J. King Saud Univ., Vol. 9, *Agric. Sci.* (1), pp. 59-71 (A.H. 1417/1997)

Effect of Sex-linked Feathering Genes on Grow-out Performance of Baladi Chickens

A.A. Alsobayel and A.A. Al-Abdullatif

Animal Production Department, College of Agriculture, King Saud University, P.O. Box 2460, Riyadh 11451, Saudi Arabia

(Received 11/6/1415; accepted for publication 22/6/1416)

Abstract. Eight hundred late and early feathering Saudi Arabian Baladi chicks were used to assess the effect of feathering genotype on grow out performance. 400 Leghorn chicks were also used in this study for comparison. The chicks in each genotypic group were wing banded, individually weighed and randomly alloted to 4 electrically heated battery, four replicates in each, to 3 weeks of age, thereafter moved to floor pens in an environmentally controlled house. At six weeks of age, sex was phenotypically determined and four replicates of 40 birds of each sex were grown separately. All chiks were subjected to conventional management practices. Early feathering Baladi significantly ($P \leqslant .05$) outweighed their late feathering counterparts only at 6 weeks of age whereas Leghorn had higher ($P \leqslant .05$) body weight than Baladi at all ages studied. Early feathering Baladi had significantly ($P \leqslant .05$) higher body weight gain at 1-6, growth rate at 1-6 and 1-20 weeks of age and lower feed intake at the first two age periods compared with late feathering Baladi. Leghorn had significantly ($P \leqslant .05$) the highest body weight gain and the lowest growth rate for most of the age periods studied and the highest feed intake at 1-6 and the best feed efficiency at 6-16 weeks of age. Males in general showed significantly ($P \leqslant .05$) better performance than females with regard to all studied parameters.

Introduction

Producers of commercial broiler breeding stocks frequently use the sex-linked genes for rate of feathering to produce chicks that can be sexed by the relative length of the primary and covert wing feathers. However, the results of previous investigations of the relationship of these genes with bird performance and mortality have been found inconsistent. Some investigators reported higher body weight for early feathering birds [1-8]. Some other reported no significant differences between early and late feathering birds [9-17] or higher body weight for late feathering birds [18-21] at certain age periods. With regard to mortality, most investigators reported no significant differences between the two genotypes [8,17,22,23] whereas few investigators indicated higher [24-26] or lower [11] mortality for late feathering birds compared with their early feathering counterparts. Feed efficiency was found to be similar for both genotype [8,18]. However, the informations on the relationship of feathering genotype with body weight gain, growth rate and feed intake seem to be lacking. Therefore, the study reported herein was conducted to assess in Saudi Arabian Baladi chicken the effect of feathering genotype on grow out performance and to compare Baladi grow-out performance with that of rapid feathering Leghorns.

Material and Methods

Late and early feathering Saudi Arabian Baladi chicks were obtained from the Baladi flock which has been randomly bred for several years in the experimental Poultry and Livestock Farm of the Animal Production Department, College of Agriculture, King Saud University. 400 chicks of each genotypic group were used in this study. Similar number of rapid feathering Leghorn chicks which has been bred under similar conditions for many years, were used for comparison. The chicks in each genotypic group were divided into four replicates of 100 chicks and housed in an electrically heated battery up to three weeks of age, thereafter moved to floor pens in an environmentally controlled house where the maximum and minimum temperature ragned between 29-31°C and 24-28°C, respectively.

The birds in each replicate were individually weighed to the nearest gram and wing-banded at one week of age. All the chicks were vaccinated against Newcastle disease using vaccines at 4 days (Hitchner B1) with reinforcing vaccinations at 25 days (Hitchner B1) and (Lasota) at 70 days of age. At six weeks of age, sex was phenotypically determined and four replicates of 40 birds of each sex were grown separately. All the birds received conventional rations (Table 1) at the different age periods [27, 23-31]. Light was maintained at 8h light: 16h dark from one week of age upto the end of the experimental period. Feed and water were offered ad libitum and the trial started when the birds were one week old and lasted until they were 20 weeks of age. Feed consumed was measured biweekly and attention was paid for lost feed. Parameters taken into consideration were body weight (BW) at 1,2,4,6,8,12,16 and 20 weeks of age, body weight gain (BG) and growth rate (GR) calculated after Brody equation [28, pp.10-23] at 1-6, 6-12, 12-16, 16-20 and 1-20 weeks of age, feed intake/bird/day (FI) and feed efficiency (EF) at 1-6, 6-12, 12-16 and 6-16 weeks of age. Liveability (LIV) was also obtained at 1-6, 6-12, 12-16, 16-20 and 6-20 weeks of age.

Data collected had been subjected to statistical analysis using SAS general linear model (GLM) procedure, KSU computer center, according to the following models:

$$Y_{ij} = \mu + G_i + e_{ij}.$$

where:

Y_{ij} is the j^{th} observation of the i^{th} genotype (G).

$(e)_{ij}$ is the random error associated with the Y_{ij} observation and

$$Y_{ijk} = \mu + G_i + S_j + (GS)_{ij} + e_{ijk}.$$

where

Y_{ijk} is the k^{th} observation of the i^{th} genotype (G) and j^{th} sex (S).

$(GS)_{ij}$ is the interaction between genotype and sex.

$(e)_{ijk}$ is the random error associated with the Y_{ijk} observation [29].

Table 1. Commercial diets used in the experiment[1]

Calculated composition	starter	Grower	Developer
	1-6 wk	7-11 wk	12-20 wk
Crude protein %	21.00	16.00	13.65
Crude fat %	3.00	3.00	3.00
Crude fiber %	3.5	4.50	5.50
Calcium %	1.00	1.00	1.00
Phosphorus %	0.65	0.60	0.60
Salt %	0.45	0.40	0.35
Met. Energy K.Cal/K.G	2970	2904	2692

[1] Manufactured by Grain Silos and Flour Mills Organization, Riyadh, Saudi Arabia

Results

Body weight (W): Genotype (G) had a significant ($P \leq .01$) effect upon W at the different age periods. Similarly was the effect of sex (S) except it was significant at the level of .05 of probability at the first week of age. G*S effect was significant ($P \leq .01$) only at 20 weeks of age. Early (EB) and late (LB) feathering Baladi had statistically similar W at 1,12,16 and 20 weeks but LB had significantly ($P \leq .05$) lower W than EB at 6 weeks of age. On the other hand, W of early feathering Leghorn (EL) was significantly ($P \leq .05$) higher than those of Baladi at all ages studied (Table 2). Males (M) were also significantly ($P \leq .05$) higher in their W than females (F) at all ages (Table 2). Figure 1 shows that among females LBF had significantly ($P \leq .05$) the

Table 2. Effect of genotype (G) and sex (S) on body weight (W) of Baladi and Leghorn at 1,6,12,16 and 20 weeks of age

Age in weeks	1	6	12	16	20
			(g)		
Genotype (G)	**	**	**	**	**
EB[1]	39.67 ± 0.34^a	295.14 ± 2.58^a	725.0 ± 15.13^a	875.56 ± 7.52^a	1074.87 ± 12.9^a
LB[2]	40.23 ± 0.34^a	283.51 ± 2.56^b	725.79 ± 5.09^a	888.05 ± 7.46^a	1063.05 ± 11.4^a
EL[3]	48.76 ± 0.35^b	338.36 ± 2.59^c	822.23 ± 5.17^b	1005.94 ± 7.6^b	1132.27 ± 11.4^b
Sex (S)	*	**	**	**	**
F	42.48 ± 0.28^a	283.71 ± 2.11^a	685.05 ± 4.21^a	828.73 ± 6.17^a	963.93 ± 10.03^a
M	43.29 ± 0.28^b	327.63 ± 2.09^b	830.31 ± 4.17^b	1017.63 ± 6.11^b	1216.19 ± 9.29^b
G*S	N.S.	N.S.	N.S.	N.S.	**
Overall mean	42.85 ± 0.20	305.70 ± 1.49	757.88 ± 2.96	923.48 ± 4.34	1096.21 ± 6.75

[a,b] Means within the same column with different superscripts differ significantly ($P \leq .05$); * ($P \leq .05$). ** ($P \leq .01$); N.S. Nonsignificant; [1] Early feathering Baladi. [2] Late feathering Baladi. [3] Early feathering Leghorn.

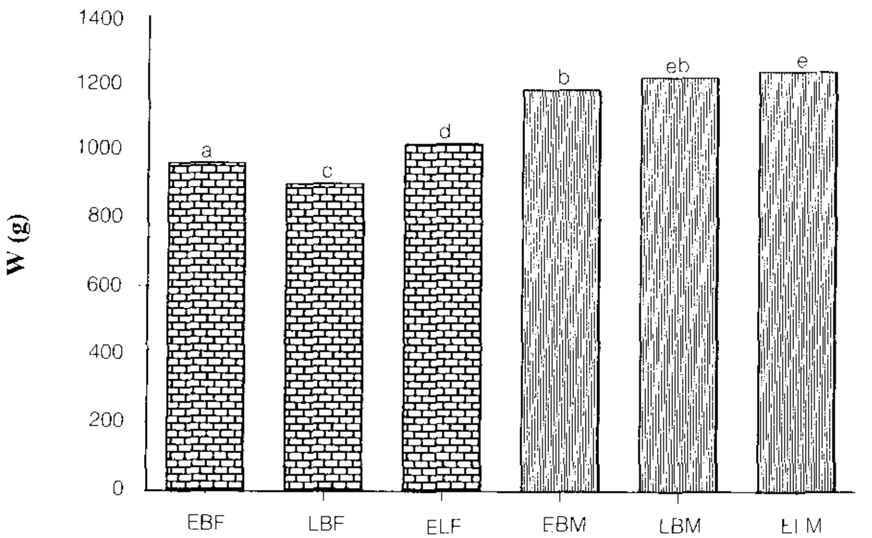

Fig. 1. Effect of G*S on body weight (W) at 20 weeks of age.

lowest and ELF the highest W at 20 weeks of age whereas among males EBM had significantly ($P \leq .05$) lower W than ELM but W of LBM was similar to that of both at 20 weeks of age.

Body weight gain (BG): Genotype (G) and sex (S) had significant ($P \leq .01$) effects upon BG at the different age periods, whereas their interaction had a significant ($P \leq .01$) effect only at 16-20 and 1-20 weeks of age. Late feathering Baladi (LB) had significantly ($P \leq .05$) lower BG at 1-6 and higher at 6-12 weeks of age than early feathering Baladi (EB) but were similar at the other age periods, whereas early feathering Leghorn (EL) had significantly ($P \leq .05$) the lowest BG at 16-20 weeks of age and the highest BG at all other age periods (Table 3). On the other hand, males

Table 3. Effect of genotype (G) and sex (S) on body weight gain (BG) of Baladi and Leghorn at 1-6, 6-12, 12-16, 16-20 and 1-20 weeks of age

Parameters	BG_{1-6}	BG_{6-12}	BG_{12-16}	BG_{16-20}	BG_{1-20}
Genotype (G)	**	**	**	**	**
EB[1]	255.48 ± 2.45^a	430.72 ± 4.89^a	150.86 ± 5.10^a	174.14 ± 8.91^a	1035.10 ± 12.80^a
LB[2]	243.28 ± 2.43^b	442.45 ± 5.14^b	161.90 ± 5.04^a	166.91 ± 7.62^a	1022.52 ± 10.95^a
EL[3]	289.60 ± 2.46^c	483.99 ± 3.88^c	183.82 ± 4.77^b	104.59 ± 7.88^b	1083.38 ± 11.33^b
Sex (S)	**	**	**	**	**
F	241.23 ± 2.01^a	401.46 ± 3.16^a	144.23 ± 3.88^a	126.38 ± 6.91^a	921.38 ± 9.92^a
M	284.34 ± 1.99^b	502.87 ± 3.13^b	185.80 ± 3.84^b	170.71 ± 6.41^b	1172.61 ± 9.20^b
G*S	N.S.	N.S.	N.S.	**	**
Overall mean	262.85 ± 1.42	452.43 ± 2.22	165.63 ± 2.73	147.57 ± 4.65	1052.96 ± 6.68

[a,b] Means within the same column with different superscripts differ significantly ($P \leq .05$); * ($P \leq .05$). ** ($P \leq .01$); N.S. Nonsignificant; [1,2,3] See Table 2.

(M) were significantly ($P \leq .05$) higher in their BG than females (F) at all age periods (Table 3). Among females, late feathering Baladi females (LBF) and early feathering Leghorn females (ELF) had significantly ($P \leq .05$) lower BG than early feathering Baladi females (EBF) at 16-20 weeks but ELF had significantly ($P \leq .05$) the highest and LBF the lowest BG at 1-20 weeks of age (Fig. 2). With regard to males, late feathering Baladi males (LBM) had significantly ($P \leq .05$) the highest and early feathering Leghorn males (ELM) the lowest BG at 16-20 weeks whereas late feather-

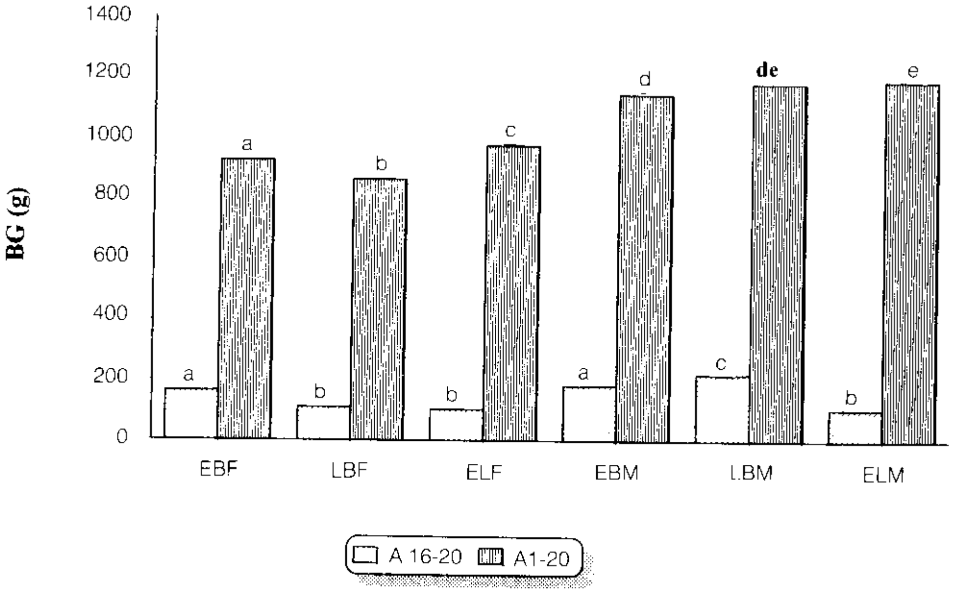

Fig. 2. Effect of G*S on body weight gain (BG) of Baladi and Leghorn at 16-20 and 1-20 weeks of age (A).

ing Baladi males (LBM) had statistically similar BG as early feathering Baladi males (EBM) and ELM but ELM had significantly ($P \leq .05$) higher BG than EBM at 1-20 weeks of age (Fig. 2).

Growth rate (GR): Genotype (G) had a significant ($P \leq .01$) effect on GR at all age periods except at 12-16. However, sex (S) had a significant effect ($P \leq .01$) on GR at 1-6, 6-12 and 1-20 weeks of age, whereas the effect of G*S was significant only at 16-20 ($P \leq .01$) and 1-20 ($P \leq .05$) weeks of age. Early feathering Baladi (EB) had significantly ($P \leq .05$) the highest GR at 1-6 and 1-20 weeks of age but had similar GR as late feathering Baladi (LB) and early feathering Leghorn (EL) at 16-20 and 6-12 weeks of age, respectively. On the other hand, EL had significantly ($P \leq .05$) the lowest GR at 1-20 and was similar to LB at 1-6 weeks of age (Table 4). Males (M) showed significantly ($P \leq .05$) higher GR than females (F) only at 1-6, 6-12 and 1-20 weeks of age (Table 4). Figure 3 indicates that among females early feathering Baladi females (EBF) had significantly ($P \leq .05$) the highest GR at 16-20 and 1-20 weeks of age whereas late feathering Baladi females (LBF) had higher ($P \leq .05$) value than early feathering Leghorn females (ELF) at 1-20 weeks but were similar at 16-20 weeks of age. With regard to males late feathering Baladi males (LBM) had significantly ($P \leq .05$) the highest and early feathering Leghorn males (ELM) the lowest GR at 16-20 weeks of age while early feathering Baladi males (EBM) and LBM had similar values but had significantly ($P \leq .05$) higher GR than ELM at 1-20 weeks of age.

Table 4. Effect of genotype (G) and sex (S) on growth rate (GR) of Baladi and Leghorn at 1-6,6-12,12-16, 16-20 and 1-20 weeks of age

Parameters	GR_{1-6}	GR_{6-12}	GR_{12-16}	GR_{16-20}	GR_{1-20}
Genotype (G)	**	**	**	**	**
EB[1]	151.87 ± 0.39^a	84.33 ± 0.51^a	18.29 ± 0.53	17.41 ± 0.81^a	185.40 ± 0.21^a
LB[2]	149.87 ± 0.39^b	87.57 ± 0.50^b	19.76 ± 0.52	16.38 ± 0.69^a	184.83 ± 0.18^b
EL[3]	149.09 ± 0.39^b	83.37 ± 0.51^a	19.86 ± 0.53	9.70 ± 0.72^b	183.18 ± 0.19^c
Sex (S)	**	**	N.S.	N.S.	**
F	147.53 ± 0.32^a	83.27 ± 0.42^a	18.84 ± 3.43	13.93 ± 0.63	182.95 ± 0.16^a
M	153.03 ± 0.03^b	86.89 ± 0.41^b	19.76 ± 0.43	15.06 ± 0.58	185.99 ± 0.15^b
G*S	N.S.	N.S.	N.S.	**	*
Overall mean	150.31 ± 0.22	85.13 ± 0.29	19.31 ± 0.30	14.29 ± 0.42	184.48 ± 0.11

[a,b] Means within the same column with different superscripts differ significantly ($P < .05$): * ($P \leq .05$), ** ($P \leq .01$); N.S. Nonsignificant; [1,2,3] See Table 2.

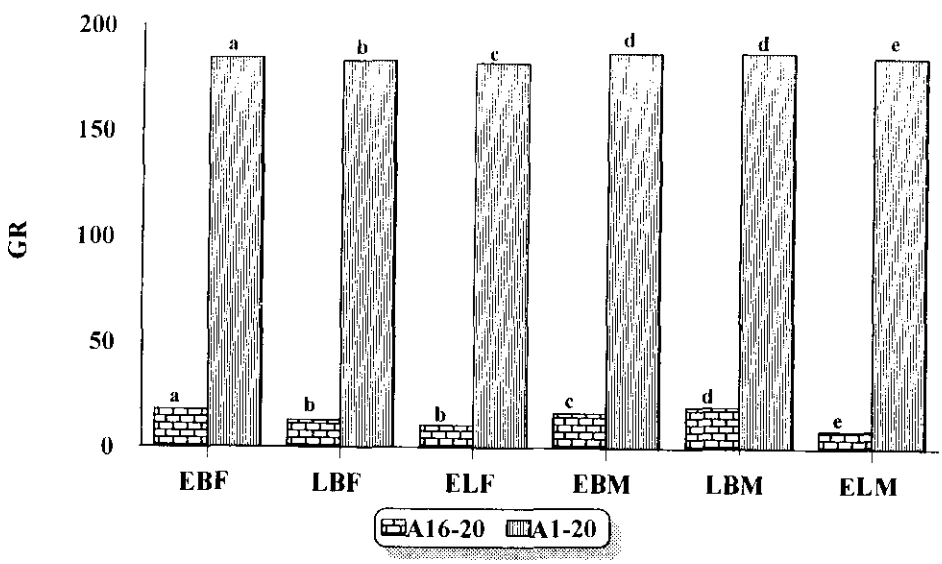

Fig. 3. Effect of G*S on growth rate (GR) of Baladi and Leghorn at 16-20 and 1-20 weeks of age (A).

Feed intake/bird/day (FI): Genotype (G) had a significant effect at the .01 and .05 level of probability on FI at 1-6 and 6-12 weeks of age respectively. However, sex (S) had a significant effect on FI at 6-12 ($P \leq .05$), 12-16 and 6-16 ($P \leq .01$) weeks of age, whereas that of G*S was not significant at any age period. Late feathering Baladi (LB) had significantly ($P \leq .05$) higher FI at 1-6 and 6-12 weeks of age than early feathering Baladi (EB) but had significantly ($P \leq .05$) lower FI at 1-6 and higher at 6-12 weeks of age than early feathering Leghorn (EL) (Table 5). On the other hand, males (M) were significantly ($P \leq .05$) higher in their FI than females (F) at all studied age period (Table 5).

Feed efficiency (FE): Genotype (G) had a significantly ($P \leq .01$) effect upon FE at 6-12 and 6-16 weeks of age and sex (S) effect was significant at 6-12, 12-16 weeks ($P \leq .05$) and at 6-16 weeks ($P \leq .01$) of age whereas their interaction was not significant. Late feathering Baladi (LB) had similar FE as the.. early feathering counterparts (EB) but was significantly ($P \leq .05$) lower than early feathering leghorn (EL) at 6-12 and 6-16 weeks of age. On the other hand, EB had significantly ($P \leq .05$) lower FE than EL at 6-16 weeks of age (Table 6). Males (M) had significantly ($P \leq .05$) higher feed efficiency than females (F) at all studied age periods (Table 6).

Table 5. Effect of genotype (G) and sex (S) on feed intake/bird/day (FI) of Baladi and Leghorn at 1-6, 6-12, 12-16 and 6-16 weeks of age

Parameters	FI_{1-6}	FI_{6-12}	FI_{12-16}	FI_{6-16}
Genotype (G)	**	*	N.S.	N.S.
EB[1]	16.97 ± 0.38^a	42.32 ± 0.65^a	48.72 ± 0.55	44.88 ± 0.57
LB[2]	18.22 ± 0.38^b	44.79 ± 0.65^b	48.82 ± 0.55	46.39 ± 0.57
EL[3]	19.86 ± 0.38^c	43.71 ± 0.65^c	50.33 ± 0.55	46.36 ± 0.57
Sex (S[4])	—	*	**	**
F	—	42.59 ± 0.53^a	47.65 ± 0.45^a	44.62 ± 0.46^a
M	—	44.61 ± 0.53^b	50.92 ± 0.45^b	47.14 ± 0.46^b
G*S	—	N.S.	N.S.	N.S.
Overall mean	18.35 ± 0.23	43.60 ± 0.38	49.29 ± 0.33	45.88 ± 0.33

[a,b] Means within the same column with different superscripts differ significantly ($P \leq .05$); * ($P \leq .05$). ** ($P \leq .01$); N.S. Nonsignificant; [1,2,3] See Table 2; [4]Sexes were seperated at 6 weeks of age.

Table 6. Effect of genotype (G) and sex (S) on feed efficiency (FE) of Baladi and Leghorn at 1-6, 6-12, 12-16 and 6-16 weeks of age

Parameters	FE_{1-6}	FE_{6-12}	FE_{12-16}	FE_{6-16}
Genotype (G)	N.S.	**	N.S.	**
EB[1]	0.43 ± 0.02	0.24 ± 0.01^{ab}	0.11 ± 0.02	0.18 ± 0.01^{a}
LB[2]	0.38 ± 0.01	0.22 ± 0.01^{a}	0.14 ± 0.02	0.19 ± 0.01^{a}
EL[3]	0.42 ± 0.01	0.26 ± 0.01^{b}	0.13 ± 0.02	0.21 ± 0.01^{b}
Sex (S[4])	—	*	*	**
F	—	0.23 ± 0.01^{a}	0.11 ± 0.01^{a}	0.17 ± 0.004^{a}
M	—	0.25 ± 0.01^{b}	0.15 ± 0.01^{b}	0.21 ± 0.004^{b}
G*S	—	N.S.	N.S.	N.S.
Overall mean	0.41 ± 0.01	0.24 ± 0.01	0.13 ± 0.01	0.19 ± 0.00

[a,b] Means within the same column with different superscripts differ significantly ($P \leq .05$); * ($P \leq .05$). ** ($P \leq .01$); N.S. Nonsignificant; [1,2,3] See Table 2; [4]Sexes were seperated at 6 weeks of age.

Liveability (LIV): Genotype (G), sex (S) and their interactions had no significant effect upon liveability at the different age periods. Early feathering Baladi (EB) tended to have the lowest liveability during the last two age periods, whereas early feathering Leghorn (EL) tended to have lower liveability at the first three age periods but higher liveability during the last two age periods compared with Baladi (Table 7). Males (M) also tended to have lower liveability than females (F) at 6-12 weeks and higher value at the other age periods (Table 7). However, the low liveability observed at 16-20 weeks of age was due to spread of New Castle disease at the farm when our experimental birds were 17 weeks of age.

Discussion

Early and late feathering Baladi had similar weight at 1,12,16 and 20 weeks of age but at 6 weeks of age early feathering had higher ($P \leq .05$) weight than their late featheirng counterparts. These results disagree with those of [8,18,20,21] who observed higher body weight in favor of late feathering birds. However, many investigators reported higher [1-6,8] or similar [4,10-17] body weight for early compared with late feathering birds. These discrepancies might be due to breed, age period,

Table 7. Effect of genotype (G) and sex (S) on liveability percent (LIV) of Baladi and Leghorn at 1-6, 6-12, 12-16, 16-20 and 6-20 weeks of age

Parameters	LIV_{1-6}	LIV_{6-12}	LIV_{12-16}	LIV_{16-20}	LIV_{6-20}
			%		
Genotype (G)	N.S.	N.S.	N.S.	N.S.	N.S.
EB[1]	96.68 ± 0.83	99.64 ± 0.38	98.93 ± 0.62	59.79 ± 6.06	58.82 ± 5.9
LB[2]	98.99 ± 0.83	99.64 ± 0.38	98.92 ± 0.62	74.99 ± 6.06	73.93 ± 5.9
EL[3]	89.38 ± 0.83	99.28 ± 0.38	98.86 ± 0.62	77.91 ± 6.06	76.41 ± 5.9
Sex (S[4])	—	N.S.	N.S.	N.S.	N.S.
F	—	99.76 ± 0.31	98.76 ± 0.51	68.46 + 4.95	67.35 + 4.82
M	—	99.28 ± 0.31	99.05 ± 0.51	73.33 ± 4.95	72.09 ± 4.82
G*S	—	N.S.	N.S.	N.S.	N.S.
Overall mean	98.02 ± 0.50	99.52 ± 0.22	98.90 ± 0.37	70.89 ± 3.57	69.72 + 3.48

N.S. Non significant.

management and/or some other factors. At 20 weeks of age, late feathering females showed lower ($P \leqslant .05$) weight compared to their early feathering counterparts but males genotypes did not differ at this age. Similarly was reported by Plumart and Mueller [7]. Opposite to out result, Dunnington and Siegel [6] reported higher body weight for early feathering females compared with their late feathering peers from 20-31 days of age. However, Baladi weights at 6 and 20 weeks of age were higher than those reported by Attia *et al.* [30] at the same age periods [302 and 1049 g). Leghorn had higher ($P \leqslant .05$) weight than Baladi at all studied age periods. Similar results were reported by Shawer [31] upto 12 weeks and by Alsobayel [32] upto 16 weeks of age. The effect of feathering genotype on body weight gain, growth rate and feed intake had not been previously investigated.

Our study shows that significant differences between early and late feathering Baladi mainly at early age periods. Early feathering females had higher ($P \leqslant .05$) weight gain and growth rate at 16-20 and 1-20 weeks of age whereas early feathering males and lower ($P \leqslant .05$) weight gain and growth rate at 16-20 weeks of age than their late feathering peers. This result may lead us to conclude that there is sex dimorphism with regard to the effect of feathering genes on body weight gain and growth ratre. Leghorn had higher ($P \leqslant .05$) weight gain and lower ($P \leqslant .05$) growth rate than Baladi at most of the studied age periods. Similarly was observed by Shawer [31] upto 12 weeks of age. However, Alsobayel [32] reported higher growth rate for Baladi upto 8 weeks of age thereafter, Leghorn had higher values upto 16 weeks of age. Early feathering Baladi consumed less feed ($P \leq .05$) at 1-6 and 6-12 weeks of age and tended to have higher feed efficiency than late feathering Baladi. Similar results were observed in feed efficiency for early and late feathering broilers [8,18].

Leghor had significantly ($P \leq .05$) higher feed intake at 1-6 and better feed efficiency at 6-16 weeks of age than early and late feathering Baladi, but late feathering Baladi had higher feed intake and lower ($P \leq .05$) feed efficiency than Leghorn at 6-12 weeks of age. Early and late feathering Baladi had similar liveability at all studied age periods. Similar results were reported by seveal investigators [17,18,22,23]. However, our results disagree with those of some investigators [24-26] who reported higher liveability for early feathering birds and with that of Goodfry and Fransworth [11] who observed lower liveability for the same genotype. Attia *et al.* [30] reported 97% liveability for Baladi upto 20 weeks of age which is similar to our figure upto 16 weeks of age. Leghorn had statistically similar liveability as Baladi. This result disagrees with that of Shawer [31] who reported lower liveability for Baladi upto 12 weeks of age but similar to that stated by Alsobayel [32] who did not find any significant differences between the two breeds upto 16 weeks of age.

References

[1] Warren, D.C. and Payne, L.F. "Influence of the Early-feathering Gene upon a Chick's Growth Weight." *Poultry Sci.*, 24 (1945), 191-192.

[2] McDonald, M.W. "Methionine, Supplements in Chickens Diets. III. The Biochemical Difference in Sulphuramino Acid Metabolism between White Leghorns and Australops." *Aust. J. Agric. Res.*, 9 (1958), 161-169.

[3] Mérat, P. "Contribution à l'étude de la valeur sélective associé à quelques génes chez la poule domestique: II - Effects maternels." *Ann. Biol. Anim. Bioch. Biophys.*, 7 (1967), 183-203.

[4] Saiki, Y. and Katsuragi, T. "Effect of Early and Late Feathering Gene on Growth in New Hampshires, Leghorns and their Crossbreds." *Poultry Sci.*, 50 (1961), 1612-1616.

[5] Goodman, B.L. and Muir, F.V. "The Influence of Comb and Feathering Phenotypes on Body Weight and Dressing Percentage in Broilers." *Poultry Sci.*, 44 (1965), 644-648.

[6] Dunnington, E.A. and Siegel, P.B. "Feather Weight of Early (k^+) and Late (K) Feathering Young Adult Broilers." *poultry Sci.*, 65 (1986a), 1863-1865.

[7] Alekseevich, L.A. and Shevchenko, L.P. "Regulation of Expression of the Gene for late Feathering in Early Posthatching Development." 5S'ezd vscs. O-Va genetikovi seleckts, on erov im. N.I. Vavilova, Moskva, 24-28 nogabr, Tez, dok I.T.3. Moscow (Abstr.), (1987), 9-10.

[8] O'Sullivan, N.P., Dunnington, E.A., and Siegel, P.B. "Growth and Carcass Characteristics of Early and Late Feathering Broilers Reared under Different Regimens." *Poultry Sci.*, 70 (1991), 1323-1332.

[9] Plumart, P.E. and Muller, C.D. "Effect of Sex-linked Early Feathering on Plumage from 6 to 12 Weeks of Age." *Poultry Sci.*, 33 (1954), 715-721.

[10] Hays, F.A. "Rate of Chick Feathering and Growing Chick Weight in Rhode Island Reds." *Poultry Sci.*, 30 (1951), 866-869.

[11] Goodfry, G.F. and Fransworth, G.M. "Relationship of the Sex-linked Rapid Feathering Gene to Chick Growth and Mortality." *Poultry Sci.*, 31 (1952), 65-68.

[12] Hale, R.W. "Rapid and Early Feathering of Chickens." *Res. Exp. Record* of the Ministry of Agriculture, Northern Ireland, (1952), 36-38.

[13] Hurry, H.F. and Nordskog, A.W. "A Genetic Analysis of Chick Feathering and its Influence on Growth Rate." *Poultry Sci.*, 32 (1953), 18-25.

[14] Wassels, J.P.H. "Relationship between Known Genetic Factors and Certain Economically Important Characters of Fowl." *S. Afr. J. Agric. Sci.*, 6 (1963), 233-237.

[15] Sheridan, A.K. and McDonald, M.W. "The Relationship between Feathering and Body Weight in Broiler Chickens." *Poultry Sci.*, 42 (1963), 1468-1471.

[16] Dunnington, E.A. and Siegel, P.B. "Sex-linked Feathering alleles (K,k^+) in Chicks of Diverse Genetic Background. I. Body Temperatures and Body Weights." *Poultry Sci.*, 65 (1986b), 209-214.

[17] Ning, G.T. and Chen, S.Q. "The Influence of Genotype on the Performance of Layers." *Chinese Journal of Animal Science*, 5 ref (abstr.), No. 3, (1988), 3-5.

[18] Lowe, P.C. and Merkley, J.W. "The Association of Rate-of-feathering Genotyupes in Broilers with Production and Carcass Composition Traits. 1. Effects of Genotyupes, Sex and Diet on Growth and Feed Conversion." *Poultry Sci.*, 65 (1986), 1853-1858.

[19] Merkley, J.W. and Lowe, P.C. "Association of Rate-of-feathering Genotypes in Broilers with Production and Carcass Composition Traits. 2. Effect of Genotypes and Diet on Processing Traits and Lipid Deposition." *Poultry Sci.*, 67 (1988), 914-919.

[20] Katanpaf, M.N., Dunnington, E.A., and Siegel, P.B. "Restricted Feed in Early and Late Feathering Chickens. 1. Growth and Physiological Responses." *Poultry Sci.*, 68 (1989a), 344-351.

[21] Verma, S.K. and Prasad, R.B. "Study on Some of the Characters of Slow Feathering and Rapid Feathering Birds." *Indian Vet. J.*, 59 (1981), 562-566.

[22] Dunnington, E.A., Siegel, P.B., and Gross, W.B. "Sex-linked Feathering Alleles (K,k^+) in Chicken of Diverse Genetic Backgrounds. 2. Resistance to Escherchia Coli." *Avian Pathol.*, 15 (1986), 139-148.

[23] Somes, R.G., Jr. and Jakowski, R.M. "A Survey of Possible Association between Morphologic Traits and Resistance to Marck's Disease." *Poultry Sci.*, 53 (1974), 1675-1680.

[24] Katanpaf, M.N., Dunnington, E.A., and Siegel, P.B. "Restricted Feeding in Early and Late Feathering Chickens. 2. Reproductive Responses." *Poultry Sci.*, 68 (1989b), 352-358.

[25] Lowe, P.C. and Garwood, V.A. "Independent Effects of K and k^+ alleles and Maternal Origin on Mortality and Performance of Crossbed Chickens." *Poultry Sci.*, 60 (1981), 1123-1126.

[26] Harris, D.L., Garwood, V.A., Lowe, P.C., Hester, P.Y., Crittenden, L.B., and Fadly, A.M. "Influence of Sex-linked Feathering Phenotypes of Parents and Progeny upon Lymphoid Leukosis Virus Infection Status and Egg Production." *Poultry Sci.*, 63 (1984), 401-413.

[27] National Research Council. *Nutrient Requirements of Domestic Animals. Nutrient Requirements of Poultry.* Washington, D.C.: Nat. Acad Sci. (1984).

[28] Brody, S. *Bioenergetics and Growth.* New York: Reinhold Pub. Corp, (1945).

[29] SAS User's Guide. *Statistical Analysis System.* Carry, NC: SAS Institute Inc., 1981.

[30] Attia, F.M., Alsobayel, A.A., and Al-Ogaily, Z.H. "The Effect of Different Protein Rearing Regimens on Growth and Egg Production of Saudi Arabian Baladi Chickens." *Emir. J. Agric. Sci.*, 3 (1991), 120-141.

[31] Shawer, M.F. "Breed Effect on Grow-out and Viability Performance in Saudi Arabian Baladi, SCW Leghorn and a Commercial Type Albo. Egypt." *Poultry Sci.*, 5 (1984), 12-25.

[32] Alsobayel, A.A. "Studies on Saudi Arabian Baladi and SCW Leghorn: Effect of Breed, Hatching Season and Sex on Body Weight Growth Rate and Viability." *Egypt Poult. Sci.*, 5 (1985), 12-25.

تأثير جينات الترييش المرتبطة بالجنس على كفاءة النمو في الدجاج البلدي

عبدالله علي السبيل و عبدالعزيز عبدالله العبداللطيف

قسم الإنتاج الحيواني، كلية الزراعة، جامعة الملك سعود،
الرياض، المملكة العربية السعودية

(قدم للنشر في ١١/٦/١٤١٥هـ، وقبل للنشر في ٢٢/٦/١٤١٦هـ)

ملخص البحث. استخدم في هذه الدراسة عدد ٨٠٠ صوص من الدجاج البلدي مبكر ومتأخر الترييش وذلك لتقويم تأثير معدل الترييش على كفاءة النمو وبالإضافة إلى ذلك استخدم عدد ٤٠٠ صوص لجهورن بغرض المقارنة، رقمت الصيصان بأرقام الجناح، وزنت فرديًا ووزعت عشوائيًا على أربع بطاريات، أربع مكررات لكل بطارية، حتى عمر ثلاثة أسابيع، وبعد ذلك تم نقلها إلى أعشاش أرضية في حظيرة مغلقة يتم التحكم في بيئتها الداخلية، عند عمر ٦ أسابيع تم تجنيس الطيور حسب المظهر وتم تربية أربع مكررات، ٤٠ طائر في كل مكرر، من كل جنس ومجموعة وراثية، وقد عوملت جميع الطيور حسب نظم الرعاية التقليدية.

دلت النتائج على أن الدجاج البلدي مبكر الترييش تميز في وزنه معنويًا (P≤.05) عن نظيره المتأخر فقط عند عمر ٦ أسابيع لكن اللجهورن كان أفضل من البلدي عند جميع الأعمار المدروسة، كذلك كان الدجاج البلدي المبكر أعلى (P≤.05) من المتأخر في زيادة الوزن عند عمر ١ ـ ٦ أسابيع وفي سرعة النمو عند ١ ـ ٦، ١ ـ ٢٠ أسبوعًا من العمر وأقل منه استهلاكًا للعلف خلال الفترات العمرية الأولى، أما فيما يخص اللجهورن فقد كان الأعلى (P≤.05) في استهلاك العلف عند ١ ـ ٦ أسابيع والأفضل في الكفاءة الغذائية عند ٦ ـ ١٦ أسبوعًا من العمر بالمقارنة مع الدجاج البلدي، الذكور على وجه العموم، كانت أفضل من الإناث بالنسبة لجميع الصفات المدروسة.