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EFFECTS OF ACCESS TO PASTURE AND INTEGRATION WITH RABBITS ON PERFORMANCE AND CARCASS CHARACTERISTICS OF BROILER CHICKEN

[1]Gambo D., [2]Carew, S. N. and [2]Winifred P. M.
[1]Department of Animal Science, Faculty of Agriculture, Nasaraw State University, Keffi
[2]Department of Animal Production, College of Animal Science, University of Agriculture, Makurdi
Corresponding Email: gambodauda21@gmail.com

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ABSTRACT
The study was conducted during rainy season (June-August) to determine the performance and carcass characteristics of broiler chicken raised on partial free range and integration with rabbits using 180 unsexed Anak broiler chicks. The birds were all brooded together for 21 days. The birds were made into group of ten per replicate. Six replicates were randomly assigned to each of the three treatments using Completely Randomised Design (CRD). The treatments were intensive (control), integration with rabbits and partial free ranging. Feed intake (FI), body weight gain (BWG) and feed conversion ratio (FCR) was measured on weekly basis for starter and finisher phases respectively. At the end of the experiment, 6 birds (3 males and 3 females) were selected from each treatment for carcass assessment. The data obtained were subjected to analysis of variance procedure of SPSS Statistical software.The result indicated that, intensive system and integration with rabbits has the highest weight gain at starter and finisher phases respectively. FI and FCR were not significant (P> 0.05) at both starter and finisher phases.Carcass traits were mostly significant (P > 0.05) except for shoulder, breast, thigh and drumstick. Intensive (control) and partial free range were best for head, wing and shank while integration with rabbits were best for neck and back. It was concluded that, broiler partial free range and integration with rabbit was feasible and could thus be used as alternative system of broiler production. The integration with rabbits could be used to reduce cost of production in terms of space, cost of feeding and facilities, thereby producing rabbits and broilers concurrently. Also, the result of partial free ranging has proved that local and village farmers who could not afford intensive management associated with broilers can raise broilers on free range with minimal care.

Keywords: *broiler, brooding, carcass, free range, integration with rabbits, pasture.*

INTRODUCTION

The increasing costs of conventional feed ingredients and its unavailability due to competition between man and livestock and the health hazards associated with some feeds, feed ingredients and medication has called for organic pasture poultry raising (O. R. C. 2007). This present competition between man and poultry for feed ingredients is due to insufficient production of local feed items. The time is approaching when government could put a ban on the use of maize (corn), barley, wheat and soya bean among others for animal production, forcing the livestock industries to look for alternative feed ingredients (World Poultry, 1997).

In recent years, consumer interest in specialty poultry products derived from free-range or organic production systems has been steadily increasing in the United States and Europe (Fanaticoet al. 2006). Under free-range or organic systems, birds have access to an outside area promoting foraging, feed selection, and activity and thus theoretically improving the welfare of the birds. Although outdoor access is intrinsic to the free-range system, there are large variations concerning the amount and type of outdoor access provided in most of the free-range and organic systems that are presently in practice in Europe and the United States. Therefore, although outside access is associated with pasture and invertebrate consumption, the nutritional value derived from the intake of such products is unknown and will vary dramatically with the system in use (Walker and Gordon, 2003).

Over the years, much attention has been given to oil seeds, cereals and tubers as sources of feed for poultry, with little attention given to pasture as means of poultry production and integration of poultry with rabbits. The objective of this study is to determine the effects of pasture and broiler integration with rabbits on performance and carcass characteristics of broiler chicken. This has become imperative due to the limited amount of work that has been carried out with broiler production on pasture (O. R. C. 2007) and broiler integration with rabbits.

MATERIALS AND METHODS

The experiment was carried out at the Livestock Teaching and Research Farm of the University of Agriculture Makurdi, Benue State, Nigeria. Benue State falls within the Southern Guinea Savannah zone of Nigeria. The state lies between latitude 7^0 and 9^0 North and Longitude 7^0 and 10^0 East. It has a climate typical of the tropical zone because of its location. It has a temperature ranging from 25^0 C in October to 36^0 C in March while monthly rainfall varies from 13.73 cm in some places to 14cm in others (Benue State Ministry of Information 2008).

Anak broiler chicks (250) were brooded for 21 days. A total of 180 broiler chicks were selected at the end of brooding using average weight of the flock (0.4kg) to select birds for each replicates. The birds were made into group of ten per replicate and six replicates were assigned to each treatment using Completely Randomized Design (CRD). There were three treatments: intensive (T1), free range (T2) and integration with rabbits ((T3). The experiment lasted for 6 weeks, the first 2 weeks was starter phase while the last 4 weeks were finisher phase. The birds were all fed commercial feed. For the intensive, 60 broiler chicks were reared on deep litter using standard broiler feed and production practices. The birds for free range system were moved out around 8:00am and returned back to their pen by 6:00pm on daily basis with carrying creates. Their feeders and drinkers were placed in shaded area and fenced with chain link fencing materials. This was to protect them from direct sunlight and to prevent access to their feed by other animals. The fencing materials were raised about six inches above the ground to allow the birds freedom of movement in and out of the fenced area. Six different coloured ropes were used as leg bands to identify the birds belonging to the six replicates.

The broilers integrated with rabbits were leg banded with 6 different coloured ropes for the groups (replicates) identification. The birds were allowed to range within the rabbitery under the hutches. Feeds and water were provided within the rabbiteryad libitum. The birds in the rabbitery had access to rabbit's droppings as well as their wasted feed in addition to conventional feed. The birds in the three treatments and their feed were weighed weekly. Weight gain and conversion efficiency were estimated from these data on weekly basis.

Feed intakes (FI), weight gain (WG) and feed conversion ratio (FCR) were recorded on weekly basis. These data were recorded for starter (2 weeks) and finisher (4 weeks) phases. The total FI were divided by WG over the period and expressed as FCR for both starter and finisher phases respectively. The phenotypic appearances of the broiler chicken (shank and beak) during growth period were noted. Assessment of colour (shank and beak) was based on visual observation that was not scored and therefore was not analyzed statistically. At the end of the experiment, 3 males and 3 females were selected per treatment and used for carcass assessment. The birds were fasted for 12 hours before slaughtering. The weight of the birds were taken before slaughter and recorded as live weight. The birds were immersed in hot water for 5 minutes before de-feathering. After de-feathering, the internal organs were removed (evisceration) and the carcass cut into various parts such as head, neck, shoulder, wing, back, breast, thigh, drumstick and shank. These parts were weighed using electronic sensitive scale.

The design of the experiment was Completely Randomized Design (CRD). Data collected were subjected to analysis of variance using the procedure of SPSS Statistical Software (2011).

RESULTS AND DISCUSSION

The body weight gains (Table 1) were significant at both starter and finisher phase. At starter phase, intensive system (T1)and integration with rabbits were the best. However, at finisher phase, partial free range and integration with rabbits were the best for body weight gain. The feed intake and feed conversion ratio were non significant statistically across the three treatments.

However, intensive system had the best (least) feed conversion ratio for starter phase across the treatments while integration with rabbits had the best (least) feed conversion ratio for finisher phase. The results of carcass yield (Table 2) were generally significant. Parameters such as Head, Neck, Wing, Back and Shank were significantly different (P > 0.05). Intensive (control) and partial free range (T2) were best for Head, Wing and Shank while integration with rabbits (T3) were best for Neck and Back. Other parameters like Shoulder, Breast, Thigh and Drumstick were not significant (P > 0.05).

Table 1: The effects of partial free range (T2) and integration with rabbits (T3) on weight gain, feed intake and feed conversion ratio of Broiler Chicken

Period	Parameters	T1	T2	T3	SEM
Starter phase	BWG (g)	490[a]	388[b]	475[a]	11.3
	FI (g)	1081	1061	1066	
	FCR	2.21	2.73	2.24	
Finisher phase	BWG (g)	972[b]	1148[a]	1066[a]	56.3
	FI (g)	3,302	3,740	3,664	
	FCR	3.40	3.26	2.80	

BWG= body weight gain, FI=feed intake, FCR= feed conversion ratio. abMean values within a row with similar or without superscripts are not significantly different (p>0.05). SEM = Standard Error of the Mean.

Table 2: The effects of partial free range (T2) and integration with rabbits (T3) on weight (g) of carcass of broilers.

Parameters (g)	T1	T2	T3	SEM
Head	2.60[a]	2.58[a]	2.01[b]	0.17
Neck	7.37[b]	7.25[b]	7.96[a]	0.14
Shoulder	14.93	14.26	15.76	0.51
Wing	4.62[a]	4.26[ab]	3.92[b]	0.13
Back	8.60[b]	8.50[b]	9.26[a]	0.22
Breast	11.39	10.86	12.36	0.51
Thigh	12.46	12.35	12.53	0.36
Drumstick	10.54	10.53	9.83	0.33
Shank	4.35[a]	4.17[a]	3.45[b]	0.21

Mean values within a row with similar or without superscripts are not significantly different (p>0.05). SEM = Standard Error of the Mean.

The experiment was designed to assess the effects of partial free range and integration of broiler with rabbits on broiler chickens. The phenotypic appearances of the broiler chicken (shank and beak) during growth period were noted. Assessment of colour (shank and beak) was based on visual observation that was not scored and therefore was not analyzed statistically. It was observed then that, shank and beak colouration was noticed in partial free ranged birds as similarly reported by (Ponte *et al.*, 2007).

Weight gain (Table 1) produced significant (P > 0.05) variation at both starter and finisher phase; intensive system (control) and integration with rabbits produced the highest weight gain at starter phase while at finisher phase, partial free range and integration with rabbits showed the highest weight gain. Feed conversion ratio was best for intensive (2.21) at starter phase while at finisher phase integration with rabbits produced the best feed conversion ratio (2.80).

Although there were variation in weight gain, all of the gains were better than those projected as fair weight performance by Dafwang and Ogundipe (1987). The total lifespan of the birds was 63 days (9 weeks). During these periods, birds on the three treatments almost reached an average weight of 2.00kg and above. This is also far better than those value advanced by Anthony (1990), who observed that broiler are fast growing chicken reaching average weight of 1.8-2.0kg in 8-12 weeks. The final body weight gains of bird on partial free range (1148g) werehigher than that of intensive (972g). This findings agree with the report by Ponte *et al*., (2007) who observed that, the final BW of birds consuming pasture were significantly greater than that of the control birds kept under the same environmental conditions but not allowed to forage. This result suggests that, in general, pasture intake promoted an increase in the consumption of the cereal-based feed. Therefore, it is possible that carcass yield may have been affected by the fact that birds with access to pasture had a more developed gastrointestinal tract (due to greater fiber intake and total feed intake). The non significant difference among the three treatments for feed conversion ratio in this study also agree with Ponte et al. (2007) who reported that there were no differences between the feed conversion ratios of birds subjected to the 3 different grazing regimens. This suggests that bird performance primarily depends on the intake of the cereal-based feed rather than from an improvement in the efficiency of nutrient utilization per se.

For carcass traits measured, parameters such as Head, Neck, Wing, Back and Shank were significantly different (P > 0.05). Intensive (control) and partial free range (T2) were best for Head, Wing and Shank while integration with rabbits (T3) were best for Neck and Back. Other parameters like Shoulder, Breast, Thigh and Drumstick were not significant (P > 0.05). The report on intensive (control) and partial

free range (T2) being best for Head, Wing and Shank fairly agrees with Fanaticoet al. (2005) who showed that pasture intake had a positive effect on carcass yield. This isexpected because the greater activity of grazing birds is believed to improve the proportion of wings, thighs, and drum sticks, whereas foraging could increase the proportion of gastrointestinal tract tissues on the overall BW. However, the non significant differences observed in Shoulder, Breast, Thigh and Drumstick strongly agree with Fanatico *et al*., (2005) who found no differences in the carcass yield of indoor and outdoor birds.

CONCLUSION

This study has demonstrated the feasibility of broilers being raised on partial free range and integration with rabbit. The integration with rabbits could thus be usedto reduce cost of production in term of space, cost of feeding and facilities, thereby producing rabbits and broilers concurrently using the same facilities. Also, the result of partial free ranging has proved that local and village farmers who could not afford intensive management associated with broilers can raise broilers on free range with minimal cost and care. The results of this experiment suggest further investigation along the line to further clarify the situation.

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