Sarker, M., Tabassum, F., Bhuiyan, M., Faruque, S.,.Monira, K., Bhuiyan, A. (2026) Growth and production performance of crossbred chicken providing similar nutritional plane, *Proceedings 13th World Congress on Genetics Applied to Livestock Production*: 24125
https://doi.org/10.31274/wcgalp.24125 ©2026 *Sarker, et al.* CC BY-NC-ND

Growth and production performance of crossbred chicken providing similar nutritional plane

M.S.K. Sarker[1, 2*], F. Tabassum[1], M.S.A. Bhuiyan[3], S. Faruque[2], K.N.Monira[2] A.K.F.H. Bhuiyan[3]

[1]Strengthening of Poultry Research and Development Project; [2]Bangladesh Livestock Research Institute, Savar, Dhaka, Irak; [3]Bangladesh Agricultural University, Mymensingh, Irak;
[*]Corresponding author: sazdulkarim@yahoo.com

Introduction

Chickens are an integral part of the farming system in Bangladesh and has created direct, indirect employment opportunities, including support services for over 8.5 million people (Hossain 2020). Chicken meat is one of the cheapest and most available sources of animal protein, preferred by all classes of people, irrespective of religion and age. Poultry farming provides meat and eggs essential for humans. Poultry contributes around 29% of meat whereas, 37% comes from chicken among all poultry species. . Now we are fulfilling our protein requirements, 136 g of meat and 147.10 eggs (DLS, 2021), as a developed country. In many developed countries in the world peoples consume comparatively almost double number of eggs and meat every year. So, to be a developed country, we should increase our minimum protein requirement level to compete with them. In this view, this research has been undertaken to develop a meat-type chicken by crossing a native breed with an exotic breed which produces comparatively more meat along with a taste similar to that of native chicken and which can attain marketing weight (1000-1200g) at 10-12th weeks of age. The best-performing chicken lines based on growth, productive performance, and meat quality parameters were selected for this study. Three native chicken genotypes and three exotic chicken genotypes were selected. Among all crossbred in F_1, only 4 crossbreds were selected on the basis of morphology, growth and reproductive performances for producing F generation.

Materials & Methods

A total of 250 birds of each up to the 40th week of age. Birds were intensively providing all necessities upto 40th weeks of age. Among 6 chicken genotypes in foundation stock only 4 were selected on the basis of morphology, growth and reproductive performances for producing F_1 generation. In F_1 generation 11 types of reciprocally produced crossbred appeared. Chicken lines were fed with recommended nutrients (ME 3000 Kcal/kg and CP 20%) upto 12 weeks of age. At the end of the experiment the birds were slaughtered to know their dressing yield and meat quality traits.

Results

Figure 1 showed the growth performance of F_2 crossbred at different ages. From this figure we observed that the highest body weight found in Line 6 at 10th and 12th weeks of age was 1079.53a±22.39g and 1429.69a±54.33g, respectively. At 10th and 12th weeks of age, the lowest was in Line 3 (966.67ab±10.94) and Line 1 ♀ (1141.41c±22.7 g) crossbreds, respectively. Body weight significantly differed among all genotypes at different ages. Table 1 shows feed intake and feed conversion ratio of different crossbred in different weeks. From this table we found that, Line

4, Line 5 and Line 6 crossbred attained comparatively more feed intake, especially at 8th, 10th, and 12th weeks of age. But in case of 1-8 , 1-10, and 1-12 weeks of age lowest feed intake was found in Line 3 (28.85±1.95g, 33.78±1.96 g & 38.81±2.06 g) crossbred where whereas the highest found in Line 1 ♀ (33.29±2.15 & 37.76±2.03 g) and Line 6 (42.15±2.16g) crossbred, respectively. On the other hand, at 1-8 weeks of age, the lowest FCR was found in Line 3 (2.08), followed by the highest in Line 2 (2.77), crossbred. At 1-10 weeks of age, the lowest FCR was found in Line 4 (2.52), and Line 2.74 attained the highest value. At 1-12 weeks of age, the lowest FCR was found in Line 6 (2.56), whereas the highest was found in Line 1(3.18), crossbred.

Table 1. Daily feed intake (DFI) and Feed Conversion Ratio (FCR) of F_2 crossbred chickens

Age (weeks)	Trait	Genotypes						P-value
		Line 1	Line 2	Line 3	Line 4	Line 5	Line 6	
1-4	DFI	18.99±1.69	18.96±1.48	16.10±1.35	20.42±1.94	19.93±1.68	18.08±1.77	0.52
	FCR	1.77	3.51	1.78	5.95	2.94	2.83	
5-8	DFI	47.60^{a}±0.94	43.32^{abc}±1.25	41.59^{bc}±1.30	41.48^{c}±0.57	42.28^{bc}±0.32	45.82^{ab}±1.47	0.00
	FCR	3.41	2.54	2.22	1.61	2.14	1.97	
9-12	DFI	58.51^{bc}±0.61	60.27^{ab}±1.29	58.72^{abc}±1.18	53.09^{d}±0.91	55.53^{cd}±0.82	62.54^{a}±0.69	0.00
	FCR	4.01	3.56	4.97	3.41	2.93	3.17	
1-8	DFI	33.29±2.15	31.14±1.90	28.85±1.95	30.95±1.74	31.10±1.73	31.95±2.19	0.74
	FCR	2.69	2.77	2.08	2.12	2.34	2.15	
1-10	DFI	37.76±2.03	35.70±1.87	33.78±1.96	34.55±1.64	35.28±1.71	37.50±2.20	0.63
	FCR	2.74	2.56	2.55	2.52	2.57	2.54	
1-12	DFI	41.70±1.95	40.85±2.01	38.81±2.06	38.33±1.66	39.25±1.73	42.15±2.16	0.64
	FCR	3.18	3.11	2.94	2.57	2.59	2.56	

$P<0.05$ refers as significant

Figure 2 shows reproductive performances of crossbred. From the figure we observed that, The lowest age at first lay was found in Line 3 (134 days), and the highest was in Line 5(165). The highest fertility % was found in Line 2(79.0%) and the lowest in Line 5 (71.2%). Highest hatchability was found in Line 4 (84 .1%) while Line 3 (72.5%) crossbred attained the lowest. So line 3 and line 6 performed better at marketing age (10th and 12th week) as well as reproduction. Although in respect of morphology, growth, FCR, age at onset of lay, fertility and hatchability line 4, line 5 and Line 6 were the good performer, the meat quality of these birds was to be estimated.

Discussion

Growth performances. Keambou *et al.* (2015) and Munisi *et al.* (2015) demonstrated that the inheritance of body weight in chickens resulted in crossbreds being intermediate to the parents. On the contrary, Sola-Ojo *et al.* (2012) reported that crossing of dominant Black strain and Fulani ecotype chicken resulted in hybrid offspring superior to the purebred parents in growth. Khan *et al.* (2007) also found mature live weight of Nera crossbred was significantly ($p<0.01$) higher (1522.67±10.01g) than other genotypes and the lower (1339.6±7.0 g) live weight was found Hilly-Fayoumi which is similar to our finding that crossbred body weight was about 1400 to 1500g at 20thweeks of age. Similar findings was also observed by Akhtaruzzaman (2002) who found weight at sexual maturity of RIR×Fayoumi was 1325g and 1465 g respectively. Amin *et al.* (1992) showed that the body weight of crossbred chicken was higher than the local breeds (1.65kg vs 1.00kg).The differences of the mature live weight might be due to heredity, management and the observed

hibrid vigor. In addition, the superiority of the crossbred genotype is consistent with the reports by Mafeni *et al.* (2005) for crosses involving exotic and local breeds of chicken.

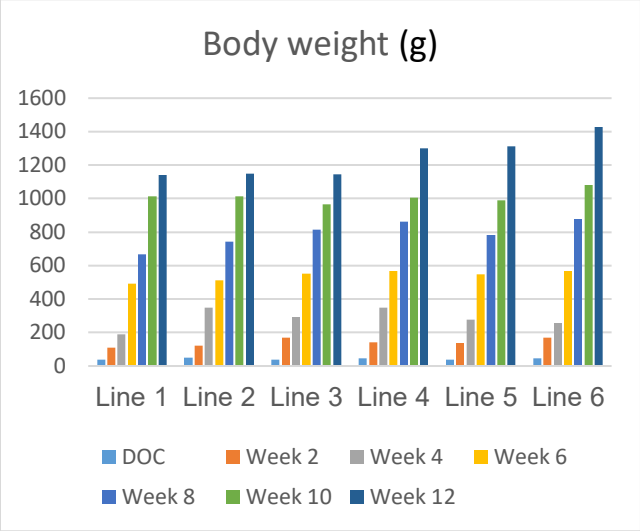

Figure 1. Growth performance of F_2 crossbreds

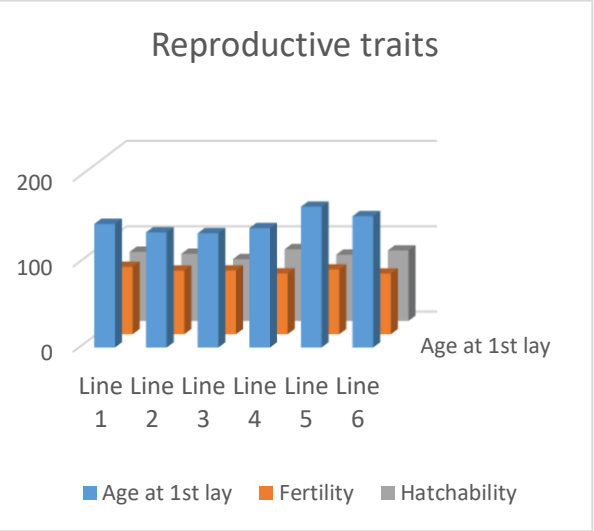

Figure 2. Reproductive traits in crossbreds

Feed Intake. In case of crossbreds, daily feed intake and FCR hold an important role in disclosing the economic importance andprofitability of chicken production. The basic expectation behind crossing in chicken line is to achieve greater production having minimum supply of feed. The highest daily feed intake of 47.60±0.94g was observed in Line 1 between 5-8 weeks of age, and 62.54±0.69g in Line 6 between 9-12 weeks of age. Besides, Line 3 crosses were most economical in terms of feed intake at 5-8 weeks and 9-12 weeks of age.However, in the longer run, the best FCR value was obtained from Line 6 (2.56). The present result implies an increase in 155. DFI and FCR from DOC to the 12thweek of age across all the crosses. This is supported by the study conducted by Joshua *et al. (*2022), who found that genotype had a significant ($P<0.05$) effect on feed intake in all genetic groups. In addition, feed intake increased as the birds aged. However, the trend of changes in DFI and FCR of crosses was almost similar to that of the foundation stock with little variation. Similar to this study, Ekka *et al. (*2016) also reported intermediate feed intake for the reciprocal crosses when Hubbard chicken was crossed with local chicken. In addition, Itafa *et al. (*2021) and Ekka *et al. (*2016) also reported lower feed intake in the direction of a cross-involving exotic roosters with local females. Joshua *et al.* (2022) reported that the SS genotype had significantly higher feed intake, while significantly ($P<0.05$) higher FCR was recorded in the WW genotype. These findings aligned with the current study in most cases.

Reproductive performances. ***Age at onset of lay:*** Nahar *et al.* (2006) found that RIR×HI and Hilly × Fayoumi crossbred showed an earlier sexual maturity than Sonali and Nera. The differences in attaining sexual maturity might be because of genetic differences. The present study is supported by an experiment conducted by Litigebew *et al. (*2021) in central Ethiopia and found age at sexual maturity of cockerels was 26, 24.9 and 25.2 weeks in indigenous breeds, exotic breeds and crossbred, respectively. Another study showed that in Ethiopia, 27.4 weeks was reported as the average age of the first eggs for local breeds.
Fertility and hatchability: However, a stable and moderate fertility and hatchability were observed in all the crossbred population (71.2 to 79.0%). Yizengaw *et al. (*2022) found, hatchability of indigenous and cross-breed eggs was 85.8 and 79.0% which is similar to our findings. On the other hand, a lower fertility

and hatchability were reported by Alemneh and Getabalew (2019) in Fayoumi-cross, RIR cross, and native Kei, which were 73.7, 54.7, and 59.0%, respectively, in Southern Ethiopia.

Conclusions

The study emphasizes crossbreeding as a strategic approach for developing crossbred chickens with better productive, reproductive efficiency and meat quality traits. These was reproduced through *inter se* mating and backcrossing among the selected four F1crossbred populations. The Line 3 and Line 6 crossbreds were the best performers according to color, growth and meat quality. These birds had reached approximately 1.0 kg body weight at 10 weeks of age and possessed good-quality meat compared to other investigated genotypes. In conclusion, the developed meat-type crossbred chicken offers a highly viable and sustainable solution for Bangladesh's increasing meat production demands. With its better growth performance and superior meat quality, the crossbred chickens emerge as ideal candidates for large-scale poultry farming, delivering both economic value and nutritional benefits.

References

Keambou TC, Mboumba S, Touko BAH, Bembide C, Mezui TM, Tedongmo AMY, Manjeli Y. 2015. Advanced Animal and Veterinary Science, 3(10):507-513.

Munisi WG, Katule AM, Mbaga SH. 2015. Livestock Research for Rural Development,27(66).

Sola-Ojo FE, Ayorinde KL, Toye AA. 2012. Asian Journal of Agricultural Rural Development, 2(2):120–125.

Khan MKI, Debnath NC, Bhuiyan MSA, Khatun MJ, Karim MR, Dey BC. 2007. Indian Journal of Animal Sciences, 77(3):257-261

Ekka R, Behura NC, Samal L, Nayak GD, Pati PK. 2016. Livestock Science,7:114-121.

Itafa BT, Mohammed AS, Abate MA, Derseh MA, Woldegiorgiss WE. 2021. Journal ofApplied Poultry Research,30(4):100214.

Joshua TD, Koffi T, Christrophe C. 2022. Tropical Animal Health and Production, 54:298.

Litigebew A, Moges F, Kebede D. 2021. Ethiopian Journal of Science and Technology, 14(2):123–137.

Yizengaw M, Ewonetu K, Ashenafi G. 2022. All Life, 15(1): 118–122.

Alemneh T, Getabalew M. 2019. International Journal of Veterinary Science and Research,5(2):039-045.

DLS. 2021. Livestock Economy at a Glance. 2020-21, Department of Livestock Services, Livestock Economic Division Dhaka.