Journal of Biology, Agriculture and Healthcare
ISSN 2224-3208 (Paper) ISSN 2225-093X (Online)
Vol 2, No.7, 2012
www.iiste.org

Growth and Agonistic Responses of Yaffa Breed Cockerels Administered Testosterone Propionate

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Abtsract
The effect of birds' duration of administration (duration of exposure) to exogenous Testosterone propionate on total weight gain (TWG) and agonistic behaviours (ABs) were evaluated in the Teaching and Research farm of the University of Ibadan, in Southwestern Nigeria. Testosterone propionate (TP) was administered once weekly, to Yaffa breed cockerels in T1,T2,T3,T4,T5 (for 8,12,16,18 and 20 weeks respectively).Birds in T6,received no testosterone propionate.ABs were evaluated twice daily, on a scale of 1-4,where 1 stood for 'least agonistic' and 4 stood for 'very agonistic'. Agonistic acts like Head and feather pecks,kicks,chases and pushes were visually evaluated TP-administered birds had significantly ($p<0.05$) higher ABs and TWGs than the birds in the Control. Higher ABs however did not affect TWG and other growth parameters negatively
Keywords: Cockerels, Testosterone propionate, Growth, Agonistic behaviour

1.0 Introduction

Nigeria is among 87 countries designated Low-income-Food-deficit Countries (LIFDC), with a daily animal protein intake of less than 3 g/caput/day,far below FAO's recommended 35 g/caput per day (Longe, 2006). Meat yield of 1.6-1.8kg per caput is estimated to come from the poultry population projected till the year 2010.When converted to protein yield, the values are staggeringly low (Longe, 2006)

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Cockerels are hatchery by products. They are cheap to procure, hence they hold a great promise to the resource-poor farmer involved in poultry keeping. The price of a day old cockerel is almost one –tenth the price of day old broilers and pullets, which makes cockerels very attractive to resource-poor farmers. But cockerels, unlike fast growing birds like broilers, attain market weight in five months

Testosterone, the main circulating androgen of testicular origin, is vital in maintaining libido, regulating body fat, maintaining muscle mass, bone density and the regulation of blood sugar.It is produced by the Interstitial cells (Leydig cells) of the testes in response to stimulation by the luteinizing hormone of the adenohypophysis, regulates gonadotropic secretions and Wolffian duct differentiation-formation of the epididymis, vas deferens, and seminal vesicle (Guyton and Hall, 2000.,Mclashlan *et al*,1996.,Hafez,1987).It also stimulates skeletal muscles and is responsible for other male characteristics and spermatogenesis after its conversion to dihydrotestosterone, catalysed by 5α-reductase in peripheral tissue (Levy and Lightman, 1997. Guyton and Hall, 2000). Testosterone also has the unique ability for protein anabolism, hence it can promote growth. This quality of testosterone is what this intervention sought to harness.

The low per caput consumption of protein (particularly protein of animal origin) is a daunting challenge that confronts Nigeria and most of sub Saharan Africa.Exogenous administration of androgens like testosterone can be resorted to, as this has been shown to increase weight gain and the attainment of sexual maturity (Ladokun,2006; Adejumo and Egbunike, 1989; Alabi *et al*, 2006., Ekeocha *et al*, 2007., Arshami *et al*,2009., Hengge *et al*,1996.,). Chiou *et al*,(2008) also demonstrated the growth enhancing effect and the serum lipid lowering effect of caponisation (removal of the testes) and androgen implantation on fowls

Testosterone propionate is an esterified derivative of testosterone.Testosterone suspension usually circulates in the body system for a relatively shorter time, giving it very little time to exert its anabolic influence. This is why testosterone is often attached to an ester (in this case, propionate). The ester determines how long it takes the body to dispose of the steroid in question, and propionate is the shortest ester available with a testosterone base (testosterone suspension has no ester). There are enzymes, called esterases in the body which have the function of removing the ester from steroids, and leaving just the steroid molecule with the ester cleaved off. The length of the ester determines how long it takes the esterase to remove it- and that amount of time determines how long the steroid stays active in the body.

Information on the best length of exposure of cockerels to testosterone propionate for optimal gain is scarce. The broad objective of this study therefore, was to examine the response (both growth and temperament) of cockerels to the administration of testosterone propionate for different durations of time.The structure of testosterone propionate is presented in Figure 3

2.0 MATERIALS AND METHODS

2.1 Study area

The experiment was conducted at the Teaching and Research farm of the University of Ibadan in South western Nigeria.Ibadan, the capital of Oyo State, lies between latitudes 7^{o} 15' and longitude 7 ^{o} 30' N of the equator and Longitude 3 ^{o} 45' and 4 ^{o} 60' E of the Greenwich meridian.Ibadan has a semi hot equatorial climate, characterized by 7 or more uninterrupted humid months and 1-3 dry months

2.2 The experimental birds

The birds were procured from a reputable hatchery in Ibadan.One hundred and fifty (180) eight week old Yaffa Breed cockerels were used for the experiment.Each treatment (length of hormone administration) was randomly allotted 30 birds, replicated 3 times (ten birds per replicate).Treatment 1 (T1) received TEP for 4 weeks,T2 received TEP for 8 weeks,T3 for 12 weeks,T4 for 16 weeks,T5 for 20 weeks while T6,the control, received no TEP for the 20 weeks.

The birds had an average live weight of 500 g at the commencement of the experiment

2.3 Feeding

The birds were fed a growers' diet throughout the duration of the experiment.The feed ingredients were milled and mixed at Feed milling facility opposite the second gate of the University of Ibadan.Feed and water were supplied *ad libitum*.Table 1 shows the gross composition of the grower diet that was fed the cockerels

2.4 Agonistic Behaviour

Agonistic behaviour was assessed by 7.00 hrs and 17.00 hrs when the birds were between 10 and 14 weeks of age. The assessor entered the pen and allowed 10-15 minutes to elapse to allow the birds to adjust to his presence before he began to score for agonistic behaviours like Head and feather pecks,kicks,chases and pushes. Scores for agonistic behaviour were allotted on a scale of 1-4 as shown on the next page:

1=moderately agonistic
2=agonistic
3= Very agonistic
4=extremely agonistic

2.5 Medications

All drugs were administered as at when due

2.6 Hormone administration

2.6.1 Administration of Testosterone Propionate

The birds were intramuscularly injected testosterone propionate (testosterone, with the propionate ester at Carbon 17, in a groundnut oil vehicle) weekly, at a dosage of 2.5 mgkg-1 live weight .The birds were distributed to different Treatments on the basis of the duration of administration of the hormone as shown below:

T1= Received Testosterone propionate (TEP) weekly for 4 weeks
T2= Received TEP weekly for 8 weeks
T3= Received TEP weekly for 12 weeks
T4= Received TEP weekly for 16 weeks
T5= Received TEP weekly for 20 weeks
T6=Received no TEP (The Control)

Testosterone Propionate (TEP) was administered once a week, by 7.00 hrs every Monday morning

3.0 Results and Discussion

3.1 Growth response of cockerels administered testosterone propionate

The initial average live weight of birds in the different treatment groups was approximately 500gm. The Final

Live weight (FLW) of the birds in T1 to T5 did not differ significantly (P>0.05) from one another, but they were all significantly (P<0.05) higher than birds in T6. The average daily feed intake (ADFI) of birds in T2, T3, T4 and T5 were significantly (P>0.05) higher than T1 and T6 which did not significantly (P>0.05) differ from each other. The Total Feed Intake (TFI) also followed the same trend. The Total Weight Gain (TWG) of birds in T1 to T5 did not significantly (P>0.05) differ from one another, but were all statistically (P<0.05) different from birds in T6 (the control). A look at the Feed Conversion Ratio (FCR) revealed values of 1.99, 2.42, 2.41, 2.42. 2.42 and 2.98 for T1, T2, T3, T4, T5 and T6 respectively. T1 birds which received Testosterone Propionate (TP) for four weeks, seemed to have the best performance with regards to Feed Conversion Ratio as birds in T1 converted feed to flesh more efficiently than birds in the other treatment groups. Placing length of administration side by side with cost, T1 was cheaper compared to T2 – T5 because it merely involved the administration of Testesterone Propionate for just four (4) weeks, while T2, T3, T4 and T5 involved the administration of testosterone propionate (TEP) for 8, 12, 16 and 20 weeks respectively. There is therefore no need to extend the administration of the hormone beyond four (4) weeks. Considering the stress of administering testosterone propionate intramuscularly,and the cost of continued administration of the steroid for longer periods, T1 held a greater promise than all other treatments. It appears the boost to growth that the birds in T1 received from the administration of TEP for four weeks gave them an edge in growth which they carried with them all through the duration of the experiment. Table 2 presents the growth performance of birds administered testosterone propionate.

3.2 Agononistic Behaviour

In terms of agonistic acts like kicks, head and feather pecks,chases and pushes, testosterone-treated birds, in line with *a priori* expectation,scored higher than birds that did not receive the steroid.These agonistics acts were higher in the morning when the feeding troughs and watering cans were full.But the higher agonistic displays exhibited by the testerone- treated birds did not adversely affect growth performance.

Figures 1 presents an attempt to score the agonistic acts of cockerels administered testosterone propionate whle Figure 2 shows the score of the agonistic acts of birds in the Control group,that recived no hormone

4.0 Conclusion

Low *per caput* animal protein consumption is one of the biggest problems staring emerging economies like Nigeria in the face. Protein supply from animal products (including contributions from fish and wildlife) was estimated to be only 3g/caput/day in 1993 and a projection of 5.32g/caput/day for year 2010.This is a far cry from the 35g/caput/day recommended by the FAO (2000) cited in Longe (2006).

Cheap, acceptable and very viable interventions are needed to shrink this wide protein gap. Poultry birds are useful in this regard,as poultry birds are cheap, with a short gestation period, and a short generation interval. Poultry also enjoys acceptance across ethnic, religious and class divides. But cockerels have a very slow growth rate, attaining slaughter weight in 5 months. This prompted this study, which involved the use of testosterone propionate as a growth promotants for different durations and an evaluation of their effect on growth and agonistic behaviour.The agonistic behaviours observed also did not pose any immediate threat to performance and productivity

The study confirmed that weekly intramuscularly administrations of testosterone propionate for four weeks (8-12 weeks of age) conferred as fast a growth rate on the cockerels relative to other regimes of administration. There was therefore no need to extend the period of administration of testosterone propionate beyond 4 weeks on 8-week-old cockerels, thereby incurring more operational cost.

References

Adejumo, D.O and Egbunike, G.N. (1989). Effect of pre-versus pubertal and post-pubertal castration on aggression and sexual; behaviour in boars.*Int.Journal of Animal Science*.**4**: 148-151

Alabi, O.M., Aderemi, F.A., Lawal, T.A., Adejumo, D.O., and Ladokun, A.O. (2006). Effect of testosterone enanthate on the performance and serum biochemistry of cockerels. Proc., 11th Annual Conference. of Animal Science Association of Nigeria (ASAN). 18th–24th September 2006(eds: Raji, A.M., Oluokun, J.A. and Odukoya, S.O)

Arshami,j.,Heydar-Poor,M.,Zarghi,H., M. Pilevar,M and Esmailzadeh,M (2009). Long-term effects of oxymetholone vs. testosterone with or without ZnSO on growth performance of turkey chicks. *International Journal of Poultry* Science 8 (5): 470-474

Chiou, P.W.S., Lee, T.Y., Chen, T.W., and Chen, K.L. (2008). Effect of caponization and androgen implantation on lipid metabolism in male chickens. Paper presented at the 23rd World's Poultry Conference in Brisbane, Queensland, Australia.30th June – 4th July, 2008

Ekeocha, A.H., Williams, J., Egbunike, G.N., Adejumo, D.O., and Essien, A. (2007). Effect of crude testosterone

on average cost and returns of broiler chicks. Proceedings, 2nd Nigeria international Poultry summit, Abeokuta, Ogun State.19th–22nd February, 2007(eds: A.O.Fanimo., O.M.O.Idowu., S.O.Peters., O.M.Sogunle.,and A.V.Jegede).

F.A.O.(2010).Low Income Food Deficit Countries.F.A.O Country profiles. http://www.fao.org/countryprofiles/lifdc.asp.Retrieved on the 4th of July,2010

Guhl, A.M. (1953). Social behaviour of the domestic fowl..*Tech.Bull.Kansas Agric.exp.sta.., No.73*

Guyton, A.C. and Hall, J.E. (2000). Text Book on Medical Physiology.(tenth edition).Saunders, the Curtis center. Independence square West, Philadelphia, Pennsylvania

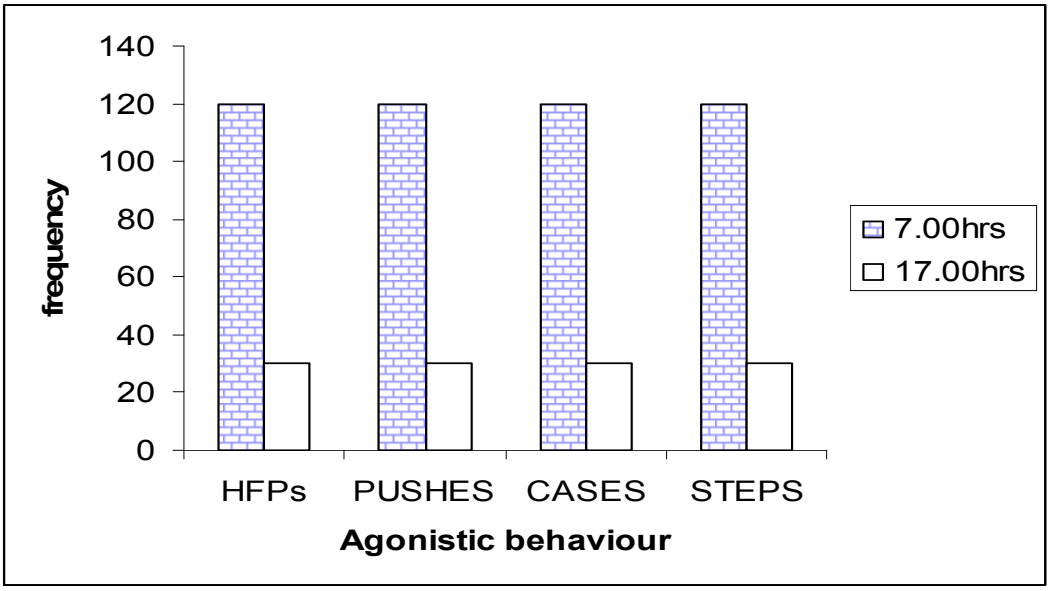
Hafez, E.S.E. (1987). Reproduction in farm animals. Lea and Fabiger, 600 Washington

Ladokun, A, O. (2006). Exogenous Hormonal regulation of growth rate, blood chemistry and fertility in pigs. PhD thesis, Department of Animal Science, University of Ibadan pp 277

Longe, G.O. (2006). Poultry: Treasure in a chest. Inaugural Lecture, University of Ibadan.24th August, 2006.

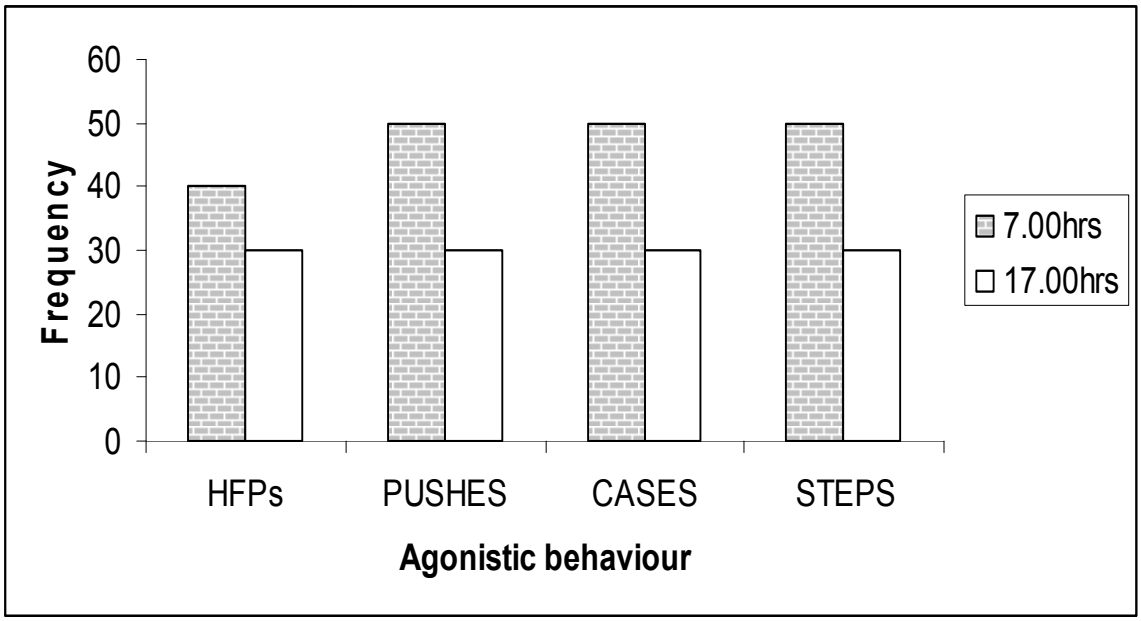
Table 1: Composition of Grower Diet

Ingredients	**Percentage inclusion**
Maize	41.0
Wheat offal	30.0
Palm kernel cake	11.5
Soyabean meal	12.0
Fish meal	2.0
Bone meal	2.5
Premix	0.25
Salt	0.25
Lysine	0.25
Methionine	0.25
Total	100.0
Crude Protein (%)	16.57
Energy	2565.62



HFPs= Head and feather pecks

Fig 1: Agonistic behaviour of cockerels administered Testosterone propionate



HFPs=Head and feather pecks

Fig 2: Agonistic behaviour of cockerels that received no testosterone propionate

Table 2: General Performance of cockerels administered testosterone propionate

	T1	T2	T3	T4	T5	T6	SEM
ILW(g)	500.00	500.00	500.00	500.00	500.00	500.00	
FLW(g)	2670.00a	2672.00a	2679.00a	2680a	2680a	2260b	106.00
ADFI(g)	28.94b	35.15a	35.08a	35.08a	35.07a	29.09b	1.12
TFI(g)	4,340.98b	5,266.22a	5,261.71a	5,265.75a	5265.20a	4361.75b	178.22
ADWG(g)	14.14	14.53	14.53	14.53	14.43	11.73	1.26
TWG(g)	2170.00a	2172.00a	2179.00	2180.00a	2181.00a	1760.00b	60.22
	1.99b	2.42a	2.41a	2.42a	2.42	2.48	0.11
FCR							
Mortality(%)	3.3	3.3	3.3	3.3	3.3	3.3	3.3

abcMeans on the same row with different alphabets are significantly different (P<0.05).
ILW=Initial live weight; FLW=Final live weight; ADFI=Average daily feed intake; ADWG=Average daily weight gain; TWG=Total weight gain; TFI=Total feed intake; FCR=Feed conversion ratio

T1=Hormone administered once weekly, for 4 weeks
T2=Hormone administered once weekly, for 8 weeks
T3= Hormone administered once weekly, for 12 weeks
T4= Hormone administered once weekly, for 16 weeks
T5= Hormone administered once weekly, for 20 weeks
T6= No hormone (Control)

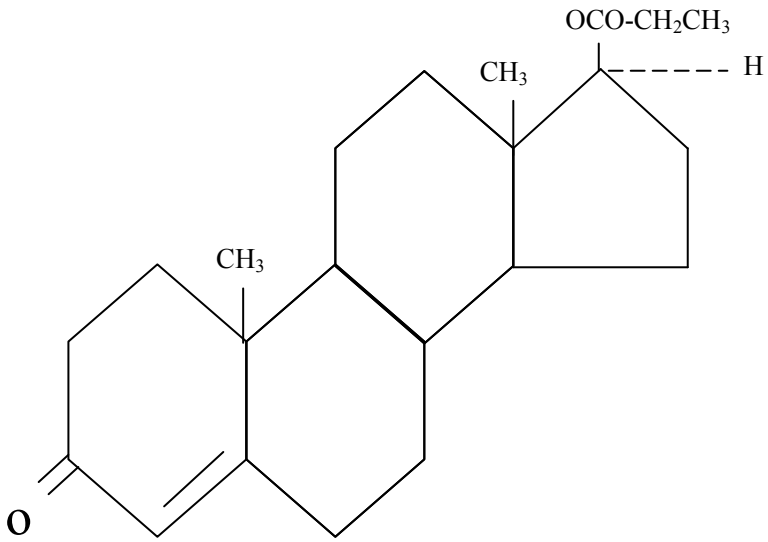


Fig 3: Testosterone Propionate