Serum Electrolytes Chan

esses

stricted		Level of significance				
l- a	Avik- - Breed Alin	Feed	Exer-cise	BxF	BxE	E
6	6.98-	XX	XX	—	—	X
.237	±0.195					
69	10.72-	—	—	X	—	X
1.494	±0.472					
4	2.61-	XX	—	X	—	—
.064	±0.070					
4.59-	142.70	XX	X	XX	—	—
.29	±2.17					
54	5.85	—	XX	X	—	X
.12	±0.12					

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STUDIES ON THE NORMS AND CORRELATIONS OF INITIAL AND POST-THAW SEMINAL ATTRIBUTES OF TRIPLE CROSSBRED BULLS

Sumant Vyas, Greesh Mohan, A. J. Dhami and K. L. Sahni

Germ Plasm Centre
Animal Reproduction Divison,
Indian Veterinary Research Institute, Izatnagar,
Bareilly-243 122, India

ABSTRACT

One hundred and sixty split-ejaculates from five triple crossbred bulls (1/2 HF x 1/4 J x 1/4 H) were studied for the initial, post-thaw and post-refrigeration sperm characteristics and their interrelationships. The mean values for the various attributes were : sperm concentration 83.54± 3.12x10^7/ml; progressive motility motility 71.03± 1.37% initial, 60.69± 1.38% prefreeze, 34.89± 1.42 % post-thaw, 16.38± 0.93 % after 1 hr of post-thaw incubation at 37°C, and 58.63± 1.43, 50.47± 1.55, 41.75±1.59 and 30.13±1.60 percent after 24, 48, 72 and 96 h of storage in tris diluent at 5°C, respectively. The percentages of live and abnormal spermatozoa were 79.86± 0.98 and 9.58±0.86 initially, and 43.51±1.46 and 14.07±0.87 after thawing. The abnormalities of sperm head, mid-piece,and tail were also increased significantly in post-thawed semen. Most of the characteristics studied were significantly (P <0.01) interrelated. Initial motility and live sperm percent were the good indicators of semen quality, freezability and liveability of crossbred bulls semen. Similarly, refrigeration motility was a good indicator of freezability and post-thaw survivability of spermatozoa, and hence could serve as a simple test in screening the bulls for freezability of their semen under the field/farm conditions, where the test freezing facilities are not available.

INTRODUCTION

The information available on the normal seminal attributes, freezability, fertility and their interdependence which could help in predicting the worth of crossbred bulls as potential sires is meagre (Rao and Kotayya, 1977; Rao and Rao, 1978; Saxena and Tripathi, 1981; Tomar *et al.*, 1985; Belorkar *et al.*, 1990). Hence, the present study was undertaken to know the physiological norms and correlations of seminal attributes and freezability in triple crossbred bulls.

MATERIALS AND METHODS

Five triple crossbred bulls (1/2 HF x 1/4 J x 1/4 H), aged 3 to 4-1/2 years, maintained under identical nutritional and managerial conditions at the Germ Plasm Centre of IVRI, Izatnagar, were taken up for this study. Semen was collected at weekly interval using artificial vagina. A total of 160 split-ejaculates were studied for the initial motility, sperm concentration, live sperm percent and abnormal sperm percent as per the standard procedures (Tomar, 1970). The semen samples were then diluted in Tris citric acid fructose egg yolk glycerol diluent keeping 25 million spermatozoa per 0.5 ml Medium French straw. The straws were frozen in liquid nitrogen vapour for 10 minutes after 3 hr of equilibration at 5°C (Sahni and Mohan, 1988). A part of the diluted semen was also preserved in refrigerator at 4-6°C and was assessed for progressive motility at 24 hourly intervals upto 96 hr. The frozen straws were thawed in water bath at 38°C for 30 seconds, after 16 hr of storage in liquid nitrogen. The pre-and post-freeze motility was assessed under a phase contrast microscope (40 X) fitted with a biotherm stage. Post-thaw live sperm and the abnormalities of sperm head, mid-piece, tail and total abnormalities were studied in eosin-nigrosin stained smears (Sharma, 1988). The same thawed straws were then immediately transferred to an incubator at 37°C and motility was reassessed after 1 hr. The data were analysed statistically for the mean ± SE values of each parameter and the correlation coefficients were worked out on a computer as per the standard procedure (Snedecor and Cochran, 1967).

RESULTS AND DISCUSSION

The mean values with their standard errors for various seminal attributes studied at the initial, prefreeze, post-thaw and post preservation at 4-6°C, and their correlation coefficients have been presented in Tables 1 and 2. The present

findings with respect to the normal seminal profiles are comparable with the earlier reports on crossbred bulls semen (Biswas *et al.*, 1976; Rao and Rao, 1978; Garg and Pandit, 1983; Chauhan *et al.*, 1983; Sharma, 1988; Belorkar *et al.*, 1990), and agree to the general views for triple crossbred bulls.

Initial motility and sperm conentration

The initial motility (71.03±1.27%) had significant (P <0.01) positive correlations with the live sperm percent at the initial and post-thaw stage, and motility at prefreezing, post-thaw (O h & 1 h incubation) and at different hours of preservation at 4-6°C. It had negative correlations with sperm abnormalities of head, mid-piece, tail and total in the fresh and post-thawed semen. Whereas, sperm concentration showed significant (P <0.01) positive correlations only with sperm tail abnormalities in fresh and post-thawed semen (Table 2). These were the expected relationships as better the initial motility of semen better would be the freezability/preservability with higher live sperm and lower dead/abnormal spermatozoa, and are in agreement with the reports of Saxena and Tripathi (1981), Rao and Rao (1978), Biswas *et al.* (1976), Patel *et al.* (1989), Sharma (1988) and Belorkar *et al.* (1990) in crossbred bulls.

Live sperm count (pre-and post-freezing)

As with initial motility, the live sperm in fresh semen (79.88±0.98%) was significantly (P <0.01) and positively correlated with the motility at pre-and post-freezing, refrigeration motility and post-thaw live sperm percent. It was negatively correlated with sperm head, mid-piece, tail and total abnormalities in the fresh and frozen-thawed semen. Similarly, the post-thaw live sperm (43.51±1.46%) had significantly (P <0.01) positive correlations with motility at pre-and post-freezing and at different hours of refrigeration, and negative correlations with sperm abnormalities pre -and post-freezing (Table 2). Correlation coefficients of similar magnitude were reported by earlier workers (Saxena and Tripathi, 1981; Sharma, 1988; Bhav *et al.*, 1988 & 1990; Belorkar *et al.*, 1990) in crossbred a buffalo bulls. Thus, greater the liveability of spermato better would be the quality and motility pre -and post-freez

Sperm abnormalities (fresh semen)

The abnormalities of sperm head, mid-piece, tail a total in the fresh semen (Table 1) were significantly (P <0 and positively interrelated with one another, and were fur correlated positively with the sperm abnormalities of different segments in post-thawed semen, and negativ with pre- and post-freezing motility (Table 2). These w the expected correlations, since the abnormalities of spe particularly the tail and mid-piece, hinder the sperm forw motility or kinetics, and also such spermatozoa are viable, hence negatively correlated with motility liveability. Similarly, the post-thaw sperm quality is dep ent on the initial quality. The present findings support observations of Biswas *et al.* (1976), Rao and Rao (19 Bhavsar *et al.* (1990) and Belorkar *et al.* (1990) in bovines.

Sperm abnormalities (Post-thaw)

In the post-thawed semen also, the abnormalitie sperm head, mid-piece, tail and total were significant <0.01) and positively interrelated, and all were negati correlated with the motility at different hours of refrig tion, as well as with motility and live sperm percent at and post-freezing (Table 2). Although the mid-piece ab malities had poor correlations with tail abnormalities refrigeration motility. Since the post-thaw motility, sperm and refrigeration motility were positively correl their negative correlations with sperm abnormalities anticipated. Belorkar *et al.* (1990) have made similar o vations in crossbred bulls.

Table 1. Norms of various seminal attributes in fresh, frozen and refrigerated semen of triple crossbred bulls

Sl.No. Attribute	Means ±SE*	Sl. No. Attribute	Mean±SE*
1. Initial motility (%)	71.03±1.27	11. Post-thaw live sperm (%)	43.51±1.45
2. Sperm conc ($x10^7$/ml)	83.54±3.12	— Post-thaw sperm abnormalities:	
3. Live sperm (%)	79.86±0.98	12. % Head abnormalities	4.63±0.48
— Initial sperm abnormalities		13. % Mid-piece abnormal	2.03±0.36
4. % Head abnormal	2.81±0.52	14. % Tail abnormalities	7.31±0.50
5. % Mid-piece abn.	0.99±0.37	15. % Total abnormal	14.07±0.87
6. % Tail abnormal	5.70±0.49	— Refrigeration preservation :	
7. % Total abnormal	9.58±0.86	16. Motility at 24 hr (%)	58.63±1.43
8. Prefreeze motility	60.69±1.38	17. Motility at 48 hr (%)	50.47±1.55
9. Post-thaw motility	34.89±1.42	18. Motility at 72 hr (%)	41.75±1.59
10. Post-thaw incubation (1 hr) motility	16.38±0.93	19. Motility at 96 hr(%)	30.13±1.60

* Values are the means of 160 observations each.

Pre- and Post-freezing motility

Prefreeze motility of semen (60.69±1.34% ignificant positive correlations (P <0.01) with pos & 1 h incubation) motility, post-thaw live s motility at different intervals of fridge preserva negative correlations with post-thaw sperm abno Similar correlations were also observed for motility at 0 hr (34.89±1.42%) and 1 hr (16.38± incubation with the post-thaw live and abnorm percent and motility after refrigeration (Table correlations revealed that better the preservability at 5°C, better would be its freezability. Thus, one indirectly depicted the another one, and hence, eith be used in evaluating the semen/bull under field c before selecting as potential sire for semen bank. Th findings are well in accordance with the corrlations by Bhavsar *et al.* (1988 & 1990), Verma and Sharm and Belorkar *et al.* (1990) in the bovines.

Refrigeration motility

Highly significant positive interrelationships served between sperm motility values at different storage in the refrigerator and these were also correl the initial and post-thaw semen characters. These ions were in accordance with the findings of Sa Tripathi (1981) and Verma and Sharma (1989) in bull semen.

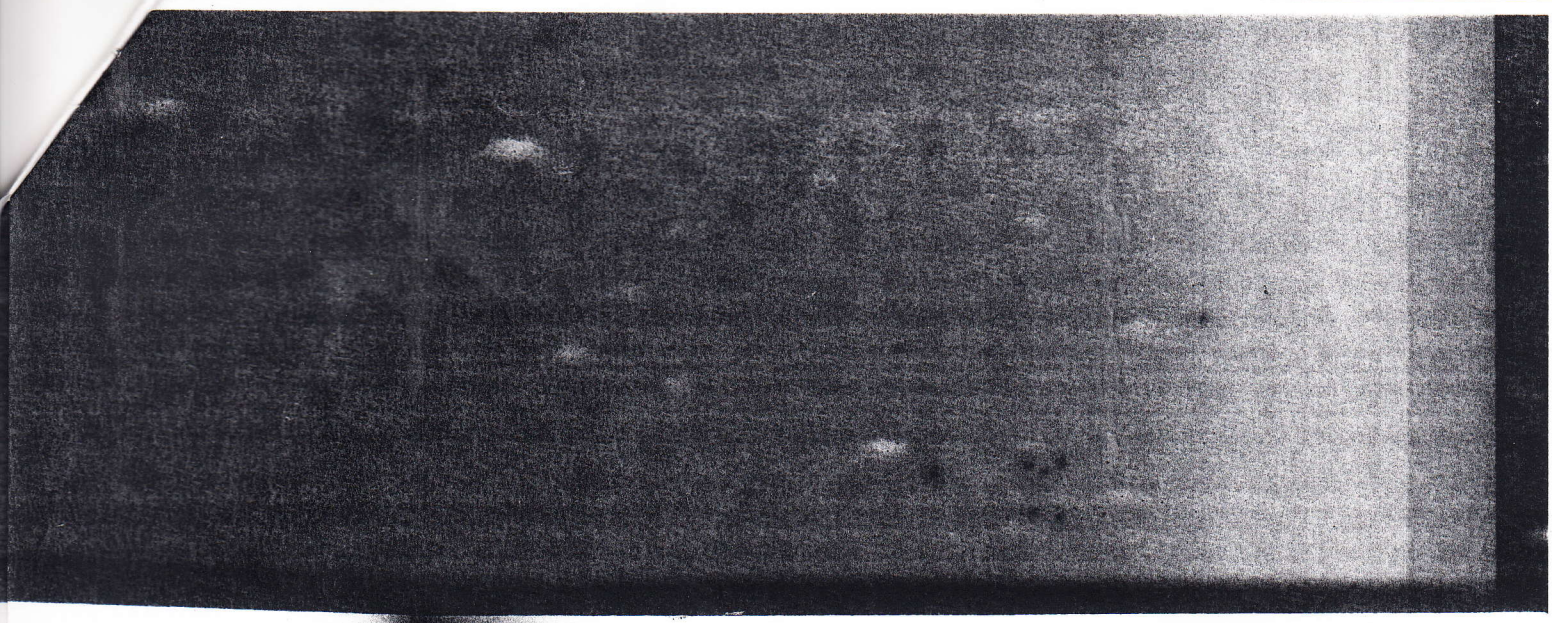
ACKNOWLEDGEMENT

The financial assistance given in the form

Table II : Correlation coefficients between various semi bulls.

	2	3	4	5	6	7	8
1	.01	.84**	-.34**	-.26**	-.31**	-.45**	.79**
2	-	-.12	-.01	-.12	.25**	.13	-.11
3		-	-.42**	-.31**	-.40**	-.55**	.73**
4			-	.39**	.17*	.69**	.31*
5				-	.11	.58**	-.12
6					-	.75**	-.40*
7						-	-.44*
8							-
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							

1 = Initial motility; SC = Sperm concentration; * = Signi
1, 2. SC, 3. Live sperm(%) Sperm Abnormalities, 4. Hea
Live sperm % PT Sperm Abnormalities, 12. Head, 13. Mid



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988 & 1990; Belorkar *et al.*, 1990) in crossbred
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- and post-freezing motility (Table 2). These
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arly the tail and mid-piece, hinder the sperm for
or kinetics, and also such spermatozoa are
hence negatively correlated with motility
ty. Similarly, the post-thaw sperm quality is dep
e initial quality. The present findings support
ions of Biswas *et al.* (1976), Rao and Rao (19
et al. (1990) and Belorkar *et al.* (1990) in

bnormalities (Post-thaw)

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ell as with motility and live sperm percent at
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d refrigeration motility were positively correla
ative correlations with sperm abnormalities w
d. Belorkar *et al.* (1990) have made similar ob
crossbred bulls.

igerated semen of triple crossbred bulls

Attribute	Mean±SE*
live sperm (%)	43.51±1.45
w sperm abnormalities:	
bnormalities	4.63±0.48
ece abnormal	2.03±0.36
normalities	7.31±0.50
bnormal	14.07±0.87
tion preservation :	
24 hr (%)	58.63±1.43
48 hr (%)	50.47±1.55
72 hr (%)	41.75±1.59
96 hr(%)	30.13±1.60

Pre- and Post-freezing motility

Prefreeze motility of semen (60.69±1.34%) showed significant positive correlations (P <0.01) with post-thaw (0 & 1 h incubation) motility, post-thaw live sperm and motility at different intervals of fridge preservation, and negative correlations with post-thaw sperm abnormalities. Similar correlations were also observed for post-thaw motility at 0 hr (34.89±1.42%) and 1 hr (16.38±0.93%) of incubation with the post-thaw live and abnormal sperm percent and motility after refrigeration (Table 2). These correlations revealed that better the preservability of semen at 5°C, better would be its freezability. Thus, one character indirectly depicted the another one, and hence, either one can be used in evaluating the semen/bull under field conditions before selecting as potential sire for semen bank. The present findings are well in accordance with the corrlations reported by Bhavsar *et al.* (1988 & 1990), Verma and Sharma (1989) and Belorkar *et al.* (1990) in the bovines.

Refrigeration motility

Highly significant positive interrelationships were observed between sperm motility values at different hours of storage in the refrigerator and these were also correlated with the initial and post-thaw semen characters. These observations were in accordance with the findings of Saxena and Tripathi (1981) and Verma and Sharma (1989) in crossbred bull semen.

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Table II : Correlation coefficients between various seminal attributes in fresh, post-thawed (PT) and preserved (at 5°C) semen of crossbred bulls.

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	.01	.84**	-.34**	-.26**	-.31**	-.45**	.79**	.57**	.44**	.57**	-.38**	-.20**	-.35**	-.48**	.70**	.64**	.59**	.58**
2	-	-.12	- .01	-.12	.25**	.13	-.11	-.02	-.04	-.08	-.12	-.07	.20*	.06	.02	.07	.11	.13
3		-	-.42**	-.31**	-.40**	-.55**	.73**	.54**	.41**	.56**	-.49**	-.24**	-.45**	-.63**	.58**	.56**	.49**	.47**
4			-	.39**	.17*	.69**	.31**	-.12	-.17*	-.22**	.66**	.11	.21*	.49**	-.28**	-.24**	-.23**	-.27**
5				-	.11	.58**	-.12	-.25**	-.22**	-.25**	.40**	.45**	.11	.41**	-.20*	-.17*	-.22**	-.29**
6					-	.75**	-.40**	-.24**	-.08	-.24**	.13	-0.1	.62**	.48**	-.29**	-.31**	-.32**	-.25**
7						-	-.44**	-.34**	-.22**	-.35**	.53**	.19*	.53**	.68**	-.38**	-.36**	-.39**	-.38**
8							-	.69**	.49**	.70**	-.23**	-.05	-.39**	-.39**	.74**	.69**	.68**	.65**
9									.79**	.96**	-.17*	-.23**	-.22**	-.29**	.58**	.55**	.58**	.55**
10										.76**	-.14	-.19*	-.08	-.18*	.38**	.34**	.42**	.44**
11										-	-.19*	-.24**	-.24**	-.31**	.59**	.56**	.59**	.54**
12											-	.39**	.21**	.71**	-.24**	-.24**	-.19*	-.21**
13												-	.10	.42**	-.11	-.17*	-.16*	-.14
14													-	.76**	-31**	-.26**	-.22**	-.12
15														-	-.35**	-.34**	-.28**	-.23**
16															-	.90**	.87**	.82**
17																-	.94**	.85**
18																	-	.91**
19																		-

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EFFECT OF FEEDIN ON THE YIELD FROM

B.V. Bhask

Nat

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Ten cross-bred milch animals on the G-1 and G-2. The G-1 group of animal concentrate mixture to meet the protein animals were fed with urea ammoniated maintenance and milk production.

In the group fed with urea treated st straw, at the same time a reduction in con treatment of straw has the potential for to increase milk yield.

INTRODUCTION

Urea upgraded straw supported better grow as compared to urea supplemented straw (Wieringa, 1988). *et al.*, (Dahiya 1990) while r creased dry matter intake and better nutrient util urea treated wheat straw in milking buffaloes, 2 in concentrate requirement has been reported.

Several studies have shown that urea trea (*Oryza sativa*) straws (Doyle *et al.*, 1986) can intake and digestibility in adult large ruminants has indicated that urea treatment of the straw c diets given to dairy animals can increase mi reduce live weight losses in lactating animal Davis, 1981, Perdok *et al.*, 1982, 1984; Davis,

The experiment described here was carrie lish if urea treatment could be used as a means the straw component in concentrate/straw d lactating crossbred cows.

MATERIALS AND METHODS

Ten 75% Holstein Friesian crossbred co diet comprising concentrates (30% crushed wheat bran, 20% groundnut cake, 2% salt a vitamin A), 5 kg (about 1 kg DM) green grass *libitum* and minerals for the first 57-59 days of concentrates were given according to NRC (19