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Study on Sexual and Fattening Performance of Partially Castrated Horro Rams

Takele Kumsa[1], Gemeda Duguma[1], Fikru Terefe[1], Ulfina Galmessa[1], and Yohannes Gojjam[2]*

[1]Oromia Agricultural Research Institute, Bako Agricultural Research Center, P. O. Box 03, Bako, Ethiopia.

[2]EARO, Holetta Agricultural Research Center, P. O. Box 2003, Addis Ababa, Ethiopia.

Abstract

Thirty, nine-month old, fully castrated, partially castrated (unilateral) and entire Horro rams (10 of each) were used to evaluate the fertility status of partially castrated rams as compared to entire rams and to compare feed intake, weight gain and fattening performance of partially castrated rams with entire and fully castrated rams. Four rams from each sex group were sacrificed for carcass measurements at the end of the experiment. Besides, four other rams from each of partially castrated and entire were assigned to mating for fertility test. Feed intake was not significantly ($p>0.05$) different between the three sex groups. Initial live weight and treatment significantly ($p<0.05$) affected final live weight, total gain and average daily gain. Slaughter weight significantly ($p<0.05$) influenced carcass weight, forequarter and hindquarter, blood, skin and tail. Treatment had no significant ($p>0.05$) effect on most carcass traits measured except on viscera full and viscera empty ($p<0.05$). No significant ($p>0.05$) difference was observed in fertility between partially castrated and entire ram lambs. However, partially castrated rams had similar fat deposition as intact rms. Yet partially castrated rams were similar to fully castrated rams in weight gain performance. They performed equally well as those of entire rams in terms of fertility. However, the evidence generated does not show a particularly useful advantage of partial castration, and further investigation is suggested also using another type of partial castration.

Keywords: Horro rams, partially castration, sexual and fattening performance.

Introduction

Partial castration (castrating only one testis) has been practiced since long ago for it's various advantages. The growth rate, feed conversion efficiency,

* Author to whom correspondence should be addressed.

and carcass traits of partially castrated rams and bulls fall between entire and fully castrated animals (Rakesh, 1981). Partial castration is also recommended for its economic advantage as the animals take less time to recover and be fattened earlier under fattening conditions thus minimizes cost and time for maintenance. More over based on observation study conducted at Bako partially castrated rams were also found to be sexually fertile and comparable to entire rams.

Full castration has a depressive action on weight gain and it favors more fat deposition (Demisse *et al*, 1989; Thys, *et al*., 1989). Thus, in countries where fat has a moderate demand, partial castration is advocated. From the information available, partial castration has many biological and economical advantages. It favors growth and better-feed conversion efficiency than full castration and more fat deposition than entire ones and adequate male fertility level as entire rams. This study was, therefore, carried out to compare the fertility, live weight gain and fattening performance of partially castrated Horro rams with entire and fully castrated rams of the same breed.

Materials and methods

The study Center, Bako, is situated in east Wollegga zone, about 250 km west of Addis Ababa on the main road to Nekemte at an altitude of approximately 1650 m above sea level (09° 06´ N and 37° 09´ E). Bako has a hot and humid climate and receives a mean annual rainfall of about 1219 mm, more than 80 % of which is recorded in the months of May to September. Mean monthly maximum and minimum temperatures are about 28°C and 14°C, respectively, with 21°C of average temperature. Potential evapotranspiration averages 62 mm per month.

Thirty Horro rams, all nine month old, obtained from the sheep research unit of Bako Agricultural Research Center were used for the current study. They were assigned into three treatments following a stratified random procedure on the basis of their body weight and type of birth. Treatment one (T1) was fully castrated, treatment two (T2) was partially castrated (castrated only one testis) and treatment three (T3) was entire (uncastrated) rams. Castration was conducted using Burdizo both in treatments one and two.

The animals were kept in-door and supplemented 400g/head/day of concentrate mixture composed of 49% maize, 49% noug cake, 1% bone meal and 1% salt on individual feeding base with *ad-libitum* hay for a period of

about three month. Feed intake and refusals were recorded daily. They were weighed at the beginning of the experiment and fortnightly there after until the end of the trial. Water was provided twice a day.

Four rams from each sex group were slaughtered for carcass measurements at the end of the trial. They were fasted over night and weighed before slaughtering. Carcass and non-carcass components were weighed immediately after slaughter. Besides, four other rams from each of partially castrated and entire rams were mated to twenty-four Horro ewes (24 ewes/ram) for fertility test. The ewes were allocated to the different rams at random, based on their parity and live-weight. Number of services per conception and number of lambs born per ewe joined were considered for comparison of fertility between partially castrated and entire rams. Herdsmen recorded observed and recorded services during the day.

The General Linear Models of the Statistical Analysis System (SAS, 1996) was used in the analysis of the data to determine the effects of treatments (sex groups) on experimental measurements. Initial body weight was included as a covariate in the analysis of body weight; treatment was the only independent effect in the analysis of carcass traits. Analysis was also done for ram's fertility in terms of number of service per conception and number of lambs born per ewe joined.

Results and Discussion

Feed intake

The least squares means (±SE) of feed intake were 383±4.00, 391±4.48 and 383±4.01 g/head/day for fully castrated, partially castrated and entire rams, respectively. There was no significance ($p>0.05$) difference in feed intake between the different treatments evaluated. Though not significant, partially castrated rams tended to have higher feed intake than fully castrated and entire ram lambs.

Body weight

Analysis of variance and least squares means (±SE) of the different traits investigated were shown in Tables 1 and 2, respectively. Initial body weight and treatment significantly ($p<0.05$) affected final body weight, total gain and average daily gain. Liveweight growth performance of Horro lambs in the current study was not significantly different between treatments in the first two-months of the experimental period. But it was significantly different

between treatments (sex groups) after two-months. This could be attributed to the stage of growth considered in the current study. According to Fourie and Heydenrych (1982), Nagy *et al*. (1999) and Solomon and Gemeda (2000), the influence of sex on live weight increased with increase in age. In a study by Thys *et al*. (1989) no significant difference was observed between totally and partially castrated rams in live weight, heart girth and height at withers of Poulfouli rams of the far north of Cameroon at the end of a 244-days study period.

Table 1**.** Analysis of variance and level of significance of body weight as affected by treatment and initial body weight.

Sources	Df	Mean squares of:						
		Wt2	Wt3	Wt4	Wt5	Wt6	Wt7	Wt8
Trt	2	1.01	1.46	1.23	4.45	6.29	22.73**	15.91*
IWt	1	1263.39***	269.77***	196.08***	254.67***	240.29**	207.87***	149.76***
R^2 (%)		97.64	92.09	71.59	86.49	73.90	83.24	74.88
CV (%)		2.64	4.78	8.35	5.09	8.37	6.03	6.42
EMS		7.12	25.85	86.38	46.65	100.73	58.25	69.59

Trt= treatment; IWt= initial body weight EMS=error mean squares; *=p<0.05; **= p<0.01; ***=p<0.001

Table 2. Least squares means (±SE) of body weight of Horro rams as affected by treatments.

Source	Overall mean	T1	T2	T3
Wt2 (Kg)	20.6	20.4 ± 0.17	20.8 ± 0.19	20.8 ± 0.17
Wt3 (Kg)	21.7	21.4 ± 0.33	21.8 ± 0.37	21.9 ± 0.33
Wt4 (Kg)	22.7	22.3 ± 0.45	22.7 ± 0.69	23.0 ± 0.59
Wt5 (Kg)	23.6	23.3 ± 0.45	24.3 ± 0.50	23.5 ± 0.44
Wt6 (Kg)	24.5	24.2 ± 0.67	25.2 ± 0.74	24.1 ± 0.65
Wt7 (Kg)	25.8	24.7 ± 0.50^{a}	27.1 ± 0.56^{b}	25.9 ± 0.49^{ab}
Wt8 (Kg)	26.5	25.6 ± 0.55^{a}	27.5 ± 0.62^{b}	26.7 ± 0.54^{ab}
Total gain (Kg)	7.7	6.7 ± 0.55^{a}	8.7 ± 0.62^{b}	7.8 ± 0.54^{ab}
Average daily gain (Kg)	0.07	0.06 ± 0.01^{a}	0.08 ± 0.01^{b}	0.07 ± 0.01^{ab}

T1= Fully castrated rams, T2= partially castrated rams and T3= Entire rams.

Different superscripts in a row denote significant differences between effects at *P* =0.05.

In the current study, partially castrated rams had higher average daily gain and final body weight than fully castrated rams. Though not significant, the relatively higher average daily gain and final body weight of partially castrated rams as compared to fully castrated rams might be attributed to the feed intake. Partially castrated rams had higher feed intake than fully castrated and entire rams, though not significant (p>0.05). Owen (1976) also reported that higher concentrate intake resulted in an increased growth rate.

No reports on performance of partially castrated rams could be found in the literature either for Horro sheep or the other indigenous sheep breeds of the country for possible comparison. However, according to Sibanda *et al.* (1989)

there is an interaction between nutrition and sexual condition (entire, partially castrated and fully castrated). Better growth in castrates than in entire goats was reported by Raghavan (1988) while Arnold and Meyer (1988) reported better growth in rams than in withers. The discrepancy in the literature might be attributed to feed type used and the stage of growth considered. Louca *et al* (1977) reported that late castration (7 months) depressed growth as compared to early castration (7 days of age) and entire.

Carcass traits

Analysis of variance and least squares means (±SE) of carcass traits measured from Horro rams of different treatments were shown in Tables 3 and 4, respectively. Final liveweight has significantly influenced carcass, forequarter and hindquarter, blood, skin and tail weight ($p<0.05$). There was no significance ($p>0.05$) difference in carcass traits measured among treatments, except on visceral full and visceral empty ($p<0.05$). In the current study, the absence of significant differences between treatments in carcass traits measured could be attributed to body weight and the stage of growth considered. Non-significant differences in hot carcass weight between withers and ram lambs was reported by Notter *et al* (1991) in spite of sizeable differences in slaughter weight. Gemeda *et al*. (2002) reported that castration had no significant effect on carcass traits measured at early age. They indicated that differences might still appear if animals were slaughtered at latter ages. The growth curve of Horro sheep shows that maturity is achieved at about 3-year of age (Solomon and Gemeda, 2000).

Table 3. Analysis of variance of some carcass traits of Horro rams as affected by treatment and slaughter weight

Source	Df	Mean squares of:										
		CWt	DP	FQ	HQ	VE	VF	BLD	KF	OF	TW	Skin
Trt	2	0.58	8.80	0.44	0.08	1.31*	1.64*	0.08	2751.52	12295.61	0.12	0.08
SWt	1	18.64***	1.78	5.67***	3.73***	0.43	0.45	0.09*	1233.01	150.97	0.61*	0.57**
R2 (%)		93.35	34.60	86.88	0.88	67.68	57.05	60.77	42.25	11.93	70.26	73.38
CV (%)		3.78	3.84	6.27	4.67	15.82	8.19	11.46	32.72	60.88	29.52	7.34
EMS		1.53	23.85	1.08	0.57	0.71	1.38	0.09	5969.99	95617.78	0.34	0.22

Trt= treatment, SWt= Slaughter weight, CWt= carcass weight, DP= Dressing percentage, FQ= forequarter, HQ= hindquarter, VE= visceral empty, VF= visceral full, BLD= blood, KF= kidney fat, OF= omental fat, TW= tail weight. EMS= Error mean square.

Though not significant, dressing percentage was greater in partially castrated rams than entire and fully castrated rams. Contrary to this result, lower dressing out percentage for intact males than in castrates were reported (Demissie *et al*. 1989) for the breed used in the current study. There

were indications of some sex differences in pattern of deposition of fat, though not significant. Fully castrated rams had higher omental and kidney fat than partially castrated and entire ram lambs.

Fertility

Analysis of variance and least squares means of ram's fertility measured by number of service per conception (NOS) and number of lambs born per ewe joined (NLB) were shown in Tables 5 and 6, respectively. Fertility was not significantly ($p>0.05$) different between partially castrated and entire ram lambs. Entire rams had similar number of services per conception though they had a slightly higher number of lambs born per ewe joined than those of partially castrated rams, but the difference was not significant (Table 6).

Table 4. Least squares means (±SE) of carcass traits measured from Horro rams as affected by treatments.

Traits	Overall mean	T1	T2	T3
SWt (kg)	25.7	25.0 ± 1.47	26.4 ± 1.47	25.8 ± 1.47
CWt (kg)	11.6	11.4 ± 0.22	11.9 ± 0.22	11.5 ± 0.22
DP (%)	45.0	44.3 ± 0.87	46.2 ± 0.87	44.5 ± 0.86
HQ (kg)	5.7	5.7 ± 0.14	5.8 ± 0.14	5.6 ± 0.14
FQ (kg)	5.9	5.6 ± 0.19	6.1± 0.19	5.8 ± 0.10
Hindleg (g)	221.7	234.2 ± 48.01	210.9 ± 47.94[a]	219.9 ± 47.40
Foreleg (g)	265.4	274.3 ± 20.09	260.6 ± 20.06	261.4 ± 19.84
VF (kg)	5.1	5.6 ± 0.21[a]	4.9 ± 0.21[b]	4.8 ± 0.21[b]
VE (kg)	1.9	2.4 ± 0.15[a]	1.6 ± 0.15[b]	1.7 ± 0.15[b]
BLD (kg)	0.9	1.0 ± 0.05[a]	0.8 ± 0.05[b]	0.9 ± 0.05[ab]
TW (kg)	0.7	0.6 ± 0.10	0.7 ± 0.10	0.8 ± 0.10
Head (kg)	1.6	1.6 ± 0.08	1.6 ± 0.08	1.6 ± 0.08
KF (g)	83.5	99.7 ± 13.83	87.7 ± 13.8	63.2 ± 13.66
OF (g)	179.6	219.0 ± 55.37	179.7 ± 55.29	140.1 ± 54.67
Skin (kg)	2.3	2.3 ± 0.08	2.1 ± 0.08	2.3 ± 0.08

Different superscripts in a row denote significant differences within effects P =0.05. Abbreviations as indicated in Table 3.

Table 5. Analysis of variance of NOS and NLB as affected by service sire treatment.

Sources	Df	Mean squares of:	
	NOS	NLB	
Treatment	1	0.02469[NS]	0.09877[NS]
R^2 (%)	1	1.82	3.67
CV (%)		35.32	69.40
EMS		13.56	26.81

NOS= Number of service per conception and NLB= Number of lambs born per ewe joined. EMS= Error mean squares. NLB-Number of lambs born per ewe joined.

Table 6. Least squares means of NOS and NLB as affected by service sire treatment.

	NOS	NLB
Overall mean	1.2	0.8
Service sire		
Entire	1.2 ± 0.08	0.9 ± 0.11
Partially castrated	1.2± 0.06	0.8 ± 0.08

Abbreviations as indicated in Table 5

Conclusion

The results of the study confirmed that partially castrated rams are equivalent to entire (non-castrated) rams in growth performance but superior to fully castrated animals. They were equally important as those of entire rams in terms of fertility. In terms of fat deposition difference was not significant among the three treatments. The study has not shown the advantage of partial castration in terms of fat deposition over the intact animals. Therefore partial castration is not a recommendable practice. However, the current study has used a unilateral type of partial castration as opposed to a short-scrotum (pushing the testis into the groin) type of partial castration. Future work may need to consider the effect of the latter type of partial castration.

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