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Production performance of BLRI developed crossbred layer genotypes under on- farm condition

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Abstract

The experiment was conducted with RIR x BPR, RIR x WR and WR x WLH crosses developed by Bangladesh Livestock Research Institute to assess their production performance under farmer's condition. A total of 1800 straight run day old chicks of three genotypes having 600 in each crosses were distributed among the nine farmers with 200 chicks to each farmer i.e. each cross had three replications. The productive performance of the crosses were studied up to 36 weeks of age. All the experimental birds were reared in open sided bamboo made slated house with straw based gable type roof. The study reveals that the live weight gain was significantly ($p<0.01$) higher in RIR x WR at 8 weeks of age compared to other two crosses but at 20 weeks of age the RIR x BPR cross obtained significantly ($p<0.001$) higher body weight than that of RIR x WR and WR x WLH crosses. While, the feed conversion efficiency of RIR x BPR cross was significantly ($p<0.01$) higher at 8 weeks of age but at 20 weeks of age there was no significant difference ($p>0.05$) in feed conversion efficiency among the genotypes. Further, it was indicated that the WR x WLH cross produced highest number of eggs ($p<0.001$) compared to other genotypes during 24 to 36 weeks of laying period. Earlier peak egg production was obtained in RIR x WR cross (192d), which was significantly higher ($p<0.01$) than that of other two crosses. The mortality percentage was lowest in RIR x WR cross compared to others. Therefore, it may be concluded that the WR x WLH cross will be suitable as layer genotype and RIR x WR cross may be reared as cockerel (meat) production because their growth was higher at early 8 weeks of age.

Keywords: Farm condition, Crossbred Chicken, Egg production

Introduction

Poultry is traditionally an important component of socio-economic fabric of Bangladesh and has been reared as an integral part of the mixed agricultural system throughout the country from the immemorial. But the term poultry-agro industry is quite new business and economic area of Bangladesh. With the expansion of poultry industry in the country, commercial layer and broiler farmers are producing eggs and meat based on chicks supplied from commercial hatcheries, even at a high price. But a vast majority of the rural farmers who have potentiality of producing egg and meat more profitably through "family poultry" rearing system are looking for low cost chicks suitable for their production system, because most of the farmers in the rural area do not have sufficient technological facilities and knowledge to rear commercial hybrid layers. Bangladesh produced 309 thousand MT commercial eggs and 321 MT chicken meat during the year 2004 (Kabir, 2004), but still per capita annual poultry meat consumption is only 1.9 kg/head/annum, ranking second lowest among the South- East Asian countries. According to an estimate, 50% minimization of deficit in meat production will need to investment of about 60,000 million taka and will crate a new employment opportunities for 14 million people (Mahmud, 2003). Therefore, for sound footings and healthy growth of commercial chicken production, the country should have its own breeding program for the production of breeding birds suitable for our country. Limited work regarding cross breeding of local chicken with exotic breeds has been published in literature. In Pakistan, Yaqoob

(1970) developed a new breed LBS (Lyallpur Silver Black) by crossing deshi birds with RIR and WLH and reported that LBS was found to be superior in all production traits of economic importance as compare to Deshi birds.

Bangladesh Livestock Research Institute has established a poultry-breeding program with the technical assistance of Japan International Cooperation Agency. Under the program 4 pure lines have been introduced from Japan. The main goal of the program is to develop a layer breed suitable for rural farmers. Since inception of the program further development of the lines through individual selection is going on. A number of test crosses have been produced to assess the egg production ability. As part of this breeding program, a study was conducted at Dinajpur Technology Transfer Center to investigate the potentiality of BLRI developed crossbred chicken under farmer's condition and also to evaluate their adoptability under rural condition.

Materials and Methods

The experiment was conducted with RIR x BPR, RIR x WR and WR x WLH crosses developed by Bangladesh Livestock Research Institute which were produced from pure lines, to assess their production performance under farmer's condition at Dinajpur Technology Testing Centre. A total of 1800 straight run day old chicks of three genotypes were distributed among the nine farmers and their productive performance were studied up to 36 weeks of age.

Housing and management

The chicks were housed in an open sided straw made roof. The floor was 0.6 m above the ground level, prepared by slated bamboo. The house was cleaned, washed, dried and then disinfected before the start of the experiment. 1.5 square feet floor space was allocated for each bird. Two types of feeders were used for the experiment. For the first 15 days, long trough feeders were used and during the last period of experiment round plastic basins, 40 cm in diameter and 10 cm deep were used. Brooding was done by using battery brooders.

Health status of birds during the brooding period was monitored everyday and mortality of birds was recorded. The birds were vaccinated against the major diseases including Newcastle and Gumboro disease as per vaccination schedule developed by BLRI (Table 1).

Table 1. Vaccination schedule followed during the experimental period

Age	Name of Vaccines	Method of vaccination
4th Day	MA5+ NDClone 30 (Imopest)	I.O.+ S.C.
10th Day	Gumboriffa + D-78	S.C.+ I.O.
17th Day	D-78 (Gumboro)	I.O.
25th Day	NDClone-30	I.O.
33rd Day	Ovo-diphtherin	Wing-web
8th Week	MA5+ Clone 30	I.O.
9th Week	Haemovax	S.C.
11th Week	A.E. +pox	Wing web
16th Week	Haemovax	S.C.
18th Week	Binewvaxidrop	L.M.

Formulation of diets

The ingredient used and the nutrient composition for the starter and layer diets are shown Table 2., which was formulated according to the recommendation of Kosaka, 1993. The birds under the experiment fed mash feed from the day of the start that contained 2939 Kcal ME/kg DM, 21.19% crude protein, 3.23% crude fiber, 1.18% calcium and 1.06% phosphorus (analyzed value) upto 8 weeks of age, thereafter a grower diet was fed up to 18 weeks of age and then a layer diet was fed during laying. The experimental birds were reared in open sided slat house made of mainly locally available materials. The birds were fed *ad libitum* on diets procured by farmers from local market under intensive management system throughout the experimental period.

Table 2. Ingredients and nutrients composition of starter and layer ration

Ingredients(%)	Starter	Layer
Maize	54.70	55.00
Rice polish	10.30	12.00
Soya meal	25.50	20.25
Protein concentrate	7.50	5.00
Dicalcium phosphate	1.25	2.00
Lysine	0.10	0.10
Methionine	0.10	0.10
Calcium carbonate	-	5.00
Vitamin mineral premix	0.25	0.25
Common salt	0.30	0.30
Nutrients		
Metabolizable energy (kcal/kg)	2939	2809
Crude protein (%)	21.19	17.83
Crude fiber (%)	3.23	2.95
Calcium(%)	1.18	3.11
Phosphorus (%)	1.06	0.75
Lysine (%)	1.22	1.01
Methionine (%)	0.44	0.35

Vitamin mineral premix supplied nutrients equivalent to per kg feed: Vitamin A -50000 IU, Vitamin D_3-11000mg, Vitamin B_1 1.875mg, B_2 12.5mg, Nicotinic acid 62.5 mg, Calcium pantothenate 31.25mg, B_{12} 0.0375mg, K_3 6.25 mg, Vitamin E 62.50mg, Biotin 0.125mg, Folic acid 2.50mg, Choline chloride 625.00mg, Cobalt 1.00mg, Copper 20.00mg, Vitamin K_3, Iron 80.00mg, Iodine 2.00mg, Manganese160.00mg, Zinc 100.00mg, Selenium 0.4mg, Spirimycin 12.50mg, 3-nitro 125.00mg, DL-methionine 125.00mg and BHT12.50mg.

Performance data recording

Body weight of day old chicks was taken initially and then weighted weekly thereafter. All birds were weighed individually, before morning feeding and offering of water. Diets were offered ad libitum twice a day in the morning and in the evening. The residues were gathered and weighed on the following morning to calculate the actual intakes. Feed intake including left over was recorded daily and was calculated from the difference between offer and left over. Feed conversion ratio (FCR) was recorded for the whole period as total feed intake (kg) per kg weight gain.

Performance parameters like live weight gain, feed intake, feed efficiency, egg production, egg weight and mortality were recorded and analyzed through a simple statistical program by computer using SPSS 10.5 version. Least Significant Difference (LSD) was used to determine test of significant differences among the treatment means.

Results and Discussion

Day old body weight was significantly higher (P<0.05) (Table 3) in RIRxWR cross than 2 other crosses, which was actually unavoidable. At 8 th week the same cross remained significantly heavier in body weight (P<0.01) among the genotypes but at 20 weeks of age RIR x BPR cross attained highest body weight (P<0.001). This result is in agreement with the findings of Pratihar *et al.* (1996), where they got higher body weight in the crossbred chicken involving RIR at 20 weeks of age. Live weight gain of the 3-genotypes up to 20 weeks of age is shown in figure1. Feed intake did not differed significantly at any stage of feeding among the genotypes. At 8 weeks of age feed conversion ratio varied significantly (P<0.01) among the genotypes and best ratio was found in RIR x BPR cross (2.93 vs. 2.98 and 3.13 respectively for RIR x WR and WR x WLH), perhaps this is due to genotypic ability of RIR and BPR to convert feed into meat more efficiently than RIR and WR or WR and WLH at early age but at 20 weeks of age the genotypes minimized the difference in feed conversion. The average hen day egg production on 24-36 weeks of laying (%) differed significantly (P<0.001) among the genotypes (81.31, 76.23 and 76.20 respectively for WR x WLH, RIR x BPR and RIR x WR cross). Production of higher egg production in the crossbred chicken was observed in earlier work of Islam *et al* (2005) and Chowdhury *et al.*, (1983), where they got 77.28% egg production in of RIRxWLH cross. RIR x WR cross attained earlier(192d) at peak egg production (P<0.01) than WR x WLH cross (199d) and RIR x BPR cross. Egg weight was highest in WR x WLH cross (P<0.01) followed by RIR x BPR cross and RIR x WR cross. Differences in mortality % was non-significant among the genotypes up to 20 weeks of age but at 36 week of age RIR x BPR accounts least mortality rate. Total mortality % at 36 weeks of age differed significantly (P<0.05) and this was lowest in RIR x WR cross (3.17), highest in WR x WLH (9.47) and intermediate in RIR x BPR cross.

Table 3. Production performance of crossbred chicken at Dinajpur Technology Transfer Centre

Parameter	RIR x BPR	RIR x WR	WR x WLH	level of sig.
	Mean ±SE			
Initial body weight (g)	35.67^{c}± 0.33	37.33^{b}±0.67	35.67^{ac}± 0.033	*
Body weight at 8 week (g)	573.33^{c}±10.72	589^{bc}±2.89	540^{a} ±2.89	**
Body weight at 20 week (g)	1600^{c}±5.77	1480^{b}±5.77	1440^{a} ±5.77	***
Feed intake at 8 week (g/b/d)	54.73±2.63	50.11±2.37	52.20±2.61	NS
Feed intake at 20 week (g/b/d)	104.80±2.60	108.07±1.44	102.52±0.96	NS
Feed intake 36 week (g/b/d)	103.40±6.94	102.80±1.44	103.03±1.70	NS
Feed conversion ratio at 8 weeks of age (feed: gain)	2.93^{c}±0.017	2.98^{bc} ±0.046	3.13^{a} ±0.017	**
Feed conversion ratio at 20 weeks of age (feed: gain)	5.65±2.60	6.13±1.44	6.31±0.96	NS
Average hen day egg production on 24-36 weeks of age (%)	76.23^{c}±0.53	76.20^{bc}±0.48	81.31^{a}±0.18	***
Egg weight at 36 weeks of age(g)	60.58^{c}±1.63	63.45^{bc}±1.04	65.93^{a} ±1.53	**
Age at peak egg production (days)	204±2.61	192±2.90	199±2.69	**
Mortality up to 8 weeks (%)	3.17±0.44	2.63±0.14	2.93±0.09	NS
Mortality up to 20 weeks (%)	2.97±0.033	3.20±0.21	3.30±0.15	NS
Mortality up to 36 weeks (%)	1.30^{a}±0.30	2.17^{a}±0.44	3.23^{b}±0.18	*
Total mortality (%)	7.43^{c}±0.47	3.17^{bc}±0.27	9.47^{a}±0.17	*

abc, with different letters in the same column differ significantly (p<0.05 to 0.001); NS= Non-significant (p>0.05);

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