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Original Article

Gross Abnormalities of Testes in Different Breed of Bucks and Rams Slaughtered at Helimex Abattoir Debre Zeit

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ABSTRACT

Study on gross abnormalities of the testes in different breeds of bucks and rams were conducted from November 2007 to April 2008 at HELIMEX abattoir Debre Zeit. The objectives were to investigate and provide information on testicular abnormalities in goats and sheep and assessing the effect of age and breed on the occurrence of testicular abnormalities. The study involved two species, goat and sheep. Prior to selection the sampling frame (Slaughter flock) was subdivided in to a series of defined subpopulation based on the breed and age (<1 year, 1 year and 2 years). Then a simple random sampling was used for selection of individual animals for all strata. A total of 730 goats and 210 sheep were selected for the study. From the slaughter flock, animals were selected at stratified random sampling based on breed and age, so that four goat breeds, Afar, Arsi-Bale, Boran and Woito-Guji and two sheep breeds: Adal and Black Head Somali were considered. The study indicated the prevalence of testicular abnormalities in bucks including cryptorchidism, testicular atrophy, orchitis, testicular calcification and haemorrhagic lesions were 3.7, 11.5, 1.5, 3.2 and 1.9 respectively. In rams the prevalence of cryptorchidism, testicular atrophy, orchitis, testicular calcification and haemorrhagic lesions were 1.4, 13.3, 5.2, 4.3 and 1.0 respectively. In bucks, the prevalence of any of these abnormalities was not related to age (P>0.05). However, the prevalence of testicular atrophy, and testicular calcification was related to the breed of goats (P<0.05) that is Boran breeds more affected. woito– Guji being more affected by haemorrhagic lesions. This study indicated that testicular atrophy and cryptorchidism of unknown etiologies dominated genital pathologies in bucks and rams. Initiating investigations to identify the major causes of these abnormalities should be the main consideration in the future

Keywords: Bucks, Debre-zeit, Gross abnormalities, Rams, Testes.

INTRODUCTION

Small ruminants are important domestic animals in the tropical animal production systems (Devendra and Meclorey, 1990). Within African society small ruminants comprise a greater

proportion of the total wealth of the poor families, because of low input requirements such as small initial capital, fewer resources and maintenance cost. They are also able to produce milk and meat in readily usable quantities using marginal lands, poor pasture and crop residues. Furthermore their production cycle makes them need only short period to reconstitute flocks after disaster and respond quickly to the demand (Gatenby, 1991; Steele, 1996).

Ethiopia owns huge number of small ruminants, about 24.2 million sheep and 22.6 million goats (CSA, 2012), sheep and goats cover more than 30% of all domestic meat consumption and generate cash income from export of meat, edible organs, live animals and skins (Fletcher and Zelalem, 1991).

Livestock production efficiency is largely dependent on their reproductive performance (Smith and Somade, 1994). This alleged poor performance may have been influenced by genotype, nutrition, management, environment and diseases (Wilson, 1989). The male as well as the female could be the source of reproductive wastage. The male has undisputed role in determining the number of females, which conceive, there by directly affecting reproductive efficiency. Contrary to this fact, fertility studies in livestock have generally tended to focus on the female sides with much less emphasis on the male side (Lee, 1978). However, male fertility is as important as female fertility rate (Knight, 1973). Under traditional breeding practices farmers consider females as the only source of reproductive failure and cull females keeping infertile males in the flock (Gordon, 1997).

The potential of testicular measurements, particularly scrotal circumference as selection criteria for improving male fertility has been shown in cattle (Morris *et al.*, 1992; Morris and Cullen, 1994) and sheep (Matos *et al.*, 1992). Scrotal circumference has been reported to be correlated to parameters of male fertility such as semen production (Al-Nakib *et al.*, 1986) and poor libido (Dufour *et al.*, 1984).

The above studies indicate that, farmers should be aware, when selecting buck and ram on, the variability of scrotal circumference is affected by some factors like age (Willet and Ohms, 1957). In addition to this the importance of sexual disorders especially orchitis, epididymitis, testicular hypoplasia, cryptorchidism should be seriously considered because they can adversely affect reproductive performance of bucks and rams (Mazouz *et al.*, 1990). This study conducted with the objectives of investigating and providing information on testicular abnormalities in goats and sheep at slaughtered at Debre zeit HELIMEX abattoir and assessing the effect of age and breed on the occurrence of testicular abnormalities.

MATERIALS AND METHODS

Study Area

The study was conducted at Hashim Nurs' Ethiopian livestock and meat export (HELIMEX) abattoir, Debre zeit from November 2007 to April 2008. HELIMEX is a private owned export abattoir. The main objective of the abattoir export of meat and edible offals to foreign countries. HELIMEX abattoir is found in Debrezeit, which is located at 9^0N latitude and 40^0E longitude with an altitude of 1880 meters above sea level in the central high lands of Ethiopia at 47km south east of Addis Ababa. It has an annual rainfall of 1151.6mm of which 84% falls down during the long rainy season that extends from June to September, and the remaining 16% during the short rainy season that extends from March to May. The mean annual minimum and maximum temperatures are 8.5^0c and 30.7^0c respectively and the mean relative humidity is 61.3% (NMSA, 2005).

Study Animals

The study involved two species, goat and sheep. From the slaughter flock animals were selected at stratified random sampling based on breed and age, so that four goat breeds, Afar, Arsi-Bale, Boran and Woito-Guji and two sheep breeds: Adal and Black Head Somali

(Getenby, 1995) were considered. Prior to selection the sampling frame (Slaughter flock) was subdivided in to a series of defined subpopulation based on the breed and age (<1year, 1year and 2years). Then a simple random sampling was used for selection of individual animals for all strata. A total of 730 goats and 210 sheep were selected for the study.

Sampling and Study Design

In this study animals were classified in to 6 groups, 2 sheep and 4 goats groups based on their breed solely for even distribution of sampling i.e. from frequent and large sources of the animals (Arsi-Bale, Boran, Woito-Guji, Afar, Black Head Somali, Adal). A group was again grouped into young (under 1 year of age in goats and 1 year and 3 months in sheep) and Adult (above or equals to 1 year of age in goats and 1 year and 3 months in sheep) based on eruption of one or more incisor teeth according to Gatenby (1991) and Steele (1996). Animals belonging to a group were randomly sampled and examined ante mortem and postmortem.

Ante Mortem Examination

Determination of Age

Since the birth date of the animal is not known by the trader and because of the difficulty of getting information in the abattoir, a chronological determination of age by means of dentition was taken as an available alternative (Gatenby, 1991; Steele, 1996).

Clinical Examination of The Testes

Clinical examination of testes of each animal was performed. The scrotum was visually examined for the presence of asymmetry, testicular pathologies such as orchitis, atrophy. The consistency (unusual softness or firmness) and the mobility of testicle in the scrotum (adhesion after periorchitis) were assessed.

Postmortem Examination

Postmortem examination was carried out after the organ was immediately removed at slaughter.

Examination Gross Pathological Changes of the Testes

Pathological examination of the testes were carried out by using visual inspection for determining the presence of lesions, discoloration, unusual change in shape, deep palpation to evaluate the consistency in terms of softness, firmness and serial and systematic dissection in to the parenchyma of the testis to determine the presence and the extent of gross pathological changes.

Data Analysis

Pearson chi-square (χ^2) was used to analyze association between breed, age and testicular abnormalities. Significance was considered when p-value was less than 0.05.

RESULTS

The study indicated testicular atrophy dominated other testicular abnormalities in both bucks and rams which was (11.5%) and (13.3%) respectively (table 1). The overall prevalence in sheep and goat was 21.8% and 25.2% respectively. In both sheep and goat only testicular atrophy was significantly associated ($P<0.05$) with age. Higher prevalence was observed with animals of one year old (Table 2). In bucks testicular atrophy ($P<0.01$), testicular calcification ($P<0.05$) and haemorrhagic lesion ($P<0.01$) were associated with breed (Table 3).

Table 1: Abnormalities of the testes in bucks and rams slaughtered at HELIMEX abattoir

Animal	Bucks	Rams	Total
No. examined	730	210	940
Testicular atrophy	84(11.5%)	28(13.3%)	112(11.9%)
Cryptorchidism	27(3.7%)	3(1.4%)	30(3.2%)
Testicular calcification	23(3.2%)	9(4.3%)	32(3.4%)
Orchitis	11(1.5%)	11(5.2%)	22(1.7%)
Hemorrhagic lesions	14(1.9%)	2(1.0%)	16(1.7%)
Total	159(21.8%)	53(25.2%)	212(21.9%)

Table 2: Abnormalities of the testes in different age groups of bucks slaughtered at HELIMEX abattoir.

Age (years)	<1	1	2	P-value
No. examined	324	323	83	
Testicular atrophy	*24(7.4%)[a]	51(15.8%)[b]	9(10.8%)[ab]	0.04
Cryptor chidism	9(2.8%)	17(5.3%)	1(1.2%)	0.109
Testicular calcification	15(4.6%)	8(2.5%)	0(0.0%)	0.064
Orchitis	3(0.9%)	8(2.5%)	0(0.0%)	0.132
Haemorrhagic lesions	7(2.2%)	7(2.2%	0(0.0%)	0.400

* Raw with different superscript significantly different (P<0.05)

Table 3: Abnormalities of the testes in different breeds of bucks slaughtered at HELIMEX abattoir

Breed	Afar	Boran	Arsi-Bale	Woito-Guii	P-value
No. examined	181	184	182	183	
Testicular atrophy	12(6.6%)	32(17.4%)	8(4.4%)	32(17.5%)	0.000
Cryptorchidisum	6(3.3%)	6(3.3%)	6(3.3%)	9(4.9%)	0.796
Testicular calcification	4(2.2%)	11(6.0%|)	6(3.3%)	2(1.1%)	0.048
Orchitis	3(1.7%)	2(1.1%)	3(1.6%)	3(1.6%)	0.961
Haemorrhagic lesions	2(1.1%)	1(0.5%)	1(0.5%)	10(5.5%)	0.001

In rams only testicular calcification showed a tendency (P<0.05) of association with age (Table 4).There was no significant association (P>0.05) between breed and any testicular abnormalities (Table 5).

Table 4: Abnormalities of the testes in different age groups of rams slaughtered at HELIMEX abattoir

Age (Years)	<1	1	2	P-value
No. examined	76	113	21	
Testicular atrophy	15(19.7%)	11(9.7%)	2(9.5%)	0.121
Cryptorchidism	1(1.3%)	2(1.8%)	0(0.0%)	0.817
Testicular calcification	3(3.9%)	3(2.7%)	3(14.3%)	0.053
Orchitis	4(5.3%)	7(6.2%)	0(0.0%)	0.504
Hemorrhagic lesions	0(0.0%)	2(1.8%)	0(0.0%)	0.420

Table 5: Abnormalities of the testes in different breeds of rams slaughtered at HELIMEX abattoir.

Breed	Adal	Black Head	P-value
No. examined	104	106	
Testicular atrophy	10(9.6%)	18(17.0%)	0.116
Cryptorchidism	O(0.0%)	3(2.8%)	0.084
Testicular calcification	4(3.8%)	5(4.7%)	0.755
Orchitis	7(6.7%)	4(3.8%)	0.336
Haemorrhagic lesions	1(1.0%)	1(0.9%)	0.989

DISCUSSION

This study revealed that the native breeds of goats and sheep in Ethiopia were affected by testicular pathologies of unknown etiologies. Testicular atrophy predominated in both bucks and rams n=84(11.5%) and n=28 (13.3% respectively. The term testicular atrophy was used to describe those testes that had descended in to the scrotum normally but were unusually small compared to normal testes, regardless of the cause (Hughes and Claxton, 1968). The

possible causes for these diminished testes were not clear. However, it is likely that the condition is due to pathological or hereditary causes other than the traditional method of castration that can sometimes be confused with testicular atrophy. First, there was no history of castration in the slaughter flock. Second, over 95% of the animal were not more than 1 year of age and it is not customary to castrate small ruminants less than 2 years of age. Third, over 80% of the animals with testicular atrophy had unilateral defect. Therefore, the small and elongated testes observed in this study may be result of either of testicular degeneration that involved retrogressive changes due to environmental, infectious or hormonal causes or testicular hypoplasia due to heritable or congenital defect (Arthur *et al*., 1998; Hafez, 1993). It has been reported that testicular atrophy of unknown etiology (Fraster, 1971; Tarigan *et al.*, 1990) and heritable testicular hypoplasia (Smith and Shermand, 1994) are common findings in goats. Similarly, testicular degeneration due to various causes is common in sheep (Maclaren, 1988; Foster *et al.*, 1990).

Cryptorchidism has been reported by Terefe (2001) to be 5.5% and 1.8% respectively in bucks and rams which is higher than the present result. Cryptorchidism and testicular hypoplasia may be hereditary conditions (Roberts, 1971; Laining, 1979) and can be prevented by controlled breeding practices (Skinner *et al*., 1972). However, controlled breeding with selection of males for breeding soundness is rarely practiced in Ethiopia. All uncastrated males have the chance of mating with females in a flock. Thus, males with unilateral Cryptorchidism or testicular hypoplasia may sire offspring with the unilateral or bilateral defect. The present result revealed that testicular calcification of 3.2% and 4.3% in bucks and rams respectively. The calcified lesions of varied extent observed in bucks and rams were found both in associations with or without testicular atrophy. These lesions might be due to previous orchitis (Smith, 1986).

The prevalence of orchitis in the present study in rams and bucks was 1.5% and 5.2% in bucks and rams respectively which is similar to that previously reported (Terefe, 2001). Although significant deference were found in some testicular abnormalities between the different breeds of bucks and rams, it is difficult to attribute these differences to breed alone because the number of animals examined for each breed was small. In addition, specific lines within breed could have been over-represented in the samples taken, thus influencing the results. Management, environment and nutrition could well have exerted an effect.

CONCLUSION

This study clearly indicated that testicular atrophy and cryptorchidism of unknown etiologies dominated genital pathologies in bucks and rams. Initiating investigations to identify the major causes of these abnormalities should be the main consideration in the future.

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REFERENCES

Al-Nakib, M.M.S., Lodrge, G.A., and Owen, J.B. (1986). A study of sexual development of ram. *J. Anim. Prodn.*, 43, 459-468.

Arthur, G.H., Noakes, D.E., and Pearson, H. (1998). Veterinary Reproduction and Obstetrics. 6th ed. Bailliere Tindall, London, UK. pp: 525 – 567.

Devendra, E., and Meclorey, G. (1990). Goat and Sheep production in tropics. Longmont.

Dufour, J.J., Fahmy, M.H., and Minivielle, F. (1998). Seasonal changes in breeding activity, testicular size, and testosterone concentration and seminal characteristics in rams with long or short breeding season. *J. Anim. Sci.*, 58, 416-422.

Fletcher, I., and Zelalem, A. (1991). Small ruminant productivity in the central Ethiopia mixed farming system, Institute of

Agricultural Research proceeding, 4th National livestock improvement conference. Addis Ababa, Ethiopia.

Foster, R.A., ladds, P.W., Hattman, D., and Briggs, G.D. (1990). pathology of the reproductive tract of Merino rams in north western Queensland. *J. Vet. Australian*, 66, 262 – 264.

Fraster, A.F. (1971). Intertility in goats related to testicular atrophy. *Tropical Animal Health and Production*, 3,173 – 182.

Gatenby, R.M. (1991). sheep. The Tropical Agriculturist, London and Basingstock.

Getenby, R.M. (1995). The Tropical Agriculturalist (Sheep). 2nd ed. Macmillan, London. various management systems: A review. *Anim. Reprod. Sci*., 20, 265-286.

Gordon, J. (1997). Controlled Reproduction in sheep and goats. CAB. London, pp: 23-32.

Hafez, E.S.E. (1993). Reproduction in farm animals. 6th ed. Lea and Febiger, Philadelphia. pp:161 –188.

Hughes, K.L., and Claxton, P.D. (1968). Brucella abortus infection. An elevation of microbiological, Serological and clinical methods of diagnosis in the ram. *J. Vet. Australian*, 44, 41 – 47.

ILCA. (1993). International livestock center for Africa. A handbook of African livestock statistics, Addis Ababa, Ethiopia.

Knight, T.W. (1973). A study of factors which affect the potential fertility of the ram. Ph.D. thesis, University of the Western Australia. pp: 7-9.

Laing, J.A. (1979). Fertility and Infertility in Domestic Animals. 3rd ed. Bailliere Tindall, London. pp: 52 – 159.

Lee, J.L. (1978). Functional infertility in sheep. *Vet. Rec*., 102, 232-236.

LMA. (2001). Livestock Marketing Authority, A brief base live information on Ethiopian livestock resources base and its trade. Addis Ababa, Ethiopia. pp: 1-9.

Maclaren, A.P.C. (1988). Ram fertility in south west Scotland, *British Vet. J.*, 144, 45-54.

Matos, C.A.P., Thomas, D.Z., Mash, T.G., Waldron, D.F., and Stookey, J.M. (1992). physiology and genetics of testicular size in sheep: A review. *Live st. Prod. Sci*., 32, 1-30.

Mazouz, A., Toe, F., Lahlou-Kassi, A. and Derquaoui, L. (1990). Selection of rams in sheep breeding management. *Small rum. Res. and Dev. in Africa. Proceeding of the first biennial conference of the African small ruminant research network ILRAD*, Nairobi.

Morris, C.A. and Cullen, N.G. (1994): A note on generic correlation between pubertal traits of males or females and lifetime pregnancy rate in beef cattle. Live st. Prod. Sci. **39:** 291-197.

Morris, C.A., Baker, R.L., and Cullen, N.G. (1992). Genetic correlation between pubertal traits in bull and heifers. *Live st. Prod. Sci*., 31, 221-234.

NMSA (2005). National Meteorology Service Agency. Addis Ababa, Ethiopia.

Roberts , S.J. (1971). Veterinary obstetrics and genital diseases. 2nd ed. CBS Publishers and distributors. India. pp: 604-725.

Skinner, J.D., vanheerden, J.H.A., and Goris, E.J. (1972). Anote on cryptorchidism in Angora goats. South African *J. Anim.Sci*., 2, 93 – 95.

Smith, M.C. (1986). Infertility in bucks. In: Amorrowed. Current therapy in theriogenology, diagnosis, treatment and prevention of reproductive diseases in small and large animals. W.B.Saunders, Philadelpha. pp: 622 – 623.

Smith, O.B., and Somade, B. (1994). Intraction between nutrition and reproduction in farm animals, *14th International conference on Anim. Repord*. January, 17-21, Niamey,

Steele, M. (1996). Goats. The Tropical Agriculturist, London and Basingstocke, Macmillan Education Ltd, ACCT. pp: 79-83.

Tarigan, S., Ladds, P.w., and Foster, R.A. (1990). Genital pathology of feral male goats. *J. Vet. Australian*, 67, 286 – 290.

Terefe, F.(2001): Gross abnormalities and normal parameters in genitalia of bucks and rams slaughtered at Debre Zeit HELIMEX abattoir, DVM thesis, Faculty of Veterinary Medicine Addis Ababa University, Ethiopia.

Willet, E.L. and Ohms, J.I. (1957). measurement of testicular size and its relation to production of spermatozoa in bulls. *J. Dairy Sci.*, 40, 1559-1569.

Wilson, R. T. (1989). Reproductive performance of African indigenous small ruminants under various management systems. A review: *Anim. Reprod*., Sci., 20: 265-286.