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EFFECTS OF CASTRATION, DEHORNING, AND DOCKING ON GROWTH PERFORMANCE AND FEED INTAKE OF YANKASA LAMB

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ABSTRACT

This study aimed to investigate the effects of castration, dehorning, and docking on the growth performance and feed intake of Yankasa lambs. A total of twelve (12) three-month-old male lambs were used for this study. The lambs were sourced from a reputable farm in Lafia, Nasarawa State. The animals were tagged and allowed to acclimatize for four weeks prior to the commencement of the experiment. The lambs were grouped into six treatment groups as follows: Control, castrated, dehorned, dehorned and docked, docked and castrated, and docked, dehorned, and castrated. The procedures were carried out based on established humane veterinary standards. Data were analyzed using analysis of variance (ANOVA) with SAS software. All the lambs had an average initial weight of 14,075 ± 75.0 g. The group that was docked, dehorned, and castrated had the highest final weight (21,650 ± 650 g) and total weight gain (7,525 ± 275 g), followed by the control group. However, the differences were not statistically significant ($P > 0.05$). Daily and weekly weight gains also did not differ significantly among the treatment groups. There was no statistically significant difference in daily feed intake, although the docked and castrated group (766.67 ± 66.6 g) and the docked, dehorned, and castrated group (766.67 ± 42.1 g) consumed slightly less feed compared to the other groups. However, there was a significant difference ($P < 0.05$) in feed conversion ratio (FCR) among the groups. The control, dehorned and docked, and docked, dehorned, and castrated groups had FCR values of 0.1694 ± 0.02, 0.1597 ± 0.01, and 0.1523 ± 0.007, respectively. These groups also exhibited relatively higher feed efficiency, although the differences were not statistically significant. Based on the findings of this study, it can be concluded that the management practices carried out did not significantly affect most growth performance parameters. However, feed conversion ratio and feed efficiency appeared to be more optimal in some treatment groups than in others.

Keywords: Lamb, Dehorning, Castration, Growth Performance Yankasa

INTRODUCTION

Small ruminant's animals such as sheep are crucial to the livelihoods of rural communities in Nigeria, by providing significant contributions to food security, income, and job creation. Musa and Yusuf (2023) reported that sheep farming is an essential component of livestock production in Nigeria, supplying meat, milk, and skin for local markets and export. The Yankasa is a meat breed sheep found in north and north central Nigeria. The Yankasa is a medium-sized breed of sheep. The tail is long and thin, the ears moderately long and somewhat droopy. Rams have curved horns and a hairy white mane and ewes are polled.

They have white coat colour with black patches around the eyes, ears and muzzle. Yankasa rams stand 70 to 80 cm at the withers and weigh 55 to 60kg at maturity. Mature females could weigh 25 to 40kg while male weighs between 35 and 50kg. The milk yield (kg) per lactation is between 30 and 56kg and has a lactation length of 91 days. The peak milk yield per day is 960 grams.

Livestock management including practices aimed at improving productivity, controlling reproduction, and enhancing animal welfare. Among these practices, castration, docking, and dehorning were primarily performed on sheep, among other livestock species (Ribera, *et al.*, 2016). These procedures were critical for herd management, injury prevention, and improving meat quality. Castration was common practice aimed at decreasing aggressive behaviour to preventing unwanted breeding, and enhancing meat quality (Bello *et al*., 2020). Dehorning was also performed to reduce the risk of injuries among both animals and handlers, while docking (tail docking) was often used to lower the likelihood of parasitic infections and boost hygiene (Oladejo & Adeoye, 2022). While limited research specifically addresses its effects on lamb growth, dehorning is known to cause short-term pain and stress, leading to reduced feed intake and weight gain (Stilwell et al., 2019). Tail docking is frequently performed to reduce the risk of fly strike and improve hygiene in sheep. Research indicates that docking can improve growth performance in certain breeds. For instance, docked lambs of fat-tailed breeds, such as Barki and Sanjabi, have demonstrated higher average daily gains and improved carcass traits compared to their undocked counterparts (Ebrahimi et al., 2021; El-Sheikh et al., 2020). Although these practices were prevalent in sheep management, but their effects on growth performance and feed intake was not thoroughly understood, especially on Nigerian local breeds of sheep, (Emeash *et al*, 2008). Also castration and docking should be performed at early age of life to decrease stress on the lamb and bleeding incidence. Despite the existing global research, there is a lack of studies examining the combined effects of these management practices on lamb growth performance in north central Nigeria. Therefore, this study aimed to investigates the effect of castration, dehorning, and docking and there combine effects on the growth performance and feed intake of Yankasa lambs.

MATERIALS AND METHODS

Location of the Study

The experiment was carried out at Teaching and Research Livestock Farm of the Department of Animal Science,

Faculty of Agriculture, Federal University of Lafia, Lafia. Nasarawa State falls within the Southern Guinea Savannah zone of Nigeria. Lafia is located on latitude 8.4939°N North and Longitude East 8.5153°E altitude 290–300m above sea level with a mean temperature of 340^{C}, humidity of 40-86%, average day light of 9-12hrs and a rainfall between 1500mm to 1800mm (NIMET, 2). In accordance with. National Bureau of Statistics (NBS). (2024). Climatological Data for Nasarawa State. Available at https://nbs.ng

Experimental Animal and Design

A total of twelfth (12) three months old male lambs were used for this study. The lambs were source from a reputable farm in Lafia, Nasarawa State. The animals were tagged and allowed to acclimatize for four weeks' post-surgical removal of testes and tail docking and dehorning before the commencement of the experiment. The animals were grouped into sex treatment groups viz: Control, castrated, dehorned, dehorned and ducked, ducked and castration and ducked, dehorned and castrated combine in a completely randomize design. The procedures were carried out based on established humane standard veterinary practice.

Experimental Animal Management

The experimental pens were thoroughly cleaned, scrubbed and disinfected using a disinfectant and allowed to dry for two weeks. Rice straw was used as the bedding materials. Feeding trough and water fountains were arranged to ease access to feed and water. Feed and water were provided at ad-libitum. Antibiotics and ant-helminth drugs were administered as of when due to boost lambs' immunity and control endo and ectoparasite. Salt and minerals licks were also provided. Standard hygienic, cleanliness and biosecurity measures were ensured throughout the experimental period, a surgical operation on the three management practice were conducted. An open castration was conducted follow by tail docking and finally the horn was removed. The animals were subjected to close observation and treatment during and after the surgical operations. The animal was subjected to recovering process for the period of two weeks there was a series of medication given such as Also castration and docking should be performed at the standard in compliance with veterinary practice to decrease stress on the lamb and bleeding incidence. The experimental animals were weighed to take their initial body weight and assign to various treatment groups pens with two replicate each for a period of 12 weeks (3months) as shown below:

Experimental Treatment Groups

Group 1: No castration, no docking, no dehorning (Control)
Group 2: Only castrated
Group 3: Only dehorned
Group 4: Dehorning and docking
Group 5: Docking and Castration
Group 6: Docking, Dehorning and Castration

Feeding Management

The lambs were fed with a diet containing 15% crude protein 25% of energy 7% of fibre and 1.5kg of mineral salt, which was include maize offal, wheat offal, dried cassava peel, cowpea husk, sorghum husk salt and potash which were mixed in ratio to meet the Animal requirement.

Data Collection

The following data were collected weekly for a period of 12 weeks.

Growth Performance

Initial Weight: the animal weighed using sensitive digital electronic weighing scale (100kg max)

Weekly weight: the animal weighed using digital electronic weighing scale for the whole period of the experiment.

Final Weight: At the end of the experiment all animal was weighed to determine their final weight.

Total Weight Gain, Daily Weight Gain, and Weekly Weight Gain were calculated.

Total weight gains = final weight- initial weight,

$$\text{Daily Weight Gain} = \frac{\text{final weight} - \text{Initial weight}}{\text{Numbers of days}}$$

$$\text{Weekly Weight Gain} = \frac{\text{Calculated as final weight - initial weight}}{\text{Number of days.}}$$

Feed Intake

Feed intake: was measured daily by subtracting the feed refusals from the total feed offered to the animal. Feed conversion ratio and Feed Efficiency were calculating thus;

$$\text{Feed conversion ratio (FCR)} = \frac{\text{Feed consumed}}{\text{Weight gain}}$$

$$\text{Feed Efficiency (FE)} = \frac{\text{Weight gain}}{\text{Feed intake}}$$

Ethical Approval

All procedures are carryout in humane and approval of the Federal University of Lafia ethic community of the directorate of research and creative thought with an approval number FUL/DIRECT/ECC/2025/LS: 0002**.**

Statistical Analysis

The data obtained were analyzed using analysis of variance (Proc ANOVA), and the significant differences among the means were tested using Tukey's test. The SAS software (Version 9.4) was used for these purposes.

RESULTS AND DISCUSSION

Effect of Castration, Dehorning and Docking on Growth Performance of lambs

Initial Weight

The initial body weights ranged from 13,650 g to 14,475 g of the animal used for this study are withing a similar range with non-significant difference ($P>0.05$) between treatment groups Table 1. This shows that the lambs were homogeneous at the start of the experiment, and any subsequent differences in growth performance can be attributed to treatment effects rather than initial weight variation.

Final Weight

Lambs subjected to Docking, dehorning and castration recorded the highest final weight gain (21,650 ± 650 g), followed by the control group (21,200 ± 2,100 g) and the lowest final weight gain was observed in the dehorning and castration group (16,450 ± 3,050 g) Table 1. Though, the difference between the treatment groups was not statistically ($P>0.05$) significant. This indicates that the management practices did not significantly influence final live weight of the lamb. However, the present findings are contrast with Koşum *et al*. (2019) who reported a non-significant influence of castration on live body weight goat fed for 12 months. Zamiri *et al.* (2012) also reported a significantly lower average daily gain on castrated fattening goat between the two castration timings.

Total Weight Gain

Total weight gain ranged from 2,800g (dehorning and castration) to 7,525 g. (Docking, dehorning and castration).

Although the combined treatment of Docking, dehorning and castration numerically has the highest weight gain. Though the difference is not statistically (P>0.05) significant. This suggests that the management procedures either singly or in combination did not adversely affect the growth performance of lambs in the study. This is in agree with the finding of Nagamine & Sunagawa, (2017). However, Claffey *et al. (2018)*, reported greater dressing percentages and carcass conformation on Wether lambs as comparison to ram lambs. There is no available literature on the combine effect of castration, dehorning and docking on the growth performance of lamb.

Daily Weight Gain

Lambs subjected to docking, dehorning and castration recorded the highest daily weight gain (89.58 ± 3.27 g/day), while dehorning and castration recorded the lowest (33.33 ± 30.9 g/day). Despite these numerical variations, no significant difference (P>0.05) was observed among treatments.

Weekly Weight Gain

Weekly weight gain ranged from 233.3g to 627.1g, with the highest value again was in the docking, dehorning and castration group. Nevertheless, the lack of significant difference (P>0.05) shows that the treatments had no measurable statistically significant effect on weekly weight gain (growth rate). Therefore, it can be concluded that castration, dehorning, docking, and their combinations had no significant effect on the growth performance of the body parameters measured in this experiment. Any observed differences were likely due to random variation rather than treatment effects. Gascoigne *et al.* (2021) reported behavioral disorders and some health challenges in castrated sheep. In contrast to his findings no behavioral changes and major health challenges were observed in lambs that received the different treatment in the present study.

Table 1: Effect of Castration, Dehorning and Docking on Growth Performance of Lambs

Treatment	Initial Weight(g)	Final Weight(g)	Total Weight Gain (g)	Daily Weight Gain (g)	Weekly Weight Gain (g)
Control	14075±75.0[a]	21200±2100[a]	7125±2175[a]	84.82±25.89[a]	593.8± 181.2[a]
Castration	13975±175[a]	16850 ±650 [a]	2875±825[a]	34.23±9.82[a]	239.6± 68.7[a]
Dehorning	14340±60.0[a]	19650±1450[a]	5310±1390[a]	63.21±16.5[a]	442.5±115.8[a]
Dehorning and Docking	14475±225[a]	17900±2150[a]	3425±1925	40.77±22.9[a]	285.4±160[a]
Docking and Castration	13650±450[a]	16450±3050[a]	2800±2600[a]	33.33 ±30.9[a]	233.3±216[a]
Docking, Dehorning and Castration	14125± 375[a]	21650±650 [a]	7525±275[a]	89.58±3.27[a]	627.1±22.9[a]

[a b c]Means bearing different superscripts in a column differ significantly at P<0.05

Effect of Castration, Docking and Dehorning on Feed Intake in Yankasa Lambs

Daily Feed Intake

There is not significantly different (P>0.05) among in daily feed intake across treatments group. Though, the treatment groups that were Ducked, Dehorned and Castrated tend to eat low (766.67 g/day) as compare to other treatments. In agreement with the present study, Claffey *et al. (2018)* reported non- significant (*P* > 0.05) effect of castration on daily feed intake differences when compare to normal lambs. The non-significant difference in feed intake across treatments suggests that the management practices that was applied did not adversely affect the animal appetite. This indicates that all animals were able to utilize the feed provided for them under the same or similar environmental conditions. There is reported influence of the combine treatment on feed intake of lamb.

Feed Conversion Ratio (FCR)

Feed Conversion Ratio expressed as the amount of feed required for the production of a unit of weight gain. it impacts on the economics of any lamb finishing system, as the more efficient lambs require less feed per unit gain and, are therefore, more profitable. In the present study feed conversion ratio (FCR) differ significantly (P<0.05) among the treatment's groups. The least FCR value**s** was observed on lambs (dehorning, castration and docking) (0.1523) and, (Docking and dehorning) (0.1597). Since a lower FCR indicates better feed utilization, this result suggests that animals converted feed to body mass more efficiently compared to other treatment groups. As in this study, Carson *et al*. (2001) reported slight difference in FCR for range of hill lamb crosses.

Feed Efficiency

There is no significant difference in feed efficiency among the treatment groups Table 2. The highest feed efficiency was observed in the present study is (6.642**)** (dehorning, castration and docking) Table 2. Although differences were not statistically significant, the trend indicates that animals that are dehorned, castrated and ducked combine utilized feed more efficiently than those in the other treatments.

Table 2: Effect of Castration, Docking and Dehorning on Feed Intake in Yankasa Lambs

Treatment	Daily Feed Intake (g)	Feed Conversion Ratio	Feed Efficiency
Control	883.33±47.7[a]	0.1694 ±0.02[b]	6.358±0.76[a]
Castration	833.33 ±42.1[a]	0.2819± 0.07[ab]	5.369±1.41[a]
Dehorning	883.33 ±60.0[a]	0.2656 ±0.02[ab]	3.968±0.46[a]
Dehorning and Docking	866.67±61.4[a]	0.1597±0.01[b]	6.642±0.54[a]
Docking and Castration	766.67 ± 66.6[a]	0.4889± 0.16[a]	3.929±1.21[a]
Docking, Dehorning and Castration	766.67 ±42.1[a]	0.1523 ±0.007[b]	6.642±0.33[a]

[a b c] Means bearing different superscripts in a column differ significantly at P<0.05,

CONCLUSION

The findings of this study indicate that castration, dehorning, and docking had no significant effect ($P > 0.05$) on the growth performance parameters of Yankasa lambs, including final weight, total weight gain, and daily or weekly weight gain. Similarly, daily feed intake did not differ significantly among the treatment groups, although lambs subjected to combined docking and castration, as well as docking, dehorning, and castration, showed slightly lower feed consumption.

However, feed conversion ratio (FCR) was significantly affected ($P < 0.05$) by the management practices. The control, dehorned and docked, and docked, dehorned, and castrated groups exhibited better FCR values and relatively higher feed efficiency compared to other groups, although differences in feed efficiency were not statistically significant. Overall, these management practices did not adversely affect the general growth performance of the lambs. Nevertheless, variations observed in feed conversion suggest potential efficiency advantages in certain treatment combinations. It is therefore recommended that castration and docking be carried out at an early age to minimize stress and reduce the risk of bleeding in lambs.

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