Observation on the growth of hubbard parent stock broilers raised for 20 weeks by manipulating the feed supply under restricted feeding regime

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Abstract

A study was carried out to monitor the effect of feed manipulation on the growth and development of male and female line Hubbard broiler parent stock reared under tropical open sided poultry house without any form of cooling system or any temperature regulating mechanism. A total of 255 females and 105 males for the male line and 360 females and 150 males for the female line were used. The birds were fed a normal soya cake/groundnut cake and maize based broiler starter ration of 2900kcal/kg ME and 20% CP and a grower ration containing 2650kcal/kg ME with 16% CP as stipulated by the Hubbard rearing guide. The birds were fed ad libitum for the first 2 weeks and thereafter placed on restricted feeding in line with the standard rearing guideline provided by the Hubbard breeding company for optimum growth and development. It was observed that the body weights of the birds did not differ much from the standard body weight expected at 20 weeks even though they were reared in the normal tropical open sided poultry house without sophisticated modern facilities. This shows that feed manipulation can be used to achieve desired weight in broiler parent stock rearing.

Keywords : *Feed manipulation, parent stock, open sided house, growth performance, broilers.*

Introduction

Parent stock broilers are managed all over the world under very strict and intensive management system involving modern technology for the control of the local environment such as temperature, relative humidity, wind speed and gas evacuation (Ammonia). These are achieved through tunnel ventilation, fogging, automatic manure removal and suction fans. These micro climatic conditions are prerequisites for optimum parent stock broiler growth and breeding. Another important area for their performance is the manipulation of the feeding regime to produce birds with the potential for good egg output during the laying period (Abeke *et al.*, 2003 and Akanji *et al.*, 2003). Feed manipulation and feeding regime are achieved more effectively through automative feeding

Equipment. However, not all farmers can afford the cost of these modern technologies so that there is need to find alternative methods for managing broiler parent stock. This will reduce the level of importation of day old chicks into the country especially now that we have the threat of avian influenza.

It has been argued that without adequate provision of all necessary facilities for the comfort of broiler parent stock, performance may be hampered. However there is also the need to raise parent stock broilers that can adapt to the tropical climate and perform well in terms of egg production. The open sided poultry house has been one of the innovations for ameliorating the harsh effect of hot temperatures in the tropics. Little modification may be necessary to make

the normal open sided house more comfortable for these birds that are not so heat tolerant. Raising the building to about 5-6 metres high and lowering the side walls to about 50cm, ceiling of the house and introduction of fans may improve performance. This project seeks to find solution to problems many have encountered in trying to raise broiler parent stock under tropical weather condition without the high and expensive technology involved. The aim is to produce parent stock broilers that are adaptable to our environment and perform optimally so as to reduce dependence on importation.

Materials and Methods

This work was carried out at the Poultry Research Programme of the National Animal Production Research Institute, Ahmadu Bello University Shika, Zaria, Nigeria. Shika is geographically located between latitude 11° 12'N and longitude 7° 33'E at an altitude of 640M above sea level (Akpa *et al.*, 2002). Shika is located about 20km along the Zaria Sokoto road in Kaduna state, North Western Nigeria. It has three distinct climatic seasons. These are the cold dry season (November February), the hot dry season (March-May) and the wet season (June October). The total annual rainfall ranges from 617 to 1365mm with a 50-year average of 1041mm. Most of the rains fall between July and September (Bawa *et al.*, 2003).

Two Hubbard parent stock broilers lines were monitored for their growth performance from day old to twenty weeks of age. These comprised 255 day old females chicks and 105 males for the male line and 360 females and 150 male chicks for the female line. Each of the lines was replicated three times with 85 and 35 birds respectively for the male line and 120 and 50 birds respectively for the

Table 1: Composition of broiler starter and broiler grower diets fed from 0-8 weeks and 9-20 weeks respectively.

Ingredients	Starter diet	Grower diet
Maize	56.75	38.05
GNC	15.00	10.00
Soya cake	20.00	10.00
Maize offal	-	27.00
Wheat offal	5.00	10.00
Limestone	0.50	2.00
Bone meal	1.80	2.00
Salt	0.30	0.30
Premix	0.25	0.25
Methionine	0.20	0.20
Lysine	0.20	0.20
Total	100.00	100.00
Calculated Analysis		
Crude Protein %	20.00	16.00
ME(kcal/kg)	2884	2650
Crude Fibre %	4.10	5.70
Ether extract %	3.71	4.30
Calcium %	1.06	1.24
Phosphorus %	0.70	0.89
Methionine %	0.42	0.38
Lysine %	1.12	0.74
Methionine + cystine %	0.81	0.62
Price/kg (N)	42.30	37.20

Biomix premix supplied the following per kg diet:

Vit. A. 10000i.u, Vit.D₃, 2000i.u Vit.E, 23mg Vit.K, 2mg. Thiamine B₁, 1.8mg. Riboflavin B₂, 5mg. Pyridoxine B₆, 3mg. Niacin, 27.5mg. Vit.B₁₂, 0.015mg. Pantothenic acid 7.5mg. Folic acid, 0.75mg, Biotin, 0.06mg. Choline chloride 300mg. Manganese, 40mg. Zinc, 30mg. Iron 20mg. Copper, 3mg. Iodine, 1mg. Selenium, 0.2mg. Cobalt, 0.2mg.

Mash of 20% crude protein and metabolizable energy of 2900kcal/kg for the first 8 weeks and growers mash of 16% crude protein and 2650kcal/kg ME for the growing phase which lasted for 12 weeks. For the first 2 weeks they were fed *ad libitum* to give the birds a good initial start. From the third week they were placed on restricted feeding. This was according to the requirement of the rearing guide. However by the third week there were signs of differential growth and weight gain that differed from the expected standard weight. Thenceforth feeding of the birds was manipulated (feed given was kept constant when the birds were above standard weight and increased when the birds were below standard weight) in response to their weight gain or weight loss in order to keep them in line within the standard weight requirements for each week. Routine medical and vaccination care were administered when necessary.

Records taken included initial weight of the birds and thereafter they were weighed weekly from the third week. Feed intake was also recorded weekly. The experiment lasted for 20 weeks

Results and Discussion

The composition of the broiler starter and broiler grower diets fed to the birds from 0-8 weeks and from 9-20 weeks of age is presented in table 1. The growth performance of the males and females lines of the Hubbard parent stocks in response to feed manipulation are presented in tables 2, 3, 4 and 5 respectively. The nutrient compositions of the diets were in line with the standard nutrient recommendation for the Hubbard broiler parent stock as given by the Hubbard breeding company.

According to Abeke *et al* (2003) the feeding regime adopted for any particular group of birds is determined by the goals for which such birds are raised. Parent stock birds are raised for the purpose of breeding and such their feeding must be

such that they are neither obese nor under weight for optimum production. Their feed must therefore be formulated to meet their nutrient requirement. The results shown in table 3 indicate that the feed given to the males of the male line were consistently higher than the standard feed requirement for the chick and grower phases. This was done to give the males the required growth necessary for obtaining a good breeding cock. Also another reason for this was to make room for any shortfall that might arise from poor quality of ingredient as well as to maintain the weight of the birds as close as possible to the standard weight. The rule of thumb for rearing male broilers for breeding purposes is that their feed must not be reduced because this will have a negative effect on the development of the testis and its associated organs, resulting in poor fertility at maturity.

However feed given to the females of the male line (table 4), showed that as a result of an initial boost in weight gain above the standard weight

Table 2. Weight changes of Males of Male line Broiler Parent Stock in response to feed manipulation

Weeks	Feed given (g/b/week)	Standard feed required. (g/b/week)	Feed Difference (g/b/week)	Obtained body weight (g/b/week)	Standard weight expected (g/b/week)	Weight Difference (g/b/week)
Day old	-	-	-	34	-	-
3	61	45.5	+15.5	477	430	+47
4	61	48.5	+12.5	659	590	+69
5	61	51.5	+9.5	809	750	+59
6	61	55.5	+5.5	861	910	-49
7	65	59.5	+5.5	919	1040	-21
8	64.9	63.5	+1.4	1059	1170	-111
9	72	68.0	+4.0	1171	1300	-129
10	75	72.5	+2.5	1235	1430	-195
11	81.6	77.5	+4.1	1442	1560	-118
12	85	82.5	+2.5	1564	1690	-126
13	92	87.5	+4.5	1712	1820	-108
14	101.5	92.5	+9.0	1864	1950	-86
15	109.9	97.5	+12.4	2055	2100	-45
16	114.9	102.5	+12.4	2194	2250	-56
17	124.9	107.5	+17.5	2396	2400	-4
18	124.9	112.5	+12.4	2602	2550	+52
19	124.9	117.5	+7.4	2702	2700	+2
20	124.9	121.0	+3.9	2883	2850	+33

recommended from day old to the 3rd week, a careful manipulation of the feed was done so as not to produce fatty broilers that will not be able to perform optimally.

Although the standard rule of non reduction of parent stock feed was followed, the increase in weekly feed given was such that they were slightly below the standard feed recommended for the females of the male line. According to Vieira *et al.*(1997) the use of feed restriction is an important tool in rearing broiler parent stock for optimum performance.

The final weights of the birds at 20 weeks for the male and female lines were found to be very close to the expected standard weight indicating a successful feed manipulation to produce cocks and hens that are ready for breeding. According to Akpa *et al.* (2002), breeding cocks must not be obese neither should they be too

small. A well grown cock has better fertility than cocks that are poorly grown. Also the developments of the gonads are achieved through good feeding. Reports by Nwagu *et al.* (2007) shows that cock that is too heavy finds it

difficult to mount and also more susceptible to heat stress than a well grown cock. According to Nwagu *et al.* (2007) selection pressure for cocks is far higher than that for hens. This according to the authors is because an unfit cock cannot breed. The authors also reported that hens that are fatty and obese cannot perform optimally in terms of egg production. They are also more susceptible to heat stress and high mortality. According to Ani and Omeje (2007) and Ani and Okorie (2003), feed is one important method of weight control in breeding flocks. A good manipulation of the feeding regime will result in well grown birds that are ready for breeding

Table 3 Weight changes of Females of Male line Broiler Parent Stock in response to feed manipulation

Weeks	Feed given (g/b/week)	Standard feed required. (g/b/week)	Feed Difference (g/b/week)	Obtained body weight (g/b/week)	Standard weight expected (g/b/week)	Weight Difference (g/b/week)
Day old				38.4		
3	39	35	+4	474	340	+134
4	39	38	+1	590	440	+150
5	39	41	-2	693	540	+153
6	39	44	-5	734	640	+94
7	47	47	0	772	730	+42
8	47	50	-3	860	820	+40
9	50	53	-3	930	910	+20
10	53	56	-3	999	1000	-1
11	60	60	0	1126	1100	+26
12	63	64	-1	1202	1200	+2
13	63	68	-5	1321	1310	+11
14	63	72	-9	1437	1420	+17
15	63	76	-13	1552	1530	+22
16	77	80	-3	1668	1640	+28
17	77	84	-7	1751	1760	-9
18	86.7	92	-5.3	1913	1890	+23
19	86.7	97	-10.3	2067	2020	+47
20	86.7	99.5	-12.8	2176	2150	+26

Feed manipulation of Hubbard parent stock

Table 4 Weight changes of Males of Female line Broiler Parent Stock in response to feed manipulation

Weeks	Feed given (g/b/week)	Standard feed required. (g/b/week)	Feed Difference (g/b/week)	Obtained body weight (g/b/week)	Standard weight expected (g/b/week)	Weight Difference (g/b/week)
Day old	-	-	-	34	-	-
3	61	45.5	+15.5	548	430	+118
4	61	48.5	+12.5	709	590	+119
5	61	51.5	+9.5	788	750	+38
6	61	55.5	+5.5	882	910	-28
7	65	59.5	+5.5	971	1040	-69
8	64.9	63.5	+1.4	1052	1170	-118
9	72	68	+4.0	1179	1300	-129
10	75	72.5	+2.5	1220	1430	-210
11	79.9	77.5	+2.4	1423	1560	-137
12	86.6	82.5	+4.1	1481	1690	-209
13	94	87.5	+6.5	1670	1820	-150
14	103	92.5	+10.5	1839	1950	-111
15	109.9	97.5	+12.4	2004	2100	-96
16	114.9	102.5	+12.4	2157	2250	-93
17	125	107.5	+17.5	2319	2400	-81
18	128	112.5	+15.5	2490	2550	-60
19	128	117.5	+10.5	2635	2700	-65
20	128	121.0	+7.0	2813	2850	-37

Table 5 Weight changes of Females of Female line Broiler Parent Stock in response to feed manipulation

Weeks	Feed given (g/b/week)	Standard feed required. (g/b/week)	Feed Difference (g/b/week)	Obtained body weight (g/b/week)	Standard weight expected (g/b/week)	Weight Difference (g/b/week)
Day old				38.4		
3	39	35	+4	418	340	+78
4	39	38	+1	575	440	+135
5	39	41	-2	614	540	+74
6	39	44	-5	658	640	+18
7	47	47	0	720	730	+10
8	50	50	0	821	820	+1
9	53.8	53	+0.8	906	910	-4
10	56.9	56	+0.9	932	1000	-68
11	60	60	0	1065	1100	-35
12	67.9	64	+3.9	1151	1200	-49
13	74	68	+6	1310	1310	0
14	72.7	72	+0.7	1394	1420	-26
15	78.5	76	+2.5	1503	1530	-27
16	84	80	+4	1578	1640	-62
17	95	84	+11	1729	1760	-31
18	95	92	+3	1894	1890	+4
19	95	94.5	+0.5	2031	2020	+11
20	99.9	99.5	+0.4	2134	2150	-16

Conclusion

Success in rearing broiler parent stock for breeding requires an effective manipulation of factors such as temperature, humidity and other management factors. However, feed manipulation is one of the most important tools in achieving the required weight in parent stock broilers. From the success achieved in raising these broiler parent stock to 20 weeks with body weights that are close to the standard recommended weight without the sophisticated gadgets for temperature and humidity control, it shows that broiler parent stock could be successfully managed in our tropical environment under the normal open sided poultry house using the tool of effective feed manipulation. These birds will have the extra advantage of being more adaptable to our local climate and are expected to produce optimally.

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