followed by P4, P2 and P1 group. In IJFG interbred sperm motility (0-5 scale) in semen observed during P2 (3.468±0.034) was significantly higher than P1 (1.529±0.074) and P3 (2.919±0.035) groups, which also differed significantly from each other. In IBFG crossbred the sperm motility (0-5 scale) in semen noticed during P1 (3.583±0.051) was significantly higher than recorded in P2 and P3 groups, the difference between them was nonsignificant.

The influence of season of semen collection on per cent live spermatozoa in semen was significant ($P < 0.01$) in IFG, IFJG and IJFG groups. These results corroborated with Singh and Pangawkar (1991) reported in crossbred bulls. In IFG group live spermatozoa (%) in semen produced during later period (P6) was significantly higher (81.940±0.919) than observed in P1 (69.463±0.764) and at par with P2 to P5 groups. In IFJG triple cross per cent live spermatozoa in semen noticed during P6 (1.800±0.356) was significantly higher than P1 (70.766±0.430) and P2 (74.590±0.277) groups and nonsignificant with P3 to P5 groups. The difference of live spermatozoa (%) in semen of group P1 to P2 was significant. In IJFG triple cross per cent live spermatozoa recorded during different periods differed significantly from each other lowest in earlier (P1) period (61.950±0.904) which gradually increased during later periods (P2 and P3).

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