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The Effect of Transfer Battery Brooded Broilers on Conventional Rice Husk Littered Floor on Production Performance

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Abstract: Seventy-five battery brooded (up to 3 weeks) broilers were transferred on conventional rice husk littered floor (CRLF) and were reared up to 49 days of age. On the other hand, seventy-five broiler chicks were reared on CRLF from day-old to 49 days of age served as control. The body weight of the battery brooded birds at 28 days of age was significantly ($P<0.01$) higher than that of floor reared birds. Rearing battery brooded broiler on CRLF following transfer depressed growth rate (at 35 days of age) in comparison with CRLF birds, but at the end of the experiment, there were no significant differences in body weight gain. Non-significant differences were also observed in case of feed intake, feed conversion efficiency and dressed yield between two management systems at the end of the experiment. There were no birds having breast blister irrespective of management system. Mortality percentage was higher in case of CRLF than that of battery brooded birds on CRLF. Battery brooding up to 3 weeks of age saved space. Males had higher body weight ($P<0.05$) and shank weight ($P<0.01$) than those of females. From the present study it is evident that battery brooder can serve as a positive brooder, because after transfer from battery brooder to CRLF there is no negative effect on overall performance.

Key words: Broiler, battery brooder, conventional rice husk littered floor, body weight, feed intake, feed efficiency, mortality, dressed weight

INTRODUCTION

In order to build up a nation with good mental and physical health, dietary protein should include adequate amounts of animal protein. The availability of animal protein in our country is only 9.25 g against the requirement of 36.0 g head^{-1} day^{-1} [1]. Poultry has become the most efficient, rapid invest return and quickest way of producing high quality animal protein for human consumption.

The supply and demand gap of animal protein can be met by increasing the production of poultry meat. In this connection, modern broiler has given a positive result. Today's broilers status is the result of improved genetics, nutrition, housing, management and disease control measures. More effects may be given for improvement in the management for producing broiler at a low cost. Various management system of intensive broiler raising (cage and floor system) have been investigated and compared[2,3]. Andrews *et al.*[4] suggested that body weight improved in cages than that of floor rearing system. Bhargava *et al.*[5] and Sirbu *et al.*[6] reported that feed consumption was lower in cage rearing broiler than those reared in floor. But Toth *et al.*[7] reported higher feed consumption in cage rearing broilers than in floor rearing broilers. Researches have also tried to improve the efficiency of broiler by brooding in one system and then transfer to another system during rearing.

In Bangladesh, very few works have been done to study the production performance of broiler under different system of management in relation to transfer of birds from one system to another during rearing. Hence, this study was designed to explore the effects of transfer battery brooded broilers on conventional rice husk littered floor on production performance under the prevailing environmental conditions.

MATERIALS AND METHODS

The experiment was started with day-old ISA-i757 straight-run broiler chicks and carried out on up to 49 days of age. A total of 150 broiler chicks were randomly divided into 2 treatment groups (T_1 and T_2) having 75 chicks in each treatment. Each treatment group

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had 5 replications of 15 birds each. T_1 represents CRLF reared broilers served as control and T_2 represents battery brooded broilers on CRLF system. After brooding 3 weeks the battery brooded broilers were transferred to CRLF.

Experimental house: Two experimental rooms of the broiler house were properly washed, cleaned and disinfected by spray using diluted iosan solution. After drying, the experimental rooms were divided into 10 separated pens of equal size by using bamboo materials and wire net. Rice husk litter material was spread on floor of the pens at a depth of about 7 cm. The house was fumigated with potassium permanganate ($KMnO_4$) and formalin. Battery brooder was properly washed and cleaned by spraying diluted iosan solution.

Experimental diets: Two experimental diets (broiler-starter and broiler-finisher) were formulated with the locally available feed ingredients. Broiler started diet was provided between 0 to 42 days and finisher diet was provided between 43 to 49 days of age. All the feed ingredients, vitamin-mineral premix and DOT (coccidiostat) were mixed properly. The diets were then divided into ten equal parts and were then stored for seven days in separate gunny bags. Chemical composition of experimental diets is shown in Table 1.

Table 1: Composition of the experimental diets

	Amount (kg) in 100 kg mixed feed	
Name of ingredients	Starter (0-42 days of age)	Finisher (43-49 days of age)
Yellow corn	40.00	42.00
Rice polish	18.00	20.00
Full-fat-soybean	13.00	13.00
Sesame oil cake	13.00	12.00
Soyabean meal	7.50	4.50
Fish meal	3.50	3.50
Meat and bone	4.50	4.50
Common salt	0.50	0.50
Calculated composition		
Metabolizable energy (kcal kg^{-1})	3080.00	3348.00
Crude protein (g kg^{-1})	238.94	217.61
Calcium (g kg^{-1})	10.13	10.20
Available phosphorus (g kg^{-1})	5.69	5.69
Lysine (g kg^{-1})	10.85	10.16
Methionine (g kg^{-1})	4.25	4.19
Tryptophan (g kg^{-1})	2.93	2.74

Vitamin-mineral premix (premix-Embavit-B, Rhone-Poulenc) was added at the rate of 2.50 g kg^{-1} mixed feed

Management: Additional heat was provided to chicks during 1 to 28 days. Brooding temperature was kept at 35°C in the first week of age and then decreased gradually at the rate of 3°C in each subsequent age until they were adjusted to normal environmental temperature. After 5th week of age, droppings were cleaned from the surface level of litter. Feed and fresh drinking water were supplied to the experimental birds, daily, once in the morning and again in the evening. The birds were always exposed to a continuous lighting of 23 h and 30 min and dark period of 30 min in each 24 h. Temperature and relative humidity were recorded properly. Birds were vaccinated against Baby Chick Ranikhet Disease and Gumboro Disease. The vitamin (Embavit-WS) was supplied to reduce stresses following vaccination. Records of chick live weight, feed intake, and mortality were kept weekly replication wise for each treatment and incidence of breast blister (if found) was kept properly also. Dressing yield and weight of the blood, feather, heart, gizzard, liver, shank, head, neck and abdominal fat were recorded replication wise for 2 broilers in each replication.

Broiler processing: At the end of the experiment, 2 broilers (one male and one female) from each replicate weighing average of the pens were randomly selected and slaughtered for processing. In order to loosen the feathers slaughtered broilers were immersed in pre-wormed water at 51 to 55°C for 120 sec. Final processing was performed by removal of the head, shank, viscera, oil gland, kidney and lungs of the carcasses. Heart and liver removed from the remaining viscera by cutting them loose. As soon as these were removed, the gall bladder was removed from the liver. The gizzard was removed by cutting it loose in front of the proventriculus and then cutting both in coming and out going tracts. Then, it was split open with knife, emptied and washed and lining was removed by hand.

Statistical analysis: Data collected and calculated for different variables were subjected to analysis of variance in accordance with the principles and procedures of a CRD. Least Significant Difference was calculated to compare variations between treatments where ANOVA showed significant difference.

RESULTS AND DISCUSSION

Body weight: The results on body weight gain of broilers reared under two different management systems in various ages are shown in Table 2. The results indicated that rearing battery brooded broilers on CLRF depressed growth rate at 35 days of age following transfer but not significant. But at 28 days of age significantly ($P<0.01$) higher body weight was found in case of battery brooded broilers than broilers of CLRF. Depressed growth rate at 35 days of age because of the birds were not so far experienced at that time with the CLRF. But, broiler with the advancement of age compensated such a growth depressing and subsequently no significant difference in

Table 2: Effect of rearing battery brooded broilers on CRLF on body weight (g) gain

	Rearing system		
Age (day)	Conventional rice husk littered floor (CRLF)	Battery brooded broiler on CRLF	Level of significance
1 (Initial)	52.00	51.00	NS
7	38.00	41.33	NS
14	122.67	130.33	NS
21	293.34^{b}	331.67^{a}	**
28	513.00^{b}	546.67^{a}	**
35	782.71	770.33	NS
42	1009.48	1004.20	NS
49	1242.10	1200.36	NS

Table 3: Effect of rearing battery brooded broilers on CRLF on feed intake (g)

	Rearing system		
Age (day)	Conventional rice husk littered floor (CRLF)	Battery brooded broiler on CRLF	Level of significance
7	112.26^{a}	94.66^{b}	**
14	302.66^{a}	272.66^{b}	*
21	667.33^{a}	631.33^{b}	*
28	1074.39	1066.00	NS
35	1708.50	1607.46	NS
42	2118.64	2021.07	NS
49	2728.38	2609.45	NS

Table 4: Effect of rearing battery brooded broilers on CRLF on feed conversion ratio (feed intake/live weight gain)

	Rearing system		
Age (day)	Conventional rice husk littered floor (CRLF)	Battery brooded broiler on CRLF	Level of significance
7	2.96^{a}	2.29^{b}	**
14	2.46^{a}	2.10^{b}	*
21	2.29^{a}	1.90^{b}	**
28	2.09	1.94	*
35	2.19	2.08	NS
42	2.23	2.01	NS
49	2.19	2.17	NS

* Significant (P<0.05); ** Significant (P<0.01); NS-Non Significant;
Means in a row having different letter (a, b) in superscript differ significantly

Table 5: Effect of rearing battery brooded broilers on CRLF on mortality (%)

Rearing systems	No. of dead broilers	Mortality (%)	λ^2 value and level of significance
CRLF (n=75)	4	5.33	3.476NS
Battery brooded broilers on CRLF (n=75)	1	1.33	

NS-Non significant

case of live weight gain was found at the end of the experiment. The results obtained coincide with the findings of some other investigators[8-10]. They compared broilers growth rearing under two system (first reared in cage/battery and then on conventional floor till the end) did not find any significant difference.

Feed intake: It is evident from the Table 3 that birds on battery at 7, 14 and 21 days of age consumed significantly (P<0.05) less feed than that of CRLF reared birds which partially coincide with the findings of some other investigators[7,11,12]. The less consumption of feed during the brooding time of battery broilers could be due to the less movement of the birds in a calm and quite environment and were not disturbed like CRLF birds. However, non significant differences in feed intake between two different systems noted at the end of experiment. Similarly, Aslam *et al.*[10] did not find any significant differences in feed intake between two different management systems assuming that the birds on battery brooded consumed less feed, but utilized it more efficiently.

Feed conversion: The results of the current study on feed conversion (Table 4) showed that transferring battery brooded broilers on floor had lower feed conversion at 35, 42 and 49 days of age. The similar observation was noted by Aslam *et al.*[10]. The better feed conversion ratio (P<0.01) of caged birds till 3 weeks of age could be attributed to the limited movement of birds in cages as compared to floor reared birds, which had to move around for food and water. The limited movement might have increased the efficiency of feed utilization in caged birds.

Breast blister and mortality: The results of the current study indicated that there were no birds having breast blister irrespective of management system, though experimental birds (battery brooded) were brooded on wire mesh floor battery brooder up to 3 weeks of age. Assuming that the birds on battery brooder were not heavier at that time. Mortality percentage (Table 5) was higher in CLRF birds than that of battery brooded birds but the difference was not statistically significant.

Meat yield: The results for different meat yield parameters and dressing percentage are shown in Table 6. The results of the present study indicated that there were no significant differences between two management systems for live weight, some meat yield parameters (blood, viscera, gizzard, abdominal fat and head) and dressing yield. This result is supported by Aslam *et al.*[10]. They did not find any significant difference of dressing percentage when floor and cage brooded broilers were transferred mutually to other system in rearing period. Meanwhile, heart and liver weight were significantly (P<0.05) higher in battery brooded birds than that of CRLF birds. The weight of the blood, feather, viscera, liver, heart, gizzard and head and the dressed weight (Table 7) did not differ significantly (P>0.05) between males and females. Males had higher body weight (P<0.05) and shank weight (P<0.01) than those of females.

Rearing battery brooded broiler on CRLF did not affect broiler performance at marketable age in terms of live weight, feed intake and feed conversion efficiency (7 weeks of age). Rearing battery brooded broilers on

Table 6: Effect of rearing battery brooded broiler on conventional rice husk littered floor on weight of body, blood, feather, viscera, liver, heart, gizzard, abdominal fat, shank and head, and dressed weight

Rearing system	Body weight (g)	Blood weight (%)	Feather weight (%)	Viscera weight (%)	Liver weight (%)	Heart weight (%)	Gizzard weight (%)	Abdominal fat weight (%)	Shank weight (%)	Head weight (%)	Dressed weight (%)
CRLF	1332.5	3.14	8.96[a]	8.08	2.54[b]	0.66	2.47	1.03	4.34[b]	3.67	61.83
Battery brooded broiler on CRLF	1308.0	2.54	6.46	9.31	2.84[a]	0.75	2.61	0.95	4.70[a]	3.62	61.74
Level of significance	NS	NS	*	NS	*	*	NS	NS	*	NS	NS

Table 7: Effect of sex on weight of body, blood, feather, viscera, liver, heart, gizzard, abdominal fat, shank and head, and dressed weight of male and female broiler

Rearing system	Body weight (g)	Blood weight (%)	Feather weight (%)	Viscera weight (%)	Liver weight (%)	Heart weight (%)	Gizzard weight (%)	Abdominal fat weight (%)	Shank weight (%)	Head weight (%)	Dressed weight (%)
Male	1351.0[a]	2.97	7.83	8.81	2.72	0.70	2.57	0.79[b]	4.95[a]	3.69	60.96
Female	1289.5[b]	2.72	7.59	8.59	2.66	0.71	2.51	1.19[a]	4.10[b]	3.60	62.61
Level of significance	*	NS	NS	NS	NS	NS	NS	*	**	NS	NS

*Significant (P<0.05); **Significant (P<0.01); NS-Non Significant; Means in a column having different letter (a, b) in superscript differ significantly

CRLF following transfer had no influence on dressing yield but it saved space. Mortality was not significantly affected by two rearing systems. Battery brooding birds consumed less feed but utilized it more efficiently and consequently the feed conversion efficiency was better then that of littered birds which may save feed and reduce the cost of rearing broiler. Meanwhile, buyers sometimes fail to take their chicks on time from hatchery for transport problem or climatic problem and for holding surplus chicks hatchery needs to brood their birds up to delivery. In these circumstances battery brooder can serve as a positive brooder, because after transfer from battery brooder to CRLF there is no negative effect on overall performance.

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