PREDICTING THE CARCASS UNIFORMITY IN KURDISH LOCAL CHICKEN BY USING COEFFICIENT OF VARIATION

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Abstract - The present study completed at Gardarash station, college of agriculture, Salahaddin University in collaboration with Hawler and Sulaimani research centres that associated with ministry of agriculture in Kurdistan Region during June and July 2014. A total of 41 roosters aged 7 months were belong to Black, Black with Brown Neck, and White. Roosters were fasted overnight and after that their live weight was recorded. The roosters were slaughtered by using the knife and were bleeding for 3 minutes. Statistical analysis presented by means, standard deviation minimum and maximum and coefficients of variation of carcass weight and carcass traits were calculated by using GLM procedure of SPSS. Pairwise correlations among live weight and carcass parts were also determined.

The mean, standard deviation and minimum and maximum values for live weight and carcass parts were summarizes, and the results showed a significant differences between the genetic lines of roosters in their live weight, carcass weight, thigh weight, leg weight, back weight, neck weight, chest weight, wing weight, liver weight, and heart weight. No statistically significant difference was observed in gizzard weight. The coefficients of variation ranged from (6.42% - 31.58%) for the studied traits, which indicate the variability in the three lines of Kurdish local roosters. The highest positive and highly significant correlations were observed between live weight and carcass weight in black with brown neck, black, and white lines, and being 0.871, 0.990, and 0.997.

It can be concluded that, significant differences were found in live weight and carcass parts of the three Kurdish local rooster lines. Black with brown neck was more uniform in live weight and carcass parts. Therefore, breeding programs considered to be necessary to increase the uniformity in live weight and carcass parts.

Keywords - Uniformity, Local Chicken, CV, Carcass Characterization, And Correlations

I. INTRODUCTION

To achieving maximum performance for chicken flock, uniformity is an important challenge for its products (Hennessy, 2005). However, uniformity does not only apply to the appearance characteristics of the chicken but also to the weight (Abbas, et al., 2010), slaughter traits (Hennessy, 2005), and egg traits (Zhang et al., 2005). Because these traits influenced by factors that happened on the chicken farms (Judice et al., 1999) and genetics (Mehaffey et al., 2006; Kosba et al., 2010), Many investigators studied the factors affecting the uniformity of carcass, and meat quality (Feddes, et al., 2002).

Uniformity analysis can be obtained by using the coefficient of variation (CV), which is the ration between standard deviation and mean. CV claimed to the size of variation relative to the sample size of the observation, and is independent of the units of observation.

As it's known that local chickens are characterized in many countries as resistance to some diseases and meat flavour (Resurreccion, 2002). For several years, attempt has been done to characterize the Kurdish local chicken, Researchers were studied body weight (Hermiz, et al., 2014), Growth performance (Hermiz & Ibrahim, 2016), Carcass traits (Hermiz, et al., 2016), Semen characterization (Hermiz et al., 2016),

and egg traits (Hermiz, et al., 2012; Abas, et al., 2014; Shaker, et al., 2016; Shaker & Aziz, 2017 and Aziz, et al., 2017) to evaluate these lines.

Genetics is a good starting point for achieving uniformity; therefore the objective of the current study was to provide general information on uniformity of live weight, carcass weight, and carcass of Kurdish local chicken.

II. MATERIALS AND METHODS

The present study completed at Gardarash station, college of agriculture, Salahaddin University in collaboration with Hawler and Sulaimani research centres that associated with ministry of agriculture in Kurdistan Government Region during June and July 2014. A total of 41 roosters aged 7 months were belong to Black (B), Black with Brown Neck (BBN), and White (W).

Roosters were fasted overnight and after that their live weight was recorded. The roosters were slaughtered by using the knife and were bleeding for 3 minutes. All the calculations of carcass traits included in this study could be found in earlier paper published by Hermiz et al. (2016).

Statistical analysis presented by means, standard deviation minimum and maximum and coefficients of variation of carcass weight and carcass traits for the

three genetic lines were calculated by using GLM procedure of SPSS version 19 (SPSS, 2011). Differences between lines mean were accomplished using Duncan (1955). Pairwise correlations among live weight and carcass parts were also determined.

III. RESULTS AND DISCUSSION

The mean, standard deviation and minimum and maximum values for live weight and weights of carcass parts including (thigh, leg, back, neck, chest, wing, liver, heart, and gizzard) are shown in table 1. In black with brown neck, the average values of live weight, carcass weight, thigh, leg, back, neck, chest, wing, liver, heart, and gizzard weights were 2681.56, 2140.31, 187.19, 167.19, 503.44, 115.63, 423.44, 116.88, 38.44, 14.69, and 38.44 gram respectively. While the values for the black were 2426.54, 1923.31, 163.85, 141.15, 456.15, 78.46, 423.08, 106.54, 31.54, 11.54, and 34.23 gram respectively. For the white line the values were 2150.83, 1707.08, 152.08, 122.92, 392.08, 90.83, 340.83, 93.75, 32.50, 11.25, and 35.83 gram respectively. There were significant differences between the genetic lines of roosters in their live weight, carcass weight, thigh weight, leg weight, back weight, neck weight, chest weight, wing weight, liver weight, and heart weight. No statistically significant difference was observed in gizzard weight.

The coefficients of variation CV of live weight, and carcass main parts weight for the three genetic lines of Kurdish local roosters are given in table 2. The coefficients of variation ranged from (6.42% - 31.58%) for the studied traits, which indicate the variability in the three lines of Kurdish local roosters.

The Pearson correlation coefficient of live weight and weights of carcass parts are shown in table 3. In black with brown neck highly positive correlation were observed between live weight and each of carcass weight, thigh weight, leg weight, back weight, and wing weight (r = 0.871, 0.700, 0.744, 0.716, and 0.780 respectively; p<0.001). Low positive correlation was observed between live weight and chest weight (r = 0.498; p<0.05). No statistically significant were found between live weight and each of neck weight, liver weight, heart weight, and gizzard weight. In black line highly significant positive correlation were obtained between live weight and carcass weight, thigh weight, and leg weight, back weight, wing weight (r = 0.990, 0.902, 0.928, 0.724, 0.750 respectively; p<0.01). No statistically significant were found between live weight and neck weight, chest weight, liver weight, heart weight, and gizzard weight (r = 0.285, 0.289, 0.332, 0.530, 0.491 respectively). Similarly in white line, highly significant positive correlation were observed between live weight and carcass weight, thigh weight, leg weight, back weight, neck weight, chest weight, and wing weight (r = 0.997, 0.979, 0.978, 0.959, 0.724, 0.939, 0.934 respectively). And

no statistically significant was observes between live weight and liver weight, heart weight, and gizzard weight (r = 0.492, 0.351, 0.375 respectively).

CONCLUSION

In summary, it can be concluded that, significant differences were found in live weight and carcass parts of the three Kurdish local roosters lines. Black with brown neck was more uniform in live weight and carcass parts then the two other lines (black and white). Therefore, breeding programs considered to be necessary to increase the uniformity in live weight and carcass parts.

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Table 1: Carcass characteristics of three lines of Kurdish local roosters.

Traits	Black with brown neck; N= 16			Black; N= 13			White; N= 12			Sig.
	Mean ± S.D. (g)	Min (g)	Max (g)	Mean ± S.D. (g)	Min (g)	Max (g)	Mean ± S.D. (g)	Min (g)	Max (g)	
LWT	2681.56 [a]±221.9	2315.00	2955.00	2426.54 [b]±243.4	1995.00	2745.00	2150.83 [c]±385.1	1615.00	2920.00	0.000
CWT	2140.31 [a] ±166.2	1850.00	2355.00	1923.31 [b] ±190.8	1570.00	2165.00	1707.08 [c]± 300.1	1270.00	2305.00	0.000
THW	187.19 [a]± 21.68	140.00	220.00	163.85 [b]±23.47	125.00	190.00	152.08 [b]±32.58	105.00	215.00	0.003
LEW	167.19 [a]± 16.02	135.00	200.00	141.15 [b]±17.58	110.00	160.00	122.92 [c]±27.75	90.00	180.00	0.000
BAW	503.44 [a]± 50.19	415.00	585.00	456.15 [b]±55.42	395.00	570.00	392.08 [c]±60.32	295.00	515.00	0.000
NEW	115.63 ± 23.94	80.00	160.00	78.46 [b]± 24.78	45.00	120.00	90.83 [b]± 23.82	60.00	135.00	0.001
CHW	423.44 [a]± 45.49	370.00	525.00	423.08 [a]±107.79	290.00	730.00	340.83 [b]±69.77	235.00	465.00	0.013
LIVW	38.44 [a]± 5.39	30.00	50.00	31.54 [b]± 5.16	25.00	45.00	32.50 [b]± 5.44	25.00	40.00	0.002
HEW	14.69 [a]± 2.21	10.00	20.00	11.54 [b]± 2.4	10.00	15.00	11.25 [b]± 2.26	10.00	15.00	0.000
GIW	38.44 [a]± 6.51	30.00	50.00	34.23 [a]± 6.72	25.00	45.00	35.83 [a]± 7.02	25.00	45.00	0.247
WIW	116.88 [a]± 7.5	105.00	125.00	106.54 [b]±11.25	90.00	120.00	93.75 [c]± 18.6	65.00	120.00	0.000

Means not having a common letter within each row differ significantly (P<0.05).
Live weight= LWT, Carcass weight= CWT, Thigh weight= THW, Leg wight= LEW, Back weight= BAW, Neck weight= NEW, Chest weight= CHW, Liver weight= LIVW, Heart weight= HEW, Gizzard weight= GIW, Wing weight= WIW.

Table 2: Coefficients of variation of live weight and carcass traits for the three genetic lines of Kurdish local roosters

Traits	Black with brown neck (%)	Black (%)	White (%)
LWT	8.28	10.03	17.90
CWT	7.77	9.92	17.58
THW	11.58	14.32	21.42
LEW	9.58	12.45	22.58
BAW	9.97	12.15	15.38
NEW	20.7	31.58	26.22
CHW	10.74	25.48	20.47
LIVW	14.03	16.35	16.72
HEW	15.06	20.82	20.10
GIW	16.94	19.64	19.58
WIW	6.42	10.56	19.84

Live weight= LWT, Carcass weight= CWT, Thigh weight= THW, Leg wight= LEW, Back weight= BAW, Neck weight= NEW, Chest weight= CHW, Liver weight= LIVW, Heart weight= HEW, Gizzard weight= GIW, Wing weight= WIW.

Table 3: Pearson correlation coefficients of live weight with carcass parts for each line:

Traits	LivWt	CWt	ThiWt	LeWt	BacWt	NecWt	CheWt	LiverWt	HerWt	GizWt
Black with brown neck line:										
LWT	1									
CWT	0.871***	1								
THW	0.700**	0.772***	1							
LEW	0.744**	0.725**	0.537*	1						
BAW	0.716**	0.840***	0.558*	0.477[N.S]	1					
NEW	0.358[N.S]	0.464[N.S]	0.309[N.S]	0.157[N.S]	0.289[N.S]	1				
CHW	0.498*	0.729**	0.441[N.S]	0.524*	0.438[N.S]	0.433[N.S]	1			
LIVW	0.183[N.S]	0.369[N.S]	0.445[N.S]	-0.035[N.S]	0.385[N.S]	0.047[N.S]	0.010[N.S]	1		
HEW	0.453[N.S]	0.594*	0.710**	0.538*	0.521*	0.130[N.S]	0.309[N.S]	0.236[N.S]	1	
GIW	0.373[N.S]	0.472[N.S]	0.120[N.S]	0.035[N.S]	0.701**	0.156[N.S]	0.340[N.S]	0.211[N.S]	0.311[N.S]	1
WIW	0.780***	0.911***	0.773***	0.602*	0.761**	0.290[N.S]	0.678**	0.448[N.S]	0.540*	0.508*

Black line:

	LWT	CWT	THW	LEW	BAW	NEW	CHW	LIVW	HEW	GIW	WIW
LWT	1										
CWT	0.990***	1									
THW	0.902***	0.920***	1								
LEW	0.928***	0.938***	0.943***	1							
BAW	0.724**	0.685*	0.432 N.S	0.567*	1						
NEW	0.285 N.S	0.337 N.S	0.566*	0.468 N.S	-0.033 N.S	1					
CHW	0.289 N.S	0.333 N.S	0.235 N.S	0.087 N.S	0.052 N.S	-0.120 N.S	1				
LIVW	0.332 N.S	0.404 N.S	0.532 N.S	0.415 N.S	-0.050 N.S	0.493 N.S	0.276 N.S	1			
HEW	0.530 N.S	0.529 N.S	0.515 N.S	0.596*	0.267 N.S	-0.027 N.S	0.165 N.S	0.129 N.S	1		
GIW	0.491 N.S	0.471 N.S	0.681*	0.555*	0.019 N.S	0.630*	-0.017 N.S	0.397 N.S	-0.050 N.S	1	
WIW	0.750**	0.773**	0.733**	0.685*	0.351 N.S	0.136 N.S	0.588*	0.387 N.S	0.445 N.S	0.375 N.S	

White line:

	LWT	CWT	THW	LEW	BAW	NEW	CHW	LIVW	HEW	GIW	WIW
LWT	1										
CWT	0.997***	1									
THW	0.979***	0.970***	1								
LEW	0.978***	0.974***	0.943***	1							
BAW	0.959***	0.960***	0.960***	0.902***	1						
NEW	0.724**	0.752**	0.595*	0.708*	0.677*	1					
CHW	0.939***	0.949***	0.902***	0.949***	0.858***	0.735**	1				
LIVW	0.492 N.S	0.509 N.S	0.507 N.S	0.384 N.S	0.662*	0.386 N.S	0.324 N.S	1			
HEW	0.385 N.S	0.351 N.S	0.486 N.S	0.335 N.S	0.512 N.S	-0.063 N.S	0.137 N.S	0.647*	1		
GIW	0.319 N.S	0.375 N.S	0.191 N.S	0.348 N.S	0.312 N.S	0.634*	0.393 N.S	0.238 N.S	-0.215 N.S	1	
WIW	0.934***	0.939***	0.912***	0.945***	0.882***	0.623*	0.938***	0.438 N.S	0.257 N.S	0.322 N.S	

Live weight= LWT, Carcass weight= CWT, Thigh weight= THW, Leg wight= LEW, Back weight= BAW, Neck weight= NEW, Chest weight= CHW, Liver weight= LIVW, Heart weight= HEW, Gizzard weight= GIW, Wing weight= WIW.
*** Correlation is significant at level 0.001; ** correlation is significant at level 0.01; * correlation is significant at level 0.05; NS correlation is not significant.

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