

GROWTH PERFORMANCE OF CROSSBRED LOCAL (INDIGENOUS) CHICKENS FROM HATCH TO MATURITY

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Abstract

Two popular strains of crossbred local chickens were used in the study for the purpose of establishing the fundamental growth information, from hatch to the age of sexual maturity at 22 weeks. A total of 200 birds comprised of equal number of males and females were used. Similar sigmoid growth curves and patterns were exhibited in their growth performance. A phase of accelerated growth observed reached a point of inflection (POI) at the ages of between 8 and 9 weeks. The POI coincides with the maximum growth rate which then starts to decline until maturity. Male birds were observed to be significantly superior to females from week 8 onwards, the superiority being most apparent between weeks 9 and 15 when significant differences in body weight gains were also observed. Two factorial designed was used, and ANOVA was the statistical tool.

Key words: crossbred, growth performance, local chicken, Point of inflection, popular strains,

Introduction

In poultry species, the phases of growth are generally characterized by an accelerating growth phase following hatch, a point of inflection (POI) coincide with maximum growth rate, a growth phase of declining rate, and a limiting mature weight which is approached asymptotically (Anthony *et al* 1991). Within this general growth pattern, most of the differences in the shape of the growth curve among common poultry species such as the quail, chicken and turkey occurred between hatching and the POI (Anthony *et al* 1991).

Engku azahan *et al.* (2006) identified four phases of growth over a growth period of 16 weeks for the relatively slow-growing meat-type local (Village) chicken, based on body weight and feed conversion ratio. In breeding works, growth and growth rate would also provide useful information on the timing of selection studies (Mignon-Grasteau *et al* 2000; Deeb and Lamont, 2002, Sengul and Kiraz, 2005). This study was carried out with the main objective of gathering fundamental growth information on the current strains of indigenous chicken, whilst concurrently evaluating differences between sexes.

Material and Methods

A total of 200 newly-hatched crossbred local chicks from two strains, Zaria in Kaduna and Wurno in Sokoto, were used in the study. Commercial feeds and water were provided ad libitum. Brooding heat was provided by kerosene stove for the first two weeks. The birds were weighted on day one for their initial weight; they are also weighted weekly until the age of 22 weeks when all pullets had laid at least an egg. This age was regarded as the age of sexual maturity for both male and female birds. Individual weekly body weight gains were calculated together with data on body weight. Two factorial designed was used, and ANOVA was the statistical tool.

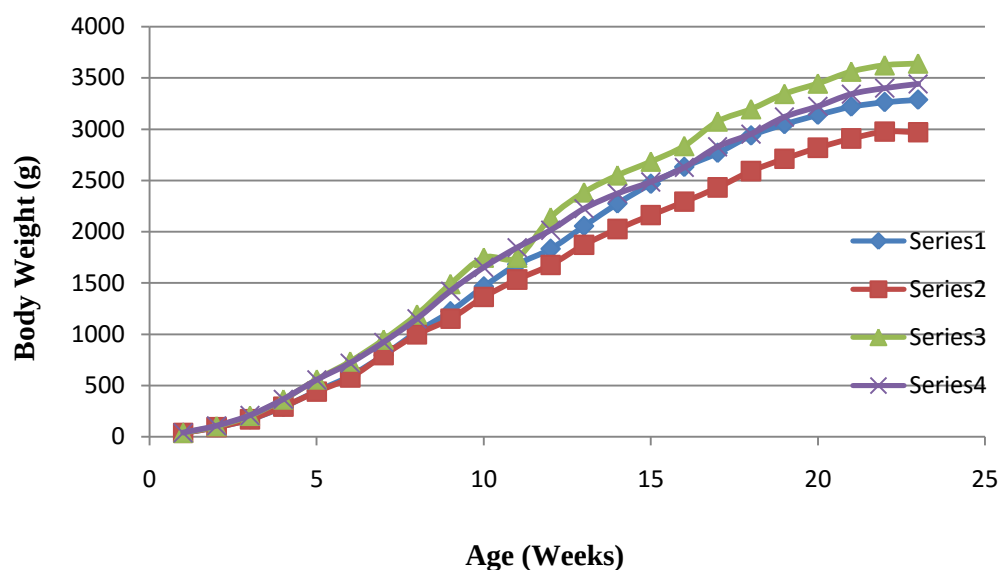


Figure 1. Growth curve of indigenous (local) chicken

Results and Discussion

In the research sigmoid curve of the growth pattern as described by Brody (1945) was observed for both strains of local chickens (Figure 1). After hatching, a period of accelerating growth was exhibited until the POI which was reached at between the 8th - 9th weeks, which coincide with the maximum growth rate. Growth rate was then seen to decline until all birds reached the age of sexual maturity at 22 weeks. The shape of the curves for the two local chicken strains was similar, although for different poultry species this could be markedly different (Knizetiva *et al*, 1995). A difference in the shape of the growth curves was observed to be noticed mainly between hatching and POI (Tzeng and Becker 1981; Zelenka *et al* 1986). The age of the POI was observed to be constant in both sexes of the chicken. In fast growing and early maturing poultry and chicken strains the POI may be reached at much younger ages. For chickens, turkeys, geese and ducks POI at ages of 21.1, 25.5, 47.7 and 74 days, respectively, have been reported (Knizetovo *et al* 1995). For both strain and sex, a continuous increased in body weight were observed from day one until week 21-22. In the first seven weeks there was no any apparent superiority of one sex over the other but from eight weeks onwards, males were observed to be heavier ($p < 0.05$) than females for both strains (Table 1). Similar reports of male superiority had been observed for Japanese native chicken breeds (Goto *et al* 2010). This indicated the effect of sex-linked growth genes in chickens as similarly observed in geese (Knizetovo *et al* 1994). Weekly growth rate increased gradually from week 1 until week 8, reaching peak at the 8th week for both strains. After the POI, growth rate was immediately observed to decline and was relatively stable from week 10 until the birds reached maturity age at 21-22 weeks. A common feature observed for the two strains was that from weeks 9-15, males gained significantly more than females except in week 11 when the difference was not significant.

Conclusion and Recommendations

Indigenous (local) chickens exhibited growth curves which were typically sigmoidal. The point of inflection coincides with maximum growth. In terms of body weight, males were significantly superior to females from week 8 onwards, the superiority being most apparent between week 9 and 15 when significant difference in body weight gain were also observed. It is recommended that more research to be conducted on the same breed and strain on their egg production performance.

Table 1: weekly body weight (g/bird) of two strain of indigenous chicken from hatch until sexual maturity (means $\pm$ std. error).

Age	Zaria strain		Wurno strain	
	Male	Female	Male	Female
Day-old	39.8 $\pm$ 0.2	40.2 $\pm$ 0.2	40.1 $\pm$ 0.3	40.6 $\pm$ 0.2
Week1	94 $\pm$ 1	95 $\pm$ 1	105 $\pm$ 2	108 $\pm$ 1
Week 2	171 $\pm$ 3	172 $\pm$ 3	207 $\pm$ 3	210 $\pm$ 2
Week 3	292 $\pm$ 7	296 $\pm$ 6	366 $\pm$ 6	367 $\pm$ 4
Week 4	448 $\pm$ 11	442 $\pm$ 10	561 $\pm$ 9	556 $\pm$ 7
Week 5	595 $\pm$ 13	579 $\pm$ 13	736 $\pm$ 11	720 $\pm$ 9
Week 6	797 $\pm$ 28	797 $\pm$ 27	949 $\pm$ 20	923 $\pm$ 19
Week 7	1024 $\pm$ 35	999 $\pm$ 35	1194 $\pm$ 28	1152 $\pm$ 26
Week 8	1224 $\pm$ 26	1152 $\pm$ 25*	1491 $\pm$ 25	1422 $\pm$ 20*
Week 9	1466 $\pm$ 30	1364 $\pm$ 29*	1748 $\pm$ 31	1653 $\pm$ 25*
Week 10	1682 $\pm$ 35	1535 $\pm$ 33*	1748 $\pm$ 31	1846 $\pm$ 29*
Week 11	1833 $\pm$ 38	1677 $\pm$ 36*	2140 $\pm$ 41	2015 $\pm$ 32*
Week 12	2055 $\pm$ 43	1873 $\pm$ 40*	2384 $\pm$ 47	2225 $\pm$ 37*
Week 13	2275 $\pm$ 49	2027 $\pm$ 43*	2550 $\pm$ 53	2372 $\pm$ 40*
Week 14	2466 $\pm$ 53	2162 $\pm$ 45*	2684 $\pm$ 56	2486 $\pm$ 43*
Week 15	2631 $\pm$ 57	2293 $\pm$ 48*	2836 $\pm$ 60	2627 $\pm$ 46*
Week 16	2768 $\pm$ 60	2432 $\pm$ 50*	3075 $\pm$ 66	2829 $\pm$ 48*
Week 17	2937 $\pm$ 62	2592 $\pm$ 51*	3195 $\pm$ 67	2953 $\pm$ 50*
Week 18	3048 $\pm$ 64	2712 $\pm$ 52*	3344 $\pm$ 68	3119 $\pm$ 50*
Week 19	3139 $\pm$ 64	2819 $\pm$ 54*	3445 $\pm$ 67	3223 $\pm$ 50*
Week 20	3219 $\pm$ 65	2909 $\pm$ 55*	3561 $\pm$ 66	3342 $\pm$ 49*
Week 21	3263 $\pm$ 65	2976 $\pm$ 55*	3623 $\pm$ 65	3400 $\pm$ 51*
Week 22	3286 $\pm$ 67	2971 $\pm$ 59*	3640 $\pm$ 66	3441 $\pm$ 55*

*within strain, differences between sexes were significant at $p < 0.05$

References

- Anthony, N.B, Emmerson, D.A Nestor, K.E, Bacon, W.L, Siegel, P.B and Dunnington, E.A. (1991). **Comparison of growth curves of weight selected populations of turkey, quail, and chickens.** *Poultry. Science.* 70: 13 – 19.
- Brody, S. (1945). **Bioenergetics and growth.** Reinhold Publ. Corp., New York, USA. pp. 14 - 21
- Deeb, N. and Lamont, S.J (2002). **Genetic architecture of growth and body composition in unique chicken population.** *Journal of Hereditary* . 93: 107 -118.
- Engku Azahan, E.A., Marini, A.M and Noraziah, M. (2000). **Evaluation on the effects of sex on growth and carcass characteristics of broilers.** *Tropical Agriculture and Food Science.* 35 (2): 313 -318.
- Engku Azahan, E.A, Noraziah, M. and Sarah, R. (2006). **Identification of growth phases of commercial Kampung (Village) chickens in Malaysia.** *Proceeding of. 2nd International Conference on Animal Nutrition. 2006 (ICAN).* Pp. 191-192.
- Goto, T., Goto, N., Shiraishi, J., Bungo, T. and Tsudzuki, M. 2010. **Comparison of growth curves of four breeds of Japanese native chicken, Onage-Dori, Toa-Jidori, Ukokkei and Hinai-Dori.** *Journal of Animal Vetrenary Advanment.* 9(9): 1362-1365.

Knizetova, H. Hyanek J. Hyankova, L. and Belicek, P. (1995). **Comparative study of growth curve in poultry.** *Genetic Selection and Evolution*. 15:533- 558.

Mignon-Grateau, S., Piles, M., Varona, L., Poivey, J.P., de Rochambeau, H., Blasco, A. and Beaumont, C., (2000). **Genetic analysis of growth curve parameters for male and female chickens resulting from selection on shape of growth curve.** *Journal of Animal Science*. 78: 2515-2524.

Sengul, T. and Kiraz, S. (2005). **Non-linear models of growth curve in Large white turkeys,** *Journal of Veterenary and Animal Science*. 29: 331-337.

Tzeng, R.Y. and W.A. Becker, W.A (1981). **Growth patterns of body and abdominal fat weight in male broiler chickens.** *Poultry. Science*. 60: 1101-1106.

Zelenka, D.,J, Dunningtomn, E.A and Siegel, P.B. (1986). **Growth to sexual maturity of dwarf and non dwarf white Rock Chickens divergently selected for Juvenile body weight.** *Applied Genetics*, 73:61-65.