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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

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Comparative Study on Carcass Characteristics of Different Genetic Groups of Spent Hen in Bangladesh

K.N. Munira, M.J. Uddin*, S. Faruque, M.S. Parvez, M.Y. Miah and M.S.I. Siddiqui
Bangladesh Livestock Research Institute, Savar, Dhaka Bangladesh
*Sylhet Government Veterinary College, Tilagor, Sylhet, Bangladesh
E-mail: Jasim235@yahoo.com

Abstract: The carcass characteristics and meat yield studied using a total 20 number of cage reared spent hens of White Leghorn (WLH), White Rock (WR), Rhode Island Red (RIR) and Barred Plymouth Rock (BPR). There were a significant different ($p<0.05$) between breeds with live weight and dressed weight although it differ breed to breed. In case of dressed weight it is observed higher in RIR intermediate in BPR & WR and lower in WLH. Shank length, head weight, liver weight and gizzard weight were statistically non-significant between breeds. Shank length was statistically non-significant between breeds but shank weight was highly significant between them and highest in WR, intermediate in RIR & BPR but lowest in WLH. Viscera loss is higher in WLH then RIR and WR, BPR are in almost similar and the similar trained was found for feather loss and blood discharge. The result exhibits that the RIR carcass is the best, BPR and WR are in second position and the lowest is WLH in qualitative or quantitative measure not only for heavy breed but the total loss (viscera, feather and blood) is the lowest in comparison to the other three breeds. On the contrary, correlation between dressed carcass weight and abdominal fat was estimated and highly correlation was found in WLH followed by BPR, RIR and WR. If dressed carcass weight increase 1 (g) then abdominal fat increase by 0.2136 (g), 0.1297(g), 0.1819 (g) and 0.0591 (g) respectively for WLH, BPR, RIR and WR. Finally it can be concluded that the RIR carcass is the best in terms of quality and quantity. The WR & BPR are almost in similar holding second position and the lowest is WLH.

Key words: Carcass characteristics, genetic group, spent hen

Introduction

Poultry keeping is one of the most suitable low capital investment, rapid return and easily adaptable enterprise all over the world. However, due to lack of knowledge, shortage of feed and outbreaks of diseases, poultry is emerging as a profitable enterprise. In this situation broiler meat is most popular all over the country but the people, who know as spent hen, also take side-by-side layer meat. Layers contribute 65 to 70% of the total poultry population, which after completing their laying cycle, render tough meat (Manish *et al*., 1999). The per capita consumption of chicken meat is very low in Bangladesh. On an average, the people in Bangladesh consumed only 1868 kcal & 47.4g proteins per day but the requirement 2248 kcal (normal work) and protein requirement is 58.6g per day per person (Bangladesh National Nutrition Survey 1995-96). With the present growth rate of broiler industry at 20% per annum, the per capita availability of poultry meat is likely to be increased but we have to go a long way to reach the consumption rate of the world as well as of developed nations. Meat from spent hens is generally tough, less tender and poor in functional properties, because of its increased collagen content and cross linkages (Kondaiah and Panda, 1987). Certainly, in future years poultry meat will significantly contribute to development of further processed products that would go through fast food channels (Sahoo *et al*., 1996). In BLRI reared 4 types layer e.g. White Leghorn (WLH), White Rock (WR), Rhode Island Red (RIR) and Barred Plymouth Rock (BPR) but have no noticeable information on its carcass qualities. So, the study was undertaken to find out and compare the carcass quality of spent hen of different breed.

Materials and Methods

Experimental management: This research work was done at Poultry Research Farm in Bangladesh Livestock Research Institute (BLRI), Savar, Dhaka, Bangladesh from January, 2003 to October, 2003. Birds of all types were reared under same environment and same management. Age at between 280 and 287 days, 20 cage reared spent hens of breed White Leghorn (WLH), White Rock (WR), Rhode Island Red (RIR) taking 5 birds from each treatment were taken. After recording the live weight, the birds were fasted for over night (12 hours) and reweighed before slaughter and thereafter as per to the procedure outlined by Jones (1984) the birds were slaughtered, bled, plucked and weighed to determine blood and feather losses. Then the carcasses were eviscerated and dissected according to the methods by Jones (1984). The abdominal fat was removed and

Table 1: Live weight, dressed weight and carcass parts of different genetic groups of spent hen

Parameter	Breed				Level of significance
	BPR	WLH	RIR	WR	
Live wt.	1804.00^{a}±46.86	1370.00^{b}±59.164	20006.00^{c}±86.87	1660.00^{a}±51.00	**
Dressed wt.	1012.0^{a}±33.376	750.00^{b}±39.749	1128.00^{c}±41.279	884.00^{d}±32.647	**
Shank length	8.68±0.170	8.32±0.098	8.46±0.16	8.34±0.094	NS
Shank wt.	57.00^{a}±2.00	40.00^{b}±0.00	58.00^{a}±3.743	60.00^{a}±1.583	**
Head wt.	53.00±1.999	52.00 ±2.549	47.00±3.00	54.00±2.45	NS
Heart wt.	3.80^{ab}±0.201	3.20^{a}±0.201	5.40^{b}±0.809	5.40^{b}±0.675	**
Liver wt.	31.00±3.998	25.00±1.583	32.00±3.389	29.00±1.869	NS
Gizzard wt.	43.00±4.06	39.00±1.869	45.00±4.472	46.00±4.847	NS
Skin wt.	120.00^{a}±6.324	91.00^{b}±11.221	152.00^{c}±13.926	116.00^{ab}±3.998	**
Keel bone length	10.40^{a}±0.456	9.36^{b}±0.273	11.14^{a}±0.366	8.82^{b}±0.089	**
Abdominal fat	59.00^{a}±9.539	32.00^{b}±5.827	70.00^{a}±9.485	52.00^{b}±10.675	*
Eviscerated wt.	124.00±12.884	116.00±13.640	144.00±8.721	116.00±8.126	NS
Eviscerate %	6.87^{a}±0.93	8.53^{a}±0.93	7.18^{a}±0.93	6.97^{a}±0.93	NS
Feather %	5.88^{abc}±0.47	6.47^{c}±0.477	5.19^{b}±0.47	5.88^{abc}±0.47	NS
Blood %	3.78^{abc}±0.69	4.69^{c}±0.69	2.90^{b}±0.69	4.22^{abc}±0.69	NS

NS = Non significance. * = Significant (p<0.05). ** =highly significant (p<0.01) . abc = values with different superscripts in same row are significantly different.

weighed according to the procedure of kubena *et al.* (1974), as a percentage of live body weight. Fat surrounding the gizzard and intestine extending within the ischium and surrounding the Bursa of Fabricus were considered as abdominal fat. During processing weight of dressed carcass, carcass component like, heart, liver, shank length and weight, head, gizzard, skin, keel bone length, abdominal fat, blood , feather as well as eviscerate weight were recorded.

Statistical analysis: The data were analyzed by using single variate General Linear Model of SPSS 9.0 for windows (SPSS) statistical package. The main parameters were the weight of dressed carcass, blood , feather, head, heart, liver, shank length & weight, gizzard, skin, keel bone length, abdominal fat as well as eviscerate weight etc. of four breeds.

Results and Discussion

Meat yield parameters of different genetic groups of chickens are presented in Table 1. The tabulated result shows that live weight was significantly (p<0.05) better in RIR in comparison to other breeds like WR, BPR as well as WLH al though live weight differ among breed to breed. After completion the same length of egg production, among the breeds, RIR showed comparatively (p<0.05) better carcass (1128.00g) quality in terms of dressed weight and keel bone length while intermediate in BPR (1012g) and WR (874 g) and the lowest in WLH (750g). The effect of age on live and dressed carcass weight significantly (p<0.05) differ (Pandey *et al.*, 1985) between breeds and the dressing per cent (Singh and Essary, 1974) of broiler have been reported.

Blood weight, shank length, head weight, liver weight, gizzard weight and eviscerated weight differ statistically non-significantly between breeds. In general the eviscerated and giblet yields obtained in this study were in agreement with those obtained by Reddy *et al.* (1990). Shank length was statistically non-significant between breeds but shank weight were highly significant between them and highest in WR (60g), intermediate in RIR (58g) and BPR (57g) but Lowest in WLH (40g).Heart wt. was statistically significant (P<0.05) between breed and highest in RIR & WR (5.40g) intermediate in BPR (3.80g) and lowest in WLH (3.20g). Skin wt. was highly significant between breeds and in RIR it was highest (152g) but others at most similar. Keel bone length highest in RIR (11.14 cm) intermediate in BPR (10.4 cm) & WLH (9.36 cm) but lowest in WR (8.82 cm) and there were statistically highly significant difference between them. Abdominal fat highest in RIR (70g) intermediate in BPR (59g) & WR (52g) and lowest in WLH (32g). There were significant difference between breeds but there was no available literature to be found on heart & skin wt., keel bone length and abdominal fat.

In case of percentage of viscera, feather as well as blood discharge from the live weight were differ among the breeds although not significantly. But it is very important as the dressed carcass weight depend on the loss of viscera, feather and blood loss. Viscera loss is higher in WLH then RIR and WR, BPR are in almost similar. In general the eviscerated and giblet yields obtained in this study agreement with those obtained by Reddy *et al.* (1990). Evisceration loss in females was higher than males (Snyder, 1962, Varadarajulu and Muralimohan Rao, 1976 and Ahmed *et al.*, 1980) The similar trained is for feather loss and blood discharge. So, the tabulated result exhibits that the RIR carcass is the best, BPR and WR are in second position and the lowest is WLH in qualitative or quantitative measure not only for heavy breed but the total loss (viscera, feather

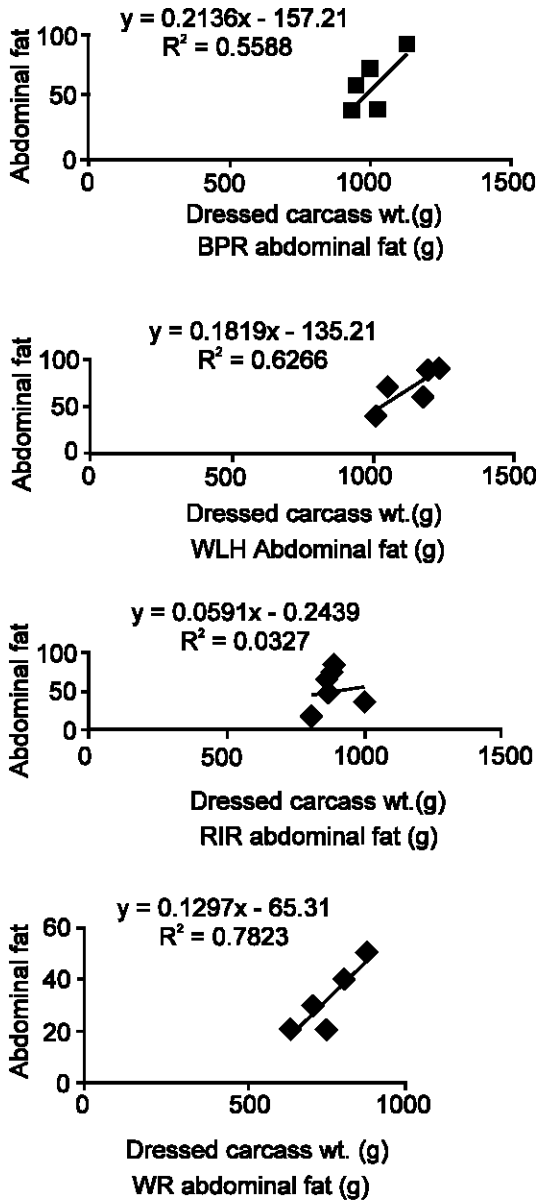

Fig 1: Relationship between dressed carcass weight (g) and abdominal fat (g) of four different chicken breeds

and blood) is the lowest in comparison to the other three breeds. Furthermore, the amount of abdominal fat significantly ($p<0.05$) rich in WLH and BPR where as lower in RIR and WR. The result shows the evidence that the solid meat (protein proportion) rich in RIR and WR carcass.

On the contrary, the abdominal fat and correlation between dressed carcass weight and abdominal fat was estimated. Abdominal fat can be best predicted (Fig. 1) from the dressed carcass weight in WLH followed by BPR, RIR and WR. In BPR, WLH, RIR and WR; if dressed carcass weight increase 1 (g) then abdominal fat increase by 0.2136(g), 0.1297(g), 0.1819 (g) and 0.0591 (g) respectively. Finally it can be concluded that the RIR carcass is the best in terms of quality and quantity. The WR & BPR are almost in similar holding second position and the lowest is WLH.

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