



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.03

TPI 2018; 7(6): 500-502

© 2018 TPI

www.thepharmajournal.com

Received: 12-04-2018

Accepted: 13-05-2018

Prathibha Kaimal R

PG student, Dept. of Veterinary Gynaecology and Obstetrics, KVAFSU, Bidar, Karnataka, India,

Tandle MK

Professor and Head, Dept. of Veterinary Gynaecology and Obstetrics, KVAFSU, Bidar, Karnataka, India

Usturge SM

Director of Instruction (PGS), KVAFSU, Bidar, Karnataka, India

Kartikesh SM

Associate Professor and Head, Dept. of Veterinary Physiology and Biochemistry, Veterinary College, Bidar, Karnataka, India

Selvaraju S

Scientist, National Institute of Animal Nutrition and Physiology, ICAR, Adogudi, Bengaluru, Karnataka, India

Naveenkumar S

Associate Professor, Dept. of AGB, Veterinary College, Bengaluru, Karnataka, India

Vinay PT

Assistant Professor, Dept of Pharmacology and Toxicology, Veterinary College, KVAFSU, Nandinagar, Bidar, Karnataka, India

Correspondence

Tandle MK

Professor and Head, Dept. of Veterinary Gynaecology and Obstetrics, KVAFSU, Bidar, Karnataka, India

Effect of climate on body weight, scrotal circumference, libido test, reaction time and quality of semen in nari Suwarna rams

Prathibha Kaimal R, Tandle MK, Usturge SM, Kartikesh SM, Selvaraju S, Naveenkumar S and Vinay PT

Abstract

The present research investigation was conducted to study effect of climate on body weight, scrotal circumference, libido test, reaction time and quality of semen in NARI Suwarna rams. The minimum temperature, relative humidity, day length and rainfall was having mixed correlation with non-significant difference with body weight, reaction time, scrotal circumference, libido and quality of semen. The rainfall was having positive correlation with gross motility of semen samples whereas the relative humidity having negative correlation with reaction time with statistically significant difference. The maximum temperature was negatively correlated with gross motility, sperm motility, head abnormalities percentage, mid piece abnormalities percentage, tail abnormalities percentage, total sperm abnormalities percentage, concentration of sperm, live sperm percentage, HOST, semen index, SCMCT and positively correlated with body weight, scrotal circumference, libido test, reaction time, volume and dead sperm percentage but the difference was statistically non-significant in NARI Suwarna rams.

Keywords: Climate, libido, semen quality, nari Suwarna

Introduction

Sexual behaviour of rams can be influenced by many factors, including season of year, genetics, breed differences, hormonal influence, post-weaning management, temperature and nutrition ^[1]. Males are not normally influenced by photoperiod to the same degree as females although seasonal changes noted in semen characteristics and libido in several breeds ^[2]. NARI Suwarna sheep strain is developed by the Nimbkar Agricultural Research Institute, Phaltan, Satara, Maharashtra, India. The NARI Suwarna breed of sheep has over 60% of ewes with twins instead of single lambs by introducing the 'FecB' gene from Garole breed of Sunderban of West Bengal which is prolific but rare breed of small sheep found in the hot and humid region. The name of the gene 'FecB' gene derives from 'Fec' for 'fecundity' and 'B' indicating the name 'Boorola' given to the gene it when first discovered in Australia in the 1970's. In view of all this research work, the present research investigation was conducted to study effect of climate on body weight, scrotal circumference, libido test, reaction time and quality of semen in NARI Suwarna rams.

Materials and Methods

The study was carried out on six mature NARI Suwarna strain of rams (60% Deccani, 30% Madgyal and 10% Garole) at Department of Veterinary Gynaecology and Obstetrics, Veterinary College, Bidar, India. The Bidar is located at 17.9°N 77.5°E lies at a central position in Deccan, a plateau at an elevation of 2300 ft from the sea level and lies between 17°35' and 18°25' north latitudes and 76°39' east longitudes. The Bidar experiences semi-arid climate with extreme summer and coldest months are December and January and temperature varies between 20 °C and 42 °C. All the rams were monitored under uniform management conditions and reared under the semi-intensive housing system.

The Body Weight (BW) and Scrotal Circumference (SC) of NARI Suwarna rams were measured as per standard procedure at monthly interval for six months. At the time of semen collection, the rams were scored through a reaction time ^[3]. Apart from this, mating enthusiasm was scored as per the score: 0: Rams do not mount *i.e.*, show no sexual interest; 1: Sexual interest shown only once (e.g. sniffing of the perineal region); 2: Rams make a mounting attempt with sliding; 3: Mounting between sliding and jumping; 4: Rams mount by jumping and 5: Rams mount with great enthusiasm.

Thirty six ejaculates in each month were collected from six NARI Suwarna rams by artificial vagina method with frequency of two collections per week from September to February (six months) and semen was evaluated for gross motility, sperm motility ^[4], sperm morphology ^[5], sperm concentration, live and dead sperm count ^[6], hypo-osmotic swelling test ^[7], semen index and *in-vitro* sperm penetration test like sperm-cervical mucus contact test ^[8].

To assess the magnitude of difference in various spermatozoa characteristics of fresh and extended semen, the data was subjected to two way analysis of variance under Completely Randomized Design (CRD) and the difference among means was tested by Turkey's test as per the methods ^[9]. The climate data like temperature, humidity and rainfall from September to February was obtained from Agriculture Research Station, Halladkeri, Bidar and association of various meteorological attributes with semen characteristics was analyzed by Pearson's correlation coefficient test and the level of significance was fixed at 5%.

Results and Discussion

The climatic data related to rainfall, maximum, minimum temperature, relative humidity and day length for the months in which the study was conducted (Table 1).

The minimum temperature was negatively correlated with body weight, reaction time, head abnormalities percentage, mid piece abnormalities, tail abnormalities percentage, total sperm abnormalities and live sperm percentage but positively correlated with scrotal circumference, libido test, volume, gross motility, sperm motility, concentration of sperm, dead sperm percentage (Hypo-Osmotic Swelling Test) HOST, semen index and Sperm Cervical Mucus Contact Test (SCMCT) without any significant difference. The relative humidity was negatively correlated with body weight, scrotal circumference, sperm motility and libido score and positively correlated with libido test, volume, gross motility, head abnormalities percentage, mid piece abnormalities, tail abnormalities, total sperm abnormalities, concentration of sperm, dead sperm percentage, HOST, semen index and SCMCT without any significant difference. The day length was negatively correlated with body weight, reaction time, head abnormalities percentage, mid piece abnormalities percentage, tail abnormalities percentage, total sperm abnormalities percentage and live sperm percentage and positively correlated with scrotal circumference, libido test, volume, gross motility, sperm motility, concentration of sperm, dead sperm percentage, HOST, semen index and SCMCT but the difference was non-significant. The rainfall was negatively correlated with body weight, reaction time, tail

abnormalities percentage and live sperm percentage and positively correlated with scrotal circumference, libido test, volume, sperm motility, head abnormalities percentage, mid piece abnormalities percentage, total sperm abnormalities percentage, concentration of sperm, dead sperm percentage, HOST, semen index and SCMCT with statistically non-significant difference. The maximum temperature was negatively correlated with gross motility, sperm motility, head abnormalities percentage, mid piece abnormalities percentage, tail abnormalities percentage, total sperm abnormalities percentage, concentration of sperm, live sperm percentage, HOST, semen index, SCMCT and positively correlated with body weight, scrotal circumference, libido test, reaction time, volume and dead sperm percentage but the difference was statistically non-significant (Table 2).

The present research findings are in line with that of earlier research, who concluded that summer and autumn semen production to be better than in spring and winter for Lacaune rams in Brazil ^[10]. Seasonal variations were recorded in almost all the monitored semen characteristics and in scrotal circumference. Sperm concentration was the only semen characteristic evaluated that did not show seasonal variation. Results showed improvement in motility, concentration and volume of the sperm during summer and autumn when compared to spring and winter. The previous study reported that, there were seasonal variations between the crosses in seminal traits and the semen has the capability and quality to be used for AI in breeding programmes throughout the year ^[11]. Significant seasonal variations of semen traits except for sperm motility, live sperm% and MBRT in Iran ^[12]. In one of the study, concluded that autumn season displayed the best results in circulating testosterone and both quality and quantity of semen physical characteristics in both groups ^[13]. Autumn months were the best season than other seasons for breeding sheep. Semen quality and quantity of Barki rams were not affected by the high summer temperatures at Siwa Oasis. On contrary, the other study found that Garole rams are capable of producing good quality semen even after a prolonged period of exposure to a semi-arid tropical climate ^[14]. This supports the present findings in NARI Suwarna breed of sheep that have 10% of Garole breed proportion.

It is clear from the literature that sheep breeds that originated from temperate climate in mid or high latitudes are seasonal breeders and the annual variation in daily photoperiod is used in timing the annual reproductive cycle ^[15]. Photoperiod is the main environmental factor affecting sheep reproduction ^[16]. Despite such changes, males continue to produce fertile spermatozoa and exhibit sexual behaviour throughout the year.

Table 1: Climatic data during the period of research work

Months	Rain fall (mm)	Temperature (°C)		Relative humidity (%)	Day length (h)
		Maximum	Minimum		
September	5.40±2.146	29.30±0.352	20.90±0.123	63.00±1.26	12.23±0.026
October	0.20±0.195	31.10±0.447	19.20±0.448	65.00±0.704	11.73±0.026
November	1.20±0.787	30.80±0.263	16.40±0.586	63.00±0.896	11.30±0.019
December	0.70±0.670	26.70±0.650	13.00±1.477	66.00±1.149	11.07±0.004
January	0.60±0.436	27.20±0.367	13.70±0.638	64.00±1.376	11.18±0.014
February	0.00±0.00	31.80±0.334	15.20±0.346	46.00±1.730	11.55±0.023

Table 2: Effect of climate on body weight, scrotal circumference, libido test, reaction time and quality of semen in NARI Suwarna rams

Climate	Analysis	BW	SC	LT	RT	V	GM	SM	HA	MA	TA	TOA	CS	LS	DS	HOST	SI	SCMCT
Rainfall	Pearson r	-0.51	0.55	0.45	-0.35	0.32	0.88	0.37	0.19	0.37	-0.21	0.11	0.54	-0.56	0.62	0.68	0.35	0.69
	P value	0.30	0.26	0.37	0.50	0.53	0.02	0.47	0.72	0.47	0.68	0.84	0.27	0.25	0.19	0.13	0.50	0.13
	Significance	ns	ns	ns	ns	ns	*	ns	ns	ns	ns	ns						
Temp Max	Pearson r	0.14	0.29	0.14	0.27	0.00	-0.56	-0.07	-0.62	-0.74	-0.42	-0.65	-0.02	-0.03	0.01	-0.24	-0.02	-0.09
	P value	0.79	0.57	0.80	0.60	0.99	0.25	0.90	0.19	0.09	0.40	0.16	0.97	0.96	0.99	0.65	0.97	0.87
	Significance	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Temp Min	Pearson r	-0.47	0.50	0.62	-0.36	0.59	0.34	0.45	-0.28	-0.02	-0.20	-0.17	0.64	-0.54	0.52	0.63	0.59	0.67
	P value	0.35	0.31	0.19	0.48	0.22	0.52	0.37	0.60	0.97	0.71	0.75	0.17	0.27	0.29	0.18	0.22	0.14
	Significance	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
RH	Pearson r	-0.73	-0.40	0.41	-0.90	0.65	0.51	-0.02	0.19	0.68	0.21	0.41	0.55	-0.49	0.46	0.46	0.62	0.49
	P value	0.10	0.43	0.42	0.02	0.17	0.30	0.96	0.71	0.14	0.69	0.42	0.26	0.32	0.36	0.35	0.19	0.33
	Significance	ns	ns	ns	*	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Day length	Pearson r	-0.26	0.71	0.50	-0.10	0.40	0.40	0.64	-0.16	-0.04	-0.14	-0.12	0.52	-0.39	0.39	0.67	0.43	0.63
	P value	0.62	0.11	0.31	0.86	0.43	0.43	0.17	0.76	0.94	0.80	0.82	0.29	0.44	0.44	0.14	0.40	0.18
	Significance	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

BW: Body Weight, SC: Scrotal Circumference, LT: Libido Test, RT: Reaction Time, V: Volume, GM: Gross Motility, SM: Sperm Motility, HA: Head Abnormalities, MA: Mid piece Abnormalities, TA: Tail abnormalities, TOA: Total Abnormalities, CS: Concentration of Sperm, LS: Live Spermatozoa, DS: Dead Spermatozoa, HOST: Hypo-Osmotic Swelling Test, SI: Semen Index and SCMCT: Sperm Cervical Mucus Contact Test

Conclusion

It can be concluded that, there was a mixed effect of climate on body weight, scrotal circumference, libido test, reaction time and quality of semen in NARI Suwarna rams. The rainfall was having positive correlation with gross motility of semen samples whereas the relative humidity having negative correlation with reaction time with statistically significant difference. The maximum temperature was negatively correlated with gross motility, sperm motility, head abnormalities percentage, mid piece abnormalities percentage, tail abnormalities percentage, total sperm abnormalities percentage, concentration of sperm, live sperm percentage, HOST, semen index, SCMCT and positively correlated with body weight, scrotal circumference, libido test, reaction time, volume and dead sperm percentage but the difference was statistically non-significant in NARI Suwarna rams.

References

- Mickelsen WD, Paisley LG, Dahmen JJ. The relationship of libido and serving capacity test scores in rams on conception rate and lambing percentage in the ewe. *Theriogenology*. 1982; 18:79-86.
- Langford GA, Shrestha JNB, Sanford LM, Marcus GJ. Reproductive hormone levels of early of early post pubertal ram lambs in relation to breed, adult testis size and semen quality. *Small Ruminant Research*. 1998; 29:225-231
- Hoflack G, Van Soom A, Maes DM, De Kruif A, Opsomer G, Duchateau L. Breeding soundness and libido examination of Belgian Blue and Holstein Friesian artificial insemination bulls in Belgium and The Netherlands. *Theriogenology*. 2006; 66:207-216
- Louskutoff NM, Crichton EG. Standard operating procedures for genome resource banking. The Bill and Berniece Grewcock Center for conservation and Research Omaha's Zoo, 2001, 1-16.
- Salisbury GM, Van Denmark, NL, Lodge JR. Semen evaluation. In: *Physiology of Reproduction and Artificial Insemination of Cattle*. Edn. 2nd, Wheel Freeman & Co., San Francisco, USA. 1978; 326-353
- Evans G, Maxwell WMC. Salamon's Artificial insemination of Sheep and Goats. Butterworths Sydney, 1987, 107-141
- Revell SG, Mrode RA. An osmotic resistance test for bovine semen. *Animal Reproduction Science*. 1994; 37:77-86
- Hafez ESE. *Techniques of Human Andrology*. North Holland Publishing Company, Oxford, 1977, 384.
- Steel RGD, Torrie JH, Dickey DA. *Principles and Procedures of Statistics-A Biometrical approach*. Edn.3rd., McGraw Hill Book Co, 1997, New York, USA
- Ender RO, Smirdele WA, Brito M, Marschner TR, Ribeiro A, Mattos RC. Seasonal variation in semen quality of Lacaune rams in Brazil. *Brazilian Journal of Veterinary Research and Animal Science*. 2011; 48(4):319-324.
- Moghaddam GH, Pourseif MM, Asadpour R, Rafat SA. Seasonal variation in semen quantity and quality traits of Iranian crossbred rams. *Slovak Journal of Animal Science*. 2012; 45(3):67-75.
- Pourseif MM, Moghaddam GH. Photoperiod as a factor for studying fluctuations of seminal traits during breeding and non-breeding seasons. *Journal of Cell and Animal Biology*. 2012; 6(16):241-249.
- Hashem ALS. Semen physical traits and thyroid activity of Barki rams as affected by season and feeding non-edible date palm at Siwa Oasis. *World Applied Sciences Journal*. 2014; 30(5):556-566.
- Joshi A, Naqvi SMK, Bag S, Dang AK, Sharma RC, Rawat PS *et al*. Sperm motion characteristics of Garole rams raised for a prolonged period in a semi - arid tropical environment. *Tropical Animal Health and Production*. 2003; 35:249-257
- Avdi M, Banos K, Stefos P, Chemineau P. Seasonal variation in testicular volume and sexual behaviour of Chios and Serres rams. *Theriogenology*. 2004; 62:275-282
- Chemineau P, Malpoux B, Delgadillo JA, Guerin Y, Ravault JP, Thimonier J *et al*. Control of sheep and goats reproduction: use of melatonin. *Animal Reproduction Science*. 1992; 30:157-184.