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Research Article

Evaluation and Freezing of Sirohi Goat Semen

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ABSTRACT

Semen ejaculates (1454) from 10 healthy Sirohi bucks collected during year 1998 and 1999 were processed. Tris egg yolk dilutor was used for extending semen. The mean volume, sperm concentration, initial motility, pre-freezing motility and post thaw motility were 1.06 ± 0.01 ml, 22631 ± 17.61 x 10^6/ ml, 86.51 ± 0.19 per cent, 83.87 ± 0.24 per cent and 58.17 ± 0.43, respectively. The mean reaction time was 48.35 ± 0.76, respectively. The mean ejaculate volume was found to be maximum as 1.13 ± 0.02 ml. in rainy season and maximum sperm concentration in winter (2762.5 ± 30.62 x 10^6 /ml). Although initial motility did not differ during seasons, the mean post thaw motility in rainy sean was highest (60.13 ± 0.8 per cent) compared to summer season (55.68 ± 1.09). Ejaculate volume was negatively and significantly correlated to sperm concentration (r=0.17) and post thaw motility (r=0.10). Reaction time was negatively correlated to ejaculate volume(r=0.56) and initial motility (r=0.16).

Key words: *Tris egg yolk extender, Goat, Artificial Insemination, Sperm*

INTRODUCTION

The goat rearing practices in Maharashtra have changed over a period of time from purely extensive to semi extensive and intensive system. The traditional keeping of large flocks of goat and sheep is slowly shifting to individual farmer level rearing of small number of goats. The non-availability of breeding bucks in these small holding is creating goat breeding problems in village area. Artificial Insemination is the best available breeding method for solving these problems and bringing about genetic improvement of the local goat. Successful Artificial Insemination necessitates good quality semen and semen evaluation for its quality thus becomes obligatory. The attempts were made in the present study to freeze goat semen and evaluate the quality of freezing of goat semen for field use purpose.

MATERIAL AND METHODS

Data on ten healthy Sirohi bucks of 25 kg. body weight were introduced to semen collection. The bucks were maintained under identical conditions of housing and feeding at BAIF Central Research Station, Urulikanchan. Ejaculates were collected twice weekly during 1998 and 1999 by artificial vagina method.

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The total volume of ejaculate, sperm concentration and initial motility were assessed by standard procedures. Ejaculates were extended using Tris egg yolk extender. Semen was frozen and packed in French mini /German mini straws. watery semen and low initial motility(<55 per cent) and post thaw motility(<55 per cent). To study the seasonal effect, year was divided into three seasons viz. Summer (March- June), Rainy (July- October) and winter (November- February). The data was analyzed by standard statistical methods[11].

RESULTS AND DISCUSSIONS

Buck-wise mean and standard errors of reaction time, initial motility, pre and post freezing motility are presented in Table 1. The mean ejaculate volume of Sirohi goat semen observed in present study was 1.06 ± 0.01ml ranging from 0.2 to 3ml. Comparatively lesser ejaculate volumes reported by Murugaiyah[5] in Kambing and Katjang crossbred buck (0.89± 0.96 ml) and Singh and Purbey[9] as 0.78 ± 0.01 ml , Wascho and Seifert[13] as 0.73 ±0.28 in west african goats and Mittal[4] as 0.69 ml.in barbari bucks semen. It is comparable to the values reported by Oliveira *et. al*.[6], noted as 0.93 ± 0.4 ml and Bakshi *et. al*.[1], 0.95 ±0.03 ml and 0.93 ±0.06 ml in Angora and 7/8 Angora buck, Pattanaik *et.al*.[7], noted 0.94± 0.24 ml. in semen of Ganjam bucks and Chahan and Israel[3] reported as 1.02 ± 0.46 Tanzanian goat. Tuly and Holfz[12] found higher ejaculate volume 1.75 ± 0.09 in Boer. These differences in the findings might be due to breed variation and breed specificity.

The mean sperm concentration/ml of Sirohi buck semen was 2621.73 ± 17.6 $x10^6$ /ml The range observed between 644 to 5330 $x10^6$ /ml. These findings are comparable with Murugaiyah,[5] (2650± 1.5$x10^6$ /ml), Bakshi *et. al*., [1] (2597.98 ± 86.34 $x10^6$ /ml) and higher concentration observed by Tuly and Holfz,[12] (2960± 0.04$x10^6$ /ml) Singh and Purbey, (3285.0±45.32 $x10^6$ /ml) Chahan and Israel,[3] (3195± 1.01 $x10^6$ /ml) and Wascho and Seifert, (3.2±0.28 $x10^9$ /ml). Oliveira *et. al*.[6], found lower values in Bahia goat in Brazil(1018±47 $x10^6$ /ml) and Pattanaik *et.al*.[7], found 2309±95.8 $x10^6$ /ml in Ganjam bucks and Mittal J.P[4], recorded sperm concentration 1678 $x10^6$ /ml in semen of barbari bucks. The breed differences thus appear to be important.

Initial motility of sperm in the semen of Sirohi buck was 86.51% ranging from 13 to 95 %. Comparatively lower initial motility found by Oliveira *et. al*.[6], Singh and Purbey[8] and Wascho and Seifert[13] 64.5± 18.18 and 76.5±0.40, 71 ±10 per cent, respectively. Mittal J.P[4], found seasonal variation in live sperms in semen barbari bucks from 62.5 % in winter to 82.03% in summer.

The means of prefreezing and post thaw motility of buck semen were found as 83.87 ±0.24 % and 58.17 ± 0.43 %. respectively. The findings in the present study are in consonance with means of prefreezing and post thaw motility observed by Singh[9] *et. al*. 80.86 ±0.51 and 52.96 ±0.83 in the Tris diluter and 76.92 ± 0.54 and 38.70 ± 0.89 in EYC extender. Sinha *et.al*.[10], found 52± 0.41 , 51.5 ± 2.26 and 44.11± 0.16 per cent mean post thaw motility in Jamnapari, Barbari and Black Bengal goats. Chaudhari[2] *et.al*. found post thaw motility 64.00± 0.05 with Tris EYCFG.

In the present study mean of diluted volume of semen and number of straws produced per ejaculate were 11.18 ±0.47 ml and 28.62 ±0.47. The mean reaction time noted as 48.35±0.76 seconds. The shortest reaction time was found in summer season (35.3 ± 1.12 seconds), followed by rainy season (51.66±1.07 seconds) and longest in winter season (56.82±1.37). Singh and Purbey[8] observed reaction time as 34.44 ±0.84 seconds and Pattanaik *et.al*.[7], observed 9.62 ±0.9 seconds.

Reaction time was negatively and significantly correlated to ejaculate volume of buck semen (r=0.56), initial motility(r=0.09) and prefreezing motility (Table 3).Ejaculate volume was significantly and negatively correlated to concentration of sperm(r=0.17) in semen and post thaw motility (r=0.18) as showed in Table 4.While it was positively and significantly correlated to initial and

prefreezing motility. Singh and Purbry[9] observed significant and positive correlation between reaction time and sperm concentration, volume and pH of semen.

Seasonal variation in the semen characteristics are presented in Table 2. During rainy season ejaculate volume was maximum (1.13 ± 0.01 ml) and minimum in winter season (1± 0.02). The sperm concentration was found highest in winter season (2762.5 x10^6 /ml) and the lowest in rainy season (2519.34 x10^6 /ml). Initial motility was found slightly higher in winter season (86.73 ± 0.24 %) followed by rainy season (86.41 ± 0.28%) and summer season (86.36 ± 0.58 %). The frozen semen was distributed to village area and based on 2000 inseminations, the mean kidding rate was observed to be 30 %.

It was concluded that the semen of Sirohi bucks can be frozen and used successfully at field level for insemination and attaining conception.

Table 1: Buckwise means and standard errors of semen parameters of Sirohi breed

Buck name	Ejaculate volume			sperm concentration (x 10 /ml)			Initial motility (%)			Motility before freezing (%)			Motility after freezing (%)			Reaction time (seconds)		
	No.	Mean	SE	No.	Mean	SE	No.	Mean	SE	No.	Mean	SE	No.	Mean	SE	No.	Mean	SE
Babu	148	1.25	0.03	138	2522.21	42.35	149	86	0.62	88	84.4	0.65	96	55.8	1.51	125	38.5	1.92
Bahadur	134	0.87	0.03	122	2774.05	53.04	131	85.9	0.87	75	84.2	0.72	82	58.5	1.37	108	56	2.46
Baj	151	1.26	0.04	138	2729.02	68.1	148	87.5	0.42	88	84	0.8	91	57	1.58	121	43.1	2.05
Benhur	130	0.8	0.03	116	2788.47	64.13	122	87.9	0.28	73	84	1.23	77	57.1	1.73	103	60.1	2.57
Bhanu	155	1.03	0.03	140	2391.81	49.07	151	86.1	0.65	85	82.7	0.8	92	56.9	1.3	119	50.4	2.08
Bhiru	150	0.94	0.03	136	2669.19	54.96	147	84.9	0.7	83	82.8	0.65	89	56	1.47	115	54.8	2.23
Bindu	149	1.37	0.03	138	2375.73	40.42	148	87.7	0.42	86	84.5	0.54	97	60.3	1.22	122	31.1	2.42
Bony	154	1.11	0.03	138	2802.16	61.95	149	86.3	0.86	88	84.7	0.67	95	61.3	1.07	122	44.1	1.8
Boss	146	1.07	0.03	133	2625.23	54.03	144	86.5	0.48	87	85.2	0.52	93	59.4	1.38	122	45.1	1.96
Bunty	137	0.88	0.03	122	2708.83	58.59	133	87.3	0.51	81	84.1	0.93	87	60	1.34	111	61.5	2.84
Total	1454	1.06	0.01	1321	2633.32	17.85	1422	86.59	0.19	834	84.06	0.24	899	58.26	0.44	1207	48.35	0.76

Table 2: Seasonwise Mean and Standard Error of semen parameters of Sirohi breed

Season	Ejaculate volume			sperm concentration (x 10 /ml)			Initial motility(%)			Motility before freezing (%)			Motility after freezing (%)			Reaction time (seconds)		
	No.	Mean	SE	No.	Mean	SE	No.	Mean	SE	No.	Mean	SE	No.	Mean	SE	No.	Mean	SE
Rainy	607	1.14	0.02	510	2533.44	26.11	582	86.6	0.28	329	84.35	0.34	345	60.67	0.84	281	51.66	1.07
Winter	527	1.0	0.02	523	2773.17	30.57	528	86.73	0.25	394	83.49	0.31	436	57.06	0.54	291	56.82	1.37
Summer	320	1.02	0.02	288	2556.22	35.95	312	86.36	0.58	111	85.23	1.00	118	55.68	1.09	260	35.30	1.12
Total	1454	1.06	0.01	1321	2633.32	17.58	1422	86.59	0.19	834	84.06	0.24	899	58.26	0.44	832	48.35	0.76

Table 3: Correlation coefficient between different semen parameters of Sirohi breed

Semen character	Ejaculate volume	Sperm concentration	Initial motolity	Prefreezing motility	Post thaw motility	Reaction time
Ejaculate volume	--	- 0.18**	0.03	- 0.10**	0.14**	-0.62**
Sperm concentration		--	0.15**	0.05	0.02	0.06
Initial motolity			--	0.09**	0.33**	- 0.04
Prefreezing motility				--	0.23**	- 0.10*
Post thaw motility					--	- 0.13**
Reaction time						--

Table 4: ANOVA showing effect of season , year and buck on characteristics of Sirohi buck semen

Source of variation	Ejaculate volume		Sperm concentration		Initial motility		Prefreezing motility		Post thaw motility		Reaction time	
	DF	MSS	DF	MSS	DF	MSS	DF	MSS	DF	MSS	DF	MSS
Year	1	60.06**	1	3279359.25**	1	552.93**	1	2104.04**	1	3445.05**	1	21641.89**
Season	2	8.58**	2	9305961.00**	2	63.64	2	72.23	2	1244.90**	2	8137.94**
Buck	9	6.07**	9	2697488.66**	9	80.29	9	56.92	9	337.92*	9	6883.71**
Error	1441	0.13	1308	386499.03	1409	54.18	821	45.79	886	170.07	819	308.91

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REFERENCES

1. Bakshi, S.A., Patil, V.K., Srivastava, A.K., Jagtap, D.Z. and More, B.K., Studies on semen evaluation and fertility rate of Angora and 7/8 Angora bucks. Livestock Adviser. **12(10):** 13-18 (1987).
2. Chaudhari A.H., Deka B.C. and Rajkonwar C.K., Effect of diluter on motility and fertility of goat semen. Cherion. **16(2):** 94-96 (1987).
3. Chauhan, F.S. and Israel, S.H., Testicular size and semen characteristics in bucks. Abstr. International conference on goats. March, pp 259 (1992).
4. Mittal, J.P., Seasonal variation in semen quality of barbari bucks. *Indian Vet. J.* **59(12):** 957-959 (1982).
5. Murugaryah, M., Changes in the semen chractristics of Kambing x Katjang crossbred bucks under hot and humid environmental temperatures. Abstr. International conference on goats. March, pp 1126-1129 (1992).
6. Olivera, J.V.L., De, Resende, J., Martinez, T.C.N., De, B.T., Ribeiri, M.A.T. and Laborda S., Da, S., Fertility of goats with regards to the physical characters of semen of breeding male in flock of northern east Banida state. *Anim. Breed. Abstr*. **56(5):** 385 (1984).
7. Pattanaik, D.G., Mohanty, B.N., Ray, S.K.H., Mohanty, D.N. and Panda, G.M., A note on semen characteristics of Ganjam bucks. *Indian J. Anim. Reprod*. **12(2):** 92 (1991).
8. Singh, L.P. and Purebey, L.N., Reaction time and physical characteristics of semen in non-descript indian bucks. Abstr. International conference on goats. *March,pp* 300 (1992).
9. Singh, L.P., Purebey, L.N. and Sahani, K.L., Studies on freezability of non-descript indian bucks. Abstr. International conference on goats. *March,pp* 303 (1992).
10. Sinha, S.N., Sinha, B.K. and Sinha, A.K., Post thaw motility and fertility of frozen sperm of bucks of different breeds. *Indian J. Anim. Reprod*. **8(1):** 28-31 (1987).
11. Snedecor, G.W. and Cochran, W.G., Statistical Methods.6th edn. Oxford and IBH Publishing Co. Calcutta. (1968).
12. Tuly, R. K. and Holtz, W., The effect of season on seminal characters in Boer goat bucks in northen temperature zone. Ab. International conference on goats. *March,pp* 1195-1200 (1992).
13. Wascho, S. and Seifert, H., Investigation on semen quality and semen freezing in West African goats. *Anim. Breed. Abstr*. **40(1):** 113-115 (1991).