Journal of Animal and Veterinary Advances 3 (2): 81-84, 2004

Fertility Studies on two Methods of Libido Maintenance in West African Dwarf Rams

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Abstract: An experiment was conducted to determine the effects of false mountings and sexual restraint on libido and semen fertility of West African Dwarf rams. Eighteen rams were assigned to nine treatment combinations involving 0, 5 and 10 minutes of restraint and 0, 2 and 3 false mounts. Semen quantity and quality were evaluated. Results from this study indicate that it requires the shortest time of 28.0 ± 0.65 sec at ten minutes of restraint and three false mounts (10R - 3FM) to achieve the highest libido. Mounting and prompt ejaculation provided a definite, clearly recognizable end point, for establishing that a ram was sexually stimulated sufficiently. Changes of stimulus animals and semen collection location were not commonly required to stimulate most of the rams and to maintain their sexual interest during teasing. Collection of semen with the highest total volumes (2.39 ± 0.05ml), sperm motility (90.02 ± 0.82%), live spermatozoa (87.88 ± 0.65%) and total sperm per ejaculate (5.0 x10^9) were obtained when rams were sexually teased for 10 minutes that included three false mounts (10R - 3FM). The results of this present study suggest that 10 minutes of sexual restraint in conjunction with three false mounts are not too time consuming to be practical as methods for increasing semen output. In an attempt to maximize sperm quality and quantity sexual teasing might precede each ejaculate.

Key words: Fertility, libido, maintenance, west aftican, dwarf, rams

Introduction

The increasing use of artificial insemination (A.I.) for genetic improvement of animals has created a greater demand for semen from superior progeny tested sires with high libido. The use of controlled sexual preparation, such as false mounting and/or restraint, for libido maintenance and to increase sperm output in male animals is well documented in cattle (Sambraus and Waring, 1975, Almquist and Amann, 1976, Nwakalor *et al.* 1979). For Large White boars, Umesiobi and Iloeje (1999) and Umesiobi *et al.* (2000) found that 5 minutes of sexual restraint was most effective for increasing semen quality and quantity as compared to no sexual restraint. However, no report is found on the effectiveness of either sexual restraint or false mounts on libido maintenance in West African Dwarf rams. With the intensification of livestock production, and gradual introduction of A.I. in the tropics, there is an urgent need to study the libido and semen characteristics of native rams for which there has been no systematic report recorded in the scientific literature.

The present study was, therefore, designed to determine the effects of false mountings and sexual restraint on libido and semen fertility of West African Dwarf rams and also the effectiveness of false mountings as a technique for increasing libido and semen quality and quantity as compared with sexual restraint.

Materials and Methods

Eighteen 2.1 year old West African Dwarf rams with mean body weight of 26.3kg were housed individually in previously cleaned and disinfected pens at the small Ruminant Research Unit of the Federal University of Technology, Owerri. The rams were provided with fresh water *ad lib*itum and fed twice daily. The feeds consisted of cut and carry all season forages, including *Cynodon nemfluensis, Pennisetum purpureum* and *Gliricidia sepium* leafhay. A commercial concentrate supplement was also provided in significant quality to meet estimated NRC (1985) requirements.

The rams were trained for one week in order to familiarize them with the experimental protocol in line with the procedures of Umesiobi and Iloeje (1999). The two methods of libido maintenance involved zero (OR), 5 (5R) and 10 (10R) minutes of sexual restraint and zero (OFM), 2 (2FM), and 3 (3FM) false mounts. Semen was harvested twice per week for 12 weeks.

The 18 rams were randomly assigned to the 9 treatment combinations involving 0, 5 and 10 minutes of restraint, and 0, 2 and 3 false mounts of libido preparation, in a 3 x 3 factorial experiment. Semen was collected using the gloved-hand method. Libido commonly referred to as reaction time (RT) and recorded in minutes was defined as the time from introduction (of male and female) to ejaculation (Walker, 1980; Umesiobi and Iloeje, 1999). On the other hand, sexual restraint (R) (teasing time) was determined in minutes as the time of introduction of the rams to the teasers to the time of first mount as described earlier by Szurop *et al.* (1985) and Umesiobi and Iloeje

(1999). Also, false mount (FM) was defined by Price (1987) as a temporary male sexual denial (dismount) from a teaser immediately after sexual ceremonies (courtship).
Each ejaculate was examined for volume, progressive sperm motility, live sperm, acrosomal morphology, sperm concentration, total sperm/ejaculate x 10^9 and semen pH. Total semen volume was determined in ml using graduated volumetric cylinders. Progressive sperm motility (%) was estimated from 0 to 100 in increments of 10 using a light microscope (Herrick and Self, 1962; Haun *et al.* 1991). The percentage of live sperm cells were determined by vital staining with eosin - negrosin stain which provided a dark background against opal blue stain (Moore and Hibbit, 1977).
The acrosomal morphology was obtained by mixing a high grade Indian ink with semen on a slide and then the mixture was drawn out to make a thin smear. The smear was read using a light microscope at x 400 magnification (Satchell, 1977; Umesiobi and Iloeje, 1999 and Umesiobi *et al.*, 2000).
All percentage data were translated into angular format, so as to stabilize the variance before analysis of variance extrapolations using the procedures of Sokal and Rohlf (1981) and SAS (1990). The data were arranged in a 3x3 factorial experiment, in a completely randomized design and significant means were separated as outlined by SAS (1990).

Results and Discussion

Table 1 describes the effects of sexual restraint and false mounts on reaction time (libido) and semen characteristics with their standard errors (SE).

Reaction Time: The sexual reaction time ranged from 98.1 to 28.0 seconds. Reaction time improved ($P<0.05$) with both increased restraint and number of mounts (Table 1). Interaction effects exerted significant differences ($P<0.05$) with the shortest RT (28.0 ± 0.65 sec) obtained at 10R - 3FM.
The results obtained in this experiment suggest that increasing the levels of sexual teasing from zero restraint at zero false mount (OR-OFM) to ten minutes restraint at the three false mounts (10R-3FM) produced a reduction ($P<0.01$) in the reaction time. This may be clear evidence of an aggravated increase in libido (sexual desire) of the rams. These results are in agreement with the findings of Orgeur and Signoret (1984) and Mani (1991).

Semen Characteristics: Total semen volume ranged from 0.5 to 2.4ml. This study revealed that the various levels of sexual restraint and false mounts resulted in higher ($P<0.05$) total semen volume. However, the highest total semen volume (2.30 ± 0.05ml) was observed at ten minutes of restraint with three false mountings. These values are in conformity with the reports of Evans and Maxwell (1987), Umesiobi (2000) and Umesiobi *et al.* (2000) who reported that the quantity of semen produced by male animals is not only dependant on the amount of sexual excitation but also partly dependent upon a number of factors which include their physical temperaments and sexual adjustment periods such as stimulus changes (changes of teaser, semen collection or both).
The percentage sperm motility ranged from of 79.4 to 90.0%. The various levels of restraint increased ($P<0.05$) the progressive sperm motility, mostly at 10R. However, the various levels of false mounts did not exhibit any significant differences ($P>0.05$) in sperm cell motility. Interaction effects of restraint and false mounts on motile spermatozoa were maintained ($P<0.05$) with the highest values of 90.02 ± 0.82% produced at 10R - 3FM.
The various levels of sexual restraint and false mounts exerted differences ($P<0.05$) in the percentages live spermatozoa, with the highest values (87.88 ± 0.65%) observed at 10R - 3FM. The interaction between restraint and false mounts produced significant effects ($P<0.05$) in live sperm cells. These results agree with the earlier reports of Heite (1973), Yeates (1990), Umesiobi (2000) and Umesiobi *et al.* (2000), who observed a positive relationship between live sperm cells and progressively motile spermatozoa with progressive levels of male teasing. Normal acrosomal morphology did not show any interaction effects ($P>0.05$) between sexual restraint and false mountings. Also, there were no interaction effects ($P>0.05$) between sexual restraint and false mounts in the sperm acrosome morphology. The normal acrosome morphological values obtained in this study are within the range recorded by Dzuik *et al.* (1972), Memon and Ott (1981) Evans and Maxwell (1987).
Sexual restraint, false mounts and their interactions did not affect ($P>0.05$) sperm concentrations per ml ejaculate. Similar to those for Nigerian breeds of sheep used by Adu and Buvanendran (1982), the sperm concentrations per ml recorded in this study is in agreement with the internationally accepted minimum range for optimum ram fertility (Mckelevy, 1992). Significant differences ($P < 0.05$) were noticed between restraint, false mounts and the total sperm per ejaculate, with the highest value (5.0 ± 0.5 x 10^9) obtained at 10R - 3FM. Also, interactions between sexual restraint and false mounts significantly ($P < 0.05$) influenced the total sperm per ejaculate. These results are in conformity with the reports of Colas (1983) and Umesiobi (2000) who confirmed that most superior rams ejaculate semen with higher total volume and optimum total sperm concentration per ejaculate under intensive sexual teasing.
Mean semen pH ranged from 6.4 to 6.7. Semen pH was not ($P>0.05$) affected by either sexual restraint, false

Table1: Effects of sexual restraint and false mounts on reaction time and semen characteristics of West African Dwarf Rams

	Level of sexual restraint (R) and false mounts (FM)								
		OR			5R			10R	
Parameters	0FM	2FM	3FM	0FM	2FM	3FM	0FM	2FM	3FM
Reaction time (sec)	98.1±0.2^a	84.3±0.19^b	70.7±0.9^c	62.1±0.6^d	55.6±0.4^e	50.0±0.7^f	40.0±0.9^g	33.1±0.7^h	28.0±0.65^i
Semen volume (ml)	0.50±-.04^i	0.63±0.04^h	0.77±0.1^g	0.91±0.04^f	1.23±0.03^e	1.57±0.07^d	1.92±0.04^c	2.18±0.07^b	2.39± 0.05^a
Sperm motility (%)	79.4±0.6^c	77.9±0.9^c	79.0±0.75^c	80.7±0.77^b	85.0±0.67^b	85.0±0.55^b	89.6±0.62^a	90.0±0.75^a	90.02±0.82^a
Live sperm (%)	65.1±0.74^i	69.1±0.9^h	73.0±0.6^g	76.1±0.67^f	79.0±0.85^e	80.4±0.8^d	83.0±0.72^c	85.3±0.84^b	87.9±0.65^a
Acrosome morphology (%)	77.3±0.43^a	76.7±0.55^a	76.7±0.5^a	75.3±0.4^a	75.5±0.55^a	76.7±0.75^a	78.0±0.54^a	78.0±0.77^a	77.9±0.67^a
Sperm conc. x 10^6	4266±71^a	4116±82^a	4206±64^a	4201±64^a	4201±64^a	4209±82^a	4241±81^a	4251±81^a	4260± 84^{a}ml
Total sperm /ejaculate x 10^9	0.80±0.22^i	1.71±0.23^h	2.50±0.5^g	2.74±0.4^f	2.88±0.02^e	2.95±0.22^d	3.64±0.31^c	4.59±0.04^b	5.09±0.5^a
Semen P^h	6.43±0.001^a	6.47±0.3^a	6.7±0.03^a	6.5±0.02^a	6.6±0.05^a	6.5±0.02^a	6.63±0.03^a	6.5±0.02^a	6.5±0.02^a

a, b, c, - - - i : Means on the same row bearing different superscripts differ (P < 0.05)

mounts or their interactions. Semen pH determination was performed immediately after the semen samples were collected so as to prevent the inherent problems of low semen pH and viability due to fructoysis, which involves the breakdown of seminal fructose by spermatozoa to generate energy for motility. (Evans and Maxwell, 1987; Eppleston *et al.*, 1996; Umesiobi and Iloeje, 1999 and Umesiobi *et al.,* 2000).

References

Adu, I.F. and V. Buvanedran, 1982. Pre-weaning performance of lambs from pure and crossbred mating among Nigerian breeds of sheep. World Review Anim. Prod., 18:73-77.

Almquist, J.O. and R.P. Amann, 1976. Reproductive capacity of dairy bulls XI. Puberal characteristics and post puberal changes in production of semen and sexual activity of Holstein bulls ejaculated frequently. J. Dairy Sci., 59:986-991.

Colas, G., 1983. Factors affecting the quality of ram semen. In: Haresign, W. (ed.) Sheep production. Butterworths, London. pp: 453-465.

Dzuik, P.J., J.M. Lewis, E.F. Graham and R.H. Mayer, 1972. Comparison between natural service and artificial insemination with fresh or frozen semen at an appointed time in the ewe. J. Anim. Sci., 35:572-575.

Eppleston, J., W.M.C. Maxwell, K.M. Battye and E.M. Roberts, 1986. Effect of thawed motility and intra - uterine dose of motile sperm of fertility in ewes. Proc. 18th Ann. Conf. Aust. Soc. Reprod. Biol., pp: 19.

Evans, G. and M.W.C. Maxwell, 1987. Salamon's artificial insemination of sheep and goats. Butterworths, Sydney.

Haun, R., D. Weberski, G. Dirkson, K.F. Weitze and F. Leiding, 1991. The effects of sperm motility and morphology on fertility of A. I. boars in the field trials. Pigs News and Information, 18: 591-594.

Herrick, J.B. and H.L. Self, 1962. Evaluation of fertility in bull and boar. Iowa State Press, Ames, IA. pp: 17-87.

Mani, R., 1991. A comparison of the cost of A. I. and natural mating. KB - Mitteilungen, 29:35-37.

Mckelvey, W.A.C., 1992. Reproductive techniques in goats. The goat Vet. J., 12:352.

Memon, M.A. and R.S. Ott, 1981. Methods of semen preservation and artificial insemination in sheep and goats. World Review Anim. Prod., 107:19-25.

Moore, H.D.M. and K.G. Hibbit, 1977. Fertility of boar sperm after freezing in absence of seminal vesicular protein. J. Reporod. Fert., 50:349-352.

NRC, 1985. Nutrient Requirements of Domestic Animals, Nutrient Requirements of Sheep. 5th Ed. National Academy of Sciences - National Research Council, Washington, D.C.

Nwakalor, L.N., B.I. Orji and G. Igboeli, 1979. Sexual behavior in Muturu, 'dama and Holstein- Friesian bulls in a humid tropical environment. World Rev. Anim. Prod. XV (3): 35-46.

Orgeur, O. and J.P. Signoret, 1984. Sexual play and its functional significance in the domestic sheep *(Ovis aries)*. Physiol. Behav., 33:11-120.

Price, E.O., 1987. Male sexual behavior. Vet Clinics of North American: Food Animal Practice, 3: 405-422.

Sambraus, Von H.H. and G.H. Waring, 1975. The influence of the urine of oestrus cows on the libido of bulls. Z. Saugetier Kunde 40:49-54.

SAS, 1990. Statistical Analytical System. Statistical Analytical Institute Inc., North Carolina, USA.

Sokal, R.R. and F.J. Rohlf, 1981. Biometry. W.H. Freeman and Co. San Francisco, pp:859.

Satchell, B.P., 1977. Male reproductive organs and semen. In: Reproduction of Domestic Animals. 3rd ed. Cole, H.H. and P.T. Cupps (eds). pp. 229-254. Academic Press, New York.

Szurop, I.A., I.A. Nagy and W. Jochle, 1985. Stimulation of libido in pubertal and mature boars with postaglandin F_2 analogs: Clinical observation. Zuchthyg 20:83.

Umesiobi, D.O., 2000. Effect of egg yolk, coconut water and fresh raphia. Palm wine extenders on the viability of boar sperm during storage at 5°C. J. Agric. Rural Dev., 1: 98-106.

Umesiobi, D.O. and M.U. Iloeje, 1999. Effect of sexual teasing and diurnal period of semen collection on reaction time and semen characteristics of Large White boars. J. Sustain. Agric. Environ., 1: 231-235.

Umesiobi, D.O. and M.U. Iloeje, G.A. Anyanwu, U. Herbert and N.J. Okeudo, 2000. Relationships between sow fecundity and sexual repertoire of the boar. J. Agric. Rural Dev., 1:114-119.

Walker, N., 1980. Pigs per litter depend on the boar. Agri. N. Ire., 55: 135-137.

Yeates, W.K., 1980 . Ejaculate and its disorders. Arch. Ital. Urol., Nefro. Androl., 62:137-148